



Uploaded to the VFC Website

▶▶▶ 2023 ◀◀◀

This Document has been provided to you courtesy of Veterans-For-Change!

Feel free to pass to any veteran who might be able to use this information!

For thousands more files like this and hundreds of links to useful information, and hundreds of "Frequently Asked Questions, please go to:

[Veterans-For-Change](#)

If Veterans don't help Veterans, who will?

Note:

VFC is not liable for source information in this document, it is merely provided as a courtesy to our members & subscribers.



Early life history and genetics may play crucial role in shaping gut microbiome

Nov 29 2016

Genetics and birthplace have a big effect on the make-up of the microbial community in the gut, according to research published Nov. 28. in the journal *Nature Microbiology*.

The findings by a team of scientists from the Department of Energy's Pacific Northwest National Laboratory and Lawrence Berkeley National Laboratory (Berkeley Lab) represent an attempt to untangle the forces that shape the gut microbiome, which plays an important role in keeping us healthy.

In the study, scientists linked specific genes in an animal - in this case, a mouse - to the presence and abundance of specific microbes in its gut.

"We are starting to tease out the importance of different variables, like diet, genetics and the environment, on microbes in the gut," said PNNL's Janet Jansson, a corresponding author of the study. "It turns out that early life history and genetics both play a role."

Scientists studied more than 50,000 genetic variations in mice and ultimately identified more than 100 snippets that affect the population of microbes in the gut. Some of those genes in mice are very similar to human genes that are involved in the development of diseases like arthritis, colon cancer, Crohn's disease, celiac disease and diabetes.

The abundance of one microbe in particular, a probiotic strain of Lactobacillales, was affected by several host genes and was linked to higher levels of important immune cells known as T-helper cells. These results support the key role of the microbiome in the body's immune response, and suggest the possibility that controlling the microbes in the gut could influence the immune system and disease vulnerability.

"We know the microbiome likely plays an important role in fighting infections," said first author Antoine Snijders of the Berkeley Lab. "We found that the level of T-helper cells in the blood of mice is well explained by the level of Lactobacillales in the gut. It's the same family of bacteria found in

yogurt and very often used as a probiotic."

To do the research, the team drew upon a genetically diverse set of "collaborative cross" mice that capture the genetic variation in human populations. Scientists studied 30 strains of the mice, which were housed in two facilities with different environments for the first four weeks of their lives. The scientists took fecal samples from the mice to characterize their gut microbiomes before transferring them to a third facility.

The researchers found that the microbiome retained a clear microbial signature formed where the mice were first raised - effectively their "hometown." Moreover, that microbial trait carried over to the next generation, surprising the scientists.

"The early life environment is very important for the formation of an individual's microbiome," said Jian-Hua Mao, a corresponding author from Berkeley Lab. "The first dose of microbes one gets comes from the mom, and that remains a strong influence for a lifetime and even beyond."

In brief, the team found that:

- Both genetics and early environment play a strong role in determining an organism's microbiome
- The genes in mice that were correlated to microbes in the gut are very similar to genes that are involved in many diseases in people

The researchers also found indications that moderate shifts in diet play a role in determining exactly what functions the microbes carry out in the gut.

"Our findings could have some exciting implications for people's health," said Jansson. "In the future, perhaps people could have designer diets, optimized according to their genes and their microbiome, to digest foods more effectively or to modulate their susceptibility to disease."

Source:

DOE/Pacific Northwest National Laboratory
