Effect of parachlorophenylalanine on the behaviour of castrated male rats

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The concentrations of 5-hydroxytryptamine (5-HT) in the brain of the rat can be reduced by treatment with parachlorophenylalanine (PCPA) (Koe & Weissman, 1966). Increased sexual behaviour has been observed in male rats treated with PCPA (Sheard, 1969; Tagliamonte, Tagliamonte, Gessa & Brodie, 1969; Shillito, 1970). As these changes in behaviour were seen in young as well as older, mature animals, it was decided to investigate the effect of this compound on castrated rats to determine if testosterone was involved in the increased sexual behaviour.

Three groups of eight male albino rats were castrated at 3 weeks of age and one group was castrated at 5 weeks. They were left for 2 weeks to recover from the operation and to allow for any circulating testosterone to be eliminated. All animals were kept under reversed daylight conditions and observed at 5–6 weeks, 8–10 weeks and 14–16 weeks of age. During the experiments, each group of rats was kept in an observation cage under the same conditions as in previous experiments (Shillito, 1970). Two forms of social interaction were recorded; (a) mounting, and (b) the number of times one rat lay on top of another. Each rat was given an identifying mark and the identity of the two rats involved in any interaction was recorded where possible. Another group of rats was adrenalectomized as well as castrated at 3 weeks of age and these were given betamethasone in the drinking water.

The untreated castrated rats behaved differently from intact rats in that they were less active and did not always become active when the light was changed from white to red; they also had very little social interaction. Twenty-four hours after an intraperitoneal injection of PCPA (316 mg/kg) they became active when the lights changed and there was increased chasing and lying over one another. Mounting, which was not seen in the untreated, castrated animals was observed after injection of PCPA. The incidence of mounting was always highest 24 h after injection. When the rats were 5 and 6 weeks old it occurred only on 2 days after the drug treatment. At 10 weeks of age the mounting was seen on 3 days after the injection. When the rats were more than 14 weeks old they appeared to be ill after treatment with PCPA (316 mg/kg) so the dose was changed to 100 mg/kg for 3 days. It was found that one dose of 100 mg/kg was effective in producing increased sexual behaviour. Rats which were both adrenalectomized and castrated were affected in a similar way. Gessa, Tagliamonte, Tagliamonte & Brodie (1970) have reported that the effect of PCPA is dependent on the presence of testosterone. The present results do not confirm this view.

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