

ORIP

OFFICE OF RESEARCH
INFRASTRUCTURE PROGRAMS



Invertebrate Models

Centers and Research Resources

orip.nih.gov

twitter.com/NIH_ORIP

Program Contact:

Sige Zou, Ph.D.

sige.zou@nih.gov

301-435-0749

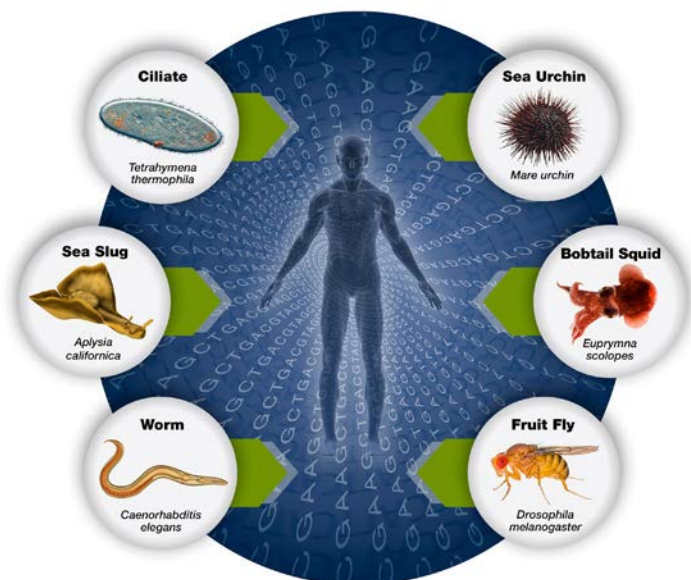
2024

ORIP'S MISSION

ORIP advances the 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.



RESEARCH CHALLENGES AND POSSIBILITIES



Advancements in genome, microbiome, and imaging research have highlighted the impact of genetic variants, microbiota, and cellular networks on human health and diseases. Diverse and relevant animal models and research tools are needed to understand the causal effects of such factors.

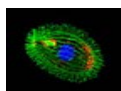
ORIP-supported invertebrate centers and research resources are meeting these needs by generating, maintaining, and distributing appropriate invertebrate models, tissues, research tools, and applications to the biomedical research community.

Invertebrate models are ideal for biomedical research owing to their short life cycles, simple culture conditions, and number of genes homologous to human genes. Invertebrate models have contributed to advances in human medicine and led to 14 Nobel Prizes in Physiology or Medicine since 1933.

Nobel Prizes for Research Using Invertebrate Models

Ciliate:	Catalytic properties of RNA (1989) Telomeres (2009)
Sea Urchin:	Cell cycle regulators (2001)
Squid:	Ionic mechanisms underlying nervous conduction (1963)
Worm:	Genetic regulation and apoptosis (2002) RNA interference (2006) Green fluorescent protein (2008)
Sea Slug:	Synaptic function in learning and memory (2000)
Fruit Fly:	Chromosomes in heredity (1933) X-ray induced mutations (1946) Genetic control of embryonic development (1995) Organization of the olfactory system (2004) Innate immunity (2011) Circadian rhythm (2017)

CENTERS AND RESEARCH RESOURCES



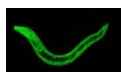
National *Tetrahymena* Stock Center (Washington University). Collects, maintains, and distributes wild-type, mutant, and genetically engineered strains of *Tetrahymena* and provides genetic services and training.



Resource for Developmental Regulatory Genomics (Carnegie Mellon University). Produces resources and tools for studying genomic control of spatial gene expression during embryonic development in sea urchin.



National Resource for *Aplysia* (University of Miami). Provides laboratory-reared *A. californica* at all life stages (eggs to adults). Studies effects of aging on behavior, neuronal function, and gene expression.



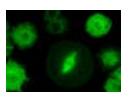
***Caenorhabditis* Genetics Center** (University of Minnesota). Acquires, maintains, and distributes approximately 21,000 genetic stocks of *C. elegans*.



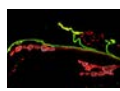
Center for *C. elegans* Anatomy (Albert Einstein College of Medicine). Provides ultrastructure information on *C. elegans* by assembling an anatomical atlas during development and aging. Improves and provides training in electron microscopy and histochemistry technologies.



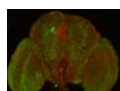
Bloomington *Drosophila* Stock Center (Indiana University). Collects, curates, maintains, and distributes more than 71,000 genetically defined fly strains. Provides scientific and technical support.



***Drosophila* Genomics Resource Center** (Indiana University). Collects and distributes reagents and materials for *Drosophila* genomics research. Refines and supports emerging cell culture technologies.



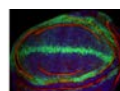
MAGIC Tools for Genome-wide Mosaic Analysis With Existing *Drosophila* Resources (Cornell University). Generates genetic tools that allow efficient mosaic analysis of genetic modifications over the entire genome throughout *Drosophila* tissues and developmental stages.



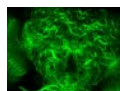
Comprehensive Resource for the *Drosophila* 4th Chromosome (Arizona State University). Generates and characterizes long-sought genetic stocks for all 105 genes and non-coding RNA on the 4th chromosome of *Drosophila* for studying human homologs relevant to human health and disease.



Resources for *Drosophila* Embryo Cryopreservation at Lab and Stock (University of Minnesota). Develops and disseminates standardized protocols and other resources for cryopreservation of embryos as the means to preserve *Drosophila* genetic stocks.



***Drosophila* Models of Human Mitochondrial Diseases** (Harvard Medical School). Generates, provides, and characterizes *Drosophila* nanobody-related reagents for characterizing and validating *Drosophila* models for human mitochondrial disease.



Comprehensive Resource for Manipulating the *Drosophila* Genome (Baylor College of Medicine). Generates and characterizes genetic reagents for functional studies of more than 2,000 fly genes and their human homologs.