Press Release – Strasbourg, France for HORUS

A new space-based research initiative, the HORUS project, is pushing the boundaries of cancer biology by exploring gene expression in human brain-derived tumoroids under microgravity conditions. Conducted by BSGN and funded by the European Space Agency (ESA) together with BrainTech Lab (UGA INSERM), Grenoble University Hospital and SpacePharma, the project aims to deepen the understanding of molecular behavior in a highly controlled and unique environment.

What sets the HORUS experiment apart is its use of advanced tumoroid models derived directly from patient brain tissue samples. TOTEM tumoroid technology (patented by UGA Braintech Lab and supported by SATT LINKSIUM) closely mimic the natural tumor environment, offering a highly relevant and innovative platform for studying gene expression beyond the limitations of traditional preclinical models.

At the core of the experiment is a specially designed biological chip developed by SpacePharma, functioning as a miniaturized bioreactor. The chip includes two experimental duplicates to enhance reliability and enable comparative analysis. Its design isolates the cells from direct fluid flow, preventing shear stress and preserving cellular integrity. Additionally, each channel features a dedicated window that allows for the seeding of large 3D tissue samples, supporting more complex and physiologically relevant models.

Complementing the hardware, OneTreck contributes its multimodal data analysis approach to the Horus experiment. By integrating imaging and omics data, the company develops models to explore how microgravity influences signaling pathways and to build patient-like specific disease avatars from these measurements.

These approaches, applied both in real time and through post-analysis, contribute to the interpretation of complex biological data generated during the mission. They also support the validation of the core technologies underlying Manta Voyager, OneTreck's flagship solution for medical support in isolated and extreme environments such as space exploration.

The experiment is scheduled to take place over approximately two months aboard the International Space Station, providing sufficient time for exposure to microgravity and the collection of meaningful biological data. The mission is expected to conclude with the return of samples in June, marking an important milestone in space-based biomedical research.

The synergistic association of Space Bioreactor, innovative tumoroid technology and artificial intelligence should impact cancer research and therapy but also pave the way for next generation "space personal medicine" mandatory to develop safe long duration flights.