



Johnson Space Center

The human place in space

The science of living and working in space

Scientists, physicians and engineers in the Space Life Sciences Directorate at NASA's Johnson Space Center (JSC) focus on medical, health, biology, human performance and biotechnology-related aspects of human spaceflight. Their mission is to be the world's leader in understanding the space frontier and the opportunities, capabilities and limitations of humans living and working on that frontier.

Making space a home

To better understand the many changes that the human body experiences while adapting to the weightless environment of space, JSC researchers perform focused biomedical research on the effects of spaceflight on bone and muscle, and the nervous, immune, metabolic and cardiovascular



View of a Tissue Culture Module as part of Fluid Dynamics Investigation for the Cellular Biotechnology Operations Support System experiment flown during Expedition 8.

effects provides scientists with a means to make crewmembers safer and more comfortable.

Knowledge gained from space-based research contributes to a deeper understanding of human physiology and psychology on Earth as well.

JSC's bioastronautics research on the physiological effects of spaceflight leads and complements the NASA-funded efforts of other organizations like the National Space Biomedical Research

systems. The Office of Bioastronautics strives to enable human exploration of space through effective risk management solutions and innovative science and technology discoveries.

Scientists also investigate human behavior and performance in space, such as psychological adaptation to the confined and remote environment of a spacecraft.

Insight into physiological

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Institute. Scientists at the institute conduct physiological research in numerous areas relating to the heart, nervous system, immune system, nutrition and musculoskeletal physiology.

Medical care in space and on Earth

The Space Medicine and Health Care Systems Office defines the medical standards NASA uses for astronaut selection. It also provides physiological and psychological support to astronauts while they train, as well as medical care both in space and during post-flight recovery and rehabilitation. In addition, JSC's occupational health program provides medical training and monitoring for any test or training activities conducted in hazardous environments, such as the Neutral Buoyancy Laboratory, the thermal vacuum chambers, the hypobaric training chambers and the C-9 aircraft used to simulate reduced gravity.

Preserving the health of crewmembers in space

Scientists in the Human Adaptation and Countermeasures Office develop the knowledge base and the technologies required to preserve the health, performance and safety of spaceflight crews. Researchers perform applied research to derive appropriate countermeasures for the unusual physiological responses crewmembers may experience in microgravity or upon return to Earth. They also manage clinical and operational investigations directed at resolving and improving spaceflight operations. The office's laboratories assist the medical team in providing health care to astronauts and international crewmembers.

Combining human and physical elements of space travel

An important factor in the health and comfort of space travelers is the physical environment of the spacecraft. Habitability and Environmental Factors scientists and engineers focus their efforts in this area of spacecraft design and operation. Human Factors

engineers study the interfaces between humans and machines – biomechanics, lighting and crew accommodations – to develop optimal conditions for the health and safety of space crews.

Food scientists study and factor in human metabolism in space, alterations in the ability to taste and the storage limitations of the spacecraft to develop a satisfying and nutritious menu for the astronauts. Advances in food science and packaging technology for space applications have been applied to the preparation and shelf life of foods on Earth.

In addition, the effects of higher levels of radiation to which living things are exposed while beyond Earth's protective atmosphere are high-priority research areas at JSC.

Education and Outreach

The Human Research Program (HRP) Education and Outreach (E&O) Project provides educational and general information to students, educators and the general community to help clearly communicate the full scope of NASA Bioastronautics research on the effects of reduced gravity on the human body, and also the countermeasures developed to reduce those effects. The focus of this material is to help stimulate students to further their education in math, science, engineering and related technologic fields.

HRP E&O also includes outreach to the scientific, academic and government communities to foster and develop interaction to improve utilization of NASA's research results in medicine, agriculture, engineering and other scientific areas beneficial to Earth's population.

For more information, visit us on the Web at:
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