Minding Nemo

The use of fish as models in biomedical research is hardly a new phenomenon. But the explosion over the past decade of the use of zebrafish and other fish species for research relating to developmental biology, neurobiology, toxicology, and a number of other disciplines, has pushed aquatic research to the forefront. For facilities that have traditionally limited their work to mammalian models, the sudden and unanticipated need to support fish research may come as a shock to the system.

There are 20,000 species of bony fish, making them the largest group of living vertebrates. They vary greatly in size, physiology, behavior, and ecology. That said, it is impossible to provide comprehensive husbandry guidelines for all types of fish. Being cold-blooded animals, fish are not covered by the Animal Welfare Act, but facilities receiving federal funding need to be aware that fish, like all other vertebrates, are covered by PHS *Policy* guidelines, and therefore must be provided with care that meets their distinct needs. In this issue, we offer introductions to topics of potential interest to a wide range of laboratory animal care professionals who may find themselves handling aquatic species, ranging from facility design and housing to surgery and post-surgical care of fish.

As more and more investigators choose to use fish to answer their research questions, animal facilities will need to find more space to house them. Basic differences between fish and the mammals traditionally used as subjects in biomedical research present both advantages and disadvantages to a program faced with the challenge of housing and caring for them. Because fish do not produce airborne ammonia or allergens, they can be housed in rooms that would not be suitable for housing rodents due to suboptimal HVAC design. On the other hand, rodent rooms are not designed to handle all of the water involved in housing fish. Not only are tanks filled with water extremely heavy, but spills also need to be planned for by including appropriate drainage systems. Author Bartlett (p. 39) highlights these and other design considerations for creating centralized aquatic facilities.

Beyond the setup of the facility itself, planners need to consider the fishes' microenvironment, as fish are acutely sensitive to variations in water temperature and quality. As such, the design of suitable housing units for aquatic species requires the incorporation of a variety of highly specialized equipment relating to considerations such as water transfer, filtration, temperature regulation, and water quality monitoring. Author Aneshansley (p. 35) describes the design and construction of the rack-based recirculating tank systems that are now commonly used to house a variety of fish species in a laboratory setting.

Beyond the fundamental husbandry concerns involved in dealing with aquatic species, there are also specialized techniques with which staff members conducting studies with these animals need to be familiar. As research with fish becomes more common, the demand for individuals skilled at performing technical procedures on fish will also increase. Author Harms (p. 28) presents an introduction to survival surgical procedures in fish. While many of the same requirements exist for survival surgery in fish as for mammals—including anesthesia and analgesia, prevention of postoperative infection, and use of proper instruments and techniques—these obviously need to be modified with the unique morphological and physiological needs of fish in mind.

Together, these features should provide readers with an overview of some of the unique considerations involved in caring for and working with this increasingly important research model.