

A worm went to space and came back with two heads. Why?

Health/Science

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From Euronews, last updated June 30, 2017 A regenerating worm from Earth has come back from the International Space Station with two heads, a shock finding that may have significant implications for advanced health care for humans. The basic story Scientists from Tufts University in Boston cut in half a group of worms, packed them into a cargo spaceship and sent them off for a five-week stay on the International Space Station. One of the aims was to study how being in space could affect these worms's well-studied regeneration process. When they came back they found a shocking result: one of the worms had two heads, one at each end of its body. Why two heads? Scientists still don't understand fully what happened to the two-headed space worm. Professor Michael Levin, Director of the Allen Discovery Center and co-author of the research, told Euronews: “The experience of space travel is kind of complex in that, when you go up to space, you experience zero gravity but you also experience loss of the geomagnetic field, you experience various vibrations during take-off and landing. There are stresses and G-forces for take-off and splash down. So, there were numerous physical perturbations on these worms. At this moment, we don't which of those is specifically responsible for this outcome. Possibly, all of them”. The experiment The worms in question are called flatworms, or planarians, and are known for their mesmerizing ability to regenerate. Within two weeks, a flatworm which has been cut in half, or even into thirds, can reconstruct the body parts it is missing. Researchers have studied these worms for many years, and no 'two-headed' anomaly is known to have ever occurred naturally on Earth. The flatworm is an ideal model to study regenerative processes, and scientists at Tufts sought the opportunity to study these processes up in space. Professor Levin and his fellow scientists began the preparation to send flatworms to space in late 2014. They began by starting to work out the logistics and designing the packaging that would allow the worms to survive the trip there and back. The worms were then cut into pieces: some of them had their heads chopped off, others lost their tail and a third group had both their heads and tails removed. They were then placed into tubes filled with a mix of half water and air. The worms blasted off to space on 10th January 2015 for their 32-day stay on the International Space Station. During this time, they remained sealed in their packaging and Levin and his colleagues had no idea what was happening to them or even whether they had survived. The exciting reveal happened on 11th February 2015 when the group of scientists opened the box. They found a number of differences between regular flatworms and the space worms - the space worms had different levels of bacteria in their bodies, and there were different levels of fatty acids and proteins from the worms in the water around them. But the biggest and most visible difference is one of the space worms had two heads, one at each end of its body.

What's more, the worm with two heads has since reproduced as it normally would by splitting into two. But, what's unusual about this is that its offspring also re-grew two heads. This

means that whatever caused this worm to change has had a long-term impact on its body and nervous system. A [report on planarian regeneration in space](#) was recently published. Ok, I get it. What does it mean for humans? Flatworms share many of the same biological processes as human beings, and they bear a large number of stem cells that allow them to produce new tissue. Down here on Earth, we have been studying these flatworms and their regenerative abilities in order to develop new and better therapies for humans. While research on astronauts show the negative effects of space travel on humans, Professor Levin believes this research shows a possible big upside too:

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