

Standard operasjonsprosedyre: Cage change on IVC rack

SOP nr: 5-02

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Forfattet av: Frøydis Kilmer, Mikael Vestberg

Revidert av: Helene Tandberg

Godkjent av: Espen Engh

5-02 CAGE CHANGE ON IVC RACKS

1.0 PURPOSE

- 1.1 To ensure that cages are changed in a hygienic and efficient manner.
- 1.2 To help prevent harm to the environment and reduce costs.
- 1.3 To ensure good animal welfare and prevent the unnecessary transmission of microorganisms between racks.

2.0 DIVISION OF RESPONSIBILITY

- 2.1 The PMSK and the Section Head have overall responsibility for animal welfare at the Section of Comparative Medicine (KPM).
- 2.2 The room manager is responsible for the changing of cages and the daily supervision of the animals.
- 2.3 The room manager is also responsible for updating the plan for changing cages and racks in his/her room. The cage changing plan must be available in the room at all times.
- 2.4 The operations coordinator must make sure that the task of changing cages is delegated to another KPM employee when staff are on sick leave or on holiday.

3.0 PROCEDURE

- 3.1 The room manager must have access to a cage changing plan in the room that shows when the cages are to be changed. This plan must be followed as closely as possible.
- 3.2 Mice cages are changed every 14 days and rat cages are changed weekly. Try to avoid more frequent changes in order to avoid stress. When dealing with strains that soil cages quicker, the room manager should consider separating the young and housing fewer of them in each cage. Try to avoid changing the number of animals in cages containing males or animals being used in experiments.
- 3.3 On red days, cage changing may be postponed and the operations coordinator will draw up a new plan.
- 3.4 On days scheduled for cage changing, but where this is not possible, the animals must be monitored and an assessment must be made as to whether the animals can wait another day before their cage is changed. When cages need changing, you should try to change all the cages on the entire rack and not just individual cages. An exception to this rule is if there is a water leak, which necessitates an immediate change for the affected cage.



- 3.5 The plan for the rotation of racks must be followed and carried out at the same time cages are changed. Every rack is rotated twice a year. The plan is saved under “New department->Building and equipment->rotation of racks.
- 3.6 Extra food and environmental enrichment must be available in the room and must be stored in boxes with lids. IVC cages should not be used for storage.
- 3.7 Autoclaved cages from the laundry come prepared with a bottom, lid, bedding, paper, feed basket with food and a cage cardholder. 1800-cages have an extra floor and a hatch in the lid.
- 3.8 Additional environmental enrichment, for example a chewing stick, more paper, an igloo (mice) or a tunnel, is added when changing cages.
- 3.9 It is recommended to reduce stress among mice by using a tunnel to transfer the animal from one cage to the next, whereas rats must be handled when changing their cage in order to accustom them to being handled.
- 3.10 Some cages come without food and are specially designed for animals on a special diet. Cages without food must always stand on the shelf outside DU-022 so that KPM users can fetch them from there. Be aware that dust particles from the food in cages containing food may gather in the bedding and this can ruin an experiment.
- 3.11 If you need new cages from the clean corridor and if you have opened a cage in the animal housing room, you must go through the air shower once again before you fetch the cages. You can also use cages from the clean shelf in the animal room or from the racks in the room. When using clean cages from racks, these can be used for animals in the same rack.
- 3.12 Pay particular attention to whether animals being used in experiments need extra measures when their cages are changed. This will be clearly marked on the cage.
- 3.13 Refer to “[SOP 5-07 Handling immunocompromised animals](#)” when changing the cages of such animals. The cages of immunocompromised animals must always be changed first and this requires an extra change of gloves.
- 3.14 The number of animals in a cage must always comply with the number registered on the cage card: in 500 cages, there should be a maximum of 5 mice and in 900 cages, a maximum of 11 mice (NB: these numbers vary for immunocompromised animals). If there is a need to house more mice in the cages, an application must be sent to the PMSK and this may incur extra costs. See illustration 2 for rats.

