

98th Indian Science Congress

January 3-7, 2011, Chennai

I

PRESIDENTIAL ADDRESS

President : Prof. Amar K. Chandra

PRESIDENTIAL ADDRESS

**Thyroid Functions in Iodine Deficiency and Region
Specific Environmental Goitrogens - their impact
in life and society**

Prof. Amar K Chandra*

Distinguish Scientists and Honorable Delegates from the Country and Abroad

It is a great privilege and pride of mine to welcome you all in the inaugural session of the Medical Sciences (including Physiology) Section in the 98th Session of Indian Science Congress in about 350 years old city of Chennai, formerly called as Madras, the gateway to South India, and it is rich in the treasures of history from temples and shrines to forts and palaces. It is one of the largest metro cities of the country and is the major trade centre of India. The venue is at SRM University which is about 25 years old that has set outstanding standards in higher education, especially in the field of Science, Technology, Medicine and Management and thus greatly involved in shaping the higher education as dreamt by our great leaders.

The topic of today's presidential address focuses on a micronutrient iodine, one of the important environmental regulator of thyroid gland functions that regulate not only growth, development and maintenance of body functions at the different stages of life of humans and animals but intimately related with the socioeconomic development of a country. Iodine deficiency is the world's greatest single cause of preventable brain damage and mental retardation manifesting itself as goiter and a range of physical and mental handicap, collectively included the term Iodine Deficiency Disorders (IDD). Environmental iodine deficiency of the earth is forever a reality, and iodine deficiency in the population is forever a risk. Thus there is a need to establish more comprehensive multi-country surveillance of iodine nutrition. IDD are considered as a public health problem and iodine supplementation though the primary regulator but it is not the only way of its prevention and control in India as experienced by the work. In the topic 'Thyroid Functions in Iodine Deficiency and

*Department of Physiology, University of Calcutta, 92, A.P.C. Road, Kolkata 700 009, India,
Email: amark_chandra@yahoo.co.in

Region Specific Environmental Goitrogens - their impact in life and society' almost all the aspects of this public health problem will be highlighted.

Introduction

In 1811, France was at war, and Bernard Courtois was producing saltpeter for gunpowder for Napoleon's army. He was burning seaweed to isolate sodium bicarbonate and he added sulfuric acid to the ash which produced an intense violet vapor that crystallized on cold surface. He sent the crystal to Gay-Lussac, who identified it as a new element, and name it to iodine, from the Greek for "Violet".

The ancient Greeks used the marine sponge to treat swollen gland because the sponge and dried seaweed remained a 'goiter cure' since Middle Ages. In 1813, learning of the discovery of iodine in seaweed, Coinder, a physician in Geneva, hypothesized the traditional treatment of goiter with seaweed or sponge was effective because of its iodine content. He began giving oral iodine tincture to goitrous patients at an initial daily dose of 165mg. This provoked strong opposition among the medical profession. Although Coinder insisted his treatment was safe, however the debate on the safety of iodine continued till the early 20th century.

The French chemist Boussingault was the first who advocated iodine-rich salt as a prophylaxis in the prevention of goiter. It will be nearly 100 years before their vision was realized. Another French chemist Chatin in 1851 for the first time published the hypothesis that iodine deficiency is the cause of goiter. However Chatin's work was greeted with great skepticism by the French Academy of Science. Despite this, French authorities began distributing iodine tablets and salt together with prophylactic measures where goiter was severe. The program was clearly effective: in a survey of 5000 goitrous children, 80% were cured or improved by the iodine treatment. The doses of iodine administered both in table salt and tablets were too high. The high dose of iodine was consistent with the enormous doses of iodine used to treat many diseases as scrofula, syphilis, arthritis. Many people tolerated the high doses of iodine well but it caused iodine-induced hyperthyroidism in some individuals, and as a result, the program was discredited and discontinued.

Cretinism occurred only in endemic goiter affected areas was recognized by Medical authorities but they were puzzled by the fact that many cretins had an atrophic or absent thyroid gland i.e. the opposite of goiter. A clue of this problem appeared when a related disease, myxedema, that resembled cretinism, was described in 1977 by Ord in London. In

1983, Seman suggested myxedema was for the lack of activity of the thyroid after reading a report of the of Swiss surgeon Theodor Kocher (1841-1917) Nobel Laureet in 1909, who described myxedemic symptoms in patients after total thyroidectomy. British physicians began successfully treating myxedema with injection, and/or oral doses of animal thyroid extracts.

In 1886, Baumann and Ross found link between goiter, myxedema and iodine while working in Freiburg, Germany. While they were digesting animal thyroid glands, were surprised to isolate residual fraction that was iodine. They termed this substance 'thyroidine' not only therapeutically active in the treatment of myxedema and goiter, but a constituent of organic molecule. Since then many prophylaxis studies inducted to evaluate the impact of iodized salt of which a few are cited below

Impact of iodized salt in Switzerland

The Swiss physician, Bayard in 1918 did the first dose-response trial of iodine to treat goiter. He did this in Grachen, an isolated village at the base of Matterhorn in the Zermatt valley. He gave iodized salt for 6 months to families in the village with their different iodine contents (3, 6 and 15 mg/kg). Bayard showed that as little as 30 μ g of iodine daily had beneficial effect on goiter and noted soft diffuse goiters in children were more responsive than nodular forms. Accordingly in 1922, the Swiss Goiter Committee cautiously advised the introduction of salt at 1.9 to 3.75 mg/kg nationwide as a voluntary basis, a compromise between proponents and opponents of iodized salt. The first canton in which iodized salt was introduced was Appenzell AR in 1922, where the salt was iodized at 7.5 mg/kg with spectacular results: newborn goiter disappeared, no new cretins were born and goiters in children were reduced in size or disappeared.

Iodine prophylaxis in Akron, Ohio, USA

Almost at the same time, during 1915-1919, Marine and Kimball introduced iodine prophylaxis in the Midwest region of U.S. Baumann's observation that large goiters contained less total iodine than in healthy glands was further confirmed by Marine. Marine suggested that goiter was "a compensatory reaction to some deficiency" and it appeared "iodine is the most important single factor". Marine realized goiter was a serious public health problem and in 1916 he planned to intervene within iodine in school-children in Cleveland. But his plan was refused considering iodine was a poison. With the help of Kimball, Marine conducted the study in neighboring Akron, Ohio. The treatment group of girls received

200-400 mg NaI/school day for 10 days. The treatment was effective and they concluded that goiter was preventable in man as well as in fish or in domestic animals. Based on these studies, general prophylaxis with iodized salt was introduced in the state of Michigan in 1924. There was great protest however in 1948, the U.S. Endemic Goiter Committee tried to introduce iodized salt to all the states by federal law but failed (Zimmermann, 2009).

Effectiveness of iodine prophylaxis in Kangra Valley, India

In order to substantiate the role of iodine deficiency as the causative factor for the endemic goiter in the Himalayan belt and to study the effectiveness of iodine prophylaxis, a prospective study was organized in 1956 in a population of approximately 1 lak persons in Kangra Valley of Himachal Pradesh in India.

Table 1. Effect of iodized salt on the prevalence of goiter in school children of the Kangra Valley, India

Zone	Sex	Prevalence of goiter (%)		
		1956	1962	1968
A	Male	34.1(2019)	19.3(2539)	7.5(1683)
	Female	51.4(510)	18.4(956)	10.4(822)
B	Male	34.2(1605)	39.8(3262)	17.2(1507)
	Female	51.7(422)	41.5(1282)	17.0(1032)
C	Male	36.0(2338)	14.5(2527)	8.4(1821)
	Female	47.4(626)	14.9(893)	10.6(856)

Source : From Sooch et.al (1973).

Notes: The Kangra Valley is in the Himalayan foothills. The study region was divided into A, B, and C zones. After a baseline survey in 1956, the salt distributed to zones A and C was fortified with potassium iodide and potassium iodate, respectively while zone B was supplied with unfortified salt. The salt fortification was at a level that supplied approximately 200ug of iodine per person per day. After 6 years of iodization, in 1962, a marked decrease in the prevalence of goiter was observed in zone A (from 38% to 19%) and zone C (from 38% to 15%) without any significant change in zone B. Six years later, in 1968, a systemic survey of goiter prevalence showed a further reduction in zones A and zone C (8.5% and 9.1%, respectively).

In 1972, spot checking of goiter prevalence in iodized salt areas showed negligible prevalence of goiter among school children, while I^{131} uptake and excretion of urinary iodine had become normal, indicating a normal thyroid function and iodine nutrition.

Following this study, the Government of India between 1962-1965, with the financial assistance of UNICEF, installed 12 iodization plants in different parts of the country. The concentration of iodine in salt was 25 ppm. Iodate supplementation at this concentration amounts to 250 μg , which is equivalent to 150 μg (Chandra, 2008).

Environmental iodine deficiency of the earth is forever a reality, and iodine deficiency in the population is forever a risk. Therefore a USI program should be placed forever. Thus there is a need to establish more comprehensive multi-country surveillance of iodine nutrition rather than focusing on salt and urinary iodine only.

(A) CONSEQUENCE & GLOBAL PREVALENCE OF IODINE DEFICIENCY DISORDERS (IDD)

For the first time in 1980, the global estimate from World Health Organization (WHO) was reported: it estimated 20-60% of the world's population was iodine deficient/goitrous mostly in the developing countries. Though it was recognized in many countries however little attention was paid to iodine deficiency in public health programs. Goiter was considered as a lump in the neck and primarily of cosmetic concern; it generated little political attention or action and few resources were allocated for its prevention and control. However, this was changed during 1980-1990, controlled studies in iodine-deficient regions showed that iodine supplementation not only eliminated the incidence of cretinism but also improved cognitive functions in the remaining population. The social and economic consequences caused by iodine deficiency found far greater than previously appreciated. It can impair the growth and development of the country. Considering the consequences, goiter and associated disorders caused by iodine deficiency was given emphasis in the development perspective. The term '*iodine deficiency disorders (IDD)*' is now used to represent a spectrum of related disorders affecting about 1.5 billion individuals. Since 1990, elimination of IDD has been an integral part of many national nutritional programs.

The term IDD refers to all the effects of iodine deficiency on growth and development in human and animal population. These can be prevented by correction of iodine deficiency. IDD including goiter, still births, neonatal and other types of hypothyroidism but the most important effect is that of fetal brain damage (Table 1). The term IDD is now used throughout the world.

Table 2. The Spectrum of Iodine Deficiency Disorders (IDD)

FOETUS	Abortions Still births Congenital anomalies Neurological cretinism: <i>mental deficiency,</i> <i>deaf mutism, spastic diplegia, squint,</i> Hypothyroid cretinism: <i>mental deficiency, dwarfism,</i> <i>hypothyroidism</i> Psychomotor defects
NEONATE	Increased perinatal mortality Neonatal hypothyroidism Retarded mental and physical development
CHILD & ADOLESCENT	Increased infant mortality Retarded physical and mental development
ADULT	Goiter with its complications Iodine induced hyperthyroidism (IIH)
ALL AGES	Goiter Hypothyroidism Impaired mental function Increased susceptibility to nuclear radiation

From Hetzel (1983) WHO/UNICEF/ICCIDD (2001)

A meta-analysis of recent research reported a total of 18 studies in which comparison was made between iodine deficient population and suitable control populations with a similar social and cultural background. These studies revealed that mean score for the iodine deficient group was 13.5 IQ points below that of the non-iodine groups (Bleichrodt & Born 1994).

Goiter is recognized as the most clinical manifestation of IDD and thus total goiter rate (TGR) used as indicator to express the severity of IDD as public health problem. A WHO report concludes that there has been progress in iodine deficiency control since 2003, but continues to affect almost 1 in 3 individuals worldwide.

(B) DETECTION OF IODINE DEFICIENCY

The likelihood of iodine deficiency in a given region may be predicted from the

**PREVALENCE OF IODINE DEFICIENCY DISORDERS
GLOBAL DISTRIBUTION**



knowledge of its geographical region e.g. whether the region is surrounded by other iodine deficient regions or in inland areas, specially with high mountains or from travelers or local health workers who may have noted that many people from a certain area have visible goiter.

Goiter is the most important clinical manifestation of iodine deficiency; however brain damage, mental retardation, miscarriages and child mortality are more serious consequences. Therefore to document the prevalence of goiter in a population is important to determine whether these more serious consequences are likely to be present. In most areas, goiter occurs in a large fraction (more than 10%) of the population will result from iodine deficiency rather than some other cause.

The most valuable means for assessing the severity of iodine deficiency in an area/region are

- the prevalence of goiter
- the urinary excretion of iodine

Goiter Surveys

To examine a children or adults for goiter, the examiner sits or stands facing the subject, then places his/her two thumbs on the either side of the subject's windpipe several centimeters below the notch of the thyroid cartilage ("Adam's apple") and rolls his thumbs gently over the thyroid, which lies next to the windpipe. This technique is called 'palpation'. The other technique is called 'ultrasonography'.

The very first decision should be whether or not the subject has a goiter. If each lobe of the thyroid is smaller than the part of the subject's thumb beyond the last joint (the "terminal phalanx"), the thyroid is classified as grade 0, no goiter. If each lobe is larger than the terminal phalanx of the subject's thumb, he or she has goiter. The goiter size is defined by goiter grading that is carried out using the criteria of WHO/UNICEF/ICCIDD (1994) as follows

Grade 0 : No palpable or visible goiter

Grade 1 : A goiter that is palpable but not visible when the neck is in the normal position. It moves upwards in the neck as the subject swallows.

Grade 2 : A swelling in the neck that is clearly visible when the neck is in a normal position and is consistent with an enlarged thyroid when the neck is palpable.

The sum of grades 1 and 2 provide the total goiter rate (TGR).

Urinary iodine

The concentration of iodine in the urine is the most widely used biochemical marker of iodine deficiency, for several reasons. Most of the body's iodine is excreted in the urine, usually over 90%; thus, the iodine level in urine reflects the subject's intake. Urine is easy to obtain in the field, in contrast to serum. Iodine in urine is stable and can withstand collection and transport under field condition. Finally, measurement of urinary iodine is technically easier and cheaper than other biochemical markers such as serum levels of thyroid hormone or TSH or procedures with radioiodine.

Other clinical and laboratory data

The goiter surveys and urinary iodine estimation are the simplest and most valuable means of assessing iodine deficiency in a population. However further information can be obtained from casual observations of cretinism or widespread mental retardation. Occasionally, additional laboratory investigations are obtained for research purposes or in association with other evaluations e.g. assay of thyroid hormones, neonatal screening, radioiodine uptake, ultrasonography etc. These tests are valuable but expensive and difficult to obtain and not applicable for general evaluation.

Severity of IDD endemicia

Data from the goiter prevalence surveys and urinary iodine determination can be used to assess the severity of IDD and the urgency of its correction. In general, a high goiter prevalence and low mean urinary iodine level indicate severe IDD.

The following table shows three stages of severity I, II and III, with typical values for their urinary iodine levels and total goiter prevalence. In case of more severity, the goiters will be more and larger in sizes

Table 3. IDD Severity and the Need for Correction

Stage	Clinical features			Typical goiter prevalence	Median urinary iodine ($\mu\text{g}/\text{dl}$)	Need for correction
	Goiter	Hypothyroidism	Cretinism			
I Mild	+	0	0	5-19.9%	5.0-9.9	Important
II Moderate	++	+	0	20-29.9%	2.0.- 4.9	Urgent
III Severe	+++	+++	++	≥ 30	< 2.0	Critical

0 = absent, +, ++ and +++ = present, with +++ being most severe

In Stage I, iodine deficiency is present but not accompanied by hypothyroidism or cretinism. It is important to correct the stage I IDD.

In Stage II, the median urinary iodine level is lower, goiters are more prevalent and larger, some degree of hypothyroidism is present and the need for correction of iodine is urgent.

In Stage III, with low urinary iodine levels, the goiters are even larger and more prevalent, hypothyroidism and cretinism also occur, and correction of iodine deficiency is critical.

Goiter prevalence and the measurement of iodine in the urine are the best practical means for assessing iodine deficiency in a community. Goiter surveys are simple and rapid, but require proper training of the examiner. Schoolchildren are convenient target group because they are easily available, reflect the current status of iodine nutrition, and are major priority group for prompt correction of iodine deficiency. On the other hand, determination of urinary iodine requires sophisticated technology that is available in many reference laboratories set up.

(C) CONTROL OF IODINE DEFICIENCY/METHODS OF IODINE SUPPLEMENTATION

Once it is estimated that iodine supplementation is necessary, it should be decided then the best way to provide it. The available methods for introducing iodine into a deficient area and some of the factors that influence the choice among them are discussed below

1. Salt

It is an ideal vehicle for addition of a micronutrient such as iodine. Everyone needs salt, usually in fairly constant daily amount. In many rural areas of the developing countries, salt is the only commodity supplied from outside. The sources of salt are usually limited and addition is easier. The technique for iodization is simple and well established. If use of salt in a region for human consumption is being refined, iodization adds very little to its total cost. The addition of iodine does not change the appearance or taste or color of salt and is generally well accepted by the consumer.

Two chemical forms of iodine, potassium iodide (KI) and potassium iodate (KIO₃) are commonly used for salt iodization. Potassium iodide is cheaper but less stable. It is satisfactory only with highly purified salt in dry, temperate climates when the salt will be consumed within several months of production. Potassium iodate is much more stable and

resistant to evaporation. Iodate, rather than iodide, must be used with impure salt, when the salt is exposed to excessive heat and humidity, or when storage and transportation take longer duration before consumption.

The amount of iodine added to salt depends on the average amount of salt consumed per capita by the target population. The desired daily consumption of iodine should be at least 150 μ g, but there are wide fluctuation relating to heat, existing customs, and economy show that the range may be from 2g or less to 20g. Consideration is made for losses of iodine from imperfect packaging or during storage. Thus as a general rule an appropriate fortification level is about one part of iodine per 20,000-40,000 parts salt as 25-50mg iodine per kg of salt, or 25-50gm of iodine per per metric ton salt.

Most of the world's iodine is obtained as a by product of the natural gas industry. Japan is the major producing country. It also comes from Chilean nitrate deposits.

Most salt is iodized mechanically. The salt is moved on a conveyer or belt and iodine is introduced at an appropriate point in a predetermined amount. Several techniques are in use - Dry-mixing process, Drip-feed addition, Spray method, Submersion process. Of these processes the spray and dry-mix are more successful with dry powdering salt but the drip feed and submersion process are cheaper for the consumer.

2. Iodized oil

A well known chemical reaction is used to add iodine to vegetable oils. The most widely used preparation, lipiodol, is 38% iodine by weight, so 1 ml contains 480 mg of iodine. A single oral administration usually provides satisfactory iodine stores for one to two years. The chief use of iodized oil is for areas where prompt correction of iodine deficiency is urgent and iodized salt is not available. The major limitation of iodized oil programs, when compared to those of iodized salt, is that direct contact must be made with each subject who will receive the iodized oil, whereas proper iodization of salt assures that every person eating the salt will receive sufficient iodine.

Iodized oil is injected by syringe and needle into the muscles of the buttocks for small children, or of the upper arm, for older children and adults. The usual dose is 1ml (480mg of iodine) for subjects one year and older and 0.5ml for age 0-1 year. The iodine is released slowly from its injection site into the blood, then circulates to the thyroid, which concentrates it and produces thyroid hormones from it. Some of iodine is also stored in body fat. Several factors are responsible for its sustained duration of effect : the high dose of iodine, the slow release from the muscle, the recycling of iodine by the thyroid, and perhaps its storage in fat.

The injectors are usually not physicians, and needed to be trained only for administering injections, sterile precautions, and proper handling and disposal of materials, particularly needles.

3. Iodized water

Iodine added to directly to drinking water can correct iodine deficiency. A measured amount of iodine, usually as a concentrated solution of I_2 , KI or KIO_3 is added directly to drinking water in a jar, in an amount appropriate for achieving a daily intake of at least 150 μ g iodine. The iodine solution is prepared locally and distributed in dropper bottles to schools and household heads.

Iodization is also achieved through a public water supply by diverting a small amount of the water through a canister containing crystals of iodine and then reintroducing the iodized water into the main water flow.

4. Lugol's iodine

Subjects can receive oral iodine directly in the form of Lugol's solution (5g I_2 plus 10g KI per 100ml or 6mg iodine per drop). Lugol's solution is commonly found even in rural hospitals in developing countries. Its main application is as an antiseptic. In contrast to iodized oil, Lugol's iodine is stored in the body only by thyroid recycling.

Iodization of the salt is the preferred approach for supplementation in iodine deficient populations. Salt is a dietary necessity whose sources are usually limited and therefore easily controlled and the technology for iodization is simple.

(D) EFFECTS OF IODINE INTERVENTION

Social and economic effects result from iodine deficiency in both human and animal populations. In humans there is reduced school performance in children and reduced productivity in adults and reduction in goiter.

Table 4. Effects of iodine deficiency control in Jixian Village, China

	Before (1978)	After (1986)
Goiter Prevalence	80%	4.5%
Cretinism Prevalence	11%	Fall
School ranking (of 14 school in the district)	14 th	3 rd
School failure rate	>50%	2%
Value of farm production (Yuan)	19,000	180,000
Per capita income (Yuan)	43	550

Ma and Lu (1996)

Notes: Jixian village was locally regarded as the village of idiots. Between 1978 and 1983, productivity, as measured by percapita income, increased by a factor of 10, school performance improved, and girls from neighboring villages prepared to marry men of Jaxian.

Table 5. Effects of iodine intervention and measurement of economic benefits in a human population

EFFECTS	BENEFITS
Reductions in: 1. Mental deficiency 2. Deaf mutism 3. Hypothyroidism 4. Goitre	1. Value of higher work output in household and labour market 2. Reduced costs of medical and custodial care 3. Reduced educational costs from reduced absenteeism and grade repetition 4. Reduced costs of investigation and treatment

From: Levin et.al (1993)

Table 6. Effects of iodine intervention and measurement of economic benefits of the livestock population

Effects	Benefits
Increase in Live birth Weight Strength Health (less deformity) Wool coats in sheep	Higher output of meat and other animal products; higher animal work output

Source: Levin et.al (1991).

Notes: The probable costs of iodine deficiency in animal production can be estimated in terms of reduced milk and meat production, as well as reduction in the production of eggs and fish. Effects of iodine intervention on the economic benefits on the livestock population are very significant.

Table 7. Pregnancy outcome in the controlled trail of iodized oil in the Jimi River district in the Highlands of Papua New Guinea

Mother	Birth	Examine	Children		
			Normal	Death	Cretin
Untreated	534	406	380	97	26
Iodized oil injected	498	412	406	66	7

Source: Pharoah et.al (1971)

Iodine gives a cretin couple a normal child in Sengi Central Java

In 1973, the Sengi village in Central Java had about 87% of the population with low serum thyroid hormone levels. The signs of clinical and subclinical hypothyroidism among people were common and 9% were cretin. The village was so quiet that there were no activities observed by visitors. No child had finished their 6 years of primary school, and the drop out was very high. This was for central hypothyroidism.

The people of the village received an injection of iodized oil for the first time on April, 1973. As a result, remarkable changes were observed within a year - children became lively, happily playing in front of their houses and group activities like volleyball, badminton etc. In subsequent years, many students passed primary, secondary and high school examinations and some were even admitted to Universities. Overall public activities increased and consequently socioeconomic condition improved.

In the village, there was a hypothyroid cretin, but he was not mentally retarded and he felt himself enough healthy to marry a woman who was a neurological cretin. In the meantime, iodine deficiency had been corrected by injection of iodized salt. This couple had now three physically and mentally developed sons who grew up and developed normally. Incidentally one died in road accident; one ranked first in the high-school examination in Semarang and finished his B.Sc. Chemistry from Diponegoro in 2001; the younger one born in 1983, rank first among 49 pupils in a high-school examination (Djokomoljianto, 2001).

All these observations revealed that the differences in all aspects of life had taken place after a single injection of iodine.

Iodine supplementation through irrigation water protects damaged reproduction

In iodine-deficient areas, women of child bearing age groups face increased demands

for iodine during pregnancy and lactation, which results in exaggerated iodine loss and consequently causes goiter; even goiter continues after the cessation of pregnancy and in latter years the goiter become multinodular. Iodine deficiency also makes the mother hypothyroid, with complications like anovulation, infertility, gestational hypertension, increased first trimesters abortion, abnormal foetal positions and still births. Hypothyroidism, infertility and fetal loss have adverse effect on her quality of life and her role in the family and community. A defective child may require long-term care, which wastes time and money. Adding of potassium iodate to irrigation water in Western China decreased infant mortality to half the average of last year and the odds of neonatal deaths were reduced to about 65% (De Long et al 1997).

The most important consequences of iodine deficiency are the reproductive failure that may be prevented by iodine supplementation through irrigation water.

Iodine supplementation prevents thyroid cancer

After the Chernobyl nuclear power plant accident in April 1986, a large increase in the incidence of children thyroid cancer was reported in contaminated areas. Most of the radiation exposure to the thyroid was from ^{131}I . A population-based case-control study of thyroid cancer was conducted in Belarus and the Russian Federation to evaluate the risk of thyroid cancer after exposure to radioactive iodine in children and to investigate environmental and host factors that may modify the risk.

Exposure to ^{131}I in children is associated with an increased risk of thyroid cancer. Both iodine deficiency and iodine supplementation appears to modify this risk. Stable iodine supplementation in iodine-deficient populations may substantially reduce the risk of thyroid cancer related to radioactive iodine in case of exposure to radioactive iodine in childhood that may occur after radiation accidents or during medical diagnostic and therapeutic procedures (IDD Newsletter, 2006).

Considering the increasing use of nuclear power worldwide, this is another good reason to ensure adequate iodine intake for all children.

Correction of iodine deficiency improves growth in children

Severe iodine deficiency in uterus causes cretinism and dwarfism. Iodized oil given during pregnancy in areas of moderate deficiency increases birth weight by 100-200g. Data from cross-sectional studies on iodine intake, positive correlations was found. In Asian countries, house-hold access to iodized salt was correlated with increased weight-for-age and mild upper-arm circumference in infancy. This is because iodine status may

influence growth through its effects on thyroid axis. Thyroxin administration to hypothyroid children increases their growth. The important determinants of growth, insulin-like growth factor (IGF)-I and insulin-like growth factor binding protein (IGFBP)-3 are dependent on thyroid status. Hypothyroidism decreases circulatory IGF-I and IGFBP-3 level but thyroid hormone replacement increases them. In iodine deficient children, impaired thyroid function and goiter are inversely corrected with IGF-I and IGFBP-3 levels.

Three prospective, double blind intervention studies were done as follows

- In a 10 month study, severely iodine-deficient, 7-10 years old Moroccan children were provided iodized salt and compared to children not using iodized salt.
- In a 6 month study, moderately iodine-deficient 10-12 years old Albanian children were given 400mg iodine as oral iodized oil or placebo.
- In a 6 month study, mildly iodine-deficient 5-14 years old South African children were given two doses of 200mg iodine as oral iodized oil or placebo.

In all the three studies, at baseline and follow-up, height, weight, urinary iodine (UI), total thyroxin (TT4), thyroid-stimulating hormone (TSH), IGF-I and IGFBP-3 were measured (except IGFBP-3 not measured) in Morocco.

Table 8. Overview of the results of the 3 studies of iodine repletion and growth in school-age children

	Baseline IDD severity (median UI)	Total thyroxine	IGF1	IGFBP3	Weight	Height
Limpopo Province, South Africa	Mild (80 µg/L)	■	■	=	=	=
Pogradec Region, Albania	Moderate (45 µg/L)	■	■	■	■	■
Brikcha Region, Morocco	Severe (18 µg/L)	■	■	nm	■	■

■ increased = no change nm not measured.

In South Africa, iodine repletion modestly increased IGF-I, but did not have a significant effect on IGFBP-3, TT4 or growth while in Albania and Morocco, iodine repletion significantly increased TT4, IGF-I, IGFBP-3, weigh-for-age z-cores and height for age z-scores (Zimmermann, 2007).

The multicentric study clearly indicates that iodine supplementation improves growth. Millions of school-age children in the world are iodine deficient and this study envisages the importance of global effort to eradicate IDD in this age group.

Iodine supplementation improves cognition in iodine-deficient children

In a study the school children in the age group 7-11 years from both sexes in the north of Benin in 2006, an area with moderate iodine deficiency having median urinary iodine 20.6µg/L. Other consequences were stunting (33%), low weight for age (17%), wasting (2%). Some children were given iodized oil (Lipidol 540mg iodine) orally, or placebo. Iodized salt became available during the course of the study; follow-up results were related to changes in urinary iodine concentration. Mental performance was assessed by existing lists, including block design, five lists from the African child intelligence tests, hand movements and colored progressive matrices, as well as two psychomotor tests- pegboard and ball throwing. One year later, the same tests were administered, as well as urinary iodine and other biochemical measures. In the improved group, the urinary iodine excretion from 0.09 to 0.68 micromoles/L, compared to 0.62 to 0.67 micromoles/L in the unchanged group. Compared to children with unchanged urinary iodine concentration, the improved group showed an overall improvement in mental performance with a z- score 0.12. In overall, the improvement was about 5 IQ points. The improvements noticed in Benin were for better iodine nutrition which could come from iodized oil and iodized salt (van den Briel et al, 2000).

In Dunedin, New Zealand, a randomized, placebo-controlled, double-blind trial in school children aged 10-13 years was conducted in 2008. Children were randomly assigned to receive a daily tablet containing either 150µg iodine or placebo for 28 weeks. Biochemical, anthropometric and dietary data were collected from each child at baseline and after 28 week. Cognitive performance was assessed through 4 subsets from the Wechsler Intelligence Scale of Children.

The results showed that at baseline children were mildly iodine deficient (median UI: 63µg/L). After 28 week, iodine status improved in the supplemented group (UI: 145 µg/L), where as the placebo group remained iodine deficient (UI: 81µg/L). Iodine supplementation significantly improved scores for 2 out of the 4 cognitive subsets. The overall cognitive score of the iodine supplemented group was 0.19 SDs higher than that of the placebo group (p<0.02).

All these observations convincingly demonstrated that mildly iodine deficient children have impairments in perceptual reasoning and suggests that mild iodine deficiency could

The mean (95% CI) effect of iodine supplementation on final scores for each individual Wechsler Intelligence Scale for Children cognitive subtest and overall cognitive score (n = 166). Children who were supplemented with iodine had better scores for picture concepts, matrix reasoning, and overall cognitive score ($p < 0.02$) than did children who received the placebo.

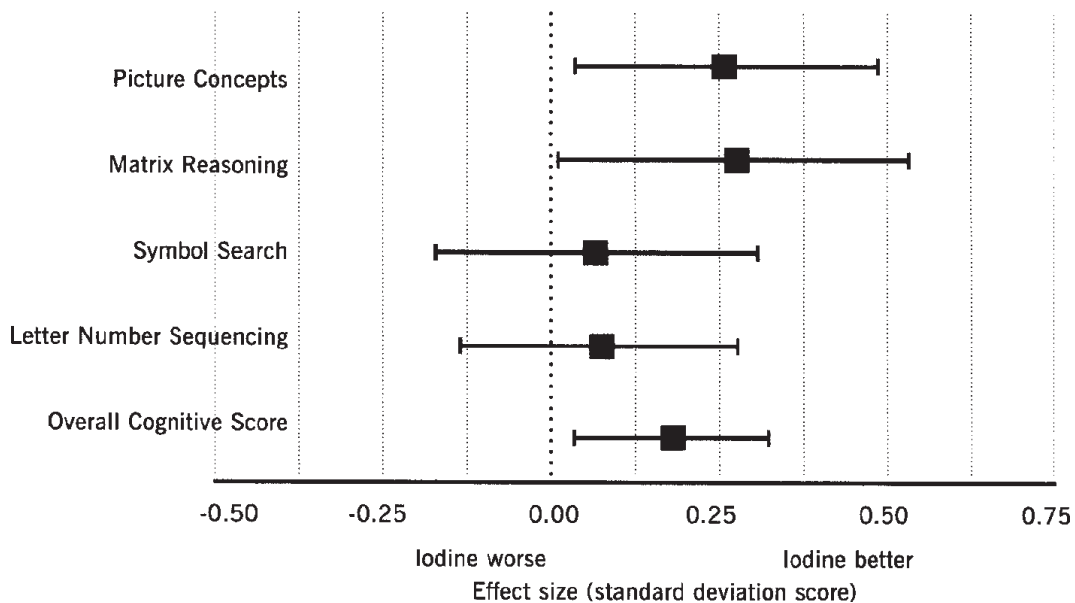


Figure 1. Effect of iodine supplementation on cognitive functions.

prevent children from attaining their full intellectual potential (Gordon et al, 2009).

This groundbreaking study demonstrates for the first time that correction of even mild iodine deficiency in children can improve their ability to learn.

Cost benefit of iodine prophylaxis

Studies on direct and indirect costs caused due to iodine deficiency by Pfannenstiel (1998) examined the cost benefit of iodine prophylaxis in Germany. Estimated goiter prevalence in Germany population is about 40 percent. In addition to reduce the affected subjects well being and quality of life, the iodine deficiency related thyroid disorders incur an enormous expense and drain on resources that include outpatient investigations performed by physician, drug treatment, hospitalizations, decreased working capacity, early retirement and rehabilitation measure. To summarize, about two billion DEM are spent per year in Germany for IDD.

Considering the supply of 100 mcg iodine/day for children to the age of 10, and 200µg for ages 10-18 years and for pregnant and breastfeeding women, at an annual cost of iodine tablets of DEM 725 million. This would lead to a potential cost savings of DEM 1.3 billion per year. This cost analysis does not consider well being and quality of life for patients suffering from thyroid disorders, because these factors are not measurable in monetary terms.

Iodine deficiency costs enormous amount for its effects on the thyroid alone. Correcting, it can prevent these disorders and significantly improve the quality of life and has tremendous potential for cost savings which is very important in an environment of limited resources for health care sector.

(E) EFFECTS OF EXCESS IODINE SUPPLEMENTATION

The beneficial effects of iodine supplementation in the prevention and control of developed thyroid abnormalities due to iodine deficiency have been discussed so far in this chapter. However, supplementation of excess iodine, including the correction of previous iodine deficient state may cause thyroid dysfunctions. In other words both low and excess intake of iodine is related with further risk of thyroid diseases. Although a daily intake of up to 1000 µg/day by a normal adult individual is quite safe, therefore, to prevent IDD, the recommended iodine requirement in an adult individual is fixed within a narrow range of 150 µg/day (Chandra, 2009).

Iodine-induced hypothyroidism / Iodide goiter

The prevalence of goiter and subclinical hypothyroidism is high in population whose iodine intake is high for prolonged duration in costal areas of Japan and China for chronic intake of sea weeds rich in iodine; high intake of iodine through drinking water from shallow tube wells was responsible for the occurrence of iodine induced hyperthyroidism. However this type of thyroid failure has not been observed after correction of iodine deficiency, including in neonates after administration of large doses of iodized oil to their mother during pregnancy (Delange, 1996).

Iodine-induced hyperthyroidism (IIH)

The important complication of iodine prophylaxis is iodine induced hyperthyroidism (IIH) that has been reported from almost frequent in individual over 40 years of age with multinodular goiters. The manifestations were cardiovascular and were occasionally fatal.

However, this epidemic condition lasted for 10 to 12 years and followed by incidence of hyperthyroidism somewhat below that existing prior to the endemic. But an increase incidence of hyperthyroidism was not reported in population who could adjust their thyroid function to chronically high iodine.

IIH is thus one of the iodine deficiency disorders that appear in the early phase of iodine supplementation. It is important that clinical facilities are available for diagnosis and treatment of these patients. They are usually over the age of 40 years, so that radioactive iodine is the treatment of choice (Delange and Hetzel, 2004).

Iodine-induced thyroiditis

The aggravation or even the induction of autoimmune thyroiditis by iodine supplementation has been reported. In experimental conditions, excessive iodine intake can precipitate spontaneous thyroiditis in genetically predisposed strains beagles, rats or chickens. Iodine-induced thyroiditis in animal models could be that elevated dietary iodine triggers thyroid autoimmune reactivity by increasing the immunogenicity of thyroglobulin or by inducing damage of the thyroid by cell injury by free radicals (Delange and Hetzel, 2004). The large scale epidemiological, metabolic or clinical studies of iodine supplementation on the occurrence of clinically significant iodine-induced thyroiditis with public health consequences on thyroid disorders are scanty.

Thyroid Cancer

The tendency for higher incidence of thyroid cancer in autopsy material from endemic goiter areas has been reported although the relationship of thyroid cancer and endemic goiter has been debated without any agreement be reached on many aspects including casual relationship (Harach et al, 1985).

Iodine supplementation has found to change the epidemiological pattern of thyroid cancer with an increased prevalence of papillary cancer found at autopsy. But the prognosis of thyroid cancer is significantly improved following iodine supplementation due to shift towards differentiated forms of thyroid cancer that may be diagnosed at earlier stage (Delange and Hetzel, 2004).

Iodine supplementation under certain conditions in certain populations causes adverse effects, e.g. iodide goiter and iodine-induced hypothyroidism, IIH, iodine-induced thyroiditis and thyroid cancer.

(F) DIETARY RECOMMENDATIONS FOR IODINE

To establish optimal iodine intake in order to guide fortification and supplementation efforts, including how much iodine to add to salt is needed. Several national and international technical groups have attempted to estimate daily needs, but the reports are often hard to obtain or to compare with other. Dr. Thomson (2002) critically reviewed the subject and a summary of her findings as follows

Table 9. Recommended Intake of Iodine for Adults ($\mu\text{g}/\text{day}$) in various countries

	Australia (1990)	UK (1991)		Germany, Australia, Switzerland (2000)		WHO (2001)	USA/ Canada (2001)
	RDI	LNRI	RNI	RNI		RI	RDA
Men	150	70	140	200	150	150	150
Women	120	70	140	200	150	150	150

RDI, recommended dietary intake; LNRI, lower reference iodine intake; RNI, reference nutrient intake; RI, recommended intake; RDA, recommended dietary allowances.

Table 10. Recommended Intakes of Iodine ($\mu\text{g}/\text{day}$) for Pregnancy and Lactation

	Australia (1990)	UK (1991)	Germany, Australia, Switzerland (2000)		WHO (2001)	USA/Can (2001)
	RDI	RNI	RNI		RI	RDA
Pregnancy	175	140	230	200	200	220
Lactation	200	140	260	200	200	290

Table 11. Recommended Intakes of Iodine ($\mu\text{g}/\text{day}$) for Infants and Children (WHO) 2001

Age	Intake
Infants 0-59 months	90
Children 6-12 years	120

Recommended intakes for adults have not changed since the first US RDA of $150\mu\text{g}/\text{day}$ set in 1974 (Food and Nutrition Board, 1974) and are similar for most countries. In

each case recommendations have been set relatively high in order to provide an extra margin of safety and to meet increased demands that may be imposed by natural goitrogens under certain conditions. In contrast recommendations for pregnancy and lactation vary considerably from country to country. Similarly USA/Canadian recommendations for infants (Adequate Intake 110-130 $\mu\text{g}/\text{day}$) and the WHO recommended intake (90 $\mu\text{g}/\text{day}$) is considerably greater than the earlier recommendations.

More data are required on iodine status and requirement of iodine in infants and also in children, so that it is not necessary to extrapolate the recommended intakes from adult values.

Consumption of iodized salt in India

In India, about 51% population consume adequately iodized salt that is far from the Universal salt iodization (USI) goal of at least 90% house-hold should consume adequate iodized salt. Coverage in India has remained stagnant at about 50% since 1998 (Figure.2) (NFHS, 2007). Similarly, there has been little change in the percentage of households consuming salt that is iodized, but at inadequate levels: 25% in 2005 compared to 21.6% in 1998 (Table12). Almost one quarter of all salt continues to have no iodine (Vir, 2008).

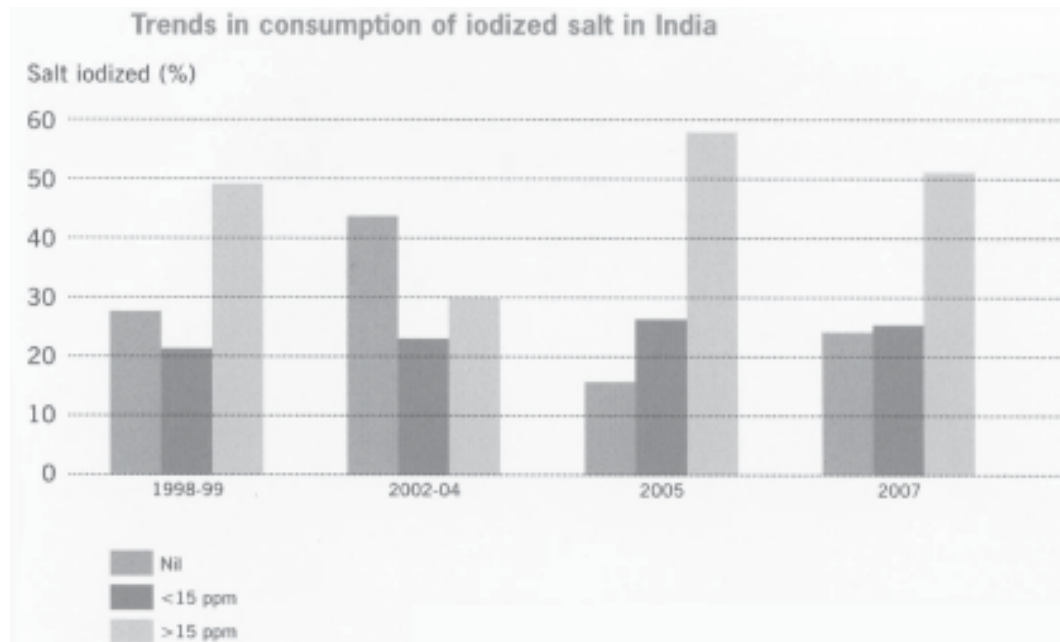


Figure 2. Trends in consumption of iodized salt in India

Table 12. Percentage of house-holds consuming iodized salt

State	Iodine Content of salt Adequate (> 15 ppm)	
	NFHS II (1998-99)	NFHS III (2005-2006)
Andhra Pradesh	27.4	31.0
Arunachal Pradesh	84.1	83.6
Assam	76.9	71.8
Bihar	47.0	66.1
Chhattisgarh	–	54.9
Delhi	82.9	86.0
Gujarat	56.1	55.7
Haryana	71.0	55.3
Himachal Pradesh	90.5	82.5
Jammu and Kashmir	52.9	75.8
Jharkhand	–	53.6
Karnataka	43.4	43.3
Kerala	39.3	73.9
Madhya Pradesh	56.7	36.3
Maharashtra	60.1	61.0
Manipur	87.9	93.8
Meghalaya	63.0	81.9
Mizoram	91.2	85.9
Nagaland	67.2	83.3
Orissa	35.0	39.6
Punjab	75.3	74.6
Rajasthan	46.3	40.8
Sikkim	79.1	78.3
Tamil Nadu	21.2	41.3
Tripura	–	75.5
Uttaranchal	–	45.9
Uttar Pradesh	48.8	36.4
West Bengal	61.8	69.1
India	49.4	51.1

There is wide difference in iodized salt coverage among Indian states (Table 12). In 14 out of 29 states, over 90% of the population consume salt with some iodine. Consumption of salt with adequate levels of iodine (>15 ppm) is remarkably better than the national average in 8 north eastern states as well as in the eastern states of West Bengal, Bihar and Jharkhand; poor availability to iodized salt in the three salt producing states (Gujrat, Tamil Nadu, Rajasthan) as well as in the states of Haryana, Maharashtra, Andhra Pradesh, Karnataka and Madhya Pradesh where 25% edible salt is reported to have no iodine. In Delhi, Punjab, Himachal Pradesh and Kerala, the iodine level in the edible salt is quite satisfactory.

The average consumption of salt per day per individual in Indian population is 10-15gm and the requirement of iodine 150 µg/day, the recommended level of iodine in India at house-hold level 15 ppm. Proper knowledge and better monitoring at different levels from producer to house-holds including storage and transport are needed to reach the goal.

(G) SUSTAINABLE IDD CONTROL PROGRAMME

National IDD Control Programmes are the basic functional units for the prevention and control of IDD because Global control depends on effective national control. The reasons for the failure of successful iodization programmes in many countries have been determined. Based on the experience to assist description and analysis, a social process model has been developed (Hetzel, 1989).

Wheel model for IDD Elimination Program

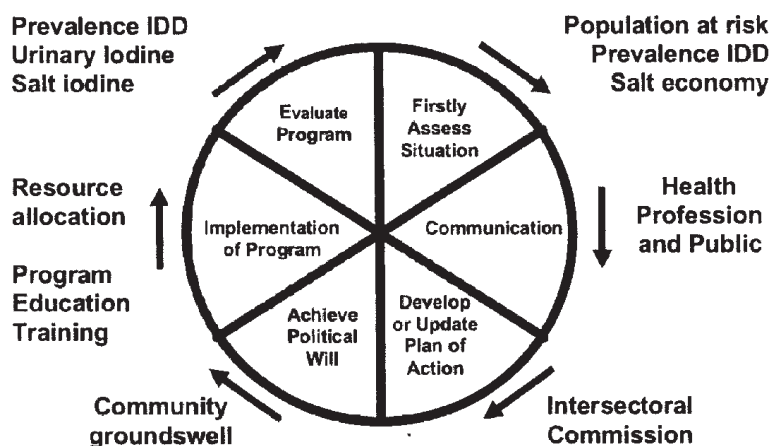


Figure 3. A model showing the social process involved in a national IDD control programme. Success depends on the establishment of a national IDD control commission with full political and legislative authority to carry out.

This model shows

- 1) Assessment (collecting data, assessing a situation)
- 2) Communication (dissemination findings)
- 3) Planning (developing or updating a plan of action)
- 4) Political decision (achieving political will and obtaining support)
- 5) Implementation
- 6) Monitoring and evaluation

The process then begins a further cycle with new data dissemination of the results of the first programme and development of a new modified one to correct the deficiencies of the fact.

Monitoring and evaluation are essential for iodization programme to ensure quantitative correction of iodine deficiency.

(H) LIMITATIONS OF IODIZATION PROGRAMS

There has been a marked decline in goiter prevalence and an improvement in the functional status of thyroid, which has been achieved by normalizing iodine nutrition status after successful iodization programs in many countries; however goiter endemicity from severe to mild degrees still persists in many areas, indicating the existence of the environmental factors present in food and water other than iodine deficiency (Chandra, 2009).

Tasmania and Finland

Antithyroid substance in milk, even in the presence of adequate iodine, has been considered as etiological factor for goiter endemics in Tasmania and Finland. In Tasmania, a seasonal variation in goiter prevalence among children was found despite adequate iodine intake; Cheiloronone, an isothiocyanate, has been suspected as the principal goitrogen. While in Finland, goitrogen present in cow's milk proved as the etiological factor for the persistence of goiter (Stanbury and Hetzel, 1980).

Western Colombia and Eastern Kentucky

Factors other than iodine deficiency are responsible for the persistence of goiter in Western Colombia and Eastern Kentucky (Gaitan, 1986). Studies in 41 localities of western

Colombia, where iodine supplementation continued for 10-20 years, showed that geological aquifers and watersheds are significantly related to goiter prevalence. Further studies indicate that sedimentary rocks rich in organic matter from coal and shales, which are also found in eastern Kentucky, are the sources of water-borne goitrogen present in drinking water are responsible for the persistence of endemic goiter even after iodine supplementation (Gaitan, 1983; Meyer et al, 1978).

Significant statically correlation found between goiter prevalence and rock types in the watersheds that supply in Western Colombia. Bacterial contamination has been implicated as a cause of endemic goiter. Sedimentary rocks natural in the water shed associated with higher goiter prevalence and an increased concentration of *k.pneumoniae* may be a natural example of biodegradation of the organic constituent (Gaitan et al, 1980).

Eastern India

Studies in India by Kochupillai (1992) showed, in spite of effective salt iodization as evidenced by urinary iodine excretion pattern, the prevalence of goiter and associated disorders not declined as was expected in the Harakh area of Barabanki district of Uttar Pradesh. In the area, the occurrence of neonatal hypothyroidism continues to be as high as 6%, even though salt iodization has been satisfactory. For this finding, urinary thiocyanate excretion level as a critical indicator for goitrogen ingestion was measured and a high level of excretion of thiocyanate was found in a significant proportion of subjects. Peroxidase-inhibiting goitrogens have been suspected of interfering with effective utilization of iodine by the thyroid gland.

In a recent study in Siddharthanagar district in eastern Uttar Pradesh, the prevalence of goiter, state of iodine nutrition of the population, consumption pattern of common goitrogen food and distribution of iodine through edible salt have been evaluated during post-salt iodization phase. The prevalence of goiter is moderate. The study concludes that inadequately iodized salt and cyanogenic plant foods containing goitrogenic/ anti-thyroidal substances by the people of the studied region are possible reasons for the persistence of goiter during post-salt iodization phase (Chandra et al, 2008; Chandra et al, 2009).

Northeast India

The entire northeast of India is in the classical goiter endemic belt of India because of its location in the sub-Himalayan region. Considering the consequences of IDD, Universal Salt Iodization program initiated in the entire region in 1988-89. However no decrease in goiter prevalence was found even after a decade later of the implementation program in

Tripura (Chandra and Ray, 2002). This is because the people are exposed to thiocyanate load. A large number of cyanogenic plants are used as common vegetables. The exciting goiter prevalence in the region could possibly due non-uniform adequate iodine supply along with thiocyanate load (Chandra and Ray, 2001).

In spite of no biochemical iodine deficiency, iodine deficiency disorders (IDD) is a serious public health problem in Manipur of North-east India (Chandra et al, 2006; Chandra et al, 2008). The consumption pattern of certain plant foods containing thiocyanate (or its precursors) was relatively high that interferes with thyroid hormone synthesis resulting in the excretion of more iodine. Thus, the existing dietary supplies of thiocyanate in relation to iodine may be a possible an etiological factor for the persistence of endemic goiter in the study region during post salt iodization period.

Sundarban delta

In post salt iodization phase endemic goiter and associated iodine deficiency disorders (IDD) found prevalent among school children in the age group 6-12 years in the Sundarban delta covering the district North and South 24 Parganas of West Bengal in eastern India. There is no environmental iodine deficiency in the region as evidenced by iodine content in drinking water. In the studied population iodine nutritional status is satisfactory. They also consume dietary goitrogens. Environmental factors other than iodine deficiency, hard drinking water and drinking contaminated with sedimentary rock and dietary thiocyanate may possibly have a role in the persistence of endemic goiter in the region (Chandra et al, 2005; Chandra et al, 2006).

Gangetic West Bengal

IDD is a severe public health problem of the population of the Gangetic West Bengal covering the Howrah and Hooghly districts. The median urinary iodine levels indicate that they have no iodine deficiency. The region is environmentally iodine sufficient. Consumption of dietary goitrogens and hard drinking water may have the possible role for the persistence of endemic goiter in the region (Chandra et al, 2007).

South India

Tribals of Andhra Pradesh and Kerala prefer a variety of millets (viz. korallu, raghulu) as their staple cereal specially to pregnant mother and weaning children because of a traditional belief among them that millets are foods that give great vitality than other varieties of cereals such as rice. Besides being source of cyanogens, these millets have

been shown to contain large numbers of organic chemical compounds which are potent inhibitors of human thyroid peroxidase, an enzyme critically involved in thyroxin biosynthesis. During the course of this study three novel compounds with peroxidase inhibiting properties have been identified. The additive peroxidase inhibiting potential of these compounds from millet can have antithyroidal activity as potent as 'propylthiouracil'. Since all these compounds can pass the fetoplacental barrier freely, the results of the present study strongly support the possibility that these peroxidase inhibiting compounds of millet origin may be responsible in the high incidence of neonatal chemical hypothyroidism from the studied region (Ravi Kumar, 1996). Extra iodine supplementation may not prevent the inhibition thyroid peroxidase activity exerted by any dietary or chemicals agents.

Different State and Union Territories of India

A total of 14,762 school children in the age group of 6-18 years from different states and Union Territories of India were investigated for goiter endemicity by Marwaha et al (2003). They reported after a decade of successful salt iodization, there has been remarkable decline in goiter prevalence and improvement of functional status of the thyroid, achieved on normalizing iodine nutrition status of school children as assessed by urinary iodine excretion. Till the overall goiter prevalence was 23%, subjects belonging to poor socio-economic strata had significantly higher goiter prevalence. It is concluded that low iodine intake, high thiocyanate exposure and thyroid autoimmunity explain only a proportion of cases with residual goiter after salt iodization. This study also shows that several varieties of thyroid pathology with functional derangements occur significantly more in goitrous subjects.

Halle/Leipzig (Saxony)

An epidemiological survey conducted in the region of Halle/Leipzig (Saxony), an area with significant air pollution suggested an inverse relationship between urinary iodine (UI)/thiocyanate (SCN) excretion and goiter prevalence. Ten years later, the same industrial area was restudied to clarify if the situation has changed after the elimination of most industrial waste products and more over, if SCN excretion levels alone or in combination with air pollution or smoking affect of thyroid function. In a cohort study of 708 individuals, individuals with goiter (n=79, 11%) had significantly higher urinary thiocyanate excretion than probands without goiter, and significantly lower UI/SCN ratios than patients without thyroid disorder. Mean UI were not different between probands with or without goiter. Smoker showed significantly elevated UI/SCN ratio to non-smokers. Age, gender and smoking were predictive for thyroid volume and UI/SCN ratio was able to detect probands

with an increased risk of developing goiter in contrast to UI levels alone. Thus SCN may remain a cofactor in the etiology of goiter (Brauer et al, 2006).

Cardiff, Wales and Turin, Italy

During 2002-2006, 22,000 women at less than 16 week gestation enrolled in the controlled Antenatal Thyroid Screening Study to determine whether environmental perchlorate and/or thiocyanate exposure is associated with alteration in thyroid function in pregnant women in Cardiff, Wales and Turin, Italy. Urinary perchlorate was detectable in all women. The median urinary perchlorate concentration was 5µg/L (0.04-168 µg/L) in Turin and 2µg/L (0.02-368 µg/L) in Cardiff. Low-level perchlorate exposure is ubiquitous but did not affect thyroid function in this cohort of iodine-deficient pregnant women (Pearce et al, 2010). Perchlorate is now a major threat in the interference of iodine nutrition in pregnant and lactating women in developed countries.

Maranhao in Brazil

Babassu (*Orbignya phalerota*), a palm-tree coconut fruit, mixed with mandioca (Mnaihut utillissima) is the staple food of the people living in endemic goiter area of Maranhao in Brazil, where goiter prevalence among school children was 38%, in 1986 in spite of adequate iodine intake in most of the population (Gaitan et al, 1994). Overall results indicate that little or no effect was produced by babassu or mandioca on thyroid iodide transport by thyroid slices or *in vivo* in the rat, indicating that neither thiocyanate nor perchlorate-like compounds are responsible for their antithyroidal effects. Results of this study provide direct experimental evidence, that this staple food is responsible, at least in part, for the persistence of goiter in the iodine-supplemented endemic region of Maranhao in Brazil.

Darfur Province in Sudan

Pearl millet [*Pennisetum millet* (L.) leeke] is one of the most important food crops of the semiarid tropics, an ecological zone that includes portions of Africa and Asia and almost encircles the earth (Osman, 1981). Epidemiological evidence suggests that millet may play a role in the genesis of endemic goiter in these areas. In *in vivo* and *in vitro* studies revealed that millet diets rich in C-glycosylflavones produce goitrogenic and antithyroid agents. It is concluded that ingestion of millet may contribute to the genesis of endemic goiter especially in relatively iodine deficient area (Gaitan et al, 1989).

The role of iodine deficiency as an environmental determinant in the development of endemic goiter is firmly established, however several epidemiological observations

supported by experimental evidences as mentioned showed that a large number of region specific agents in the environment present in food, water known to interfere with thyroid gland morphology and function posing the danger of thyroid disease.

(I) GOITROGENS IN FOOD

Goitrogens are naturally occurring substances that can interfere with the function of thyroid gland. Goitrogens get their name from the term 'goiter' which means the enlargement of the thyroid gland. If the thyroid gland has the difficulty in synthesizing thyroid hormones, it may enlarge to compensate for this inadequate hormone production. Goitrogens cause difficulty for the thyroid in making its hormone. The foods that contain goitrogens/antithyroid substances and are responsible for the exaggeration, persistence and development of goiter and associated disorders have been studied (Chandra, 2010).

The foods that have been associated with disrupted thyroid hormone production in humans and broadly classified into two categories: Cyanogenic plant foods and flavonoids containing plant foods.

Cyanogenic plant foods

Cyanide in trace amounts is almost ubiquitous to the plant kingdom and occurs mainly in the form of cyanogenic glycosides and thioglycosides or glucosinolates. Both are nitrogen containing secondary metabolites. They derive biogenetically from amino acids and occur as glycosides which are stored in the vacuole. They function as prefabricated defense compounds that are activated in case of emergency, releasing cyanide from cyanogens or isothiocyanate from glucosinolates. The goitrogenic substances produced from cyanogenic plants are thiocyanate, isothiocyanate and thiooxazolidone.

The goitrogenic action of cassava has been demonstrated in different ethnic populations of Ubangi, Zaire, Idjwi Island and Kivu (De Lange et al, 1968). Consumption of vegetarian diet especially cyanogenic plant foods has been considered as one of the etiological factors in certain instances for the persistence of endemic goiter in India. Cyanogenic vegetables viz. cauliflower, cabbage, mustard seeds and leaves, turnip, radish and bamboo shoot collected from the goiter endemic areas of West Bengal and Tripura, cassava from Meghalaya and Kerala and their cyanogenic glucosides, glucosinolates and thiocyanate were estimated and thyroid peroxidase activity (TPO) on human thyroid was assayed from microsomal fraction following I_3 from iodide. Relative antithyroid potency of the plant extracts was also evaluated in terms of IC_{50} and PTU equivalence. The overall results show that all these plant foods contain goitrogenic substances however in different

proportion. Raw, boiled and cooked extracts of the plants showed antithyroidal activity *in vitro*. Extra iodide reversed the anti-TPO activity to some extent but could not neutralize it (Chandra et al, 2004; Chandra et al, 2005). *In vitro* and *in vivo* goitrogenic/antithyroidal potential of a number of cyanogenic food *viz* bamboo shoot (Chandra et al, 2004), radish (Chandra et al, 2006), cassava (Chandra et al, 2006), cabbage, cauliflower, mustard seeds (Ph.D. Thesis, 2006a) and many other plants of Indian origin. The overall results report that chronic consumption of those plant foods gradually develops a state of hypothyroidism. Extra iodide has shown to reduce the antithyroid effect to an extent but could not cancel it.

Flavonoids containing plant foods

Flavonoids and flavonoids-like compounds are reported to have beneficial effects on diverse biological processes and disease conditions. However, consumption of flavonoids and some phenolic acids by experimental animals caused enlargement and histological changes in the thyroid gland (Sartelet et al, 1996; Ferreira et al, 2006).

Both the vegetarian and non-vegetarian people consume soyabean due to high protein content. All essential amino acids are present in it. In spite of all the qualities there have been report that soyabean causes goiter. The present study showed that soyabean causes an apparent enlargement thyroid gland by inhibiting TPO activity as observed *in vivo* and *in vitro* studies for the presence of genistein an isoflavone in soyabean (Chandra, 2010).

Catechins are flavonoids found in abundance in green tea. The study was designed to examine whether green tea has any harmful effect on thyroid physiology in orally administered green tea extracts to male rats at different doses for 30 days. The results suggest that catechin present in green tea extract at high dose could alter thyroid function adversely (Chandra and De, 2010). Black tea also possesses the goitrogenic as well as antithyroidal activity but it is less potent than green tea because of its less catechin content (Chandra et al, 2010).

The importance of dietary flavonoids in the etiology of environmental thyroid disease is suggested by the resistance of endemic goiter to the universal iodination of salt in some parts of India. In these areas, the principal food stuff is grains that contain high levels of flavonoids, found to inhibit TPO and other thyroid-specific processes important to biosynthesis of thyroid hormone (Divi and Doerge, 1994).

Goitrogens in water

Nitrate is a wide spread contaminant of ground and surface water. Human and animal

systems are affected on nitrate exposure. The study was to investigate the effect of dietary nitrate exposure on thyroid status in experimental animals by feeding potassium nitrate (KNO_3) for 4 weeks. The results indicated the development of a relative state of functional hypothyroidism which can explain a part for the persistence of residual goiter in the post salt iodization phase (Mukhopadhyay et al, 2005).

Environmental factors other than iodine deficiency viz. hardness of drinking (high calcium and magnesium) and drinking water contaminated with sedimentary rock, may possibly have a role in the persistence of endemic goiter in Sundarban delta (Chandra et al, 2005, 2006). Excess calcium has goitrogenic and antithyroid potentiality as evidenced by *in vivo* and *in vitro* studies in rat (Communicated for publication).

Goitrogenic and antithyroid substances present in the environment come through food and water may have the role for persistence of endemic goiter in spite of consumption of adequate iodine. Goitrogenic content varies from plant to plant and even in the plant of same genetically origin, it varies because for different ecological differences. More investigation is thus necessary to reach a certain definite cause of high goiter prevalence in the population during post-salt iodization phase.

(J) FUTURE RESEARCH NEED

The major questions that need answers and the major areas in need of research are

- Whether the concentrations of goitrogens in plant foods, which have been recognized for a long time, have increased in recent years following the introduction of modern intensive agricultural practices e.g heavy use of fertilizers and the irrigation and farming practices.
- More plant biotechnology research is necessary to identify and produce superior quality of plant foods low in cyanogenic constituents/flavonoids (as the case may be).
- Does the urinary iodine always truly reflect the iodine nutritional status in an environment where consumption of foods containing thiocyanate precursor is relatively high? This is because the iodine retaining capacity of thyroid/body depends on the consumption pattern of cyanogenic plant foods.
- What should be the 'adequate' or optimum level of iodine? Will this remain same all over the country or will it depend on goitrogenic environment associated with iodine deficiency of areas of the country or whether there is no environmental iodine deficiency?

- Mild and moderate iodine deficiency also affects the intelligence, fine motor skills, problem solving capacity etc. of the children and thus to evaluate the brain damage if any by measuring IQ level, with cognitive and motor functions along with the stages of goiter in mild and moderate iodine deficient regions is important.
- Evaluation of the cellular and molecular mechanisms of the synthesis of thyroid hormones in *in vitro* cultured thyroid follicular cells under the influence of goitrogenic plant-foods with and without iodine supplement is urgent.

There is considerable scope for intercountry cooperation in all the above areas of research. The last two are in progress in author's laboratory.

CONCLUSIONS

- Isolation of iodine from natural sources, its presence in the thyroid gland and its impact in the treatment of goiter are the results of extensive studies of the nineteenth century.
- The prophylactic use of iodine/ iodization programs supplementing directly sodium iodide in large scale carried out for the first time during 1916-1920 in USA. The role of iodine in the reduction of goiter established without any side-effects.
- Supplementation of iodine through salt for the control of goiter was introduced in Switzerland followed by Michigan during 1924-1937. The prevalence of goiter and associated disorders fell sharply.
- To evaluate the effectiveness of salt iodization programs a large-scale study organized in 1956 in Kangra Valley – a classical goiter endemic belt of India. A follow up study in 1962 showed a marked decrease in goiter prevalence, ¹³¹I uptake and excretion of iodine had become normal, indicating a state of normal thyroid gland.
- In 1966, injection of iodized oil in a severely goiter endemic residents of New Guinea and a follow up study showed the disappearance of cretinism, survival of the foetus and their brain development, the importance of iodized oil established further.
- It has established that iodine supplementation related to the socioeconomic development of the affected community. It enhances higher work output, reduces the cost of medical and custodial care and reduces educational costs. Such

intervention improves the economic benefits of the livestock population by increased live births, weight, strength and health and better wool coats.

- Excess iodine supplementation is related with further risk of iodide goiter, iodine-induced hypothyroidism, iodine-induced hypothyroidism, iodine induced thyroiditis and thyroid cancer.
- Iodine supplementation programs do not always result in complete eradication of endemic goiter and associated disorders in all areas because of the interference of goitrogen and antithyroid agents found in food that affect the synthesis of thyroid hormone.
- Cyanogenic constituents and flavonoids found in many plant vegetables *viz.* cassava, cabbage, cauliflower, radish, mustard, turnip, sweet potato, bamboo shoots contain the precursor molecules of goitrogenic substances are the common sources of cyanogenic glucosides and glucosinolates while soyabeans, millet, tea, onion, apple, kale, red wine, tofu and grape fruit are the sources of flavonoids containing plants. Most of the plants contain the goitrogenic substances but in different concentrations.
- Successful iodization programme along with identification of region specific environmental goitrogens and appropriate measures to counteract their effects are needed to prevent and control this public health problem.

References

- Bleichrodt, N. Born MP (1994). A meta analysis of research on iodine and its relationship to cognitive development. In: *The Damaged Brain of Iodine Deficiency* (Stanbury JB ed) Cognizant Communication Corporation, 195-200.
- Brauer VF (2006). The role of thiocyanate in the etiology of goiter in an industrial metropolitan area, *Eur. J. Endocrinol.* 154:229-235.
- Briel T, van den, West CE, Bleichrodt N et al (2000). Improved iodine status is associated with improvement mental performance of school children in Benin, *Am J Clin Nutr*, 72, 1179-1185.
- Chandra AK, Bhattacharjee A, Malik T, Ghosh S (2008). Goiter prevalence and iodine nutritional status of school children in Sub-Himalayan tarai (flat land) region of eastern Uttar Pradesh, *Indian Pediatrics*, 45(6):469 – 475.
- Chandra AK, Bhattacharjee A, Malik T, Ghosh S (2009). Etiological Factors for the Persistence of endemic Goiter in selected areas of Siddharthanagar District in eastern Uttar Pradesh, *J of Pediatric Endocrinology & Metabolism*, 22(4):317 – 325
- Chandra AK (2009). Evaluating the efficiency of iodization programs: Impact of iodine prophylaxis on different aspects of life and society, In: Victor R Preedy, Gerard N. Burrow and Ronald Watson, editors, *Comprehensive Hand Book of Iodine*, Oxford: Academic Press, 771-778.

