

Microgravity Study of the Cardiovascular System on the KC-135

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One of the first adaptations of the body to spaceflight is the adjustment of the cardiovascular system. Furthermore, the magnitude of these adaptations appears to increase as a function of time in flight. The effects of prolonged microgravity on the electrical stability of the heart are largely unknown. I had a unique opportunity to participate in a biomedical research project at NASA that studied the electrophysiological changes in the heart in microgravity as a way to understand how the body's conduction system works.

We conducted a carefully designed series of KC-135 flight experiments that proved we could make appropriate measurements, analyze, store and transmit the resulting data to medical specialists and researchers on the ground. The KC-135 is the NASA flight platform used to provide short burst of microgravity, lunar gravity, and Mars gravity conditions. We successfully confirmed our conclusions. This means that long-term signal collection can now be justified to provide medical researchers with a way to understand how the conduction system works as a function of microgravity and time in flight. If this can be done, then it may be possible to create and deploy effective counter-measures for astronauts who could be 239,000 miles away on the moon. It may also serve as an effective screening tool for selection of astronauts for long terms missions in the future.

My talk will briefly discuss the following topics.

- . cardiac incidents in space to demonstrate the critical need for the study;
- . the effects of long term microgravity on the cardiovascular system;
- . medical and computer collection equipment used for our experiments;
- . medical protocol developed for the experiments;
- . KC-135 operational procedures;
- . computer and communication protocols used for the experiments.

I had the unique opportunity of participating in the entire spectrum of this research, from helping develop the medical, computation, and safety protocols, as well as being an actual medical test subject on one of the

KC-135 flights. I would like to share my experience with our women students and convince them that they, too, can participate in space research in many exciting and enriching ways.