

Persistence of gut microbial strains in twins, living apart after cohabitating for decades

January 8 2020, by Jeff Hansen



Credit: CC0 Public Domain

Your fingerprints stay the same all your life. But what about the "fingerprint" of microbial strains that are shared in the guts of childhood twins?

Using a genomics strain-tracking bioinformatics tool developed at the

University of Alabama at Birmingham, researchers investigated whether those shared [bacterial strains](#) remain stable and resilient to changes in diet or environment after adult twins—who had lived together for decades—began to live apart.

The UAB study, published in the journal *PLOS One*, analyzed two metagenomic sequencing databases from pairs of twins—one for children who were still living together and the other from adult twins, ages 36 to 80, who then lived apart for periods from one to 59 years.

"Adult twins, ages 36 to 80 years old, showed that a certain strain or strains between a pair of twins was shared post-separation," said Casey Morrow, Ph.D., professor emeritus in UAB's Department of Cell, Developmental and Integrative Biology. "While we do not know the origin of these shared microbes in the twins, these results suggest the possibility of strains shared between non-cohabitating twins for decades. As a corollary to these studies, our studies establish a time line for stability of microbial strains in the human gut."

The study used a strain-tracking bioinformatics tool previously developed by UAB, called Window-based Similarity Single-nucleotide-variant, or WSS. Hyunmin Koo, Ph.D., UAB Department of Genetics and Genomics Core, led the informatics analysis. The research generated about six terabytes of data, which was analyzed with the help of the Cheaha UABgrid supercomputer and the UAB Information Technology's Research Computing group.

Morrow and colleagues have used this microbe fingerprint tool in several previous strain-tracking studies. In 2017, they found that fecal donor microbes—used to treat patients with recurrent *Clostridium difficile* infections—remained in recipients for months or years after fecal transplants. In 2018, they showed that changes in the upper gastrointestinal tract through obesity surgery led to the emergence of

new strains of microbes, and in 2019, they analyzed the stability of new strains in individuals after antibiotic treatments.

The current study used metagenomic sequencing databases from fecal samples of eight twin child individuals and 50 twin adult individuals.

The UAB researchers found significantly more shared strain pairs in child-aged twins who still lived together, as compared with adult twins after living apart for periods of time. Among the adult twins, those who had lived apart less than 10 years shared significantly more related strain pairs than twins living apart for longer periods, from 10 to 60 years.

Specifically, 80-year-old twins who had lived together for 79 years then were apart for 1 year showed the highest number of related strain pairs. The next highest numbers of related strain pairs were found in 56-year-old twins who had lived together for 51 years then apart for five years, in 73-year-old twins who lived together for 66 years and then apart for seven years, and in 36-year-old twins separated for 19 years.

Single-shared strains were seen in three twin sets who had lived apart between 22 to 54 years, but these sporadic shared strains did not show a correlation with the length of living apart.

"While certain gut microbial strains can be stable in people, in some cases for decades, changes in the host environmental conditions over time can impact the stability landscape of the gut microbial community," Morrow said. "This might result in the appearance of new [strains](#) that could potentially impact the microbial interactions that are essential for function in human health."

More information: Hyunmin Koo et al. Sharing of gut microbial strains between selected individual sets of twins cohabitating for decades, *PLOS ONE* (2019). [DOI: 10.1371/journal.pone.0226111](https://doi.org/10.1371/journal.pone.0226111)

Provided by University of Alabama at Birmingham

Citation: Persistence of gut microbial strains in twins, living apart after cohabitating for decades (2020, January 8) retrieved 9 April 2024 from

<https://medicalxpress.com/news/2020-01-persistence-gut-microbial-strains-twins.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.