New technique explores gut microbiome one microbe at a time

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Video Byte

Keywords: Single-cell genomics, Gut microbiome, Uncultured bacteria, Mouse, Inulin, Bacteroides

Posted Date: October 29th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-100314/v1>

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Abstract

The numerous microorganisms that live in our gut take care of us by regulating our metabolism. One way to take care of them is to add fiber to our diet. While indigestible to humans, certain forms of fiber are the perfect food for beneficial microorganisms. Unfortunately, it's notoriously difficult to determine which organisms in the gut respond to fiber and more difficult still to measure their response. To solve that problem, researchers have devised a new technique called the single-amplified genome-gel platform, or SAG-gel. SAG-gel works by trapping single cells found in fecal samples in tiny gel beads. These individual cells are often entire bacteria, whose DNA can be neatly extracted and stored within each bead. DNA sequencing then reconstructs the genome of the trapped organisms which can then be analyzed to determine the regions responsible for breaking down different forms of fiber. For mice fed a diet rich in the fiber inulin, SAG-gel revealed increased activity from bacteria of the genus *Bacteroides*. By tracing this path from food to function in the gut, SAG-gel could help researchers better understand how diet affects our resident microbes.