

Questions and answers on animal experiments at the German Federal Institute for Risk Assessment (BfR)

BfR FAQ, updated 30 March 2023

The German Federal Institute for Risk Assessment (BfR) performs animal experiments as part of its statutory duty. The scientific purposes animals are used for at the Institute, the species employed and how it is guaranteed that the animals suffer as little as possible is summarised below as questions and answers.

For what purpose does the BfR perform animal experiments?

Animal experiments are performed at the BfR as part of its statutory duty. Firstly, this involves research concerning the safety of food and feed. The goal of these experiments is to recognise and assess risks for humans and livestock. Second, animal experiments are performed at the German Centre for the Protection of Laboratory Animals (Bf3R) as part of the BfR to investigate the possibilities to reduce the number of animals used in experiments (reduction) and to reduce the stress on animals in experiments (refinement). The scientific goal of this work is to establish better management and experimental conditions that can be applied worldwide.

Which animal species are used in BfR animal experiments?

In the BfR's animal facility, mice, rats, rabbits, chickens, turkeys, sheep, goats, cows, shrimps as well as farm fish species and zebrafish are kept and used for scientific research. Some animal species, such as chickens or rats, are only occasionally used in a few individual experimental projects. Other animal species, such as mice, are constantly used in different projects every year.

For which objectives are animal experiments carried out at BfR?

Reference material: The statutory duties of the National Reference Laboratories within the BfR include developing and refining detection methods for pathogens, which are transmissible to humans via food, and unwanted or prohibited substances in food. The National Reference Laboratories also regularly inspect the methodical expertise of food safety laboratories. For these purposes, animal reference material is required. The reference material either originates from untreated animals which have been proven to be free from the pathogens or substances in question, or from animals which have specifically been infected with certain pathogens or specifically treated with certain substances. Depending on the method, faeces, spontaneous urine, fur or feathers, eggs, milk, blood or meat can act as reference material.

Training: The German Animal Welfare Act (TierSchG) and the German Ordinance on the Protection of Animals Used for Experiments or Other Scientific Purposes (TierSchVersV) state that only persons with proven expertise in the care of laboratory animals and animal experiments may be involved in animal experiments. Expertise must be gained through regular further training. Thus, the BfR trains animal keepers in the field of research and clinical practice, and trains employees in planned animal experiments in accordance with legal guidelines. Initially, many animal free training methods are used such as instructions, instructional videos, working with artificial models and practical instruction in daily work. Only when these methods are fully exhausted living animals are used for certain procedures, so that they can be applied safely in experiments and the laboratory animals suffer from as little stress as possible.

Reduction: One of our research project has shown that the reproducibility of experimental results can be increased by prior habituation of the animals to the experimental apparatus. This

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is primarily done by reducing the random variability in the data in favour of stable behavioural patterns that develop through habituation. Through the targeted use of these habituation measures, the number of experimental animals required can be significantly reduced.

Refinement: In accordance with Article 4 of EU Directive 2010/63/EU on the protection of animals used for scientific purposes, there is a particular emphasis on ‘refinement’ (improvement, refining) by the member states. This means that any possible pain, suffering, stress or long-term damage in animals used for scientific research must be avoided or reduced as much as possible. The “Laboratory Animal Science” unit and animal husbandry at the BfR are analysing how the exposure of laboratory animals can be determined and reduced as objectively as possible. The goal is to establish better housing and experimental conditions.

Food and animal feed safety: As part of its legal duties, the BfR carries out animal experiments to assess the safety and possible contamination of food of animal origin as well as animal feed.

How many animals were used in animal experiments at the BfR in 2022?

In 2022, 143 animals were used in animal experiments at the BfR. A total of 115 mice, twelve rabbits, twelve cows and four pigs were used in six animal experiments. Of these, five projects were associated with mild severity for the animals, one experiment was associated with moderate severity for the animals.

In addition to the animals used in animal experiments, ten mice were killed in order to use their organs to develop replacement methods for animal experiments. These animals were not subjected to any stress or procedure before their death and were killed painlessly. This also applies to 147 zebrafish, which were used in breeding and killed at an advanced age to avoid diseases and suffering.

What is the 3R principle?

The 3R principle was published in 1959 by the British scientists William Russell and Rex Burch and is anchored in the European Directive 2010/63/EU for the protection of animals used for scientific purposes, which was passed in 2010. The aim of the **3R** principle is to avoid animal experiments completely (**R**eplacement) and to limit the number of animals (**R**eduction) and their suffering (**R**efinement) in experiments to the absolute minimum. All persons and institutions that conduct animal experiments are legally obliged to act according to this principle.

More information on the 3R principle can be found on the Bf3R website.

➤ <https://www.bf3r.de/en/bf3r-homepage.html>

What research is the BfR doing to replace animal experiments?

Various research projects are continuously being planned and carried out at the BfR to replace animal experiments. Some examples are shown below. The list does not claim to be complete.