- Chandra AK (2010). Goitrogens in food: Cyanogenic and flavonoids containing plant foods in development of goiter: In Ronald Ross Watson and Nictor R. Preedy, editors, *Bioactive Foods in Promoting Health*, Oxford: Academic Press, 2009, 691-716.
- Chandra AK and De N (2010). Goitrogenic/antithyroidal potential of green tea extract in relation to catechin in rats, *Food and Chemical Toxicology* 48, 2304 – 2311.
- Chandra AK and Ray I (2001). Dietary supplies of iodine and thiocyanate on the etiology of endemic goiter in Tripura. *Indian J Pediat* 68(5) 399-404.
- Chandra AK and Ray I (2002). Evaluation of the effectiveness of salt iodization status in Tripura, north east India. *Indian J Med Res* 115: 22-27.
- Chandra AK, De N and Roy Choudhury S (2010). Effect of different doses of un-fractionated green & black tea extracts on thyroid physiology, *Human and Experimental Toxicology* (In Press).
- Chandra AK, Debnath A, Tripathy S (2008). Iodine nutritional status among school children in selected areas of Howrah district in West Bengal, India. *Journal of Tropical Pediatrics*, 54(1):54-57.
- Chandra AK, Ghosh D, Mukhopadhyay S and Tripathy S (2004). Effect of bamboo shoot, *Bambusa arundinacea* (Retz.) Willd. on thyroid status under conditions of varying iodine intake in rats. *Indian J Exp Biol* 42: 781-86.
- Chandra AK, Ghosh D, Mukhopadhyay S and Tripathy S (2006). Effect of cassava (*Manihot esculenta* Crantz) on thyroid status under conditions of varying iodine intake in rats. *African J Traditional Complementary and Alternative Medicines*.3 (3): 87-99.
- Chandra AK, Lahari D and Mukhopadhyay S (2005). Goitrogen content of cyanogenic plant foods of Indian origin. *J Food Sc. & Tech* 42 (1): 212-218.
- Chandra AK, Mukhopadhyay S, Ghosh D and Tripathy S (2006). Effect of radish (*Raphanus sativus* Linn.) on thyroid status under conditions of varying iodine intake in rats. *Indian J Exp. Biol.* 44: 653-661.
- Chandra AK, Mukhopadhyay S, Lahari D and Tripathy S (2004). Goitrogenic content of cyanogenic plant foods of Indian origin and their anti-thyroidal activity in vitro. *Indian J Med Res* 119:180-185.
- Chandra AK, Singh L H, Tripathy S, Debnath A and Khanam J (2006). Iodine nutritional status of school children in selected areas of Imphal West district, Manipur, North East India. *Indian J Pediatrics* .73:795-798.
- Chandra AK, Singh, HL, Debnath A, Tripathy S, Khanan, J (2008). Dietary supplies of iodine and thiocyanate in the etiology of endemic goitre in Imphal East of Manipur, North East India, *Indian J Med* , 128(5):601-605.
- Chandra AK, Tripathy S, Ghosh D, Debnath A and Mukhopadhyay S (2005). Iodine nutritional status & Prevalence of goitre in Sundarban delta of South 24- Parganas, West Bengal, *Indian J Med Res*.122 (5): 419-424.
- Chandra AK, Tripathy S, Ghosh D, Debnath A and Mukhopadhyay S (2005). Iodine nutritional status & Prevalence of goitre in Sundarban delta of South 24- Parganas, West Bengal, *Indian J Med Res*.122 (5): 419-424.
- Chandra AK, Tripathy S, Ghosh D, Debnath A and Mukhopadhyay S (2006). Goitre Prevalance and the state of iodine nutrition in Sundarban delta of North 24- Parganas in West Bengal, *Asia Pac J Clin Nutr* 15 (3): 357-361.
- De Long GR, Leslie PW, Wang SH et al (1997). Effect of infant mortality of iodination of irrigation water in a severely iodine-deficient area of China, *Lancet*, 350, 771-773.

- Delange F (1996). Administration of iodized oil during pregnancy: a summary of the published evidence, Bull WHO, 74, 101-108.
- Delange F and Hetzel BS (2004). The scientific basis for the elimination of brain damage due to iodine deficiency (ed. B.S. Hetzel, F. Delange, J.T. Dunn, J Ling, V Manner, C. Pandav), Oxford University Press, New Delhi, 151-194.
- Delange F, Thilly C and Ermans AM (1968). Iodine deficiency a permissive condition in the development of endemic goiter, J. Clin Endo and Metab, 28, 114-116.
- Divi R and Doerge DR (1994). Mechanism based inactivation of lactoperoxidase and thyroid peroxidase by resorcinol derivatives, Biochemistry, 33, 9663-9674.
- Djokomoeljanto R (2001). Iodine gives cretin couple normal child, IDD Newsletter, 17(4), 58.
- Ferreira ACF, Neto JC, da Silva ACM et al, (2006). Inhibition of thyroid peroxidase by *Myrcia uniflora* flavonoids, Chem. Res. Toxicol, 19 351-355.
- Food and Nutrition Board IM (1974). Recommended dietary allowances, 8th edition ed. Washington DC: National Academy of Sciences, 1974.
- Gaitan E (1986). In (eds. G. Medeiros-Neto and E Gaitan) Frontiers in Thyroidology, Planum, New York, NY, 19-26.
- Gaitan E, Cooksey RC, Legan J, Lindsay RH, Ingbar SH and Medeiros-Neto G (1994). Antithyroid effects *in vivo* and *in vitro* of babassu and mandioca: a staple food in goiter areas of Brazil, Eur. J Endocrinology, 131, 138-144.
- Gaitan E, Lindsay RH, Reichert RD et al (1989). Antithyroid and goitrogenic effects of millets: Role of C-glycosylflavane, J. Clin Endocrinology and Metabolism, 68(4), 707-714.
- Gaitan E, Medina P, De Rouen Ta, Zia, MS (1980). Goiter prevalence and bacterial contamination in water supplies. J Clin Endocrinol & Metab. 51(5), 957-961.
- Harach HR, Escalante DA, Onativa A, Outes JL, Day ES and Williams ED (1985). Thyroid carcinoma and thyroiditis in an endemic goiter region before and after iodine prophylaxis, Acta Endocrinol (kbh), 108, 55-60.
- Hetzel BS (1983). Iodine Deficiency Disorders (IDD) and their eradication, Lancet, 2, 1126-1129.
- Hetzel BS (1989). The story of Iodine Deficiency- An international challenge in nutrition, Oxford University Press, Bombay, Calcutta, Madras. pp.235.
- IDD Newsletter (2006). Thyroid cancer in Urkanian Children after Chernobyl Accident, 21(1), 43.
- Levin HM, Pollitt E, Galloway R, Mc Guire J (1993). From "Enriching lives", Overcoming Vitamin and Mineral Malnutrition in Developing Countries, World Bank Washington 1994.
- Ma T, Lu TZ (1996). From IDD in China Chapter 16 from SOS for a Billion: The conquest of Iodine Deficiency Disorders, 2nd Edition, Oxford University Press, New Delhi, 293-302.
- Marwah RK, Tandon N, Gupta N, Karak AK, Verma K and Kochupillai N (2003). Residual goiter in the post iodization phase: iodine status, thiocyanate exposure and auto-immunity, Clinical Endocrinology, 59, 672-681.
- Meyer JD, Gaitan E, Merino H, De Rouen TA (1978). Int. J. Epidemiology 7, 25-30.
- Mukhopadhyay S, Ghosh D, Chatterjee A, Sinha S, Tripathy S, Chandra AK (2005). Evaluation of the possible goitrogenic and antithyroidal effect of nitrate, a potential environmental pollutant, Ind J Physiol Pharmacol, 49(3), 284-288.

- National Family Health Survey (NFHS III), 2005-2006, Volume I, IIPS, 2007.
- Osman AK (1981). Bulrush millet (*Pennisetum typhoides*) a contributory factor to the endemicity of goiter in Western Sudan, *Ecol Food Nutr*, 11, 121-128.
- Pearce EN, Lazarus JH, Peter PA, et al (2010). Perchlorate and thiocyanate exposure and thyroid function in first-trimester pregnant women, *J Clin Endocrinol Metab*. 95(7):3207-15.
- Pfannensteiel P (1998). The cost of continuing iodine deficiency in Germany and the potential cost benefit of iodine prophylaxis, *IDD Newsletter* 14(1), 11-12.
- Pharoah, POD, Butfield, IH, Hetzel BS (1971). Neurological damage to the foetus resulting from severe iodine deficiency during pregnancy. *Lancet* 1, 308-310.
- Ravi Kumar (1996). To identify the role of dietary goitrogen in the continued high incidence of neonatal chemical hypothyroidism in certain foci of goitrous region in India Ph.D. Thesis, AIIMS, 203.
- Rose G, Rose M, Skeaff S, Andrew G, Kirstie M and Tea R (2009) Iodine supplementation improves cognition in mildly iodine deficient children, *Am J Clin Nutr*, 90, 1264-1271.
- Sartelet H, Serghat S, Lobstein A et al, (1996). Flavonoids extracted from the Fanieo millet (*Digitaria exilis*) reveal potent antithyroidal properties, *Nutrition*, 12, 101-106.
- Stanbury JB, Ermans AE, Bourdoux P, Todd C, Oken E et al (1998). Iodine-induced hyperthyroidism: occurrence and epidemiology, *Thyroid*, 8, 83-100.
- Stanbury JB, Hetzel BS (1980). Endemic goiter and cretinism. *Iodine Nutrition in Health and Disease*. Willy, New York, NY, pp.1-606
- Thomson CD (2002). Dietary recommendation for iodine around the world, *IDD Newsletter*, 18(3), 38-42.
- Vir Shella (2008). How to increase consumption of iodized salt in India: a situation analysis, *IDD Newsletter*, 30(4), 7-10.
- WHO/UNICEF/ICCIDD (1994). Indicators for assessing iodine deficiency disorders and their control through salt iodization WHO/NUT/ 94.6.
- Zimmermann MB (2009). Research on iodine deficiency and goiter in the 19th and early 20th century, *IDD Newsletter* 32(2), 12-14.
- Zimmermann MB, Jooste PL, Solomon Mabapa N et al (2007). Treatment of iodine deficiency in school children increases IGF-1 and IGFBP-3 concentrations and improves somatic growth, *J Clin Endocrinol Metab*, 92(2), 437-442.

98th Indian Science Congress

January 3-7, 2011, Chennai

II

ABSTRACTS OF PLATINUM JUBILEE LECTURE

PLATINUM JUBILEE LECTURE

Occupational Health Hazards: An Ergonomics Overview

Prof. A.M. CHANDRA

Dept. of Physiology, University of Calcutta
University College of Science
92- A.P.C.Road, Calcutta -700 009

Key words: *Occupational health, health hazards, Disability Adjusted Life Years (DALY), Ergonomic stresses, MSD*

Health at work and healthy work environment are amongst the most valuable assets of individuals, communities and countries. In the light of rapid economic growth and industrial progress in our country, it becomes imperative that safety and health at the workplace be given its due importance. However, with stress being laid on quick profits, safety aspects are generally ignored. It is only with the increase in the number of people killed and injured at workplace that the significance of the problem has been realized.

The rapid industrial growth has introduced new occupational hazards in the country. Every occupation whether working on a machine, carrying out cutting/ welding operations or sitting in front of a computer or working on assembly line has an occupational health hazards, which, if ignored may develop into an occupational disease. In short, no occupation is without an occupational hazard and there is no occupational hazard that is not preventable.

In the last two decades or so, worldwide, there has been much automation, mechanization and increase in usage of computers and video display unit in manufacturing sector and significant rise in the contribution of service sector to the respective country's GDP. The trend has been almost similar in our country. This has exposed the workers to many ergonomic stressors and Low Back Pain has emerged as the single most common musculo-skeletal disorder reported by the workers in the service sector.

Work-related deaths, diseases and injuries remain at unacceptably high levels and result in an economic loss amounting to about 4-5% GDP. The burden of disease from selected occupational risk factors amounts to 1.5% risks of the global burden in terms of Disability Adjusted Life Years (DALY). The World Health Report 2002 places occupational risks as the 10th leading cause of morbidity and mortality. Almost 22.5 million DALY and

699,000 deaths are attributable to these risk factors. According to the Report, work related injuries cause nearly 310,000 deaths each year, and nearly 146,000 deaths are attributable from the region remains largely uncharacterized. South East Asia Region countries had a loss of over 8 million DALYs (27% of the total) and the highest regional burden of disease attributable to occupational risk factors which includes occupational injuries, work place exposure to carcinogens, dust, noise and ergonomic stressors. These afflictions bring hardship not only to the victims but also to their families as most of the affected individuals in the developing countries are in the prime of their lives; they are sole earning member of the family and without social security including insurance.

The occupational health personnel are slowly awakening to the occupational hazards associated with the IT sector. India being the forerunner in the world of IT, is also one of the countries with highest number of white-collar professionals from IT sector complaining of occupational health related problems. An estimated 10.3 million people are suffering from diseases, which they believe was caused or made worse by their current or past work. These problems if ignored can prove debilitating and can cause crippling injuries forcing one to change one's profession. There is an urgent need to understand the dynamics of these problems and prevent it from assuming epidemic proportions. It is important to be aware of the problems and follow required preventive steps to check the progression of various occupational health problems.

In India, occupational accidents, traditional physical and ergonomic hazards and occupational diseases are important factors influencing the health of the industrial workers.

The Occupational Health and Safety Administration (OSHA) prefers to define ergonomic injuries in the context of the accident, that such injuries consist of a "musculoskeletal disorder, Occupational medicine Job-related injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, spinal disk etc..

In general, MSD refers to a group of injuries and illnesses impacting the musculoskeletal systems.

It is also well known that most workplace injuries involve musculo-skeletal disorders. Repetitive movement patterns and habitual working positions, condition of the muscular and nervous system into states of tension that lead to injury. At sub-clinical levels, chronic muscular tension is debilitating, creates pain and depletes the body's energy reserves. At clinically significant levels, heightened muscular tension causes muscle pain, joint compression, and nerve impingements that don't readily yield to manipulative clinical approaches. Another approach is needed.

Too often, people do not correct situations until they have become critical. Habitual tension adds strain to a job, distorts posture, and makes better body-use patterns feel “unnatural”. Often, people do not realize that there is a problem until it has become critical. With repetitive use injuries and lifting injuries, the problem has developed for a very long time before it incapacitates the individual and drops them into a medical situation. Injuries in themselves may leave residual muscular tensions that can lead to further injury.

There are two reasons for this situation: (1) the person has become used to the gradually-accumulating strain and has lost the ability to feel it, and/or (2) he or she does not know what to do about it and so fails to address it effectively. A third possibility is that people do not feel themselves deserving of care for what they feel is developing.

So to ensure a self-enforcing environment, where assurance of occupational health and safety is the norm rather than an afterthought, a positive, strong infrastructure has to be developed. This necessitates a reorientation not only in the minds of the employers and the government, but also in the attitudes of the employees and the general public. An integrated approach is to be adopted to have a healthy and hazard free industrial environment.

98th Indian Science Congress

January 3-7, 2011, Chennai

III

ABSTRACT OF YOUNG SCIENTIST AWARD PROGRAMME

YOUNG SCIENTIST AWARD PROGRAMME

**Monoisoamyl Dimercaptosuccinic Acid: A Novel Thiol
Chelator for Treatment of Chronic Arsenic Poisoning**

Smrati Bhadauria

Division of Toxicology, Central Drug Research Institute,
Lucknow 226 001, Uttar Pradesh
E-mail: smraticdri@gmail.com

Keywords: *Arsenic toxicity, thiol chelator, DMSA, DMPS*

Arsenic contamination in natural water is worldwide problem affecting several regions including India. Existing therapeutic regimen employs administration of thiol chelators such as DMSA and DMPS orally. However poor intracellular distribution renders these agents ineffective against chronic arsenicosis thereby exacting the need to develop more efficacious antidotes. Present study establishes superior efficacy of a newly synthesized, intracellularly distributed thiol chelator viz MiADMSA over conventional I chelating agents. Novel therapeutic strategies such as combination therapy and antioxidant I supplementation were also tested and results revealed their superior efficacy in terms of over all arsenic decorporation and abatement of arsenic toxicity.

98th Indian Science Congress

January 3-7, 2011, Chennai

IV

ABSTRACTS OF SYMPOSIUM/INVITED LECTURES

98th Indian Science Congress

January 3-7, 2011, Chennai

ABSTRACTS OF SYMPOSIUM LECTURES

PROCEEDINGS
OF THE
NINETY EIGHTH SESSION OF THE
INDIAN SCIENCE CONGRESS
CHENNAI, 2011

PART II : ABSTRACTS OF SYMPOSIUM LECTURES

SECTION OF
MEDICAL SCIENCES (INCLUDING PHYSIOLOGY)

President : Prof. Amar K. Chandra

1. Prolactin and Angiogenesis

Kambadur Muralidhar

Hormone Research Laboratory, Department of Zoology,
University of Delhi, Delhi 110 007

Keywords: Prolactin, angiogenesis, peptides, somatostatin, bradykinin

The pars distalis of pituitary has five cell types and lactotrophs secrete mammotropin or prolactin. There are many mysteries about prolactin including its role in the human male, absence of a physiologically relevant bioassay, role of structural microheterogeneous forms in circulation, absence of any deficiency disease in animals and humans etc. Our laboratory has been working on the endocrinology of water buffaloes including studies on prolactin. Our recent studies have shown that naturally occurring size isoforms of prolactin have anti angiogenic activity as measured in CAM assay as well as in Cell proliferation and wound healing assays using human endothelial cell line. When prolactin monomer was cut with Cathepsin, peptide fragments of 14kD size which also exhibited anti angiogenic activity

were obtained. Through bioinformatics tools an internal sequence was located and the synthetic peptide (fourteen mer) bearing this sequence was more active than the gold standard Somatostatin in all the bioassays. The prolactin derived synthetic peptide was found to inhibit the action of VEGF and Bradykinin through inhibition of Nitric Oxide (NO) production. The conformation of a crucial phenylalanine residue appears to be important for activity.

2. Melatonin: A Hormone Acts in Harmony with the Signal of Environment

Saumen Kumar Maitra

Department of Zoology, Visva Bharati University,
Santiniketan, 731 235

Keywords: *Melatonin, photoperiod, pineal, reproduction, rhythm*

Since discovery of melatonin (N-acetyl-5-methoxytryptamine) from the bovine pineal glands, past fifty years have witnessed enormous enrichment of knowledge on its biosynthesis, metabolism, periodicity, physiological and patho-physiological functions, as well as its interactions with other endocrine or neuro-endocrine glands and tissues. Beside pineal gland as the major site of synthesis, melatonin has been detected in the retinae, Harderian gland and gastro-intestinal tracts in vertebrates as well as in a wide variety of organisms ranging from several invertebrates to plants. One of the remarkable features of this tiny tryptophan derivative molecule is that its synthesis takes place during the dark-phase in a light-dark cycle irrespective of the habit and habitat of concerned animals. Extensive research on this unique hormone has demonstrated its wide range of applications in physiology and biomedical fields. Carefully controlled studies in various animals, especially in mammals, have unequivocally proved importance of melatonin not only as a chronobiotic molecule in the synchronization of body functions with the environmental light-dark cycles, but in the mechanism of regulation of a diverse range of body functions ranging from aging to aggression, hibernation to hypertension, sleep to stress, reproduction to tissue regeneration, scavenging of free-radicals to suppression of immune functions as well. Melatonin acts on its target cells/tissues through MT1, MT2 and MT3 transmembrane receptors or through orphan nuclear receptors of the retinoic acid receptor family. Being a lipophilic molecule, melatonin has free access to all cells, all tissues, and all organs of the body and thereby offers an additional receptor independent non-hormonal role of free-

radical scavenger in the reduction of oxidative stress. Current deliberation highlights the recent research on its biomedical importance in humans as well as economically important animals.

3. Challenges in Understanding Complex Interactions between the Brain and Immune System

Edathil Vijayan

Center for Neuroscience, Dept. of Biotechnology,
Cochin University of Science & Technology, Kochi -682 022, Kerala

Keywords: *Neuroscience, gonadotrophin, nitric oxide synthase, nerve cell, behaviour*

Neuroscience is a vast field with opportunities for research in brain function, in diseases and disorders, in brain imaging and in providing important insights into thought, emotion and behavior. Given the brain's staggering complexity, it is hardly surprising that the nervous system can malfunction in countless ways. It's complex network of 100 billion or more nerve cells orchestrates every aspect of our thoughts, perception and behavior. More than anything else, our brain defines who we are. Brain is remarkably plastic and continues to change throughout life in accordance with our experiences. Brain, behavior and environment are all intricately linked in an interactive loop. Immune cells which constitute the body's biological defense against infections and toxins have many things in common with nerve cells. One of the most exciting findings in recent years is that neuroendocrine system and immune system communicate through common biochemical language. Cytokines released from cells of immune system inhibit gonadotrpil releasing hormone (GnRH) release an action similar to that of nitric oxide synthase (NOS) inhibitor. Nitric oxide (NO), an ubiquitous signal molecule, plays a crucial role in a host of biological systems including the brain as a neurotransmitter. Nitric oxide synthase(NOS) inhibitor containing neurons occur in the hypothalamus, where the perikarya are located in paraventricular and supraoptic nuclei , the structure that contain largest quantity of NOS of any organ in the body. When NOS inhibitor and cytokine were added together, both in vivo and in vitro incubation systems there was an additive suppressive effect on GnRH/LH release. Our understanding of these complex interactions between the brain and the immune system is revealing targets for therapeutic intervention. For instance possibility of various vaccines that might arrest or slow the progress of brain tumor growth or Alzheimer's disease and immune therapy

for spinal chord injury are under way. New findings show that some adult brain cells (stem cells) can divide and become new neurons and glial cells allowing scientists to analyze and make progress toward understanding the causes of brain disorders such as Alzheimer's disease and Parkinson's disease.

4. A Homeodynamic Model of Trophoblast Differentiation in Early Gestation: Analysis of Differential Gene Expression

Jayasree Sengupta, Debabrata Ghosh

Department of Physiology, All India Institute of Medical sciences,
New Delhi 110029

Keywords: *Preeclampsia, anti-apoptosis, angiogenesis, oxytocin receptor, trophoblast*

Early placental development is critical for successful pregnancy in the human. Developmental inadequacy in placenta at this stage is associated with more than 50% incidence of pregnancy loss during the first trimester, and also with increased risk of developing several types of complications during later stages of pregnancy like preeclampsia and intrauterine growth retardation. Analysis of relative gene expression in human placental villi during 6- to 8-weeks of gestation revealed that a large number of gene products were over represented by their either up-regulation (70 genes: ~18%) or down regulation (53 genes; ~14%) between 6 and 8 weeks villi samples and these genes are reportedly involved in biological processes like regulation of cell growth and proliferation, anti-apoptosis, angiogenesis, immune and inflammatory responses, extracellular matrix remodeling and multicellular organismal development involving almost all cellular components and molecular functions like signal transduction activity, transcription factor activity, nucleotide and protein binding, ion (especially calcium and zinc) binding and growth receptor activities. Interestingly, four genes (oxytocin receptor, tenascin C, TNF-R1 and retinol binding protein 1) showed differential regulation in human placental villi during 6-8 weeks of gestation, suggestive of an underlying network of regulation involving these factors in the developing placenta. Quantitative analysis of six specific gene products (*CXCR4*, *COL4A4*, *ERBB2*, *HDAC1*, *HPRT1*, and *TNFRSF1A*) by real time RTPCR revealed considerable concordance (> 95% confidence) in pair-wise analysis of transcript profiles. We report for the first time that development of human placental villi show a *steady state expression* of *COL4A4* and *HPRT1* during six to eight weeks of gestation and a *categorical balance* between

the expression of *ERBB2* and *HDAC1* genes affecting cell proliferation and differentiation in one hand, and *CXCR4* and *TNFRSF1A* affecting inflammatory response and apoptosis on the other hand that strongly substantiate the earlier observations from this laboratory that trophoblast growth, differentiation and syncytialization in early gestation involves a complex set of homeodynamics involving proliferation, differentiation and apoptosis.

5. Experimental Hyperhomocysteinemia in Rats: A Model to Explore Molecular Cues to Polycystic Ovary Syndrome

*Syed N. Kabir**, Pratip Chakraborty, Baidyanath Chakravarty

* Reproductive Biology Research, Indian Institute of Chemical Biology,
Jadavpur, Kolkata, P
Institute of Reproductive Medicine, Salt Lake, Kolkata
Email: snkabir@iicb.res.in

Keywords: *Hyperhomocysteinemia, polycystic ovary syndrome, hyperandrogenism, dyslipidemia, insulin resistance, transmethylation, methionine*

Polycystic ovary syndrome (PCOS) is a heterogeneous clinical entity that encompasses a broad spectrum of ovarian disorders and metabolic syndrome including hyperandrogenism, anovulation, insulin resistance (IR), obesity, dyslipidemia, and cardiovascular diseases. The aetiology of the syndrome is unknown and the search for causative genes is proving elusive, but it is generally agreed that hyperandrogenism plays the central role. Experimental induction of hyperandrogenemia, however, develops polycystic characteristics of ovaries, but without the metabolic features. Recent studies document frequent association between hyperhomocysteinemia (HHcy) and PCOS. The present submission demonstrates that a moderate degree of HHcy induced by oral administration of Hcy through drinking water replicates the full morphologic and metabolic spectra of PCOS. Hcy attenuates insulin-mediated cellular uptake of 2-deoxy-D-[1-3H] glucose in a dose-dependent manner. It down-regulates Wnt4 expression and thereby activates glycogen synthase kinase-3 β that inactivates glycogen synthesis pathway and leads to hyperglycemia and glucose intolerance. It is of interest to note that HHcy induces hyperandrogenemia, possibly by way of attenuating Wnt4 signaling cascade, and both HHcy and hyperandrogenemia can individually or collectively attenuate the expression of methylenetetrahydrofolate reductase, the essential enzyme involved in transmethylation of Hcy to methionine to prevent development of HHcy.

HHcy also down-regulates ovarian anti-Mullerian hormone and increases the number of recruited follicles in the growth trajectory, which explains increased expenditure of follicle in PCOS. In conclusion, experimental HHcy in rats develops an array of biochemical as well as ovarian phenotypes that characterize the major morphologic and metabolic tenets of PCOS, and may serve as a useful tool to explore the pathogenesis of the syndrome.

6. Transcriptomics of Endometrial Receptivity in the Rhesus Monkey

Debabrata Ghosh, Jayasree Sengupta

Department of Physiology, All India Institute of Medical Sciences,
New Delhi

Keywords: *Embryo, endometrium, receptivity, mifepristone, transcriptomics*

Endometrial receptivity to blastocyst implantation involves time-synchronous development of endometrium and embryo under adequate progesterone action. We proposed to elucidate the underlying physiological basis of endometrial receptivity using time-course transcriptomics of receptive endometrium collected from proven fecund cycles with and without adequate progesterone action using rhesus monkeys as the primate model. Endometrial samples were collected from mated animals yielding retrievable embryos on days 4 and 6 after ovulation treated with anti-progestin, mifepristone (2 mg/kg body weight, s.c.) or vehicle only on day 2 after ovulation. We have compared transcript profiles using cDNA arrays containing sequence-verified clones for annotated 409 genes between control receptive stage (n=13), and mifepristone-induced desynchronized and non-receptive stage (n=12) endometrial samples collected on days 4 (n=12) and 6 (n=13) after ovulation from mated, potential conception cycles of rhesus monkeys. Of 409 genes, a total of 40 gene transcripts were seen to be affected, 9 gene transcripts in endometrial samples were found to progressively increase between days 4 and 6 following mifepristone treatment, while an additional 5 genes showed differential expression profile depending on day after treatment. Additionally different sets of 12 and 14 gene products showed changes in days 4 and 6 post-ovulation samples, respectively. We report for the first time that a cohort of 28 gene products in receptive stage endometrium was affected by luteal phase mifepristone. Additionally, we observed that a cohort of gene expression was consistent between days 4 and 6 after ovulation in a fecund cycle, while a group of genes showed categorical reprogramming in endometrial transcript expression towards receptivity.

7. Concurrent Dengue and Malaria in an Area in Kolkata during an Epidemic Outbreak of Dengue

A. K. Hati^a, H. Mukherjee, Rajyashree De^c, D. Bandyopadhyay^d,
Bhaswati Bandyopadhyay^c.

^aDepartment of Pathology, The Gautam Laboratories,
9A, Kalikishna Tagore Street, Kolkata 700 007,

^bDepartment of Medical Entomology,
The Calcutta School of Tropical Medicine(CSTM), Kolkata 700 073.

^c Department of Virology, CSTM,

^d Department of Paediatrics,

B. R. Singh Hospital and centre for Medical Education and Research, Kolkata 700 014

Email:ksarkarmail@gmail.com

Keywords: dengue haemorrhagic fever, falciparum malaria, endemic area

In 2005, an epidemic outbreak of dengue fever (DF) and dengue haemorrhagic fever (DHF) occurred in Kolkata, extending from August to the end of the year, claiming 14 lives which corresponded with the peak transmission season of malaria. A prospective study was conducted, involving altogether 868 fever cases of central Kolkata who were investigated for both malaria (by examining thick and thin blood films) and dengue (by MAC ELISA). The aim was to find out concurrent infection of dengue and malaria. In eleven cases concurrent infection of malaria and dengue was detected, seven of those patients were suffering from vivax malaria and four from falciparum malaria. In an endemic area, where both dengue and malaria are active, possibility of such concurrent infection should be kept in mind, for effective treatment at a small delay, to avoid serious complication.

8. BDNF and Melatonin Prevent 6-Hydroxydopamine Induced Dopaminergic Neurons Loss in Rat Model of Parkinson's Disease

Manisha Gautam, Shalu Nim and Bal Krishana

Department of Physiology, Maulana Azad Medical College,
New Delhi-110002

Keywords : 6-hydroxydopamine, brain-derived neurotrophic factor, melatonin

Introduction : Brain derived neurotrophic factor (BDNF) played important role in

prevention of dopaminergic neurons loss against 6-hydroxydopamine (6-OHDA) neurotoxicity in rat striatum. Melatonin rescued striatal dopaminergic neurons death against 6-OHDA treated rats.

Aims: BDNF and melatonin co administration were investigated to gain a better neuroprotective effect on striatal dopaminergic neurons in 6-OHDA induced rat model of Parkinson's disease (PD).

Methods: Fifty Sprague-Dawley rats received injections of BDNF vehicle (5 μ L sterile Dulbecco's phosphate buffer saline, intrastriatum) or melatonin vehicle (1ml, saline, ip) or BDNF (5 mg dissolved in 5 μ L vehicle, intrastriatum) or melatonin (500 μ g/kg, ip) or BDNF & melatonin 2 hours before subsequent intrastriatal injection of 8 μ g 6-OHDA. Various behaviors tests (apomorphine-induced rotational, staircase, stepping, rotarod and postural balance test); histological (Cresyl violet); immunohistochemical (tyrosine hydroxylase, glial fibrillary acidic protein); neural counting and electron microscopic examination were used to evaluate the neuroprotective effect of BDNF and melatonin.

Results: Statistically significant difference was found between post-lesion values of all groups (ANOVA, $p < 0.001$ in apomorphine-induced rotational, staircase and rotarod; $p < 0.05$ in stepping and postural balance test). BDNF and melatonin caused more survival of dopaminergic neurons in the lesioned striatum, compared to that of BDNF or melatonin treated animals.

Conclusions: Taken together, the present study illustrates that BDNF and melatonin are more effective neuroprotective agent than BDNF or melatonin on dopaminergic neurons in rat model of Parkinson's disease. The study revealed possible use of BDNF and melatonin as new neuroprotectory approaches for PD patients in future.

9. A Journey from Cancer to Cancer Stem Cells: An Approach towards a Multifocal Signal Modulation Therapy

Tanya Das

Division of Molecular Medicine, Bose Institute, Kolkata

Keywords: *Apoptosis, angiogenesis, cancer stem cells, drug-resistance, metastasis, signal-modulation*

Cellular signaling pathways are not isolated from each other but are interconnected to

form complex signaling networks that regulate diverse processes, such as cell growth, motility, differentiation, and apoptosis. During the course of tumor progression, cancer cells acquire a number of characteristic alterations in the cellular signaling pathways. These include the capacities to proliferate independently of exogenous growth-promoting or growth-inhibitory signals, to invade surrounding tissues and metastasize to distant sites, to elicit an angiogenic response, and to evade mechanisms that limit cell proliferation, such as apoptosis. Cancer is thus a multiple signal disorder disease that requires modulation of multiple pathways and multiple targets. Utilising plant polyphenols, theaflavins, as the tool we targeted the signaling network responsible for cancer progression by undertaking four approaches. In the first approach, apoptosis could be induced in wild type p53-expressing cancer cells *via* activation of SMAR1-p53 loop that mediates Bax transactivation and stimulation of intrinsic death pathway, while in mutant p53-expressing cancer cells, activation of death receptor-dependent extrinsic apoptotic pathway and inhibition of survival pathway initiated apoptosis. Second approach unveiled that by inhibiting HIF-1 α -induced VEGF expression *via* (i) up-regulation of p53 and (ii) down-regulation of p38 MAPK VEGF, tumor angiogenesis can be blocked. In the third approach, retardation of cancer cell metastasis could be accomplished by (i) disrupting cytoskeletal structure of the cells *via* inhibition of actin filament formation, (ii) up-regulating cell-to-cell adherence protein E-cadherin, and (iii) inhibiting membrane lipid raft-associated integrin-signaling. Our fourth approach divulged that by differentially manipulating ROS-PIASg cross talk, the functional interplay between ATM signaling network can be modulated to mediate ‘resistance to apoptosis’ switchover *via* inhibition of NF κ B-mediated resistance pathway while activation of JNK-dependent apoptotic cascade. Such multiple-signal-modulating property of these plant polyphenols tempted us to search for their effect on “cancer stem cells” (CSCs), which are very recently being considered as the root cause of drug-resistance and metastasis thereby representing a paradigm shift in our understanding of carcinogenesis. Since the current cancer therapeutics mainly kill tumor cells while sparing CSCs, development of CSC-targeted therapies is of utmost requirement for complete regression of cancers. Interestingly, theaflavins efficiently shifted the cellular micro-environment of drug-resistant CSCs towards apoptosis by changing Ras/p53 balance. Outcome of this study might expand our knowledge in developing a multi-targeted signal modulation therapy of cancer using the “user-friendly” active ingredients of the popular beverage black tea and provide a highly potential and effective tool in the hands of clinicians.

10. Application of Chitosan Loaded Antibiotics to Treat the Vancomycin Resistant *Staphylococcus Aureus*

Somenath Roy, Subhankari Prasad Chakraborty

Microbiology and Immunology Laboratory, Department of Human Physiology with Community Health, Vidyasagar University, Midnapore-721 102, West Bengal

E-mail: sroy.vu@hotmail.com

Keywords: *Vancomycin resistant Staphylococcus aureus, nanoconjugated vancomycin, minimum inhibitory concentration, disc agar diffusion, Na-K-ATPase activity*

Staphylococcus aureus causes respiratory tract infection, musculoskeletal infection, endocarditis and skin infection. In 1961 *S. aureus* developed resistance to Methicillin, invalidating almost all antibiotics including the most potent β -lactams. Vancomycin was used for the treatment of Methicillin Resistant *Staphylococcus aureus* (MRSA) in 1980. Vancomycin-resistant *S. aureus* (VRSA) was first appeared in the USA in 2002. Treatment of VRSA is a serious problem in medical practices. Folic acid tagged Chitosan nanoparticles, a biocompatible and biodegradable semisynthetic polymers are used as Trojan horse to deliver vancomycin into bacterial cells. These nano-sized vehicles enhance the transport of vancomycin across epithelial surfaces, and show its efficient drug-action which has been understood from studies of MIC, MBC, DAD of nanoparticle of chitosan derivative loaded with vancomycin. Tolerance values distinctly show that vancomycin loaded into nano-conjugate is very effective and has strong bactericidal effect on VRSA.

11. Effect of Lesion of Different Nuclei of Amygdala on Some Immune Responses in Rats

Tushar Kanti Ghosh, Nilotpal Mondal

Neurophysiology Laboratory, Dept. of Physiology, University College of Sciences & Technology, University of Calcutta, 92, APC Road, Kolkata 700 009

Keywords: *Amygdala, phagocytic activity, LAI, DTH, neuroimmunomodulation*

A modulatory role of different brain areas on immune system has been reported in recent literature. It has been found that the amygdaloid complex is linked with the immune

system. The immunomodulatory role of three nuclei of amygdaloid complex, namely basolateral nucleus (BLA), central nucleus (CA) and medial nucleus (MA) have been investigated by electrolytic lesion method. Total count (TC) of RBC and WBC, differential count (DC) of WBC and Arneth count were investigated before and after lesion of specific nuclei of amygdala. The phagocytic activity of RE cells and WBC of blood, leucocyte adhesive inhibition complex (LAI) of splenic macrophage, and delayed type of hypersensitive reaction (DTH) were measured in control (C), BLA, CA and MA lesioned rats and sham operated rats. TC of RBC and WBC did not show any significant change in BLA, CA and MA lesioned rats. In BLA lesioned rats, percentage of neutrophils was decreased and the percentage of lymphocytes was increased compared to pre-lesioned condition. The percentage of lymphocytes was decreased in CA lesioned rats while DC did not show any significant change in the MA lesioned rats. The percentage of higher lobed neutrophils in Arneth count was increased while 3- and 4-lobed neutrophils were decreased in percentage in BLA lesioned rats compared to pre-lesioned condition. There were no significant changes in Arneth count in CA and MA lesioned rats. LAI was increased in BLA lesioned rats and decreased in CA lesioned rats compared to that of control and sham operated rats. In MA lesioned rats, LAI was not changed significantly. Phagocytic activity of WBC was decreased in BLA lesioned rats compared to that of control and sham operated groups, but it did not change in CA and MA lesioned rats. Phagocytic activity of RE cells was increased in BLA and CA lesioned rats compared to that of control and sham operated groups. In MA lesioned rats, the phagocytic activity of RE cells did not show any change. The DTH was increased in BLA lesioned rats and decreased in CA lesioned rats compared to that of control and sham operated rats. DTH is not altered in MA lesioned rats. The study indicates that three nuclei of amygdaloid complex play dissimilar role on the observed immune parameters.

12. Immune Editing Strategies of Tumor to Evade Immune System

Gaurisankar Sa

Division of Molecular Medicine, Bose Institute, Kolkata 700 054

E-mail: gauri@boseinst.ernet.in

Key words: *IL-10, Immune evasion, FoxP3, Tr1, T-regulatory cells, type-2 cytokine bias*

Immune dysfunction is well documented in cancer patients, and likely contributes to

tumor evasion. Often tumor targets and impairs T cell function to escape from immunosurveillance. This dysfunction includes loss of effector-/activated-T cells, type-2 cytokine bias and T-regulatory (T_{reg}) cell expansion. However, the mechanisms involved in the process of immune-escape still remain controversial. We used multiple experimental systems to show that tumor-shed various soluble factors play critical role in suppression of anti-tumor immunity. One of the factors is pro-taglandin- E_2 , which dampens IL-2g-chain-mediated Jak-3/Stat-5-survival-signaling in T cells. As a result T cells demise. It was also observed that tumor-shed ganglioside-induced oxidative-stress perturbs NFkB, thereby, leaving T cells vulnerable to tumor-secreted TNF α -induced apoptosis. Further investigation revealed that tumor burden up-regulated IL-10-producing Tr1-type FoxP3⁺ T-regulatory (T_{reg}) cells that contributed to type-2 cytokine bias in the tumor-microenvironment. Generally IL-10-producing Tr1 cells best characterized as adaptive T_{reg} cells are essentially FoxP3-negative. In contrast our study identified a novel population of Tr1-type cells to be essentially FoxP3-positive that contributed to IL-10-dependent type-2 cytokine bias in peripheral circulation of breast cancer patients. Captivatingly FoxP3 depletion by RNA-interference resulted in diminished proportion of IL-10 production from these cells. However the full-fledged production of IL-10 in FoxP3-negative Tr1 cells and genome wide analysis of FoxP3 targeted genes rule out any possibility of FoxP3 directly regulating IL-10 gene transcription. Using *co-immunoprecipitation*, *2D-gel electrophoresis*, *MALDI-TOF MS* and *ChIP* analysis we found that in tumor condition FoxP3 associated with Stat-3 to gain access to the IL-10 *loci* and induced chromatin remodeling through increased histone acetylation. These array of events finally enhanced IL-10 production from this population of Tr1-type T_{reg} cells. Together these findings for the first time describe a novel transcriptional mechanism implemented by FoxP3, where failing to achieve direct promoter occupancy, FoxP3 enhanced IL-10 gene transcription in association with a docking molecule like Stat-3.

13. A New Outlook on Therapeutic Hints on the New but Old Diseases – The Scourge to the World

Devavrata Chakravarti

Past President, Medical (Including Physiology) Section,
84th Session of the Indian Science Congress, 1997

Keywords: *immunization, infectious diseases, Similia Similibus Curentur*

Man inherited the dynamic spirit of striving towards better environment from his genes for the struggle of the survival of the fittest.

Every living thing is made of cells, and everything done by the cells that make it up. That is the truth and there are no exceptions; one reliable, unchanging fact is a changing world. These dictatorial cells have total control, even of our bodies, those of such a superior creatures as homo-sapiens; - sapiens of the wisest of wise, a sentient, cognitional creature of supposedly independent will. Yet we don't make a move but that some of the sixty thousand billion cells in our body make it move first.

The prevention of infectious diseases depends on controlling or eliminating the source of infection breaking the chain of transmission or increasing the resisting of the individual to the infection by general means or by immunization.

Effective management logically follows accurate diagnoses. Such logic is often difficult to apply in practice. Absolutely diagnostic accuracy may not be possible, - particularly in the field of primary care, when management has to be an analysis of symptoms and on knowledge of the individual patient and family.

Good management must include knowledge of the nature, course and outcome of the conditions, as well as prominent clinical features and assessment and investigation, but the emphasis on what to do best for the patient.

In spite of all epoch-making discoveries of our men of sciences, and particularly the Medical Science, - the scourge of the modern times, e.g. AIDS, Cancer, Tuberculosis, Kala-azar, Malaria, Chron's Disease, Avian Influenza, Swine Influenza etc. is almost beyond their control.

In such a critical situation, Dr. Samuel Hahnemann's classical law: 'Similia Similibus Curentur' can be the saviour.

14. Melatonin as an Antioxidant

Debasish Bandyopadhyay

Department of Physiology, Oxidative Stress and Free Radical Biology Laboratory,
University of Calcutta, University College of Science and Technology,
92, APC Road, Kolkata 700 009
E-mail: debasish63@gmail.com

Key words: *Melatonin, antioxidant, gastric ulcer, heart disease*

The pineal secretory product melatonin (N-acetyl-5-methoxytryptamine) is a highly

evolutionarily conserved molecule present virtually in all organisms, i.e. in both plants and animals. Melatonin has several important physiological functions in mammals including seasonal reproductive regulation, immune enhancement and regulation of light–dark signal transduction along with the capacity to influence possibly some aspects of aging. In 1993, Tan et al. has shown for the first time that this natural indole has tremendous potential to serve as an antioxidant. Since then, melatonin has been tested in over two hundred different models of oxidative stress and shown to have widespread antioxidant effects in a variety of organ systems. We have also tested melatonin's ability to provide protection against oxidative onslaught in stress and drug-induced gastric ulceration, hypertrophic heart disease and myocardial ischaemia using rat as an animal model. Our results reveal that in these experimental situations, melatonin exerted its protective effects through its direct as well as indirect antioxidant mechanism(s) although mechanism(s) other than this may not be ruled out and needs further investigation. Additionally, in some of our experiments, melatonin was also found to serve as an excellent co-therapeutic. The results emanating from our research and the results of the animal and human studies reported from other laboratories around the globe indicate strongly that melatonin has the capability to provide protection against oxidative stress in different experimental as well as human situations. Since melatonin has no morpho-physiological barrier in the cells and since very high pharmacological doses of melatonin has been reported to be tolerated well by humans without toxicity, it seems that melatonin may be considered as a safe antioxidant for human consumption singly or as an adjunct therapy in various situations where oxidative stress is considered to be involved in the process of initiation and / or progression of the disease.

15. Heat Exposure Response Planning

P. K. Nag

National Institute of Occupational Health (ICMR),
Ahmedabad

Keywords: *Perception of heat stress, heat related morbidity, occupational health, response plan*

Estimated ~48 million people are affected in Asia during the year 2008, due to climatological, geophysical, hydrological and meteorological events. Occupational situations, such as open field farming, glass and ceramic production, molten metal operations, and other hot industrial processes during the extreme heat events are potential risks to people

in the tropics and other regions. Analysis of heat related morbidity and perception of heat stress among men and women in different age groups provides option for epidemiological cross correlation between chronic heat exposure and susceptibility of persons to heat disorders. Under nutrition and environmental heat are interrelated to affect human health, since the effective heat load on the body is relative to metabolic load. Since occupational involvement is imperative, unpredictable heat waves may change geographic risk in certain regions. The occupational and environmental health practitioners have obvious targets to generate experimental data from the heat exposed population from the community and work environment. Integration of geo-spatial and enviro-climatic information, socio-economic data, health outcome and well-being measures has been emphasized in planning response to heat extremes, with reference to morbidity of heat disorders and possible productivity impacts.

16. Effect of Background Colour with Increasing Task Difficulty on Cognitive Performance during Reading on Screen

D Majumdar, J Banerjee, D Bhattacharyya

Defence Institute of Physiology and Allied Sciences, Lucknow Road,

Timarpur, Delhi 110 054

Email: majum55@yahoo.com

Keywords: Background colour, cognitive performance, eye movement parameters

Our perceptual world is greatly enriched by the capacity to perceive through our colour vision. Colour is important not only for judging the identity and state of objects but also for perceiving the spatial structure of scenes. Colors can stimulate, excite, depress, tranquilize, increase appetite and create a feeling of warmth or coolness. Background colour plays an important role in understanding the complexities of visual information in human-computer interface. The present study has been designed to identify the effect of background colour on human cognitive performance with increasing task difficulty during reading on computer screen.

The present study was performed on a group of doctoral student in a national research organisation. Their mean (SEM) age, height, weight were 27.05 (0.59) yrs, 167.5 (2.29) cm, 65.5 (2.31) kg, respectively. All participants were screened for normal color vision. Two background colours were selected (i.e. white and black) for this study. Participants

were requested to perform 'stroop colour test' with two increasing task difficulty levels against two background colours on computer screen. Different eye movement parameters such as pupil diameter, numbers of fixation, fixation frequency, mean fixation duration and total gaze duration were measured with the help of a binocular eye movement recorder.

It was observed that average pupil diameter, fixation frequency and total gaze duration increased significantly in black background colour in comparison to white background colour. Number of fixations and total gaze duration were found to be increased significantly with the increment of task difficulty levels in both background colour. These observations suggest that white background colour is more preferable for presentation of visuals as it demands less cognitive workload for perception of visual information than black background colour.

17. Evaluation of Postural Stress and Physiological Stress of the Workers Engaged In vegetable cultivation

Prakash C. Dhara

Ergonomics and Sports Physiology Division,
Dept. of Human Physiology with Community health,
Vidyasagar University, Midnapore, W.B. India

Keywords: *Vegetable cultivation, posture analysis, physiological stress*

A large number of agricultural workers including women are involved in vegetables cultivation in West Bengal. They have to perform their jobs by putting manual labour and are exposed to different occupational stresses. The present study was aimed to evaluate the postural and physiological stresses of the workers engaged in vegetable cultivation. The study was conducted on 442 (male -219, female -223) agricultural workers doing potato and other vegetable cultivation in different villages of Purba and Paschim Medinipur Districts, West Bengal. For evaluating physiological stress heart rate and blood lactate of the workers were measured during rest and in different hours of the working period. The postural stress was assessed by OWAS method as well as by measuring center of gravity and body joint angles. The job analysis was also made by standard technique. In potato cultivation jobs the OWAS results showed that the workers had the action category 3. It indicated that corrective measures in posture should be taken as soon as possible. The center of gravity was found to be deviated from 6% to 14% in vertical direction in different phases of potato cultivation. The joint angle study revealed that there was a marked deviation

in hip angle (75 - 123 degrees) and shoulder angle (44 - 59 degrees) during performing potato cultivation tasks. The average work pulse in different agricultural tasks was about 28 beats per min and the cardiovascular stress index was varied from 26 to 31 among the agricultural workers. The blood lactate of the workers was found to vary in different tasks. From the job analysis some recommendations were suggested for improving productivity. It was concluded that during performing vegetable cultivation tasks the workers had a great extent of postural and physiological stress. Ergonomic intervention is required for reducing the drudgery of the workers.

18. Health and Fitness Status of Indian White Collar Employees

*Amitabha De*¹, *Iqbal R.*¹, *Bendale K.*¹, *Ghosh S.*, *Mishra W.*¹,
*Parmar V.*¹, *Chandra A. M.*²

¹National Institute of Industrial Engineering (NITIE), Vihar Lake, Mumbai 400 087;

²Department of Physiology, University College of Science, Technology and Agriculture,
University of Calcutta, 92 APC Road, Kolkata 900 009, India

Keywords: *Cardio vascular diseases, white collar employees, dyslipidaemia, physical inactivity*

In India, Cardio Vascular Diseases (CVD) is going to be the largest cause of death in 2020 with 29.6 million projected deaths due to coronary diseases. Half of the deaths are likely to occur among young and middle aged Indians (WHO, 1999, 2004). Studies have shown that the growing burden of CVD is due to the increasing prevalence of cardiovascular risk factors such as diabetes, hypertension, dyslipidaemia, overweight or obesity, physical inactivity and work place stress (WHO, 2004; Reddy, 2006; Mohan, 2008). In view of the above, a study titled 'Health and Fitness Status of Indian White Collar Employees' was taken up. The objective of the study was to find out whether similar problems are present in white collar employees in India. The study was carried out on 110 white collar employees working in several offices in Mumbai. It was found that significant numbers of the study subjects were overweight or obese, diabetic, had high central obesity, high lipid profile and high occupational stress. Study also showed that majority of them consumed high calorie diet and physical fitness levels of most of the subjects were poor. It can be therefore concluded that if precautionary measures are not taken, the prediction of WHO that India will face a serious cardiovascular health related problems cannot be circumvented.

19. Good Design Fundamentals and Ergonomics Health Risks Factors

Debkumar Chakrabarti

Professor, Department of Design,
Indian Institute of Technology Guwahati,
Guwahati 781 039
Email: dc@iitg.ernet.in

Keywords: Design, human compatibility factors, ergonomics risks aspects of design, trust issues

Good design aids human life whereas improper design appears to be troubleshooters and imposes threat to health and causes accidents. Towards preventing anticipated problems design must fulfill a set of context specific human compatibility factors and gain total trust. Clinical rectification steps are to be taken if any mismatch prevails that in long run use creates health problems. This paper analyses the above ergonomics risks aspects with examples of few day to day life used items, and looks into the scope of new design ideation in terms of satisfying the perceived needs as well as some aspects that need to be considered to gain trust through value addition to the existing product employing certain fundamentals of design ergonomics.

20. Transformation of Exercise Physiology in quest of Human Performance, Health and Well-being

Alok K Banerjee

University of Kalyani,
Kalyani, Nadia, West Bengal

Keywords: Exercise & stress, Basic Science to applied research, Health & wellbeing, Life Style

Sports or Exercise Physiology is a special branch of science that deals with structure and function of the human body in relation to exercise stress. Exercise Physiology as an academic field of study consists of three distinct components: 1) a body of knowledge built on facts and theories derived from research, 2) a formal course of study at institutions of higher learning, and 3) professional preparation of practitioners and future leaders in the

field. Exercise Physiology has emerged as a field separate from physiology because of its unique focus on the study of the functional dynamics and consequences of movement.

A brief historical development of the subject right from Galen (131-202 Ad) to late twentieth century advancement will be focused. This will help the listeners to understand modern trend i.e., use of exercise as a therapy. The medical interest in exercise physiology is developing as a separate discipline – clinical exercise physiology.

At this point it is necessary to understand the modern concept of health from traditional view point – a positive view that focuses on our individual attempts to achieve optimum well-being within a realistic frame work. The knowledge of exercise physiology will help to develop physical fitness, an essential component of health. A positive approach towards quality of life can be achieved through well planned life style intervention programme. How LIP can influence on health will be focused briefly.

During the early seventies the application of needle biopsy of percutaneous muscle opened a new horizon and knowledge of muscle bio-chemistry stimulated a wealth of research. Today, the use of stable isotopes to study cellular metabolism in human during rest, exercise and post exercise condition has conceptualized to the further understanding of substrates used during exercise. Similarly, noninvasive techniques such as magnetic resonance (MR) imaging and MR spectroscopy are providing insight into the function and adaptability of skeletal muscle metabolism to different exercise intensities. The future of exercise physiology seems destined to be one of continued increased interest and diversity.

98th Indian Science Congress

January 3-7, 2011, Chennai

ABSTRACTS OF INVITED LECTURES

1. Diabetes Epidemic in India – Genes, Environment or Both

V. Mohan

Chairman & Chief of Diabetologist,
Dr. Mohan's Diabetes Specialities Centre
Madras Diabetes Research Foundation, WHO Collaborating Centre for Non Communicable
Diseases Prevention & Control, IDF Centre of Education,
Gopalapuram, Chennai, India.

Keywords: *Type 2 diabetes adiponectin, PGC-1, TCF7L2, Pro 12 Ala polymorphism*

In India 50 million people are already affected by diabetes and this is expected to increase to 87 million by 2030. The ongoing ICMR – INDIAB looks at the prevalence of diabetes at a national level and confirms high prevalence rates of diabetes both in urban and rural areas. The term “Asian Indian phenotype” refers to the low body mass index threshold for diabetes, occurrence of the disease 2-3 decades earlier compared to Europeans and stronger genetic factors in Indians.

We have identified unique genetic factors predisposing to diabetes in Indians. Studies on the PPAR γ gene showed that the Pro 12 Ala polymorphism which is known to be protective against diabetes in Caucasians, does not offer protection to Indians. We also observed that the Thr394Thr (G→A) polymorphism of the PGC-1 gene was strongly associated with diabetes, as well as body fat, in Indians. The TCF7L2 is also strongly associated with Type 2 diabetes. Finally, a novel intronic polymorphism +10211T->G of the Adiponectin gene was uniquely associated with type 2 diabetes as well as with lower adiponectin levels in Indians.

Environmental factors are also important in causing the diabetes epidemic. The rapid growth of economy has resulted in nutritional transition with changes in eating habits accompanied by a marked decrease in physical activity. We recently reported that the intake of refined grains (white rice) contributes greatly to the diabetes epidemic in India. Thus, our studies have helped to explain why Indians are prone to diabetes and also show that a combination of genetic and environmental factors is driving the diabetes epidemic in India.

2. Alzheimer's - A new approach to Neuroprotection

Debjani Guha

Prof, of Neuroscience S.N.Pradhan Center for Neurosciences,
University of Calcutta, Kolkata 700 020

Key words: *Benincasa hispida*, oxidative stress, colchicine, Radial Y- arm maze

A chain of extensive surveys in developed countries has shown that there is an alarming increase in the occurrence of neurodegenerative diseases through out the world and India is no exception. Studies with Alzheimer's disease (AD) have shown an increase of this disease in the Western World and it is believed that by 2025 there will be a 44% rise in AD in the West especially in USA. The etiology of AD though a mystery, there is evidence, which indicates that defective energy metabolism; excitotoxicity and oxidative damage may be some crucial factors. In traditional system of Indian medicine certain Indian plants are used for the management of various disease processes. These plants have been reported to possess strong antioxidant activity. In the present study, a common plant used as food has been selected to determine the possible protective effect in colchicine induced rat model of AD as it has already been reported to possess strong antioxidant property.

In the present study, neuroprotective role of *Benincasa hispida* (BH) was evaluated in colchicine infused and hypobaric hypoxia exposure animal Alzheimer's model. Result showed impairment of memory (RAM task) in colchicine infused group and hypobaric hypoxia which can be related with the destruction of cholinergic neurons in dentate gyrus of hippocampus. Other than Cholinergic neurons, brain monoamines that are involved to exert modulatory functions in memory processing are also damaged on ICV infusion of colchicine. The impairment may be due to induction of oxidative stress in both conditions. Treatment with BH (400mg/kg b.w) fruit pulp increased SOD and Catalase activity and decreased LPO together with decreased destruction of cholinergic neurons as evident by increased ChAT activity in hippocampus and cerebral cortex. APP protein and NFT accumulated in the perikarya and in the proximal neurons after colchicine infusion and hypobaric hypoxic stress and they decreased after BH administration.

The present study also reported that BH fruit pulp extract exerts differential effects on monoamine levels in different regions of central nervous system after administration of colchicine and in hypobaric hypoxic exposure.

Our work is supportive from EEG studies in which alpha, beta and delta wave frequency was markedly suppressed in Alzheimer models in rats and spike wave pattern

was prominently increased. Treatment with BH showed an increase in beta wave with few alpha waves in the EEG, thus implicating an effective neuroprotective role of BH to improve coordinated and integrated function of the brain.

3. Food and Nutrition are Primarily Responsible for Health and Disease

T. K. Das

Bangalore

Keywords: *Food, nutrition, adaptation health, disease*

It is essential to have nutritionally balanced proper food for maintaining good health, physique, activities and long life. Just filling up belly with whatever available, or whatever one wants to have, will not necessarily give good health. Major effects (good or bad) on health and physique can be traced to dietary Intake in proper perspectives.

There are differences of opinion amongst the scientists about nutritional requirements for growth, production and activities for various physiological systems and different ethnic Population. Moreover most wondering question is about the roles of vast and various microbes present in our system.

Merely presence of chemically estimated nutrients in the food may have little relation with their biological availabilities. Biological interferences can be due to the antinutritioal factors naturally present or part of agricultural procedures or systemic and procedural shortcomings.

Our ancestors, Homosapians' life were feast or fast. Due to evolutionary development our physiological and anatomical systems can accept very limited amount of food with concentrated and essential nutrition at regular intervals. However the great scientist, Lamarck's observation" The Law of use and Disuse" constantly reminds us about our regular physical activities and culture.

Present day there is a vast gap of scientific knowledge regarding the nutritional adaptation to various foods intake by individual person or group of people in different ethnic regions. To study the mechanism of nutritional adaptations for maintaining long healthy life is a scientific curiosity and its unfolding of mystery is a great challenge before us.

4. The Art and Science of Lie Detection

Tapas Kumar Bose

Department of Forensic Medicine,
N.R.S. Medical College, Kolkata

Keywords: *Lie detection, psychology, polygraphy, narco analysis, brain mapping, Fingerprinting, functional MRI*

Lie is misuse of energy. According to the American Heritage Dictionary, a lie is a false statement deliberately presented as being true; a falsehood or something meant to deceive or give a wrong impression. The emphasis on the person's intent is very important

Many philosophers (e.g. Kant, Thomas Aquinas) prohibited lying, even if it meant death.

- Lying is a misuse of the human faculty of speech.
- Lying undermines trust, which is essential to the community.
- Lying undermines others; Lying makes a decision for the other person, rather than letting him/her decide based on facts.

Others defend lying, such as telling a cancer patient that you have a simple tumor

Detection of lie

- Liars will look different ONLY when the following two conditions are fully met:
 - a) The person is deliberately and knowingly telling a lie.
 - b) The person thinks lying is wrong.

People who do not believe that lying is wrong will show few, if any, detectable signs of arousal. Psychopaths, criminal or not, are incapable of empathy or guilt. Therefore, they do not perceive that harming others is a problem, and will be effective liars. Detecting lies in people you know is FAR easier than detecting lies in a stranger. When dealing with strangers, use baseline questions that nobody would lie about to establish "normal" behavior.

Lie Detection Tests :

1. Polygraph tests are reliable about 65% of the time, even when conducted by experts. Consequently, they are not admissible in court.

2. “Truth serum” (Narco Analysis): More recently researches towards the development of new and effective drugs are based on the linkages between the bio-molecule responsible for a particular bio-activity and the drug
3. Brain mapping: Glucose activity increases in the part of brain used. Activity is detected by a PET scan. Different tasks like creating and memory produce different brain activity.
4. Brain fingerprinting the fundamental difference bet. The perpetrator of a crime and an innocent person is that the perpetrator having committed the crime, has the details of the crime stored in his memory, and the innocent suspect does not. This is what Brain fingerprinting testing detects scientifically, the presence or absence of specific information.
5. fMRI: imagined events are identical. Cannot detect lies by omission Brain activity during the processing of real memories and can detect if a person is thinking about a place versus a face can detect extra brain activity required by lying.

Different available methods their merits and demerits will be discussed towards the goal of lie detection which is an essential component in many aspects of life particularly in the field of criminology.

5. Etiology and Epidemiology of Mycetoma

Pankaja Lakshmi V. Venugopal

Tamilnadu Dr. MGR Medical University, Chennai 600 032,
Medical Services & Research Center, Bhagavan Sri Dhanvanthri Foundation,
MAA Pharma (IND), Chennai.600 041

Key Words: *Etiology, Epidemiology, Mycetoma, am p;nb sp*

Mycetoma is a chronic, suppurative, granulomatous disease of the subcutaneous tissues and bones. It is characterized by localized swellings with multiple sinuses discharging granules or grains that are the microcolonies of the causal agents. The etiologic agents range from bacteria (actinomycotic mycetoma) to fungi (eumycotic mycetoma) existing in nature as soil or plant saprophytes and enter the tissues through abrasion or implantation. Actinomycotic mycetoma is caused by aerobic species of actinomycetes belonging to the

genera *Nocardia*, *Streptomyces* and *Actinomadura*. Eumycotic mycetoma is associated with a variety of fungi, the most common are *Madurella mycetomatis*, *Pseudallescheria boydii* and *Acremonium* species.

Though mycetoma has been reported from all over the world, it is endemic in tropics and subtropical regions. The species responsible for mycetoma varies from country to country and the agents that are common in one region are rarely reported from others. Climate exerts some influence on the prevalence of the disease and distribution of the causative agents.

The disease is predominantly seen in the age group 21-40. Men are more frequently affected than women and the commonest site of the lesion is foot. Diagnosis is established by identifying the type of the granules found in the discharge which guides the treatment. The morphologic appearance of the granules in tissue sections is characteristic for most of the species of the causative organisms. Confirmation is obtained by isolation of the infecting agents. Fine needle aspiration cytology is useful for routine diagnosis and epidemiological surveys. Serologic tests are useful in very early stages of the disease.

Early, specific diagnosis is imperative for appropriate therapy and consists of prolonged course of antibiotics or antifungal drugs often combined with surgery. Since trauma, often inflicted by a thorn is generally found to be the basis of mycetoma, advice of foot-wear should be a practical control measure.

Ramendra Sundar Sinha Oration Lecture (PSI)

6. Immunological Profiles in Post Kala-Azar Dermal Leishmaniasis

J. P. Halder

Department of Physiology,
Bangabasi Evening College, Kolkata

Keywords: *Kala-azar, leishmaniasis, anti-leishmanial, PKADL*

The present resurgence of kala-azar(KA) in the eastern part of India has claimed many human lives and caused a major public health problem in this area. The reservoir of the causative parasite, *Leishmania donovani* is believed to be the persons known as 'post kala-azar dermal leishmaniasis' (PKADL) cases. In 1922, Sir Upendra N. Brahmachari

established that 10 to 20% of the treated KA patients developed the dermal lesions containing *L. donovani* within 1 to 2 years of their recovery from visceral infection, as a sequel to KA. PKADL patients do not have any visceral infection of the parasite. The apparent change in the viscerotropic properties of *L. donovani* to dermatotropism is believed to be induced by the immunoregulatory mechanisms in cured KA patients. A number of such PKADL patients were studied with respect to their humoral and cell-mediated immune responses against the parasite. Circulating anti-leishmanial antibodies could be detected in most of the patients by employing ELISA technique. Unlike the active visceral leishmaniasis (KA) cases, the majority of the PKADL patients exhibited positive lymphocyte sensitivity against *Leishmania* antigen as determined by lymphocyte transformation tests in vitro and delayed type skin hypersensitivity reaction in vivo. Interestingly, some patients, living in the same endemic area, with no history of kala-azar, developed dermal lesions containing *L. donovani* and exhibited similar immune responses. Chemotherapy resulted substantial diminution of skin lesions in all these patients with concomitant decrease in circulating anti-leishmanial antibody levels. PKADL is a state of 'premunition' resulted by the immunological modulation during the host-parasite interaction. Treatment of these patients must be taken up, along with the kala-azar, for an effective eradication of clinical leishmaniasis from India.

7. Prevalence Pattern of Obesity among Adults in Thiruvananthapuram

Shyamala Chellammal

Kerala Agricultural University
Email: schellammal@hotmail.com

Keywords: BMI, WHR, TLC

There has been a rise in prevalence of obesity and life style diseases in India especially in Kerala. Obesity if not checked properly will lead to a host of life style diseases. In the present study the prevalence of obesity and over weight was assessed among adult population in the urban and rural area of Thiruvananthapuram. 800 adult populations were so far screened. Body Mass Index, Waist Hip Ratio and the Body Fat composition were assessed. The result revealed that 20 - 25% of the study population was either over weight or obese,

which indicate that there will be a rise in the prevalence of Life style diseases also in the near future. Counselling on Therapeutic Life Style Modification was given to the group and the reduction in BMI, WHR and Fat composition will be assessed after 3 months.

8. Familial Risk for Diabetes in U.S. Adults: A 6-Year Results From the National Health and Nutrition Examination Survey (1999-2004)

Arnab Ghosh

Biomedical Research Laboratory, Department of Anthropology,
Visva Bharati University, Sriniketan 731 236, West Bengal
Email: arnab_cu@rediffmail.com

Keywords: *diabetes, family history, US-NHANES, obesity, odds ratio*

We examined the utility of a three-level familial risk stratification system as a screening tool for diabetes in a nationally representative sample of the U.S. adult population. The National Health and Nutrition Examination Survey (NHANES, 1999-2004) data were used to assess the prevalence and distribution of familial risk for diabetes, the association between three levels of familial risk and undiagnosed diabetes, and the use of familial risk as a screening tool for diabetes, alone and in combination with body mass index and age. The prevalence of undiagnosed diabetes was 3% and increased with increasing familial risk (average = 2%, moderate = 4%, high = 10%). High familial risk was significantly associated with undiagnosed diabetes (adjusted odds ratio = 4.6; 95% confidence interval: 1.9–11.3). The use of a three-tiered familial risk stratification for diabetes screening yielded higher specificity (94%) and positive predictive value (9.9%) for high familial risk than body mass index (BMI) ≥ 25 specificity = 38%, positive predictive value = 4.2%). High familial risk and body mass index ≥ 25 combined had higher specificity (97%) and positive predictive value (13.4%); the addition of age ≥ 45 years further improved positive predictive value (21.0%) without reducing specificity. It seem reasonable to argue that there was a strong and proportional association between familial risk and undiagnosed diabetes, suggesting that a three-tiered (stratified) assessment of familial diabetes risk may increase the effectiveness of diabetes screening.

9. Homoeopathy-Yoga-Diet Therapy – A Path of Cancer Treatment

*Pradhan Ashoke Kumar, Pradhan Amalendu,
Ghosal Kajal, Paul Dharendra Nath*

Institute of HYDT Research & Education,
487, Rabindra Sarani, Kolkata - 700 005

Keywords: *Cancer, Similia Similibus Curantur, chemotherapy, radiotherapy*

Now a days Cancer is the second leading cause of death and is a challenge to the nation and as well as all oncologists & surgeons. To meet this burning problem, Homoeopathy has a great role to combat against cancer in a gentle, harmless and economically viable way. In Homoeopathy, we treat the patient and not the disease itself, based on “Similia Similibus Curantur” and in an individualized, constitutional, miasmatic, holistic approach considering the totality of symptoms comprising the disease symptoms, family history, past history, personal history & mental symptoms of the individual cancer patient.

