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A B S T R A C T S

ALTERATIONS IN SERUM AND CARDIAC TRANSAMINASES AS A FUNCTION OF AGE AND MYOCARDIAL INFARCTION. S. ASHA DEVI AND E. RADHA.
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Myocardial infarction was experimentally induced in albino rats belonging to 20-, 40-, 60- and 80 weeks of age by injecting DL-Isoproterenol (ISO) hydrochloride at a dose level of 30 mg/100 gm body weight. The animals were autopsied at different time intervals to ascertain the patho-physiological variations in young vs. old rats due to the action of the drug. Occurrence of infarction was confirmed by gross as well as by microscopic examination of the hearts. Serum and cardiac transaminases were estimated spectrophotometrically using aspartate and alanine as the substrates.

Serum GOT activity showed an increase between 20 and 40 weeks of age with no significant difference thereafter, whereas in the cardiac muscle, GOT activity increased by 100% between 20 and 40 weeks. After ISO injection there is a marked elevation in the activity of GOT in serum with a corresponding decrease in the cardiac muscle. It is significant to note that older rats experienced much severe depletions in the enzyme activity compared to the younger ones.

With age, GPT activity showed progressive increases in serum. There is an age-related difference in the maximum change seen in serum GPT activity due to ISO injection. The maximum change seen in cardiac GPT is a decrease of 80% at 12 h after ISO injection. The recovery of cardiac muscle from the damage caused by the drug could be seen in the increase in GPT between 24 and 48 h after ISO injection.

The above results are discussed with respect to the differential responses of the young vs. old hearts, to experimentally-induced myocardial infarction.

STUDY OF RETARDATION IN BRAIN DEVELOPMENT IMPOSED BY UNDER-NUTRITION : EEG CHANGES OF LIMBIC CORTEX AND HIPPOCAMPUS. CAROL MASCARENHAS AND T. DESIRAJU. *Department of Neurophysiology, National Institute of Mental Health and Neuro Sciences, Bangalore - 560 029.*

Effects of undernutrition were inferred by studying computerised-EEG abnormalities of limbic cortex (cingulate gyrus) and hippocampus in the growing Wistar rat. Rats were reared by feeding diets of known composition, on either normal amounts of ration or on reduced amounts to produce the malnutrition. The body weights were taken regularly to indicate the degree of the effect of malnutrition. It was found that the development of the rhythm of sleep state of the hippocampus lagged behind by several days in the malnourished rats. The maturation of the cingulate cortex EEG also showed considerable lag in the undernourished pups. Further, the amplitude and the range of the lower frequencies in the cingulate EEG were considerably higher in the malnourished pups than in the normals. The abnormalities in the EEGs were found to decrease to some extent spontaneously, in spite of the malnutrition continuing upto six months. Restituting the normal amounts of diet after the age of 21 have not improved the above progress of spontaneous remission much further.

HIGH HEDONISTIC RESPONSES TO SINE WAVE ELECTRICAL STIMULI OF BRAIN REWARD SYSTEM. D. NARAYAN RAO AND T. DESIRAJU. *Department of Neurophysiology, National Institute of Mental Health and Neuro Sciences, Bangalore - 560 029.*

Fine bipolar stainless steel electrodes have been chronically implanted by using stereotaxic method in the Wistar rat in the midbrain adjacent to substantia nigra and in the pre-optic and other hypothalamic areas. The data of 15 rats prepared as above is presented in this study. The rats have been tested in the Old's paradigm of intracranial self-stimulation by pedal pressing by the rat, which is considered as an indicator of the hedonistic behaviour. At the end of the several weeks of experimental observations on each rat's behaviour, it was sacrificed and the electrode locations were verified by sectioning the brain. The results to both square wave stimuli and the sine wave stimuli were obtained for each electrode site. It was found that the sine wave stimuli evoked the highest rates of self-stimulation. The square wave stimuli produced only about 60% of the response rates evoked by the sine wave stimuli. However, the square wave stimuli required only about half to one-third of the currents needed for the sine wave stimuli for a given site in the brain. Increasing the current strengths of square wave stimuli did not increase the self-stimulation rates, but have evoked motor and other disturbing reactions. It is concluded that the sine wave currents are the best for evoking intense intracranial electrical self-stimulation behaviour.

EFFECT OF METRONIDAZOLE ON INTESTINAL TRANSIT TIME AND FAECAL PARAMETERS. ANURA KURPAD AND P.S. SHETTY. *Department of Physiology, St. John's Medical College, Bangalore - 560 034.*

It is now generally assumed that bacterial mass is the main component of faeces and that dietary fibre which acts by providing substrates for bacterial proliferation in the human colon increases faecal weight and thereby reduces the mean intestinal transit time (MTT). Antimicrobial therapy should therefore alter both MTT and faecal parameters. Six, male South Indian subjects were maintained on metabolic balances for a period of 24 days. After an equilibration period of 8 days on a constant energy (2600-3600 kCal), constant protein (66 g) and constant dietary fibre (25-35 g) intake per day, MTT was monitored continuously using the continuous marker technique. From days 17 to 21 (*i.e.*, 5 days) metronidazole (1 g. d⁻¹) and ampicillin (1 g. d⁻¹) were administered. Following the antimicrobial treatment faecal weights increased by 198% while MTT showed a variable response which was not statistically significant. It would appear that antimicrobial drugs increase rather than decrease faecal weight with little effect on transit times indicating that microbial proliferation may not be the sole determinant of faecal parameters.

