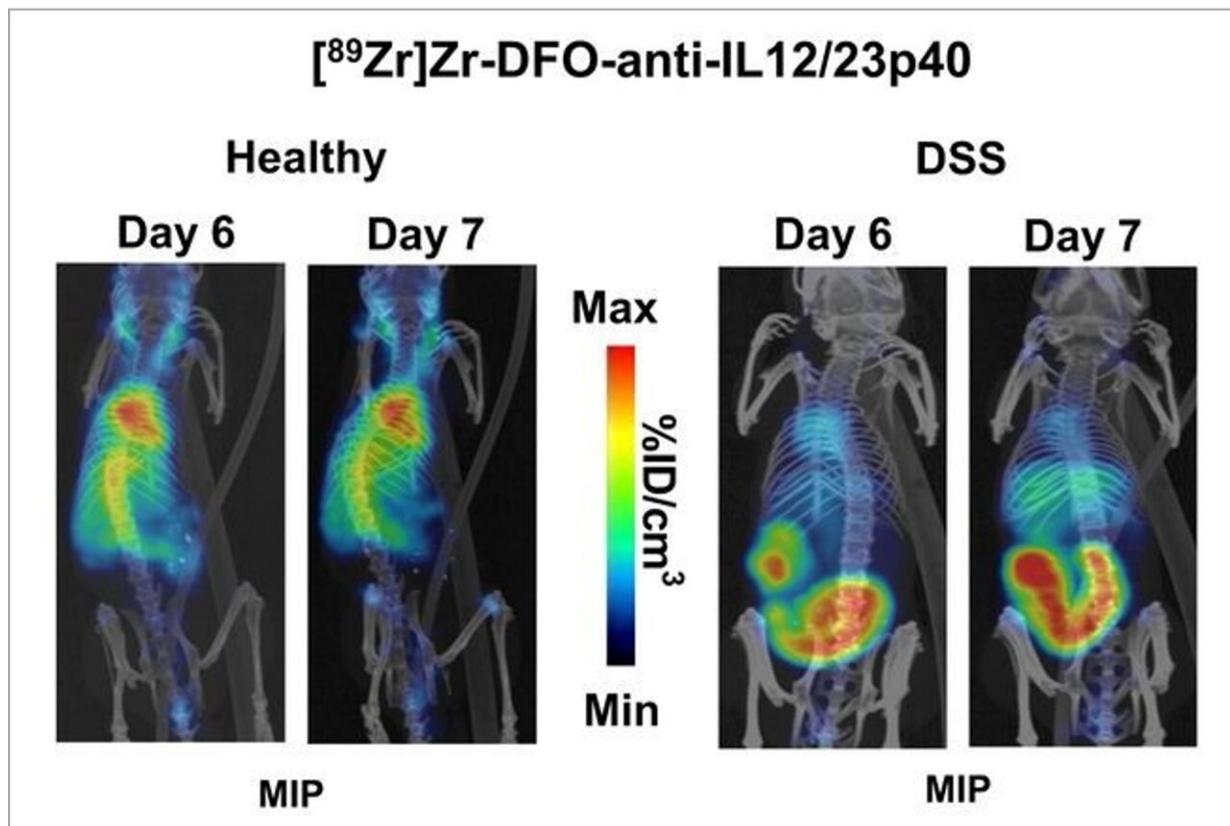# Novel PET radiotracer facilitates early, noninvasive detection of inflammatory bowel disease

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IL12/23p40 immuno-PET/CT imaging of healthy and DSS-treated mice. Representative maximum-intensity projection images of healthy (left) and DSS-treated (right) mice acquired at 24 hours (day 6) and 48 hours (day 7) after injection of [^{89}Zr]Zr-DFO-anti-IL12/23p40. Credit: *Journal of Nuclear Medicine* (2023). DOI: 10.2967/jnumed.123.265649

A newly developed PET radiotracer can be used to create an inflammation map of the entire gastrointestinal tract, providing detailed information to accurately detect and stage inflammatory bowel disease (IBD). Targeting the IBD biomarker IL12/23p40, the PET imaging tool offers a minimally invasive approach to identifying disease and guiding treatment. This research was published in the November issue of the *Journal of Nuclear Medicine*.

IBD is an inflammatory disorder of the gastrointestinal tract that affects nearly 7 million people worldwide. The most common forms of IBD are Crohn's disease and ulcerative colitis. Detecting and tracking chronic inflammation in the gastrointestinal tract is critical to improving outcomes among patients.

Current diagnostic and surveillance methods for IBD involve some combination of tracking clinical manifestations (e.g., bloody diarrhea) plus physical examination, endoscopy, and pathological findings. However, none of the available standard-of-care diagnostic tools, whether used alone or in combination, completely meets the need for safe, accessible, reliable, quantitative visualization of gastrointestinal inflammation with high spatial and molecular specificity.

"We know that the biomarker IL12/23p40 is a specific driver of inflammation in IBD," said Nerissa T. Viola, Ph.D., associate professor in the Department of Oncology at the Karmanos Cancer Institute at Wayne State University in Detroit, Michigan. "Thus, developing an imaging agent that targets IL12/23p40 is likely to be particularly useful clinically to detect disease progression among the most at-risk patients."

Viola and colleagues developed an immuno-PET imaging agent by radiolabeling an antibody targeting IL12/23p40 with the radioisotope [89]

Zr. A chemically induced mouse model of ulcerative colitis was created, and researchers used IL12/23p40 PET to image the disease. Biodistribution studies and other analyses were then conducted.

IL12/23p40 PET successfully achieved detection of acute inflammation in the mouse model of ulcerative colitis. The results of the biodistribution study clearly demonstrated increased uptake in the gastrointestinal tissues of the ulcerative colitis mice, reflecting the PET imaging results.

"This contribution is significant because it represents a new category of diagnostic tool that simultaneously alleviates patient burden and improves clinical value," stated Viola. "Of note, IL12/23p40 PET can potentially serve as a companion diagnostic to FDA-approved ustekinumab (Stelara), which also targets IL12/23p40."

"Overall, our approach establishes a foundational framework for future efforts to develop non-invasive imaging tools that meet or exceed the specificity and robustness of more conventional clinical diagnostics," she concluded.

 More information: Farzaneh Rezazadeh et al, Detection of IL12/23p40 via PET Visualizes Inflammatory Bowel Disease, *Journal of Nuclear Medicine* (2023). DOI: 10.2967/jnumed.123.265649

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