The purpose of this presentation is to search and review the related homoeopathic medicines to treat the common cancers along with dietary regimen and exercises.

In this presentation, the investigator would like to enlighten the efficacy of homoeopathic treatment in cancer patients before and after chemotherapy, radiotherapy and surgery. It will also provide a guideline on homoeopathic remedies with - a statistical analysis.

10. Effect of Tulsi (*Ocimum Sanctum* Linn) on Clinical and Biochemical Parameters of Metabolic Syndrome

D. K. Devra, K. C. Mathur*, R. P. Agrawal, India Bhadu,
Vivek Agarwal, Shekhar Goyal*

*Department of Physiology, S.P.Medical College,
Bikaner Diabetes Care and Research Centre, S.P.Medical College, Bikaner

Keywords: *metabolic syndrome, Tulsi plant, eugenol, hypertension, dyslipidemia*

Introduction: Metabolic syndrome can be defined as a set of symptoms which occurs together and usually associated with a risk of coronary artery disease, hypertension,

hyperlipidemia, hyperglycemia and obesity. Insulin resistance is the main feature of this syndrome. Eugenol is a phenolic compound and major constituent of essential oils extracted from different parts of Tulsi plant. Its therapeutic use has been established on the basis of several pharmacological studies related with hyperglycemia, hypertension and dyslipidemia.

Purpose: To investigate the effect of Tulsi on clinical and biochemical parameters of metabolic syndrome.

Material and Method: 100 patients randomly selected for this study, further categorized in 2 groups, group I (control group i.e. Placebo) and group II (study group i.e. Tulsi extract). Patients were asked to take 5ml of Tulsi extract two times a day for three months. Baseline parameters were taken for every patient i.e. BMI, W/H Ratio fasting blood sugar, blood pressure, HbA_{1c}, lipid profile. Biochemical and anthropometric data were also recorded at the end of the study.

Results: On comparing control and study population for effect of Tulsi therapy, an improving trend was observed in study group. BMI (28.11 ± 2.65 to 27.10 ± 8.64 kg/m², $p < 0.5$), SBP (150.20 ± 3.88 to 138.68 ± 9.84 mmHg, $p < 0.001$), DBP (94.98 ± 4.04 to 87.12 ± 8.81 mmHg, $p < 0.001$), glycemic control - FBS (202.52 ± 39.87 to 155.28 ± 20.70 mg/dl, $p < 0.001$), HbA_{1c} (7.93 ± 1.40 to $7.34 \pm 0.89\%$, $p < 0.05$). Lipid profile - total cholesterol (256.50 ± 24.70 to 209.28 ± 29.03 mg/dl, $p < 0.001$), triglyceride (175.10 ± 18.53 to 138.32 ± 15.17 mg/dl, $p < 0.001$), HDL (33.74 ± 4.31 to 39.36 ± 4.25 mg/dl, $p < 0.001$), LDL (167.05 ± 10.33 to 42.11 ± 27.50 mg/dl, $p < 0.001$), VLDL (33.23 ± 1.85 to 27.66 ± 3.03 mg/dl, $p < 0.001$).

Conclusion: In metabolic syndrome, Tulsi therapy significantly reduces blood glucose, blood pressure and lipid profile. It shows the therapeutic effect of Tulsi and it may be used as an adjunct with diet and drugs in management of metabolic syndrome.

11. Assessment of Ovarian Reserve in Fertile and Subfertile Women South Indian Population

Saikumar. P , Prabhu K, Kalaiselvi

Sree Balaji Medical College & Hospital,
Chennai

Keywords: AMH, ovarian reserve, AFC

Women are born with finite number of oocytes, and an estimate of total follicular

cells in both ovaries is called ovarian reserve. Assessment of ovarian reserve reflects the reproductive potential of woman and this work focuses on assessing it in both fertile and subfertile population. 100 women of which 50 fertile group and 50 sub fertile group in the age group 23-30 were chosen in this study. In each group they were divided into women having regular and irregular cycle. In all subgroups ultra sonographic assessment of ovarian reserve like ovarian volume, Antral follicular count and Day-3 hormonal assessment like FSH, E2 and AMH were taken. Increase in ovarian volume and AFC were seen in women belonging to fertile group with regular cycle. Elevated levels of FSH, decreased AMH were seen in subfertile women having regular cycle. Appropriate timing of FSH measurement is difficult for women with irregular period. AMA levels were found to be three times higher in women having irregular cycle with PCOS. So all the tests of ovarian reserve reflects oocyte quantity but not its quality. So these tests to predict ovarian reserve can be of good diagnostic purpose and to prove the prognosis of ovarian reserve in reflecting reproductive potential.

12. Remodelling of the Extracellular Matrix and Accelerated Collagen Degradation Cause Ventricular Dysfunction in Hyperthyroid Rat Heart

*Arun Bandyopadhyay, Sreerupa Ghose Roy, Dipak Kar,
Aditya Konar, Monodeep Biswas*

Indian Institute of Chemical Biology,
4 Raja S. C. Mullick Road, Kolkata 700032

Key Words: *Hyperthyroidism, 3,5,3' triiodothyronine (T3), doxycycline, MMPs*

Hyperthyroidism has profound influences on the cardiovascular system. Although, ventricular performance is initially enhanced, however, chronic hyperthyroidism, if untreated, results into myocardial remodelling, hypertrophy, abnormal heart function and ultimately leads to heart failure. Here we have tested the hypothesis that excessive degradation of collagens in the myocardial matrix is causally responsible for altered cardiac function and cardiovascular hemodynamics due to hyperthyroidism. Heart functions, cardiac remodelling and matrix metalloproteinases were examined in rats treated with 3,5,3' triiodothyronine (T3, 8 µg/100 g body weight, i.p) for 15 days in the absence or presence of global matrix metalloproteinase inhibitor, doxycyclin (35 µg/100 g body weight, i.p). Co-treatment with

doxycycline, partially inhibited T3-induced cardiac hypertrophy and brain natriuretic peptide (BNP) expression. Treatment of rat with T3 resulted into increased heart beat, increased cardiac output and improved systolic function compared to control after 15 days. Doxycyclin restored heart beat and cardiac output nearly to the normal level. Collagen deposition in the ECM of the left ventricle was decreased by T3 which was restored to the normal level when co treated with doxycycline. Protein levels of collagen I and III were decreased whereas the mRNA levels were significantly increased in T3 treated rat heart compared to control. The activities of MMP1 and MMP 13 were significantly increased by T3 and doxycycline prevented such rise. The present study demonstrates that thyroid hormone alters ECM by differential regulation of MMPs and collagen metabolism. Therefore, antifibrotic effect of thyroid hormone may contribute to excessive degradation of ECM and ventricular dysfunction.

13. Differential endocrine response during exposure to simulated high altitude

Dishari Ghosh

Endocrinology and Metabolism Laboratory,
Defence Institute of Physiology and Allied Sciences,
Defence Research and Development Organization, Lucknow Road, Timarpur, Delhi 110 054

Keywords: *Hypoxic stress, catecholamine, corticosterone, ACTH, CBG, testosterone*

High terrestrial altitude is generally characterized by low barometric pressure (hypobaria), low partial pressure of oxygen (hypoxia), severe cold and low humidity. High-altitude illness is a spectrum of disease related to hypobaric hypoxia and its consequences. The reduced availability of oxygen owing to low barometric pressure is the basic problem associated with high altitude and the adaptive processes to hypoxia imply complex modifications in the homeostatic steady state of several endocrine and metabolic functions. But, there are large and enduring differences between individuals in the magnitude of their response to stress.

In the present study, we determined hypoxic gasping time as a measure to assess the degree of tolerance of animals to hypobaric hypoxia by exposing the animals to a simulated altitude of 10,668 m at 32° C and animals were categorized as low and high tolerant

groups. There were distinct individual differences in response to hypoxic tolerance test and that may be mainly due to varying reactions occurring at the level of regulatory systems, the hormonal system in particular. The hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system are the principal neuroendocrine systems responsible for physiological adaptation to stress. Epinephrine and norepinephrine are released almost immediately from the sympathetic nervous system in response to a stressor. There was a significant increase in plasma norepinephrine concentration ($p < 0.05$) in high tolerant group than low tolerant rats. The most common indicator of stress routinely measured is the serum level of corticosteroid which is considered to be the stress hormone and plays a key role on adapting the animal to stress. After hypoxic tolerance test, total circulating corticosterone (CORT) level also increased but this increase was not significant between the two groups of rats. CBG concentration differ significantly ($p < 0.05$) in different groups of rats resulting in the observed changes in circulating free CORT that in turn may be responsible for individual differences in hypoxic gasping time. Significant differences ($p < 0.05$) were also observed in prolactin and testosterone levels of both the groups. These data indicate that multiple components of the stress response are providing a basis for individual differences in physiological responses to stress.

14. The State-Of-The-Art of Emergency Contraception with Cutting Edge Drug

Narendra Nath Sarkar

Department of Reproductive Biology

AIIMS, New Delhi

Email: N_N_Sarkar@Yahoo.Co.In

Keywords: *Prms, agonist, antagonist, abortifacient, receptor, ovulation, endometrium*

The Objective Of This Study Is To Evaluate And Elucidated The Potential Of Progesterone Receptor Modulators (Prms) To Be An Effective Emergency Contraceptive Drug. The Data Are Extracted From the Literature through the MEDLINE Database Service from 2000-10. The Prms Are In Fact Progesterone Receptor Ligands That Could Bind To Progesterone Receptor (PR) And Exert Antagonistic, Agonistic Or Mixed Agonistic-

Antagonistic Effects. About A Dozen Of Prms Have Been Tested Or Evaluated To The Significant Extent. These Prms Are Mifepristone, Onapristone, Asoprisnil, Ulipristal, Proellex And Some Other Compounds. Currently Developed Prms May Exert Contraceptive Effect By Blocking Ovulation And Endometrial Desynchronization. Their Potential Clinical Applications Are Manifold. Prms May Be Administered Though Oral, Vaginal, Intrauterine Or Subdermal Routes And Are Very Promising In Major Public Health Areas. Low-Doses of Prms Retard Endometrial Maturation without Affecting Ovulation. Here Is The Prospect For Development Of Endometrial Contraception. Unfortunately, This Approach Is Not Found Very Promising In Women But Works Well In Monkeys. Mifepristone Is Not Very Effective For Prevention Of Pregnancy But With Prostaglandin Acts As An Excellent Abortifacient, However, Fails To Compete With Levonorgestrel As EC Because Of Delay In Onset Of Next Menstrual Cycle And Negative Abortion-Related Image That Has Affected Its Development And Acceptability As EC. Further Studies Are Needed To Explore The Potential Of Other Prms Or Selective Prms To Be An Effective Emergency Contraceptive Drug.

15. Identification and Characterization of Gene Expression and Protein Processing in Bovine Endometrium in Association with Recognition and Establishment of Pregnancy

S. Mondal, S. Nandi, P. Chapdelaine*, M. A. Fortier*

National Institute of Animal Nutrition and Physiology,
Adugodi, Bangalore 560 030;

* *Département d'Obstétrique et Gynécologie,*
Centre de Recherche en Biologie de la Reproduction,
Université Laval, Ste-Foy, Québec,
Canada G1V 4G2

Keywords: *Prostaglandin E synthase, prostaglandin F synthase, LPS, TNF α , IFN- γ , EPA, DHA, LNA*

Prostaglandins (PGs) are the notorious mediators of maternal recognition of pregnancy, implantaion, decidualization and parturition in bovines. The production of PGs is primarily dependant upon two rate limiting enzymes viz., cyclooxygenases -1 and -2 (COX-1 and 2).

The down stream enzymes, prostaglandin E synthase (PGES) and prostaglandin F synthase (PGFS), catalyze the conversion of PGH_2 to PGE_2 and $\text{PGF}_{2\alpha}$, respectively. $\text{PGF}_{2\alpha}$ acts as the luteolytic agent to control estrous cycle whereas PGE_2 plays a major role in blastocyst hatching and implantation in ruminants. Recognition and establishment of pregnancy depends on the regulation of balance between PGE_2 and $\text{PGF}_{2\alpha}$. Various modulators viz., lipopolysaccharide, $\text{TNF}\alpha$, hormones (oxytocin, estrogen and progesterone) and IFN-i alter prostaglandin biosynthesis during estrous cycle and early pregnancy in bovines either by up-regulation or down-regulation of expression of PTGHS, PGES and PGFS genes, alteration in critical enzyme coupling or as in the case of fatty acids (AA, EPA, DHA, DGLA, linoleic acid, linolenic acid) by producing PGs with altered relative potencies. Expression of PGES mRNA has been found to increase in presence of IFN-i in epithelial cells and LPS, $\text{TNF}\alpha$ and IFN-i in bovine endometrial stromal cells. It has been observed that oxytocin induced the production of $\text{PGF}_{2\alpha}$ and expression of COX-2 gene by endometrial epithelial cells in vitro. In contrast, IFN-i decreased the production of $\text{PGF}_{2\alpha}$ in a dose dependent manner. Interestingly, $\text{TNF}\alpha$ has been found to stimulate $\text{PGF}_{2\alpha}$ production only in stromal cells via the activation of PLA2 and nitric oxide synthase. Although both oxytocin and $\text{TNF}\alpha$ has been observed to alter $\text{PGF}_{2\alpha}$ output at the follicular phase, $\text{TNF}\alpha$, in contrast to oxytocin, also modulate PGF_{2a} output at the mid and late luteal phases. Oxytocin had also been found to increase the production of PGF_{2a} in epithelial cells in presence of PGF_{2a} receptor antagonist (AL 8810; 10 μM and 25 μM) but the production was more with 10 μM AL 8810 treatment group. Similarly, OT increased the production of PGE_2 in presence of 10 μM AL 8810 in endometrial epithelial cells. The expression of COX-2 protein increased by treatment of AL8810 in presence of OT and OT+IFN but decreased in presence of IFN alone. Progesterone stimulated basal $\text{PGF}_{2\alpha}$ production by the endometrial cells and tissues but it inhibited oxytocin induced $\text{PGF}_{2\alpha}$ secretion. Although estradiol decreased basal $\text{PGF}_{2\alpha}$ production by down-regulating COX-2 mRNA, it increased oxytocin stimulated $\text{PGF}_{2\alpha}$ production in cultured bovine endometrial cells. Recent studies have shown that polyunsaturated fatty acids (EPA, DHA, LNA) altered the secretion of $\text{PGF}_{2\alpha}$ and expression of COX-2 and cPLA-2 in bovine endometrial cells. Interestingly, it has been observed that dietary supplementation of polyunsaturated fatty acids alter prostaglandin biosynthesis in bovine uterus and influence embryo survival. Exploration of molecular regulatory mechanisms involved in prostaglandin biosynthesis will lead to develop diagnostics for pregnancy recognition and/ or novel gene based therapies for ameliorating early embryonic wastage in bovines.

16. Identification of Key Molecules Involved In the Regulation of Sperm Motility during Epididymal Transit

*Sandhya Rekha Ddung, Sujoy Das, Kaushik Das ,
Gopal Chandra Majumder**

Indian Institute of Chemical Biology, 4, Raja S. C. Mullick Road,

Jadavpur, Kolkata 700 032, West Bengal;

*Center for Rural and Cryogenic Technologies,

Jadavpur University, Kolkata 700032

E-mail: srdungdung@iicb.res.in

Keywords: *Epididymis, spermatozoa, motility regulator, motility promoter, motility inhibitor*

Spermatozoa undergo a maturation process and acquire motility and fertility as they migrate from the proximal to the distal end of the long convoluted tubule known as the epididymis. The microenvironment of various regions of the epididymis together allows involvement of segment-specific expression of secretory proteins and cellular proteins to respond uniquely to external stimuli and novel mechanisms the epididymis uses to deliver and remove proteins from the epididymal lumen. Studies from our laboratory have identified and characterized a few unique sperm motility regulator proteins/glycoproteins molecules on sperm outer surface and epididymal plasma using goat as the model. A 125 kDa motility initiating protein (MIP) has been purified from goat epididymal plasma that promotes motility of mature sperm and initiates forward motility in the immature (immotile) caput-epididymal sperm. We have demonstrated a 98 kDa sperm motility inhibiting glycoprotein factor (MIF) in sperm plasma membrane of goat spermatozoa. Very recently a 160 kDa potent sperm motility-inhibiting protein factor (MIF-II) has been purified and characterized from epididymal plasma (EP) of caprine cauda epididymis. The purified protein factors have the potential of sperm motility inhibition and may serve as a vaginal contraceptive. The antibodies raised against the motility inhibitors have the potential for enhancement of forward motility of the cauda-spermatozoa. This antibody may thus be useful for solving some of the problems of human infertility due to low sperm motility. A D-galactose- specific lectin and its receptor have been purified to apparent homogeneity from goat epididymal sperm plasma membrane and characterized. The cell-surface lectin specifically interacts with receptor of the neighboring cells to cause autoagglutination demonstrated in the mid-phase of the maturing

epididymal spermatozoa in vitro. Synchronous modulation of homologous cell surface lectin and their receptor as noted during sperm maturation constitutes a novel mechanism for cellular regulation by manipulating lectin-sugar interaction.

17. Nutritional Status, Dietary Intake and Onset of Menarche among Socio-economically Backward Adolescent Scheduled Caste and Scheduled Tribe Female Subjects of Birbhum District of West Bengal

Krishna Roy

Hooghly Mahasin College, Hooghly,
West Bengal

Keywords: *BMI, menarche, MUAC, Scheduled Caste, Scheduled Tribe*

Onset of menarche is mainly dependent on genetic factors, however geographical and nutritional factors among other factors have been attributed to the events of menarche. The present study was undertaken among adolescent female subjects belonging to low socio-economic status in the Birbhum district of West Bengal. The aim of this study is to determine the age of onset of menarche and the role of nutritional status if any. A cross-sectional study was conducted in four blocks of the district. Data was collected through July 2009 to April 2010, using a pre-tested structured questionnaire interview schedule; and nutritional status was measured by weight, height, Body Mass Index (BMI), MUAC. Data were obtained from 436 adolescent girls aged 10-17 years. An attempt has been made to find correlation if any between the nutritional status and menarcheal age of two different S.C(Bagdi and Ruidas) and another two types of S.T. (Santal and Kora) populations. Dietary intake of all these subjects was also evaluated.

The result had revealed that both the measurements, i.e. the height (the indicator of skeletal maturity), and the weight (the indicator of fat accumulation), were negatively correlated with age at menarche and so with the BMI. The mean menarcheal age of the Ruidas community was found to be significantly lower from all other communities tested and delayed menarche with accompanying under-nutrition was reported to be prevalent among the Santal, Kora and the Bagdi population of the district.

18. An Iodine Nutritional Profile among School Children in Manipur, North East India

Laishram Hemchandra Singh

Department of Zoology (P. G. Section),
D. M. College of Science, Imphal, Manipur

Keywords: *Endemic goitre, goitrogens, school children, urinary iodine, urinary thiocyanate*

Manipur, a North east state of India, is located at the foothills of the Himalayas. The entire state is in the classical goitre endemic belt of India because of its geographical location. Endemic goitre and associated iodine deficiency disorders (IDD) were found prevalent in post salt iodization phase in this state. The present study was thus undertaken to assess the iodine nutritional status among school children (6 – 12 yrs.) in Manipur.

A total of 4852 school children from different study areas of four valley districts of Manipur were clinically examined for goitre by palpation method. A total of 600 urine samples collected from clinically examined children irrespective of thyroid size were analyzed for urinary iodine and thiocyanate levels. Iodine content was also measured in 525 salt samples and 75 drinking water samples. Assay of TSH, T4, anti-Tg and anti-TPO was also performed from the representative goitrous population.

The goitre was prevalent at endemic level (overall goitre prevalence: 31.2 %) but the studied population had no biochemical iodine deficiency as evidenced by median urinary iodine level of 176.3 µg/l. The region was environmentally severe iodine deficient as indicated by low level of iodine in drinking water (1.9 ± 1.8 µg/l) but the people used to consume iodine at recommended level (i.e., > 15 ppm) through edible salt. The studied population consumed relatively high dietary goitrogens as evidenced by high urinary thiocyanate levels (0.962 ± 0.190 mg/dl). Presence of high anti-Tg and anti-TPO in a proportion of goitrous subjects indicates a high risk for development of autoimmune disease and thyroid failure.

The overall observations reveal that the studied region is clinically severely goitre endemic without biochemical iodine deficiency. Universal Salt Iodization programme is successfully operating in this environmentally iodine deficient region. The studied population consumed sufficient foods containing goitrogenic /antithyroid substances which normally interfere thyroid functions. Goitrous subjects with high anti-TPO and anti-Tg have maximum chance to develop autoimmune diseases.

19. Effect of Toxicity of Indigenous Herbal Agents *O. sanctum* (Tulsi) and *A. indica* (Neem) Leaf Extract and Psychotropic Lithium Ion for Modulation of Hormonal, Enzymatic and Behavioural Regulation of Reproductive Function

Uma Roy

Dept. of Food and Nutrition,
Biharilal College of Home Science,
University of Calcutta
Email: umaroy.6@gmail.com

Keywords: *Reproductive, hormonal, enzymatic, behavioural, O.s, A.i Li*

In spite of the considerable development of biotechnology search for indigenous reproductive regulatory remedies continues to be a potential area of investigation. Outcome of primary search has provided some discrete information's on reproductive toxicity of the psychotropic element Lithium and antistress herbal agents viz *Ocium sanctum* (Tulsi) *Azadirachta indica* (Neem) leaf extract on mammalian species.

Aim of the present work was to study the probability of finding any beneficial efficacy for the toxic potency of these agents on modulation of mammalian reproductive state.

For this purpose a program was designed to undertake a time course study with this agent for behavioural, hormonal and enzymatic changes in different reproductive stages i.e. non pregnant, pregnant and lactating state of female and male albino rat.

Result Indicated significant changes in ovum and sperm character with simultaneous significant decrease of reproductive hormones and reduction in activity of potent steroid synthesizing gonadal enzymes. Repetitive dosages of this agents affected both macro and micro anatomical structure of the reproductive system. Further it was documented that effect of lithium ion was also associated with various side effect in other physiological function. Therefore all this observations may throw some lights on the therapeutic rationale of the use of this two plant medicine ie. *O. sanctum* and *A. indica* for beneficial controlling effect of our population both are being economical and relatively non-toxic to other organ system.

20. Comparative Efficacy of Crude Leaf and Leaf Extracts of *Hygrophila Spinosa* on Induced Anaemic Rats

G. K. Dutta, K. Thakur, S. Mandal, A.K.Dash

Department of Veterinary Biochemistry,
College of Veterinary Science & A.H., Anjora, Durg (C.G.)

Key Wards: *Hygrophila, Anaemia, Free haemoglobin, lipid peroxidation*

Hygrophila spinosa (Family: Acanthaceae) is a wild herb widely used in 'Ayurveda' as 'Rasayana' for treatment of various disorders. *Hygrophila spinosa* extract (pre flowering and flowering extract @40 mg/kg body weight) and powdered form of aerial part (@equivalent to 40 mg of extract /kg body weight) were used to treat induced anaemic rats for 30 days. Treatments ameliorate the anaemic condition by improving haematological parameters and RBC indices. Free haemoglobin concentration was brought to normal only in treatment with pre-flowering extract. All the treatments increased Co and Cu concentrations. A reduced Fe concentration and total iron binding capacity was also observed in response to treatment. Percent transferrin was also improved. Lipid peroxidation reversed to normal on 30th day of treatment and lowest value was observed in rats treated with pre-flowering extract.

A better amelioration of anaemia was found in response to treatment with preflowering extract.

21. Protective Efficacy and Immunogenicity of a Live Transconjugant Hybrid Strain of *Shigella Dysenteriae* Type 1 in Guinea Pig Model

Soumik Barman¹, Dhira Rani Saha², Ranajit Kumar¹, Hemanta Koley^{1*}

¹Division of Bacteriology, ²Division of Electron Microscopy, National Institute of Cholera and Enteric Diseases, P-33 CIT Road, Scheme XM, Beliaghata, Kolkata 700 010

Email: hemantakoley@hotmail.com

Keywords: *Shigella Vaccine, oral immunization, protective efficacy, guinea pig colitis model*

Enteric bacterial infection cause of bacillary dysentery is a major problem of infant

morbidity and mortality in developed as well as in developing countries. At present, only antibiotic therapy is available for treatment of shigellosis. Unfortunately, due to the global emergence of multidrug resistance, the choice of antimicrobial agents for treating shigellosis is very limited and we are approaching where the shigellosis can become an untreatable disease because of lack of an effective antibiotic. Therefore, the possibilities of other preventive measures such as anti-dysentery vaccines have attracted increasing attention in this field. Various trials of several candidates' vaccine are being done in different parts of the world, but till date no suitable *Shigella* vaccine is available for public health use. There are different serotypes of *Shigella* species and their distribution varies between endemic geographical regions. The immune response against *Shigella* species are serotype-specific, so current immunization strategies have required the administration of multiple vaccine strains to provide protection against multiple serotypes. In our earlier studies we constructed a hybrid strain of *Shigella dysenteriae* type 1 by introducing a plasmid vector pPR1347, carrying both the *rfb* gene cluster and the *rfc* gene of *Salmonella typhimurium*. After introduction of a lipopolysaccharide biosynthesis gene, virulent *Shigella dysenteriae* type 1 strain became avirulent. On 28th day after immunization, all non-immunized group of guinea pig developed shigellosis, but the immunized group of guinea pig did not show any signs and symptoms of shigellosis following challenge with 10^9 number of the live virulent shigellae strain. The protection following challenge was 100% protection in the immunized group where as the unimmunized group of animals developed dysentery. Serum IgG and IgA titers showed exponential rise during oral immunization. Histology of the colonic biopsy samples, immunoblot assays against whole cell lysate, lipopolysaccharide and outer membrane protein strongly supported the mounting of a vigorous immune response following oral immunization. Protection studies showed 100% protection against intra rectal challenge with wild type *Shigella* strain in guinea pig colitis model. Our results suggested that the hybrid strain could be a useful vaccine candidate strain in the future.

22. Studies on Interrelation between Iodine and Thiocyanate Intake and Their Excretion Pattern among School Children in Sub-Himalayan Tarai Region

¹A Bhattacharjee, ²A K Chandra

¹Department of Physiology Nepalgunj Medical College, Nepalgunj, Nepal.

²Endocrinology and Reproductive Physiology Laboratory, Department of Physiology, University College of Science and Technology, University of Calcutta, 92, A.P.C. Road, Kolkata – 700 009.

Key Words: *Goiter prevalence, school children, urinary iodine, urinary thiocyanate, dietary goitrogens, Sub-Himalayan tarai region*

Aims & Objectives: Available literature suggests that the development of goiter not only depends on intake of iodine or intake of thiocyanate but critically related to the balance between dietary supplies of iodine and thiocyanate. Therefore a close interrelation may exist between iodine and thiocyanate intake and their excretion pattern in some geographical region where consumption of foods containing thiocyanate precursors is relatively high. To evaluate the interrelation between iodine and thiocyanate intake and their excretion pattern in relation to goiter prevalence, a prospective study has been conducted in sub-Himalayan tarai region of Eastern Uttar Pradesh, where consumption of foods containing thiocyanate precursors is relatively high.

Methods & Materials: Clinical goiter survey was conducted among 4167 school children, aged 6-12 years of both sexes. Urine samples of the representative population were analyzed for iodine (I) and thiocyanate (SCN) concentration. The goitrogenic constituents (cyanogenic glucosides, glucosinolate, thiocyanate) in common plant foods consumed by the population were measured.

Results & Discussion: Median urinary iodine level was 76.2 µg/l and 32.3% had concentration <50µg/l indicating biochemical iodine deficiency in the study region. However, in some studied area, in spite of optimal iodine nutrition (i.e., MUI e 100µg/l), goiter prevalence was severe to moderate indicating that urinary iodine excretion may not always be considered as biochemical marker for the assessment of IDD. The mean urinary thiocyanate level was 0.762±0.45 mg/dl, indicating that the entire studied population is further exposed to thiocyanate load. Urinary SCN⁻ excretion (mg /dl) correlated positively with goiter prevalence (r=0.043) showing that in study areas where consumption of thiocyanate/cyanogenic plant food by the population is more, goiter prevalence is high,

suggesting the role of thiocyanate in the etiopathogenesis of endemic goiter. A significant positive correlation ($r=0.13$, $P<0.01$) found between urinary iodine and urinary thiocyanate concentration of the studied population indicating that in an area where thiocyanate excretion of the population is high, iodine excretion is proportionally high. Thiocyanate content was found high in common plant foods of tarai region.

Conclusion: The involvement of thiocyanate available from the consumed food may have additional role other than iodine deficiency for the persistence of endemic goiter. This study shows the iodine retaining capacity of the body depends on the consumption pattern of cyanogenic foods. Therefore, body's thiocyanate level may be considered as one of the regulator to maintain iodine level in the body.

23. Combined Exposure of N-Acetylcysteine and Melatonin Ameliorates Arsenic-Induced Oxidative Stress in Male Wistar Rats

*Sudipta Pal**, *Ajay K. Chatterjee***

*Department of Human Physiology, Tripura University, Suryamaninagar,
West Tripura, Tripura 799130,

**Department of Physiology, University of Calcutta,
Kolkata-700009

Key words: *arsenic, oxidative stress, ROS, N-acetylcysteine, melatonin*

The protective effects of combined supplementation of N-acetylcysteine (NAC) and melatonin, on arsenic-induced oxidative stress were studied in male Wistar rats. Arsenic treatment at a dose of 5.55 mg/kg b.w./day for a period of 30 days caused depletion of liver glutathione, which could account for the increase of cellular lipid peroxidation. The inverse relationship between lipid peroxidation and glutathione concentration was also observed in kidney. The glutathione reductase activity decreased in liver, while increased in kidney after arsenic treatment. In addition, arsenic treatment decreased both superoxide dismutase (SOD) and catalase activities in liver and kidney, accompanied by increase in free hydroxyl radical formation. These support the oxidant stress activity of arsenic. The NADPH oxidase activity in liver and kidney increased significantly due to arsenic treatment. In addition, Glutamate-oxaloacetate transaminase activity increased significantly, while glutamate-pyruvate transaminase activity decreased markedly following exposure to arsenic. Treatment also increased the activity of g-glutamyltranspeptidase in serum. From all of

these observations, it is surmised that arsenic treatment at the present dose and duration exhibits potential modulatory effects on cellular antioxidant defense system.

Co-exposure of N-acetylcysteine (NAC) (1mmole/kg b.w./day orally for last 7 days of arsenic treatment) and melatonin (10 mg/kg b.w./day i.p. for last 7 days) restored appreciably the changes in GSH level of both liver and kidney. Combined supplementation was found to completely restore the alterations in peroxidation level in both liver and kidney. The SOD activity of both liver and kidney of arsenic-treated rats were completely restored after co-supplementation. Further, co-exposure counteracted the decreased catalase activity appreciably in liver and kidney. The increased free hydroxyl radical formation in liver and kidney following exposure to arsenic was also completely counteracted by co-supplementation. In addition, changes in GOT and GPT and NADPH activities in liver and kidney and serum g-glutamyltranspeptidase activity were also counteracted by NAC and melatonin co-exposure. It is, therefore, suggested that NAC and melatonin co-exposure to arsenic treated rats exhibit excellent protective effects against arsenic-induced oxidative stress.

24. Importance of Sympathovagal Imbalance in Pathophysiology and Management of Pregnancy-Induced Hypertension

G. K. Pal¹, P. Shyma¹, Pravati Pal¹, S. Habebullah²

¹Dept. of Physiology and ²Dept. of Obstetrics and Gynecology,
Jawaharlal Institute of Post-Graduate Medical Education and Research (JIPMER),
Pondicherry – 605 006.
E-mail: gopalpravayi@sify.com

Key words: PIH, Sympathovagal imbalance, HRV analysis

Pregnancy-induced hypertension (PIH) is common in Indian subcontinent, having the incidence of about 8 – 10 % of all pregnancies. PIH is a serious complication of pregnancy associated with high morbidity and mortality accounting for about 12% of maternal deaths, which is in developing countries mainly due to its late diagnosis and inadequate treatment. PIH usually develops late in pregnancy and in some, the dysfunction progresses rapidly. Hence, in the absence of meticulous and repeated screening at short intervals, early diagnosis of PIH is missed and patient reports in the advanced stage of the disease; and therefore, this usually creates difficulty in the management of the dysfunction. PIH has been proposed

to be a state of sympathetic overactivity in which placenta is believed to play an important role as only removal of the placenta following delivery usually cures the disease. It was suggested that some vasoconstrictors released from abnormal placenta increases sympathetic activity in PIH, nevertheless the exact nature of these chemicals is yet to be identified. Though the precise etiology of PIH is not yet known, it has been clearly documented that the disease is characterized by low circulating volume and high vascular resistance. The vascular resistance primarily depends on basal sympathetic tone, as systemic blood vessels have exclusively sympathetic innervation. It was observed that sympathetic activity slowly increases in third trimester in normal normotensive pregnancy, which is exaggerated in PIH, and therefore, it was suggested that changes in baroreceptor sensitivity and sympathovagal tone in early pregnancy can be used to predict the development of PIH. To best of our knowledge, no research has been conducted yet to analyze the application of heart rate variability (HRV), a sensitive autonomic function test, in a large group of pregnant women having risk factors for PIH, who subsequently do not develop PIH, rather a smaller subset develop the disease. We have analyzed the importance of sympathovagal imbalance assessed by spectral analysis of HRV in PIH for its early prediction, and its role in pathophysiology and management of this dysfunction.

25. Application of Biological Monitoring in Occupational Health Surveillance Programme – A Special Reference to Fuel Distribution Workers

Ashit Kumar Mukherjee

Regional Occupational Health Centre (Eastern)

ICMR

Email: asit_mukherjee@yahoo.com

Keywords: *Personal exposure, Volatile organic compounds, Urinary metabolites, Benzene, tt Muconic Acid, S-phenylmercapturic acid, mandelic acid, hippuric acid, solid phase extraction, Comet assay; äaminolevulinic acid*

Human exposure to any contaminant is generally assessed by using direct and indirect methods. Exposure, biologically effective dose and biological monitoring are the important

tools in risk assessment programme. External exposures measured by different methods provide data regarding exposure to contaminant, its time-activity pattern, initial assessment of potential contact with the contaminant and predict future exposure of population, while biological monitoring in a specific study confirms the exposure to contaminant and also measures the current and accumulated internal dose. The basic consideration lies in biological monitoring is, which biological specimen will contain the target chemical or its metabolite at a level that will accurately reflect the exposure. Scientific and technological advancement in the analytical techniques have led to the development of biomarkers for different toxicants which improved the scope of risk assessment.

Based on the frame work of health risk assessment, workers in gasoline and diesel distribution centres of the city were studied. These workers are exposed to volatile organic compounds (VOCs), benzene, toluene, ethylbenzene, xylenes (o-, m- & p-), propyl benzene and mesitylene, having haematotoxic and genotoxic potentiality. VOCs were measured by GC, FID technique. The metabolites, tt-muconic acid (tt-MA) and S-phenylmercapturic acid (SPMA) for benzene, hippuric acid (HA), mandelic acid (MA) and methyl hippuric acid (MHA) respectively for toluene, ethyl benzene and xylenes, were estimated simultaneously in urine by HPLC technique.

Personal exposure to toluene was highest among the VOCs; followed by benzene and others. The exposure of fuel fillers to toluene and benzene were found between 45.0 - 2600.0 $\mu\text{g}/\text{m}^3$ and 26.0 - 773.0 $\mu\text{g}/\text{m}^3$ respectively. Outdoor air around fuel distribution centres showed similar trend. Benzene correlated significantly with post-shift urinary tt-MA ($p < 0.001$) and SPMA ($p < 0.001$) and so also urinary metabolites of ethylbenzene, toluene and xylene. Exposure to benzene and relative excretion of SPMA showed better correlation than tt-MA. A decreasing order of HA, MA and MHA was noticed as the sequence of hydrocarbons in environment.

The effect on haematology and DNA damage in peripheral lymphocytes of fuel fillers were also monitored. Besides, α -aminolevulinic acid (ALA) formed in heme bio-synthesis pathway was estimated in isolated lymphocytes to observe the alteration in heme metabolism. Though hematological parameters [haemoglobin (Hb), red blood cell (RBC), platelet (PLT), hematocrit (Hct)] significantly decreased in fuel fillers compared to control, the DNA damage measured by comet assay was not statistically significant. An increase in ALA level was noticed among exposed workers.

26. Effect of Melatonin on PCB Induced Neuronal Damage and Neurotoxicity in the Cerebral Cortex, Cerebellum and Hippocampus of Adult Rats

P. Venkataraman *, J. Arunakaran

Department of Endocrinology,
Dr. A L M Post graduate Institute of Basic Medical Sciences,
University of Madras, Taramani,
Chennai 600 113;

* Department of Medical Research,
SRM University, Kattangulathur,
Chennai 603 203

Email: From: j_arunakaran@hotmail.com

Keywords: *PCB, environmental toxicants, neurodegenerative processes, neurotoxicity, lipid peroxidation, ATP ases, acetylcholine, SOD*

PCBs are one of the environmental toxicants and neurotoxic compounds which induce the production of free radicals leading to oxidative stress which is a contributing factor to alteration caused in neurodegenerative processes. The proteins embedded in membranes which control ionic gradients across both plasma and organellar membranes are especially easily damaged when oxidized by PCBs. When rats treated with PCB (aroclor 1254) (2mg/kg bw) (daily for 30 days), neural levels of lipid peroxidation products along with concentrations of hydroxy radicals and hydrogen peroxide were elevated. Conversely GSH concentrations as well as the activities of a variety of enzymes (sodium, potassium, calcium and magnesium ATP ases and acetylcholine esterases) were diminished. Giving melatonin either 5 mg or 10mg/kg bw daily in combination with the PCB reversed the effects of PCB. In a follow up study, where Aroclor 1254 was used to induce neuronal damage and suppress Cu/Zn SOD and GPX-4 mRNA expression, melatonin again relieved the effects of PCB. In this study, the benefits of melatonin against neurotoxicity were seen in the cerebral cortex, cerebellum and hippocampus. In both the studies the protective actions of melatonin were attributed to its antioxidative actions.

27. Chromium III Exposure Inhibits Brain Na⁺K⁺ATPase Activity of *Clarias batrachus* L. Involving Lipid Peroxidation and Deficient Mitochondrial Electron Transport Chain Activity

^a G. Paul, ^a A. K. Maiti, ^b B. Maity, ^c D. Mazumdar, ^d N. C. Saha

^a Environmental Physiology Division, Toxicology Unit, Department of Physiology, University of Kalyani, Kalyani, West Bengal 741235, India

^b Bio-Organic Division, Bhaba Atomic Research Centre, Mumbai 400085, India

^c Department of Agricultural Statistics, Bidhan Chandra Krishi Vishwavidyalaya, West Bengal 741252, India

^d Department of Zoology, Jhargram Raj College, Vidyasagar University, West Midnapore, West Bengal 721507, India

Keywords: *Lipid peroxidation, Mitochondrial electron transport chain activity, Chromium*

The present study elucidated the role of lipid peroxidation and diminished mitochondrial electron transport chain activity in partial dysfunction of brain Na⁺K⁺ATPase of *Clarias batrachus* exposed to chromium III ions. The fish were exposed to 10 % and 20 % of the derived 96 h LC₅₀ value, 5.69 mg/L and 11.38 mg/L, respectively, and sampled on 20, 40 and 60 days. Exposure to chromium III on fish brain demonstrated an increased lipid peroxidation, production of protein carbonyl and reactive oxygen species and loss of protein thiol groups in synaptosomal fraction with decreased activity of Na⁺K⁺ATPase, partial inactivation of mitochondrial electron transport chain activity and energy depletion.

28. The Molecular Mechanism of Cholera Toxin Production under the Influence of Quorum Sensing Autoinducers and Biofilm Regulators in *Vibrio Cholerae* Organisms Following *flaA-vpsR* Circuit for Biofilm Formation

Chandradipa Ghosh

Department of Human Physiology with Community Health,
Vidyasagar University, Paschim Medinipur, West Bengal

Keywords: *Cholera, epidemiology, signal transduction, quorum sensing*

Cholera is lethal watery diarrhoea caused by gram negative bacteria *Vibrio cholerae*

and is considered one of the major public health problems in developing countries including India. At present in cholera epidemiology the issues related with environmental persistence of the organism in the endemic zone has gained importance for future epidemic. Biofilm formation by *Vibrio cholerae* in aquatic environment, the quorum sensing regulation and their relation with virulence expression are important in this regard. In the present study an approach has been made to understand the molecular mechanism underlying the expression of the most important virulence marker i.e., cholera toxin gene under the influence of quorum sensing autoinducers like Cholera Autoinducer I (CAI-I) & Autoinducer II (AI-II) and regulator for biofilm formation, VpsR & FlaA in a particular subtype of *Vibrio cholerae* organisms of high epidemiological importance who follow the flagella-dependent signal transduction pathway for biofilm formation. In this respect functional CAI-I, AI-II and VpsR deficient deletion mutants were prepared in the model *Vibrio cholerae* strain MO10 lac-. It has been revealed from further studies that CAI-I & AI-II, and VpsR are important influencing factors for cholera toxin production as the respective mutant strains were found to be defective in cholera toxin production. To understand the regulatory pathway involved in this virulence gene expression the promoter activities of three important regulator genes for cholera toxin production like *toxR*, *tcpP* and *toxT* were studied under different mutant backgrounds by preparing *toxR-lacZ*, *tcpP-lacZ* and *toxT-lacZ* transcriptional reporter constructs. It appears from these assays that the quorum sensing autoinducers and biofilm regulator, VpsR & FlaA have great influences on the level of gene expression of these three important regulators for cholera toxin production and apparently influence the cholera toxin production by influencing these three regulators.

29. Cellular and Molecular basis of Parkinsonism induced by Paraquat in Mice

Soham Mitra ¹, Arindam Bhattacharyya ¹, Nilkanta Chakrabarti ^{2*}

¹Department of Zoology, University of Calcutta, Kolkata,

²Department of Physiology, University of Calcutta, Kolkata

Key Words: Paraquat, Parkinsonism, neuro-inflammation, Phospho-CREB

Although paraquat (PQ; herbicide) causes Parkinsonism in adult brain, the cellular basis and molecular mechanism of its action are in debate. Several studies indicate that the toxicity of PQ is mediated by formation of superoxide radicals. PQ causes dopaminergic neuronal cell loss in substantia nigra (SN) and inclusion of α -synuclein in both SN as well

as in frontal cortex. However, it is not clear that PQ induced dopaminergic cell death is selective or other cell types are similarly effected. In addition, the mechanism(s) by which reactive oxygen species influence cell survival and death decisions are incompletely defined. In the present study it has been reported first time that PQ causes differential pattern of changes in cellular morphology and expression of several molecules in three regions of adult mice brain like SN, hippocampus and frontal cortex. Morphological changes linked with cellular necrosis or apoptosis, formation of dead cells and axonal degeneration appeared in these three regions. PQ induced Parkinsonism was characterized by decrease in Tyrosine hydroxylase (TH) expression level and differential expression pattern of Lewy bodies and α -synuclein. PQ treatment caused neuroinflammation and that was characterized by localization of microglial aggregation and increase in expression pattern of TNF- α and IL-1 β . PQ altered genetic expression and that was evidenced by increase in expression of transcription factor like pCREB. All together, these new findings indicate cellular and molecular basis of Parkinsonism by PQ in adult mice model.

30. An Attempt to Predict the Reference Body Weights of the Pre-School Children

Indrajit Ray

Department of Human Physiology, Ramkrishna Mahavidyalaya,
Kailashahar, North Tripura 799 277

Keywords: *Reference body weight, formulae of reference weight, undernutrition, obesity, nutritional status, preschool children*

The reference body weights are the anthropometric tools of interpreting the nutritional status of the children. The children having body weights lower or higher by a certain level than the reference weights are considered to have undernutrition or obesity respectively. Undernutrition generally remains associated with reduced immunity, fetal brain damage, physical growth retardation, low work capacity and impaired learning abilities. Besides, obesity leads to various diseases such as hypertension, myocardial infarction, ischemic stroke, diabetes mellitus type 2 and cancer. To control undernutrition and obesity undertaking nutritional and health intervention programmes, diagnosis of them screening the children consulting reference is necessary. But the existing reference body weights of preschool children have no (or less elaborate) height-based spectrum of weights for each age to interpret satisfactorily the nutritional status of the currently well-nourished children who

were previously undernourished. Besides, handling the record of reference body weights for the purpose of interpretation is laboursome and time consuming. Therefore, an attempt was taken to devise the formulae of predicting reference body weights using sex-based reference standard body weights (WT, in kg) and reference standard heights (HT, in cm) of different ages (A) from the 'WHO Child Growth Standards, 2006'.

Consequently, this work resulted in the following formulae

1-13 weeks (A, in week):

$$\text{Boy's WT} = [9.0227\text{HT}/(230-0.4\text{A}) + 107255.11\text{HT}^2/\{42501+(13-\text{A})^4\}^2] - 0.810;$$

$$\text{Girl's WT} = [14.9233\text{HT}/(336+\text{A}) + 204.4456\text{HT}^2/\{1873+(13-\text{A})^3\}^2] - 1.805.$$

3-12 months (A, in month):

$$\text{Boy's WT} = [7.5583\text{HT}/(206+1.5\text{A}) + 298.8062\text{HT}^2/\{2025+(12-\text{A})^3\}^2] + 0.809;$$

$$\text{Girl's WT} = [7.7082\text{HT}/(178+2\text{A}) + 80.0949\text{HT}^2/\{1205+(12-\text{A})^3\}^2] - 0.814.$$

1-5 years (A, in year):

$$\text{Boy's WT} = \{(0.95152\text{HT} - 0.000026\text{A}^7)/(30+\text{A}) + (0.042469\text{HT}^2/(27-\text{A})^2)\}^2 + 2.521;$$

$$\text{Girl's WT} = [\{0.013406/(20-\text{A})^2 + 0.000041641\}\text{HT}^2 + (0.94587\text{HT} - 0.000028\text{A}^7)/(31+\text{A})]^2 + 1.963.$$

These formulae-based reference weights do not differ significantly and deviate by only <1.5% from the WHO standard weights. These indicate that the formulae of reference weights are able to represent the WHO standard weights compensating for the inadequacy of height-based spectrum of weights for each age up to 5 years. However, there remains scope for further improvement of these formulae by reducing the margin of existing maximum deviations.

31. Iodine nutritional status in Sundarban delta of West Bengal, India

Smritiratan Tripathy, Amar K Chandra*

*Department of Physiology, Berhampore Girls' College, Berhampore, Murshidabad 742 101;
Endocrinology and Reproductive Physiology Laboratory, Department of Physiology,
University of Calcutta, 92, A.P.C. Road, Kolkata 700 009

Keywords: *Sundarban delta, iodine deficiency disorders (IDD), endemic goiter, goitrogen*

Background & objectives: The Sundarban delta is the largest mangrove ecosystem

of maximum bio-diversity in India. In post salt iodization phase endemic goiter and associated iodine deficiency disorders (IDD) were found in a randomly selected rural area of Sundarban delta and its adjoining areas of West Bengal. The present investigation was thus undertaken to study the total goiter rate, urinary iodine and thiocyanate excretion pattern of the school going children, iodine content in edible salt and drinking water in the Sundarban delta of West Bengal.

Methods: A total of 6706 school children (6-12 yr) were clinically examined for goiter from 19 different areas in the delta region. Urinary iodine and thiocyanate levels were measured in 760 (40 from each area) samples collected randomly to evaluate the iodine nutritional status and consumption pattern of dietary goitrogen. Simultaneously iodine content was determined in 152 (8 from each area) drinking water samples and 665 (35 from each area) edible salt samples collected from the areas.

Results: Results indicate that the studied region is clinically severely goiter endemic having goiter prevalence 36.7% (grade 1: 32.9%, grade 2: 3.8%), median urinary iodine level 220 μ g/l indicating no biochemical iodine deficiency, 60 % salt samples contain recommended level of iodine and the iodine content in drinking water is sufficient while mean urinary thiocyanate level was 0.619 + 0.36 mg /dl.

Conclusion: In spite of the consumption of adequate iodine, the existing goiter prevalence may be for the consumption of dietary goitrogens / antithyroid substances that possibly come through food and water.

32. Human Health and Influence of Animals

Prof. Ganga Prasad Sen

President, Section of Medical & Veterinary Sciences,
1993 & Emeritus Scientist (ICAR) & Retired Professor of Veterinary Public Health (IVRI,
Kolkata

Keywords: *Health, animals in human life, health-deviation, diseases, prevention*

Health concept of human population has been continuously changing with the development of civilization. Health is considered as the physical, mental, social, economical

and cultural well-being. Deviation from any of these aspects of well-being leads to disease. Man got the diseases by legacy from animals from which he descended. The degree of domestication of animals, the hygienic standards of the community, the geographical location, the prevalence of infectious and non-infectious diseases in the farm, pet and wild animal population determine the health problems in man.

Human habitations constitute either urban or rural type and their health problems associated with animals are influenced accordingly. Our observations in a community having livestock show that illness of human population reported from 35.4 % of the families keeping livestock and from 26.5% of the family's not-keeping livestock. Further, out of a total 51 rural families showing livestock illnesses, 40 families had human illness. The relationship of illness between man and livestock in the community was statistically highly significant necessitating probe on zoonoses problems and control at Primary Health Care level. Since the 1st report of outbreak of Avian Influenza virus infection H5N1 in January, 2008 in West Bengal 83 outbreaks involving 69995 birds have been reported, sacrificing about 5 million birds till March 2009 yet no human infection was reported. The Influenza virus H1N1 termed as Swine Flue is creating panic among the human population. Haemagglutinin (H) 16 in number and Neuraminidase (N) 9 antigens have been identified in influenza virus of which H1N1 contain 1 human influenza virus Gene, 1 of bird's influenza Gene and 2 of swine's influenza gene but not affecting the swines. Presence of several types of influenza viruses in swine is giving ample opportunity for intermingling of genes creating newer Influenza viruses affecting human beings which require regular surveillance. Human population associated with production, preparation, processing & packaging and distribution of Foods of Animal origin are at high health-risk similar to consumers of the products which have become a subject as Food Hygiene in Public Health Courses. Minimizing the unhygienic contact between animal species and infectious agents, increasing the resistance of host species, treatment of individuals affected with the diseases; and education and enlightenment of human population for their Prevention and Control coupled with their social behavior would reduce the risks of animal-transmitted diseases/infections.

33. Non Viral Vectors in Development of Rnai Therapeutics for Cancer

Tathagata Dutta

Formulation Research and Development,
Aizant Drug Research Solutions,
Apparel Park Road, Dulapally,
Hyderabad-500014,
India & Dimantina Institute for Cancer,
Immunology and Metabolic Medicine,
University of Queensland, St Lucia,
Brisbane, QLD 4072, Australia.
Email: duttatathababu@yahoo.com

Keywords: *siRNA, cancer, gene delivery, RNAi therapeutics, Dendrimer, dendrosome*

Although small interfering RNA (siRNA) treatment holds great promise for the treatment of cancers, the field has been held back by the availability of suitable delivery system. Unmodified, naked siRNAs are relatively unstable in blood and serum as they are rapidly degraded by endonuclease and exonucleases, thereby having very short *in vivo* half-life. The administered siRNA, should be suitably internalized by the target cell, must avoid endosomal uptake & errant siRNA compartmentalization for exerting gene silencing activity. Selection and formulation of siRNA with an appropriate biocompatible and possibly “genocompatible” delivery system is necessary for improving biological stability, targeted cell uptake, and pharmacokinetics of siRNA. Inappropriate selection of a delivery vector can thereby reduce gene-silencing activity and even enhance off-target effects. Delivery systems can also alter the pharmacokinetics of siRNA by altering their molecular and physical size so as to reduce excretion via the kidneys and thereby prolong *in vivo* half-life. Targeting to diseases cell is necessary for efficient gene silencing. Once inside the cell, siRNA has to escape compartmentalization into cell organelles such as endosomes and lysosomes, be intracellularly bioavailable, and interact with its intended mRNA targets in the cytosol to affect highly potent and sequence-specific gene-silencing activity. Strategies for delivering siRNA to specific tissue/organ *in vivo* following systemic administration involves hydrodynamic intravenous injection, cationic liposomes, cationic polymer and peptide based delivery systems, local *in vivo* delivery systems, etc. The success of RNAi therapeutics for cancer lies in formulating siRNA/shRNA involving a suitable delivery system, which can overcome these challenges.

34. Cytotoxic, antitumour and antimetagenic principles of the *Calotropis gigantea* latex extracts against Dalton's Ascitic lymphoma and in *Allium cepa* root

Sujata Maiti Choudhury

Department of Human Physiology with Community Health,
Vidyasagar University, Midnapore, West Bengal,
India, Pin-721102.

E-mail: smaitichoudhury@yahoo.com

Keywords: *Calotropis gigantea* ; Antitumor and antioxidant potency; Dalton's Ascitic Lymphoma; Antimetagenic; *Allium cepa* root tip; Membrane blebbing; Mean survival time; Hematological and antioxidant parameters

The incidence of cancer is increasing worldwide and it continues to be a leading cause of mortality in both developed and developing countries. *Calotropis gigantea* of Asclepiadaceae family is a common wasteland weed and most abundant in tropics and sub-tropics. It has purgative, antihelminthic, analgesic, anticonvulsant, anxiolytic, sedative and antipyretic effect and is used as a treatment for leprosy, leucoderma, ulcers, tumours, piles and diseases of the spleen, liver and abdomen. The aim of the work presented here was to evaluate *in vitro* cytotoxic and *in vivo* antitumor and antioxidant properties of ethanolic (EECGL) methanolic (MECGL) and water extracts (WECGL) of *Calotropis gigantea* latex in Dalton's lymphoma (DAL)-bearing Swiss albino mice as well as antimetagenic activities of the extracts in *Allium cepa* root tip were studied. Cell morphology study and cell cycle analysis were done against Dalton's Ascitic Lymphoma (DAL) cells at the dose of 75µg/ml with the above extracts. EECGL, MECGL, WECGL produced prominent membrane blebbing compared to phosphate buffer saline (PBS) control. *In vitro* cytotoxicity study showed that DAL-cell viability was decreased in a dose-dependent manner after the treatment of extracts. In cell cycle analysis, Dalton's Ascitic Lymphoma (DAL) cells treated with the extracts were associated with cell cycle arrest and in a time-dependent manner, apoptosis was induced significantly. EECGL, MECGL, WECGL were administered intraperitoneally at dose level of 100 and 150 mg/kg body weight per day for consecutive 14 days after 24 hour (day zero) of DAL cell inoculation (1×10^6 cell) to mice using 5-fluorouracil as standard drug control. The *in vivo* study was performed in EAC-bearing mice by assessing the mean survival time, viable and non-viable tumor cell count, tumor

volume, hematological and antioxidant parameters. Decrease in tumor volume, and viable tumor cell count were observed in the extract-treated groups compared to DAL-control group. Treatment with EECGL, MECGL and WECGL increased the mean survival time, body weight of the DAL-bearing mice. All the hematological parameters were restored to more or less normal levels. Treatment with the extracts decreased the levels of MDA, GSSG and increased the levels of GSH, SOD, and CAT. The extracts of *Calotropis gigantea* latex significantly inhibited the growth of roots and mitotic activity at the dose of 10 mg/ml. These data indicate the extracts of *Calotropis gigantea* latex exhibit *in vitro* cytotoxic, apoptotic and *in vivo* antitumour and antioxidant activities against Dalton's Ascitic Lymphoma tumor cells and antimitogenic potency in *Allium cepa* root.

35. The Expression and Activity of the MEF2C is Induced by VEGF in Endothelial Cells

*Debasish Maiti**, *Elia J Duh*[#]

*Department of Human Physiology, Tripura University,
Suryamaninagar, Tripura;

[#]Department of Ophthalmology, Johns Hopkins University,
Baltimore, USA

Email:debmaiti@rediffmail.com

Keywords: VEGF, MEF2C, angiogenesis

The transcription factor myocyte enhancer factor 2C (MEF2C) is thought to play an important role both in vasculogenesis and angiogenesis during vascular development. In this study, we investigated the regulation of MEF2C by VEGF in endothelial cells, as well as the role of MEF2C in endothelial cell migration and tube formation. We found that VEGF induces *MEF2C* gene expression in endothelial cells in a dose- and time-dependent fashion. VEGF induction of *MEF2C* expression was completely abrogated by inhibition of the protein kinase C pathway. In addition to regulating *MEF2C* expression, VEGF treatment of endothelial cells resulted in activation of upstream signaling regulators of MEF2C (p38 MAP kinase and BMK1/ERK5), as well as in activation of MEF2C phosphorylation. In a luciferase reporter gene assay, VEGF stimulated transcription from

a MEF2-dependent promoter in endothelial cells. Experiments with a GAL4/MEF2C fusion protein indicated that VEGF can directly activate the transactivation domain of MEF2C in endothelial cells. Finally, transfection of a dominant-negative mutant of MEF2C significantly inhibited VEGF-stimulated endothelial cell migration as well as tube formation. These studies implicate VEGF as a key regulator of MEF2C, and suggest that MEF2C may be an important transcription factor mediating VEGF's pro-angiogenic effects in endothelial cells.

26. Understanding of the Life Style Medicines in the Health and Disease Management of Mankind on the Basis of Standard Module in the Coming Year of 2020

Samir Lodh

Bakul Sevayatan & Rehab Centre;
12/8A, Satchasi Para Road,
Kolkata 700 002
E.mail:slodh_dr01@yahoo.com

Keywords: *Dynamic force, health spectrum, Behavioral Sc., health promotion, good stress, bad stress, stressful RE, defensive management, behavioral modification, correction, integration, correlation*

The present trend to see a case overall of human health concerned is of paramount importance. The man is a dynamic being. His intent always forced him/her to explore multidimensionally. As such some particular arrangements have evolved tools and techniques which may be used in various combinations for the assessment of physical health out of other three namely mental, the social as well as vital or spiritual etc. According to the spectrum of health, it is a continuum along with health & disease and can be divided as in the module. They are 'Arrangement-I', 'Derangement-II' and 'Management-III' indeed. Constitution and Normal Physiology restores the health. Any deviation whether it is termed according to any interpretation of modern medical science should be taken into consideration. Best mode to adopt the health in normal is promotion. Specific protection, Prevention by early diagnosis & screening, Disability limitation and correction are possible through computerized elucidation & prescription for modification, intervention, co-relation and by modification.

37. Health Implications of Global Warming: Warning for Human Resources in Industries

Shankarashis Mukherjee

Department of Physiology,
University of Calcutta, 92 Acharya P C Road,
Kolkata 700 009
Email: msasish@yahoo.co.in

Keywords: *Global warming, heat load, health impact, informal sector, West Bengal*

Global warming is caused by green house gases like CO₂, water vapor, methane, nitrous oxide, which trap in the sun's infrared rays in the earth's atmosphere, which in turn heat up the earth's atmosphere. There has been 0.6 degree C rise in ambient temperature during the 20th century and at present the rate of increase is 0.2 degree C per decade. It is projected that 1.8 - 4.0 (average 3.0) degree C rise will take place by 2100 AD depending on actions taken to limit GHG emissions and future developmental scenario. Variability in rainfall and increase in frequency of occurrence of extreme events like storms, droughts and floods are expected. There will obvious adverse impact on health. Introduction of new diseases, decline in crop production leading to possible adverse impact on nutritional status etc are feared. A tropical country like India and its citizens will suffer more. The industrial sector neither is immuned against the danger. If we confine our attention to the our state of West Bengal and plight of human resources working in industries, we find that it, the fourth most populous state, has a population of about 80 million, and little more than one-third constitute the working population. And only about 1 percent of the population works in the registered factories. A huge proportion earns their livelihood working in the informal sector; again a vast majority of them is exposed to adverse conditions of high temperature in the work environment. A further rise in ambient temperature, which is taking place, in our tropical environment will definitely complicate things further for individuals occupationally exposed to high temperature. The paper discusses with both environmental and physiological data from the industrial sectors with high occupational heat exposures.

38. Risk Analysis of Gastric Toxicity in Clinical and Legal Medicine

Babul Banerjee*, Neepamanjari Barman¹, Prabir Banerjee²,
Subrata Banerjee³

*Forensic Toxicology Department Forensic Science Laboratory,
Kolkata 700 037;

¹Department of Pathology SSKM Hospital IPGME&R,
Kolkata 700 020;

²Gastroenterology Department Calcutta Medical College and Hospital.
Kolkata 700 073;

³Biophysics Department Saha Institute of Nuclear Physics,
Salt Lake, Kolkata 700 091

Email: bblb88@hotmail.com

Keywords: *Gastric carcinoma, EBV, H. Pylori, GI bleeding, atrophy, gastropathy*

The detection and determination of the cause of gastric mucosal and sub-mucosal hemorrhages and GI bleeding at Autopsy and Toxicological analysis is very crucial. It may be due to poisoning, drug interactions and/or organic diseases. The proper recording of medication status in terminal illness due to NSAID consumption is always necessary to rule out other possibilities of foul play. Some unnatural deaths are due to gastric carcinoma and / or UGIB risk, as reported on history of FIR made by the investigating authorities. Pan-endoscopic surveillance of premalignant and/or malignant gastric lesions reveal the presence of *Helicobacter pylori* infection and Epstein-Barr Virus in gastric tissues of the patients compared to normal asymptomatic volunteers used as control. Histopathological study of gastric biopsy samples truly confirms the states. The levels of trace metals have also been determined to interpret the clinical results. A large cohort of EBV-positive and EBV-negative gastric adenocarcinomas has been analyzed for their clinicopathologic features to determine whether they constitute a different clinical entity. The *H. Pylori* infection is crucial and early detection /eradication are extremely essential for safety. Thus the study delineates the Risk analysis of gastric toxicity matrices in clinical science as well as in legal medicine to enrich prosecution witnesses for Justice.

39. Work Stress among IT Professionals

Anjali Nag

National Institute of Occupational Health
(Indian Council of Medical Research), Ahmedabad

Keywords: Work stressors, IT professionals, Health complaints, OHS policy

The information technology enabled services has been experiencing phenomenal growth in the recent years around the globe. India's position is strongly perceived as dominant contributor in this sector. This growing population of IT professionals has been subjected to increased diversity in their work pattern, associated with VDT workstations, procedure of work, material interfaces and human-computer interaction environment. A cross-sectional survey was conducted among IT professionals in which they responded to an ergonomics checklist on work system analysis (e.g., job characteristics, physical and psychosocial stresses of work, workplace constraints, visual strains, environmental hazards, and operator-VDT and equipment interaction) and a general health questionnaire including musculo-skeletal pain and discomfort, sleep disturbances, shift work pattern and psychosocial stresses. The study substantiate that there was high prevalence of work related health complaints and psychosocial symptoms; which are the results of interaction of multiple stresses associated with work and work environment, and other personal factors. The IT workers are nurtured for their importance in today's world of work, and it is furthermore imperative that the workplace risk potentials are minimized to the extent possible.

The overall design of work calls for a distinctive approach in the IT-enabled services, in order to facilitate efficient VDT operation for a more healthy, comfortable and safe working condition. Any successful step towards the implementation of corrective/preventive measures (to be taken on the basis of recommendation of a comprehensive survey) will at the very outset require the constitution of a disciplinary framework that will not only include problems and possible solutions for the sector but also will accommodate well defined comprehensive policy statements like IT policy, health policy and worker welfare policy. Provisions must be evolved through the existing systems of management, such as occupational health and safety management systems. The sector specific management system, however, will demand suitable delineation of activities and functions of the IT related sector. This multi-pronged systematic study provides an account of the work-related as well as lifestyle related issues of the workforce engaged in the sector, and its consequent health impacts.

40. Excelling Sports Performance: The Science of Exercise Physiology

Mantu Saha

Defence Institute of Physiology and Allied Sciences (DIPAS),
Defence Research and Development Organization (DRDO),
Ministry of Defence, Govt. of India. Lucknow Road,
Timarpur, Delhi 110 054

Keywords: *sports, performance, exercise physiology, genetic*

The superior physical performance of sportspersons is the result of a complex blend of several factors. Optimal performance may be achieved through systematic scientific training programme to provide the sportspersons with the basic means to adapt to the physical load encountered through controlled exercise. Sport science awareness has progressed tremendously over last few years in terms of the understanding of many of the underlying concepts in exercise physiology and human performance. Research in the field of sports science has introduced and validated the use of simulated laboratory technologies in order to improve the levels of sports specific knowledge and to find the most appropriate ways to reach the best possible performance. Human physical performance is determined by a variety of environmental and also genetic factors. Several studies have revealed that heritability is a strong component of endurance and strength phenotypes. Optimal scientific training coupled with nutritional supplements can improve physical power, enhance mental strength and make competitive advantage. Nutritional supplements are used by sportspersons to enhance energy supply and performance, recovery from exercise, anabolic effects in muscles, immune system function and performance via effects on central nervous system. In order to achieve success in today's sports competition, an athlete must move faster, throw farther, and jump higher. Besides genetic predisposition this increased level of athleticism has been augmented by engineered nutrition, a greater understanding and utilization of biomechanics of sport movement, more efficient and effective scientific training, conditioning techniques, advances in psychological support and improvements in coaching education. The continuous efforts to extend laboratory testing into the sport specific field simulation have resulted in the identification of several variables deemed necessary for successful performance in several sports. Bringing together the science of sport and the practical knowledge of coaches will ultimately empower athletes at all the levels and strengthen the world of sports performance.

41. Musculo Skeletal Discomfort of Women Workers Employed in Call Centres

Parimalam, P, Premalatha, M. R.,* Sashidevi, G,***
Ganguli, A. K.,**, Gayathri, D**

*Home Science College and Research Institute, Tamil Nadu Agricultural University, Madurai;

**Occupational Health Services, Bharat Heavy Electricals Limited, Trichy;

***Post Harvest Technology Centre, Tamil Nadu Agricultural University, Coimbatore

Keywords: *Call centre workers, low back pain, work experience, work hours*

Call centres provides employment to higher number of younger age group people. A study was carried out among one hundred and eighty women workers employed in call centres at Chennai. The mean age and work experience of the workers were 24.4 (+3.3) and 2.4 (+2.16) years respectively. They worked for 9 to 10 hours a day in different shift timings. The workers carried out different activities such as data processing (data entry), attending inbound and outbound calls. Analysis of the discomforts revealed that eighty three per cent of workers reported low back pain and shoulder pain, followed by neck pain (63%) and discomforts in lower extremities (51%). Chisquare analysis indicated that there was no association between nature of work and discomfort experienced in different body parts. Further analysis also indicated that there was no association between work experience of the workers and discomforts faced by the workers. This clearly indicates that majority of the workers developed musculo skeletal discomfort irrespective of their nature of work and work experience.

