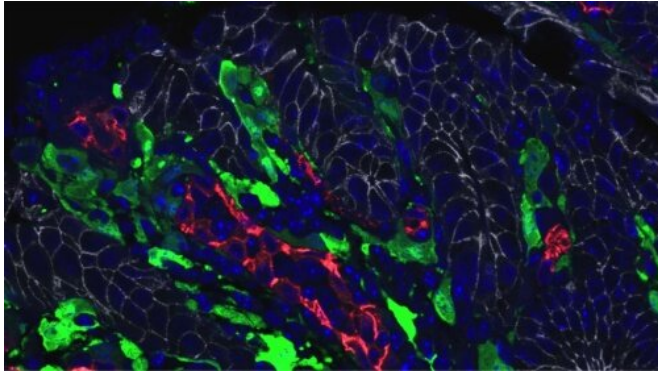


A new study identifies interleukin 11 as a marker of cancer-associated fibroblasts

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Credit: Toho University

IL-11 is known to promote the development of colorectal cancer in humans and mice, but when and where IL-11 is expressed during cancer development is unknown. "To address these questions experimentally, we generated reporter mice that express the green fluorescent protein (EGFP) gene in interleukin 11 (IL-11)-producing (IL11+) cells in vivo. We found IL-11+ cells in the colons of this murine colitis-associated colorectal cancer model," said Dr. Nishina, the lead author of a study published April 16 in *Nature Communications*. "The IL-11+ cells were absent from the colon under normal conditions but rapidly appeared in the tissues of mice with colitis and colorectal cancer."

In the study, Dr. Nishina and colleagues characterized the IL-11+ cells by [flow cytometry](#) and found that most IL-11+ cells express stromal cell surface markers, such as Thy1, podoplanin, and Sca-1, suggesting that IL-11+ cells are stromal fibroblasts. RNA-seq analysis revealed that the expression of approximately 350 genes was elevated in IL-11+ fibroblasts compared IL-11- fibroblasts. These genes were also elevated in murine and human [colorectal cancer](#) tissues in

vivo. IL-11 released from IL-11+ cells induced activation signals in nearby tumor cells and fibroblasts in a paracrine or autocrine manner. Thus, IL-11+ fibroblasts and tumor [cells](#) constitute the tumor microenvironment that supports tumor growth.

"We looked at human [cancer](#) databases and found that elevated expression of genes enriched in IL-11+ fibroblasts correlate with short duration of disease-free survival. We think IL-11+ fibroblasts can be new therapeutic targets for treating human colorectal cancer," said Prof. Nakano, the senior author of the study.

These results were published in *Nature Communications* on April 16, 2021. This research was conducted in collaboration with Associate Professors Nobuhiro Tada and Hideo Yagita of Juntendo University, Professor Masato Ohtsuka of Tokai University, Professors Koji Matsushima and Chiharu Nishiyama of Tokyo University of Science, Professor Masanobu Oshima of Kanazawa University, and Naohiro Inohara of Michigan University.

More information: Takashi Nishina et al, Interleukin-11-expressing fibroblasts have a unique gene signature correlated with poor prognosis of colorectal cancer, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-22450-3](https://doi.org/10.1038/s41467-021-22450-3)

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