

# Unraveling Endometriosis: Is Fusobacterium the Culprit for Endometriosis

To the Editor,

Endometriosis is a chronic inflammatory condition characterized by endometrial tissue outside the uterine cavity.<sup>[1]</sup> It can cause various symptoms such as dysmenorrhea (painful periods), acyclic pelvic pain, dysuria (painful urination), dyschezia (painful bowel movements), and chronic fatigue.<sup>[2]</sup> Some studies have suggested that women with endometriosis may have a higher risk of certain infections, allergies, and autoimmune diseases possibly due to alterations in the immune system or pelvic inflammation associated with the conditions.<sup>[3]</sup> They may be more likely to experience depression, anxiety, and other psychiatric conditions.<sup>[4]</sup> Endometriosis can affect approximately 10% of women of reproductive age and can be challenging to diagnose due to uncertainties regarding its pathogenesis.<sup>[1]</sup>

The estimated cost of endometriosis in the United States is reported to be around \$70 billion annually.<sup>[5]</sup> This cost includes direct medical expenses related to diagnosis, treatment, and management of the condition, as well as indirect costs such as lost productivity and reduced work hours due to the impact of symptoms. Thus, it poses a significant economic burden on health-care systems and individuals.

Fusobacterium is an opportunistic, Gram-negative anaerobic rod found in the mouth, gastrointestinal tract, and elsewhere of humans. It usually shares a symbiotic relation with humans, but there are reports of it causing pathogenicity. One of which is colorectal cancer,<sup>[6]</sup> periodontal infections, and possibly oral cancers too.<sup>[7]</sup>

This bacteria is also responsible for causing pregnancy-related complications and adverse pregnancy outcomes, such as placental infections, chorioamnionitis, and preterm birth.<sup>[8]</sup>

In a recent and noteworthy development, researchers have uncovered a compelling and intricate link between fusiform bacteria and the perplexing condition known as endometriosis. This finding, which sheds new light on the complex landscape of reproductive health, has sparked significant interest within the medical community.

Intriguingly, this specific bacterium has emerged as a prominent player, having been identified in a substantial 64% of individuals affected by endometriosis. This stands in stark contrast to the relatively low prevalence of <10% in females not afflicted by the condition.<sup>[9]</sup> The

sheer contrast in these statistics not only highlights the potential significance of this bacterium but also raises questions about its potential role as a biomarker for endometriosis.

The revelation does not stop at mere correlation. The presence of this bacterium has been painstakingly pinpointed within the endometrial lining, thereby suggesting a tangible and intimate relationship with the development and progression of endometriosis.<sup>[9]</sup> This revelation opens avenues for further investigation into the precise mechanisms through which the bacterium may exert its influence on this enigmatic condition.

Taking the research a step further, an illuminating experiment involved introducing fusobacterium into a well-matched mouse model of endometriosis. The consequences were both striking and enlightening. Notably, there was a considerable upsurge in TAGLN-positive myofibroblasts—an indication of heightened cellular activity—alongside a noteworthy increase in the quantity and weight of endometriotic lesions.<sup>[9]</sup> This experimentation underlines the potential interplay between the bacterium and the cellular microenvironment, and how it could contribute to the pathogenesis of endometriosis.

However, the narrative does not end with these provocative findings. The researchers delved into the realm of intervention, and here, too, they made noteworthy strides. By administering antibiotic treatment, they were able to significantly impede the establishment of endometriosis in the mouse model. Moreover, the antibiotic intervention also resulted in a tangible reduction in the number and weight of already established endometriotic lesions.<sup>[9]</sup> These results underscore not only the potential to prevent endometriosis by targeting the bacterium but also the prospect of managing the condition in those who are already affected.

However, this is still in the initial phase and more clinical trials should be done to have a better understanding between the relation of the two. By knowing the exact cause of endometriosis, we will be able to treat it more effectively and can figure out more noninvasive tools and methods for diagnosing it.

## CONCLUSION

To sum it up, the enigma of endometriosis continues to challenge our understanding, impact, and management

of this chronic inflammatory condition. Recent progress, however, highlights a novel dimension– the intriguing link between fusiform bacteria and endometriosis. This newfound connection potentially serves as a diagnostic marker, with the bacterium’s presence notably higher in endometriosis cases. Its specific location within the endometrial lining fuels curiosity about its influence on the condition’s development.

Yet, this discovery marks the starting point, not the end. Comprehensive clinical investigations and trials are essential to fully comprehend this correlation’s implications and potential for diagnosis, treatment, and prevention. Ultimately, deciphering endometriosis’s intricacies, possibly intertwined with fusiform bacteria, could revolutionize interventions, improve patient well-being, and alleviate health care and economic burdens.

As the medical community collaborates to decode endometriosis and its potential ties to fusiform bacteria, a unified effort holds the key to unlocking new insights, refining approaches, and addressing this complex condition more effectively.

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### Conflicts of interest

There are no conflicts of interest.

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