

Improving the environment of laboratory rhesus monkeys through social interactions and paired housing.

By Andrea Bolderson

Introduction

The Rhesus monkey (*Macaca mulatta*) is a non-human primate that is kept in large numbers as a captive laboratory animal. Although these animals appear to adapt well to captivity by thriving and breeding readily, they commonly develop abnormal patterns of behaviour that are considered indicative of compromised welfare. These behaviours are defined as stereotypies and self-injurious behavior (SIB) and include pacing, swaying, hair pulling, self-biting and wounding. Studies have attempted to determine the factors influencing these behaviours in order to improve the animal's welfare but also to enable the production of more accurate research results, which is of utmost importance to scientific research. Although the issue of keeping these animals for research is often the source of highly emotive debate, this report will focus on the improvement of their situation in captivity by examining three papers that deal with the influence of environmental and social enrichment on abnormal behaviours.

Discussion

Environmental enrichment is an attempt to improve the welfare of captive animals and can include enlargement of cages, provision of toys or inanimate objects, visual and auditory stimulation, food motivation and ultimately the wish to simulate the animal's wild environment. The nature of the enrichment depends on a number of factors, from the requirements of the species being held captive, to the facilities and budget of the research centre. In the wild the rhesus monkey lives in a complex harem system and it is thought that social and housing conditions affect their behaviour more so than cage size or other environmental enrichment (Young, 2003). The housing of these monkeys in individual cages is associated with an increased incidence of stereotypies and SIB, as well as depressed immune function and an increased likelihood of contracting disease (Hotchkiss and Merle, 2003).

A study undertaken by Lutz et al. (2003) involving 362 rhesus monkeys highlighted the importance of paired or group housing as a vital enrichment tool. The monkeys were observed in a variety of different caged situations and each animal's behavioural history was taken into consideration. The history included the age at which they were weaned from their mothers, as hand rearing was noted to be the single best predictor of stereotypic behaviour (Lutz et al., 2003). However, opinions differ on the most appropriate age of weaning, and after observing these monkeys it was concluded that the age of onset of individual housing was a more important risk factor than rearing experiences (Smith and Boyd, 2003). This study also suggested that stressful events may lead to the perpetuation of stereotypies. Such events included changes in husbandry routines, increased activity of personnel, and procedures involving restraint.

The significance of stressful events as a factor influencing behaviour was also noted by Novak (2003) in her study that investigated the etiology, physiology and treatment of SIB in rhesus monkeys by recording self-biting rates over 6 hour periods. A pattern emerged with peak biting times in the morning when technicians were busiest cleaning and feeding, and lowest biting times at lunch when the technicians were absent or taking a break.

The study by Novak (2003) aimed to identify the motivation for abnormal behaviours. Self-biting (a common SIB) rapidly lowers the heart rate and was suggested by Novak as a coping strategy to reduce arousal. Novak questioned the "payoff" for the animal. What do they get out of it? Possibilities included reducing or increasing arousal and attracting the attention of caregivers. The research emphasised the importance of understanding the motivation behind these behaviours and effective treatment. It also confirmed the inability of previously accepted environmental enrichment strategies, such as puzzle feeders and foraging tools, to lower the

incidence of stereotypies. Although the monkeys interacted with these objects, none of them showed less frequent self-directed biting (Novak, 2003).

When rhesus monkeys are to be housed in pairs or groups it is necessary to be aware of the welfare issues concerning the implementation of such a strategy. Successful socialisation depends upon a number of variables including age, sex, temperament, and compatibility. It is also important to allow sufficient room for pair housed animals to move away from one another (Young, 2003).

A study by Weed et al. (2003) also focused on social enrichment. Instead of considering same gender pairings, their research measured the effect that mixed gender groups had on treating persistent SIB. The study involved the use of vasectomisation in males to enable male-female interaction without the consequences of unwanted pregnancies. The subjects were six male rhesus monkeys that had prior histories of SIB. The animals were vasectomised and then placed with females after a period of intermittent socialisation behind plexiglass panels. Interestingly, their research showed a marked decrease in the incidence of SIB, although there was a concern over the low number of subjects and the relatively short observational duration (1 to 2 months). However, their research did highlight the benefits of vasectomisation to younger monkeys. By allowing a resemblance of social groups to be maintained in captivity, immature animals could acquire normal patterns of social behaviour through the observation of mature animals and contact with peers of both sex. Unfortunately in this study only one of the pairings remained together at the time of publication and the other monkeys that had been separated from their new partners all returned to higher levels of SIB almost immediately.

Conclusion

To enable improvements to be made to the welfare of captive rhesus monkeys it is important to understand the factors influencing abnormal behaviours. All three studies examined were in agreement that the most important enrichment tool is the provision of housing that allows adequate social contact. Perhaps animal welfare legislation needs to be put in place to ensure basic social conditions are provided for this highly social species of macaque when kept in captivity.

References

- Hotchkiss, C. and Merle, P.G. (2003) Effect of Pair-Housing on Operant Behaviour Task Performance by Rhesus Monkeys. *Contemp. Top. Lab. Anim. Sci.* 42:4 38-41.
- Lutz, C. (2003) Stereotypic and Self-Injurious Behaviour in Rhesus Macaques: A Survey and Retrospective Analysis of Environment and Early Experience. *Am. J. Primatol.* 60: 1-15.
- Novak, M.A. (2003) Self-Injurious Behaviour in Rhesus Monkeys: New Insights Into It Etiology, Physiology, and Treatment. *Am. J. Primatol.* 59:3-19.
- Young, R.J. (2003) *Environmental enrichment for captive animals*. Blackwell Science Ltd. Great Britain.
- Weed, J.L., Wagner, P.O., Byrum, J., Parrish, S., Knezevich, M. and Powell, D. (2003) Treatment of Persistent Self-Injurious Behaviour in rhesus Monkeys through Socialisation: A Preliminary Report. *Contmp. Top. Lab. Anim. Sci.* 42:5 21-23.
- Smith, J.A. and Boyd, K.M. (2003) The Boyd Group of Papers on: The use of non-human primates in research and testing. *Animal Welfare and Technology* 2:2 89-89.