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ABSTRACTS

ROLE OF AORTIC NERVES IN BLOOD PRESSURE CHANGES DUE TO STIMULATION OF MUSCLE RECEPTORS IN DOGS. **B .B. Das and Binod** *Department of Physiology, M. K. C G. Medical College, Berhampur.*

Johnson (1962) and Coote *et al.* (1971) demonstrated that reflexes from exercising muscles in animals produce cardiovascular and respiratory responses. Mitchell *et al.* (1972) found the reflex path through the dorsal roots, but they did not study the pathway higher up. Biscoe and Purves (1967) suggested that these reflex responses from muscle are through the cervical suggested that these reflex responses from muscle are through the cervical sympathetic, carotid body and sinus nerve. These cardiovascular responses of muscle squeezing are not mediated through cervical sympathetic and carotid bodies. (Epari *et al.* 1973).

Aortic bodies are more concerned with cardiovascular changes than respiratory ones. Further there is a rich sympathetic supply to aortic bodies. (Diamond and Howe 1971). Hence, this study was undertaken to find out the role of aortic bodies in these reflex cardiovascular responses to muscle receptor stimulation.

In chloralose—anaesthetized dogs with artificial respiration, gastro-enemius muscle was squeezed both before and after sectioning of aortic nerves and blood pressure was recorded with mercury manometer. With intact aortic nerves there was an increase in blood-pressure by 16.5% and after cutting them it increased by 15.8% only on average. Thus it was concluded that the above reflex responses are not mediated by aortic chemoreceptors.

COMPARISON OF CARDIO PULMONARY FUNCTION AMONG THE SEDENTARY AND PHYSICALLY ACTIVE SUBJECTS. **U. Naidu.** *Department of Physiology, Medical College, Jabalpur.*

A comparative study of some of the cardiopulmonary parameters were made on 76 medical students out of which 25 were grouped separately as physcially active subjects on the basis of various forms of regular physical activity.

Pulmonary function tests were carried out and heart rate recovery time was recorded after exhaustive exercise.

M.B.C./Sq. m of M.S.A. was found to be significantly higher (P=1.05) in physcially active subjects. The recovery time was also shorter in these individuals and was significant.

It is concluded that, since recovery time is related to working capacity, physically active subjects have better working capacity.

STUDIES ON EXPERIMENTAL CARDIAC NECROSIS. **N. Padmanabhan, V.B.S. Rajan and A. Namasivayam.** *Institute of Physiology & Experimental Medicine, Madras Medical College, Madras.*

Selye has produced cardiac necrosis in rats and other experimental animals by combined treatment with 9-alpha fluro-cortisol, a gluco-mineralo corticoid and disodium acid phosphate. This has been named electrolyte/steroid cardiopathy with necrosis (ESCN). ESCN has been potentiated by exposure to stress. Steroids, electrolytes and stress have been the physiopathologic triad in producing cardiac necrosis.

This concept of pleuricausal causation of cardiac necrosis is based upon experiments wherein gluco and mineralo corticoids have been administered exogenously.

The validity of this concept under physiologic conditions was tested in the present series of experiments using Angiotensin II to liberate the endogenous mineralo-corticoid and administering small doses of a pure glucocorticoid triamcinalone along with the unusual electroyte treatment.

This shows that repeated endogenous over production of adrenal steroids under physiologic conditions leads to a pathologic response. Thereby the myocardial fibres are sensitised to the destructive effects of variations in electrolyte concentrations of the body fluids leading to myocardial necrosis.

STUDIES ON THE HYPOTENSIVE EFFECT OF *Carica papaya* **I.G. Dubey and N. Padmanabhan.** *Institute of Physiology & Experimental Medicine, Madras Medical College, Madras.*

Padmanabhan (1967) has shown the hypotensive effect of *Carica papaya* extract. It has long been known in India that *papaya* fruit is capable of inducing abortion in the early months of pregnancy by stimulating the uterine smooth muscle. Presently it is proposed to investigate the mode of hypotensive action of extract of *papaya* leaves and its effect of smooth and cardiac muscle. It is observed that the hypotensive effect of *papaya* is reverted by atropinization and is potentiated by neostigmine.

Aqueous extract of *papaya* leaves produces an increase in the force of contraction of cardiac muscle without altering the heart rate. On the intestinal smooth muscle, it has an inhibitory effect, by decreasing its tone and movements.

STUDIES ON RENOGENIC CALCIFYING CARDIOPATHY. **N. Padmanabhan and J. Vimala.** *Institute of Physiology & Experimental Medicine, Madras Medical College, Madras.*

Lehr has reported that standardized renal damage can be induced by intraperitoneal injection of a single excessive dose of sodium acetyl sulfathizaole. This is accompanied almost invariably by severe disseminated necrosis in the cardiovascular system and gastrointestinal tract along with calcification of these structures. This was associated with hypertrophy of the parathyroids.

Since enlargement of the adrenals and thymic atrophy is also seen in this condition, this study was undertaken to ascertain whether the resulting cardiopathy is directly renogenic or mediated indirectly through other endocrine.

Initially the role of pancreas, adrenals and thyroids in producing the renogenic calcifying cardiopathy was studied. Renal tubular obstruction was produced with sodium acetyl sulfathiazole in groups of alloxan diabetic rats, bilaterally adrenalectomized animals 'maintained very low glucocorticoids and thyroid treated rats.

The resulting lesions in the heart, blood vessels and gastro intestinal tract were examined macroscopically and histologically and graded. The main changes observed in our present study after standard renal injury caused by sodium acetyl sulfathiazole injection was myocardial necrosis. These lesions are preceeded by diffuse and focal infiltrations of the myocardium with mononuclear cells.

Since adrenalectomy and parathyroidectomy both decrease the cardiac lesion, it is presumed that an adrenal cortex-parathyroid axia may play a part. Administration of thyroxine to thyroparathyroidectomized animals aggrevate the lesion probably by increasing the work load of cardiac tissue due to an increase in metabolism. Since alloxan diabetes has no influence on the genesis of renogenic cardiopathy the role of pancreas in causation of myocardial necrosis is not clear.

CARBOHYDRATE AND LIPID METABOLIC PROFILE ON ELECTRICAL STIMULATION OF THE HYPOTHALAMUS IN RHESUS MONKEYS. **G.S Chhina, J.S. Bajaj, S.K. Garg and B. Singh.** *Department of Physiology, A.I.I.M.S., New Delhi.*

Energy balance and homeostatic regulation of different metabolites for this purpose has been suggested to be regulated by the hypothalamic mechanisms. The precise influence of each region on end products of carbohydrate and Lipid metabolism has not been investigated. In the present study, different hypothalamic and some extra hypothalamic areas were stimulated through chronically implanted electrodes and their effects on blood glucose, free fatty acids (FFA) triglycerides (TG) and chloesterol were determined in fasting male monkeys. The estimations were done before and after 30, 150 and 240 mins of the electrical stimulation of these areas.

While stimulation of the lateral and posterior hypothalamic areas led to an increase in blood glucose level, a fall was obtained from statiety region, preoptic area and mammillary body. The effects of lateral area were minimal. There was a generalised increase produced in serum/ FFA, but no change occurred in serum TG and serum, cholesterol on stimulation of different hypothalamic areas. The stimulation of extra hypothalanic areas like anterior commissure, globus pallidus and anterior perforate substance also produced a generalised increase in serum/ FFA which was much less than that produced by hypothalamic stimulation. None of these areas produced any change in blood glucose, serum TG and serum cholesterol. The possible relationship of these observations to consumption of food for maintaining energy balance was discussed.

ASSESSMENT OF HYPOTHALAMIC ACTIVITY IN RESPONSE TO STRESS AND TRIAMCINOLONE. **S. Chatopadhyay and V. Prasad.** *Department of Physiology, Institute of Medical Sciences, B. H. U., Varanasi.*

The dynamic changes in the activity of the neuroendocrine axis in response to stress is usually determined at a particular time after the exposure to stress. The hypothalamic integration depends on the time sequence of positive and negative inputs of neuronal and humoral messages, which in turn determines the activity of pituitary trophic hormones. Therefore an estimation of circulating hormone level following an exposure to stress, fails to reflect the dynamics of hormonal changes after stress.

The cumulative effect of activation of hypothalamus during an exposure to stress and after exogenous administration of triamcinolone was assessed in terms of *in vivo* incorporation of P^{32}. All rats were injected with P^{32} 24 hrs prior to collection of hypothalamus. The stress group was subjected to gridshock (25 times/min, 70 volts, for 20 min) immediately before sacrifice and the triamcinolone (100/μg/100 g. b. w./day, for 5 days treated rats received P^{32} on the 5th day of the treatment. The total level of P^{32} retained in the hypothalamus showed a fall after treatments of stress and triamcinolone (—15% and —20% respectively). However, the mechanism of fall in the level of P^{32} after above treatments differ : whereas the stress induces a net loss of P^{32}, the traimcinolone probably inhibits P^{32} uptake by hypothalamus under negative feedback influence. It appears that further analyses of P^{32} in different cellular components would reveal the sequence of activation in the hypothalamus due to neuronal message after exposure to stress.

NATURE OF POTENTIALS OF DORSOLATERAL FRONTAL ASSOCIATION CORTEX EVOKED LY ELECTRICAL STIMULATIONS OF THE LONG INTERCORTICAL ASSOCIATION FIBER FASCICULI IN THE MONKEY. **T. Desiraju.** *Department of Physiology, A. I. I. M. S., New Delhi.*

The frontal association cortex (FC) is known to participate in adjustments of higher nervous behaviour. The associative connections between FC and other cortical gyri are being investigated. Evoked potentials were recorded on the pial surface of the dorsolateral frontal granular cortex during electrical stimulations of different loci in subcortical white matter of posterior cortical gyri in encephale isole monkey. (1) Stimulation of junction of cingulum and corpus callossum, evoked a 2 msec latency negative-positive wave response, in the F.C. (2) Stimulation at confluence of white matter of precentral—postcentral gyri 10 mm lateral to midline corresponding to location of arcuate fasciculus evoked 1 msec latency negative—positive response in the FC. (3) Stiumulation of white matter in the superior limb of longitudinal fasciculus at the junction of the parietotemporal gyri 8 mm lateral to midline evoked a 2 msec latency positive—negative response in the FC. The above 3 types of responses were elicitable with stimulus frequencies up to 50/sec and even in monkeys lightly anaesthetized with Nembutal. (4) Stimulation of nucleus medialis dorsalis of thalamus (MD) evoked a 3 msec latency positive—negative response in the FC. The amplitude of the MD evoked

FC response was augmented by a parallel stimulation of locus (3) mentioned above. It is considered that the potentials evoked by stimulations of fibers traversing near cingulum and in white matter underneath central gyri are to be due to orthodromic activation of superficial layers of FC, whereas the potentials evoked by stimulation of parieto—temporal white matter to be due to antidromic and othrodromic engagements of lower layers of FC.

FREQUENCY-MODULATED BEHAVIORAL RESPONSES ON HIPFCCAMPAL STIMULATION IN CONSCICUS CATS. **R.A. Dhume, M.G. Gogte and J.F. Mascarenhas.** *Department of Physiology, Goa Medical College, Panaji, Goa.*

It is generally believed that hippocampus is involved in the control of instinctual behaviour including emotions and visceral activities. Our earlier work of electrical stimulation of these areas in anaesthetized cats and monkeys revealed that the visceral responses varied depending upon size, location of areas investigated and parameters of stimulation used. The visceral responses obtained under low frequencies (10—30 cps were entirely different from those obtained under high frequency stimulation (70—100 cps).

In order to correlate these effects with behavioral changes, identical areas were stimulated with fixed 1 msec duration pulses of 2-5 volts and varied range of frequencies through chronically implanted teflon coated electrodes of 26 gauge and behavioral changes were studied in seven conscious cats: it was observed that low frequency stimulation (5-10 cps) induced a change to sleeping posture, yawning and sleep like condition within 2 min of stimulation. Frequency ranging from 10 to 70 cps brought about gradual alerting reaction manifested by staring of vision, arching of the body raising of the tail, piloerection and slight dilatation of pupils. This would further induce contralateral turning of head accompanied by quickening of respiration, the animal appearing anxious and searching the surrounding with fear. High frequency stimulation (70—100 cps) induced epilepsy.

It is, therefore, concluded that visceral responses induced from these areas are probably indices of a specific emotional behaviorural and which is indicative of the roles of Hippocampus in "self-preservation."

EFFECT OF DIELDRIN OF REPRODUCTION IN RATS. **P.C. Hurkat and Som Nath.** *Department of Physiology and Biochemistry, JLN Medical College, Ajmer.*

Dieldrin is a broadspectrun insecticide which is used to control certain insects attacking principal field, vegetable and fruit crops for the last twenty years throughout the world. The effect of dieldrin was studied on the reproduction (viz. fecundity, gestation, parturition, teratology, rearing, etc.) in rats. The work was carried on 50 rats out of which 10 were males and rest females. The animals were given dieldrin orally in two dose schedules (viz 5 and *mg/kg*, body weight) on alternate days. The control rats only received the vehicle (ground nut oil).

Dieldrin produced no adverse effect with regards to becoming pregnant (fecundity) or carrying (gestation) and delivering (parturition) the young ones. The number of young ones delivered at a time varied from 6 to 10. The rearing was not latered in any way but, the mortility of the litter was marked. The causes of increased litter mortality in dieldrin administered animals were discussed.

STEROIDAL HORMONAL CONTRACEPTIVES, VAGINAL SMEARS AND OVARIAN CHANGES IN RATS. **V. Krishnan, N. M. Muthayya, S. Parvathi Devi and J. Dhandapani.** *Department of Physiology, Madurai Medical College, Madurai.*

The term "oestrus" drawn from the Latin adaptation of a Greek term has now been "biologically fixed" as indicative of "sexual organsm" in animals. Heape (1900) related this word "oestrus" to the period of "sexual desire of the female" and he evolved the terminology "proestrous, oestrus, metoestrus and dieostrous" for the sequences in reproductive cycles of mammals. In the normal unmated albino rat, the duration of such an "oestrus cycle" is 4.8 days on an average. Examination of the vaginal smears employing the methods of Papanicalaou's staining technique serves to reckon events occuring during the "oestrus cycle". The cell patterns noted in vaginal smears point to the ovarian events under their neuroendocrine control. At oestrus, the vaginal smear is exclusively of non-nucleated cornified cells. Interpreting these vaginal smear patterns on the basis of a derived "oestrus index" (O.1) (Pro-oestrus+ Oestrous/Metoestrus+Diestrous=normally 1) an increase in oestrus configuration of the vaginal smears, would raise, the O.1 to greater than 1.