Cage changing

- 3.15 A transport rack with enough cages for the rack you are changing, sufficient water and other equipment needed should be brought to the animal room before you start changing cages. Make sure that the tape on the autoclaved equipment has black stripes, which verifies that the equipment has been autoclaved. Select first the cages and water that have been on the rack the longest.
- 3.16 If the rack is not immediately adjacent to the LAF bench, disconnect it from the ventilation unit and bring it to the LAF bench. You should connect the rack to the fresh air supply in the LAF bench. An extra tube is connected to the air coming out of the rack and is placed under the bench next to the ventilation. NB! Remember to change gloves after you handle the fresh air tube! Training must be given on how to use the lift for 1800 cages. When taking a break, make sure that all the cages have water and leave the LAF bench running.

- 3.17 Be sure to read any notes on the cage and to move any relevant notes to the new cage. Update or remove any notes that are out-of-date. Use “animal examination” in Science Linker to save long-term information such as microphthalmia, anophthalmia, eye spots, birth defects etc.
- 3.18 When changing a cage where fighting has occurred, open the lid and change gloves before handling the animals and cage contents so as not to introduce odours that can add to the stress.
- 3.19 All cages must be given enough food to last until the next cage change. Some of the old food can be placed at the bottom of the cage as enrichment. Try to mix the food when transferring feed pellets from a dirty to a clean cage. Add more food if needed. Do not pile up the food in the basket so that it gets in the way of the vents in the lid. Make sure that the food basket is properly positioned, otherwise mice might get caught in the food basket.
- 3.20 In the case of cages containing few mice (i.e. 1-2 mice), it is preferable to move them to a clean cage without new food. However, if you consider that the food is very old, it should be discarded and replaced with fresh food. Solitary and stressed animals must be followed up and an email should be sent to the user to enquire whether the animal can be euthanised. The reply should be registered in Science Linker.
- 3.21 Environmental enrichment must consist of at least a tunnel, paper and an igloo/exercise wheel. Cardboard tunnels and chewing sticks that appear to be in good condition can be reused. Chewing sticks are only used in cages housing animals that need them. Holding cages can be equipped with an exercise wheel (mice), unless they have a label saying “No exercise wheel”. Varying the environmental enrichment is a good way of preventing stress, but enrichment should not be changed too often due to odour. Animals being used in experiments must have same enrichment for the entire duration of the experiment.
- 3.22 More paper should be provided when needed. Nude mice (Nu/Nu) and newly separated animals can easily get cold and therefore need extra paper or cotton wool. Breeding cages will benefit from extra paper as nesting material.
- 3.23 In order to reduce stress, a small amount of the paper from the old cage should always be transferred to the new one. This is especially important with male mice and animals housed alone. The dominant male mouse in a cage with several other males will urinate all over the cage, including on the paper. Transferring some of the old paper can prevent the hierarchy from having to be re-established.
- 3.24 When changing cages, the dirty cages should be placed under the clean ones on the transport rack.
- 3.25 Dirty bottles are left in the dirty cage, except in all 1800 cages, which have bottles that have tops with a ball. These tops are sent separately from the bottle to the laundry in a box labelled "Med kule" (“with a ball”). Bottles can be reused if they are new. Always change the bottle in cages with solitary individuals.
- 3.26 More thorough inspection is carried out while changing cages. Animals are counted when moved to a new cage. The number and gender must match the cage card. Any injuries or defects are recorded and sick animals are treated or euthanized. The notes and Science linker (SL) must be updated and an email sent to the user if necessary.
- 3.27 Young, small mice can be lifted by the base of the tail. Larger animals should be lifted using a tunnel or by cupping your hand while carefully holding on to the tail so that the mouse cannot jump onto the floor. Rats must never be lifted by the tail alone. Tunnels can be used to lift rats but it is preferable to lift them by placing your hands around the animal’s chest so that they get used to being handled. If



there are many rats in an 1800 cage, it may be best to take out the closest rats via the hatch. Make sure that the hatch on the clean cage is well secured before placing the cage back in the rack.

