

Annelids (segmented worms) are among the most ecologically diverse animal groups, occupying habitats that range from hydrothermal vents to glacier ice. This diversity, along with their simple body plan and broad experimental accessibility, has made them desirable subjects of scientific curiosity over the past century. Unfortunately, trends in modern biology have clustered mainstream researchers around a few model systems that support contemporary molecular techniques, creating a relatively narrow scope in the scientific community and sometimes overcrowded and undercollaborative fields. A consortium of scientists is eager to increase the diversity of research subjects in the sciences, as a means of enhancing our ability to dissect fundamental biological questions as well as to promote the discovery of biological novelties. Annelids are particularly suited and well poised for these challenges, as they occupy a strategic evolutionary position in animal phylogeny (i.e. Lophotrochozoa) and have an experimental infrastructure that supports state-of-the-art methodologies.

In my own somewhat eclectic research interests, which include neurodevelopment, embryonic stem cell specification, cold temperature physiology and biomaterials science, I have found that annelids of various species offer unexpectedly versatile experimental systems. For instance, stem cells in glossiphoniid leeches are among the largest in the Metazoa (up to 300 μm in some species), which facilitates their homogenous isolation and subsequent characterization; clitellate cocoons comprise thin, flexible biomembranes sealed with underwater glues, and display remarkable resiliency to heat and denaturing chemicals; glacier ice worms represent the largest and most sophisticated cold-adapted ectotherm. Others have employed the experimental accessibility of annelids to examine fundamental questions in neurobiology (for which hirudinid leeches are the classical preparation), learning and memory, immunology, development, ecology, life at extreme environments, and for assessing environmental quality and toxicology—all topics that are addressed in this book.

This compilation of annelid works is by no means intended to be comprehensive; rather, it provides a sampling of the types of questions that can be investigated using annelids as research subjects. I am committed to promoting and fostering the use of annelid worms in science, as they remain a relatively unexplored animal group that are potential gold mines in disparate scientific disciplines. My hope is to inform and encourage members of the scientific community, particularly emerging young scientists, to consider the use annelids in their future studies, with the long-term and necessary goal of increasing diversity in scientific research.

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