

July 16th, 2024

Press release

The Swiss 3R Competence Centre funds two new research projects to advance the ethical use of animals in research

The Swiss 3R Competence Centre (3RCC) announces the funding of two pioneering research projects under its Targeted Call 2023 funding scheme entitled *Advancing Responsibility: Reducing Surplus Animals and Promoting Change*. This initiative aims to foster innovative strategies to globally address and reduce surplus animals, enhancing the ethical use of animals in research. After a rigorous two-stage selection process, the designated Scientific Advisory Board has recommended two projects for funding, both of which were confirmed by the Strategic Board. The grants are awarded to Philippe Bugnon from the University of Zurich for the project on “Algorithmic Breeding Planning” and to Prof. Ori Bar-Nur from ETH Zurich for “Optimizing Transgenic Animal Derivation Utilizing Sterile Hosts and a Sex-Specific Genetic Reporter” with the amount of CHF 842'000. These projects exemplify the 3RCC’s commitment to advancing responsible research by reducing surplus animals and promoting ethical practices. We look forward to the significant positive impacts these projects will have on the scientific community and animal welfare.

The projects:

Algorithmic Breeding Planning

Dr. med. vet. Philippe Bugnon
University of Zurich

The project directly addresses the issue of surplus animals by developing a user-friendly online software tool that supports breeding planning through the incorporation of various breeding parameters, such as Mendelian genetics, fertility, contingent size, and experimental cohort sizes. The main goal is to create an accessible software solution that combines and expands the existing inventory of algorithms for breeding planning and to validate this software through retro- and prospective studies. Breeding outcomes in laboratory settings are inherently stochastic, involving the need to choose various parameters, such as the number of animals bred, kept, and euthanized. Currently, optimal breeding termination and intermittent breeding have not been effectively modeled, leading to significant surplus animals. The project is expected to significantly reduce the number of surplus animals generated during complex breeding efforts, potentially decreasing surplus animal numbers by up to 59% in extreme scenarios. The implementation of this software could reduce the surplus animal population by hundreds of thousands across Europe. To achieve these ambitious goals, a team of experts in bioinformatics, statistics, modeling, optimization, and laboratory animal science, each

with extensive experience and knowledge in animal breeding, will collaborate on the development and validation of the required algorithms. A reviewer highlights that “the scientific impact will be enormous as not only laboratory animals in Switzerland or the EU can benefit from this tool but also all around the world.”

Optimizing Transgenic Animal Derivation Utilizing Sterile Hosts and a Sex-Specific Genetic Reporter

Prof. Dr. Ori Bar-Nur
ETH Zurich

The current methods for producing transgenic animals in biomedical research are lengthy, inefficient, and result in the sacrifice of a large number of non-transgenic animals. This project aims to optimize the transgenic animal derivation process by addressing these inefficiencies and reducing the generation of surplus animals without the desired genotype. The project will focus on generating sophisticated mouse transgenic lines that will prevent the birth of surplus animals lacking the desired transgene, making the derivation process more rapid and efficient. Additionally, the project seeks to reduce the need for extensive genotyping during and after generation and to replace surgically vasectomized male mice with genetically sterile male mice. This innovative approach is expected to develop methods that significantly reduce surplus animals in transgenesis, accelerate and streamline the transgenic animal derivation process, and lower the breeding and husbandry costs associated with transgenic animal generation. Furthermore, it will eliminate the need for surgical procedures to create vasectomized male mice. The project is anticipated to attract considerable interest from laboratories and transgenic units worldwide, as the proposed models can be adapted for a wide range of transgenic applications. It tackles a widely spread problem, occurring across the transgenic cores with technology clearly addressing the surplus issue. Reviewers stated that “the expected impact on 3Rs is outstanding” and that the “method is considered as highly transferrable to other units across CH and internationally.”

About the Swiss 3R Competence Centre

The 3RCC, a research infrastructure of national importance, focuses on research, education, monitoring and communication in promotion of the 3R Principle (Replace, Reduce and Refine) for humane use of animals in research. The 3RCC strives to drive 3Rs advancement for better animal welfare and science in Switzerland.

For further information contact jessica.lampe@swiss3rcc.org; www.swiss3rcc.org.