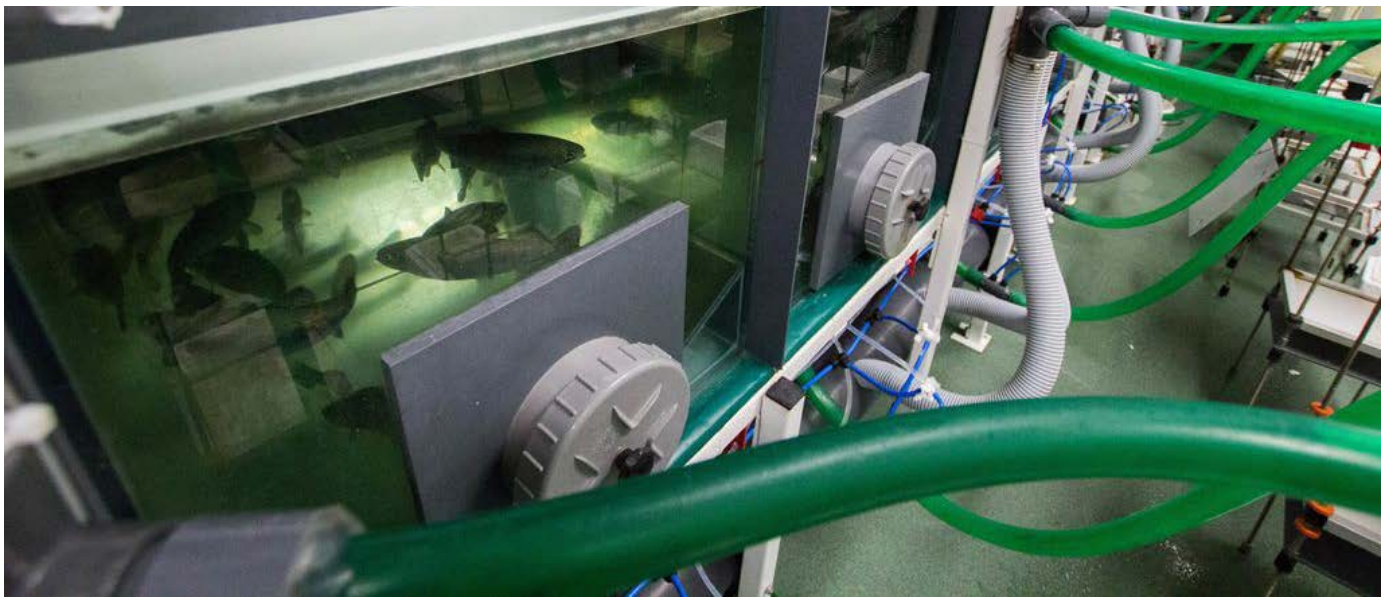

Animal Testing Annual Report 2018

Introduction

Various research methods are used in biology, animal production and life sciences research (the focus areas at WUR). For example, computer models can be used to make calculations and forecasts. Laboratory experiments are suitable for modelling processes or investigating sub-processes in the human or animal body. These methods are undergoing rapid developments and are leading to increasingly better results, but there are occasions when animal experiments are still needed. In some cases, an animal experiment may even be a legal requirement. Animal experiments are also used for educational purposes.

At WUR, we carry out research into agriculture, nutrition, nature and the environment. The focus of this research may be humans or animals. In both cases, animal testing may be used as part of the research. The test animal may be used to represent a human, or the animal itself. In this case, the test animal is the target animal. Research into farm animal health and welfare or the protection of animals in the wild are examples of this. At WUR, the test animal is very often also the target animal.

WUR recognises that animal experiments are scientifically and societally relevant in specific cases. We are signatories to the Code for Transparency in Animal Testing of the Association of Universities in the Netherlands (VSNU). The WUR is therefore committed to transparency regarding its animal experiments

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How do we apply for an animal testing licence?

Only researchers who have the relevant training (an 'Article 9 status') and are employed by an institution that is licensed to carry out animal experiments (a licensee) may apply to conduct an animal experiment. However, even if a researcher considers an animal experiment to be necessary, there is a long way to go before the experiment can actually start. To be able to carry out an animal experiment, the researcher first needs to apply for a project license. The application must include a detailed description of the research project, in which the researcher makes it clear why an animal experiment must be used and not an alternative approach. The applicant is legally obliged to describe why an approach that does not use animal testing is not possible, and why it is not possible to carry out the experiment with fewer animals or with less suffering for the animals. The aim to replace, reduce and refine animal testing (the three Rs) is addressed later in this annual report page 7.

The licence application is assessed in various steps. These steps address issues such as legal requirements, ethical considerations, the scientific value of the animal experiments, and technical aspects.

Legal requirements

Is the animal test acceptable under Dutch law?

The European directive on animal research was drawn up to protect test animals in Europe. This directive has been incorporated into Dutch law as follows:

- Wet op de dierproeven (Wod; Experiments on Animals Act)
  The purpose of this Act is to protect test animals. The Act applies the 'no, unless' principle, which means that no animal experiments may be carried out unless there are no suitable alternative methods for the research project. The Act was amended in 2014, resulting in regulations that are, in some areas, stricter than the European directive. For example, animals that are killed for research with no prior handling also fall under the protection of the Act.

