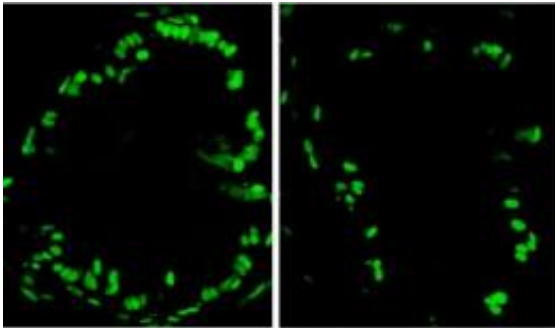


Gut microbes promote cell turnover by a well-known pathway

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Sections of zebrafish intestines show more proliferating cells (in green) in fish reared in the presence of microbes, left, versus those reared under sterile conditions at right. Credit: Courtesy of Karen Guillemin

Microbes matter -- perhaps more than anyone realizes -- in basic biological development and, maybe, they could be a target for reducing cancer risks, according to University of Oregon researchers.

In a study of very basic biology of zebrafish, scientists in the UO Institute of Molecular Biology focused on the developing intestine during its early formation in the sterile environment of its eggshell through the exposure to natural colonizing bacteria after hatching.

What they found was eye opening, said Karen Guillemin, professor of biology: Resident [microbes](#) in the still-maturing intestine send messages that promote non-disease-related cell proliferation in the same Wnt

[pronounced went] signaling [pathway](#) where [genetic mutations](#) have long been known to give rise to colorectal cancer. The findings appeared online ahead of regular publication in the [Proceedings of the National Academy of Sciences](#).

The complex Wnt pathway in the gut already is considered the starting point for more than 70 percent of sporadic colorectal cancers. In the study, researchers used normal zebrafish and those harboring mutations in the Wnt pathway. They were reared under germ-free conditions and then exposed under laboratory conditions to specific microbes to define how microbial signals interact with the Wnt pathway to promote cell proliferation in the gut.

"We were able to show that microbial signals do feed into and enhance signaling in the [Wnt pathway](#). They feed in at a point after the node where most cancer-promoting genetic mutations occur," Guillemin said. "What this says is that for anyone who is at risk for developing cancer because they have these mutations, it matters what microbes these mutations are associated with. These two pieces of information contribute in parallel and feed into the same pathway."

The findings, she said, add fodder in an emerging shift in cancer research to look at the impact of microbes and other infectious causes of the disease. "It may be that associated microbes play as significant a role in cancer risk as genetic mutations," she said. "We need to learn more about the contributions of microbe signaling to cell proliferation. Maybe you could intervene with a targeted therapy. Even if you can't fix a mutation you might manipulate the associated microbes to change the interaction and reduce unwanted [cell proliferation](#)."

Genetic research on zebrafish – a high-priority model organism for the National Institutes of Health, which supported the project – began at the UO in the early 1970s. Guillemin, who recently received an early career

investigator-scholar award from the NIH Institute of Digestive and Kidney Diseases, is known for her studies in zebrafish on the role of good bacteria in the gastrointestinal tract.

More information: Guillemin web page:
molbio.uoregon.edu/facres/guillemin.html

Provided by University of Oregon

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