42. Assessment of Physical Working Environment in a Chemical Industry and Ergonomics Intervention

Rauf Iqbal¹, Durgesh Chakrabarty²

¹National Institute of Industrial Engineering, Vihar lake, Mumbai – 400087,

²Tata Chemicals Ltd, Haldia, West Bengal

Email: rauf_iq@yahoo.com

Keywords: *Effective temperature, Corrected Effective temperature, Wet Bulb Globe Temperature, Relative Humidity, Air Velocity, Ergonomics*

The study was conducted in a chemical industry in West Bengal. Physical working

environment like, Heat stress indices and ventilation level were assessed in the operation areas and ware houses. Various heat stress indices measured were Effective temperature (ET), Corrected Effective temperature (CET), and Wet Bulb Globe Temperature (WBGT). The operation areas covered were DAP1 & 2, STPP Bagging area, Sulphonation plant, Soda Ash godown, Old Warehouse and New Warehouse. Mean and SD of the ET, CET and WBGT in the operation areas were - DAP 1 & 2 ($29.1 \pm 1.17^{\circ}\text{C}$, $29.1 \pm 1.23^{\circ}\text{C}$, $30.3 \pm 0.72^{\circ}\text{C}$); STPP Bagging area ($28.4 \pm 1.12^{\circ}\text{C}$, $28.5 \pm 1.25^{\circ}\text{C}$, $29.5 \pm 1.59^{\circ}\text{C}$); Sulphonation Plant ($27.7 \pm 3.54^{\circ}\text{C}$, $29.3 \pm 1.83^{\circ}\text{C}$, $30.4 \pm 1.05^{\circ}\text{C}$); Soda Ash Godown ($29.4 \pm 1.37^{\circ}\text{C}$, $29.8 \pm 1.53^{\circ}\text{C}$, $30.3 \pm 1.82^{\circ}\text{C}$); Old Warehouse ($30.0 \pm 0.63^{\circ}\text{C}$, $30.5 \pm 0.82^{\circ}\text{C}$, $31.6 \pm 2.14^{\circ}\text{C}$); New Warehouse ($30.6 \pm 0.72^{\circ}\text{C}$, $31.0 \pm 0.72^{\circ}\text{C}$, $31.8 \pm 0.82^{\circ}\text{C}$) respectively.

Mean and SD of the Relative Humidity (RH) and Air Velocity in the operation areas were - DAP 1 & 2 ($64.1 \pm 6.49\%$, 73.3 ± 56.74 cm/s); STPP Bagging area ($63.3 \pm 3.77\%$, 52.1 ± 22.14 cm/s); Sulphonation Plant ($62.4 \pm 4.39\%$, 63.8 ± 67.92 cm/s); Soda Ash Godown ($58.3 \pm 7.09\%$, 43.2 ± 25.16 cm/s); Old Warehouse ($55.2 \pm 1.96\%$, 22.9 ± 4.65 cm/s); New Warehouse ($50.1 \pm 2.77\%$, 22.5 ± 4.53 cm/s) respectively.

The present status of heat stress and ventilation were compared with the norms and ergonomics interventions were provided for better Health and Safety concerns and lesser fatigue level among the workforce.

43. Physiological Perspectives of Overtraining – An Update

Amit Bandyopadhyay

Sports & Exercise Physiology Laboratory, Department of Physiology,
University of Calcutta, University College of Science & Technology,
92, A. P. C. Road, Kolkata: 700 009
E-mail: bamit74@yahoo.co.in

Keywords: *Overtraining markers, fatigue, stress, injuries, recover*

Overtraining is a condition in which adaptive mechanisms of athletes are stressed that diminishes the capacity to maintain a balance between exercise and recovery. Due to this chronic fatigue state the physical performance is hampered, leading to appearance of various pathophysiological and psychological symptoms. Excessive stress with insufficient recovery period is the main cause of overtraining. It usually happens due to sudden increase

in training volume with shorter recovery times in between the successive training bouts. However, other stressors, apart from training, exist in an athlete's life, and these may also ameliorate the chances of getting overtrained. Academic and parental pressures exist particularly in case of young athletes. Exterminating or minimising these causes by proper counselling on training loads, recovery times, nutrition and use of suitable markers can aid to prevent overtraining syndrome in athletes. Present review was undertaken to thoroughly scrutinize the physiological perspectives of overtraining with special emphasis on the different angles of recent research observations related to causes, markers, signs and symptoms, types, mechanisms involved, recognition and possible remedial measures of overtraining. Checking the prevalence of overtraining in young athletes with gender variation (if any) was another major concern of the review work.

98th Indian Science Congress

January 3-7, 2011, Chennai

V

ABSTRACTS OF
INVITED FOREIGN LECTURES

Prof. S. C. Mahalanabis Oration Lecture (PSI) :

1. Perchlorate Exposure and the Thyroid

Elizabeth N. Pearce

Section of Endocrinology, Diabetes and Nutrition,
Boston University School of Medicine,
Boston, Massachusetts 02118

Keywords: *Thyroid functions, perchlorate exposure, endocrine disruptors, iodine uptake*

Environmental perchlorate comes from a variety of sources, is extremely stable as an inorganic salt, and persists in low levels in soil and groundwater over long periods. In pharmacologic doses, perchlorate inhibits thyroidal iodine uptake and subsequently decreases thyroid hormone production. Although pharmacologic doses may be used in the treatment of hyperthyroidism, the question of whether low-level environmental perchlorate exposure has significant consequences for human health has generated considerable controversy. This is of particular concern to the developing fetus and infant, whose normal neurodevelopment depends on adequate iodine intake for the production of thyroid hormones.

Recent studies have focused on environmental sources of perchlorate exposure, assessments of perchlorate exposure in population studies, the effects of perchlorate on thyroid function, potential impacts of perchlorate levels on vulnerable exposure populations, and proposals for perchlorate regulation and the current recommendations for iodine nutrition. The health impact of environmental perchlorate may be dependent upon adequate iodine intake and should be interpreted in combination with other environmental exposures that are also potential thyroidal endocrine disruptors.

2. Gene and Environment Interaction in Regulating Body Stress and Immune Functions

Dipak K. Sarkar

Endocrine Program, Rutgers University,
67 Poultry Farm Road, New Brunswick NJ 08901, USA

Key words: *Epigenetic, environment, proopiomelanocortin, beta-endorphin, breast and prostate cancers*

There is increasing support for the idea that an interaction between genes and the environment may significantly contribute to the etiology of various diseases including alcoholism and cancer susceptibility, and that environmental factors or genetic predisposition alone does not underlie the dependent state. In recent years, epigenetic research has emerged that reveals how environmental stimuli may have both instantaneous physiological affects as well as long term effects that are transmittable over generations. I will present data on the prenatal ethanol effect on beta-endorphin neuron, which regulates the stress axis and controls lymphoid functions by reducing body stress mechanisms and inhibiting sympathetic neurons input to the spleen. I will show that prenatal ethanol induces epigenetic modification of the beta-endorphin precursor gene, proopiomelanocortin in the hypothalamus. I will present data to show that ethanol has the ability to program the neuroendocrine-immune axis to promote a transgenerational disease state. I will show that prenatal ethanol induces stress hyperresponse and immune incompetence and increases the incidence of cancers. Furthermore, I will demonstrate that beta-endorphin cell transplants prevents stress axis and immune dysfunctions and reduces the growth and progression of breast and prostate cancers.

3. Biology of Neuronal Cytoskeleton Regulation and Neurodegeneration; A Novel Approach to Inhibit the Deregulation of the Kinases Involved in Neurodegenerative Diseases

Harish C. Pant

National Institute of Neurological Disorders and Stroke,
National Institutes of Health, Bethesda, MD 20892. USA

Keywords: *Neurodegeneration, perikarya, cytoskeleton,*

The Biology of Neurodegeneration program evolved in our laboratory studying the

basic biology of neuronal cytoskeletal protein phosphorylation regulation during development and normal function in the adult. To understand the molecular basis of neurodegeneration our major focus has been to study the regulation of compartment-specific patterns of cytoskeletal protein phosphorylation in neuronal perikarya and axons. We have demonstrated that phosphorylation of the numerous acceptor sites on such proteins as Tau and neurofilaments was tightly regulated topographically and generally confined to the axonal compartment. It was recognized that in neurodegenerative disorders such as Alzheimer's disease (AD) and Amyotrophic lateral sclerosis (ALS), the pathology was characterized by an accumulation of aberrantly and hyper-phosphorylated cytoskeletal proteins in cell bodies, suggesting that topographic regulation had been compromised. This led inevitably into studies of neurodegeneration in cell culture and model mice with emphasis on a specific neuronal protein kinases, e.g. cyclin dependent kinase5 (cdk5), MAPKs that targets numerous neuronal proteins including cytoskeletal proteins, which when deregulated, may be responsible for the pathology seen in neurodegeneration. In cell systems, neuronal stress leads to deregulated kinases, for example, cdk5, accompanied by abnormal cytoskeletal protein phosphorylation and cell death characteristic of neurodegeneration. Recently we have developed peptides derived from, p35, a neuron specific activator of cdk5, for deregulated cdk5 activity which rescue cells in vitro from this stress induced pathology. The questions currently being investigated are (1) How is cytoskeletal protein phosphorylation topographically regulated in neurons? (2) What factors are responsible for the deregulation of cdk5 in neurons? (3) Can mouse models of AD and ALS be treated therapeutically with peptides that specifically inhibit deregulated cdk5?

4. Role of Protein Kinase C in Mood Disorders and Suicide

Ghanshyam N. Pandey

Department of Psychiatry, College of Medicine,
University of Illinois at Chicago, 1601 W Taylor St., Chicago, IL 60612, USA

Keywords: *Mood disorders, depression, bipolar disorder, suicide, postmortem brain, prefrontal cortex (PFC), protein kinase C (PKC)*

Background: Protein kinase C (PKC) is a group of phospholipids-dependent enzymes which play a crucial role in cell signaling. PKC family consists of at least 10 different isoforms and abnormalities of PKC have been implicated in mood disorders and suicide. In this study we examined the role of PKC isoforms in mood disorders and suicide.

Methods: We determined the protein expression by western blot and gene expression by qRT-PCR of various PKC isoforms in prefrontal cortex (PFC; Brodmann area 9) of 24 depressed subjects who died by suicide, 12 depressed subjects who died of natural causes, 15 bipolar subjects and 24 normal control subjects. The postmortem brain tissues were obtained from the Maryland Brain Collection at the Maryland Psychiatric Research Center, Baltimore, Maryland and from the Harvard Brain Collection Program.

Results: We observed that mRNA expression of PKC α , β , and γ were significantly decreased in the PFC of both depressed suicide subjects and depressed non-suicide subjects compared with controls. mRNA expression of PKC δ was significantly decreased only in depressed suicide, but not in depressed non-suicide subjects, relative to controls. No significant changes were observed in PKC ϵ , ζ , η , θ , and ι in either of the groups compared with controls. The protein expression of PKC δ , PKC β , and PKC γ , was significantly decreased in membrane and cytosol fractions of both depressed suicide and depressed non-suicide subjects compared with controls. The protein and mRNA expression of PKC α , PKC δ and PKC β were significantly decreased in bipolar subjects compared with controls.

Conclusion: These results suggest that abnormalities of specific PKC isoforms are generally associated with both mood disorders and suicide and may play an important role in their pathophysiology.

5. Enhancement of Cyclic GMP Pathway Using PDE (Phosphodiesterase) Inhibitors to Improve Vascular Functions and Care of Foot in Diabetes

¹ Sriraman, ² O N Paramasivan

¹ Consultant Physician & Endocrinologist,

² Consultant Orthopaedic Surgeon,

United Lincolnshire Hospitals NHS Trust, Lincoln, United Kingdom.

Type 2 diabetes is positioned to be one of the largest epidemics in human history and, certainly, it is one of the major threats to human health in the 21st century. Insulin resistance which, classically refers to an impairment of the degree to which a given quantity of insulin lowers plasma glucose, is a common feature of type 2 diabetes.

Diabetic foot ulcers are a major health care problem. Complications of foot ulcers are a leading cause of hospitalisation and amputation in diabetic patients. Diabetic ulcers result from neuropathy or ischemia. Neuropathy is characterized by loss of protective sensation and biomechanical abnormalities. Lack of protective sensation allows ulceration in areas of high pressure. Autonomic neuropathy causes dryness of the skin by decreased sweating and therefore vulnerability of the skin to break down.

Ischemia is caused by peripheral arterial disease. Poor arterial inflow decreases blood supply to ulcer area and is associated with reduced oxygenation, nutrition and ulcer healing. The microcirculation in neuropathic diabetic feet is the subject of the same changes found in other end organs of the diabetic patients. In diabetic neuropathy, abnormal neurogenic regulation of the hemodynamics in the small vessels may contribute to the development of microangiopathy, which is manifested as increased basement thickening.

Foot problems constitute a significant part of morbidity in diabetics in India. Peripheral neuropathy (PN) and peripheral vascular disease (PVD) are well known common long-term complications of diabetes, and although a proportion of people with PN and PVD have severe and debilitating pain, many are asymptomatic. However, despite the lack of symptoms, people with PN and PVD are known to be at high risk of foot complications including foot ulceration, infection and amputation. PN and PVD are the main causes of non-traumatic lower limb amputation.

Complications affecting the lower limbs are among the most common manifestations of diabetes; it was reported that 15% of diabetic patients will eventually suffer from foot ulceration during their lifetime. These complications are a frequent cause of hospitalization and disability; with 1 in 5 hospitalizations among diabetics directly related to foot ulcers.

Insulin is a vascular hormone and its physiological effects on the vasculature contribute to its regulation of glucose metabolism. In this way, insulin resistance in the vasculature can be seen as an important component of overall tissue insulin resistance. This vessel wall action is largely mediated by endothelial nitric oxide production, and this action is impaired in clinical states of insulin resistance, which is associated with endothelial dysfunction.

The endothelium is a dynamic monolayer tissue which lines the inner aspect of blood vessels. It regulates vascular tone and the interaction of the vessel wall with circulating substances and blood cells. The endothelium produces vasodilator and vasoconstrictor

substances, which are in balance under normal healthy conditions. Nitric oxide (NO) is a major vasodilator substance produced by endothelium, which has multiple vascular protective actions. The health of the vasculature critically depends on the normal functioning of the endothelium. Endothelial dysfunction is defined as an imbalance in which the effects of vasoconstrictors outweigh the effects of vasodilators. This imbalance generally results from decreased NO availability, which is reflected as decreased vasodilatory capacity leading to loss of vascular protection.

NO, released by the vascular endothelial cells in response to various vasomodulating factors such as shear stress, hormonal agonists, exercise etc induces vasorelaxation by increasing the second messenger cyclic guanosine monophosphate (cGMP) via the activation of soluble guanylate cyclase in vascular smooth muscle. Vascular smooth muscle responses to cGMP- dependent vasodilatory stimuli are regulated by the activity of vascular smooth muscle phosphodiesterase (PDE), which catalyses the degradation of cGMP to inactive products. Thus PDE inhibition should prolong the vasodilatory action of cGMP. Indeed this mechanism is utilised in the clinical effectiveness of sildenafil (Viagra), which is used successfully to treat erectile dysfunction in diabetes. The effect of such PDE inhibition elsewhere in the circulatory tree has not been so extensively explored, however previous work in this laboratory have demonstrated that sildenafil can prolong maximum microvascular hyperaemia in skin of healthy volunteers, a response that is known to be due in part to a NO dependent mechanism.

Skeletal muscle is the major source of the insulin mediated glucose uptake and becomes resistant to insulin in type 2 diabetes. Recent studies in humans indicate that insulin enhances total limb blood flow and this is dependent on the release of nitric oxide, although this is disputed. Insulin contributes to the metabolic response of skeletal muscles by enhancing access for both insulin and glucose to muscle. Insulin mediated, NO dependent vasodilatation appears to influence insulin sensitivity. It seems that, insulin does this by increasing the bulk flow to the muscle and increasing the capillary recruitment and this effect may be impaired in insulin resistance due to endothelial dysfunction.

In this prospective double blind placebo controlled cross over study, we looked at the effect of a single oral dose of 100mg sildenafil on central and peripheral blood pressure, pulse wave velocity of the brachial artery and aorta as a measure of arterial stiffness, sympatho-vagal balance as a measure of autonomic function, colour vision and insulin sensitivity.

This study showed that an acute dose of 100mg sildenafil improves parameters associated with vascular health in type 2 diabetic subjects in the form of reducing central and peripheral blood pressure, and had no significant effect on colour vision or insulin sensitivity.

The vast majority of diabetic foot complications resulting in amputation begin with the formation of skin ulcers. Early detection and appropriate treatment of these ulcers may prevent up to 85 percent of amputations. Careful inspection of the diabetic foot on a regular basis is one of the easiest, least expensive and most effective measures for preventing foot complications. Appropriate care of the diabetic foot requires recognition of the most common risk factors for limb loss. Many of these risk factors can be identified based on specific aspects of the history and a brief but systematic examination of the foot.

98th Indian Science Congress

January 3-7, 2011, Chennai

VI

**ABSTRACTS OF
ORAL/POSTER PRESENTATION**

PROCEEDINGS
OF THE
NINETY EIGHTH SESSION OF THE
INDIAN SCIENCE CONGRESS
CHENNAI, 2011

PART II : ABSTRACTS

SECTION OF
MEDICAL SCIENCES (INCLUDING PHYSIOLOGY)

President : PROF. AMAR K. CHANDRA

ORAL PRESENTATIONS

Endocrinology and Reproductive Physiology

1. Prevalence of Iodine Deficiency Disorder (IDD) in Southern Assam and Amplification of the Target *Tpo* Gene for Genetic Study

*Bishal Dhar, Biswadeep Choudhury¹, Sumita Dutta Gupta¹,
P Das¹, Sankar Kumar Ghosh*

Department of Biotechnology, Assam University, Silchar-788011

¹Silchar Medical College and Hospital, Silchar, Assam

Email:drsankarghosh@gmail.com

Keywords: *Iodine deficiency disorders (IDD), hypothyroidism, goiter, cretinism, TPO, FNAC, RT-PCR*

Iodine is chief constituent for thyroid hormone synthesis. Deficiency of Iodine results in impaired thyroid activity which is known to be Iodine Deficiency Disorders (IDD). To overcome this, Iodine had been made mandatory as dietary supplement. But the problem still persists in Southern Assam of India and some parts of the world, though the people

have Iodine in their diet. This could be due to mutation in TPO gene, which is the key factor for thyroid hormone synthesis. Our aim is to study the epidemiology of IDD in this region and identify the most abundant mutation in TPO gene. The present study showed that 44% of the people are affected from IDD which is quite high, so we amplified the target region i.e. TPO gene.

2. Human Umbilical Cord Blood and Diabetes Mellitus

Alluru S Reddi

Chief, Division of Nephrology & Hypertension

Key Words: *Cellular therapy, Human umbilical cord blood (HUCB), bone marrow*

Cellular therapy for patients with diabetes is receiving great attention among scientists and clinicians. Bone marrow is considered one of the rich sources of stem cells. However, the limited availability of bone marrow donors precludes its use for all the suitable patients. Human umbilical cord blood (HUCB) is being increasingly used as an alternative source of stem cells for cell-based therapy for malignant and nonmalignant diseases. HUCB is preferred to bone marrow because of its easy availability, low potential for graft-versus-host disease and tumorigenicity as well as infectious complications. Furthermore, no immunosuppression is required. In vitro and in vivo studies have shown that HUCB-derived stem cells can differentiate into insulin-secreting β -cells. Administration of HUCB cells has been shown to improve blood glucose levels in diabetic animals. In my presentation, I will focus on the current status of the use of HUCB in the management of both type 1 and type 2 diabetes in animals and human subjects.

3. No Reason to Stop Sugar in Type II Diabetes Mellitus

Salil Kumar Mandal

Department of Physiology,
KPC Medical College, Jadavpur, Kolkata 700 032

Keywords : *Blood Sugar, Oral Sugar, Diabetes - Type —II*

In the present investigation 10 Type II diabetic subjects were given 10G of sugar

(Cane Sugar) orally daily for one year without significant change in blood Sugar level, the other 10 subjects were compared without giving them any sugar. All the subjects were controlled diabetics between the age group of 50 to 65 years and their heights were between 150—165 cm. Of them 50% were males. They were allowed sugar in Tea 2.5G per cup x Twice daily and were given also one Sandesh (sweet) or| Rossogolla (sweet) containing about 5G of Sugar once daily every day. The diets of these subjects were calculated and maintained at Height in cm XI0 calories daily. They were allowed 200G of vegetables and 100G of fruits daily. After one year blood sugar (Fasting) was found between 110 mg to 140 mg % level which was, similar to that when the investigation started 1 yr back. So stop sugar advice should be abolished immediately and ten grams of sugar can be allowed to the Type II Diabetes daily.

4. A study on prevalence of obesity among type -2 diabetics

V. Chinnari Harika, Ch. Manmohan, P. Padmavathi

Dept of Foods and Nutritional Sciences, Doctor (GGH Guntur),

Dept of zoology, Acharya Nagarjuna University,

Nagarjuna Nagar - 522 510

Keywords: Obesity, type II diabetics, anthropometric measurements, metabolic syndrome

The present study was aimed to investigate prevalence of obesity among type –2 diabetes. Two hospitals were selected for the study, Government general hospital, Guntur and Sai hospitals, Guntur. A total of 1200 members aged 35-75 yrs took part in the study. A random sampling procedure was used to select the subjects. All subjects were belonging to Guntur population, Andhra Pradesh. Anthropometric measures namely height, weight, minimum waist circumferences (MWC) etc., were collected using standard techniques. Body mass index (BMI), nutritional index (NI), Ideal body weight (IBW) and a waist hip ratio was taken. Left arm systolic (SBP) and diastolic (DBP) blood pressure was taken. Metabolic profiles namely total cholesterol (TC), triglycerides (TG), very low density lipoprotein (VLDL), fasting blood glucose (FBG) were taken. All subjects were categorized into three groups. Group I (age 35 - 44 years), Group II (age 45-54 years) and Group III (age 55+ years). One way Anova revealed that there was significant group difference for age, WHR, BMI, IBW, NI, SBP, DBP, TG, VLDL-C across the groups. Chi-square test revealed significant group difference for the prevalence of obesity among type II diabetes

such as high TC, high TG, high BP and high BMI across the age groups and warranted prevention of obesity among type II diabetics.

5. Thyroxine Improves Reproductive Function in (+)-Catechin Induced Hypogonadal Adult Male Rats

Suvendu Ghosh ¹ and Amar K Chandra ²

¹Dept. of Physiology, Jhargram Raj College
(Govt. of W. Bengal),

² Dept. of Physiology
University of Calcutta

Keywords: (+)-catechin, hypothyroidism, L-Thyroxine, TSH, T3, T4, FSH, LH, testosterone

Thyroid hormone is a critical regulator of growth, development of animals and metabolism in almost all tissues. Altered thyroid status affects the function of organs and systems. Changes in thyroid hormone level can adversely affect fertility, postnatal development in human and animals and reproductive system function. Thyroid dysfunction including both hypo and hyper conditions induced alterations in reproductive system such as altered levels of LH and FSH, and altered steroid ratios and decreased sperm count in male laboratory animals and humans. Flavonoids have been reported to inhibit thyroid peroxidase activity and deiodinase activity being classified as antithyroidal agent and (+)-catechin, classified as a compound within flavonoid subfamily.

In the present investigation it has been observed that supplementation of (+)-catechin has created a hypogonadal condition in adult male rats as was reflected in deteriorated morphology and weights of testicular and accessory sex organ, sperm count, serum FSH, LH and testosterone levels compared to placebo. A simultaneous fall in serum T3, T4, and elevation of serum TSH also prognoses a transient hypothyroid condition. To confirm whether the above findings may be due to influence of thyroid hormones on adult testis, we supplemented L-thyroxine (L-T₄) to these (+)-catechin supplemented rats and monitored the gonadal status and thyroid hormone profiles in these male animals.

The present study showed that normal testicular function is highly dependent on a functional thyroid system. (+)-catechin, induces a state of transient hypothyroidism that

blunts the pituitary testis axis. The results thus indicate that thyroid hormones play an important pituitary-gonadal effect that is reflected by an impairment of testicular testosterone synthesis associated to a defective LH response to GnRH in hypothyroidism. As the inhibitory effects of hypothyroidism on the gonadotropin testicular axis are reversed by replacement with L-T₄, it has been suggested that thyroid hormone (TH) may regulate gonadotropin and testosterone biosynthesis and/or secretion which in turn controls normal testicular function.

6. Effect of PUFA Feeding on Ram Semen Fertility

S. Nandi, Priyadharsini Raju, S. Selvaraju S. B. N. Rao,
J. P. Ravindra

Animal Physiology Division
National Institute of Animal Nutrition and Physiology Adugodi,
Bangalore 256630

Keywords: ram, spermatozoa fertility, sperm concentration, motility

The objective of the present study was to assess the effect of different energy source (maize Vs PUFA) on semen parameters and fertility. Eighteen Nellore adult rams were randomly divided in to either a maize group (n=9) or PUFA group (n=9). Complete mixed rations were formulated to be and fed iso-energetic and isonitrogenous diets according to the ICAR feeding standards. The ingredient composition (%) of the concentrate mixture in maize group was maize grain, 64; soya cake, 33; mineral mixture, 2 and salt, 1. The ingredient composition (%) of the concentrate mixture in PUFA group was sunflower oil rich in linoleic acid (66% of total fat composition), 8; soya cake, 34; wheat bran, 55; mineral mixture, 2 and salt, 1. The ration was fed for 60 days and semen evaluation was carried out. The PUFA fed animals had significantly (P<0.05) lower semen volume and significantly (P<0.05) higher sperm concentration. There is no significant change in mass activity of the semen samples collected from the both groups. The progressive forward motility was significantly (P<0.05) higher in PUFA fed group as compared to maize fed group. It was also observed that PUFA feeding does not improve in vitro fertility in ram semen.

Neurophysiology

7. Single and Repeated Stress Induced Alteration of Neurotrophins in Rat Brain: Role in Learned Helplessness Behavior

Amal Chandra Mondal, Ritabrata Banerjee

Dept. of Physiology, Raja Peary Mohan College,
Uttarpara, Hooghly (W.B.)

Keywords: *Inescapable shock, escape test, learned Helplessness, brain neurotrophins, ELISA*

Stress induced learned helplessness (LH) in animals serves as a model of behavioral depression and some aspects of post traumatic disorders. We examined whether LH behavior is associated with alterations in brain neurotrophins levels, how long these alteration persists after inescapable shocks (IS) and whether repetition of IS prolongs the duration of LH behavior and changes in neurotrophins levels. In this present studies, we have shown that repeated IS prolongs the duration of LH behavior which is associated with the reduction in brain neurotrophins, This reduction in brain neurotrophins may be critical in the pathophysiology of depression and other stress related disorders.

8. Neurofacilitation of Developmental Reaction (NFDR) Approach for Modulating Early Motor Behavior in Cerebral Palsy

Meenakshi Batra¹ and Vijay Batra²

¹Senior Occupational Therapist, Pandit Deen Dayal Upadhyay Institute for the Physically Handicapped (Ministry of Social Justice & Empowerment, Govt. of India) & PhD scholar (C.S.M.M.U.); ²Senior Research Fellow & PhD scholar (C.S.M.M.U.)

Keywords: *Cerebral Palsy (CP), neurofacilitation of developmental reaction (NFDR), neuro developmental therapy (NDT), primitive reflexes, gross motor functional abilities (GMFM)*

Objective:

To see the efficacy of NFDR over NDT for modulating early motor behavior (Primitive Reflexes) in CP.

Method:

Randomized Controlled trial. 30 CP children of age range 6 months to 2 years were included. Their baseline evaluation was done for Tone, Reflex profile and GMFM. The subjects were randomly allocated to two groups. With group A, NFDR and group B, NDT was used for 3 months followed by re-evaluation.

Result:

Between groups analysis was done and p value was found to be significant ($P < .05$).

Conclusion:

NFDR approach is more effective for modulating early motor behavior in CP.

9. Role of Prenatal, Neonatal and Postnatal Risk Factors in Patients of Profound Mental Disability

¹ Minakshi Vashist, ² Amit Kumar, ³ Joginder Kairo ⁴ Ritu Yadav Shivani

¹ Dept. of Genetics, M. D. University,

² Dept. of Genetics, M. D. University,

³ Deptt. Of Psychiatry, PGIMS,

⁴ Dept. of Genetics, M. D. University, Rohtak

Keywords: *Mental disability, intelligent quotient, risk factors*

Nineteen patients of profound mental disability were studied from Pt.B.D.Sharma University of Health Sciences Rohtak, Haryana. Out of these there were 8 males (42.1%) & 11 females (57.9%). All of these patients were with low socio-economic status and illiterate background. A questionnaire was developed to assess the prevalence of recognized medical risk factors. In profound group prenatal, postnatal & neonatal risk factors were noted in eleven, sixteen & seventeen patients respectively. Age group range of 11-20 years has highest frequency (47.4%) of mental disability in profound category. Inadequate nutrition was the most frequent prenatal risk factor with highest percentage frequency. The most frequent neonatal risk factor was delayed cry. In postnatal risk factors failure to thrive was having the highest frequency.

Ergonomics, Work and Sports Physiology and Occupational Health

10. Work Related Upper Limb Disorders among the Women Workers Engaged In Fruit Processing Industries of Assam and Design Development Scope

*Nandita Bhattacharyya**, *Sangeeta Pandit***
and *Debkumar Chakrabarti****

*Faculty of Home Science,
Assam agricultural University, Jorhat 13;

**Department of Design,
Indian Institute of Technology Guwahati,
Guwahati 781 039;

***Department of Design,
Indian Institute of Technology Guwahati,
Guwahati 781 039

Keywords: *Musculoskeletal problems, ergonomic intervention, occupational stress, fatigue*

Fruit processing industry is an unorganized agro based industry with highly women labour intensive in Assam, and is an upcoming business opportunity as private enterprise. A study was conducted in pineapple industry where the tasks performed by the women workers demand a high degree of physical effort and adoption of unnatural postures leading to untimely fatigue and musculoskeletal problems; peeling of pineapple is a skillful and labour intensive mostly done by manually with knives. Postures scores found were very high which require immediate attention.

The present study looks into the scope for ergonomic design development, specifically work tools and work posture, to improve the productivity and occupational health and safety.

11. Effects of military load carriage on upper body kinematics in sagittal plane during walking at varying speeds

Deepti Majumdar, M.S. Pal and D. Majumdar

Defence Institute of Physiology & Allied Sciences (DIPAS),
Lucknow Road, Timarpur,
Delhi 110054

Keywords: *Load carriage, trunk forward lean, pelvic tilt, ROM, walking speed*

Trunk forward lean and pelvic tilt responses were recorded while ten healthy male infantry soldiers with mean(SD) age 23.3(2.6)yrs, height 172.0(3.8)cm and weight 64.3(7.4)kg carried out eight military load carriage operations and one no load (NL) condition as they walked respectively at self selected slow (3.5km.h⁻¹) and fast (6.5km.h⁻¹) walking speeds. Gait data was collected using a six camera based 3D Motion Analysis System while the subjects walked on a 10m level ground walkway with and without load. Load items were backpack (BP, 10.7kg), haversack (HS, 4.4kg), Rifle (4.2kg) and light machine gun (LMG, 6.8kg) and were carried on back and hand singly and in combination. Trunk forward lean and pelvic tilt angles at different gait events (foot strike, midstance and toe-off) were reported and ranges of motion (ROM) in these joints were calculated for both the speeds. Results were subjected to One-way ANOVA followed by Dunnett post hoc test. Data was compared between load and no load (NL) conditions for each speed. Also the angular changes and ROM at NL and each load condition at slow speed were compared with the respective fast speed data.

At slow speed, trunk remained upright at NL for all events while at high speed trunk showed about 4.5° forward lean at the beginning of walk at foot strike. An increase in pelvic extension was observed with BPLMG in comparison to NL at both the speeds. However, at fast speed there was an increase in pelvic flexion in comparison to corresponding load carriage operation at slow speed.

12. Assessment of Illumination and Noise level in a Chemical Industry and Ergonomics Intervention

Durgesh Chakrabarty,¹ Rauf Iqbal²

¹Tata Chemicals Ltd, Haldia,
West Bengal,

²National Institute of Industrial Engineering,
Vihar lake, Mumbai – 400087

Email: durgesh.chakrabarty@tatachemicals.com

Keywords: *Illumination, noise, day shift, night shift, ergonomics*

The study was conducted in a chemical plant in West Bengal. Physical working environment was assessed in terms of illumination and noise levels in the operation areas, warehouses and office premises. The operation areas covered were SAP1&2, PAP, STPP, DAP, SSP, Bagging area and RM store. Office areas covered were Control rooms, OHS center and Admin & HR section. Illumination level was measured in the dayshift as well as in the night shift also to assess the status of illumination in the plant. Mean and SD of the illumination level measured in the operation areas both in the dayshift and night shift were – SAP1&2 (169.9 ± 116.86 lux, $32.0 \pm 36.52^{\circ}\text{C}$); PAP (84.6 ± 68.25 lux, $24.3 \pm 46.31^{\circ}\text{C}$); STPP (250.2 ± 386.90 lux, 72.1 ± 13.91 lux); DAP (144.5 ± 82.77 lux, 133.2 ± 67.60 lux); SSP (104.9 ± 14.28 lux, 122.8 ± 173.64 lux); Bagging area (113.9 ± 47.74 lux, 86.1 ± 49.15 lux); RM store (184.3 ± 66.42 lux, 127.6 ± 22.97 lux) respectively. Illumination level in the warehouses in the day shift and night shift were – Old warehouse (111.7 ± 100.11 lux, 11.8 ± 6.57 lux); New warehouse (674.0 ± 14.42 lux, 25.9 ± 6.94 lux) respectively.

Mean and SD of the illumination level in the office rooms were – Control rooms (305.9 ± 142.88 lux, 330.9 ± 154.47 lux); OHS center (305.9 ± 142.88 lux, 330.9 ± 154.47 lux) and Admin & HR section (271.8 ± 71.10 lux, no night operation) respectively.

Noise level in various sections were - SAP1&2 (70.4 ± 4.90 dB); PAP (93.6 ± 7.20 dB); STPP (92.2 ± 4.01 dB); DAP (85.3 ± 14.53 dB); SSP (94.1 ± 7.16 dB); Bagging area (85.3 ± 14.53 dB); RM store (67.7 ± 5.47 dB); Control rooms (70.4 ± 4.90 dB, 330.9) and Admin & HR section (66.3 ± 8.29 dB).

The present status of illumination and noise levels were compared with the standards and ergonomics interventions were provided for better working environment and lesser stress level among the workforce.

13. Effect of Training on Selected Physiological Variables of Indian Soccer Players

^aIndrnil Manna, ^bGulshan Lal Khanna, ^cPrakash Chandra Dhara

^aDepartment of Physiology, Midnapore College,
Midnapore, West Bengal

^bDepartment of Health Sciences,
Manav Rachana International University, Faridabad

^cDepartment of Human Physiology, Vidyasagar University,
Midnapore, West Bengal

Keywords: *Body fat, VO₂max, anaerobic power, strength, lipid profile, soccer*

The purpose of this study was to find out the effect of training on selected physiological variables of soccer players. Thirty (30) male (age: 20-23 yrs) soccer were selected from SAI, a 12 wks of training was employed; the effects were studied on selected physiological variables. A significant increase ($P < 0.05$) in LBM, VO₂max and anaerobic power, strength; significant decrease ($P < 0.05$) in body fat, heart rates were noted among the players after training. No change was noted in HRmax and body mass after the training. The present study may provide useful information to the coaches to develop their training program.

14. Evaluation of Stair Climbing Test as a Measure of Cardiopulmonary Reserve

Debasis Pramanik and Chiranjit Bal

Department of Physiology, Medical College,
88, College Street, Kolkata 700 073
Email: deba pram (a)vahoo.co.in

Keywords: *Stair climbing test, VO₂max, cardiopulmonary reserve*

Assessment of cardiopulmonary reserve can be done by measuring VO₂max with sophisticated computerized treadmills which are often unavailable in peripheral hospitals. The present study evaluates stair climbing test, a simple alternative. Patients are instructed to climb 6 flights of stairs with a total height of approximately 11 metres, in the shortest possible time which is then correlated with VO₂max values determined by computerized

treadmill. Pearson's correlation analysis showed strong correlation ($r = -0.786$, $p < .000...$) between values of stair-climbing time and V_{O2max} . Points to emphasise in stair climbing test are using a standard total height of stairs (10-12 metres) and encouraging patients verbally to give best possible effort.

Drug Design, Drug Development and Toxicology

15. Preparation and Characterization of Repaglinide Loaded Chitosan Polymeric Nanoparticles for drug delivery

**U. M. Dhana Lekshmi, G. Poovi, Narra Kishore, G. Pramod Reddy[‡],
and P. Neelakantareddy**

Bio Organic Chemistry Laboratory,
Central Leather Research Institute (CSIR) Adyar,
Chennai 600020. India,

[‡]Siddha Central Research Institute, Arumbakkam, Chennai 600106. India.

Keywords : *Chitosan, repaglinide, diabetic disease, polymeric nanoparticles*

The aim of this study was to formulate and optimize repaglinide (Rg) loaded chitosan (CN) nanoparticles as a sustained release. Repaglinide is a hypoglycemic agent of the meglitinide analog. In present study repaglinide loaded chitosan nano particles were prepared by solvent evaporation method in three different ratios. In this method weighed quantity of drug and polymer were dissolved in suitable organic solvent acetone and 2% acetic acid (organic phase). This solution was added drop by drop to the aqueous phase of PVA and homogenized using homogenizer at 18000 rpm followed by magnetic stirring for 2-3 h. The formed Rg-CN nanoparticles were recovered by centrifugation at 25,000 rpm for 15 min followed by washing thrice with petroleum ether and lyophilized. The prepared nanoparticles were evaluated for particle size, Scanning Electron Microscopy (SEM), Fourier Transform Infra Red spectroscopy study (FT-IR), percentage yield, drug entrapment and for in vitro release kinetics. Among the three different ratio 1:4 ratio shown high drug loading (11.22% w/w) and encapsulation efficiencies (97.0%) and nanoparticle recovery (86.40%). Scanning electron microscopy exposed that nanoparticles were spherical in shape with a nearly smooth surface morphology. Particle size was analyzed by Malvern particle size analyzer and shown 48-100 nm range. FT-IR study reveals that, there was no interaction between

repaglinide and polymers. Based on the in vitro study, repaglinide released from prepared formulation was slow and sustained over 15 days. Application of the in vitro drug release data to various kinetic equations indicated first order release, swelling and diffusion mechanism from repaglinide nanoparticles.

16. Mercury in Vaccines...Is It A Threat or Not?

R. Krishnaraj

Assistant Professor (Sr.G), School of Management,
Srm University, Kattankulathur 603 203, Tamilnadu

Keywords : *Mercury, Autism, Thiomersal, Vaccines.*

Mercury is a toxic metal that can cause immune, sensory, neurological, motor, and behavioural dysfunctions. Every major symptom of autism matches the symptoms of documented cases of mercury poisoning. This paper analyzes the link between the use of vaccines that contain the preservative 'thiomersal' and the threats posed by it. Still there are lot of vaccines are being marketed in India, with the preservative of thiomersal. Doctors and scientists should work for the elimination of thiomersal in all vaccines.

17. Arsenic Toxicity in the Drinking Water in Some Parts of the Gangetic West Bengal

Barendra Purkait

Department of Geology, Calcutta University,
35, Ballygunge Circular Road, Kolkata 700 019
E-mail: baren.purkait@gmail.com; baren_purkait@yahoo.co.in

Keywords: *Arsenic toxicity, Gangetic West Bengal, Microbe*

Deleterious effect of Arsenic (As) toxicity in the drinking water of the Gangetic alluvial plain of West Bengal has become an alarming issue. It has affected population of about 7-8 million in eight (Malda, Murshidabad, Nadia, Burdwan, Hooghly, Howrah, N- & S-24 Parganas) out of 18 districts of West Bengal. Recently three more districts e.g.

Koch Bihar, South Dinajpur and North Dinajpur have also been affected. As poisoning spreads in an area with length of about 400km and width of 60km along a linear stretch of the upper deltaic alluvial plain of the Ganga-Bhagirathi river system and more than 10 million in 61 out of 64 districts of Bangladesh. Around 560 villages in more than 50 blocks within these severely affected eight districts have been affected by arsenic poisoning. The estimated population in these eight districts was around 40 million (population survey, 2006), within which the estimated population using high arsenic contaminated water (above 50ppb) was more than one million, while the estimated population using moderate arsenic contaminated water (between 10 and 50 ppb) was around 1.3 million.

Most of the tubewell-water contain arsenic in the form of arsenite (As^{+3}) and arsenate (As^{+5}). Many people have arsenical skin lesions as melanosis, keratosis, hyperkeratosis, gangrene and skin cancer. Arsenic hotspots, typically associated with elevated ground water Fe and Mn, were found to be correlated to some extent with old river channels/ abandoned meanders/oxbow lakes, where sandy aquifers included intercalated fine-grained over bank deposits rich in As, Fe, Mn and carbonaceous matters. Abundant channels, meander scrolls, and swampy areas are the ideal sites of microbial growth, which play an important role in releasing As to ground water. An SEM study reveals such microbes which respire on As. It is likely that after their decomposition, As is released to ground water. Hence a detailed study is needed to study this microbe like features.

18. A Study on Effect of Smoking on Function of Tear Film

*Chiranjit Bal, Debasis Pramanik, Debajyoti Das
and Ajoy De Sarkar*

Dept. of Physiology and Ophthalmology,
Medical College Kolkata,
88, College street, Kolkata 700 073
Email: drchiranjitbal@gmail.com

Keywords: *Smoking, Tear film*

The present study was performed to evaluate the qualitative and quantitative change in tear film among smokers. Tear film break-up time (BUT) and basal tear secretion by

Schirmer's test, were performed in 40 smokers (80 eyes) and 35 non-smokers (70eyes). Tear film BUT and basal tear secretion was 7.89 ± 2.84 sec, 6.38 ± 2.94 mm, in smokers and 9.71 ± 3.23 sec, 10.13 ± 3.96 mm, in nonsmokers respectively ($p<0.05$). Our results lead us to conclude that quantity and quality of tear film significantly decrease with smoking and this decrease is further related to the amount of smoking.

19. PCR Based Diagnosis of Human Papillomavirus (HPV) Infection of Suspected Cervical Cancer Patient from Southern Assam: A Report

Memton Singh, Jagadish Hansa, Biswadeep Choudhury¹, Sumita Dutta Gupta¹, A Das¹, Rajeev Kumar², Ruhina S Laskar², Ravi Kannan², and Sankar Kumar Ghosh

Department of Biotechnology, Assam University,
Silchar-788011, Assam,

¹ Silchar Medical College & Hospital,
Silchar, Assam,

² Cachar Cancer Hospital and research Centre,
Silchar

Keywords: *PCR, Cytological Methods, Cervical Cancer, HPV, Sensitivity, Specificity, Cancer Prevention Programmes, Screening.*

World-wide epidemiological studies have shown that cancer of the uterine cervix is the second most common malignant disease in women. Virtually every cervical cancer (99.7%) is HPV-positive, indicating that the presence of HPV is an obligatory element in the development of cervical cancer. The present study was done by PCR based diagnosis of HPV 16 and HPV 18 infection amongst patients of suspected cervical cancer, confirmed by cytological methods. Twelve women out of a total of fifty studied cases who had positive cervical pap smears (24%) were found to be positive for HPV 16/HPV 18 infection when PCR based technique was applied. The results indicate, perhaps, a greater specificity of PCR based diagnosis or presence of other HPV subtypes as etiological factors in the Southern Assam in which the study group was confined to.

20. Inhibition of Ethanol-Induced Oxidative Stress and Alteration of Protein Pattern by Livina, a Polyherbal Formulation in Mice

Soumendra Darbar*, Abhijit Bhattacharya, Shyamaprasad Chattopadhyay

Research and Development Division,
Dey's Medical Stores (Mfg.) Ltd.,
62, Bondel Road, Kolkata-700019,
West Bengal, India
E-mail: darbar_soumen@yahoo.co.in

Keywords: *Oxidative stress, Liver damage, Protein alteration, Ethanol, Livina*

Medicinal plants have become indispensable in the present age, even though one can not completely overcome the dependence on the synthetic drugs. As the medicinal plants and their derivatives have lesser side effect as comparison to that of synthetic medicine, the use of these herbal medicines have been gradually increase throughout the world. Traditional herbal medicines form an important part of the healthcare system in India.

The present study was conducted to evaluate the protective action of Livina, a polyherbal formulation in an animal model of hepatotoxicity induced by ethanol.

Ethanol intoxication caused a reduction of serum total protein and increase levels of serum alkaline phosphatase (ALP), serum aspartate aminotransferase (AST) and serum alanine aminotransferase (ALT) at higher extent in the toxic group. This phenomenon was paralleled by an impaired liver redox status i.e. decrease the level of reduced glutathione (GSH), superoxide dismutase (SOD), glutathione peroxidase (GPx), and catalase (CAT) and increased of MDA in ethanol-administered groups. Moreover, a marked reduction of ATPase and thiols were observed in ethanol-induced group. Alterations of serum and tissue protein observed by gel electrophoresis were occurred in liver tissue of ethanol intoxicated group. Animals pretreated with Livina, a polyherbal formulation, showed a marked mitigation of the severity of liver enzymes and of the impaired redox status of the liver. Moreover, Livina partly prevented the alteration of serum and tissue protein pattern and elevated the liver tissue ATPase and protein thiols as compared with the groups treated with ethanol alone.

Thus in the present study it may be concluded that Livina, a polyherbal drug, have some protective effect against ethanol-induced liver damage in animal model.

21. Minimally Invasive and Biosafe Method for Diagnosis of Tuberculosis in Cases of Infertility

S. Dutta Gupta¹, P R Ghosh² and S K Ghosh

Department of Biotechnology, Assam University, Silchar-788011,

¹ Department of Pathology, Silchar Medical College and Hospital, Silchar, Assam,

² Department of Animal Physiology, West Bengal University of Animal & fishery Science, Kolkata

Email: drsumitadg@gmail.com

Keywords: *Infertility, Tuberculosis, FG TB, Polymerase Chain Reaction*

Female genital tuberculosis (FGTB) is still a major cause of infertility in different parts of India among Indian women in spite of the availability of specific therapy. In North East India, out of several infertility patients suspected of genital tuberculosis, only a few are confirmed by traditional methods. Accurate and early diagnosis of tuberculosis (TB) is of major importance in the management and control of TB. A case study comprising 6 suspected TB positive infertile women visiting the infertility Clinic in Silchar Medical College and Hospital, Assam. The present study was carried out on history, symptoms, blood biochemistry, USG etc. compared with cervical and glandular cytology and AFB staining. All the six patients are diagnosed positive by PCR report.

22. Development of a Platform for Cell Culture-Based Influenza Vaccine: Experience with H1N1 Vaccine

**Nagendra R. Hegde^{1*}, Deepak Kumar¹, G. Ravi², P. Panduranga Rao¹,
Krishna Kumari², Yashpal Kaushik², Chakrapani², K. Gopinathan²,
Santosh Kumar M.², R. Ravikrishnan³, Sai D. Prasad²,
V. Krishna Mohan² and Krishna M. Ella²**

¹ Bharat Biotech Foundation, and ² Bharat Biotech International Limited, ³ RCC Laboratories India, Private Limited, Genome Valley, Turkapally, Shameerpet Mandal, Hyderabad 500078.

*Email: hegden@bharatbiotechfoundation.org

Keywords: *Influenza, vaccine, cell culture*

Influenza causes serious illness and death, especially in young children and the elderly. Annual vaccination is a must because the virus rapidly evolves and produces new variants

every year. Technology has existed for production of vaccines using embryonated chicken eggs. However, several limitations of this method as well as outbreaks of H5N1 and H1N1 influenza have highlighted the need for radical changes in the production of influenza vaccines. The development of cell culture-based technology is the most promising of these. We report here the development of MDCK-based influenza vaccine production platform. This is the first such platform in India.

23. Synthesis and In Vitro Antitubercular Activity of Some New Quinoxaline Derivatives

A.Puratchikody¹ *, N.Ramalakshmi²

¹Department of Pharmaceutical Technology,
Anna University of Technology,
Tiruchirappalli - 620 024, Tamil Nadu,

²Department of Pharmaceutical Chemistry,
C. L. Baid Metha College of Pharmacy,
Chennai 600 097, Tamil Nadu

Keywords: *Quinoxalines, azetidinone, thiazolidinone, and antituberculosis*

Twenty new quinoxalines bearing azetidinone and thiazolidinone groups were synthesized. The requisite 3-(phenylimino)-3,4-dihydroquinoxaline-one was obtained by the reaction of quinoxaline-2,3-dione with aniline in the presence of ethanol and glacial acetic acid. It was then reacted with free amino group of o-phenylenediamine to generate 4-methyl-N-((e)-3-(phenylimino)-3,4-dihydroquinoxalin-2(IH)-ylidene)benzenamine. This reaction with various aromatic aldehydes produced Schiff bases (**1n-w**) which underwent cyclization with chloroacetyl chloride in presence of triethylamine and thioglycollic acid to form azetidinones (**2n-w**) and thiazolidinones (**3n-w**) respectively. The structures of synthesized compounds were confirmed by IR, ¹H & ¹³C NMR, Mass and elemental analysis. They were tested against *Mycobacterium tuberculosis* H37Rv at 10⁶g/ml by Microplate Alamar Blue Assay method. Quinoxalines with chloro and dimethyl amino group showed better activity.

Forensic Science

24. Relevance of Biological Examination in Rape Investigation: A Case Report

Pankaj Shrivastava* and Mehmood Ali**

DNA Fingerprinting Unit, State Forensic Science Laboratory,
Department of Home (Police), Govt. of Madhya Pradesh, Sagar (MP),

*Scientific Officer & Asstt. Chemical Examiner, Govt of M.P.,

** Joint Director and Incharge DNA Unit

E mail: pankaj.shrivastava@rediffmail.com; pshri_sgr@dataone.in

Keywords: *Forensic science, DNA typing, Y-chromosome, short tandem repeats*

DNA fingerprinting has proved to be a valuable tool in the field of forensic DNA examination. Presence of spermatozoa is the biological evidence most often sought in the examination of rape victims. Absence of spermatozoa signifies termination of biological investigations. A case of triple murder in which one victim was also sexually assaulted was referred to the biological examination was found to be negative for the presence of semen stains and spermatozoa. Seeing to the heinous nature of the crime, the case was taken up for DNA examination. In this case not only Y-chromosome STRs were detected and but also autosomal STR mixed profile was generated which matched with one of the three suspects in this case, thus, while a conventional biological examination had resulted in the exoneration of the accused, DNA fingerprinting examination led to a conclusive and irrefutable evidence of connecting one of the accused as a rapist in the case.

25. Gun Shot Patterns and Artifacts on Human Body and their Medico Legal Aspects

Raj K. Shrivastava

Senior Scientific Officer, State Forensic Science Laboratory, Sagar (M.P.)

Email: swaraj1999@rediffmail.com

Keywords: *Gun shot wounds, forensic ballistics, forensic medicine, blackening, tattooing, abrasion collar, artifacts, contact shot*

‘Gun shot wounds’ i.e. wounds on living body caused by firearms, is a very important

field of study on the interface of two scientifically interrelated areas namely – Forensic Ballistics and Forensic Medicine.

In present submission, following aspects of gun shot wounds, relating to forensic medicine considerations are discussed and exemplified with three actual laboratory cases/scene of crime investigation - miscellaneous anatomical and physiological effects on human body namely - effects of bullet fired from a rifled firearm, pink tissue coloration, determination of distance of fire from the presence and profile ('gun shot patterns') of the gun shot residues on and around gunshot wounds i.e. Blackening, Tattooing, Abrasion collar etc., Medico legal aspects, and most importantly, the 'artifacts' which may mislead to a false ballistic opinion.

In first case, by microscopic physical examination and micro chemical examination of merely a piece of skin alone, not only conformation of a gun shot hole was done, possible caliber and type of firearm used and distance of fire (a contact shot) was approximated. In second case, in a blind firing incidence, merely by the study of observations in autopsy report, use of a standard rifled firearm was suggested rather than a country made firearm, as considered by local investigation. In third case, by on-spot examination of the dead body, a legally relevant opinion was given, solving 'homicidal'-versus-'suicidal' controversy.

26. Application of Physiological Principles in Evaluation of Cause of Death

¹A. Saravanan, ²K. Thankaraj,
³C. Ramachandran and ⁴Nitin Ashok John

^{1,4}Department of Physiology;

²Department of Forensic Medicine;

³Department of Physiology, SRM Medical College,
SRM University, Kattankulathur-603203. Tamil Nadu

Email: drasaravanan1977@gmail.com

Keywords: *Death, postmortem examination, plaster of paris bandage, septicemia*

Introduction:

A 35 year old man, who was abducted by his friends, was strangled to death with a nylon rope. The body was thrown in the thorny bushes. His body was brought to Taluk

Hospital for postmortem examination in decomposed state. A Plaster of Paris bandage was found over his left leg and the doctor opined that cause of death was septicemia and unnoticed the any strangulation mark over the neck.

Aim & Objective:

We decided to review his postmortem examination report to evaluate the cause of death.

Materials and Methods:

A detailed study of postmortem findings, histological and histopathological examination was conducted to substantiate the physiological basis if any for the cause of death.

Discussion:

The postmortem report was septicemia; the body was exhumated after 17 days and found a lump in the carotid artery. This is due to the the kinetic force released by the constrictive force of the rope and the counter force offered by mean arterial pressure from the carotid artery and the application of Bernoulli's principle confirmed that the injury was antemortem and homicidal strangulation was the cause the of death.

Conclusion:

Physiological principles and its evaluation of cause of death in postmortem examination also may be considered in court of law.

27. Snake Bite Death and Forensic Autopsy**Suparna Dutta**

Forensic Medicine Department, SSKM Hospital,
IPGME & R, Kolkata 700 020
Email: drsuparna12@yahoo.co.in

Keywords: *nephritis, haemodynamics, autopsy, renal failure, snakebite*

Snake-bites are the common cause of morbidity and mortality in tropical countries. In this study a wide spectrum of clinicopathological changes has been described in cases of

ARF. There is a broad spectrum of renal pathological changes. All renal structures are involved. A review of snakebite nephropathy is necessary due to the proliferation of clinical and scientific data on the topic. Snake-bite is unreliable due to improper reporting system. Snake venom is well known to cause toxic damage to the kidneys and Acute renal failure is one of the clinical manifestations that may result from this toxicity. Forensic experts detects or quantitates the snake venom residue in autopsy specimens of snakebite victims so as to ascertain the exact cause of death and to prevent false claims and/or ensure true claims. Detection of snake venom in Forensic specimens is more tedious for the Forensic experts to know the exact cause of death of the victim. Management of severe snakebite is a major challenge for Hospitals. Improved anti-venom procurement and use policies, combined with targeted snakebite education interventions, are key interventions to reduce the ongoing toll from snakebite. Further studies in animals are required.

Homeopathy

28. Treatment of Lung Cancer in Homoeopathy

*Pradhan Amalendu, Pradhan Ashoke Kumar, Ghosal Kajal,
Nandi Rabindra Nath, Mahuya Kundu*

Institute of HYDT Research & Education,
487, Rabindra Sarani,
Kolkata - 700 005

Keywords: *Lung cancer, HYD Therapy (Homoeopathy-Yoga-Diet Technique), chemotherapy, radiotherapy, surgery*

Lung cancer is the second most common cancer and the is cause of cancer death in both men and women. Although there has always been a higher incidence in men, the incidence in women has risen rapidly in recent years.

Science and technology has been playing a vital role in the development of human civilization. Lung Cancer is now challenging to all oncologists, surgeons, as well as governments. To meet this burning problem, HYD Therapy (Homoeopathy-Yoga-Diet Technique) has a great role to combat against the lung cancer in a gentle, harmless and

economically viable way. Homoeopathic Treatment based on nature law of cure and holistic approach considering single medicine; potentise form, minimum dose and totality of symptoms similarity.

A statistical analysis of Homoeopathy-Yoga-Diet Therapy will be presented to enlighten the patient, educator groups as well as doctors about the lung cancers with signs and symptoms, metastasis, investigations and diagnosis and its Homoeopathy-Yoga-Diet Therapy. It will also and to enlighten the efficacy of homoeopathic treatment in lung cancer patients before and after chemotherapy, radiotherapy and surgery.

29. Stomach Cancer and Its HYD Therapy

*Swarnakar Bharati, Pradhan Ashoke Kumar, Pradhan Amalendu,
Ghosal Kajal, Subal Sankar Ray*

Institute of HYDT Research & Education,
487, Rabindra Sarani,
Kolkata - 700 005

Keywords: *Stomach Cancer, aflatoxin, pernicious anemia, achlohydria*

Stomach Cancer is one of the leading causes of deaths all over the world. Eighty percent of the cases are diagnosed at an advanced stage and it is found that it spread to nearby or distant organs. Exact cause of stomach cancer is unknown. Rich spicy foods, alcohol, tobacco use, irritating drugs, smoked meats, fish and other foods preserved with nitrates, foods with aflatoxin, a carcinogenic fungus are also leading causes Cancer Stomach. It is common in people living in lower socio-economic standers, employed in various industries like coal mine, nickel refining, rubber and timber processing. People with pernicious anemia, achlohydria, peptic ulcer and atrophic gastritis associated with *Helicobacter Pylori* are also susceptible to cancer stomach.

There are different forms of stomach cancer which will be enlightened by Common symptoms, investigation, screening and diagnostic measure to prevent the spreading and to treat the leading cause of death by this disease.

A case presentation of cancer in stomach along with Homoeopathy, Yoga & Diet Treatment adopted at Institute of HYDT Research & Education.

30. Oral Cancer and its Homoeopathic Treatment

**Ghosal Kajal, Pradhan Ashoke Kumar, Pradhan Amalendu,
and Chandrima Das**

Institute of HYDT Research & Education,
487, Rabindra Sarani, Kolkata - 700 005

Keywords: *Oral cancer, tobacco, pan masala, khaini, gurakhu, cigarette, bidi, homoeopathic medicine*

Of the oral cavity Cancer is one of the most common cancer in our country as well as all over the world. Millions of people died of oral cancer every year. Chewing tobacco, pan masala, khaini, brushing with gurakhu, smoking cigarette, bidi, snuff dipping and Physical trauma from poor dentition can lead to malignant transformation at the site of trauma of tongue & cheek. Oral cavity cancer causing pharyngeal cancer, tongue cancer, cheek cancer & other site of the oral cavity.

This paper will present a clinical observation of treated patients along with the common causes, sign and symptom, modern investigations, metastasis and it's homoeopathic treatment with a critical analysis.

A discussion on little homoeopathic medicine with sign and symptoms to select common remedies used in oral cancer from the clinical study at Institute of HYDT Research & Education.

31. Prostate Cancer in HYDT Treatment

**Maji Lakshman Chandra, Pradhan Ashoke Kumar, Pradhan Amalendu,
Ghosal Kajal and Saha Ambuj Kanti**

Institute of HYDT Research & Education
487, Rabindra Sarani, Kolkata - 700 005

Keywords: *Prostatic carcinoma, malignant neoplasms, homoeopathy-Yoga-Diet treatment*

Prostatic carcinoma is one of the most common malignant neoplasms occurring in men. The prostate gland produces prostatic fluid that makes up most of the liquid part of

semen, under the influence of testosterone hormone. Prostate cancer happens when cells in the prostate grow out of control and can then invade nearby tissues or spread throughout the body. Usually prostate cancer is very slow growing, but it may spread rapidly to nearby lymph nodes in the pelvis. In some cases it may spread to distant parts of body particularly the bones & liver etc. Prostate cancer is mainly a disease of the elderly. The risk increases with age.

In this presentation a case of prostate cancer will be presented to prove the efficiency of homoeopathic medicine. A Statical Analysis will be presented which will show the incidence, cause, early diagnosis & its homoeopathy-Yoga-Diet treatment.

32. Berberis Vulgaris Q (Mother Tincture) - A Good Homoeopathic Remedy For Urinary Tract Infection, Renal Calculi & Cholecystitis

N. C. Ghatak

“Shivam Apartment”,
30, Dey Street, Flat No-206,
2nd Floor, P. O. Shrirampur, Dist - Hooghly,
West Bengal 712 201
Email- ncghatak30@gmail.com

Keywords: *Berberis Vulgaris Mother Tincture, Homoeopathic Remedy, Urinary Tract Infection, Renal Calculi, Urethritis, Renal Colic, Cholecystitis.*

BERBERIS VULGARIS Mother Tincture is derived from BOTANICAL source. This tree is available in Europe. The root of the Berberis Vulgaris is used. Extract of the root of the tree is used to prepare Mother Tincture. This tincture is used as a Homoeopathic Remedy to cure Urinary Tract Infection, Removal of Renal Calculi, Urethritis, Renal infection & Cholecystitis etc. Here Clinical features of the Renal Calculi & Cholecystitis are given, cause & mechanism of stone formation, its management & Remedy also given. At the end case histories of renal calculi & Cholecystitis are stated with the description of Diagnosis

33. Sphere of Homoeopathic Medicines in the Treatment of Uterine Myoma

Udayan Kumar De

M. B. Homoeopathic Medical College & Hospital
Email: dr.ukde@gmail.com; dr_de@live.com

Keywords: *Prolapse of uterus, Myoma, Homoeopathic Medicine, Sepia*

Nilam Devi 44/F/H; c/o irregular menses, prolapse of uterus, H/o 5 issues, stool-once daily at morning; USG on 10/10/08 shows bulky uterus (8.6x4.0x5.0 cms) with a big Myoma (3.4x3.7 in cms) at right posterior wall, came to me for treatment (due to fear of operation) on 12/12/08 and I prescribed Sepia 6/10 B.D. on 12/12/08 followed by placebo. Menses improved and then stopped improving. Then repeated the medicine Sepia 6/10 B.D. on 03/03/09 and followed by placebo. USG on 17/03/09 shows bulky uterus (8x3.8x4.7 in cms) and myoma at right posterior wall noted (2.6x2.9 in cms). Hence size of uterus and that of Myoma reduced. Then prescribed Sepia 30/10 B.D. on 20/05/09 followed by placebo. Then repeated Sepia 30/10 B.D. on 25/07/09 followed by placebo. Menses became normal and the patient was improved in all respect. Then an USG was done on 12/10/09 and shows no Myoma found but mildly bulky uterus.

Conclusion: Uterine Myoma can be cured by Homoeopathic Medicine.

33A. Efficacy of Homoeopathic Medicine in the Treatment of Hyperprolactinemia

Shubhamoy Ghosh

Department of Pathology,
M.B. Homoeopathic Medical College & Hospital
Govt. of West Bengal

Keywords: *Hyperprolactinemia, homoeopathic treatment, serum prolactin level by CLIA method*

Hyperprolactinemia is a condition of elevated serum prolactin. PRL is a 198-aminoacid protein (23KD), produced in the lactotroph cells of the anterior pituitary gland. Its

primary function is to enhance breast development during pregnancy and to induce lactation.

Fasting value of PRL of non-pregnant women is less than 30 ng/ml.

Hyperprolactinemia in Pathological condition is usually due to pituitary adenoma, hypothyroidism, idiopathic, psychotropic drug induced etc.

Miss A.DAS 24Yrs/H/F (non-pregnant) were suffering from galactorrhoea. Irregular menstruation, nausea with few months duration, was under dopamine agonist therapy (Bromocriptine and Cabergoline) due to hyperprolactinemia.

She cannot tolerate the adverse effects of modern medicine and switched over to the domain of homoeopathic treatment on 24/03/09. With the totality of symptoms, prescribed CalCarea phosphoricum 200/2 doses in distilled water ODM x 2days. Repeation of medicine done by strict principle of homoeopathy.

Within few months the patient was gradually free from symptoms and biochemically PRL Level is declined in sequential tests. PRL (F) Level—24/03/2009 -142.13 ng/ml; 18/04/2009 — 52.41 ng/ml, 09.10.09- 39.68 ng/ml; 04.03.10 -28.61 ng/ml; 12/06/2010 - 18.72 ng/ml - Test done by CLIA method.

Acupuncture

34. Holistic and Body-Friendly Effects of Acupuncture Needling in Body in the Light of Modern Science

Mrigendranath Gantait *

Dr. B.K. Basu Memorial Research & Training Institute of Acupuncture
(Government of West Bengal),
Email: mrigengantait@gmail.com

Keywords: *Acupuncture, neuro-humoral mechanism, nerve-endocrine-immune network*

Acupuncture needling is done in many diseases to get relief from symptoms and signs of diseases. Without any medicine applied how acupuncture acts is a very common question faced by acupuncturists.

Plenty of researches are being done all over world to see what effects are produced by acupuncture. The main effects can be summarized as

- 1) **Analgesic effect.** It has been observed that nerve and humoral pathways are responsible for such action.
- 2) **Sedative effect.** Acupuncture increases release of gamma amino butyric acid (GABA) which induces sedative effect. Sedative effect also potentiates analgesic effect.
- 3) **Regulatory effect.** Acupuncture needling tries to maintain body's internal balance mechanism (milieu interior).
- 4) **Immunity effect.** Acupuncture can raise both **cellular and humoral immunity**.
- 5) **Anti-inflammatory effect.** It has been found that after acupuncture therapy in osteoarthritis patients the **superoxide dismutase** (an anti-oxidant enzyme) activity decreased.
- 6) **Vasodilation** .Clinically it has been seen that acupuncture needling can heal gangrene of ischaemic limbs e.g. Buerger's and Raynaud's disease.

Effects of acupuncture needling occur in body through body's own mechanism of **Nerve-Endocrine-Immune (NEI) network**.

As body's own mechanism works, there happen no adverse side-effects due to acupuncture needling. Besides, body's internal balance mechanism tries to overcome hypo or hyper activity of system. It leads to bi-directional variation of effects of acupuncture needling in therapeutics.

35. Frozen Shoulder Treated By Acupuncture

Asit Kumar Nandy

15/8b, Haridevpur Road, Kolkata-700082.

Keywords: *Frozen shoulder, Electro-acupuncture, Moxibustion, Effective therapy*

20 patients were presented pain in shoulder joint with stiffness and restriction of

movements. Age of the patients ranged from 32 years to 65 years, Males-12, Females - 8. In all of the patients acupuncture was applied.

Acupuncture points used were - Jianliao (SJ. 14), Jianyu (L.I.15), Quchi (L.I.11), Hegu (L.I.4), Weiguan (SJ.5), Yanglingquan (G.B.34), Jianjian (G.B.21), Jianzhen (S.I.9) and Ahshi points as and when required.

