

# Blast off for first UK-led experiment on the International Space Station

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UK-led research is taking place on the International Space Station (ISS) for the first time, following a successful launch from Kennedy Space Centre at Cape Canaveral in the US.

An experiment using microscopic nematode [worms](#) involving teams of scientists from the Universities of Nottingham, Exeter and Lancaster was among a shipment of cargo and scientific investigations to be delivered to the ISS by the SpaceX Dragon spacecraft following the launch by the SpaceX Falcon 9 rocket at 6.16 pm (UK time) on Wednesday 5 December.

Space is an extreme environment that causes many negative health changes to the body, including substantial muscle loss – in fact, astronauts lose up to 40 per cent of their muscle after six months in [space](#).

The worms on the ISS are part of the Molecular Muscle experiment which will try to identify the precise molecules that cause these problematic changes and will also test new therapies to try and prevent muscle loss in zero-gravity.

## **Molecular changes**

The University of Nottingham's Professor of Space Biology, Nate Szewczyk, who travelled to Cape Canaveral for the launch, said: "We are hugely excited to be coordinating the first UK-led experiment on the International Space Station.

"The Molecular Muscle Experiment is the first experiment to try to establish the precise molecular causes of neuromuscular decline in space. We will be using a combination of gene manipulations and drugs to pinpoint these causes.

"This work is part of a broader investment in space by both the UK government and the University of Nottingham and could lead to real-life improvements to [human health](#), both in space and on Earth."

Earlier research has revealed that the microscopic worms, *C.elegans* and humans experience similar molecular changes in space that affect muscle and metabolism. The muscles of thousands of worms will be examined as part of the experiment on the ISS.

The changes in muscle observed in astronauts are known to be an excellent model to study the muscle ageing process, and scientists are able to use the knowledge gained from studying in astronauts to better understand the ageing human body.

## **Practical advantages**

Tim Etheridge, Senior Lecturer at the University of Exeter, said: "Worms are, perhaps surprisingly, a very good model for human muscle maintenance. At the molecular level, both structurally and metabolically, they are highly similar to that of humans and, from a space flight-specific perspective, they provide a lot of practical advantages. They are very small, quick to grow, cheap and easy to maintain. It makes them good to work with."

Preparations for Wednesday's launch—which was delayed by a day after mouldy food was found among another research team's kit—began at Kennedy Space Centre with the arrival of the first scientists on 13 November. Immediately before the launch the worms were placed in liquid bacterial feed and sealed in special gas permeable plastic bags. The bags were then housed in a special container and placed in an incubator.

The worms reproduce in space and after growing into adults – in around 6.5 days – will be frozen until returning to Earth. The experiment can be followed on Twitter via @worms\_space

Dr. Beth Phillips, another co-investigator on the project in the University

of Nottingham's School of Medicine, said: "The Molecular Muscle Experiment is also important because it lets us engage with young people to encourage them to consider careers in science and technology."

In addition to following the experiment on Twitter, students can learn more about the experiment online at [www.mme-spaceworms.com](http://www.mme-spaceworms.com) and for graduates The University of Nottingham will be offering Ph.D. studentships in Astromedicine and Astropharmacy funded by the Engineering and Physical Sciences Research Council from next autumn.

UK scientists are able to carry out this research thanks to the UK Space Agency's subscriptions to the European Space Agency's exploration programme, which contributes to the costs of the International Space Station, which the UK joined in 2012.

Libby Jackson, Human Spaceflight and Microgravity Programme Manager at the UK Space Agency, said: "This is the first of many exciting experiments heading to the International Space Station from the UK, thanks to our contributions to ESA. The Molecular Muscle Experiment will provide knowledge that will benefit our understanding of [muscle](#) ageing and help to improve life on Earth."

Provided by University of Nottingham

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