

Less suffering – for humans and animals

The BfR research funding programme supports external projects focusing on the development of innovative alternative methods to animal experiments. Eight projects received funding approval in 2017. Here is an overview.

Better donor organs, fewer laboratory animals

Lung transplants can save lives, but there is always a lack of donor organs. More lungs are being successfully transplanted through the rinsing and respiration of a donor lung outside the body, known as “*ex vivo* lung perfusion”. The working group headed by Professor Markus Kamler at Essen University Hospital is investigating whether pigs’ lungs from the slaughtering process are just as suitable to improve the procedure as lungs from laboratory animals. If this proves to be the case, fewer laboratory animals would have to be killed in order to obtain their organs in years to come.

Cardiac insufficiency: fruit flies rather than rodents

Persistently weak pumping power of the heart muscle (chronic cardiac insufficiency) is a serious complaint, and the number of patients is constantly increasing. The team under Professor Ulrich Kintscher at the Charité – Universitätsmedizin Berlin is investigating new treatment options in this area. The researchers are combining microscopy and video technology – and using the fruit fly (*Drosophila melanogaster*) as the model organism. This can help to reduce the number of rodents currently used in such experiments.

Rats and mice from the printer

Animal experiments require the safe handling and use of laboratory animals. Most courses focusing on animal experiments still use rats and mice for practice purposes. In order to reduce the burden on laboratory animals, the necessary techniques can be practiced on training models (simulators) that simulate the reaction of the live animal in question. The working groups headed by Professors Johanna Plendl and Christa Thöne-Reinecke (both Freie Universität Berlin) are assessing existing rat and mouse simulators. The objective is to create a model that is as close as possible to reality and that can then be printed out on a 3D printer.

“Mini-organs” for effective research

How do chemical substances affect the embryo? This is one of the main questions for toxicologists. Organoids – organ-like microstructures in the Petri dish – provide a new tool for the investigation of this question. These “mini-organs” can be used to perform toxicological experiments and investigate the effects on the development of the embryo without the need to use laboratory animals for this purpose. The team headed by Dr. Christian Schröter from the Max Planck Institute for Molecular Physiology in Dortmund is developing this kind of organoid system, which simulates the properties of an embryo. This is an alternative to animal experiments with a future.

Why wounds heal – without animals

The healing of a wound is a complex process, the success (or failure) of which can decide on life or death in extreme cases. Together with her team, Professor Sarah Hedtrich from Freie Universität Berlin is developing a wound healing model based on human skin cells. The aim is to improve our understanding of the healing process – including, for example, the inflammation that occurs during healing. The model also represents a further important step towards replacing animal experiments in wound healing research.

Liver under pressure

The liver is essential to survival as our central detoxification and metabolic organ. In order to better understand how the liver works, the working group headed by Professor Jens Kurreck at Technische Universität Berlin is designing three-dimensional models. This involves bringing together living cells to create a kind of “artificial liver” on a small scale with the help of “bioprinting”. As an organ model, the “printed liver” represents an alternative to animal experiments.

Less pain for zebrafish

After mice and rats, it is the small, agile zebrafish (*Danio Rerio*) that are used most frequently in animal experiments, and their use is increasing. Zebrafish share more than 80 percent of the genetic dispositions that are involved in the development of diseases in humans. Together with his team at Tübingen University, Junior Professor Aristides Arrenberg is researching methods that can reduce the pain and suffering of zebrafish. This also includes the development of suitable anesthetics for fish.

Sick lung, healthy lung

Chronic diseases can permanently damage the lungs. But how does this respiratory organ still manage to recover? A working group at the Helmholtz Centre in Munich headed by Dr. Claudia Staab-Weijnitz is tasked with investigating this question. At the same time, the group is also trying to identify new techniques that can replace the debilitating animal experiments that use chemicals and are currently employed to address such questions. For this purpose, the researchers are growing human respiratory tract cells that can be used to study the regeneration of the lung.

The next invitation to apply for Bf3R research funding will be announced in the spring of 2019.

More information:

www.bfr.bund.de/en > German Centre for the Protection of Laboratory Animals > Bf3R Research Funding