

The behavioural effects of EOS-induced changes in substantia nigra GABA levels

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GABA levels in the substantia nigra (SN) are raised after local injection of ethanolamine-*O*-sulphate (EOS), an inhibitor of GABA: glutamate transaminase (Dray, Oakley & Simmonds, 1975). Dray, Fowler, Oakley, Simmonds & Tanner (1975) have reported lowered striatal dopamine levels on the side of the EOS injection and rotational behaviour consistent with asymmetrical striatal functioning. These effects faded after 5 days. We have studied the changes in spontaneous and amphetamine induced motor behaviour after *bilateral* injection of EOS into the SN (zona reticulata).

Rats are implanted bilaterally with 23 gauge cannulae to within 1 mm of a site in the zona reticulata of the SN. The co-ordinates were A, 3.0; L, 2.0; V, 6.8 from the atlas of Pellegrino and Cushman. For the EOS injection the rat was held firmly and a 30 gauge injection cannula was lowered through the guide to a site 1 mm beyond the guide tip. EOS (200 µg/kg) was injected in 1.5 µl of saline over a 2 min period. Control rats received a 1.5 µl of vehicle solution under identical conditions. Thirty minutes elapsed between the injections on the two sides of the brain. Behaviour was observed immediately following the EOS injection. Twenty-four and 72 h after the injection spontaneous locomotor behaviour was measured for

30 min and stereotyped behaviour was rated. (+)-Amphetamine (1.5 mg/kg) was then administered and these behaviours recorded for 2 hours. The EOS injection was repeated at weekly intervals. The cannulae placements were verified histologically at the end of the experiment.

Immediately following the EOS injection contralateral turning occurred (i.e. away from the injection side). When the injection was given on the second side turning in the opposite direction occurred. Stereotyped behaviours including sniffing and biting were also seen soon after the injection and were still pronounced 24 h later. At this time (+)-amphetamine (1.5 mg/kg) intensified the on-going stereotyped behaviour both in its nature and duration. These effects became more pronounced after each weekly EOS injection.

The results suggest that raising GABA levels in the zona reticulata of the SN results in heightened functional activity of the dopamine-containing nigro-striatal tract. This activity results in spontaneous stereotypy and enhanced motor responses to amphetamine. The nigro-striatal system appears to become progressively sensitized to the EOS treatment.

References

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Platelet uptake of [¹⁴C]-5-hydroxytryptamine in 'emotional' and 'non-emotional' rats

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A method has been developed in our laboratory for selecting rats characterized by a high level of emotionality (Boissier, Simon & Soubrie, 1975). We have undertaken studies in order to look for biochemical differences between 'emotional' (E) and 'non-emotional' (NE) rats. We report here data concerning 5-hydroxytryptamine (5-HT) uptake by blood platelets. Such a study is of interest because the

uptake of amines by platelets is thought to be a model for some aspects of aminergic brain function.

The experiment was performed on 14 E rats and 14 NE rats. Two fractions of 1 ml of platelet-rich plasma were prepared for each rat. The uptake of [¹⁴C]-5-HT (25 nmol, 1 µCi/ml) was measured at suitable time intervals. Statistical analysis (Student's *t* test) of the results (expressed in d.p.m. × 10³ per 10⁷ platelets) indicates that 5-HT uptake by platelets is lower in E rats than in NE rats:

Time of incubation (min)	5	15	30
E rats	1.97 ± 0.13	3.60 ± 0.13	6.52 ± 0.35
NE rats	2.00 ± 0.07	4.68 ± 0.21	7.82 ± 0.40
	ns	P < 0.001	P < 0.02