

# NYUAD researchers develop 3D-printed capsule to sample gut microbiome

*CORAL capsule offers non-invasive access to understudied intestinal microbes*

ABU DHABI, ABU DHABI, UNITED ARAB EMIRATES, September 8, 2025

/EINPresswire.com/ -- Gut microbiome studies have long relied on fecal samples, which primarily represent microbes from the large intestine. This leaves the small intestine, where many crucial interactions between the body and microbes happen, largely unexplored.

A research team at NYU Abu Dhabi has developed a 3D-printed capsule called CORAL (Cellularly Organized Repeating Lattice), designed specifically to collect microbial samples from the small intestine as it travels through the digestive tract.

“The bacterial communities in the gut profoundly influence immunity, metabolism, aging, and overall health. CORAL’s potential lies in enabling earlier disease detection, tracking how therapies are working, and ultimately developing new microbiome-based treatments that restore balance where it’s lost.” says co-author Hanan Mohammed.

The capsule, made from inert resin, has a sponge-like surface inspired by marine corals, which support diverse microbial life due to their porous structure. This design increases its surface area, allowing it to passively capture microbes with no need for special moving parts. Once



CORAL capsule offers non-invasive access to understudied intestinal microbes



Hanan Mohammed and Khalil B. Ramadi

swallowed, it naturally moves through the body, collects microbial samples, and is excreted with the stool. Researchers can then retrieve and analyze the capsule.

“The design of the CORAL capsule draws inspiration from the highly complex and self-organized porous architecture observed in marine corals, which themselves are hubs for microbial communities,” the authors wrote in the study published in the journal *Device*.

The researchers tested the capsule both on isolated animal tissue and in live rats. In all tests, it passed safely through the body. Genetic analysis confirmed that it collected microbial communities that are usually missed in standard fecal samples, such as *Streptococcus*, *Enterococcus*, and *Curtobacterium*.

This innovative capsule is also simple to manufacture using a single 3D printing step, which saves time and keeps costs low. That simplicity, combined with its passive sampling method, makes it easy to scale for larger studies or clinical use.

Co-author Khalil Ramadi says, “In developing CORAL, we prioritized passive design functionalities that simplify manufacturing and minimize failure points. This robust functionality enhances its clinical utility, and we will be beginning trials in patients soon.”

By providing direct, non-invasive access to the small intestine, CORAL could enable future investigation into microbial communities that influence nutrition, metabolism, disease, and immune response.

“We see CORAL as a transformative tool for unlocking parts of the gut that have long been inaccessible. In research, it will allow scientists to study microbial communities in the small intestine with unprecedented detail. Clinically, we envision it supporting non-invasive diagnostics and personalized treatment strategies for gut-related conditions,” says co-author Aashish Jha

DOI

<https://doi.org/10.1016/j.device.2025.100904>

Enas Qudeimat

NYUAD CGSB

[email us here](#)

---

This press release can be viewed online at: <https://www.einpresswire.com/article/847088485>

EIN Presswire's priority is source transparency. We do not allow opaque clients, and our editors try to be careful about weeding out false and misleading content. As a user, if you see something we have missed, please do bring it to our attention. Your help is welcome. EIN Presswire, Everyone's Internet News Presswire™, tries to define some of the boundaries that are reasonable in today's world. Please see our Editorial Guidelines for more information.

© 1995-2025 Newsmatics Inc. All Right Reserved.