



norecopa

Norwegian consensus platform for replacement, reduction and refinement of animal experiments

Norecopa's prize for the advancement of the 3 R's

(Replacement, Reduction, Refinement)

for 2014

A diploma and NOK 30,000



Prize committee

- Lasse A. Skoglund, academia
- Heidi Bugge, regulatory authorities
- Christian Wallace, industry
- Torill Malmstrøm, animal welfare organisations



Evaluation criteria

- Shall contribute to increase our knowledge, recognition and use of the 3 R's
- Nominations can be for scientific, technological, practical or administrative improvements
- Shall be of high quality
- Important to spread information about the activity



And the nominees are...



- Anne Gro Veia Salvanes, University of Bergen
- Department of Comparative Medicine, Oslo University Hospital - Radiumhospitalet
- Erlend Nagelhus, University of Oslo
- Espen Remme, Oslo University Hospital – Rikshospitalet
- Ioanna og Axel Sandvig, Norwegian University of Science and Technology (NTNU)
- May-Britt og Edvard Moser, Norwegian University of Science and Technology (NTNU)
- Shaw Bamber, International Research Institute of Stavanger
- Sissel Rønning, Nofima
- Tom Hansen, Institute of Marine Research



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Anne Gro Veia Salvanes, University of Bergen

- Variation early in life is important for development of behaviour. Animals in captivity often display a smaller range of behavioural traits than their wild counterparts.
- Together with Victoria Braithwaite and Olav Moberg, the group has shown that this also applies to fish. The research has attracted international interest.
- The group has in addition utilised observational methods which reduce the number of animals which must be studied to one seventh in relation to traditional behavioural studies where new animals are used each time.
- The group is working to develop standard housing which provides environmental enrichment and which can be used on a large scale in fish farming.
- **Reduction** and **refinement** of animal experiments.



Photo: US Fish & Wildlife Service



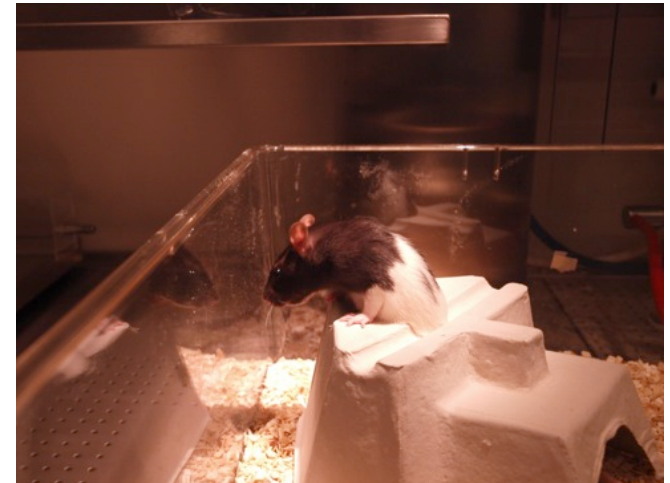


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Department of Comparative Medicine, Oslo University Hospital - Radiumhospitalet

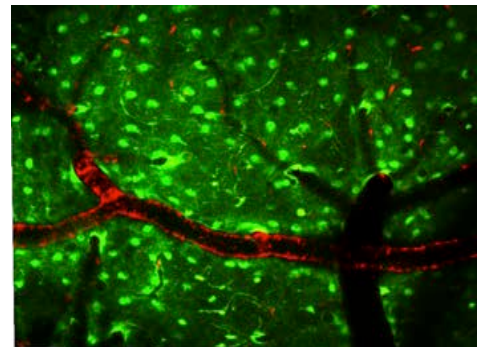
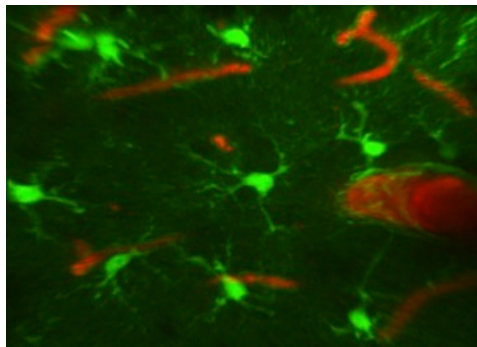
- There was a strong focus on animal welfare when the hospital recently built its new animal facility.
- All the animals now have larger cages than previously, with at least two forms of environmental enrichment. All have paper for making nests and cardboard houses, while other forms of enrichment vary.
- The department has 15 smaller animal rooms, with fully equipped procedure rooms in direct contact with each, to reduce disturbances and cross-infection. The infection barriers are at room level, so it is easy to inspect and handle the animals daily.
- An elaborate alarm and logging system has been installed, to monitor relevant environmental parameters.
- **Refinement** of animal experiments.