- Dierproevenbesluit (Animal Experiments Order)
  This describes the conditions that companies, institutions and researchers must meet in order to conduct animal experiments. Examples are housing requirements for test animals and training requirements for people who work with test animals.

- Dierproevenregeling (Animal Experiments Regulations)
  These regulations go into more detail than the Experiments on Animals Act and the Animal Experiments Order, for example by naming specific requirements that the licensee, researcher and test animal breeder must meet.

Ethical considerations

Does the research aim outweigh possible animal suffering?

Animals have an intrinsic value, separate from their usefulness to humans. This is laid down in the Wet dieren (2013; Animals Act) and the Wod. A researcher must therefore also provide valid ethical arguments for why the animal experiment is necessary in the license application.

Scientific value

Is the experiment scientifically justified?

The scientific value of the animal test must be maximised and the number of animals and level of animal suffering minimised. To assess the scientific value, a review is made of the experimental design, for example the risk of mistakes being made and the correct number of test animals. It is important not to use more test animals than are needed, but enough animals must be used to enable reliable research results to be obtained.

Technical aspects

Will the experiment be conducted in the best way possible?

Do the researchers and other staff members have the required expertise and skills, are the housing and care facilities appropriate, and are suitable procedures used?

The license application procedure is shown in Figure 1 on page 4.

Who is involved in the licence application procedure?

Various bodies and committees are involved in the licence application procedure for animal testing. The main parties are the Animal Welfare Body (*Instantie voor Dierenwelzijn*, IvD), the Animal Tests Committee (*Dierexperimentencommissie*; DEC) and the Central Animal Testing Committee (*Centrale Commissie Dierproeven*; CCD).

Animal Welfare Body

Every licensee is legally obliged to contact an IvD. This body is responsible for advising on animal welfare and on replacement, reduction and refinement (the three Rs), for registering animal experiments and for coordinating a project proposal prior to application for a project licence. The IvD assesses whether the proposed research can be carried out appropriately in the research facility. Attention is also paid to the expertise and skills of the researchers and other staff members, the housing provided for the animals, and the availability of suitable test procedures. Once a project licence has been awarded, the IvD then assesses whether specific experiments meet the conditions of the licence.

In accordance with the Wod, the members of the IvD must meet certain criteria. For example, the IvD must include at least one research scientist and an expert in animal testing – an 'Article 13f3a officer'.

What is an animal experiment?

According to the Experiments on Animals Act (Wod), an experiment is an animal experiment if it uses vertebrates or cephalopods and if the animal suffering consists at least the insertion of a needle by an expert, or the animal is killed with no prior handling.

Not every experiment involving animals is therefore an animal experiment. According to the Wod, nutrition research that investigates the preference of an animal or the relationship between nutrient uptake, growth and faeces composition under normal housing conditions, is not animal testing. If a blood sample is taken, or if the animals are killed to examine tissues or organs, this is animal testing.

All research involving animals at WUR is assessed by the Animal Welfare Body (IvD) to determine whether the research falls under the definition of the Wod and is therefore an animal experiment. Even if the research is not considered to be an animal experiment in accordance with the definition of the Wod, the IvD provides the WUR or the researcher with advice on the best way to conduct the research.

Animal Tests Committee (DEC)

