

Researchers identify link between gut bacteria and pre-clinical autoimmunity and aging in rheumatoid arthritis

October 9 2023, by Colette Gallagher



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While the bacteria in the intestine are helpful for digesting food and fighting infections, they have long been suspected to play an essential

role in triggering rheumatoid arthritis. This chronic inflammatory disorder affects the joints.

Mayo Clinic researchers have discovered a link between an abundance of specific gut bacteria and the triggering of an immune response against a person's tissue. They also found that this happens even before the clinical symptoms of rheumatoid arthritis appear. They published their findings from the [study](#) in *Science Advances*.

"As we age, our gut bacteria and their byproducts change, which impacts our [immune system](#)," says senior author Veena Taneja, Ph.D., a Mayo Clinic immunologist. There is a known link between imbalances in gut bacteria, aging, and rheumatoid arthritis, but it is challenging to prove this connection in humans. "This research sheds light on the complex relationship between gut microbiota and rheumatoid arthritis."

Dr. Taneja explains that it is difficult to determine if [gut microbiota](#) is the cause of the disease in patients because an autoimmune response precedes the onset of clinical symptoms in patients by one to 10 years.

"The [gut microbiome](#) may hold the key to understanding [healthy aging](#), how to avoid chronic diseases, and may lead to earlier diagnosis and treatment," says Dr. Taneja.

Using a preclinical model (experimenting in the lab and not on patients), the researchers determined that the gut bacteria *Eggerthella lenta* causes an autoimmune response before the onset of the clinical symptoms of rheumatoid arthritis. In that response, the immune system produces autoantibodies that mistakenly target and attack the body's tissues and cells instead of foreign invaders, such as bacteria or viruses.

This same microbe also reduces [amino acids](#) such as arginine, citrulline and tryptophan metabolites to levels more similar to that of much older

people, who see a gradual deterioration of their immune system due to aging.

In addition to their findings, researchers noted a connection between *Eggerthella lenta* and higher levels of these autoantibodies in female patients with rheumatoid arthritis, highlighting the importance of considering gender-specific factors in the disease.

Informing patient care

Rheumatoid arthritis has a [genetic predisposition](#); however, many at risk may not know whether they are at risk for severe rheumatoid arthritis

This biomarker may help diagnose severe rheumatoid arthritis and assess its progression.

The research suggests that clinicians could use measurements of metabolic byproducts induced by these [gut bacteria](#) as a marker for the severity of the disease. In familial cases and people harboring rheumatoid arthritis-susceptible genes, the researchers say that sequencing [bacteria](#), autoantibodies and metabolites—especially in healthy females—may help predict the likelihood of them developing rheumatoid arthritis.

Researchers plan to work on how clinicians can use *Eggerthella lenta* in their diagnoses, especially in women. They will study whether targeting it using antibiotics or specific genes and metabolites can affect preclinical autoimmunity in [rheumatoid arthritis](#). They are also exploring the link between *Eggerthella lenta* and its effect on aging.

More information: Baskar Balakrishnan et al, *Eggerthella lenta* augments preclinical autoantibody production and metabolic shift mimicking senescence in arthritis, *Science Advances* (2023). [DOI](#):

[10.1126/sciadv.adg1129](https://doi.org/10.1126/sciadv.adg1129)

Provided by Mayo Clinic

Citation: Researchers identify link between gut bacteria and pre-clinical autoimmunity and aging in rheumatoid arthritis (2023, October 9) retrieved 27 April 2024 from <https://medicalxpress.com/news/2023-10-link-gut-bacteria-pre-clinical-autoimmunity.html>

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