Erlend Nagelhus, University of Oslo

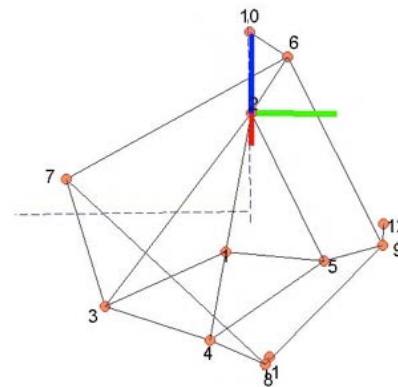
- In order to study the brain's supporting cells (glial cells) and their communication with nerve and blood vessel cells, it has been common practice to use genetically modified mice expressing foreign proteins. Research using such transgenic mice requires large-scale breeding which produces more mice than those needed for the studies, since not all the genotypes produced will be suitable.
- The group has established a technique whereby genes for proteins of interest are delivered to the brain using harmless viruses. This has reduced the number of animals used by the group by 50%.
- All the animals which are bred can therefore be used in the studies: no animals are killed because they have the wrong genotype. In addition, use of the virus technique avoids exposing the animals to repeated injections of tamoxifen, which is carcinogenic. The new technique thus increases both animal welfare and the safety of the personnel.
- **Reduction** and **Refinement** of animal experiments.





Espen Remme, Oslo University Hospital - Rikshospitalet

- Senior researcher at the Intervention Centre, using mathematical simulation models instead of animal studies in the development of new diagnostic techniques
- Developed a mathematical model of the heart, which can be used to simulate the movements of a sensor attached to the cardiac wall. Such sensors are used to monitor heart movements during and after cardiac surgery
- Has programmed a robot to perform the same movements as the heart, and validates the sensor by connecting it to the robot and measuring the movement
- **Reduction** in animal numbers



Remme et al., Med Eng Phys, 2012





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Ioanna and Axel Sandvig, Norwegian University of Science and Technology (NTNU)

- The group studies damage and degenerative disease in the central nervous system, and how these can be repaired. The group has especially focussed on techniques which can help people with Parkinson's disease and stroke.
- They have managed to reduce the number of animal studies significantly by utilising a range of reliable and non-invasive methods to study regeneration in the nervous system, instead of having to kill animals repeatedly at different stages of the process.
- The group has also developed methods to increase the longevity of stem cells which can be implanted to increase regeneration. This has also reduced the number of animal experiments.
- This type of research on stem cells makes it now possible to grow "artificial brains" (organoids) instead of doing research on living animals.
- *Science* magazine has described this type of research as one of the 10 most important breakthroughs in 2013.
- **Replacement, Reduction and Refinement** of animal research



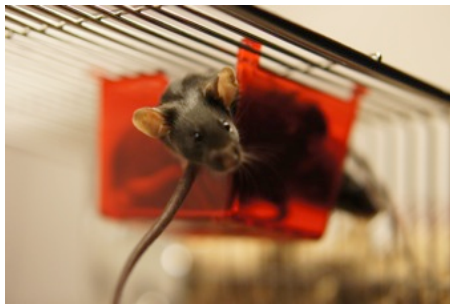


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May-Britt and Edvard Moser, Norwegian University of Science and Technology (NTNU)

- The Mosers are recognised internationally for their breakthroughs in brain research and studies of the internal map which is used to navigate in an environment.
- Their lab rats live in large cages where there is the opportunity to climb, as well as various types of shelter, toys and bedding material, with regular handling to reduce stress.
- Many publications document the fact that environmental enrichment leads to more reliable experimental results and is therefore good science.
- **Refinement** of animal research.