Cell and tissue culture methods are being developed at the BfR in order to completely replace an experimental method in which animals are used with an alternative method. They are intended to lay the foundation for the creation of new, animal-free alternative methods for basic research and toxicological assessment.

Research projects for basic biomedical research include, e.g.

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- Bone-on-a-chip / organ-on-a-chip systems
- Development of an *in vitro* implantation model (MIVI)
- A search engine for alternatives to animal testing (SMAFIRA)

Research projects for toxicological risk assessment

- Development of an alternative method for testing the cancer-causing potential of hormone-active substances
- Alternative methods to animal experiments for detecting hormone-active effects *in vitro*
- Influence of circadian regulatory systems on *in vitro* test methods
- Toxicological *in vitro* studies on the combined effect of fungicides
- Computational toxicology: Role and importance of novel methodological approaches in health risk assessment
- Establishing integrated approaches to testing and assessment (IATAs) to support nanomaterial groups
- Prediction of the sensitising potential of chemicals and products *in vitro* in the human system as a substitute for animal experiments
- Development of “tattooed” 3D skin models
- *In silico* methods for predicting adverse health properties of pesticides

More information on the projects can be found on the Bf3R website.

- https://www.bf3r.de/en/replace_development_of_new_alternative_methods_for_animal_testing-297872.html

What research is performed at the BfR to reduce the use of laboratory animals?

Various research projects are continuously being planned and carried out at the BfR to reduce the use of animals in experiments. Some examples are shown below. The list does not claim to be complete.

In order to identify the extent to which the number of laboratory animals used in research can be reduced, the BfR's research includes, for example, new statistical and bioinformatic analysis models. They are intended to be used to draw conclusions as to which methodological and institutional changes in research and the publication process might contribute to a reduction in animal experiments. At the same time, the BfR applies novel biometric approaches to make the statistical planning of experiments more efficient, both with and without the use of laboratory animals. In the case of planned research projects featuring laboratory animals, the number of animals required should be reduced to a minimum. Another project showed that the reproducibility of experimental results can be increased by prior habituation of the animals to the experimental apparatus. This is primarily done by reducing the random variability in the data in favour of stable behavioural patterns that develop through habituation. Through the targeted use of these habituation measures, the number of experimental animals required can be significantly reduced.

More information on the projects can be found on the Bf3R website.

- https://www.bf3r.de/en/reduce_development_of_methods_for_the_reduction_of_laboratory_animal_numbers-298281.html

What research is the BfR doing to reduce the pain and suffering of laboratory animals?

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Various research projects are continuously being planned and carried out at the BfR to reduce the pain and suffering of laboratory animals. Some examples are shown below. The list does not claim to be complete.

Measures to reduce stress and improve well-being are being investigated in order to reduce pain, suffering or stress in laboratory animals and thus, simultaneously, to increase the quality of experimental results. In addition, assessment criteria for determining the degree of exposure are being developed. Examples of previous research projects include:

- Improvement of the housing conditions for laboratory animals
- Development of choice experiments to determine the needs of the laboratory animals from their point of view
- Development of home cage-based testing procedures in which the animals participate voluntarily in various tests (e.g. learning experiments that are integrated into the housing system)
- Influence of chronic monotony and boredom on psycho-emotional behaviour and cognition in laboratory animals
- Automated detection of stress based on facial features
- “Animal personality” - personality traits and their influence on experimental results and their reproducibility
- Pain perception in fish (using the zebrafish model organism)
- Methodology and effectiveness of training measures for laboratory animals

More information on the projects can be found on the Bf3R website.

- https://www.bf3r.de/en/refine_research_on_methods_to_reduce_pain_or_suffering_of_laboratory_animals-298288.html

Who authorises animal experiments at the BfR?

The State Office for Health and Social Affairs (LAGeSo) is responsible for inspecting and authorising animal experiments in the German federal state ("Land") of Berlin. Each experiment planned at the BfR contains a written application which is submitted to the LAGeSo. Beforehand, each experimental project is discussed and planned extensively with the BfR Animal Welfare Officer and the BfR Animal Welfare Body is also involved. We adhere strictly to the '3Rs' principle in this regard: First, checks are performed to see whether the purpose of the experiment can also be achieved with methods not involving animal experiments ('replace'). If this is not the case, the number of animals to be used is chosen in order to ensure that as few animals as possible are used ('reduce'). This is achieved by means of careful statistical calculation while planning animal experiments. Care is also taken to ensure that the experimental conditions are designed in a way that reduces pain, suffering and lasting harm are reduced to a non-avoidable minimum ('refine'). Examples of this include the continued improvement of animal management conditions, animal housing and the handling of the animals. Training laboratory animals for certain measures reduces stress during the animal experiments. If painful procedures are performed, suitable analgesics are administered.