Electro-stimulation was applied in all the points for 20 minutes with continuous wave. In only 4 patients, additionally moxibustion was used. Acupuncture was done thrice a week for 10 sittings followed by 12 days gap. Most of them showed good improvement. Then 10 sittings were done twice a week. Few patients with residual pain were treated 10 sittings once a week. All of them were advised exercises involving shoulder joint.

It appears that acupuncture is a very effective treatment for Frozen shoulder. Out of 20 cases, 11 had remarkable improvement after having 20 sittings. Pain diminished after completion of 10 sittings, 7 showed satisfactory improvement after 20 sittings. 2 patients have no pain but some movements were restricted.

It is possible that acupuncture produces anti-inflammatory and analgesic effects which help to resolve the disease process.

36. Dysmenorrhoea treated by Acupuncture - a study of 25 cases

Arati Sahoo

DPL Hospital
Durgapur- 713202

Keywords *Dysmenorrhoea, electro-acupuncture, symptomatic relief, sustained result.*

Primary dysmenorrhoea sometimes becomes very troublesome in some unmarried girls. Acupuncture treatment was applied in 25 such girls, their age varying between 16 to 25 years. During the active pain, strong continuous electro-acupuncture was applied in Sanyinchiao(Sp-6) for 30 minutes along with Baihui(Du-20) and ear points- uterus, ovary, shenmen. It was found that all the girls felt immediate symptomatic relief(80-100%) during and after the treatment. For sustained relief, acupuncture was done just before the expected

date of pain using all the points as above along with Baliao(UB.31-34) and Qugu(Ren-2), Qixue(K-13), daily for 6-7 days. Treatment was done for 4-5 menstrual cycles, which resulted in appreciable relief in following cycles. It is concluded that, in respect of pain relief, effectivity rate of acupuncture treatment is 100% in dysmenorrhoea.

37. Acupuncture Treatment in 30 Cases of Ejaculatory Problem

Bhabani Prasad Sahoo

Kolkata Acupuncture Medical College
13, Simla Street, Kolkata-700 006 &
Medical Officer (Acupuncture),
M R Bangur Hospital (Govt. of WB), Kolkata-700 033

Keywords: *Premature ejaculation, nocturnal emission, electro-acupuncture.*

Synchronised ejaculation of semen is the vital part of sexual activities of males. It is very much needed for his physical and mental health (and also of his partner if any) and also for the continuation of progeny. Neurologically it is mostly related to sympathetic nerve activity.

Here 18 cases of premature ejaculation (PE) (all married) and 12 cases of nocturnal emission (NE) (all unmarried) have been reported of their acupuncture treatment, which most of them started after trying some other therapies and getting no result. No other ejaculatory problem like retrograde ejaculation or absent ejaculation is being considered here. All the cases were treated either at the clinic of Kolkata Acupuncture Medical College or M R Bangur Hospital, Kolkata.

Main points used in PE were selected from Baihui (Du.20), Neiguan (P.6), Qugu (Ren.2), Heng Ku(K. 11), Zhishi (U.B.52), Sanyinchiao (Sp.6), Yinglingquan (Sp.9), Taixi (K.3). Electroacupuncture was used in some points. Ear points shenmen, chaokan (sympathy), subcortex, testis were also used. Genital area in scalp with electrical stimulation was applied in some cases. In NE, the points were almost same, except Shenmen (H.7) in stead of Neiguan (P.6).

It was found that 16 cases (90%) of PE were virtually cured by 20 acupuncture sittings (thrice or twice in a week). One got good response as shown by occasional more

prolonged time of ejaculation and other felt no effect. On the other hand 11 of the NE cases were virtually cured and one had diminished frequency of NE (total effective rate 100%).

Thus it can be concluded that acupuncture can be the treatment for these not so uncommon, disturbing psychosomatic problems if not improved otherwise.

Health and Disease

38. Ets1 transcription factor collaborate with alternative signaling pathways to induce VEGF regulated MMP-9 and MMP-13 expression in human ovarian carcinoma cells

*Sonali Ghosh and Sib Sankar Roy**

Cell Biology and Physiology Division, Indian Institute of Chemical Biology,
Council of Scientific and Industrial Research,
4 Raja S. C. Mullick Road, Kolkata-700032, India.

*Email: sibsankar@iicb.res.in

Keywords: *MMPs, VEGF, SKOV-3, cancer*

Degradation of extracellular matrix (ECM) is a crucial event for invasion and metastasis of malignant cells and is mediated by MMPs. Expression of MMP gene is transcriptionally regulated by a variety of cytokines and growth factors. VEGF signal transduction plays a central role in disease progression and prognosis for ovarian carcinoma. VEGF, the most potent angiogenic cytokine, was shown to induce invasion of ovarian cancer cell through induction of MMPs. Based on this background information, we wanted to investigate the role of VEGF on different relevant MMPs expression in ovarian cancer cell line Sk-Ov-3. Our report showed that VEGF induces expression of MMP-2, MMP-9 and MMP-13. It induces cell migration and invasion through the activation of PI3K/Akt pathway and also follows an alternative p38-MAPK pathway. However, the molecular mechanisms regulating the expression of these proteins are not well understood. Both MMP-9 and MMP-13 promoters contain an ETS-binding site, suggesting the possibilities of regulation by this factor. As Ets-1 expression is increased by VEGF in SKOV-3, we hypothesize that it contributes to increased expression of MMP-9 and MMP-13. To test our hypothesis, we

determined VEGF-mediated expression as well as localization of ETS in SK-OV-3 cells. It was also observed that nuclear extracts from VEGF-treated SKOV-3 cells showed increased Ets-1 binding activity to MMP-9 and MMP-13 promoters. Lastly, treatment with Ets-1 siRNA in SKOV-3 cells down-regulated VEGF-induced MMP-9 and MMP-13 expression. In summary, our results indicate that VEGF regulates ovarian cancer invasion and migration through activation of MMP-9 and MMP-13 in a PI3K and p38-MAPK-dependent pathway, with major involvement of Ets1 transcription factor. Thus, the study provides a mechanistic insight into the prometastatic functions of VEGF-induced expression of MMPs.

39. Prevalence of Vector Mosquitoes of Various Diseases in Winter Season in Rural Area of Terai Belt of Sub-Himalayan Region, India

Sarita Kumar, Rakesh Katyal and Ved Parkash

National Centre for Disease Control,
(Formerly known as National Institute of Communicable Diseases),
22, Sham Nath Marg, Delhi-110 054

Keywords: *Vector Mosquitoes, Genus, Terai*

Mosquitoes are the most common public health hazard, as some species are transmitting important vector borne diseases like Malaria, Filaria, Dengue/DHF, Chikungunya and Japanese Encephalitis in urban as well in rural areas. Information regarding the most prevalent mosquito species during winter season in terai belt of Uttarakhand state especially in rural area is scanty and is based on epidemiological studies of vector borne diseases. In order to update the knowledge regarding the prevalence of winter season mosquitoes in rural area of terai belt of Uttarakhand state, an entomological survey was carried out during December, 2004 in village Tilpuri located in PHC Gadarpur in district Udham Singh Nagar of Uttarakhand state in sub-Himalayan -Kumaun region.

The study village Tilpuri is situated near the Haripura reservoir and is having approximate 140 houses with approximate populations of 700. The main occupation of people is agriculture & farming. Immature & adult mosquitoes were collected by using standard WHO techniques. Immature stages were collected from indoor and out door potential breeding places. Adult mosquitoes were collected from indoor and out door human,

mixed and cattle dwellings. The collected immature and adult mosquitoes were brought and processed in the laboratory and identified up to species level.

16 species of mosquitoes belonging to four genera viz: *Anopheles*, *Culex*, *Aedes* and *Armigers* were identified. Out of the total 16 mosquito species collected, 9 belonged to genus *Anopheles*. The species identified were *A. fluviatilis* (71.88%), *A. annularis* (7.81%), *A. culicifacies* (5.45%), *A. splendidus* (3.91%), *A. aconitus* (3.13%), *A. nigerrimus* (3.13%), *A. subpictus* (2.34%), *A. barbirostris* (1.56%) and *A. varuna* (0.78%). Out of these, 4 species are vectors of malaria viz. *A. fluviatilis*, *A. culicifacies*, *A. annularis* and *A. varuna*. In genus *Culex*, 4 species were collected viz: *Culex quinquefasciatus* (66.67%) which is the vector of filaria and *Cx. tritaeniorhynchus* (20.0%), *Cx. vishnui* (6.67%) and *Cx. pseudovishnui* (6.67%) which belong to *Cx. vishnui* group and are the vectors of Japanese Encephalitis. In Genus *Aedes* 2 species viz: *Aedes vittatus* (66.67%) and *Aedes albopictus* (33.33%) were collected. *Aedes albopictus* is the vector of dengue/DHF. In genus *Armigeres* only one species *Armigeres kuchingensis* could be collected.

40. Conjugated Linolenic Acid and Health

Pubali Dhar

Department of Home Science,
Food and Nutrition Division,
University of Calcutta

Keywords: *Conjugated Linolenic acid, antioxidant, antidiabetic*

Conjugated fatty acid (CFA) is a generic term used for fatty acids with conjugated double bond systems, as exemplified by conjugated linoleic acid (CLA) and conjugated linolenic acid (CLnA). CLnA (C18:3) is being distributed at 30-50% level in the seeds of some of the common vegetables like parwal (*Tricosanthes dioica*), bitter gourd (*Momordica charantia*) and snake gourd (*T. angnina*) consumed by Indians as well as by the people of other countries.

Studies have been conducted to find out the dietary effects of CLnA, its *in vitro* antioxidative effect, anticarcinogenic effect, antitumorigenic, antidiabetic effect. There are some studies showing that mixtures of CLnA isomers, prepared by alkaline isomerization

of α -linolenic acid or plant seed oil, have some physiological functions including body fat reduction. It was found that purified puniolic acid (isomer of CLnA) have hypolipidemic effect in human liver derived HepG2 cells. The accumulated hepatic triacylglycerol was markedly decreased by 9c, 11t, 13c-CLnA diet in OLETF rats. Activities of hepatic enzymes related to fatty acid synthesis and fatty acid β -oxidation were not altered by 9c, 11t, 13c-CLnA diet. Levels of monounsaturated fatty acid (MUFA), major storage form of fatty acid, in serum triacylglycerol were markedly higher in obese, hyperlipidemic OLETF rats than in lean LETO rats. In addition, 9c, 11t, 13c-CLnA diet significantly decreased MUFA levels in OLETF rats.

CLnA showed lowering of total cholesterol and non-HDL cholesterol, triacylglycerol in comparison with control diabetic rats. LDL-lipid peroxidation and erythrocyte membrane lipid peroxidation were reduced significantly in each of the experimental groups. CLnA + α -tocopherol diet induced a greater reduction in membrane lipid and liver lipid peroxidation than α -tocopherol alone. CLnA present in some seed oils can protect our cardiovascular system as well as diabetic complications when present in a small concentration in our diet.

41. Pulmonary Function Studies in Hyperthyroid Females with Goiter - Before & After Thyroid Surgery

G. Sugapriya

Department of Physiology,
SRM Medical College Hospital & Research Centre,
Potheri, Kattankulathur 603 203
Email: msmanimd@yahoo.co.in

Keywords : *Pulmonary function tests, thyroxine, goiter, thyroid surgery*

Objective: Pulmonary function tests are measurements of Physical characteristics such as volume, compliance and also of performance. The aim of this study is to assess the pulmonary functions of female individuals with goiter having increased thyroxine level and compare the lung function of individuals having goiter before and after thyroid surgery.

Experimental Design: 50 hyperthyroid female subjects aged between 25 - 40 years with goiter posted for thyroid surgery were selected from department of surgery. After obtaining ethical approval written informed consent was taken from each subject and

recordings were done using computerized spirometer. Graphic recording of airflow during maximal inspiration and expiration at different lung volumes were carried out inpatients undergoing surgery for goiter. The same was documented one month later to find whether there is any improvement in flow rates after surgery.

Observation: On analysis of the data the subjects were categorized into groups. The mean and standard deviation were calculated for all measured parameters. The significance of difference in the values was analysed using students paired 't' tests before and after one month of surgery and their probability was estimated.

Conclusion: Following thyroid surgery denotes the changes in the early and mid airway bronchus and bronchioles making us to conclude that the mechanical compression due to enlarged thyroid were responsible. The decrease in FVC, FEF 75% in subjects with goiter could be due to the effect of excess thyroxine on the smooth muscle of the bronchial tree apart from its general metabolic activity on lung parachyma. (Key words - Pulmonary function tests, forced expiratory flow rates, upper airway obstruction, thyroid hormones).

42. Intervention Based on Musculoskeletal Dynamics for Altered Plantar Weight Distribution Pattern in Early Knee Osteoarthritis

¹Vijay Batra and ²Meenakshi Batra

¹G. B. Pant Hospital,
GNCT Delhi (C.S.M.M.U.),

²Department of Physical Medicine & Rehabilitation,
RALC & Sr. OT Pt. D.U.I.P.H.

Keywords: *Plantar weight distribution; Knee osteoarthritis; Musculoskeletal Dynamics; Functional position*

Objective: To see the effectiveness of Intervention based on musculoskeletal dynamics for altered Plantar Weight distribution pattern in early knee osteoarthritis

Methods: 80 Subjects were randomly allocated into two groups. With group A, Intervention based on musculoskeletal dynamics and Group B, conventional treatment was used. The evaluation was done for plantar weight distribution pattern and functional status at baseline and after 8 weeks.

Result: Statistical analysis was done, & p value was found significant ($p < .05$) for medial arch, & heel region; and functional status.

Conclusions: Intervention based on musculoskeletal dynamics can modify the altered Plantar Weight distribution pattern.

43. Markers for Differentiation of Tubercular Pleural Effusion from Non Tubercular Effusion

Vivek Ambade

Defence Research Development Organization (DRDO),
Dept of Biochemistry,
Armed Forces Medical College, Pune 411 040
Email:vivekambade@rediffmail.com

Keywords: *Tubercular pleural effusion, non-tubercular pleural effusion, ADA, interleukins*

Objectives: Exploring the levels of ADA and interleukins in pleural effusion of tuberculous, malignant and miscellaneous origin for differential diagnosis of tubercular and non-tubercular effusion.

Design and Methods: ADA was estimated by kinetic method employing Xanthine oxidase while interleukins were measured using commercially available enzyme-linked immunosorbent assay kits in pleural fluids of tubercular and non-tubercular origin.

Results: Mean \pm SD of pleural fluids INF-g, sIL-2R, TNF- μ and ADA were significantly higher in TB group (n=48) as compared to non-TB group (n=33) (INF-g; 1958.7 ± 896.5 pg/mL versus 356.9 ± 733.6 pg/mL, sIL-2R; 6101 ± 1753.8 pg/mL versus 3166 ± 2611.1 pg/mL, TNF- μ ; 195.5 ± 292.1 pg/mL versus 59.7 ± 128.9 pg/mL, ADA; 123.6 ± 81.8 IU/L versus 48 ± 48.5 IU/L, $p < 0.01$).

Conclusion: INF-g is more sensitive and specific than ADA for the diagnosis of TB and should be added to the armamentarium of the diagnostic workup of pleural fluids for timely and accurate diagnosis of TB and differentiation of tubercular pleural effusion from non-tubercular effusion.

44. ICF Core Set for Medical Conditions

Jeganathan Arumugam

Maeer's Physiotherapy College, Mimer Medical College,
Talegaon Dabhade Pune 410507, Maharashtra

Keywords: ICF, ICF checklist

Background:

The ICF and Health is a framework and classifications that provide a unified and standard Language by which people can describe health and health related states. The outcomes of interventions can be evaluated by recording performance in the individual's real-life environment.

Objective:

- To Provide a scientific basis for understanding and studying health and health related states , outcomes and determinants
- To establish a common language for describing health and health related states in order to improve communication between healthcare workers , Researchers , Policy makers and people with disabilities.
- To allow data comparison across countries, healthcare disciplines, services and time.
- To provide a systematic coding scheme for health information systems.

Tool for Case Records: WHO's ICF checklist itemizes the major ICF categories. It is a practical tool to elicit and record summary information for case records. The ICF checklist has been used to identify the most common problems in patients with chronic health conditions.

Benefits & Conclusion: The inclusion of functional status information in administrative records gives a fuller picture of the health of individuals and populations. It promotes consistency of records across the health and community care sectors. Routinely collecting functional status information>status across the health system allows us to evaluate outcomes, compare treatments, predict and manage costs associated with healthcare delivery and establish eligibility for government programmes.

Knowing about the functional status of populations may also inform Social policies such as social security, Pensions, Retirement, Long-term care of older people, Education, Employment, Housing and Transport policies for younger people.

45. Family History of Hypertension and Level of Adiposity among Asian Indian Children & Adolescents: The Kolkata childhood obesity study

Paramita Mondal, Arnab Ghosh

Biomedical Research Laboratory, Department of Anthropology,
Visva Bharati University, Sriniketan 731 236, West Bengal
Email: arnab_cu@rediffmail.com

Keywords: *Family history, CVD, obesity, hypertension, Asian Indians*

The present cross-sectional study was aimed to compare anthropometric, body composition and blood pressure variables by familial history of hypertension among the Asian Indian children and adolescents in Kolkata, West Bengal. A total of 1061 healthy Asian Indian school children aged 8-18 years are considered from urban living in Kolkata. A random sampling procedure was followed to select the participants. Socio-demographic characteristics such as monthly family income, type of family, education of parents etc were collected using a pre-designed schedule. Anthropometric measures namely height, weight, circumferences at minimum waist (MWC), maximum hip (MHC), skinfolds at biceps (BSF), triceps (TSF), subscapular (SUSF), suprailliac (SUSF) etc., were collected using standard techniques. Waist hip ratio (WHR) and sum of four skinfolds (SF₄) were then calculated subsequently. Percentages of body fat (%BF), body mass index (BMI) and basal metabolic rate (BMR) were measured using an Omron body fat analyser. Left arm systolic (SBP) and diastolic (DBP) blood pressure was also taken from participants. Mean arterial pressure (MAP) was then calculated from SBP and DBP. All subjects were categorized into two groups: positive family history of hypertension (n= 141) and no family history of hypertension (n= 920). Socio-demographic characteristics revealed that 58.06% were belonged to nuclear family. Furthermore, 32.42% participants have had monthly family income of > Rs. 15000/- and their parental education showed that 35.63% parents were graduate. One-way ANOVA revealed significant group differences for BMI, WHR, SF₄, %BF, BMR, SBP, DBP, MAP between the groups. To conclude, it seems reasonable to argue that family history of hypertension plays a significant role in the development of CVD (cardiovascular disease) risk in children and adolescents of Asian Indian origin.

46. Public Screening for Osteoporosis Using Portable Heel Bone Densitometer at SRM University, Kattankulathur, Tamil Nadu

M. Anburajan, V. Sapthagirivasan, D. Ashok Kumar, W. D. Evans*

Department of Bio Medical Engineering, School of Bioengineering,
SRM University, Kattankulathur, Tamil Nadu 603 203;

*Dept of Medical Physics and Clinical Engineering,
University Hospital of Wales, Cardiff, UK

Email: hod.bm@ktr.srmuniv.ac.in

Keywords: *Osteoporosis- Indian women and men- Estimated heel bone mineral density-Quantitative ultrasound (QUS) - Portable heel bone densitometer*

‘Osteoporosis’ is one of the world health problems. The aim was to study the prevalence of osteoporosis in the population aged above 50 years. Total of 659 Indian men and women, aged 18-84 years were screened. Heel bone mineral density, BMD (g cm^{-2}) was estimated using Sahara Bone Sonometer. In Indian women and men, average decrease in estimated heel BMD per decade of age (24-64 years) was found to be -6.8% and -3.3% respectively. At *T-score* d'' -1.5, 19.6% and 21.1% of the Indian women and men, aged above 50 years were diagnosed as having osteoporosis.

47. Preparation and Evaluation of Chitosan- Gelatin Composite Films for Wound Healing Activity

Vidyavathi. M^{1*} and RV.Suresh Kumar²

¹Institute of Pharmaceutical Technology,

Sri Padmavathi Mahila Visvavidyalayam, Tirupati,

²College of veterinary sciences, SV Veterinary University, Tirupati

Email: vidyasus@rediffmail.com

Keywords: *Chitosan, gelatin, chitosan-gelatin, wound healing*

Natural polymers are used as lead compounds for design of therapeutic drugs in treatment of different ailments. Chitosan and gelatin have proven wound healing properties individually. As both have wound healing property, the combination of two polymers had

shown improvement in wound healing property. Thus, the composite films were evaluated for various *in vitro* and *in vivo* tests to ascertain the applicability of prepared combination for wound healing activity. The composite films were prepared with increase in gelatin concentration and were evaluated for thickness, folding endurance, water absorption capacity, tensile strength and for biological properties like antimicrobial activity and *in vivo* wound healing performance by excision wound model. With increase in gelatin concentration, thickness, folding endurance, water absorption capacity and tensile strength were increased. Percentage of wound contraction was more in wounds treated with chitosan-gelatin composite film. With the above results, it was concluded that chitosan-gelatin combination has improved wound healing property than chitosan film alone.

48. Evaluation of Computer Usage in Health Care among Private Practitioners of NCT Delhi

*Ganeshkumar P**, *AK Sharma*** and *OP Rajoura****

Department of Community Medicine, RM Medical college;

** Department of Community medicine, UCMS & GTBH, Delhi 95;

*** Department of Community medicine, UCMS>BH, Delhi 95

Email:sumitrakam2020@gmail.com

Keywords: *Attitude to Computers, Computer Literacy, Computers/utilization , Hospital Information Systems/utilization, Medical Record Administrators/statistics & numerical data*

Objectives:

1. To evaluate the usage and the knowledge of computers and Information and Communication Technology (ICT) in health care delivery by private practitioners.
2. To understand the determinants of computer usage by the private practitioners.

Design: A cross sectional study was conducted among the private practitioners practising in three districts of NCT of Delhi between November 2007 and December 2008 where knowledge and usage of computers in health care and determinants of usage of computer was evaluated in them by a pre coded semi open ended questionnaire.

Measurements: The primary outcomes were to measure the availability, knowledge and usage of computer and internet in the clinic and the secondary outcomes were identification of potential barriers of using computer in the clinic and identification of determinants of usage of computer in the clinic.

Results: About 77% of the practitioners reported to have a computer and had the accessibility to internet. It was seen that earlier the age of starting to use a computer higher the chances of owning it. Computer availability and internet accessibility was highest among super speciality practitioners (95.4%). Only 63(10.5%) and 10(1.5%) of the practitioners installed computer and internet in their clinic respectively. Practitioners who attended a computer course were 13.8 times [OR: 13.8 (7.3 - 25.8)] more likely to have installed an EHR in the clinic. Technical related issues were the major perceived barrier among the practitioners in installing a computer in the clinic.

Conclusion: Practice speciality, previous attendance of a computer course, age of started using a computer of practitioners influenced the knowledge about computers. Practice speciality and previous attendance of a computer influenced the usage of computers. Speciality of the practice, presence of a computer professional and gender were the determinants of usage of computer by the practitioners.

49. Health Perception among Medical and Engineering Professionals: An Attempt to Investigate Meaning of Being Healthy

M. Logaraj

Professor of Community Medicine,
SRM medical College Hospital & Research Centre,
Chennai
Email:mlogaraj@gmail.com

Keywords: *Health perception, being healthy, medical professionals, engineering professionals*

The question arises do the people recognise all the dimensions of health equally or they give priority to one or the dimension? It is essential to know the felt need to people so that the strategies of health promotion can be tailored accordingly. In a world of continuous

change, new concepts are bound to emerge based on the changing socio cultural values and the new pattern of thought. We, as health promoters, explore and define for ourselves what being healthy means to us and may mean to our community. This study aims to bring out prevailing perception on health among the medical and engineering professionals. A cross- sectional study was carried out among the professional in two randomly selected Medical and Engineering colleges in Chennai by administering a pre tested semi- structured questionnaire. Analysis of the 295 respondents perception on health reveals that health means to them more of emotional, spiritual, followed by nutritional, vocational, and environmental aspect of health. The present study showed that both the group believe on the emotional, spiritual, vocational, and nutritional dimensions of health.

Miscellaneous

50. Urine Specific Gravity, Heart Rate and Health Fitness in Healthy Individuals during Hot Summer Environment

*M. Kannapa Reddy, Nitin A John, C. Ramchandran
and C. Ramchandran*

Department of Physiology, SRM Medical College,
Hospital & Research Institute, Potheri,
Kancheepuram, Chennai
Email:drnitinjohn@yahoo.co.in

Keywords: *Specific gravity, hot environment, heart rate, Harwards fitness index*

Background:

We investigated the physiological responses of the healthy normal individual working indoor during hot summer environment when temperature indoor is also high as a method of environmental risk assessment.

Methods:

Fluid intake, and urine specific gravity were recorded and continuous heart rate and harwards step test for recovery pulse were used to assess fatigue.

Results:

The results obtained indicated that the workers are physiologically challenged in fluctuating harsh hot environmental conditions.

Conclusion:

People can work, without adverse physiological effects, in hot conditions if they are provided with the appropriate fluids and rehabilitation in cooler environment.

51. 3D Physiological CAD Model in Pedagogy of Physiology and Medical Sciences

Sougata Karmakar, Chandrajit Dattu Patil and Debkumar Chakrabarti

Dept. of Design, Indian Institute of Technology Guwahati,

Guwahati, Assam 781 039

Email: karmakar.sougata@gmail.com

Keywords: *CAD model, anatomy, physiology, pedagogy*

In the era when cadaver study is experiencing innumerable constraint and dummy models are incompetent and impractical, 3D physiological CAD model is gaining its momentum in pedagogy of physiology and medical sciences, with the rapid advancement of virtual simulation and virtual reality technologies. An attempt has been made in present research to exhibit how 3D CAD model with functional animation could be used for easy demonstration of anatomy and biomechanics of human organs. Structure of eye ball and its movement within orbit by six extra-ocular muscles have been considered as a case example in this intention.

52. World Health Organization (WHO) Guidelines for Quality Standards for ASU Medicines

Abdul Latif

Department of Ilmul Advia, F/O Unani Medicine,
Aligarh Muslim University, Aligarh 202 002

Keywords: *Herbal medicines, WHO, good agricultural and collection practices*

India has a rich heritage of ASU (AYURVEDIC, SIDDHA and UNANI) Medicine. There are plentiful infrastructures available in our country for the purpose of teaching, learning and research institutions under the purview of Govt. of India and state Governments. ASU Medicine and the rapid expansion of the global market, the safety and quality of Herbal product are also influenced by the quality of the raw materials used.

The quality of herbal medicines can directly affect their safety and efficacy. In order to promote and improve the quality of herbal medicines and also to reduce the proportion of adverse events attributable to the poor quality of herbal medicines, WHO has committed to the development of a series of technical guidelines related to quality assurance and control of herbal medicines, as well as to update the existing guidelines.

WHO has developed a series of technical guidelines and documents relating to the safety and quality assurances of medicinal plants and herbal materials. These include, Guidelines on good agricultural and collection practices (GACP) for medicinal plants and Quality control methods from medicinal plant materials.

53. A Chemical Threatening Human Life – BPA

***Chandan Datta and **Suparna Datta**

*Deptt of Polymer Engineering,
Birla Institute of Technology, Mesra, Ranchi;
**Department of Forensic and State Medicine,
IPGME & R, Kolkata 700 020
Email: chandand007@yahoo.com

Keywords: *Bisphenol A, endocrine disruption, plastic, Low dose effects, toxicities*

Bisphenol A (BPA) is a monomer used to manufacture polycarbonate plastics, the

resins of cans and other products with global capacity in excess of 6.4 billion pounds per year. Because ester bonds in these BPA based polymers are subjected to hydrolysis, leaching of BPA has wide spread human exposure. A recent report prepared by Harvard Centre for Risk funded by the American Plastic Council concluded that evidence for low dose effect of BPA is weak on the basis of a review of only 19 studies; the report was issued after a delay of 2.5 years. A current comprehensive literature review reveals that the opposite is true of December'2004; there were 115 published in vivo studies of low dose effect of BPA, and 94 of these report significant effects. In 31 publications of vertebrate and invertebrate animals, significant effect occurred below the predicted "safe" or reference 50 microgram/kg/day BPA. An oestrogenic mode of action of BPA is confirmed by an in vitro study which describes disruption of cell function at .23ppt. nonetheless, chemical manufacturer continue to discount these published findings because no industry funded have reported significant effects of low doses of BPA, although more than 90% of Government funded reports have noted significant effects.

54. How Safe Are Indian Shrimps?

Abhijit Mitra, Kakoli Banerjee

Department of Marine Science,
University of Calcutta,
35. B.C. Road, Kolkata 700 019

Keywords: *Shrimp, river Ganga, Sundarbans delta complex, neurotoxic*

Shrimp is one of the major export items from India and also a preferred food item for internal market. Due to their culture in contaminated water bodies they often accumulate pollutants from ambient environment. To evaluate such kind of contamination, we attempted to analyze selective heavy metals in muscle tissue of five commonly edible shrimp species, namely *Penaeus monodon*, *Penaeus indicus*, *Penaeus semisulcatus*, *Penaeus marguensis* and *Metapenaeus brevicornis* collected from the lower stretch of the River Ganga (in the Sundarbans delta complex). Concentrations in shrimp species ranged as follows: Zn: 10.55 ± 0.46 - 313.15 ± 2.12 ; Cu: 6.44 ± 0.29 - 131.21 ± 1.76 ; Pb: BDL - 10.41 ± 0.55 and Cd: BDL - 5.66 ± 0.43 mg kg⁻¹ dry weight. Heavy metals accumulated

in the shrimp muscle in the order $Zn > Cu > Pb > Cd$. The concentration of heavy metals in the tissues varied significantly depending upon the locations from where the species were collected. Concentrations of Pb and Cd in the shrimp muscle is a matter of concern as per the present study is concerned. Accumulation of Pb in the body tissues of human beings may result in neurotoxic effects and children are particularly vulnerable to lead exposure from food sources. Cd is a toxic metal and its accumulation in the human system may cause kidney damage.

55. Gift to the Bio-Physicist for the Development of Modern Medical Sciences in 21st Century

Krishna Kumar Chowdhury

Medical College of Alternative Medicine (Open University);
3, Canal Street, Kolkata 700 014

Keywords: *Physicist, invention, technology, diseases, diagnosis*

In 21st century India is a developing country in Asian region in the field of Medical Science. The gift of the Bio-Medical Scientist, Bio- engineer and Physicist which instrument an application of new modern medicine, a large number of new technologies and sophisticated instrument have been developed to causing revolutionary change in the field of medical practice. These instruments and machines help to confirmed in accurate diagnosis and successful to their treatment of various diseases. His efforts and achievements are scientific thinker, Bio-medical scientists and social reformer. As for Sir Felix Block and Sir Edward M. Purcell who discover the Magnetic Resonance Imaging (MRI) in 1946 and jointly awarded the Noble Prize in Physics in 1952. The technique of the endoscopy was discovered by Sir. B. Hirschowitz (1957) in Michigan University (USA) C.T. Scanning was invented in 1972 by British Engineer Godfrey Hounsfield who was awarded a Noble Prize in 1978. This technique is based on work of an Indian Bio-physicist Gopalsamudram N. Rama Chandran. A systematic approach to solving medical problems and developing technologies that apply the solutions in the medical practice.

56. Results of a Community Based Intervention of Disaster Relief and Rehabilitation Services for the Tsunami Affected in Shirkaly Taluka of Nagapattinam District of Tamil Nadu

K. R. John

Coordinator, CMC, Disaster relief and Rehabilitation Services,
Dept of Community Health, Christian Medical College, Vellore, 632 002,
Currently Professor Dept of Community medicine SRM Medical College
Email krjohn.john@gmail.com

Key words: *tsunami, long term medical care, psycho social care, lively hood, orphans, widows care and vocational training, cost effectiveness*

A population of nearly 30000 tsunami affected people where nearly 564 deaths occurred from 16 fishermen villages in Nagapattinam district was chosen. This was one of the worst affected areas. A need assessment and baseline socio demographic survey at the beginning of the disaster. The interventions included psycho social care including medical care for nearly 52467 patient contacts; free vocational training for nearly 809 children 350 orphan children of the area were given counseling and educational assistance. The impact of the intervention was done by an independent evaluation team which has shown the cost effectiveness. The paper has high policy implications.

57. Anti Inflammatory and Analgesic Activity of Stem Bark of *Litsea Glutinosa* (Maida Lakdi) in Albino Rats

Abdur Rauf* Arshad Ali, M. Aftab Ahmad***, M. Akhtar******

* D/O Ilmul Advia, AMU, Aligarh,

**T.T. State Unani College Lucknow, U.P.

*** D/O Ilmul Advia, F/O Medicine, Jamia Hamdard, New Delhi.

****D/O Pharmacology, F/O Pharmacy, Jamia Hamdard, New Delhi

E-mail ID: abdurraufmd@yahoo.com

Keywords: *NSAID, carrageenan, analgesiometer, oedema*

Maida Lakdi (stem bark of *Litsea glutinosa*) is a well known Unani drug, being used for centuries to treat inflammatory disorders like rheumatoid arthritis and gouty joints. To

validate the above claims a scientific study for anti inflammatory activity was undertaken on experimentally induced inflammation in albino rats' paw oedema with carrageenan and analgesic activity of test drug was also assessed by analgesiometer on tail flick test in rats of either sex weighing 150-200 gm. The aqueous and alcoholic extracts of test drug were used in low doses (90 mg/kg body wt and 100 mg/kg body wt respectively) and high doses (130 mg/kg body wt and 140 mg/kg wt respectively). The animals were divided into six groups of six animals each including control and standard groups. The standard drug piroxicam (3 mg/kg body wt) was given orally. The data expressed as Mean \pm SEM was analyzed by ANOVA followed by Dunnet, "t" test. The inhibition of formalin induced hind paw oedema in rats at high dose (140 mg/kg body wt.) of alcoholic extract of test drug was 22.06%, 27.09%, 26.47%, 28.9% and 30.63% at 1, 2, 3, 4 and 5th hours respectively and statistically it was found significant. The alcoholic extract of test drug at high dose (140 mg/kg body wt) showed a significant increase in reaction time as 4.79 \pm 1.44, 6.35 \pm 1.13, 6.43 \pm 1.08 and 6.16 \pm 0.68 seconds at 30, 60, 90 and 120 minutes respectively after drug administration while the initial reaction time was 3.78 \pm 0.84 sec. On the basis of findings mentioned earlier it was concluded that the alcoholic extract of test drug at high dose (140 mg/kg body wt) exerts potent and significant anti inflammatory and analgesic effect similar to Non Steroidal Anti inflammatory drugs (NSAIDs).

58. Aqueous Bark Extract of *Terminalia Arjuna* Protects Against Cu²⁺-Ascorbate-Induced Oxidative Stress *in vitro*

Aindrila Chattopadhyay¹, Arnab K. Ghosh²,
Debasish Bandyopadhyay²

¹Department of Physiology, Vidyasagar College,
39, Sankar Ghosh Lane, Kolkata 700 006,

²Oxidative Stress and Free Radical Biology Laboratory,
Department of Physiology, University of Calcutta,
University College of Science and Technology,
92, APC Road, Kolkata 700 009

Keywords: TA bark extract, Cu²⁺-ascorbate, oxidative stress, antioxidant

Terminalia arjuna (TA) belonging to the family *Combretaceae* is an important medicinal plant widely used in the preparation of Ayurvedic formulations for over three

centuries in India. It has been found to be of therapeutic benefit in treatment of cardiovascular diseases. The reactive oxygen species (ROS) play a critical role in the pathogenesis of various cardiovascular diseases. The cardio-protective effects of TA are thought to be caused by the antioxidant nature of several of the constituents of TA extract. A compound might exert its antioxidant actions by inhibiting generation of ROS or by directly scavenging the free radicals. Additionally, an antioxidant may act by raising the levels of the endogenous antioxidant defenses. Cu^{2+} -ascorbate is an established model of oxidative stress *in vitro*. Our present studies indicate that the aqueous TA extract is capable of protecting against oxidative stress as is evident from its effect on lipid peroxidation, reduced glutathione and protein carbonyl content and the activities of the antioxidant enzymes like catalase (CAT) and superoxide dismutase (SOD) of goat red blood cells (RBCs). Additionally, the aqueous bark extract of TA exhibited a strong hydroxyl radical as well as superoxide anion free radical scavenging potential. However, it does not possess any H_2O_2 scavenging activity or metal-chelating activity. The minimum effective concentration of the aqueous TA bark extract against oxidative stress induced *in vitro* by Cu^{2+} -ascorbate was found to be 20 mg /ml. Thus, it is clearly evident from the present studies that the aqueous bark extract of TA do possess a strong antioxidant potential which may be of future therapeutic importance.

59. DiFiD, a Novel Curcumin Derivative Prevents Pancreatic Tumor Growth *in Vivo* and By Suppressing Components of the Notch-1 γ -Secretase Complex

*Dharmalingam Subramaniam, Pallavi Lagisetty, Vibhudutta Awasthi,
Roy Jensen and Shrikant Anant*

Keywords: *DiFiD, COX-2, VEGF, pancreatic adenocarcinoma cell lines, caspase 3*

Background and Aims: With some 220,000 new cases per year in the world, pancreatic adenocarcinoma is the fourth highest cause of death by cancers. Among the newly diagnosed patients about 210,000 will die within 9 months following diagnosis. Therefore, effective adjuncts to current treatments are necessary. Dysregulated notch

signaling plays an important role in the progression of pancreatic cancer. Previous studies have demonstrated that curcumin, the active ingredient in the spice turmeric can modulate notch activity. In this study, we have developed a novel curcumin derivative DiFiD and have determined its effects on notch signaling and its intracellular g-secretase complex proteins in pancreatic cancer cells.

Methods: Five pancreatic adenocarcinoma cell lines (AsPC-1, MiaPaCa-2, PanC-1, BxPC-3 and Pan02) were used in the study. Cell proliferation was measured by hexosaminidase and colony formation assays. Apoptosis was determined by measuring caspase 3/7 activity and western blot analysis for caspase 3. Cell cycle analysis was performed by propidium iodide staining and flow cytometry. Real Time PCR and western blot analyses were used to measure mRNA and protein levels. For in vivo studies, nude mouse xenografts were developed with mouse pancreatic tumor cells (Pan02). Measuring tumor volume assessed the resulting effects of DiFiD treatment. Immunohistochemistry was performed for CD31 (endothelial marker, surrogate for angiogenesis) and for COX-2, VEGF and Notch-1 expression.

Results: DiFiD treatment resulted in a dose and time dependent inhibition of proliferation and in colony formation in all 5 pancreatic cell lines. Conversely, DiFiD did not affect the proliferation of normal mouse embryo fibroblasts. The compound also induced apoptosis by activating caspase 3. Cell cycle analyses demonstrated that DiFiD induced G2/M cell cycle arrest, which was followed by the induction of apoptosis as evidenced by caspase-3 activation and an increased number of cells with a sub-G1 DNA fraction. Western blot analyses demonstrated that DiFiD downregulated the expression of cell cycle related proteins cyclin A, D1 and E, while upregulating p21WAF1. In addition, DiFiD significantly downregulated the expression of Notch-1, Jagged-1, Hey-1, Hes-1, and two proteins of the g-secretase complex, Presenilin 1 and Nicastrin. DiFiD also down-regulated the expression of COX-2, IL-8 and VEGF. To determine the effect of DiFiD on tumor growth in vivo, nude mice harboring pancreatic cancer tumor xenografts in their flanks were administered the compound intraperitoneally every day for 21 days. DiFiD significantly inhibited tumor xenograft growth, with notably lower tumor volume and weight. Microvessel density, based on CD31 staining was also significantly lower in the tumors following DiFiD treatment when compared to tumors in controls. Real Time PCR and Immunohistochemistry analyses demonstrated significant inhibition of COX-2, VEGF, and Notch-1, and cyclin D1 mRNA and protein expression in the tumors.

Conclusion: Together, these data suggest that DiFiD is as an effective inhibitor of pancreatic tumor growth in vivo in part through downregulating Notch-1, g-secretase complex proteins and its downstream targets. Therefore, DiFiD may be a novel therapeutic agent for pancreatic cancer.

60. Preliminary Evaluation and comparison of antimicrobial potential of Ascorbic acid with streptomycin

Lalitha.P, Sudipta Ghosh, Phanindra Kumar.T

Dept.of Microbiology, Gitam Institute of Science,
Gitam University, Rushikonda,
Visakhapatnam 530 045

Keywords: *Ascorbic acid, Streptomycin, Drug resistance*

Ascorbic acid commonly known as Vitamin C is commonly found in various Citrus fruits. Deficiency of Vitamin C has been known to cause Scurvy among sailors in the past. The present study aims at demonstrating the advantage that ascorbic acid tends to have over antibiotics in terms of development of resistance and antimicrobial activity. In the study carried out we found that the microorganisms developed resistance to the antibiotic streptomycin to a dose as high as 250mg/ml against *Bacillus* sp. , *Pseudomonas* sp. , *staphylococcus aureus*, *Escherichia coli* and against the fungal species of *pencillium*, *Tenea rubrum*, *microsporium gypseum*.

POSTER PRESENTATIONS**Endocrinology and Reproductive Physiology****1. Effect of Un-Fractionated Green and Black Tea Extracts on Thyroid Physiology**

Neela De, Amar K Chandra

Endocrinology & Reproductive Physiology Laboratory,
Department of Physiology
University of College of Science & Technology,
University of Calcutta, 92, A.P.C. Road, Kolkata 700 009
Email: neela_de@yahoo.co.in

Keywords: *Catechins, green tea, black tea, thyroid, thyroid peroxidase, Na⁺,K⁺-ATPase, 5'-deiodinase I*

Tea is a rich source of polyphenolic flavonoids including catechins, which are thought to contribute to the health benefits of it. Flavonoids have been reported to have antithyroid and goitrogenic effect. The purpose of this study was to evaluate whether high doses of green and black tea have a harmful effect on thyroid physiology. Un-fractionated green and black tea extracts were administered orally to male rats for 30 days at doses of 1.25g%, 2.5g% and 5.0g%.

The results showed that green tea extract at 2.5g% and 5.0g% doses and black tea extract only at 5.0g% dose have the potential to alter the thyroid gland physiology and architecture i.e. enlargement of thyroid gland as well as hypertrophy and/or hyperplasia of the thyroid follicles and inhibition of the activities of thyroid peroxidase and thyroidal, hepatic and renal 5'-deiodinase I with elevated thyroidal Na⁺,K⁺-ATPase activity along with significant decrease in serum T3 and T4, and a parallel increase in serum TSH. However, *in vitro* study shows the similar observations in the activities of thyroid peroxidase and 5'-deiodinase I after both tea exposure, only the activity of thyroidal Na⁺,K⁺-ATPase remain unaltered even in high concentration of both tea extracts. Taken together, the present study reinforces the concept that tea flavonoids i.e. catechin might behave as antithyroid agent and possibly the chronic consumption could alter thyroid function. This study concludes that goitrogenic/antithyroidal potential of un-fractionated green tea extract is much more than black tea extract because of the differences in catechin contents in the tea extracts.

2. Calcium-a potent environmental threat to thyroid

*Haimanti Goswami**, Amar K Chandra

Endocrinology and Reproductive Physiology Laboratory,
Department of Physiology, University of Calcutta,
92, A.P.C. Road, Kolkata-700 009

E-mail: hgoswami2007@rediffmail.com, haimanti.goswami@gmail.com

Keywords: *Excess calcium, TPO, Na⁺-K⁺-ATPase, DI, T4, T3, goiter*

Abnormalities in thyroid physiology, especially iodine deficiency disorders (IDD) and goiter that lead to potent abnormalities in overall body functions remained a topic of interest among scientists since ancient ages. Persistence of goiter in areas even with environmental iodine sufficiency or consumption of sufficient iodine by people living there led to extensive research work revealed the presence of certain other factors; consumption of hard water (with high calcium content) being one of them. Adult (approximately 3 months), male, albino rats of Wistar strain were fed with CaCl₂ at a selective dose for 15 and 30 days. Significant ($P < 0.05$) alterations were found in thyroid gland weight, enzyme activities including thyroid peroxidase (TPO), sodium-potassium ATPase (Na⁺-K⁺-ATPase) and deiodinase (DI); serum total thyroxine (T4) and total triiodothyronine (T3) levels in Ca treated groups (for 30 days) when compared to the control group, although no significant changes were observed in case of 15 days treatment group. So, it can be concluded that, excess calcium produces marked alterations in functional status of thyroid gland, consequently leading to the development of goiter and thus poses a great threat to human life.

3. Consumption of Sugarcane (*Saccharum sp*) and Morphological and Functional Alteration of Thyroid Gland in Albino Rats

Chiranjit Mondal, Amar K. Chandra

Endocrinology and Reproductive Physiology Laboratory,
Department of Physiology, University of Calcutta, 92, A. P. C. Road, Kolkata 700 009
Email: chiranjit.mondal82@yahoo.com

Keywords: *Glucosinolates, sugarcane, triiodothyronine, thyroxine, urinary iodine*

Sugarcane juice (*Saccharum sp*) is a most popular drink among the people of all

ages from both sexes irrespective of their cast, creed and the socioeconomic status in the temperate and tropic region of the world. The effect of prolonged feeding of fresh sugarcane juice (*Saccharum sp*) to albino rat on thyroid physiology have been evaluated using the parameters such as morphological and functional status of thyroid, thyroid peroxidase (TPO) activity, serum triiodothyronine (T_3), thyroxine (T_4) levels. The overall results show that regular consumption of sugarcane increases weight of thyroid gland, alters the structural features as evidenced by histological and histometric findings followed by increased urinary excretion of thiocyanate and iodine, decreased thyroid peroxidase (TPO) activity and reduced serum total circulating T_3 and T_4 levels as compared to their respective control. The analysis of sugarcane indicates that it contains cyanogenic glucosides, glucosinolates and polyphenols, having antithyroidal properties therefore a relative state of morphological as well as biochemical hypothyroidism developed gradually after chronic sugarcane consumption in rats for the presence of those goitrogenic/ antithyroidal substances.

4. Study of Thyroid Dysfunction and Insulin Resistance in Hemodialysis Patients

***Sikha Ann Seban * Dr. P.Renuka M.D **Dr. Padmanaban M.D**

*Department of Biochemistry **Department of Nephrology
SRM Medical College Hospital and Research Centre Kattankulathur,
Kancheepuram District, Tamil Nadu, India

Keywords: *Thyroid hormones, Hemodialysis, End Stage Renal Disease (ESRD), Insulin resistance (IR)*

Introduction

Thyroid hormones are necessary for growth and development of kidney and for maintenance of water and electrolyte homeostasis. Conversely, kidney plays a role in metabolism and elimination of thyroid hormones and target organ for thyroid hormone action. Hemodialysis is associated with abnormalities in thyroid function. Insulin resistance (IR) is a common problem with End Stage Renal Disease (ESRD) patients on regular hemodialysis patients.

Aims and Objectives

The aim of the study was to evaluate the thyroid dysfunction and insulin resistance in patients undergoing hemodialysis.

Materials and Methods

The present study was carried out to evaluate the level of free triiodothyronine (FT3), free thyroxine (FT4) and TSH in 30 patients with End stage renal disease [ESRD] and 30 healthy individuals were selected as controls. Insulin resistance was also assessed by homoeostasis model assessment (HOMA). Patients with diabetes mellitus and known thyroid disorders were excluded from the study.

Result

The result of this study demonstrates that serum levels of free triiodothyronine (FT3), free thyroxine (FT4) and TSH were significantly lower in hemodialysis patient [$p < 0.05$] when compared with controls. The data also suggest that degree of insulin resistance is highest at ESRD just before the initiation of dialysis.

Conclusion

From the evidence presented it seems that majority of hemodialysis patients show thyroid dysfunction in ESRD. These patients with ESRD before the initiation of dialysis had insulin resistance which was partially reversed by hemodialysis.

5. Effects of Androgen and Estrogen on the Proliferation of Human Osteosarcoma Cells

***M.Monisha,*M.Sekar,*K.Shakthi Shree,
M.Balaganesh and **N. Srinivasan.

*Pg Research Department Of Zoology,
Government Arts College (Autonomous) Coimbatore-641 018, Tamil Nadu, India.

**Department of Endocrinology, Dr. ALM Post Graduate Institute of
Basic Medical Sciences, Taramani, Chennai – 600 113, India.

Keywords: *Bone Formation, in vitro, in vivo, Osteoblast, estrogen, androgen, thymidine*

Bone formation is a dynamic process, which is regulated by various hormones and

growth factors. The importance of sex steroids in the maintenance of bone mass is widely accepted. It has been well established by both *in vitro* and *in vivo* studies that estrogen decreases bone resorption. Increasing recognition of the morbidity and mortality attributable to osteoporosis in men has stimulated considerable interest in recent years on the effects of androgens on bone. Many *in vitro* studies investigating the effect of sex steroids on osteoblast proliferation have produced inconsistent results. Hence, the present investigation was designed to delineate the effect of estrogen and androgen on human osteosarcoma cell proliferation. 2×10^4 cells/well were plated in 24 well plates and treated with different doses of estrogen and androgen. The cells were incubated with test agents for 24, 48, and 72 hrs and [^3H] thymidine incorporation assay was performed to study the cell proliferation. Both the androgen and estrogen significantly increased the proliferation of MG-63 cells. The results will be discussed in the light of available literature.

6. Generation of Oxidative Stress by L-thyroxine Administration and its Possible Protection by Tea Flavonoid (Catechin)

Sabyasachi Sinha, Amar K Chandra

Endocrinology and Reproductive Physiology Laboratory,
Department of Physiology, University of Calcutta,
92, APC Road, Kolkata 700 009, West Bengal
Email: sabya_sinharoy@rediffmail.com

Keywords: *Catalase, Catechin, Lipid peroxidation (LPO), L-thyroxine, Oxidative stress, Superoxide dismutase (SOD), Tea flavonoid.*

L-thyroxine administration is an essential procedure during many pathophysiological conditions. But it may sometime cause some sort of stress in various organs. On the other hand tea flavonoid, such as catechin, has its anti stress effects upon different organs viz liver and testis. So the present study has been undertaken to evaluate the developed stress in liver and testis after thyroxine administration and its possible protection by tea flavonoid (catechin).

Thyroxine treated rats were administered of 0.3 mg/kg of body weight L-thyroxine intraperitoneally for about 15 days. On the other hand, catechin treated rats were also fed with normal diet along with administration of catechin 100mg/ kg of body weight/day for 15 days. After 15 days, rats were sacrificed and LPO level, superoxide dismutase (SOD)

and catalase activities were measured in liver and testis along with body weight and organ weight.

An increase of antioxidant enzymes SOD, catalase with a concomitant rise of LPO level were observed in testis and liver in thyroxine treated rats when compared to the control group. It has been also observed that the antioxidant enzyme activities and LPO level were normalized when thyroxine and catechin were administered simultaneously.

The present investigation shows that thyroxine administration causes oxidative stress in testis and liver as evidenced by increased LPO level, associated with enhanced SOD and catalase activities to defend against the effects of oxidative stress. Simultaneous administration of tea flavonoid (catechin) with thyroxine, maintains the LPO level, SOD and catalase activities almost at normal. Therefore the developed stress caused by excess L-thyroxine administration may be overcome by simultaneous Tea flavonoid (catechin) supplementation.

7. Indigenous Postpartum Practices of Puerperal Women in District Kangra of Himachal Pradesh

Neetu Sharma

Krishi Vigyan Kendra, Hamirpur at Bara 177 044,
CSKHPKV Palampur, Himachal Pradesh

Keywords: Indigenous, postpartum, dietary practices, kangra

Indigenous knowledge refers to the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area. Many of the traditional health care systems have developed their own maternal and child health care practices. The postpartum period is important in many Asian cultures, and is seen as a period of recovery. The paper attempts to present a rich variety of documented postpartum dietary practices of puerperal women in district Kangra, Himachal Pradesh. Questionnaire based survey along with informal discussion were adopted as tools to record the information pertaining to practices followed or type of food served along with method of preparation and consumption, etc. It was observed that the postpartum diet consists of food dietary prescriptions and proscriptioin, as well as the consumption of herbal decoction and infusions. Documenting the indigenous dietary practices is not only

an important part in understanding and analyzing elements of traditional maternal care practices, but a way to perpetuate knowledge at risk of being lost. Modernization of healthcare in the country could benefit from incorporating these treatments into healthcare modernization programmes. It would facilitate the implementation of culturally appropriate healthcare that respects traditional knowledge and contributes to bio-culturally sustainable development.

8. Green Tea Extract on Male Gonadal System in Adult Albino Rats: An *In Vivo* and *Invitro* Study

Shyamosree Roy Choudhury^{1*}, Amar K Chandra¹, Mahitosh Sarkar²

^{1*}Endocrinology & Reproductive Physiology Laboratory,

¹Department of Physiology, University College of Science & Technology,
University of Calcutta, Kolkata 700 009,

²Department of Physiology, Gurunanak Institute of Dental Science & Research, Kolkata
Email: roy_sree@rediffmail.com

Keywords: *Green tea, testicular Δ^5 3 β -HSD, testicular 17 β -HSD, sperm count, testosterone*

Green tea is prepared from the leaves of the shrub *Camellia sinensis* and used as a common beverage in many countries including Asian countries. It has been reported that green tea may cure many diseases including cancer, rheumatoid arthritis etc. However its effects on male reproductive physiology have not been explored adequately and thus the present investigation has been undertaken to evaluate the same in adult male albino rats. The results of *in vivo* studies demonstrate that Green Tea Extract (GTE) treatment at mild (1.25g %), moderate (2.5g %) and high (5.0g %) doses for a period of 26 days may alter morphology and histology of testis and accessory sex organs. A significant dose-dependent decrease in the sperm count, inhibited activities of testicular Δ^5 3 β - hydroxysteroid dehydrogenase (Δ^5 3 β -HSD) and testicular 17 β - hydroxysteroid dehydrogenase (17 β -HSD) as well as decreased serum testosterone level are also noticed. Histopathological examination revealed inhibition of spermatogenesis evidenced by preferential loss of maturing and elongated spermatids. From these observations it can be concluded that GTE at relatively high dose may cause impairment of both the morphological and normal functional status of testis in rodents and thus relatively high green tea consumption raises concern on male reproduction in spite of its other beneficial effects.

9. Biochemical Markers of Bone Turnover in Postmenopausal Mother and Perimenopausal Daughter

I. Samiya begum, Meera Shivasekar and R. Dhanapal,*

Department of Biochemistry*, Department of Orthopedics

** , SRM Medical College Hospital & Research Centre, Potheri, Tamilnadu.

Keywords: *Postmenopause, perimenopause, bone turnover, serum alkaline phosphatase, serum creatinine, serum uric acid*

Introduction:

Osteoporosis is a major health problem affecting one in three women in older adults. A strong genetic influence on the bone mass inevitably implies a parent-offspring relation that would enable identification of women at future risk for osteoporosis before onset of bone loss.

Aim & Objective:

To study the biochemical markers of bone turnover in postmenopausal mother and their perimenopausal daughter.

Materials & Methods:

The study was conducted on 50 postmenopausal mother of age 45-55 who attended orthopedics OP in SRM Medical College Hospital & Research Centre and the daughters of age about 30-40 yrs were also included in the study and the healthy volunteers of about 50 women with no known risk factors and normal levels of biochemical parameters were considered as Control. Serum Calcium, Serum Phosphorus, Serum Creatinine, Serum Uric acid, Alkaline phosphatase (Enzymatic Method) and Urinary Calcium were estimated by standard kits. The data obtained were analyzed for various parameters are compared using student "t" test. Statical analyses were performed using SPSS windows.

Result:

There was significant decrease in Serum Total Calcium and Phosphorus and uric acid in postmenopausal mother ($p < 0.01$) and similarly Serum Alkaline phosphatase were significantly increased in postmenopausal mother when compared to premenopausal daughter. The bone mineral density was found to correlate with the above risk markers.

Discussion:

The result of the study suggest the biochemical markers such as Serum Calcium, phosphorus, uric acid, creatinine, Alkaline phosphatase would be used as indicators of bone turnover to minimize the course of change in the bone mass and predicts the future fracture risk.

10. Excess Potassium Iodide Induced Alteration in Testicular Physiology in Adult Male Albino Rats

*Arijit Chakraborty** and Amar K. Chandra

*Endocrinology and Reproductive Physiology Laboratory,
Department of Physiology,
University College of Science & Technology,
92, A.P.C. Road, Kolkata 700 009
Email: say.arijit22@gmail.com

Keywords: *excess iodine, Δ^5 3 β -HSD, 17 β -HSD, testosterone, sperm count*

The role of iodine in homeostatic regulation of thyroid was first demonstrated many years back. Consequently, excess iodine intake, through hypothyroidism or hyperthyroidism poses great risk to the reproductive efficiency of animals and man, since there are several reports of close interrelationship between the thyroid and the gonads. This present study was therefore designed to evaluate the effect of excess iodine on male reproductive system of non iodine deficient euthyroid rats. Adult albino rats of Wister strain (90days of age) were force-fed potassium iodide at a dose of 0.2ml/kg of body weight /day for 30 days. They were supplied with normal diet and water ad libidum. Anti-testicular effect of this compound were estimated using different parameters like relative testicular weight, relative weight of accessory sex organs, epididymal sperm count ,serum testosterone level ,testicular steroidogenic enzymes(Δ^5 3 β -Hydroxy Steroid Dehydrogenase and 17 β -Hydroxy Steroid Dehydrogenase) and testicular histoarchitecture. Results showed a significant reduction (P<0.05) in testicular and accessory sex organ weights, along with inhibition of Δ^5 3 β -HSD and 17 β -HSD activity and diminution in the serum testosterone level were observed in the experimental groups. These findings provide evidence that chronic exposure of excess

iodine produces suppressive effect on testicular activity mainly on testicular weight, steroidogenesis and accessory sex organ weights leading to a marked alteration in overall male reproductive system.

11. Excess Dietary Calcium Depresses Male Gonadal Activity by Inducing Oxidative Stress in Adult Albino Rats

Pallav Sengupta^{1*}, Amar K Chandra¹, Mahitosh Sarkar²

¹Endocrinology & Reproductive Physiology Laboratory,

¹Department of Physiology, University College of Science & Technology,
University of Calcutta, Kolkata 700 009;

²Department of Physiology,

Gurumanak Institute of Dental Science & Research, Kolkata

Email: sunny_pallav_1984@yahoo.co.in

Keywords: *Dietary calcium, oxidative stress, testosterone, sperm count, Δ^5 3 β -HSD, 17 β -HSD, ROS*

Despite reactive oxygen species (ROS) are important for normal functioning of various cells, but can interrupt common physiological pathways and cause cell death at oxidative stress levels. They are also vital mediators of testicular physiology and pathophysiology. Calcium which has been accounted in various reports to cause chemocastration has been taken to conduct the study to explicate the effect of excess dietary calcium-induced oxidative damages in male reproductive system in investigational model. To carry out the same, adult male Wister strain rats (90±5 days of age) were fed with CaCl₂ for a selected dose for their one and two spermatogenic cycles. Anti-gonadal and stress-inducing effect of calcium was estimated by using parameters like relative weights of testicular and accessory sex organs, epididymal sperm count, serum testosterone and LH & FSH levels, steroidogenic enzymes activities (testicular and adrenal Δ^5 3 β -Hydroxy Steroid Dehydrogenase & testicular 17 β -Hydroxy Steroid Dehydrogenase), testicular lipid peroxidation, catalase, SOD, serum corticosterone was measured. A significant alteration (P<0.05) has observed after calcium treatment describing calcium causes oxidative stress induced altered adrenocortical activity that relates to hypogonadism in experimental rats.

12. To Study the Percentage of Young Ladies (18-24 Years) Suffering from Dysmenorrhoea and Type of Medication Pattern among Medical and Para Medical Students of SRM University, Chennai

Kiran B, Jamuna Rani R, Akila L

Pharmacology Department,
SRM Medical College Hospital & Research Centre, Chennai

Keywords: *Dysmenorrhoea, medications, menstruation*

Objective: The current study is designed to study the percentage of young ladies (18-24 years) suffering from dysmenorrhoea and type of medication pattern among medical and para medical students of SRM University, Chennai.

Materials and methods: Study includes second year female students of Medical, Nursing and Pharmacy Colleges of SRM university, Chennai aged between 18 -24 years. A questionnaire is prepared and given to the students to complete which includes age of attaining menarche, symptoms of menstruation, type of medications used and loss of working hours during dysmenorrhoea.

Results: It will be interpreted after analysing statistical data.

Food, Nutrition and Dietetics

13. An Epidemiological Study to Evaluate the State of Iodine Nutrition among the Population of Low Socioeconomic Group of Kolkata Metropolitan City

Udayan Bhattacharya, Amar K. Chandra

Endocrinology and Reproductive Physiology Laboratory,
Department of Physiology, University of Calcutta, Kolkata 700 009

Keywords: *Endemic goiter, flavonoids, iodine deficiency, metropolitan city, socioeconomic group, thiocyanate, urinary iodine*

To evaluate the state of iodine nutrition during post salt iodization phase, a goiter survey by palpation method and urinary iodine excretion pattern were carried out among

the school children in the age group of 6-12 years of both sexes in randomly selected municipal primary schools near the slum areas in Kolkata as per the criteria of WHO/ UNICEF/ ICCIDD.

The study areas were selected from Central, North, East, West and South Kolkata by purposive sampling methodology. A total of 200 urine samples were collected taking at least 40 from each area for the estimation of urinary iodine and thiocyanate excretion pattern. Simultaneously thirty five (35) salt samples were collected from the studied school at random in air tight container for the analysis of iodine in the edible salt samples.

Overall 2101 school children were clinically examined for enlargement of thyroid gland (goiter) taking at least 252 in each area. Among the school children goiter prevalence in central Kolkata is 11.11%, in North Kolkata 10.28%, in East Kolkata 23.71%, in west Kolkata 33.75% and in South Kolkata 9.36%. While the iodine excretion pattern as evidenced by median urinary iodine level in Central Kolkata 61.38 $\mu\text{g}/\text{dl}$, in North Kolkata 52.00 $\mu\text{g}/\text{dl}$, in East Kolkata 16.50 $\mu\text{g}/\text{dl}$, in South Kolkata 19.75 $\mu\text{g}/\text{dl}$ and mean urinary thiocyanate level is 0.79 ± 0.47 mg/dl, 0.81 ± 0.65 mg/dl, 1.14 ± 0.56 mg/dl respectively. The over all goiter prevalence among the children of lower socioeconomic group in Kolkata metropolitan city is 18.51%.

In spite of adequate iodine intake, the school children in the age group 6-12 years are affected by endemic goiter. The poor nutritional status may be responsible for the persistence of this disorder in the Kolkata metropolitan city. The results further indicate that some factor(s) other than iodine deficiency perhaps responsible for the persistence of endemic goiter. The role of goitrogenic foods containing thiocyanate, flavonoids may not be ruled out.

14. Anemia Levels in Tribal and Non Tribal Population in North Tripura

Santanu Ghosh¹, Ananga Mohan Chandra²

¹Research Scholar, Department of Physiology, University College of Science and Technology (U.C.S.T), University of Calcutta, 92, APC Road, Kolkata-700009

²Professor, Department of Physiology, U.C.S.T
Email: chandraam@gmail.com

Keywords: *Anemia, Tribal, Non-tribal, Tripura*

The objective of the study was to study the level of anemia in tribal and non tribal population in North Tripura.

The cross-sectional study was carried out in Dharmanagar subdivision of North Tripura.

A total of 453 subjects participated in the study of which 253 were tribal and 108 non tribal. Hemoglobin levels were estimated by cyanmethhemoglobin method.

The results indicate that compared to their non tribal counterparts tribals are better off in case of their hemoglobin levels cross the age range. In case of the male adolescent population, both the groups suffer from mild to moderate anemia while female adolescents non tribals suffer from severe anemia. In case of pregnant and lactating mothers non tribal females are worse off as their average hemoglobin levels indicate that they are suffering from severe anemia.

This is a pilot study with small sample groups, thus extensive studies should to be carried out with this section of children to create awareness not only to the families under the study but at the same time to bring it to the notice of the State Govt., Central Govt. and N.G.Os so that attempts are made to ameliorate the situation.

15. Probiotic fruit beverage - A healthy way to keep tummy fit

Sai Bramari G,^{1} Kalpana P², Dr.L. Anitha³,*

^{1,2}Research scholars, ³ Associate Professor,
Department of Microbiology and Food Science & Technology,
Gitam Institute of Science, GITAM University,
Visakhapatnam, A.P, India – 530045

Keywords: *Probiotics, Lactobacillus Plantarum, Fruit beverage, Diarrhea, Fermentation.*

Research was undertaken to determine the suitability of different fruits as raw materials for production of probiotic fruit beverages by lactic acid bacteria. Ever-growing consumer demand for convenience, combined with a healthy diet and preference for natural ingredients has led to a growth in functional beverage markets. Current trends and changing consumer needs indicate a great opportunity for innovations and developments in new probiotic products. Probiotics are defined as the viable microorganisms that exhibit a beneficial effect on the health of the host by improving its intestinal microbial balance. Lactobacilli have played a crucial role in the production of fermented products for millennia. Their probiotic effects have recently been studied and used in new products. Fruit juices like

Papaya, Guava, Pomogranate, grape juices were inoculated with a 24-hr-old lactic culture (1×10^6) *Lactobacillus plantarum* (2529 Ncim number) and incubated at 30 °C. Changes in pH, acidity, sugar content, and viable cell counts during fermentation under controlled conditions were monitored. After 4 weeks of cold storage at 4 °C, the viable cell counts of *L.plantarum* were still 4.1×10^7 . Fermented fruit juices could serve as a healthy beverage for vegetarians and lactose-allergic consumers. Many beneficial health effects were observed by probiotics one of which is effectively treating of different types of diarrhea. Attributes of lactic acid bacteria such as anti-microbial agent production and competition with potential pathogens in the gut provided the impetus for investigating a role for probiotics in diarrhoea. Acute gastroenteritis diarrhoea in infancy is normally due to rotavirus and a number of trials have shown a reduction in the duration and incidence of diarrhoea in response to probiotics. Thus, both a therapeutic and preventive effect of probiotics has been demonstrated. Hence, Probiotics keeps the tummy fit.

16. Prevalence of Overweight and Obesity among Adolescents (13-15 years) in Jorhat Town, Assam

Barooah N*, Barooah M.S, Neogi N*****

*Senior Research Fellow, **Professor, ***Associate Professor,
Department of Food and Nutrition, College of Home Science,
Assam Agricultural University, Jorhat – 785013

Keywords: *Anthropometry, BMI, Prevalence, Overweight, Obesity, Life style factors.*

The prime objective of the study was to screen out the overweight and obese adolescents and correlate the prevalence of overweight and obesity with food habits and life style factors from a sampling universe of 1007 adolescents, purposively selected from 7 high schools of Jorhat Town.