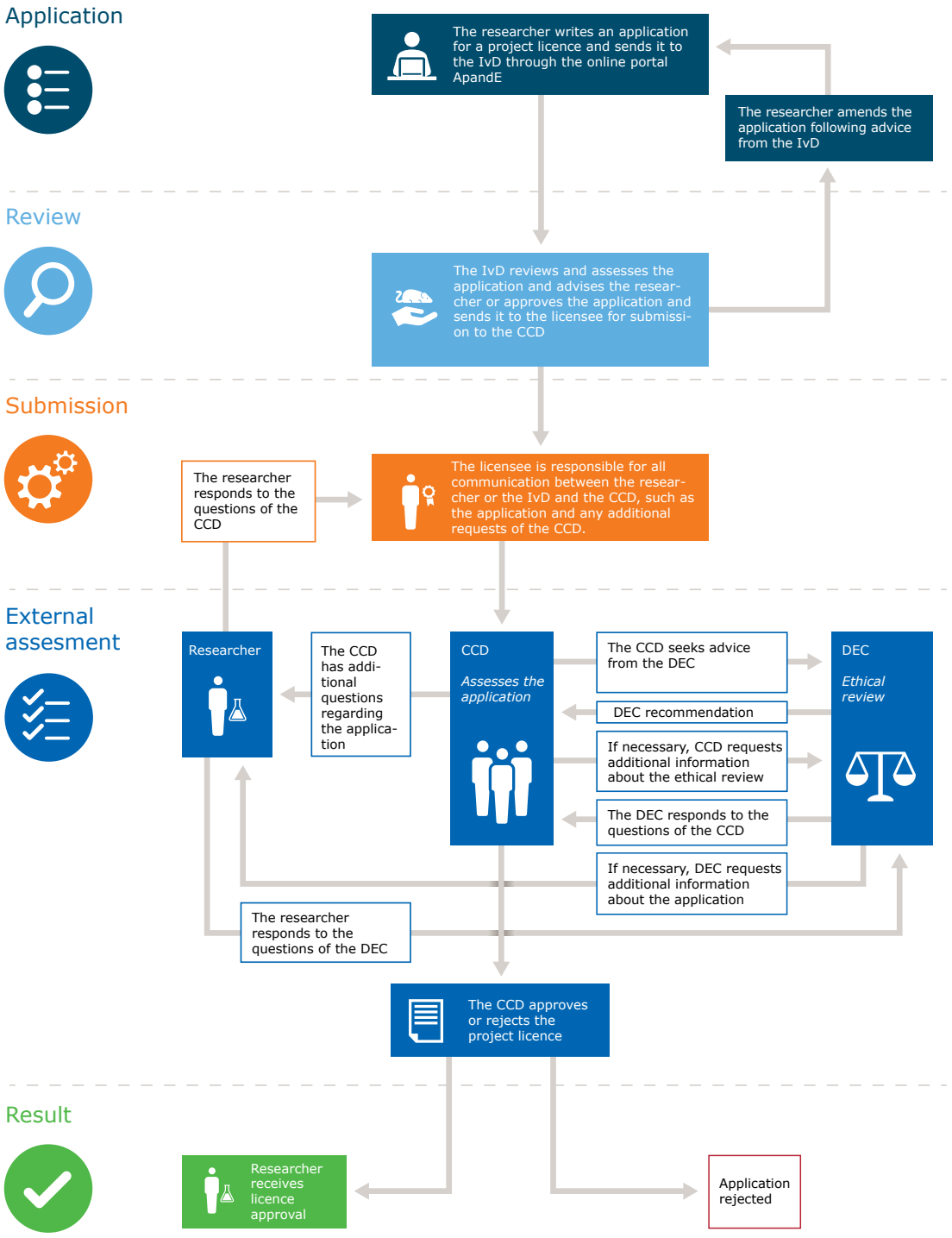
The Animal Tests Committee is an independent committee that evaluates the ethical aspects of applications for a licence to conduct animal experiments. The main question that the DEC asks is, 'Does the purpose of the animal experiment outweigh the suffering of the animals in question?' To answer this question, the DEC again considers the 3Rs:

- Replacement: are there alternatives to the animal experiments?
- Refining: can the pain or discomfort be prevented,
- for example using pain relief?
- Reduction: is it possible to reduce the number of test animals? The fewer animals that are used the better, but too few animals can mean that the research results are invalid and that the research has been carried out for nothing.

Under the Wod, the DEC must meet certain requirements in terms of expertise and independence. The DEC must also be recognised by the CCD..

Central Animal Testing Committee (CCD)

The CCD is an independent authority that provides licences for animal testing. The CCD always seeks advice from a DEC. The CCD will not approve a licence if the DEC advises that no licence should be granted, but it may overrule a positive recommendation from the DEC. The CCD also publishes the Non-technical Summary (NTS) for the project. This is a brief description of the project, written for the general public.



The Netherlands Food and Consumer Product Safety Authority (NVWA) monitors and enforces regulations relating to animal testing in the Netherlands on behalf of the Dutch government. The NVWA conducts inspections at institutions where animal testing is carried out and checks that the necessary licences have been obtained and that the animal experiments are carried out in accordance with these licences. It also checks that animal housing and care and the administration concerning animal experiments are in accordance with regulations. Institutions report the number and purpose of their animal experiments to the NVWA each year, and the NWVA publishes these figures in an annual report (‘Zo doende’).

Type of research and use of animal experiments

Animal testing is used for education, scientific research and statutory research tasks in various departments and research institutes at WUR, and for a wide range of research questions.

- Human and animal health and well-being
  Test animals may be used as a model for humans in health and welfare research. Examples are research into nutrition and health, lifestyle, health in old age and metabolic disorders. These all concern humans. However, the test animal may also be used as a model for the animal itself. In this case, the test animal is called the target animal. For example, chickens are used as test animals in research into improving the health and welfare of chickens. Target animals are also used to research diseases that are transmitted from animals to humans, or 'zoonoses'.

Human health research using mice

Many human diseases are characterised by an excess storage of fat in cells. For example, an accumulation of fat and inflammation in the liver (steatohepatitis) is associated with an increase in fat storage in the liver cells. Researchers at WUR would like to improve their understanding of the relationship between cells and fat. They want to find out why an excess of fat harms most cells, and what people can do to prevent this. To do this, they look for new factors that influence the storage of fat in cells. They have been able to show that a certain protein, HILPDA, increases the accumulation of fat in cultivated liver cells. However, they do not know whether HILPDA has the same role in the human liver. To find this out, they use mice as an animal model for humans. This is a special type of mouse that is no longer able to produce the HILPDA factor. They examined whether the absence of HILPDA affects the storage of fat in tissues and whether this has consequences for the development of certain diseases, such as steatohepatitis and diabetes. Initial results show that the absence of HILPDA does in fact result in less fat accumulation in the liver. The next step is to examine what effect an absence of HILPDA has on other cells, such as fat cells and white blood cells.

