Laboratory Animal Facilities

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General Summary

Our laboratory animal facilities have 3,000 m² of floor space and 67 rooms (including 29 animal breeding rooms, 8 laboratories, 3 operating rooms, 2 cage-washing rooms, an X-ray room, and a sterilization room) and have the capacity to breed about 10,000 laboratory animals per day. Our tasks include establishing suitable environments for new technological studies using laboratory animals and offering the knowledge we have obtained to medical and biological research. Our activities range over wide fields of basic sciences, from laboratory animal anatomy and physiology to technical development applicable to clinical medicine.

Research Activities

Publishing anatomic color atlases of the laboratory rat and mouse

We have published 3 series of the macroscopic and sectional anatomy atlases of laboratory animals (*Color Atlas of Sectional Anatomy of Rabbit*, Chikusan Publishing Co., Ltd., Tokyo, Japan, 1993; *Color Atlas of Sectional Anatomy of Rat*, Chikusan Publishing Co., Ltd., Tokyo, Japan, 1997; and *Color Atlas of Sectional Anatomy of Mouse*; Maruzen Co., Ltd., Tokyo, Japan, 2001). Plans to republish English versions of the rat and mouse atlases are advancing in collaboration with the Department of Anatomy (I).

Bactericidal activities and safety of chlorine dioxide

In June 2004, the International Agency for Research on Cancer classified formaldehyde as carcinogenic to humans. For this reason, we have explored other gas compounds that could be usedfor disinfection instead of formaldehyde gas.

We have reported several methods for generating chlorine dioxide gas and have explored whether this gas could be used for disinfection instead of formaldehyde gas. Chlorine dioxide gas is strongly oxidizing and is corrosive to steel (at concentrations greater than 100 ppm); however, we have used concentrations of approximately 30 ppm, so the adverse effects were tolerable. We believe that chlorine dioxide gas could be used for disinfection instead of formaldehyde.

Spermatozoa and spermatids retrieved from frozen whole bodies of male mice can produce normal offspring

Cryopreservation of male germ cells is a strategy for conserving animal species and strains of animals valuable for biomedical research. We tested whether male mouse germ cells could be cryopreserved without cryoprotection techniques by simply freezing

epididymides, testes, or whole bodies. Testicular spermatozoa retrieved from the bodies of male mice (BALB c nude and C3H He strains) that had been kept frozen (−20°C) for 15 years could produce normal offspring through microinsemination. We reported that spermatozoa or spermatids, retrieved from frozen reproductive organs or frozen bodies of mice, can produce offspring through microinsemination.

Immunohistochemical detection of markers for oxidative stresses in the ovulating ovary
Reactive oxygen species containing superoxide were believed to play a role in ovulation. By using a specific sensor for superoxide we have recently confirmed production of superoxide in the ovulating ovary. This year, we attempted to observe the localization of oxidative stresses by using several stress markers (8-hydroxydeoxyguanosine, 4-hydroxynonenal, and hexanoyl lysine). We observed heavy oxidative stresses in the theca interna and the theca externa and concluded that these stresses were involved in stigmata formation during ovulation.

Establishment and characterization of strains originated from the Japanese wild mouse and the Phodopus hamster
Originally established inbred strains derived from Japanese wild mice (*Mus musculus molossinus*) and Phodopus hamsters (*Phodopus sp.*) were maintained in this laboratory. *Phodopus* hamsters are small rodents that differ taxonomically from Syrian hamsters, which are the most commonly used laboratory hamster. We recently determined that the *Phodopus* hamster is a good candidate for a new laboratory animal and have established an inbred strain. Furthermore, we continue to establish new inbred strains or congenic strains, to develop models of human disease, and to research these strains' biomedical characteristics.
In the collaboration with the Department of Biochemistry 2, we developed 2 new mouse strains using our original wild-derived inbred strain MSKR. One strain is a congenic strain having a knockout allele of *Oaz1* derived from the B6.129-*Oaz1*^{tm} to the MSKR background, and the other strain is a consomic strain that has chromosome 10 derived from the above-mentioned strain to the MSKR background. We have confirmed that these newly established strains are useful for researching genetic modification of *Oaz1* knockout mice.

Publications

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