ABSTRACTS OF INVITED PLENARY LECTURES

Maj. Gen. S. L. Bhatia Oration

FUNCTIONS OF THE PREOPTIC AREA: A SPECIAL ROLE IN THE REGULATION OF SLEEP-WAKEFULNESS

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The preoptic area (POA) plays an important role in the regulation of sleep-wakefulness, body temperature and reproduction. Our laboratory has been investigating the interrelationship of these regulations, with emphasis on control of sleep-wakefulness. Lesion studies, using different neurotoxins, have clarified the role of the POA neurons and their afferents in different functions. Restoration of some of these functions in those lesioned animals, which received total POA transplantation, provided information about the role of the POA neurons, and also indicated the possible future application of these research findings.

POA contains neurons which alter their discharges with changes in cortical EEG. Changes in the POA neuronal firing, induced by stimulation of limbic structures, brain stem reticular formation and peripheral afferents, revealed the kind of influence these afferents have in altering the POA funtions. Studies in which neurotransmitters were microiontophoretically applied, gave an insight into the complicated neuotransmitter modulation of the POA neuonal activity.

Application of different neurotransmitter agonists and antagonists at the POA selectively stimulated or inhibited some of these functions. Diverse changes produced by different compounds supported the theory that each of these functions in the POA are regulated by different neurons, afferents and receptors. These findings provided information about post synaptic alpha adrenergic control of hypnogenesis, and beta receptor in elicitation of male sex behaviour. Involvement of 5 HT in thermogenesis, inhibition of sex behaviours and LH surge, and cholinergic system in arousal, LH surge and lowering body temperature, were observed. Glycine and GABA were inhibitory to LH surge. The prostaglandins, which have a role in thermoregulation and sleep-wakefulness, also have a stimulatory effect on LH surge.

PL-01

NEUROPHYSIOLOGICAL STUDIES OF CENTRAL DOPAMINERGIC FUNCTIONS

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Clinical disorders and experimental studies have contributed immensely to the understanding of physiological role of central dopaminergic fibres. Large number of dopamine mediated behavioural functions in animals are being investigated at present. Pharmacological approaches directed in enhancing or blocking the dopamine receptor

function have also aroused keen interest in defining possible role of dopaminergic functions.

Severe loss of nigro-striatal dopaminergic neurons leads to Parkinson's disease; whereas, schizophrenia may be due to overactive mid-brain dopaminergic system. Microinjection of dopamine or amphetamine in the terminal field regions of mesolimbic system is associated with hyperlocomotion in rats.

Studies of nigro-striatal and mesolimbic dopaminergic systems have also revealed that dopamine may be a neurotransmitter involved in regulation of food and water intake. Hyperphagia can be suppressed by dopaminergic lesions. Manipulation of dopamine levels in limbic areas has provided evidence that dopaminergic system is related closely to thirst mechanism.

Dopamine depletion in brain reduces active learning behaviour in rats and approach behaviour like exploration in novel environment is disturbed after lesions of mesolimbic pathway. These and other studies support that central dopaminergic systems may be modulating behaviours like learning, motivation, reward mechanisms, feeding, drinking, drug addiction and alcoholism.

PL-02

M.P.T.P INDUCED PARKINSONISM

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Parkinson's disease, first recognized in 1817, is characterised by progressive destruction of dopaminergic neurons in the nigrostriatum, but the factors causing this selective neuronal loss is still unknown. M. P. T. P., present as an impurity in the"illicit heroin" samples marketed in 1982, produced features identical to Parkinson's disease. This development has ushered a new era in the history of the disease.

How it all began:-

Seven young men, in their early thirties, were brought to a Californian hospital with features of advanced parkinsonism, the symptoms having developed overnight. Being severe heroin addicts, the heroin samples were subjected to analysis - the samples had no heroin at all, but revealed the presence of an unusual substance, M.P.T.P. The chemist, in fact, had synthesised a reverse ester of pethidine, but M.P.T.P, a byproduct, also crept in. Studies in monkeys proved beyond doubt that M.P.T.P was indeed the causative agent.

Further studies on M.P.T.P victims

Out of the 400 and odd persons exposed to M.P.T.P, features of early parkinsonism could be detected in 50. A few, with no symptoms at all, showed significant depletion of dopamine in the striatum on PET scanning a preclinical hypodopaminergic state?

How does M.P.T.P induce Parkinsonism?

M.P.T.P (methyl phenyl tetrahydro pyridine) functions as a protoxin. In the brain, the substance is converted to MPP+ (methyl phenyl pyridinium) by the enzyme MAO(B). The MPP ion functions as a free radical, gets selectively taken up by the dopaminergic neurons - neuronal damage results from inhibition of mitochondrial enzymes. Inhibition of MAO(B) by selegiline prevents MPTP-parkinsonism in monkeys.

Relevance of MPTP induced parkinsonism

i. Has provided the most wanted animal model for parkinson's disease

ii. Has aroused the possibility of environmental toxins like MPTP in initiating the disease process.

iii. Has confirmed the presence of a preclinical stage for the disease.

iv. Has instilled sufficient hope of delaying the progression of the disease process - initial studies in this regard, using selegiline are quite promising.

PL-03

DESIGNING PROTOCOLS FOR SCREENING OF DRUGS FROM TRADITIONAL SYSTEMS OF MEDICINE

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Traditional systems of Medicine prevalent are Ayurveda, Unani, Sidha, Emchi and Naturopathy. Of these, Ayurveda is prevalent in almost all parts of India since 3000 years and also in the neighbouring countries like Nepal, Bangladesh, Pakistan and Sri Lanka. However, alien invasion of the country in the middle ages impeded the growth of this ancient science. The introduction of Allopathic drugs bringing about a quick relief for many diseases, became very popular and this was reinforced by the rapid advances made in the development of newer drugs like sulfonamides, antibiotics, etc. The practice of Traditional Medicine slowly receded more or less to rural areas. Moreover, Ayurveda did not make use of modern scientific methods of drug research and clinical trials in drug development. Hence, a rational approach to this therapy was not available. With Independence, there was a revival of Traditional Medicine in India and scientific research on this system was initiated by different laboratories/ agencies/ drug research institutes. However, as on today, only very few drugs have been developed from this system.

A rational approach to traditional drug research is **Ethnopharmacology,** the aims and objectives of which are discussed in detail. The protocol for screening of traditional drugs at present employed, newer experimental models available and protocols for future research including clinical trials are discussed.

PL-04

SENSATIONS FROM THE LUNGS

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Abstract not received

PL-05

PERSPECTIVES IN BIOLOGICAL MOTIVATIONS : A SYSTEMS APPROACH

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Virtually any behaviour entails motivation, but what makes one to behave the way he does, seemingly invokes an insight into an understanding of the underlying physiological processes that initiate, sustain and regulate the particular behaviour. Biological motivations described under the rubric of 'homeostatic motivations' meet the driving biological needs and include among them motivations of hunger, thirst, fear, aggression, sexual attractions and

various parental, particularly maternal motives. The signals of homeostatic needs are integrated with other sensory signals. The flow of information to the brain is not all in one direction but various strategies are used by the organism to gather and analyse information and react in strict accordance with the requirements of external and internal environment. The continuum of behaviour is patterned on the lines of specific hierarchy in which the particular driving need (e.g. hunger) becomes prepotent, and there is a concomitant dynamic interaction between hierarchial levels of neuraxis dovetailing the information processing with shifting dominant needs imposed by varying internal and external environmental features. In this multistage organisation afferent synthesis, decision-making with retrieval of pertinent experience (memory), feed back influence as acceptor of action results, efferent synthesis, forming of action proper and, finally, the assessment of the results achieved, are all taken into consideration. The quantitative cybernatic systems approach has revealed the operation of these interconnected and interacting factors and has unfolded consideration of formerly identified isolated processes as a unified feature, bringing motivation, emotion and memory seen as integrated elements in the behavioural act. For instance, lateral hypothalamic stimulation arousing hunger motivation and initiation of the act of ingestion in an otherwise satiated animal shows a distinct neuronal discharge pattern in limbic-forebrain regions and executive motor mechanisms coincident with the behavioural act. If, however, food reinforcement is not provided, there is a complete reorganisation of neuronal activity profile in these interacting regions within multiseconds and is reflected in the modulation of the goal-directed behaviour.

PL-06

BIOMEDICAL TECHNOLOGY FOR THE BENEFIT OF COMMON MAN

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Biomedical Technology is playing an important role in the health care delivery system. The modern medicine relies to a great extent on the diagnostic/ therapeutic value of biomedical equipments. In our country, the biomedical technology is still in its infancy. Most of the life saving equipments are still imported. Medical instruments are specially required in the disciplines of cardiology, oncology, radiology and imaging, neurology and ophthalmology. The present import bill of medical instruments is in the order of Rs: 150 crores per year, whereas indigenous production amounts to Rs: 40-45 crores per year. In fact, the real requirements will be 4-5 times more to provide these valuable equipments to our hospitals adequately. Hence, any effort from the part of the scientists to develop biomedical instruments and life saving devices will be a welcome step in our health care system, specially to achieve the target of "Health For All by 2000". With this view, a Society for Biomedical Technology has been recently launched to use spin off benefits from the defence technology for the development of biomedical equipments. The frontier areas of defence technologies arising from missile programme, aeronautics, advanced electronics, computer science and solid state physics are being used to develop some of the vital instruments so that these can be manufactured at an affordable price for the benefit of the common man. This will be a spin off benefit from the defence technology for social welfare through medical care.

Recent advances in endocrinology

SYM 101

CHEMOSIGNALS WHICH MODULATE BEHAVIOURAL PHYSIOLOGY OF MAMMALS AND THEIR HORMONAL CONTROL

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Chemosignals (Pheromones) play a salient role in behavioural biology of diverse groups of animals. Regarding mammals, the specialised skin glands have an ubiquitous distribution and constitute the major site of pheromone production. These chemosignals are disseminated by specific behavioural processes termed as scent marking. This is facilitated by specialised scent hairs (osmetrichia) equipped with special storage space wherein these glandular exudates are transitorily kept and bacterial action help in production of chemosignals. The neuroendocrinological basis of scent marking has been elaborated. Various messages relating to age, sex, sexual status, individual recognition, social dominance, territory, etc. are conveyed by these cues.

However our existing concepts on biochemical aspects of these glandular exudates are quite meagre with hardly very few of these mammalian pheromones isolated as yet. Recent studies on chemosignals of certain rodent pests of India have revealed that these chemosignals have a signatory role in modulating reproductive and parental behaviour. During oestrus, female gerbils and palm squirrels tend to scent mark actively using perineal glandular exudates. These perineal chemosignals function as sex attractents eliciting mating responses in male conspecifics. Further chemosignals disseminated by certain specialised skin glands of rodent pups tend to stimulate maternal behaviour in female rodents. Certain chemosignals elicit aggressive behaviour in conspecifics and this can be modulated by gonadal steroid hormones.

Chemosignals have a profound role in human social interactions. The existence of a social pheromone in human female effecting menstrual synchronisation among close friends has been suggested. Olfactory cues also help in mother - infant bonding. The behavioural relevance of these data is discussed.

SYM 102

GROWTH HORMONE SECRETION - PHYSIOLOGY, PATHOLOGY AND PHARMACOLOGY INTERVENTION - MODERN CONCEPTS

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Abstract not received

SYM 103

PANCREATIC ISLET TRANSPLANTATION

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Discovery of insulin in the year 1922 has significantly reduced the acute mortality rate due to diabetes mellitus. However, the use of exogenous insulin has not prevented the complications associated with this disease which develop over many years. They involve the eye, kidney, cardiovascular system and nervous system leading to blindness, renal failure, early development of arteriosclerosis and neuropathy. These complications are secondary to the diabetic state and are due to the inability of the present forms of therapy to maintain the blood sugar levels within normal limits all the time. In insulin dependent diabetes mellitus the islets of Langerhans are destroyed by mechanisms that are not known at present. A possible therapeutic approach would be to transplant normal insulin secreting tissue, with the hope that these transplanted cells will maintain the blood sugar levels within normal limits all the time and prevent the complications. Transplantation of insulin secreting tissue can be done in three ways. It can be whole pancreatic organ, isolated islets or foetal pancreas. In our laboratory, transplantation experiments are carried out using isolated monkey islets and monkey foetal pancreas. Preliminary work on the structure of human foetal pancreas in relation to its foot length has been studied.

SYM 104

HORMONAL CONTROL OF SPECIALISED SKIN GLANDS AND SCENT MARKING IN THE INDIAN MUSK SHREW, *SUNCUS MURINUS VIRIDESCENS* (BLYTH)

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Both sexes of the Indian musk shrew (*Suncus murinus viridescens*) were subjected for studies on their specialised skin glands and scent marking patterns. Flank, oral lip, oral angle, post auricular, cephalic and perineal regions of the shrew have well developed skin glands of behavioural relevance. There is no sexual dimorphism in the glandular structures as well as in the scent marking patterns.

Bilateral castration of adult male shrews resulted in the depletion of glandular structures. Secretory output of the flank gland showed gradual reduction after castration along with the depletion oF glandular tubules. The frequency of scent marking was also reduced in castrated shrews. Oral administration of steroid hormones in sufficient doses restored the glandular structures to the normal levels in four weeks and hyper-activated scent marking patterns in male shrews.

Scent marking patterns such as the flank gland rubbing, throat rubbing, perineal rubbing and specialized grooming are related to the glandular functions. Secretions of these glands are used in olfactory signalling by this nocturnal mammal.

Fertility and contraception

SYM 201

REGULATION OF GONADOTROPIN SECRETION BY STEROIDS

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Recent work from our laboratory suggests that a complex interaction exists between ovarian and adrenal steroids in the regulation of preovulatory gonadotropin secretion. Ovarian estradiol serves to set the neural trigger for the preovulatory gonadotropin surge, while progesterone from both the adrenal and the ovary serves to: 1) initiate, 2) synchronize, 3) potentiate and 4) limit the preovulatory LH surge to a single day. Administration of RU486 or the progesterone synthesis inhibitor, trilostane, on proestrous morning attenuated the preovulatory LH surge. Adrenal progesterone appears to play a role in potentiating the LH surge since RU486 still effectively decreased the LH surge even in animals ovariectomized at 08.00h on proestrous. The administration of ALTH to estrogen primed ovariectomized (ovx) immature rats caused LH and FSH surge 6h later, demonstrating that upon proper stimulation, the adrenal can induce gonadotropin surges. The effect was specific for ACTH, required estrogen priming and was blocked by adrenalectomy or RU486, but not by ovariectomy. The progesterone-induced gonadotropin surge appears also to involve mediation through NPY and catecholamine systems. Immediately preceeding the onset of the LH and FSH surge in progesterone-treated estrogen-primed ovx rats, there was a significant elevation of MBH and POA GnRH and NPY levels, which was followed by a significant fall at the onset of the LH surge. The effect of progesterone on inducing LH and FSH surges also appears to involve α^1 and α^2 adrenergic neuron activation since prazosin and yohimbine (α^1 and α^2 blockers, respectively) but not propranolol (a β - blocker) abolished the ability of progesterone to induce LH and FSH surges. Progesterone also caused a dose-dependent decrease in occupied nuclear estradiol receptors in the pituitary. The effect may be important in the action of preovulatory progesterone to limit the proestrous LH surge to a single day since it could aid in extinguishing the biological activity of estradiol through down regulation of its receptor.

SYM 202

MALE CONTRACEPTION: PRESENT AND FUTURE

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The major methods for the regulation of male fertility include arrest of spermatogenesis in the testes, prevention of sperm maturation in the epididymis as well as the transport of spermatozoa during ejaculation. The suppression of spermatogenesis by hormonal methods is a priority area of research and includes use of

androgens either alone or in combination with antiandrogens, GnRH antagonists or progestational agents like DMPA. Majority of these regimens require androgen supplementation to offset the decrease in circulating androgens which has necessitated the development of long acting androgen preparations. The assessment of the ability of residual sperm in these contraceptive users to fertilise the ovum is also an active area of research while no major contraceptive agent with specific action on sperm maturation which is safe and reversible, has been possible, the advantage of using such an extra-gonadal agent for fertility regulation would provide an ideal male contraceptive. Many new developments have occurred in improvement of vasoocclusive procedures including non-scalpel vasectomy and use of percutaneous sclerosing agents and these would offer a wider choice to men of different ethnic origin and religious beliefs.

SYM 203

SENSITIVITY OF MALE GERMINAL CELLS UNDER THE EXPOSURE OF INDUSTRIAL CHEMICALS

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A wide variety of chemicals of industrial importance have been found to cause male germinal injury which leads to reproductive health impairment. In this study, an attempt has been made to elucidate the wide-ranging industrial chemicals which cause male germinal cell injury at different morphological and biochemical levels. These observations will be highlighted somewhat narrow mechanistic approach by defining essential sites in the process of gametogenesis and also elucidating the cytotoxic consequences resulting from interruption of vital processes by various models of toxins. The following areas will be discussed here:

i. structure and function of male germinal cells

ii. intra and inter male germinal cellular mechanism to regulate the reproductive function

iii. cellular target sites in different chemical exposure and mode of germinal impairment.

The study of reproductive toxicology is relatively new. Male germinal cell sensitivity studies in laboratory animal is important with two perspective, i.e. determination of slow irreversible damage in male germinal cells which inturn affects hormonal control. Laboratory study revealed that lead, mercury, selenium, cadmium and chromium are industrially important chemicals, resulting in different types of germinal impairment. The mechanism of action of these chemicals may be assessed through a dependable biological techniques. Therefore, potential gonadotoxic agent may be identified in a proper scientific base. There is an urgent need for fundamental studies to be directed at elucidating relevant toxic mechanism, because under certain circumstances irreversible damage in germinal cells may pass on to subsequent generation.

SYM 204

REPRODUCTIVE BEHAVIOUR OF ALBINO RATS (*RATTUS NORVEGICUS ALBINUS*) AS INFLUENCED BY PINEAL GLAND

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Pineal gland, a tiny component of the central

nervous system, functions as an environmental transducer organ, conveying information regarding the external environment to the endocrine-gonadal axis of the animal. This aspect has been better studied with respect to the reproduction of temperate mammals, especially rodents; the temperate region being characterised by definite seasonal variations of environmental conditions such as photoperiod and temperature. However, little information is available regarding its role in the reproduction of tropical mammals. Hence, the present study was undertaken to get some insight into the role of pineal gland as a transducer organ of tropical animals, as revealed by the effect of pinealectomy on one aspect of reproduction, namely reproductive behaviour, of the tropicalised rodent, *Rattus norvegicus albinus*.

Three sets of rats (normal intact control, sham operated and pinealectomised), each consisting of equal number of males and females (120-160 gm) were used for the present study. Observations of the reproductive behaviour were made on the following four combinations:

i. Normal males vs normal females
ii.Normal males vs pinealectomised females
iii.Normal females vs pinealectomised males
iv.Pinealectomised males vs pinealecto-mised females

Observations were made during the estrous phase of females and that too only when the females have exhibited three continuous estrous cycles during the estrous phase. The period of observations in all cases were from 17.00-21.00h. Reproductive behavioural variables taken into consideration are mount, intromission and ejaculation in the case of males and lordosis and after discharge in the case of females.

The data were statistically analysed to test the significance of variations among the behavioural variables of the four combinations. The processed data are presented, which show significant variations, as a consequence of pinealectomy.

C.M.E. Programme on recent trends in teaching methodology

SYM 301

THE ROLE OF COMPUTERS IN MEDICAL EDUCATION

C. R. Soman

In the last two decades, information technology has advanced far beyond the dreams of major players in the field. Consequently computers are playing an increasingly dominant role in all spheres of education and training, including medical education. The use of computers in medical training at its simplest form is represented by interactive educational software enabling the individual student to learn complex ideas at his own pace using an inexpensive PC. Expert systems helping students to sharpen diagnostic skills are also available in large numbers. At the advanced level, complex

molecualr structures, drug receptor interactions, and mechanisms of enzyme substrate interactions can all be learned using specially created software.

The cheap availability of compact discs and CD ROM readers have ushered in a new age of information storage and retrieval to enable inproved medical teaching. Entire textbooks and medical encylopedias are available in CD's and the user can select any topic and obtain relevant information in a matter of seconds from the data stored in the compact discs. Medline and Lifeline on CD enable access to a vast amount of information, both current and old, at your library or office. On line facilities like MEDLAR will enable one to have immediate access to current medical literature from the vast databases already available. Emerging technology of multimedia and virtual reality will further enhance the effectiveness of class room and clinical teaching.

SYM 302

PATIENT-ORIENTED PROBLEM-SOLVING (POPS) SYSTEM AS A METHOD OF TEACHING PHARMACOLOGY

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Teaching pharmacology to first clinical year students who are beginning to learn about clinical medicine poses a challenge to the teacher. Patient-oriented problem-solving method of teaching is considered as a means of improving the problem solving skill of a medical student in relation to therapeutic problems. Instead of learning a self contained and quickly forgotten body of facts known as pharmacology, the information is gradually assembled in such a way as the student reflects on the clinical problem. The use of well-selected problems facilitates the integration of knowledge from basic science to the solution of clinical problems. This method helps the student to engage in learning through a problem, and to locate information necessary for solving problems by using sources (e.g. books and peers) that are available throughout career. The activity consists of different phases:

i. The student is required to review the set of objectives for each topic and to complete the pretest

ii. Review the answers for the pretest using the textbook in an "open-book" session

iii. A group of students are given the task of solving patient-oriented problems. Information exchange and group interaction are keys to the success of this phase. The students learn to communicate with fellow students and to evaluate colleagues' opinions, thought processes, etc.

iv. Final step is to take a post-test individually which enables student to assess his/her own progress in knowledge on the given topic.

One exercise on POPS requires usually a period of 2 hours. In each session groups of students are presented with clinical problems. The clinical problem is solved by the group. Each student in a group has one part of the problem only so that students must share information to complete the solving of the problem. Each student must be prepared to explain in detail his or her portion of the problem to the whole group. Pretest and post-test are completed by students individually.

Teachers are not expected to impart knowledge in the usual didactic form. During the session, the

role of teacher is to facilitate student interaction. Teacher should assist students to find relevant information in text books and may serve as a source of information when students have exhausted their patience. Teaching faculty should become familiar with the exercises and learn how to conduct these sessions. These assignments are open book exercises. Students should be requested to bring text books for the session. The students should be assigned to groups and each group should be provided with the topic objectives and necessary instructions regarding the problem.

The problems are usually presented as episodes or case histories in the medical history of the same patient. These problem solving sessions should be incorporated in the usual sequence of pharmacology course to supplement usual methods of teaching the topic. This method is found as useful alternatives to other laboratory exercises for selected topics.

SYM 303

LECTURE AS A METHOD OF TEACHING

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A lecture is a prestigious teaching assignment. The teachers reputation is greatly influenced by the quality of his/her lectures. In the past lecture was widely respected but these days there are often demands or cutting back on lectures, as the quality and quantity of text books have increased and many self-learning devices have come into existence. A lecture may be considered worthwhile to-day, only if it accomplishes more than what any book can i.e motivating students into creative thinking.

An analysis of the evaluation of lecture classes as a method of teaching by medical students in the state of Tamil Nadu will be presented. The advantages and drawbacks of a lecture will be briefly pointed out. As no single method of teaching is better than the other and as lectures are still widely used as a method of teaching undergraduate students, certain guidelines for improving the content and delivery of lectures to make it more meaningful for students will be presented.

SYM 304

PROBLEM-BASED LEARNING (PBL)

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This is a self-directed learning method which is becoming increasingly popular in medical education. Students are divided into small groups, usually of about six to eight. A tutor is assigned to the group; he need not be an expert in the topic being studied. The group is given a carefully composed description of a selected, imaginary but real-life situation to cope with which they will need to acquire a variety of information and skills; this is the Problem. In a first discussion, the group tries to analyse the problem, understand it and decide on the items of information needed and their sources. The tutor, who would have been given the problem earlier, guides the discussion process but does not provide any information himself. At the end of the session, the students would have divided the items of required knowledge among themselves, for acquiring them from the various identified sources. The sources can be textbooks, journals, the media and resource persons from within or outside the local medical establishment. At a

subsequent meeting the information acquired in the interim is shared, discussed, evaluated and assimilated, all in a spirit of friendly but critical honesty and openness. Often in the course of this session new items of information may be recognised as necessary, or may be prompted by providing a second instalment of the problem, leading to a third meeting. At the end of the last session, the entire collected information is reviewed as well as the process of the dialogue in all the sessions, including a critical appraisal of each individual's performance. The problem itself, its presentation and the usefulness of the sources are also evaluated. The advantages and disadvantages of this method, the different forms of PBL and the prerequisites for successful use of the method will be discussed.

SYM 305

EVALUATION METHODS AND THEIR SIGNIFICANCE IN TEACHING/ LEARNING

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It is well recognised that students' strategies of learning are largely influenced by the type of examination he faces. Use of faculty and casual evaluation methods can adversely affect the students' attitude towards the educational goals. Recent trends in evaluation methodology have aroused a lot of interest in teachers in medical profession to restructure the existing examination system and remove the present deficiencies. Awareness of using proper assessment methods is a healthy trend in this direction.

Expectations and attitudes of the examiner are largely dependent on his understanding of purpose and method of evaluation. It is equally important to appreciate the students perception. Besides, imposing a certain degree of stress, final examination is perceived by the student as a critical hurdle.

Directions in which assessment methods are proceeding include, improving the objectivity and removing the subjectivity and inconsistency, measurement of problem solving abilities, skills, attitudes, repeated testing with feedback during training to guide learning, participation of all teachers in assessment, and emphasis on competency based evaluation.

The impact of using appropriate methods of evaluation is shown by changes in learning habits of the students and redesigning of teaching learning experiences to meet the new expectations of the students. This shift in examination system will prove more relevant to the needs of students for clinical training.

It is very important that in any educational activity the teacher is able to play effectively his role as an examiner. There should be no excuse for employing substandard tests/examinations which provide negligible feedback on students` performance.

SYM 306

DISTANCE EDUCATION (DE) IN HEALTH CARE: A TEACHING/LEARNING METHODOLOGY

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Many a teaching/learning methodology is adopted by medical teachers, especially those trained in educational technology. The problem based learning (PBL) is one that is gaining popularity

in many innovative medical schools throughout the world. However, the application of distance education in training of health care personnel is just gaining momentum throughout the world, including India. The application of distance education (which is now a distinct discipline) for CME/CE of health care workers of all categories is a cost effective training methodology.

The personal experiences of DE methodology for CME/CE activities is to be shared. These could be considered as flexible DE models.

i. CME for GP's in India at CMC Vellore 1984-1993.

ii. M.Phil/P.G. diploma/certificate in Hospital management at CMC Vellore-1989-1993.

iii. Technicians/ Technician tutors / Pathologists CMAI program conducted by CMC Vellore-1993.

iv. DE for pathologists through out Tamil Nadu IAPM 1991-1993 chapter and CME program at Medical College, Kottayam.

The total registered for the GP-program include 1226 GP's, 69 for the management course, 27 for technician / tutor / pathologist course and number for the pathology group is not documented. The registered number in groups 1-3 include learners from all over India. For item 4 the learners were from Tamil Nadu / Kerala.

A self DE module on DE will be circulated to all participants to sensitise further the trainer group to DE as a teaching / learning methodology for any learner group. The module highlights distance education format and includes certain medical education aspects of use to a medical teacher like academic audit, etc. Its application in training any category of health worker is a possibility, which would satisfy the "concept of self learning" highlighted by MCI, National Health Policy and educational technologists.

Molecular mechanisms in resistance to therapy

SYM 401

THE MOLECULAR MECHANISM OF DRUG ACTION

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This is an area which deals with how drugs act in a molecular sense. In otherwords how drug molecules must get so close to the molecules of which cells are made that the functioning of the cellular molecules is altered. Paul Ehrlich had the ingenuity to recognise this basic tenets of Pharmacology and stated that "A drug will not work unless it is bound" ("Corpora non agunt nisi fixata"). Besides the understanding of the molecular mechanism of action of drugs which makes therapeutic approach a rational one, it also enables the drugs being made-to-measure to fit precisely to the structure of a defined target.

The principal targets for drug action on mammalian cells can be broadly divided into (a) receptors, (b) ion channels (c) enzymes (d) carrier molecules.

Recent advances have made receptors which had till recently been treated largely as theoritical entities to emerge as biochemical realities. In terms of both molecular structure and the nature of the transduction mechanism four types of receptors have been defined. These are : (1) Direct ligand-gated channel type, (2) G-protein coupled type (3) Tyrosine-kinase-linked type. (4) Intracellular steroid/thyroid type.

At this stage there is enormous data on the targets for drug action, about their molecular organisation, cascade of events following binding of drugs to the targets and the ultimate pharmacological effects but still too little is known of how these systems interact in real life.

The rapid advance of our understanding in this area in recent years owe much to the development of several techniques. To mention a few, these are patch-clamp technique of Nejer and Sakmann; purification of receptors using tightly-bound radio active ligands and affinity chromatography, gene cloning methods; use of specific chemical tools such as foskolin, use of fluorescence indicators such as Fura-2 and x-ray crystallograph.

The present understanding of the molecular mechanism of action of drugs has broken the barriers between physiology and pharmacology and also between pharmacology and biochemistry.

SYM 402

FACTORS CONTRIBUTING TO RADIATION RESISTANCE IN SOLID TUMORS

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Radiotherapy is the most commonly practised treatment modality, apart from surgery, for local control of solid tumors. However, radiotherapy is not always able to destroy all the cancer cells and effect a cure. Failure of radiotherapy of cancer is often attributed to the presence of hypoxic cells. These cells are about three times as radioresistant as the surrounding normal tissues. The hypoxic fraction in a solid tumor will increase with the size of the tumor. In addition, other factors like the ability of the cells to repair sublethal injury, their clonogenic potential and proliferation kinetics, intracellular glutathione content and tumor vascularity also can influence the extent of radiation injury in the tumor. There are evidences to show that human tumors with high GSH content are more resistant to radiotherapy than those with low GSH levels. The role of hypoxia and other factors in increasing tumor radioresistance and its implication in clinical cancer therapy are discussed.