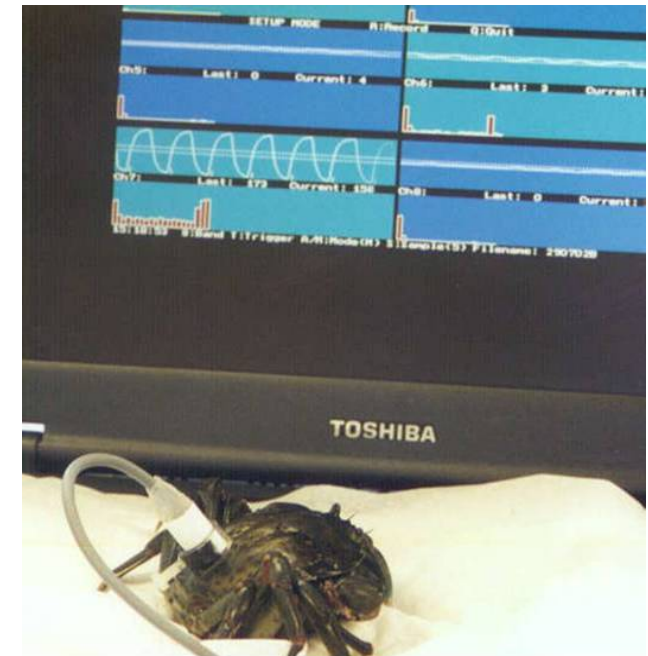


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Shaw Bamber, International Research Institute of Stavanger

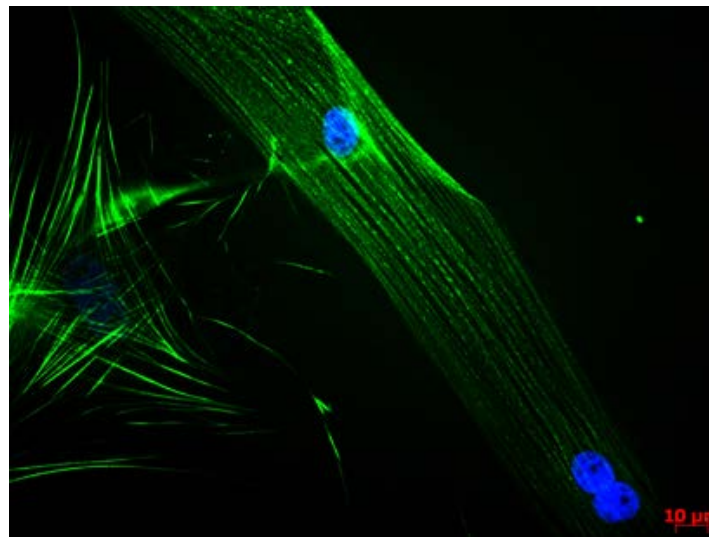
- The group has developed methods for monitoring the effect of environmental changes on animals in the sea in real time, at the same time taking their welfare into consideration.
- Sensors have been developed which are mounted externally on the animal to measure heart frequency and shell closure time.
- This research is relevant to, among other things, oil extraction and CO₂ storage, where leakages can influence marine life.
- The animals are returned to their original environment after the experiments.
- **Refinement** of animal research.





Sissel Rønning, Nofima

- Studies of meat quality at a molecular level are best performed on live animals, but there are both ethical and economic restraints to this.
- The group has developed a cell model system based upon stem cells from the sirloin of cattle.
- The system is used to study the changes that occur at slaughter, when muscles lose their supply of nutrients and oxygen.
- The model system can be used for a range of studies, such as the effect of changes in nutrient supply and the conversion of muscle cells to adipose tissue.
- **Replacement** of animal experiments with a cell system





Tom Hansen, Institute of Marine Research

- The group has started the production of identical lines of Atlantic salmon, where all individuals are genetically identical
- By removing the genetic variations between research animals, it is possible to manage with far fewer animals in experiments
- The project is working on optimisation of the method for producing identical animals
- So far the project has produced more than 300 such animals, which will be used as the foundation of cloned lines which can be used in research
- **Reduction** in due course in the number of animals used in fish research





All the nominees

- increase knowledge, recognition and use of the 3 R's
- contribute to an increase in animal welfare
- satisfy the prize's quality criteria and contribute to dissemination of advances in the 3 R's
- can in due course contribute to change international practice in the area



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Norecopas pris til fremme av de 3 R-ene
(Replacement, Reduction, Refinement)

for 2014

tildeles

**Ioanna og Axel Sandvig
NTNU**

for sitt fremragende arbeid innenfor regenerativ
medisin med å redusere og forbedre dyreforsøk

styreleder, Norecopa

leder, priskomiteén

www.norecopa.no

Norecopa tilstreber konsensus mellom
de 4 interessepartene rundt dyreforsøk:

