

Scientist sending yeast and algae to space on Artemis 1

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Dr. Corey Nislow and his team are sending yeast and algae into space aboard Artemis 1. Credit: Justin Ohata/UBC Pharmaceutical Sciences

When NASA's Artemis 1 lunar mission takes off on August 29, on board will be four science experiments—including one from Canada.

UBC pharmaceutical sciences professor Dr. Corey Nislow is sending yeast and algae cultures into space, in a pod not much bigger than a shoebox, to study the effects of cosmic rays and near zero gravity on living organisms.

When the spacecraft returns after its uncrewed 42-day orbit around the Moon, Dr. Nislow will get his samples back, along with the information they contain.

In this Q&A, he explains what the NASA project could mean for medical advances on Earth and in space.

What is it exactly that you're sending into to space, and why?

We chose to study *Chlamydomonas reinhardtii*—a single-cell green alga—and 6,000 yeast mutants. They will be grown for up to seven generations as Orion (the spacecraft used for the Artemis mission) completes its journey to the far side of the Moon. Yeast is a good model for [human cells](#) as its genes are somewhat similar to [human genes](#), while *C. reinhardtii* was chosen because it is a model for plants and a valuable source of food, molecular oxygen and hydrogen for fuel.

What happens when you get the samples back?

We'll study the [genetic changes](#) produced by space exposure, using our UBC lab's database of 10 million gene-drug interactions and information drawn from 20 years of study of these organisms. The information we gain can help design better treatments for future space travelers and for cancer patients undergoing chemotherapy.

As an example, we aim to find out if the yeasts' genome-wide signature

in response to [cosmic radiation](#) resembles that seen by cells exposed to DNA-damaging cancer drugs. Our preliminary data suggests that the answer is yes. In this way the Artemis mission will provide us with important directions for how to develop countermeasures for combating [radiation damage](#) to both yeast and crew member DNA—as well as ways to minimize the side effects of different chemotherapies.

What else should we know about this experiment?

For the first time in 50 years, [biological materials](#) will leave lower Earth orbit, contend with being exposed to cosmic radiation and then be returned to our laboratory for detailed molecular analysis. We will bring modern biotechnology to the unique environment of cosmic radiation combined with microgravity.

Artemis 1's upcoming flight is a [test flight](#) for a future [lunar mission](#) that will return humans to the Moon. It will set the stage for longer explorations—NASA has announced a goal to go to Mars with astronauts in the 2030s or soon after. To be part of such a historic project is an incredible opportunity.

Provided by University of British Columbia

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