Scientist planning to send microscopic worms into space for muscle development study

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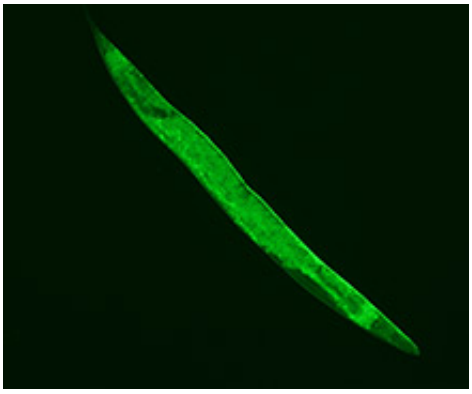

A nematode worm of the species Caenorhabditis elegans

A University of Exeter scientist is set to send thousands of microscopic worms on a mission to the International Space Station (ISS) in an experiment aimed at increasing our understanding of what triggers the body to build and lose muscle.

Dr Timothy Etheridge's study was announced as the UK Space Agency published its National Strategy for Space Environments and Human Spaceflight.

In a recent international call for new life sciences experiments to be flown on the ISS, coordinated by NASA, the European Space Agency (ESA), and the Japanese and Canadian space agencies, three new

experiments led by UK research teams were selected for further definition. Of these, two were the top-ranked proposals in Europe in terms of scientific merit, judged to be 'outstanding' by the international review panel.

One is led by Dr Etheridge of Sport and Health Sciences, who studies muscle decline in space and potential ways of counteracting this. Muscle weakness and reduced muscle mass are significant problems with spaceflight, but the research findings also have wider potential application in ways to help people with muscular dystrophy and diabetes, people immobilised by casts and the elderly.

The experiment, likely to take place between 2017-2020, might therefore improve our understanding of human health here on Earth, as well as the effects of long duration human space travel.

Dr Etheridge said: "As the world's space agencies plan longer, more ambitious missions, this poses a major challenge. Astronauts lose as much as 40% of muscle mass after 180 days onboard the International Space Station.

"Perhaps more worryingly, because muscle carries out several metabolic processes such as burning glucose and fat for energy, this level of muscle wasting could help lead to metabolic ailments such as type 2 diabetes, cardiovascular disease and obesity. These experiments will provide the first definitive demonstration of the mechanisms underlying muscle loss in space, and help to develop targeted therapies to lessen the problem in the future."

The researchers will use a nematode worm species called Caenorhabditis elegans – or 'C. elegans' – which are highly useful for studying long term changes in human physiology because they suffer from muscle loss under many of the same conditions that people do.

The worms, which are too small to be seen by the naked eye, will be placed in small bags of liquid food and flown to the International Space Station to live and produce offspring for five and a half days, before being frozen by the astronauts and returned to Dr Etheridge's lab for analysis of muscle health.

The UK has a strong research base and is rapidly establishing itself as a key player in space environments research.

Dr David Parker, Chief Executive of the UK Space Agency, said: "Our new national strategy is all about making the most of space: exploiting the unique opportunities for growth which human spaceflight and associated research programmes can offer. I'm immensely proud of British scientists, who really are among the world's best, as demonstrated by the strong showing in the recent international space life sciences competition. Space and life sciences are two areas where the UK has a proud heritage and the UK Space Agency is committed to helping researchers access unique facilities such as the ISS."

Dr Etheridge has conducted previous space experiments with C. elegans, the last in 2009 when worms blasted off alongside astronauts on board the Space Shuttle Atlantis.

Provided by University of Exeter