

Cancer Research That Shoots for the Stars

Studying T cell function in microgravity at the International Space Station could eventually lead to new immunotherapies for cancer.

November 25, 2024 By [Damon Runyon Cancer Research Foundation](#)

The University of Texas MD Anderson Cancer Center, where former Damon Runyon Clinical Investigator Cassian Yee, MD, runs his lab, is home to the Moon Shots program, a cancer research initiative inspired by America's drive toward space in the 1960s. Recently, Dr. Yee and his colleagues announced a project that combines these two ambitions: sending T cells into space to inform the development of new cancer treatments.

Specifically, the team is interested in how T cell function is affected by prolonged exposure to the "microgravity," or near-weightlessness, at the International Space Station. Studies of short-term microgravity have shown that it can impact structural elements of the T cell, such as its cytoskeleton. It remains to be seen how sustained microgravity will impact T cell differentiation—the various paths the immune cell can take, whether it persists in the body and keeps fighting cancer, or it loses steam. One of the goals of this project is to gain a deeper understanding of the signaling pathways involved in T cell differentiation, which could eventually lead to new and improved immunotherapies for cancer.

"The one thing we cannot do on earth that we can do in space is use gravity as a lever to influence the direction in which these T cells take as a final path towards memory or exhaustion," Dr. Yee explained.

Dr. Yee is a pioneer in the field of adoptive cell therapy, in which patients' own immune cells are engineered to recognize and target their cancer cells. He has spent the past two decades translating discoveries about T cell biology into antigen-specific T cells for use in cancer treatment.

Now, Dr. Yee's lab will use single-cell sequencing tools on T cells frozen in space and returned to Earth to evaluate changes in their gene expression. If they can identify factors that lead to T cell persistence, they may be able to develop more effective cell therapies.

Dr. Yee is excited by the prospect. "We look forward to this opportunity to study how T cells are affected [...] and translate these findings into meaningful therapeutic strategies that can improve cellular therapies and enhance life here on Earth," he said.

[This post](#) was originally published October 23, 2024, by [Damon Runyon Cancer Research Foundation](#). It is republished with permission.

© 2026 Smart + Strong All Rights Reserved.

<http://beta.docker.cancerhealth.com/blog/cancer-research-shoots-stars>