

- COPPOLA, J. A. (1969). Turnover of hypothalamic catecholamines during various states of gonadotrophin secretion. *Neuroendocrinology*, **5**, 75-80.
- COPPOLA, J. A. (1971). Brain catecholamines and gonadotrophin secretion. *Frontiers in Neuroendocrinology*. pp. 129-143. ed. *Martini, L. and Ganong, W. F.*
- ENDERSBY, C. A., GALLAGHER, M., HORTH, C. E., McDONALD, P. G. & WILSON, C. (1972). Changes in plasma levels of oestrogen, progesterone and LH in immature rats treated with PMS. *J. Endocr.* (in press).
- STRAUSS, W. F. & MEYER, R. K. (1962). Neural timing of ovulation in immature rats treated with gonadotrophin. *Science*, **137**, 860-861.

Is cortical dopamine only the precursor of noradrenaline?

G. BLANC, J. GLOWINSKI, L. STINUS and A. M. THIERRY* (introduced by L. L. IVERSEN)

*Groupe NB, Laboratoire de Biologie Moleculaire, College de France,
11 Place Marcelin Berthelot, Paris 5e, France*

It has generally been assumed that the catecholamine nerve terminals in the rat cerebral cortex were noradrenergic (Ungerstedt, 1971). However, the dopamine (DA) concentration in this structure is comparable to that of noradrenaline (NA). To investigate whether cortical DA might play a role other than merely the precursor of NA in noradrenergic neurons, NA and DA were estimated biochemically in the cortex (Thierry, *et al.*, 1971) after electrolytic or chemical destruction of the ascending noradrenergic pathways. Groups of 8 Charles River male rats were killed 5 weeks after either bilateral electrolytic lesions of the locus coeruleus or microinjections of 6-hydroxydopamine (6-OH-DA) made laterally to the pedunculus cerebellaris superior (PCS), or after sham operations. Electrolytic lesions were made with high frequency current (100 KHz, 2 mA. 10 s). 6-OH-DA (2 µg in one µl, protected with ascorbic acid) was injected locally into the PCS (1 µl/5 min). Lesions of the dorsal noradrenergic pathway (locus coeruleus) or combined lesions of the ventral and dorsal noradrenergic pathways (PCS) induced marked decreases in cortical NA content (Table 1), of 65 and 92%

TABLE 1. Catecholamine levels in the rat cortex after either bilateral electrolytic lesions of the locus coeruleus or bilateral microinjection of 6-OH-DA made laterally to the pedunculus cerebellaris superior (P.C.S.)

	Locus coeruleus		P.C.S.	
	Control	Lesion	Control	6-OH-DA
NA (µg/g)	0.280 ± 0.014	0.097 ± 0.001*	0.213 ± 0.021	0.017 ± 0.003*
DA (µg/g)	0.196 ± 0.024	0.151 ± 0.009	0.122 ± 0.007	0.140 ± 0.029

Results are the mean ± S.E.M. of data obtained with 8 rats.

**P* < 0.001 when compared with control values.

respectively. Surprisingly, cortical DA concentration was not changed significantly after either type of lesion to the noradrenergic neuronal systems. These results strongly suggest that most cortical DA is not localized in noradrenergic nerve terminals and this may suggest the existence of dopaminergic neurons in the cerebral cortex.

REFERENCES

- THIERRY, A. M., BLANC, G. & GLOWINSKI, J. (1971). Dopamine-norepinephrine: another regulatory step of norepinephrine synthesis in central noradrenergic neurons. *Eur. J. Pharmacol.*, **14**, 303-307.
- UNGERSTEDT, U. (1971). Stereotaxic mapping of the monoamine pathways in the rat brain. *Acta Physiol. Scand. Supplementum*, **367**, 1-48.

Pharmacological interactions between γ-hydroxybutyric acid and agents which modify cerebral γ-aminobutyric acid (GABA) metabolism

D. BENTON*, J. T. RICK and P. V. TABERNER (introduced by J. F. MITCHELL)

Department of Psychology, University of Birmingham, Birmingham 15 and Department of Pharmacology, University of Bristol Medical School, Bristol 8

γ-Hydroxybutyric acid (GHB) and imidazoleacetic acid (IMA) are both naturally occurring brain metabolites which, when administered to rats and mice at 400 mg/kg i.p.,