SYM 403

MULTI-DRUG RESISTANCE IN CANCER CHEMOTHERAPY

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Results of treatment with anticancer agents have steadily improved over the years following introduction of more effective drugs and the establishment of better designed chemotherapy strategies. However chemotherapy failure remains a significant problem in many cancer patients. Mammalian cells exposed to single cytotoxic drug can develop resistance to the selective agent and cross-resistance to a broad spectrum of structurally and functionally distinct chemotheraopeutic agents. This phenomenon is termed Multi-Drug Resistance (MDR). The

predominant feature of cells showing MDR is the amplfication and overexpression of genes coding for an integral plasma membrane protein called P-glycoprotein. Current evidence suggests that P-glycoprotein is an energy dependent unidirectional drug efflux pump with a broad substrate specificity that decreases intracellular accumulation of drugs and increases resistance to their effects. Whether intrinsic or acquired, MDR plays an important role in chemotherapy failure and its modulation by resistance modifying agents (RMAs) is a topic of current interest.

SYM 404

CELL COMMUNICATION AND INTERACTIONS ESSENTIAL FOR MAINTENANCE OF PHYSIOLOGICAL HOMEOSTASIS

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We have for many years been thinking of the nervous system as the sole province when we talk of communication in the human body. But it is not. Cell communication and interactions are absolutely essential in the proper functioning of other biological systems too. Immune system is one of the most sophisticated examples wherein myriad cell to cell interactions, cell to mediator interactions , cell to extracellular matrix interactions play very crucial roles. The very basis of initiation, propagation and regulation of immune response itself is the complex interactions between functionally distinct populations of T cells, B cells, cells of monocyte-macrophage lineage, antibodies and other immunoreactive proteins. The nature of these interactions decides the susceptibility of an individual to a particular disease and also the course a disease follows following treatment and hence is of great interest to biologists.

SYM 405

MOLECULAR BASIS OF IMMUNE INTERVENTION

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The elucidation of the cellular and molecular components of the immune system and the principles of immune response have paved the way for newer strategies for immune intervention. T lymphocytes play a central role in the immune response by killing infected cells, controlling inflammatory response and helping B lymphocytes to make antibodies. The key steps in the immune response are as follows:

i. Antigen processing and its presentation in association with Class II MHC as MHC-Peptide complex by dendritic cells (DC) or macrophages.

ii. Antigen recognition by specific T cell receptor (TCR) assisted by co receptors CD4 + and CD8+ (signal 1).

iii. Co stimulation and augmentation of response by interaction between specialised receptors on T cells (CD28) and antigen processing cells (APC) with B7 receptors (signal II)

iv. Transduction of stimulus to the T cell nucleus by a series of biochemical reactions resulting in transcription of lymphokine mRNA and production of a variety of cytokines and activation antigens (signal transduction).

v. Functional specialisation of T cells to TH1 & TH2 cells based on their ability to produce different lymphokines.

Various immune intervention strategies exploiting each of the above steps are currently available and areas of future research. Their major applications include 1. protective immunity (vaccination) for infections, tumours and auto immune diseases, 2. adoptive immunotherapy with activated T cells and antibodies (passive immunity), 3. studying the mechanism of action of immunosuppressive drugs, 4. Strategies for selective immunosuppression using antibodies to variable region of immunoglobulins and TCR, 5. blocking and down regulation of immune response by manipulating co-receptor interactions and co-stimulator signals and 6. blocking the MHC antigens thereby preventing MHC-Peptide complex formation. Pharmacological modulation of signal transduction in activated T cells offers future scope for research.

Membrane Biophysics

SYM 501

VOLTAGE GATED SODIUM CHANNELS IN EXCITABLE CELLS

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In most excitable cells such as neurons and neuroendocrine cells, excitability is manifested as an action potential firing which consists of three phases. The rising phase of the action potential is mediated by rapid increase in permeability to Na^+ through voltage gated Na channels. The ion conductance of voltage gated ion channels is controlled on the millisecond time scale by two experimentally separable processes: (i) voltage-dependent activation, which controls the time and voltage-dependence of ion channel opening in response to changes in membrane potential, and (ii) inactivation which controls rate and extent of ion channel closure during a maintained depolarization. The sum of the two processes ensures a rapid and transient activation of ion channels in response to membrane potential changes.

What we currently know about these channels today stems from the earlier work of Hodgkin and Huxley in the 50s, who tried to explain the phenomena in terms of electricity and electrochemistry utilizing the voltage-clamp technique in squid giant axons. In the last decade or so, however, two new techniques, the patch clamp and the application of molecular cloning techniques to membrane proteins including site-directed mutagenesis has helped us get a feel of the molecular details of the structural components in the channel protein, involved in ion channel function such as voltage-sensitivity gating and inactivation.

The talk will be a general one covering the development of ideas in this area with certain examples taken from the work done in our laboratory.

SYM 502

SHORT CHAIN FATTY ACID-LINKED SODIUM ABSORPTION IN THE COLON

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Short chain fatty acids (SCFA), the major luminal anions in the colon, are absorbed and stimulate the active absorption of sodium from the mammalian colon. The mechanisms of this linkage are not clear, and effects on cell metabolism, membrane transport, diffusional components or combinations could be responsible. Recent studies in rat colon encompassing *in vivo* perfusion, *in vitro* studies in Ussing chambers and studies in isolated membrane vesicles have shed light on the mechanisms involved, and its regulation. In the rat distal colon, electroneutral NaCl absorption is due to double ion (Na-H, Cl-HCO_3) exchanges. In this tissue, SCFA stimulate net Na and Cl absorption without an increase in short circuit current, consistent with electroneutral NaCl absorption. This is inhibited by 1mM mucosal amiloride and by removal of mucosal Cl, but not by acetazolamide. Therefore, HCO_3 formation from cell metabolism is not necessary for this process. Studies in apical and basolateral membrane vesicles from rat colon suggest the presence of SCFA- HCO_3 exchange in both, with the presence of a unique unidirectional SCFA-Cl exchanger in the apical membrane. SCFA-linked transport is abolished in hyperaldosteronism in which condition Na-H exchange is inhibited. Cyclic nucleotides do not inhibit SCFA-linked Na absorption, in contrast to their inhibition of neutral NaCl absorption. These diverse evidences allow us to formulate a composite model of SCFA-linked Na absorption in which apical Na-H, SCFA-HCO_3 and Cl-SCFA exchanges are involved.

SYM 503

EPITHELIAL TRANSPORT OF INORGANIC PHOSPHATE

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The transport of inorganic phosphate across renal and intestinal epithelia occurs in three steps - uptake at the brush border, intra cellular migration and release from the baso-lateral border. In our laboratory, the intestinal transport was studied in vitro on the everted gut sacs prepared from mice according to the method of Wilson & Wiseman (1954). The uptake was found to be sodium dependent like other co-transport systems. But a small sodium gradient appeared to be sufficient to maintain it. The uptake was reduced by sugars that require sodium for their transport. Sugars that do not require sodium for transport but are phosphorylated on entry in the gut epithelium, reduced the release of phosphate without affecting the uptake. This may be due to the trapping of inorganic phosphate during the process of phosphorylation of these sugars. Inhibition of phosphorylation led to a recovery of phosphate release. The release of phosphate was inhibited by ouabain implicating a role for sodium potassium ATPase in the release process. This inhibition was overcome by raising the potassium concentration on the serosal side, fortifying the possibility of a role for sodium potassium ATPase in the release of phosphate from the intestinal epithelium.

(Research grant obtained from ICMR for this study is gratefully acknowledged)

SYM 504

CELL MEMBRANE LYSIS

D.M. Vasudevan & T. Vijayakumar

In physiological and pathological conditions, cell membranes are lysed by various mechanisms, important ones being (a) T killer cell mediated direct cytolysis (CMC) (b) antibody dependent complement mediated cytolysis (ADCMC) (c) antibody dependent cell mediated cytolysis (ADCC) (d) NK cell mediated cytolysis and (NKCC) (e) tumor necrosis factor mediated lysis. Most of these mechanisms are temperature sensitive and influenced by calcium ions. T cells can kill target non-self cells by recognising the histocompatibility antigens. Initially a few nicks are produced on the cell suface, through which water is imbibed by osmotic pressure. The cell lysis could be detected by short time chromium release assay or by trypan blue inclusion test. The target cell lysis is very specific so that by-stander cells are not destroyed. The complement factors are activated when antibody is fixed on the cell surface antigens. Hemolytic anemias are generally produced by this method. Antigen antibody complexes may also activate complement. The specificity of the reaction is mediated by the antibody and the final effect is produced by the complement. This produces holes on the cell surface, through which water enters to produce cell lysis. In ADCC mechanism, the specificity is made possible by the antibody, but the final lytic reaction is mediated by a killer cell, usually described as of non-T, non-B cell lineage. In the NKCMC mechanism, the NK cells by a non-immunological mechanism, can kill target cells by liberating certain factors locally, and producing small nicks on the cell surface. The cell surface characters are being altered during transformation into malignancy. For example, most of the malignant cells have more sialic acid on their cell surface than their normal counterparts, rendering the cancer cells more negatively charged. The cancer cell antigens may be masked by the sialic acid groups, so that the recognition of cancer cells by the immune cells may be decreased.

SYM 505

PLANT LECTINS AS PROBES IN IMMUNOLOGY AND ONCOLOGY

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Plant lectins or phytohemagglutinins are proteins and glycoproteins with ability to bind to specific mono or polysaccharides. They are a heterogeneous group of compounds sharing a common ability to recognise and combine with specific carbohydrates on cell surface. Lectins are routinely detected and quantitated by their ability to agglutinate erythrocytes and are readily purified by affinity chromatography on immobilized carbohydrate. The basis of their use as reagents in biology is their ability to recognise complex carbohydrate structures in glycoproteins and glycolipids, in particular those of cell membranes.

Malignancy is diagnosed on the presence of morphological appearances characteristic of malignant tissue and presence of basement membrane invasion. Lectins, like the jack fruit lectin, are reported to be able to recognise incomplete nonsialated forms of membrane glycoconjugates and these less than fully differentiated glycoconjugates are expressed on the surface of cells in malignant lesions. Hence

the lectins exploit a more fundamental difference between benign and malignant lesions and will be better able to predict malignant potential of suspected lesions.

Lectins have been used extensively as histochemical probes to study cell surface glycoconjugates on tumor cells and the overall results complement the data obtained by immunohistochemistry with polyclonal and monoclonal antibodies. Many of the lectins are found to be as selective as monoclonal antibodies and these lectins conjugated to chemotherapeutic agents can be successfully employed to fight against cancer.

Lectins are konwn to detect alterations in cell surface through changes in the glycoconjugates on the cell surface. Radiation damage to cell membrane may lead to increase or decrease in these glycoconjugates. There may be masking of the components or new components may appear on the surface of the cell membrane . Studies so far undertaken indicated that alterations in lectin binding pattern, in cytological smears, after various doses of radiation, may help in predicting the radiosensitivity of neoplastic cells.

The ready availability, the ease of preparation in purified form and the fact that the lectins can be conjugated to any diagnostic and/or therapeutic agents make them potential tool in histochemistry and/or cytochemistry as well as in treatment.

Neurotransmitters and Behaviour

SYM 601

CHANGES IN NEURONAL PHYSIOLOGY ON RAPID EYE MOVEMENT SLEEP LOSS AND ITS IMPLICATION

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Even after forty years of its discovery, understanding the functions of Rapid Eye Movement Sleep (REMS) is a challenge to the sleep researchers. However, since its loss/disturbance induces derangement in mental, physical and physiological functions and even death in extreme situations, the fact remains that REMS phenomenon cannot be ignored.

Though the effects of REMS deprivation on gross physiology and behaviour was known, it is only recently that the sleep researchers have stated unravelling the functions and role of REMS at the neuronal/cellular level. Since it is not possible to review the entire knowledge in the area in this talk my emphasis will be to bring out the knowledge regarding the role of REMS and its effect of deprivation on brain and neuronal excitability with a special reference to specific contribution made by my group.

There are REMS - related and unrelated neurons depending on their firing pattern in relation to REMS . Both these groups of neurons are affected on REMS deprivation, though differentially. REMS deprivation is also known to affect brain excitability in addition to other physiological effects. Since, it is a generalized effect and based on other existing knowledge, we hypothesized that REMS deprivation possibly would affect a basic structure of the neurons so as

to affect the general cellular functioning. With this background the membrane bound enzymes and membrane fluidity were studied in rat brains.

Our findings show that membrane fluidity and activities of several membrane bound enzymes get altered after REMS deprivation and helps in understanding the role of REMS. Alterations in the membrane physiology may be the possible reason for REMS deprivation induced changes in brain and neuronal excitability. Possible mechanism of action and its physiological implications will be brought out in the discussion.

SYM 602

CONTINGENT NEGATIVE VARIATION EVOKED RESPONSES IN CHRONIC PAIN

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The present study assesses CNS processing, subjective appraisal, expectancy, orientation and reaction time as indexed by Contingent Negative Variation (CNV) in chronic pain patients. N1, P300 & CNV were recorded during a CNV paradigm in a simple reaction time task with a constant interstimulus interval (ISI) of 1 sec. CNV was measured from Cz X Fz (10-20 system) in 14 normal controls (Age 28.2 ± 7.1 yrs) and 14 chronic pain patients (Age 32.85 ± 8.9 yrs) suffering from Cervical Spondylosis (n=8) & low backache pain due to Sciatica (n=6). Duration of pain was 5 to 10 years and intensity varied from moderate (n=5) to severe (n=9) as adjudged by Visual Analogue Scale. CNV experiment consisted of 32 trials of S1 and S2 motor response sequence. Each trial consisted of a warning stimulus click (S1) followed by the imperative stimulus in the form of flashes (S2). S2 could be terminated by the subject quickly by pressing a response button with the dominant hand. Cursors were hand set to score latencies for N1 and P300 potentials to S1, maximal CNV amplitude was scored as the largest negative going potential immediately prior to S2 onset. Similarly reaction time (RT), orientation and expectancy wave amplitudes and latencies were also recorded. There was a significant increase in P3000 latency, RT and O wave latency in chronic pain patients meaning thereby that there is blunting of cognitive functions and increase in reaction time in patients suffering from chronic pain. The chronic patients also take more time to orient to CNV paradigm.

SYM 603

CHARACTERIZATION OF SPINAL REFLEXES IN NEO-NATAL RATS *IN VITRO*

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Stimulation of a dorsal root in an isolated neonatal spinal cord, elicited a monosynaptic reflex (MSR) in the corresponding ventral root at a latency of 3-5 msec and a dorsal root reflex (DRR) in an adjacent dorsal root 2-3 times the latency of MSR. The magnitude of DRR was 10 times smaller than the MSR. The amplitude, latency and rise time of the MSR were temperature dependent with optimal conditions occurring at 25°C. MSR and DRR could be decreased by either decreasing the $[Ca^{2+}]_o$ or by increasing $[Mg^{2+}]_o$. Further, in this preparation homosynaptic inhibition could be elicited by stimulating at higher frequency (0.2 to 1.0 Hz).

The MSR was inhibited when the conditioning stimuli were applied to an adjacent dorsal root at 1-150 msec before the MSR was evoked; the inhibition has both an early and late phase. The early phase of inhibition occurred at conditioning test intervals of 1-20 msec with peak inhibition occurring at 7 msec. Raising the temperature to 31°C were exposing the cord to strychnine blocked the early phase of inhibition. The late phase of inhibition that occurred at C-T intervals greater than 20 msec was unaffected by temperature and was blocked by bicuculline. The early phase of inhibition therefore appears to be postsynaptic in origin and mediated by glycine while the late component of inhibition may be presynaptic in origin and mediated by GABA.

SYM 604

SEROTONIN AND HUMAN BEHAVIOUR

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The Serotonergic System (5 HT- System) is one of the most diffusely organised projection systems in the human brain. During the last decade, there has been a tremendous advance in our understanding of the 5.HT-System and its role in human behaviour. Scientific investigations have brought voluminous information on anatomy, physiology and behavioural pharmacology of the 5 HT- System. At least seven serotonergic receptor systems are now well recognised. Having different receptor systems, serotonin not only conveys different messages but also have differential effects at different sites. It has been shown that the basic physiological functions like mood, motivation, circadian rhythmicity, thermoregulation, sexual behaviour, sleep wakefulness, nociception, learning, memory and feeding behaviour are partly regulated by the 5 HT-System. The involvement of the 5 HT-System in depression, anxiety, aggression, suicidality, eating disorders, alcoholism and other forms of substance abuse disorders is reasonably established. A novel idea that has generated a lot of discussion is the role of 5 HT in regulating maturation of the brain during the early development and again during the adult period. Pathological sprouting of the 5 HT neurones and the resultant disturbances in the 5 HT regulation of the neuronal maturation could be a major factor in the structural abnormalities seen in the brains of patients with refractory forms of schizophrenia, unipolar and bipolar depression, unremitting anxiety and obsessive compulsive disorders. The identification of specific 5 HT receptor subtypes and the effectiveness of selective 5 HT reuptake blockers in obsessive compulsive disorders and in depression has generated a lot of enthusiasm among researchers. Recent advances in physiology, and behavioural pharmacology have brought out a significant revolution in the treatment of major depression, mania, anxiety, and schizophrenia. The demonstration of serotonergic abnormalities in the post mortem tissue, plasma, CSF and endocrine challenges have given a new dimension in the understanding of the basic pathophysiology of various psychiartric disorders. Further research will be able to unravel further hidden mysteries which may provide new insight and advances in the understanding of the human behaviour, neuro-psychiatric syndromes and their definitive management.

SYM 605

BRAIN MONOAMINE CHANGES DURING IMMUNIZATION

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The neural modulation of immune system has been well established during the last decade. Studies in our laboratory have shown that electrolytic lesions of discrete regions of the rat brain influences the peripheral immune process in a characteristic way. Following this observation, we planned a study to elucidate the central nervous system response to an antigenic challenge. Considering the biogenic amine response as an indicator of the neural response male wistar strain albino rats were immunized with sheep Red blood cells ($10^{c}9$ cells/ml) intraperitoneally on "O" day. Groups of animals were sacrificed at 24 hr intervals upto 7 days following the primary immunization and the brain biogenic amine content in discrete areas were studied by fluorometric method. Analysis of results have shown that at 24 hr. after immunization Dopamine (DA) content increased in hippocampus, hypothalamus and cerebral cortex, 5 HT level in hippocampus where as norepinephrine (NE) and epinephrine (E) levels have decreased in cerebral cortex. At 48 hr. DA level showed a fall in striatum and an increase in hippocampus and cerebellum. NE level decreased in striatum, pons medulla and cerebellum where as E level showed an increase in striatum, hippocampus, hypothalamus, mid brain and cerebellu,m. 5 HT levels showed a consistent increase in all the areas studied at 48 hours. All these perturbations in monoamines return to normal values on the 7th day after primary immunization indicating thereby that after an antigenic challenge the central nervous system is appraised of the challenge and responds by altered biogenic amines in discrete regions.

FREE COMMUNICATION SESSION

27A Nervous system I

001

POSTURAL STRESS AT WORK AMONG WOMEN IN SMALL INDUSTRIES

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Mass production small scale industries employ women as the dominant work force. A representative case study on women (N = 178) in beedi making industry (wrapping of pulverized tobacco in a tendu leaf) included time record of nine sitting work postures, discomfort analysis, EMG of erector spinae in sitting work postures, and design of work station.

Predominant postures are (i) sitting on floor with crossed legs and (ii) sitting on floor with legs extended. These are relatively less strenuous among nine postures as recorded from the EMG of erector spinae. In order to facilitate work with

less strain, the design of a circular work desk was suggested, i.e, 140 cm in diameter and 40 cm in height, accommodating 4 persons with minimum overlap in the work areas. The suggested design of workplace may also be suitable for other similar type of work performed in small/cottage industries.

002

PHYSICAL FITNESS AND MOTOR PERFORMANCE OF BOYS WITH AGE CHANGES

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A number of research studies have reported that the Physical Fitness (PF) and Motor Performance (MP) improve with age. But not much work has been done on Indian subjects. Therefore, the present study has been taken to find out the chances in PF and MP patterns with increase in age. PF and MP in 127 boys, divided into seven groups with mean ages ranging from 10.5 to 16.5 years, have been studied. The parameters measured were height, body weight, cardiovascular condition, agility, power, balance, speed and reaction and movement time. Height, body weight, scores of Standing Broad Jump Test (SBJT) and Stork Stand Test (SST) and timings of 50 yards Dash have shown significant positive changes with increase in mean age. The Physical Efficiency Index (PEI) and Quadrant Jump Test (QJT) scores have shown non-significant positive trends. Nelson Choice Response Movement Test score did not show any change. The athletes have been found to be significantly better in PEI and scores of QJT, SBJT and SST. The better physique, PEI and higher scores of QJT, SBJT and SST and less time for 50 yards Dash with increase in age may be due to normal growth pattern in the boys. The athletes showing more PEI, higher scores of QJT, SBJT and SST and lower timings for 50 yards Dash than non-athletes may be due to the daily physical activity in the form of practice and training sessions they attended.

003

ISCHAEMIA INDUCED NEURONAL DEGENERATION IN RAT SPINAL CORD STRUCTURAL AND ELECTROPHYSIOLOGICAL ASSESSMENT

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Ischemia was induced in anaesthetized male wistar rats weighing around 150-200 grams, by clamping abdominal aorta immediately below renal artery branching points for 30 minutes. The animals were sacrificed 3, 7 and 14 days after ischemia. Lumbo-sacral spinal cords of ischemic and normal control animals were studied by staining 120 μ microtome sections with Golgi or Cresyl Violet. By 14th day following ischemia loss of neurons and neuronal atrophy characterized by hypertrophy of neuronal soma and disruption of membrane were observed. There was also an attrition of dendrites.

The effect of ischemia was also confirmed by somatosensory evoked potentials. Sensory evoked responses were obtained from the cortex by stimulating the tibial nerve on 3rd, 7th and 14th day following ischemia. While the amplitude of the response peak was decreased by 7th day, the peak latency was found to be affected only on 14th day after ischemia. The cause for degeneration of motor neurons and the role of

trophic factors in protecting neurons from ischemic insult will be discussed.

004

PATHOPHYSIOLOGY OF MOTOR NEURONE DISEASE - A STUDY USING CULTURED CHICK SPINAL CORD NEURONS

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A progressive degeneration of lower and upper motor neurons takes place in motor neurone disease (MND). Neurofibrillary tangles (NFT) have been observed in the motor neurons of victims of MND. The formation of NFT may be due to excessive phosphorylation of cytoskeletal proteins like neurofilaments (NFs) in the soma. Since the toxic effects of serum and cerebrospinal fluid (CSF) of MND patients on survival of cultured neurons are known, this study aimed to evaluate their effects on NF phosphorylation in cultured spinal cord neurons. Spinal cord neurons were cultured from ten day embryonic chicks and exposed for 48 hours to culture medium supplemented with CSF and serum at a concentration of 10% from amyotrophic lateral sclerosis (ALS) and non-ALS patients. The cultures were fixed at the end of 48 hours and stained for phosphorylated NF epitope using a specific primary monoclonal antibody and a secondary antibody conjugated to fluorescent isothiocyanate. The number of neuronal soma staining for phosphorylated NFs were counted using a Leitz microscope equipped for epifluorescence detection. Results were analysed by 2-way analysis of variance followed by Student Newman Keul's test. There was a significant increase ($p < 0.001$) in the number of soma staining for phosphorylated NFs in the cultures exposed to CSF from ALS patients compared to other cultures. Under normal conditions very few neuronal soma contain phosphorylated NFs and exposure to ALS CSF resulted in more soma showing the presence of phosphorylated NFs in 48 hours. Therefore, these results suggest the presence of factor(s) in CSF of ALS patients, inducing enhanced NF phosphorylation in neuronal soma, which probably may be the initial event in the formation of NFT and degeneration of neurons.

005

THE EFFECTS OF VERAPAMIL ON CHICK BIVENTER CERVICIS MUSCLE

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Intramuscular injections of calcium antagonist, Verapamil to chicks in the concentration 110 uM, exhibits generalised muscle weakness, ataxia, dyspnoea and respiratory paralysis with intermittent episodes of spastic convulsions followed by death in about 120 minutes. The effect of Verapamil on chick biventer cervicis muscle in normal calcium krebs (n=5) showed reduction in the amplitude of indirectly stimulated muscle twitches with gradual increase in muscle tone. The drug produced neuromuscular blockade exhibit inverse relationship with the developing muscle tone. It is reversible, abolish responses to exogenous acetylcholine in normal calcium krebs and shortens the duration with pronounced effect on muscle tone in strontium krebs (n=5). Two fold

concentration of Verapamil (220 μM) in normal calcium krebs shortened the duration. However, there is no significant change in the muscle tone. It has been suggested that the reversible neuromuscular blockade produced by Verapamil exhibit lately developing postsynaptic action associated with B2 receptor mediated G(s) GTP system activation of calcium channel and persistent phosphorylation that leads to increase in the muscle tone.

006

FACILITATION OF SKELETOMOTOR FUNCTION BY HOT WATER EXTRACT OF BLACK TEA (*CAMELLIA SINESIS* (L) O. KUNTZE)

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Effect of tea on mammalian skeletomotor function has not been investigated so far. In the present study we have investigated the effect of hot water extract of black tea on skeletal muscle and its neurotransmission employing innervated and denervated rat diaphragm preparation. Tea extract potentiated the twitch contractions of indirectly stimulated rat diaphragm as a function of its concentration. tea induced facilitation was nullified in presence of magnesium chloride. Non-facilitatory concentrations of tea extract antagonised the submaximal paralytic effect of d-tubocuraine and decamethonium. Tea induced facilitation concomitantly increased with increasing concentration of $CaCl_2$ in the bathing solution. In Ca^{2+} free bathing solution, tea failed to produce facilitation of twitch responses in presence of EDTA. The facilitatory effect was antagonised by nifedipine as a function of its concentration, and the effect remained unaltered in presence of atropine sulphate. Tea extract did not have any effect on direct twitch responses and on ACh and KCl-induced contractures of denervated rat diaphragm. It is suggested that tea may act on Ca^{2+} channel at the skeletomotor junction.

27 B Nervous System II

007

SEPTAL NUCLEI AND SEXUAL BEHAVIOUR

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Increasing evidence is accumulating to implicate septal nuclei in sexual behaviour. However, its exact role has still not been elucidated. The present study was undertaken to study the effects of septal lesions on male sexual behaviour. Confirmed stud male rats were divided in to two groups (Group A and B). All rats were presented with primed stimulus female and tested for sexual behaviour in an arena for 10 minutes. Sex drive score (SDS) and latencies for pursuit, mount, intromission and ejaculation were measured. Once these parameters were stable, bilateral electrolytic lesions of lateral septal nuclei were done by passing 1.5 mAmp of anodal current for 20 seconds in Group A. In Group B, medial septal nuclei were lesioned using same

parameters. Sexual behaviour was tested in these groups 7 days after lesions. Pre-operative SDS and latencies were compared with post-operative results. After the experiments were over, the rat brains were perfused with 3% potassium ferrocyanide in 10% formol saline and the site of lesion was determined by appropriate histological procedure.

at the site of anodal lesion. It is seen that in Group A, the SDS was decreased and all latencies were increased after lesions, indicating that lateral septal nuclei facilitate male sexual behaviour in rats.

008

BEHAVIOURAL MECHANISMS OF CHLORDIAZEPOXIDE EFFECT ON FOOD REINFORCED OPERANT RESPONDING

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Benzodiazepines are widely used therapeutically for anxiety. Among a number of other effects, they have anorexigenic action. The behavioural mechanism of this action is yet unresolved: whether it resembles the deprivation effect and/or increases palatibility. It is also not clear whether alterations produced by them in instrumental performance for food involves facilitation of learning mechanisms and some influence on affective reaction to food. In this study, changes in the features of several schedule - specific operant behaviours were examined in normal and chlordiazepoxide (CDP)-administered rats. simple interval schedules and multiple schedules were used in order to characterize the influence of CDP on learning mechanism and on the affective reaction to food. The results point to a disruption of information processing of the contingencies of reinforcement during acquisition of the operant.

009

EFFECT OF ANGIOTENSIN ON PRESSOR AND DRINKING BEHAVIOUR IN ACCUMBENS AND CAUDATE NUCLEI IN RATS

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Injection of different doses of angiotensin - II into nucleus accumbens and caudatus elicited a dose- dependent increase in water intake without any change in blood pressure. But pretreatment with Losartan, a non peptide angiotensin-II receptor antagonist prevented angiotensin-facilitated water intake, rather when given alone, Losartan inhibited water intake to a marked extent. Also, pretreatment of spiperone, a central dopamine antagonist prevented angiotensin-dependent water intake in nucleus accumbens but not in nucleus caudatus. This suggests that angiotensin-II receptors in accumbens and caudate nuclei are involved in dipsogenesis but not in pressure regulation and dopamine receptors are essential for dipsogenic action of angiotensin in accumbens nucleus but not in nucleus caudatus.

010

MIDBRAIN VENTRAL TEGMENTAL (VTA) ENKEPHALINERGIC MECHANISMS IN THE MODULATION OF PREDATORY ATTACK BEHAVIOUR IN CAT

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Bipolar concentric electrodes implanted in lateral

hypothalamic area (LHA) at stereotaxic coordinates A 12-12.5, L 3.5-3.75, V 3.5 -3.7 mm, when stimulated (1 ms, sq. wave pulses, biphasic, 60 Hz, 300-800 uÅ) produced predatory attack in ten cats from ten loci. At 300 uÅ only components of alertness, pupillary dilatation and ear flattening responses were produced. More components like piloerection and salivation were added with the increase in current strengths. A full blown neck biting attack on a rat was exhibited at a current strength of 600-700 uÅ. A scoring system allowed the construction of stimulus response curve which remained fairly constant when repeated over a period of 3-4 weeks. Bilateral microinjection of delta-alanine methionine-enkephalin (DAME) (500 ng in 0.5 ul saline, pH 7.4), in VTA (A 3-4, L 3.5-3.75, V 3.5-3.75 mm) elevated the thresholds for alertness upto 600 uÅ and inhibited the somatomotor components of predatory attack completely for 30-45 minutes. Affective display components were equally affected. The thresholds came back to their normal levels within 1 hr. Microinjections of naloxone (1 ug in 0.5 ul, pH 7.4) in the same region lowered the thresholds for alertness to 100 uÅ and for a full blown predatory attack response to 400 uÅ. Naloxone also reversed DAME effects in a similar manner within the same period. In both cases, the effects of naloxone appeared within 10 minutes of microinjection and persisted for 20-30 minutes. Controls of saline (pH 7.4) in similar volumes did not show any effect. The excitatory effects of naloxone and inhibitory effects of DAME were statistically significant at $p<0.01$ and $p<0.05$, Wilcoxan's signed rank test. The present study shows that enkephalinergic mechanisms in VTA are involved in the modulation of predatory attack behaviour elicited from LHA.

