

Shuttle Atlantis to launch with yeast

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When NASA's final space shuttle mission launches today it will carry four astronauts and some unusual passengers – yeast cell growth experiments developed by Canadian researchers at the University of Toronto's Donnelly Centre for Cellular and Biomolecular Research.

The Micro-4 project will study simple yeast cells to better understand human disease. The genetic makeup of a yeast cell is remarkably similar to that of a human cell, which makes it an ideal system for studying genetic defects and understanding how these defects may manifest in human disease. In two separate experiments – conducted at the International [Space](#) Station – researchers will study the effect of microgravity on cell growth, and how different mutant genes might affect susceptibility to a microgravity situation.

"The results of these experiments may provide critical insight into which set of human genes are important and how these genes work together to help humans deal with extreme environments associated with space travel," says Brenda Andrews, researcher and director of the Terrence Donnelly Centre for Cellular and Biomolecular Research "This information could inform future planned missions to Mars as well as longer-term settlement of moon and Mars-based colonies."

In the first experiment, yeast cells will be grown in petri dishes and kept in temperature-controlled chambers. To prevent cell growth, the chambers will be kept at 4o C until the shuttle has reached the space station. Once on the station, chamber temperature will be increased to

30o C, an optimal temperature for yeast cell growth. The cells will be allowed to grow for 48 hours after which they will be cooled back down and returned to Toronto for analysis. In the second experiment, 6000 different yeast cells, each identified by a special 'bar-code,' will be grown in liquid broth and the crew will transfer the [yeast cells](#) to fresh liquid broth twice during the course of the mission. These experiments will allow the Toronto team to see how the space environment and the genetic background of the cell combine to impact [cell growth](#) and survival.

"Little is currently known about the effects of long-term zero gravity on biological systems. Through these experiments, we expect to get a huge amount of new information about how genetic background affects survival in low-gravity/low- radiation environments, issues that are relevant to people exposed to these environments," says Professor Corey Nislow, researcher and principal investigator at the Donnelly Centre for Biomedical Research.

The Micro-4 project is led by U of T professors Corey Nislow, Guri Giaever, Charles Boone and Brenda Andrews from the Donnelly Centre for Biomedical Research. The project is coordinated by Michael Costanzo, Project Leader in the Donnelly Centre and is supported by Ames and BioServe Space Technologies. Timothy Hammond of the Durham Veterans Affairs Medical Center, Durham, N.C., is the principal investigator.

The space shuttle Atlantis is scheduled to lift off today at approximately 11:36 a.m. from NASA's Kennedy Space Center in Florida.

Provided by University of Toronto

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