

# SOUTHWESTERN NEWS

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## **UT SOUTHWESTERN SPACE RESEARCHERS PINPOINT MECHANISM INVOLVED IN LOSS OF CONSCIOUSNESS AFTER SPACE FLIGHT**

DALLAS – Jan. 15, 2002 – In one of the most ambitious medical experiments ever conducted aboard a space shuttle, UT Southwestern Medical Center at Dallas space researchers have pinpointed the mechanism responsible for the brief loss of consciousness and lightheadedness that many astronauts experience in the upright posture after space flight. The findings have broad application to medicine, both in space and on earth.

Two-thirds of astronauts experience orthostatic intolerance after space flight. Symptoms include lightheadedness, dizziness, palpitations and difficulty concentrating upon standing. The same condition also affects 500,000 people in the United States.

Using data collected during the 1998 Neurolab space shuttle mission, UT Southwestern researchers reported in one of three papers in a series of studies published in the January issue of *The Journal of Physiology*, that orthostatic intolerance is due to the heart shrinking and becoming stiff. Previous research suggested that the condition is due to a malfunction of the sympathetic nervous system, which helps maintain a normal blood pressure by controlling the size of arterial blood vessels.

“This was an ambitious project because it was the first space flight in which researchers directly recorded the sympathetic nerve activity of the astronauts,” said Dr. Benjamin Levine, lead author of the study and associate professor of internal medicine.

“These studies and follow-up experiments performed in our laboratory suggest that drug therapies aimed at boosting sympathetic activity in astronauts after space flight in response to standing upright may not be necessary. Rather, efforts to combat the primary problem, namely an excessive reduction in stroke volume while standing, which causes the heart to stiffen and shrink, may be effective,” Levine said.

He said many forms of orthostatic intolerance can be prevented or reversed without the use of drugs.

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“Markedly increasing the consumption of both salt and water, exercise training – both endurance and strength training to increase the heart size and flexibility and expand the blood volume – and behavioral modification to facilitate return of blood back to the heart has helped more than approximately 75 percent of patients who present to our autonomic function clinic with symptoms of orthostatic intolerance,” said Levine, who is medical director of the Institute for Exercise and Environmental Medicine, a collaboration between UT Southwestern and Presbyterian Hospital of Dallas.

The researchers studied six male astronauts before, during and on landing day of the 16-day Neurolab space shuttle mission, which was dedicated to the study of the nervous system in space. The investigators monitored the astronauts' blood pressure and how the cardiovascular system is stressed by gravity.

“This research has led to a better understanding of the type of blood-flow problems that affect astronauts on return to earth and that can also cause an elderly person who stands up too quickly to become dizzy,” said Dr. Gunnar Blomqvist, professor of internal medicine and physiology, and director of the NASA Specialized Center of Research and Training in Physiology at UT Southwestern from 1993 to 1998.

Blomqvist served as principal investigator of UT Southwestern's Neurolab research group, one of eight scientific teams from nine countries that participated in the investigation from the ground.

Other principal investigators for the autonomic nervous system research project include Dr. F. J. Baisch of DLR Institute of Aerospace Medicine in Germany, Dr. D.L. Ekberg of Virginia Commonwealth University and Dr. David Robertson of Vanderbilt University.

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