

News

Office of Medical Information
The University of Texas Southwestern Medical Center at Dallas
5323 Harry Hines Boulevard Dallas, Texas 75235-9060 214/688-3404

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CONTACT: Ann Harrell
Office: 214/688-3404
Home: 214/520-7509
Fax: 214/688-8252

****UT Southwestern research cardiologist
readies for upcoming space shot

DALLAS--Spaceman, physician, scientist, pilot, Air Force officer:

This description of Dr. Drew Gaffney sounds like a litany of a little boy's dreams about his future. And with the launching of the first space flight dedicated to human research, scheduled for later this year, Gaffney's dreams for himself will have come true.

An associate professor of internal medicine and cardiologist at UT Southwestern, Gaffney will conduct research on Spacelab Life Sciences 1, the bus-sized "payload" laboratory that will be attached to the space shuttle Columbia. It is scheduled for a nine-day mission, possibly by mid-December.

Gaffney has worked with the NASA program as a "payload specialist" since 1985. (Although Gaffney has undergone astronaut training, the term "astronaut" is reserved for men and women who are career "sailors among the stars.")

When the United States space program began more than 30 years ago, animals monitored for various physiological responses made the first trips. From these experiments and human studies in simulated space environments, space travel--at least for short periods of time--was judged safe. Researchers then began looking at the physiological effects of gravity changes on the human body, such as weight loss and fluid distribution.

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"The main purpose of the Life Sciences 1 mission is to study certain physiological changes that occur during flights into space and the body's readjustments after returning to earth," said Dr. Gunnar Blomqvist, principal investigator of one of the major projects on Life Sciences 1 and professor of internal medicine at UT Southwestern. The researcher said that many of the physiological changes in space, including cardiovascular\cardiopulmonary system changes, still are not well understood.

Blomqvist said Life Sciences 1 will examine the various ways space flight influences different organ systems. Twenty studies will be looking at the following systems: cardiovascular/cardiopulmonary, renal/endocrine, circulatory, immune, musculoskeletal and neurovestibular, which includes the brain, nerves, eyes and inner ear.

Gaffney, along with UT Southwestern faculty members Drs. Jay Buckey and Ronald Peshock, has been working with Blomqvist to develop studies on cardiovascular adaptation to zero gravity. Blomqvist said the studies will track the redistribution of blood and other fluids and correlate them with changes in cardiovascular function, including changes in heart size and heart response to exercise.

The heart functions differently in space, he explained. When the forces of gravity disappear, blood and other body fluids rise to the top of the body, and the heart temporarily increases in size. On the other hand, there is a reduction in the total circulating blood volume, which restores normal heart size in space but can cause serious problems with lowered blood pressure upon return to the normal gravity of earth.

Gaffney will have a small catheter attached to a monitoring system

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running up a vein in his arm to a point near the heart in order to measure pressure changes caused by fluid shifts. He also will be monitored following the flight. Other cardiovascular tests include measuring blood pressure and blood flow changes in Gaffney's leg.

In addition, changes in the size of the heart will be tracked by a new echocardiographic technique developed by Buckey for use on the flight. The technique utilizes three-dimensional images of the heart that measure the size of the cavity and the heart-muscle mass.

"We have been working on all of this for a very long, long time," commented Blomqvist. However, the researcher believes that despite the many postponements of the Space Lab 1 flight, the research results will be worth the wait. "No one anywhere else has been able to gather this kind of literature on cardiovascular studies done in space. The flight as a whole has a set of very complex experiments with the most sophisticated of equipment."

Follow-up studies are slated for two 1992 life-sciences flights, one in cooperation with Germany and the other with the European Space Agency.

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NOTE: The University of Texas Southwestern Medical Center at Dallas comprises Southwestern Medical School, Southwestern Graduate School of Biomedical Sciences and Southwestern Allied Health Sciences School.