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‘Brave and bold’ new strategies for cancer immunotherapy

The advent of immunotherapy has changed the way we treat cancer. But current techniques can only benefit some patients, and fare poorly against solid tumors. Cellular biologist [Meghan Morrissey](#) at UC Santa Barbara is working to change that by focusing on macrophages, a type of innate immune cell.

Her research has attracted the attention of the Damon Runyon Cancer Research Foundation, which selected Morrissey for the Damon Runyon-Rachleff Innovation Award. This recognition provides funding to creative thinkers with a revolutionary idea who don't yet have the preliminary data needed to obtain traditional funding. The foundation selects only the most novel and creative projects with a strong potential for high impact in the cancer field.

“I really admire the Runyon Foundation's strategy of funding brave and bold projects,” said Morrissey, an assistant professor in the Department of Molecular, Cellular, and Developmental Biology. “They have an amazing track record of funding visionary scientists.” Indeed, 13 Nobel laureates are former Damon Runyon scientists.

Only five scientists receive the Runyon-Rachleff Innovator Award each year. “I feel incredibly lucky to be included in this elite group,” said Morrissey, who received the accolade on the heels of the American Cancer Society's Trailblazer Award, [presented to Morrissey](#) at the society's 2024 gala.

Morrissey's lab is working on ways to reprogram the immune system, which has shown promise for treating a variety of diseases, including cancer. Her work focuses on macrophages, immune cells that kill pathogens, infected cells or damaged cells by eating them.

As a postdoctoral scholar, Morrissey designed synthetic Chimeric Antigen Receptors (CARs) to instruct macrophages to attack cancer cells. Her initial design targeted blood cancers, but she plans to apply her technique to solid tumors. "Macrophages are very common in solid tumors, which have been the hardest to treat with current immunotherapy options," she explained.

This exciting strategy is currently in clinical trials; however, Morrissey hopes to improve on the technique. Her lab has found that most macrophages nibble at the cancer cells in solid tumors instead of eating them outright, like clinicians had hoped. Unfortunately, this doesn't usually kill the cancer cell, at least not right away. And what's worse, this nibbling removes the markers that allow macrophages to recognize cancer cells, making them invisible to the immune system.

The Innovation Award provides Morrissey's lab with \$400,000 over two years to investigate why some cancer cells die after being nibbled while others survive. The aim is to promote factors that kill the cancer cells and prevent those that enable the cancer to survive. If the team makes progress, they could receive an additional \$400,000 to continue the pursuit.

"Funding from the Runyon Foundation will allow us to start this exciting new project, which is currently much too risky for most funding agencies," Morrissey said. After four years, she expects to have a more mature line of research that other groups will be eager to explore.

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