



Fruit Fly Lab

Studying Fruit Flies in Space Aboard the International Space Station

The Fruit Fly Lab provides a research platform aboard the International Space Station for long-duration fruit fly (*Drosophila melanogaster*) experiments in space. Such experiments will examine how microgravity and other aspects of space affect these insects, providing information relevant to long-term human spaceflight, in particular the response to illness. Approximately 77 percent of human disease genes closely match the fruit fly genome.

Fruit fly spaceflight experiments have contributed significantly to our understanding of the effects of microgravity on biological processes that are directly relevant to humans in space. Because of the fly's short lifespan, fruit fly studies provide information at the whole biological system level about the effects of spaceflight on the immune system, the development cycle (birth, growth, reproduction, aging), and behavior. Specific research questions are defined in the National Research Council's 2011 Decadal Survey Report, "Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era."

Historically, short-term fruit fly experiments were transported into Earth's orbit aboard NASA's space shuttle. The International Space Station is the first essentially "permanent" orbiting science laboratory that offers the opportunity for longer-term experiments in space. In 2012, NASA's

Ames Research Center in Moffett Field, Calif., was authorized to develop the Fruit Fly Lab for research aboard the space station.

This hardware development project leverages the experience gained from prior flight experiments with fruit flies using a space shuttle-based system. Advanced capabilities of the new Fruit Fly Lab include providing environmental and behavioral monitoring for long duration studies that the previous system lacked. In the post-shuttle era, the hardware also must support safe transport of fruit flies on the commercial resupply service vehicle SpaceX Dragon.



