

Aerospace Medical Association



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Jeff M. Bingham
Senior Adviser on Space and Aeronautics
United States Senate
SH-427 Hart Senate Office Building
Washington, DC 20510

Dear Mr. Bingham:

It was indeed a pleasure meeting you April 18th on Capitol Hill. Thank you very much for the time you gave us to discuss our concerns regarding space life sciences research. As you requested, I am providing you with a reiteration of our discussion.

The President has set the nation on a bold course to send astronauts to the Moon and Mars during the coming decades. In order to have reasonable certitude that astronauts can complete these missions safely and in good health, we deem it critical that we have effective countermeasures and an inflight medical care system with appropriate capability.

Since we have been in space approximately 40 years, scientists have done an excellent job defining the effects of microgravity on astronauts. The effects of microgravity on the cardiovascular system, neurological system, blood, and bone are particularly worrisome in that they could not only jeopardize the mission, but could also cause deleterious health effects. Added to this are the unknowns of cosmic radiation, mental health illness, and behavioral aberrations. We do have countermeasures for some of these but they are marginally effective. Consequently, we do not have the confidence that the current countermeasures will effectively protect astronauts particularly on long duration missions as long as 2 to 3 years with no capability of rescue. Consequently, we are in urgent need of a robust, balanced program of basic and applied research to develop effective countermeasures.

Regarding inflight medical care, we are in uncharted waters. There is little doubt that astronauts will become ill or injured inflight. To mention only a few of the challenges, emergency major surgery may be necessary on long duration flights and as of yet, we do not have the means of doing so in microgravity. Furthermore, there is evidence that medications are not absorbed by the gastrointestinal tract in microgravity as they are on Earth. This information is extremely important in the determination of dosages for a large array of medications. Because of expected weight and volume restrictions on space vehicles, we must ensure that we have effective pharmacy, laboratory, and imaging capability to provide a reasonable level of diagnostic and therapeutic modalities while staying within the aforementioned constraints. These and other related inflight medical care issues have yet to be resolved.

We feel we have a long way to go in fulfilling these requirements and that the state of our knowledge must be advanced far beyond what we possess today. For this reason, we are extremely concerned about inadequate funding in the area of space life sciences research. We fear that if we stay on the current budget track, the safe return of a healthy crew is far from assured. For these reasons, we would ask that you give your full support to adequate space life sciences research.

Thank you very much.

Sincerely,

Russell B. Rayman, M.D.
Executive Director