Center for Experimental Medicine and Systems Biology

Core Laboratory for Developing Advanced Animal Models
先進モデル動物作製コア

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The Core Laboratory for Developing Advanced Animal Models supports basic sciences in the life science field by producing and providing gene-manipulated mice or rats such as human disease models or gene KO/KI models. Using cutting-edge genome editing techniques, we make various types of gene-manipulated animals, including indel mutation, large fragment deletion, SNPs, conditional Cre/loxP, drug inducible gene expression/silencing, reporter gene KI, or gene conversion for making humanized mice or rat models either by direct gene editing in zygote or highly efficient ES cell-mediated gene targeting followed by chimera animal productions.
https://www.ims.u-tokyo.ac.jp/cemsb/public_html/index.html

Laboratories that consist of the Core

'Core Laboratory for Developing Advanced Animal Models' was launched in 2020 to provide gene-manipulated mouse or rat models to domestic or international academic institutions. One division, the Division of Genome Engineering, and two laboratories, the Laboratory of Reproductive Systems Biology and the Laboratory of Genetically Engineered Mouse Research, all of which belong to the Center for Experimental Medicine and Systems Biology, comprise the Core.

Cutting-edge genome editing techniques

For making indel mutants, large deletion, or short DNA fragment KI such as SNPs, or peptide tags, we offer direct genome editing using mouse or rat zygotes through NEPA electroporation systems (NEPA Gene). In mice, embryos from C57BL/6J strain are routinely served for genome editing, but other strains, such as C57BL/6N or BDF1, are also applicable if necessary. In the rat, F344/Jcl strain is served for zygote genome editing. For large-size gene manipulations in mice, such as Cre/loxP conditional allele, fluorescein reporters KI, gene conversion from mice to human, or drug-inducible Tet-on/off system, we offer CRISPR/Cas9-assisted plasmid KI using ES cells through Neon Electroporation system (ThermoFisher) followed by blastocyst injection for developing chimeric mice. ES cells from C57BL/6J, C57BL/6N, 129, B6129F1, or BALB/c strains are available for chimera productions. For producing large-size gene-manipulated rats, e.g., reporter KI or humanized rat models, the direct zygote genome editing technique, termed Combi-CRISPR, is applicable.

Supporting gene-manipulated mouse or rat model production through the core lab and AdAMS platform

We provide cutting-edge animal production techniques through our core lab and Advanced Animal Model Support, AdAMS. Our core is a member of AdAMS, which belongs to the Committee on Promoting Collaboration in Life Science, MEXT, and is an aca-

demic platform for producing gene-manipulated animals. Therefore, researchers earning KAKENHI, Grant-in-Aid for Scientific Research, can apply to this platform.

Number of mice or rat strains we developed in 2023

In 2023, our core provided 13 or 11 strains of gene-manipulated mice through the core lab or AdAMS, respectively. In the rat case, 4 strains of gene-manipulated rats have also been provided through AdAMS.