011

NOREPINEPHRINE SENSITIVITY OF THE MEDIAL PREOPTIC AREA NEURONS RELATED TO MALE SEX BEHAVIOUR

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The medial preoptic area (mPOA) plays an important role in the regulation of male sex behaviour. Norepinephrine (NE) when applied locally in the mPOA can facilitate male sex behaviour. The aim of the present study was to determine the responses of the mPOA neurones participating in male sex behaviour to iontophoretic NE application. The extracellular unit activity recorded from the mPOA showing changes to DPN stimulation were taken as those involved in male sex behaviour. About 55% of the tested neurones responsed to DPN stimulation. Excitatory and inhibitory changes were found in almost equal numbers of neurones. Iontophoretic application of NE on the vicinity of these mPOA neurons produced excitation in 15 and inhibition in 13 neurons. The direction of changes was similar to that induced by DPN stimulation. The results suggest that the mPOA neurons related to male sex behaviour are influenced by NE. It could also be possible that NE at the level of the mPOA can further modulate the sensory inputs from the male sex organ.

012

SERUM GAMMA AMINOBUTYRIC ACID (GABA) LEVELS IN THE PATIENTS OF OPIOID (BROWN SUGAR) DEPENDENCE

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Opioid dependence is one of the major problems we are facing today. Inspite of our best efforts, the treatment of this condition remains unsatisfactory. The main reason for this seems to be the intense craving for the substance which occurs during the withdrawal and abstinence period. Like the other physical symptoms of withdrawal even the mental symptom of craving should have some biological basis. Study of this biological basis may then help us in improving our treatment methods.

To study this biological base, serum GABA levels were done in 43 patients of opioid dependence (index group) and in 47 volunteers (control group) who were not taking opioids in any form. Mean serum-GABA levels in drug addicts were high when compared with controls ($p < 0.001$). It has been suggested that the prolonged stimulation of opioid receptors during chronic exposure to opiates might cause an affect to the levels of neurotransmitter.

27 C Haematology

013

EFFECT OF MENSTRUATION ON TOTAL AND DIFFERENTIAL W.B.C. COUNT AND HAEMOGLOBIN CONCENTRATION OF BLOOD.

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The data collected from twenty girls from 1st M.B.B.S. students B.J.M.C., Pune. The blood samples were collected six days prior and six days after the cessation of menstrual period. Haemoglobin concentration remained same both times i.e. prior and after the menstrual period. Total W.B.C. count showed decrease in post-menstrual period. Neutrophil % count showed decrease in post-menstrual period. Other types of W.B.Cs did not show any change in the count.

014

HEMATOLOGICAL AND BIOCHEMICAL RESPONSES TO AUDITORY STRESS

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The belief that auditory stress could lead to serious consequences on the health is gaining currency. Keeping this in view, studies were conducted on noise induced alterations in hematological and biochemical parameters in rats exposed to 110 dBA noise for 2 h daily for one to

ten weeks and men exposed to noise stress of 100 dBA for 30 min with/without ear defenders.

Hematological profile of rats exposed for three weeks revealed marked reticulocytosis, decreased hematocrit, increased coagulation potential and decreased fibrinolytic activity and biochemical indices indicated atherogenic lipid profile.

Men exposed to noise have higher cortisol, cholesterol and triglyceride levels in the plasma but the use of ear defenders prevented the increase in cholesterol and cortisol levels indicating the effect to be of auditory origin.

The possible consequences of such changes on atherosclerotic disease are discussed.

015

RELATION OF MATERNAL Rh FACTOR WITH SERUM BILIRUBIN IN NEONATES

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Cord Blood Serum Bilirubin was studied in relation to mother's Rh blood group in 122 cases. This serum bilirubin was estimated by the method of Malloy & Evelyn.

It was observed that babies born to Rh negative mothers have relatively higher serum bilirubin levels in both primiparous and multiparous mothers. Primiparous Rh positive and Rh negative mothers had no significant difference in cord serum bilirubin levels, whereas significantly higher cord blood bilirubin was observed statistically in multiparous who were Rh negative than Rh positive mothers. This difference is probably because Rh negative mothers get sensitised to Rh factor. In subsequent deliveries babies will have higher serum bilirubin levels.

016

SOME HAEMATOLOGICAL PARAMETERS IN RECRUITS OF POLICE TRAINING SCHOOL, INDORE, M.P

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Soldiers and sportsmen are symbol of physical excellence. These physically fit young men are regarded as example of healthy beings. The facts of the medical science are, however, contrary to the common belief. In fact, various studies reveal that soldiers in combat training and even olympic record holder athletes are very often anaemic.

The present study was undertaken to study the hemoglobin, hematocrit, M.C.H.C., serum iron and total iron binding capacity in recruits of police training school, Indore. The recruits were divided into three different groups: i). non-exercising group, ii). exercising for 2 months and iii) exercising for 10 months. All the abovesaid parameters were measured in all the groups by following standard techniques. On analysis of the data, it was observed that Hb., hematocrit and serum iron values were significantly lowerin group ii as compared to i, while T.I.B.C. was higher in group ii. In group iii all the parameters were lower as compared to i while were higher as compared to ii except T.I.B.C.

017

EFFECT OF TOPICALLY APPLIED SULPHUR MUSTARD ON ANTIOXIDANT ENZYMES IN BLOOD CELLS AND BODY TISSUES OF RATS

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The effect of sulphur mustard (0.5 LD50, percut) on antioxidant enzymes - superoxide dismutase (SOD) , catalase (CAT) and glutathione peroxidase (GSH-PX) in blood cells - RBC, WBC and platelets and body tissues - liver, kidney, spleen and brain of rats has been investigated 24 hr post exposure. The SOD activity was significantly decreased in WBC and platelets among blood cells and spleen and brain among body tissues, and increased in kidney. CAT activity was significantly inhibited in RBC, kidney and spleen and enhanced in liver. It is concluded that sulphur mustard at sublethal dose exerts different effects on antioxidant enzymes. However, WBC and spleen are adversely affected. The study suggests that free radical mechanism is involved in sulphur mustard intoxication.

018

EFFECTS OF HYPOGLYCEMIA ON CATALASE, GLUTATHIONE AND GLUTATHIONE RELATED ENZYMES IN RAT ERYTHROCYTES

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The Wistar strain rats were made hypoglycemic after administration of 5U lente insulin/100 gm body weight. Rats were sacrificed at time intervals of 1.2 and 3 hrs. of insulin administration. Rats were also made hyperthyroid giving injection of 50 ugm/100 gm body weight for 10 days. The blood was withdrawn from the heart and passed through a column of a-cellulose and microcrystalline cellulose for the purification of RBCs. Levels of catalase (CAT), reduced glutathione (GSH) and glutathione related enzymes (glutathione-S-transferase, GST) were measured in RBCs,. Decreases in CAT and GST and increases in GPx, GR and GSH were observed in hyperinsulinemic rats whereas hyperthyroidism resulted in increases in CAT and GPx together with decreases in GR and GSH. Insulin was found to stimulate Hb_2O_2 production more, however, thyroid hormones produce an increased amount of H_2O_2 showing altered defense mechanism.

019

FEASIBILITY OF PROBLEM-BASED LEARNING IN AN INDIAN SETTING

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The effectiveness and feasibility of problem-based learning (PBL) as compared to the traditional didactic lectures as a form of self directed learning was studied in 119 preclinical resident medical students of the Christian Medical College, Vellore, India. Anonymous questionnaires were used for evaluation, after separate sessions of lectures and PBL over a period of 12 weeks. Significantly more time was spent, with more number of physiology and other books used as resource material while preparing for PBL as compared to lectures. PBL was found to be significantly more interesting and motivating with greater scope for interactions with others in the group. In spite of the above trends, the students preferred a combination of PBL and lectures as a mode of teaching physiology with more time being allocated for lectures. PBL, as conducted in this study, in the absence of tutors in most of the small group discussions seems feasible and an effective form of learning at least part of physiology, in a situation with limited faculty.

020

AN INTERACTIVE COMPUTER PROGRAM FOR TEACHING NEURAL CONTROL OF BREATHING

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A simple program has been written in BASIC to give a graphic demonstration of the genesis of the neural rhythm of breathing and the effects of the pneumotaxic centre, the apneustic centre and the vagus on it. The student can alter the rate of discharge of the pneumotaxic and apneustic centres and also, cut the vagus or restore it. A spirogram illustrated at the right-lower corner of the screen gives the resultant pattern (in terms of the rate and depth) of breathing for each combination of neural discharge pattern. A schematic figure at the left-lower corner of the screen shows the changes in the thoracic capacity during breathing and the discharge of the vagus at tidal volumes greater than 1 Litre. The centre of the screen shows the summation of stimuli in the ventrolateral nucleus of the tractus solitarius with each discharge of the R.α neurons and the triggering of the R.ß neurons with termination of inspiration.

021

EDUCATION IN PHYSIOLOGY IN THE MEDICAL COLLEGES OF INDIA.

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Undergraduate Physiology teaching in most medical colleges in India is still following the British Pattern (established before Independence) of Lectures, Practicals/demonstration and few tutorials. Evaluation in both internal & University examinations is by written papers (essay type) Viva Voce & Practicals and a sprinkling of internal assessment awards. This is producing mostly examination oriented passive learners. Attempts are being made at some centres to minimise lecturing, encourage

discussions in small groups, hold student seminars & clinical demonstrations, devise experiments to develop skills to assess the functioning of different organ systems of the human body and emphasize their clinical importance, a continuous evaluation of students performance throughout the course, more objective type of questions in the written examinations (eg. short answer questions), and multiple choice questions etc, and more objectively structured practical examinations. More fundamental changes in the entire medical education were proposed through the Reorientation of Medical Education Programme and primary care curriculum. Recently the principles of Problem Based Learning &the problem solving approaches, motivating life long self learning are being examined particularly in the context of community based medical education.A shortened one year course for the 1st Prof examination has been now proposed by the Indian Medical Council, and there is much apprehension in the minds of the teachers that unless updated education in human biology is introduced in the schools & colleges (10+2) & structure based functional concepts are emphasised through the selection process in the medical college at the national levels, the shortened course would only lead to further cramming up by the students just before the examinations and make the established goals of learning ineffective.

022

CULTIVATION OF COMPETITIVE ATTITUDE AMONG MEDICOS OF DCMS

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It is a fact that all students who are interested in professional courses have to face a common entrance examination called EMCET, before joining the Medical Course in any one of the Ten Medical Colleges of Andhra Pradesh including private minority Colleges (DCMS) recognised by MCI. In case of DCMS, the students are screened by the members of the Board of DET (Darussalam Education Trust), to ascertain their eligibility and status. Of course, students belong to top class of society. The rules and regulations imposed by University of Health Sciences, Vijayawada are strictly implemented because it is affiliated to the University. However, it is generally observed that the students do have relaxed mood and little lack of competitive spirit, Therefore to boost up this since last 2 years Quiz-test with awards of some gifts along with regular monthly system-vice group tutorials are conducted. On comparison of performance of last 2 batches (i.e 90/92 & 91/93) taking into account the result of M.B.B.S part-II University examination, it is observed that the performance of students has improved and also an increase in meritious group with a glaring sex difference. This will be discussed.

023

A NEED TO IMPROVE SMALL GROUP LEARNING METHODOLOGY IN TEACHING PHYSIOLOGY

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The aim of medical education is to produce doctors who are professionally excellent, dedicated, committed and having priority to serve in needy areas. There is growing concern from all over the world that all is not well with medical education. It is high time for bringing changes and improvements. Medical Council of

India has recommended rural and community orientation in medical education. Christian Medical College, Ludhiana has attempted to introduce community based, problem solving, 'student-centered' medical education. The results were positive for the innovative methods used for MBBS admission of 1987. Definite restraints exist in Discipline Based Education.

The teaching method of small group discussions introduced in addition to traditional lectures was evaluated in the case of 70 students admitted in 1982. A topic was selected for discussion by the students under the supervision of a facilitator from the staff. Even though it was intended to promote learning in a relaxed and disciplined atmosphere it did not find favour with staff and students.

An appraisal of the comprehensive questionaire on the above aspect revealed that 70% students did not like this teaching method and 80% of them wanted guidelines for making the method a success. This proved a useful guide to the teaching staff for improving the methodology.

024

EDUCATIONAL STRATEGIES FOR MEDICAL COLLEGES IN INDIA

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"Consider the Patient as a person". This highly implicit phrase was offered to the medical student as his sole introduction to the social aspects of medicine. If it is true that "Man is a biological and social being" then it must also be true that medicine is a natural and social science. The object of medical teaching can only be achieved if Man is studied in relation to his external as well as internal environment.

There are three major features of illness - physical, emotional and social. These are so intimately interwoven in the pattern of disease that they must be considered together, rather than separate entities. All three must be included in the curriculums if medical education is to provide the students with the knowledge and skills necessary to fulfill the aims of medicine. The medical student should learn to recognise and understand the social factors in every case, to evaluate them in relation to the factors in every case, to recognise and understand the social factors in every case, to evaluate them in relation to the medical problem and to assume responsibility for the relevant problems as a part of diagnosis and treatment. He should develop certain attitude that will help him to establish effective and wholesome relationship with the patient and his family and with his own colleagues. He should be taught certain skills such as utilization of the physician-patient relationship.

The Report of the Medical Review Committee has been accepted in principle. One of the terms of reference of the committee is "to suggest measures aimed at bringing about overall improvement in the undergraduate and postgraduate medical education paying due attention to:

i. Institutional goal

ii.content, relevance and quality of teaching and training and learning setting and

iii.Evaluation systems and standards.

The above is discussed in detail.

025

SERUM SEX HORMONE LEVELS IN VMN LESIONED AND TRANSPLANTED FEMALE RATS.

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Bilateral lesion of ventromedial hypothalamic nucleus (VMN) leads to an irreversible obesity besides sterility which are more pronounced in females. This study was aimed to explore the reversibility pattern of disturbaces in circulating levels of sex hormones i.e. estradiol, progesterone and testosterone of VMN lesioned female, adult rats following neural transplantation. The hormones were assayed by radioimmunoassay. The circulating level of testosterone hormone was not affected by VMN lesion (1.28 ± 0.37 basal, 1.26 ± 0.49 nmol/s post lesion); whereas, the levels of progesterone and estradiol significantly decreased from 16.28 ± 8.02 to 10.68 ± 7.2 nmol/L and 283.26 ± 254.56 to 161.53 ± 60.1 p mole/L respectively. The decrease in hormonal levels continued even after transplantation. Testosterone and progesterone levels were less affected than estradiol. The results suggest that no recovery takes place following transplantation in the sex hormone status of VMN lesioned female rats.

026

EXOGENOUS ADMINISTRATION OF INSULIN IN GROWING KIDS (CAPRINE): EFFECT ON GROWTH AND METABOLISM

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To study the effect of exogenously administered insulin on growth and metabolism an experiment was conducted in growing Barbari and Black Bengal kids of 4-7 months of age. In a 10 day experimental period insulin lente (dissolved in NSS) was injected subcutaneously to six experimental kids at a rate of 0.20 units. Kg^{-1} Day^{-1} on day 1, 5 and 10 while the five control animals received saline injections. In the metabolism trial, samples were separately pooled into two lots from the phase-I (day 2-5) and phase-II (day 6-10) of the expeirmental tenure. Weighing of animals before and after each of the two phases and blood sampling on day 1, 5 and 11 were also made.

Dry matter intake and digestibility, nitrogen intake, digestibility and retention, urinary nitrogen, average daily gain and feed conversion efficiency did not differ significantly between the experimental and the control groups in either of the phases. Significantly lower blood glucose ($p < 0.05$) and plasma protein ($p < 0.05$) and higher blood haemoglobin ($p < 0.25$) in the insulin injected kids compared to their control

counterparts were the salient features of blood analysis. Plasma calcium, inroganic phosphorus and creatinine levels remained almost unaltered. However, there was no significant treatment/day effects for blood metabolites. Generally insulin appeared to promote anabolism likely by both promoting protein synthesis and inhibiting protein breakdown.

027

THYROIDAL ADAPTATION DURING CROSS ADAPTATION TO HEAT, COLD AND HYPOXIA

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Plasma cortisol, total T_4 (TT_4), total T_3 (TT_3), free T_4 (FT_4), free (FT_3), reverse T_3 (rT_3), thyroxine binding globulin (TBG) and T_3 uptake were monitored in three batches of healthy euthyroid men undergoing an acclimatisation schedule of heat-cold-hypoxia, cold-hypoxia-heat and hypoxia-cold-heat in a sequential manner. The heat acclimatisation was achieved by exposing the subjects to 45°C DB and 30% relative humidity in a climatic chamber for two hours per day for 8 consecutive days, whereas acclimatisation to cold was achieved by exposing the subjects to 10°C for 4 hours daily for 21 days. The hypoxic exposure was carried out in a decompression chamber (4200m) maintained at an ambient temperature of 24 to 26°C for 6 hours per day for 21 days. Plasma cortisol showed a significant increase on the first day of exposure to the environmental stress. When these subjects were subsequently exposed to another environmental stress, there was no further rise in cortisol, indicating that the increased secretion of cortisol may not be necessary for acclimatisation to the second stress. however, following exposure to the third environmental stress, the cortisol secretion again showed an increase suggesting that beneficial effects of exposure to the first two stressors are not carried forward during subsequent exposure to the third environmental stress. Similarly, inhibitory effects of heat exposure on thyroid function were evident even during cold exposure but could not be seen during subsequent exposure to hypoxia. The stimulatory effects of cold or hypoxia on circulatory levels of thyroid hormones persisted during acclimatisation to the first two environmental stressors ie cold and hypoxia and were not present following exposure to the heat stress. These changes in thyroid hormones during acute exposure to the environmental stress appear to be due to shift of hormones from intracellular to extracellular fluid compartment and/or to altered peripheral metabolism of the hormones. These observations do not indicate a direct participation of the thyroid in cross adaptation to the multiple environmental stressors and suggest that the cross adaptive tendencies are lost when exposed to more than two environmental stressors sequentially.

028

ELECTROPHORETIC SEPARATION AND CHARACTERIZATION OF MULTINODULAR GOITRE PROTEINS

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The study was conducted in patients of both sexes of multinodular thyroid swelling. The normal tissue (from non-goitrous region of nodular gland) and goitrous tissue from patients

of multinodular gland were collected immediately after thyroidectomy. The tissue was then dried, minced, homogenized and then centrifuged. Polyacrylamide slab gel electrophoresis (PAGE) and SDS-PAGE were performed from the supernatant of last centrifugation. Objective of our study was to isolate the non thyroglobulin proteins synthesized by multinodular gland tissue resolved into three major proteins apart from thyroglobulin, whereas in multinodular goitre there were three more proteins besides these major proteins. When SDS-PAGE was performed in same tissues, most of the bands resolved into a single protein band of less than 29 kDa, indicating that they are rich in disulphide bridges. Probably these extra proteins synthesized by the thyroid gland are goitrogenic in nature, causing multinodular goitre instead of iodine deficiency in thyroglobulin.

029

LONG TERM LOW PROGESTERONE CONTRACEPTIVE IMPLANTS AND LIVER FUNCTION

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Of all the contraceptive methods available, contraceptive implants which contain the progestogen levonorgestrel have shown high success rates. But its use involves continuous exposure to the drug for fairly long periods, with possible side effects affecting different organs.

The aim of the present study was to find out whether this contraceptive poses some hazards to the users with regard to liver function. The study group consisted of 61 normal healthy females in the age group 18-38 years attending the family welfare clinic of SAT Hospital, Thiruvananthapuram who were using Norplant for a variable period from 2 months to 5 years. 30 normal untreated healthy females of the same age group served as controls.

Liver function tests were carried out in serum samples. The following estimations were done: SGOT, SGPT, alkaline phosphatase, total protein, albumin, globulin and A:G ratio. No abnormality was detected in any of the above parameters. This was true irrespective of the duration of exposure. It can be concluded that long term use of levonorgestrel does not in any way impair liver function.

030

CARDIOVASCULAR STUDIES IN NONINSULIN DEPENDENT DIABETES MELLITUS WITH SPECIAL REFERENCE TO TREADMILL TEST

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Diabetes mellitus is one of the major risk factors for both silent and symptomatic ischaemic heart disease. The present study was undertaken to determine the incidence of latent coronary artery disease in non- insulin dependent diabetes mellitus using Treadmill stress ECG test as a diagnostic tool in patients attending Victoria Hospital. Fifty patients of NIDDM without any previous history of cardiovascular disease and having normal resting ECG were selected. A control group of thirty healthy subjects were also studied. Detailed history and clinical examination including fundoscopic examination,

routine heamotological tests, oral GTT, lipid profile, X-ray Chest and Treadmill cardiac stress test by using modified Bruce protocol were done.

Results indicated that latent coronary artery disease as a cause of significant morbidity in 30% of diabetes cases and 6% in control group.

Incidence of CAD was increased with the duration of diabetic state. The lipid profile was significantly higher in diabetic stress positive patients. Diabetic patients with latent CAD had reduced exercise capacity and exercise tolerance. It was concluded that latent coronary artery disease was a cause of significant morbidity in diabetes and exercise ECG test is a useful screening test in diabetes patients.

28 A Students Session I

031

HAEMATOLOGICAL PROFILE OF PROFESSIONAL BLOOD DONORS OF LUCKNOW CITY

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This study was carried out in professional blood donors of Lucknow City. The aim of this study was to know the Hb% of professional blood donors and to find out relationship between the Hb% and period of donation and frequency of donation.

It was observed that Hb% of the donors was decreased significantly in professional donors. This decrease in Hb% was more pronounced in those donating blood more frequently than donors keeping sufficient gap between each donation.

032

A SIMPLE TEMPERATURE PROBE FOR DEPTH RECORDING OF REGIONAL BRAIN TEMPERATURE

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In experimental research, using stereotactic depth EEG recordings, it is often necessary to record the regional temperature variations. The value of this becomes more vital when one is conducting experiments pertaining to thermal changes accompanying any activity be it hyperthermic seizures, febrile convulsions or learning tasks.

Most of the techniques available today incorporate complex expensive thermocouples, or thermositors. In this design, we have introduced a device which is based on elementary relationship between voltage and

temperature and we have come out with an instrument that is not just handy, inexpensive and simple but also convenient to record precise temperatures from the very regions of the brain from which one is recording the EEG using the same depth electrode that one uses for the purpose.

Preliminary studies are under way using this equipment in recording critical seizure temperature and temperature profile from hippocampus during hyperthermia induced seizure in rats.

033

FORMULATION OF A NEW THEORY OF MUSCLE CONTRACTION WITH THE ASSUMPTION THAT THE ULTRA-STRUCTURE OF THE MUSCLE COULD BE SLIGHTLY DIFFERENT

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For convenience I have divided my theory into 3 parts. Part I - With a very few exceptions all the skeletal muscles contract towards their origin. Part II - The ultrastructure of the muscle has been slightly modified - All the cross bridges arising from the myosin filaments project in the same direction . Part III - The heads of cross bridges are away from the origin of the muscle, towards its insertion.

Therefore whenever a depolarising potential is applied, by the similar reaction (molecular changes) as stated by the Ratchet theory, the heads of the cross bridges interact with the thin filaments and pull them closer ie, the 'z' discs are brought closer. On applying the depolarising potential all the cross bridges move in the same direction i.e. they all pull the muscle fibres towards the origin of the muscle. so there is no question of a tug of war for the 'z' discs.

By a series of such reactions, maximum contraction occurs when the cross bridges pull the thin filaments so much that these cross bridges straighten up ultimately to provide maximum place for contraction.

But when these cross bridges straighten up they will require more space between the upper and lower thin filaments to accommodate themselves. Therefore they push the upper and lower actin filamets away from the myosin filaments, which will result in the straightening up of the 'z' discs to some extent i.e, the vertical length of 'z' discs increases. It is this procedure that causes the bulging of the muscle or the increase in the circumference of the muscle on contraction. (This aspect is not explained in the Ratchet theory).

034

ASSESSMENT OF 'TOTAL FAT'. 'FATLESS TISSUE' AND 'PERCENTAGE FAT' FROM SKIN-FOLD MEASUREMENTS; AND THEIR RELATIONSHIP WITH THE BODY WEIGHT.

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125 children, attending Paediatrics Out-patients' Department of Guru Tegh Bahadur Hospital, Delhi in the age group of 5 to 10 completed years were randomly selected to assess the nutritional status using skin-fold measurements. Skin-fold thickness (mm) was measured using GPM-skinfold caliper, a Swiss precision instrument at ten standard sites (cheek, chin, chest, flank, waist, abdomen, triceps, subscapula, calf and knee). Height and weight, measured by the standard methods, were used to calculate the

body surface area. The collected information was used to calculate the 'total body fat' (kg), 'fatless tissue' (kg) and percentage fat'. Percentage body weight was calculated using the reference weight (kg). The reference weight was taken to be the fiftieth percentile of the weight for the particular age from Indian Standard. The data was subjected to computer analysis, and scatterograms were prepared.

It was found that the percentage weight is significantly ($p<0.01$ to $p<0.001$) linearly correlated to 'sum of skin-fold thickness', 'total body fat' and 'fatless tissue'. 'Weight' as an anthropometric measurement is used commonly in the nutritional assessment. Hence, the significant correlation implies that skin-fold measurements can be used to assess the nutritional status in addition to the body composition in a particular population.

035

DIASTOLIC BLOOD PRESSURE: A NORMAL VARIANT OF NERVE CONDUCTION

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The present work was done to find out whether there exists a normal relationship between diastolic blood pressure (reflecting sympathetic vasomotor tone) and sensory nerve conduction (SNC). Twenty healthy male volunteers (age, $\bar{x} = 19 \pm 2$ years) were selected for the study. Dominant median nerve SNC was measured by stimulation of the index finger and the evoked response recorded at the wrist. For each reading, 32 evoked responses were averaged by the evoked potential recorder. The SNC velocity was 57.93 $\pm$ 3.87 m/s (range 54.06-61.8 m/s). Blood pressure was measured in the contralateral arm using automatic sphygmomanometer. The diastolic blood pressure was 72.35 $\pm$ 7.10 mmHg (range 65.25-79.45 mmHg). ANOVA showed a statistically significant correlation ($p < 0.05$) between diastolic blood pressure and SNC. This was also true for latency, peak latency & duration of action potential. This could be due to vasomotor regulation of the blood flow in the vasa nervosa or due to peripheral interaction of sympathetic efferents with the sensory afferents. This finding assumes clinical significance in the context of individuals with raised diastolic blood pressure whose reduced nerve conduction may be interpreted as peripheral neuropathy.

036

PATTERNS OF CELLULAR PRESENTATION OF IMMUNOCOMPETENT CELL SPECIFIC ANTIGENIC DOMAINS IN THE HUMAN ENDOMETRIUM

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Human endometrium exhibits the components of typical mucosa-associated lymphoid tissue (MALT), typically composed of lymphocytes (several subsets of T cells, and B cells), granulocytes (eosinophils and neutrophils), monocytes-macrophages and histiocytes. These cells can be characterised by their expression of cell type specific antigens. The aim of the present study was to examine the patterns of cellular distribution of antigenic domains characteristic of immuno-competent cells in human endometrium. Human endometrial biopsies collected in different phases of the menstrual cycle were fixed, and 6μ paraffin

sections were employed for immunohistochemistry using monoclonal mouse antibody. The test panel constituted antihuman Mabs against leucocyte common antigen (PD7/26+2B11), CD 45RO (UCHL1), CD 20 (L26), CD 68 KP1, HLA-DR (CR3/43) and MAC387. Our study showed that the presence of monocytic-macrophagic antigen and that of mature B cell specific antigen bearing lymphocytes in human endometrium was very low and did not show any cyclic patterns. The expression of T lymphocyte antigens showed variations with the phase of cycle and were typically detected in both lymphoid aggregates and in isolated vesicular as well as fibroblastic cells. A population of T lymphocytes also appeared as intraepithelial and subepithelial lymphocytes. Cellular expression of antigens related to MHC II showed a pattern associated with the phase of menstrual cycle. Interestingly, few antigenic domains related to macrophagic lysosome, MHC II and blood group glycoproteins were seen in nonimmune cells of human endometrium, especially glandular and surface epithelium, periglandular and perivascular stromal cells and occasionally in venular endothelial cells. Further studies are necessary to test the possibility that these cells may, in fact, be involved in processing and presentation of antigens to the local immune network and to understand their roles in the physiology and pathology of human endometrium.

(Funds were obtained from research grants supported by the NIH-USIF and the WHO-HRP)

037

EFFECT OF APPLICATION OF GAMMA AMINO BUTYRIC ACID AT THE MEDIAL PREOPTIC AREA ON SLEEP-WAKEFULNESS

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The Medial Preoptic Area (mPOA) plays an important role in the regulation of sleep-wakefulness (S-W). The presence of GABA receptors and GABAergic neurons in the POA suggests a possible role of GABA in the regulation of sleep. In addition, the hypnogenic agents, benzodiazepines, which are thought to act via the GABAergic mechanisms are known to produce sleep when injected into the mPOA. The aim of the present study was to find out the effect of application of GABA at the mPOA on S-W. Male Wistar rats (200-250 g) were chronically implanted with EEG, EOG and EMG electrodes and a bilateral guide canula lowered stereotaxically into the mPOA. GABA (50 µg/o.2 µl) was slowly injected into the mPOA at the rate of 0.1µl/min after the rats had recovered from surgery. All recording was carried out during the dark period. Polygraphic data was divided into 30 sec epochs and scored. Injection sites were confirmed by post-mortem histology. There was no apparent change in S-W when the effect of injection of GABA at the mPOA was compared with that of saline. On the other hand, initial findings have shown that administration of picrotoxin (0.25µg/0.2 µl) at the mPOA

produced marked arousal. The present experimental design did not reveal any hypnogenic effect of GABA at the level of the mPOA. This may be due to the rapid break-down of this injected transmitter in the brain.

