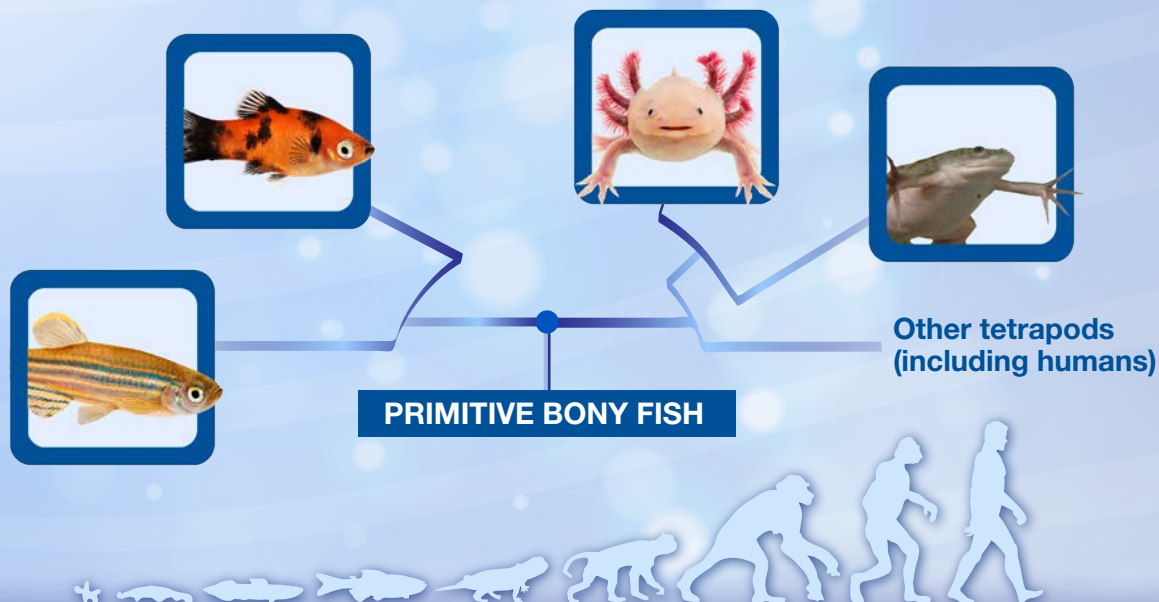


ORIP

OFFICE OF RESEARCH
INFRASTRUCTURE PROGRAMS



AQUATIC MODELS

Centers and Research Resources

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Fact Sheet 2025

ORIP'S MISSION

ORIP advances the National Institutes of Health (NIH) mission by supporting infrastructure for innovation. This support is focused on research resources, including animal models for human diseases, cutting-edge scientific instrumentation, construction and modernization of research facilities, and research training opportunities for veterinary scientists. Through continued engagement with NIH institutes, centers, and offices and the biomedical research community, ORIP empowers and expands existing programs and develops new initiatives to support NIH research at the forefront of scientific progress.



National Institutes of Health
Office of Research Infrastructure Programs

OVERVIEW

ORIP's Division of Comparative Medicine (DCM) funds grants for a variety of centers and research resources that support laboratory animals to study human health and disease modeling.

The centers develop, characterize, maintain, cryopreserve, and distribute wild-type strains, mutants, and transgenic

and inbred lines of different species. ORIP is committed to ensuring that scientists have access to important laboratory animals, including aquatic models. Aquatic model centers and research resources supported by DCM are further described at [ORIP's Research Resources Directory](#).

HOW AQUATIC MODELS ADVANCE TRANSLATIONAL RESEARCH

During the past century, aquatic animal species—including fish (such as zebrafish and *Xiphophorus*), salamanders (such as *Ambystoma*), and frogs (such as *Xenopus*)—have demonstrated their utility as powerful models for studying human development, behavior, genetics, and disease because humans and aquatic species share related genetic information (Figure 1). These species' short developmental cycles, small sizes, and transparent embryos offer unique advantages to researchers.

At the molecular level, researchers can take advantage of orthologous, paralogous, and novel genes and their expressions to obtain information about species-specific evolutionary survival adaptations (fitness). By studying these differences and the preserved commonalities among species, scientists can understand the roles that genes play in adapting to and surviving in the environment. One example is tissue regeneration in salamanders, a capability lost in humans.

Using aquatic models, researchers can identify functions of specific genes, allowing them to better understand the underlying basis of human health and disease. So far, more than 10 Nobel laureates in Physiology or Medicine have used at least one of these species in their research, indicating the importance of aquatic models in advancing scientific knowledge. A summary of these and other species' contributions to medical discoveries can be found at the [Foundation for Biomedical Research's Nobel Prizes](#) page.

The scientific relevance of each species is based on the aspects of biology, physiology, and genetics shared with humans, as well as the opportunities that the species offer to create complementary models for human disease studies.

RESOURCE CENTERS

[Ambystoma Genetic Stock Center](#). Maintains a collection of Mexican axolotls (*Ambystoma mexicanum*), unique among vertebrates for their ability to regenerate numerous tissues and body parts.

[National Xenopus Resource](#). Serves as a stock center for various transgenic, mutant, and inbred *Xenopus laevis* and *X. tropicalis* animals.

[Xiphophorus Genetic Stock Center](#). Houses a collection of 24 of the 26 species of the freshwater genus *Xiphophorus*, including northern swordtails, southern swordtails, and platyfish. They are livebearing fish that retain their eggs inside the body and give birth to live, free-swimming young.

[Zebrafish International Resource Center](#). Serves as a stock center for wild-type and mutant strains of zebrafish (*Danio rerio*). It also provides pathology services and offers services to diagnose and treat infection by opportunistic pathogens affecting zebrafish.

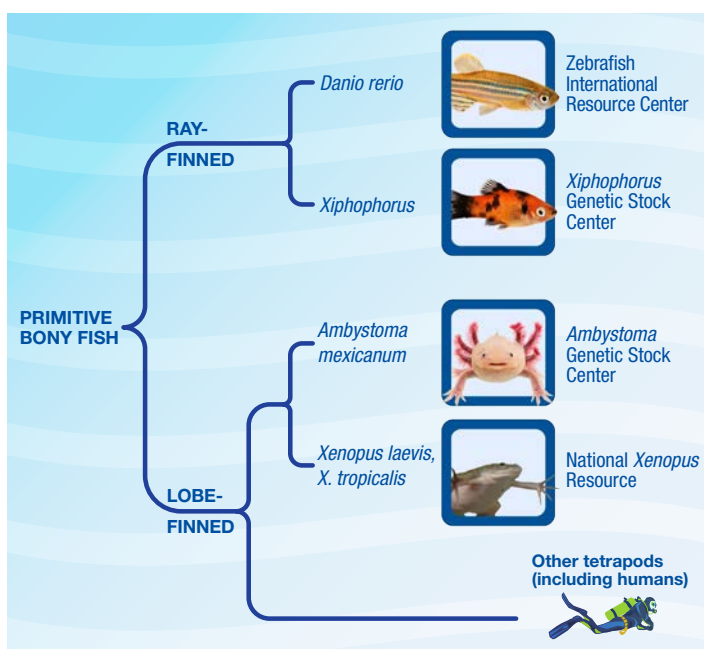


Figure 1. Simplified diagram of the evolutionary relationship of *Danio rerio*, *Xiphophorus*, *Ambystoma mexicanum*, *Xenopus* (available at ORIP's supported centers), and other tetrapods (including humans).