EFFECTS OF HELMINTHIC INFESTATION ON INTESTINAL MOTILITY OF DOG. B. S. RAO AND D. S. AMAR. *St. John's Medical College, Bangalore - 560 034.*

Adult dogs fed *ad lib* for 1 hour (13-14 hour) a day and trained to obey commands were surgically fixed with intestinal fistula approximately 30 cm from pyloric end of stomach. Fistula was closed when not in use with close fitting plastic plunger. One week after post-operative care intestinal motility was recorded kymographically using conventional method of water-filled balloon and mercury manometer. Records obtained from both infested (IN) and dewormed (DE) animals before (BF) and after (AF) food intake showed interesting changes in amplitude (mm Hg) and frequency (waves/min.). AF amplitude of IN dog (11.4±0.52) and DE dog (7.6±0.78) was increased over respective BF amplitude of IN (3.4±0.33) and DE (2.6±0.47) dog. The amplitude of IN dog either BF or AF was increased as compared to respective BF and AF amplitudes of DE dog. Further wave frequency of IN dog BF (25.6±1.2/min) was similar to AF (27.5±2.1/min.) frequency. In contrast BF frequency of DE dog (14.1±1.7/min) was significantly reduced as compared to AF frequency of DE dog (25.0±1.3 min.).

A COMPARATIVE STUDY OF SODIUM AND POTASSIUM LEVELS IN AMNIOTIC FLUID, MATERNAL SERUM, FOETAL SERUM AND CYTOLOGY OF AMNIOTIC FLUID. V.T. SHAKUNTHALA, F. DA COSTA AND S. MAQBOOL AHMED. *Department of Physiology, Bangalore Medical College, Bangalore - 560 002.*

Amniotic fluid, Maternal serum and Foetal serum samples from 15 normal full-

term pregnant women were analysed for Sodium and Potassium, and a comparison was made. Effects of factors like sex of the baby and gravidity of the mother on these levels were studied. Maternal serum and Foetal serum have significantly higher Sodium and Potassium content than Amniotic fluid in both male and female baby groups. The cytological study of 6 Amniotic fluid samples showed the presence of Barr body, which were samples from women who delivered female babies. Thus an attempt is made to study the determination of sex by the Cytology of Amniotic fluid, and to correlate Sodium and Potassium levels with the sex of the baby.

IMPACT OF LOCALIZED MUSCULAR ELECTRICAL STIMULATION ON THE PROTEIN CONSTITUENCY OF DENERVATED MUSCLE. E. DAVID, S. GOVINDAPPA AND P. REDDANNA. *Department of Zoology, Sri Venkateswara University, Tirupati - 517 502.*

The impact of localized muscular training programme of electrical stimulation as studied on the denervation atrophied muscle. The progressive muscular atrophy was witnessed in denervated animals upto 30 days period. The muscular fuels were accumulated in the atrophied muscle with decrease in the protein constituency. The study on the muscle tissue proximate analysis after 10 days and 30 days of denervation revealed that the therapeutic value will be more if the electrical stimulation was applied as early as possible after denervation. The therapeutic programme applied to 10 days denervated muscle increased both sarcoplasmic and myofibrillar proteins with a decrease in the collagen content. It was suggested that electrical stimulation can be successfully employed to retard the muscular atrophy, and the same can be applied to treat the muscle wasting diseases.

DEVELOPMENTAL AND AGE RELATED CHANGES IN VITAMIN B₆ METABOLISM IN RAT BRAIN*. T. S. RAJESWARI. *Karnataka State Sericulture Development Institute, Thalohattapura, Bangalore - 560 062.*

Metabolism of vitamin B₆ was studied in the brain of rats aged 1 day, 7, 14 and 21 days and 3, 12 and 24 months. The levels of the three vitamers, 5'-phosphate esters of pyridoxal and pyridoxamine and activities of three enzymes involved in B₆ metabolism were determined. Total vitamin B₆ content decreased from birth upto 21 days and showed no change with advance in age from 3 to 24 months. The vitamer pyridoxine in general were high at birth and decreased during development. No significant change in both pyridoxal and pyridoxamine levels was observed with advanced age from 3 to 24 months. The coenzymes pyridoxal phosphate and pyridoxamine phosphate increased

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from birth upto 3 months. At 24 months pyridoxal phosphate showed an increase and pyridoxamine phosphate showed a decrease when compared with the 3 months old adult. The activity of pyridoxal phosphokinase both with pyridoxal phosphate and pyridoxamine phosphate as substrates increased upto 3 months and decreased later on. Pyridoxine phosphate oxidase showed a very marked increase during the third postnatal week and reached the adult level at 21 days itself. At 24 months, a 28% increase in activity was observed. Maximum increase in the activity of pyridoxal phosphate phosphatase was seen between 21 days and 3 months. Increase in age from 3 to 24 months resulted in a 40% increase in its activity.

