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Summary of the Astrobiology Panel in the first stage

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Top sciences in the lunar and planetary missions in the next ten years were discussed from the point of view of astrobiology. Astrobiology targets life's origin, evolution, distribution and future of life. We selected (1) Mars life detection missions and (2) missions for detection of life and organics in ice satellites and small bodies. Recent finding of methane on Mars has made life on Mars more plausible. Several missions are in progress in USA and Europe, but we can expect Japan's own Mars mission (MELOS). In the mission, living organisms can be targeted since we have unique life detection methodologies. Among many ice satellites, Europa, Titan and Enceladus are major targets since they could have their own biosphere. In addition, it is expected to have fossils of chemical evolution toward the generation of life which were lost on Earth. Missions to ice satellites may not be prepared in the next 10-15 years, but we should develop instrumentation to detect life and organic compounds in extreme cold environments in the coming 10 years. Cultivation of Japanese community for this purpose is strongly required.

Keywords: planetary missions, astrobiology, Mars, ice satellites, life detection, organic compounds