- Animal production
  Research at WUR is also carried out in the field of animal production, including livestock farming, the fisheries sector and fish farming. For example, we investigate how to increase the sustainability of existing animal production systems. We also develop new systems that contribute to more sustainable food production. Livestock research, for example, concerns the nutrition, behaviour and welfare of animals and greenhouse gas emissions from farms.

Chicken welfare research

Research into the welfare of chickens focuses for example on increasing their resilience. This enables them to cope with stressors such as infections, changes in food or transportation, and improves their welfare.
A research project started in 2018 to examine the effect of the conditions during the early stage of a chick's development on its behaviour, immunological characteristics and the composition of the intestine microbiome (profile of the intestine bacteria). Chicks were raised in optimum conditions until day 14 by leaving them to hatch in the coop and providing them with a surrogate mother and a warm, dark rest area. These chicks were compared with control chicks that were not raised in such optimum circumstances. For this research project, the researchers used an animal model under experimental conditions. This allowed them to monitor the behaviour in the coop, the composition of the microbiome in different segments of the intestine, immunological characteristics, and the chicks' response to a mild stressor in a behavioural test, such as removing the chicks from the group for two minutes and noting how often a chick peeped (a sign of stress). This provides insight into underlying mechanisms of resilience and health, as well as possible associations between the microbiome composition, the response to the behaviour tests and the expression of natural behaviour in the coop, such as scratching in the dirt, preening and taking dust baths.

- Animal health, food safety and environmental pollution
  A large part of the research in animal health, food safety and environmental pollution is statutory research that is commissioned by the Dutch government. These are the 'statutory research tasks'. Examples are the diagnosis and identification of notifiable animal diseases, safety and efficacy tests, the detection of pollutant residues (residue testing) and toxicology research. WUR also carries out research into the toxicity of substances in the environment. This research therefore contributes directly to a safe environment for humans and animals. We explicitly seek to develop alternatives to animal testing for such research.

- Sustainable management of the environment
  The monitoring of fish stocks contributes to the sustainable management of our environment, including our oceans and forests. Research into the reintroduction of threatened species such as the otter, and ecological research into the behaviour of wild animals, such as the great tit, is also included in this category.

- Plant health
  A very small proportion of the research projects that use animal testing concern plant health. These projects include the development of tests to detect plant diseases. Every year, depending on the crop, between 15 and 50% of the global harvest is lost to disease and plague. If we are to improve food security, it is vitally important to prevent plant disease.
  In the Netherlands alone, millions of plant samples are tested every year using tests developed at WUR. These tests are just as important at the global level. Much research is carried out into developing alternative tests that do not require animal experiments.

- Development and validation of alternatives to animal testing
  Test animals are also required for the development and validation of alternatives to animal testing. This is because an existing animal experiment is often required for comparison (as a 'reference') to demonstrate the reliability of the alternative. The careful validation of animal testing alternatives is important to increase acceptance of the alternative both within WUR and beyond. For example, it is possible to obtain good predictions of possible results of some animal studies using in vitro (laboratory) studies and computer models.

Fish stocks research

Wageningen Marine Research carries out research into fish stocks. This research is largely a statutory research task, which Member States are required to conduct under EU law. These tasks are described in national and international regulations. An important European regulation is the Data Collection Framework (DCF). The DCF consists of a number of orders and decisions that oblige Member States to collect data on the fisheries sector and fish stocks. This includes biological, economic and statistical data on the composition, size and distribution of fish stocks and fishing activities. The research largely focuses on fish from commercial fishing activities and research vessels.

Fish have to be killed to be able to determine the age distribution of the fish. It is possible to determine their age based on various characteristics, such as the inner ear (otoliths), the scales, fin rays and the vertebrae, which form growth rings. For most species, the best way of accurately determining the age of a fish is using the otoliths. Researchers also determine the sex, sexual maturity and fertility of the fish using their sexual organs. Researchers may also examine the stomach contents and the presence of parasites. Tissues may also be taken for DNA and other analyses. The data collected in this way is used to support policy recommendations for the fisheries sector and ecosystem management.

Replace, reduce, refine: the three Rs

WUR actively seeks to develop and implement alternatives to animal testing. This could be an alternative research model or an alternative research technique that makes the use of animal testing unnecessary (replace), that reduces the number of test animals needed (reduce), and/or ensures that the research methods cause less suffering to the animals (refine). An alternative research model or technique can mean that the use of test animals is delayed until the final, decisive and/or evaluative phase of the research project, or that it is no longer needed at all. In some cases, alternative research methods produce better results and are cheaper than animal tests.

Replace

An animal test is fully or partially replaced with computer models or laboratory tests on tissues. In some cases, so much information can be obtained in this way that fewer or no test animals are needed in the research project.

Reduce

The aim is to obtain a reliable research result using as few test animals as possible. Statistical techniques are very important for achieving this. Improved research methods or test conditions can reduce unintended variants, allowing a reliable result to be obtained using fewer animals.