BMI criteria were used to screen out the overweight and obese samples. Standard techniques and pre-tested and structured schedules were used to elicit information on different parameters of the screened samples. The parameters included nutritional assessment through 24 hour dietary recall method, studying of different life style factors, biochemical assessment to assess the level of haemoglobin with increase in body surface, physical endurance through Harvard's Step Test and estimation of body fat percentage.

The survey revealed the prevalence of overweight and obesity to be 4% and 0.4% respectively. Percentage distribution of overweight and obesity according to gender showed 1.6% and 0% among boys and 2.6% and 0.4% among girls respectively. Distribution according to age groups revealed majority of overweight and obese adolescents among 15 years, the prime cause being physical inactivity. Correlation of BMI with food habits in terms of fast food consumption revealed a positive association for both boys ($r = 0.5422$) and girls ($r = 0.0097$). Correlation of BMI with life style factors in terms of dietary practices as well as physical activity levels for both boys and girls revealed a positive association. Further correlation of BMI with those of their parent's also revealed a positive association (boys with fathers and girls with mothers).

Formulation of need based govt. and non-govt. programmes could help to provide appropriate measures to combat the menace along with school and college campaign focusing on allied aspects of overweight and obesity.

17. Development of Recipes Suitable For the Jaundice Patient

Jayashree Goswami and Basanti Baroova

College Of Home Science,
Assam Agricultural University,
Jorhat-13

Keywords: *Jaundice, Optimum nutrition, Liver, Carbohydrate, Fluid*

The present investigation was undertaken with an aim of providing optimum nutrition to the jaundice patient to regenerate the damaged liver cells. The specific objective of the study was to develop few recipes suitable for the jaundice patient. Recipes were developed and standardized by considering the nutritional facts and psychological condition of the patient. The developed recipes were grouped into seven categories- Beverages, Soups, Main dishes, and Accompanying dishes, Salad, Snacks and Dessert. Study revealed that a total of seventeen recipes were standardized and categorized under the seven meal patterns such as Three recipes were developed under beverage category, Three recipes under soups, Two products under main dishes, Two items as accompanying dishes, Two recipes under salad category, Four recipes as snacks and One recipe under dessert category. In conclusion it could be summarized that the developed recipes were well tailored for keeping

the food ideology of the caretakers (carbohydrate based, low salt and boiled foods with ample fluid) along with the provision of correct nutrition to the patient and therefore the products were highly acceptable both by the taker (patient) and the giver (caretaker).

18. A Study on Dietary Intakes and Iron Nutritional Status of Social Welfare Hostel Girls in Guntur

V. Chinnari Harika, T. Sowmya

Department of foods and nutritional sciences,
Acharya Nagarjuna University,
Nagarjuna Nagar – 522 510

Keywords: *Anthropometry, HB estimation, Dietary intakes, recommended dietary allowance.*

To study the nutritional status and hemoglobin levels of subjects, this study is conducted on dietary intakes and iron nutritional status of social welfare hostel girls in Guntur. In this study 75 samples were taken randomly in the hostel and to study their hemoglobin levels, BMI were noted and Anthropometric measurement, clinical parameters were noted and dietary and nutritional intakes were taken by using 24 hrs recall method. The results of the study were summarized below according to objective of the study. In this study 75 samples were taken randomly in the hostel and study their hemoglobin levels. It is interesting to note that the mean heights of hostel girls are significantly lower. 11% of girls are lesser than the who stands the normal BMI is 20–25 were 25% of girls are less than the normal value. 20% of the girls are facing clinical symptoms along with eye problems. According to nutritional status 100% of the girls consume less energy, protein, iron, calcium vitamin – C and folic acid thiamin B1, than R.D.A dietary allowance. All the subjects course higher B1 Thiamin, Riboflavin, Niacin than R.D.A. there is high significant correlation between B1, B2 and B3 and dietary iron. However consumption of folic acid and vitamin C which are at cut of level of HB found that out of 50%, 40% of the HB level in the blood forming substances lowers than the RDA values. To improve the nutritional status of an individuals encourage them to take from vegetables, green leafy vegetables, and seasonal fruits like Guava. Oranges are to be included in the evening time. Millets like Ragi and wheat may also include in diet. Most of the girls are Anaemic due to lack of iron

rich foods in their diets. In this study girls are suffering not only Aneamia but also other nutrients associated with their diets, only B-Complex vitamins are higher than RDA.

19. Obesity, Motor Quality & Physiological Development: A Study on Adolescent Boys and Girls

*Prithwiraj Mukherjee**, Mouli Choudhury, Smritikana Biswas,
Sougata Bhunia, Supriyo Mishra, Chandradipa Ghosh

Department of Human Physiology with Community Health,
Vidyasagar University
Midnapore-721102

Keywords: *Obesity, overweight, adolescence, body composition, environmental factors*

The number of overweight and obese adolescent has been increasing, reflecting changes in social and environmental factors those need to be understood and modified for effective prevention. The present study was undertaken to understand the relationship of obesity with the developmental pattern of certain important motor quality and physiological variables in adolescents. In this study the body composition in terms of BMI, body fat% and lean body mass, motor quality variable like hand reaction time, hand grip strength, standing long jump, agility and certain important physiological variables like respiratory rate, VO_2 max were obtained from 105 healthy school going boys and girls from middle class bengali families of age group 10-12 years from surroundings of Midnapore town, West Bengal. The selected subjects were divided into normal, overweight and obese groups according to their BMI percentile values following the guidelines of WHO. Motor abilities like hand reaction time, agility and physiological variables like aerobic capacity were found to be significantly lower in overweight and obese boys in caomparison to the normal group by one-way anova and successive Sceffe's multiple comparison tests. Similar pattern of development was also observed in case of girls. BMI and Body fat% were also found to have significant association with certain motor quality and physiological variables in both boys and girls. This study confirms the interference of obesity with motor development and physiological activities in adolescents.

20. Effect of Nutrition Education on Anthropometric and Blood Glucose Levels of Niddm in Guntur City

Jalaja Kumari. D, B.Babitha

Faculty, Department of Foods & Nutritional sciences,
Acharya Nagarjuna University (A.N.U), Guntur
E-mail: jalaja9krishna@yahoo.com

Keywords: *NIDDM, Prevalence, Nutrition counseling, over weight*

Sixty Non Insulin Dependent Diabetic subjects in the age group of 40-60 years were selected from hospital of SHKDCC, Guntur and were surveyed for their nutrient adequacy using “24 hour recall method” for three consecutive days. Nutrition education was imparted to the subjects after assessing their basic knowledge regarding the diet and disease. Nutrition Counseling improved their mean score of diabetic knowledge significantly ($P < 0.01$). Significant decrease in the consumption of cereals, milk and milk products, fats and oils, sugar and jaggery whereas increase in the consumption of pulses, green leafy vegetables, root vegetables was found among diabetics after nutrition counseling. The percentage of calories from carbohydrates 59 to 61%, protein 13 to 16% increased and from fat it was decreased to 27 to 22% in the subjects after nutrition counseling. The intake of fiber (39 to 44%) increased while of vitamins and minerals except iron, zinc and niacin were adequate in the subjects after nutrition counseling as compared to ICMR’s recommendations. Thus, nutritional counseling is an effective measure to bring about the favorable and significant change in diabetic state.

21. Food Preservative and Its Impact on Human Health

Jayprakash Singh, Saumik Panja, Anirban Dasgupta

Department of Environmental Science, University of Calcutta
Email: jayprakashsingh2007@gmail.com

Keywords: *Preservative, ADHD, anaphylactic shock, ethoxyquin, chromosome aberration*

Preservative is a naturally occurring or synthetic substance that is added to products such as foods, pharmaceuticals, paints, biological samples, wood, etc. to prevent

decomposition by microbial growth or by undesirable chemical changes. It is seen that modern synthetic preservatives have become controversial because they have been shown to cause respiratory and other health problems. Some studies point to synthetic preservatives and artificial coloring agents aggravating ADHD (attention deficit hyperactive disorder) symptoms in those affected. Some preservatives in food or medicine can cause anaphylactic shock in susceptible individuals, a condition which is often fatal within minutes without emergency treatment. In vitro studies shows increase in necrosis and apoptosis in cultured human cell line. A study shows that a preservative such as ethoxyquin induce chromosome aberrations. There are also some reports which suggest that it affects our immune systems in a number of ways. A careful and a scientific approach is needed before using any pesticide in our food products and other essential items.

22. Report on Phytin Phosphorus Present in Food items Often Consumed by Indian People

Amrita Ray, Debanjana Sen and Kamala Adak

Department of Home Sciences,
Judges Court Road, University of Calcutta,
Kolkata-700027

Keywords: *Phytin phosphorus; mineral absorption; spectrophotometry; Ferric Chloride solution; hazardous effects*

Estimation of Phytin phosphorus content of various Indian food items rich in iron is performed. This process is executed spectrophotometrically under strong acidic condition using ferric chloride solution. Three nuts and oilseeds (cashew, almond & sesame), two protein rich legumes (Rajma & Soybean) and a fruit (water melon) are analyzed. From the result developed it has been observed that the levels of phytin phosphorus are in the lower range as recorded in the standard book of NUTRITIVE VALUE OF INDIAN FOODS by Indian Council of Medical Research. The experiment is executed keeping in mind the hazardous effect of phytin phosphorus in human. However the experimental results show its non-hazardous effects and therefore can be used as safe, nutritious food items.

23. Mangrove Conservation - From a Nutritional Point of View

Dripta Roy Choudhury, Sutapa Paul, Minati Sen

Department of Home Science,

University of Calcutta

Email: rchoudhuryd(S> gmail.com and spblueheaven(a>gmail.com

Key Words: *Mangrove, Suaeda maritime, Sesuvium portulacastrum, Micronutrients, Alternative Food source, Conservation*

Biodiversity is a valuable natural resource and mangrove is one of the important contributory factors of this biodiversity and it also plays a vital role in socio economic life. World wide mangrove dominates 3 quarters of topical coast lines and currently India accounts for 2.6% of the world's total mangrove cover with an area of 4827 sq Km. The largest mangrove forest in the world is located in the Ganges delta in West Bengal, India and Bangladesh. The Pichamvaram Mangrove Forest near Chidambaram in Tamilnadu stands as the second largest. Mangrove, on one side, can survive in drought condition, while on the other side, offers beneficial effects like prevention of soil erosion, protection from flood, storm surge, tsunamis and provide a means of subsistence for local people. Staring at the threat of population explosion and food scarcity the natural availability and the richness of mangrove acts as a patron to investigate its nutritional index. *Suaeda maritima* and *Sesuvium portulacastrum* are such mangrove originated plants which grow in abundance in Sunderban areas, West Bengal and along the Tamilnadu coastline and are very popular as regional foods in their corresponding localities. In the present study, a comprehensive nutritive value analysis have been done on these two species. Macro nutrients like carbohydrate, protein, fat, moisture, total dietary fibre and micro nutrients like total minerals, sodium, potassium, iron, calcium, phosphorus, iodine, magnesium, ascorbic acid, G>-carotene, vitamin E are estimated by standard methods. From the study, it is found that they are very rich in micro nutrients, especially sodium (582.7mg%), iron (13.2mg%), phosphorus (18.9mg%), B-carotene (6994 mcg%) etc. when compared to conventional leafy vegetables and land vegetables. Its micro nutrient density has increased its nutritional excellence to a higher level as per the modern scientific dietary pattern which gives very high emphasis on the importance of micronutrients in our diet. So, from the above study we can conclude that mangrove conservation and farming of theses species might be more encouraged for conserving biodiversity as well as its utilization as a natural alternative food source.

24. Health and Nutritional Status of Preschool Children

D. Jalaja Kumari*, B.Babatha

*Department of Foods & Nutritional sciences,
Acharya Nagarjuna University (A.N.U), Guntur
E-mail: jalaja9krishna@yahoo.com

Key words: *Under nutrition, Dietary intakes, Protein Energy Malnutrition and Vitamin deficiency.*

Health and nutritional status of preschool children of kandukuru and Singaraya Konda of Prakasam District was studied with the help of clinical examination, and height and weight measurements. A total of 400 children (228 boys and 172 girls) formed the study group. With clinical symptoms, the prevalence of various deficiencies was estimated. With measurements of height and weight, the prevalence of undernutrition was also determined. A close proximation was observed in the appearance of deficiency symptoms and undernutrition between boys and girls, depicting their poor state of health and nutrition.

Neurophysiology

25. Intervention Based On Dynamics of Postural Control in Children with Cerebral Palsy (CP) - An Integral Approach

Meenakshi Batra and Vijay Batra

Senior Occupational Therapist,
Pandit Deen Dayal Upadhyay Institute for the Physically Handicapped
(Ministry of Social Justice & Empowerment, Govt. of India) &
PhD scholar (C.S.M.M.U.), Senior Research Fellow & PhD scholar (C.S.M.M.U.)

Keywords: *Cerebral Palsy (CP), Postural reaction, Postural control, Dynamics of postural control, Gross motor functional abilities (GMFM)*

Objective: To see the effectiveness of Intervention based on Dynamics of postural control over Conventional approach in CP.

Method: 38 CP children of age 2 to 7 years were included. Baseline evaluation was done for Postural reactions, and GMFM. The children were randomly allocated to two groups. In group A, intervention based on Dynamics of postural control and group B, conventional treatment were used for 12 weeks followed by re-evaluation.

Result: Statistical analysis was done, & p value was found to be significant ($p < .05$).

Conclusion: Intervention incorporating Dynamics of postural control is more effective than conventional approach in CP.

26. Central plus peripheral stimulation (CPPS) for post-stroke motor rehabilitation: a novel concept and clinical application.

Fayaz Rahman Khan

Sree Chitra tirunal Institute for Medical Sciences and Technology Trivandrum

Keywords: TBS, NMES

Aim and hypothesis: The aim of study was to assess the motor-cortex plasticity and functional motor outcome in early-stroke patients after CPPS approach with Theta Burst Stimulation (TBS) a repetitive Trans-cranial Magnetic Stimulation (TMS) paradigm and Neuromuscular Electrical Stimulation (NMES). The proposed hypothesis was combined stimulation would be more effective than single stimulation.

Methods: 5 patients and 5 age matched controls underwent three experimental sessions in three consecutive weeks. First-week (TBS-W1) with TBS alone, second-week (NMES-W2) with NMES alone and third-week (PLUS-W3) with both TBS and NMES given in sequentially. Cortical excitability was assessed with single pulse TMS stimulator before and immediately after the three interventions for Resting Motor Threshold (RMT) and Cortical Silent Period (CSP) in the first dorsal interossei muscle of the affected and unaffected hand. Post intervention clinical assessment was done with 9-H ole Peg Test (9PHT) for change in reaction time (RT).

Results: CPPS with TBS and NMES showed synergistic effect in both electrophysiological and clinical assessment. A combined approach (CPPS) may be a more effective for post-stroke motor rehabilitation.

27. Effect of Monosodium Glutamate on Antioxidants and Histopathology in Brain

¹Sauganth Paul M.V, R. ²Harikumar Nair

¹School of Biosciences,
Mahatma Gandhi University, Kottayam, Kerala, India,

²Assistant Professor, School of Biosciences,
Mahatma Gandhi University, Kottayam, Kerala, India

Keywords: *Monosodium glutamate, Antioxidant enzymes, Electrolytes, Brain*

The use of monosodium glutamate (MSG) as a flavour enhancer is increasing tremendously in fast food processing industry. The MSG as a food additive, reported to have toxic effects in different organs of human and animals. MSG (4 & 8mg/g b.wt) was administered orally for 180 days to Wistar rats. A significant increase in malondialdehyde and significant decrease in antioxidant enzymes were observed in experimental groups. Brain tissue indicated neuronal atrophy, degenerative changes, fatty degeneration and perinuclear vacuolation. Serum sodium, potassium and calcium levels were significantly declined. Present work suggested that oral administration of MSG (4 & 8mg/g b.wt) induces oxidative stress and histopathological alterations in brain.

28. Differential Gender - Specific Vulnerability to Depression Induction in Learned - Helplessness Model of Rats

*Ritabrata Banerjee and Amal Chandra Mondal**

Raja Peary Mohan College,
Uttarpara, Hooghly University of Calcutta, West Bengal,
*Asst. Professor in Physiology, Raja Peary Mohan College,
Uttarpara, Hooghly, University of Calcutta, West Bengal

Keywords: *Inescapable foot shock, Escape test, learned helplessness, Depression, Gender, Antidepressant drug*

Women show a higher prevalence for depression than men, however the biological basis of gender differences in stress response and recovery still remain poorly understood.

The aim of the present study was to assess the gender differences in response to single and repeated stress and recovery with and without anti-depressant drug in rats using Learned helplessness (LH) model, where young female Sprague-Dawley rats exhibited a significant difference in escape latency in compared to male associated with cognitive impairment. The induced depressive behavior in both sexes however was sensitive to flexitime. In conclusion, the findings suggest that female rats respond more to stress than males.

29. Chronic Undernutrition Delayed Motor Development of Santal Children of Purulia District, India

*Sutanu Dutta Chowdhury, Tusharkanti Ghosh**

Department of Physiology,
University of Calcutta,
92 APC Road, Kolkata 700009

Keywords: *Motor development, Nutritional status, Undernutrition, Motor function.*

The objectives of the present study were to measure the motor development and to investigate the effect of undernutrition on motor development in 5-12 years of Santal children of Purulia district of West Bengal, India. A total of 841 (427 boys and 414 girls) children were studied. The nutritional status of each child was assessed by z-score of height-for-age parameter. Socioeconomic status (SES) was measured by the updated Kuppusswami scale. Motor development was measured using the Bruininks-Oseretsky Test of Motor Proficiency-Second Edition, Short Form (BOT-2). Mean age- and sex-standardized total BOT-2 score of Santal children corresponded to around 1st percentile of BOT-2 reference values. Sex had a significant ($p < 0.05$) effect on children's score of running speed and agility, upper-limb coordination and strength with higher scores for boys than girls. Total BOT-2 scores of higher age groups were significantly ($p < 0.05$) higher than younger age groups. Children with lower SES had total BOT-2 z-score of -2 or less compared with children of higher SES ($\chi^2 = 181.46$, $p < 0.0001$). Likewise, children with a height-for-age z-score of -2 or less were significantly more likely to have a total BOT-2 z-score of -2 or less compared with children at a healthier height-for-age range ($\chi^2 = 271.136$, $p < 0.0001$).

Well-nourished children scored significantly higher ($p < 0.05$) than undernourished children in total BOT-2 standard score and in all individual motor subtests. Santal children with lower SES and poorer nutritional status have lower motor proficiency compared with Santal children with comparatively higher SES and nutritional status. The vulnerable nutritional and socioeconomic statuses of Santal children are the major reasons for their poor motor development.

30. The Effect of Stimulation of Medial Septal Glutamate or Ach Receptors on Heart Rate Variability of Sodium Pentobarbital Anaesthetised Rats

G. Dutta, A. R. Goswami, T. K. Ghosh

Neurophysiology Laboratory, Dept. of Physiology,
University College of Sciences and Technology,
University of Calcutta, 92, A. P. C. Road,
Kolkata- 700 009, West Bengal, India

Keywords: *Medial septum, heart rate, glutamate, acetylcholine, DNQX, atropine*

As a nodal point of limbic system, medial septum (MS) has some role on exploratory and locomotor behaviour. The complex interneuronal circuits of MS contains glutamate and acetylcholine (Ach) receptors containing neurons. In the present study the role of MS on heart rate variability (HRV) was investigated in sodium pentobarbital anaesthetised rats after infusion of glutamate (0.5 μ M), non-NMDA glutamate receptor blocker DNQX (0.1 μ g), Ach (0.1 μ M) and Ach blocker atropine (1.6 μ g) into MS in rats. After infusion of glutamate or Ach into MS, heart rate (HR) was decreased with the elevated vagal tone and decreased sympathetic-vagal balance (SVB). After infusion of DNQX or atropine into MS, HR was increased and vagal tone was decreased. These changes of HR may be due to the modulatory role of MS on autonomic regulatory areas of brain.

31. Effects of Naproxen on the Neurotransmitter Levels of the Different Brain Areas in Male Rats Exposed to Simulated Hypobaric Hypoxia

A. R. Goswami, G. Dutta, N. Mandal , T. K. Ghosh *

Neurophysiology Laboratory, Dept. of Physiology,
University College of Sciences and Technology,
University of Calcutta, 92, A. P. C. Road,
Kolkata- 700 009, West Bengal, India

Keywords: Hypobaric hypoxia, naproxen, monoamine neurotransmitter

Different neurological and immunological dysfunctions were reported after exposure to hypobaric hypoxia in animals and humans. Previously it was reported from our laboratory that some immune parameters are altered in male rats exposed to hypobaric hypoxic condition. It was further observed that naproxen; a prostaglandin synthesis inhibitor can block some of the hypobaric hypoxia induced immune changes in rats. In the present study the neurotransmitters of different regions of brain were measured in control (C), hypobaric hypoxia (HH) exposed naproxen-treated control (CD) and hypobaric hypoxia exposed with naproxen treated (HD) rats. The rats were exposed to hypobaric hypoxia in a simulated chamber at 380 Torr (18,000 ft) for 8 hrs / day for consecutive 6 days. The levels of monoamine neurotransmitters such as nor epinephrine (NE), epinephrine (E), dopamine (DA) and 5-hydroxy tryptamine (5-HT) in different brain regions like cerebral cortex (CC), cerebellum (CB) and hypothalamus (H) were measured by HPLC-ECD method . Naproxen was given at the dose of 18 mg/ kg body wt. In HH rats the brain neurotransmitter NE, E and DA levels were significantly decreased in CC and CB region, but 5-HT level was decreased only in CC region of brain. In hypothalamus only the DA and NE level were decreased, while E and 5-HT levels remained unchanged in HH rats. In HD rats the DA level was not decreased like HH rats in CC, CB and H and 5-HT level was not decreased in CC as in HH rats. However, NE and E levels in CC and CB were also decreased in HD rats like that in the HH rats. It was also observed that NE and E levels were decreased in CC and CB and E levels was decreased in H in CD rats. However DA and 5-HT in all the brain areas in CD rats was not changed. It appears that the changes of DA in CC and CB and 5-HT in CC in HH condition are influenced by naproxen and these changes may alter the regulatory role of brain on other physiological systems during acclimatization in high altitude.

32. Perhaps Interactive Memory Is Misinterpreted As Intelligence

Salil Kumar Mandal

Department of Physiology,
KPC Medical College & Hospital,
Jadavpur, Kolkata 700 032

Keywords: *Interactive memory, intelligence, cognitive functions,*

Intelligence is the ability to acquire and apply knowledge and skill. Memory is the faculty by which mind stores and remembers information. Non- declarative (implicit or reflexive) memory includes habituation, sensitization, simple classical conditionings, skills, habits and priming. The declarative (explicit or recognition) memory includes facts and events. Social judgment though is said to be part of intelligence but it found that some so called intelligent persons are lacking this quality. Again calculation is part of intelligence but without memory it is not possible to calculate. So it seems that memory is the mother of intelligence or the word intelligence is misnomer or it is part of memory.

The higher cognitive functions may be categorized in the following groups which can also be determined by memory testing.

1. The fund of knowledge.
2. The manipulation of knowledge (e.g. calculation or problem solving)
3. Social awareness and judgments.
4. Abstract thinking (e.g. interpretation of proverbs, proper explanation Legal matters and constitutional articles.)

All the above mentioned cognitive functions are included in intelligence but virtually all depend upon memory. These are better when the fund of knowledge is rich or memory is sharp i.e. ability to answer with rapidity when any question is asked. But without adequate knowledge it is not possible. Again knowledge is stored memory. So the power to interpret any statement or to tract with any matter properly is regarded as intelligence. But all these are dependant upon the stored knowledge and its proper manipulation. So this interactive

knowledge of memory is regarded by some people as intelligence but actually it is same part of memory.

Ergonomics, Work and Sports Physiology and Occupational Health

33. An Ergonomics Study on Women Weavers' Performance: Design and Occupational Assessment in the Handloom Industries in Assam

*Sangeeta Pandit, Nandita Bhattacharyya and
Debkumar Chakrabarti*

Ergonomics laboratory, Department of Design,
Indian Institute of Technology Guwahati,
Guwahati 781 039
Email: s.pandit@iitg.ernet.in

Keywords: *Women weavers, occupational and health assessment*

Posture and long work hour affects the performance and raise a series of ill effects on health issues, specifically when it relates with the women workers the problem aggravates. Women workers adopting awkward posture at traditionally designed looms face the same. A preliminary ergonomic study on postural effects was carried out on 10 such women workers in Assam. Workstation and weaving activity were ergonomically assessed. The findings were discussed with others engaged in the same profession. The resultant observation confirms the conventional loom and work place arrangement which demand multiple body movement and adoption of unnatural postures to perform different activities imposes health problems, specifically to mention the respondents were found to suffer from work related stress, joint discomfort and muscle pains. This paper addresses some remedial ergonomics concerns and design issues towards elevating the overall wellbeing and production.

34. Ergonomic Evaluation of Pathology Laboratory to reduce Personnel Discomfort and Postural Stress

Shreya Maulik¹, Archana Bhatnagar², Rauf Iqbal³

¹. Research Fellow, National Institute of Industrial Engineering,
Vihar Lake, Mumbai. 400 087,

² Professor, S.N.D.T Womens University, Juhu, Mumbai,

³Assistant Professor, National Institute of Industrial Engineering,
Vihar Lake, Mumbai 400 087

Keywords: *Pathological laboratories, technicians, workstation, anthropometric dimensions, posture, ergonomic intervention*

The study focused on the ergonomic assessment of pathological laboratories which included two different working groups (Technicians in Hospital Laboratory and Students in University Laboratory) from the user's perspective in Mumbai and Kolkata. The study was conducted on university students ($n = 25$) with the mean age, height and weight of (18.76 ± 0.5) years, (160.36 ± 2.1) cm & (53.64 ± 1.7) kg respectively from a university laboratory and professional technicians ($n = 25$) with the mean age, height and weight of (41.8 ± 9.2) years, (167.4 ± 4.7) cm & (67.48 ± 3.1) kg respectively from a pathology laboratory in the hospital. The study was conducted by administering the structured questionnaires and interviews.

The results revealed that the workstation height (81.5cm) for both the laboratory settings in the university as well as in the hospital is low as compared to the anthropometric dimensions of the users which forced them to continue work inspite of discomfort. Majority of the personnel adopted standing posture while working in the laboratory. 28% of the students and 52% of technicians found the table height to be too low for standing operations. Total storage area was adequate but not properly organized and it was observed that maximum storage was provided below the table which occupies the leg space. Subjective response of the technicians at the end of the shift revealed high incidence of pain in the eyes (24%), neck (24%), upper arm (24%), lower arm (4%), wrist (20%), upper back (12%), lower back (12%), whole back (32%), thighs (8%), and knees (60%) and in the calf muscles (56%). The corresponding values were comparatively lower in case of students. Also the visual fatigue was found to be pronounced among the technicians who were exposed to microscopic activities more than the students. The study recommended ergonomic interventions on workstation.

35. VM - Multidisciplinary Weight Distribution Analysis System: A Diagnostic and Evaluative Tool for Altered Plantar Weight Distribution

*Vijay Batra** and *Meenakshi Batra***

*G. B. Pant Hospital, GNCT Delhi, SRF & PhD scholar (C.S.M.M.U.),

**Department of Physical Medicine & Rehabilitation, RALC & Sr. OT Pt. D.U.I.P.H.

Keywords: *VM - Multidisciplinary weight distribution analysis system; knee osteoarthritis; altered plantar weight distribution; clinical decision making*

Plantar Weight distribution pattern is a vital biomechanical parameter to evaluate knee joint changes and its functional correlates in knee osteoarthritis. VM - Multidisciplinary Weight Distribution Analysis System consists of transducers (load cells), interface and, digital display unit. This system can measure plantar weight distribution variation with change in functional positions and can identify the biomechanical factors / attributes responsible for altered plantar weight distribution pattern. The knowledge of this altered plantar weight distribution variations in knee osteoarthritis can guide the treatment process; selection of exercise regime within functional context; designing & prescription of orthosis and clinical decision making.

36. Menace of Irrational Fixed Dose Combination medicines for musculoskeletal system in India

*Rajendra Diwe*¹ *Kunda Gharpure*², *Vijay Thawani*³

¹ The Hitavada, Nagpur,

² Consultant Pharmacist, Nagpur,

³ Govt. Medical College, Nagpur

Email: rajendradiwe@gmail.com

Keywords: *Rational, irrational, drugs, fixed dose combinations, FDCs, drug controller general of India (DCGI), musculoskeletal system*

India is facing menace of irrational fixed dose combinations. According to recent survey, the irrational medicines sale in the retail market was 10.73% but in terms of number

of irrational brands, out of total top selling brands it was 22.22%. FDC drugs accounted for 10% of the Rs 70,000 crore domestic retail pharmaceutical markets. Even if a small percentage of these FDCS are presumed to be irrational, it amounts to a large chunk of people's hard earned money, going down the drain.

There is also a strong need to promote rational prescribing practices. The paper discusses about Menace of Irrational Fixed Dose Combination medicines for musculoskeletal system in India

37. Postural Assessment of BPO Workers

*Gayathri, D**, *Pariamalam, P.** *Ganguli, A. K.,*** *Premalatha, M. R.,* , Sashidevi, G.****

*Home Science College and Research Institute,
Tamil Nadu Agricultural University, Madurai,

**Occupational Health Services, Bharat Heavy Electricals Limited, Trichy

***Post Harvest Technology Centre,
Tamil Nadu Agricultural University, Coimbatore

Keywords: *BPO workers, RULA, Postural assessment.*

In modern society, there is an increasing demand for BPO (Business Process Outsourcing) employees in worldwide. During the last few years, the BPO business has experienced huge growth. The Indian BPO industry, a knowledge based sector, has always attempted to include a large number of women in workforce. According to a survey, out of 400 millions of workforce in India, around 30-40 per cent are women. They are one of the driving forces behind the success of BPO industry in India. A study has been conducted among BPO women workers employed in different BPOs at Chennai. Rapid Upper Limb Assessment (RULA) was carried out to assess the postures adopted by the workers during their work schedule. The postures were photographed using a digital handycam and later they were analysed. The results indicated that the BPO workers adopted postures which had a wrist and arm scores varied between '3' and '4', while the neck, trunk and leg scores varied between '4' and '7'. Sixty nine per cent of the workers had a final score of '5' and '6' which indicates that the postures need to be *investigated further and changed soon*. This clearly indicates that the workers need to be sensitized on the work methods and work postures that are to be adopted during work.

38. A Study of Correlation of Body Mass Index and Waist Circumference with Blood Pressure

Archana Khanikar and Siddhartha S. Konwar

Department of Physiology and Surgery,
Assam Medical College, Dibrugarh University Dibrugarh, Assam.

Keyword: *Obesity, body mass index, waist circumference*

Increase in weight gain is seen to have its effect on Cardiovascular system with alteration of Blood Pressure. Body fat distribution is an important contributor to its association between obesity and high blood pressure. Weight gain or obesity is measured by using Body Mass Index (BMI) and Waist Circumference (WC). This study shows association of BMI and WC with blood pressure in 100 subjects of age group 24 to 45 years. It is seen that BMI and WC shows a positive correlation with blood pressure. And WC is a better predictor of mean blood pressure.

39. Measurement of Respiratory Status among Paint Industry Workers from West Bengal, India

Rumila Majumdar, Anindita Mandal (Majee)

Raja Peary Mohan College, P.O- Uttarpara,
Dist-Hooghly, West Bengal, Pin -712258
Email: anindita11us@rediffmail.com

Keywords: *Pulmonary function, paint workers, India*

Objectives: Paint industry workers are exposed to many solvents (toluene, acetone, butanol, xylene, benzene, trichloro ethylene). We investigated whether chronic exposure to solvents has adverse effect on respiratory system.

Materials & Methods: This cross sectional study involving 149 paint industry workers were selected from paint industries of West Bengal, India. The study parameters include FVC, FEV₁, FEV_{1%}, FEF₂₀₀₋₁₂₀₀, FEF_{25-75%}, FEF_{75-85%} and PEFR. Besides, age, smoking habit, duration of smoking, type of work, duration of work and other respiratory illness symptoms were recorded.

Results: 75.9% workers of paint industry have restrictive ventilator impairment in higher age group workers but 83.78% in lower age group. Again occurrence of restrictive ventilator impairment is 76.9% in smoker and 78.4% in non smoker workers but 94% restrictive impairment is observed in workers of hazardous zone of high VOC conc. and 69.75 in workers of non hazardous zone of low VOC conc. indicating effects of dust and VOC in respiratory impairment than smoking. Significant correlation has been found between pulmonary functions and year of exposure to solvents and dust in older workers. Thus restrictive lung impairment mainly depends on high VOC conc. and partly on year of exposure.

Conclusion: This study will give baseline information regarding respiratory status of Paint workers of West Bengal. 77.85% paint workers have restrictive pulmonary function impairment which can be checked by using high quality protective equipments, reduction of VOC conc. in work environment and worker education.

40. Playing Related Musculoskeletal Disorders in Tabla Players of West Bengal

Mishra W¹, Amitabha De¹ and Chandra A. M.²

¹National Institute of Industrial Engineering (NITIE),
Vihar Lake, Mumbai – 400 087

²Department of Physiology, University College of Science,
Technology and Agriculture, University of Calcutta,
92 APC Road, Kolkata 900 009

Keywords: *Musculoskeletal disorder; tabla players, low back pain*

Playing related musculoskeletal disorders (PRMDs) are prevalent in professional instrumental musicians. Each musical instrument is associated with a unique set of injuries that are related to the physical and postural demands while playing that instrument. Studies have also indicated that percussionists are at a higher risk for playing-related musculoskeletal disorders as compared to other instrumental groups. The present study was taken up to

assess the presence of playing related musculoskeletal disorders in Tabla players of West Bengal and also to determine the anatomical zones of discomforts among them. Twelve professional Tabla players voluntarily participated in the study. Subjective responses were collected through self-reported questionnaire and posture analysis was done by Rapid Upper Limb Assessment (RULA). It was revealed from the study that neck, shoulders (right), low back and knees were the prone anatomical zones. It was found out that the discomforts were higher especially in low back when compared with other instrumental groups as reported in the literature.

41. Assessment of working conditions and Physical Fitness of Female Tobacco workers processing dried Tobacco leaves

B. S. Wali, P. D. Raut and V. A.Sawant

Department of Zoology,
Shivaji University, Kolhapur
Email: bharatiwali@gmail.com

Keywords: *Physical fitness, tobacco industry, indoor environmental monitoring, grip, Strength, Occupational Hazards*

The aim of this study was to examine the physical fitness and work place conditions of Jaysingpur Tobacco Industry; no such study has been previously conducted. A total 100 seasonal and permanent tobacco female workers were studied. The study included 1) Collection of personal information with standard questionnaire and personal interviews 2) Physical Fitness Test 3) Grip Dynamometer 4) Peak Expiratory Flow rate (PEFF) 5) Physical factors like light temperature noise level were measured. Workers in the office section were treated as controls. Low physical fitness performances, low grip strength indicated among these female workers. Results of out study indicated adverse working conditions in the work place of tobacco industry. Occupational adverse effects were observed with workers shown relationship with period of exposure.

42. Correlation and Regression among Pain, Physical Strength, Functional Ability, Quality Of Life and Sexual Frequency in Low Back Pain

Suraj Kumar

Department of Physiotherapy, Pt. DDU IPH,
4-VD Marg, New Delhi-110002, India

Keywords: *Low back pain, correlation, rehabilitation, regression*

Aims - The present study was undertaken to find out the relationship among outcome variable as well as association between dependent variables with physical characteristics.

Outcome Measures - Correlations between outcome variables [pain, back pressure change-BPC, abdominal pressure changes-APC, walking, stairs climbing, stand ups, quality of life (QOL) and sexual frequency] of all LBP subjects before and after treatments. Regression analysis estimate baseline BPC and APC of LBP subjects from their baseline demographic characteristics (age, height, Waist circumference. Systolic Blood pressure. Pulse rate) and severity of Pain.

Methods - Total 141 non-specific chronic low back pain patients were recruited. After baseline recording, all subjects were given trunk stabilization training for 20 regular days. After training, the follow up was done at gap of each 15 days up to 6 months (180 days). At the last follow up session (180th day) the outcome variables were recorded again.

Findings - This present study found an inverse relation between pain and muscle functions (BPC: $r = -0.36$; PO. Oland APC: $r = -0.26$; PO.01). This study also showed that BPC was more inversely related with the pain than APC.

Conclusions - This study concludes that Physical strength (BPC & APC) of LBP subjects is more closely associated with the pain than the functional ability (Walking, Stairs climbing and Stand-ups). This study also estimated (baseline or before treatment) BPC and APC in LBP subjects from their physical characteristics and pain severity.

43. Use and Abuse of Anabolic Androgenic Steroids - A Synoptic Review

Riddhi Mahansaria, Shirsendu Ghosh* and Aniruddha Mukhopadhyay

Department of Environmental Science,

University of Calcutta,

51/2, Hazra Road, Kolkata 700 019

*Email: shirsendughosh48@gmail.com

Keywords: *Anabolic androgenic steroids (AAS), testosterone, athletes, abuse, adverse effects; forensic evidence; androgen responsive reporter gene assay*

The anabolic androgenic steroids (AAS) are a family of hormones including the natural male hormone testosterone and its synthetic derivatives, exhibiting both *anabolic* (muscle building) and *androgenic* (masculinizing) properties, which acts on both the reproductive and non-reproductive target tissues. Conventionally, they have been used in treating bone marrow failure, hypogonadal states, renal disease, anaemia and the late stages of breast cancer. AAS have been placed on the Food and Drug Administration's list of controlled substances primarily due to the adverse effects seen in athletes taking high doses in attempts to enhance performance. AAS have been used by elite athletes since the 1950s and became widespread drugs of abuse in the general population by the 1980s. High and multi-doses of AAS cause adverse effects like irreversible organ damage, hepatic neoplasms, carcinoma, tendon damage, reduced fertility and gynecomastia in males and masculinization in women and children, including prolonged psychiatric effects, behavioural disorders and progression to other forms of substance abuse. Forensic evidence of AAS abuse is commonly detected in urine by gas chromatography-mass spectrometry or liquid chromatography-mass spectrometry or androgen responsive reporter gene assay. Drug-prevention counseling should be done and the use of AAS should be avoided for an individual's better future.

Drug Design, Drug Development and Toxicology

44. Effect of Anthocyanin fraction of *Syzygium cumini* on Cisplatin-induced Nephrotoxicity

A. Sreedevi

Division of pharmaceutical Chemistry,
Institute of Pharmaceutical Technology SPMVV,
Tirupathi., Andhra Pradesh

Keywords: *Anthocyanin, Syzygium cumini, nephrotoxicity, cisplatin*

Present study is designed to evaluate the effect of Anthocyanin fraction of *Syzygium cumini* on cisplatin-induced nephrotoxicity. Anthocyanin fraction was isolated from dried Fruits of *Syzygium cumini*. Nephroprotector activity was evaluated in male Albino rats. Nephrotoxicity induced by intraperitoneal administration (6 mg/kg,i.p., single dose) of cisplatin. Anthocyanin fraction was administered by gastric intubation at two dose levels. Animals were divided into 5 groups. Group I animals received vehicle (2% gum acacia). Group II animals received cisplatin on day 1. Group III and IV received 7.5mg/kg and 15mg/kg Bd.Wt. anthocyanin fraction respectively at 1 hr before, 24 hrs and 48 hr after cisplatin injection. Group V received only Anthocyanin fraction. 72 hr after cisplatin injection blood was collected and estimated serum markers level. A Malonaldehyde level was also estimated in kidney tissue. Histological studies were also conducted. Cisplatin caused acute renal damage characterized by elevation of Blood Urine Nitrogen, Serum creatinine, Malonaldehyde level, marked drop in creatinine clearance. Animals which received Anthocyanin fraction reversed all the effects induced by cisplatin in dose dependent manner. Histological studies also substantiated above results. Present study reveals that anthocyanin fraction attenuated the nephrotoxicity of cisplatin in rats.

45. Biochemical Evaluation of the Protective Effect of Garlic on Antioxidant Defense System and Histological Changes in the Kidney of Alcoholic Rats

K. R. Shanmugam^{ab} and K. Sathyavelu Reddy^a

^a Department of Nutrition and Dietetics, Faculty of Allied and Health Sciences, University of Kebangsaan Malaysia, Jalan Raja Muda Aziz, 50300 Kuala Lumpur, Malaysia.

^b Division of Molecular Biology and Exercise Physiology, Department of Zoology, Sri Venkateswara University, Tirupati – 517 502, A. P, India

Keywords: *Alcohol, antioxidant enzymes, rats*

It has been suggested that alcohol-induced brain damage is mediated through increases in oxidative stress. Current research suggests that antioxidants of medicinal plants protect against the toxicity of alcohol. For this purpose rats were divided into 4 groups and treatment was given as stated in experimental protocol. Alcohol treatment depleted the renal antioxidant enzymes like superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx). However with garlic supplementation these antioxidant enzymes were reversed back to normal levels. This shows the antioxidant potential of garlic. Moreover, histopathological studies also proven that garlic reduced the renal damage in alcohol treated group than that of alcoholic group. Our findings strongly support oxidative nature of alcohol-induced cellular stress in renal tissue and imply that a strong protective effect could be achieved rat medicine like garlic.

46. Superoxide Radical Mediated Lipid Peroxidation and Antioxidant Enzyme Status in Serum and Neutrophil of Gutkha Chewers

**Santanu Kar Mahapatra, Soumyabrata Roy,
Subhankari Prasad Chakraborty, Somenath Roy***

Microbiology and Immunology Laboratory, Department of Human Physiology with Community Health, Vidyasagar University, Midnapore-721 102, West Bengal.

E-mail: sroy.vu@hotmail.com

Keywords: *Neutrophil, Oxidative stress, Superoxide radical, Glutathione, Catalase, Superoxide dismutase.*

Oxidative damage in neutrophil is the cause of cellular damage and pathology. This

study was to examine the redox status in serum and neutrophil of normal and gutkha chewers and determine the correlations between oxidative stress related parameters. Superoxide radical generation, NADPH Oxidase activity, Lipid peroxidation (MDA), reduced glutathione (GSH), Oxidized glutathione (GSSG), Catalase (CAT), and superoxide dismutase (SOD) in serum and neutrophil of gutkha chewers were studied. It was observed that Superoxide radical generation, NADPH Oxidase activity, MDA and GSSG level were significantly increased in gutkha chewers group as compared with control; where as GSH level, CAT and SOD activity were significantly decreased in gutkha chewers group as compared to control. The results indicate the balance of oxidant and antioxidant systems in serum and neutrophil shifts in favor of accelerated oxidation due to chewing of gutkha.

47. Anti-Proliferative Activity of *Evolvulus Nummularius* (L.) L., a Medicinal Plant of Tripura, on Doxorubicin Resistant Human Leukemia Cells

**Rupanjali Saha^a, Biswanath Dinda^b, Jayati Mookerjee Basu^c,
Samir Kumar Sil^{a*}**

^aDepartment of Human Physiology,

^bDepartment of Chemistry, Tripura University,
Tripura 799130,

^cDepartment of Immunology,
IICB, Kolkata

Keywords: *Evolvulus nummularius*, cancer, leukemia, anti-proliferative activity, doxorubicin

Natural products provide a rich source for developing novel drugs with anti-leukemia activities. Considering the severe limitations of current cancer therapy, it would be desirable to have novel drugs, which are active against otherwise resistant tumor cells. *Evolvulus nummularius* is a herb of convolvulaceae family with known ethno medicinal history. *E. nummularius* scatterly grows in the grassy places across the north eastern states of India. In the present investigation *in vitro* test is carried out to assess anti-proliferative activity of

methanolic extract of *E. nummularius* against doxorubicin resistant human leukemia cancer cell line, CEM/ ADR 5000. The dose of 25mg/ ml is found sufficient to achieve 99.32% (p= 0.001) anti-proliferative activity compared to untreated control.

48. Effect of Alna Rich Sitosterol Ester on Plasma Lipids and Cholesterol Absorption in Hypercholesterolemic Rats

*Avery Sengupta**, Mahua Ghosh

Dept. of Chemical Technology,
University of Calcutta

*E mail-avery.sengupta@gmail.com

Keywords: *β -sitosterol, ALnA rich sterol ester, Hypercholesterolemia, Nutraceutical, Cholesterol Absorption*

Sterol esters are currently gaining importance because of their recent recognition and application in the food and nutraceutical industries. Phytosterol esters have an advantage over phytosterols, naturally occurring antioxidants, with better fat solubility and compatibility. The purpose of the study was to investigate the effect of α -linolenic acid (ALnA) rich sitosterol ester on plasma lipid lowering and cholesterol absorption in rats in hypercholesterolemia. Twenty four rats were divided into 4 groups: control group, hypercholesterolemic group and two experimental groups fed with ALnA rich sitosterol ester in two different doses, 0.25g/kg body wt/day and 0.5g/kg body wt/day, of sterol esters. The treatment of sterol ester was gavaged to the rats daily for 4 weeks. The plasma total cholesterol, non-HDL cholesterol and triacylglycerol level which were elevated in hypercholesterolemia were significantly lowered by both the doses of sterol esters. The high dose of ALnA rich sterol ester showed the best result. Cholesterol absorption decreased in the treated groups than the hypercholesterolemic one. The decrease in total cholesterol therefore could be attributed by the decrease in cholesterol absorption. In conclusion, the ALnA rich sterol ester was proved to be an effective nutraceutical.

49. Curry Leaf Extract Protects against Piroxicam-induced Gastric Ulceration in Rats

Syed Benazir Firdaus, Arnab K Ghosh, Anjali Basu,
Debasish Bandyopadhyay

Oxidative Stress and Free Radical Biology Laboratory,
Department of Physiology, University of Calcutta,
University College of Science and Technology,
92 APC Road, Kolkata 700 009.
E-mail: debasish63@gmail.com

Keywords: *Antioxidant, curry leaf extract, gastric ulcer, NSAID, oxidative stress, piroxicam, gastric peroxidase*

Non-steroidal anti-inflammatory (NSAID) drugs widely prescribed and used as a therapeutic agent in rheumatologic as well as non-rheumatologic conditions induce gastric ulceration. Already marketed H₂ –receptor blockers and proton-pump blockers used as co-therapeutics in NSAID treatment, though effective have been found to have adverse side-effects. Curry leaves better known for its culinary use in Indian dishes have been reported as a rich source of anti-oxidants. Our studies on NSAID mediated gastric ulceration in piroxicam-treated rat model reveals most of the NSAID (piroxicam) induced effect is mediated through free radical generation and subsequent oxidative stress development. Significant decrease in reduced glutathione (GSH) level and increased lipid per oxidation level on piroxicam treatment substantiated stress development. Measurement of antioxidant enzyme activities supported piroxicam-induced ulceration is mediated through oxidative stress. Curry leaves rich in antioxidants and non-toxic even at higher doses is thus thought as a co-therapeutic agent in piroxicam treatment. Graded doses of curry leaf extract co-administered with piroxicam in male albino rats of Wistar strain show dose dependent decrease in ulcer index, increase in GSH level and decrease in lipid per oxidation level. Further studies on antioxidant enzyme activities show an increase in activities of antioxidant enzymes like superoxide dismutase, catalase, xanthine oxidase and dehydrogenase, whereas gastric peroxidase activity decrease in a dose-dependent manner on curry-leaf extract co-administration. The possible mechanism of amelioration of piroxicam-induced oxidative

stress mediated gastric ulceration in rats may be attributed to the prolific antioxidant properties of curry leaf extract.

50. Curry leaf (*Murraya koenigii*) extract protects against lead induced oxidative stress in rats

*Debosree Ghosh, Monalisa Dey, Elina Mitra
and Debasish Bandyopadhyay**

Oxidative Stress and Free Radical Biology Laboratory,
Department of Physiology, University of Calcutta,
University College of Science and Technology,
92 APC Road, Kolkata 700 009

*Email: debasish63@gmail.com

Keywords: *Lead, Curry leaf (Murraya koenigii), oxidative stress, antioxidant, i.p.*

Administration of lead acetate to Wistar rats at a dose of 15mg/kg body weight, i.p., daily for a period of 7 days caused elevations in the levels of lipid peroxidation and reduced glutathione content of the hepatic and cardiac tissues indicating generation of oxidative stress. The activities of the antioxidant enzymes, like, Cu- Zn superoxide dismutase and catalase, were found to be increased following treatment of rats with lead acetate confirming an elevated level of oxidative stress. The histological studies reveal a tissue injury following lead treatment of rats. All these changes were prevented from occurring when the lead acetate treated rats were pre-treated orally with curry leaf extract at a dose of 100mg/kg body weight half an hour before lead treatment indicating a protective role of curry leaf against this divalent cation-induced oxidative stress. Curry leaf is a well known Indian nutritional herb and has been suggested to possess potent antioxidant properties. The results of our present studies indicate that the amelioration of lead induced oxidative stress in rats by the curry leaf extract may be through its potent antioxidant potential although possibilities of the involvement of mechanism(s) other than this may not be ruled out, and, is currently under investigation.

51. Tulasi Leaf Extract Protects Against Cadmium-Induced Hepatic Injury in Rats

Elina Mitra^{1*}, Arnab K. Ghosh, Debosree Ghosh
and Debasish Bandyopadhyay¹

¹Oxidative Stress and Free Radical Biology Laboratory,
University of Calcutta, University College of Science and Technology,
92 APC Road, Kolkata 700 009
Email: debasish63@gmail.com

Keywords: *Tulasi leaf, Cadmium, hepatic injury, Oxidative stress, protection*

Tulasi (*Ocimum sanctum* L.) is one of the most potent medicinal herbs of India. Cadmium is a known environmental pollutant that can produce adverse effects in various organs including liver. Studies indicated that free radicals contribute to cadmium induced damage. In the present investigation administration of Tulasi leaf aqueous extract at a dose of (200 mg/kg b.w.) prior to cadmium treatment (0.44 mg CdCl₂ / kg b.w. sc) significantly protected the hepatic tissue from cadmium-induced oxidative stress as reflected through restoration of the tissue antioxidant level and protection of the activities of the antioxidant enzymes when compared to the activities observed in Cd-treated rats. The findings suggest a protective role of Tulasi against cadmium-induced hepatic injury in rats. Further studies are being carried out to identify the bio-active fractions from Tulasi leaf.

52. Adrenaline Induced Myocardial Injury in Rats: Protection by Melatonin

Smita Rudra^{1*}, Debasri Mukherjee¹, Arnab K. Ghosh¹, Elina Mitra¹,
Anjali Basu¹, and Debasish Bandyopadhyay^{1^}

¹ Oxidative Stress and Free Radical Biology Laboratory,
Department of Physiology, University of Calcutta,
University College of Science and Technology, 92, APC Road, Kolkata 700 009
Email: debasish63@gmail.com

Keywords: *Adrenaline, Melatonin, Heart, Oxidative stress*

Catecholamine oxidation products have been reported to produce myocardial injury

through the generation of toxic reactive intermediates including free radicals. Melatonin, a naturally occurring potent antioxidant, has been reported to have remarkable free radical scavenging ability. Since melatonin is a highly conserved natural antioxidant of ubiquitous occurrence present both in plants and animals and its pharmacological doses have been found to be nontoxic, the present studies were carried out to determine the protective effect of melatonin against adrenaline-induced myocardial injury in rats. Our studies reveal that adrenaline brings about myocardial injury in rat heart through the generation of oxidative stress as evident from alteration in the level of tissue antioxidant and activities of antioxidant enzymes. All these changes have been found to be mitigated when the rats were pre-treated with a low pharmacological dose of melatonin. The results indicate toward cardio-protective ability of melatonin, an area which is currently under intense investigation.

53. Design and *in vitro* Evaluation of Solid Lipid Nanoparticle Drug Delivery for Aceclofenac

*Kishore Narra, Dhanalekshmi U. M, Raja, M. D, Bhavani Saranya,
Pramod Reddy G Neelakanta Reddy P **

Bio Organic Chemistry Laboratory,
Central Leather Research Institute (CSIR),
Adyar, Chennai-600020, India.

Keywords: *Solid Lipid Nanoparticles (SLN), Aceclofenac, Tripalmitin, Poloxmer 188, Lecithin, Tween*

Solid lipid nanoparticles (SLN) are interesting nanoparticulate delivery system. The present work was carried out with the aim to develop prolonged release solid lipid nanoparticulate system for the drug using aceclofenac. Aceclofenac loaded Solid Lipid Nanoparticles (ACSLN) was prepared by hot high pressure homogenization technique. Tripalmitin was used as the lipid core. Ionic surfactant (Poloxmer 188), non-ionic surfactants (Tween 80 & Soya lecithin) and co-surfactant (Sodium tauro Glycholate) were used in the formulations. The prepared ACSLN formulations were characterized for Encapsulation Efficiency (EE), Photon Correlation Spectroscopy (PCS), Scanning Electron Microscopy (SEM) and X-Ray Diffraction (XRD). From these studies mean particle diameter of

formulation prepared with combination of ionic and non-ionic surfactant (Poloxmer 188 and Tween 80) was about 200 nm with spherical morphology and amorphous nature. Higher EE was obtained with SLN prepared using combination of soya lecithin and poloxmer 188. The organization and distribution of the ingredients in the nanoparticulate system were studied by DSC and the results showed that the drug is incorporated into the solid matrix. The prepared formulations demonstrated favorable *in-vitro* prolonged release characteristics. Experimental *in-vitro* release data were substituted in available mathematical models to establish the release kinetics of ACSLN and it was found to follow first order kinetics and Higuchi diffusion mechanism. Our results suggest that these SLN formulations could constitute a promising approach for the drug delivery of aceclofenac.

54. Morphological Studies on Kidney of Sildenafil Citrate (Caverta) and Ethanol Treated Albino Mice

Udayakumar, R., Suriyakumari, K.V.P^{*,+} and Ramya, S

DDE Study centre, Annamalai University,
Villupuram – 605 602
Email: drrudayakumar@gmail.com

Keywords: *Erectile dysfunction, sildenafil citrate, alcohol abuse*

Erectile dysfunction (ED) is a sexual dysfunction characterized by the inability to develop or maintain an erection of the penis. The need for oral treatment of ED appears to have been fulfilled with the introduction of Sildenafil citrate (Viagra). However, Sildenafil citrate can cause some side effects. Similarly, Alcohol abuse can lead to the malfunction of the organs such as the heart, liver, kidney, etc. Therefore, the present study was carried out with an aim to observe the impact of the combined dosage of Sildenafil citrate and Ethanol on the morphological characteristics of the kidney of Albino mice. From the histological investigations, it is concluded that the long term treatment of Albino mice with the combined dosage of the above said drugs would adversely affect the form and the vital functions of the kidney.

55. Nanorobots in the Diagnosis and Treatment of Diabetes

*Shipra Singh*¹, *Atul Kumar Singh*²

¹Bio-Medical Engineering, ²Automobile Engineering,
S.R.M University Kattankullathur,
Kancheepuram, Chennai Tamil Nadu 603 203

Keywords: *architecture; biochip; nanorobot; nanobioelectronics; nanobiosensor*

This paper presents the innovative nanorobot architecture for diabetes control, using computational nanotechnology for medical device prototyping. For the glucose monitoring the nanorobot uses embedded chemosensor that involves the modulation of human SGLT3 protein glucosensor activity. Medical nanorobot includes embedded and integrated devices, which can comprise the main sensing, actuation, data transmission, remote control and coupling power supply subsystems.

In the proposed 3D prototyping, a physician can help the patient to avoid hyperglycemia by means of a cell phone enclosed with cloth, which is used as a portable device to communicate with nanorobots. Therefore, this architecture provides a suitable choice to establish a practical nanorobot for in vivo continuous glucose monitoring.

56. Downregulation of Connexins Expression Accelerates the Rate of Diabetic Wound Healing After Selenium Administration

Surabhi Bajpai, Rakesh K. Singh

Department of Biochemistry, Faculty of Science,
Banaras Hindu University,
Varanasi – 211 005

Key Words: *Diabetes, wound, connexins, selenium*

This study was done to analyze the levels of connexins expression in diabetic and non-diabetic wounds. The STZ induced diabetic and non-diabetic groups of mice were injected with different concentrations (10 µg/ml, 20 µg/ml, 30 µg/ml) of sodium selenite after wound creation. The connexin expression was found elevated in diabetic wounds as

compared to the non-diabetic wounds. A decrease in the expression of different connexins Cx 43, 26, 30.3, 31, and 31.1 along with a decrease in the serum glucose level was observed in both, diabetic and nondiabetic wounds but more significant in diabetic wounds, after the selenite administration.

57. Polyphenol and Flavonoid Content and *in vitro* Radical Scavenging Activity of Extracts of *Oxalis Corniculata*

Sayani Mukherjee*, Swati Banerjee, Sangjukta Dutta, Pubali Dhar

*Department of Home Science,
Food and Nutrition Division,
Calcutta University

Keywords: Polyphenol, favonoid, antioxidant, DPPH, ascorbic acid, BHA, α -Tocopherol, liposome

According to World Health Organization (WHO) more than 80% of the world's population relies on traditional medicine for their primary healthcare needs. Use of herbal medicines in Asia represents a long history of human interactions with the environment. Radicals of oxygen (superoxide anion, hydroxyl radical and peroxy radicals), reactive non-radical oxygen species such as hydrogen peroxide and singlet oxygen, as well as carbon, nitrogen and sulphur radicals comprise the variety of reactive molecules that can cause damage to cell. Antioxidants are immediately involved in the prevention of cellular damage—the common pathway to cancer, ageing and a variety of diseases. The antioxidant activity of phenolics is mainly because of their redox properties which allow them to act as reducing agents, hydrogen donors, singlet oxygen quenchers and metal chelators. The most important of these bioactive compounds of plants are alkaloids, flavanoids, tannins and phenolic compounds. *Oxalis corniculata* a herbaceous plant of the Oxalidaceae family is being used in a variety of disorders specially diarrheal diseases, hemorrhage, antidotes of venomous snakes etc. by tribes of India. The objectives of the present study are to investigate the biochemical composition of *Oxalis corniculata* leaves that is commonly consumed in Bengal as leafy vegetable and to investigate the *in vitro* antioxidant property of *Oxalis corniculata* leave extract.

The presence of some polyphenols has been detected by HPLC analysis. The polyphenol and flavonoid content has been measured. Reducing power, hydroxyl radical

scavenging activity, FRAP assay, DPPH radical scavenging activity and liposome oxidation test were conducted which showed that the extract have a high antioxidant activity.

58. Zinc Supplementation Prevents Liver Injury in Cypermethrin-Treated Rats

Tuhina Das, Sujata Maiti Choudhury

Department of Human Physiology with Community Health,
Vidyasagar University, Midnapore,
West Bengal, India, Pin-721102.
E-mail: smaitichoudhury@yahoo.com

Keywords: *Cypermethrin; Zinc Supplementation; Serum alanine and aspartate transaminases; Blood glucose level, Antioxidants status.*

Cypermethrin (α - Cyano-3-Phenoxybenzyl (+ cis, trans) 3-(2, 2-Dichlorovinyl)-2, 2-dimethyl cyclopropane carboxylate), a potent agricultural type II synthetic pyrethroid insecticide, widely used for food storage, in public health, for insect control and in animal husbandry, has high toxicity towards fishes, bees and water insects. It causes brain and locomotor disorders, polyneuropathy. This study was undertaken to investigate the protective role of zinc(2mg/kg body weight/day), if any, in attenuating the toxicity induced by cypermethrin in rat liver at the dose level of 51.42mg(1/7th of oral LD₅₀) and 72mg(1/5th of oral LD₅₀)/kg body weight/day for consecutive 14 days. Cypermethrin treatment resulted in a significant increase in serum cholesterol, serum bilirubin, blood glucose level, liver protein level. The activities of serum alanine and aspartate transaminases (ALT and AST) were elevated in the cypermethrin-treated rat in a dose-dependent manner. The MDA level and GSSG content and GST activity of liver were increased whereas GSH level, liver SOD and catalase activity were decreased significantly compared to the control group. Zn supplementation to cypermethrin treated rats restored the altered levels of serum cholesterol, serum bilirubin, blood glucose, liver protein as well as AST and ALT activities and antioxidant status of rat liver. Results concluded that zinc confers marked protection against cypermethrin-induced liver toxicity.

59. Antitumor and Antioxidant Activities of *Anacardium Occidentale* Leaf Extracts in Dalton's Ascites Lymphoma Bearing Male Swiss Albino Mice

Pralay Maity, Madhubanti Bepari, Sujata Maiti Choudhury *

Department of Human Physiology with Community Health,
Vidyasagar University, Midnapore,
West Bengal, India, Pin-721 102.
E-mail: smaitichoudhury@yahoo.com

Keywords: *Antitumor and antioxidant potential; Dalton's Ascites Lymphoma; haematological parameters; hepatic and renal lipid peroxidation.*

Anacardium occidentale, belonging to the Anacardiaceae, is a well known medicinal plant widely used in tropical regions. The present study was used to investigate the antitumor and antioxidant potential of the ethanolic (EEAOL), methanolic (MEAOL), water extract (WEAOL) of *Anacardium occidentale* leaf against Dalton's Ascites Lymphoma (DAL) cells. The EEAOL, MEAOL, WEAOL were administered intraperitoneally at the dose level of 50mg/kg body weight per day for consecutive 14 days after 24 hour (day zero) of DAL cell inoculation (1×10^6 cell) to mice. The *in vivo* study was performed in EAC-bearing mice by assessing the increase in life span (ILS %), viable tumor cell count, total tumor cell count, and haematological parameters. Haemoglobin content, RBC count, lymphocyte & monocyte count of lymphoma control group was significantly decreased in comparison to the normal group. Treatment with EEAOL, MEAOL, WEAOL significantly increased haemoglobin content, RBC, lymphocyte and monocyte count to more or less normal level. The total WBC and neutrophil count were found to be increased significantly in DAL-control group which were restored towards normal after the treatment of EEAOL, MEAOL, and WEAOL. This EEAOL, MEAOL, WEAOL also reduced the hepatic and renal lipid peroxidation (MDA content), oxidized glutathione (GSSG) level and increased the reduced glutathione (GSH), superoxide dismutase (SOD), catalase (CAT) compared to the DAL-control group. These results indicate that EEAOL, MEAOL, WEAOL has anticarcinogenic effect as well as antioxidant activity in DAL-bearing male albino mice.

60. Evaluation of Cytotoxic Potential of *Anacardium occidentale* Leaf in *Allium Cepa* Root Model and in vitro Cytotoxicity and Apoptotic Properties in Dalton's Lymphoma Cell

Madhubanti Bepari, Pralay Maity and Sujata Maiti Choudhury *

Department of Human Physiology with Community Health,
Vidyasagar University, Midnapore,
West Bengal, India,
Pin-721102.
E-mail: smaitichoudhury@yahoo.com

Keywords: *Antimitotic and cell apoptotic properties; Allium cepa root tip cells; Dalton's Ascitic Lymphoma; In vitro cytotoxicity; Membrane blebbing*

Anacardium occidentale commonly known as 'kaju' belongs to Anacardiaceae, family is worldwide and it is a common medicinal plant in tropical region. The present study was designed to find out the antimitotic activities of the ethanolic (EEAOL), methanolic (MEAOL), water extract (WEAOL) of *Anacardium occidentale* leaf on *Allium cepa* immature root tip cells and *in vitro* cytotoxic and apoptotic properties of the extracts against Dalton's Ascitic Lymphoma (DAL) cells. EEAOL, MEAOL, and WEAOL at the dose level of 10 mg/ml exhibited prominent antimitotic activity; among them EEAOL showed the highest degree of suppression of cell division. The EEAOL, MEAOL, WEAOL were subjected to in-vitro cell morphology and cell viability studies and cell cycle study against Dalton's Ascites Lymphoma (DAL) cells at the dose of 100µg/ml. *In vitro* cytotoxicity study showed that DAL- cell viability were decreased after the treatment of ethanolic, methanolic and water extract in a dose dependent manner. The EEAOL, MEAOL, WEAOL produced significantly higher degree of membrane blebbing compared to phosphate buffer saline (PBS) control. . In cell cycle analysis, Dalton's Ascitic Lymphoma (DAL) cells treated with the extracts associated with cell cycle arrest and induced apoptosis significantly in a time-depended manner.

61. Genotoxicity of Zinc Oxide Nanoparticles in Human Peripheral Lymphocyte

Manivannan. J, Anita Mukherjee

Cell biology and Genetic toxicology laboratory,
Centre of Advanced Study in Cell and Chromosome Research,
Department of Botany, University of Calcutta, Kolkata
Email: anitamukherjee28@gmail.com

Keywords: *ZnO, genotoxicity, nanoparticles, human lymphocyte cells*

Nanostructures of ZnO have attracted a great deal of attention in recent years because of their widespread application in paints, wave filters, UV detectors, solar cells, sunscreens and other cosmetic products. The genotoxicity of ZnO nanoparticles was studied in human lymphocyte cells and naked DNA (plasmid pBR322). The genotoxicity in human lymphocyte was evaluated using cell viability, DNA fragmentation and oxidative stress as endpoints. No cytotoxic effect of the particle was observed using *WST-1* assay, resazurin, and trypan blue dye exclusion methods. ZnO nanoparticles did not reveal any significant DNA fragmentation in lymphocytes or in plasmid DNA pBR322. Oxidative stress levels measured in human plasma did not show any significant increase in malondialdehyde formation when compared to control. Our data demonstrates that ZnO nanoparticles even at higher concentrations do not possess a genotoxic potential in human peripheral lymphocytes as well as in cell free systems.

62. Alcohol Toxicity from the Viewpoint of Forensic Science

Saumik Panja, Jay Prakash Singh, Anirban Dasgupta,
Dr. Aniruddha Mukhopadhyay*

Dept. of Environmental Science, University of Calcutta,
51/2, Hazra Road, Kolkata- 700 019
*Email: joy.dasgupta1987@gmail.com

Keywords: *Blood Alcohol Concentration (BAC), Class I alcohol dehydrogenase, ethyl glucuronide, cocaethylene, buprenorphine, benzodiazepines, methylethylketone, fermentation*

Various anthropogenic effects including mortality related to alcohol and drug toxicity

are an important focus area of Forensic Science. When questions arise in the court in criminal and civil litigation about the elimination rate of ethanol from the blood in forensic situation (BAC > 20mg/100ml), a suitable guideline is required based on the study of class I alcohol dehydrogenase which drives out the ethanol (rate 2-10mg/ml) from the circulating system. Two metabolites of ethanol, ethyl glucuronide and cocaethylene are often found in the body of drug users can be detected by chromatography and spectroscopy but these two are not stable where ethyl sulfate, another ethanol metabolite are stable and even resistant of microbial degradation. Sometime interference of ethanol with other drugs like buprenorphine, benzodiazepines may also result in mortality. Now the detection procedure of alcohol like methylethylketone is crucial as sometime in gas chromatograph an ethanol like peak is given by other compound and the post mortem procedure also crucial because alcohol may also be produced after death by microbial fermentation, if these are not counted it will result in misleading the scenario. Recent studies indicate that some genetic markers may be responsible for controlling the development of alcoholism in some population. Now more thrust should be given on the research areas under Forensic Science and the methods are also subjected to scrutinization for achieving a more scientific approach leading to the proper justice.

