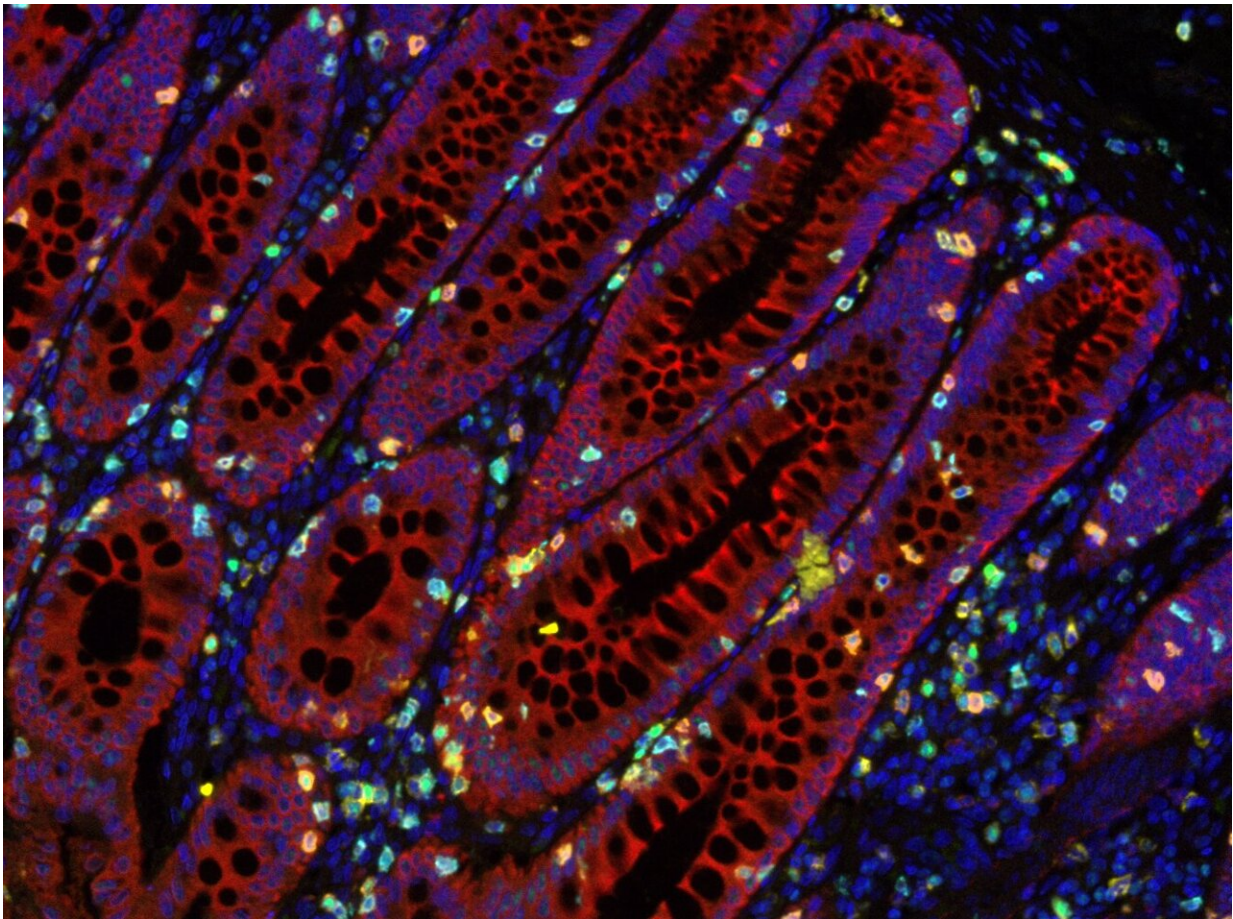


Research breakthrough sparks new hope for bowel cancer patients

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A fluorescent multiplex immunohistochemistry microscopy image of healthy human colon. Credit: Olivia Newton-John Cancer Research Institute

Every year, over 15,500 Australians are diagnosed with bowel cancer,

and it is the second leading cause of cancer deaths in the country. Over 1,700 (one in 10) of those diagnosed are young Australians aged under 50, and this incidence is increasing.

There is an urgent need to discover more effective treatments and improve bowel cancer screening, particularly for early-onset bowel cancer (those aged 25–49 years). Australians born in 1990 onwards have double the risk of developing bowel cancer compared with those born in 1950. These younger bowel cancer patients often have poorer outcomes as they typically present with late-stage disease.

Immunotherapy is one of the most promising new treatments for cancer, which involves boosting the ability of immune cells to recognize and remove [cancer cells](#). However, less than 10% of bowel cancer patients respond to current immunotherapies.

The results of a study published on 6 October, 2023 in *Science Immunology*, was led by researchers at the Olivia Newton-John Cancer Research Institute. Principal Investigator and Head of the Mucosal Immunity and Cancer Laboratory at the Olivia Newton-John Cancer Research Institute, Dr. Lisa Mielke, explained the importance of this research breakthrough.

"We have discovered that an important group of immune cells in the large bowel—gamma delta T cells—are crucial to preventing bowel cancer."

"Gamma delta T cells act as our frontline defenders in the bowel. What makes these immune cells extraordinary is that they constantly patrol and safeguard the [epithelial cells](#) lining the bowel, acting as warriors against potential cancer threats," said Dr. Mielke.

"When we analyzed bowel cancer patient samples, we found that when

more gamma delta T cells were present in the tumors, these patients were reported to have better outcomes and improved survival."

The large bowel contains trillions of bacteria, viruses and fungi, collectively known as the microbiome. While some bacteria are associated with disease, others are extremely important for the [immune system](#).

Lead co-author of this study, Marina Yakou, Ph.D. candidate at the Olivia Newton-John Cancer Research Institute, described how this new research may lead to improved treatments for cancer patients in the future.

"We discovered that the amount, and diversity of, the microbiome in the large bowel resulted in a higher concentration of a molecule called TCF-1 on Gamma delta T cells compared to other areas of the gut. This molecule (TCF-1) suppresses our natural immune response, the gamma delta T cells, from fighting off bowel cancer."

"When we deleted TCF-1 in [gamma](#) delta T cells using pre-clinical models, this fundamentally changed the behavior of these immune cells and we saw a remarkable reduction in the size of bowel cancer tumors," said Yakou.

"Our world-first research breakthrough paves a new roadmap for developing targeted combination immunotherapies to more effectively treat bowel [cancer patients](#)."

This research discovery also opens up new possibilities for understanding how the microbiome and [immune cells](#) in the bowel interact, which could lead to the development of new strategies to lower [bowel cancer](#) risk and better screen for [bowel cancer](#).

More information: Marina Yakou et al, TCF-1 limits intraepithelial lymphocyte anti-tumor immunity in colorectal carcinoma, *Science Immunology* (2023). [DOI: 10.1126/sciimmunol.adf2163](https://doi.org/10.1126/sciimmunol.adf2163).
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