The above results are discussed with reference to age related alterations in biochemical pathways involved in B₆ metabolism and its coenzyme function in regulating the pool of amino acids having neurophysiologic and metabolic functions.

EFFECT OF CALORIE/MEAL TIME RESTRICTION ON THE ALKALINE PHOSPHATASE AND CHOLINESTERASE ACTIVITIES OF RAT INTESTINAL MUCOSA. S. SUDHA, S. DUA-SHARMA AND K. N. SHARMA. *Department of Physiology, M.S. Ramaiah Medical College, Bangalore - 560 054 and University College of Medical Sciences, New Delhi - 110 016.*

CFTRI Strain albino rats of either sex, based on the feeding schedule were divided into group I - *ad lib* diet; group IIA - adults on 3 hours food schedule; group IIB - young rats on 3 hour food schedule; group III - 50% calorie restricted; group IV - 75% calorie restricted. The activities of intestinal enzymes namely alkaline phosphatase and cholinesterase were studied after adaptation to different feeding schedules. Both the enzymes showed a proximal-distal gradient with no significant difference between sexes. Group IIA, group IIB and group III have an alkaline phosphatase activity as compared to group I. In group III there was maximum peak response in duodenum (males: 54.09 ± 1.91 S.A. units, females: 53.94 ± 4.17 S.A. units), and jejunum (males: 37.61 ± 5.79 S.A. units, females: 22.03 ± 4.94 S.A. units) as compared to group I duodenum (males: 36.58 ± 1.75 S.A. units, females: 32.22 ± 3.16 S.A. units), jejunum (males: 23.34 ± 3.05 S.A. units, females: 14.81 ± 1.55 S.A. units). In the meal time restricted animals there was maximum % difference in the activity level in the jejunal segment. Activity was reduced in the severely calorie restricted group IV. There was a non-significant increase in the cholinesterase activity in groups IIA, IIB and IV as compared to group I. Analysis of the % difference in the activity level of the various groups showed that different regions have different levels of activity on different nutritional regimes. Data obtained by histochemical studies were comparable with the biochemical studies.

OPERANT CONDITIONING OF HEART RATE BY REINFORCING WITH ELECTRICAL SELF-STIMULATION OF BRAIN REWARD SYSTEM. M. G. BASAVARAJAIAH AND T. DESIRAJU. *Department of Neurophysiology, National Institute of Mental Health and Neuro Sciences, Bangalore - 560 029.*

Adult Wistar rats (mostly females) were stereotaxically implanted with bipolar electrodes in the medial fore-brain bundle of lateral hypothalamus. After the post-operative recoveries, the rats were tested for self-stimulation behaviour through these electrodes. The rats in whom the electrodes were found to be properly placed to give good self-stimulation rates were chosen for the operant learning experiments. During the session of the operant learning, the rat was paralysed by Flaxedil and maintained on artificial respiration. The electrocardiogram of lead II of the rat was monitored continuously and also passed through level-setters to 'on' or 'off' automatically a brain-stimulator connected to the hypothalamic electrode. The level-setters were set in such a way that whenever the heart rate was lowered, the stimulator would be 'on', and the hypothalamic hedonistic centres would get stimulated. The reward of getting stimulation to the hedonistic centres would be the reinforcement, if the rat exerted consciously to keep its heart rate low. The experiments revealed that this indeed is the effect. It was also observed that the hypothalamic stimulation reward could be modulated by administration of drugs which are known to modify dopaminergic transmission, haloperidol, which is known to reduce dopaminergic transmission reduced the operant conditioning of lowering of heart rate, whereas amphetamine, which is known to facilitate dopaminergic transmission has facilitated the operant conditioning of lowering of heart rate. The data reveals an interesting point that even the autonomically innervated structure like heart can be subjected to operant conditioning and further by direct intracerebral activation of the hedonistic system.

STUDY OF RETARDATION IN BRAIN DEVELOPMENT IMPOSED BY UNDER-NUTRITION : EEG CHANGES OF NEOCORTEX. B. RAJANNA AND T. DESIRAJU. *Department of Neurophysiology, National Institute of Mental Health and Neuro Sciences, Bangalore - 560 029.*

Electrocorticographic activities of Wistar rat pups of normally nourished mothers and of undernourished mothers were monitored through chronically implanted electrodes and quantified by computerised procedures. The degree of undernutrition was firstly studied by measuring the body weights and brain weights of the growing rats under the conditions of the restricted or *ad libitum* diets.

