SOME STUDIES ON THE USE OF "STANDARD OPPONENTS" IN INTERMALE AGGRESSION TESTING IN TT ALBINO MICE

by

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(With 7 Figures)

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Aggressiveness (being those internal factors which are presumed to influence an animal's propensity for exhibiting fighting behavior) of animals cannot be measured directly. As a consequence of this rather obvious statement, "aggression tests" are utilized in which the amount of agonistic behavior in a standard time interval is assessed by various means, and, as this fighting behavior (the action pattern) is assumed to be closely related to the aggressiveness (internal motivational state) of the animal, some index of this property is obtained.

It has been previously indicated that both in the rat (BARNETT, 1969) and the mouse (BRAIN & NOWELL, 1970a), the amount of agonistic behavior exhibited in a test situation is strongly influenced by the animal's previous experience. If this is indeed true, such testing as utilized in the well-known "round robin" test will involve a degree of "training" as well as being very time consuming and difficult to treat statistically. Indeed, indications have been obtained that the results of this test are difficult to relate to individual physiological measures (BRAIN & NOWELL, 1969a; 1970b). To overcome this difficulty, a "standard opponent" aggression test has been utilized in which test animals are fought against relatively non-aggressive young (30-40 days), sexually naive males from groups of 6, which have been housed together since weaning (BRAIN & NOWELL, 1970a). Such animals are variable to a degree of course, but they are utilized at a stage before pronounced fighting occurs in their home cages with subsequent hierarchy formation and such mice (from the strain used at least) readily submit if attacked by the test animal and have never been seen to initiate an attack on a test mouse.

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Such a test is very similar in construct to the "bully test" employed in other studies (e.g. Edwards, 1969) and to one described by Häutojarvi & Lagerspetz (1968). Mugford & Nowell (1971) in their work on pheromones and fighting behavior in the Tuck albino mouse, employed prepuberally castrated males as “standard opponents” in order to minimize the effects of pheromone production by these mice. Edwards (1969) had previously shown that castrated and inexperienced male and female mice would attack a much smaller opponent even in the absence of replacement therapy with male sex hormone and that under such conditions there was little difference between the behavior of males and females castrated at 30 days of age. These findings were largely supported by a study by White et al. (1969) but it was found that quite different effects were obtained when the “standard opponent” was an adult. In all these studies the “standard opponents” were generally used more than once.

In this study the use of “standard opponents” was studied in a number of respects. Firstly, young intact males and young castrates were contrasted as “standard opponents”. Secondly, the effects of fighting experience on a number of measures commonly used to assess aggressiveness were studied and the effects of this experience on the relationships between these measures were investigated.

**METHODS**

The twenty male mice of the TT albino strain (originally obtained from A. Tuck and Sons Ltd, Essex) utilized as test animals in this study were from breeding regimes described more fully elsewhere (Brain & Nowell, 1969b). Briefly, the mice were kept in conditions of minimum extraneous stress with a light regimen of 12 hours (on 08:00-20:00 hr) and were supplied with food and water 'ad libitum'. They were obtained from litters born in a 5 day period, which had been culled on the day of birth to 6 and had remained unhandled until weaning at 18-22 days of age when they were segregated into single sex groups of 6. The experimental animals had been successfully mated at 9 weeks of age and at approximately 13 weeks of age, 10-14 days following the birth of the litter, they were removed from the breeding cages and were isolated in galvanized metal cages measuring 37 X 17 X 12 cm for a 6 day period (isolation is known to increase the appearance of fighting behavior, probably as a result of modifications in the functions of the pituitary-adrenocortical and the pituitary-gonadal axes as reviewed by Brain, 1971). The naive intact males against which these mice were fought were from the same breeding regime and were approximately 40 days old on the first day of testing. The naive castrates used as opponents were litter mates of the intact opponents which had been operated on under ether anaesthesia at 18-22 days of age and then maintained in groups of 6 until testing.

The aggression test situation used was based on a method described by Levine et al. (1965). The tests took place in a lidless, metal container measuring 68.5 X 34 X 20 cm, painted black internally and with a partition across the middle of the long side. The test mouse and its “standard opponent” were initially separated by the partition for one minute and after the partition was removed their actions were observed for a further 5 minutes. The agonistic sequence of the mouse consists of an initial approach, threat,