

References

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Effects of chronic (\pm)-propranolol on catecholamines and GABA in rat striatum

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Investigations of the effects of (\pm)-propranolol on central catecholamine concentrations have produced conflicting results (Peters & Mazurkiewicz-Kwilecki, 1975). However we have shown that chronic administration of propranolol to rats increased steady state concentrations of dopamine in the corpus striatum. (Mahon, O'Donnell & Leonard, 1977). In the study reported here we have attempted to extend our previous findings.

Male Sprague-Dawley rats (180-200 g) were given (\pm)-propranolol (30 mg/kg) daily for 14 consecutive days in a divided dose. Diazepam (5 mg/kg) was similarly administered to another group and controls received saline. All injections were given i.p. Behaviour was assessed on day 12 using a modified form of the hole-board of Davies & Wallace (1976). Twelve h after the final injections the concentrations of γ -amino-n-butyric acid (GABA), noradrenaline (NA) and dopamine (DA) in the midbrain and striatum were estimated following microwave radiation of the skulls. The catecholamines were determined by the method of Leonard & Tonge (1969) and GABA by the method of Uchida & O'Brien (1964). Striatal catecholamine turnover following similar propranolol treatment was measured in a second experiment using the MAO inhibitor, pargyline.

Chronic administration of propranolol caused a significant ($P < 0.005$) decrease in striatal GABA concentration and increases ($P < 0.05$) in striatal DA and midbrain NA levels. Neither chronic diazepam nor an acute dose of propranolol (30 mg/kg) had any effect on the neurotransmitters measured. No effects of

propranolol on turnover were detected. The animals' behaviour was unaltered by any of the drug treatments.

An increase in steady state DA concentration in the striatum could be due to direct receptor blockade, and/or to an effect on tyrosine hydroxylase activity in this brain area. Propranolol has been shown to differ from the phenothiazines in that it augments the rotation produced by amphetamine (Fuxe, Bolme, Agnati & Everitt, 1976). Peters & Mazurkiewicz-Kwilecki (1975) have reported a stimulation of striatal tyrosine hydroxylase activity in rats given propranolol for 6 days. Our results are compatible with an action of the drug on this enzyme.

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