

A vaccine to live in space? What's happening in a Florida lab may help aging seniors, too

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Traveling by plane isn't always easy on the body. And neither is space travel. Astronauts often experience atrophy, the loss of bone and muscle, during their months living in space's zero gravity. People on Earth also tend to see their bones and muscles weaken as they age, increasing risk of injuries from falls.

Companies like Elon Musk's SpaceX and Jeff Bezos' Blue Origin are working to open [space travel](#) for more people.

And figuring out how to reduce atrophy—a condition that affects [space](#) explorers as well as [senior citizens](#) on Earth—is on the mind of scientists.

At the University of Central Florida in Orlando, researchers are collaborating with biotech company Vaxxinity, which moved its headquarters from Texas to Cape Canaveral in Florida last year, to develop vaccines that can prevent and mitigate muscle and bone weakening, a common health problem for people experiencing long-term spaceflight—and aging seniors.

The space medicine research will help researchers develop studies to assess the effects of Vaxxinity's immunotherapies on proteins in the body that could affect bone and muscle growth.

The goal? Create a vaccine that can help reduce muscle loss or help regain it in case of injury, immobility or space travel. This vaccine could help people on Earth and in space live a better and healthier life as they age, according to Dr. Melanie Coathup and Dr. Michal Masternak, professors who work in UCF's College of Medicine and involved in the collaboration.

If all goes well, [human clinical trials](#) for the vaccines could begin as early as 2025, said Lou Reese, co-founder and executive chairman of Vaxxinity, who is also a self-proclaimed "space dork."

"UCF was born as a university to support the [space program](#), and the College of Medicine is continuing that mission, working to bring back to Earth the secrets that space medicine research can reveal," Dr. Deborah German, vice president for health affairs and dean of UCF's College of

Medicine, said in a statement. "We look forward to collaborating with Vaxxinity on this research and applying their unique technology to benefit the [aging population](#) on our planet and future space travelers."

Research into how people can live longer and healthier lives as they age is becoming more important in the U.S., which is expected to see its population of people 85 and older triple by 2060.

Healthy aging research is also key to Florida's future, which has more than 5.5 million residents 60 and older, outnumbering the senior population of 20 other states combined, according to Florida's Department of Elder Affairs. Florida is second to California in people 60 and older.

By 2045, Florida is projected to have more than 8.4 million older adults, or more than 30% of the state's population, according to the department's 2022-2025 state plan on aging.

It's not surprising that a vaccine to help astronauts and seniors drew Florida's interest.

Besides Florida's large population of aging seniors, the Sunshine State also has a tourism-driven economy, which includes Mickey Mouse, beaches, and space. Florida is home to NASA's Kennedy Space Center in Cape Canaveral, which every year sees more than 1.5 million visitors. People visit the center to learn more about space exploration, and if they're lucky, see a rocket launch, too.

Recently, SpaceX launched a private astronaut mission from Cape Canaveral to the International Space Station. The mission is the third one organized by Houston company Axiom Space, and carried Axiom's first all-European crew, including Turkey's first astronaut Alper Gezeravcı, Space.com reported.

A vaccine to help stop or reduce the deterioration of bone and muscle could also help further space exploration, too.

"It opens up a whole new opportunity for thinking and trying to work out what solutions can come from this ... and trying to learn as well because what happens in that extreme environment (space) is so different to what happens in Earth," Coathup said.

"We mentioned deep space exploration to Mars and a lot of people think, 'Oh, it's not possible.' Well you know, at the moment, I guess it isn't. But for me, there's an excitement to actually make that possible. What can we do? What are the barriers? And how can we potentially get through them?"

NASA is planning to send astronauts back to the moon, a mission planned for 2025. And if the U.S. wants to do longer space missions, such as to Mars, finding ways to reduce bone and muscle deterioration will be key in reducing some of the health strains of space, Masternak said.

"There's a lot of excitement from many people working in this sector in order to develop new discoveries that will push health for astronauts but also like we're saying we'll be able to deliver new discoveries for people on Earth as well," Coathup said.

Astronauts exercise for an average of two hours a day to reduce the bone and muscle deterioration caused by zero gravity, according to NASA. Without the exercise, the space agency says astronauts wouldn't be able to walk or stand up when they return to Earth months later.

A recent 2022 study of bone loss in 17 astronauts who flew aboard the International Space Station, with missions ranging from four to seven months, found that the astronauts experienced "significant bone loss"

during six-month spaceflights. The astronauts exhibited 2.1% reduced bone mineral density in the tibia, one of the bones of the lower leg, and 1.3% reduced bone strength, according to Reuters.

The loss is what "we would expect to see in [older adults](#) over two decades on Earth, and they only recovered about half of that loss after one year back on Earth," University of Calgary professor Leigh Gabel, the lead author of the [research published](#) in the journal *Scientific Reports*, told Reuters. Nine of the [astronauts](#) didn't recover [bone](#) mineral density a year after their flight.

"Putting humans into this extreme environment (of space), it shows the kind of weak points of our body and by studying this we can also apply it to humans living on Earth," Masternak said. "So this combination of better understanding what's happening there can give us much quicker answers to some problems that we are getting here on Earth with our everyday living."

Reese, Vaxxinity's executive chairman, said the company wants to help "humanity prepare for the next millennia," and that this vaccine research is just part of the puzzle.

"If humanity is to become a space-faring species, solving fundamental problems related to space travel and living are table-stakes," Reese said.

"Vaxxinity is all-in on developing and commercializing these solutions, and working with the State of Florida and UCF, collectively, we strive to promote both healthy aging and ensure humanity can become multi-planetary, brave low gravity exposure, and be of the stars," Reese said. "The support for this research from the State of Florida exemplifies a commitment to pioneering solutions in the fields of space travel, as well as longevity and age-related diseases."

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