Refine

There are different ways of refining animal experiments. The welfare of test animals can be improved by adapting housing, introducing remote monitoring (telemetry) and/or improving laboratory techniques so that less material (e.g. blood) is required. It is also possible to adapt protocols and procedures to improve the quality of animal-animal and human-animal relationships (e.g. between the test animal and its carer). Another way of improving the welfare of the test animal is to introduce measures that reduce boredom and prevent stress.

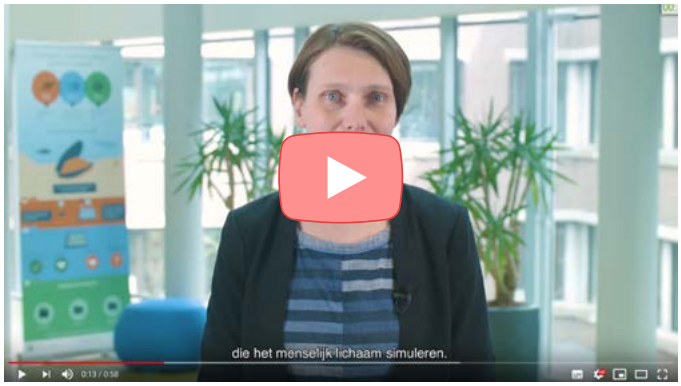
Examples of alternatives to animal testing

For toxicological testing and the diagnosis of infectious diseases, more and more animal experiments are being replaced with alternatives, in the form of chemical and biochemical tests.

Using organoids – small models of organs made from organ cells – it is possible to conduct tests on human or animal cell tissue. Organoids cannot replace test animals entirely, but they offer plenty of opportunities for reducing the number of test animals required, especially in preliminary studies.

Laboratory models are used to simulate the digestion of food and nutrients in the mouth, stomach and intestine.

Computer models are also being developed that simulate the human or animal body. For food research, computer models have been developed that predict how much of a nutrient enters the blood and what the combined effect of multiple nutrients is.



Alternatives to animal testing are also available for wild animals, for example to investigate the prevalence of a certain species in an area. Whereas researchers used to have to catch animals, we can now obtain information such as individual identification, sex and family relationships by analysing the DNA in the faeces https://www.wur.nl/nl/show/eDNA-barcoding-detectie-van-specifieke-soorten-en-bepaling-van-de-soortenrijkdom.htm

Reduce suffering through refinement

Refinement is about optimising the welfare of animals and reducing their suffering. This concerns not just the animal experiments, but the whole process, including transport and the acclimatisation period.

Multifunctional test animal housing is available at WUR, in which the housing system is adapted to the specific needs of each type of animal. The aim is to provide each animal with the opportunity to display natural behaviour as much as possible, despite the demands of the research procedures. For example, litter and other forms of enrichment are added. Pigs will use litter on a daily basis to make a place to rest and sleep. Rodents are provided with shelters and nesting material, and ferrets with hammocks. Brushes, water bowls and games may also be added. For chickens, bells and mirrors may be hung up, and dogs are provided with an obstacle course to encourage physical activity. Wherever possible, test animals are housed as a group, with extra attention paid to acclimatisation, socialisation and training. Such measures help prevent chronic stress amongst test animals. We are learning more and more about the effects of chronic stress on the immune system and well-being of animals. Preventing chronic stress not only improves animal welfare, but also the quality of the research. The animal carers at WUR are trained to monitor animal welfare.

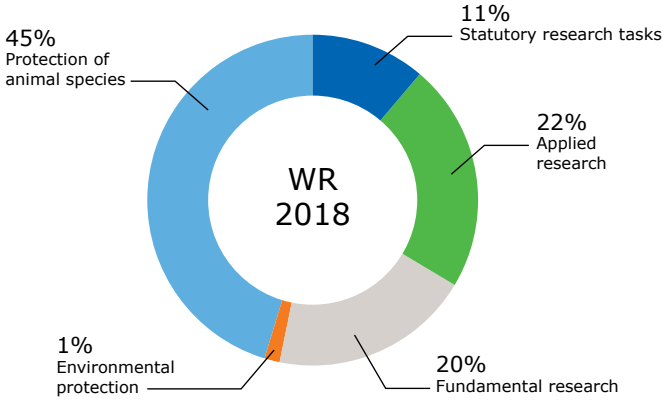
Figures on animal testing

The number of animal experiments has fluctuated since the Wod was amended in 2014. There was a large increase in the number of fish used in experiments between 2014 and 2015, as fish used to monitor fish stocks in the North Sea did not fall under the Wod prior to 2015. Annual fluctuations in the number of animal experiments were mainly seen for pigs, chickens and fish and, to a lesser extent, mice. This is due to large, long-term research projects that took place into the health and welfare of pigs and poultry, into more sustainable fish farming, and into the role of mice in the transmission of Lyme and other diseases.

A total of 56,502 animal experiments were carried out at WUR in 2018, an increase of 9.4% compared with 2017, when 51,203 animal experiments were conducted. These are experiments that fall under the Wod and that were completed in 2018. Note that the number of animal experiments is not the same as the number of test animals used, because more than one experiment may be carried out on a single animal. The number of test animals used is therefore always less than the total number of animal experiments.

