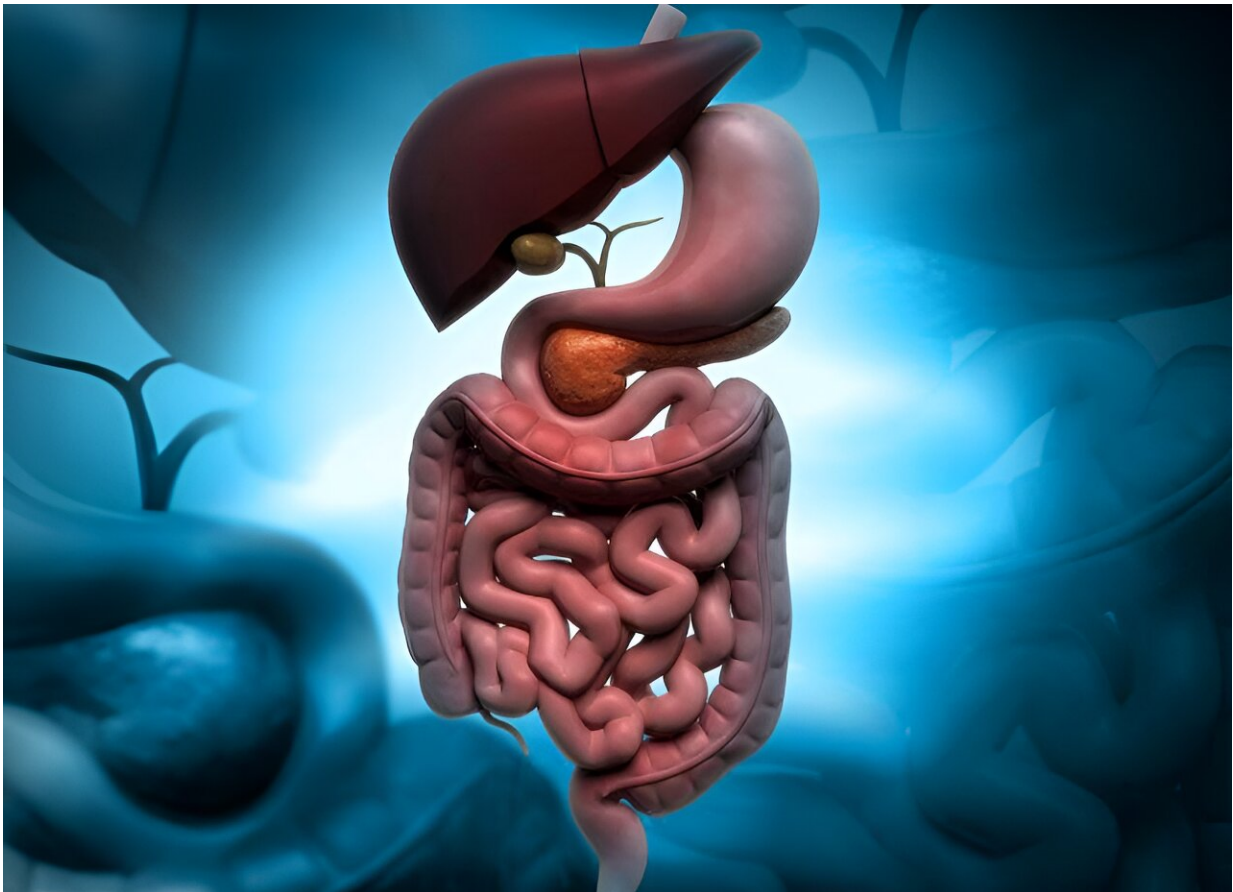


Scientists gain new insights into how small intestine works

February 8 2024, by Ernie Mundell



It was the ancient Greeks who first divided the 20-foot length of the small intestine into three parts: The duodenum, the jejunum and the

ileum.

However, the organ may finally be ready for an update: U.S. researchers say the small intestine is actually comprised of five distinct segments, each being responsible for the absorption of various nutrients.

"We're excited because this groundwork identifies different cellular 'neighborhoods' within the small intestine that not only execute different intestinal functions, but also show major differences in the likelihood to develop [gastrointestinal diseases](#), such as intestinal cancers, ileitis [a common type of inflammatory bowel disease] and [celiac disease](#)," said study lead author Rachel Zwick.

"These regional molecular and cellular differences help us better understand these diseases," added Zwick, who is an American Cancer Society Postdoctoral Fellow at the University of California, San Francisco.

She spoke in a news release from Cedars-Sinai in Los Angeles, which helped with the research.

According to the researchers, their work examined the "geography" of the small intestine across multiple species, including mice and humans. Overall they tracked the makeup of 30 different sections of the organ.

Part of their investigation was genetic: Zwick and her colleagues identified genes that appeared to be responsible for nutrient absorption at various spots along the small intestine.

That helped them to determine the number of distinct regions in the small intestine, and what each might be responsible for.

Overall, they counted five distinct regions along the length of the organ.

"Each domain is associated with different aspects of nutrient absorption, and each exhibits distinct responses to changes in diet," the Cedars-Sinai news release said.

What's more, research involving [cell cultures](#) in the lab showed that cells taken from various intestinal regions "remembered" aspects of their molecular signatures even one month after being removed from the organ.

That could give clues to how the small intestine successfully regenerates itself over the [life span](#), the research team explained.

Three regions that are each home to distinct intestinal stem cell types also exist within the small intestine, the scientists discovered.

The findings were published Feb. 6 in the journal *Nature Cell Biology*.

"As far as we know, this is the first study to molecularly define the regions of the small intestine," said study co-senior author Dr. Ophir Klein, executive director of Cedars-Sinai Guerin Children's. "This is information scientists can use to understand the cellular and molecular processes that occur in the [small intestine](#) and what goes wrong in gastrointestinal diseases."

More information: Rachel K. Zwick et al, Epithelial zonation along the mouse and human small intestine defines five discrete metabolic domains, *Nature Cell Biology* (2024). [DOI: 10.1038/s41556-023-01337-z](https://doi.org/10.1038/s41556-023-01337-z)

Find out more about the small intestine at the [Medical University of South Carolina](#).

Citation: Scientists gain new insights into how small intestine works (2024, February 8) retrieved 27 April 2024 from

<https://medicalxpress.com/news/2024-02-scientists-gain-insights-small-intestine.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.