

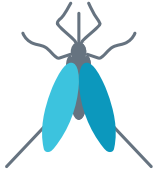


**FASEB**

Federation of American Societies  
for Experimental Biology

## Research with Invertebrates

Invertebrates are a group of animals that do not have a vertebral column (also known as a spine or backbone). As the largest group in the animal kingdom, invertebrates are a diverse species that live both on land and in water. Because of their unique properties, research with invertebrates helps scientists understand basic biological development as well as many human diseases. A few examples of invertebrates in research include:



Mosquito/Tick



Honeybee



*C. elegans* (roundworm)



*Drosophila* (fruit fly)



Starfish

### Why Invertebrates?

A powerful way to understand and treat human diseases



#### ***Drosophila*: Important for studying genetics, neurodevelopment, and heart disorders**

Research in *Drosophila* led researchers to understand how genetic traits are passed on by confirming that genes are stored in chromosomes, structures inside cells that carry our DNA. The *Drosophila*'s genetic pathways and cardiac system are very similar to mammals, allowing scientists to use this species to understand how our hearts and brains develop. In 2023, researchers completed a full map of the *Drosophila* brain and its connections. This helps scientists develop therapies for various diseases like autism spectrum disorder.



#### ***C. elegans*: Important for studying aging and terminal illnesses**

Even as a simple organism, *C. elegans* are a great way for scientists to study human diseases because its genes are similar to what we find in humans. For example, through research with *C. elegans*, scientists better understand the signals that control aging. This helps researchers determine potential treatments for age-related diseases such as dementia. *C. elegans* also help scientists investigate the genetic causes of diseases like Amyotrophic Lateral Sclerosis (ALS) by learning how the neurons controlling our muscles deteriorate.



#### **Honeybee: Important for studying memory, cognition, and neurological disease**

Honeybees have a very sophisticated memory, which allows scientists to better understand the neural basis of learning and cognition. In 2006, researchers completed sequencing of the honeybee genome and found it is more similar to humans than any other insect. The honeybee's unique genetic and cognitive characteristics help scientists understand the mechanisms involved in many neurodegenerative diseases, including Alzheimer's.