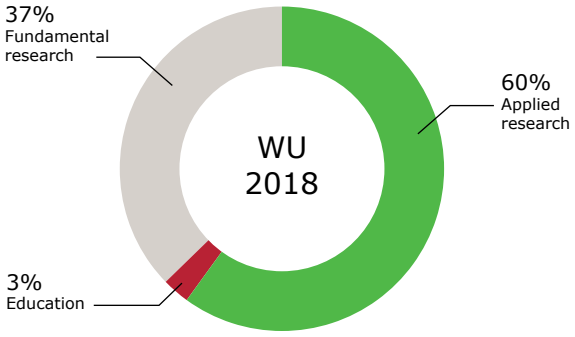
Wageningen Research (WR)

Most of the animal experiments carried out at WR in 2018 were used in research into the protection of animal species (45%), primarily the monitoring of fish stocks. This was followed by applied and translational research (22%), primarily into ethology, animal behaviour and animal biology. After this came fundamental research (20%), mainly into animal welfare.

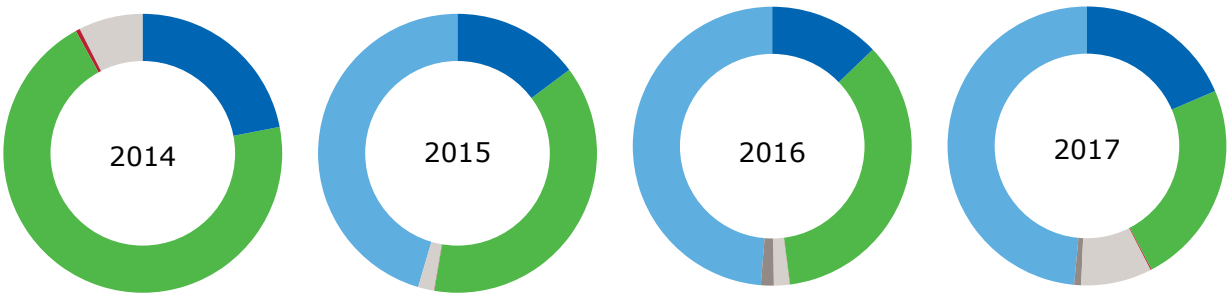


Wageningen University (WU)

Most of the animal experiments carried out at WU in 2018 were for applied and translational research (60%), in particular research into animal welfare. This was followed by applied research (37%), in particular into the immune system, then educational purposes (3%).

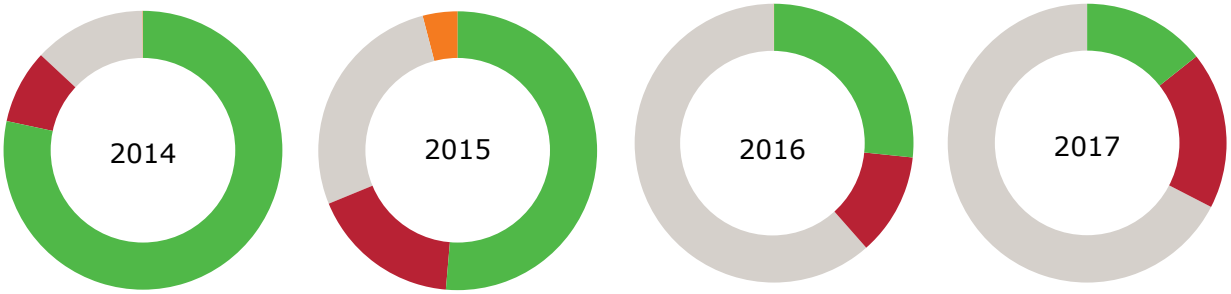


Wageningen Research



	2014	2015	2016	2017
Environmental protection	0% (0)	0% (0)	0% (0)	0% (0)
Protection of animal species	0% (0)	45% (20526)	49% (23720)	49% (21666)
Forensic research	<1% (10)	<1% (6)	2% (731)	<1% (361)
Fundamental research	7% (2857)	2% (837)	2% (895)	8% (3670)
Education	<1% (187)	<1% (18)	<1% (12)	<1% (58)
Applied research	70% (26834)	38% (17107)	35% (17118)	24% (10607)
Statutory research tasks	22% (8415)	15% (6680)	13% (6244)	19% (8283)

Wageningen University



	2014	2015	2016	2017
Environmental protection	<1% (10)	4% (364)	<1% (4)	0% (0)
Fundamental research	13% (1838)	27% (2439)	61% (4437)	67% (4417)
Education	9% (1214)	17% (1567)	12% (856)	18% (1195)
Applied research	78% (11086)	51% (4613)	27% (1924)	14% (938)

Education

Wageningen graduates may be required to conduct animal experiments as part of their work. WUR therefore believes it has a duty to teach students about responsible animal testing and the ethical aspects associated with the use of test animals.
Any students who are opposed to animal experiments on ethical grounds or who do not wish to use materials taken from animals during practical sessions may choose to follow a dissection-free variant of the compulsory classes. This is not however possible for subjects in the specialisation phase of the programme, although students may choose subjects in which they do not have to carry out animal experiments.