63. Organophosphorus Toxicity: A Review of Its Effects on Humans

Anirban Dagupta, Jayprakash Singh, Saumik Panja*,
Dr. Aniruddha Mukhopadhyay

Department of Environmental Science,
University of Calcutta,
51/2, Hazra Road, Kolkata- 700019
*Email: saumikpanja@gmail.com

Keywords: *Organophosphorus, Human serum paraxonase, Butyrylcholinesterase, DDVP, Head Space-Solid phase Microextraction, ingestion*

Pesticides are used in most countries around the world to protect against pest damage. However, poisoning by these pesticides occurs as a result of misuse, accidental or intentional exposure. Acute pesticide poisoning is a major health problem. Organophosphorus pesticides are involved in human poisoning more frequently than any other chemicals. Inhibition of cholinesterase activity is the main mechanism by which these insecticides kill insects.

However they also exert fatal effects on human physiological system. Human serum paraxonase catalyzes the hydrolysis of certain organophosphorus pesticides and significantly alter individual's response to toxicity to these chemicals. There is a correlation between level percent stimulation of paraxonase and butyrylcholinesterase activities in case of individuals exposed to an acute dose of the pesticide. The tissue distribution of organophosphates such as DDVP shows that the heart and spleen are the sites with highest concentration of the chemical. The methods for detecting the level of pesticide in tissue include gas chromatography using Nitrogen/Phosphorus sensitive detector and electron mass spectrometry with selected ion monitoring. Another method is Head Space-Solid phase Microextraction. According to a study in Portugal, over a period of three years, it was found that 81% of deaths caused by intoxication were due pesticide ingestion. In several agricultural districts of South-East Asia pesticide ingestion precedes all other cause of unnatural deaths. Most of the acute poisoning cases are intentional. Poisoning due to occupational exposure is also common but not well documented. In Sri Lanka, according to study 68% deaths was due to intentional ingestion in areas of high incidence of pesticide poisoning. All these cases require an emerging application of Forensic science.

64. The Pesticides, Harmful Poison is Reality or Myths, Indispensable for Agricultural Crop Protection and Food Security

Sambit Dutta, Ujjal Pati, Saswati Pradhan, Ashim Chowdhury*

Department of Agricultural chemistry and Soil Science,
Inst of Agricultural science, Calcutta University,
Ballygunge science College, Calcutta University
*Email: ashimchowdhry@gmail.com

Keywords: *GDP, agricultural commodities, food security, pesticides, agrochemicals*

Agriculture has always been a core sector of Indian Economy. The importance of agriculture is evident from the fact that about 18-20 percent of the country's GDP is contributed by this sector. In Addition about 20% of total exports earning of the country are also accounted for by the agricultural commodities. Two thirds of our workforce is employed in agriculture and 70% of the population is dependent on agriculture.

The growing population @ 2% & limitation of land due to rapid urbanization, the

policy makers thinking of seriously the issue of food security and mal nutrition as well for huge population. There is no other option other than growth of agriculture in totality. For sustainable production, the Input oriented agriculture growth without affecting the ecology is to be continued. Pesticides or Agrochemicals inputs are indispensable in this regards. No doubt these are poison but for crop protection issues if, judiciously used, resulting no harm/ minimum harm to the Human being & Ecology as well. Lot of Myths are there only with regard to these agrochemical inputs use but the reality is that crop production is not viable with out these important inputs, would form the content of this presentation.

65. Haemopoietic Function and Flowcytometry of Pronephric Kidney in *Clarias batrachus* L. under the Impact of Organophosphate - Sumidon 40

K. Gangopadhyay, S. Homechaudhuri*

Aquatic Bioresource Research Laboratory Department of Zoology,
University of Calcutta
35 Ballygunge Circular Road,
Kolkata 700 019

*Email: sumithomec@yahoo.com

Keywords: *Organo-phosphate, Haemopoiesis, Cell cycle, Pronephros, Flow cytometry*

The impact of different doses of SUMIDON-40, an organophosphate pesticide on the haemopoiesis of *Clarias batrachus* L. (Clariidae) was tested. The small lymphoid haemoblast decreased and consequently the young erythrocytes increased significantly in both sublethal and LC50 dose treated fish. The percentage of mature reticulocyte increased significantly in LC50 dose treated group. The erythropoietic efficiency was increased significantly in fish exposed to sublethal dose and decreased in fish exposed to LC50 dose. Among leucocytes, the percentage of neutrophil increased significantly in both treatment groups and the percentage of macrophage increased only in LC50 dose treated group. The overall leukopoietic efficiency, however, was increased significantly in both treatment groups. Flowcytometric analysis of cell cycle in pronephric kidney cells confirmed that the cell death was increased and DNA synthesis was significantly decreased with increasing dose of pesticides. It is concluded that habitat deterioration caused by agrochemical impedes haemopoiesis in this species resulting to reduction of endurance levels to pollution.

66. Rauwolfia (Apocynaceae) curing and controlling old diseases

C. R. Das

D-26//CS - 343, Kalitala, P. O. Laskarpur,
Kolkata: 700 153, Dist. South 24-Parganas.

Keywords: *Rauwolfia, old diseases, blood pressure, labour pain*

Rauwolfia (Ranunculaceae) has two valid species: *R. canescens* L and *R. serpentina*, Benth ex Kurz. *R. serpentina* Benth ex Kurz is known in Sanskrit as “Sarpagandha”, the root of which has got an important medicinal value. Root contains rauwolfscine, stem bark and also leaves contain the medicinal principle in *R. Canescens* L – the plant is found often in wild state in the district of 24-Parganas in West Bengal, when quoted it can be grown quite easily. Sometimes grows side by side with *R. serpentina* Benth ex Kurz also be on potted domestically. Abundantly found inhabiting on moist and hot region in India throughout. Distribution rather wide: from sub-Himalayan tracks Sirhind eastward Assam with Dehradun in particular, Swalik range, Rohilkhad, Oudh, Gorakhpur rising upto 300 meter on ascending and konkan, Kanara, S Marata, W. and E. ghats of Chennai state and district of Bihar Patna – Bhagalpur – north and central and lower Bengal. Medicinally Rauwolfia Q (Mother tincture may cure Cardiac troubles, Blood pressure due to old disease attack with the woman during labour pains and contraction of uterus after child-birth. The name Sarpagandha suggests repellant of snakes and effective to snake bite provided time permits.

67. Use and Abuse Of Benzodiazepines A Synoptic Review

Riddhi Mahansaria, Shirsendu Ghosh, Dr. Aniruddha Mukhopadhyay

Department of Environmental Science,
University of Calcutta, 51/2, Hazra Road, Kolkata 700 019
Email: riddhimahansaria@gmail.com

Keywords: *Benzodiazepine; Psychoactive drugs; GABA A receptors; Psychomotor; Anterograde amnesia*

Benzodiazepine is a psychoactive drug whose core chemical structure is the fusion of a benzene ring and a diazepine ring. Benzodiazepines are used to treat anxiety, panic

attacks, seizure disorders, and insomnia by activating GABA A receptors in the mammalian brain. Internationally, benzodiazepines are categorized as Schedule IV controlled drugs by the INCB under the Convention on Psychotropic Substances. The problems identified with benzodiazepine abuse are dependence, withdrawal, and cognitive and psychomotor impairment which are proportionally greater among the elderly, who take these drugs for their sedating effects. These are potentially addictive drugs; psychological and physical dependence can develop within a few weeks or years of regular or repeated use. Anterograde amnesia is strongly associated with benzodiazepines in patients who take an overdose. Long-term use has the potential to cause both physical and psychological dependence and severe withdrawal symptoms such as depression, anxiety and panic attacks, and agoraphobia. Benzodiazepines are sometimes used for criminal purposes; they serve to incapacitate a victim in cases of drug assisted rape or robbery. Wise clinical administration, strict monitoring, enactment and enforcement of laws are necessary for proper use of benzodiazepines.

68. Cytotoxic effects of acute Carbon Tetrachloride exposure on Liver, Kidney and Testis

Dakshayani Mahapatra, Amar K Chandra

Endocrinology and Reproductive Physiology Laboratory,

Department of Physiology, University of Calcutta,

92, APC Road, Kolkata 700 009

Email: bhutudarling@gmail.com

Keywords: *Carbon Tetrachloride, GOT, GPT, alkaline phosphatase, acid phosphatase*

The ever increasing pollution in the world is caused by various pollutants which can be solid, liquid or gas. One such pollutant is Carbon Tetrachloride (CCl₄) which can cause harm both in gaseous form as well as in solution. Exposure to high concentrations of CCl₄ affects the brain, liver, kidney, gonads, muscle, etc. adversely. However the effects of exposure of CCl₄ in low concentration and for a short period of time has not been studied properly. We studied the cytotoxic effects of acute carbon tetrachloride exposure on liver, kidney and testis and studied the functional and morphological status of these organs as well as its effect on GOT, GPT, alkaline and acid phosphatase level in these organs in 6 adult male Wister rats with body weight of about 200 ±10gm. A total of 12 rats were

taken, and divided into two groups – the experimental group (6 rats) and the control group (6 rats). The rats of both the groups were maintained on a standard diet and CCl₄, at a dose of 50mg/kg body weight was administered to each of the 6 rats of the experimental group by force feeding for alternative 3 days. The control group was fed equal amount of water. At the end of the experimental period, the animals were sacrificed using ether anaesthesia. From each rat of both the groups, liver, kidney and testis were excised and weighed and blood was collected to measure SGPT, SGOT, alkaline and acid phosphatase. Histological changes were observed in the tissues of the treated rats. The GPT activity was found to be higher in liver, testis and serum but lower in kidney of treated rats compared to the control group. The GOT activity was found to be higher in kidney, testis and serum but lower in the liver of CCl₄, treated rats. The alkaline phosphatase activity was found to be more in liver, kidney, testis and serum of the treated rats than the control group. The acid phosphatase activity was found to be decreased in kidney and serum but no significant changes were found in liver and testis compared to the control group. Thus the activities of all these enzymes were higher in serum in acute CCl₄, exposed groups, indicating toxicity. It also confirmed the toxic effect of CCl₄, on liver and kidneys to be more than that on testis.

69. Amelioration of Arsenic-Induced Toxicity by Dietary Phosphate

Sangita Majumdar¹, Subhra Karmakar², Anasuya Maiti³, Monalisa Choudhury², Aniruddha Ghosh⁴, Asankur Sekhar Das², Chandan Mitra^{2*}

¹Department of Physiology, Haldia Institute of Dental Sciences and Research,

^{2*}Department of Physiology, Presidency College, Kolkata 700 073,

²Pre-Clinical Physiology Laboratory, Tripura Institute of Paramedical Sciences,
Hapania, Tripura (West) 799 014,

³372, DumDum Road, Gourav Apartment, Kolkata 700 074,

⁴Department of Physiology, Southern Illinois University, Carbondale,
Illinois – 62901, USA.

E-mail: chandanmitra2009@yahoo.in, sangita_presi@yahoo.com

Keywords: *Phosphate supplement, Arsenic transference, Arsenic toxicity, Oxidative stress, Hepatic mitochondrial toxicity, and Hepatic injury*

The present study was aimed to test the hypothesis that inorganic phosphate may reduce arsenic toxicity by decreasing its intestinal transference. Co-administration of

inorganic phosphate (6.56 M) and arsenic (6.07 mM) in the intestinal loops of rats, *in situ*, caused significant reduction of arsenic transference. Short-term arsenic exposure (3mg/kg body weight/day for 30 days) caused liver damage evidenced by activities of liver enzymes and necroinflammatory changes. These effects of arsenic were coupled with changes in indices of hepatic mitochondrial oxidative stress and iNOS expression, mitochondrial swelling, cytochrome c oxidase, Ca²⁺-ATPase, mitochondrial calcium content, hepatic caspase 3 activity and DNA fragmentation. All these apoptosis-related molecular changes caused by arsenic could be alleviated by supplementation with inorganic phosphate.

Cancer Biology

70. Serum Lactate Dehydrogenase and Lipid Profile in Breast Cancer

* N.Swetha, *Arul Senghor, **P.S.Venkateswaran, ***Vedhamoorthy

*Department of Biochemistry, **Department of Surgery,

***Department Of Oncology, SRM Medical College,
Hospital and Research Centre, Tamil Nadu

Keywords: *Breast cancer, LDH, dyslipidemia, BMI*

INTRODUCTION:

Breast cancer is a malignant tumor and one of the commonest causes of cancer mortality in females.

Cancer is a proliferating and invasive disease and the tumor cells respire anaerobically. LDH is an enzyme essential for anaerobic glycolysis. The invading tumor causes severe tissue damage resulting in the release of intracellular enzymes like LDH into the blood stream by the injured or dying cells.

Malignant proliferation of breast tissue in women has been associated with alterations in serum lipid profile and shows the effect of BMI on breast cancer risk.

AIM AND OBJECTIVE:

The purpose of the study is to analyze serum LDH levels and investigate the lipid profile in breast cancer patients.

MATERIALS AND METHODS:

Blood samples are collected from 60 healthy controls and 60 histopathologically confirmed female breast cancer patients (premenopausal and postmenopausal women) aged 25 to 80 years. Serum LDH levels and lipid profile are investigated preoperatively and serum LDH levels are estimated 21 days after the surgery.

RESULT:

There is a significant increase in preoperative and decrease in postoperative serum LDH levels in breast cancer patients as compared to controls. The values of preoperative serum LDH are higher in postmenopausal cases. Breast cancer patients have high BMI with increased total cholesterol, TGL, LDL-C as compared to the controls which is statistically significant.

CONCLUSION:

The findings of this study suggest an immense potential for LDH as a prognostic marker for breast cancer and confirms the association between dyslipidemia, BMI and increased breast cancer risk.

71. Detection of Mitochondrial Genome Variation in Head and Neck Cancer

Rosy Mondal, Jagadish Hansa, Ravi Kannan and Sankar Kumar Ghosh

Department of Biotechnology,
Assam University,
Silchar-788011
Email: drsankarghosh@gmail.com

Keywords: *Mitochondrial DNA, C-tract, d-loop, Biomarker, Head and Neck cancer*

Mitochondrial dysfunction is a hallmark of cancer cells. Mitochondrial DNA (mtDNA) mutations strewn throughout coding and noncoding regions have been reported in cancer. The C-tract region within d-loop is composed of 12-18 cytidine bases that are interrupted by a thymidine base at position 310 and is found to be a “hot spot” region for somatic

mutations in many cancer types. In this study, we analyzed tissue samples of head and neck cancer patients from Barak Valley using PCR and direct sequencing and found three common mutations in nucleotide position 73, 263 and 489 with insertions and deletion within the polycytidine stretch in all the individuals so far analyzed. We observed that with the advancement of tumor stage, the number of mutations increases significantly in C-tract. The nucleotides may prove to be the biomarkers for early diagnosis of cancer.

72. Mitochondrial DNA detection at the D-310 region by COLD-PCR in Cancerous tissue

**Jagadish Hansa, Rosy Mondal, Ravi Kannan*
and Sankar Kumar Ghosh**

Biotechnology Department, Assam University,
Silchar-788011

*Cachar Cancer Hospital & Research Centre,
Meherpur, Assam.

Email: drsankarghosh@gmail.com

Keywords: *mtDNA, D-loop, D-310, COLD-PCR, Somatic Mutation, Head & Neck Cancer.*

Mitochondrial DNA mutations occur in a wide variety of degenerative diseases, sudden infant death, ageing and cancer. Many of the somatic mtDNA mutations in human cancers are located in the displacement loop (D-loop) and particularly at polycytidine stretch (C-tract) referred as D310. Most of the somatic alterations found in tumors showed deletion / insertions of 1- or 2-bp generating D310 variants identical to constitutive polymorphisms. To ensure highest sensitivity in mutation detection and overcome from the polymorphism, we adapted COLD-PCR method followed by DNA sequencing. After analysis of all the sequences for C-Tract alteration, we got some severe changes in the region by means of deletions and insertions. Though the region has polymorphism about 6-9C in first stretches of sequence in D-310 but the sequence of C-Tract has found 30% changes in all cases of head and neck cancerous patient.

73. CFTR Gene Mutations and Clinical Correlation in Indian Patients with Congenital Bilateral Absence of the Vas Deferens

Manish Kumar Jain, D. K. Saraf

Department of Zoology, Dr H. S. Gour University,
Sagar, MP, India – 470003

Keywords: *CFTR, CBAVD, deltaF508, Poly T*

Cystic fibrosis (CF) is the most common potentially lethal autosomal recessive disorder. Congenital bilateral absence of the vas deferens (CBAVD) is a form of male infertility in which mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene have been identified. Here we identify different mutations of CFTR and the poly-T variant of intron 8 (IVS8) in Indian patients (Sagar district of MP) and analyze sweat test values and clinical characteristic related to Cystic Fibrosis (CF). For counseling purposes the most frequent possible mutation in Indian population: deltaF508 was screened in wives. Four patients (23%) showed abnormal chloride values (> 60 mmol/l). A second group of 3 patients (18%) had borderline values of sweat chloride (40-59 mmol/l). We defined another group with 3 patients (18%), with normal sweat chloride levels (30-39 mmol/l) and a fourth group of 8 (41%) patients with sweat chloride below 30 mmol/l. deltaF508 mutation was found in 3 of the 18 patients (16%). On a sample of 14 patients, IVS8 analysis showed a frequency of 6/56 chromosomes (11%) of 5T allele. Even though these findings present an improvement in the detection of mutations related to clinical correlations in Indian patients (Sagar district of MP) CBAVD population, the search for other common and uncommon mutations should be continued.

74. Incidence of cancer and it's correlation with blood groups and age

Shikha Dubey^{1}, Mangla Bhide¹, Braj Raj Shrivastav²*

¹Oncology lab. Department of Zoology, School of Biological & Chemical Sciences,
Dr. H. S. Gour University Sagar (M.P.) 470 003,

²Cancer Hospital & Research Institute, Gwalior (M.P.) 474 009

*Email: shikhagene@gmail.com

Keywords: *Cancer, blood group, age, mortality*

The correlation between ABO blood type and cancer is an issue that impacts many

primary care physicians. Risk factors for cancer have been assessed over the years and many strong associations have been discovered.

There is a statistical association between increased risks of cancer in people with blood group B (Case study of central Indian population). This includes breast cancer, cervical cancer, liver cancer etc. That is not to say people of other blood types don't get cancer, it simply means that blood type B people have less defense against it.

For the scientifically minded, the reason is quite simple and very profound. It seems that cancer cell have certain type B qualities that make it almost invisible to the immune system in blood type B people. Like wise age group 40-50 years also shows the same in case of various cancer

75. Clinical Efficacy of the Propylthiouracil in Psoriatic Patients from South India – A Clinical Trial

*Hemamalini Malligarjunan, Pushpa Gnanaraj, Swapna Subramanian,
Tamilselvi Elango and Haripriya Dayalan*

Department of Medical Research,
SRM Medical College Hospital and Research Centre,
Kattankulathur 603 203, Tamil Nadu
Email: dhpsrm@yahoo.in

Keywords : *Psoriasis, keratinocyte hyperproliferation, inflammation, PTU*

Background:

Psoriasis is a chronic skin disease ERUMmetryd by keratinocyte hyperproliferation, abnormal differentiation & inflammation. Elias et al in the year 2001 reported that PTU was found to be effective in the treatment of psoriasis in United States. There is an ethnic variation in disease susceptibility.

Objective:

To investigate the clinical efficacy of PTU on psoriatic patients from south India.

Methods:

Oral PTU, 100mg was administered every 8 hours for 12 weeks to 25 patients with

psoriasis. Skin biopsy specimens were taken from the lesions before and at the end of the study. Clinical response was monitored with Psoriatic Area Severity Index (PASI) scoring system. Blood was obtained for Total and Differential count, Liver Function Test, Renal Function Test & Thyroid Function Test at 0 day, end of 6th week & 12th week of the study.

Results & Discussion:

Two patients dropped out of the study, of the remaining 23 patients, 15 showed 80-100% clearing of their psoriatic lesions, whereas the remainder 8 showed 25-65% improvement in their clinical PASI score (15.4 ± 8.09 to 4.3 ± 4.02) at $p < 0.001$. Histology showed significant decrease in the epidermal thickness. TC & DC, TFT, LFT & RFT showed no significant change which proves that PTU does not have adverse side effect.

Conclusion:

PTU was found to be clinically efficient in treatment of psoriatic patients from south India. Because of its less toxicity & cost effectiveness, PTU may be used for the treatment of patients with psoriasis.

76. Multifactorial Determination of Lung Cancer in Urban Indians

*Dipavali Acharya, Sounak Kundu, Amrita Mukherjee, Ishita Mukherjee,
Saloni Sinha, Shreyakor, Snehadutta and Arup Kr. Mitra**

Department of Microbiology,

* Faculty of Department of Microbiology

St. Xavier's College, Kolkata

Email: sxcdipon@gmail.com, drakmitra01@hotmail.com

Keywords: *Active smoking, passive smoking, age group, sex, uneducated mass, chi-square test, correlation study*

Lung cancer is a problem usually associated with old age because of active and passive smoking. It is marked with changes in cellular stature in the cells surrounding the bronchii of the lungs. Common symptoms are often confused with that of the tuberculosis

or pneumonia. In this investigation the sample size taken was of 756 and the statistical analysis revealed the following results:

- The person who takes non filtered cigarettes is more prone to lung cancer.
- The male population was more prone to lung cancer than the female population
- A correlation was found in between economic status and severity of cancer with patients coming from middle class families.
- The person belonging to the age group of 40-60 was detected maximally with lung cancer than the patients of other age groups.

Thus this investigation reveals that the actual cause of cancer is not only smoking but sadly it increases due to our inadvertency among the uneducated mass of urban areas.

77. Predicting Anti-Cancer Activity of Quinoline Derivatives: A QSAR Study

Ankur Vaidya^a, *Abhishek Kumar Jain*^a, *Prashantha Kumar BR*^b, *Sushil Kumar Kashaw*^a, *Ram Kishore Agrawal*^{a*}

^aPharmaceutical Chemistry Research Laboratory,
Department of Pharmaceutical Sciences,
Dr. H.S.Gour University, Sagar, M.P.470003, India,

^bJSS College of Pharmacy, Ooty

Keywords: *QSAR, CoMFA, CoMSIA, topoisomerase, quinoline*

The 3D QSAR relationships of thirty one quinoline nuclei containing compounds and their biological activity have been investigated to establish various models. The CoMFA and CoMSIA studies resulted in reliable and significant computational models. The obtained CoMFA model showed high predictive ability with $q^2 = 0.592$, $r^2 = 0.966$ and standard error of estimation (SEE) = 0.167, explaining majority of the variance in the data with two principal components. Predictions obtained with CoMSIA steric, electrostatic, hydrophobic, hydrogen bond acceptor and donor fields ($q^2 = 0.533$, $r^2 = 0.985$) showed high prediction ability with minimum SEE (0.111) and four principal components.

Forensic Science

78. Some Aspects of Forensic Medicine in Outer Space

Malay Adhikari

Research Scholar in Space Law,
NALSAR University of Law, Hyderabad 500 078
Email: adhikari69@gmail.com

Keywords: *Outer Space, Physiology, Psychology, Forensic Medicine, Crime*

Space travel is now a normal topic of conversation; only commercial one is still away. Yet human being is an earth bound creature. Our requirement is a strictly controlled atmosphere for survival in outer space. We are greatly upset by rapid changes in motion. Our senses and brain work at a limited speed. So space flight must therefore introduce physiological as well as psychological problems which strike at our very existence.

The paper focuses on causes and its medical effects on human beings in space flight and side by side the importance of development of forensic medicine in outer space.

79. Legal Investigation in Hanging Cases

Samapti Banerjee*, B. N. Kahali¹

*Department of Police Training,
Barrackpore P T College, Calcutta 700 112;
Department of Forensic & State Medicine,
SSKM Hospital, Calcutta 700 020

Keywords: *Hanging, strangulation, homicide, suicide, investigation*

Hanging is one of the most commonly used methods for suicide worldwide. This communication summarizes some of the cases on suicide by hanging. The focus is on its epidemiology and on identifying potential means of prevention. The research on suicides occurring in prisons and hospitals and Cities has been documented into Suicide and Homicide and some other additional information from different sources. It is a hard task of tuff

challenge to manage the scene of crime to the Investigating Police personal. The most commonly used ligatures and ligature points are widely variable; thus prevention strategies focused around restriction of access to means of hanging are of limited value. The first point of protection of the scene of crime and its subsequent spot Forensic examination are the prima facie importance for case trial and witnesses. Strategies to reduce suicide by hanging should focus on the prevention of suicide in controlled environments and others. The homicidal claims appear incredible till the time actual assassins were caught. The case report discusses the bearing of autopsy on the decision-making of whether hanging was homicidal or suicidal. Autopsy alone may not differentiate suicidal from homicidal or post-mortem hanging. Proper diagnosis of a medico legal case depends upon the proper history, inquest of the Police Officer and finally on Forensic Expertise. Investigating Police Officer should be skilled and careful to handle and transport the case. More research is required to better understand the new methods to solve the Forensic clues for case witnesses.

80. Changing Scenario in Forensic DNA technology – A Review

*Pankaj Shrivastava**, *M. Ali**, *P.K.Singhal***

*DNA Fingerprinting Unit, State Forensic Science Laboratory,
Sagar; Department of Home (Police), Govt. of Madhya Pradesh;

** Department of Biological Science, R.D. University,
Jabalpur, Madhya Pradesh

E mail: dnasgr@rediffmail.com; pshri_sgr@dataone.in

Keywords: *Forensic, DNA, STR's, Y DNA, mt DNA*

DNA testing is often conducted to resolve a disputed attribution of paternity. DNA fingerprinting, as this technique of identification is called, can confirm with certainty the parentage of an individual. The primary value of DNA Evidence has significantly increased over the last seventeen years due to the introduction of short tandem repeats (STRs) loci in routine forensic identification. The Forensic Use of DNA Profiling is a major contribution to a technology which can help not only in including the culprit but also to exclude the innocent. In this article an attempt is made to elaborate the fast pace of change in the technology in recent years. This paper will discuss the state of modern DNA-based identity testing, describe the different variants of the technology used to perform this testing, and describe its use as it relates to forensic applications with some real case examples.

81. Exit Hole – An Enigma in Gunshot Case

*Sulagna Chakraborti**, *Trijit Nanda***, *Suddhodan Batyabal¹*,
and Pranab Kumar Ghosh²

* Department of Physics, Techno India, Salt Lake, Kolkata,

** Department of Zoology Vivekananda College Thakurpukur Kolkata 700 063;

¹Department of Forensic and State Medicine Medical College Kolkata 700 073;

²Forensic Ballistics Department Forensic Science Laboratory Kolkata 700 037

Keywords: *Gunshot, entrance hole, exit hole, Improvised firearms, wound ballistics*

The Post Mortem report of a victim murdered by gunshot reveals that the entrance hole, oval in shape is bigger in size than the circular shaped exit hole, which was atypical of gunshot cases in forensic examinations. The wearing apparel of the victim and the fired .303" rifle bullet forwarded, while examined, it was evident that the victim was shot by some improvised firearm from close range. The course of trajectory of a .303" rifle bullet fired from an improvised firearm due to its instability has been discussed as per the laws of exterior ballistics. Again behavior of such bullet inside human body has been discussed in accordance with the principles of wound ballistics, which helped in solving the mystery of small exit hole, as found in the human dead body. The prosecution witness evidences of Forensic Ballistics and Autopsy results together also justify the cause of unnatural death in Medico Legal case in the courts of law.

82. Exhumation and Forensic Examination

**Arup Ratan Banerjee¹, Biswajit Sukul² and Babul Banerjee³*

¹Department of Anthropology University of Calcutta Kolkata 700 089;

²Forensic and State Medicine NRS Medical College Kolkata 700 012;

³Forensic Toxicology Department Forensic Science Laboratory Kolkata 700 037

Email: drprghosh@gmail.com

Keywords: *CFR, forensic, autopsy, anthropology, skull, exhumation, morphology*

An exhumation is carried out when issues, which can only be clarified by an autopsy and possible supplementary examinations, arise after burial. Forensic indication, as in the

case when a belated suspicion of an unnatural cause of death arises, makes an exhumation mandatory. The exhumation is carried out for doubtful and undetected homicide and medical insurance reasons. Forensic Anthropology applies a legal focus to the study of human remains. Typically, it requires and involves detail knowledge of skeletal structure and human Biology with an archeological stant when recovering remains. The morphological findings (both macroscopic and microscopic) are gathered. Exhumation is successful for recovering evidence which should better have been collected immediately after the death of an individual. Exhumations can also be regarded as an instrument to evaluate the quality of death certificates and death investigations. A thorough anthropological, odontological, skull identification via superimposition and X-ray analysis is indispensable before performing a CFR. The first and second time autopsies in Medico Legal cases of unnatural deaths have been studied on exhumation with accuracy, and the results in the Courts of Law can justify efforts of new research.

83. Study of Mental Health Status in Forensic Justice System

Soumen Tanti*, Sadhan Dasgupta¹, Biswajit Sukul², Babul Banerjee³

*Department of Pathology, R N Tagore Hospital,
144 Mukundapur, Kolkata 700 099;

¹Department of Psychology, University of Calcutta, Kolkata 700 009;

²Forensic and State Medicine, NRS Medical College, Kolkata 700 012;

³Forensic Toxicology Department, Forensic Science Laboratory,
Kolkata 700 037

Email: soumentanti@gmail.com

Keywords: *Forensic psychiatrists, ERUMmetry, EEG, psychology, toxicology*

Forensic psychology and clinical psychology are involved with understanding the patient's condition, criminal or not, mental status within the criminal justice system, in cases that deal with the mental health of a suspect. Forensic psychiatrists, on the other hand, focuses on the interface of law and mental health and identify and categorize the specific symptoms of mental disorders which can be used within the context of legal proceedings to evaluate a witness, a victim or a suspect as the court deems appropriate. Forensic Expert witnesses are very important within the context of a court of law. The accountability of Psychometry, Electroencephalography and Clinical interpretation with

medications are accepted as necessary evidence witnesses in civil and criminal Justice system in the Courts of law. Legal knowledge is an integral part of Forensic Psychiatry and Psychology because Court trials often rely on the findings of forensic psychiatrists as trial evidence. Some medico legal cases have also been studied where the presences of antidepressants and tranquilizers have been detected in Forensic Toxicological study with or without having the history of mental disorders of the deceased in unnatural deaths.

84. Importance of Drug Quality in Forensic Pharmacy

Amit Kumar Dey*, **Sriparna Datta¹**, **Babul Banerjee²**

^{*1}Department of Chemical Technology, University of Calcutta,
Kolkata 700 009;

²Forensic Toxicology, Department Forensic Science Laboratory,
Kolkata 700 037

Email: sriparna_d@yahoo.com

Keywords: *Forensic pharmacy, drug, toxicology, quality, witness*

Forensic Pharmacy deals mostly with legal issues, i.e, drug doping in sport, drug toxicology, drug pharmacology, poisoning, etc. Pharmacists specializing in this science are concerned with proper clinical use of medicines. Forensic refers to applying this science to legal issues. The area includes those related to malpractice, adverse drug reactions, driving in drunken condition, and use drugs for unethical stimulation during sports. Forensic pharmacy overlaps with the criminal justice system and other branches of forensics. Forensic experts may testify in court, be involved in regulatory activities, consult with lawyers or law enforcement officials and perform other related work. Thus Forensic Expertise is chosen every day, by attorneys, insurance professionals, and other private and public agencies, since they all need the opinion and the scientific findings of premier forensic experts in the complicated drug related cases. Drug Quality must always be determined with various quality assessments. The problems arise if the active ingredients are of sub-standard quality or low availability due to poor formulation or product degradation. It is also crucial that the drugs are properly formulated and patients complete the treatment course. Fake and substandard drugs that are under-dosed, promote resistance. Combating such drugs is therefore very important to ensure the use of drugs to fight diseases.

85. Study of Mental Health Status in Forensic Justice System

Rosy Bhattacharya*, **Sadhan Dasgupta¹**, **Tapas Kumar Bose³**,
Babul Banerjee⁴

¹M.M.Medical Centre Ballygunge, Kolkata 700 019;

²Department of Psychology, University of Calcutta, Kolkata 700 009;

³Forensic and State Medicine, NRS Medical College, Kolkata 700 012;

⁴Forensic Toxicology, Department Forensic Science Laboratory, Kolkata 700 037

Keywords: *Forensic psychiatrists, ERUMmetry, EEG, psychology, toxicology*

Forensic psychology and clinical psychology are involved with understanding the patient's condition, criminal or not, mental status within the criminal justice system, in cases that deal with the mental health of a suspect. Forensic psychiatrists, on the other hand, focuses on the interface of law and mental health and identify and categorize the specific symptoms of mental disorders which can be used within the context of legal proceedings to evaluate a witness, a victim or a suspect as the court deems appropriate. Forensic Expert witnesses are very important within the context of a court of law. The accountability of Psychometry, Electroencephalography and Clinical interpretation with medications are accepted as necessary evidence witnesses in civil and criminal Justice system in the Courts of law. Legal knowledge is an integral part of Forensic Psychiatry and Psychology because Court trials often rely on the findings of forensic psychiatrists as trial evidence. Some medico legal cases have also been studied where the presences of antidepressants and tranquilizers have been detected in Forensic Toxicological study with or without having the history of mental disorders of the deceased in unnatural deaths.

86. Synthesis of Vinyl-Simple/Nano Filler Filled Polymer Composites and its Application in Forensic Analysis

Prabir Banerjee and Amarnath Banerjee

Dept. of Polymer Science and Technology,
University of Calcutta.

Keywords: *Polypropylene (PP), nanocomposites, clay, bentonite (bent), montmorillonite (MMT), Compatibilizer, MA, SEM, TEM, AFM, XRD*

The effect of clay filler e.g. Indian bentonite, montmorillonite on polypropylene (PP)

matrix was studied. The effect of introduction of nano-filler was compared with virgin polypropylene. The effect of silica filler was also studied with using compatibilizer e.g. partial methyl ester of styrene/maleic anhydride (MA) copolymer. The size of the nano particle was determined by X-ray diffraction analysis. As the molecular weight of polymer is solely dependent on the composites physical properties e.g. tensile, abrasion, impact etc.

Our aim was to protect the molecular weight of the polymer used by avoiding molecular degradation by either mechanical friction or high temperature heating i.e. melt mixing or intermix type of mixing. For these reason in the present work the solution mixing of PP solution in hot Xylene with nano-fillers dispersed in Xylene by through mechanical mixing process was used. In this present work wide range of nano-fillers (up to 15wt %) was used, but the optimization was occurred at 5wt%. It was found that 7.5wt% composition gives slightly better physical and mechanical properties. So our optimization filler lies 5wt% in major.

The effect of nanoclay was studied by using various advanced characterization techniques e.g. tensile testing, impact, hardness, flexural, XRD, SEM, AFM, TEM etc.

In forensic analysis it is very useful to identify the virgin polymer from the impure or other foreign particle mix (nano-size) polymeric materials.

87. Role of Palaeoanthropology in Forensic Science

A. R. Sankhyan

Anthropological Survey of India,
27 Jawaharlal Nehru Road,
Kolkata-700 016
Email arsankhyan@gmail.com

Keywords: *Palaeoanthropology, forensic science, ancient cases*

Forensic palaeoanthropology through its diachronic insight and comparative morphometrics techniques can nlighten on remote cases of causes and circumstances of death since the prehistoric times, like 'the return of the mummy'. They study the taphonomic changes/ context of boney remains, post-mortem trauma, palaeodiet, palaeopathology, malnutrition, palaeodemography, activity patterns, physique, population migration, and

therefore can enlighten about the accidents, genocide/ massacre, war crimes, cannibalism, man-animal relationships, social inequality, love-tales, etc. by efficiently corroborating the osteological evidence with the cultural/ archaeological artifacts of killing right from the prehistoric handaxes and choppers, bows and spears, harpoons, and arrows, through historic swords, daggers, lances, guns and artillery. Thus, palaeoanthropologists can assist in the investigation search and recovery efforts, and developing a biological profile, and offer expert witness courtroom testimony. Some cases are discussed.

88. Identification of Microbial Community from Soil and Water Sample: A Potential Tool for Microbial Forensics

Subhasis Sarkar, Prosun Trivedi, Koushik Mukherjee, Alok Kumar Sil

Department of Microbiology, University of Calcutta,
35 Ballygunge Circular Road,
Kolkata 700 019

Keywords: *Microbial forensics, microbial community, ribotyping*

In microbial forensics, researchers work to track down the source of microbe(s) whether in a criminal investigation or a study of naturally occurring disease outbreak. Towards achieving the goal, methods of sampling, isolation and identification of organisms from different sources holds key importance. Whether it is a criminal investigation or surveillance the epidemic outbreak, the major share of microbial sources is held by soil and water. As microbial forensics demand a rapid and sensitive identification of microbes from various sources, tools based on modern biology are being employed to meet the requirement. To this end we have established methods to identify microbial community from urban domestic sewage and soils from disposal ground based on ribotyping, metabolic finger printing and phylogenetics. Thus, in our laboratory we have identified organisms of specialized functions such as microbes capable of degrading synthetic polymers and stabilizing waste water. As we have identified microbial community structure of two relevant niches, our study holds the promise to be exploited in microbial forensics.

89. Antiperspirants: Posing a Threat to Mankind

Saumik Panja, Antara Ganguli, Jay Prakash Singh
and Sreedipa Bose

Keywords: *Antiperspirants, cosmetics, deodorants, Alzheimers, Aluminium, Zirconium, DNA, Parabens, Genotoxic, Breast cancer, Neurotoxin, UV-B, Estrogen*

Antiperspirants are getting very popular in the global market of cosmetics, especially to the people of the tropical countries where the temperature and the moisture content in air are respectively higher than other regions. In the socio-economic condition of 21st century's world, the uses of cosmetics are growing day by day. Antiperspirants are generally considered as a subgroup of deodorants. Different dreadful diseases like cancer, Alzheimers, dermatitis etc are being observed in the users. The Aluminium compounds like Aluminium chloride, Aluminium chlorohydrate, Aluminium zirconium and also Parabens are present in antiperspirants. The genotoxic capability is found in Aluminium, which causes damage to DNA molecules and subsequently causing epigenetic effects. Aluminium interferes with estrogen action by forming metalloestrogen. Another constituent Parabens mimics estrogens and may have severe consequences like breast cancer. Various experimental reports indicate that Aluminium is an established neurotoxin and probably one of the causal factors for Alzheimer's disease. Methyl paraben when applied to skin readily reacts with UV-B which subsequently leads to increased skin aging and DNA damage. Contact dermatitis and allergic reactions are very common when epithelial lining of the skin comes in contact with both Aluminium zirconium and Parabens. Finally a conclusion can be drawn that the antiperspirants which are getting popular among the people, are posing a serious threat to a major population as more and more people have developed a habit of using such products particularly in the tropical countries.

90. Imidacloprid Poisoning and Medico Legal Evidences

Probal Ranjan Ghosh*, Sankar Sa¹, Kali Prasanna Dhara², Babul Banerjee³

*Dept of Veterinary Physiology WB University of Animal & Fisheries Kolkata 700 037;

¹Department of Instrumentation Central food Laboratory Kolkata 700 016;

²Department of Chemistry University of Calcutta APC Road Kolkata 700009;

³Forensic Toxicology Department Forensic Science Laboratory Kolkata 700037

Email: drprghosh@gmail.com

Keywords: *Imidacloprid, toxicity, autopsy, evidence, pesticide*

Imidacloprid, 1[(6-chloro-3-pyridinyl) methyl]-N-nitro-2-imidazolidinimine, is a new neonicotinoid insecticide. It is a systemic, chloronicotiny insecticide. Imidacloprid has proven to be a remarkable advancement in flea control for pets and in agricultural pest control. It is generally considered nontoxic to humans based on available literature, but Forensic Toxicology examinations reveal some unnatural death cases due to Imidacloprid poisoning. Imidacloprid has been detected in the viscera of the deceased and the experimental results are considered as Medico Legal evidences as prosecution witnesses during the case trial in the Courts of law. The results of acute toxicological studies in laboratory animals support the mammalian toxicity. In clinical chemistry parameters high dose of imidacloprid has caused significant elevation of serum GOT, GPT, glucose and BUN and decreased the activity of AchE in serum and brain. The commercial Imidacloprid preparation is much toxic than the Imidacloprid alone.

Homeopathy

91. Changes in the Physiological Values of Different Experimental Mice Due to *Plasmodium Falciparum*

K. Sunita

Acharya Nagarjuna University, Andhra Pradesh

Keywords: *Plasmodium falciparum, SGOT, SGPT, ALP, ACP, ERUM Creatinine, VLDL, LDL*

The present communication deals with changes in the physiological values of differential

experimental mice due to *Plasmodium falciparum* infection. The *P. f* infection caused marked decrease in SGOT, SGPT, ALP, ACP and Serum Creatinine levels. When these were mice treated with Artemisinin derivative anti-malarial drugs i.e., Arteether and Artesunate; the SGOT, SGPT, ALP, ACP and Serum Creatinine levels become normal. During infection these levels were higher in comparison with the control values. Lipid profile was also studied in *P.f* infected and drug treated mice. Serum Cholesterol, Triglyceride values have increased during infection where as after treatment these values have become normal. And HDL values decreased due to infection and increased after treatment. Where as VLDL and LDL values increased due to infection and decreased after treatment with arteether and artesunate.

92. Homoeopathy-Yoga-Diet Therapy – A Path of Cancer Treatment

**Pradhan Ashoke Kumar, Pradhan Amalendu, Ghosal Kajal,
Paul Dharendra Nath**

Institute of HYDT Research & Education,
487, Rabindra Sarani,
Kolkata – 700 005

Keywords: *Cancer, Similia Similibus Curantur, Homoeopathy*

Now a days Cancer is the second leading cause of death and is a challenge to the nation and as well as all oncologists & surgeons. To meet this burning problem, Homoeopathy has a great role to combat against cancer in a gentle, harmless and economically viable way. In Homoeopathy, we treat the patient and not the disease itself, based on “Similia Similibus Curantur” and in an individualized, constitutional, miasmatic, holistic approach considering the totality of symptoms comprising the disease symptoms, family history, past history, personal history & mental symptoms of the individual cancer patient.

The purpose of this presentation is to search and review the related homoeopathic medicines to treat the common cancers along with dietary regimen and exercises.

In this presentation, the investigator would like to enlighten the efficacy of homoeopathic treatment in cancer patients before and after chemotherapy, radiotherapy and surgery. It will also provide a guideline on homoeopathic remedies with – a statistical analysis.

93. Homoeopathy in Vitiligo

**Swami Sradhyamayanandaji Maharaj, Pradhan Ashoke Kumar,
Ghosal Kajal, Pradhan Amalendu, Saha Ambuj Kanti**

Ramkrishna Math & Mission, Belur,
Howrah, West Bengal

Keywords: *Vitiligo, depigmented skin lesion, cutaneous melanin pigments, Homoeopathy*

Vitiligo is a fast growing skin disease in all age groups all over the world. It is a depigmented skin lesion presented with varying and irregular sized and shaped, sharply demarcated white patches surrounded by normal or hyper pigmented skin. Though the disease is not a life threatening one but is of great importance for its ugliness in the affected persons. The exact cause of the disease is not known but, heredity and exposure to certain chemical substances and drugs may induce damage to the cutaneous melanin pigments temporarily or permanently. Once a person is affected by this disease, it increases day by day covering the whole body area even after modern available treatment.

Homoeopathy has a great scope to combat the burning problem of vitiligo. Homoeopathic Treatment is based on nature's law of cure and holistic approach considering single medicine.

A statistical analysis of Homoeopathic treatment will be presented to show the efficacy of Homoeopathy in Vitiligo.

94. Treatment of Colo-Rectal Cancer in Homoeopathy-Yoga-Diet Technique

**Subal Sankar Ray, Pradhan Ashoke Kumar, Pradhan Amalendu,
Ghosal Kajal, Shib Prasad Mahato**

Institute of HYDT Research & Education,
487, Rabindra Sarani, Kolkata – 700 005

Keywords: *Colo-Rectal cancer, Homoeopathic medicine*

Colo-Rectal cancer is the second leading cause of death due to malignancy in the

United States. This cancer is treatable and often curable disease when it is localized and diagnosed early. But when it spreads through the bowel wall to the lymph nodes or nearby organs, the chances for cure are reduced.

Colo-Rectal cancers represent an important public health problem, especially in the West. Between cancers of the colon and rectum, there are many overlapping issues such as risk factors, diagnosis and certain components of therapy. Treatment in Homoeopathy is based on nature's law of cure – "Similia, similibus and curantur" to treat Colo-Rectal cancer patients in a harmless way without any medicinal side effects.

This paper will present the cases of patients of Colo-Rectal cancer treated with Homoeopathic medicine, Yoga & dietary advice at Institute of HYDT Research & Education. This will also enlighten the patients regarding signs and symptoms, diagnosis, & its homoeopathic therapeutics including dietary advice & preventive measures.

95. Breast Cancer and Its HYD Therapy

**Swarna Kar Bharati, Ghosal Kajal, Pradhan Ashoke Kumar,
Pradhan Amalendu, Mahuya Kundu**

Institute of HYDT Research & Education,
487, Rabindra Sarani, Kolkata – 700 005

Keywords: *Breast cancer, late marriage, breast feeding*

The cancer of breast in women is a burning problem in the modern and civilized societies all over the world. Late marriage, abstinence from breast feeding to the babies is some of the common causes of breast carcinoma. Though it is common in elderly women, more and more young ladies are affected by this fatal disease. The conventional treatments like surgery, chemotherapy, radio therapy and biological therapy are associated with limitations of treatment acceptance, biological reactions along with numerous side effects and economical viability.

On the contrary, homoeopathy is a rational art of healing based on the natural law of cure – "Similia, Similibus, Curantur", i.e., "like cure like" in the field of medicine, introduced by Dr. Samuel Hahnemann in 1790, thus imparting a great role in meeting this burning problem in a gentle, harmless and economically viable way. In homoeopathy, the patient is

treated in an individualized, constitutional, miasmatic, holistic approach considering the totality of the symptoms, family and personal history of cancer patient.

The paper will enlighten the women regarding pre-disposing factors, signs and symptoms, early diagnosis, self examination of breast, clinical and pathological investigations, invasion-grade and metastasis and prognosis of the breast cancer patient along with homoeopathic therapeutics.

96. Homoeopathic Medicine Detecting By Pulsation Selection and confirmation of the suitable medicine for individual patient

Md. Shabbir. Alam

P.O:- Salkhua Bazar,Railway Station:-Kopariya (M.E.R.),

Dist: - Saharsa, Bihar (INDIA)-852126

Email:-drmdshabbiralam@yahoo.com

Keywords : *Selector Agent, achyranthus aspera.*

A New device named Suitable Selector Agent (S.S.A.) has been found out by me. It begins to function when it is touched with the skin of the patient. By this process we are able to choose appropriate medicine for a particular patient.

The Suitable Selector Agent is good source determination of accurate and appropriate medicine. In a true sense by means of this agent the homoeopathic physician will be able to select appropriate medicine and easily remove the trouble and complains of the patients.

I have prepared Suitable Selector Agent with the root of *Achyranthus aspera*.

Procedure:

For the selection of requiring the rate rhythm and the volume of radial pulse are studies and according to totality of symptoms medicine are determined by the physician . When the S.S.A. is touched to any part of the body of the patient we feel that the rate of rhythm and volume of radial pulse begins to decrease and they diminish for a short moment and after that begin to increase and later on they become constant.

Now by keeping The Suitable Selector Agent at the same place the phial containing the previous selected medicine is touched one after another. In this way when the appropriate

medicine in a appropriate potency is taken in the hand of a physician, the volume of the radial pulse sinks completely and the physician becomes determined in his mind that the medicine will be appropriate for the particular patient.

97. A Survey of Contraceptive Practices amongst Female Patients in a Homoeopathic Hospital

Jahir Abbas, Arup Das, D Basu

Department of Practice of Medicine,
National Institute of Homoeopathy, Salt Lake, Kolkata-700106

Keywords: *Contraception, Homoeopathic hospital, Hormonal contraception, Permanent contraception, Temporary contraception.*

Patients who come for treatment in a homoeopathic hospital belong to a particular socio-cultural group. Survey was done on 91 married females (age 16-45yrs) for contraceptive practices by themselves/husbands to understand the contraceptive practices they were adopting. It showed high degree of acceptance of standard contraceptive practices, even methods not considered as integral component of homoeopathic medical care. Contraceptives were used by 66 (72.53%), [27 (40.9%) permanent, 39 (59.1%) temporary methods (5 by husband, 34 by wife – 33 were hormonal)]. The data was also analysed I duration of marriage, number of children, and age of the youngest child.

98. Observations on Contraceptive Practices amongst Male Patients in a Homoeopathic Hospital

Arup Das, Jahir Abbas, D Basu Professor

Department of Practice of Medicine,
National Institute of Homoeopathy, Salt Lake, Kolkata-700106

Keywords: *Contraception, Homoeopathic hospital, Hormonal contraception, Permanent contraception, Temporary contraception*

Patients of the socio-cultural group who come for treatment in a homoeopathic hospital

were surveyed to understand their contraceptive practices. Observations on contraception by 53 married males (age 21-50yrs) (themselves/ wives) showed contraceptives used by 34 (64.15%), [10 (29.4%) by husband, 24 (70.6%) by wife; of wife 10(29.4%) permanent and 14 (41.2%) temporary]. No male had undertaken permanent method. The data was also analysed for duration of marriage, number of children, and age of the youngest child. It was evident that factors affecting contraceptive behaviour in the community were operating in this special socio cultural group also.

99. Leukemia Cure in Homoeopathic-A Documentary Evidence

***Pradhan Ashoke Kumar, Pradhan Amalendu, Ghosal Kajal,
Paul Dharendra Nath, Mahato Shibaprasad***

Institute of HYDT Research & Education
487, Rabindra Sarani, Kolkata – 700 005

Keywords: *Leukemia, bone marrow, HYD, Acute Myeloid Leukemia*

Leukemia is the most common type of cancer in childhood, and about four-fifths of childhood leukemia is of the ALL type (most of the rest is of the acute myeloid type). The peak incidence is at about three or four years of age. A routine blood test may indicate that ALL is a possibility, but the definite diagnosis is made by taking a sample of bone marrow.

A patient was diagnosed and receiving conventional treatment for one year due to side effect of the treatment and high cost of treatment she refused the conventional treatment and undergone HYD treatment in the Institute of HYDT Research & Education.

This paper will present a successful treated case of Acute Myeloid Leukemia by Homoeopathic Medicine, Yoga & Diet Treatment who is leading a normal life more than ten years having no sign & symptoms of Leukemia.

Acupuncture

100. Management of Migraine by Acupuncture and Acupressure

M. S. Balaji

Acupuncturist and Physiotherapist,
Samatha Hospital,

Door No.5/1/68, Opp: Old maternity Hospital
Tirupati – 517507. AP.

Email : drbalaji2005@yahoo.co.in ; balajims454@gmail.com

Keywords : *Migraine, Acupuncture, Acupressure, Non Pharmacological, Endogenous opiates, Visual Analogue Scale*

Introduction:

Acupuncture and Acupressure are one of the most ancient non Pharmacological healing methods, drawing the attention of the modern scientific world for more than three decades. World Health Organization (WHO) has recommended Acupuncture for treating around forty types of disorders.

Aim of study is to evaluate the efficacy of Acupuncture and Acupressure in management of Migraine.

Method:

Selected patients with age group 28 – 55, who were suffering from migraine and treated with Acupuncture / Acupressure.

Conclusion:

The study shows that Acupuncture and Acupressure have significant role in management of Migraine. Acupuncture gives not only pain relief but also improves natural sleep and psychological well being. It results progress in daily activities and ‘Quality of Life’.

101. Acupuncture in Sports Injuries

Asit Halder *, Mrigendranath Gantait **

P. Medical Officer (Acupuncture),

** Ex-Director, Dr. B.K. Basu Memorial Research & Training Institute of Acupuncture

(Government of West Bengal),

188/87 Prince Anwar Shah Road,

Kolkata 700045.

Email: mrigengantait@gmail.com

Keywords: *Acupuncture, Sport injury, rectus abdominis microtear, moxibustion*

Acupuncture needling was done in sports injury cases. In 27 cases of sport injuries having rectus abdominis microtear, adductors of thigh pull, hamstring muscles pull, ligaments of knee sprain, acupuncture was applied at Dr. B.K. Basu Memorial Research & Training Institute of Acupuncture during November 2008 to August 2010. Age of patients ranged from 16 to 31 years. All were sportsmen.

Acupuncture needles were applied generally at and around sites of pain. Electro-stimulation, moxibustion and hammering were added to needling when needed. At the beginning daily sitting, then sittings on alternate days were given. 5 to 10 sittings of treatment were given in one spell.

In 19 (70.37%) cases there was complete recovery of pain. In 6 (22.22%) cases there was 80 to 90% relief of symptoms. In 2 (7.40%) cases there was satisfactory improvement (60 to 70%) but had to be continued for longer duration. No drug was applied.

Relief of symptoms in sports injuries with acupuncture was quicker without having adverse side-effects.

Health and Disease

102. Abstract with drawn

103. Study of Lipoprotein (A) In Rheumatoid Arthritis

*K.P. Shivagovindan; *V.M. Vinodhini, **P. Panchapakesha Rajendra

*Department of biochemistry;

**Department of Rheumatology,
SRM Medical College and Hospital,
Research centre, Potheri – Tamilnadu

Keywords: lipoprotein, cardiovascular disease, Rheumatoid arthritis

Introduction:

Rheumatoid arthritis (RA) is a chronic systemic disease of joints, inflammation of synovial membrane, articular structure and reduction of bone size. An increased concentration of Lipoprotein (a) Lp(a) has been found to be closely associated with cardiovascular disease (CVD).

Aim and objective:

The purpose of the study is to analyze serum Lp(a) levels and investigate lipid profile in rheumatoid arthritis patients.

Materials and methods:

Blood samples were collected from 60 rheumatoid arthritis patients who attended rheumatology clinic of SRM Medical College and hospital, with an age of 25 to 80 yrs and from 60 healthy controls.

Serum Lp (a) (immunoturbidimetric method), Total cholesterol (oxidase method), triglycerides (enzymatic method) and high density cholesterol (HDL) (precipitation assay method) were estimated. Low density lipoprotein- cholesterol (LDL-C), Very low density lipoprotein-cholesterol (VLDL-C) by friedewald's formula and ratio of total cholesterol / HDL-C, LDL / HDL-C are calculated.

Study compared by using student 't' test ($p < 0.05$ is significant)

Results:

Lp (a) concentration was significantly increased ($p < 0.05$) in RA patients compared with controls. Triglycerides, VLDL-C, Total cholesterol/ HDL-C ratio were found to higher in patients than controls. HDL-C was lowered in patients than controls.

Conclusion:

The findings indicate that the patients with RA are at high risk of developing CVD in future. In addition to conventional lipid profile, estimation of Lp(a) can prove to be a valuable tool in risk assessment of population in general and management of disease in particular.

104. Uric acid as a Mediator of Endothelial Dysfunction in Hypertension

*P. Modagan**, *Meera Shivashekar**, *V. Sundaravadivelu***

*Department of Biochemistry;

**Department of Medicine,

SRM Medical College Hospital and Research Centre

Keywords: *Hyperuricemia, hypertension, atherosclerosis, endothelial cells*

Introduction: Hyperuricemia is a well recognized risk factor for cardiovascular disease, is now validated as a sensitive marker for atherosclerosis. Uric acid causes activation of endothelial cells, platelet activation, and increased platelet adhesiveness, which increases the risk of cardiovascular disease.

Aim: The aim of the study is to evaluate the correlation between blood uric acid levels in patient with hypertension.

Materials Methods: The study included 50 hypertensive patients (mean age of 50 ± 10) attending medical O.P of SRM medical college hospital and research centre compared with age and sex matched control subjects. Serum uric acid, Total cholesterol, Triglyceride (TGL), High density lipoprotein (HDL), and (Low density lipoprotein (LDL-C), and Very low density lipoprotein (VLDL-C), by calculation method) were measured using standard enzymatic methods with a semi automated analyzer. All numerical variables were correlated statistically.

Result: The patient group showed significant increase in serum uric acid level compared to control group ($P < 0.001$). Total cholesterol, Triglycerides (TGL), Low density lipoprotein (LDL-C) levels were significantly increased and the high density lipoprotein cholesterol (HDL-C) levels were significantly decreased in hypertensive subjects compared to controls.

Conclusion: The study suggests that high levels of uric acid as a sensitive marker of risk for cardiovascular disease.

105. Insulin Resistance and Alanine Aminotransferase Level in First Degree Relative of Type II Diabetes Mellitus

*V. Kuzhandai velu, *B. Jyothirmayi, **J. S. Kumar

*Department of Biochemistry,

**Department of General medicine,

SRM Medical College Hospital and Research Centre,

Kattankulathur, Kancheepuram District,

Tamil Nadu

Keywords: *Insulin resistance, dyslipidemia, hypertension, obesity, HDL*

Introduction:

Insulin resistance is established as independent predictor of a range of disorders like

obesity, hypertension, dyslipidemia, Type 2 Diabetes Mellitus and atherosclerotic cardiovascular diseases. There is association of hyperinsulinemia with hypertriglycerdemia, low level of HDL and high level of LDL. In Nonalcoholic fatty liver disease, there is elevation of ALT, raising the possibility that the prospective relationship between ALT and type 2 Diabetes may reflect cross-sectional associations with insulin resistance or obesity.

Aim and Objective:

To find the significance of Insulin Resistance and Alanine aminotransferase level in first degree relative of type 2 Diabetes Mellitus.

Materials and Methods:

The study includes 50 first degree relative of type 2 Diabetes (25 men and 25 women) aged 20 – 50 years and 30 control of similar age. All cases were taken from SRM Medical College Hospital and Research Centre. All the cases were analyzed for HOMA_{IR}, QUICKI, IR ratio, Fasting Glucose, Insulin (ELISA), Lipid Profile and Alanine aminotransferase. Student ‘t’ test were used for statistical analysis by SPSS 17 version.

Results:

There is significant increase in Insulin Resistance ($P < 0.001$) and ALT levels in first degree relative of type 2 diabetes mellitus.

Conclusion:

The result shows that the insulin resistance and ALT levels are the predictors of type 2 diabetes mellitus in first degree relative’s types 2 diabetes mellitus.

106. Rapid Diagnosis of Female Genital Tuberculosis using Multiplex and Fast-PCR of the Infertile Women in Southern Assam

K Choudhury, R Mondal, P R Ghosh¹, S. Dutta Gupta²,
P Das², S K Ghosh

Department of Biotechnology, Assam University,
Silchar-788011;

¹Department of Animal Physiology,
West Bengal University of Animal & Fishery Science,
Kolkata;

²Department of Pathology, Silchar Medical College and Hospital,
Silchar, Assam
Email:drsankarghosh@gmail.com

Keywords: *Genital tuberculosis, Infertile Women, FGTB, multiplex PCR, Fast-PCR, Northeast India*

Genital tuberculosis is an important cause of sub fertility and resulted about 26% of cases of infertility among Indian women. Rapid and accurate diagnosis of female genital tuberculosis (FGTB) is highly confusing by conventional diagnostic methods. Sixty two infertile patients of which 30 highly suspected for FGFB are randomly selected in this study. Traditional investigation viz. cervical cytology, Montoux test, AFB staining etc. is performed; subsequently with PCR amplification by two sets of designed primers intending multiplex PCR amplification as well as fast PCR format of ESAT6 and IS6110 in both tissues and menstruation blood samples. Results indicate that PCR method along with multiplex amplification is more sensitive and accurate over traditional methods. Rapid diagnosis with high resolution can be achieved using Fast PCR within 15 minutes. The menstrual blood which is less invasive may be the ideal for PCR diagnosis.

107. Estimation of Nicotine and Cotinine in Urine of Workers Engaged in Bidi Binding Processes Using Reverse Phase High-Performance Liquid Chromatography

Mukherjee AK, Roy SK, Manna SK, Hossain M, Chattopadhyay BP

Regional Occupational Health Centre (Eastern),
Block DP, Sector V, Salt Lake, Kolkata 700 091
Email:sujoymanna10@gmail.com

Keywords: *Occupational exposure, Nicotine, Cotinine, Urinary biomarker, Creatinine, Bidi binding*

This study reports biological monitoring of nicotine and its biomarker cotinine among workers in bidi binding processes of West Bengal by using HPLC after solid phase extraction. Urinary nicotine of non-smokers and smokers were 4.34 ± 4.91 and 5.15 ± 4.39 mg/g creatinine respectively and that of cotinine were 0.91 ± 0.81 and 3.70 ± 2.80 mg/g creatinine respectively. Urinary nicotine and cotinine levels found significantly ($p < 0.01$) higher among workers with smoking habit than the non-smoking. The bidi binders are exposed to significant amount of nicotine both through inhalation and dermal routes, even higher than non-exposed bidi smokers as reported elsewhere.

108. Metabolic Memory' Benefits of Early Glycemic Control by Insulin on Hyperalgesia in Diabetic Rats

**Balakumar M, Prabhu D, Ganesan S, Sathishkumar C, Mohan V,
Balasubramanyam M**

Madras Diabetes Research Foundation & Dr.Mohan's Diabetes Specialties Centre,
WHO Collaborating Centre for Non- Communicable Diseases Prevention & Control.
Gopalapuram, Chennai-600086. Tamilnadu.

Corresponding author:
Email: balusignal@gmail.com

Keywords: *Insulin, metabolic memory, Diabetes Control and Complications Trial*

Background: The Diabetes Control and Complications Trial (DCCT) and the follow-

up Epidemiology of Diabetes and Its Complications (EDIC) studies emphasize that glycemic control initiated prior to the onset of overt pathology has the most-profound long-term benefits. Present study evaluated the impact of early insulin (EI) versus late insulin (LI) treatment on diabetic neuropathy (hyperalgesia) in STZ-induced diabetic animal model.

Materials and Methods: Streptozotocin (STZ, 30mg/kg i.p) was injected interaperitoneally to induce diabetes in Wistar male rats. EI group received Intensive Insulin (2.5 IU/animal, once daily Insulatard) treatment from day 1 to 90. LI group received the same insulin treatment but from day 60 to 90. Control and STZ-diabetic animals were treated with normal saline. Plasma biochemical markers were estimated on day 30, 60 and 90. Diabetic neuropathy was assessed in terms of Paw pressure thresholds (PPT). PPT was registered with the paw pressure analgesia meter for the Randall-Selitto test (RRT).

Results: Early insulin treatment normalized body weight, plasma biochemical markers like glucose, cholesterol, HbA1c, TGL HDL/LDL ratio, VLDL, and lipid peroxidation in STZ-treated rats. But late insulin treatment failed to reverse the biochemical changes in STZ-treated rats. Diabetic rats showed mechanical hyperalgesia as detected by RRT from day 30 onwards. Early insulin completely protected the rats from hyperglycemia-induced hyperalgesia. Late insulin failed to reverse hyperalgesia in STZ-diabetic rats.

Conclusion: With a 'metabolic memory' effect, early insulin treatment resisted all the STZ-induced morphological, biochemical and pharmacological changes. Late insulin treatment failed to reverse the STZ-induced hyperalgesia most likely due to 'hyperglycemic memory'.

109. Studies on Expression of Heat Shock Protein in Tuberculosis Patients

Jagrati Parihar

Forest Pathology Division,
Tropical Forest Research Institute, Jabalpur, M.P.
Email:jags.parihar@gmail.com

Keywords: *Heat shock protein, 65 kilodalton Antigen, tuberculosis, ELISA*

In the present study expression of 65 kDa Ag i.e. heat shock protein (HSP) in serum and CSF sample of tuberculosis (TB), tuberculosis-Meningitis (TBM), NonTB and Pyogenic Meningitis patients detected by Indirect-ELISA using monoclonal-antibody specific to 65-

kDa Ag. Incase study of 19 TB patients, 16 patient show positivity and out of 61 NonTB patients, 49 patients show 65-kDa negative. Incase study of 17 TBM patients, 16 patient show 65-kDa positive, out of 41 NonTB patients, 34 patients show 65-kDa negative and incase of 4 PM patients, 3 show 65-kDa positive. Expression of HSP in *M. tuberculosis* culture, significant difference was obtained between HS treated *M. tuberculosis* culture and control by SDS-PAGE.

The result support that the expression of 65-kDa HSP might be useful in diagnosis of tuberculosis.

110. Cardiovascular disease – Prevalence and Prevention

Pooja Verma

Keywords: *Cardiovascular disease, coronary circulation, dietary modification*

Human heart is the most successful organ in performing its life sustaining work hence it needs to be well protected as any impairment of the heart function may leads to obstructive changes in the coronary circulation and thus may be threatening for life.

Today the most leading cause of death in India is due to the heart diseases and it has been predicted by the Global Burden of Diseases Study that by 2020 there would be a 111% increase in cardiovascular deaths in India. This increase is much more than 77% for China, 106 % for other Asian countries and 15% for economically developed countries.

Deaths caused by cardiovascular diseases can be correlated with the life style since due to westernization and modernization the dietary habits are also changing. The major factors which are responsible for developing heart diseases include cigarette smoking, alcohol, obesity and increased intake of fats in the diet.

For treating the heart diseases too many people rely on surgical procedure but it basically causes the abuse of the resilient bodies. Hence to prevent the heart disease the best approach to be adopted is dietary modification with careful diet planning meeting the requirements of the individual.

111. A Study on Effect of Smoking on Function of Tear Film

**Chiranjit Bal¹, Debasis Pramanik, Debajyoti Das,
Ajoy De Sarkar**

Dept. of Physiology and Ophthalmology, Medical College Kolkata,
88, College Street, Kolkata 700 073
Email: drchiranjitbal@gmail.com

Keywords: *Smoking, Tear film*

The present study was performed to evaluate the qualitative and quantitative change in tear film among smokers. Tear film break-up time (BUT) and basal tear secretion by Schirmer's test, were performed in 40 smokers (80 eyes) and 35 non-smokers (70eyes). Tear film BUT and basal tear secretion was 7.89 ± 2.84 sec, 6.38 ± 2.94 mm, in smokers and 9.71 ± 3.23 sec, 10.13 ± 3.96 mm, in nonsmokers respectively ($p<0.05$). Our results lead us to conclude that quantity and quality of tear film significantly decrease with smoking and this decrease is further related to the amount of smoking.

