

Housing laboratory animals individually

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1 Introduction

Dutch and European regulations ^{1,2} state that laboratory animals must be housed in groups (two or more animals), unless the species is solitary by nature. In principle, all of the Utrecht Science Park (USP) animal facilities provide group housing for laboratory animals. Species that are solitary by nature, such as hamsters, are housed singly (individually). There may also be biological, welfare, experiment-related, practical or other reasons that make it desirable or even necessary to house animals singly, whether temporarily or permanently. In this regard, it is important to know that individual housing affects an animal's behaviour and physiology, even if only temporary, and thus has an effect on not only the animal's welfare, but also the data resulting from the experiment itself. The regulations state that in these cases the length of separation must be kept to the minimum necessary and that visual, auditory, olfactory and/or tactile contact must be maintained. In addition, the introduction or reintroduction of animals in existing groups must be carefully supervised, in order to avoid problems resulting from incompatibility or disrupted social relationships.

¹ Experiments on Animals Act:
<https://wetten.overheid.nl/zoeken/zoekresultaat/rs/2,3,4/titel/dierproeven/titelf/1/tekstf/1/artnr/0/d/20-06-2019/dx/0>

² EU directive 2010/63/EU, Annex III: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:276:0033:0079:en:PDF>

2 Aim

The aim of this policy is to:

- clarify when and under what conditions animals that live in groups by nature may be individually (singly) housed;
- set frameworks for determining when exceptions can be made to the obligation to attempt to re-introduce animals from individual back into group housing;
- give guidance for when to discontinue individual housing;
- align with national policy.

3 Scope

This policy is binding for employees of UU and UMC Utrecht. External parties housing their animals in one of the UU or UMC facilities are expected to comply with this policy. Exceptions can only be made in consultation with the Animal Welfare Body Utrecht (hereafter IvD).

4 General guidelines

- A researcher faced with the decision (whether planned or unplanned) to individually house animals used for an experiment must inform him/herself of its expected effects on the experimental results, and must consider these effects in deciding whether or not to house the animals individually.
- If the animal(s) cannot be kept in group housing, they must be housed in such a way that they can see, hear, smell, and/or touch each other. The researcher must also ensure enrichment of the environment that is appropriate to the species, such as toys and/or extra attention from the caretakers.

5 Situations and circumstances under which individual housing is permitted

The following laboratory animals may be housed individually, if the accompanying conditions (in italics) are met.

- Stabled horses in the Clinic for Equine Health.
Horses in the pasture are always in a group, with the exception of stallions. If stabled, the horses must be able to see at least one other horse and have physical contact, either by using open-top boxes/stalls or a hole between stalls allowing them to touch noses. The researcher(s) will explore possible forms of group housing in stables.
- Bulls with the Department of Farm animal Health.
- Pregnant laboratory animals, from at least one day prior to parturition, or as much longer as necessary before parturition to ensure the welfare of the mother and a proper birth process.
- Laboratory animals who cannot, or can no longer be housed in a group situation, because of traits of their strain, sex, or individual personality, such as aggression or microbial or immunological status.

Additional conditions:

- *The time and reason for single housing must be recorded in the work protocol or welfare log.*

- *On the basis of consultation with the IvD, the designated veterinarian or clinic veterinarian, the researcher(s) will decide:*
 - *How long the animals will be kept, also in relation to the education/research they are used for*
 - *Whether enough effort was made to prevent individual housing*
- Sick animals or animals with a particular discomfort, in which case the purpose of individual housing is treatment and/or recuperation of the individual animal or to prevent contamination or stress to conspecifics. The fact that group housing may have a positive effect on the animal's recovery must be considered.

Additional conditions:

 - *The IvD, the designated veterinarian or clinic veterinarian must be consulted.*
 - *The necessity for individual housing must be documented.*
 - *The animals must not be kept in single housing longer than is reasonably necessary.*
- Laboratory animals in experiment who must temporarily or permanently be housed individually in the interest of the research.

Additional conditions:

 - *Individual housing must be mentioned in the work protocol.*
- Male animals being used for breeding – in particular mice and rats – who can no longer be housed in a group situation after mating.

Additional conditions:

 - *The necessity must be mentioned beforehand in the breeding protocol.*
 - *Male mice and rats to which this applies must be kept individually housed for as short a time as possible, and for no longer than 12 consecutive weeks.*
 - *Exceptions are only allowed on the basis of consultation with the IvD.*

6 Discontinuing single housing

If a situation occurs in which it seems possible to return individually housed animals to group housing (e.g. the last living animal in an experimental group, only weanling of either sex, victim of aggression), efforts must be made to discontinue single housing. The following points are to be considered.

