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# Exposure experiments of amino acids and their precursors at the exposure facility on ISS

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Since a diverse suite of amino acids is found in carbonaceous chondrites, exogenous delivery of organic matter could have played an important role for the prebiotic chemical evolution on the early Earth. The interplanetary dust particles (IDPs) are considered to be the major carbon source [1]. However, the organic matter in IDPs is susceptible to the cosmic and solar radiation due to their small nature.

The Tanpopo mission consists of capture experiments and exposure experiments of organic matter and microbes at the Exposure Facility of Japan Experimental Module (JEM) ”Kibo” on the International Space Station (ISS), which aims to investigate possible interplanetary migrations of organics and microbes. Here we report the exposure experiments of amino acids and their precursor molecules to the space environment to explore their alteration and survivability.

Selected organic compounds are amino acids (glycine and isovaline), their possible precursors (hydantoin and 5-ethyl-5-methyl hydantoin), and a complex amino acid precursor material synthesized from a mixture of carbon monoxide, ammonia and water by proton irradiation (here after called ”CAW”). The amino acid water solutions, hydantoin ethanol solutions, and CAW were put into 3 $\mu$L pits on the exposure panels, and dried under a clean booth. The solid samples were left on the pits ca. 75 nmol each for amino acids and hydantoins, and 15 nmol equivalent to glycine for CAW. Then the samples were covered with hexatriacontane ($C_{36}H_{74}$) in order to prevent the sample lost during the experiments and transportations. The exposure panels will be launched in this year, and will be recovered after one year, two years and three years of exposure.

[1] Chyba C. and Sagan C. (1992) Nature, 355, 125-132.

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