The pattern of undernutrition imposed is as follows - Undernutrition till weaning (22nd day) was imposed by reducing the amount of food provided to the mothers. After

weaning, the pups were continued on undernutrition by reducing their diet (normal composition) till 40th day when the protein content of the diet was also reduced and provided till 60th day. After that, they were provided normal composition diet *ad libitum*. In another group, even after 60th day, they were continued to be undernourished with the reduced amount of food of normal composition. The protein-deficit diet was also provided (between 40th and 60th day of age) to the pups of control group which were not otherwise undernourished in any other way. It was found that the EEG of the two groups which were undernourished from birth and subjected to the additional protein malnutrition during 40th and 60th days of age, whether they were subsequently reverted to normal nutrition or continued on undernutrition of normal diet, showed an abnormal degree of increase in the amplitudes of the lower frequency rhythms of EEG (delta and theta bands). The difference between continued malnutrition group and the rehabilitated group was not marked in this aspect. Probably, this was because of the additional malnutrition of protein reduction imposed on them, which could have curtailed the spontaneous remissions which were observed in some of the reared pups without the additional protein-undernutrition. However, the control pups also had the protein-undernutrition, but they did not develop the high-amplitude low-frequency rhythms. Therefore, it is inferred that the effects of post-weaning undernutrition would critically depend on the state of preweaning nutritional status.

STUDY OF RETARDATION IN BRAIN DEVELOPMENT IMPOSED BY UNDER-NUTRITION : CHANGES IN NEURONAL MORPHOLOGY OF CEREBRAL CORTEX.
GIRIJA GUNDAPPA AND T. DESIRAJU. *Department of Neurophysiology, National Institute of Mental Health and Neuro Sciences, Bangalore - 560 029.*

The motor and visual cerebral cortical areas of 3 normal and 3 malnourished Wistar rat pups of 19 days, 26 days and 37 days age were studied by rapid golgi technique to find out the differences in their neuronal and dendritic morphologies and to infer the effects of the undernutrition. The undernutrition was imposed by reducing the amount of diet of normal composition provided to the pups or to their mothers. The body weights of the undernourished pups varied between 25% and 50% of their comparable normals. The pyramidal neurons of the upper layers and the lower layers of the cortical areas were particularly studied. It was found that the neurons of both visual and motor cortices of the undernourished pups had very poor development of dendritic branching. Further, the numbers of spines on the dendrites present were also much diminished compared to the normals, and, the spines of the neurons of the undernourished pups were also abnormally looking. The data obtained so far lends support to an inference that the nutrition imposed during postnatal growth and development.

AMBIENT TEMPERATURE INFLUENCES PYROGEN INDUCED CHANGES IN FOOD INTAKE. K.M. MADDAPPA AND P.S. SHETTY. *Department of Physiology, St. John's Medical College, Bangalore-560 034.*

Food intake of an animal is to an extent the function of ambient temperature. We have earlier reported the effects of pyrogen induced pyrexia on food and water intake (IJPP, **26** : 341A, 1982). Since our earlier studies were carried out at the same ambient temperature (24/25°C), the present study was designed to see the effects if any of varying ambient temperature on the pyrogen induced responses. Male, albino rats were used in this study; rectal temperature, food and water intake were monitored at 4 hourly intervals for 24 hours prior to and after administration of pyrogen (cholera vaccine) at 3 different ambient temperatures *i.e.*, 24/25°C, 28°C and 32/33°C. The pre-pyrogen 24 hour energy intake (expressed in kCals per 100 gm body weight) : 28.5 kCals (at 24°C); 21.5 kCals (at 28°C) and 18.7 kCals (at 32°C) was inversely related to the increase in ambient temperature. At ambient temperatures of thermoneutral (28°C) and below pyrogen administration produced a reduction in food intake (—12.6% at 24°C $P < 0.01$; —15% at 28°C $P < 0.01$) while at ambient temperatures above thermoneutral pyrogen administration increased 24 hr energy intake by +51.1% ($P < 0.001$). This study indicates that energy intake is determined by an interplay between central and peripheral input of thermal sensation.

AN APPARATUS FOR CONTINUOUS MONITORING OF OXYGEN CONSUMPTION OF SMALL ANIMALS. D. V. MURALIDHARA, K. J. LOUIS AND P. S. SHETTY. *Department of Physiology, St. John's Medical College, Bangalore - 560 034.*

Many different types of apparatus have been described for determining oxygen consumption of small animals. Most such equipment are complex and expensive. The simpler ones described do not permit continuous monitoring of changes in oxygen consumption over a long period of time. A simple apparatus which has the advantages of continuous monitoring under controlled temperatures is described. The present system represents an example of an old principle being applied using simple instrumentation with resultant advantages that suit a greater range of experimental requirements. The set up is inexpensive, simple to construct and operate, is reliable and accurate.

The principle involved is that pressure inside a closed chamber is increased by introducing a known volume of oxygen. Expired carbon-dioxide and water are absorbed by an absorbant and the time taken for chamber pressure to return to equilibrium level is accurately indicated by a photosensitive lamp. Repeat measurements of oxygen consumption in six albino rats, using this apparatus shows a variability of less than 2.2%. Use of the set up to continuously monitor oxygen consumption following administration

of Noradrenaline for over 2.5 hours enables the measurement of energy expenditure in animals on a long term basis, which is reproducible on several occasions.

