

Concept Clearance - Reissue of Mutant Mouse Resource and Research Centers (MMRRCs) and the Informatics, Coordination and Service Center (ICSC) for the MMRRCs

The number of genetically modified mouse strains has expanded greatly in recent years, resulting in increased pressure to preserve and make these mice available for the research community. NIH established the Mutant Mouse Resource and Research Centers (MMRRCs) to serve the scientific community. The MMRRCs were started in 1999 with funding through cooperative research agreements (U42). Currently, the MMRRC Consortium is the largest government supported mouse strain repository in the U.S. and consists of four breeding and distribution facilities located at the University of North Carolina at Chapel Hill, University of Missouri-Columbia, University of California at Davis (UC-Davis), and The Jackson Laboratory. The fifth MMRRC Consortium component, an Informatics, Coordination, and Service Center (ICSC), is located at UC-Davis.

ORIP's Strategic Plan emphasizes expansion and accessibility to animal models and animal and biological materials, as well as exploration of ways to improve the reproducibility of research using disease models. To accomplish these goals, the MMRRC Consortium is responsible for obtaining mice from donating investigators and establishing banks of cryopreserved sperm, embryos, and related materials for distribution to research investigators. In addition, each Center provides services on a fee-for-service basis to investigators which includes specialties such as colony management and breeding services, assisted reproduction services, embryonic stem cell and microinjection services, genetic analysis, phenotyping, pathology and diagnostics.

The MMRRC Consortium strains are held to the highest standards to optimize reproducibility of studies and ensure scientific rigor and transparency. All submitted strains are thoroughly reviewed before acceptance and include additional quality control measures. For example, documenting, and accurately reporting the genetic backgrounds of mouse models used in research is essential for recreating an experimental study and achieving reproducible results. The MMRRCs also use up to 10% of their budget on high risk, high return research pilot projects that complement the goals and needs of the MMRRC Consortium. These projects include cryopreservation of mouse embryos and gametes; rederivation of living mice from cryopreserved embryos and sperm; quality control testing for mouse pathogens; mutagenesis and embryonic stem cell isolation and cloning; and phenotyping and genotyping services. The MMRRC Consortium has an External Advisory Committee of experts and users who advise the Centers and NIH on how to enhance the capacity of the Centers, as well as address the MMRRC's long-term sustainability and relevance to biomedical research.

Critical functions of the ICSC are to provide informatics and coordinating services to support the function of the MMRRC Consortium. These include maintenance and further development of a public website portal and Customer Service Center; operation of the order processing system; review and processing of applications from donating investigators; organization and participation in monthly teleconferences; annual consortium meeting and other activities; oversight of marketing efforts; and completion of monthly and yearly metrics reports.

The current collections at the MMRRC Consortium consists of 61,866 unique mutant alleles (submission include live mice, frozen germplasm, or embryonic stem cells). Mice provided by the MMRRC Consortium are used by investigators funded by NIH grants from most NIH Institutes and Centers. There is a steady growth of the curated submissions to the repositories, as well as the number of MMRRC users for the last 10 years (from about seven thousand users in 2013 to almost twenty thousand users in 2023).

Based on the performance of the program and the need to raise the predictive power and reproducibility of animal studies, ORIP requests concept clearance from the Council of Councils to continue support for the "MMRRCs and the ICSC for the MMRRC".