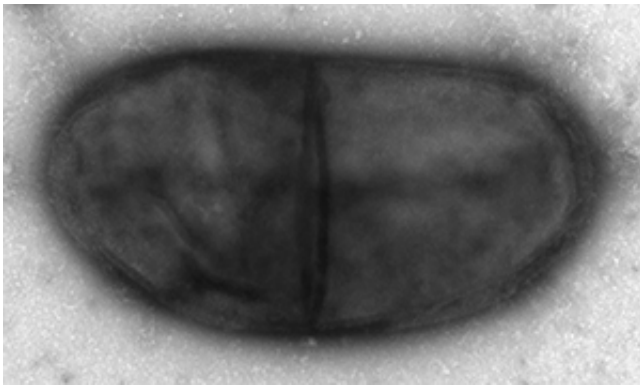


Bacteria may contribute to premature births, STDs

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Gardnerella vaginalis, a common species of bacteria, may be an important contributor to bacterial vaginosis, a condition linked to preterm birth and increased risk of sexually transmitted diseases. Credit: Wandy Beatty

(Medical Xpress)—New research at Washington University School of Medicine in St. Louis points to a common species of bacteria as an important contributor to bacterial vaginosis, a condition linked to preterm birth and increased risk of sexually transmitted diseases.

The condition affects one in every three [women](#), making it more common than [yeast infections](#). But [bacterial vaginosis](#) often does not cause significant symptoms, leaving many women unaware they have it.

"Bacterial vaginosis can [precipitate](#) significant health problems, but it is not a common topic of conversation between patients and their

[gynecologists](#)," says Amanda Lewis, PhD, assistant professor of [molecular microbiology](#). "Our findings, which come from new [experimental models](#) of the condition, may be a first step toward a better understanding of how to treat bacterial vaginosis and prevent serious complications linked with the condition."

Bacterial vaginosis occurs when the typical mix of microbes in the vagina is knocked off-kilter. In some cases, bacterial vaginosis causes a change in the consistency of vaginal fluids and an unpleasant odor. The condition is diagnosed through examination of the vagina and tests of the vaginal fluids. Doctors typically treat it with antibiotics, but the condition often recurs.

Lewis and her colleagues recently published back-to-back papers on bacterial vaginosis, the first in *Journal of Biological Chemistry* and the second in *PLOS One*.

Dozens of [bacterial species](#) have been linked with bacterial vaginosis, leading to heated debates in the scientific community over which bacteria actually cause the condition and its complications. The new research provides evidence that mucus layers and cells lining the surface of the vagina are damaged in women with bacterial vaginosis and suggests that a single organism, *Gardnerella vaginalis*, is likely the cause.

G. vaginalis is commonly found in the vaginal fluids of women with bacterial vaginosis and in some women who don't have the condition. The latter had led many researchers to dismiss the bacterium's potential contributions to bacterial vaginosis.

Working in mice to simulate this condition, Nicole Gilbert, PhD, postdoctoral fellow, showed that *G. vaginalis* causes increased shedding of the outermost cells covering the vaginal lining.

"We think the vaginal lining is shed as part of the body's effort to eliminate bacteria," says Gilbert. "However, this shedding may also expose sensitive underlying tissues. This may be important for understanding why women with bacterial vaginosis are more susceptible to sexually transmitted diseases and urinary tract infections."

Based on their observations in mice, the researchers compared vaginal samples from women with and without bacterial vaginosis and found that the outermost cells from the lining of the vagina are shed in higher numbers during bacterial vaginosis.

"This is the first time, to our knowledge, that the presence of increased numbers of shed cells has been detected in bacterial vaginosis in humans," Lewis says. "These results also suggest that *G. vaginalis* is the cause of this increase."

The researchers examined the ability of *G. vaginalis* to degrade mucus, which normally helps protect the vagina and uterus from infection.

Using biochemical approaches, Warren Lewis, PhD, research instructor in medicine, and Lloyd Robinson, PhD, research technician, showed that the bacterium uses an enzyme called sialidase to detach sialic acids, which are an abundant and important part of mucus.

The research team showed that the bacterium not only breaks up mucus barriers but also makes a meal of some of the components it frees from the barriers.

When the researchers tested vaginal mucus samples from women with bacterial vaginosis, they found lower levels of sialic acids than in women who did not have the condition. Mice also had lower levels of vaginal sialic acids after infection with *G. vaginalis*.

"This is the first time that a bacterium associated with vaginosis has been shown to participate in mucus degradation," says Lewis. "This is significant because infection of the uterus is a common cause of preterm birth and likely requires degradation of the mucus plug, a physical structure that protects the pregnant uterus from bacteria in the vagina."

More information: Lewis WG, Robinson LS, Gilbert NM, Perry JC, Lewis AL. Degradation, foraging and depletion of mucus sialoglycans by the vagina-adapted actinobacterium *Gardnerella vaginalis*. *Journal of Biological Chemistry*, published online.

Gilbert NM, Lewis WG, Lewis AL. Clinical features of bacterial vaginosis in a murine model of vaginal infection with *Gardnerella vaginalis*. *PLOS One*, published online.

Provided by Washington University School of Medicine

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