BENEFICIAL INFLUENCE OF SALINITY ON THE TOLERANCE LIMIT OF *TILAPIA MOSSAMBICA* TO NICKEL SULPHATE. L. LUMINE AND V. GOPAL. *Neurophysiological and Behavioural Sciences, Department of Zoology, Bharathiar University, Coimbatore - 641 046.*

Considering the biological magnification through food chain, increasing dangers of water pollution by heavy metal toxicants necessitate the establishment of water quality criteria and the determination of safety limits for fish. The industrial processes have added considerable quantities of heavy metal pollutants to the aquatic system posing imminent threats to the countless lives within. The undesirable effects of heavy metals on the aquatic ecosystem are well documented and the insidious effects of nickel intoxication has been realised only in recent years. The very fact that the fish facilitates nickel accumulation, necessitates evaluation of methods to reduce the toxicity, though not abolishing its effects completely. The present investigation is aimed in that direction.

The tolerance limit of *Tilapia Mossambica* to NiSO was evaluated in control tap water of 330 ppm salinity and the LD₅₀ was found to be 183 mg/l at 72 hrs. Addition of NaCl to this toxic dose has extended the period of survival. While 50% mortality occurred at 72 hrs in the tap water of 330 ppm salinity, it occurred at 89 hrs and 122 hrs in 1330 and 2330 ppm salinity respectively, thus increasing the survival duration. Further, increase of salinity to 3330 ppm though has reduced the survival duration to 105 hrs. still it was better than the control tap water.

A COMPARATIVE STUDY OF ELECTROLYTES IN BLOOD AND SWEAT OF HUMANS DURING ACUTE EXPOSURE TO HEAT. N. SURESH BABOO AND S. MAQBOOL AHMED. *Department of Physiology, Bangalore Medical College, Fort, Bangalore - 560 002.*

Alterations in the body electrolytes is a factor causing Heat Disorders. The urinary output of salt may go down during heat stress but skin cannot conserve it. Thus the intention of this study was to find out the effects of Acute Heat Stress on body electrolytes. Thirteen healthy adult male volunteers were exposed for 50 minutes in a hot chamber (Tdb 57°C, Twb 37°C, RH 33% AIR velocity 55 feet/min.) Sodium, Potassium and Chloride of blood, urine and sweat were estimated. Results showed that the loss of Potassium is more than that of Sodium and Chloride. Therefore an added potassium supplementation during heat stress may be beneficial.

DISTRIBUTION OF BLOOD GROUPS (ABO) AMONG 400 MEDICAL STUDENTS OF BANGALORE MEDICAL COLLEGE. S. MUNIREDDY, N. SURESH BABOO AND S. MAQBOOL AHMED. *Department of Physiology, Bangalore Medical College, Bangalore - 560 002.*

ABO system of blood grouping is the oldest. Even now it is being extensively studied because, it is the basic system of blood grouping. But the distribution of various groups among the population in different parts of the world varies. In a vast country like India it is possible that a regional variations in the distribution of groups may be present. In this present study 400 students of Bangalore Medical College were tested for ABO groups by simple slide method using 5% washed RBC suspension. It is found that there is a predominance of O group followed by B group, AB group being the least.

INFLUENCE OF NATUROPATHY TREATMENT IN THE MANAGEMENT OF ASTHMA. S. SATYANARAYANA MURTHY. *Institute of Naturopathy and Yogic Sciences, Bangalore - 560 073.*

Research study to treat Bronchial Asthma patients with Naturopathy system of treatment was started at the Institute of Naturopathy and Yogic Sciences, Bangalore, in the year 1981-82. During the first year of study the results were measured on the basis of peak expiratory flow rate, data, subjective and objective scores. Initially the study was conducted for a period of 6 weeks. The patients started showing remarkable improvement from the second week onwards and the final results were very much significant.

All the patients were screened through various Pathological and Biochemical examinations, X-ray and ECG examinations. All the patients were diagnosed as Asthmatics. The parameters like vital capacity, forced expiratory volume in one second and peak expiratory flow rate were measured.

During the year 1981-82, 27 patients were admitted. Encouraged by the results and closely following the data obtained during this year, the 1982-83 period of treatment was reduced from 6 weeks to 4 weeks with intensified treatment methods. During the year 1982-83 in addition to the recording of regular peak expiratory flow rate parameter, other Lung Function Tests were also conducted.

The total number of patients treated this year is 32. The patients showed considerable improvement in their condition in all Lung Function Tests and this signifies the influence of Nature cure treatments in the management of Bronchial Asthma cases. Treatment is given purely with Nature cure treatments combined with Yoga therapy and without the help of any drugs.

LIFE SUPPORT IN ENCLOSED SPACES : A BRIEF REVIEW. TARA CHRISTOPHER, N. SURESH BABOO, FRANCIS DA COSTA, AND S. MAQBOOL AHMED. *Department of Physiology, Bangalore Medical College, Fort, Bangalore - 560 002.*

Exposure of men in enclosed spaces for more and more prolonged duration are in vogue presently. Outer space or Underwater exploration are two striking examples. In such situations people have to stay in confined spaces for prolonged periods. How their life is supported in such a situation is the topic of this review. Points like oxygen supply, Carbondioxide removal, Temperature control, waste disposal, etc., are discussed. The model selected for discussion is that of a small underwater vehicle which is expected to be submerged for prolonged periods for search and rescue.