With the above understanding and the fact that spontaneous occurrence of persistent oestrus is associated with deficient ovulation (Everett), the present study was undertaken in selected groups of female albino rats. Being "experimental" in nature, the investigations were directed to note the effects of steroidal hormonal contraceptives on the vaginal smears of these rats as indicative of the ovarian changes induced thereby.

The animals were categorised:

(a) for administration of low and high dosages of the agent (Ovulen 50);
(b) for short and long term treatment with the same.

The vaginal smears of these treated rats conform to an oestrus index exceeding 1 pointing thus to a dominantly oestrous pattern and an underlying ovulation inhibition. The vaginal smears and ovarian changes are being presented and discussed.

CHANGES IN CENTROACINAR CELLS OF PANCREAS AFTER PANCREATIC DUCT LIGATION. **C.L. Vimala, K. Govindadas and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

Since Banting and Best in 1921 ligated the pancreatic duct in the dog to bring about the degeneration of pancreatic acini it has become a standard experimental procedure. Still there is disagreement concerning the pancreatic lesion and its physiopathology.

It is generally seen that after duct ligation the pancreatic acini becomes fibrous, ducts dilate and islets are unaffected. The specific changes in acinar and ductal cells leading to this condition which is of importance in understanding the physiopathology of pancreatitis and cystic fibrosis is not clear. Since the functional role of the centro acinar cell of pancreas is not clearly understood. It was sought to show this by duct ligation in this experiment.

Histogenetic studies of the pancreas, liver, spleen, kidney and submaxillary salivary gland were carried out at various intervals following pancreatic islets were also done. The spleen showed marked enlargement with enlarged malpighia corpuscles and increased pulp. Periportal fibrosis and hepatic cell necrosis were observed on microscopical observation of liver specimen. The submaxillary salivary gland acini showedv acuolization degranulation of secretory granules and there were also dilatation of inter and intra lobular ducts. No changes were observed in kidney. Regarding the pancreas, the occurance of dilatation and atrophy of acinar cells being a prominent feature in the histological studies the endocrine parts were free of this effect. This has been confirmed by the tolerance studies which showed no changes. In contrast to endocrine part, the centro acinar cell first shows hyperplasia and then gradual atrophy. Since this observation just coincides with that of exocrine part, these cells probably be having some exocrine function or be responsible for the development of exocrine elements but their actual role is still obscure.

EFFECT OF LYOPHILISED SALIVARY GLAND EXTRACT ON BLOOD GLUCOSE LEVEL IN DOGS. **K. Govindadas, D. P. Sakunthala and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

It has been reported that the salivary glands secrete a anti insulin principle. This was investigated in this study by administering lyophilised salivary gland extract (LSE) to Mongrel dogs.

The dogs were divided into groups of sham operated controls, salivary duct ligated and bilateral submaxillary gland extirpated animals. The insulin and glucose tolerance studies were conducted in salivary duct ligated dogs at the end of two months. In submaxillary gland extirpated animals the tests were repeated at the end of the two months and four months.

In the same animals with extirpation of salivary gland at the end of four months, LSE was given intravenously and the tolerance studies were repeated. The results of these experiments showed that the salivary gland contains some antagonistic principle to insulin which inhibits its action.

ENDOCRINE FUNCTION OF SALIVARY GLANDS IN ALLOXAN INDUCED DIABETIC RATS. **K. V. Kuppu Rao, D.P. Sakunthala and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

The possible role of submaxillary glands in the Homeostasis of insulin and in carbohydrate metabolism has been recently reported. The present study was undertaken to further elucidate the inter relationship between experimental diabetes and functions of submaxillary glands.

This was studied in groups of alloxan induced diabetic male rats of Wistar Strain as controls and similar experimental diabetic animals with bilateral submaxillary gland extirpation or ligation as experimental animals.

The results showed that with a optimum dose of alloxan (40 *mg/kg* i.v.), the experimental animals developed less severe diabetes than the controls. Submaxillary gland extirpation reduced the hyperglycaemic effect of alloxan. Duct ligation was less effective in this respect. The experimental animals could be maintained without insulin which was essential in the case of the controls. For effective results the extirpation of the submaxillary gland has to be performed two months prior to inducing the Alloxan diabetes.

These results were further confirmed by carbohydrate tolerance studies.

FLUCTUATION IN SEX CHROMATIN DURING VARIOUS PHASES OF MENSTRUAL CYCLE. **I.S. Paintal.**
Department of Physiology, Seth G.S. Medical College, Bombay.

Aceto-Orcin stained buccal smears were studied for increase of the sex chromatin bodies throughout the menstrual cycle on each of 25 females. In virtually all subjects the increased number of sex chromatin bodies were preceded and followed by a marked decrease; value ranged from 17% to 37% (1) (5). The highest percentage of the sex chromatin was observed on the ovulation day i.e. the 14th day of menstrual cycle with a mean occurance of 33% of sex chromatin. A second elevation in the sex chromatin count was observed in the last half of the cycle i.e. on 22nd day when the mean value was 28% of sex chromatin. At menstruation, the samples showed the mean value of sex chromatin low.

In other words, it is observed that rise in percentage of sex chromatin coincides with the rising level of estrogen during the menstrual cycle and therefore, highest percentage of sex chromatin is obtained on the ovulation or the 14th day, when the estrogen level is at it's peak high. Further decreasing level of sex chromatin coincides with the increasing levels of progesterone and therefore the lowest value of sex chromatin was found to be on 26th day when the levels of the progesterone are also at its peak.

From the present study, it is concluded that hormones play an important role as an extra-genetic factor in the determination of the genetic sex in the somatic cells and so variation in the frequency of sex during the menstrual cycle also depends upon the hormones i.e. estrogen and progesterone, which have an important role in the menstrual cycle as well.

COMPARATIVE STUDY OF CARDIO RESPIRATORY ADJUSTMENTS BETWEEN HYPOXIC AND ANAEMIC HYPOXIA. **S.D. Nishith.** *Department of Physiology, Regional Medical College, Imphal.*

The anaemic cases, were studied for circulatory and respiratory adjustments during severe chronic anaemia. The results were compared with the cases of hypoxic hypoxia.

During rest the pulse rate, respiratory rate and systolic blood pressure were high in anaemic cases, while in high attitude acclimatized cases they were within the normal limits.

The diastolic B.P. was less in anaemic cases while there was no significant change in the same at high attitude. Vital capacity and maximum breathing capacity were increased at high attitude while the same are reduced in chronic anaemia. There is no change in Breath holding time at high attitude, while in anaemic cases the same is reduced. Oxygen consumption is reduced in chronic anaemia. There is no change in Breath holding time at high attitude, while in anaemic cases the same is reduced. Oxygen consumption is reduced in both types of hypoxia. The main difference in compensation for hypoxia in anaemia in comparison to compensation for hypoxia of high attitude seems to be increased cardiac output and reduced peripheral resistance in anaemia, thereby increasing the blood flow to the tissues. Increased respiratory activity also compensates for this. In hypoxia of high attitude increased haemoglobin content mainly compensates.

CLOSING VOLUME BY SINGLE BREATH NITROGEN WASHOUT— A USEFUL PULMONARY FUNCTION TEST. **U.C. Luft and S.V. Rao.** *Department of Physiology, Levelace Foundation for Medical Education and Research, Albuquerque, New Maxico.*

A farily significant correlation has been observed between data obtained from closing volume studies done on 34 subjects (mostly patients) by the differential dilution single breath N_2 washout techinque and some of the conventional pulmonary function tests done the same day in similar upright sitting position. With reference to nitrogen gradient in the begining of phase III or junction of III with II of the former is not well defined, the following three values are calculated:—

$$X_1 = \frac{\text{nitrogen gradient in phases II+III+IV}}{\text{Volume of II+ III+ IV.}}$$

$$X_2 = \frac{N_2 \text{ gradient in phase III;}}{\text{Volume of III.}}$$

$$X_3 = \frac{N_2 \text{ gradient in III+ IV.}}{\text{Volume II=III+ IV.}}$$

$$\text{and } X_4 = \frac{\text{Volume IV.}}{\text{Volume II+ III+ IV.}}$$

These four values from closing volume tracing are correlated with: Y_1 (RV/TC%); Y_2 (FRC/TC%); Y_3 (mixing efficiency of predicted);

Y_4 (FEV_1); Y_5 (MMEF/VC); Y_6 (diffusion % of predicted).

X_4 correlates significantly with Y_4 & Y_5 (p .01) and with Y_1 & Y_3 (p .05), but significantly with Y_3 & Y_6. X_2 correlates significantly with all the 6 Y values (p .05). Importance of gradient in the phase III is recognised and the possibility of predective value of closing volume data is considered.

EFFECTS OF DEHYDRATION ON PERFORMANCE. **Y. Venkataswamy, B.B. Lal, G. Pichan, N.C. Majumdar and M.S. Malhotra.** *Defence Institute of Physiology and Allied Sciences, Delhi Cantt.*

Studies have been carried out at Delhi during summer months on neat acclimatized subjects to assess the effect of different degrees of dehydration on the physiological responses and performance while working in heat and to evaluate the effects, if any, of prehydration on performance efficiency and physiological responses. The trial subjects were given a nine-mile route march under five different treatments of dehydration and prehydration. Responses like pulse rate, oral temperature and sweat loss were recorded and psychological tests administered. It was seen that adverse physiological effects begin to manifest only when dehydration exceeds about 4% of body weight. Highest average dehydration observed was 5.6% of body weight which was well-tolerated by all the subjects. Highest individual values for pulse rate and rise in oral temperature have been observed to be 166 per min and 1—2°C respectively, without manifestation of any ill-effects or reduction in work performance.

THE EFFECT OF AGING PROCESS ON FEV_1, M.V.V. & M.E.F.R. **H.C. Dube, S. Asthana and H.C. Gupta.** *M.G.M. Medical College, Indore (M.P.)*

With the advancing age, the lung functions deteriorate due to a change in the elastic tissue of the lungs, a reduction in the strength of respiratory muscles and an increase in the stiffness of thoracic cage.

FEV_1, MVV, & MEFR values were determined by using "Toshniwal Expirograph" on two groups of 50 subjects each, one of healthy adult medical students between 18-24 yrs of age and the other groups of aged normal persons between 50-70 yrs of age.

The mean values of FEV_1, MVV & MEFR in one first group were — 83.9%, 98.69 lit/min and 213.53 lit/min respectively, while these values in the second group were found to be 79.43%, 51.66 lit/min and 94.67 lit/min. The differences in these values of both the groups were discusssed.

DIFFERENTIAL ACTIVITY OF FRONTAL ASSOCIATION CORTEX NEURONS RECEIVING SPECIFIC THALAMIC PROJECTIONS AND OF NEURONS NOT HAVING SUCH INPUTS DURING ALTERED STATES OF CONSCIOUSNESS. **T. Desiraju.** *Department of Physiology, A. I. I. M. S., New Delhi.*

It has been reported earlier by the author that augmenting and recruiting activities can be evoked in dorsolateral frontal granular cortex of conscious monkey by electrical stimulations of nucleus medialis dorsalis and rostral thalamus respectively. To further understand the principles of operation of the thalamocortical system, patterns of spontaneous unitary activities of the cortical neurons which were identified to respond with short latency excitatory impulse discharges durit.g augmenting responses were investigated during sleep-wakefulness cycles in monkey. Such neurons were observed to have lowest spontaneous discharge rates of impulses during states of deep slow (delta wave) sleep. Thier mean discharge rates were similar during major parts of REM sleep and wakeful states. On the other hand cortical neurons which were either uninfluenced or whose spontaneous activities were slightly inhibited by specific thalamic stimulations were found to discharge impulses with higher rates and bursts during early slow sleep than during preceding state of wakefulness. Later, their discharge rates also declined progressively during progression into deep slow sleep and early parts of REM sleep. On reversal to wakeful state and in prewakeful REM sleep state, the discharge rates rose to pre-sleep levels. Some of these neurons were identified to be excited during recruiting responses. The data strengthens the hypothesis that cortical neurons coupled to specific thalamic system are progressively inhibited in slow sleep, whereas neurons coupled to unspecific thalamic system are firstly activated and later inhibited.

HISTOMORPHOLOGY OF NERVE FIBRES AND SENSORY END-ORGANS IN THE RAT PENIS : EFFECT OF DENERVATION. **R. Kanaka, S. Sharma. A.L. W. Joseph and K. N. Sharma** *Department of Physiology, St. John's Medical College, Bangalore.*

On an average, 43-50 nerve fibre bundles, with diameters ranging from 10 to 96 m, are present in glans penis of rat. The fibres end as free nerve terminals in tunica albuginea and other superficial layers or reach the basal cell layers of the encapsulated end-organs appearing as conical projections above the surface. These conical projections appear mechanoceptive in function. By the 5th day of sectioning of the nurves dorsalis penis, the number of nerve fibre bundles decrease to 26—30 which may further decrease to 6—12 by the 15th day and 4—8 by the 25th day. By the 35th day, the fibre bundles are barely discernible but sparsely distributed nerve endings are identifiable. Though well defined degenerative changes in nerve fibres appear by the 5th day, there is evidence of regeneration after the 15th day. The number (60—65), size (80 m U 128 W long 45—64 wide), and staning reactions of the conical projections also dercrease after nerve sectioning. As compared to the control, the number of concial projection decreases to 40—45 by the 5th day, and to 25—30 by the 15th day. The height of the conical projections, however, increase (64 U to 256 U). Even by the 35th day, the conical projections, though are almost 50% in number of that seen in control, their heights on an average range between 83 m to 144 m. The results point to the histomorphologic basis of genital responses seen after denervation.

