

Division of Comparative Medicine

The Division of Comparative Medicine (DCM) provides animal husbandry and clinical care for all research animals on the MIT campus. Since its inception in 1974, DCM has evolved into a comprehensive laboratory animal program that provides a full range of veterinary and surgical support. Additionally, DCM has a National Institutes of Health (NIH) grant for training veterinarians for careers in biomedical research and is funded by NIH to introduce veterinary students to careers in biomedical research. The division also has an active research program funded by numerous R01 grants from NIH. DCM's total personnel now comprises 165 individuals. DCM's administrative headquarters, along with its diagnostic and research laboratories, are located on the eighth floor of Buildings 16 and 56. Recent renovations, partially underwritten by a gift from the Mallory Foundation, have converted lab space to offices in Building 16, and rooms in the contiguous eighth floor of Building 56 have been converted to laboratory space to accommodate the division's quarantine, diagnostic, and research activities. The division now encompasses approximately 175,000 square feet devoted to animal research activities. The new Koch Institute for Integrative Cancer Research currently being constructed will contain a new vivarium.

Facility Management and Animal Care

The average daily census of laboratory animals held constant in FY2008. Mice remain the primary species used by MIT investigators and represent more than 98 percent of DCM's animal population. The animal facilities support transgenic and gene "knockout" in vivo experiments. DCM now operates two transgenic cores and performs a range of transgenic services, including in vivo embryo transfer for rederivation of mice with endemic disease that have been imported to MIT from laboratories worldwide, in vitro fertilization, and genotyping of mice. During the past year services were expanded to include a full range of cryogenic services including laser-assisted in vitro fertilization. Efforts are currently underway to perfect a technique of vitrification freezing that will allow us to freeze all stages of preimplantation embryos. The transgenic core also provides genetically engineered mice to the investigative community at MIT.

Research Activities

Currently DCM faculty and scientific staff have 12 NIH-funded grants supporting in vivo studies of nitrite carcinogenesis, *Helicobacter hepaticus*, and tumorigenesis; pathogenesis of inflammatory bowel disease and of *H. pylori*; and pathogenesis of gastric cancer. Studies are also conducted involving diet and *H. pylori* infection, microflora-induced colitis, *Helicobacter* species-induced hepatocellular carcinoma, virulence factors of *Escherichia coli* O157:H7 genotypes, the role of probiotics in attenuating inflammatory bowel disease, and in vivo studies investigating CD4⁺CD25⁺ regulatory cells' abilities to treat colon cancer. Total research expenditures were \$2.2 million in FY2008.

FY2008 was the 20th year of the division's NIH postdoctoral training grant. This grant underwent competitive renewal and was funded for another five years. Our NIH three-to-four-year sponsored postdoctoral training program has been completed by 38 trainees, and 30 of them passed the board examination of the American College of Laboratory

Animal Medicine. An additional 15 DVMs or MDs completed postdoctoral fellowships sponsored by individual R01 or Program Project grants. Many former trainees hold leadership positions in academia as well as pharmaceutical and biotechnology companies. The NIH training grant also provides short-term training opportunities for veterinary students interested in careers in comparative medicine. During FY2008, DCM had 12 short-term trainees for periods ranging from four to 10 weeks.

DCM faculty and staff published one book, six book chapters, 20 papers, and 11 abstracts in FY2008 and presented numerous research papers at national and international meetings. Dr. James Fox was one of three editors for the recently published book *The Biology of Gastric Cancers*.

Academic Activities

Professor Fox was recently elected president of the American Association for Veterinary Medical Colleges. Professor David Schauer serves on an advisory committee for NIH and the new MIT interdepartmental program in microbiology. Professor Schauer is also involved in the Singapore-MIT Alliance.

DCM faculty and staff taught two graduate subjects in the Department of Biological Engineering (20.202 In vivo models: Principles and Practices and 20.450 Molecular and Cellular Pathophysiology) and one undergraduate subject (20.106J Systems Microbiology). Dr. Robert Marini serves as a lecturer in the Harvard-MIT Division of Health Sciences and Technology, where he is involved in the teaching of two courses.

Committee on Animal Care Activities

All students, staff, visiting scientists, and principal investigators who use animals in teaching or research must be certified by the Committee on Animal Care (CAC). To enable protocol submission and personnel training, CAC's website provides required forms, continuing education material, and information about CAC activities. In conjunction with CAC, DCM staff have developed an online training program that is combined with individual orientation and training in animal use by the veterinary staff at the Institute. Periodically, individual and group didactic training sessions for Institute personnel on topics pertaining to the care and use of laboratory animals are also offered. CAC has also developed an occupational health program for animal-related occupational health issues and periodically sponsors seminars on health issues such as zoonotic diseases. CAC continued to distribute to other institutions in the United States and abroad two instructional videos, one focusing on the role and responsibilities of institutional committees for the care and use of animals and the other on the use of anesthesia in laboratory animals. Both are available to MIT researchers at the division or in the Hayden Science Library.

James G. Fox

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More information about the Division of Comparative Medicine can be found at <http://web.mit.edu/comp-med/>.