presented are the means of six experiments, with the exception of the higher dose of (−)-LSD which was tested in three animals.

Treatment with (−)-LSD at 1 or 3 mg/kg did not change the content of the sleep/wakefulness cycle nor did it affect the quality of the phases. In particular, the drug did not cause any inhibition of the duration of paradoxical sleep. (+)-LSD causes a significant inhibition of paradoxical sleep, and also significantly delays the onset of the first phase of paradoxical sleep (Depoortere & Loew, 1971a). Treatment with BOL-148 led to a 27% decrease ($P<0.05$) in paradoxical sleep and a 14% increase ($P<0.05$) in slow wave sleep. The delay in onset of the first phase of paradoxical sleep was increased by the drug, but this effect was not significant. Thus, the effects of BOL-148 on paradoxical sleep were found to be qualitatively similar to those of (+)-LSD.

Evaluation of the qualitative changes in paradoxical sleep revealed that (+)-LSD reduced the number of phases of body movement occurring during paradoxical sleep, but increased the intensity of such movements. Both these qualitative changes were seen after BOL-148 treatment, although this drug was not as potent as (+)-LSD in this respect.

Thus, in these experiments, (−)-LSD was found to be devoid of central activity whereas BOL-148 exerted definite central actions. Although less potent, BOL-148 has an activity which is similar to that of its hallucinogenic congener (+)-LSD. The two compounds differ in that (+)-LSD induces initial stimulation which is not seen following BOL-148 administration.

The results are consistent with the view that the effects of (+)-LSD on the rat sleep electroencephalogram are not related to its hallucinogenic effects.

REFERENCES

DEPOORTERE, H. & LOEW, D. M. (1971a). Alterations in sleep/wakefulness cycle in rats following treatment with (+)-lysergic acid diethylamide (LSD-25). *Br. J. Pharmac.*, **41**, 402*P*.

DEPOORTERE, H. & LOEW, D. M. (1971b). Motor phenomena during sleep in the rat, a means to improve the analysis of sleep/wakefulness cycle. In: *The Nature of Sleep*, International Symposium, Wurzburg. Stuttgart: Gustav Fischer Verlag. In the Press.

Influence of endocrine glands on central and peripheral monoamine oxidase activity

MARGARETHE HOLZBAUER and M. B. H. YOUDIM*

A.R.C. Institute of Animal Physiology, Babraham, Cambridge, and Queen Charlotte's Maternity Hospital, Goldhawk Road, London

The influence of steroid producing glands on the activity of enzyme monoamine oxidase (monoamine: O_2 oxidoreductase (deaminating) EC 1.4.3.4.) was studied in male and female rats which were kept under constant lighting conditions. It was measured in four brain regions (septum, hypothalamus, caudate nucleus and part of the amygdala-hippocampus complex), heart, liver, adrenal glands, uterus and ovaries during periods of low locomotor activity (white light) and high locomotor activity (red light).

In male rats, the monoamine oxidase activity was increased in all four brain regions (25–120%) when the animals were physically active and that of the heart was nearly doubled. The enzyme activity in the liver was, however, only slightly raised.

In the female rats, monoamine oxidase activity showed significant variations

during the oestrous cycle, the changes running parallel in the four brain regions, the ovaries and the adrenal glands. The highest values were observed on the days of pro-oestrus and di-oestrus and the lowest 3 h after onset of red light on the day of oestrus. A very low uterine monoamine oxidase activity during oestrus and a very high uterine monoamine oxidase activity during met-oestrus coincided with low ovarian progesterone secretion rates during oestrus and high secretion rates during met-oestrus (Hashimoto, Henricks, Anderson & Melampy, 1968; Fajer, Holzbauer & Newport, 1971). Similarly, the monoamine oxidase activity in human endometrium was found to be increased during periods of increased progesterone concentrations in the blood (Southgate, Grant, Pollard, Pryse-Davies & Sandler, 1968). A rise in monoamine oxidase activity during increased locomotor activity was most pronounced on the day of met-oestrus. In contrast, on the day of oestrus monoamine oxidase activity was lowest when the rats became active.

The monoamine oxidase activity in the septum of castrated male rats was about double that in castrated female rats.

The increase in monoamine oxidase activity of the rat heart after adrenalectomy described by Avakian & Callingham (1968) was confirmed. In addition, there was a rise in the monoamine oxidase activity of the hypothalamus by 45%.

The interrelation between steroid hormones and brain monoamine oxidase may be linked with the depressant effect of certain steroids on the central nervous system (Gyermek, Genther & Fleming, 1967). Brain amines are also thought to be involved in the chain of events which lead to the release of pituitary hormones. Steroids might exert their feed-back mechanism on the brain by affecting brain amine metabolism.

M.B.H.Y. is grateful to the Wellcome Trust for the support of this work.

REFERENCES

AVAKIAN, V. M. & CALLINGHAM, B. A. (1968). An effect of adrenalectomy upon catecholamine metabolism. *Br. J. Pharmac. Chemother.*, **33**, 211*P*.

FAJER, A. B., HOLZBAUER, M. & NEWPORT, H. M. (1971). The contribution of the adrenal gland to the total amount of progesterone produced in the female rat. *J. Physiol., Lond.*, **214**, 115–126.

GYERMEK, L., GENTHER, G. & FLEMING, N. (1967). Some effects of progesterone and related steroids on the central nervous system. *Int. J. Neurochem.*, **6**, 191–198.

HASHIMOTO, I., HENRICKS, D. M., ANDERSON, L. L. & MELAMPY, R. M. (1968). Progesterone and pregn-4-en-20α-ol-3-one in ovarian venous blood during various reproductive states in the rat. *Endocrinology*, **82**, 333–341.

SOUTHGATE, J., GRANT, E. C. C., POLLARD, W., PRYSE-DAVIES, J. & SANDLER, M. (1968). Cyclical variations in endometrial monoamine oxidase: correlation of histochemical and quantitative biochemical assays. *Biochem. Pharmac.*, **17**, 721–726.

Failure to induce experimental hypertension in rats after intraventricular injection of 6-hydroxydopamine

L. FINCH, G. HAEUSLER* and H. THOENEN

Department of Experimental Medicine, F. Hoffman-La Roche & Co. Ltd., Basle, Switzerland

Injections of 6-hydroxydopamine into a lateral brain ventricle of rats produce a marked and long-lasting depletion of brain catecholamines (Uretsky & Iversen, 1970). A possible relationship between the activity of central adrenergic neurones and the development of deoxycorticosterone-(DOCA) sodium chloride hypertension in rats (Nakamura, Gerold & Thoenen, 1971), and of neurogenic hypertension in rabbits (Chalmers & Wurtman, 1971), has been proposed. The current study was under-