

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
Microgravity Sciences on board ISS and beyond (6)

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MISSION BEYOND: THE AMYLOID AGGREGATION EXPERIMENT ON BOARD THE  
INTERNATIONAL SPACE STATION

**Abstract**

“Amyloid Aggregation” is an Italian Space Agency simple test tube aiming to assess if and how amyloid fibrils aggregations are affected by microgravity, identifying a possible professional risk in astronauts spending long periods in space. Since protein aggregation causes a variety of neurodegenerative diseases,

a deeper comprehension of mechanism underlying peptides aggregation also impacts neuroscience research on Earth. It will be executed on the ISS (July-December 2019), during the Beyond mission sponsored by European Space Agency. The experiment is performed in the frame of a specific agreement between ESA and ASI, which allows Italian utilization of the ISS resources available to ESA.

The Italian astronaut Luca Parmitano has been trained on how to use the payload, which was conceived by scientists from the “Istituto Zooprofilattico Sperimentale del Piemonte Liguria e Valle d’Aosta” (IZSPVLV), in collaboration with Aerospace Logistics Technology Engineering Company (ALTEC), acting as developer of the payload.

The experiment consists of 36 special jars divided in six group, each one corresponding to an incubation time period (ITP) and two temperature controls. On board the ISS, the samples are removed from cold stowage and left to thaw and equilibrate at ambient temperature. To start the aggregation reaction, Luca Parmitano presses and rotates the top of the jars. At the end of each ITP, the astronaut transfers the jars in cold stowage to stop the aggregation reaction until the analysis after re-entry. Results are compared with data collected on Earth through an identical experimental protocol. ALTEC selected the jars and packaging materials for launch and return, qualified the HW for flight in compliance with scientific, integration and safety requirements and is in charge of the delivery of the Flight Model after pre-launch operations. The payloads selected for the mission “BEYOND” are funded and coordinated by ASI, resulting from a public call open to the industrial and scientific research communities. ASI, in the frame of its national mission of promoting and fostering the culture of space across the Country, provides access to the ISS as a laboratory in space. The utilization support services are provided thanks to a contract, awarded by ASI, to ARGOTEC/Telespazio (UTISS Team). This team supports safety evaluation and payload manifesting and qualification processes leading towards a safe and efficient delivery, utilization, integration on board the ISS and recovery of the payload on ground, allowing scientists to access and retrieve experimental data and instruments after they return to Earth.