

ASTROBIOLOGY RESEARCH ON BOARD OF THE INTERNATIONAL SPACE STATION AS PART OF THE EUROPEAN SPACE EXPLORATION INITIATIVE. G. Horneck, Deutsches Zentrum für Luft- und Raumfahrt DLR, Institut für Luft- und Raumfahrtmedizin, 51170 Köln, Germany, e-mail: gerda.horneck@dlr.de

Introduction: The environment of the International Space Station (ISS) comprises a complex spectrum of physical parameters that are not experienced on Earth and that are of high interest to Astrobiology. Exposure facilities on board of the ISS have provided unique opportunities to study biological and chemical processes in response to those parameters directly in Earth orbit [1]. From such studies a better understanding has been reached

- on the role of interstellar, cometary and planetary chemistry in the origin of life,
- on the role of the ozone layer in protecting our biosphere,
- on the likelihood of the interplanetary transfer of life via meteorites, i.e. the hypothesis of lithopanspermia,
- on the chances of survival of terrestrial microorganisms in outer space, e.g. on a trip to Mars, leading to the formulation of planetary protection requirements,
- on the habitability of Mars by exposing biological samples to simulated Martian conditions, providing support to “search for life” experiments.

ESA has developed a variety of astrobiology facilities (BIOPAN, STONE, EXPOSE-E, EXPOSE-R, EXPOSE-R2) to be attached to Earth orbiting satellites or the ISS [2]. For the next generation of test facilities on board of the ISS devices for *real-time in-situ* monitoring of the phenomena are recommended.

References:

[1] Horneck, G., Klaus, D.M., and Mancinelli, R.L. (2010) Space microbiology. *Microbiol. Mol. Biol. Rev.* 74, 121-156.

[2] Horneck, G. and Zell, M. (guest editors) (2012) EXPOSE-E mission, special collection, *Astrobiology*, 12, 373-528.