

The First Report of the Tanpopo Mission after Its Arrival to the International Space Station

KAWAGUCHI, Yuko^{1*} ; YANO, Hajime¹ ; HASHIMOTO, Hirofumi¹ ; YOKOBORI, Shin-ichi² ; IMAI, Eiichi³ ; MITA, Hajime⁴ ; KAWAI, Hideyuko⁵ ; YABUTA, Hikaru⁶ ; TOMITA-YOKOTANI, Kaori⁷ ; NAKAGAWA, Kazumichi⁸ ; KOBAYASHI, Kensei⁹ ; OKUDAIRA, Kyoko¹⁰ ; TABATA, Makoto⁵ ; HIGASHIDE, Masumi¹ ; HAYASHI, Hironobu¹¹ ; SASAKI, Satishi¹² ; KEBUKAWA, Yoko⁹ ; ISHIBASHI, Yukihiko¹³ ; YAMAGISHI, Akihiko²

¹ISAS/JAXA, ²Sch. Life Sci., Tokyo Univ., Pharm., Life Sci., ³Nagaoka Univ., of Tech., ⁴Fukuoka Inst., of Tech., ⁵Chiba Univ., ⁶Osaka Univ., ⁷Univ., of Tsubaki, ⁸Kobe Univ., ⁹Yokohama Natl. Univ., ¹⁰Univ., Aizu, ¹¹Tokyo Univ., Tech., ¹²Tokyo Insti., Tech., ¹³Kyusyu Univ.,

To investigate the panspermia hypothesis and chemical evolution, The Tanpopo mission has been developed as Japan's first astrobiology-driven space experiments since 2007 (Yamagishi et al., 2009). This "Tanpopo" mission is launched this spring and it will be likely to start its first-year exposure on the ExHAM pallet onboard the Kibo Exposed Facility of International Space Station (ISS) by the time conference will be held.

The Tanpopo mission is composed of two main experimental apparatus: capture panels and exposure panels. Both will be prepared inside the Kibo module and exposed via airlock with its robot arm up to the maximum of 4 years. The capture panels are to intact capture micrometeoroids, space debris and possible terrestrial aerosols uplifted to the ISS orbit by the world's lowest density silica aerogels exposed to space. If the Tanpopo succeeds to capture terrestrial microbes embedded in the aerosol particles in the aerogel capture panels, it will push the upper limit of existing altitude for terrestrial microbes from the current record of 77 km to 400 km from the ground.

We also test both the survivability of some terrestrial microbes and the chemical alteration of astronomical analog organic compounds in the near Earth space environment. For the former, we emphasize on the importance of cell-aggregates, whose concept is known as "masapanspermia" (Kawaguchi et al., 2013), as the ark for interplanetary transfer of microbes

It is planned that the first samples of both panels will be retrieved back to the Earth in mid-2016, for post-flight analysis initially at ISAS and then at laboratories nationwide by the Tanpopo Team members.

References

- Yamagishi et al., 2009, Trans. JSASS Space Tech. Japan, 7, ists26 (2009), pp. Tk 49-55.
Kawaguchi et al., 2013, Origins of Life and Evolution in Biospheres, 43, 411-428.

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