038

AUTOSUGGESTION: ITS EFFECT ON CARDIO-RESPIRATORY PARAMETERS IN NORMAL CHRONIC SMOKERS AND HYPERTENSIVES

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Autosuggestion or autohypnosis is the process of making subject reach a stage of extreme relaxation or trance. Well stated documents are available indicating its use in surgery, dentistry and gynaecology and is now widely acclaimed that hypnosis should be a major treatment constituent in psychosomatic disorders. These days it is also being used in the west for pain management, treating smoking habits, asthma and obesity. However, in India, because of misconceptions and wide- spread ignorance the studies are much limited. In view of this, a preliminary study was conducted in 30 subjects grouped as normal, chronic smokers and hypertensives (10 in each group) and autosuggestions were given in sessions each lasting for 15 min for two months (2 sessions/week). The effect on various cardiac and respiratory parameters was seen before starting the sessions and after 2 weeks. Cardiac parameters included: i) pulse rate, ii) systolic blood pressure in mm/of Hg, and iii) diastolic blood pressure. Whereas respiratory measurements like i) Forced Vital Capacity (FVC in 1), ii) Forced Expiratory Volume (FEV in l/sec), iii) % forced vital capacity, iv) % forced expiratory volume, v) Peak Fow Rate (PFR in 2/sec, vi) different flow rates at 75%, 50% and 25% were done with the help of autospiror machine giving computerized spirometric data. A questionnaire was also given to every subject in which his response and experiences of the autosuggestion sessions were recorded. By comparing these tables, it becomes apparent that marked improvement in cardio-respiratory parameters (statistically significant) was present after autosuggestive therapy in normal, chronic smokers as well as in hypertensives.

039

MODULATION OF ACUTE PAIN BY SEPTAL NUCLEI

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Various studies have shown that septal nuclei respond to somatic non-nociceptive and nociceptive stimuli. They have been shown to have well defined connections with the components of descending analgesia system, namely, PAG and ventral tegmentum. In the present study, role of septal nuclei in modulation of acute pain produced in tail flick test was examined in the adult male wistar rats. Tail flick latency was significantly lowered ($p<0.001$) in the rats with bilateral electrolytic lesions of septal nuclei, compared to sham operated group. Therefore, it is probable that normally septal nuclei maintain a tonic inhibitory restraint on the transmission of acute pain.

040

EFFECT OF ADMINISTRATION OF CLONIDINE AT THE MEDIAL PREOPTIC AREA ON SLEEPWAKEFULNESS AND BODY TEMPERATURE

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The medial preoptic area (mPOA) plays a pivotal role in the regulation of sleep-wakefulness (S-W) and body temperature (Tb). Norepinephrine (NE), when injected into the mPOA, produces arousal and hypothermia. As the time course of induced changes in S-W and Tb is not identical, it was suggested that these two responses are mediated through different receptors (1). So this study was conducted to find out the changes in S-W and Tb after selective stimulation of alpha-2 NE receptors in the mPOA. Under pentabarbitone sodium anaesthesia, male adult Wistar rats were implanted with electrodes for assessment of S-W and cannulae for intracerebral injection. Animals were trained for about 4-5 days to accept the rectal probe. After post-operative recovery, clonidine hydrochloride (2µg/0.2µl), an alpha-2 adrenergic agonist, was slowly injected into the mPOA, through chronically implanted bilateral cannula, in freely moving rats. Injection of clonidine induced arousal, though there was no change in the Tb. The result of this study show that the arousal response of NE is mediated through alpha-2 receptors, where as hypothermia is probably, mediated through alpha-1 receptors.

041

ACETYLCHOLINE AND NORADRENALINE INDEPENDENTLY INFLUENCE SLEEP WAKEFULNESS AND BODY TEMPERATURE

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Medial preoptic area (mPOA) regulates sleep (S), wakefulness (W) and body temperature (Tb). Independent investigations showed that noradrenaline (NA) and acetylcholine (ACh) in mPOA influence S-W as well as Tb. Whether NA and ACh act independently or, one acts through the other was unknown. Since S-W and Tb may influence each other, the interaction was studied simultaneously on S-W and Tb in freely moving chronically prepared rats.

Under surgical anaesthesia, bilateral guide cannulae towards mPOA as well as EEG, EMG and EOG electrodes were implanted. After recovery, baseline data of S-W and Tb were simultaneously recorded during day and night. Thereafter, either a combination of α-1 antagonist (prazosin) and cholinergic agonist (carbachol), or a combination of cholinergic antagonist (scopolamine) and α-1 agonist (methoxamine) in 0.4 µl was locally microinjected into mPOA, and recording continued until the effects lasted.

A combination of prazosin and carbachol though induced W without affecting Tb during day, neither affected S-W nor Tb at night. On the other hand, a combination of scopolamine and methoxamine neither influenced S-W nor Tb

during day and night.

These effects were qualitatively similar to algebraic sum of effects obtained after independent individual injection of chemicals in combination. These results suggest that cholinergic and noradrenergic mechanisms in the mPOA may have independent effect on S-W and Tb though they may act simultaneously.

042

DORSOLATERAL PONTINE AREA AND RAPID EYE MOVEMENT SLEEP

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Lesion and transection studies have shown the involvement of dorsolateral pontine area in rapid eye movement sleep (REMS). REM off neurons are present in this area. We did not know if this area was involved in the generation and/or maintenance of REMS. It was hypothesized that if cessation of REM off neurons was a must for the generation of REMS, continuous activation of those neurons by nonstop electrical stimulation of the dorsolateral pontine area would reduce REMS and REM frequency would be affected predominantly.
Experiments were conducted in freely moving male albino rats (250-350 gm). Bipolar electrodes were implanted under surgical anaesthesia for recording EEG, EMG and EOG; and stimulating electrodes were implanted bilaterally in the dorsolateral pontine area around locus ceruleus (LC). The area was stimulated (2 Hz, 150 μA) continuously for 8 hours followed by post stimulation recording for 4 hours. The effects on REMS were recorded and analysed statistically.

The results showed that there was a significant decrease in total quantity of REMS during stimulation. The decrease in REMS was due to a decrease in the REM frequency without affecting the REM duration per bout. This was followed by a significant increase in these parameters during post stimulation period.

These results suggest that the dorsolateral pontine area may be responsible for REMS generation.

043

SUPPRESSION OF SLEEP AFTER NMDA LESION OF THE PREOPTIC AREA

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The preoptic area (POA) can be considered as a hypnogenic center in the brain, as electrolytic and radiofrequency lesions of this area produce severe suppression of sleep. As these lesions destroy neurons and fibres of passage, the role of neurons alone can be studied by lesions with cell-specific neurotoxin N-methyl D-aspartic acid (NMDA). The study was carried out in male Wistar rats (200-250 g) which were maintained in controlled lighting and temperature. Animals which showed normal rest activity cycle were chronically implanted with bilateral EEG, EMG and EOG electrodes. Under barbiturate anaesthesia, NMDA (5μg in 0.2 ul) was stereotaxically injected bilaterally into the POA. The sleep-wakefulness (S-W) was assessed on the basis of polygraphic recordings of EEG, EMG and EOG. In addition, locomotor activity was also recorded. All these parameters were continuously recorded for 24 h (19.00h to 19.00h next day) before and at different days after the

lesion. Destruction of the POA cells induced long lasting increase in wakefulness and severe suppression of sleep. It also produced increase in locomotor activity. NMDA injection produced more precise and localised lesion than the other neurotoxic agents. Thus, this study indicates that the neuronal population of the POA plays a vital role in the modulation of S-W.

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044

OLFACTORY BULB TRANSPLANTS : A QUANTITATIVE STUDY ON MITRAL CELLS

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Bilateral olfactory bulbectomy was done on 3-4 day old Wistar rat pups by aspirating the olfactory bulb. In the cavity so created, 1-2 mm^3 of embryonic (same strain) olfactory bulb (E15-16) was transplanted. Following a survival period of two and three months (six animals in each group), transplanted olfactory bulbs were processed for cresyl violet staining. a total of ten, 25 µm thick sections from mid olfactory bulb were selected for mitral cell count per animal. In each section two randomly selected segments of mitral cell layer each of 300 µm length was used for cell count. Mitral cells were counted using an ocular micrometer at a magnification of 390x and compared with matched normal olfactory bulbs, processed in the similar way. The transplanted olfactory bulbs, were processed in the similar way. The transplanted olfactory bulbs had a typical laminar organization of normal olfactory bulb. both in two and three month group, transplanted olfactory bulb contained about 8 mitral cells / 300 µm length of mitral cell layer and there was no significant difference between normal and transplanted olfactory bulbs. The results indicate that by two month survival period transplanted olfactory bulb attained a normal morphological features and there were no degenerative changes of these major projection neurons atleast upto a survival period of 3 months. The successful integration of transplants in the host brain resulted in the functional recovery.

045

REACTION TIME IN DAY NIGHT WORKERS: A COMPARATIVE STUDY

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Reaction time can serve as a good indicator of mental stress. In this study reaction times (both ART & VRT) have been measured in press workers.

These workers were divided in to three groups. The day time workers, night time workers and those doing alternate day and night duties. These data were compared and analysed. The results indicate increases in reaction time values in night workers in comparison to day time workers.

046

ACTIVITY OF ACETYLCHOLINEE-STERASE IN STROKE

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Acetylcholinesterase (AChE) is an enzyme which

splits acetylcholine rapidly at the cholinergic synapses. An attempt was made to find out the AChE activity in cerebrovascular injury cases of strokes. Totally fifty five cases were studied for the AChE activity (by the method of Ellman *et.al.*, 1961) in the age group of 32-75 years (x = 55.5 years) admitted in the medicine wards of the K.E.M. Hospital, Bombay - 400 012, out of which 30 cases were of strokes and 25 were controls who were neurologically normal. AChE shows decreased activity in ($p < 0.001$) when compared with controls. Low AChE activity strokes could be attributed to the altered permeability of the blood brain barrier.

047

EFFECT OF TONIC PAIN ON SCHEDULE SPECIFIC FEEDING BEHAVIOUR

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Tail pinch has been shown to suppress the schedule induced drinking and food reinforced bar pressing. The present study was designed to observe the effect of tonic pain on the motivation to get reward (food). The rats (n=4) were trained on continuous reinforcement schedule and the number of bar presses were recorded for 1 hr. Formalin (50 ul of 5% formalin) was injected in either hindpaw of the rat to produce pain. The behavioural pain scoring was done for one hour and the number of bar presses made were also recorded. Formalin injection decreased the bar presses from 526 ± 69.8 to 148.7± 136.8 which was statistically significant ($p < 0.001$). The results suggest that induction of tonic pain attentuates the motivation to get reward in food deprived rats, thereby demonstrating that attention to pain is preferred over feeding behaviour.

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048

VENTILATORY RESPONSE TO EXERCISE IN NORMAL SOUTH INDIAN CHILDREN

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Although the control of ventilation during exercise is normally very precise, the coupling of ventilation to metabolic rate has been controversial because of complex physiological control system. In order to study the ventilatory response to exercise in normal South Indian children, we studied parameters such as tidal volume (VT), respiratory frequency (F), minute ventilation (VE) and carbon dioxide production (VCO_2). A total of 100 children of age group 7 to 14 years (48 boys and 52 girls) were assessed at rest and maximal exercise level using a computerised treadmill. Age related increase was seen in VT, VE and VCO_2 both at rest and maximal exercise. Boys had higher VT, VE and VCO_2 both at rest and maximal exercise compared to girls of same age. The year-wise increase in these parameters were more in boys than girls of same age. Respiratory frequency did not correlate with age in both groups. Ventilatory response to exercise

was different for boys and girls probably due to their different rates of lungs growth.

049

STRESS OF EXERCISE AND UNDER-NUTRITION DURING PREGNANCY IN RATS: EFFECTS ON MATERNAL METABOLISM AND FOETAL OUTCOME

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The stress of maternal exercise and undernutrition during pregnancy, on maternal metabolism and foetal outcome were studied in Wistar rats. Rats were trained to swim 2 hours/day, 6 days/week for 30-35 days before pregnancy and exercise was continued throughout pregnancy. Dietary restriction during pregnancy was induced by pair feeding the exercised undernourished rats to 75% diet of the exercised ad libitum fed rats. The resting metabolic rate (RMR) was determined by indirect calorimetry and the capacity for Non Shivering Thermogenesis (NST) was assessed by measuring the increase in oxygen consumption following a subcutaneous injection of norepinephrine (250 ug/kg bw). The RMR of pregnant exercised underourished rats decreased below the pre-pregnant levels; reduction being 12%, 0.5% & 7% respectivley in the first second and third weeks of pregnancy. The capacity NST during pregnancy in the exercised undernourished rats was significantly lower (50%; $p < 0.001$) than the pre-pregnant levels and a 6% reduction in the spontaneous activity levels was recorded. The birth weight of the pups was adversly affected. Results indicate that the energy conserved by the decreased RMR and NST during pregnancy in exercised undernourished rats is inadequate to maintain normal foetal development; both, maternal and foetal weights are compromised.

050

EFFECT OF PYRIDOXINE DEFICIENCY ON THE STRUCTURAL AND FUNCTIONAL DEVELOPMENT OF HIPPOCAMPUS

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Malnutrition during early life can impair biochemical and physiological development of brain as brain is more vulnerable to nutritional insult during its period of growth spurt. In this study, it was attempted to understand the effect of pyridoxine deficiency on the structural and functional development of an important area of brain - the hippocampus. Hippocampus has been closely associated with complex neuroendocrine control of physiological activities as well as behavioural responses including learning process and memory retention. Prenatal, preweaning and weaning deficiency of pyridoxine was induced in the experimental rats by feeding dams with diet deficient in pyridoxine during pregnancy and lactation. The general growth profile for pyridoxine deficient (PD) rats is compared with control ones. The structural changes in the hippocampus of pyridoxine deficient rats was investigated using the histological techniques. Hippocampal electrical activity was recorded from in vitro brain slice preparation. The study clearly showed the structural impairment in hippocampus of PD rats. The electrical activity recorded from hippocampal slice of PD rats showed significant variation when compared to controls. Pyridoxine is taking part in very important biochemical reactions including

synthesis of neurotransmitters and hormones. Pyridoxine deficiency is common in pregnant woman who used anovulating steroids before pregnancy. The pyridoxine deficiency of the mother may result in permanent behavioural abnormality and intellectual deficit in the progeny.

051

EFFECTS OF ISOLATION AND IMMOBILIZATION STRESS ON BIOCHEMICAL CHANGES AND ORGAN WEIGHTS IN ALBINO RATS

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The present work was undertaken to study the effects of isolation and immobilization, for varying periods of time, on hematological, biochemical changes as well as weights of various organs in Wistar strain albino rats. Healthy adult male rats were put on isolation cages for 7, 15 and 30 days, respectively, in 3 groups. Another group of rats were immobilized in specially made wooden boards for 1 hour daily for a period of 7, 15 and 30 days, respectively, in 3 different sub-groups. Blood sugar, cholesterol, SGOT and SGPT were assessed besides measurement of weights of various organs like heart, spleen. liver, brain, kidney and adrenal glands. Total leucocyte, absolute counts of eosinophil and lymphocyte were also performed. In all groups of animals, ECG was also monitored at the end of stress period. Weights of adrenal glands alone were increased markedly in both kinds of stress. Total leucocyte, absolute eosinophil and absolute lymphocyte counts were significantly reduced. While blood sugar was reduced, serum cholesterol SGOT & SGPT levels were significantly increased ECG tracings showed normal pattern. There was no significant difference in response observed among the two types of stress employed. The stress responses were sustained upto 30 days and these responses were almost of the same magnitude at the end of T days; 15 days and 30 days without showing any relevance to the period for which the animals were put under stressful situation. The type of stress employed does not seem to matter as regards the biochemical changes studied are concerned. The implications of these biochemical changes will be discussed in detail.

052

EFFECT OF KAYOTSARGA ON SKIN RESISTANCE AND ALPHA RHYTHM

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Kayotsarga is a process of relaxation in the system of Preksha Meditation. The aim of the present pilot study was to evaluate the effect of short term single session of 'Kayotsarga' on the Galvanic Skin Resistance (GSR) and Alpha Brain Waves (Alpha) in young normal healthy subjects. Total 9 subjects of same age group and sex were incorporated in the study. They were made well trained in performing the 'Kayotsarga'. After 30 minutes of 'Kayotsarga' GSR and no. of Alpha were recorded by using respective biofeedbacks and compared with basal readings. The results shows significant increase in both GSR and Alpha. The possible mechanisms involved are discussed.

053

EFFECT OF SVARA ON PHYSIOLOGICAL CHANGES DUE TO PSYCHOLOGICAL TASK PERFORMANCE

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Svara yoga recommends performance of passive activities (*soumya karya*) during *Ida svara* (dominant left nostril breathing) and vigorous activities (*roudra karya*) during *Pingala svara* (right nostril breathing). Hence the possible physiological changes in heart rate, systolic and diastolic blood pressure, respiratory rate, right and left eye pupillary diameter were assessed by measuring them before and after performance of specific psychological tasks. Two groups of 10 young males each participated. One group started with right and the other with left nostril dominance. Nostril dominance was reflexly altered during the second half of session for each group. A set of psychological tasks were performed during left and right nostril breathing by each group. Significant differences were obtained in changes of heart rate and systolic blood pressure. Pshychological task performance during left nostril breathing increased and similar performance during right nostril decreased heart rate and systolic blood pressure. Thus psychological task performance in left nostril breathing is stressful but not so in right nostril breathing. Hence right nostril breathing is recommended for stress free psychological task performance.

054

CHANGES IN RESPONSE TO COLD PRESSOR TEST AFTER YOGA

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It is well known that 'the cold pressor test' evokes a sharp cardiovascular response; by an increase in both the systolic and diastolic blood pressures and an increase/decrease in heart-rate, mediated by autonomic reflexes. This study was aimed at investigating the nature of this response after Yoga.

Six healthy males aged between 29 - 40 years were selected. They practised Yoga daily one hour each in the morning and in the evening. The heart rate and the blood pressure were measured; once before and once after cold pressor test. Heart rate was calculated on the basis of ECG obtained from a polygraph and the blood pressure was measured by using a sphygmomanometer. The 'cold pressor test' involved the immersion of subjects right hand in water kept at 10°C for 2 minutes. These observations were repeated after 15 days of yoga. The results showed, before yoga; there was bradycardia from 83 ± 14.3 to 77.5 ± 12.8, a rise in the systolic blood pressure from 123.7 ± 15.9 to 127 ± 10.1 and a rise in diastolic blood pressure from 79.7 ± 6.4 to 87 ± 4.7. After 15 days of yoga the cardiovascular responses were very much restrained as suggested by a bradycardia from 74.9 ±11.2 only to 72.25 ± 10.6. The rise in the systolic blood pressure was negligible from 123 ± 22.7 to 123.7 ± 13.1 and the rise in diastolic pressure was also slight from

82.3 ± 14.3 to 85.3 ± 12.2.

In conclusion, it is most likely that the cardiovasular system can withstand a cold stress much better after yoga.

055

EFFECT OF STRESS ON BODY WEIGHT AND INGESTIVE BEHAVIOUR IN RATS

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The effect of 90 minutes supine restraint or forced swim stress, on body weight and ingestive behaviour in sixty adult male albino rats was studied. One group of twenty rats served as control; second group of twenty was immobilized and third group of twenty was forced to swim in water at room temperature.

The animals were studied for a period of 15 days. During this period they were subjected to 90 minutes of stress every day at the same time. The rats in second group were immobilized in supine position by restraining them in wire-mesh cylinders which can be adjusted to snugly fit the body of the rat. Forced swim stress was exerted by putting the rats in cylindrical vessels filled with water. Both the groups of stressed animals showed a decrease in body weight for initial two to three days, followed by gain in body weight upto fifteenth day. Feed intake showed an initial decrease in both stress groups upto third day followed by increase. The changes in fluid intake were not statistically significant.

Therefore, immobilization and forced swim stresses initially reduced the level of food intake and body weight, but became normal as rats get accustomed to the stress.

056

KRIYA YOGA INDUCED MIDDLE LATENCY CHANGES OF AUDITORY AND SOMATOSENSORY EVOKED POTENTIALS

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Auditory and somato-sensory middle latency responses were recorded in three repeated sessions of four senior practitioners of Kriya Yoga in eyes closed condition before and after the practice. The potentials were analysed on-line with Nicolet Med-80 system. The practice of Kriya Yoga consists of 4-5 rounds of slow, medium fast breathing with an awareness. Auditory middle latency responses (AEP-MLRs) of Na and Nb components in eyes closed condition were decreased significancantly in post Kriya Yoga practice, when compared to pre yogic state. However the peak latency of Pa component showed a decreasing trend. Like the AEP-MLRs, the latencies of somato-sensory N20 and N50 were also decreased significantly in post eyes closed condition, while the P26 and P40 showed a decreasing trend in all subjects.

These findings indicate that the practice of Kriya Yoga decreases the latencies of both auditory and somato-sensory middle latency responses suggesting enhanced paceof neuronal processing of sensory stimuli.

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EFFECT OF "SULAHARINI" ON ETHANOL-INDUCED GASTRIC ULCER IN RATS

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"Sulaharini", an Ayurvedic preparation used for the treatment of peptic ulcer, was investigated for its anti-ulcerogenic activity against ethanol-induced gastric lesions in rats. Cimetidine was used as reference drug. Preliminary experiments had established that 200 mg/kg (po) showed significant antiulcer effect and the same dose was used in the present studies. The effects on gastric acid and pepsin output, protein and carbohydrate contents of soluble and visible mucous and ulcer index were determined in ulcerated and non-ulcerated rats. The results indicated that there was no significant effect on the volume of gastric juice, acid and pepsin output. The drug brought about significant decrease in ulcer index. There was an appreciable increase in carbohydrate content and decrease in protein content of both types of mucus which resulted in a significant increase in the C:P ratio. The drug was found to increase the carbohydrate content of mucus even in normal animals. These results suggest that the anti-ulcerogenic effect of the drug is mediated by augmenting the mucosal resistance rather than reducing the aggressive factors. Cimetidine decreased the acid output significantly, but did not show any appreciable change in C:P ratio.

060

HYPOGLYCEMIC ACTION OF *NIGELLA SATIVA* SEEDS

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Hypoglycemic action of a decoction of *Nigella sativa* seeds, a commonly used indigenous preparation, was studied in rabbits. The minimum effective single dose of the extract was obtained as 10 gm/kg body weight which produced a 41% reduction in blood glucose level at the end of 3 hours. The action persisted for 6-8 hours after which the glucose levels tended to rise, reaching normal values at 24 hours.

Glucose tolerance test was done in rabbits given the same dose of extract with tolbutamide as standard. The peak levels of blood glucose attained was higher in *Nigella sativa* group. However, the fall after this peak was more marked in this group compared to the tolbutamide group. The lowest levels reached after 4 hours was also lower with the *Nigella* group.

Alloxan diabetic rabbits also responded to the extract but to a lesser extent.

A single dose of the extract raised serum insulin levels in normal rabbits. Alloxan diabetic animals showed a less pronounced insulinogenic response.

On the basis of the findings of this work, the claim that *Nigella sativa* seeds have hypoglycemic potential appears to be scientifically true and its probable mechanism of action is to facilitate the synthesis and release of insulin though additional mechanisms cannot be ruled out.

061

HYPOGLYCEMIC EFFECT OF AEGLE MARMELOS (BAEL) IN EXPERIMENTAL DIABETES MELLITUS

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Diabetes mellitus is a prevalent disease in our country. In the treatment of diabetes, plant extracts have been used for a long time in folk medicine. In the present study, the hypoglycemic effect of Aegle marmelos (Bael leaves) was studied in streptozotocin (STZ) induced diabetes of varying degrees. Bael juice was prepared from the leaves and a particular dose was administered intragastrically. To assess the hypoglycemic property, the studies conducted were, hourly blood glucose estimation, comparative glucose tolerance test using Tolbutamide and estimation of daily blood sugar level for thirty days. Young albino rats weighing between 150-175 g were used. Streptozotocin was given in varying doses and according to the blood sugar levels, the rats were divided into mildly, moderately and severely diabetic types. From the study it was concluded that Bael may be used in mild diabetes, but it is not so effective in moderate and severe type diabetes. The hypoglycemic effect may be by activating Beta cells of Pancreas to increase the synthesis and secretion of insulin. for this some Beta cells should be present in the Pancreas.

062

ANTI-INFLAMMATORY AND WOUND HEALING PROPERTIES OF MORINGA OLEIFERA

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The effects of the root extract of Moringa oleifera (fam: moringaceae) was studied for its anti-inflammatory and wound healing properties. Anti-inflammatory action was studied by observing percentage reduction in carragenin induced rat paw oedema at 3 hr. Wound healing effects were studied on incision (skin breaking strength), excision (percentage wound contraction and epithelialisation time) and dead space (granuloma breaking strength and biochemical parameters) wound models. Moringa showed significant acute anti-inflammatory action but did not suppress chronic inflammation significantly. A significant increase in the tensile strength as well as lysyl oxidase activity was observed. In addition, hexosamine level was also elevated, implicating involvement of ground substance with the increased tensile strength (and thereby the pro-healing action) by better cross-linking of collagen.

063

IMMEDIATE EFFECT OF *OCIMUM SANCTUM* LINN (TULSI) ON VARIOUS BIOCHEMICAL PARAMETERS IN NORMAL MALE VOLUNTEERS

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This study has been planned to investigate

immediate effect of Tulsi on various Biochemical Parameters in normal male volunteers. The study was carried out in six normal male volunteers by adopting randomised cross over design. After overnight fast, blood sample was collected at 8 A.M. Then volunteers received either standard breakfast or standard breakfast plus 3 gms. of Tulsi leaves. Then, blood sample was collected at 1 P.M. (after 5 hrs). Various biochemical parameters estimated in Blood were Sugar, Cholesterol, Triglycerides, HDL, Urea, Creatinine, Uric acid, Sodium, Potassium, SGOT, SGPT, Alkaline phosphatase and Acid phosphatase. Results revealed that there is no immediate effect of Tulsi leaves on any biochemical parameters of normal male volunteers. This study has been further extended to investigate the effect of Tulsi leaves on various biochemical parameters on its chronic administration and also in patients with abnormal metabolic parameters.

064

REVERSAL OF ETHANOL ABSTINENCE IN MICE AND RATS BY BR-16A (MENTAT), A HERBAL PREPARATION

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The protective effect of BR-16A (Mentat), a herbal psychotropic preparation, on alcohol abstinence-induced anxiety and convulsions was studied in mice and rats. Chronic adinistration of ethanol (2-5/kg, p.o.) for 6 days produced anxiogenic reaction in mice and rats on 7th day, 24 hrs following ethanol withdrawal. Daily administration for BR-16A (100 mg/kg, p.o) prior to ethanol administration for 6 days prevented withdrawal-induced anxiety in both rats and mice. However, acute administration of a single dose of BR-16A to ethanol withdrawn animals, on 7th day, showed significant anxiogenic response. Ethanol withdrawal also sensitized the convulsogenic reaction to pentylenetetrazole (PTZ). A nonconvulsive dose (40 or 60 mg/kg) of PTZ produced full blown convulsions and increased mortality in ethanol withdrawn rats and mice, respectively. Both acute and chronic administration of BR-16A (100 mg/kg) exhibited significant protection against ethanol withdrawal-induced reduction in PTZ threshold in rats and mice. The results suggest the usefulness of this safe herbal preparation in the management of ethanol withdrawal reactions.

065

HYPOGLYCAEMIC EFFECT OF *CURCUMA LONGA* LINN

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50% ethanol extract of *Curcuma longa* (henceforth called 'drug') was used in the dose of 100 mg, 200 mg, 500 mg and 1000 mg per kilogram body weight. Tolbutamide in the dose of 250 mg per kilogram body weight was used as standard drug.

The 'drug' did not show significant hypoglycaemic effect in fasted and glucose-fed normal rabbits. In fasted alloxan diabetic rabbits there was a significant reduction ($p<0.001$) in blood sugar level with 500 mg and 1000 mg per kilogram body weight doses. The maximum reduction was seen at the end of 3 hrs and the levels rose back to normal at the end of 24 hrs. In glucose fed diabetic rabbits, there was a significant reduction ($p<0.001$) in the peak

glucose concentration though it was less when compared with tolbutamide. After continuous feeding of the 'drug' at a single daily dose of 500 mg per kilogram body weight for 4 consecutive weeks, there was a significant reduction ($p<0.001$) in the fasting blood glucose concentration. In this group, there was a significant reduction ($p<0.001$) in the peak blood glucose concentration after a glucose load.

Thus it was seen that *Curcuma longa* possesses hypoglycaemic effect in diabetic animals. The mechanism of this action is to be worked out.

066

KUNSTELARIA KERALENSIS - A PROMISING ANTIFERTILITY AGENT

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Tribal communities in India use a number of Wild medicinal plants for antifertility, menstrual regulating and related sexual disorders. However, no scientific validation of such claims has been undertaken. In our search for safer fertility regulating agents based on tribal usage, a number of promising plant species have been recorded with antifertility activity. The present communication reveals the findings on one such species, Kunstelaria keralensis which has shown very promising findings. Methanolic extract of the stembark produced a dose dependent anti-implantation effect in pregnant rats. The extract did not exhibit any estrogenic activity as indicated by various biochemical markers and also scanning Electron Microscopic investigations. The extract did not possess any CNS depressant activity and no significant effect on the cardio-vascular functions was observed. The extract did not produce any mortality upto a dose of 4 g/kg. It is concluded that K. keralensis has a promising scope of developing into a safer fertility regulating agent in near future.

067

EFFECT OF MENTAT^R, A HERBAL FORMULATION, ON EXPERIMENTAL MODELS OF ALZHEIMER'S DISEASE AND CENTRAL CHOLINERGIC MARKERS IN RATS

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Mentat^R is a formulation of Medharasayanas or drugs which improve memory and intellect. The effect of subchronic administration of Mentat was assessed on two animal models of Alzheimer's disease, induced by intracerebroventricular (i.c.v.) administration of colchicine and by lesioning of nucleus basalis magnocellularis by ibotenic acid, in rats. The effect of Mentat was evaluated on i.c.v. colchicine induced depletion of acetylocholine (ACh), reduction in choline acetyltransferase (ChAT) activity and decrease in muscarinic cholinergic receptor (MCR) binding, in frontal cortex and hippocampus. Rats were initially trained to exhibit 100% avoidance response in an active avoidance paradigm. Thereafter, lesioning was done by either colchicine or ibotenic acid, under pentobarbitone sodium anaesthesia. Tests for retention of learning were done 7, 14 and 21 days later. Drug or vehicle treatment was initiated on day 1, just prior to colchicine or ibotenic acid administration

and continued for 3 weeks. Retention tests were done on days 7, 14 and 21. Cholinergic markers acid induced marked cognitive deficits which were attenuated by Mentat (100 and 200 mg/kg p.o.) after 14 and 21 days treatment. These doses of Mentat also attenuated the reduction in the cholinergic markers induced by colchicine in frontal cortex and hippocampus, following treatment for 14 and 21 days. The findings of this study indicate that Mentat is effective in reversing cognitive deficits in animal models of Alzheimer's disease, following subchronic treatment for 2 and 3 weeks, and that its efficacy was related to conservation of cholinergic function adversely affected by colchicine.