HISTOCHEMICAL CHANGES IN PENILE TISSUE ON SECTIONING OF NERVOUS DORSALIS PENIS. **R. Kanaka, A.L.W. Joseph. S. Sharma and K. N. Sharma.** *Department of Physiology St John's Medical College, Bangalore.*

Alkaline phosphatase (Alp), cholinesterase (ChE) and PAS activity of penile tissue in rat was studied before and 5, 15, 25 and 35 days after sectioning of nervous dorsalis penis. A five-point scale was used to express intensity and a three-point scale for distribution of staining reactions. As compared to controls, Alp activity markedly decreased (1+) by 5th day of sectioning and remained low (2+) till by 25th day, the activity increased and was comparable to control values (3+). It again showed a sharp decline and was 1+ by 35th day. ChE activity declined by 5th day (2+) to be maximally (1+) by 15th day. The activity was comparable to control values around 25th day and again showed a marked decrease (1+) by 35th day. By contrast. P.A.S. reaction shows an initial increase (4+) by 5th day, then decreases to 2+ by 15th day, to increase again by 25th day (3+), and finally decreases (1+) once again by 35th day. These changes may be linked with the responses of peripheral genital receptors. (Supported by Mysore S.B.M.R.).

THE PINEAL AND REPRODUCTION—SOME ASPECTS. **N. M. Muthayya, S. Parvathi Devi, V. Krishnan and M. Tamilkodi.** *Department of Physiology, Madurai Medical College, Madurai.*

The last ten years have seen substantial growth of information on the pineal body as a controller of reporductive functions. The existence of a gonadotrophin inhibitory activity in the pineal has been firmly established. Physical means of pinealectomy as evolved by Fiske, through varying photoperiodic conditions have been useful in such studies, e.g. subjecting immature female rats to constant lighting results in precocious vaginal opening and persistent oestrus. Male or female rats kept in constant darkness from infancy show feeble gonadal development.

With these and related facts in mind, the present study confined itself to observations on—

(1) Changes in the pineals, ovaries a testes in selected categories of rats housed under constant illumination and constant darkness.
2) The effects of continuous artificial lighting and constant darkness on the peneals of rats subjected to such environmental factors, during gestation.
(3) Follow up study of the litter pups of the above groups for—
(a) birth weights of pups;
(b) subsequent reproductive behaviour.

Some of our findings are:—

Rats	Pineal	Ovaries	Testes
(a) On continuous illumination	Reduction in cellularity	Stimulatory resonses (gonadal augmentation)	Stimulatory responses (gonadal augmentation)
(b) On continuous darkness	Increased cellularity	Supdressive effects	Suppressive effects

These observations indicate:—

(1) That artificial continuous illumination has definite inhibitory influences on pineal metabolism thereby stimulating gonadal activity.

(2) That light deprivation functionally activates the pineal resulting in its enhanced inhibitory effects on gonadal functioning.

The results also point to pineal involvement in gestation litter size and reproductive behaviour of the progeny. These shall be discussed in the presentation. Conclusively there exists an intimate inter-relationship between photoperiodic conditions, pineal and repoduction.

IDENTIFICATION AND RESPONSE CHARACTERISTICS OF GENITOTESTICULAR AFFERENTS. **S. Sharma, P.S. Shetty, A. L. W. Joseph and K. N. Sharma.** *Department of Physiology, St. John's Medical College, Bangalore.*

The response characteristics of afferents from the genital area and the testis were investigated in 14 anaesthetized adult male mongrel dogs. The afferents from the genital area show cyclic bursts of medium (40—50/*uv*) and large 60-70 *uv* fibre activity lasting between 2—10 sec. at intervals of 50 to 105 sec. and superimposed on asynchronous small fibre (15—25 *uv*) activity. After a short but variable latency, increase in frequency of medium and large amplitude spikes was noticed and this was characteristics of dynamic rather than static manipulations of the genital area. Both the spontaneous and evoked responses were enhanced by intravenous injections of 60 to 500/*μg*), of Methyl testosterone (Perandren : Ciba). Ethinyl estradiol (Ovocyclin : Ciba 5/*μg*), on the other hand, enhanced the cyclic discharge but suppressed the spontaneous small fibre activity as well as the evoked activity. Ethisterone (Lutocyclin : Ciba 150/*μg*) had similar but less marked effects than estradiol on the spontaneous activity and testos-terone-like influence on evoked activity.

The testicular afferent activity is characterized by regular cyclic bursts of 15, 25 and 45/ uv spikes lasting for 7—15 sec. at intervals of 25 to 30 sec. Unlike the genital afferents, manipulations and tactile stimulation of the genital area does not produce evoked discharge in these afferents. In 2 dogs, a depot injection (interamuscular) of Testenon (Organon : 12.5 *mg*) changed, after 7—10 days of administration, the spontaneous cyclic pattern into asynchronous firing of 15—25 /*uv* spikes.

ARGENTAFFINE CELL FUNCTION IN RELATION TO TOLBUTAMIDE HYPOGLYCAEMIA IN RATS. **C. L. Vimala, K.V. Kuppu Rao and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

Godlowski *et. al* have reported with experimental evidences that the hypoglycemic action of tolbutamide is mediated through argentaffine cells of submaxillary gland and gastro intestinal

tract. The present work is to further elucidate the functions of argentaffine cells and mode of action of tobutamide. This was studied in groups of alloxan induced diabetic rats and controls treated with tolbutamide and adrenergic blocking agent.

The normal and alloxan induced diabetic Wistar strain male albino rats with mean body weight 160 *gms* were given Tolbutamide orally and diabenzylene intravenously. Tissues specimens (Duodenum, ileum, large intestine and submaxillary salivary glands) from various groups of animals were collected for histological studies and the argentaffine granules were stained using fortanas silver nitrate technique.

The animals beated with tolbutamide alone showed degranulation of demilanar cells of submaxillary salivary gland and no change in argentaffine cells of intestinal tract. Similar degranalation changes wer not observed in alloxan induced diabetic animals treated with tolbutamide or Dibenzylene.

EFFECTS OF SUBMAXILLARY GLAND EXTIRPATION AND DUCT LIGATION ON GLUCOSE AND INSULIN TOLERANCE IN RATS. **K.V. Kuppu Rao, D. P. Sakunthala and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

The salivary glands have been suspected to possess an effect on carbohydrate metabolism and insulin-like activity. There are histological similarities between the salivary glands, particularly in submaxillary glands and pancreatic islets. Recent functional studies lend further support to these views. Yet, there are conflicting reports regarding the relationships of the salivary glands to carbohydrate metabolism. The present study is to further elucidate the role of the submaxillary gland in glucose metabolism.

Insulin tolerance tests (ITT) were performed in male Wistar rats after bilateral extirpation of submaxillary glands in one group of animals and in another group following submaxillary ducts ligation. Similar studies were done in normal and sham operated controls. The results show that the sensitivity to exogenous insulin was more in experimental animals as compared to sham-operated controls. Any possibility of stress being responsible for this observation was ruled out by carrying out the studies beyond one month. In salivary gland extirpated animals the duration of the experiment was two months by which time the response of increased insulin sensitivity was obtained. In duct ligated rats, the experiments had to be continued upto three months.

Glucose tolerance tests (GTT) were done in another series of animals similar to ITT. The 'Removal Rate' of administered glucose was faster in rats following bilateral extirpation of submaxillary glands. Similar observation were not seen in duct ligated rats. In these animals removal rate was not significantly affected.

The fasting blood sugar of the experimental rats were significantly lower than in sham-operated controls.

CHANGES IN AUTONOMIC BALANCE AT HIGH ALTITUDE. **Lazar Mathew and M.S. Maihotra.** *Defence Institute of Physiology and Allied Sciences, Delhi Cantt.*

Recordings of resting heart rate, blood pressure, respiratory rate. oral temperature, skin temperature, salivary out put (volume and pH), EEG (occipital leads) and cold pressor response were carried out at Delhi in two groups of subjects. One Group (A) had just returned from altitude (4000 m) after staying there for a period of 2 years and the other group (B) had never been to altitude. Results indicate that there is significant lowering of heart rate, cold pressor response and skin temperature while there is an increase in the respiratory rate in the altitude group (A) as compared to the control group (B). No changes in oral temperature, blood pressure salivary output and EEC were however noticed. The observations suggest that there is a selective hypertonus of autonomic nervous system, some components favouring sympathetic overactivity while other showing predominance of parasympathetic system, due to the effect of prolonged stay at high altitude.

FURTHER STUDY ON INFLUENCE OF ESERINE AND "HISTOPLAC" ON WORK-PERFORMANCE OF PERFUSED CASTROCNEMIUS MUSCLE OF FROG. **P. Brahmayya Sastry, V. Ramamohan and T. Ravi Raju.** *Department of Physiology, Andhra Medical College, Visahkapatnam.*

In this study double myograms of urethane-anaesthetised frogs were recorded in 117 experiments with optimum after-loading of gastrocnemius muscles while the latter were perfused through abdominal aorta with plain Ringer's fluid (PR) Eserinised-Ringer (ER) with varying concerntrations of E (10^{-9}, 10^{-8} 10^{-7} and 10^{-6} *g/ml*), and "Histoplac" Juice (HJ)—containing Ringer HJR or HJER with HJ (1 : 100) and HJ (1 :10) and stimulated through their sciatic nerves (2-4 V, 0-5 msec 1/sec, 20/sec, and 50/sec). the perfusate being collected from the cut veins of the lower abdomen. Histoplac Juice is a commericial extract of lyophilized placenta made by SCLAVO, SIENA, Italy.

This work is also extended to the estimation of acetylcholine (Ach) released is a single isolated gastro-chemius muscle. perfused through its/artery of supply and the perfusate collected from its cannulated vein; the acetylcholine (Ach) being estimated by bioassay on chloralosed and eviscerated cat's arterial blood pressure.

The work performance of muscle (WP—in *gm/cm/g* of muscle) perfused with PR was 628 at 1/sec, 858 at 20/sec and 4095 at 50/sec stimulation; and the perfusion flow rate (PFR) was 0 63 *ml*/min; HJR (1:100) changed the WP to 88%, 155% and 103% respectively and the PFR to 140%, HJR (1.10) increased WP to 202%, 149% and 118% respectively and PFR to 0.5% to 0.5%.

EPR (10^{9} to 10^{6} *g/ml*) changed WP to 163%; EHJR (HJ 1:100) to 175% and EHJR (HJ 1:10) to 20%. E 10^{-9} *g/ml* elicited best WP in all conditions. WP seems to be conditioned by Ach release, HJ increasing the Ach; and the reduced WP may be due to depolarisarion block by excess Ach.

The preliminary results of estimation of Ach released from perfused muscle are 5.3—5.9 *mg*/min. during stimuation.

EXPERIMENTAL STUDY OF TIK-20 POISONING AND ITS TREATMENT. **R.K. Saxena, N.P. Mishra, S.S. Gupta and S.M. Mishra.**

The experimental study of the effect of Fenitrothoin (Tik-20) was carried out in rats and its treatment was eveluated by pyridine-2-aldoxime metho-chloride (2-PAM chloride). LD-50 of Fenitrothoin administered orally in rats was found to be 197.50/*mg* while the combined treatment with atropine did not significantly change the LD-50 (198.6 *mg*/*kg*). However, pretreatment of rats by 2-PAM chloride+Atropine before appearance of sign of toxicity did significantly influence the LD-50 (404.40 *mg*/*kg*). This protection was even more marked when the combined treatment was given after appearance of signs as the LD-50 was raised to (809.30 *mg*/*kg*). The protective effect of 2-PAM Chloride and atropine in lower doses (50% of max. effective dose 200 *mg*/*kg*.) is well marked while in higher doses 2 PAM+Atropine reactivation of cholinestrase was more significant, but LD50 was not raised proportionately.

The efficacy 2-PAM chloride in the treatment of Fenitrothoin (Tik-20) poisoning is well substantiated.

A REPORT ON COMPARATIVE HEMATOLOGY AND HEMO-CHEMISTRY OF SLENDER LORIS AND BONNET MONKEY WITH REFERENCE TO MAN. **Hafeezur Rahman, K. Srihari and R.V. Krishnamoorthy.** *Department of Zoology, University of Agricultural Sciences, Bangalore.*

The hematology and hemochemistry of slender loris, Loris tardigradus and Bonnet monkey, Macaca radiata have been studied in detail.

The total RBC count does not vary with reference to sex in loris but does so significantly in bonnets. RBC counts for both sexes among bonnets fall within the range of human values but the loris shows relatively lower counts than the former.

In differential counts, the Eosinophiles and Monocytes of loris and bonnet occur in same percentage as in man, whereas the polymorph and lymphocyte counts differ. The loris is characterised by a low polymorph content (human value being the highest) and high lymphocyte (human values being lowest) content. Basophils are rarely seen in both loris and bonnet.

In ionic composition of its blood, the bonnet more or less resembles man, whereas the loris shows relatively higher Mg. Ca, K and Cl levels than the bonnet. Blood sugar levels also seem to be very low in loris in comparison with bonnet which has a significantly lower level than man.

Lower lymphocytes and higher polymorph contents of human in comparison with loris and bonnet and a gradual increase in blood sugar level from loris to man as revealed by this study seem to have an evolutionary significance in primate hematology.

EFFECT OF FOOD-INTAKE ALTERING DRUGS ON HAEMOGLOBINOXYGEN AFFINITY. **P.P. Irudavaraj, P.S. Shetty, R. Vasudev and K. N. Sharma.** *Department of Physiology, St. John's Medical College, Bangalore.*

Earlier investigations on chronically food-deprived frogs and rats showed increased oxygen affinity of haemoglobin as compared to well fed animals. The present study is an extension of the above and the applicability of the phenomenon was examined in groups of rats given daily subcutaneous injections of 25 μg Eltroxin (BDH), 15 IU Insulin lente (Boots), or 2 *mg* Dexedrine (SK & F) for a total period of 20 weeks. Streptozotosin (Up John) was given in a single dose (50 *mg/kg* intracardiac). The haemoglobin and oxygen affinity was tested before and after the drug schedule. The oxygen affinity of haemoglobin is decided by the amount of sodium dithionite required to reduce the fully saturated oxyhaemoglobin to reduced haemoglobin while the spectral characteristics of the latter are studied between 500 to 600 mu. The disappearance of the absorption minima at 558 *mu* of HbO_2 while being converted to Hb is taken to be the index for total reduction. The controls required 2.95 ± 1.0 *mg* of sodium dithionite to reduce 1.5 *mg* of fully saturated oxyhaemoglobin. The thyroxine, insulin, dexedrine and the streptozotosin groups required respectively 5.33 ± 2.3 *mg*, 4.0 ± 1.63 *mg* 9.6 ± 1.67 *mg;* and 14 *mg* for the reduction. The results indicate that the O_2 and Hb binding is much firmer in these groups.

