**THE TANPOPO: AN ASTROBIOLOGY MISSION ON THE INTERNATIONAL SPACE STATION TO TEST PANSPERMIA AND QUASI-PANSPERMIA HYPOTHESES.** K. Kobayashi,[1] H. Fushimi,[1] T. Hirako,[1] J. Kawai,[1] Y. Obayashi,[1] T. Kaneko,[1] H. Mita,[2] H. Yabuta,[3] E. Imai,[4] K. Nakagawa,[5] J. Takahashi,[6] S. Yokobori,[7] S. Yoshida,[8] S. Hasegawa,[9] H. Hashimoto,[9] H. Kawai,[10] K. Marumo,[11] K. Okudaira,[12] M. Tabata,[9] M. Yamashita,[9] H. Yano,[9] A. Yamagishi[7] and TANPOPO WG[9]

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The idea that life on the Earth was delivered from space (*Panspermia*) is not widely accepted. Recent discoveries of terrestrial microorganisms in harsh environments including extraterrestrial environments suggest possibility of interplanetary migration of microorganisms [1]. On the other hand, various kinds of organic compounds have been found in space. Bioorganic compounds such as amino acids were detected in carbonaceous chondrites and in cometary dusts [2]. It was suggested that these organic compounds were formed in quite cold environments such as in molecular clouds [3, 4].

Amino acid precursors were formed from possible interstellar media by irradiation with high-energy particles [5, 6] or ultraviolet light [7, 8]. When frozen mixtures of simple molecules found in interstellar environments such as methanol, ammonia and water with high energy heavy ions from HIMAC, NIRS, Japan, amino acid precursors with molecular weights of a few thousands were formed, and they gave various molecules including heterocyclic compounds by pyrolysis-GC/MS. It was suggested that complex amino acid precursors with large molecular weights could be formed in ice mantles of interstellar dusts in dense clouds by action of cosmic rays.

Therefore we could say that seeds of bioorganic compounds are widely distributed in space. It is plausible that such organics were delivered to the primitive planets by meteorites, comets or space dusts. Chyba and Sagan suggested major carrier of extraterrestrial carbons was micrometeorites [9]. Nature of organics in micrometeorites has been little known since they were caught in terrestrial biosphere.

We have proposed the "Tanpopo Mission" to catch them in space environments by using the exposed facility of Japanese Experimental Module (JEM) on the International Space Station (ISS). Not only organic compounds but also microorganism will be analyzed in the captured dusts to test the interplanetary exchanges of microbes [10]. Aerogel, silica gel of ultra-low density (0.01 g $cm^{-3}$) will be used to catch them. Ground simulation with a two-stage light gas gun equipped in ISAS/JAXA is being conducted to test the recovery of microorganisms and organic compounds after high-velocity (*ca*. 4 km $s^{-1}$) impact. In addition to the capture experiments, organic compounds and microorganisms will be exposed to space radiation and solar UV to examine their survivability in actual space environments for years. Both panspermia and quasi-panspermia (interplanetary delivery of chemical seeds of life) will be tested in the mission, which might start as early as in 2012.

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