Experiments may only be performed by appropriately trained persons, which has to be explained in the application form. The personnel of the LAGeSo check whether the application documents are complete and understandable. They rely on the advice of an independent animal experimentation committee. All questions arising about the experimental procedure are answered in written form and then checked again by the LAGeSo. When all questions have sufficiently been answered, an authorisation notice can be issued for this proposed experiment for a maximum of five years.

Who is responsible for ensuring that animal experiments at the BfR are performed appropriately?

The competent authority is responsible for the inspection of animal experiments; in the case of Berlin, it is the State Office for Health and Social Affairs (LAGeSo). The LAGeSo controls experiments with announced or random visits. All animal experiments are accompanied internally by the BfR Animal Welfare Officers. In addition to veterinary training, the Animal Welfare Officers also possess a specific qualification in the field of laboratory animal science. Performing experiments properly is in the interest of all parties involved in the experiment and is documented accordingly. The BfR's Animal Welfare Body discusses ongoing and completed animal experiments with the project managers and all those involved in the experiment and makes recommendations for future projects, especially with regard to improving animal welfare.

Where does the BfR obtain the animals used for the experiments?

Some animal species are specifically bred at the BfR for in-house experiments. Other animals are purchased from specialist laboratory animal breeders or selected agricultural enterprises, in accordance with legal guidelines.

How does the BfR ensure that the suffering of animals is kept as low as possible?

Applications for animal experiments specify the maximum amount of stress, pain and lasting harm animals are exposed to. Measures are taken for keeping the stress as low as possible. These include suitable analgesics, as well as sufficient resting periods and an environment designed to be animal-friendly (including factors such as suitable toys or lighting conditions). The German Animal Welfare Act (TierSchG) stipulates that animals must be constantly monitored during animal experiments. The animals are therefore systematically and regularly monitored for signs of stress. If a set stress limit is reached, the experiment is stopped for the affected animal. Monitoring of stress indicators and endpoints, which induce the need to remove an animal from an experiment, is authorised beforehand by the competent authority who also check for compliance. All parties involved in animal experiments are obliged to continuously make use of veterinary and nursing measures for improving the welfare of the animals and reducing stress to the minimum.

What happens to the animals after the experiment?

What happens to the animals after the experiment essentially depends on the type of procedure. For some experimental purposes, the animal must be sacrificed in accordance with the legal regulations, so that further investigations can be performed on its organs. If it is possible for the animals to survive without impairment of their well-being, and without them presenting a hazard to humans, other animals or the environment, they either remain at the BfR or attempts are made to hand the animals over to knowledgeable private individuals.

Which other statutory duties and initiatives does the BfR follow with regard to animal welfare?

The German Centre for the Protection of Laboratory Animals (Bf3R) was founded at the BfR in 2015 as part of the animal welfare initiative of the German Federal Ministry of Food and Agriculture (BMEL). The centre co-ordinates all activities nationwide with the goal of restricting animal experiments to only those which are considered essential, and guaranteeing the best possible protection for laboratory animals.

Selected questions and answers are available here:

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- <https://www.bfr.bund.de/cm/349/questions-and-answers-on-the-german-centre-for-the-protection-of-laboratory-animals-bf3r.pdf>

On 7 January 2019, the German Centre for the Protection of Laboratory Animals at the BfR started the digital animal experiment register www.animalstudyregistry.org. The register was set up as a reaction to the reproducibility crisis and offers scientists a platform to register a detailed study plan before beginning their experiments, thereby preventing selective reporting. Furthermore, animalstudyregistry.org also creates more transparency around the world. New fields of research and development for more animal welfare can therefore be identified.

More information about the registry is available in our FAQ:

- https://www.animalstudyregistry.org/asr_web/asr.web.static.action?name=asr.links.faq

The legislator has also assigned the BfR the task of publishing anonymised summaries of authorised animal experimentation projects in Germany. For this purpose, the database www.animaltestinfo.de was established.

Explanatory background information about this platform can be found here:

- https://www.bf3r.de/en/animaltestinfo_application-296532.html

Does the BfR support the “Transparent Animal Experiments Initiative”?

The “Transparent Animal Experiments Initiative” is a joint project of the Senate Commission for Animal Experimental Research of the German Research Foundation (DFG) and the initiative “Understanding Animal Experiments” of the Alliance of Scientific Organisations, which was launched on July 1, 2021.

The BfR not only supports this initiative, but is also [one of its very first signatories](#). The project’s declared aims include promoting transparency and openness in communicating information about the use of animals in scientific research. The BfR has been active in this field for many years with its German Centre for the Protection of Laboratory Animals (Bf3R). The BfR is committed to ensuring that animal experiments are transparent to the public. The AnimalTestInfo and Animal Study Registry databases aim to promote understanding about animal experiments and avoid unnecessary animal experiments.

This text version is a translation of the original German text which is the only legally binding version.