HBRS Guidelines for a PhD thesis including animal experiments

How to prepare a dissertation that includes animal experiments?

In the following, you will find some information that will help you in your work with animal experiments and in writing your doctoral thesis. Furthermore, you will be able to work on your dissertation more quickly if everything has been documented accordingly.

Therefore, please note the following points:

1. Are you familiar with the corresponding animal experiment application by your supervisor and all notifications of changes as well as the corresponding approvals? Do you know exactly which experiments are approved and how? Is your collaboration officially approved? Which parts of the experiment are you allowed performing yourself?

- Before starting your experiments, obtain the relevant animal experiment application and approval. Make sure that your name is mentioned in the application as well as the permit or that you are subsequently registered for the project.
- Do you have the special permit for all the techniques you want to perform?
- How many animals had been applied for and approved for which group/experiment?
- If, for whatever reason, the experimental protocol changes (duration of the experiments, form of administration of drugs, type of medication, etc.), write a change notification together with the deputy/head of the animal experiment project before the new strategy is implemented.

If you do not follow the above points, you may be accused (administrative offence or criminal offence). Make sure that the descriptions of the study design and implementation in your dissertation are in accordance with the details of the animal experiment application and the approval.

2. What information about the animals and the animal experiments must be included in a dissertation?

We recommend the use of the checklist of the ARRIVE Guidelines (1, 2). Besides following the rules of good scientific practice, you find below the parts about the animals/experiments that you would have to describe. In general, the wording "Performed as described in xy et al. (2020)" is not sufficient.

Ethics statement/approval:

All file numbers of the LAVES (Lower Saxony State Office for Consumer Protection and Food Safety) or other approving authorities for the approval of the described animal experiments as well as the conformity with the German Animal Welfare Act and the EU Directive 2010/63/EU should be listed.

Study design:

Give a detailed description of the study design. Please describe

a) the number of experimental and control groups,

b) the sample size. Information should be provided on the total number of animals used for each experiment / experimental group and how the sample size was determined (e.g. power analysis). The animal experiment application is also helpful for this purpose;

c) the steps taken to minimize systematic errors, e.g. in the distribution of animals among treatment groups (randomization, matching) and in the evaluation of results (e.g. blinding);

d) the particular experimental unit (e.g. an animal, group or cage of animals);

e) the order in which the animals of the different groups were treated or evaluated;

f) the termination criteria and the assessment scheme for exposure assessment.

A time-line diagram to illustrate the complexity of the experimental procedure may be helpful!

Experimental techniques with regard to animal welfare

For each experiment and experimental group (including controls) precise details (including possible modifications during the experiment) of all methods should be given.

a) How: The technique/operation, including anesthesia (incl. monitoring) and analgesia, euthanasia method, observation frequencies, dosages, volumes and application type of all substances should be described. According to which score were the animals checked and how often? How many animals had to be withdrawn prematurely from the experiment?

b) When: e.g. best time point

c) Where: own cage, laboratory, Water Maze

d) Why: For certain techniques e.g. reasons for choice of anesthetic, administration route, dosage of the substance

Laboratory animals

a) Mouse strains should be named according to the international nomenclature guidelines (www.informatics.jax.org) and the official name should be mentioned in correct spelling at least once in the dissertation and, if necessary, also special features of the mouse strain used. If other species are used, the exact name should also be given. The number, sex, age and weight of the animals should also be mentioned.

b) Information on the health status of the animals should be included, with reference to the FELASA guidelines.(3) This can be obtained from the microbiological laboratory of the ZTL.

c) Were the animals specially trained for the experiment e.g. via clicker training, TTouch, tunnel handling or were rats tickled?

Keeping of the animals:

a) How were the animals kept at what time? Information should be provided on access to water and food and the type of food. Were there bedding, hay, straw, wheels, nesting material or mouse houses? How many animals were in which type of cage? The light cycle in the ZTL is 14:10h (light:dark) for all animals at a humidity of 55% ± 5% and a temperature of 22°C ± 2°C for rodent areas. For all other areas please ask your responsible animal keeper.

b) Were animal welfare measures implemented before/during/after the experiment? Were the animals allowed to settle in?

Target parameters and statistical methods:

Which target parameters were measured? Which statistical methods were used for the analyses, did animals have to be excluded from the analysis and why?

Declaration of independence:

Which experimental parts/techniques did you perform yourself? Were the experiments possibly *ex vivo*, i.e. on materials obtained from an animal experiment by other people? However, the file number of the animal experiment must also be given here. A clear presentation helps to avoid misunderstandings and facilitates the evaluation of your work in terms of animal protection law.

3. Control:

Have all interventions described by you in the dissertation been approved by LAVES/other authorities under the given reference number? Did you yourself have an exceptional permission of the authorities to carry out the respective interventions?

4. Documents:

The documents (animal experiment application, all notifications of change as well as the approvals) of animal experiments that have been performed and approved at external institutions (e.g. HZI, Twincore) or that are older than 2014 must be made available to the Animal Welfare Officer of the MHH for review of the dissertation.

5. Data protection:

Do you wish to mention all persons named in your dissertation/thesis? Or should you use the phrase "by the persons named in the animal experiment proposal"?
The same applies to your current address/mobile number/email address in your CV. Do you really want to make this information available to the public at any time in connection with an animal experiment?

References

1 Kilkenny C, Browne WJ, Cuthill IC, Emerson M, & Altman DG (2010) Improving bioscience research reporting: the ARRIVE guidelines for reporting animal research. PLoS Biol 8(6):e1000412.

2 Percie du Sert N, et al (2020) The ARRIVE guidelines 2.0: Updated guidelines for reporting animal research. PLoS Biol 18(7):e3000410.

3. Mähler M, et al. (2014) FELASA recommendations for the health monitoring of mouse, rat, hamster, guinea pig and rabbit colonies in breeding and experimental units. Lab Anim 48(3):178-192.