GASTRIC ACID-MUCIN RATIO IN RABBITS AFTER DOXEPIN AND CIMETIDINE. S. H. KADLIMATTI, R. SEETHALAKSHMI AND G. AMRUTHRAJ. *Department of Pharmacology, Bangalore Medical College, Bangalore - 560 002.*

In recent years, much attention is being given to the protective role played by gastric mucus secretion in protection against peptic ulceration. Doxepin a tricyclic antidepressant is known to possess anti-cholinergic property and it is suggested for the treatment of peptic ulcer. Hence, the present study is undertaken to find out the effect of Doxepin on gastric acid content and mucin content. Cimetidine and H₂-receptor blocking agent is taken as a standard reference. F.T.M. was conducted in healthy albino rabbits by using 15 ml of 7% alcohol. Acid and mucin content were estimated in the fasting as well as half hourly samples upto 11 hours.

The results are discussed. Doxepin has reduced acidity whereas Cimetidine reduced acidity but stimulated mucin secretion.

PHARMACOLOGICAL STUDIES OF *COSTUS SPACIOSUS*. M. S. SHALLAMMA, A.P. NARASSAPPA AND R. SEETHALAXMI. *Department of Pharmacology, Bangalore Medical College - 560 002.*

The root of *Costus Speciosus* which is known as Pushkara in Sanskrit, is useful in catarrhal fevers, coughs, dyspepsia, worms, skin diseases and snake bites.

The root extract is used in Ayurvedic system of medicine for the treatment of respiratory diseases. The present study is undertaken to find out the different pharmacological properties of *Costus Speciosus*. The hot water extract of the root was taken for this study. The actions were studied on cardiac, skeletal and smooth muscle ; normal body temperature, antibacterial property. Acute toxicity studies in mice and chronic

toxicity studies in rats were also conducted. The hot water extract of *Costus Speciosus* showed the effect of increased contractions on smooth muscle; decreased contractions on cardiac muscle and no effect on skeletal muscle.

MANAGEMENT OF DIBETES MELLITUS WITH NATUROPATHIC TREATMENTS.

S. SATYANARAYANA MURTY. *Institute of Naturopathy and Yogic Sciences, Bangalore - 560 073.*

The research study on Diabetes Mellitus is being conducted in the Institute of Naturopathy and Yogic Sciences, Bangalore, from the year 1981-82 onwards. During the first year two batches of Adult Diabetic patients were admitted under this scheme. 16 in the first batch and 17 in the second batch. All these patients were diagnosed as Diabetics elsewhere and all of them were on some sort of Anti-Diabetic medication, either on oral hypoglycaemic agents or on Insulin. All the subjects were screened with standard GTT tests and other pathological and biochemical tests and ECG and X-ray examinations. The persons who were found to be suffering from any other chronic diseases were not admitted into this study. The first batch of patients were treated for a period of 8 weeks and from the second batch onwards the duration of the treatment was condensed to 45 days. Initially the Anti-Diabetic medication was completely withdrawn. Glucose level was checked by Ortho-tolyidine method. The GTT was performed on the basis of the weight of the individual by giving oral glucose depending upon their body weight. Day-to-day evaluation of Urine Sugar was conducted and regular maintenance of vital data was done. The results at the end of the study are very much significant and all the patients have shown considerable improvement during the period of treatment without the help of any Anti-Diabetic drugs. This explains the importance of Naturopathic treatment combined along with yoga therapy in the treatment of Diabetes Mellitus patients without the help of any drugs.

INFLUENCE OF AGE AND POSTURE ON M.V.V. (MAXIMUM VOLUNTARY VENTILATION). S. SHARADA, MAQB'OL AHMED AND F. DA COSTA. *Department of Physiology, Bangalore Medical College, Bangalore - 560 002.*

The aim of the present study is to obtain normal standards of M.V.V. in different postures of the same subjects and different sexes and different age groups to attempt a comparison of the results obtained by this investigation with those obtained by other workers in other regions of India and abroad.

M.V.V. is a dynamic test of the lung function and was determined in 262 normal healthy subjects of both sexes ranging from 7 to 55 years of age using Inco's recording spirometer (ME 6237). Most of the values (Mean \pm S.D.) are higher in males than in females subjects and also higher in younger age group (31 and 35 years). All the values were recorded in 5 postures, *i.e.*, standing, sitting, left lateral, right lateral and supine. When the values obtained in different postures were compared, it is found highest in standing posture and least in supine.

EFFECT OF ACUTE REDUCTION OF NEPHRON POPULATION IN DOGS ON BLOOD PRESSURE AND ELECTROLYTES PATTERN IN SERUM AND URINE. H.B. VEERANNA AND S. MAQBOOL AHMED. *Department of Physiology, Bangalore Medical College, Bangalore - 560 002.*

The rate of urine flow, the urinary excretion of Sodium Potassium and serum sodium, potassium have been studied following ligation of a segmental branch of a renal artery in dogs. Segmental ligation of a renal arterial branch results in acute reduction in nephron population, which leads to changes in the excretion pattern of sodium, potassium and also urine flow rate by the remanant nephrons of the kidney. There was a fall in the urinary excretion rate of sodium, potassium and calcium within 30 min of ligation, subsequently followed by a gradual rise in the excretion of these electrolytes towards the pre-ligation values by the end of experiment. The serum analysis in all the experiments showed no significant changes in the concentration of these electrolytes. Blood pressure recorded before and after the ligation showed no significant change in all the experiments. This shows that kidney, despite the reduction in nephron population plays a major role in functional adaptation of these electrolytes so as to maintain "HOMEOSTASIS" in the body.

