

ORIP

OFFICE OF RESEARCH
INFRASTRUCTURE PROGRAMS



Invertebrate Models

Centers and Research Resources

<https://orip.nih.gov>

Program Contact:

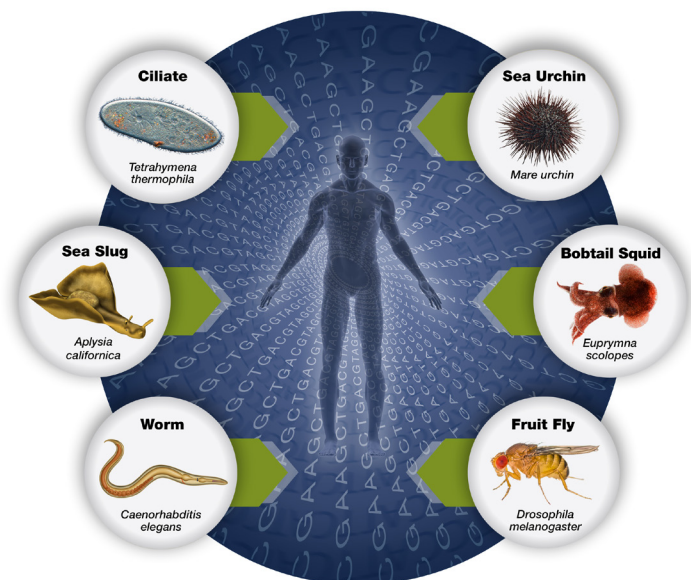
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ORIP'S MISSION

The Office of Research Infrastructure Programs (ORIP) enhances biomedical research in all disease areas and across basic, translational, and clinical research through its support of research infrastructure and resource programs. ORIP grants enable biomedical researchers to purchase state-of-the-art instruments; validate and disseminate research models, materials, and genetic stocks; and establish specialized research resource centers. ORIP also supports training and career development of individuals with DVM/VMD degrees, as well as predoctoral veterinary students.



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.

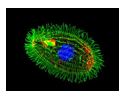
ORIP-supported invertebrate centers and research resources are meeting these needs by generating, maintaining, and distributing appropriate invertebrate models, tissues, research tools, and applications to the biomedical research community.

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 between 1933 and 2017.

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



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



A 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.



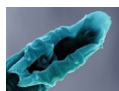
National Resource for Aplysia (University of Miami). Provides laboratory-reared *A. californica* at all life stages (eggs to adults). Studies effects of aging on behavior, neuronal function, and gene expression.



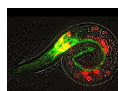
Vibrio Virulence Determinants in a Benign Colonization (University of Hawaii at Manoa). Studies specific binary symbiosis between *Vibrio fischeri* and its squid host and develops approaches and technologies for understanding the complex host-microbe interactions.



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



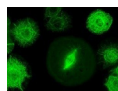
Center for *C. elegans* Anatomy (Albert Einstein College of Medicine). Provides ultrastructure information on *C. elegans* by assembling an anatomical atlas during development and aging. Improves electron microscopic (EM) and histochemistry technology, and provides training in modern EM techniques.



WormGUIDES (Yale University-led consortium). Develops super-resolution imaging and computational technologies for studying spatial dynamics of cell position and morphologies during development in *C. elegans*. Builds an atlas of embryonic neurogenesis and integrates informatics resources on cell lineage, structure, and genomic and genetic data.



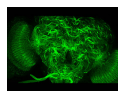
Bloomington *Drosophila* Stock Center (Indiana University). Collects, curates, maintains, and distributes more than 71,000 genetically defined fly strains. Provides scientific and technical support.



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



Next-generation *Drosophila* Cell Lines to Elucidate the Cellular Basis of Human Diseases (Harvard Medical School). Generates and provides *Drosophila* cell lines of specific lineage, cell lines expressing fluorescent markers of subcellular components, and gene editing reagents for knockout in cell lines.



A Comprehensive Human cDNA Library for Functional Gene Replacement in *Drosophila* (Baylor College of Medicine). Generates and provides a library of epitope tagged human cDNAs of genes conserved between *Drosophila* and human, and transgenic flies with epitope tagged human cDNA for studying functions of human gene variants.