Human muscle cells hitch a ride as SpaceX launches supply mission to space station

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A SpaceX capsule full of science experiments studying everything from asteroid mining to in-flight medical treatment launched from Florida to the International Space Station on Sunday, in hopes the research will

further humans' quest to return to the moon and reach Mars.

The Falcon 9 rocket lifted off from Kennedy Space Center's 39A launch pad at 11:17 a.m. for the 24th launch in 2020 from the company led by Elon Musk. About eight minutes into the mission, the first-stage booster landed successfully on the drone ship "Of Course I Still Love You" floating in the Atlantic Ocean.

The spacecraft will dock at the ISS on Monday afternoon and stay about a month before splashing back down on Earth in the Atlantic Ocean.

The CRS-21 mission is the 21st cargo resupply mission to the ISS for SpaceX since it signed a contract with NASA more than a decade ago. It's also the maiden flight of the company's upgraded Dragon 2 cargo capsule, succeeding the now-retired Dragon 1 capsule that flew for the last time in March.

Packed inside are more than 6,400 pounds of equipment for science experiments, including the mission's main focus: an airtight commercial airlock billed as a way to help more private companies deploy satellites into space and expose experiments to space.

Built and designed by Houston-based Nanoracks, the Bishop Airlock will join three other airlocks on the station, two that astronauts can leave through and one for releasing payloads into space. But this one, Nanoracks says, can hold about five times the volume.

An experiment hitching a ride on the Dragon 2 involves tiny human muscle cells that researchers hope will help explain how micro-gravity contributes to muscle loss. Leading the project is Dr. Siobhan Malany, an associate professor of pharmacodynamics at the University of Florida's College of Pharmacy.

Dr. Paul Coen, an associate investigator at the Translational Research Institute for Metabolism and Diabetes at AdventHealth Orlando, said the experiment will involve cells taken from muscle biopsies, half from older subjects and the others from younger individuals. Half of the cells will also be hooked up to electrodes that can make the cells contract, simulating exercise.

The goal is to better understand why, similar to astronauts aboard the ISS, adults on Earth lose muscle strength as they age.

Other similar experiments will look at how microgravity affects cardiovascular health, using engineered heart tissues, and early brain development, using mini-brains made from human stem cells of adults.

Another is aimed at making strides with in-flight medical treatment that could one day be used to diagnose and treat astronauts. The experiment involves testing a device that can perform blood analysis, similar to what a patient would undergo at a hospital. The device has been tested on Earth but not in micro-gravity.

"Our goal in this work is to really try and expand what we can do in spaceflight from a medical perspective," said Kris Lehnhardt, an element scientist for exploration medical capability at NASA's Johnson Space Center. "Because when we send people to Mars and someone gets sick on the way to Mars, we need to be able to take care of them where they are instead of focusing on being able to get them back to Earth quickly."