Animal species

Almost two thirds of the animal experiments carried out at WUR are on fish (63.7%). These experiments are mostly for statutory fish stock monitoring, within the research theme 'protection of animal species'. This is followed by chickens (15.9%) and mice (10.1%). Chickens and pigs are mostly used for research into animal welfare. Mice are mostly used for the statutory testing of animal vaccines. Not all of the animals used in animal experiments are housed in WUR facilities. For example, research for the conservation or monitoring of populations in the wild is carried out using wild animals. Some animal experiments are also carried out on experimental farms, for example on chickens.

Animal species	**WU**	**WR**	**totaal**
Muizen	1146	4572	**5718**
Rats	97	0	**97**
Guinea pigs	0	485	**485**
Other rodents[1]	101	70	**171**
Rabbits	0	29	**29**
Dogs	0	4	**4**
Cats	32	0	**32**
Other predators[2]	0	74	**74**
Horses, donkeys and crossbreeds	0	6	**6**
Pigs	1397	1716	**3113**
Goats	22	40	**62**
Sheep	0	126	**126**
Cattle	463	696	**1159**
Other Mammals[3]	5	6	**11**
Domestic fowl (Chickens)	3342	5652	**8994**
Other birds[4]	0	282	**282**
Reptiles[5]	0	125	**125**
Zebrafish	843	0	**843**
Other fish[6]	2552	32619	**35171**
	10000	**46502**	**56502**

Which animals fall under the Wod?

The Wod applies to animals that are used for scientific or educational purposes and that undergo pain or suffering as a result of an experiment. The Act applies to vertebrates, including the independently feeding larval forms of fish and reptiles, the foetal forms of mammals from the last trimester of their development, and cephalopods. Some animals that are housed at WUR are not covered by the Wod and are therefore not included in this annual report. This may be because they are kept for breeding, or as commercial animals, or because they are not exposed to pain or suffering during the experiment, for example because they are only kept for observation.

Adoption

The 'rehoming' of test animals is permitted under certain conditions. WUR follows the Code of Practice drawn up by the Netherlands National Committee for the protection of animals used for scientific purposes for the rehoming of test animals.
Cats that are kept at WUR are 'retired' after seven years and put up for adoption. Using a detailed questionnaire, the right cat is coupled to the right owner. The cats that are housed at WUR are mainly used for behaviour and food research. They receive a lot of attention from students and carers and are therefore well-socialised and suitable for adoption. Eight cats found new homes in this way in 2018.

	2014		**2015**		**2016**		**2017**	
Animal species	**WU**	**WR**	**WU**	**WR**	**WU**	**WR**	**WU**	**WR**
Mice	1486	8705	585	6448	646	5670	537	6961
Rats	72	40	70	0	15	0	17	0
Guinea pigs	0	1766	0	1164	0	1214	0	1394
Other rodents[7]	831	246	0	131	38	140	0	59
Rabbits	0	33	0	22	0	39	0	20
Dogs	0	23	0	2	0	37	0	17
Cats	58	0	8	0	30	0	0	0
Ferrets	0	92	0	28	0	36	0	40
Other predators[8]	0	338	0	410	0	212	0	263
Horses, donkeys and crossbreeds	0	0	16	0	2	6	0	6
Pigs	1715	778	77	245	477	1119	557	935
Goats	0	0	0	0	0	0	10	36
Sheep	0	146	0	62	0	55	0	118
Cattle	1106	2272	1078	655	208	735	223	568
Other mammals[9]	0	12	0	10	0	0	0	4
Domestic fowl	4976	8760	4159	3097	2968	13252	3909	6525
Other birds[10]	105	0	0	7	0	0	0	20
Reptiles[11]	27	181	0	174	0	176	0	277
Frogs	0	0	0	0	20	0	9	0
Zebrafish	30	0	628	0	1122	0	0	0
Other fish[12]	3742	14911	2362	32719	1695	26029	1288	27402
Total	**14148**	**38303**	**8983**	**45174**	**7221**	**48720**	**6550**	**44645**
Total WUR		**52451**		**54157**		**55941**		**51195**

1 Hamster, garden dormouse, hazel dormouse
2 Mink
3 Llama
4 Pekin duck
5 Slow worm, common lizard
6 44 species
7 Hamster
8 Mink, harbour porpoise, harbour seal, wild boar
9 Sandwich stern, Pekin duck
10 Common musk turtle, slow worm, common lizard
11 ≥70 species

Level of suffering at WUR

The tables show the level of suffering experienced by test animals at WUR in 2018. The expected level of suffering is assessed as part of the project plan, and again when the project has been completed. The table shows the actual levels of suffering. Various factors are taken into account to determine this, such as the pain and fear that a particular procedure causes, or lasting harm to the animal. Animal suffering is assessed cumulatively. For example, different processes may be carried out within a procedure that each cause 'light suffering'. However, the total amount of suffering during the entire procedure may be categorised as 'moderate suffering'.