068

ANTI-TUMOR PROPERTIES OF SOME SELECTED MEDICINAL PLANTS

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Cytotoxic and anticancer principles have been reported from several plants. Notable among them are *Ixora javanica*, *Withania somnifera*, *Crocus sativus* and *Centella asiatica*. however a good many plants used by tribals to cure tumor-like symptoms need to be pharmacologically evaluated. The findings of some of our investigations in this line will be presented.

28D Reproductive System

069

EFFECT OF PARITY ON NUTRITIONAL PARAMETERS DURING PREGNANCY

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One hundred and seven pregnant women without any associated renal, hepatic or metabolic disorders, were selected from obstetrics outpatients and antenatal clinic. Subjects were asked to report on empty stomach in the morning, for withdrawal of blood samples. Haemoglobin (Hb.), serum Iron, transferrin, total protein and lipid profile were studied. The subjects were divided into three groups. Group I was primi gravida, Group II having second or third pregnancy and Group III having four or more pregnancies. Serum Iron level was higher in Group I as compared to Group II and Group III. Transferrin level was minimum in Group I and increased with the number of pregnancies. Total lipid, phospholipids and cholesterol decreased in Group II from Group I and continued to remain so in Group III.

(The finance for the project is granted by Roussel Scientific Institute India)

070

EFFECT OF PROGESTERONE ON BRAIN NEUROTRANSMITTER IN OV_x FEMALE RATS

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Previous report from this department[1,2,3] showed that progesterone when given orally in

human females, ECG desynchronisation and changes psychoanlytical scoring develop whereas in intact female rats intraperitoneal progesterone causes a fall of Noradrenalin (NA) concentration in selected areas of brain. The present work is an extension of the previous work done in animals with some changes in the protocol. Instead of using intact rats, ovariectomised (OV_X) rats were used to remove the influence of endogencous sex steroids, if any.

Virgin female adult rats were ovariectomised(OV_X).4 weeks after the operation they were treated with oestrogen (I.P.) 48 hours after oestrogen, the experimental rats were treated with progesterone in propylene glycol I.P. whereas the control groups were treated with only propelene glycol I.P. ---> sacrificed after 20 hours and selected areas of brain (the entire brain stem + thalamus + hypothalamus only) where quickly dissected out.

Oestrogen was given in two different doses so also was progesterone. All procedures were carried out in a cold room. In the selected areas of brain, concentrations of different neurotransmitters were estimated; two outstanding features were fall of NA concentration and rise of GABA concentration after progesterone injection. Implications of them are enormous.

On the whole from our series of works it appears, that both fall of NA concentration and rise of GABA concentration may be related to progesterone induced anxiolysis and sedation. Fall of NA concentration may additionally, represent the mechanism of ovostasis in oral contraceptive pills. Also by interpolating the results of our previous papers it appears that ovariectomy makes no substantial difference so far as NA concentration is concerned.

071

MENARCHEAL AGE AND PRE-MENSTRUAL SYNDROME IN RELATION TO BLOOD GROUPS

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Frequency of occurrence of various diseases in relation to racial or genetic difference has been investigated by many workers. Very few workers have studied association of the age at menarche in relation to the principal blood groups. The present study has been undertaken to find out if there is any relationship among the blood groups, menarcheal age, pre-menstrual syndrome (PMS) and dysmenorrhea. 266 Medical Students, aged 17 to 20 years who could furnish their menarcheal age accurately, were selected for the study. the ABO blood typing was done by standard technique. To evaluate pre-menstrual syndrome, girls were given PMS calenders and were instructed to record the presence and severity of their physical and emotional symptoms for three consecutive menstrual cycles.

It was observed that girls belonging to AB group had an early menarche, as compared to other groups. The trend observed was AB (11.30 ± 1.14) < O (12.22 ± 1.67) < A (12.33 ± 0.95) < B (12.38 ± 1.14). The percentage of girls having pre-menstrual symptoms consistent with PMS in relation to blood group was in order of AB (33%) > O(25%) > A(23.81%) > B(20%) and dysmenorrhea in the order of AB(32%) > A(27%) B(26%) > O(25%).

It is evident from the present study that girls belonging to AB group have an early menarche and high incidence of pre-menstrual syndrome and dysmenorrhea.

072

EFFECT OF MET-ENKEPHALINS ON OESTROUS CYCLE

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The study was conducted on female albino rats. Rats were kept in separate cages to ensure that they are not pregnant. These rats were divided into two groups. In experimental group of rats 20 mcg of met-enkephalin was injected intraperitoneally on the Ist day in each rat. Simultaneously, same quantity of saline was injected in the control group. From the first day onwards, vaginal smears of every rat were taken. These smears were examined after staining with Leishman's stain for presence of nucleated epithelial cells, polymorphs and cornified cells. On the basis of the study of vaginal smears, the day of oestrus was decided. On comparing the experimental group with the control group, it was found that the oestrous cycle was preponed in the rats injected with met-enkephalins.

073

EFFECT OF COMBINED ORAL CONTRACEPTIVE PILLS ON THE LIPID PROFILE IN FEMALE RABBITS

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Population explosion is a world wide phenomenon and to control this various methods of contraception are being used world over including India. amongst the various methods of contraception, use of contraceptive pills is being more and more popular. But use of contraceptive pills is not free from various side effects; the most common being lipid metabolic disturbances which has led to increased incidence of cardiovascular diseases like Myocardial Infarction and Cerebral Strokes.

The present study has been aimed at finding the metabolic changes in the lipid metabolism of non-pregnant adult female rabbits weighing between 1.1 to 1.3 kg caused by the continuous use of combined oral contraceptive pills over a period of 3 months.
Two brands of combined oral contraceptive pills have been used - Low dose oral contraceptive pills containing 30 ug of Ethinyl estradiol plus 150 ug of Levonorgestrel and high dose oral contraceptive pills containing 30 ug of Ethinyl estradiol plus 300 ug of Norgestrel.

Serum levels of Total Cholestrol, HDLC and Triglycerides have been measured over 3 months of study at regular intervals of 15 days. It is observed that the low dose oral contraceptive pills produced insignificant increases in Serum Cholesterol ('t' = 1.027; $p > 0.3$) Serum Triglyceride ('t' = 0.392; $p > 0.7$) and an insignificant decrease in the mean level of serum HDLC ('t' = 1.414; $p > 0.1$). On the other hand, high dose oral contraceptive pills resulted in significant decreases in the mean levels of total serum cholesterol ('t' = 5.115; $p < 0.001$), Serum HDLC ('t' = 8.944; $p < 0.001$) and Serum Triglyceride ('t' = 2.443; $p > 0.02$) over a period of 3 months, starting right from 15th day.

A decrease in serum HDLC level has been known to be a risk factor of cardio-vascular disorders and since high dose combined oral contraceptive pills produced significant decrease in serum HDLC level, the low dose oral contraceptive pills which produced slight lipid metabolic disturbances should be preferred as an oral contraceptive agent.

074

EFFECT OF ORAL ZINC ON COPPER AND HAEMOGLOBIN LEVELS IN PREGNANT WOMEN

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Conflicting reports appearing in literature regarding the effect of oral zinc administration on copper and haemoglobin levels in pregnant women promoted this study. Zinc sulphate 200 mg (containing 45 mg elemental zinc) was administered p.o. per day to 104 pregnant women in differnt trimesters of pregnancy, till delivery. 58 untreated pregnant women served as control. All women in control and study group were given iron supplementation regularly. Hb and Cu estimations were done in each trimester since reporting, and at term. Cu estimation was done in serum, urine and cord blood serum.

In control subjects, serum Cu increased significantly with duration of pregnancy ($p < 0.001$) while urinary Cu remained unchanged. Hb level of these subjects improved significantly with advancement of pregnancy ($p < 0.05$-0.01). In zinc treated subjects, serum and urinary copper levels declined following zinc administration ($p < 0.001$). Cu level in cord blood serum was although lower than maternal serum levels ($p < 0.001$), yet remained constant. Serum and cord blood serum Cu of zinc treated subjects was significantly lower as compared to untreated subjects (p 0.05-0.001). Zinc supplemented subjects showed a greater improvement in Hb level after 3 months or more, as compared to control subjects ($p < 0.05$-0.01).

075

OESTROGENIC RHYTHM INDUCED BY A SINGLE ADMINISTRATION OF THE EXTRACT OF *FERULA JAES-CHKEANA* TO IMMATURE RATS

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Antifertility agents of synthetic or natural origin exert their action mostly through the alterations in hormonal properties. Extracts of medicinal plants are known to exhibit potent antifertility activity and most of them elicit exclusive estrogenic characteristics. Although such agents do not have scope in the field of contraceptive development, however, mild estrogenic substances are used in various disorders of infertility. Hexane extract of *Ferula jaeschkeana* is known to possess antifertility activity due to its estrogenic effect, however, its estrogenic rhythm is not known.

In the present investigation a single dose of 25 mg/kg was administered to immature rats and were sacrificed after different days. Vaginal opening, cornification and uterine wet weight, glycogen contents and histological features were considered. Hexane extract significantly increased the uterine wet weight and caused premature opening of the vagina and induced vaginal cornification. Uterotrophic peak was attained 2 days after administration and thererafter declined gradually. At 10 days values become almost normal. Significant amount of glycogen was estimated in the uterus during first 5 days after administration and thereafter declined. Histological features of uterus showed stimulated endometrium which continued for 6-8 days only. The estrogenic rhythm induced by the hexane

extract has been compared to that following diethylstilbesterol administration.

076

THE EFFECTS OF *AEGLE MARMELOS* POLYSACCHARIDE ON ISOLATED ALBINO RAT UTERUS AND RABBIT UTERUS IN SITU

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Preliminary screening of the uterine stimulant activity with graded doses of aqueous extract of the leaves of *Aegle marmelos* exhibited good oxytocic activity on isolated albino rat uteri (of different hormonal phases, early pregnancy and late pregnancy), rabbit uterus and guinea pig uterus. The uterine tissue was suspended in De Jalon's solution in an organ bath assembly at 32°C. The mechanism of action was found to be due to direct stimulant action on uterine tissue. The present study was carried out to assess the role of polysaccharide isolated from aqueous extract of *Aegle marmelos* on rat uteri and rabbit uterus in situ. Graded doses of polysaccharide showed stimulation of spontaneous contraction and increase in tone in a dose dependent manner. This effect was compared with pitocin. These results indicate that the oxytocic activity of *Aegle marmelos* can be due to polysaccharides along with other components.

077

IN VIVO INHIBITORY EFFECT OF CHLORPHENIRAMINE, CIMETIDINE AND CLONIDINE ON HUMAN SPERM MOTILITY. GRADE I

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Nine Male Patients in the age range of 30-40 yrs. and in 3 groups of 3 each of dermal allergy, peptic ulcer and hypertension were treated with Chlorpheniramine, 12 mg/day, Cimetidine 1200 mg/day and Clonidine 0.3 mg/day respectively for 15 days. (These drugs have imidazoline moiety with C-C-N linkage similar to that in histamine). Patient's semen was examined before and after the commencement of treatment period. The motility grade I of sperms was inhibited by all the tested drugs to varying extent; from 60 percent ± 2.2 SEM to 25 percent ± 3.7 SEM by Chlorpheniramine. 70 percent ± 3.1 to 30 percent ± 2.9 SEM by Cimetidine and from 65 percent ± 3.3 SEM to 27 percent ± 3.75 SEM by Clonidine.

28E Cardiovascular System

078

SYSTOLIC TIME INTERVALS IN CHRONIC ALCOHOLICS

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Despite the wide prevalence of alcoholism in Western Maharashtra, cardiac symptoms in alcoholic patients have often been ignored unless obvious clinical, electrocardiographic or radiological evidence of cardiomegaly or arrhythmias is present. In the present study a noninvasive evaluation of hearts of chronic alcoholic subjects with and without clinical evidence of heart disease was performed by

determining systolic Time Intervals (STI). alcoholics with and without cardiac symptoms has abnormal STI as compared to normal healthy controls. PEPI is increased, LVETI is decreased and PEP/LVET ratio is increased in alcoholics ($p < 0.01$) indicating that there is left ventricular functional impairment. Thus, present study confirms that early impairment in cardiac functions can be determined by simple noninvasive techniques as determination of Systolic Time Intervals and therefore help to prevent further deterioration of heart.

079

ADENOSINE INFUSION LIMITS MYOCARDIAL INFARCT SIZE

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The aim of this study was to assess the effect of Intravenous adenosine (ADO) on myocardial infarct size. Ischemia was produced by occlusion of a branch of the left coronary artery in open chest anaesthetized rabbits for 30 minutes followed by 3 hours of reperfusion. The first group (n=12) served as control. Group 2 (n=12) received ADO infusion (rate 2cc/m) commenced 5 min. prior and continued for 60 min. after releasing the occlusion. Group 3 (n=12) received a bolus dose of Lidocaine (2mg/kg) + ADO infusion (2cc/m). The Ischemic region was measured by Postmortem infusion of flourescent particles and the volume of Infarct was determined by incubating serial slices in triphenyl tetrazolium.

In control, 43.2 ± 2.15 of the ischemic zone infarcted. With ADO infusion 26.6 ± 2.2 % infarcted and with ADO + Lidocaine infusion 22.8 ± 3.1% infarcted.

Data obtained indicate that infusion of Adenosine alone (Group 2) and Adenosine + Lidocaine (Group 3) significantly reduced ($p < 0.01$) infarct size compared to control group (Group 1). However, no significant difference ($p>0.05$) was observed in infarct size with addition of lidocaine (Group 3) compared to infusion of adenosine alone (Group 2).

080

CERIUM INDUCED NEGATIVE INOTROPIC CHANGE ON PAPILLARY MUSCLE IS IRREVERSIBLE IN MAGNESIUM DEFICIENCY

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Based on the observation of the presence of cerium and deficiency of magnesium in the cardiac tissue of patients with endomyocardial fibrosis (a cardiomyopathy with diastolic dysfunction), the inotropic changes due to Ce^{3+} and the influence of extracellular Mg^{2+} have been recorded using the rat papillary muscle.

i. Introduction of micromolar concentration of Ce^{3+} to the perfusate with physiological levels of Mg^{2+} decreased the force of contraction. This change induced by Ce^{3+} was found to be reversible.

ii. A positive inotropic effect was observed on elimination of Mg^{2+} from the perfusion medium.

iii. Addition of Ce^{3+} to Mg^{2+} deficient medium produced a decrease in the force of contraction.

This change was found to be irreversible.

The mechanism of action of Ce^{3+} can be similar to that of La^{3+} in effecting a negative inotropic response. Earlier studies have suggested that La^{3+} acts as it binds to the cellular surface, causing marked inhibition of Ca^{2+} influx and efflux. Lanthanum heavily saturated the basement membrane and was not found internal to the sarcolemma.

Calcium inward current in mammalian ventricular muscle is also inhibited by Mg^{2+} though it is much less potent than La^{3+}. This supports the positive inotropic effect observed on elimination of Mg^{2+} from the perfusion medium.

It has been reported that trivalent cations such as La^{3+} which are larger than Mg^{2+} and which normally do not cross the cell membrane will be able to pass into the vascular smooth muscle cells in the absence of membrane magnesium. It is therefore inferred that the irreversible change induced by Ce^{3+} in conjunction with magnesium deficiency could be due to the influx of the trivalent ion into the cell and consequent cellular dysfunction.

081

A NON-INVASIVE EVALUATION OF LEFT VENTRICULAR FUNCTION IN DIABETICS WITHOUT CLINICAL EVIDENCE OF MYOCARDIAL DYSFUNCTION

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Myocardial complications form an important cause of mortality in diabetes mellitus. Increased incidence of congestive heart failure in the absence of associated coronary heart disease or of hypertension has been reported in diabetes. Therefore, present study was undertaken to evaluate left ventricular function, non-invasively, by measurement of systolic and diastolic time intervals in diabetes mellitus, not showing clinical evidence of heart disease. Systolic time intervals (STI) and diastolic time intervals (DTI) were determined in 25 male patients of diabetes mellitus (non-insulin dependent) and 30 male normal subjects from simultaneous recording of apexcardiogram, carotid arterial pulse, electrocardiogram and phonocardiogram. STI showed prolongation of pre-ejection period, shortening of left ventricular ejection time and significant increase in PEP/LVET ratio, indicating impairment of left ventricular systolic relaxation time, abbreviation of rapid filling time and increased ratio of slow filling time to rapid filling time, reflecting decreased compliance of the left ventricle in diabetic patients as compared to controls. There was improvement of left ventricular function with treatment (Sulphonylurea drugs) as shown by the return to control values of various parameters used to assess left ventricular function. The results suggest the possibility that LV dysfunction in early diabetics could be due to metabolic derangement.

082

BLOOD PRESSURE MEASUREMENT IN FEMALE CLOSE RELATIVES OF HYPERTENSIVES

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Genetic and environmental variables have strong influence on determination of BP in an individual. It is reported that basal BP tends to be

higher in Ist degree relatives of hypertensives. subjects of present study were healthy, young females (19-30 yrs) among general population of Delhi. They belonged to 2 categories Group-I, experimental group comprised of subjects having positive family history of essential hypertension (BP > 140/85 mm Hg) (n=88) and Group II - age sex matched controls with no family history of hypertension (n=62). Basal blood pressure of subjects was recorded in sitting posture during same phase of menstrual cycle. Mean systolic and diastolic B.P of the two groups was compared by applying "Student t test". Mean systolic B.P. (though within normal range) was significantly higher ($p < .001$) in experimental as compared to control group. There was no significant difference in DBP of the two groups. Persons with first degree hypertensive relatives are known to have elevated risk of develping hypertension. In present study as number of subjects is not adequate (for this type of study0 no definite conclusion can be drawn, so it is proposed to continue the project. an attempt will also be made to study pattern of BP in Ist degree relatives of hypertensives beyond the age of 30 yrs to observe the mode of onset of essential hypertension, whether it is gradual or sudden.

083

CARDIOVASCULAR DECONDITIONING ON EXPOSURE TO PSEUDOHYPO-GRAVITY

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A facility to simulate physiological effects of hypogravity (pseudo-hypogravity) by dry floatation is designed, fabricated and installed at Institute of Aerospace Medicine, Indian Air force, Bangalore. Presently, this facility is the only one of its kind in south East Asia. Twenty four healthy adult male volunteers were studied in this new simulator for cadiovascular deconditioning on exposure to pseudo-hypogravity for 12 hours. Changes in orthostatic tolerence as assessed by 70° head-up tilt before and after the exposure are compared to evaluate the cardiovascular deconditioning in these subjects. The findings are as expected theoretically and are in agreement to available literature. It is, therfore, assumed that the newly installed system is able to simulate the effects of weightlessness. The results of the pilot study are briefly reported.

084

DICROTIC WAVE AND ANTHROPOMETRY

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This preliminary study was done to evaluate the relationship between some anthropometeric measurements and presence of dicrotic wave in pulse tracing. Anthropometric measurements included Height, Weight, and Chest circumference. Pulse was recorded on a students physiograph from proximal phalanx of right thumb. 69.3% subjects had dicrotic wave on their pulse tracing. Statistical analysis showed that the presence of dicrotism was associated with increase in height and weight, wheras it disappearance was related to increased chest circumference and ageing. Paper also includes a brief account of somatotyping and its historical relationship with types of pulses, as documented in Ayurvedic and Unani classics.

085

MODULATION OF GLOBAL ISCHAEMIA BY NITRIC OXIDE IN MONKEY HEART

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Our earlier studies in isolated rat heart indicated the involvement of nitric oxide (NO) in global ischaemia. This prompted us to examine this observation in monkey. Experiments were performed using the whole heart obtained from freshly sacrificed normal monkeys used in other pharmacological experiments. Global ischaemia in isolated monkey hearts was induced by cessation of perfusion for 45 minutes resulting in a $55 \pm 4\%$ inhibition of the contractile force. This negative inotropic effect was further potentiated (29.0 ± 9.1) in the presence of sodium nitroprusside (10^{-5} M) (SMP). Addition of methylene blue (5×10^{-6} M) significantly prevented the effect of SMP. The results indicate possible involvement of NO or related intermediaries as the L-Arginin-NO pathway is thought to be the primary effector of myocardial reoxygenation injury after global ischaemia or hypoxia in primates.

086

EFFECT OF CLASS I ANTIARRHYTHMIC DRUGS ON REPERFUSION ARRHYTHMIAS : A STUDY IN RABBITS

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Reperfusion arrhythmias which were considered a marker of restoration of coronary flow can be malignant in nature. Various interventions have been tried to suppress these arrhythmias and hence reduce post reperfusion mortality. The present work was designed to study the effect of class I anti-arrhythmic drugs viz., quinidine, mexiletine and lignocaine on reperfusion arrhythmias in intact rabbit hearts. Healthy rabbits (1.5-2 kg) were anaesthetised with pentobarbitone sodium (30 mg/kg i.v.). Thoracotomy was performed to expose heart and LAD coronary artery was ligated. After 30 minutes, ligature was released to accomplish reperfusion for 1 h. Quinindine (1, 3 & 10 mg/kg), mexiletine (2.5, 5 & 7.5 mg/kg) and lignocaine (1, 2 & 2.5 mg/kg) were administered i.v. at the time of reperfusion. Severity and incidence of arrhythmias decreased in a dose dependent manner. The results shall be discussed.

087

EFFECT OF CORONARY ARTERY OCCLUSION ON LEFT VENTRICULAR FUNCTION IN DOGS

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Coronary artery occlusion is known to cause myocardial hypoxia and induce autonomic adjustments in cardiovascular system. It is also known to activate cardiac receptors and induce various reflex responses. We have earlier reported that acute LAD coronary artery occusion attenuated arterial baroreflex control of heart rate and reduction of baroreflex sensitivity is mediated by parasympathetic afferents.

In the present study, attempt has been made to assess the performance of left venricle with special reference to its contractility during acute occlusion of LAD in dogs. Experiments were performed in anaesthetized, artificially ventilated, thoracotomized animals. Myocardial hypoxia

was induced by acute occlusion of LAD and left ventricular pressure, arterial pressure, heart rate, right atrial pressure were recorded on a Polygraph. Cardiac output was measured by thermodilution technique using cardiac output computer. Arterial pO2, pCO2 and pH were measured at regular intervals.

It was observed that after LAD occlusion with time, there was A significant ($p < 0.05$) decrease in LV systolic pressure and no significant change in LV dp/dt max even after five hours of LAD coronary occlucion. A significant decrease in mean Arterial pressure and an increase in heart rate was observed after 5 hrs of occlusion. Small ($p < 0.05$) increase in cardiac output compared to pre occlusion of LAD was also observed. Our results suggest that although acute LAD occlusion impairs baroreflex mediated reflex regulation of cardiovascular system, the left ventricular contractility was not affected by acute LAD occlusion for five hours.

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088

PATTERN OF MEAN ELECTRICAL AXIS IN YOUNG ADULTS

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First year M.B.B.S. students belonging to the age group 18-20 years were selected for the study. All of them were male students. Their electrocardiograms were recorded. Only the standard limb leads viz. lead I, lead II and lead III were recorded. Electrocardiogram was recorded both in the lying down posture and standing posture. The mean electrical axis was calculated from lead I Einthoven's Triangle methods. The mean electrical axis was also determined both in the lying down and standing postures.

The Mean Electrical Axis calculated by both the Triaxial Reference system and Einthoven's triangle methods are compared here. The pattern of mean electrical axis in the above measurements is discussed.

089

EFFECT OF LOWER BODY NEGATIVE PRESSURE ON CARDIOVASCULAR RESPONSES IN SEATED POSITION

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Lower body negative pressure (LBNP) has been used to evaluate the orthostatic tolerance and for studying the effects of +Gz induced physiological strain and hence has great practical significance in Aerospace Medicine. Cardiovascular responses in man on application to LBNP at -40 mm Hg seated (upright) position in a specially designed LBNP chamber have been studied. Six male subjects were exposed to -40 mm Hg for 5 min duration and also in steps of -10 mm Hg each for 5 min (total duration 20 min) on subsequent days in sitting position in LBNP chamber. Heart rate, blood pressure and cardiac output were measured and mean blood pressure and total peripheral resistance were calculated. The results indicate a significant increase in heart rate, decrease in systolic and mean blood pressure and increase in peripheral resistance. The results of LBNP at -40 mm Hg have been discussed in relation to 70° head-up-tilt. LBNP can be applied for assessing cardiovascular functions during various physiological stress.

090

OPERANT RESPONDING UNDER DELAYED REINFORCEMENT IN FOOD DEPRIVED RATS

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It is well known that food deprivation increases ingestive behaviour as well as general activity level including food reinforced operant behaviour. It is likely that there is a stimulation of reinforcement mechanisms in addition to increased incentive value of food. To test the hypothesis, several rats were controlled for their body weight through graded food deprivation. Their performance in a Skinner Box examined on a delayed reinforcement schedule. The appropriate pattern of responding on this schedule is a prompt bar press following a reinforcement with complete inactivity on the bar during the delay. Increase in the activity level of the animal interferes with the appropriate pattern of responding due to the appearance of bar presses during the delay. Hence performance of deprived animals is affected by increased activity on the bar. A method is devised to isolate effects of increased bar pressing activity and facilitated reinforcement mechanisms. When allowance is thus made for deprivation-induced increase in bar pressing rate, animals show an improved efficiency of responding on the delayed reward schedule in proportion to the degree of deprivation. It is concluded that deprivation facilitates reinforcement mechanisms. The specificity of the stimulated mechanism is under study in further investigations.

091

EFFECT OF 2, 4-D (AGENT ORANGE) ON REGIONAL LEVELS OF NOREPINEPHRINE, DOPAMINE AND 5-HYDROXY TRYPTAMINE IN THE DEVELOPING RAT BRAIN AND ON THE OPERANT CONDITIONING PARADIGM.

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2, 4-Dichlorophenoxy acetic acid (2, 4-D), a component of Agent orange, has been used throughout the world as an herbicide. It's mechanism of action, however remains to be elucidated. In the present study 2, 4-D was administered to wistar rat pups from post natal day 2 to 25 by gastric intubation and its effect on the levels of norepinephrine (NE) dopamine (DA) and 5-hydroxy tryptamine (5-HT) was assayed in olfactory bulb (OB), hippocampus (HI), visual cortex (VC), cerebellum (CB) and brainstem (BS) using HPLC with flourimetric detection. In addition rats were also assessed for learning and memory by operant conditioning paradigm. At 10 days of age NE levels were increased in OB (34%, $P<0.01$), HI(58%, $P<0.01$), VC (55%, $P<0.001$) and CB (45%, $P<0.001$). 5-HT levels were also increased in HI (37%, $P<0.01$). CB (53%, $P<0.01$) and BS (46%, $P<0.001$). On the contrary at 25 days of age, 2, 4-D consumed rats showed consistently decreased NE and DA levels (about 20%) in OB ($P<0.05$), HI ($P<0.01$) and VC ($P<0.05$) and CB (24%, $P<0.05$). Operant conditioning revealed diflicts in both acquisition

and rate of padal press at 25 days of age. These results indicate differential regional and temporal vulnerability of rat CNS when exposed to 2, 4-D during post natal brain development.

092

EFFECT OF TAMOXIFEN ON ENDOMETRIAL MORPHOLOGY AND MORPHOMETRY AND ASSOCIATED CHANGES IN PROSTAGLANDINS DURING EPITHELIAL PLAQUE AND STROMAL DECIDUAL REACTIONS IN RHESUS MONKEYS

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Mammalian uterus normally responds to an implanting embryo with the formation of decidua. In the rhesus monkey, an additional epithelial plaque transformation occurs as an immediate endometrial cellular response to penetrating trophoblast cells. A model of trauma induced endometrial epithelial plaque and stromal decidual cell reactions has been established using long-term ovariectomized oestrogen and progesterone treated, rhesus monkeys (Gosh D & Sengupta J, J. Endocrinol, 1989, 120:51; Sengupta *et al*: J. Endocrinol, 1990, 124 : 53). While it is known that progesterone is essential (Ghosh *et al*: Hum. Reprod, 1992, 7:1048), the role of oestrogen towards decidualization is not known. The objective of the present study was to examine the requirement of oestrogen in endometrial plaque and decidual cell reactions in response to application of artificial deciduogenic stimulus to uteri of oestrogen and progesterone primed, ovarietomized rhesus monkeys. An antioestrogen, tamoxifen [trans-1-(p-B-dimethylaminoethoxyphenyl)-1-diphenyl but-1-ene) was administered in a time sequenced manner for this purpose. The effects of this antioestrogen on the morphological, as well as biochemical characteristics of endometrial responses were studied. Despite a significant decrease in recruitment of epithelial cells for plaque transformation and an increase in stromal oedema, treatment with tamoxifen did not induce any marked changes in morphological characteristics of epithelial plaques and stromal decidual cells and in the temporo-spatial patterns of endometrial responses towards decidualization. Biochemical and immunohistochemical analyses of synthetic capability of prostaglandins (PGE and PGF) by endometrial cells revealed associative changes. In conclusion the present study has revealed that tamoxifen did not affect the temporo-spatial and anatomical characteristics of plaque-decidual cell reactions during decidualization in rhesus monkeys. However, there were subtle changes in the extent of endometrial cellular and extracellular responses during decidualization following tamoxifen treatment, and tissue prostaglandins appeared to play an integral role.

