Human microbiome could shed light on higher morbidity rate in minoritized populations

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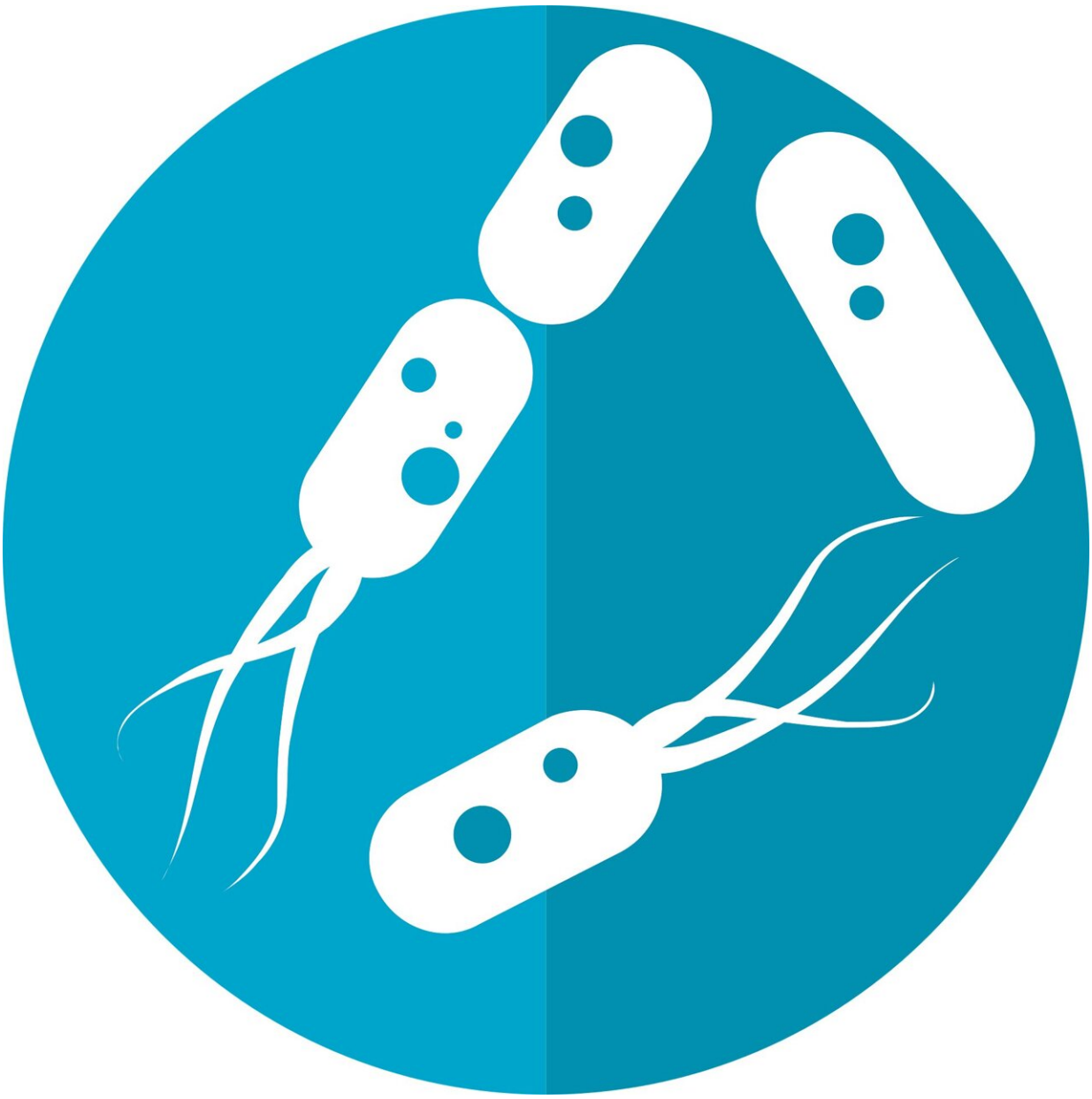

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The human gut is more than a source of instinct.

A new Northwestern University study is the first to explicitly address the gut microbiome as a pathway to understanding how environmental inequities could lead to health disparities.

Biological anthropologist Katherine Amato, assistant professor of anthropology at the Weinberg College of Arts and Sciences at Northwestern, is the study's lead author.

Amato says, despite a rich body of literature documenting environmental impacts on the microbiome, and the microbiome's impact on human health, the links between structural discrimination, altered environments, microbiome structure and health disparities have not been comprehensively outlined.

The new study calls for a better understanding of how structural discrimination that exposes minoritized populations to 'unhealthy' environments—from altered diets, pollution, sanitation and lack of access to green space—impacts the human gut microbiome, which in turn affects almost every aspect of human biology and health.

"Research has implicated the microbiome in most chronic diseases, and we know that there are disparities in most chronic diseases in which higher morbidity is observed in minoritized populations," Amato said.

Prior studies have demonstrated the impact of environmental inequality

on health. For example, a 2020 study showed that children who are exposed to plants and dirt daily at school have higher microbial diversity and improved immune markers, likely because the exposure to microbes in these materials are transmitted to children's bodies. The pattern suggests that minoritized populations living in neighborhoods with little access to outdoor green space are more likely to have lower microbial diversity and associated health risks.

Among its many roles, the gut microbiome contributes to protection from pathogens, nutrition and metabolism, immune function, brain development and behavior. An altered gut microbiome can also have an impact on the gestational environment and the resulting health of the next generation.

Amato's study builds on prior research that shows the environment's role may be stronger than genetics in shaping the human microbiome, and that changes to the composition and function of the microbiome are most flexible in early life.

According to Amato, more empirical and interdisciplinary research is needed to facilitate epidemiological approaches that can tease apart multiple interacting determinants of health and help isolate the factors leading to chronic disease.

An ultimate goal of the research is to be able to deliver interventions that address environmental issues and individualized therapies to restore and improve microbiome health.

"Demonstrating the potential importance of these therapies in combatting health inequities could lead to transformative policy interventions that strive for universal access to emerging health technologies, and to healthcare more generally," Amato said.

"The human gut microbiome and health inequities" will publish June 14 in the journal *Proceedings of the National Academy of Sciences* (*PNAS*).

More information: Katherine R. Amato el al., "The human gut microbiome and health inequities," *PNAS* (2021). www.pnas.org/cgi/doi/10.1073/pnas.2017947118

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