SEX STEROID HORMONES AND EOSINOPHIL RESPONSES IN RATS. **Geetha Saraswati, S. Jayabharati and Saroja Bose.** *Department of Physiology, Madurai Medical College, Madurai.*

A comparative study of alterations in adrenocortical activity induced by the administration of sex steroid hormones, oestrogens, progesterone and testosterone was made through a modest investigation using eosinophil counts as indirect indices of such assessment.

Select groups of male and female albino rats constituted the material for this work. The male rats received 0.5 cc of Testosterone propionate on alternate days for 2 weeks while the female rats divided into two groups were administered 0.5 *mgm* of Oestrogen and 0.5 *mgm* Progesterone respectively for a similar period. Eosinophil counts were done on all the rats at the same hour daily during the period of hormone administration. This study was repeated with a second series of rats similarly treated.

The following were the observations :—

(a) Gradual fall in eosinophil values in rats receiving testosterone propionate.

(b) An initial rise followed by a fall though small in eosinophil values in the rats administred oestrogen.

(c) A good reduction in eosinophil values in the rats on progesterone treatment.

CYTOCHEMICAL EVALUATION OF ALKALINE PHOSPHATASE IN LEUKOCYTES IN HEALTH AND DISEASE.

J.K. Sengupta. *Department of Physiology, University Medical College, Burdwan.*

Normal leukocytes are important in many of the body defence mechanisms and abnormal leukocytes are often a manifestation of significant human disease. Its biochemical studies are potentially applicable to problems of host-defence reactions and to chemotherapy of malignant haematological diseases.

Studies have been made on the species difference in the elves and cellular distribution of Leukocyte alkaline phosphatase which confined to the Neutrophilic Leukocyte in case of man in health and disease.

High scores were found in Leukamoid reactions. Pyogenic infections and non-Leukaemic Myeloproliferative disease. Scores in chronic granulocytic leukaemia were always very low in relapse but often returned to the lower ranges of normal during successful treatment. There was no definite relation between the degree of remission and height of score.

High scores, often much above normal were found in Hodgkin's disease, whereas in Lymphosarcoma and reticulum cell sarcoma scores were within or just below the normal range. It is possible that here again alkaline phosphatase cyto-chemistry may prove of value in differential diagnosis.

The impact of infection and other diseases is inadequate to explain the very great difference in unit cell activity. This has promoted the present investigation of the situations in which unit cell alkaline phosphatase is increased and attempt to find some common denominator which might integrate the observations.

UTILIZATION OF DIETARY FATS AT HIGH ALTITUDE.

R.M. Rai, M.S. Malhotra, G.P. Dimri and T. Sampathkumar. *Defence Institute of Physiology and Allied Sciences, Delhi Cantt.*

Utilisation of fats has been investigated at altitudes of 3500, 3800 and 4700 m on 27, 7 and 12 soldiers respectively, who were staying at the respective altitudes for over 4 months. At altitude of 3500 m. on intakes of 128, 168 and 198 *g* of fat the faecal fat excretions were 5.926, 6.45 and 7.09 with digestibility of 95.9, 96.2 and 96.6% respectively. At altitude of 3800 m. on fat intake of 124, 224, 324 and 364 *g* the faecal fat content was 8.17, 11.03, 8.92 and 11.48 g the percent digestibility being 93.4, 95.0, 97.2 and 96.9 respectively. At altitude of 4700 m, the total daily fat intake was 142, 189 and 232 *g* with digestibility of 95.5, 97.5 and 97.5% respectively. The faecal excretions on these intakes were 6.44, 4.66 and 5.24 *g*. The urine examination did not reveal ketone bodies on any of these intakes; neither was there any incidence of constipation nor diarrhoea.

Though the digestibility was not affected up to intake of 364 *g*/day, there was feeling of thirst at night on intake of 324 *g* while 364 *g* could not be fully concumed. Thus, digestibility, absorption and utilisation of dietary fats are not disturbed at high altitude.

ONTOGENY OF TASTE IN PREWEANLING PUPS. **K.N. Sharma and P.S. Shetty.** *Department of Physiology, St. John's Medical College, Bangalore.*

Using different solutions in brief exposure tests, gustatory responses were measured in pups upto the weaning period. Test solutions (0.1 to 0.2 *ml*) were applied to the tongue via a rubber tubing mounted on a tuberculin syringe. A seven category rating scale from 1+ to 7+ (modified from Jacobs and Sharma), was used to evaluate acceptability of the solution.

From birth the animals demonstrated moderately positive (6+) response to 3.7% lactose which remained at this level throughout the entire preweaning period. This score was higher as compared to glucose and saccharine of equal or more sweetness. The initial responses to quinine (0.004%) and saccharine (0.1%) are equivocal and similar, but by 60 hrs the score for the former decrease. The quinine response ranges between 3+ to 4+ and is unstable upto the fifth day. By the 15th day, it becomes 1+ to 2+ On the other hand, saccharine response gradually increased after the fifth day and is about 6+. NaCl (0.9%) and distilled water produce mildly positive (4+ to 5+) responses. Trials during the 14th to 21st day indicated preferences to sweet solutions in the following order: lectose (3.7%), glucose (9.0%, 4.5%, 22%, saccharine (0.025%, 0.0125%, 0.00625%). With increasing concentration (18.0%) the score for glucose increases whereas that of saccharine declined at higher concentrations (0.05%, 0.1%). Increase in concentration of lactose (7.4%, 14.8%) did not appreciably increase its acceptability.

HYPOTHERMIA AND ALPHA METHYL DOPA THERAPY. **M.. Chandra Mohan, N. Hariharasubramaniam, E.S. Johnson and S. Parvathi Devi.** *D epartments of Medicine and Physiology, Madurai Medical College, Madurai.*

Profound hypothermia (29.C) was observed in three patients on treatment for systemic hypertension with alpha methyl dopa. The work of Feldberg and associates on animals revealed that serotonin is the neurotransmitter acting at the anterior hypothalamus inducing hyperthermia. That alpha methyl dopa could cause hypothermia by blocking the synthesis of serotonin has been brought out.

In an attempt to confirm such a postulate, this study was directed to the analyses of 5 HIAA in 24 hours samplings of urine of nine pateints treated with alpha methyl dopa of whom three manifested hypothermia on the fifth day of such therapy. These estimations were done in each of the nine patients before therapy with methyl dopa and on the third and fifth days following alpha methyl dopa administration. The values point to a reduction in urinary excretion of 5 HIAA after treatment with alpha methyl dopa.

A STUDY ON THE EFFECTS OF SIX HORMONES ON COAGULATION OF BLOOD. **S. Gaur and R. P. Bhargava.** *Department of Physiology, Gandhi Medical College, Bhopal.*

Effect of oestrogen, progesterone and testosterone on the whole blood clotting time,

prothrombin time, fibrinogen content, platelet count and platelet adhesiveness was studied in rabbits in groups of 5 each for a period ranging from 1—12 weeks.

Intramuscular administration of oestrogen (oestroform) produced reduction in whole blood clotting time and prothrombin time, increase in fibrinogen level and platelet count and decrease in platelet adhesiveness evidenced by increased percentage of platelets after 80 min.

Intramuscular administration of progesterone (Progestogen) showed reduction in whole blood clotting time and prothrombin time, increase in firbinogen content and decrease in platelet adhesiveness. The platelet count was variable.

Intramuscular administration of testosterone also produced reduction in whole blood clotting time and prothrombin time, increased platelet count and decreased platelet adhesiveness. The fabrinogen content showed a distinct rise.

RETICULOCYTE RESPONSE AFTER PARTIAL NEPHRECTOMY IN RATS. **G. Kesavalu, K. V. Kuppu Rao and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

A review of literature regarding reticulocyte response after unilateral nephrectomy shows contradictory results. Some workers are of the opinion that the reticulocyte response occurs two weeks after unilateral nephrectomy. Others report that it occurs much earlier.

In the present study an attempt is made to evaluate the time sequence of the reticulocyte response after unilteral nepherectcmy, one and two-thirds nephrectomy and both unilateral nephrectomy and partial hepatectomy in different groups of Wistar male ablbino rats.

In another similar series of experimental animals the effects of cobalt chloride in inducing reticulocyte response was studied. In all these experiments the parameters studied were reticulocyte response, RBC count, Haemoglobin concentration, MCH, MCV and total WBC count.

In both unilateral nephrectomy and one two thirds nephrectomy there seems to be an erythropoetin feed-back mechanism. The decreased ertythropoetin level acts on the remaining kidney and increases its secretion of ery hropoietin so that the reticulocyte count, RBC, Haemoglobin and Haematocrit values are increased.

Partial hepatectomy depresses the expected response in RBC count, haemoglobin content and haematocrit values after unilateral nephrectomy when done simultaneously. This is probably attributed to decrease in the stores of the haematinic principle. This is supported by the fact that the MCV and MCH increases during this phase of depression leading on transient state of Macrocytosis.

Cobalt chloride induces the reticulocyte count, and other haemopoietic parameters. This results suggest that it acts primarily on the kidney liberating erythropoietin. But it cannot be denied that the action may also be to a lesser extent on the bone marrow.

OBSERVATIONS ON ANALGESIC ACTIVITY OF PLAIN ASPIRIN AND MICROFINED ASPIRIN IN HUMAN VOLUNTEERS. **D.S. Salunkhe, J. J. Balsara and J. H. Jadhav.** *Department of Pharmacology, Dr. V.M. Medical College, Sholapur.*

It is reported in littrature that serum salicylate concentrations of microfined aspirin were higher than the plain aspirin. In a double blind study, the analgesic activity of microfined aspirin and plain aspirin was examined in human volunteers. Another drug paracetamol was used as a reference standard. The pain threshold was determined by the muscle ischemic method, periodically before and after oral administration of drugs up to 90 minutes. In the light of the resultant analgesia by aspirin, microfined aspirin and paracetamol, the findings were discussed.

LIPID COMPOSITION AND ATPASE ACTIVITY OF MITOCHONDRIA IN AN ATROPHIED FROG MUSCLE. **R.V. Krishnamoorthy.** *Department of Zoology, University of Agricultural Sciences, Hebbal, Bangalore.*

The phospholipid and cholesterol contents were compared in sarcoplasmic fraction and mitochondria, prepared by centrifugation from control and denervated gastrocnemius of frog after one month unilateral denervation. Abnormalities have been noticed in the phospholipid and cholesterol contents. Cholesterol content increased in the mitochondria as well as in the sarcoplasmic reticulum of the denervated muscle. The total phospholipid content did not alter in the mitochondria but decreased in the sarcoplasmic reticulum of the denervated muscle. As a result the cholesterol/phospholipid molar ratio of the muscle increased on denervation.

Na-azide sensitive Ca^{2} ATPase activity of the sarcoplasmic reticulum decreased on denervation whereas the activity in the mitochondria did not alter. Howerver, ouabain inhibited Na+ plus k+AT Pase activity did not alter in the mitochondria or in the sarcoplasmic reticulum.

The alterations discernible in phospholipid/cholesterol composition and ATPase activities as a result of denervation seem to indicate that the primary influences of the nerve supplying the muscle is manifest in membrane properties.

PRELIMINARY STUDY OF MUSCLE CONTRACTION IN ION FREE MEDIUM. **S. M. Kendurkar and G.S. Seth.** *Department of Physiology, Seth G.S. Medical College, Bombay.*

Heart contracted rhythmically for many hrs when perfused with liquid paraffin. Though force of contractions was diminished after about four hrs, rhythmicity was still maintained.

In castcr oil also, heart contracted rhythmically but for a shorter time as compared to liquid paraffin. Contractions did not stop even after about four hrs but it developed heart block. Sinus venosus was showing rhythmic contractions even after six hrs.

Muscle immersed in liquid paraffin and/or castor oil gave normal contractions. Latent period, force of contraction, contraction period were similar to those when nerve muscle was immersed in isotonic saline. Muscle fatigue was observed at approximately the same time irrespective of the perfusing fluid.

PHASIC MUSCLE TENSION CHANGES ON GASTRIC DISTENTION. **L.V. Murali Dhar, P.S. Shetty and K. N. Sharma.** *Department of Biophysics, All India Institute of Mental Health, and Department of Physiology, St. John's Medical College, Bangalore.*

Changes in the tension of the passively stretched gastrocnemius muscle on distention of the stomach have been reported earlier. The present work attempts to investigate the effect of gastric distention on the tension developed by reflexly induced muscle contraction. The tendon of the frog gastrocnemius muscle was cut and hooked to Grass FT 03C Force transducer. The tension developed on reflex contraction of the muscle by single pulse (8.0 to 10.0 V. 0.2 msec dur) skin stimulation of the same dermatomes, was recorded on RS Beckman Dynograph. One to two *ml* gastric distenion was sufficient to produce a significant decrease in muscle tension which further decreased with increasing volumes in a non-linear fashion. In many cases, higher volumes (4—7 *ml*) completely inhibited the reflexly induced contraction. The variable pattern of phasic tension changes is similar in many respects to the previously reported tonic responses. Volume distentions maintained for 2 mins not only decrease the tension during the period of distention, but also show significantly lower contractile responses for over 30 mins after the release of distention. The results indicate that the gastric distention effects on somatic musculature are inhibitory in nature, appear after a latency of 10 sec to 2 min and remain for several minutes; the exact amount and course of changes being influenced by the degree, duration and other temporal characteristics of gastric distention.

IMPROVEMENT IN MUSCLE STRENGTH WITH DIFFERENT TYPES OF PHYSICAL TRAINING. **M.S. Malhotra, J. Sen Gupta and N. T. Joseph.** *Defence Institute of Physiology and Allied Sciences, Delhi Cantt*-10.

Different countries use different training programmes involving primarily aerobic, isometric or isotonic exercise. The Indian Army follows a physical training programme based mainly on isotonic exercises, while the U.S. Air Force uses aerobic exercises and the Royal Canadian Air Force uses its own programme called 5BX-11 which is to be done only for 11 minutes a day.

A comparative evaluation of these three programmes has been made, both in field performance and in laboratory tests, on 64 subjects, by observing their improvements aerft 12 weeks

of training. It has been found that the physical training programme being followed by the Indian Army is the best of the three as improvement in both the muscle strength and the endurance work capacity is the maximum with this programme. The US programme only helps to increase the oxygen uptake capacity and has not much effect on the muscle power. The 5XB-11 minute programme of Canadian Air Force comes in between the two.