112. Prevalence of Dermatophytosis Infection in SRM Medical College Hospital & Research Centre

¹Nilofer Rana, ²Radha Madhavan, ³S. Gomathi

¹Assistant Professor; ²Profesor & HOD;
³Professor, Department of Microbiology,
SRM Medical College Hospital & Research Centre

Keywords: *Dermatophytosis, Tinea corporis, Trichophyton rubrum*

To study the prevalent fungal species causing superficial fungal infection in and around Kattankulathur. One hundred and sixty two non repetitive, clinically suspected cases of dermatophytosis were subjected to direct smear examination and culture. 55/162 (33.9%) were positive for fungus in direct microscopy, 37/162 (22.8%) were culture positive. Out of 37 fungal isolates 20 were dermatophytes and 12 were non dermatophyte. Young adult in age group of 21-30 years were mainly affected. Tinea corporis (30.20%) was the most common clinical presentation followed by onychomycosis. Trichophyton rubrum(35%) was the most common species isolated.

Microbiology and Immunology

113. Antibacterial Activity and Antifungal Activity of *Aloe Vera* Gel and Leaf

V. Poorna Harika, P. Bhargavi, M. Anvitha, V. Mounika,
S. Bhargavi, D. Bindu Priya

P. G. Student, Department of Microbiology, GIS,
GITAM University,
Visakhapatnam-45
Email: harikavadapalli@gmail.com

Keywords: *Aloe vera*, antimicrobial, traditional healers

The fleshy leaves and roots of most species within the *Aloe* family are used in many traditional treatments. Traditional healers and indigenous people utilize mainly the leaf sap of this genus widely for the treatment of wounds, burns, rashes, itches, cracked lips and cracked skin. Antimicrobial activities of *Aloe vera* was carried out in attempts to validate the use by traditional healers in the use of there latex and gel exudates for various medicinal ailments. The antimicrobial activities of the gel and leaf of *Aloe vera* were tested against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Aspergillus flavus*, *Aspergillus niger* and *Candida albicans*. Ethanol was used for the extraction of the leaf after obtaining the gel from it. Antimicrobial effect was measured by the appearance of zones of inhibition. Antimicrobial susceptibility test showed that both the gel and the leaf inhibited the growth of *S. aureus* (16.0 and 6.0 mm, respectively). Only the gel inhibited the growth of *A. niger* and *A. flavus* (20.0 mm and 18mm, respectively), while the leaf possesses inhibitory effects on *P. aeruginosa*, *E.coli* and *C. albicans*. The results of this study tend to give credence to the popular use of both *Aloe vera* gel and leaf.

114. A Survey of Wheat Flour Microbial Quality and Mycobiota Content

**P. Bhargavi, M. Anvitha, S. Bhargavi, D. Bindu Priya,
V. Mounika, V. Poorna Harika**

P.G.Student, Department of Microbiology, GIS,
GITAM University, Visakhapatnam-45
Email: bhargavipethakamsetti@gmail.com

Keywords: *Wheat flour, Mycobiota, contamination*

Mold growth has detrimental effects on the quality of flour and may result in mycotoxin contamination. The search for potential mycotoxins—almost 400 are known—are time-consuming and expensive. However, detailed knowledge about the mycobiota and especially the toxin producing fungi enables the effective search for these toxic fungal metabolites. Therefore, wheat flour was investigated for the total qualitative as well as quantitative mycobiota. Examination of flour samples obtained from local retail outlets and distributors indicated that the microbiological quality of flour is high. Yeast, moulds, coliforms and *Bacillus* were observed from the flours microbiological examination.. The fungi detected in flour samples included *Penicillium*, *Rhizopus*, *Aspergillus*, yeasts, and occasional isolates of other genera.. The mycobiota of flours was dominated by *Aspergillus* spp. i.e *A.niger* and *A.flavus* accounting for 67% of the isolations. Fungi of the genus *Penicillium* spp. occurred only to a minor degree: 8% of the isolations. In the present study from the identified fungi most of them belong to the group of toxigenic molds.

115. Antibiotic Sensitivity of Bacteria in Pus

A. Dattatreya, P. Ravi Kiran, J. S. K.Chaitanya

P.G.Student, Department of Microbiology, GIS,
GITAM University, Visakhapatnam-45
Email: dattu619@gmail.com

Keywords: *Staphylococcus aureus, β -streptococci, pseudomonas aeruginosa, Klebsiella pneumoniae, Escherichia coli*

To screen various bacterial pathogens present in diabetic pus and to determine their

antibiotic sensitivity and resistance pattern against the commonly used standard antibiotics. The common bacterial pathogens isolated from the diabetic pus samples were grampositive cocci like *Staphylococcus aureus*, *S.epidermidis* and β -streptococci, gram-negative bacilli like *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Escherichia coli*. The bacterial pathogen showed resistance to most of the antibiotics. The magic bullets, the miraculous drugs, antibiotics can be used to heal the diabetic wounds and thus the amputations, which is the threat of all diabetic patients in the whole world can be minimized to a great extend.

116. Isolation of Pathogenic *Pseudomonas Aeruginosa* from Pus Sample of Urinary Tract Infection Patient

*Subhadip Santra, Subhankari Prasad Chakraborty,
Santanu Kar Mahapatra, Sourav Chattopadhyay, Somenath Roy*

Microbiology and Immunology Laboratory,
Department of Human Physiology with Community Health,
Vidyasagar University, Midnapore-721 102,
West Bengal
E-mail: sroy.vu@hotmail.com

Keywords: *UTI infection, Pseudomonas aeruginosa, biofilm formation, pathogenicity*

Pseudomonas aeruginosa, a Gram-negative, aerobic, rod-shaped bacterium with unipolar motility is a common bacterium which can cause life-threatening disease in humans and as well as animals. It is found in soil, water, skin flora and most man-made environments throughout the world. The present study was designed to isolate pathogenic *P. aeruginosa* from pus sample of UTI infected patient. To achieve this goal, we have collected fifteen (15) pus samples from nearby Nursing Home. Species identification was carried out by Gram staining, standard biochemical tests and growing of isolates on selective media. Pathogenicity of the isolates was determined by coagulase test, haemolysis test and biofilm

formation of the isolates. From this study it was observed that 60% of isolates were *P. aeruginosa*; out of these 66.66% are pathogenic.

117. Plasmid Mediated Intraspecies and Interspecies Transfer of Vancomycin Resistant

***Subhankari Prasad Chakraborty, Santanu Kar Mahapatra,
Subhadip Santra, Sourav Chattopadhyay, Somenath Roy***

Microbiology and Immunology Laboratory,
Department of Human Physiology with Community Health,
Vidyasagar University, Midnapore-721 102,
West Bengal
E-mail: sroy.vu@hotmail.com

Keywords: *Plasmid, Staphylococcus aureus, VRSA, E. coli, vanA, vanB*

Staphylococcus aureus is the major pathogen of the genus *Staphylococcus*. It is an important pathogen which is responsible for a great variety of pyogenic infections in man and animals. Most of the *Staphylococcus aureus* strains are resistant to traditional and conventional antibiotics. Vancomycin was the last resort of antibiotics used for the treatment of MRSA, but resistance finally emerges in 2002. The aim of the present study was to understand whether vancomycin resistance phenomenon was plasmid mediated or not. Plasmids were isolated from a chosen strain of VRSA (MMC-17). This plasmid was then transferred to a vancomycin sensitive *S. aureus* (MMC-6) and *E. coli* RGK 26 and after which the sensitive *S. aureus* and *E. coli* RGK 26 strains developed vancomycin resistance. Plasmid analysis of the transformed VSSA and *E. coli* RGK 26 revealed that it contains a plasmid corresponding to that of the donor *Staphylococcus aureus* strain that harbor *vanA* gene encoding vancomycin resistance in the donor *Staphylococcus aureus*.

118. Molecular Approach for Monitoring Drug Resistant Malaria Parasite in Some Malaria Endemic Zone in West Bengal

Santanu KarMahapatra^a, Sabyasachi Das^a,
Subhankari Prasad Chakraborty^a, Amiya Kumar Hati^b, Somenath Roy^{a*}

^aMicrobiology and Immunology Laboratory,
Department of Human Physiology with Community Health,
Vidyasagar University, Midnapore-721 102,
West Bengal,

^b Ex. Director, School of Tropical Medicine,
Kolkata-700 073
E-mail: sroy.vu@hotmail.com

Keywords: *P. falciparum*, drug resistance, PCR, RFLP

The increasing outbreak of *Plasmodium falciparum* malaria is found in different malaria endemic zone of west Bengal. In the present study, we collected *P. falciparum*-infected blood samples in Bankura and Midnapur, and performed *in vitro* sensitivity to chloroquine (CQ), in 11 *P. falciparum* isolates collected from Bankura and 11 *P. falciparum* isolates collected from Midnapur and assessed the prevalence of three presumed genetic polymorphisms of drug resistance to the chloroquine, *pfcr* K76T, *pfmdr1* N86Y, and *pfmdr1* D1246Y, by PCR-RFLP analysis. The percentage of isolates resistant to CQ, in Bankura was 90.91% and in Midnapur was 72.73. There were two significant associations between drug sensitivity and presence of particular molecular markers, i) CQ resistance / *pfcr* 76T (P=0.001), and ii) CQ resistance / *pfmdr1* 86Y (P=0.01). In Bankura the high levels of CQ pressure have led to strong selection of the *pfcr* 76T polymorphism where as in Midnapur both 76 T and *pfmdr1* 86Y appears to be a good predictor of *in vitro* CQ resistance.

119. Isolation and Identification of Bacteria and Yeasts from Dental Caries and Plaque Samples: Effect of Xylitol and Various Antimicrobial Agents on These Isolates

Ch. Pavana Jyothi ¹, R. Naveen Kumar, L.Venkateswar Rao ^{*2}

¹Department of Microbiology/FST, GITAM Institute of Science,
GITAM University, Visakhapatnam,
Andhra Pradesh,

^{*2}Department of Microbiology,
Osmania University, Hyderabad,
Andhra Pradesh
Email: pavana_01@yahoo.co.in

Keywords: *Dental caries, xylitol, Streptococcus mutans Candida sp., antimicrobial agents*

Caries is a common problem in all age groups. As less data is available on the microbiology of caries and plaque samples from Indian patients, we evaluated 25 samples (caries and plaque samples) for isolation of bacteria and yeasts and tested the effect of xylitol and antimicrobial agents on these clinical isolates. The cultivable bacteria and yeasts were isolated and identified using standard methods and commercial identification kits (Hi Carbohydrate kits HiMedia KB009 for bacterial identification and CANDIFAST KIT for *Candida* species identification). The main findings were the isolation of predominant groups of organisms, *Streptococcus mutans* and *Candida* sp. This study provides baseline information on the microbiological features of caries and plaque samples in Indian patients. Effect of sugar substitutes (xylitol and sorbitol), different antimicrobial agents (Triclosan, Chlorohexidine, Teatreeoil, Benzoic acid) and aloe plant oils (Clove oil, Eucalyptus oil) were tested on the oral isolates. A 28% of the clinical isolates were inhibited by xylitol, 100 % of the clinical isolates were inhibited by chlorohexidine and triclosan and 70 % of clinical isolates were inhibited by clove oil. The details of the results will be discussed during the presentation.

120. Preliminary Evaluation and Comparison of Antimicrobial Potential of Ascorbic Acid with Streptomycin

Lalitha. P, Sudipta Ghosh, Phanindra kumar.T

Dept.of Microbiology, Gitam Institute of Science,
Gitam University, Rushikonda,
Visakhapatnam 530 045
Email: sumitrakm2020@gmail.com

Keywords: *Ascorbic acid, Streptomycin, Drug resistance*

Ascorbic acid commonly known as Vitamin C is commonly found in various Citrus fruits. Deficiency of Vitamin C has been known to cause Scurvy among sailors in the past. The present study aims at demonstrating the advantage that ascorbic acid tends to have over antibiotics in terms of development of resistance and antimicrobial activity. In the study carried out we found that the microorganisms developed resistance to the antibiotic streptomycin to a dose as high as 250mg/ml against *Bacillus* sp. , *Pseudomonas* sp. , *staphylococcus aureus*, *Escherichia coli* and against the fungal species of *pencillium*, *Tenea rubrum*, *microsporum gypseum*.

121. Polyphenol and Flavonoid Content and Antimicrobial and Probiotic Effect of Extracts of Flowers of *Sesbania Grandiflora*

Sauradip Sen*, Ratna China, Sangjukta Dutta, Pubali Dhar

* Food and Nutrition Division,
Department of Home Science,
Calcutta University
Email: pubalighoshdhar@yahoo.co.in

Keywords: *Polyphenol, favonoid, antioxidant*

Polyphenols are among the most common and widely distributed phytochemicals in fruits and vegetables, with currently ~ 8000 phenolic structures known. Flavonoids are the major constituents of this group with more than 4000 compounds. The role of polyphenols in plants may partly explain the biological properties observed *in vitro* or *in vivo*. Herbal

medicine for treatment of chronic and infectious diseases. Even though pharmacological industries have produced a number of new antibiotics in the last three decades, resistance to these drugs by microorganisms has increased. In general, bacteria have the genetic ability to transmit and acquire resistance to drugs, which are utilized as therapeutic agents. The increasing failure and side effects of popularly used chemotherapeutics and appearance of multiple drug resistance phenotypes in pathogenic microbes led to the search of new compounds with antimicrobial activity. Use of herbal products as antimicrobial agents may provide the best alternative to the wide and injudicious use of synthetic antibiotics. The demand on plant based therapeutics is increasing in both developing and developed countries due to growing recognition that they are natural products synthesized in the secondary metabolism of the plant, non narcotic, easily biodegradable producing minimum environmental hazards, having no adverse side effects and easily available at affordable prices.

The 80% ethanolic extracts of *Sesbania grandiflora* showed antimicrobial activity against bacteria like, *E. coli*, *Streptococcus aureus*, *Bacillus subtilis*, *Klebsiella aerogenes* and *Salmonella typhi* and probiotic effect on *Lactobacillus acidophilus*. Therefore, plants extracts should be intensely investigated to better understand their properties, safety, and efficiency.

122. An Economical Study of Fermentative Production of Glutamic Acid and L-Lysine from Tubers of *Mirabilis Jalapa* Using Bacterial Culture Through Solid State Fermentation

¹R. Bhagya Lakshmi, ²D. Sarvamangala, ³P. Appa Rao,
⁴P. Vijaya Lakshmi

¹M.Sc final year, ²Asst.prof in Gitam University,

³M.D, Imma Labs, ⁴Lecturer in-charge,

Visakha Govt. Degree College

Keywords: *Bacterial cultures, Mirabilis tubers, Solid state fermentor, paper chromatography, ninhydrin, U.V.Spectrophotometer crystallization*

Introduction

Technology progresses every day and with it a new discovery comes every corner we turn. In the present study, an original and economical fermentation practice was

established for the production of L-Glutamic acid and L-Lysine from tubers of *Mirabilis jalapa* using bacterial culture. The *M.jalapa* is widely spread and easily available along the coastal Andhra Pradesh.

Better and cheaper methods of L-Glutamic acid and L-Lysine production has always been an issue of scientific interest. This paper deals with the establishment of a novel fermentation study. Lysine has much industrial importance as it is an essential amino acid.

Methodology

Solid state fermentation was carried out in one litre conical flasks containing tuber extract, bacterial culture and inoculation media. Maximum yield can be obtained by incubating the respective substrate for 4 days at a temperature of 30 C, pH of 7.2 .at a biotin concentration of $\mu\text{g/L}$ and an amount of 0.8g/L of urea. Analytical methods used for the identification of Glutamic acid and L-Lysine include Ninhydrin method and Paper chromatography and crystallization.

123. Reemergence and Rapid Spread of Chikungunya Virus All Over West Bengal

*Debjani Taraphdar**, *Arindam Sarkar**, *Shyamalendu Chatterjee***

*Research Fellow, ** Assistant Research Officer,
ICMR Virus Unit, ID & BG Hospital Campus,
Kolkata, India.

Keywords: *Chikungunya, West Bengal*

In India, the first outbreak of Chikungunya fever was recorded from Kolkata in the year 1963, where 1, 00,000 cases were recorded with 500 hospitalization and 200 deaths. After that, the virus disappeared from this region. In 2006, after a long gap of four decades, the virus has reappeared in West Bengal in the district of North 24 parganas. Since then, every year suspected cases of Chikungunya are being reported from one after another districts. Up to September 2010, it has been observed Chikungunya virus has spread all over the State of West Bengal. Up till now a total of 1503 serum samples, collected from suspected cases, have been tested. Out of which 524 cases were confirmed as Chikungunya infection by ELISA method. The viral RNA has also been detected by RT-PCR method.

124. Detection of JEV Activity in Some Districts of West Bengal, India

*Arindam Sarkar**, *Debjani Taraphdar**, *Shyamalendu Chatterjee***

*Research Fellow, **Asst. Research Officer,
I.C.M.R Virus Unit, GB-4, 1st FL; I.D & B.G Hospital,
Beliaghata, Kolkata-700 010,
West Bengal

Keywords: *Prevalence, JE Virus, AES, CPE*

To detect the Japanese Encephalitis virus (JEV) as the etiologic agent amongst the AES cases admitted in some district hospitals of West Bengal, a total of 424 sera samples, of which 224 from AES cases and 200 from contacts, were collected. These 224 acute samples were tested for the presence of IgM antibody, isolation of RNA followed by RT-PCR test. Attempts were made to isolate the virus using tissue culture system. Out of 224 acute samples, 30 were positive to IgM antibody, 21 samples were RT-PCR positive and 6 samples have produced prominent CPE in the C6/36 cell line. The contact samples are under serological investigation for the detection of the JE antibody titer in them. The Japanese Encephalitis virus is still in circulation, in the population of these districts of West Bengal.

125. Probiotic activity and Partial Characterization of Bacteriocin Producing *Lactobacillus fermentum* Isolated from Human Milk

Ilayaraja. R, Radhamadhavan

Dept. of Microbiology,
SRM Medical College Hospital & Research Centre,
SRM University, Kattankulathur-6032023.
Tamil Nadu, India
Email: srmmicro@gmail.com

Keywords: *Bacteriocin, probiotics, antimicrobial activity, Lactobacillus*

Bacteriocin producing *Lactobacillus fermentum* strain isolated from human breast milk, showed broad spectrum of antimicrobial activity against some major clinical pathogens.

Maximum bacteriocin production was observed at 37⁰C, pH 7 and 2% sodium chloride. In addition of enzymes such as α -amylase, proteinase K, pronase E, trypsin were strongly inhibited bacteriocin production. The bacteriocin has purified by ammonium sulphate precipitation, dialysis and Ion exchange chromatography. Biochemically it was pure protein and the molecular weight was 10kDa. Physiochemically it was tolerate bile, acidic pH, high temperature, hemolytic activity and bacterial viability during storage at -20⁰C, 4⁰C and room temperature. The study revealed that bacteriocin producing *Lactobacillus fermentum* may be used as probiotic to inhibit pathogens.

126. Urinary Tract Infection in Females of Child Bearing Age

*R.C Pande, **Manjusha Pandey

*HOD of Pathology, Microbiology and Blood Bank,

Vivekananda Polyclinic and Institute of Medical Sciences, Lucknow;

** Microbiologist, Vivekananda Polyclinic and Institute of Medical Sciences,
Lucknow

Email: dr.rcpande@yahoo.com

Keywords: *Urinary tract infection, mac'conkey agar medium, klebsiella aeroginosa*

Introduction:

After respiratory tract urinary tract infection is second commonest infection is encountered in the clinical practise. The infection is more common in female than in male. Short and wide urethra is attributed as the etiological factor, sexual intercourse, pregnancy are additional important factors of urinary tract infection in female.

The present work was undertaken with a view to study, incidence of urinary tract infection in females, unmarried married and pregnant.

Material and Method:

Mid stream urine was collected with all the sterile precautions after washing the parts from medial to lateral side of the body of females between ages 18 to 45 year of age. Culture was carried out immediately on blood agar and mac'conkey agar medium by

standard wire loop techniques and incubated at 37 °C aerobically. After 24 hours colony count was done. A colony count of more than one lakh organism was taken as positive culture; identification was carried out on basis of culture characteristic, biochemical reaction as per standard technique.

Result:

In unmarried girls the culture showed 1.67% positivity in comparison to Married female 5 % and in pregnant women highest urine culture positivity 13.9 % was observed. *Escheriae coli* were found to be commonest organism followed by *klebsiella aeroginosa* and *Streptococcus fecalis*. The result will be discussed.

Miscellaneous**127. Media and Health: Reference to Representations, Design and Content**

Payel Chakrabarti

Research Scholar, Department of Humanities and Social Sciences,
Indian Institute of Technology,
Guwahati 781 039
Email: payel@iitg.ernet.in

Keywords: *Media communication and health, human factors aspects, mental stress*

Effective communication to the masses or to a specific target group, regarding a situation or a particular theme, results in elevating wellbeing or in reverse it imposes stresses and thus affects health mentally as well as physiologically. Perceptions of media communication and health carry both, the design, the ways of message representation, and the message regarding health awareness with a specific content. Media function would be to spread the good and make aware of the evils. This paper looks into some human factors aspects and issues of impression creation by media representation, both in print and electronic, and studies the possible ill effects from negative mediation that imposes mental stress which ultimately may lead to health hazards.

128. Circadian blood pressure variability in a cohort of young subjects from Chhattisgarh as function of gender

Nishtha Vaidya

School of Life Sciences,
Pt. Ravishankar Shukla University, Raipur 492 010
Email: nishthavaid@gmail.com

Keywords: *ABPM, blood pressure, circadian rhythm, dipping pattern*

Circadian variability in blood pressure was studied in a cohort of healthy young subjects from Chhattisgarh. BP was monitored in 60 females and 40 males, using Ambulatory Blood Pressure Monitor (ABPM, TM 2430) for over a period of 2-4 consecutive days. Results indicate that 25% of the studied population was non-dippers. The rhythm detection ratio was low among non-dippers. Significant differences for the circadian Mesors and peaks of BP variables were noticed between males and females. Identification of 25% non-dippers may be an indicator of higher risk of cardiovascular diseases among young individuals of this region.

129. Comparison of Cardiovascular Disease Risk Factors by Central Obesity Status in Asian Indian Women: Santiniketan Women Study

Minakshi Bhagat, Arnab Ghosh

Biomedical Research Laboratory,
Department of Anthropology,
Visva Bharati University,
Snmketan 731 236, West Bengal
Email: arnab cu@rediffmail.com

Keywords: *Body composition, central obesity, menopause, CVD, Asian Indians*

The present cross-sectional study was aimed to compare cardiovascular disease (CVD) risk factors by central obesity (CO) status in Asian Indian Women with the hypothesis that central obesity plays any vital role to develop CVD in women. A total of 280 healthy women aged 25 to 65 years took part in the study. A random sampling procedure using a

local voters' registration list was followed to select the participants. All participants belonged to the Bengalee population and were inhabitants of the Bolpur-Santiniketan area, West Bengal. Anthropometric measures namely height, weight, circumferences at mid upper arm (MUAC), minimum waist (MWC), maximum hip (MHC), skinfolds at biceps (BSF), triceps (TSF), subscapular (SUSF), suprailliac (SUSF) etc., were collected using standard techniques. Waist hip ratio (WHR) and sum of four skinfolds (SF4) were then calculated subsequently. Percentages of body fat (PBF), intra-abdominal visceral fat (IVF), body mass index (BMI) and basal metabolic rate (BMR) were measured using an Omron body fat analyser. Left arm systolic (SBP) and diastolic (DBP) blood pressure was taken in participants. Metabolic profiles, namely, total cholesterol (TC), triglyceride (TG), high-density lipoprotein (HDL), low-density lipoprotein (LDL), fasting plasma glucose (FPG), insulin, testosterone, and estrogen (e.g. 17 p estradiol), were measured accordingly. All subjects were categorized into two groups: centrally non obese (WHR<0.85) and centrally obese (WHR>0.85). One-way ANOVA revealed significant group differences for age, BMI, MUAC, SF₄, PBF, IVF, and PBF: BMI, BMR, SBP, DBP, MAP, and Estrogen. Distribution of body composition & physiological characteristics in percentile according to central obesity status in pre and postmenopausal women revealed a positive increasing trend for variables as per central obesity status in pre and postmenopausal women. Comparison of central obesity status by Indian diabetes risk score (IDRS) in pre and post-menopausal women showed that there was significant difference [$\chi^2 (i) = 13.3$] for CO status by IDRS in pre and postmenopausal women. Prevalence of CO is comparatively high in postmenopausal women and warranted early intervention well before the onset of natural menopause as CO is considered to be one of the major risk factors of CVD.

130. Nanomaterials for Stem Cell Labelling and Imaging

G. Rajapandiyani

Amity Institute of Nanotechnology,
Amity University, Noida,
Uttar Pradesh-201 301
Email: rajapandiyani0072000 (g), gmail.com

Keywords: *Stem cell nanotechnology, magnetic nanoparticles spios, quantum dots, regenerative medicine, stems cell imaging*

In recent years, stem cell nanotechnology has emerged as a new exciting field.

Nanotechnology and biomedical treatments using stem cells are among the newest veins of biotechnological research. While the potential applications for nanotechnology in stem cell research are countless, three main categories can be assigned to their use bracking or labeling, scaffold delivery. Nanotechnology enables labeling stem cells using magnetic, genetic or fluorescent probes which can be monitored by magnetic resonance imaging (MRI) or fluorescence imaging. This review details the current challenges in regenerative medicine, and applications of nanomaterials in stem cell biology and further potential of nanotechnology towards regenerative medicine, focusing mainly on magnetic nanoparticles and quantum dot based application in stem cell research.

131. Screening of Antidepressant Activity of Dronabinol in Mice

Shishir Mishra, D. Kumarswamy, V. Sathyanarayanan, R. Jamuna Rani

Clinical Tutor, SRM University,
Kattankulathur 603 203, Tamilnadu
Email: shishirmishra13@gmail.com

Keywords: *Antidepressant activity, dronabinol, imipramine, Dunnet's test, antidepressant activity*

Aim:

To evaluate the antidepressant activity of dronabinol in two experimental models, tail suspension test and forced swim test in mice.

Materials and Method:

Adult Albino mice (Swiss strain) weighing 25-30 grams, bred in our own laboratory will be used. The animals will be divided in four group groups first receive standard drug imipramine, second and third two doses of test drug and fourth group receives normal saline. Duration of immobility will be recorded and expressed as mean \pm SEM. ANOVA followed by Dunnet's test will applied for analysis of results.

Result:

Result will be interpreted after analysing statistical data. If the test drug decreases the duration of immobility it will be considered to have antidepressant activity.

132. FMN-Phosphatase from Goat Heart

**Monalisa Dey, Swagata Basak, Debosree Ghosh,
Debasish Bandyopadhyay**

Oxidative Stress and Free Radical Biology Laboratory,
Department of Physiology, University of Calcutta,
University College of Science and Technology,
92 APC Road, Kolkata 700 009
Email: debasish63@gmail.com

Keywords: *Riboflavin, FMN-phosphatase, goat heart*

The physiological significance of riboflavin lies in its conversion to flavin mono nucleotide (FMN) and flavin adenine dinucleotide (FAD), the two coenzymes that is required for a wide variety of redox reactions. Present study deals with a phosphatase in the goat heart tissue which hydrolyses FMN into riboflavin and inorganic phosphate. There is no information available to-date about goat heart FMN-phosphatase which, our studies show, is a good source of the enzyme. The phosphatase activity was found to be localized in the microsomal fraction of the tissue. The optimum pH and temperature for the enzyme activity was found to be 5.0 and 40⁰C respectively. FMN (Km=0.2mM) was found to be the best physiological substrate although synthetic substrate like para-nitrophenyl phosphate was also readily hydrolysed. The enzyme activity was found to be competitively inhibited by divalent cations like Zn, Cu, Cd and Ca indicating a possible involvement of a reactive sulfhydryl group at or near its active site. Blockers of –SH group such as PCMB, NEM and DTNB are potent inhibitors of the enzyme, and their effect is reversed by GSH. Phosphate also suppresses the enzyme activity by competitive inhibition. Further studies with a purified preparation of this enzyme are in progress.

133. A Flavin Phosphatase from Goat Liver

Swagata Mallick, Monalisa Dey, Debasish Bandyopadhyay

Oxidative Stress and Free Radical Biology Laboratory,
Department of Physiology, University of Calcutta,
University College of Science and Technology,
92 APC Road, Kolkata 700 009
Email: debasish63@gmail.com

Keywords: *Riboflavin, FMN-phosphatase, goat liver*

A comparative study of the tissues from several animals showed the presence of phosphatase(s) hydrolyzing flavin mono nucleotide (FMN). Liver is a rich source of this enzyme. The FMN phosphatase of goat liver was not studied earlier. Present study deals with the localization and properties of this enzyme. Post-mitochondrial supernatant was found to exhibit maximal enzyme activity. The enzyme showed a linear activity with the increasing concentration of FMN & protein to produce riboflavin & inorganic phosphate. The optimum pH & temperature were found to be 5.0 & 50°C respectively. Among the compounds tested for its hydrolytic activity, FMN ($K_m=2 \times 10^{-3}$ M) was the most important physiological substrate although the enzyme was found to hydrolyze p-nitrophenyl phosphate maximally. The enzyme was found to be inhibited by the divalent cations in increasing order of inhibition, $Ca^{2+} < Zn^{2+} < Cd^{2+} < Cu^{2+}$ indicating the presence of a -SH group at or near the catalytic site of the enzyme. Parachloromercuribenzoate (PCMB) and 5, 5'-dithiobis-2-nitrobenzoic acid (DTNB) are potent inhibitors while N-ethyl maleimide (NEM) inhibited the enzyme activity to a lesser extent at even higher concentrations and this inhibition of enzyme activity was found to be protected by reduced glutathione indicating the involvement of a sulfhydryl group in the catalytic mechanism. Further studies are being carried out to characterize this flavin metabolizing enzyme with a purified preparation.

134. Perceptions about HIV/AIDS among School Teachers of Punjab

Anju Soni¹, Sonika Jain²

¹Lecturer Chemistry,

²Lecturer Physics, GGSSS,
Jawahar Nagar, Ludhiana, Punjab

Keywords: *Perceptions, HIV, AIDS, school teachers*

Objective: To assess the knowledge about HIV/AIDS among school teachers of Punjab

Sample size: 524

Study area: Secondary and Senior Secondary Schools

Study tool: Pre designed questionnaire

Statistical analysis: Percentages, Chi Square test

Results: Out 566 teachers contacted, 524(90%) participated in the study. There were 49.2% subjects in the age group of 31-40years, 69.1% were from urban area, 60.7% were Sikhs and 94.7% were married. Majority of the subjects (85.1%) cited germ as the cause of AIDS. 20.2% subjects reported that males are more likely to get AIDS. Regarding the modes of transmission majority reported correctly where some also reported hand shaking, sharing clothes/toilets as mode. Awareness about other related aspects like curability, availability of vaccine/medicine, etc was also sought.

135. Measurement and Analysis of Heart Rate Using Fuzzy Logic

N. Thanigasalam, Kailash Krishnan, C. Vaithilingam*

3rd year B.Tech students,*Asst. Professor,

Dept. of EEE, SRM University 603 203

Email: thani31@gmail.com

Keywords: *Wrist mounted heart rate measurement, auto-watch, Fuzzy logic, piezoelectric sensors.*

The constant monitoring and analysis of heart rate of an individual can help in

maintaining a record of his physical condition over a period of time. This data helps the individual to predict impending ailment, also, to regulate his method of training to improve fitness. The device being proposed aims to serve the above mentioned purpose.

A wrist mounted heart rate measuring device capable of continuous measurement of pulse (using piezoelectric sensor) and storage of the same for further analysis (using Fuzzy logic). This entire setup is integrated on to a digital watch circuit modified so as to make it self-charging.

136. Towards Creating the Joys of Seeing for the Blind

V. S. Vamsi, J. Santhosh

GMR Institute of Technology – Rajam

Email:vs.vamsiv@gmail.com

Keywords: *Blindness, artificial vision system, artificial silicon retina, cortical implants*

Blindness is more feared by the public than any other ailment. Artificial vision for the blind was once the stuff of science fiction. But now, a limited form of artificial vision is a reality. Now we are at the beginning of the end of blindness with this type of technology. In an effort to illuminate the perpetually dark world of the blind, researchers are turning to technology. They are investigating several electronic-based strategies designed to bypass various defects or missing links along the brain's image processing pathway and provide some form of artificial sight.

Our paper is about curing blindness. Linking electronics and biotechnology, the scientists has made the commitment to the development of technology that will provide or restore vision for the visually impaired around the world. Our paper describes the development of artificial vision system, which cures blindness to some extent. Our paper explains the process involved in it and explains the concepts of artificial silicon retina, cortical implants etc. The roadblocks that are created are also elucidated clearly. Finally the advancements made in this system and scope of this in the future is also presented clearly.

137. Stability and Fluorescent Studies of the Coloring Content of Flowers of *Nyctanthes Arbor Tristis*

K. Sreenivas Aithal¹, K K Sreenivasan², Nalini³,
Sachin Honguntikar⁴, Smitha P S⁵

¹Professor, Dept of physics, MIT;

²Professor, dept of Pharm. Chemistry,
Manipal College of Pharm. Sciences;

³Professor, Dept of Biochemistry, KMC;

⁴Research Scholar, MLSC, Manipal university,
Manipal;

⁵Lecturer, Dept of Physiology,
KLE Institute of Dental Sciences, Bangalore

Keywords: *Nyctanthes arbor tristis*, Column chromatography, Spectro photometer, fluorescence study, Stability study

Carotenoid glycoside named Crocin (coloring compound) is the main constituent present in saffron. Several biological activities are attributed to this compound. It is usually isolated from *Crocus sativus* which is highly expensive and not easily available. Crocin is important commercially significant constituent of saffron. Isolation of crocin from easily available like *Nyctanthes arbor-tristis* flowers will be of great significance. The flowers of *Nyctanthes arbor-tristis* are reported to exhibit anti-plasmodial, anti-bacterial and anti-arthritic properties. It was also reported that this coloring compound was present in corolla tubes of flowers of *Nyctanthes arbor-tristis* by Dhingra et al (1976). In this study, we tried to elucidate the stability and fluorescence property of crocin by using ethanolic extract of the flowers by spectroscopy and fluorimetry methods respectively. The compound seems to be fairly sensitive to sunlight but stable with pH.

138. Quality Education and Excellence in Science Research in Indian Universities

Siddhartha

Manager, Mint, INDIA GOVT MINT,
A Unit of SPMCIL, Diamond Harbour Road,
Alipore, Calcutta 700 053
Email: siddhartha08@gmail.com

Keywords: *Revolution, edge, expansion, inclusiveness, equity, partnership, internationalization, funding, commission*

Higher Education in India including research has expanded enormously during the last sixty years. It is also encountering a few important and significant challenges. The concept of education itself has gone through a sea change.

Education for Knowledge, Information, Skills, Employment, Livelihood, Empowerment, social and National Development.

Some institutions of higher education also have been active in working on problems that affect the poor. For instance, the Telecommunication and Networking (TelNet) group at the Indian Institute of Technology in Chennai has developed ICT solutions that deliver a menu of services, such as health care by telemedicine, agricultural consulting via Internet, education, communication, banking, entertainment, and E-governance.

Early experiments showed that ICT can be a critical tool for empowering rural India, and people are willing to pay for improvements in their quality of life. This makes it a sustainable option and generates employment. This was an initiative taken by an academic group and put into operation by start-up ventures rather than supported by any research councils.

But it is not only S&T delivered by the public or private sector that leads to inclusive growth. The problems of the poor are identified by the poor themselves, and it is the subsequent intervention by formal S&T systems that makes the huge difference.

139. A Study on the variation of Scalp, Pubic and Axial hair in Bengalee Caste Hindu population

Sanchita Mistry¹, Arup Ratan Bandyopadhyay²

¹Deaprtment of Anthropology, Sree Chaitanya College,
Habra, 24 Parganas (N);

²Department of Anthropology, UCSTA,
University of Calcutta, 35, Ballygunge Circular Road,
Kolkata 700 019

Email: sanchitaanthro@gmail.com

Keywords: *Bengalee population, scalp hair, pubic hair, axial hair, quantitative traits*

Hair examinations and comparisons conducted by forensic scientists often provide investigative and associative information. The microscopic comparison and identification of human hair are based on its physical morphology. Apart from its length and its natural color, hair displays a morphologic diversity both macroscopically and microscopically. Pseudogenization of *öHhA* type I hair keratin gene inactivation highlight dramatic differences and thought to be one of the strongest reason for localization of hair in human. Therefore, humans have several different types of hair that can be classified depending on their body position and form. Size, angle of penetrance through the skin, embryological time of first appearance, and structural variations in the hair follicles are all taken into account when classifying hair types. However, the classification of differential types of hair quantitative traits in human is yet to be undertaken. An attempt has been made in the present study to understand the variation by using the histomorphological and quantitative variables of 540 hair strands (180 each scalp, axial and pubic hair) of 18 Bengalee Hindu caste females. Apart from variation in histomorphological variables, quantitative variables regarding shaft and medulla diameter demonstrated variation in terms of significantly higher ($P < 0.05$) in pubic hair compared to that of axial and scalp hair. Therefore, the present study envisaged variability in histomorphological and quantitative traits in differential area of human could be one of the important criteria for personal identification in forensic research.

140. Microscopic Observations on the Mammalian Tongue As Visualized by the Cholinesterase Technique

R.S. Purwar* (Sr.) ,¹R. Purwar, ²R. S. Purwar (Jr.)

*Former Professor and Principal of Higher Education,

¹Former Assistant Prof., ²Jr. Former Assistant Prof.;

Dept. of M.P. Govt., 24, Alkapuri,

Behind New High Court,

Gwalior, M.P., 474 006

Keywords: *Innervation, intrinsic, tongue, Cholinesterase technique*

An investigation was undertaken for the study of the intrinsic innervation of tongue of *Rattus rattus rufescence* (rodent pest), as visualized by Cholinesterase technique, under maintained pH 5.2, temperature 37 °C and an incubation period of 18 hrs, using acetylthiocholine iodide, as a substrate.

Numerous papillae, taste buds, muscle spindles and blood vessels and their associated nerves, ganglia, and nerve bundles showed AChE-positive reaction i.e. positively stained. Innervation of the papillae was recorded either by the nerves of the blood vessels or the nerves of the ganglia or at times, by both.

Blood vessels in the vicinity of the papillae (i.e. *filiform, fungiform, foliate and circumvallate papillae*) were richly and profusely innervated by the nerves of the blood vessels, nerves of the neuro-muscle-spindles or the nerves of the ganglia.

Taste buds showed AChE-positive activity at their anterior end and were innervated by fine divisions of the non-myelinated nerves and the nerves of the blood vessels.

Neuro-muscle-spindles were innervated by the nerves of the blood vessels, nerves of the papillae and nerves of the ganglia. At times, ganglia were recorded lying on the periphery of the muscle spindle. Muscle spindles also showed *slight* AChE-positive reaction to the AChE substance.

141. Neurohistochemical Study of the Pancreas of a Rodent, as Visualized by Cholinesterase Technique

¹R. Purwar, ²R. S. Purwar*, ³R. S. Purwar

¹Former Assistant Professor, ²Jr Former Assistant Professor,

³Former Professor & Principal of Higher Education

Department of Govt. of M.P.;

24, Alkapuri, Behind New High Court,

Gwalior, M.P. 474 006

Keywords: *Innervation, pancreas, cholinesterase technique*

An investigation was undertaken for the study of intrinsic innervation of islet cells with reference to the formation of “Neuro-insular Complex” in the pancreas of *Rattus rattus rufescence* (rodent pest), as visualized by Cholinesterase technique, under maintained pH 5.2, temperature 37°C, and an incubation period of 16 hours, using acetylthiocholine iodide, as a substrate.

Intricate intrinsic innervation of islet cells was recorded, as the nerves formed the “Neuro-insular Complexes” in various regions in the pancreas. The close associations and deep relations of the AChE-positive nerves with the pancreatic structures were observed through the nerves of the blood vessels, nerves of the acinar cells, nerves of the islet cells, nerves of the AChE-positive ganglia and nerve cells, at times. At times, the nerves of the blood vessels through their vascular plexuses and nerves of the acinar cells, formed the peri-insular plexus, encircling the islet cell.

Ganglia of AChE-positive nature were recorded in very close relation and association with the islet cells and participated in the formation of “Neuro-insular Complex”. Distribution of the “Neuro-insular Complexes” was noticed in the vicinity of the blood vessels (either an artery or vein) and the acini.

The formation of the “Neuro-insular Complexes” was by AChE-positive ganglia and nerve cells (assuming the shape of small ganglia) which have been described and discussed. Distribution and localization of AChE activity was marked in numerous ganglia, of various shapes and sizes, nerve cells, nerve bundles, coarse nerves of myelinated and non-myelinated nature, neural networks and plexuses of the acinar cells, blood vessels, islet cells, and pancreatic duct and on the contrary the acinar cells and connective tissues were negatively stained.

142. Studies on Some Physico-Chemical Parameters of Surface and Ground Water in and Around East Kolkata Wetlands, West Bengal

C. Datta*, **S. Bramha¹**, **B. Goswami²**

*¹Asutosh College; 92, S.P. Mukherjee Road, Kolkata 700 026;

²Department of Geology, University of Calcutta

35, Ballygunge Circular Road, Kolkata 700 019

Keywords: *Water quality, east Kolkata wetlands, West Bengal*

The East Kolkata Wetland (EKW) covering an area of about 12,500 hectares is a highly complex and poorly understood ecosystem. The area processes the solid and liquid waste of Kolkata Metropolitan area in a natural way and renders a service that would be very expensive to replace. In 2002, the EKW was declared as Ramsar Site based upon the wise use of the wetland in particular sewage treatment, fish farming, and agricultural irrigation. The waste water of the Metropolis enters the wetlands through a network of drainage channels ultimately feed the fisheries. Some physico-chemical parameters of water like pH, Conductivity, DO, BOD, COD, Chloride, Total Hardness, TSS, TDS, Total Iron, Nitrate-N, Phosphate-P, Nitrite-N at six equal intervals of the stretch starting from EM Bypass to Bidyadhari river (Kulti Gong) have been studied. We have also studied few parameters like pH, Conductivity, DO, Chloride, Total Hardness, TSS, TDS, Total Iron, Nitrate-N, Phosphate-P, Nitrite-N of the ground water collected along this stretch. Some of the parameters like Conductivity, Chloride, Total Hardness, TSS and TDS of both surface and ground water have been found varying consistently from one area to another. The results of these investigations shall be presented in the meeting.

143. Evaluation of Stair Climbing Test as a Measure of Cardiopulmonary Reserve

Debasis Pramanik¹, **Chiranjit Bal**

Department of Physiology, Medical College and Hospital,

88, College Street, Kolkata 700 073

Email: deba_pram@yahoo.co.in

Keywords: *Stair climbing test, VO₂max, cardiopulmonary reserve*

Assessment of cardiopulmonary reserve can be done by measuring VO₂max with

sophisticated computerized treadmills which are often unavailable in peripheral hospitals. The present study evaluates stair climbing test, a simple alternative. Patients are instructed to climb 6 flights of stairs with a total height of approximately 11 metres, in the shortest possible time which is then correlated with VO₂max values determined by computerized treadmill. Pearson's correlation analysis showed strong correlation ('r' = -0.786, p < .000.) between values of stair-climbing time and VO₂max. Points to emphasise in stair climbing test are using a standard total height of stairs (10-12 metres) and encouraging patients verbally to give best possible effort.

144. Value of Polymerase Chain Reaction in the Diagnosis of Extra Pulmonary Tuberculosis

V. Makesh Kumar¹, Radhamadhavan², Sujathanarayanan³

²Department of Microbiology,
SRM Medical College Hospital & Research Centre,
Kattankulathur - 603203, Kanchipuram District, Tamilnadu;

³Department of Immunology,
Tuberculosis Research Centre, (ICMR) Institute,
Chetput, Chennai, Tamilnadu
Email: micromakesh_2007@rediffmail.com

Keywords: *Extra pulmonary tuberculosis, acid fast bacilli, Lowenstein Jensen medium, polymerase chain reaction, IS6110 element*

Introduction: Diagnosis of extra pulmonary tuberculosis (EPTB) poses a great challenge. Sensitivity of AFB smears (10-37%) and culture (12-80%) is very low and differs with types of clinical specimen.

Objectives: To evaluate efficacy of Polymerase Chain Reaction (PCR) using the repetitive Sequences (IS 6110) as target for DNA to detect Mycobacterium tuberculosis in different Clinical Specimens of clinically and radiologically suspected EPTB Patients.

Methods: One hundred and seventy one non repeated clinical specimens were collected from clinically and radiologically suspected EPTB patients admitted in SRM

Hospital from May 2008 – June 2010. All Samples were subjected to AFB staining and conventional culture in Lowenstein Jensen (LJ) medium. All samples were processed for PCR amplification targeting IS 6110 of M.tuberculosis Complex.

Results: AFB smear was positive in 6/171 (3.42%) samples; culture was positive in 4 out of 6 AFB smear positive patients, PCR was positive in 46/171 (28%).

Conclusion: PCR technique is a better diagnostic tool for clinically and radiologically suspected EPTB patients.

145. Public Screening for Osteoporosis Using Portable Heel Bone Densitometer at SRM University, Kattankulathur, Tamil Nadu

*M Anburajan, V Sapthagirivasan, D Ashok Kumar, W D Evans**

Department of Bio Medical Engineering, School of Bioengineering,
SRM University, Kattankulathur, Tamil Nadu, India. Pin: 603 203;

*Dept of Medical Physics and Clinical Engineering,
University Hospital of Wales, Cardiff, UK
Email: hod.bm@ktr.srmuniv.ac.in

Keywords: *Osteoporosis, Indian women and men, estimated heel bone mineral density, Quantitative ultrasound (QUS), Portable heel bone densitometer*

‘Osteoporosis’ is one of the world health problems. The aim was to study the prevalence of osteoporosis in the population aged above 50 years. Total of 659 Indian men and women, aged 18-84 years were screened. Heel bone mineral density, BMD (g cm^{-2}) was estimated using Sahara Bone Sonometer. In Indian women and men, average decrease in estimated heel BMD per decade of age (24-64 years) was found to be -6.8% and -3.3% respectively. At *T-score* d'' -1.5, 19.6% and 21.1% of the Indian women and men, aged above 50 years were diagnosed as having osteoporosis.

146. Net Based Rural Health Care System

S. Govindarajan, Mrs. S. Kanchana Devi

Department of Computer Applications,
SRM University, Kattankulathur 603 203 Tamilnadu
Email: sgrsgr@yahoo.com

Keywords: *Web Based Medical information system, using latest cutting edge technology, -OLAP- Smart card-Three layer architecture spread across villages, taluks, and state capitals- Fourth layer a control at single point for the whole country*

For the past four decades, Clinicians, physicians, Health service Researchers, and others have been investigating in bringing the advanced telecommunications and information technologies to improve Healthcare for our vastly populated nation. The main objectives of a health system are to respond to people's expectations and needs by providing services in a fair and equitable manner. This paper focuses on Intranet based Rural Healthcare system. The Healthcare centers are organized as a hierarchy of three layers, where the layers are Sub-center, Primary health center and state-wide Community health center. . The proposed system is going to make the functionalities of each layer as computerized one. In order to exploit the latest cutting-edge technologies of Information Communication Technologies (ICT), this paper defines the technologies recommended to be deployed in each layer of three layer architecture. The fourth one, visualized as of now could be the Central terra-database (Mega) for the population across the country.

147. Assessment of Nutritional Status of Muslim Madrasah Student in West Bengal

Md. Warish, AnangaMohan Chandra, Amalendu Samanta

Department of Physiology,
University College of Science and Technology (U.C.S.T),
University of Calcutta, 92, APC Road, Kolkata 700 009

Keywords: *Nutritional status, school children, body mass index (BMI)*

To create a general awareness for all and to bring it to the notice of the State Govt.,

Central Govt. and N.G.Os, a cross-sectional study was carried out to make an assessment of the nutritional status of Muslim madrasah student in West Bengal. Their physical parameters such as Height, Weight, BSA BMI etc were recorded using standard procedures.

To ascertain their family back ground and economic status, they were asked to fill up a questionnaire on their usual physical activity, habit of watching TV and time spent with computer and usual sleeping time as well as family income, parents' educational status, number of family members and working status of the parents etc.

Total number of 64 student participated in the study (among 30 primary and 34 upper primary students). The average age of the primary student and upper primary students were 8 years (6+ to 10 years) and 13 years (10+ to 14 years) respectively.

Results showed 76.47% of the upper primary student and 66.66 % of the primary student were found under nutrition category as per BMI and only 3.12% of the primary student was fall in obese category where no one of upper primary student was found in obese category.

The present study shows a high occurrence of under nutrition in upper primary student (6+ to 10 years) in contrast to primary student (10+ to 14 years) because the upper primary students were financially weak and to earn for their own living hood. These studies also showed that occurrence of overweight and obesity among them were insignificant.

This is a pilot study with small sample groups, further elaborate studies will to be helpful in arriving at a conclusion.

148. Asymptomatic Carriage of Beta Hemolytic Streptococci among School Going Children

Jebamalar.V, Habeeb, Ali Baig, Anandhi Lakshmanan, Radha Madhavan

Dept of Microbiology, SRM Medical College Hospital and Research Centre,
Kattankulathur.

Email: vincymalar_2007@yahoo.co.in

Keywords: *Beta- Hemolytic Streptococci, asymptomatic carriers, respiratory infection*

To study the carriage rate of beta- hemolytic Streptococci among school going children

in and around Kattankulathur. Healthy Carriers of beta-hemolytic Streptococcus harbor the organism in their nose or throat. This asymptomatic infection is common in children and helps to maintain the organism in the community. It facilitates spread of respiratory infections in the community. Study of the prevalence of healthy carriers may be useful for following effective control measures. Throat swabs were collected from 750 school children aged between 5 to 15 yrs. Samples were collected in different areas which included, a boys home, an orphanage, two charity running schools and 8 government schools. The isolates of beta hemolytic streptococci were serogrouped by agglutination tests using specific antisera. In this study the carriage rate of beta hemolytic streptococci around Kattankulathur was found to be 6.1%. In that carriage rate of group A Streptococci being 0.5% and Group C Streptococci 5.6%. It was higher in the age group of 10-15. The significance of Group C Streptococci carriage obtained by us requires further follow up study correlating the throat carriage and clinical disease.

149. *Zingiber Officinale* Roscoe Alone and in Combination with Á - Tocopherol Protect the Kidney against Aceclofenac - Induced Acute Renal Failure

***Soumendra Darbar, Nilendra Chatterjee, Tapas Kumar Chattaraj,
Tapan Kumar Pal***

Bioequivalence Study centre,
Department of Pharmaceutical Technology,
Jadavpur University, Kolkata 700 032
E-mail: darbar_soumen@yahoo.co.in

Keywords: *Antioxidant, free radicals, nephrotoxicity, aceclofenac, Zingiber officinale*

Non-steroidal anti-inflammatory drugs (NSAIDs) are the most common prescription medicine in India, also freely available over-the-counter (OTC). Unfortunately, one of the

main side effects of NSAID administration is renal function damage. NSAID are accountable for 7% of all cases of acute renal failure and for 37% incidents of drug-associated acute renal failure. Oxidative stress due to abnormal production of reactive oxygen molecules (ROM) is believed to be involved in the etiology of toxicities of many xenobiotics. Evidences suggested that ROM is involved in the nephrotoxicity of a widely used nonsteroidal anti-inflammatory drug, aceclofenac. The nephroprotective effects of ethanol extract of *Zingiber officinale* alone and in combination with vitamin E (α -tocopherol) were evaluated using aceclofenac (90 mg/kg body wt., i.p) induced acute renal damage in mice. The serum urea and creatinine levels in the aceclofenac alone treated group were significantly elevated ($P < 0.001$) with respect to normal group of animals. The levels were reduced in the *Z. officinale* (250 and 500 mg/kg, orally) plus diclofenac sodium, vitamin E (250 mg/kg) plus aceclofenac, and *Z. officinale* (250 mg/kg) with vitamin E plus aceclofenac treated groups. The renal antioxidant enzymes such as superoxide dismutase (SOD, catalase (CAT), glutathione peroxidase (GPx) activities and level of reduced glutathione (GSH) were declined; level of malondialdehyde (MDA) was elevated in the aceclofenac alone treated group. The activities of SOD, CAT, GPx and level of GSH were elevated and level of MDA declined significantly ($P < 0.05$) in the *Z. officinale* (250 and 500 mg/kg) plus aceclofenac and *Z. officinale* (250 mg/kg) with vitamin E plus aceclofenac treated groups. The protective effect of *Z. officinale* (250 mg/kg) was found to be better than that of vitamin E (250 mg/kg body wt). The results also demonstrated that combination of *Z. officinale* (250 mg/kg) with vitamin E (250 mg/kg body wt) showed a better protection compared to their 250 mg/kg alone treated groups. Moreover, *Z. officinale* along with Vitamin E prevented serum and tissue protein alteration as well as DNA fragmentation as compared with the groups treated with diclofenac alone. In the histopathological observation, kidney damage induced by aceclofenac was markedly improved in *Z. officinale* treated rats. The study concluded that ethanol extract of *Z. officinale* alone and in combination with vitamin E partially ameliorated aceclofenac-induced nephrotoxicity. This protection is mediated either by preventing the aceclofenac-induced decline of renal antioxidant defense system or by their direct free radical scavenging activity.

150. A Study of Biofilm Formation in Indwelling Catheter Devices in SRM -Hospital, Kattankulathur

¹ *Maharaja*¹, *Radhamadhavan*, ² *Thirumavalavan*,

¹Research Scholar, ² Professor & Head, Intensive Care Unit,
SRM Medical College Hospital & Research Centre,
Kattankulathur, Kanchipuram District, Chennai, Tamil Nadu

Keywords: *Bio film, indwelling catheter, brain heart infusion broth, cysteine lactose electrolyte deficient agar, E. coli, P. aeruginosa, Test tube method, Hospital acquired infection*

INTRODUCTION: Biofilm can be a threat to human health by the growth of biofilms on medical implants such as prostheses, heartvalves and urinary catheter leading to infections and biofilms as source of pathogen causing contamination. Moreover biofilm shows an increased resistance to antimicrobial agents.

AIM & OBJECTIVES: To isolate and identify the biofilm producing organisms and its antibiotic sensitivity pattern in patients with indwelling various catheter.

MATERIALS & METHODS: A total 75 strain isolated from urinary catheter samples of various clinically diagnosed patients by brain heart infusion broth (BHI) and incubated for 24 hrs at 37 degree Celsius. After 24 hrs incubation, one loopful of sample has taken from BHI broth and inoculated in Cysteine Lactose Electrolyte Deficient agar (CLED). The detection of biofilm crystal violet test tube method was performed and its was confirmed by colorimetric analysis according to the optical Density (OD) value.

RESULTS: *Escherichia coli* were the predominant organism producing biofilm in indwelling catheter and *Pseudomonas aeruginosa* also. Apart from that the present study proved *Staphylococcus aureus*, *Klebsiella* sp. *Enterococcus* sp. *Proteus mirabilis*, Coagulase Negative *Staphylococci* (CONS), and Beta - hemolytic *staphylococci* also produced biofilm formation on indwelling catheter. Antibiotic sensitivity pattern showed the *E.coli* and *P.aeruginosa* were resistant to all antibiotic(MDR) compare than other isolates.

CONCLUSION: *E.coli* and *P.aeruginosa* also frequently isolated from various cases of indwelling catheter patients. Still both organisms cause major problem in hospital acquired infection and resistant to all antibiotics.

151. Prevalence of Anaemia in School Children in Kattankulathur Area, Tamil Nadu

¹ B. Sudhagandhi, ²S. Sundharesan, ³G. Shivashekar,
⁴K. Sumitra, ⁵A. Prema

¹Research Scholar, Department of Biochemistry,

²Assistant Professor, Department of Medical Research,

³Professor & Head, Department of Pathology,

⁴Assistant Professor, Department of Medical Research,

⁵Professor, Department of Pediatrics,

SRM Medical College Hospital & Research Centre,
SRM University.

Keywords: *School children, anemia, prevalence, hemoglobin*

Background & Objectives: Anemia is the most widespread nutrition problem in the world and has predominance in India like developing countries, particularly in children and women. The magnitude of the Anemia has been well documented in pregnant women and infants, but however, there is no data prevailing on the occurrence of anemia in school children. The main objective of this study was to estimate the prevalence of anemia and its correlation to variables such as age, gender and Body Mass Index in school children of Kattankulathur, Tamilnadu, India.

Methods: A total of 900 children were included in this study between the age group of 8-16 years. Parent consent was obtained in the written format. Blood was collected by finger prick and the hemoglobin was determined by Cyanmethaemoglobin method. A pre planned questionnaire was used to collect the health details of the children. According to the age, the children were grouped.

Results: Prevalence of Anemia as per WHO recommended cut-off value of hemoglobin, among these children was 48.60% (437 / 900). The frequency of prevalence of anemia was significantly higher amongst girls (63.6%) as compared to the boys (33.6 %). The prevalence of anemia in our study was higher in under weight children 72.3% when compared to normal weight and obese children.

Conclusion: In our study population 48.60% were anemic, number of girls (63.6%) were higher than the boys (33.6 %). Most of the anemic children were under weight. All the school children should be screened periodically and appropriate measures should be taken.

152. Antimicrobial activity of C-phycoyanin

T.Murugan, Radhamadhavan

Dept of Microbiology
SRM Medical College Hospital and Research Institute
SRM University, Kattankulathur 603 203,
Tamilnadu, India

Keywords: *C-phycoyanin, antimicrobial activity, partial purification, screening, minimum inhibitory concentrations*

The C-phycoyanin was extracted from *Spirulina platensis* grown in-vitro. Initially the standard partially purified C-phycoyanin obtained from Sigma Aldrich(USA) was analysed for antibacterial activity of both gram positive and gram negative bacteria. After the initial confirmation, the C-phycoyanin was extracted from laboratory grown *Spirulina platensis*, and the identity was confirmed with standard C-phycoyanin by HPTLC and SDS-PAGE. It was then partially purified and screened for antibacterial, antifungal and antiviral activity. The results were compared with standard C-phycoyanin (Sigma-Aldrich) and standard antibiotics. There were 6 bacterial isolates (Clinical isolates) were subjected to screening and 15 isolates used to determine Minimum Inhibitory Concentration of antimicrobial activity. In addition there were 5 fungal sps and 4 virus cell lines also subjected to the antimicrobial assay. The study proved that the C-phycoyanin possess antimicrobial activity and also potent than the commercially available chemotherapeutic agents and standard C-phycoyanin.

153. Antifertility Studies of *Carica Papa Ya* Linn. Seed Extract on Protein Profiles in Male Albino Rats

Changamma C, Lakshman J, Hasim Basha S & Govardhan Naik A

Department Of Zoology, S.V.University Pg Centre,
Kavali-524 201, A.P, India.

E-Mail: challa_changamma@yahoo.co.in

Keywords: *Male infertility. Carica Papaya seed. Protein metabolism. Nucleic acids*

The activity of *Carica Papaya* Linn. (Paw-Paw) seed extract on protein metabolism of albino rats was studied. The oral administration of papaya seed extract (50mg/kg body wt/day for 20 days) shows the effect on total proteins, free amino acids and nucleic acids. The decreased protein content were noticed in testes and sex accessory glands **with** accumulation of proteins **in** epididymis and no **significant** changes in liver, indicates the reduced protein metabolism particularly **in** testes. Due **to** the accumulation of proteins in the epididymis the sperm entering the epididymis does not undergo maturation which leads to infertility. The increased amino acids decrease the alkalinity of the semen **in** prostate gland which leads **to** decrease **the motility** and survival capacity and protection of the genetic material. The **significant** decrease **in RNA/DNA** ratio in liver reflecting **ribosomal** loss and **cytoplasmic** shrinkage in liver cells. Thus these results, therefore, suggest **that C** Papaya seed extract is used as an **antispermatogenic** agent **at** lower doses **for** temporary infertility.

98th Indian Science Congress

January 3-7, 2011, Chennai

VI

LIST OF PAST SECTIONAL PRESIDENTS

PAST SECTIONAL PRESIDENTS**Medical Sciences (including Physiology)**

Dr. Tapas Kumar Bose	(2010)	B.B.Mallick	(1990)
Dr. Ananga Mohan Chandra	(2009)	Basudeb Datta Chaudhuri	(1989)
Ranajit Sen	(2008)	P.N.Bhat	(1988)
Dr. Amal Roy Chowdhury	(2007)	A.K.Ganguly	(1987)
Sujit Kumar Bhattacharya	(2006)	Chandan Roy Choudhuri	(1986)
P.K.Banerjee	(2005)	S.S.Khera	(1985)
P.P.Venugopalan	(2004)	Ajay K. Ghosh	(1984)
Debjani Guha	(2003)	R.C.Mazumdar	(1983)

Medical & Veterinary Sciences

		H.G.Sen	(1982)
Pratip Kumar Debnath	(2002)	P.K.Banerjee	(1981)
P.C.Das	(2001)	Jayasree Roy Chowdhury	(1980)
Tushar K. Maitra	(2000)	Dipak Kumar Ray	(1979)
P.Rai	(1999)	Dinabandhu Banerjee	(1978)
A.P.Galhotra	(1998)	S.R.Das Gupta	(1977)
Devavrata Chakravarti	(1997)	Sushiela Swarup Mitra	(1976)
M.A.Ghafoor	(1996)	B.Chakrabarti	(1975)
Hrishikesh Jana	(1995)	B.R.Sen Gupta	(1974)
Amiyakumar Hati	(1994)	P.N.Wahi	(1973)
G.P.Sen	(1993)	N.V.Bhaduri	(1972)
T.K.Das	(1992)	P.N.Brahmachari	(1971)
N.N.Roy Chowdhury	(1991)	Kalyan Bagchi	(1970)

D.P.Basu	(1969)	F.C.Minett	(1943)
S.R.Rao	(1968)	S.K.Basu	(1942)
Amiya B. Chowdhury	(1967)	A.C.Ukil	(1941)
P.C. Sen Gupta	(1966)	J.R.Haddow	(1940)
J.B.Chatterjee	(1965-1964)	T.S.Tirumurti	(1939)
Srish Chandra Seal	(1963)	Medical Research	
J.C.Banerjee	(1962)	U.N.Brahmachari	(1938)
A.K.Hazra	(1961)	Medical and Veterinary Research	
A.R.Natarajan	(1960)	A. Olver	(1937)
P.G.Pande	(1959)	M.E.Shortt	(1936)
A.K.Bose	(1958)	K.R.K Iyengar	(1935)
C.R.Das Gupta	(1957)	S.S.Sokhey	(1934)
Subodh Mitra	(1956)	A.D.Stewart	(1933)
Sushil Kumar Basu	(1955)	M.H.King	(1932)
R.N.Chaudhuri	(1954)	Brahmachari Bahadur	(1931)
S.C.A Dutt	(1953)	R.Knowles	(1930)
V.R.Khanolkar	(1952)	R.E.Wright	(1929)
G.Sankaran	(1951)	R.N.Chopra	(1927)
M.V.Radhakrishna Rao	(1950)	R.Rao	(1926)
M.B.Soparkar	(1949)	Medical Research	
G.D.Bhalerao	(1948)	F.P.Mackie	(1925)
G.Panja	(1947)	S.R.Christophers	(1924)
K.N.Bagchi	(1946)	J.Cunningham	(1922)
S.W.Hardikar	(1945)	J.W.D.Megaw	(1921)
K.V.Krishnan	(1944)	Harvey	(1920)

W.Glen Liston	(1919)	Rabindra Nath Sen	(1979)
Physiology		Hrishikesh Jana	(1978)
Manoj Kumar Chakrabarti	(2002)	S.N.Ray	(1977)
Subodh Ch. Paul	(2001)	Sripati Bose	(1976)
A.Namasivayam	(2000)	C.C.Deb	(1975)
Khub Singh	(1999)	A.K.Maiti	(1974)
Pratima Chatterjee	(1998)	S.K.Mukherjee	(1973)
W. Selvamurthy	(1997)	K.N.Sharma	(1972)
Usha Nayar	(1996)	Sarada Subramanyam	(1971)
P.K.Dey	(1995)	J.Nag Chaudhuri	(1970)
Satipati Chatterjee	(1994)	P.Brahmayya Sastry	(1969)
S.K.Manchanda	(1993)	M.L.Chatterjee	(1968)
Lazar Mathew	(1992)	S.R.Maitra	(1967)
T.Desiraju	(1991)	B.K.Anand	(1966)
H.B.Kundu	(1990)	M.C.Nath	(1965-1964)
Haripada Chattopadhyay	(1989)	D.P.Sadhu	(1963)
B.S.Gajalakshmi	(1988)	G.C.Esh	(1962)
G.S.Chhina	(1987)	D.N.Mullick	(1961)
Jyotirmoy Sen Gupta	(1986)	A.Roy	(1960)
Biswanath Koley	(1985)	N.P.Benwari	(1959)
J.M.Senapati	(1984)	S.N.Ray	(1958)
S.Dua Sharma	(1983)	Inderjit Singh	(1957)
N.K.Bhattacharyya	(1982)	D.V.S.Reddy	(1956)
A.K.Medda	(1981)	N.N.Das	(1955)
A.K.Mukherjee	(1980)	P.B.Sen	(1954)

N.D.Kehar	(1953)	B.Narayana	(1943)
S.Banerjee	(1952)	N.N.Das	(1942)
S.M.Banerji	(1951)	B.B.Dikshit	(1941)
Kalidas Mitra	(1950)	W.R.Aykroyd	(1940)
B.B.Sarkar	(1949)	N.M.Basu	(1939)
Bashir Ahmad	(1948)	R.N.Chopra	(1938)
S.A.Rahman	(1947)	S.L.Bhatia	(1937)
P.De	(1946)	W.Burridge	(1936)
B.Mukherji	(1945)	Veterinary Research	
S.N.Mathur	(1944)	Arthur Olver	(1938)

**PROCEEDINGS
OF THE
NINETY EIGHTH SESSION OF THE
INDIAN SCIENCE CONGRESS**

CHENNAI, 2011

PART II

SECTION OF MEDICAL SCIENCES (Including PHYSIOLOGY)

President : Prof. Amar K. Chandra

CONTENTS

I.	Presidential Address	1
II.	Abstract of Platinum Jubilee Lecture	41
III.	Abstract of Young Scientist Award Programme	47
IV.	Abstracts of Symposium / Invited Lectures	51
V.	Abstracts of Invited Foreign Lectures	121
VI.	Abstracts of Oral / Poster Presentations	131
	i. Endocrinology and Reproductive Physiology	
	ii. Food, Nutrition and Dietetics	
	iii. Neurophysiology	
	iv. Ergonomics, Work Physiology, Sports Physiology and Occupational Health	
	v. Drug Design and Toxicology	
	vi. Cancer Biology	
	vii. Forensic Science	
	viii. Homeopathy	
	ix. Acupuncture	
	x. Health and Disease	
	xi. Microbiology and Immunology	
	xii. Miscellaneous	
VII.	List of Past Sectional Presidents	311