- The decision to stop individual housing in an experiment, is made by the principal investigator (PI) or alternate principle investigator (API). He or she will ascertain if this aim is compatible with the research question and the proper execution of the experiment. He/she will also take into account critical factors such as the sex, personality (in e.g. a dog or cat), microbial status, age and weight of the individual animal and/or its potential cage/housemate.
- A temporary or permanent separation can cause or exacerbate aggression in certain species, strains or sexes. This must be considered when deciding whether or not to return animals to group housing. If the decision is made to reunite the animals, their interactions with each other must be well monitored.
- If it is found that the individual housing must be continued, the reason for doing so must be recorded.
- If problems occur after the individual housing is discontinued which are reason to return the animal to individual housing (e.g. persistent aggression), then a second attempt to restore group

housing does not need to be made. The animal will then be housed individually on a permanent basis. The maximum duration of this situation must be decided and documented in consultation with the IvD.

- Animals in experiments who are put in individual housing seven days or less before the planned end of the experiment need not be returned to group housing (regardless of the reason for single housing). Sometimes the period can be extended in consultation with the IvD.
- With large laboratory animals, situations may occur in which restoring group housing is possible, but it reduces the available space per animal to less than the legally required minimum. This is acceptable; group housing has priority in these kinds of situations. In all such cases the IvD must be consulted.

7 Prevention and discontinuing of individual housing

The following examples are to serve as *inspiration* in order to avoid/prevent or discontinue individual housing of laboratory animals:

- *Reducing/preventing aggressive behaviour*: There are several housing measures that can help to prevent aggressive behaviour between conspecifics.
- *Combining groups*: Animals in an experimental situation who are treated the same way, or whose treatment is not disturbed by cagemates, can be put together into new groups for the duration of the experiment. If this leads to problems in identification, a second form of marking can be used to distinguish animals with the same marks. This is only permitted if combining groups does not result in aggression between new group members.
- *Placement with buddies*: In both breeding and experiments, individual housing can be avoided by placing the animal in question with one or more animals, whether or not purchased beforehand, that are not involved in the breeding or the experiment.
- *Mixing species*, for example sheep and goats. These species must be known to get along with each other and get added value from the company of the others.
- *Placing a pup/young animal with breeding males*, for example mice or rats.
- *Genotyping mice and rats before weaning age*: This way experimental groups or breeding animals of the right genotype can already be selected before weaning.
- *Modifying the experiment tools or design*: Evolving knowledge and technological developments may make individual housing during the experiment partially or wholly superfluous, or allow for group housing in between phases (e.g. giving animals time to play together).

Situation-specific measures and the way of monitoring their effects can be discussed with animal caregivers and technicians and/or the IvD.

8 Relevant legislation and other resources

Annex III of directive 2010/63/EU on protection of animals used for scientific purposes contains rules for housing and caring for laboratory animals.

General:

<https://www.nc3rs.org.uk/3rs-resources/housing-and-husbandry>

Rodents:

[Kappel S, Hawkins P, Mendl MT.](#) (2017) **To Group or Not to Group? Good Practice for Housing Male Laboratory Mice.** *Animals* 7(12). pii: E88. doi: 10.3390/ani7120088.

[Schipper L1,2, Harvey L3, van der Beek EM2,4, van Dijk G1](#) (2018) **Home alone: a systematic review and meta-analysis on the effects of individual housing on body weight, food intake and visceral fat mass in rodents.** *Obes Rev.* 19(5):614-637. doi: 10.1111/obr.12663. Epub 2018 Jan 15.

Dogs:

[Grigg EK^{1,2}, Nibblett BM¹, Robinson JQ¹, Smits JE³](#) (2017) **Evaluating pair versus solitary housing in kennelled domestic dogs (*Canis familiaris*) using behaviour and hair cortisol: a pilot study.** *Vet Rec Open.* 2017 Jun 26;4(1):e000193. doi: 10.1136/vetreco-2016-000193. eCollection 2017.

Farm animals:

[Nawroth C^{1,2}, Langbein J¹, Coulon M³, Gabor V⁴, Oesterwind S^{1,5}, Benz-Schwarzburg J⁶, von Borell E⁷](#) (2019) **Farm Animal Cognition-Linking Behavior, Welfare and Ethics.** *Front Vet Sci.* 6:24. doi: 10.3389/fvets.2019.00024. eCollection 2019.

[Costa JHC¹, von Keyserlingk MAG¹, Weary DM²](#) (2016) **Invited review: Effects of group housing of dairy calves on behavior, cognition, performance, and health.** *J Dairy Sci.* 99(4):2453-2467. doi: 10.3168/jds.2015-10144. Epub 2016 Feb 10.

Horses:

[Yarnell K¹, Hall C², Royle C², Walker SL³](#) (2015) **Domesticated horses differ in their behavioural and physiological responses to isolated and group housing.** *Physiol Behav.* 143:51-7. doi: 10.1016/j.physbeh.2015.02.040. Epub 2015 Feb 25.

Keurmerk Paard en Welzijn (2018) Handleiding Keurmerk paard en Welzijn.
<http://keurmerkpaardenwelzijn.nl/wordpress/criteria-2/>

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