CHANGES IN LIPID COMPOSITION IN THE DENERVATED MUSCLE OF FROG. **A Singarachari.** *Department of Zoology, Bangalore University, Bangalore.*

One month denervated gastrocnemius muscles of 60-65 g frogs showed progressive atrophy and utilized fats. Cholesterol was accumulated but the cholesterol esters remained unchanged. The total lipid, triglycerides, total free fatty acids and total esterified fatty acids significantly decreased on denervation, whereas cholesterol, glycerol and acetoacetate content increased on denervation in frogs. Phospholipid, lipoprotein classes and cholesterol esters did not exhibit any change. All these observations further emphasized the plausible occurrence of degradation of fats, as well as fatty acid oxidation in the denervated muscles. The steady levels of phospholipid content and lipoprotein classes in the denervated muscle were correlated, with steady level of mitochondrial protein content. The changes in cholesterol levels were attributed with a relationship between cholesterol and phospholipids and membrane properties. The acetoacetate, oxaloacetate, acetate and B-hydroxybutyric acid levels increased on denervation in contrast to acetylcholine and pyruvate. The iodine number of fats was increased. Concentration gradients of fat and fat metabolic products in the muscle and the blood of the denervated frog illustrated the possible changes in the permeability properties of muscle membranes.

COMPARATIVE PHARMACOLOGICAL STUDIES OF BETA ADRENERGIC STIMULANTS VIZ. ISOFRENALINE, SALBUTAMOL, ORCIPRENALINE AND ISOETHARINE. **C.P. Trivedi, and S.D. Tonpay.** *Department of Pharmacology, G.R. Medical College, Gwalior.*

A comparative study on the therapeutically important pharmacological actions of the four beat adrenergic stimulants namely Isoprenaline, Salbutamol, Orciprenaline and Isoetharine was undertaken. All the four drugs increased the outflow perfusate in guinea-pig isolated lung perfusion per se as well as on histamine induced bronchial spasm. Isopre naline was found to be the most and orciprenaline the least potent. This effect was blocked by propranolol. An increase in the ionotropic and chronotropic effect on rabbit's isolated perfused heart as well as on auricle was observed with all the drugs. In both preparations isoprenaline was the most potent and salbutamol the least potent. Their effects were blocked by practolol. All the beta stimulants increased the outflow of the perfused in dog's hind limb with Isoprenaline showing the maximum and orciprenaline the minimum effect. This vasodilator effect was completely blocked by propranolol but not by practolol. A hypotensive effect on dog's carotid blood pressure was shown by all the drugs, however Isoprenaline showed the maximum effect. Propranolol blocked the hypotensive effect of all the four drugs but practolol in equivalent doses blocked the effect of salbutamol and orciprenaline totally, while that of isoprenaline and isoetharine partially.

STUDY OF THE ACTION OF ADRENALINE ON TERMINAL GUINEA-PIG ILEUM. **R.J. Minima.** *Department of Physiology, Seth G.S. Medical College, Bombay.*

Experiments were carried out on the terminal part of the isolated guinea-pig ileum and some on duodenum and proximal ileum of the same animal, with the idea of observing the responses of adrenaline. Acetylcholine was used initially to standardize the response. Effects of adrenaline before and after treatment with dihydroergotamine (DHE) an alpha blocking drug, were studied and also before and after treatment with atropine. Temperature of the bath was also lowered to study effects of temperature variation on responses of terminal ileum.

It was observed that adrenaline caused contraction of the terminal guinea-pig ileum and relaxation of the proximal ileum. The duodenum not being very sensitive in the guinea-pig, gave either a slight relaxation or no response at all. After blocking the action of adrenaline by DHE, it was observed that adrenaline did not give any response, but that after repeated washings, when the effect of DHE was abolished, adrenaline again caused contraction of terminal ileum. Similarly, treatment with atropine blocked the action of acetylcholine, but had no effect on adrenaline, the action of which produced the usual contraction of terminal guinea-pig ileum.

NEGATIVE INOTROPIC EFFECT OF CATECHOLAMINES ON IMMATURE RABBIT AURICLES. **B. S. Deshmankar and R.K. Mohabey.** *Department of Pharmacology, Medical College, Jabalpur.*

Isolated auricles from immature rabbits were found to respond to catecholamines, aminophylline, nicotine and tyramine with negative inotropism. This aberrent response was seen mostly in immature females and was rare in immature males. It was blocked by propranolol and in several instances treatment with excess Ca+ ions or overnight if refrigeration restored normal positive inotropic effect.

EFFECT OF CHOLINOMIMETIC DRUGS ON THE INTESTINE OF A TELEOSTEAN FISH CLARIAS BATRACHUS. **M. Ovais and S.S. Gupta.** *Department of Zoology, Safia College, Bhopal and Department of Pharmacology, Gandhi Medical College, Bhopal.*

The effects of Acetylcholine, Pilocarpine carbachol and Nicotine were studied on the isolated longitudinal smooth muscle of the intestine of a teleostean fish. Site of the action of these agents was investigated by using cholinergic blocking agents and local anaesthetics.

The action of Ach was not blocked by Hexamethonium up to 10^{-3} *gm/ml*, but a potentiation effect to the Ach response was observed by Hexamethonium from 10^{-5} *gm/ml* to 10^{-4} *gm/ml* and above this range hexamethonium from per se elicited contractile response. Tubocurarine up to 10^{-5} *gm/ml* had no effect on the Ach induced response, however, above this concentration itself contracted the intestine and inhibited the Ach response. Cocain in low doses causes a potentiation to Ach response and procain from 10^{-5} to 10^{-4} *gm/ml* inhibited and finally abolished the Ach response. The excitatory effect of nicotine was blocked by ganglionic blocking agents from 10^{-5} to 10^{5}-*gm/ml*. The results indicate that in

the intestine both muscarinic and Nicotinic receptor are present and the action of Acetylcholine is dual in nature.

FURTHER STUDIES ON NEUROHUMORAL TRANSMISSION IN FROG'S HEART. **P. Brahmayya Sastry and Y. Venkata Reddy.** *Department of Physiology, Andhra Medical College, Visakhapatnam.*

The classical double-heart perfusion experiment on frog's heart done by Otto Loewi was repeated using the method of Bain, but simplified by us; and the results of 370 observations made in 89 experiments are presented. The isolated donor heart (DH) and the isolated recipient heart (RH) were perfused with oxygenated Clark's solution (CS) and both vagosympathetic nerves of DH were stimulated together (V4—12; pulse 1.0 msec; F—5—80/sec; for 30 secs or for 2—6 min-occasionally — up to 19 min). Agents that alter vagal transmission such as Eserine Sulphate (E-10^{-5} - $5x10^{-6}$) choline chloride (CH-1. $2x10^{-6}$ *g/ml* or 10^{-4} M), "Histoplac Juice" (HJ-1 : 10)—a commercial extract of lyophilized placenta of SCLAVO, SIENA, Jtaly, Hemicholinium compound No. 3 (HC3—10^{-5} M—10^{-4} M) and Atropine 10^{-10}—10^{-5}) were added to CS and the effects studied.

The average degree of concurrent inhibitions in RH compared with the vagal inhibition in DH during short and long stimulations respectively were 10% and 9% with CS; 13% and 18% with ECS; 10% and 3% with CHCS: 76% and 29% with ECHCS; 6% and 2% with HJCS and 206% and 38% with EHJCS. Enchancements of vagal effects in DH and RH seem to take place with possible improvement in acetylcholine release.

Much easier and more frequent is the transmission of the sympathetic component seen as augmentation, mostly by systolic rise, and/or acceleration in DH (138%) and RH (140%); the latter being time-related to Vagal escape (VE) in DH; and this suggests strongly that noradrenaline released from the Vagosympathetic triggers VE. Confirmation of this was obtained by the fact that Vagal block by HC3 and Atroprine respectively enhanced the sympathetic transmission to 177% and 167% in DH and to 192% and only to 123% in RH. CH (10^{-4} M) and HJ (1 : 5) effectively removed the vagal block induced by HC3 or Atropine.

HYPOTHALAMIC STIMULATION AND CHANGES IN CORTISOL INSULIN AND GROWTH HORMONE. **G.S. Chhina, S.K. Garg, J.S. Bajaj and B. Singh.** *Department of Physiology, A.I.I.M.S., New Delhi.*

Isolated studies have been conducted to determine the role of hypothalamus in the regulation of different endocrine secretions. Simutaeneous investigations of the hormonal secretion pertaining to carbohydrate and lipid metabolism have not been undertaken in rhesus monkeys so far. In male rhesus monkeys electrical stimulation of different hypothalamic regions was done through permanently implanted electrodes and changes in plasma cortisol, serum insulin and serum growth hormone were observed. Stimulation of lateral hypothalamus, ventromedial nucleus, preoptic area, supra optic nucleus and posterior hypothalamus produced an increase in the secretion of plasma cortisol. Insulin, on the other hand, increased on stimulation of lateral hypothalamus while the effect of supraoptic, ventromedial nucleus and posterior hypothalamus was to produce a decrease. Mammillary body, preoptic and posteromedial regions

were ineffective in producing any change in serum insulin levels. The growth hormone showed an increase on stimulation of lateral and ventromedial nucleus of hypothalamus. The other hypothalamic areas produced a decrease. Stimulation of extra-hypothalamic regions like globuspallidus and interpeduncular fossa was ineffective in producing any changes in the secretion of these hormones. There were some pecularities in the hormonal responses in the sense that only high frequency was able to produce an increase from lateral hypothalamus while low frequency stimulation was ineffective. The relation of these hormonal changes on stimulation of feeding and satiety mechanism was discussed.

CHANGES IN BLOOD CORTISOL, ADH AND URINARY CATECHOLAMINES IN HIGH ALTITUDE PULMONARY OEDEMA. **Inder Singh, M.S. Malhotra and H.D. Brahmachari.** *Defence Institute of Physiology and Allied Sciences, Delhi Cantt.*

Blood cortisol, ADH and urinary catecholamines have been determined in ten subjects susceptible to high-altitude pulmonary oedema who had earlier suffered, but comletely recovered from the disease, both at sea level and periodically during their stay at 3500 m.

At high altitude (HA), four of the subjects developed high-altitude pulmonary oedema (HAPO), two got acute mountain sickness (AMS) and four remained unaffected. Blood cortisol showed a sharp rise on the first day at HA in all the subjects. Thereafter, in the unaffected and AMS subjects it declined gradually. In the HAPO cases, on the other hand, there was a sharp fall in the level before the clinical manifestation of the disease. Changes in ADH and catecholamines levels at HA were not significant in any of the three groups.

It thus appears that failure in the maintenance of the normal adrenocortical response to altitude stress in susceptible cases is a factor in precipitating high-altitude pulmonary oedema.

THE EFFECT OF THYROCALCITONIN ON THE DEVELOPMENT OF OSTEOPOROSIS OF DISUSE IN YOUNG RATS. **J. Prakaso Rao and To Robert Bullard.** *Department of Physiology, Christion Medical College Vellore.*

Previous studies have suggested that thyrocalcitonin may be effective in preventing the development of osteoporosis of disuse. However, beneficial effects have not been observed in experiments on mature animals; a finding which has been attributed to increasing age. The purpose of the present study was to determine the effect of thyrocalcitonin on the development of disuse osteoporosis in young rats.

The right hind limb of 28 four to six week-old male rats was partially immbilized by sciatic neurectomy. Rats were divided into two equal groups. One group received daily injections (intramuscular) of procaine thyrocalcitonin (2 MRC units per kilogram of body weight) in 16% gelatin for a period of thirty-two days. The control group received only gelatin. Immobilization caused a significant decrease in dry weight, ash content, calcium, phosphorous, and radio density of "immobilized" femora as compared to "normal" femora in both control and thyrocalcitonin-treated rats. Thyrocalcitonin appeared to have no effect in preventing these changes.

Thus thyrocalcitonin does not seem to be effective in inhibiting the development of disuse osteoporosis in young rats.

INTERACTION BETWEEN ADRENALINE AND 2-DEOXYGLUCOSE IN THE INDUCTION OF STREPTOZOTOCIN DABETES. **Maya Phillip, L.N. Ramani and P. Zachariah.** *Fleming Research Institute, Christian Medical College, Vellore.*

The study of streptozotocin (SZN) is of interest not only in regard to experimental diabetes but also because of its possible relevance in beta cell physiology. 2-deoxyglucose (2DG) is known to annul the effect of SZN. In skeletal muscle adrenaline inhibits the phosphorylation of 2 DG. The possibility of an action of adrenaline on the antistreptozotocin effect of 2 DG has been investigated in the present study.

In adult rats the glucose tolerance curves determined two days prior to, and one week following, treatment were compared. The increase in the area under GTT curve after treatment was taken as a measure of the severity of diabetes induced by the treatment. By comparison of the diabetogenic effect of different doses of streptozotocin, 45 *mg/kg* (intravenous) was found to be an optimal dose producing moderate fasting hyperglycemia and about 200% increase in the area under the GTT curve.

Given individually adrenaline and 2 DG had no effect on the glucose tolerence one week later. Simultaneous administration of adrenaline did not affect the diabetogenic action of streptozotocin. 2 DG when administered along with SZN almost completely protected the animals against the action of the latter. However when adrenaline was given along with 2 DG and streptozotocin, this protective effect of 2 DG was almost completely abolished.

THYROXNE INDUCED PALATABILITY SHIFTS IN RATS. **R. Vasudev, P.S. Shetty, P.P. Irudayaraj, S. Sharma and K.N. Sharma.** *Department of Physiology, St. John's Medical College, Bangalore.*

Daily one hr test of glucose (13.5%), saccharine (0.2%), sodium chloride (0.9%) or mixtures of glucose-quinine and saccharine-quinine was done to assess gustatory responses in adult albino rats. In addition, body weight and food and water intake was measured daily. After the control period lasting about three months,d aily subcutaneous injections of 25 μg Eltroxin (BDH) were given for a period of 16 to 19 weeks and the above measurements were repeated.

After Eltroxin treatment the body weight decreased to about 9.6% between 4th to 6th week, after which there was a tendency for increase in weight but it barely reached the pretreatment level, there was a concomitant decrease of about 22% both in daily food and water intake during the first 2 weeks, followed by an increase of about 33% (food) and 115%(water) for the remaining period of thyroxine treatment. As compared to the control values, glucose intake during firrt 5 weeks showed a decrease of 40% but it increased to 30% around 11th week, and showed a second fall of about 38% beyond 15th weeks of treatment. By contrast, saccharine showed a 36% increase during first five weeks followed by 110% increase except in 2 rats which showed marked decrease (91%). NaCl intake produced variable results. In case of

mixtutres, which was tested during the 14th to 19th week of treatment, the thyroxine treated group preferred saccharine-quinine over glucose-quinine mixture when higher concentration of quinine (0.008%; 0.016%; 0.04%) was added.