POSSIBLE MOLECULAR MECHANISM OF OXYGEN TOXICITY. N. SURESH BABOO, H PRABHAKAR, FRANCIS DA COSTA AND S. MAQBOOL AHMED. *Department of Physiology, Bangalore Medical College, Bangalore - 560 002.*

Oxygen is more and more used as a drug now-a-days. Hyperbaric oxygenation is used in many clinical conditions. Oxygen toxicity is a major limitation in these situations. Oxygen is very powerful oxident which will oxidise many vital enzymes in the body. It can also inactivate vital reduction pathways. A few mechanisms are reviewed.

HAEMATOLOGICAL CHANGES DURING OESTROUS CYCLE OF RAT. SAVITRI NATARAJAN. *P.S.G.R. Krishnammal College, Coimbatore - 641 046* and M.V. GOPAL. *Bharathiar University, Coimbatore - 641 046.*

The Cellular and Biochemical composition of blood reflects the activities of various organs including that of reproduction. The present work is aimed to find out whether cyclic variations of female sex hormones during oestrous cycle is also reflected as haematological variations. Blood cell counts were made during each stage of oestrous cycle. The results show that both total RBC and WBC count as well as differential counts of WBC, vary during diestrous and proestrous and less during oestrous and metaestrous phases. Maximum count is observed during diestrous and minimum during oestrous phases. Significant variations is also observed with regard to differential count of Neutrophils and Lymphocytes.

DRUG INTERACTIONS - A VIEW. R. SEETHALAKSHMI. *Bangalore Medical College, Bangalore - 560 002.*

'Drug Interactions' has gained familiarity among the practitioners. This can happen when two or more drugs are administered to one person where the combination produces a new unexpected action. The site of action, in such cases, can be at the level of transportation, receptor metabolism, exertion, etc. A drug-non-drug interaction may occur in the presence of food, beverage, parasite, eco-chemical factors, etc. Drug interaction can be beneficial or detrimental. A clinician must always be alert to detect the adverse effects of interactions so that unpleasent Medico-legal involvement can be avoided.

TRANSPORT OF IONS ACROSS BIOLOGICAL MEMBRANES. SAYED AQLAK AHMED JAVAZ, S. MAQBOOL AHMED, N. SURESH BABOO, H.B. VEERANNA AND NANJUNDIAH. *Bangalore Medical College, Bangalore - 560 002.*

In this paper an attempt is made to explain the mechanisms of transport of ions across the Biological membrane—which are physiologically very vital. Different ion transport systems have been studied in the Eucaryotic cell. Now-a-days the channel model is much favoured to the carrier model in the transvers movement of ions. In general the channel protein and the arrangement of sodium ion and potassium ions, A.T.Pase and Calcium A.T.Pase pumps and their conformational changes explain the transport of ions. And in conclusion it can be noted that a beginning has been made in the understanding of the structure of membrane proteins in general and ion transport protein in particular.

STUDY OF THE CARDIOTONIC ACTION OF ALCOHOLIC EXTRACT *NERIUM ODORUM*. SURYANARAYANA JOSHYAM, R SEETHALAKSHMI AND AMRUTHRAJ. *Bangalore Medical College, Bangalore - 560 002.*

Nerium odorum is a plant widely grown in South India. The glycosides of *Nerium odorum* isolated and proved effective may be of therapeutic importance in cardiac cases where digitalis is contra indicated. The effect of alcoholic extract of *Nerium odorum* leaves was studied on failing heart preparations in frogs by using quarter calcium, frog ringer solution on intact as well as isolated preparations. The effects are compared with that of digitalis and 50% alcohol. Results were discussed.

EFFECTS OF SUCROSE AND FAT SUPPLEMENTATION ON FOOD INTAKE CHANGES INDUCED BY CHEMICAL HEPATITIS. SUDHIR KRISHNA, MATHEWS J. ALLAPAT, D. JOSEPH RAVINDRA AND P.S. SHETTY. *Department of Physiology, St. John's Medical College, Bangalore - 560 034.*

Food and Water Intake of adult, male Wistar rats were monitored to stability for a period of several weeks after which chemical hepatic damage was induced by intraperitoneal administration of Carbon-tetra-chloride. The induction of chemical hepatitis was confirmed by histological sections of the liver made at 24, 48, 72 hrs. and 1 week after administration of Carbon-tetra-chloride. Rats on standard laboratory chow showed a marked decrease in food intake ($P < 0.01$) which peaked at 24 hours and lasted for 72 hours. The reduction was statistically significant when compared to baseline and an equal number of sham injected controls. Supplementation of sucrose and fat to the diet in two other sets of rats ($n=6$ each) produced changes in baseline food intake. Induction of chemical hepatitis in sucrose and fat supplemented groups produced a statistically significant (but lower than control group) reduction in food intake which peaked at 72 hours and lasted for a longer duration. There were no differences between the fat or sucrose supplemented groups either in the degree or duration of the food intake changes or in the histological appearance of the liver at 1 week interval indicating that possibly the dietary observations during clinical hepatitis have little experimental basis.

