[**Genome Modification Facility**](http://gmf.fas.harvard.edu/)

**URL:** <https://gmf.fas.harvard.edu/>

**Faculty Director:** Joshua Sanes

**Facility Director:** Lin Wu

**Description:**

The Genome Modification Facility (GMF) provides a wide range of services in generating, maintaining, and recovering genetically modified mouse lines to investigators of Harvard University and its affiliated institutions, as well as to investigators within the U.S. and abroad. The GMF assists researchers on gRNA ex-vivo validation, performs microinjection of CRISPR/Cas or TALENs reagents into mouse zygotes for gene editing projects of knock-out or knock-in, DNA injection into fertilized embryos to generate transgenic mice, DNA or CRISPR/Cas reagents transfection into ES cells for the creation of recombinant ES cell clones, injection of gene-targeted ES cells into host blastocysts to generate gene knock-out or knock-in mice, teratoma formation studies, and other related ES cell-based services. Other services include cryopreservation of mouse sperm and embryos, in vitro fertilization (IVF), recovery of cryopreserved mouse sperm and embryos to live animals, rederivation of pathogen free mouse lines, and derivation ES cell lines from wild type and mutant mice with a variety of genetic backgrounds. The facility provides general consultations on experimental designs, procedures and vectors for gene modification-related projects, DNA preparation, recombinant ES clones, colony breeding and husbandry. The facility can also customize services as requested to support development of animal models of human diseases.

To contact us, please send an email to [GMFmail@fas.harvard.edu](mailto:GMFmail@fas.harvard.edu).

**Services:**

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| **Microinjection of CRISPR, TALEN, DNA, RNA, ES or iPS Cells**   * Generation of gRNA ex-vivo validation preps for testing gRNAs and selecting the best gRNA for a gene editing project * Microinjection of CRISPR or TALENs reagents into zygotes for gene deletion/knockout projects * Microinjection of CRISPR or TALENs reagents and DNA donor into zygotes for gene insertion/knockin projects * Microinjection of plasmid DNA into pronuclei of embryos: hybrid mouse strain, C57BL/6, FVB, Balb/C, or mutant strains for generating transgenic mice * Microinjection of BAC or YAC DNA into pronuclei of embryos:  hybrid mouse strain, C57BL/6, or FVB * Microinjection of ES clones (targeted 129, JM8A, or hybrid ES Cells) into embryos of C57BL/6, B6-albino, hybrid, or CD1 for generating gene targeted mice * Microinjection of iPS clones into embryos of C57BL/6, B6-albino, hybrid, or CD1   [**ES Cell Gene Targeting**](http://gmf.fas.harvard.edu/pages/embryonic-stem-cell-gene-targeting)   * Gene targeting in ES cells: C57BL/6-129 Hybrid, C57BL/6N (JM8A), C57BL/6, or 129 ES Cells transfection package (from DNA transfection to ES cell pellets in 96-well plates) ~200 colonies * Expansion of ES Clones * ES cells Mycoplasma screening * ES cells karyotyping |
| [**ES or iPS Cell Line Services**](http://gmf.fas.harvard.edu/es-or-ips-cell-line-services)   * Derivation of ES Cell lines from mutant or wild type mice * Validation of human or mouse iPS cells by teratoma formation * Characterization of the pluripotent status of mES by immunocytochemistry analysis * Examination of the pluripotent status of mES  and germ line transmission by microinjection |
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| **[Cryopreservation, IVF, & Strain Rederivation](http://gmf.fas.harvard.edu/pages/services-and-fees)**   * Sperm Cryopreservation - including cryo-sperm quality test * Cryo-storage mouse sperm or embryos generated within the GMF * Recovery of live pups following sperm cryopreservation and cryo-sperm test * IVF recovery of mice from cryopreserved sperm (one litter of pups provided) * IVF recovery of mice from fresh sperm for rapid expansion of mouse colony * Embryo Cryopreservation * Resuscitation of cryopreserved mouse embryos * Rederivation of mouse strains by embryo transfer to generate pathogen free mouse lines |
| [**Additional Services**](http://gmf.fas.harvard.edu/additional-services)   * DNA purification for microinjection or gene targeting * DNA extraction from ES clones * Mouse colony breeding * Mouse ID tag & tail biopsy * Mouse tail DNA extraction * Provide mouse embryonic fibroblast (EF) cells * Provide mouse embryos * Provide CD1-lactating mouse with litter |