

FRUIT FLIES

On the International Space Station

Fruit flies are bug eyed and spindly, they love rotten bananas and, following orders from their pin-sized brains, they can lay hundreds of eggs every day.

Genetically speaking, people and fruit flies are surprisingly alike. About 77% of known human disease genes have a recognizable match in the genetic code of fruit flies, and 50% of fly protein sequences have mammalian analogues.

Fruit Flies could help NASA travel deeper into space than ever before. That's why fruit flies, known to scientists as *Drosophila melanogaster*, are commonplace in genetic research labs. They can be good substitutes for people. They reproduce quickly, so that many generations can be studied in a short time, and their genome has been completely mapped. *Drosophila* (literally dew-loving) is being used as a genetic model for several human diseases including Parkinson's and Huntington's.

They're about to become genetic models for astronauts. **We are sending fruit flies to the International Space Station. They will orbit Earth alongside astronauts, helping us explore the effects of long-term space flight on human beings.**

The flies will be living in a habitat developed at Ames called the "Fruit Fly Lab." Inside, they will lead the hurried lives of fruit flies--living, dying, reproducing, and experiencing the same space radiation and microgravity as their human counterparts. Cameras will record the behaviour and appearance of these miniature astronauts; and at intervals some of them will be frozen and returned to Earth for analysis.

This research was recommended by the National Research Council itself. **In a recent Decadal Survey (looking 10 years into the future),** the council noted that "model systems offer increasingly valuable insights into basic biology."

And they called for "an organized effort to identify common changes in gene expression [among] key model systems in space." **The Fruit Fly Lab will allow us to look into a variety of questions such as the effect of space flight on aging, cardiovascular fitness, sleep, stress and much more.**

It has long been known that astronauts' ability to resist disease is weakened in space. Turns out, the same thing happens to fruit flies. *Drosophila* sent into a 13 day orbit in 2006 all experienced a similar decrement in immune functions, Astronauts travelling to Mars and other distant places will be in space for much longer. A fruit fly habitat permanently installed on the ISS will allow researchers to conduct studies directly relevant to such long-duration space flight.

Flies onboard the space station will also have their own "carnival ride." **A 1-g centrifuge will subject them to the equivalent of Earth-gravity, allowing researchers for the first time to unravel the competing influences of radiation and gravity.**

The Fruit Fly Lab is scheduled to launch in late summer 2014 onboard a Space-X rocket. AK from NASA Notes.

