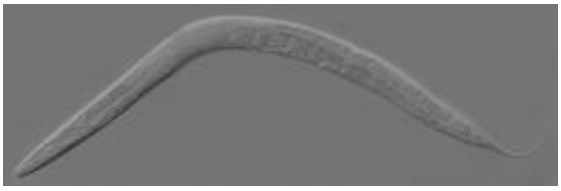
Why roundworms are ideal for space studies

May 25 2015, by Rachel Molina



Caenorhabditis elegans. Image: Wikipedia.

Humans have long been fascinated by the cosmos. Ancient cave paintings show that we've been thinking about space for much of the history of our species. The popularity of recent sci-fi movies suggest that the human mind just might be coming to grips with theharsh environment "out there."

The human body is another matter.

When gravity is greatly reduced—as in spaceflight—we no longer use our muscles to resist the usual pull of a planetary mass, and, without additional exercise astronauts lose both bone and muscle. Additionally, studies have shown that other parts of the body change in space like the bend of the spine, the amount of blood in the body and eyesight.

As we are now, prolonged voyages into outer space may be limited by our physical abilities…but a tiny new astronaut could provide much-needed insight into the ways that our bodies behave in microgravity: the noble roundworm.

It may come as a blow to the ego, but roundworms—or Caenorhabditis elegans—share a considerable amount of genetic material with humans. Enough, in fact, to make them the good candidates for a new study designed to determine how low-gravity environments affect astronauts.

Roundworms, like fruit flies, are often used as models for larger organisms. This is because their short lifespans allow for scientists to observe several generations of worms within a short period of time, yielding quicker results for studies. In a new investigation entitled Alterations of C. elegans Muscle Fibers by Microgravity, crew members of the International Space Station will grow two batches of worms: one in microgravity and one in a centrifuge, allowing the worms to experience simulated gravity. The Japan Aerospace Exploration Agency (JAXA) is spearheading the investigation.

"The astronauts will cultivate multiple generations of the organism, so we can examine the organisms in different states of development," says Atsushi Higashitani, principal investigator for the experiment with Tohoku University in Miyagi, Japan. "Our studies will help clarify how and why these changes to health take place in microgravity and determine if the adaptations to space are transmitted from one cell generation to another without changing the basic DNA of an organism."

The results from the experiment could impact more people than just future astronauts. Understanding the molecular changes that potentially take place in microgravity could help researchers to develop treatments and therapies to counteract physical changes associated with aging and extended bed rest. The roundworm may be surprisingly important for the elderly and infirm population of Earth, as well as to the astronauts orbiting it.

On April 14th, the space worms launched to the International Space Station on SpaceX's sixth resupply mission.

Provided by NASA