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Biology in Space (8)

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RESEARCHES AND ACTIVITIES IN HEALTH AND LIFE SCIENCES AT THE ITALIAN SPACE AGENCY

Abstract

Space exploration requires human presence in Low Earth Orbit (LEO) and beyond for long periods. It is therefore essential to encourage progress of research and technological activities in all the disciplines directly involved in guaranteeing life and wellbeing of men in Space. On the other hand, space research should also benefit life on Earth, contributing to improve human, environmental and animal health. To this end, ASI actively encourages and supports cross-sectoral networks that foster dialogues and idea exchange between the space and health sectors, both from Accademia and Industry. So far, ASI conducted over 83 national projects on the International Space Station, mainly on Biology and Biotechnology, Human Research and Technology Development and Demonstration. On-going projects aim at investigating the effect of microgravity and radiation on human physiopathology, nutrition and food production, as well as the development of autonomous, portable and wearable devices to monitor radiation dose and human health impairment caused by the extreme space conditions. These projects are conducted by world-reputed Italian Universities, Research Institutes and Industries, and allowed training and recruitment of several young professionals as well as representation in International peer-reviewed journal and/or at National and International congresses and conferences. ASI, together with NASA, ESA, CNES, DLR, JAXA and CSA, is part of the International Space Life Science Working Group, the goal of which is to effectively coordinate space activities relevant to Life Science and promote international collaborations; ASI also works on the definition of a medium/long-term national strategy, identification of excellence and expertise in the national territory, identification of infrastructures of potential interest for Space. ASI routinely organizes events to encourage discussion on the national heritage in Life Science, including Biomedicine, "Lab-on-chip", and Astrobiology, to identify research gaps and requirements, and to explore innovative ideas for technologies and research activities. Future actions will focus on the development of autonomous and automated/smart solutions for real-time monitoring and diagnostics of astronauts' health; and integrated approaches of active/passive countermeasures to protect human beings from prolonged exposure to space conditions. Advancing in these disciplines will contribute to find sustainable solutions for global health issues on Earth, such as universal and affordable provision of health-care services, tailored radioprotection during radiotherapy treatments or for professionals exposed to radiations, prevention and control of psychophysical diseases (depression, anxiety).