

A Message

from

Chiaki Mukai, MD, Ph.D.

Astronaut

Japan Aerospace Exploration Agency (JAXA)

17 May 2008

I would like to express my gratitude to Dr. Ragnar and all the good people who have worked so diligently to bring the 7th International Head-Out Water Immersion Symposium to life. Although I am unable to attend, I am most certainly with you in spirit, and I fully support the fundamental principles guiding your gathering.

Because of the tremendous advances we have made in science and technology, space has become an extension of our otherwise earth-bound living and working environment. Unique characteristics of the space environment include microgravity, high vacuum, abundant solar energy, a vast orbital field of view, cosmic radiation, and a ready site for laboratory work and science platform deployments. The space environment can be utilized for research areas in such fields as life science, biotechnology, space science, microgravity science, and space technology.

Having flown twice in space, I understand the importance of your symposium and the research you promote. The same physically unique characteristics of the microgravity environment that make space a remarkable laboratory for research and development also pose special challenges for the human body. Space flight induces physiological effects such as balance disorders, cardiovascular deconditioning, decrease of bone mineralization, muscle disuse atrophy, reduction of immune response, and more. Many of these physiological changes are the result of adaptation to microgravity and the subsequent re-adaptation to earth's 1-g environment.

I am excited by the potential posed by your research to not only aid space travelers, but also all people on our planet who will benefit by the application of your investigations.

As we learn how living organisms react and adapt to such an alien environment as that posed by space, space life-science research and the related research your symposium offers will also help us to understand the role of gravity, or lack of, in shaping life as we know it here on our planet. Tonight when you take a bath, simply close your eyes, and feel wonders of floating and you will be experiencing some of the very same effects I experienced while on orbit.

I sincerely wish you the best possible symposium and hope to have the opportunity to join you upon your next gathering.

Chiaki Mukai, MD, Ph.D.

A handwritten signature in cursive script that reads "Chiaki Mukai".