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093

PULMONARY OEDEMA FOLLOWING SCORPION (*BUTHUS TAMULUS*) ENVENOMATION

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Pulmonary oedema usually is the cause of death in cases of scorpion stings. This is identified either by clinical signs or by histopathological observations (Gajalakshmi, 1982 Ind J. Med Res

76, 337). However, direct evidences of pulmonary oedema following scorpion envenomation are lacking. Therefore, the present study was undertaken to quantify the oedema following intravenous injection of *Buthus tamulus* (BT) venom. Adult rats (200-250 g weight) of either sex were anaesthetised with Urethan (1.5 g/kg body wt. i.p.). Tracheostomy & Jugular venous cannulation were performed. Varying concentrations (20-100 ug/kg body wt. i.v.) of BT-venom or saline in 0.1 ml volume was injected. After 30 min, the lungs were dissected out, weighed and kept in an oven at 90°C. After 48 hours of drying, it was weighed again and the percentage of water content per unit mass of tissue was determined. The water content of saline (0.1 ml.) treated animal was 78.8 ± 0.98%; with BT-venom, 20µg/kg body weight it was 81 ± 0.77%; with 50 µg/kg body weight 79.8 ± 3.6% and with 100 ug/kg body weight. It was 84.5 ± 2.14%. Water content of lungs obtained from animals treated with 100 ug/kg body wt. of BT-venom was significantly higher ($p < 0.05$) than the saline treated animals. The results signify that pulmonary oedema could be produced within 30 min of scorpion envenomation

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094

RELEVANCE OF SPIROMETRY IN EPIDEMIOLOGICAL STUDY IN RELATION TO AIR POLLUTION

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The present paper is based on an ongoing epidemiological study in relation to Air Pollution in Delhi, which is presently the 4th most polluted city in the world. On the basis of data obtained from Central Pollution Control Board, Delhi is divided into low, moderate & high pollution zones. A relatively homogenous sample population was selected from the different zones and pulmonary function tests were compared in the subjects from these zones and also with that of normal Indian Standards. Our results suggest that in air pollution research spirometery is not a very helpful tool in epidemiological studies. Except for FEF 25-75% no other parameters (FVC, FEV 1, TV, MV PEFR) was sensitive enough to show a significant impairment with increasing level of pollution. In this paper the possible causes for the failure of spirometery will be discussed and other major studies done in India and abroad in relation to air pollution will be reviewed.

095

STUDY OF PULMONARY FUNCTIONS DURING PREMENSTRUAL, MENSTRUAL AND POSTMENSTRUAL PHASES IN FEMALE MEDICAL STUDENTS

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The present study was carried out in 40 female medical students of (1st year and 2nd year M.B.B.S.) King George's Medical College, Lucknow, between the ages of 18-25 years. The pulmonary functions were done by Medspiror machine in the Department of Physiology, during pre-menstrual, menstrual and post-menstrual phases.

Significant changes were observed in the menstrual phase only and there was decrease in the values of all the pulmonary function tests as compared to pre-menstrual values while during

post-menstrual phase, values returned to, within normal range.

096

STUDY OF THE EFFECTS OF EXTREMELY LOW FREQUENCY ELECTRO MAGNETIC FIELD ON BACTERIAL SYSTEM

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Electromagnetic field of high strength has no effect upon Biological Systems in general and not many a study were done heretofore. With the advent of electrical appliances and visual display units suspicion of long-term exposure to electromagnetic field giving rise to changes in biological system intensified. Evidence for increased incidence of cancers as its adverse effects especially in the domain of childhood cancers are being reported regularly.

Effects of pulsed and varying electromagnetic field on chick as well as rat embryogenesis has been well observed and also reported from our lab. However, the mechanism of such effect has not been clearly understood. It is felt that bacterial system may serve as a better laboratory model for study of the mechanism of action. Therefore the present study has been taken up to see if pulsed electromagnetic field has any effect on different parameters of bacterial system.

Escherichia Coli serves as the most favourite organism because of its easy growth in defined media, short generation time with a variety of techniques applicable to it. E. Coli (JC 411 & DH_1 strains) were grown inside electromagnetic field of different intensity and frequency. The effects on alkaline phosphatase enzyme regulatory genes can be observed by using XP dye (5-bromo-4-Chloro-3-Indolyl Phosphate), a Chromogenic substrate of alkaline phosphatase. The findings will be delineated.

097

ROLE OF PITUITARY IN MODULAT-ION OF TOOTH PULP EVOKED RESPONSE IN PRIMATES

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The pituitary has been well documented as a neuroendocrine structure of the brain. However, its role in nociception has been controversial. Hypophysectomy leads to dramatic pain relief in cancer patients while its stimulation produces analgesia as evidenced in primate studies. These controversial results have been explained by assuming that there is a pituitary inhibitory system (PIS) which is activated by both these manoeuvres. To understand the underlying mechanisms of PIS, the effect of pituitary stimulation on tooth pulp evoked jaw opening reflex (TP-JOR) was studied in monkeys (n=5). Tooth pulp was stimulated by 0.5 msec pulses, once in 2 sec with 1.5 times threshold intensity in anesthetized monkeys and the amount of pain afflicted was quantified by recording EMG from diagastric muscle. Pituitary was approached through the floor of the pituitary fossa by first incising the soft palate and then drilling in the sphenoid bone. Thereafter a bipolar steel electrode was lowered upto the gland and 0.3 msec pulses of 20 Hz frequency were delivered at varying intensities. In large number of observations, the amplitude of TP-JOR reduced

by 43 ± 23 % immediately after the stimulation and this reduction lasted for more than 250 sec in some animals. In one monkey, an increase in this response was also found which lasted for shorter duration. Both these responses were related to the intensity of stimulation. Further the effect of injection of naloxone was studied which blocked the effect of pituitary stimulation even at higher intensity of stimulation. From these preliminary results, an analgesic role of pituitary is suggested which could be mediated by opioids.

098

LEVELS OF PLASMA VITAMINS A AND E AND THE RISK OF ISCHEMIC HEART DISEASE

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Experimental studies have established that Vitamins A and E play an important role in the maintenance of the structure and the normal functioning of the tissues. Therefore, it is critical to evaluate the above parameters in ischemic heart disease (IHD) due to atherosclerosis, and to see whether the status of these vitamins is responsible for the fragility of the endothelium. This might provide a solution for preventing endothelial injury. The total plasma levels of vitamins A and E were determined by using spectrofluorometer and spectrophotometer respectively, in patients with IHD (n=78) in the age group of 26-72 years from K.E.M. Hospital, Bombay and in control subjects (n=25) in the same age group who are without IHD. A strong inverse correlation was present between the total plasma levels of both vitamins A and E and the incidence of IHD ($p < 0.005$ and $p < 0.001$ respectively). The present data suggest physiological functions of a-Tocopherol as an antioxidant i.e. as protector of lipoproteins against peroxidation and atherogenic apo-B-modification. vitamin A is an extremely potent morphogen and its esters form a sort of last barrier against PUFA peroxidation. These observations suggest that some patients with IHD may benefit from eating diets rich in natural antioxidants.

099

PERIODICITY OF ESTROUS CYCLE IN ADULT RATS UNDER THE INFLUENCE OF EXTRACT OF *BUPLEURUM MARGINATUM*

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Number of medicinal plants have been reported to prevent implantation and also cause resorption of foetuses. These plants have been categorised under antifertility agents and further investigations in relation to their mode of action have also been done. Of these plants most of them exhibt estrogenic potency but few are also known to antagonise the estrogenic effect. Being having hormonal property these extracts usually exerts effect on the duration of reproductive cyclicity. Ethanolic extract of *Bupleurun marginatun* (Sipli) is known to show antiimplantation and abortificent effect due to its potent estrogenic activity, however, its effect on the duration of estrous cycle is not known. Present paper deals these findings. 50 mg/kg dose of ethanolic extract of *B. marginatum* was administered daily through gavage to adult cyclic female rats for different periods. The vaginal smear of each rat was examined daily and after the experimentation the results were analysed.

Administration of 10 days caused significant increase in the duration of metestrus stage. Similarly other longer durations of treatment caused significant increase in the metestrus phase. Interestingly it has been observed that the percent increase in the duration of metesters phase at 10, 20 And 30 days is almost identical. These results will be discussed in relation to the antifertility activity of the extract.

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STUDIES ON PERIPHERAL ACTIONS OF ISATIN

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Recently extensive neuropharmacological studies with Isatin (2,3-Dioxoindole), and endogenous stress marker, has been reported. The present study was undertaken to evaluate the role of Isatin, if any, in peripheral system. The study was conducted on common laboratory animals utilising conventional techniques. The result shows that: The spasmogenic response of Isatin on intestinal smooth muscle of rabbit could be blocked by antihistaminic, by atropine in guineapig and by cyproheptadine in rat fundus. Isatin could not modify the Norepinephrine, 5HT and ACh responses on rat vasderferens and ileum. Isatin could attenuate histamine induced bronchoconstriction in guineapigs without affecting acetylcholine reponse. Isatin potentiated Acetylcholine response in frog rectus muscle. In frog the cardiac depressant action of Isatin was not modified by atropine and Isatin is devoid of any effect on hypodynamic heart. Immunological and non-immunological inflammations were unaffected by Isatin.

The central actions of Isatin have been postulated to be mediated through 5HT. Such conclusions cannot be implicated regarding the peripheral actions of Isatin.

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ANTI-IMPLANTATION MECHANISM OF ACTION OF HEXANE EXTRACT OF *FERULA JAESCHKEANA* IN RATS

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Consumption of few herbs has been reported to induce sterility in wild animals. Reproductive cycle of domestic and laboratory animals has also been influenced with the administration of plant extracts. Extract of *Ferula jaeschkeana* (Heeng) is known to contribute antifertility activity in rats. When administered at a dose of 25 mg/kg/day for 7 days after coitus, however, its mechanism of action is not known. In the present paper the hexane extract of *F. jaeschkeana* was studied at an oral dose of 25 mg/kg/day for its *post-coital* (i.e., from day 1 to day 5) effects in pregnant rats. Ovaries of treated rats remained in the cyclic state rather undergoing pregnancy as revealed through constant ovulation accompanied with newly formed corpora lutea. Uterine histoarchitecture of treated rats appeared non-receptive, as no deciduoma was observed on day 5 of pregnancy and luminal epithelium remained unresponsive. The extract caused increase in the protein and glycogen contents of ovary and uterus. While the activity of acid phosphatase remained essentially unchanged and the activity of alkaline phosphatase was increased.

To evaluate the involvement of various proteins in the process of implantation polyacylenamide

slab gel electrophoresis was run. After scaning the gels with ISCO UA-5 Scanner their molecular weights and concentrations were calculated. It was found that in experimental animals some new proteins appeared whereas some of them disappeared. Probably these alterations in the protein pattern may be responsible for anti-implantation effect of *Ferula jaeschkeana.*

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A COMPARATIVE STUDY OF PRESCRIBING PATTERN AT DIFFERENT LEVELS OF HEALTH CARE DELIVERY SYSTEM IN SOUTH INDIA

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A study of prescribing pattern was undertaken at three levels of Indian health care delivery system, viz., tertiary, primary and urban general practice to evaluate the feasibility of data acquisition methods and prescribing practices. The study sample included 1810 prescriptions (for 3932 drugs) obtained in duplicate from prescribers at the three levels. The mean number of drugs per prescription was highest at the level of urban general practice (2.41 ± 0.8). The four most frequently prescribed drug groups were antibiotics, vitamins, NSAIDs and respiratory drugs at all the three levels. General practitioners prescribed antibiotics (47%), NSAIDs(45%) and respiratory drugs (25%), most often. Most number of prescriptions at the general practice and primary level were for antibiotics. At tertiary level, vitamins were prescribed most often. Analysis of prescribing frequency of individual drugs showed that prescribing prevalence was highest at the general practice level except that for sulfidiazine which was highest at the primary health care level. The age-sex interaction with prescribing frequency is discussed. The results can be used to plan intervention strategies aimed at promoting rational drug therapy.

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ANTIOXIDANT NEUROPHARMACOL-OGY OF *BOERHAVIA DIFFUSA* L. IN RATS

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Popularity known as "Punarnava" the herb B. diffusa is an Ayurvedic plant medicine of high repute. Its rejuvenating potential against organ damage has been variously revealed and salutary effects of the drug on neurohumoral regulation of the natriuretic response was observed earlier in adriamycin induced oxidant renal damage in rats. *In vitro* studies indicate a dose dependent inhibitory effect of the plant extract on iron-catalysed peroxidation of lipids in ischemic renal tissue in rat, which displays similarity with EDTA, a known chelator of biologic cations. Antagonists of important biologic cations i.e. calcium channel blockers and iron chelators are known to reduce ischemic brain damage, where reactive oxygen species get associated as cause and effect respectively, to induce peroxidation in neurones. The *in vitro* investigations, referred above, are supplemented by *in vivo* studies of B. diffusa pre and post treatment in rats, on carotid occlusion and their correlation with visible manifestation of brain excitotoxicity is assessed. Results reveal novel neuroprotective potential of the herb.

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MODULATION OF NEUROTOXICITY OF P-CHLOROAMPHETAMINE BY P-CHLORO-PHENYLALANINE AND RESERPINE

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P-chloroamphetamine (PCA) is toxic to serotonergic neurons producing long lasting depletions in brain levels of 5-HT and its metabolite 5-HIAA in the brain. Adult, male Sprague-Dawley rats were injected with PCA at doses from 2.5 to 10.0 mg/kg. They were sacrificed 1, 3, 7 or 14 days later. PCA produces depletions of 5-HT and 5-HIAA upto 14 days after administration. Another group of rats were preinjected with p-chlorophenylalanine (PCPA) (250 mg/kg) and reserpine (2.5 mg/kg). PCPA and reserpine produce 90% depletion of brain 5-HT and 5-HIAA but the levels recovered back to normal within 14 days. Rats preinjected with PCPA and reserpine were then injected with PCA (8 mg/kg). 5-HT and 5-HIAA levels were decreased 1, 3, and 7 days after PCA injection but they recovered back after 14 days to normal values. It is concluded that transient depletion of 5-HT by PCPA and reserpine provides substantial protection against subsequent PCA-induced neurotoxicity.

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INTRACRANIAL GRAFTING OF NORADRENERGIC CELLS ENHANCES FEEDING IN RATS

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Noradrenergic neurons from the locus ceruleus area of 17-day old rat fetus were transplanted into the anteroventral part of the third ventricle of adult rats. Quantity of food consumed in 24 hr was recorded to the nearest 0.2 gm and the results compared with that obtained from the age matched control rats. Grafted neurons were allowed to proliferate and feeding influences of transplantation were observed 8 weeks after the transplantation. Both, the experimental and the control animals were observed till they attained the age of 38 weeks. Observations were made at the age of 22, 30 and 38 weeks. Thereafter, theanimals were sacrificed and growth of the transplanted cells confirmed histologically. Six rats were taken in each group and the feeding pattern observed for 5 days. In the first observation taken at the age of 22 weeks there was no significant difference in the food consumption of the rats of control and the transplanted group. However, 24 hr food consumption of the transplanted rats was significantly greater ($p < 0.01$) than thecontrol in the observations taken at the age of 30 and 38 weeks. It appears that noradrenergic transplantation attenuates the age related decrease in food intake.

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VENTROMEDIAL AND LATERAL HYPOTHALAMIC INTERACTIONS IN MODULATION OF PHASIC PAIN

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Recently, several studies have shown Ventromedial and Lateral Hypothalamic (VMN & LH) areas to be important in pain modulation,

being depicted predominantly as analgesic contres. The present study aims to investigate the effect of VMN on phasic pain and the relationship if any, between these two areas in terms of antinociception. In this study, the effect of electrical stimulation of VMN before and after naloxone administration at LH was determined on tooth pulp evoked jaw opening reflex (TP-JOR), a phasic pain test. The test includes implantation of electrodes on the pulp of lower incisor tooth of anesthetised rats (n=5) which when stimulated (duration 0.5 msec, frequency 1Hz, intensity 1.5 times threshold EMG response), resulted in reflex opening of the lower jaw. The amount of pain afflicted was quantified by measuring the amplitude of the resultant electromyographic changes recorded from the diagnostic muscle (dEMG) with the help of needle electrodes. Stimulation of VMN (duration 0.3 msec, frequency 90 Hz, at varying intensities for 10 secs) reduced the mean amplitude of dEMG which was related to the intensity of stimulation. When VMN was stimulated at 10v, the amplitude of dEMG was reduced by as much as 85.7% although the mean reduction was 56.22%. Injection of naloxone at LH had no effect on TP-JOR per sec. However, VMN induced analgesia was reduced when naloxone was injected at LH. Also the time taken for the dEMG response to recover to the basal level was more when VMN was stimulated after naloxone injection. These results suggest that VMN induced analgesia could be partially modulated via lateral hypothalamus.

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NORADRENALINE, DOPAMINE AND SEROTONIN LEVELS IN HIPPOCAMPUS AND MOTOR CORTEX AFTER SELF STIMULATION EXPERIENCE

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Self-stimulation rewarding experience promotes structural changes in pyramidal neurons of the CA3 region of hippocampus and the vth layer of the motor cortex in adult male Wistar rats (Shankaranarayana Rao et al, Brain Research 1993). We wanted to investigate whether structural changes are accompanied by biochemical changes in terms of levels of different transmitters. In the present study the levels of noradrenaline (NA), dopamine (DA) and 5-hydroxytryptamine (5-HT) were estimated in hippocampus (HI) and motor cortex (MC) by HPLC with fluorimetric detection. Intracranial stimulation (ICS) experience was provided daily for one hour for a period of 10 days through four bipolar electrodes placed bilaterally in adult male Wistar rats in lateral hypothalamus (LH) and substantia nigra-ventral tegmental area (SN-VTA). In self-stimulation experienced (SS) animals, NA levels were increased significantly in both HI and MC, whereas, DA levels were increased significantly only in MC. The 5HT levels were decreased significantly in HI and no changes in MC. Such changes were not observed in sham control (SH) and experimenter administered (EA) control groups compared with

normal control (NC) group. These results indicate that there is an enhanced involvement of noradrenergic system than dopaminergic or serotonergic systems during self-stimulation experience.

29B Nervous system III

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EFFECT OF TESTOSTERONE ON PAIN THRESHOLD IN MALE RATS

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It is well known that the perception of pain is modulated by endogenous opiates. The endogenous opioid peptide, beta-endorphin appears to influence nociception at the spinal and supraspinal levels. Levels of beta-endorphin in the pituitary and hypothalamus are modulated by gonadal steroids such as testosterone and oestrogen. Pain threshold was determined in castrated male rats and castrated male rats treated with testosterone propionate by electrical stimulation. It was seen that castration resulted in a significant reduction in the reaction time to the painful stimulus. Administration of testosterone to such castrated rats produced a significant increase in pain threshold.

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AUTONOMIC VARIATION IN MALES AND FEMALES

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Autonomic nervous system function is a feature of all human activity, maintaining homeostasis as various stresses such as changes in posture, exercise or temperature etc. are placed on the individual. Considering the physical, behavioural and endocrinal differences in males and females, the study was carried out on normal healthy female and male medical students of same term, to see any variation in autonomic activity. The tests involving cardiovascular reflexes such as Valsalva ratio, Tachycardia ratio, S/L ratio and 30:15 ratio were carried out mainly to evaluate parasympathetic activity, Galvanic Skin Resistance (GSR) and Cold Pressor Response (CPR) for sympathetic activity.

The results obtained show higher value for GSR in males under resting condition indicating comparatively lesser sympathetic outflow at rest in contrast to greater sympathetic discharge during activity as evident from greater increase in B.P. in response to Cold Pressor Test and greater increase in heart rate observed during Valsalva manoeuvre in males.

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COMPARATIVE STUDY OF AUTONOMIC ACTIVITY IN MALES AND FEMALES (PRE-MENSTRUAL & POST-MENSTRUAL PHASES)

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Autonomic functions were studied in healthy male and female subjects (18-25 years age). In

case of females the functions were tested during the pre-menstrual, menstrual and post-menstrual phases. The various parameters which were recorded on polyrite (Medicare) were:

i) Galvanic Skin Resistance (GSR), ii) Pulse, iii) Blood Pressure and iv) Electrocardiogram (ECG) and S/L ratio. All the recordings were taken at a comfortable environmental temperature (25-28°C).

Our observations indicate a higher B.P and a lower GSR in pre-menstrual phase as compared to other phases in females. While in the case of males the average GSR is higher than females as also the systolic B.P. Heart rate on the other hand is higher in females. Other parameters did not show significant differences between the two sexes.

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AFFECTS OF NEUROGENIC NOCICEPTION ON THE MEMBRANE AND AXONAL REGENERATION IN RAT

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Excitotoxic nature of neurogenic pain at its peak period after loose ligatures made on posterior tibialis nerve was assessed. Regeneration of motor axons, stress hormone levels, etc. in the blood and membrane electrical properties were studied at different time periods for their respective efferent affects.

Sciatectomy was performed after inducing mononeuropathic pain, by loose ligatures made on posterior tibialis nerve. Regeneration of motor axons was assessed by motor unit recordings. Motor units were classified as per the contraction time and tensions. Stress hormone levels in the blood and the membrane potentials in muscle membranes were recorded at different time periods.

The focus and echo in this model study was differential, affecting neuro-humoral involvement with a concomitant result of deficiency in motor function. Biochemical variables in enzyme profiles indicates the key roles of both volley of nociceptive pulses and the corticosteroids were suspected in this model were studied. It was found that conditional nociception was shown to speed up the moto-neurone regeneration with dichotomy and innervation of phasic motor fibres. It was also found that there was a rapid loss of muscle mass on comparison with denervated and disused groups. The results on stress hormone levels in the blood and their probable effect on membrane electrical properties is apparently more severe than earlier studies made on experimental arthritic pain models. Further more, studies made on electrolytic composition and relevant membrane bound enzyme profiles confirmed the excitotoxic nature of nociceptive stimuli.

Preceding pain is seen to promote faster regeneration of motor axon and this probably speeds up the synthesis and transportation of building blocks to injured site. Catatoxic affects of stress hormones and the efferent reflex volley of pulses were suspected to change the electrical and enzymatic profiles of the muscle membrane.

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EFFECT OF PRE-EXISTING SYMPATHETIC ACTIVITY ON RESPONSE TO VALSALVA MANOEUVER

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To assess the effect of ongoing sympathetic activation on Valsalva manoeuver, seven human volunteers (29.8 ± 9.62) performed Valsalva manoeuver (VM, 40 mmHg for 15 second) under two situations - alone and during isometric exercise (iso-ex, sustained handgrip at 30% of maximum voluntary effort for 4 minutes). VM during iso-ex was done at 1st minute. The ECG and respiration were monitored and BP was recorded at defined intervals. The VM parameters were compared in two situations-VM alone and VM during exercise. The parameters compared were Valsalva ratio, HR difference (Phase VI - phase IV), maximum HR achieved (HRmax), minimum HR in Phase IV (HRmin), tachycardia ratio (HRmax/mean resting HR), bradycardia ratio, maximum rise in HR (HRmax-basal) and maximum fall in HR (basal-HRmin). Wilcoxon sign rank test was used to compare the results. The HRs preceding to VMs in two situations were significantly different ($p<.0001$) and all subjects have shown consistent rise of DBP more than 10 mmHg. Valsalva response during isometric exercise was significantly different for HRmax and HR min ($p<.001$) and for deviations in HR from basal values (i.e. HRmax - basal, basal - HRmin). Bradycardia observed during isometric exercise was less than that of VM alone situation ($p<.07$). It is concluded that pre-existing sympathetic activation modifies heart rate such that the Valsalva ratio is kept same in spite of occurrence of relatively less bradycardia.

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EFFECT OF NOISE STRESS ON STATUS OF AUTONOMIC NERVOUS SYSTEM IN THERMAL POWER STATION WORKERS

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Noise in 20th Century has become a very important "Stress Factor" in the environment of man. The present study was undertaken on 80 healthy male subjects, aged 30-60 years, to assess the effect of chronic noise stress on the status of autonomic nervous system. Their systolic and diastolic blood pressure (SBP & DBP) using a mercury sphygmomanometer, heart rate (HR) using ECG machine and galvanic skin resistance (GSR) by using a GSR Biofeedback apparatus supplied by Medicaid system were recorded after 30 minutes of quiet relaxation. Forty subjects worked near boilers and turbines for 15 to 25 years in Thermal Power Station were exposed to noise stress (Sound level 110-120 dB). Another 40 subjects who acted as control were either office workers or laboratory staff (sound level 30-50 dB). HR, SBP and DBP were higher and GSR was lower in workers exposed to noise stress as compared to the control group. The increase in HR ($p< 0.05$) and decrease in GSR ($p < .001$) was significant, whereas increase in SBP and DBP was not significant. All the above changes could be attributed to the activation of hypothalamo-sympathetic-adrenal axis and the resultant release of catecholamines from adrenal medulla due to noise stress.

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EFFECT OF PROLONGED STAY IN ANTARTICA ON THE AUTONOMIC RESPONSE

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The objective of applied physiological research in Antartica is identifying the maleffects of Antartic stay and correlating the physiological and psycho-emotional behavioural adaptation to the factors which are prevailing there. To study the important function in adaptation by autonomic nervous system, the recordings of blood pressure (BP), heart rate (HR) and body temperature in 25 subjects were taken once in a month. A significant fall in HR (76 ± 7.81 to 69 ± 10.32/min; $p < .05$) was observed towards the end of winter i.e. August to October. BP response on change of posture, i.e. when the normotensive subjects were made to stand, also showed a significant ($p < .05$) fall in both systolic (124 ± 8.12 to 110 ± 9.24 mm Hg) and diastolic BP (86 ± 11.43 to 82 ± 8.61 mm Hg) in all the subjects through out the period of winter. The analysis of the time course change of body temperature during winter also showed a significant hypothermia (36.65 ± 0.16 to 35.98 ± 0.37°C). It can therefore be concluded that observed changes in HR, BP and body temperature indicate the shift in autonomic balance more towards parasympathetic dominance.

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EFFECT OF ACUTE NOISE ON SENSORY NERVE CONDUCTION

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Acute noise is known to cause elevation of blood pressure and heart rate. However, its effect on the nervous system is not well understood. This study was conducted to find the interaction, if any, of Tonic & White acute noise with the median nerve sensory conduction. Twenty healthy subjects volunteered for the study. Dominant median nerve sensory conduction velocity was measured by orthodromic stimulation of the index finger and the evoked response recorded at the wrist. Blood pressure was measured in the contralateral arm using automatic sphygmomanometer. Noise at 90 dB was played back from a tape recorder (for a duration of 15 minutes) with the speakers kept at a distance of 1 m from the subjects. Nerve conduction and blood pressure measurements were recorded before and during exposure of noise (at 3, 10 and 15 minutes). Acute noise caused a reduction in nerve conduction and elevation of blood pressure and heart rate, especially during exposure of 10 and 15 minutes. The reduction in nerve conduction could be due to increase in diastolic blood pressure. Hence the present study shows the interaction of vasomotor and sensory mechanism that forms a part of the stress response.

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EFFECTS OF 2-BUTEN 4 OLIDE ON FEEDING BEHAVIOUR OF RHESUS MONKEY

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Lately 2-Buten 4 Olide (2-B40), a short chain sugar derivative has been identified as an endogenous satiety substance in adult and growing rats. This study was aimed to investigate the effects of 2-B40 in monkeys. The cannula was implanted in the third ventricle of three, adult, male, Rhesus monkeys. Monkeys were conditioned to ingest their daily requirement of food during one hour. Their daily food intake was recorded. Various doses of 2-B40 (1.6, 2.1, 2.7, 4.3, 10.6, 20 and 25 mg) were administered intracerebroventricularly on different days five minutes prior to presentation of food. The minimum effective dose for inducing satiety effect was 20.0 mg, while 10.6 mg induced a mild and 25.0 mg a severe effect. When administered intraperitoneally 43 mg/Kg bw, 2-B40 induced satiety effect, but was ineffective in doses of 1.5 and 21.5 mg/kg bw. This study is suggestive of the presence of 2-B40 satiety mechanism in monkeys almost in doses similar to those previously reported for rats.

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THE ANALGESIC, ANTIPYRETIC AND ANTI-INFLAMMATORY ACTIVITY OF THE UNANI DRUG SUDDAB (E. DRACUNCULOIDES) -AN EXPERIMENTAL STUDY

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Suddab is a well known Unani drug. Suddab is generally considered to be *Ruta graveolens* Linn. But the North Indian market samples of Suddab has now been identified as Euphorbia dracunculoides (Afaq *et al.*, 1993). Suddab (*E. dracunculoides*) is claimed to possess analgesic, anti-pyretic and anti-inflammatory activity in Unani system of Medicine. *E. dracunculoides* has not been pharmacologically investigated for the above actions. Therefore in the present study the aqueous extract of *E. dracunculoides* was tested for analgesic, antipyretic and anti-inflammatory activity.

The analgesic activity was studied by the Analgesiometer Test and the Eddy's Hot Plate Test, antipyretic activity by the method of Dhawan et al (1962) modified by Amin et al (1992) with D.P.T as the pyrexogenic agent and antiinflammatory activity by Carrageenin Oedema Test with Piroxicam as the standard drug for comparison. The test showed that the drug possesses analgesic and anti-pyretic activity but does not have anti-inflammatory activity. The study therefore substantiates the claims of "Tibb-

e-Unani" that Suddab has analgesic and antipyretic activity. However, some Unani Tabibs claim that it has resolvent activity, generally taken as antiinflammatory activity, which was negated by the present study. The present study also pharmacologically substantiated the claims that E. dracunculoides is Suddab by showing that it possesses two important pharmacological actions ascribed to it in the Unani system of medicine.

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COMPARATIVE EVALUATION OF ANALGESIC AND BEHAVIOURAL EFFECTS OF ANALGESIC MIXTURES IN RATS

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Different fixed dose analgesic combinations having antipyretic and opioid analgesic effects are available for moderately severe somatic pain. A study of some analgesic mixtures was conducted to evaluate their analgesic and behavioural effects in rats. Analgesics given orally in suspension through intragastric cannula were - paracetamol (500 mg/kg); dextropropoxyphene (65 mg/kg) + paracetamol (400 mg/kg); paracetamol (325 mg/kg) + codeine (30 mg/kg); pentazocine (15 mg/kg) + paracetamol (500 mg/kg); paracetamol (500 mg/kg) + codeine (7.5 mg/kg) + caffeine (30 mg/kg) and analgin (250 mg/kg) + paracetamol (250 mg/kg) + caffeine (15 mg/kg) + codeine (5 mg/kg). The analgesic activity was observed with help of a technoanalgesiometer employing the tail flick latency. Behavioural study was done following Irwin's method.

Results indicate that paracetamol + codeine and paracetamol + pentazocine afford a higher level of analgesia than does paracetamol alone or in combination with dextropropoxyphene. Paracetamol +codeine + caffeine or analgin + paracetamol + caffeine + codeine have no better analgesic effect. However, all forms of analgesic mixtures are superior than paracetamol alone. Analgesics containing dextropropoxyphene or pentazocine produce drowsiness.