- 3.28 The gender of the litter is determined when changing the cage and is recorded on the cage card. The sex can be differentiated by looking at the distance from the anus to the penis/vagina (urogenital distance). Males have a longer urogenital distance than females. The sex of pigmented mice, especially in younger and new-born mice, can also be differentiated with anogenital pigmentation (see illustration 1). Males have a distinct darker spot at the perineum than females.
- 3.29 When breeding proves to be problematic (high mortality rate, few births etc), you should consider postponing changing cages containing newly born litters for a few days. This should be clearly noted on the cage card. If the cage has already been opened when a litter is discovered, the entire litter/nest should be transferred when changing the cage. Gender should not be determined before the next cage change.
- 3.30 The cage card is transferred to the clean cage.
- 3.31 Dirty bedding for sentinels must be taken from all cages when changing cages. Racks shared with the same sentinels must be changed in the same week. Dirty bedding should not to be taken from the dirtiest part of the cage but from a relatively dry spot. Place the dirty bedding in the cage prepared for the sentinels. The sentinels must have approximately 1-2 cm of dirty bedding. If you have taken too much dirty bedding, mix it well and throw the excess amount away. If you have taken too little, mix in some clean bedding to achieve the correct amount. Ideally, the sentinels should only have dirty bedding. If cages are changed on a rack that shares sentinels with another rack, you change the sentinels and leave them with half the amount of bedding until the next rack is changed. When changing the second rack, the bedding can be collected in a white bag before spreading it out in the sentinel cage.
- 3.32 Sentinels are changed last. Other cages on the rack must not be handled with the same gloves used to handle the sentinels.
- 3.33 When you have finished changing the cages, place an autoclaved water bottle in each cage. The water should not be hot. Give small cages small bottles and big cages large bottles. Double check that all the cages have water. Be aware that some rats need a bottle with a long spout, so make sure that these animals are provided with this kind of bottle again.
- 3.34 Any unused cages can be placed on the shelf inside the room or on top of the racks. The filter lid must be closed on any empty cages connected to the ventilation in the rack.
- 3.35 Throw away any superfluous enrichment, such as paper and tunnels. Pens and notes etc. must be disinfected with 70 % ethanol. The work surface must be cleared, cleaned with soapy water and disinfected with 70 % ethanol or ProChlor. The floor must be swept.
- 3.36 Cage changes and inspections must be recorded on the inspection form on the wall. Record any new litters in SL and update SL in the case of any cannibalised litters, injuries etc.
- 3.37 Dirty equipment must be placed on the dirty side of the laundry.

4.0 HEALTH, SAFETY AND ENVIRONMENT (HMS)

- 4.1 Everyone must have adequate training to ensure that they use the proper clothing and protective gear.

- 4.2 Everyone who handles animals must have undergone adequate training and practice.
- 4.3 The work must be carried out on a ventilated bench or LAF bench to avoid the spread of, and exposure to, allergens and microbiological organisms.
- 4.4 Everyone who handles chemicals must have adequate training and access to proper protective gear to ensure the safe use of such chemicals.
- 4.5 Everyone should be familiar with the Eco Archive and Safety Data Sheets for the chemicals they may be exposed to.
- 4.6 The lift should be used when changing GR1800 cages in order to prevent injuries.

Kemetyl technical ethanol 96%	CAS no	Pictogram	Hazard statements	Precautionary statements
Ethanol	64-17-5	 	H225 Highly flammable liquid and vapour H319 Causes serious eye irritation	P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P370 + P378 In case of fire: Extinguish with carbon dioxide (CO ₂), foam, powder or water.

Contac Prochlor	CAS no	Hazard statements	First aid
Calcium Hypochlorite	7778-54-3	H272 Oxidiser - may intensify fire H302 Harmful if swallowed H314 Causes severe skin burns and eye damage H400 Very toxic to aquatic life EUH031 Contact with acids will generate toxic gas	Skin contact: Wash immediately with plenty of soap and water. Eye contact: Rinse eye under running water for 15 minutes. Contact a doctor. Ingestion: Rinse mouth with water. Inhalation: Move to fresh air after inhalation of vapours. Contact a doctor.

