Plants in space

October 10 2012

How plants handle stress in space and what astronauts can learn from them is the subject of a new study at Michigan State University.

Federica Brandizzi, Michigan State University plant biologist, will use a grant from the National Aeronautics and Space Administration to shed light on how plants and humans can adapt to handle the stress of long-term space missions.

"I've always been fascinated with NASA and space exploration," Brandizzi said. "Knowing that my research could contribute to the potential of a future with sustainable life in space makes my work quite rewarding."

From earlier research, Brandizzi has identified a pathway in plants that plays a key role in plants' ability to adapt to stress and continue to grow. Inside cells are organelles that communicate with the nucleus. When the organelles need protein – necessary for building important cell materials – they signal to the nucleus to send it their way; growth stops when this signaling doesn't happen.

One key master regulator of this process is governed by a multifunctional protein called IRE1. To better study the pathway's impact on growth, the Brandizzi lab isolated Arabidopsis mutants without a fully functional IRE1 pathway. These mutant plants offer excellent insight into how larger organisms, such as humans, endure and survive growth stress.

Brandizzi will travel to the Kennedy Space Center to prepare a crew of these plants to spend time on in flight. The launch is tentatively scheduled for July 2014. While Brandizzi won't escape the surly bonds of Earth, she will ready her plants and develop protocols for the flight crew to follow. Upon reentry, the samples will be returned to Brandizzi's lab to be tested.

"Being launched into space and living in zero- or low-gravity is stressful for plants and humans," Brandizzi said. "I believe we'll see what genes govern stress levels, find out what turns them off and on, and gain insight on how to control these signals so stress levels can be better managed while in space."

Provided by Michigan State University