

Nov 28, 2024

## Group housed home cage monitoring for assessment of activity in mice

DOI

<https://dx.doi.org/10.17504/protocols.io.rm7vzk8e4vx1/v1>

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**Protocol Citation:** George Goodwin, Franziska Denk 2024. Group housed home cage monitoring for assessment of activity in mice. protocols.io <https://dx.doi.org/10.17504/protocols.io.rm7vzk8e4vx1/v1>

**Manuscript citation:**

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**Protocol status:** Working

**We use this protocol and it's working**

**Created:** November 15, 2024

**Last Modified:** November 28, 2024

**Protocol Integer ID:** 112174

**Keywords:** home cage analyser, group housed home cage monitoring, home cage monitoring, home cage monitoring for assessment, home cage analyser, housed mice, activity in mice, mice this protocol, mice, activity in group, activity, group, actual analytic

**Funders Acknowledgements:**

UKRI

Grant ID: MR/W027518/1

## Abstract

This protocol describes how to use the home cage analyser developed by Actual Analytics to measure activity in group-housed mice.

## Guidelines

Mice should be housed in cages of four.

## Materials

**Equipment and consumables:**

Actual Analytics home cage analyser for mice (<https://www.actualanalytics.com/actualhca-mouse-desktop>)

Laptop with Home cage analyser capture and analysis software

RFID tags e.g. Identichip (Animalcare Ltd) + implanter

Electric shaver

Isofluorane anaesthetic rig + oxygen concentrator

70% Ethanol swab

Heating blanket

Topical tissue adhesive (e.g., GLUture, Zoetis)

Local anaesthetic (5% EMLA cream, AstraZeneca)

## Injection of RFID tag

- 1      \*This should be done a week before baseline testing in the home cage analyser commences.\*  
  
Weigh mouse.
- 2      Turn on oxygen concentrator and set flow rate to 1-1.5L/min.
- 3      Place mouse into isoflurane induction chamber and set vaporiser to 5% until deep level of anaesthesia is achieved.
- 4      Remove mouse from the induction box and, in a separate area, use a shaver to remove the fur from the inguinal area.  
  
\*The skin is delicate in this area so take care not to cut it with the shaver.\*
- 5      Place the anaesthetised mouse on the surgical area and place the nose of the mouse into an anaesthesia nose cone. Set the vaporiser to the appropriate level at which anaesthesia is maintained (by checking front paw pedal reflexes) but no more (usually around 2%).
- 6      Remove the needle preloaded with RFID microchip from packaging.
- 7      Wipe injection area with a 70% ethanol swab.
- 8      Apply a small amount of local anaesthetic cream to the injection area.
- 9      Once the cream has been rubbed into the skin, lift a small area of skin in the shaved inguinal area from the body.
- 10     Insert preloaded implanter subcutaneously in the inguinal area and implant the microchip under the skin.
- 11     Carefully withdraw the needle implanter.
- 12     Use topical tissue adhesive to seal the hole made by the implanter.

- 13 Wait 30s for the tissue adhesive to set before removing mouse from anaesthetic mask and returning it to its home cage.
- 14 Make a note of the RFID tag number that the mouse was injected with.

## Home cage analyser

- 15 Change the bedding in the home cage at least 24 hours before testing. To ensure accurate chip readings from the antenna, put minimal sawdust down into the bottom of the cage (height of 5-10mm) and only put minimal bedding material in the cage.
- 16 On the day of testing, turn on the home cage analyser PC and remote connect into the PC using a laptop with the Actual Analytics HCA capture software on.
- 17 Place home cage into home cage analyser.  
  
\* This should be done at least 5 hours prior to the dark phase (19:00-07:00) commencing.\*
- 18 On the laptop Click "start recording" and, in the pop-up window that appears, enter the appropriate duration and study name.
- 19 Set the segment duration to 15 minutes.
- 20 Click "OK" and then click "disconnect" to close capture software.
- 21 Reconnect to capture software after the planned duration of the recording.
- 22 Copy the data to a hard drive.
- 23 Launch HCA analysis software on the analysis computer and add the files to be analysed.



- 24 In the HCA analysis software window, set data to be extracted in 1-hour time bins in the field marked "time bin into" and click "generate report." When a popup window appears, enter the name of the report and the preferred location for saving the report.

\*The data are extracted in Comma Separated Values (.csv) format. Note that the choice of time bin is arbitrary, as the data are recorded in 40-ms intervals.\*

## Protocol references

For further information, please see: Hobson L, Bains RS, Greenaway S, Wells S, Nolan PM. Phenotyping in Mice Using Continuous Home Cage Monitoring and Ultrasonic Vocalization Recordings. Curr Protoc Mouse Biol. 2020 Sep;10(3):e80. doi: 10.1002/cpmo.80. PMID: 32813317.