Services

1. Generation of new mutant mouse lines

- **Gene targeting in ES-cells and the generation of chimeras**

  Embryonic Stem (ES) cells are electroporated with a targeting vector designed to introduce a specific mutation in the mouse genome. After antibiotic selection, surviving colonies are picked and expanded for screening and freezing. To generate transgenic mice over-expressing a gene of interest, dedicated ES-cells and targeting vectors are available to specifically introduce the transgene in the Rosa26 locus.

  Correctly targeted ES cells are introduced in an early mouse embryo. This can be done by injecting the ES cells into blastocysts or by aggregating ES cell clumps with morulas; The ES cells assist in the formation of the fetus. The resulting mouse is a chimera composed of two cell types: cells derived from the embryo and those derived from the introduced ES cells. The chimeric mice are mated with wild-type mice to transmit the desired mutation from the chimeria to the offspring

- **Nuclease mediated gene editing via zygote injection**

  A new method to generate mutant mice is the implementation of designer nucleases into the genome. We successfully implemented ZFN, Talen and Crispr/Cas technology and are now offering Crispr/Cas as our main service. This technology is very efficient for making knockin, multiplex knockout and conditional knock-out mice. It offers a significant time reduction compared to ES-cell mediated gene targeting and can be used to generate mutant mice in virtually any desired background.

  In addition to nucleases, other DNA constructs (eg. cDNAs, bacterial artificial chromosomes (BACs)) can be introduced into the genome by means of zygote injection in order to create mutant mice.

2. Rederivation of mouse strains

The presence of any type of mouse pathogen (whether it causes clinical disease or not), changes the physiology of the mouse, which can lead to false experimental results. Mouse strains harboring pathogens can be rederived to a pathogen-free status by transferring pre-implantation embryos from a contaminated mouse to a pathogen-free foster mother. The resulting pups will then also be pathogen-free.

3. Cryopreservation

The purpose of cryopreservation is to protect valuable, unique mouse lines against loss through breeding failure or disease, and to eliminate the cost of maintaining mouse lines that are not in use. Sperm freezing is the principal method as it is inexpensive, quick and requires only a small number of mice. *In vitro* fertilization (IVF) with the frozen sperm is required to revive the mouse line. For complex genetic backgrounds, embryo freezing is the preferred method to archive the mouse line.