STUDIES OF BLOOD GLYCOGEN CONTENTS IN UNCONTROLLED DIABETICS. **P. K Sharma, B. B. Maitrya and Som Nath.** *Department of Physiology, J. L. N. Medical College, Ajmer.*

Blood glycogen studies are carried out histochemically as well as biochemically in 50 uncontrolled diabetics, comprising 33 males and 17 females, diabetes was of a maturity onset type in 42 and of juvenile type in remaining 8 subjects. Histochemically there is increased glycogen content in granulocytes. A significant quantitative rise in whole blood glycogen has been found. There is a highly positive degree of correlation between the glucose and glycogen level of blood.

ASCORBIC ACID, THE ADRENAL CORTEX AND THE THYROID. **P.U. Saroja Bose, C. Ramachandran and Rajesh Nandini.** *Department of Physiology, Madurai Medical College, Madurai.*

The needs for ascorbic acid in stepping up the biosynthesis of adrenocortical hormones has been well defined. Its role in intermediary metabolism is known. This modest "experimental" study has its focus on the effects of low and high dosage schedules of ascorbic acid administered on short and long term bases to select rat groups, housed and few under controlled circumstances.

Observations were made on :

(1) Eosinophil responses in these ascorbic acid treated animals.
(2) Changes in adrenocortical cytology.
(3) Changes in thyroid acini.

Eosinopenic responses associated with adrenocortical zona fasciculata hyperactivity and increased thyroid colloid were noted. These features are being presented and discussed.

SKINFOLD MEASUREMENTS. **J.V. Bhatt, M.J Barua and V.G. Parulkar.** *Department of Physiology, T.N. Medical College, Bombay.*

Skinfold thickness at four standard sites on the body has been measured on 100 male and 100 female normal healthy medical students. These measurements have been correlated to height, weight, and surface area of the students.

The results have been statistically analysed and also plotted in the form of histograms.

It has been concluded that there is no correlation between hight, weight or surface area of the body and skinfold thickness. However, skinfold thickness in all four areas have been found to be higher in females than in males.

The role of measurement of skinfold thickness in addition to height and weight in routine physical check-up was discussed.

LITHIUM AND SODIUM LEVELS. **N. Hariharasubramanian, S. Parvathi Devi and A. Venkoba Rao.**
Departments of Physiology and Psychiatry, Madurai Medical College, Madurai.

Research into the pharmacodynamics of Lithium and its effect on various physiological systems has been significant. Since lithium is chemically closely allied to Sodium, its administration is necessarily sought with changes in the distribution and balance of Sodium. Sodium is the principal extracellulary ion in the body and its role in nerve cell excitability has been firmly established. Information on the metabolism of Sodium in mania and depression has revealed that the ion—levels vary considerably in these states. Some of the studies on lithium have been directed towards establishing the lithium induced changes in Sodium esuilibrium, as these could be reckoned as pointers to the mode of action of Lithium.

Investigations have shown that lithium is transported across cell membrances in a manner similar to that of sodium; and that by competitive entry into the cell, lithium ultimately inhibits sodium transport into the cell.

In this present investigation an attempt has been made to observe the changes in Serum and urinary sodium levels in maniac-depressive patients while on lithium carbonate.

Ten patients of whom one (A. T.) was a case of 48 hr psychosis hospitalised in the Psychiatry Ward, Government Erskin Hospital, Madurai and receiving lithium carbonate daily formed the subjects for this study. Serum samples and 24-hr collections of urine were obtained on hospitalisation.

(1) Prior to the commencement of lithium therapy.

(2) 24—48 hrs following the commencement of lithium therapy.

(3) Subsequently at regular intervals of 5 days while on lithium.

Clinical progress was recorded. The sodium estimations were done by Flame Photometry.

Observations : Significant were:—

(1) A fall of 10-25 milliequivalents/litre of serum sodium the fall being greater in maniacs than in depressives.
(2) A rise in urinary excretion of sodium.
(3) Increase in urinary volumes.
(4) Of note are the pretreatment values for urinary volumes and urinary sodium which were higher in manics as compared with the depressives.
(5) The serum sodium levels were stable in the normal ranges on continued administration during this period of treatment and study.
(6) Particular mention is being made on the case of 48-hr psychosis (depression and excitment regularly alternating over a 48-hr period) in whom serial estimations of

serum sodium were made. It was observed that the serum sodium levels were higher in depressed mood than during the excited phase. After administration of lithium, the fluctuations in serum sodium levels lessened concomitant with reduction in mood variations.

METABOLIC CONSEQUENCES OF LOW PROTEIN-CALORIE INGESTION IN HUMAN SUBJECTS. **P.S. Shetty, V. Kumaraiah, P.P. Irudayaraj and K. N. Sharma.** *Department of Physiology, St. John's Medical College, Bangalore.*

Metabolic, cardiovascular, clinical and biochemical parameters were investigated in subjects with differing nutritional background and socio-economic status. Group I consisted of medical students and staff, whereas unskilled labourers comprised the group II. The daily caloric intake in group II was found to be 1315 calories (1005—1802). Percentages of protein, carbohydrates and fats in their diet, were 8.69 (8.04—10.67), 73.34 (75.50—74.92) and 3.98 (2.46—5.2), respectively. The basal metabolic rate in Kcal/hr/Sq. metre surface area in this group (28.8—35.9) was 20.0% lower than the group I subjects (34.5—45.4), while the R. Q. was 0.93 and 0.77, respectively. Cardiovascular parameters of group II subjects show systolic B. P. below 100 mm Hg. and diastolic pressure below 78 mm Hg., both in reclining and standing postures. In addition, good scores are obtained on Crampton's vasomotor index (65—85%) and cardiovascular efficiency test (10—16). Of the biochemical parameters, serum cholesterol (148±36.7 *mg*%) is significantly lower in group II as compared to group I (174±24.1 *mg*%) while fasting blood glucose values are similar. Though the mean value of plasma NEFA (314 & 386 mEq/L) of both groups are comparable, they occur over a wide range (125—750 mEq/L) in group II. Determination of haemoglobin—oxygen dissociation shows significantly higher affinity in group II. It is surmised that these metabolic and biochemical differences may be linked to the differential gustatory responses observed in these two groups.

ANABOLIC AND HEPATOPROTECTIVE ACTIONS OF AN INDIGENOUS DRUG—LIV—52. **V.V. Subbarao and M.L. Gupta.** *Upgraded Department of Physiology, S. M. S. Medical College, Jaipur.*

The anabolic and hepato-protective actions of the indigenous drug Liv-52 of the Himalaya Drug Co. has been studied in albino rats of the either sex. It has been observed that the Liv-52 fed group showd a significant gain in body weight indicating its anabolic effect. Administration of carbon tetrachloride 0.2 *ml/g.* body weight resulted in a significant elevation of the serum transaminsase and glutamic oxalacetic transaminase activity. This indicates the extent of cellular damage of the liver parenchyma. The necrotic change of the liver has also been confirmed histologically. The Liv. 52 fed group when treated with carbon tetrachloride showed no alteration of the serum transaminases (GPT and GOT) nor the liver revealed any necrosis on histologic examination. This observation confirms the hepatoprotective action of Liv. 52 and

could be used as a hepato-tonic. From this work it is evident that the drug could be used as an anabolic agent as it promotes growth and also offers protection to the hepatic tissue against toxic substances.

STUDIES ON THE GLUCOSE ABSORPTION IN ALLOXAN DIABETIC AND SALIVARY DUCT LIGATED RATS. **V. B.S. Rajan, P. Kanagavalli, A. Namasivayam and N. Padmanabhan.** *Institute of Physiology & Experimental Medicine, Madras Medical College, Madras.*

It has been reported that insulin increases the glucose transportation in some tissues like muscle and liver whereas it has no action on the glucose absorption by the intestinal mucosa.

In diabetes mellitus one of the cardinal symptoms is hyperphagia. Yet, it is not clear whether glucose absorption is altered in this condition. The action of glucagon on intestinal absorption of glucose is also not well understood.

The present study was to further elucidate the pattern of glucose absorption in alloxan diabetic rat intestines in which there is only glucagon secretion. Further, our previous work has shown that salivary gland extracts influence the carbohydrate tolerance in rats and dogs. Salivary glands are thought to secrete a anti-insulin factor.

The rate of absorption of glucose by intestinal mucosa in alloxan diabetic rats is lower during the initial phase and greater during the termination of the experiment when compared with the control. This is probably due to the unopposed actions of hyper glycemic agents like glucagon etc.

The glucose absorption in salivary duct ligated animals is lesser than the control though not statistically. The L.S.E. treated rats show marked increased in the rate of absorption of glucose. It is tentatively concluded that the salivary gland may contain an active principle in the nature of an anti-insulin factor which may increase the rate of absorption of glucose by the intestinal mucosa.

CHANGES IN PHYSICAL WORK CAPACITY DUE TO PROLONGED STAY AT HIGH ALTITUDE. **J. Sen Gupta, G. L. Dua, N. Shrinivasulu and M.S. Malhotra.** *Defence Institute of Physiology and Allied Sciences, Delhi Cantt.*

Studies were conducted on the physical work capacity and cardiac frequency on 26 low landers during prolonged stay at an altitude of 3700 m.

Maximal aerobic capacity, resting, sub-maximal and maximal heart rates and time in 1 mile run were determined at sea level and at high altitudes after a stay of 1, 10 and 20 months.

Results indicate that the maximal aerobic capacity drops significantly on induction to high altitude, the mean value being 2.65 L/min at sea level as against 1.90 L/min during 1st month at altitude. Thereafter it improved with further stay the mean values being 2.08 and 2.25

L/min after a stay of 10 and 20 months respectively. The mean maximum heart rate after 1 month at altitude dropped to 182.8 beats/min from and initial sea level value of 188.4 beats/min. It increased to 199.2 beats/min after 10 months of stay and again decreased to 185.6 beats/min after 20 months of stay. The cardiac frequency during sumbaximal work rates requiring 1.0 and 1.5 lit. 02 per various duration of stay indicated the highest rate after 1 month at high altitude and dropped due to prolonged stay, though it still remained higher than the sea level value. These changes have been compared with the high altitude native residents. The adaptational changes in the cardiac functions have also been correlated with performance capacity and the possible adaptational mechanisms have been discussed.

A STUDY OF THE ACETYLATION OF SULFANILAMIDE IN RABBITS. **A.V. Ghate and M.B. Gharpure.** *Department of Pharmacology, Medical College, Aurangabad.*

The work was started with a view to study the effect of some drugs on the acetylation of sulfanilamide. In the present paper, results with Isonicotinic Acid Hydrazide (INH) only, are reported. The test object was rabbit.

First control observation on the acetylation of sulfanilamide (50 *mg/kg*; orally) were made. Next, the effect of INH (50 *mg/kg* given once and 10 *mg/kg* given once daily for 7 days, both orally) on acetylation of sulfanilamide has been studied.

In control study, rabbits showed a wide variation in acetylation of sulfanilamide when tested on three different occasions and rabbit to rabbit variation was also considerable. This applies for both one and four hr values for percentage acetylation. The variation in control observation was so large that it was difficult to interprete the results for the effect of INH on the acetylation of sulfanilamide.

From this work, it appears that, rabbit is an unsuitable experimental animals for such a type of study.

BLOOD UREA AND SERUM PROTEIN CONCENTRATION DURING KIDNEY REGENERATION. **D. P. Sakunthala, P. Kanagavalli and N. Padmanabhan.** *Institute of Physiology & Experimental Medicine, Madras Medical College, Madras.*

One of the striking effects of nephrectomy is the physiological compensation of the remaining kidney. This compensatory renal hyperplasia is attributable to the reduction of the renal mass as such or the functions overload of the kidney in elimination of urea and maintaining water balance. Whe ither the increased mitotic activity and percentage regeneration is proportional to the blood urea concentration was studied in the present work.

It is observed that there is a transient rise in blood urea concentration followed by a fall upto 120 hrs and again a gradual rise till the duration of the experiment. There is no correlation between either mitotic activity or percentage regeneration and blood urea concentration.

It has been shown from our previous studies that hepatectomy inhibits compensatory renal hyperplasia, and this inhibition has been attributed partly to the lowering of plasma proteins. The changes in the plasma protein levels are studied after simultaneous partial hepatectomy and unilateral nephrectomy.

It is observed that plasma albumin is markedly decreased at 24 hrs simultaneous partial hepatectomy and unilateral nephrectomy as compared to the control animals. By three weeks plasma albumin level is not restored to the preoperative levels. The changes in the other protein components are not significant.

CARDIOVASCULAR ACTIONS OF THE TWO ANTIHISTAMINICS CYPROHEPTADINE AND DIMETHIDINE. **S. Pande.** *Department of Pharmacology, M.G.M. Medical College, Indore.*

Comparative studies of the two anthistaminic drugs—Cyproheptadine and Dimethindine have been carried out. These compounds produced hypotensive in dog on intravenous administration.

During the study of their interactions with guanethidine, it was found that the initil depressor and secondary pressor effect were intensified by cyproheptadine and was not markedly changed by dimethidine.

Since cyproheptadine and dimethindine have been found to modify the action of isoprenaline on carotid blood pressure of dog, the interaction with propranolol was also studied, which revealed no change in their responses.

Interaction of cyproheptadine with guanethidine and propranolol by their simultaneous administration revealed a very interesting observation. The combination was found to be able to reverse the depressor action of isoprenaline on carotid blood pressure. The probable mechanism of this interaction was discussed.

HEPATIC REGENERATION IN CIRRHOTIC LIVERS. **M. Kannappa Reddy, A. Namasivayam and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

"Intense Instant Cirrhosis" of the liver was produced by a modification of the method of Maclean as reported by us earlier.

In group of animals with fully developed hepatic cirrhosis, partial hepatectomy was done and the regenerative process in the cirrhotic livers was studied by using the parameters of mitotic index and Percentage of Regeneration.

The normal liver after partial hepatectomy responds briskly by a rise in the mitotic index which reaches a maximum in 48 hrs. But there is a marked statistically significant fall in the Mitotic Index in the regenerating cirrhotic livers. The marked depression is seen at 48 hrs.