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ANTINOCICEPTIVE ACTIVITY OF CALCIUM CHANNEL BLOCKERS

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The antinociceptive activity of calcium channel blockers (CCB) viz. verapamil, nifedipine, diltiazem and dilazep was investigated in albino rats and mice of either sex against tail flick technique by analgesiometer and acetic acid induced writhing experimental models respectively. The potentiation of morphine analgesia by CCBs was also studied by tail flick method. The results of our study showed that oral administration of verapamil (50 mg.kg) and nifedipine (40 mg/kg) produced significant analgesic effect as judged from increase in reaction time in tail flick method. Both verapamil and nifedipine in the doses of 10 mg.kg orally potentiated the analgesic effect of morphine. Diltiazem and dilazep, though did not produce significant analgesic effect but potentiated morphine analgesis. In acetic acid induced writhing test, verapamil and nifedipine showed protection and decrease in the number of writhings significantly in dose dependent manner. Diltiazem and dilazep reduced number of writhings but did not show protection. In view of analgesic activity and potentiation of

morphine analgesia by CCBs, these may be investigated for analgesic action in human beings and lower the dose of morphine when used combinedly.

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INHIBITION OF THE ADRENALINE INDUCED INCREASED FACILITY OF AQUEOUS HUMOUR OUTFLOW IN RABBITS BY CYCLO-OXYGENASE INHIBITORS

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Acute or chronic administration of topical adrenaline lowers intra-ocular pressure (IOP) in the rabbits largely due to an increase in the facility of outflow of aqueous humour. The present paper studies an inhibition of this adrenaline induced increase in the facility of outflow by cyclo-oxygenase inhibitors like indomethacin and piroxicam. Topical indomethacin inhibited the acute changes of IOP, both the early rise and prolonged fall induced by adrenaline. Indomethacin pretreatment prevented a large rise in facility of outflow caused by topical administration of adrenaline. It did not block the mydriatic effect. Piroxicam also blocked the adrenaline induced increase in the facility of outflow though it does not block Ca^{2+} movements. Results indicate that the hypotensive mechanism of adrenaline may involve synthesis of prostaglandins since cyclo-oxygenase inhibitors achieved an inhibition of an increase in outflow facility induced by adrenaline.

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EFFECT OF FELODIPINE ON CHOLINERGIC RESPONSES IN ISOLATED STZ DIABETIC RAT

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High mortality (80%) in diabetes mellitus (DM) is due to cardiovascular complications. In chmic DM, intracellular calcium overload resulting in decreased myocardial contractility and degeneration of myocardial autonomic nerves have been reported. The present study was taken up to find out the effect of felodipine, a dihydropyridine calcium antagonist, on myocardial cholinergic responses in streptozotocin (STZ) diabetic rats. Albino Wistar rats of either sex, 4 weeks after STZ, were administered feliodipine in a dose of 5 mg/kg/day oral for 4 weeks. Isolated heart was perfused on a non-circulating Langendorff setup with McEwan fluid and responses to graded doses of acetylcholine (ACh) were recorded on a polygraph. Weight gain was lower in diabetic (D) rats compared to controls (C). Duration of negative chronotropic action of graded doses of ACh on the isolated heart was unaltered with felodipine. Declined coronary output in D was significantly increased by felodipine. The improved myocardial perfusion could be due to its action on contractility through alteration of intracellular calcium or vasodilatation. Further studies on myocardial inotropic responses are required to unravel the full spectrum of activity of felodipine on diabetic rat heart.

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PUPILLARY CONSTRICTION TO DIFFERENT DROP VOLUMES OF PILOCARPINE

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The instillation of drug in eye drop form is the predominant method of topical ocular delivery system. Pilocarpine eye drops used in Glaucoma are associated with a variety of systemic adverse drug reactions (ADR) which can be minimized by using smaller drop size. The smaller drop volume may also enhance the intra-ocular drug penetration and therapeutic response. The present, double mask, randomized, cross-over study was conducted in 6 healthy subjects, to investigate the acute effect of different drop sizes (10, 20, 40 or 80 ul) of pilocarpine 2% on pupil diameter (PD) and heart rate (HR). PD and HR were measured before and at 0.25, 0.50, 0.75, 1.0, 2.0, 4.0 and 5.0 Hr after drop volume administration. There was no statistically significant difference in the PD and HR in different groups at different time intervals. PD decreased significantly after the drug instillation from 0.50 to 5.0 Hr ($p < 0.05$). HR also decreased after drop volume administration in all the groups. We conclude that to achieve the desired therapeutic effect and decrease the ADR profile, the drop volume of pilocarpine 2% should be 10 to 20 ul.

29C Respiratory system

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PULMONARY FUNCTION TESTS AND IMMUNOGLOBULIN E IN DAL MILL WORKERS

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The present work was carried out to study the effect of exposure to Dal Mill environment on 65 workers. 25 healthy persons were taken as control. Pulmonary function tests were done by Medspiror - a computerised spirometer and serum IgE levels were assessed by ELISA method. It was observed that all the parameters like FVC, FEV_1, PEFR, FEV_1/FVC were significantly low in test group as compared to control. The mean serum IgE level was 173.05 IU/ml. in test group as compared to 61.05 IU/ml. in controls. Serum IgE levels among smokers of Dal Mill workers (44%) had higher values as compared to non-smokers of that group (56%).

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COMPARISON OF PULMONARY FUNCTIONS IN YOUNG MALE SMOKERS AND NONSMOKERS

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Smoking is a major public health problem in India as it is all over the world. Since tobacco smoke is commonly inhaled, it affects the

respiratory System. Smoking is a known etiologic agent in the causation of Chronic Obstructive Pulmonary Disease.

The aim of the study was to compare the values of tests of pulmonary function of young male smokers with non smokers 20-30 years old, using a Collin's 9 liter spirometer.

It was apparent that the tests of dynamic pulmonary function; MEF and PEFR were impaired in smokers as compared to non smokers.

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PULMONARY FUNCTION TESTS IN HEALTHY ADULTS OF DIFFERENT SEX AND NATIVES

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Pulmonary function tests (P.F.T) were carried out in 140 healthy adults (73 males and 47 females) aged 17-22 years of different natives (56 north & 84 south Indians). FVC, FEV_1, FEV_1/FVC % was determined by using the computerised spirometer (Medispiror) and the results were analysed statistically. Regression equations were derived for predicting Maximum Voluntary Ventilation (MVV) in the above subjects.

CONCLUSION

i. The healthy Indian adult showed positive correlation of height and weight, with MVV, irrespective of their nativity.

ii. South Indian males had positive correlation of only height, while North Indian females had positive correlation of only weight with MVV.

The above conclusions have been discussed.

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AIRWAYS FUNCTION DURING MENSTRUAL CYCLE

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Progesterone is known to have marked smooth muscle relaxing effect, specially on gut and uterine muscle. Its role on respiratory smooth muscle is not clearly known. The therapeutic effect of progesterone in COPD and asthma patients suggest bronchodilator activity. The luteal phase of menstrual cycle is associated with increase in progesterone level in blood. Assuming possible role of progesterone on airway dynamics, the present serial study of forced expiratory spirometry during menstrual cycle was undertaken in 40 healthy women of 18-38 years of age. Forced expiratory spirogram was recorded on Expirograph (Godart, Holland). Forced vital capacity (FVC), forced expiratory volume in first one second (FEV_1), forced expiratory flow between 0.2-1.2 lit. of FVC($FEF_{0.2-1.2}$), maximum mid (25-75% of FVC) and end expiratory(75-85% of FVC) flow rate; instantaneous flow at 25, 50 and 75 % of FVC were all normal and statistically unchanged during the three phases of menstrual cycle (menstrual, follicular and luteal). These findings suggest that the increase of progesterone concentration which is normally associated with luteal phase, does not alter airways function.

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RESPIRATORY EFFICIENCY DURING FASTING STATE

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Respiratory efficiency tests, blood pressure and pulse rate were studied in the fasting individuals of Jain community of Gujarat. Individuals of Jain community in Gujarat remain on fast from the middle of August to the middle of September. During the fasting period they drink boiled and cooled water three to four times only during the day time (i.e.08.00-18.00h). The fasting period is at least of one week and maximally of four weeks.

The subjects for the control group and fasting state remained the same through out the study. The subjects of control group were studied one week before their fasting days. For the sake of convenience of the study, the fasting states were categorized in weeks i.e. I, II, and III week, of fasting. Respiratory efficiency tests like respiratory rate (R.R), breath holding test (B.H.T.), 40 mm endurance test, and expiratory pressure test (E.P.T) were carried out in all the groups. Simultaneously, the blood pressure and pulse rate were also studied.

Respiratory rate remained significantly higher during the fasting states, while BHT, EPT, and 40 mm endurance values remained significantly lower during the fasting states. Blood pressure was not significantly lowered and pulse rate was not significantly increased during the fasting states.

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PULMONARY RESPONSES TO PAH COMPOUNDS IN COPPER FACTORY WORKERS

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Pulmonary functions of 254 workers belonging to a copper factory were investigated. These workers were divided into four groups depending on their work place: group I from packing and loading section, formed the control group, group II from scrutinization unit, group III from moulding unit and group IV from mixing unit. The quantitative and qualitative analysis of work place environment for particulates were carried out by Kimoto High volume sampler with five stage cascade arrangement at a flow rate of 1.7 m^3/min. Glass fibre filter paper (GF/A Whatmann), giving fraction size of :> 10.4, >5.2, >1.6, >0.6 and <0.5 (in μm) was used. Whereas qualitative analysis for polynuclear aromatic hydrocarbons were carried out by gas chromatography. Pulmonary function tests included FVC, FEV1%, RV, TLC, RV/TLC%, PEFR, PIFR and Raw, were recorded using ELF (P.K. Morgan). Decrements in ventilatory functions occurred following the exposure to the PAH compounds as/also assessed by duration of working in the plant. Workers of the mixing unit (group IV) were most affected and were found associated with the exposure to highest concentration of TSP (Total Suspended Particulate) and PAH compounds like Anthracene, Phenthracene, crysene etc. Chest X-rays of some workers from mixing section exhibited radiographic abnormalities which could

be proportionate to their exposure to longer duration.

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COMPARISON OF PULMONARY FUNCTION AMONGST DELHI, SIDDI, VANVASHI AND LADAKHI BOY AND GIRL ATHLETES

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Lung functions were studied in contemporary healthy boy and girl athletes of Delhi, Siddi, Vanvashi and Ladakhi origin. These athletes were being trained for running events of varying distances at Sports Authority of India, Jawahar Lal Nehru Stadium, New Delhi during the tenure of this study. As lung functions are related to ethnic and environmental factors, the aim of the study was to compare the lung function in boys and girls belonging to these four groups. Vital Capacity (VC), Forced Vital Capacity (FVC), Forced Expiratory Volume in 1st second, Expiratory Reserve Volume (ERV), and Inspiratory Capacity (IC) were recorded using conventional closed circuit spirometry. Maximum Voluntary Ventilation (MVV) was estimated collecting deep and rapid breathing expired air in a litres metereological ballon for a period of 12 seconds and measuring its volume. It was found that Ladakhi boys and girls were having significantly higher VC, FVC and FEV1 values than their counterparts. However, there was no significant difference in MVV amongst Delhi, Siddi, Vanvashi and Ladakhi boys. The average MVV of Ladakhi girls was only significantly higher than Siddi girls ($p < 0.05$). Results are discussed keeping in view the ethnic and environmental factors.

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PULMONARY FUNCTIONS AT REST BEFORE AND AFTER 7 DAYS OF SATURATION DIVE IN SUBJECTS BREATHING HELIUM OXYGEN MIXTURES AT 6.5 ATMOSPHERES

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This presentation will describe a chamber saturation dive in which 8 normal subjects were exposed for 7 days to a pressure equivalent to 55 metres of sea water followed by decompression, breathing Helium and Oxygen. Part of the justification for the experiment was to assess the operational and medical problems of this type of dive. The major physiological purpose were to establish man's ability to do useful work at these depths and to determine the effect that living in this environment has on the respiratory functions.

As a working hypothesis, it was assumed that the predominant feature of the high pressure environment would be increased density of breathing medium. Other factors that may be important, however, and that must be considered in interpreting our results are, helium as a pharmacological or narcotic agent, the effect of confinement and inactivity, the unusual thermal properties of helium, the high humidity in the chamber and the slightly increased oxygen tension.

In 8 subjects exposed to pressure equivalent to 55 metres, pulmonary function showed little change at rest. These experiments show that man can spend long periods of time at the depths of continental shelves. It is not known what the

physiological limitation of deeper saturation diving will be.

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THE EFFECT OF PREGNANCY ON AIRWAY FUNCTIONS

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The air way functions in pregnancy have been widely studied. but the report obtained from western and Indian population show much divergence. While the Indian Scientists have shown significant changes in total and timed vital capacity, the western counterpart dismiss such changes as insignificant. The present study was aimed to substantiate such variations. Sixty five healthy females, belonging to middle class, with no obstetric or medical complication were selected in 2nd and 3rd trimester of pregnancy. There were 33 females in 2nd and 32 subjects in 3rd trimester, who were subjected to different ventilatory functions. The various lung parameters were done with the help of autospiror machine (gives computerized results) and included functions - forced vital capacity (FVC in 1), forced vital capacity in Ist sec (FEV1), % Forced expiratory volume in Ist sec (% FEV1) Forced expiratory volume in 1st sec (FEV in 1 sec) and flow rates at 75 %, 50%, 25% of forced expiration. Measurement of various anthropometric parameters like height (Ht in cm), weight(Wt in kg) and body surface area (sqm) were made with standard techniques. These parameters were then compared with equal number of non-pregnant women and analysed statistically using unpaired 't' test and the result showed no significant changes in the airway functions in different trimesters of pregnancy. It can be concluded that there might be a relationship between hormones and the changes in different volumes, which help to balance and bring about the desired effect.

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STRESS PROTEINS IN HYPOXIC CELLS

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Heat Shock Proteins (HSP) are evolutionary highly conserved polypeptides that are produced under a variety of stress conditions to preserve cellular functions. A major antigen of tubercle bacilli of 65KD is a heat shock protein that has significant sequence similarity and cross-reactivity with antigens of other cells. Monoclonal antibodies against this common bacterial HSP were used to identify a molecule of similar size in hypoxic vero cells. Vero cells when subjected to low pressure hypoxia (222 mm Hg) resulted in the synthesis of a new 65KD stress protein which reacted with monoclonal antibody obtained against tubercle bacilli of molecular weight 65KD. This presumably helped the vero cells to withstand the hypoxic stress.

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EFFECT OF GRADED EXERCISE ON PULMONARY VENTILATION AND OXYGEN CONSUMPTION

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In the present study, efforts are made to quantify the effect of graded exercise on pulmonary ventilation and oxygen-consumption in

non-athletic subjects. Further, it is attempted to establish a correlation between lung function tests at rest, and pulmonary ventilation and oxygen consumption during exercise.

Thirty able bodied male medical students with comparable anthropometric data performed dynamic exercise on mechanically braked Bicycle ergometer. They performed two sessions of exercise lasting for 5 minutes each with a rest of 15 minutes in between. The work done during these sessions amounted to 300 KPM and 600 KPM, respectively. The respiratory rate and respiratory minute volume were measured using K.M. Respirometer (Germany) and the composition of equilibrium sample of expired air was estimated by Scholander's Microgas Analyser.

The mean increase in respiratory rate was 11.73 breaths/min and 16.33 breaths/min for the first and second sessions, respectively. The respiratory minute volume showed a mean rise of 26.33 litres/ min and 48.48 litres/min. The mean rise in oxygen consumption for the first session was 0.753 litres/min and that for the second session was 1.276 litres/min. The changes in respiratory rate, respiratory minute volume and oxygen consumption in both the sessions were statistically significant ($p<0.001$). During recovery, all the parameters returned to resting level within 15 minutes of rest following first session. However, respiratory minute volume and oxygen consumption remained persistently higher even after a rest of 15 minutes following second session ($p < 0.001$).

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A STUDY OF RESIDUAL LUNG VOLUMES IN YOUNG INDIAN MALES

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Twenty one healthy south Indian males with no history of lung disease were studied. Their residual lung volumes were measured after training in duplicate by the nitrogen dilution method. The method consisted of rebreathing a bag of pure oxygen starting at complete forced expiration. The nitrogen concentration in the bag after rebreathing was measured indirectly, by subtracting the concentration of oxygen and carbon dioxide, which were measured using a calibrated paramagnetic (Sybron Taylor, UK) and a calibrated infra-red (ADC Instruments, UK) analyser respectively. Residual volumes were calculated using a closed system dilution formula and corrected to body temperature and pressure (BTPS). The subjcts had a mean height of 172.2 ± 7.6 cm, and a mean weight of 60.6 ± 9.6 kg. Their chest circumferance was 86.7 ± 6.2 cm, chest depth 18.6 ± 1.9 cm, chest breadth 26.1 ± 2.2 cm, biacromial diameter 40.3 ± 2.1 cm, and trunk height measured from the highest point on the iliac crest to the acromion was 87.1 ± 4.0 cm. The average residual volume was 1.17 ± 0.28 L. When the residual volume was regressed against anthropometric parameter, it was found that the only positive correlations were with indices of stature i.e. trunk height and total height, $r=0.54$ and 0.44 respectively. The correlation with trunk height was significant ($p \leq 0.05$). The mean value obtained in this study was less than that reported previously for Indian

males, eg: for a male aged 20 years and of height 172 cm (average values in this study), the predicted value was 1.394L. The present method is relatively simple to set up, and it is possible to train subjects so that residual volume measurements can be made rapidly.

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EFFECT OF SMOKING ON PULMONARY FUNCTIONS IN AMERICAN SUBJECTS

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A spirometric study of lung functions (FVC, FEV, FEVP, PEFR, MMEFR, MVV) was carried out in American subjects with long duration of smoking.

This study showed a significant reduction in lung functions in symptomatic smokers with history of more than 20 years of smoking. In asymptomatic smokers, short duration of smoking (more than 10 years), showed a decrease in PEFR. This study indicates that obstructive type of lung changes affect the larger airways first, followed by bronchospasm. Restrictive changes occur only after prolonged smoking.

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ANTHROPOMETRIC REFERENCE DATA AND PHYSICAL FITNESS

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A study of anthropometric reference data and assessment of physical fitness by VO_2 Max & recovery index measurements is undertaken on randomly selected 4147 Indians of either sex (females - 207, males - 3940) in and around Agra City. Anthropometric measurements Data in females & males were Σf 54.691 ± 1.720 mm & Σf 54.383 ± 1.637 mm respectively. VO2 Max was found 44.353 ± 1.697 ml/kg/min & 44.498 ± 1.096 ml/kg/min in females and males respectively. Recovery Index measurement was 74.676 ± 6.986 in females and 74.643 ± 1.637 in males. The correlation would be discussed.

29D Development, Nutrition, Drug Reaction

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EMBRYOGENESIS IN RATS EXPOSED TO EXTREMELY LOW FREQUENCY PULSED ELECTROMAGNETIC FIELD

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Pregnant rats were exposed to Extremely Low frequency Pulsed Electromagnetic Field (PEMF) with different combinations of intensity and frequency for 72 h during 3-5 days of gestation. Foetuses were surgically collected at term and their growth was determined by measuring the weight and Crown-Rump length. Histological examinations using H & E as well as Rapid Golgi Staining were also done to find out the effect of PEMF on the growth of foetal brain.

Maximum inhibitory effect was observed on the cell lines for both foetal weight-gain and attainment of C-R length at 30 μT/50Hz. At 100 Hz, although both the intensities of 20 and 40 μT caused inhibition of foetal weight-gain, C-R length was increased at 40 μT whereas 20 μT caused a slight reduction in this length. These results indicated that the cell-lines for non-skeletal tissue development is more adversely affected than that of skeletal tissue. Histological examination revealed that PEMF exposure to pregnant rats resulted in neural abnormality in foetuses, regardless of the intensity and frequency. However, the severity of the damage varied with both intensity and frequency. The neuronal pathology involves a series of continuous effects like oedema leading to necrosis, dilation of ventricles, disturbed cytoarchitecture, gliosis etc. Thalamus was found to be severely oedematous after exposure to PEMF of intermediate field intensities of 30 μT and 40 μT only.

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BONE CHANGES IN PROTEIN CALORIE MALNUTRITION

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Protein Calorie Malnutrition affects the growth and maturation of the skeleton to a detectable degree. In the present study, the effects of malnutrition on bones were analysed. 80 malnourished children (60% females, 40% males) aged 1 to 6 years were studied. The children were graded according to Indian Academy of Paediatricians classification as Grade I (13.33%), II (13.33%), III (33.3%) and IV (40%).

The skiagrams of both hands and wrist were studied. The mean lengths of the long bones showed a definite decrease in Grade III and IV malnutrition compared to fixed mean lengths for the age. The sequence of appearance of ossification centres was capitate, hamate, epiphysis of lower end of radius, triquetral, lunate, trapezium, trapezoid and scaphoid. A delay in appearance of secondary ossification for carpal and metacarpal bones was observed in Grade III and IV. The lower epiphysis of radius showed a delay of 2-3 years. 60% cases showed osteoporosis, 30% transverse lines of arrested growth, 4% rachitic and 4% scorbutic changes.

A significant hypoproteinaemia was noticed in grade III and grade IV (serum proteins 5.40 ± 0.63, 5.00 ± 0.65 g/dl) compared to I and II. Mean serum calcium levels were 9.6 ± 0.71 and 8.9 ± 1.2 mg/dl in grade III and IV, respectively. Mean serum phosphorus levels were 5.13 ± 0.8 and 4.61 ± 0.93 mg/dl in grade III and IV. These levels were significantly ($p<.05$) low as compared to grade I and II. Serum alkaline phosphotase was significantly low in grade IV.

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BIOCHEMICAL FINDINGS ON ETHANOL - STRESS INTERACTION

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The possible preventive effect of alcohol on stress induced biological changes was examined by measuring alterations in blood sugar, serum

cholesterol, SGOT, SGPT, electrocardiogram and hematological parameters like total leucocyte, absolute eosinophil and absolute lymphocyte counts, induced by the stress of isolation and immobilization for a period varying from 7 to 30 days. Ethanol was administered in two different doses of 1 g/kg and 2 g/kg body weight, one hour prior to stress sessions in separate sub groups. One set of animals (adult male albino rats) were kept on isolation cages, respectively, for 7, 15 and 30 days. These animals received ethanol every day. Another set of animals were immobilized for one hour daily in 3 different sub groups and kept for 7, 15 and 30 days, respectively. These animals also received ethanol, one hour prior to immobilization every day. No change in organ weights were observed (except in the case of adrenal glands which were markedly enlarged) either due to stress or due to ethanol pre-treatment. Absolute lymphocyte count which was reduced due to stress, was brought to near normal pre-stress level due to ethanol pre-treatment. Reduction in blood sugar level due to stress remained unaffected by ethanol administration. Rise in plasma cholesterol level due to stress was remarkably reversed by pretreatment with ethanol. But, on the other hand, ethanol did not alter the pattern of rise in SGOT and SGPT level which was produced by stress alone Quantitatively, administration of 2 g/kg of ethanol appeared to be more potent than 1 g/kg ethanol in reversing certain effects, at least. It is suggested that at least certain of the stress induced biochemical changes can be reversed by ethanol administration as ethanol can act as an antistressor within certain limitations.

SERUM VITAMIN `A' LEVELS IN CASES OF BURNS

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Vitamin `A' plays a vital role in wound healing. In the present study post burn serum vitamin A levels were measured.

The serum vitamin 'A' levels were studied in 20 normal healthy controls and 50 cases of burns aged 20-40 years. The cases were classified into 4 groups - Group I 20% cases (45% burn), Group-II 30% cases (50% burn), Group-III 20% cases (60% burn) and Group IV 30% cases (65% burn). The serum vitamin 'A' levels were measured on 3rd and 7th day post burn by method of Kalmen.

The mean serum vitamin 'A' levels in control subjects was 22.84 mcg/dl (ranging 14.84 mcg/dl - 34.22 mcg/dl). No significant difference in the levels of male and female subjects were observed.

The mean serum vitamin 'A' levels on the 3rd day were in group-I 13.6 ± 1.2 mcg/dl, II-13.82 ± 0.77 mcg/dl, III 12.13 ± 0.55 and Group-IV 10.41 ± 0.18 mcg/dl.

The mean serum vitamin 'A' levels on the 7th day were - in Group-I 14.49 ± 1.2 mcg/dl., II 13.96 ± 1.42, mcg/dl, III-13.12 ± 0.68 mcg/dl and Group IV 12.92 ± 1.32 mcg/dl.

All the patients had a fall in serum vitamin 'A' levels post-burn. With the increasing degree of burn a greater fall was noticed.

It is concluded that vitamin 'A' should be supplemented in all burn cases to promote healing.

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MIGRATING MYOELECTRIC COMPLEXES IN PUP (NEW BORN DOGS)

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The Migrating Myoelectric Complexes (MMC) was first described by Szureszewski (1969) in fasted dog, opened a new era of gastrointestinal motility. The duration of MMC cycle is 120 min in adult dogs. Since then little work have been carried out on new born animals. In order to know the appearance of adult pattern, MMC was recorded and analysed in puppies (2-24 weeks).

The duration of MMC cycle in 2 week old pup was less (63.66 ± 1.57 SEM minutes) compared to (95.80 ± 4.61 SEM minutes) in 24 week old pup. Slow wave frequency in young puppies (2-6 weeks) was 14 per minute while in older puppies (24 weeks) it was 17 which is same as in adult dog. Simultaneously heart rate was also monitored which showed a significant decrease from 285 ± 8.25 SEM in 2 week old pup to 104 ± 0.89 SEM in 24 week old pup. The average velocity of migration of MMC in 2 week old pup increased from 1.02 to 1.44 cm/min. in 24 week old puppies.

As the average velocity of migration of MMC is increasing and heart rate is decreasing, it is suggestive of some higher brain-stem influences in determining the pattern of MMC. However, it is to be further investigated that these changes may be due to either increased activity of cholinergic neurons or their higher density in myenteric plexuses.

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H-REFLEX STUDY IN NEONATES AND INFANTS

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Present study was carried out in healthy term neonates and infants, twenty each, to evaluate the effect of age on late response (H-reflex) parameters mainly the latency and its persistence in the small muscles of hand in later years of the life.

H-reflex was elicited in small muscles of hand like Abductor Pollicis Brevis (APB) on submaximal stimulation of median nerve at wrist. Latency was measured directly from stimulus artefact to the beginning of H-reflex using Medelec MS 92 Electromyograph. In our study, we could elicit this reflex in small muscles of hand upto the age of five months (55% incidence). In literature, the age of 6 months has been reported. Persistence of H-reflex even after two years of age may be interpreted as a sign of central nervous system dysfunction eg U.M.N. lesion (upper motor neuron).

Linear regression analysis and multivariate analysis showed a highly significant correlation of H-latency with age in neonates and infants (16.94 ± 4.29 ms, $p<0.001$) and (15.88 ± 1.15 ms, $p<0.001$), respectively.

Assessment of peripheral nerve function by the

conventional methods is associated with error in distance measurement between two electrodes owing to non-cooperative nature of the study group.

Hence, evaluation of peripheral nerve functions using late response (H-reflex) as an index serves to have a better diagnostic yield than the conventional nerve conduction velocity measurement especially in paediatric population.

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EXERCISE INDUCED CHANGES IN VISUAL EVOKED POTENTIAL (VEP) AND CONTRAST SENSITIVITY FUNCTION

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In conditions such as in operational military or sports settings, where human performance requires exposure to work stresses like physical exercise, the study of visual sensory and discriminatory functions is extremely important.

Changes in the latency, amplitude and contrast sensitivity measures in a pre-post exercise paradigm were studied in 28 selected subjects. VEPs to checkerboard reversal patterns were computer averaged online, contrast sensitivity was measured on a Nicolet Optronics system. EKG, GSR and respiration were recorded on a Medicare polygraph.

The experimental procedure consisted of a 20 minute pre exercise baseline measurement during which the VEP and autonomic measures were recorded simultaneously. Contrast sensitivity was then measured at six spatial frequencies between 0.5 to 22.8 cycle/degree. The subject then exercised to the point of exhaustion on a Monark bicycle ergometer according to a graded schedule. The exercise was followed by repeated recordings of the above measures within 0.5 seconds and 20 minutes duration after exercise.

Pre-post exercise changes indicated decreased P1 and N2 VEP latencies and amplitudes and an increase in contrast sensitivity in all spatial frequencies. The results suggest exercise induced facilitation of visual processes.

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EFFECT OF DIFFERENT INTENSITIES OF EXERCISE ON BIOCHEMICAL AND PHYSIOLOGICAL PARAMETERS OF FEMALE HOCKEY PLAYERS

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The study was conducted on 14 non-smoking female hockey players. They were assigned to one of two training groups, exercising on cycle ergometer 3 days per week for 8 weeks-high-intensity (H:N-8:75-80% VO_2 max 20 min/session) or low intensity (L:N=6:45% 40 min/session). Data were obtained at two week intervals for body weight and 12 hour fasting blood levels of cholesterol, (CHOL) Triglyceride (TG), high density lipoprotein cholesterol (HDL-C) and low density lipoprotein cholesterol (LDL-C).

Results:

i. Decrease in the weight of both the groups.

ii. Significant decrease in the Cholesterol level of both the groups.

iii. Significant decrease in LDL-C

iv. Significant increase in HDL-C

v. No statistically significant changes were observed in TG for either groups.

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EFFECT OF PMF THERAPY ON HYPERCHOLESTEROLEMIA

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Experimental model of hypercholesterolemia was produced in rabbits by feeding cholesterol at a dose of 5 mg/kg body weight daily intragastrically for a period of four weeks. The above regime resulted in a serum cholesterol level of 700 mg/ 100 ml or above.

Pulsed Magnetic Field (PMF) therapy was administered to the hypercholesterolemic rabbits to assess the ability to reduce serum cholesterol level. Different wave forms, varying in intensity and frequency were used for PMF therapy and the effect was observed at varying intervals of time upto nine weeks. In this preliminary study, there was a slow but definite lowering of serum cholesterol in PMF treated animals. The results were compared to cholesterol lowering effect of Questran and are discussed with respect to hypercholesterolemic and normal animals.