Guest Lectures**DOPAMINE AGONISTS AND ANTAGONISTS.** ALICE KURUVILLA. *Department of Pharmacology, Christian Medical College, Vellore - 632 002.*

In recent years much interest has focussed on the endogenous catecholamine, dopamine which occurs as a precursor of noradrenaline (Blaschko, 1959). Dopamine has been found in high concentrations in sympathetic nerves and adrenal glands. In addition, it has been identified in areas where noradrenaline does not occur in high concentrations. Recognition of the physiological role of dopamine as a neurotransmitter in the basal ganglia resulted in the use of levo-dopa, a dopamine precursor in the treatment of Parkinson's disease. Dopamine increases myocardial contractility and heart-rate and therefore is widely used as inotropic agent. In contrast to the other catecholamines, dopamine produces unusual vasodilatations, in the renal, mesenteric, coronary, and intracerebral arterial vascular beds (Goldberg, 1972). Several investigators have shown that dopamine can be useful in cardiogenic shock, especially in patients who are unresponsive to other agents. Apart from this dopamine can also be used in congestive cardiac failure, hypertensive renal disease, hepatic cirrhosis associated with renal dysfunction, acute renal failure and drug intoxication. Since the therapeutic potential of dopamine is increasing the search of new dopamine agonists is continuing.

Dopamine systems in the brain has been studied by mapping of the histochemical pathway. These systems arise mainly from a large collection of cell bodies in the ventral mesencephalon (cell body groups A8 to A10). These neurones form a continuous sheet of cell bodies extending across the mid-line over the interpeduncular nucleus out into the pars compacta of the substantia nigra on each side (the A9 area). The cells of the A9 area give rise to terminals in the nucleus accumbens and olfactory tubule, sometimes referred to the "mesolimbic" dopamine area. More recently a dopaminergic innervation of the frontal cortex has been described using the glyoxylic acid fluorescence method (Lindvall and Bjorklund, 1974). It appears that these terminals originate from the cell bodies of A10 area. A small system of dopamine neurones arise from the arcuate nucleus of the hypothalamus with terminals distributed to the median eminence. This system has a role in inhibiting prolactin release (Fuxe *et al*, 1969). Dopamine receptors in the brain has been classified into two groups based on receptor binding studies : D₁ and D₂ receptors. D₁ receptors are linked to adenylate cyclase. 3H-haloperidol and 3 H-spiperone have been used for binding studies.

The study of receptor function in the brain has led to an understanding of the action of neuroleptics. Neuroleptic drugs are known to interfere with dopamine transmission in the brain. Dopamine hypothesis of schizophrenia is related to study of neuroleptics as dopamine antagonists. The sensitivity of neuroleptics to D₁ and D₂ receptors are different as evidenced by the IC 50 values in binding studies. Dopaminergic supersensitivity has been observed after prolonged administration of neuroleptics.

EVALUATION OF CARDIOVASCULAR REFLEX INTEGRITY BY ORTHOSTATIC STRESS TESTS. Wg. Cdr. M.B. DIKSHIT. *Head of the Department of Physiology, Institute of Aviation Medicine, IAF, Bangalore - 560 017.*

Failure of reflex cardiovascular integrity is one of the important causes of vasovagal syncope. It is therefore imperative to investigate this aspect of clinical physiology especially in aircrew. This is done by orthostatic stress tests. The principal involved is the sudden reduction of transmural pressure in the region of the carotid sinus as also a reduction of the central blood volume. This excites the restorative cardiovascular reflex, originating from the baroreceptors which convey their impulses on to the complex medullary centre arrangements which in turn advise the efferent cardiovascular mechanisms to take up the correct reflex action, *i.e.*, increase in heart rate and diastolic pressure. The current understanding of this mechanism is discussed. Various methods are available for inducing this stress. These include passive standing, 70° HUT, Lower body negative pressure and the like. The merits/demerits of the methods are discussed. The normal response to orthostatic stress as given by 70° head up tilt in the authors laboratory will be brought out alongwith the consideration for analysis of the test with the recent developments and understanding in the final interpretation of the tests.

GENETIC ENGINEERING. T.M. JACOB. *Department of Biochemistry, Indian Institute of Science, Bangalore - 560 012.*

Genetic Engineering is the manipulation of the genetic material (DNA), according to plan.

The discoveries in molecular genetics, especially in the enzymology of nucleic acids, has made it possible to isolate specific genes from any organism (animals, plants or microorganisms) and to clone them in microorganisms. Using, DNA cloning technology, the organization and control of expression of several mammalian genes have been studied in detail. Useful proteins are being manufactured through microorganisms by DNA cloning technology. Examples are hormones, vaccines and interferons.

Genetic engineering techniques are of potential use for the diagnosis and treatment of hereditary diseases.