**UCI Transgenic Mouse Facility (TMF)**

**Facility Description**

**June 2023**

The **UC Irvine Transgenic Mouse Facility (TMF)** <https://transgenic.uci.edu/> provides intellectual and technical support to investigators wishing to use genetically engineered mouse models (GEMM) in their research. The TMF offers advice using a one-on-one consultation basis, and by pro-active outreach and education, about the experimental design of genetically modified mice as well as practical instruction in their use in biological and biomedical research.

The TMF offers a comprehensive range of services associated with the design, creation, sourcing, production, cryopreservation and reanimation of GEMM. Services include the production of genetically modified animals via pronuclear microinjection of DNA and development of ES cell derived gene-targeted modifications followed by microinjection of ES cells into blastocyst host embryos for production of chimeric mice. The TMF also has significant expertise in CRISPR -mediated gene targeting in ES cells and mouse embryos, having completed over 100 independent CRISPR-based projects. Examples of CRISPR projects include production of null alleles via indels; introduction of polymorphisms; generation of 'floxed' conditional mutant alleles, introduction of reporter gene sequences using single-stranded DNA sequences, introduction of double-stranded plasmid DNA sequences at targeted sites in zygotes. CRISPR methods have also been developed in house to perform gene-replacement strategies - e.g. substitution of a mouse genetic locus for the human orthologous sequence - in ES cells. The introduced changes are validated using various technology including Sanger, Illumina and ONT based sequencing, sequence deconvolution of genetic mosaic founder animals, Southern analysis, *in vitro* cre testing and by breeding.

A full range of ancillary services is offered, including embryo and sperm cryopreservation and reanimation, production of cohorts of age-matched experimental and control animals via IVF and embryo transfer to pseudopregnant recipients, allele genotyping and validation of mouse strain background through molecular genotyping. Other services include targeted transgenesis at the ROSA26 and *Hipp11* loci, BAC transgenesis (including BAC preparation and quality control), chromosome counting services, Southern analysis, high-resolution DNA/RNA fragment analysis, and advice on development of strategies for genetic modification. A notable strength of the TMF is its ability to partner with PI's to develop new methodology for modification and analysis of the mouse and to identify and procure existing mouse assets from the international community for use by PI’s. Since its inception in 1996, the TMF has generated and facilitated analysis of hundreds of lines of genetically modified mice.

The TMF is a Shared Resource funded in part by the Chao Family NCI-Comprehensive Cancer Center Support Grant (P30CA062203) from the National Cancer Institute. In addition to supporting UCI investigators, approximately 30% of the services are provided to off-campus investigators (including some at other Cancer Centers) at academic and commercial institutions throughout the USA, including investigators at UCSD, UCR, UCLA, UCSF and Stanford University in California.