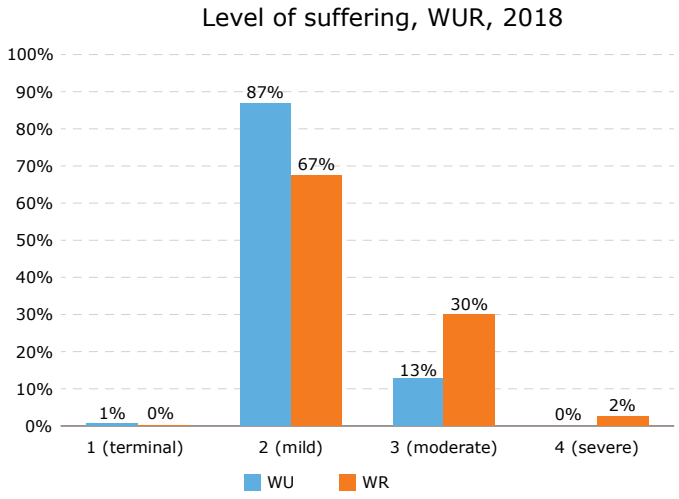
Animal experiments are assessed as **terminal** if the animal is killed to examine tissues or organs. The animal does not therefore experience pain or discomfort during a procedure.

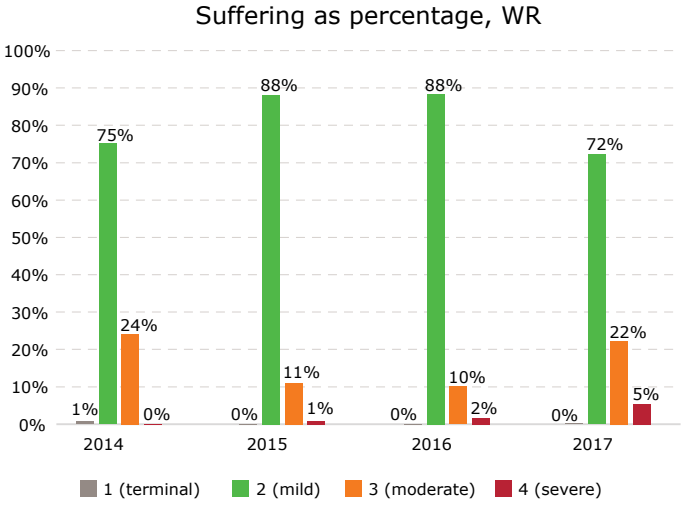
Light suffering means that there is a risk of slight pain or discomfort for a short period. These activities and procedures do not therefore significantly affect the animal's well-being. These could include the administration of and waking from a light sedation, taking a blood sample, or administering a substance through a tube. Housing social animals such as mice or chickens in isolation is also regarded as light suffering.

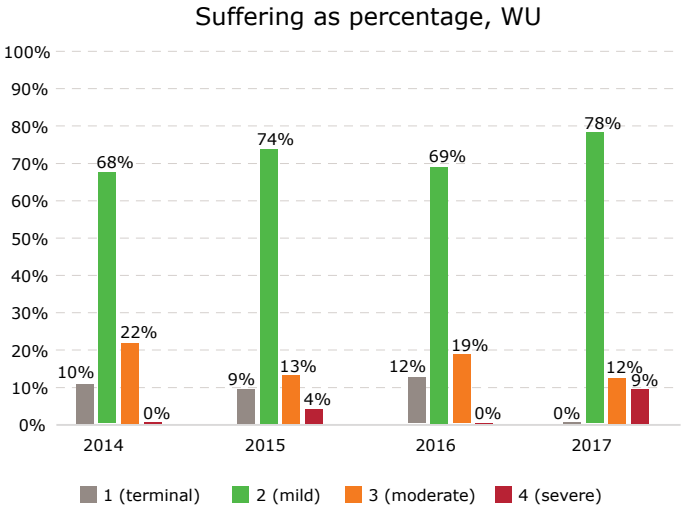
In the case of **moderate** suffering, there is a risk that the animal experiences a moderate level of pain or discomfort for a short length of time, or slight pain or discomfort for a longer time. Examples of procedures that cause moderate suffering are frequently taking blood samples, surgery with good post-operative pain management, or the solitary confinement of social animals for several days to several weeks (depending on the species).

Severe suffering is the highest category of suffering. The animal is likely to experience severe suffering during an experiment that seriously harm the animal's well-being. Examples of procedures that cause severe suffering are exposure to a deadly disease associated with prolonged pain and suffering or the long-term housing of a social species in solitary confinement.

Most of the animal experiments at WUR are categorised as causing light suffering. The number of animal experiments assessed as causing light suffering have decreased at WR in the last two years. However, the number of animal experiments assessed as causing increased in the last two years. The number of experiments classified as terminal decreased from over 12% to no more than 1% in the last two years at WU. No animal experiments were carried out at WU in 2018 that cause severe suffering, although this was not the case at WR.







Relatively more experiments that cause moderate suffering are carried out at WR. One reason for this difference is the nature of the experiments that are carried out at WR. These include experiments for research into animal disease, which in some cases require animals to be infected with the disease in order to study it.

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