Percentage regeneration in the cirrhotic livers after partial hepatectomy compared with the controls. There is a slight reduction in the regeneration as compared with the normal. This reduction is not statistically significant.

This suggests that the mechanism controlling hyperplasia and the mechanism controlling hypertrophy are different.

Due to the cellular hypertrophy the percentage regeneration is near normal. This hypertrophy is due to the functional need of the body. In the cirrhotic liver due to the increased demand responds by hypertrophy.

The cirrhotic liver is in a stage of resistance. When partial hepatectomy was superimposed, on this liver the animals were not able to respond by mitosis. This failure of response may be due to increased production of adrenal corticoids or due to decreased destruction of the steroids by the cirrhotic liver.

COLLAGEN CONTENT IN REGENERATING LIVER AND IN EXPERIMENTAL CIRRHOSIS. **P. Kanagavalli, A. Namasivayam and N. Padmanabhan.** *Institute of Physiology & Experimental Medicine, Madras Medical College, Madras.*

The compensatory growth of the liver following partial hepatectomy is almost complete in about three weeks. It has been reported that regeneration of collagen lags behind and is incomplete even after three weeks when liver parenchyma is fully regrown. The collagen content of the tissue is estimated by its hydroxy proline content and multiplying the result by the factor 7.25 since 13.6% of collagen content is formed by hydroxy proline. The collagen content of regenerating liver was estimated at periodic intervals of three weeks.

Intense-Instant cirrhosis of liver was produced in rats and the genesis of cirrhosis was estimated by determining the collagen content, during the induction of experimental cirrhosis.

In fully developed cirrhotic animals partial hepatectomy was carried out and its effect on the total collagen content of the liver was estimated after three weeks and six weeks.

In cirrhotic liver the collagen content is increased. After partial hepatectomy there was a decrease in the collagen content of the liver in three weeks.

Six weeks after partial hepatectomy there was a further slight fall in collagen concentration.

COMPARATIVE STUDIES OF STRESSORS IN RATS. **S. Meenakshi, D.P. Sakunthala, K. Govindadas and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

Padmanabhan observed that the phases of general adaptation syndrome induced by different stressors vary in duration, intensity and damage caused.

In the present work a comparative study of stressor agents like injection of formalin, multiple fractures, quadriplegia spinal cord transaction, exposure to cold and starvation has been made in albino rats.

It was found that formalin injection was the most severe stressor and had longer duration of the stages of Alarm reaction and resistance than the other stressors as assessed by changes in adrenal cortex, thymus, gastro-intestinal mucosa and haematologic changes. Multiple fractures were second in the order of severity.

Maximum depletion in the blood eosinophil and lymphocyte count is seen within 24 hrs after exposure to stress when the peak of Alarm reaction is attained.

There is increase in size and weight of the adrenal cortex at 48 hrs associated with reduction in the weight of the thymus due to its involution. There is emergency hyperglycemia at 24 hrs after stress. Squamous metaplasia with eosinophilic in filtration in the mucous membrance of the stomach leading to ulcers in stomach and intestines occur at 48 hrs.

The serum transaminase (SGOT, SGPT) levels were enormously increased after all stressors most marked after formalin treatment during the stage of Alarm reaction and continued to be significantly higher during the stage of resistance.

These results show that transaminases are released due to tissue damage as a non specific reaction. As such the significance of its eleboration in myocardial infarction cannot be overestimated as all stressors either to a greater or lesser extent increases the transaminase levels.

STRESS ON REGENERATION OF LIVER. **A. Namasivayam, M. Kannappa Reddy and N. Padmanabhan.**
Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.

Since Higgins and Anderson demonstrated the effects of partial hepatectomy a review of literature shows that the effects of various types and degrees of stressors have not been evaluated on hepatic regeneration.

In the present study, the effects of established stressors like spinal transaction, quadriplegia, formalin injection, multiple fractures or sudden exposure to intense cold were studied on hepatic regeneration. The parameters of gross and histologic changes in the liver along with mitotic index and percentage regeneration were analysed.

It was found that the mitotic index was very much reduced after exposure to stressors but its time sequence was unaffected. Mitotic peak occurs as usual between 48-72 hrs after partial hepatectomy both in the stressed and control animals. The percentage of regeneration of the liver was not altered significantly.

The fact that despite the lower mitotic index the percentage of regeneration was essentially normal denotes that there was more hypertrophy of the cells than hyperplasia following stress.

It is significant to observe that stress reduces cellular proliferation and increases its hypertrophy in regenerating liver. This may be related to the serum albumin concentration as reported in our earlier work.

EFFECT OF PARTIAL HEPATECTOMY ON COMPENSATORY RENAL HYPERPLASIA IN THE RAT. **D.P. Sakunthala, S. Padmavathy and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

It has been shown from our previous experiments that compensatory hypertrophy in partially hepatectomized parabiotic rats is dependent on humoral factors released during hepatic regeneration.

It is proposed to investigate the role of this humoral factor on the compensatory renal hypertrophy following unilateral nephrectomy in rats. The effects of simultaneous partial hepatectomy and unilateral nephrectomy on the regenerating kidney was studied. The parameters studied were renal mitotic index and percentage of regeneration.

It has been shown that there is an inhibition of kidney regeneration after partial hepatectomy and unilateral nephrectomy when compared to the control nephrectomized animals. Subsequent studies have shown that this inhibition is attributable to the reduction in plasma albumin level and selective diversion and utilisation of the plasma proteins by the regenerating liver.

EFFECTS OF PORTAL HYPERTENSION ON EXPERIMENTAL CIRRHOSIS AND ITS REGENERATION IN RATS. **A. Namasivayam, D.P. Sakunthala and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

Since the early recognition of the rapid reconstitution of liver tissue following partial hepatectomy various dietary, endocrine, biliary and other factors thought to control or stimulate this process have been elucidated in many experiments.

Although earlier workers have shown that portal blood supply is the most important limiting factor in liver regeneration, later reports by Weinbren has shown that deficient portal blood supply does not alter the ability of liver to regenerate after partial hepatectomy.

The present work was undertaken to investigate the role of portal blood flow on carbon tetrachloride induced experimental hepatic cirrhosis. It was observed that following the portal vein obstruction to one of the hepatic lobes, the severity of cirrhosis was markedly increased in that lobe along with a concomitent rise in its collagen content as compared with that of the normal lobes with an obstructed portal blood flow.

Moreover it has been observed that portal hypertension produced by the portal vein ligation in the unobstructed lobe seems to have a protective action against the CCl_4 induced cirrhosis.

This may be due to increased rate removal or destruction of CCl_4 in the unobstructed lobe.

AN IMPROVED METHOD FOR THE PRODUCTION OF INSTANT CIRRHOSIS OF LIVER. **A. Namasivayam, M. Kannappa Reddy and N. Padmanabhan.** *Institute of Physiology and Experimental Medicine, Madras Medical College, Madras.*

There are three etiological types of experimental cirrhosis of liver, those induced by ethionine treatment, carbontetrachloride intoxication and those due to choline and protein deficiency. Of these carbontetrachloride is commonly used because of the easier induction and quicker on set and marked collagen content. In ethionine cirrhosis the reticulin is increased.

Carbon tetrachloride cirrhosis is commonly induced by biweekly injection or biweekly inhalation of its vapours. Maclean has induced cirrhosis in three weeks by treating animals simulatenously with phenobarbitone in drinking water along with carbon tetrachloride inhalations. This has been called "Instant Cirrhosis of the Liver".

The present work was undertaken to produce experimental model of cirrhosis with more severe fibrosis and a quicker onset. With this view all the three methods of injection inhalation and phenobarbitone treatment were combined in this improved method.

As a result a hepatic cirrhosis is which does not undergo any reversal upto four weeks after the withdrawal of the treatment. The duration for the induction for cirrhosis was reduced though not markedly. Thus "Intense Instant Cirrhosis was produced."

A PRELIMINARY STUDY ON THE HYPOTENSIVE ACTIVITY OF AN INDIAN MEDICINAL PLANT. **N.R. Indapurkar, R.S. Rathore, V. K. Bhargava and K. Kaur.** *Department of Pharmacology, H. P. Medical College, Simla.*

EFFECT OF GLUCOCORTICOIDS ON THE MYOCARDIAL FUNCTION IN EXPERIMENTAL HAEMORRHAGIC SHOCK. **Manjeet Singh and P.L. Sharma.** *Department of Pharmaceutical Sciences, Punjab University and Department of Pharmacology, P.G.I.M.E.R., Chandigarh.*

CARDIOVASCULAR CHANGES DURING PERICARDIAL STIMULATION. **N. R. Prabhakar and B. N. Mazumdar.** *Department of Physiology, Medical College, Baroda.*

THE RELATION OF PERICARDIAL PRESSURE TO CHRONOTROPIC RESPONSE OF ISOLATED FROG HEARTS. **C.L. Pathak.** *Department of Physiology, Biophysics and Biochemistry, S. N. Medical College, Jodhpur.*

MAST CELLS IN THE MAMMALIAN HEARTS. **C. L. Pathak and S. Goyal.** *Department of Physiology, Biophysics and Biochemistry, S. N. Medical College, Jodhpur and Department of Zoology, University of Jodhpur, Jodhpur.*

EFFECTS OF HEMICHOLINIUM ON THE SOMATOSENSORY EVOKED POTENTIALS IN RATS—A FURTHER EVIDENCE OF CHOLINERGIC INHIBITORY MECHANISM. **V. K. Bhargava and P. Bhargava.** *Department of Pharmacology, H. P. Medical College, Simla.*

TEMPERATURE DEPENDENCE OF MAGNESIUM STIMULATED AT-PASE ACTIVITY DURING THE AGING OF CENTRAL NERVOUS SYSTEM. **Chandra Mohan.** *Department of Zoology, Bangalore University, Bangalore.*

A STUDY OF ANTICONVULSANT ACTIVITY OF N-SUBSTITUTED DERIVATIVES OF SUCCINIMIDES, OXAZOLIDIEDIONES AND THEIR STRUTURAL CONGENERS. **P.K. Das, G.B. Singh, P. K. Debnath, S. B. Acharya and S. N. Dubey.** *Department of Pharmacology, Institute of Medical Sciences and Department of Pharmaceutics, Institute of Technology, B. H. U., Varanasi.*

ACTION OF ACETYLCHOLINE ON RNA. **P. Simhadri.** *Upgraded Department of Physiology, Institute of Medical Sciences, Osmania Medical College, Hyderabad.*

INCIDENCE OF PHENYLTHIOCARBAMIDE (PTC) TASTE BLINDNESS IN NORMAL INDIVIDUALS OF BHOPAL, M.P. **M. Siddiqui, P. Rajani and R.P. Bhargava.** *Department of Physiology, Gandhi Medical College, Bhopal.*

STUDY OF ADRENERGIC SENSITIVITY OF SMOOTH MUSCLE OF REPRODUCTIVE TRACT OF THE RABBITS TREATED WITH ADRENERGIC BLOCKER WITH DIFFERENT HORMONAL STATUS. **J. I. Bhanot, S. R. Gupta and G. S. Chinna.** *Department of Physiology, A.I.I.M.S., New Delhi.*

STUDY OF GONADAL DYSFUNCTION IN MONKEYS WITH EXPERIMENTAL DIABETES. **J. S. Bhatia, H. K. Kang, J. S. Bajaj, B. Singh and G. S. Chinna.** *Department of Physiology, A.I.I.M.S., New Delhi.*

EFFECTS OF METAPROTERENOL ON PROSTAGLANDIN INDUCED ACTIVITY IN ISOLATED RAT UTERI. **M. Jetley and V. S. Mathur.** *Department of Pharmacology, Postgraduate Institute of Medical Education and Research, Chandigarh.*

ENZYME PRODUCTION BY HUMAN PLACENTA "IN VITRO". **S. C. Sikka, K. S. Raghavan and V. S. Mathur.** *Department of Pharmacology, Postgraduate Institute of Medical Education and Research, Chandigarh.*

HYPOXIA AS AN OSCILLATING VERSUS CONTINUOUS STIMULUS FOR RESPIRATION. **K. Khetarpal, Satish Kumar and B. K. Anand.** *Department of Physiology, A.I.I.M.S., New Delhi.*

TOLERANCE OF CARDIOVASCULAR AND RESPIRATORY FUNCTIONS TO GRADED HYPOXIA. **V. Mohan Kumar, G.S. Chhina, B. Singh and B.K. Anand.** *Department of Physiology, A.I.I.M.S., New Delhi.*

CONSTRUCTION OF A COMPLETELY INDIGENOUS LOW COST RESPIRATORY TRANSDUCER. **V. Mohan Kumar, G.S Chhina, B.Singh and B.K. Anand.** *Department of Physiology, A.I.I.M.S.. New Delhi.*

A SUBSTITUTE FOR AN ENVIRONMENTAL CHAMBER TO STUDY THE EFFECTS OF HYPOXIA AND COLD. **V. Mohan Kumar, G. S. Chhina, B. Singh and B. K. Anand.** *Department of Physiology, A.I.I.M.S., New Delhi.*

CORRELATION OF CHANGES IN KIDNEY FUNCTIONS TO THE THERMOREGULATORY RESPONSES DURING HYPERTHERMIA. **S. Bhalla, S. Logawney, S. Thomas and B. K. Anand.** *Department of Physiology A.I.I.M.S., New Delhi.*

A STUDY OF URINARY VOLUME AND CREATININE EXCRETION IN NORTHERN INDIA. **V. J. Butany, S. H. Singh and S. K. Lal.** *Department of Physiology, Lady Hardinge Medical College, New Delhi.*

ARTERIAL DESATURATION AFTER I. V. SODIUM BICARBONATE IN ASTHMA PATIENTS. **S. Benjamin.** *Department of Physiology, Christian Medical College, Vellore.*

SOME NEUROPHARMACOLOGICAL ACTIONS OF CANNABIS INDICA LINN. **P. K. Das and P. P. Singh.** *Department of Pharmacology, Institute of Medical Sciences, B. H. U., Varanasi.*

HISTOCHEMICAL STUDIES ON THE DEVELOPING BRAIN. **Sandip Kumar Ghosh.** *National Institute of Occupational Health, Ahmedbad.*

NEURAL PHOTORECEPTORS IN AN ARACHNID—SCORPION. **Geethabali.** *Department of Zoology, Bangalore University, Bangalore.*

UREA SYNTHESIS IN DIFFERENT REGIONS OF RAT BRAIN. **B. Sadasivudu and T. I. Hanumantharao.** *Department of Biochemistry, Kurnool Medical College, Kurnool.*

