

# **Modification by anti-depressant drugs of plasma corticosterone levels in the stressed bulbectomized rat**

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Rats following bilateral olfactory bulbectomy exhibit a motivational deficit in a one-way avoidance task (King and Cairncross, 1974), associated with a reduction in telencephalic noradrenaline concentrations. Amitriptyline (1.5 mg/kg i.p.) administered for 14 days prior to behavioural testing reversed the behavioural deficit (Cairncross, Schofield & King, 1973, Cairncross, King & Schofield, 1975). These observations suggested the bulbectomized rat as a screen for potential antidepressant drugs. The viability of such a premise has been confirmed using a variety of behavioural parameters (van Riezen, Schnieden & Wren, 1976, Rigter, van Riezen and Wren, 1977). This raised the question as to whether a physiological parameter could be used as an alternative indicant of antidepressant activity.

Bassett, Cairncross and King (1973) have established that plasma corticosterone elevation can be quantitated in the rat. Two degrees of corticosterone elevation were noted, an intermediate elevation (45–55 µg/100 ml blood plasma) and an extreme elevation (80–90 µg/100 ml blood plasma). Extreme glucocorticoid elevation occurred when a psychological stressor was superimposed on a physical stressor. Thus, it was decided to examine the effects of bilateral olfactory bulbectomy as a stressor and to expose bulbectomized and sham operated rats to predictable stress in the form of footshock (5 s of 1.5 mA scrambled footshock every 55 s for 20 min i.e. 20 trials).

It was demonstrated that footshock in sham operated rats produced intermediate 11-OHCS elevation, from a control value of  $18.2 \pm 1.6$  to

$44.4 \pm 2.8$  µg/100 ml blood plasma ( $P > 0.001$ ). Bulbectomy without stress elevated plasma 11-OHCS levels to the intermediate level (43 µg/100 ml) and following regular footshock, the 11-OHCS level rose to extreme values ( $78.1 \pm 3.04$  µg/100 ml.  $P > 0.001$ ). Similar patterns of elevation occurred in individually housed rats and in rats housed in groups of five.

The effects of antidepressant drugs were examined on the extreme steroid elevation induced by bulbectomy plus footshock. Amitriptyline and mianserin were administered at a dose of 5 and 10 mg/kg i.p. for 10 days and viloxazine at 2 and 5 mg/kg i.p. for 8 days to groups of bulbectomized and sham operated rats. The animals were subjected to footshock and immediately sacrificed. Whilst the three antidepressants had no effect on the intermediate 11-OHCS elevation induced by footshock in the sham operated groups, it was found that each drug significantly lowered the extreme steroid elevation in the bulbectomized groups.

## **References**

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