

## Zebrafish Disease Testing at the Veterinary Diagnostic Laboratory

The zebrafish (*Danio rerio*), long a popular aquarium fish, is now well established as one of the most important animals associated with biomedical research. They are found in hundreds of laboratories around the world and are crucial to the success of research in diverse arenas including infectious diseases, genetics, immunology, toxicology, and oncology.

As the use of zebrafish in research expands at an rapid rate, so does the interest in diseases afflicting the fish in a research setting, but it is relatively early in the development of this branch of pathology, and the list of recognized zebrafish diseases is short. Also, there are few diagnostic laboratories offering assistance in the identification and characterization of zebrafish diseases. Recognizing these limitations, the Veterinary Diagnostic Laboratory is taking steps to assure it has a leadership position in this specialty.

For several years, under the guidance of Dr. Michael Kent, professor of parasitology at the College of Veterinary Medicine and the Veterinary Diagnostic Laboratory (VDL), and an internationally recognized expert in zebrafish diseases, the VDL has offered diagnostic services, including histopathology and microbiology, to research facilities encountering health problems in their zebrafish colonies, or to those conducting disease surveillance as part of their biosecurity programs. Dr. Kent has identified and characterized several diseases of these animals, some common to aquarium fishes in general, others more peculiar to the zebrafish. These include various mycobacterial infections as well as some unusual parasites, such as *Pseudoloma neurophilia*, a protozoan with a predilection for the nervous system.

Dr. Kent is confident there are a host of new or emerging diseases of zebrafish waiting to be identified, and there clearly is a need for additional diagnostic tools to assist with this endeavor. In response, the VDL has assembled a team of diagnosticians and researchers focused on developing and validating new and highly-sensitive, molecular-based diagnostic testing zebrafish. Crucial to the success of this effort has been a growing collaborative relationship between the VDL and the Sinnhuber Aquatic Research Laboratory, a center of excellence for zebrafish research at Oregon State University, the only zebrafish laboratory in the world with SPF fish (specific pathogen free for *Pseudoloma*), and an international resource for the research community.

Along with Dr. Kent, the “zebrafish team” includes pathologists Drs. Jerry Heidel and Christiane Löhr, bacteriologist Dr. Kathy O’Reilly, molecular diagnostician Donna Mulrooney, and NIH post-doctoral fellows Drs. Trace Peterson and Danielle Meritet,. This group harnesses expertise in fish pathology, microbiology, and molecular diagnostic techniques that will be critical to the development of tests that are not only rapid, but are also exquisitely sensitive and specific. Diseases of interest that will be the immediate focus of this effort include *Pseudoloma neurophilia*, *Pleistophora hyphessobriconis*, *Edwardsiella ictaluri*, *Mycobacterium chelonae*, *M. marinum* and *M. haemophilum*, and *Infectious Spleen and Kidney Necrosis Virus*.

The VDL sees this effort as an important part of a comprehensive diagnostic service for the zebrafish community. But just as important, this work will help expand VDL diagnostic services for other aquatic animals, not only from laboratory environments but also those from aquaculture, the ornamental fish industry, and natural resource agencies.

Please contact the VDL if you have questions regarding our diagnostic services for zebrafish as well as other aquatic species.