HYPOTHALAMIC INFLUENCE ON THE IMMUNE RESPONSE OF RATS TO SHEEP RED BLOOD CELL. **D. B. Konar and S. K. Manchanda.** *Department of Physiology, A.I.I.M.S., New Delhi.*

SOME ASPECTS OF CORTICO-SUBCORTICAL INTERACTIONS IN DIFFERENT PHASES OF NATURAL AND ELECTROSLEEP. **S. Kesar, U. Nayar, B.K. Anand, G. S. Chhina and B. Singh.** *Department of Physiology, A.I.I.M.S., New Delhi.*

ROLE OF CHEMOSENSITIVE INTESTINAL AFFERENTS IN FOOD INTAKE IN RELATION TO THE HYPOTHALAMIC SATIETY MECHANISMS. **R. Kapoor, S. Thomas, G. S. Chhina and B. Singh.** *Department of Physiology, A.I.I.M.S., New Delhi.*

UNIQUE DESIGN TO GRADE THE AGGRESSIVENESS IN SMALL MAMMALS. **P. Simhadri and G. Krishna Rao.** *Upgraded Department of Physiology, Osmania Medical College, Hyderabad.*

MANAGEMENT OF PREMATURE LABOUR WITH METAPROTERENOL. **V. S. Mathur and A. Laxmi.** *Departments of Pharmacology and Obst. and Gynae., P.G.I.M.E.R., Chandigarh.*

AUDITORY REACTION TIME DURING DIFFERENT PHASES OF MENSTRUAL CYCLE. **Y. B. Mehta, B.N. Mazumdar, J. D. Pathak and K. P. Skandhan.** *Department of Physiology, Government Medical College, Surat.*

INTERACTION OF (+) INPEA AND PROSTAGLANDINS ON ISOLATED TISSUE PREPARATIONS. **V. S. N. Rao and P. L. Sharma.** *Department of Pharmacology, P.G.I.M.E.R., Chandigarh.*

ENZYME INDUCTION BY OXYTOCIN: AN EXPERIMENTAL STUDY ON ISOLATED PERFUSED HUMAN PLACENTA. **S. Jayaraman, S. C. Sikka, K. S. Raghavan and V. S. Mathur.** *Department of Pharmacology, P.G.I.M.E.R., Chandigarh.*

A STUDY OF OVULATORY PERIOD IN INDIAN GIRLS. **S. Bhatia, V. M. Bhatnagar and B. K. Sen.** *Department of Physiology, Seth G. S Medical College, Bombay.*

RELATIONSHIP OF BLOOD PRESSURE RESPONSES OF AUTONOMIC DRUGS TO THE MEAN BASAL BLOOD PRESSURE IN ANAESTHETISED DOGS. **A. G. Chandorkar.** *Deaprtment of Pharmacology, Dr. V. M. Medical College, Sholapur.*

EFFECT OF SOME BETA-ADRENERGIC RECEPTOR BLOCKING DRUGS ON THE NEUROMUSCULAR BLOCKADE BY d-TUBOCURARINE. **V. K. Khetarpal and P. L. Sharma.** *Department of Pharmacology, Post-graduate Institute of Medical Educatioan and Research, Chandigarh.*

A STUDY OF THE RELEASE OF NON-ADRENALINE BY MJ 1999 (SOTALOL). **M. V. Natu and S. L. Agarwal.** *Department of Pharmacology, Pt. J.N.M. Medical College, Raipur.*

THE RELEVANCE OF BETA ADRENERGIC BLOCKADE IN OUABAIN TOXICITY. **D. P. Nag, and P. L. Sharma.** *Department of Pharmacology, Postgraduate Institute of Medical Education and Research, Chandigarh.*

EFFECT OF VARIOUS ADRENERGIC RECEPTOR ANTAGONISTS ON CATECHOLAMINE INDUCED POTASSIUM LEVELS IN MONKEYS. **K. A. Narendranath, P. L. Sharma and S. K. Garg.** *Department of Pharmacology, Postgraduate Institute of Medical Education and Research, Chandigarh.*

L-DOPA, RESERPINE AND EOSINOPHIL RHYTHMS IN RATS. **C. Ramachandran, S. Parvathi Devi and N. Hariharasubramanian.** *Department of Physiology, Madurai Medical College, Madurai.*

MECHANISM OF ANTICONVULSANT ACTION OF ADRENERGIC BETA-RECEPTOR ANTAGONISTS. **G. Rajakumar and P.L. Sharma.** *Department of Pharmacology, Post-graduate Institute of Medical Education and Research, Chandigarh.*

BLOOD CHOLESTEROL VALUES AND THE REPRODUCTIVE LIFE OF THE WOMEN, **M. Ramaraj and S. Parvathi Devi.** *Department of Physiology, Madurai Medical College, Madurai.*

THE EFFECT OF ORAL CONTRACEPTIVES ON PLATELET ADHESIVENESS. **V.S. Raysad and M. Basavaraju.** *Department of Physiology, Karnatak Medical College Hubli.*

EFFECT OF TWO ISOMERS OF DDT ON CEREBRAL AMINOACIDS LEVEL OF MICE. **M. A. Matin and P. P. Kar.** *Industrial Toxicology Research Centre, Lucknow.*

TRANQUILISING A CTIVITY OF A SYNTHETIC SUCCINIMIDE DERIVATIVE. **R. S. Rathor, S. K. Bhasin, S.S. Gambhir and G.B. Singh.** *Department of Pharmacology and Pharmaceutics, B.H.U. Varanasi.*

EFFECT OF PREFRONTAL LOBECTOMY ON BLOOD PRESSURE CHANGES DURING CAROTID OCCLUSION AND SCIATIC NERVE STIMULATION. **K. Seetha Devi, L. R. K. Reddy and N. M. Reddy**. *Department of Physiology, Kurnool Medical College, Kurnool.*

INVOLVEMENT OF CENTRAL ADRENERGIC MECHANISM IN THE INDUCTION OF CARDIAC ARRHYTHMIAS BY ACONITINE NITRATE ADMINISTERED INTRAVENTRICULARLY. **B. V. Telang**. *Section of Medical Pharmcacogy, Department of Medicine, Kenyatta National Hospital Nairobi, Kenya.*

CEREBELLAR INHIBITION AND EXCITATION OF MAYER'S WAVES. **O. P. Tandon and S. K. Manchanda.** *Department of Physiology, A. I. I. M. S., New Delhi.*

CEREBELLAR INFLUENCES ON GASTRIC ACIDITY. **O. P. Tandon and S. K. Manchanda.** *Department of Physiology, A. I. I. M. S., New Delhi.*

EFFECT OF HEAT STRESS ON LEARNING BEHAVIOUR AND ON BRAIN GLUTAMIC ACID CONTENT IN RATS. **V. V. Subbarao, P. K. Pareek and M. L. Gupta**. *Upgraded Department of Physiology, S.M.S. Medical College, Jaipur.*

URINARY EXCRETION OF NITROGENOUS COMPOUNDS, THIER INTERRELATIONSHIP AND SERUM CREATINE KINASE ACTIVITY IN PSEUDOMUSCULAR HYPERTROPHY. **S. Bhamal, S. A. Bhambal, K.S. Sharma and B. L. Patel.** *Department of Paediatrics and Biochemistry, Gandhi Medical, College, Bhopal.*

A COMPARATIVE STUDY OF WORK DONE BY ISOLATED MUSCLE WITH INTACT AND INTERRUPTED REFLEX ARC. **H. S. Nayar, A. G. Bhide and S. B. Kesbekar**. *Department of Physiology, Armed Forces Medical College, Poona-1.*

ISOZYME PATTERNS OF LACTIC DEYHDROGENASE IN THE DEVELOPING CHICK MUSCLES. **E. Radha.** *Department of Zoology, Bangalore Universitiy, Bangalore.*

ATP-CREATINE-TRANSPHOSPHORYLASE ACTIVITY IN THE SLOW, FAST AND CARDIAC MUSCLES OF RAT DURING DEVELOPMENT AND AGING. **E. Radha**. *Department of Zoology, Bangalore University, Bangalore.*

HYPOTHERMIC ACTIVITY OF SOME ALIPHATIC AND AROMATIC SYMPATHOMIMETIC AMINES. **S. Shartry, A. Q. Saify and S. L. Agarwal.** *Department of Pharmacology, Pt. J. N. M. Medical College, Raipur.*

A COMPARATIVE STUDY ON THE BETA-RECEPTOR BLOCKING POTENCY OF TERBUCLAMIN AND PROPRANOLOL IN NORMAL HUMAN VOLUNTEERS. **P.L. Sharma and R. P. Sapru.** *Department of Pharmacology and Division of Cardiology, Department of Medicine, Postgraduate Institure of Medical Education and Research, Chandigarh.*

CERTAIN METABOLIC EFFECTS OF PHYSOSTIGMINE IN GUNJA PIGS. **P. K. Das and D. K. Rao.** *Department of Pharmacology, Institute of Medical Sciences, Banaras Hindu University, Varanasi.*

3-METHOXY, 4-HYDROXY MANDELIC ACID (VMA) EXCRETION IN MENTALLY RETARDED ANXIETY NEUROTIC AND STRESSED SUBJECTS. **V. Srinivasan, A. Venkoba Rao and S. Parvathi Devi.** *Departments of Physiology and Psychiatry, Madurai Medical College and Government Hospital, Madurai.*

INTERACTION OF ANTIHISTAMINIC AGENTS WITH ADRENOCEPTORS. **Zakir Hussain, C. T. Chopde and A. K. Dorle.** *Department of Pharmaceutical Sciences, Nagpur University, Nagpur.*

STUDY OF SOME ASPECTS OF METABOLIC AND HORMONAL CHANGES IN CHRONIC COLD EXPOSURE. **P. K. Dikshit, B. K. Anand, G. S. Chhina, B. Singh and J. S. Bajaj.** *Department of Physiology, A.I.I.M.S., New Delhi and Directorate General, Armed Forces Medical Service New Delhi.*

EFFECT OF GARLIC ON BLOOD SUGAR IN RABBITS. **P.K. Jain, A.G. Chandorkar, P.M. Bulakh and V. P. Mathur.** *Department of Physiology, Dr. V.M. Medical College, Sholapur.*

FAILURE OF PGF_2 TO RELEASE OXYTOCIN FROM THE POSTERIOR PITUITARY OF RAT. **K. S. Raghavan and J. Jayaraman.** *Department of Pharmacology, Postgraduate Institute of Medical Education and Research, Chandigarh.*

PLASMA TRYPTOPHAN LEVEL AS AN INDEX OF DIETARY PROTEIN QUALITY. **S. A. Bhambal, Barnabas John and K. S. Sharma.** *Department of Biochemistry, Gandhi Medical College, Bhopal.*

ROLE ON CATALASES AND PEROXIDASES IN AMINO ACID AND PROTEIN METABOLISM. **S. Ramani Natrajan and G. D. Kalyankar.** *Department of Biochemistry and Biophysics, St. John's Medical College, Bangalore.*

CERTAIN PHYSIOLOGICAL NORMS IN DIFFERENT ETHNIC GROUPS AND THE SIGNIFICANCE OF MAGNESIUM LEVELS IN PROTEIN-CALORIE MALNUTRITION AND JUVENILE DIABETES. **S. Subrahmaniyam, J.G. Henrotte and B.S. Gajalakshmi.** *Department of Phisology, Stanley Medical College, Madras.*

A STUDY OF AMINO ACID TRANSPORT IN SMALL INTESTINE WITH DIFFERENT CELL POPULATIONS IN VINIBLASTINE TREATED RATS. **J. Nagchaudhrui and R. K. Sharma.** *Department of Phyisology, Institute of Medical Sciences, B. H. U., Varanasi.*

EFFECTS OF AMBIENT COLD ON FEEDING DRIVE IN RATS AND ITS DIURNAL RHYTHM. **L. Rai, G. S. Chhina, Baldev Singh, Usha Nayar and B.K. Anand.** *Department of Physiology, A.I.I.M.S., New Delhi.*

INTERSPECIES VARIATION IN 'MR' SENSITIVITY TO THERMAL CHANGES. **Neena Bhattacharya, G. S. Chhina and Baldev Singh.** *Department of Physiology, A, I. I. M. S., New Delhi.*

HISTAMINASE LEVELS IN ANAPHYLAXIS. **S. C. Lahiri and Anita Basu.** *Department of Pharmacology, School of Tropical Medicine, Calcutta.*

ANTI-INFLAMMATORY ACTIVITY OF SYNTHETIC DERIVATIVES OF 3, 5, DIBROMOSALICYLAMIDE AND PHENYL ACETAMIDE. **Mohd. Wazir, R. S. Rathor, G. B. Singh and N. R. Indapurkar.** *Department of Pharmacology and Pharmaceutics, Banaras Hindu University, Varanasi.*

INFLUENCE OF AGE ON RESIDUAL LATENCY. **V. Anantharaman, O. P. Bhatnagar and A. K. Ganguly.** *Department of Physiology, J. I. P. M. E. R., Pondichery.*

A NEW HERBAL TREATMENT FOR HEMORRHOIDS. **J. N. Sharma.** *Department of Pharmacology, A. I. I. M. S., New Delhi.*

PHARMACODYNAMICS OF PENICILIN HYPERSENSITIVITY. **N. Singh.** *Department of Pharmacology, I. V. R. I., Izatnagar.*

ANTI-HISTAMINIC AND ANTI-SEROTONIC AGENTS IN *Najanaja* ENVENOMATION IN MICE. **G. S. Singh, and J. K. Grover.** *Department of Pharmacology, Lady Hardinge Medical College, New Delhi.*

A STUDY OF THEN ORMAL ELECTROCARDIOGRAPHIC PATTERN IN HEALTHY INDIVIDUALS. **M. Siddiqui, R. P. Bhargava and R. K. Bhargava.** *Departments of Physiology and Medicine, Gandhi Medical College, Bhopal.*

AN EVALUATION OF SERUM ENZYMES IN DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION. **O. P. Bagga and N. K. Serashtha.** *Department of Biochemistry, Lady Hardinge Medical College, New Delhi.*

ROLE OF CORTISONE IN EXPERIMENTAL COBRA *Najanaja* VENOM POISONING IN MICE. **J. K. Grover, G. S. Singh and M. P. Shrivastava.** *Department of Parmacology, Lady Hardinge Medical College, New Delhi.*