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News

Health

Human milk could help fight bacteria that harm pregnancies

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PAZ RUIZ LUQUE/GETTY IMAGES

Pregnancy can reduce a woman's immune response

A TYPE of sugar in human milk could help treat infection by a common strain of *Streptococcus* bacteria, which can complicate pregnancies when it infects the vagina.

"[Human milk] is the second-most important liquid in the universe after water, and we don't know much about it," says Steven Townsend at Vanderbilt University in Tennessee.

Researchers are beginning to unpack the properties of helpful sugars found only in it: human milk oligosaccharides, or HMOs. Although they were once thought to be random sugars, recent studies suggest they are extremely effective prebiotics, "kind of like personalised medicine" for newborn babies, says Townsend.

Previous studies have focused on how they might benefit the gut microbiome. Townsend and his team decided to instead study their effect on the vagina. They wanted to better understand how HMOs may help regulate the proportion of healthy bacteria and potentially dangerous Group B Streptococcus, or GBS.

"Group B Strep is a bacteria that all of us have," says Townsend. "It typically is going to cause us no harm, and we're not even going to know we have it." However, GBS can cause disease in immunocompromised people. During pregnancy, GBS in the vagina can cause a variety of problems, like preterm birth, so it is typically treated with antibiotics.

"The sugars in breast milk promoted the growth of healthy bacteria, which outcompeted the bad"

Townsend and his team tracked the growth of GBS and healthy *Lactobacillus* bacteria in the presence of HMOs. They studied three different scenarios: the bacteria and sugars on their own, on lab-engineered vaginal tissue and in living mice. In all three cases, HMOs promoted healthy bacteria, which outcompeted the GBS (*ACS Infectious Diseases*, doi.org/pzqp).

The result is likely due to a "nice little storm of positive effects", says Townsend. GBS cannot grow in an environment with HMOs, he says, whereas the healthy bacteria can eat HMOs and grow prolifically, further stifling the growth of GBS. On top of this, as the healthy bacteria consume the HMOs, they produce fatty acids that make the environment more acidic, killing even more harmful bacteria.

The finding suggests more ways to potentially regulate and restore a healthy vaginal microbiome. "Anything that points to new tools or methods to do that are of high therapeutic value for women and their newborns," says Katy Patras at Baylor College of Medicine in Texas. However, she says a potential therapy is still several steps down the road.

Even when a usable therapy becomes available, the researchers say the best course of action to treat a GBS infection is still to take antibiotics. "What we're doing is not to replace antibiotics," says Townsend. "We're doing this research to try to save antibiotics", because overuse of antibiotics can lead to antibacterial resistance that renders the drugs ineffective. A therapy using HMOs to regulate the microbiome could be used in tandem, reducing the amount of antibiotics required to treat GBS.

"I think those synergistic interactions could be extremely useful," says Lars Bode at the University of California, San Diego.