

The Törneby Primate Facility Optimisation of housing conditions for Rhesus Macaques in Sweden

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Introduction

The past: a brief historical background.
The Törneby Primate Facility (TPF) was preceded by the Primate Laboratory for Fertility Research in the 1960s. This was located at the Academic Hospital, Uppsala University. Pioneering studies on female reproduction was done here by Dr Gemzell until 1975. In the 1980s the research focus changed to the use of rhesus monkeys in Positron Emission Tomography (PET) research under Professor Bengt Långström. In 1994, the TPF was established by converting one of the university farms (11 km from Uppsala City) into a modern non-human primate housing facility at a cost of SEK 12 million. In 1997, the administration of the TPF was taken over by the university's newly established centralised Laboratory Animal Resources under Professor Jann Hau.

The Facility

Törneby Primate Facility is a typical red Swedish wooden farm (Figure 1) about 11 km from Uppsala City, 70 km from Stockholm. The facility is divided into 6 units, each with indoor and outdoor access and spacious corridors ($6 \times 30 \text{ m}^2$ indoor cages and $6 \times 100 \text{ m}^2$ outdoor runs). Support facilities include: a procedures room for minor surgery adequately supplied with surgical equipment, food storage (cold) room, changing rooms, conference/library room, kitchen/lunch room, bedroom for overnight stays and large drive-in storage room/warehouse. The TPF is well designed to withstand extremes of weather and provides a pleasant home for rhesus macaques used for biomedical research as well as a good working environment for staff.

Figure 1.



Figure 1 shows the front view of the TPF. The building on the left consists of procedure rooms, library, kitchen, bedroom, bathrooms, changing rooms and hardware store. On the right is the drive-in storage room. The animals are housed in

the indoor cages which are connected to outdoor enclosures to the back of the buildings. The floors are heated throughout the facility and this is particularly important in the Swedish winter.

Figure 2



The outdoor enclosures

These are used by the animals all year round. Part of the enclosures is covered by a plastic roof and infra-red lights provide extra warmth as the winter temperature can drop to -30°C . The enclosures are provided with ropes and swings and whole tree trunks have been erected inside (Figure 2). These features efficiently increase the usable space.

The indoor rooms

The groups housed in each of the six units consist of one male and 5-9 females. The animals have access to the outdoor enclosures through a swing door which can be controlled remotely by the staff. The main cage is connected to a smaller cage (8 m^2) which is used when an animal is isolated for veterinary care or research. Food is scattered in wood chip bedding and placed at several places in the room and in food containers. Drinking water is provided from automatic water nipples. A variety

of environmental enrichment materials are provided (Figure 3).

Husbandry

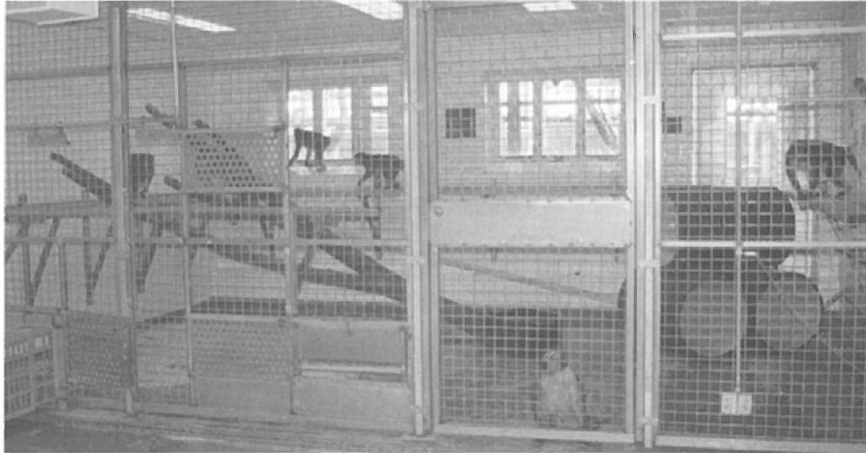
There are four members of staff who work at the TPF. The indoor rooms are cleaned with high pressure water on a daily basis while the outdoor runs are cleaned every other day, also with high pressure water. All surfaces are sprayed with standard house hold detergent, scrubbed and flushed with clean water. The drains are flushed with plenty of water several times during the cleaning. Wood chips are changed and side cages washed once a week.

The animals are fed twice a day. In the morning they are supplied with dry pellets cereal meals (maize, wheat, and peas) while during late afternoon they are given any two combinations of the following fresh fruits (oranges, bananas, grapes, apples, and pears). The food is scattered on the

floors of the indoor rooms and some is placed in strategic places and inside food cans, and in objects and crevices in the rooms. Some food is spread in a deep litter of wood chips in a side cage and in troughs filled with wood chips and placed

in the rooms. In between meals, members of staff socialise with the animals by hand feeding them tiny pieces of favourite treats such as wheat seedlings, raisings, honey coated rice puffs and Kellogg's corn flakes.

Figure 3



Health monitoring

The staff keep daily journals of the animals health status. These journals include information on behaviour, appetite, stool, menstruation and injuries. The animals are observed daily and physically examined twice a year. Blood samples are taken for Herpes B virus screening as well as stool samples for bacterial and parasitological screening. The present colony has now tested negative for Herpes B virus since 1994.

Apart from sporadic incidents of bite wounds, and occasional cases of protozoa infections and spontaneous tumours (Guhad *et al.* 1998), no infectious diseases have been recorded in recent years in the facility.

Behaviour Monitoring

A series of behavioural studies have been initiated using the colony as a tool to develop efficient behavioural monitoring systems which can be applied to monitor social stress in captive rhesus monkeys (Augustsson and Hau, 1998). Ethological monitoring of social compatibility and

of individual time budgets provide scientific data assisting in changes to group compositions and assessments of well-being. From this project we aim to get a scientific documentation of social stress connected to coping ability in animals in different social groupings and environments. The continuous monitoring system will provide information on which factors are important when trying to enhance the welfare of laboratory animals.

Positron Emission Tomography (PET)

The PET research is expected to continue as the main research area for which the rhesus monkeys are used as animal models. The objective of the research program is to increase the knowledge of neurophysiological processes, particularly within the brain. Studies are aimed at elucidating the mechanisms underlying neurological and psychiatric diseases and to develop treatment for them. The principal research programs include neurophysiological studies focused on mechanisms for the regulation of neurotransmitter

synthesis, mechanism of anesthesia, mechanisms of serotonergic, dopaminergic, cholinergic, GABA-ergic receptor function and regulation, as well as studies on their interaction with the NMDA-receptor complex (International Directory of Primatology, 1998). Pharmacodynamic and pharmacokinetic studies, e.g. distribution of drugs and nutrients from mother to fetus, in the lungs after inhalation, drug uptake from the GI tract, are also within the scope of the PET programme.

References

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