5.0 EQUIPMENT AND MAINTENANCE

- 5.1 Transport rack
- 5.2 Clean cages: GM500, GR/GM900, GR1800

- 5.3 Lift for GR1800 cages
- 5.4 Autoclaved water bottles
- 5.5 Autoclaved food and enrichment
- 5.6 Science Linker
- 5.7 Gloves
- 5.8 P2/P3 mask
- 5.9 Pens and notes
- 5.10 Soapy water
- 5.11 70 % ethanol
- 5.12 Paper towels

6.0 HISTORY OF EDITING

- 6.1 Written in January 2010
- 6.2 Completely revised in October 2012 in connection with the opening of the new department and equipment.
- 6.3 Revised in March 2014 for the purpose of minimizing work time and stress on the animals.
- 6.4 Revised in July 2014 for the purpose of minimizing the risk of mice and rats being put in the same cage.
- 6.5 Revised 01.03.2018, comprehensive changes (Frøydis Kilmer)
- 6.6 Revised 24.07.2020 (Frøydis Kilmer)
- 6.7 17.06.2021: information on the use of top with ball for water bottles for GM1800 cages added (Frøydis Kilmer)
- 6.8 22.12.2021: Added statement 3.22 (Helene Tandberg)
- 6.9 Revised 26.05.23 (Helene Tandberg)

7.0 REFERENCES

- 7.1 Dyrevelferdsloven 2011 (Animal Welfare Act)
- 7.2 https://app.ecoonline.com//documents/msds/1000362/15738015_286_4ac77e6f156a8f4d9518e533d0a4990d.pdf
- 7.3 <https://www.nature.com/articles/labn0109-35.pdf?proof=true>

Illustration 1

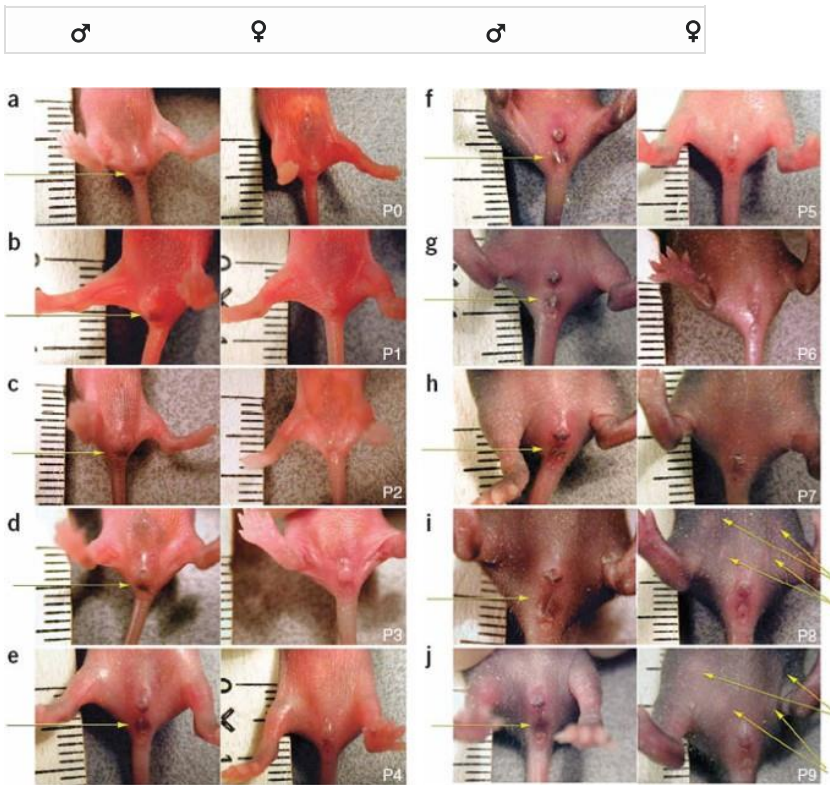


Illustration 2

Housing for mice and rats

Mice

GM500 cage	GM900 cage
1-4 mice	Max 10 mice

Rats

Weight	GM900 cage	GM1800 cage
< 200 g	2-4 rats	max 7 rats
200-300 g	2-3 rats	max 7 rats
300-400 g	2 rats	max 5 rats
400-600 g 30	2 rats	max 4 rats
> 600 g	Not applicable	max 3 rats