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COMPARATIVE STUDY OF THE INFLUENCE OF COMMONLY USED SATURATED AND UNSATURATED DIETARY OILS ON SERUM LIPOPROTEINS IN RABBITS

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The importance of diet-heart relationship in the prevention of cardiovascular disease is an interesting subject still, since there are divergent opinions regarding the influence of dietary fats on lipoprotein profile of an individual. This study was undertaken in order to understand the influence of the commonly used saturated (coconut oil, palm oil) and unsaturated (sunflower oil) dietary oils on circulating lipoproteins and also to see whether there is any modification on the effects of these oils when cholesterol is supplemented to the diet. Oils were fed to the male rabbits in different groups along with a cholesterol free or cholesterol supplemented diet. Blood chemistry including total cholesterol, LDL-cholesterol, HDL-cholesterol and triglyceride were done at biweekly intervals for a period of six months and histological studies of the aorta and liver were conducted at the end. All the parameters except HDL-cholesterol were increased in palm oil fed group whereas the increase in HDL-cholesterol was greater in coconut oil fed group on a cholesterol supplemented diet, which is protective factor for cardiovascular disease. The observation of sunflower oil fed group showed that it is superior to coconut and palm oils as far as coronary heart disease is concerned.

Histological studies were consistent with the blood chemistry changes.

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EFFECT OF YOGURT ON RESPONSE OF SPLENIC AND INTESTINAL LYMPHOCYTES TO MITOGENS IN MICE CHALLENGED WITH *SALMONELLA TYPHIMURIUM*

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Two groups of 4-5 week old DBA/2J Nii mice were put on a yoghurt-based (n=31) or milk-based (n=28) diet, respectively, for 4 weeks. At the end of the feeding trial, a sub group of yoghurt-fed mice (YN, n=16) and milk-fed mice (MN, n=15) were sacrificed for assessment of immune response. The remaining subgroups of yoghurt-fed mice (YC, n=15) and milk-fed mice (MC, n=13) were challenged intragastrically with 2 x 10^{10} live *Salmonella typhimurium* organisms. The inoculated mice continued to be on their respective diets for 8 d and were then sacrificed for assessment of immune response. The immune response was measured by tritiated thymidine uptake by splenic or intestinal lymphocytes in response to mitogens concanavalin A (Con A), phytohaemagglutinin (PHA) and lipopolysaccharide (LPS). The response of splenic lymphocytes (mean ± SD, cpm) was not significantly different in YN and MN mice but was significantly higher ($p<0.001$) in YC mice (23054 ± 3353) as compared to MC mice (15365 ± 2641) in response to Con A. The response of intestinal lymphocytes was significantly higher in response to LPS in YN (11984 ± 1522) than in MN (9044 ± 1532) ($p<0.028$) and in YC (17240 ± 2082) than in MC (13776 ± 2332) ($p<0.016$) and in response to Con A in YC (13593 ± 1153) than in MC (10416 ± 1218) ($p<0.028$). The experiments indicate a considerable improvement in local gastrointestinal as well as systemic immunity on a yoghurt diet as compared to a milk diet.

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EFFECTS OF GABA AND GABA-MIMETICS ON RAT GASTRIC MUCOSAL PROTECTIVE FACTORS

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The role of gastric mucosal protective factors in etiopathogenesis of peptic ulcer has received considerable attention. GABA has been reported to affect some of the factors involved in ulcer protection. The present study includes the effects of orally administered (mg/kg, 1 day or 4 days with or without 200 mg/kg aspirin), GABA (100) and GABA-mimetics viz. baclofen (BAC, 10), diazepam (DZ,10) and sodium valproate (SV, 400) on rat PL-i) gastric juice mucin (TC:P ratio), DNA and protein contents and ii) gastric mucosal thickness, sialic and 5-HT contents. The results indicate that all the above drugs increased mucin secretion (15-60%, $p < 0.1$ to $p < 0.01$) and mucosal sialic acid content (29-58%, $p < 0.05$) and decreased cell shedding as evidenced by decrease in DNA (5-50%, $p < 0.1$ to $p < 0.01$) and protein (14-34%, $p < 0.05$) contents of gastric juice both in per se and in aspirin-treated groups. Mucosal thickness was not affected by any drug and 5-HT was increased by GABA only (12-27 % $p < .01$ - 0.05). Thus ulcer protection afforded by GABA and GABA-mimetics could be due to increased mucin secretion and decreased

cell shedding and increased sialic acid content of gastric mucosa.

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STATUS OF A.D.R. MONITORING IN INDIA

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Despite extensive clinical trials of drugs, the occurrence of advrese drug reaction (ADRs) is unpredictable. ADRs may be so trivial as to be ignored, or may be serious enough to threaten life. No drug is absolutely safe; ADRs may occur even with a seemingly harmless compound, even when prescribed in a correct dose and manner. It is, therefore, essential that an awareness is created among the medical and pharmaceutical staff, as well as general populations regarding the possibility of occurrence, and potential seriousness of ADRs.

Adverse reaction pattern of a pharmaceutical preparation may vary from one country to another. The reasons for such variations are manifold, e.g. socioeconomic, genetic, environmental, nutritional, ethnic use of different excipients in preparation, different dosage employed or different indications for the use of the drug.

A national programme of ADR monitoring should have a National Centre, which in collaboration with a university, institution hospital department or the social health insurance system collects data regarding case identification, patient, and details of adverse reaction.

An ICMR collaboration study on 58,000 patients indicated that the incidence of ADRs, although was not much at variance with that observed in other countries, yet the pattern did not really match. Incidence of ADRs in our country was 5.81% with antimicrobials; 32.21% with antiamoebics; 75-100% with anticancer drugs; 3.14% with drug used for cardiovascular system; 8.01% with bronchodilators; 4.65% with drugs used for G>I>T>; 3.9% with hypnotics and sedatives; 21.34% with anticonvulsants and 14.64% with NSAIDS. Worthwhile ADR findings have been recorded regarding many drugs, including antihypertensive drugs, chloroquine, some antibiotics, metronidazole, oxyphenbutazone, carbamazepine, lignocaine and antidepressants.

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BANNED/ BANNABLE DRUG REIGNS SUPREME: A CASE WITH ANALGIN

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Dipyrone (Analgin) is notorious because of its potential to induce agranulocytosis. Immunological reactions damages neutrophils or their precursors in the bone marrow leading to maturation arrest and has a mortality rate of 20%. Hence its use is justified only in life threatening situations where no alternative analgesic, antipyretic is available or suitable. Analgin/combination has been recommended for ban by Drug Control Committee in the year 1987. 27 countries including Pakistan have already banned or made analgin not available. Analysis of 700 case-sheets of the period Jan. & Feb. 1992 showed that 40.85% received analgesics. Of these 08.57% was contributed by analgin/combination. As a part of campaign against the use of banned/bannable drugs and also of promoting the concept of Rational drug therapy. Department of Pharmacology presented

the epidemiological data regarding excessive use of analgin/combination in the Scientific Forum of the College. After this once again analysis of case-sheets of the period March & April 1993 were undertaken. It was seen that there was no significant reduction in the use of analgin/combination. Our study shows that documentation of adverse effects, motivation & creating awareness are not suficient unless the drug is totally withdrawn from the market..

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ROLE OF TESTOSTERONE IN ALCOHOL AND PARACETAMOL INDUCED TOXICITY IN RATS: HISTOPATHOLOGICAL OBSERVATIONS

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Ethanol and Paracetamol, both individually and in combination causes hepatotoxicity in experimental animals. Testosterone has been observed to have lipotropic and necrotropic activity. The present study looks at the effect of testosterone in alcohol and paracetamol induced toxicity in rats. Histopathological changes included chromatolyses, fragmentation of nuclei, micro and macrovesicular fatty changes, cytoplasmic eosinophilia, hyaline bodies, inflammatory cell infiltration, Kuppfer cell hyperplasia and hepatocellular necrosis. In the rats which were administered testosterone, these histopathological changes were less conspicuous. Cellular changes like binucleation, sinusoidal dilatation and cytoplasmic vacuolation persisted. Biochemical changes in hepatic enzymes, antiperoxidative enzymes, glutathione, metabolites like malonaldehyde, were estimated in the blood and various tissues including brain and liver. The biochemical alterations paralleled histological alterations. These observations suggest that in therapeutic doses, testosterone could be useful in neutralising the toxicity of alcohol and paracetamol.

29E Miscellaneous

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COPING ABILITIES OF ALCOHOLIC RATS TO STRESS

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Coping abilities of 3.2% and 10% ethanol-drinking rats to two types of stresses was studied. They were the offspring of rats reared on similar ethanol solutions. Ethanol solutions were the sole source of fluid in them. Daily 11/2 hour forced-swimming for 2 weeks and 2 sessions of REM sleep deprivation, of 72 hours each in 2 weeks, were the stresses the rats were subjected to.

Food intake in all forms of stress was the highest in EI(3.2%), a little less in E II (10%) and least in C (water) group. Fluid intake during forced-swimming was the highest in E I and equal in E II and control groups. E I showed a consistent small increase in body weight during the control

and forced - swimming periods, the increase being always more than the control group except the 2nd REM sleep deprivation when the fall in body weight of E I was more than the fall shown by control group.

The rats on 3.2% alcohol showed better coping abilities when subjected to physical stress (forced swim) but succumbed to repeated psychological stress (REM sleep-deprivation). E II was not able to cope with the stressful conditions.

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ZINC NEUROTOXICITY IN PRIMARY RETINAL NEURONAL CULTURES

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The present study examined the neurotoxicity of zinc on primary retinal neuronal cultures. Primary cultures of retina were generated from newborn Wistar rat pups of either sex. The cells were seeded at a density of 9.7×10^4 cells/well in multiwell culture trays. Subsequently they were grown in an incubator at 95% humidity and 5% CO_2 environment for a period of five days. On the fifth day in vitro, cells were exposed to graded concentrations (200 µM; 400 µM; 600 µM) of zinc for a 24 h period (n=7). Neuronal cell injury was assessed quantitatively by lactate dehydrogenase (LDH) efflux assay and morphologically by phase contrast microscopy. A concentration dependent increase in LDH activity was observed. Zinc, at concentrations of 200 µM, 400 µM and 600 µM significantly increased LDH activity by nearly 40%, 80% and 88%, respectively, over controls. The amount of LDH released in cultures is directly related to the extent of neuronal degeneration. 200 µM zinc exposure resulted in swollen cell soma and beaded neurities. 400 µM and 600 µM zinc concentrations resulted in further hypertrophy and rupturing of neuronal cell soma. Zinc may exert its effects by potentiating glutamate/kainate mediated toxicity through AMPA/KA receptors which are distributed profusely on retinal neurons.

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PRE-MENSTRUAL STRESS AND AUDIO-VISUAL REACTION TIME

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The study was conducted on 40 young female medical students of age group 17 to 20 years. A detailed history especially the menstrual history was recorded and the pre-menstrual and post-menstrual phases were calculated. The auditory reaction time (ART) and visual reaction time (VRT) were measured during premenstrual and postmenstrual phases by reaction time instrument supplied by Medicaid Systems. In pre-menstrual phase the ART and VRT were 311.90 ± 212.68 msec and 273.94 ± 133.15 msec, respectively; and in post-menstrual phase the times were 220.99 ± 141.99 msec and 173.93 ± 115.75 msec, respectively. The prolongation of both ART and VRT in pre-menstrual phase were highly significant ($p>0.001$). This could be attributed to fluid and salt retention due to ovarian steroids leading to decrease in the processing capability of the central nervous system.

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MEASUREMENT OF BODY COMPOSITION IN SOUTH INDIAN MALES

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Body composition was measured by three different methods in a group of 21 young and healthy South Indian males. The methods used were skinfold thickness, hydro-densitometry and bio-electrical impedance. All these methods gave a two compartment model of the body (ie) a fat, and a fat free mass (FFM) component. Skin folds were used to predict body density by a regression equation while hydro-densitometry directly measured body density. Both these methods then used Siri's equation to predict percent fat and hence FFM from the density. In the bio-impedence method, body fat was directly predicted from the measured impedence of the body. The subjects had mean heights and weights of 1.73 ± 0.07 m and 63.2 ± 10.4 kg respectively. The mean BMI (Body Mass Index, Weight (Kg) / Height^2(m)) was 21.1 ± 2.9. The mean FFM measured by hydro-densitometry was 53.4 ± 5.6 kg; by skinfolds was 53.7 ± 6.8 kg, and by bio-impedence was 54.4 ± 8.0 kg. Thus, the mean difference (bias) between the groups was 1.1 ± 3.6 kg (hydro-densitometry vs bio-impedence), and 0.36 ± 2.8 kg (hydro-densitometry vs skinfolds). However, the scatter of the bias in both cases was large, amounting to about ± 7 kg (± 2 SD) for the hydro-densitometry vs bio-impedence comparison, and about ± 5 kg for the hydro-densitometry vs skinfold comparison. All three methods agreed significantly with each other. In terms of the mean bias, the three methods are comparable, being within 2% of each other, and correlate well. However, this comparability must be treated with caution because the 95% confidence intervals of the bias is about 10% of the estimate.

Acknowledgement: The bio-impedence analysis was carried out on the 'Bodystat - 1500, which was provided by Body stat Ltd., UK. The study was supported by the Nestle Foundation Switzerland.

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SINGLE BLIND, CONTROLLED CLINICAL TRIAL OF A UNANI DEADDICTIVE DRUG COMBINATION IN OPIATE DEPENDENT SUBJECTS

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Drug addiction, particularly the painful abstinence syndrome which is the chief hindrance to withdrawal from the drug abuse is an important medical problem. Western Medicine does not have comprehensive abstinence syndrome-attenuating drugs that are likely to significantly improve the chances of de-addiction. Tibb-e-Unani (Unani Medicine) claims to possess such drugs but they have not been scientifically evaluated. The authors studied the effect of a Unani drug combination in morphine dependent rats and it was found to produce striking attenuation of abstinence syndrome (unpublished). Therefore, in the present study the drug combination was tested in subjects dependent on opium, morphine and heroin in a seven-week, single blind, controlled clinical trial. The study revealed that the Unani drug combination produces a striking suppression of

the abstinence syndrome. All the subjects remained withdrawn from the drug and there was no relapse into drug use during the study period. Therefore the present study shows the test Unani drug combination is an effective de-addictive agent in opioid dependence.

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MECHANISM OF ANXIOGENIC ACTION OF ISATIN

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Earlier studies from our laboratory indicated anxiogenic action of isatin, (2-3-dioxoindole), which has been responsible for atleast part of the action of tribulin, a postulated endocoid marker of stress and anxiety. The present study was designed to investigate the mechanism of anxiogenic action of isatin. The anxiogenic dose of isatin was found to increase rat brain levels of serotonin (5-HT) and dopamine (DA) and to enhance 5-HT concentrations in several rat brain areas. there was significant increase in 5-HT levels of frontal cortex, hypothalamus, pons, medulla and spinal cord. The anxiogenic action of isatin, as assessed by the Montgomery's conflict test in mice using the levated plus maze, was significantly attenuated by metergoline, 5, 6-DHT, Zacopride and by pimozide but remained unaffected following pretreatment with propranolol ketanserine, buspirone and flumaxenil. Isatin induced increase in rat brain DA was attenuated following pretreatment with 5,6-DHT and zacopride.

The results indicate that the anxiogenic action of isatin is 5-HT mediated and a function of the 5-HT_3 receptor subtype, involving modulation of DA activity.

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IMMUNOREGULATION IN ORAL CANCER

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Sera from 93 patients with carcinoma of the buccal mucosa were analysed for its regulatory effect on CD_2 antigen expression using anti CD_2 monoclonal antibodies and sheep erythrocyte rosetting assay. The sera from 55.5% of the patients showed an inhibitory effect (blocker sera) while sera from 44.5% showed an enhancing effect (enhancer sera) on the CD_2 antigen expression. An interesting feature observed was the dominance of enhancer sera in the early stages of the cancer, well differentiated squamous cell carcinoma and verrucous carcinoma. The regulatory effect of the sera had no correlation to the concentration of circulating immune complexes (CIC), ferritin, and serum immunoglobulins on an individual basis. Taken as a whole the concentration of CIC was higher in the enhancer sera while the concentration of FgG and IgM were highr in the blocker sera. The dominance of enhancer sera in groups with better prognosis in clinical practice suggest a correlation with the presence of serum enhancing factors to a good prognosis. The correlation of regulatory status to the prognosis of the patient is examined as the second phase of the study.

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LITHIUM AND THE KIDNEY

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An investigation on renal function was conducted

in 35 patients of MDP (bipolar) from Kashmir (20M and 15F) who were treated with lithium for 1-6 yrs. Another 20 patients (12M and 8F) MDP (15 unipolar, 5 bipolar) represented the Control Group not being treated with lithium but were on antidepressants for 1-2 yrs. Urinary concentration ability, urinary sodium potassium, chloride ion, urine pH, serum electrolytes, creatinine, uric acid and creatinine clearance tests were not significantly different between patients on lithium and patients never treated with lithium. Out of 9 patients complaining of polyurea, only one patient on lithium for 6 years had a urine volume of 3.5 L whereas other 8 patients had urine volume between 2.2-2.8 L (mean : 2.5 L) and were on lithium for 3-5 yrs. (mean : 4.1 yrs). The patients who were on lithium for more than 3 yrs. had low sp. gravity, higher serum creatinine as compared to patients who were on lithium for less than 3 yrs. But the difference did not achieve statistical significance. Our dosage regimen of lithium carbonate ranged from 750-900 mg/day with serum lithium levels between 0.6-1.2 mEq/L. The data indicate that the above regimen is safe and provides effective prophylaxis and ensures good compliance.

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RESPONSE OF THE IRON-INDUCED EXPERIMENTAL EPILEPSY TO ANTIPEROXIDANT TREATMENT

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Epileptic electrophysiological activity in clinical post traumatic epilepsy is belived to be mediated by neuronal membrane lipid peroxidation caused by oxygen-derived free radicals whose formation is catalysed by iron released from extravasated haemoglobin. If lipid peroxidation is causally involved, treatment with antioxidants can be expected to counter the development and progression of the epileptic activity. Use of tocopherol as add on therapy in a few clinical cases appeared to result in a decrease of epileptic activity which in normal course is intractable to usual antiepileptic therapy. Iron-induced experimental epilepsy in animal models post trauatic epilepsy. We have therefore studied the effect of a-tocopherol on the development and progression of iron-induced epilepsy in the rat brain cerebral cortex. Experimental animals were administered tocopherol at varying intervals following the intracortical injection of $FeCl_3$. The result showed significant attenuation of the electrographic seizures in the ipsilateral epileptogenic focus. Our data provide experimental evidence in support of the view that treatment of post traumatic epilepsy by antioxidants is therapeutically rational. Previous experimental studies concerning the antiperoxidant prevention of Iron-epilepsy dealt with only whether pretreatment with an antioxidant could prevent the development of epileptic activity. It was however of more interest to determine whether antiperoxidant treatment could prevent the progression of epileptic activity after it has developed.

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PAIN MODULATORY ROLE OF VENTROMEDIAL HYPOTHALAMIC NUCLEUS IN RATS

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Ventromedial hypothalamic nucleus (VMN) produces satiety. However, we are ignorant about its role in pain beheviour. The present study was undertaken to determine the role of

VMN in pain modulation. Pain response in conscious rats was observed 1-2 weeks after VMN lesion using a battery of pain tests viz hot plate, noxious heat and electrical stimulation induced tail flick (TF), simple vocalization (SV) and vocalization after discharge (VA) and formalin test. In the tail flick test by electrical stimulation the threshold for tail flick decreased from 0.74 ± 0.4 mA to 0.15 ± 0.05 mA after lesion, which was statistically significant ($p<0.01$). Further, the thresholds for SV and VA also decreased from the basal values of 1.25 ± 0.5 mA and 1.64 ± 0.7 mA to 0.41 ± 0.2 mA and 0.88 ± 0.5 mA respectively, showing a hyperalgesic effect of VMN lesion with electrical stimulation. On the other hand when TF was elicited by noxious heat the TFL increased from 10.06 ± 1.4 sec to 12.32 ± 2.5 sec. An increase in hind paw l=licking latency (12.97 ± 4.7 sec) to 13.93 ± 5.2 sec) was also observed in the hot plate test. An analgesic response was obtained in the formalin pain test showing that VMN modulates phasic and tonic pain differently, confirming the earlier reports that different types of pain and their control are mediated via multiple and complex pathways.

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EFFECT OF A 2 BUTEN 4 OLIDE ON PAIN IN RATS

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Recently, short chain sugar acid, 2 Buten 4 Olide (2B 4-0) has been suggested as an endogenous satiety substance mediating satiety through hypothalamic glucoreceptors which have been implicated in pain modulation besides their role in feeding behaviour. Effect of systemically administered (i.p) 2B 40 on pain response was tested. 2B 4-0 was injected in the dosage that produced satiety (73 mg/kg b.w). Tail-flick latency to noxious heat and pain related behavioural scoring to formalin injection were observed. The former is the model for phasic pain whereas the latter for tonic pain. Following 2B 4-0 administration, the tail-flick latency decreased to 0.810 ± 0.2 sec. from the basal value of 1.405 ± 0.6. The tonic pain induced by formalin (5% s.c. in the forepaw) was affected selectively. The average pain rating as well as that during the 5-25 min epochs remained statistically unaffected, although the mean values were lesser of each epoch. During the 30 min the rating was reduced significantly from 2.06 ± 0.1 to 1.66 + 0.3 ($p < 0.05$). These results suggest that 2B 4-0 modulates phasic pain and tonic pain selectively in doses that induce satiety effect.

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PAIN MODULATION BY CHOLINERGIC AND OPIOIDERGIC ANTAGONISTS

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It has recently been shown that multidoses of cholinergic and opioid antagonists produce bi-directional effects on pain. Effects of amygdalar stimulation and systemic administration of atropine, a muscarinic receptor antagonist (5 mg/kg) and naloxone, a specific opioid antagonist (3 mg/ kg) were studied on thresholds (mA) for tail-flick (TF), simple vocalization (SV) and vocalization after-discharge (VA) using electrical stimulation. Tail-flick latency (TFL) to noxious heat was measured. For tonic pain formalin test was done. Adult male albino rats were used for

the study (n=18). Systemic atropine did not show any significant effect on the threshold for TF (0.18 mA) as compared to basal (0.15 mA), but increased the thresholds for SV from 0.60 ± 0.2 to 0.80 ± 0.3 mA and for VA from 1.23 ± 0.4 to 2.02 ± 0.4 mA. Atropine with amygdalar stimulation elevated the thresholds for TF from 0.15 to 0.24 mA, for SV from 0.60 ± 0.2 to 1.03 ± 0.2 mA, and for VA from 1.23 ± 0.4 to 2.83 ± 1.0 mA. Atropine lowered the TFL (8.160 ± 0.3 sec) as compared to saline (11.301 ± 1.5 sec) but the same dose of atropine with amygdalar stimulation significantly elevated the latency from 11.301 ± 1.5 to 22.428 ± 4.6 sec. Peripheral injection of naloxone slightly decreased the thresholds for TF from 0.15 to 0.13 m/a and significantly decreased the thresholds for SV and VA (0.31 ± 0.1 and 0.76 ± 0.1 mA) as compared to basal thresholds, 0.60 ± 0.2 and 1.23 ± 0.4 mA respectively. Naloxone with amygdala stimulation increased the thresholds for SV from 0.60 ± 0.2 to 0.76 ± 0.1 mA (n=5), but completely inhibited the VA. In formalin test, atropine produced analgesia by lowering the average pain rating from 2.07 ± 0.1 to 1.56 ± 0.1 (n=5). These results suggest that cholinergic and opioidergic mechanisms influence tonic and phasic pain in different ways.

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DESIGN OF AN ELECTRONIC STIMULATOR FOR STUDENTS EXPERIMENTS IN ELECTROPHYSIOLOGY - AN INEXPENSIVE SUBSTITUTE FOR THE CONVENTIONAL INDUCTORIUM

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In most of the medical colleges students are using conventional inductorium coil type nerve stimulator in the Physiology laboratory to record the muscle contraction and conduction studies. They find it very difficult to set up this system to get proper stimulus. This is due to the drawbacks in the conventional system which was introduced long back before the introduction of transistors and integrated circuits. Hence an inexpensive electronic stimulator using transistors and integrated chips was designed to substitute the conventional system. This paper describes the current design in detail and discusses the advantage over the conventional system. Since the cost of the stimulator will be only Rs. 150/- this can replace the old inductorium coil type stimulator in all medical colleges. This stimulator gives monophasic rectangular pulses of adjustable duration and intensity with front panel controls which can be easily operated by the students. The stimulator is triggered by the microswitch mounted on the Kymograph to give stimulus in synchronisation with the rotation of the drum of the Kymograph. The power supply of the stimulator is taken from the low voltage power supply already available in the laboratory to reduce the cost and also to maintain electrical safety.

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A COMPARATIVE STUDY OF STRESS IN THE DIFFERENT STAGES OF LABOUR

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The stress reactions of a group of pregnant women in the last week of pregnancy and during labour has been studied. The plasma cortisol, absolute eosinophil count, serum T4 levels and BP recordings were selected as parameters. Results show that, at fullterm plasma cortisol levels were comparable to those of controls.

Highly significant elevation of cortisol levels occurred in the first and second stages of labour. In the third stage of labour the cortisol levels were only moderately high concomitant with the relief of the stressful factors during this phase. Within 2 hrs. after labour ie. the 4th stage plasma cortisol returned to the original fullterm levels. The decrease in eosinophil count noticed in the second stage correlated well with the rise in cortisol. Serum T4 was within normal non pregnant levels at fullterm. But the levels significantly increased during labour and did not comeback to normal even in the fourth stage.

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BIO-METEOROLOGY AND AVICENNA

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There is a misconception that Biometeorology is a modern science but if we turn the pages of Unani Classics we find that there are various beautiful chapters devoted to this science in their work. This paper discusses the few statements of Avicenna related to Biometerology from his first volume of Cannon of Medicine.

Avicenna discribes the composition of fresh air, various pollutants; types of seasons and their effects on the human body, including the humors. He also suggests various preventive measures for the protection from the ill effects of the season. He also describes micro-environment for the convalescence of a patient and also during the treatment of the patient. The various factors related to mountains, forest, and oceans, have influence on the atmosphere and human health are discussed beautifully by Avicenna. This paper is a brief description of his statements which are more advanced than the modern Biometeorology.

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SELF SIMILAR TRANSPORT IN MUSCULAR DYSTROPHY AND CHAOTIC BEHAVIOUR IN STOCHASTIC WEB

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The present paper analyses the mysterious random motion of the 0.427 Megadalton dystrophin in the human muscles. The dynamical chaos as manifested in the different forms of muscular dystrophy has been critically examined using three dimensional flow pertaining to hexagonal symmetry in a plane. Stochastic webs of DMD, BMD, FSHMD and LGMD have been studied. It is found that the anomalous transport of the dystrophin can be successfully comprehended using displacement distribution functions. The self-similar properties of different topological and dynamical characteristics of the dystrophin motion are seen to have resemblence to those observed in Weierstrass-like random walk. It is concluded that these properties are responsible for anomalous transport exponent.

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STUDIES ON MULTIPLE O/W/O EMULSIONS: PROLONGED ANTI-INFLAMMATORY ACTIVITY OF DICLOFENAC SODIUM

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The aim of the present work was to develop

multiple O/W/O emulsions as prolonged release formulations of a potential NSAID, Diclofenac sodium (DS). Multiple O/W/O emulsions were prepared by a two step technique. Also, simple O/W emulsion (N), multiple O/W/O emulsion containing 3% ascorbic acid in the intermediate aqueous phase (BSb) and multiple O/W/O emulsion having pH of the aqueous phase (BSb) and multiple O/W/O emulsion having pH of the aqueous phase as *.) (BWB) were prepared. The formation of these emulsions were confirmed microscopically. All the formulations were studied for anti-inflammatory activity, after oral administration in graded doses, against the corrageenin-induced hind paw oedema in albino rats in which paw oedema was monitored for 24 hrs. The simple emulsion showed inhibition even upto 24 hrs at all dose levels. The inhibition by multiple emulsion persisted for 24 hours at higher dose but for 10-12 hrs at lower dose levels. Multiple emulsion 25b showed no inhibition effect at lower dose level but at higher dose levels, the inhibition effect was observed for 24 hours. The multiple emulsion BMB provided the inhibition effect upto 12 hours at all the dose levels.

It was therefore, concluded that the multiple O/W/O emulsions can be better utilised as a prolonged release formulation of DS.

PRIZE PAPER SESSION

AP-01

EFFECT OF RAPID EYE MOVEMENT SLEEP DEPRIVATION ON RAT BRAIN MONOAMINE OXIDASES

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Monoamine oxidase, monoamine oxidase-A and monoamine oxidase-B activities were compared in free moving, rapid eye movement sleep-deprived, recovered and control rat brains. The activities were estimated in the whole brain, cerebrum, cerebellum, whole brainstem, medulla, pons, and midbrain. The flowerpot method was used for continuing deprivation for one, two, or four days. MAO activity decreased significantly in the cerebrum and the cerebellum of the sleep-deprived rats, whereas MAO-A and MAO-B were differentially affected. Medullary MAO-A was the first to be affected, showing an increase after just one day of rapid eye movement sleep deprivation, while longer deprivation decreased its activity. The activity of MAO-B was not significantly affected in any brain areas of the deprived rats until after two days of rapid eye movement sleep deprivation. All the altered enzyme activities returned to control levels after recovery. Control experiments suggest that the decrease was primarily caused by the rapid eye movement sleep deprivation and was not due to nonspecific effects.

These findings are consistent with past studies and may help to explain earlier observations. The results support the involvement of aminergic mechanisms in rapid eye movement sleep. The

plausible reasons for the changes in the activities of monoamine oxidases, after rapid eye movement sleep deprivation are discussed.

AP-02

SERUM PROLACTIN LEVELS IN SCHIZOPHERENICS

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Serum prolactin levels are determined in 116 schizophrenics and 120 control subjects. Values of prolactin levels of the patients are compared with the values of controls of the same sex and age group. There is no significant difference between prolactin levels of controls and those with negative or positive symptoms of schizophrenia. Analysis taking age into account also does not show any significant difference between patients with positive or negative symptoms and that of controls. The relationship between nature of symptoms of schizophrenia and serum prolactin levels varies in different studies. The possible reasons for such variations are discussed.