THE ROLE OF INDIVIDUAL RECOGNITION BY ODORS IN THE SOCIAL INTERACTIONS OF THE MONGOLIAN GERBIL (MERIONES UNGUICULATUS)

by

ZULEYMA TANG HALPIN 1)2)

(Department of Zoology, University of California, Berkeley, Calif., U.S.A.)

(With 2 Figures)

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INTRODUCTION

WILSON (1970) has suggested that individual identification by odors may be an important function of vertebrate pheromones, especially among species whose social behaviour is based on the recognition of individuals. Surprisingly, however, this aspect of pheromone function has been studied in only a few species.

Individual recognition by odors has been reported in the yellow bullhead Ictalurus natalis (BARDACH & TODD, 1970), in blacktailed deer Odocoileus hemionus columbianus (MÜLLER-SCHWARZE, 1971), and in the flying phalanger Petaurus breviceps (SCHULTZE-WESTRUM, 1969). GOODRICH & MYKYTOWYCZ (1972) reported individual differences in the chemical composition of secretions from the chin, anal and inguinal glands of rabbits (Oryctolagus cuniculus). A previous study (MYKYTOWYCZ & DUDZINSKY, 1972) had provided behavioural evidence of individual differences in the odors from inguinal secretions.

Among rodents, BOWERS & ALEXANDER (1967) showed that mice (Mus musculus) can be trained to discriminate between the odors of two different conspecifics. MACKINTOSH & GRANT (1966) demonstrated that this ability to recognize individuals by odors can be an important element affecting the social interactions of mice. By using pairs of familiar and unfamiliar males they were able to show that familiar males scented with anogenital odors from unfamiliar males elicited a significantly greater number of attacks than did unscented, familiar animals. On the other hand, unfamiliars scented

1) Present address: Department of Biology, University of Missouri-St. Louis, St. Louis-Missouri, 63121, U.S.A.

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with odors from familiar conspecifics elicited fewer attacks than did untreated, unfamiliar, control males. In the rat (Rattus norvegicus), studies by Carr et al. (1970) and by Alberts & Galef (1973) suggest that individual recognition by odors may also be important in the social interactions of this species.

In the Mongolian gerbil (Meriones unguiculatus), a highly social Cricetid rodent, Nyby et al. (1970) and Thiessen & Dawber (1972) have suggested that biological odors serve a territorial function. However, Baran (1973), Baran & Glickman (1970), and Thiessen et al. (1970) have reported that gerbil odors can also act to attract unfamiliar conspecifics. In 1971, Dagg & Windsor (1971) showed that four gerbils which had been trained to distinguish between pairs of odors in a T-maze could discriminate between urine odors from two conspecifics. By employing a habituation-preference testing technique, Halpin (1974) demonstrated further that there are individual differences in the biological odors of the gerbil in the case of ventral gland secretions, urine, and gerbil-soiled shavings, and that conspecifics are capable of discriminating these differences. The same study found no evidence of individual differences in the odors of fresh fecal pellets.

If, as suggested by these studies, gerbils can in fact recognize individuals by odors then it might be expected that this would be a significant factor influencing the social behaviour of this species. The object of the present study is to determine the importance of individual odors in the social interactions of male Mongolian gerbils.

**EXPERIMENT ON THE EFFECTS OF ANOSMIA ON SOCIAL INTERACTIONS**

Most studies on the effects of anosmia on the social behaviour of rodents have shown that olfactory deprivation results in a reduction of aggressive behaviours during intraspecific encounters. Bilateral removal of the olfactory bulbs has been reported to reduce aggression in the golden hamster (Murphy, 1970), in the mouse (Rowe & Edwards, 1971), and in the rat (Bandler & Chi, 1972). In these studies it was generally assumed that all changes in behaviour were due to the experimental animals' inability to smell. However, since ablation of the olfactory bulbs inevitably causes some damage to surrounding neural tissue and may induce abnormal activity in structures receiving input from the bulbs, it is possible that some behavioural changes could have been due to central nervous system effects not directly related to olfaction (Edwards, 1974).

In 1971, Alberts & Galef (1971) reported on a new procedure for inducing anosmia without causing damage to the central nervous system. They found that bathing the nasal mucosa of rats with a 5% solution of