

Could omega-3 fatty acids help prevent miscarriages?

February 7 2019



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Compounds found in fish oil prevent pregnancy complications, including preterm birth, neonatal death, and stillbirth, in mice when the complications are caused by a common oral bacteria, according to

research published today in the journal *JCI Insight*.

The study, by scientists at Columbia University's College of Dental Medicine and Vagelos College of Physicians & Surgeons, suggests a new strategy for protecting pregnancy in women.

Approximately one in 10 U.S. infants are born before term. Between 10 and 30 percent of preterm births have been attributed to uterine infections with a type of bacteria commonly found in the mouth, *F. nucleatum*.

This research identifies a potential prophylactic treatment for pregnant women to lower the risk of adverse outcomes including stillbirth.

"This type of bacteria is ubiquitous; everybody has it in their mouths," says Yiping Han, Ph.D., senior author of the new study. "The problems start when it travels to other parts of the body."

In pregnant women, the placenta is at particular risk for infection with *F. nucleatum*. Hormonal changes during pregnancy can cause inflammation and bleeding in the gums, which affects between 30 and 100 percent of pregnant women. Bleeding gums create an entryway for bacteria to leak into the bloodstream. Once in the [circulatory system](#), the bacteria can migrate to the placenta and cause inflammation there, sometimes triggering miscarriage or stillbirth.

Isolating the inflammatory mechanism

"We knew from our previous work that uterine inflammation due to infection with this bacteria is associated with adverse pregnancy outcomes, but in order to prevent those outcomes, we needed to determine exactly how these infections trigger inflammation."

Using a [mouse model](#), the researchers injected the bacteria into mice during their third trimester of pregnancy. As predicted, the bacteria invaded the animals' uteruses.

The researchers saw that the bacteria triggered an [inflammatory response](#) in [endothelial cells](#) within the mouse placenta, leading to preterm births.

The inflammatory response only occurred when a specific immune protein was present in the mothers' endothelial cells. In pregnant mice lacking this protein, fewer fetuses died, suggesting that inflammation ignited by this protein is critical for causing preterm births.

Omega-3's prevent inflammation, improve birth outcomes in mice

After determining how the bacteria trigger inflammation within the placenta, Han's team used cultured cells to look for ways to inhibit those mechanisms.

"We were looking for an anti-inflammatory agent that's safe for pregnant women to use," says Han.

Because [omega-3 fatty acid supplements](#) are widely used to reduce inflammation in chronic inflammatory diseases, such as heart disease and rheumatoid arthritis, Dr. Han considered fish oil, which is rich in omega-3 [fatty acids](#). These supplements are already recommended for pregnant women to support fetal development.

The experiments showed that supplements containing omega-3 fatty acids also inhibited inflammation and bacterial growth in pregnant mice, and reduced preterm births, miscarriages, and stillbirths.

Han now hopes to begin a clinical trial to test whether omega-3 fatty acids can prevent intrauterine *F. nucleatum* infection and adverse

outcomes in [pregnant women](#).

Caveats

The doses of omega-3 fatty acids used in this study were far higher than those recommended for people taking fish oil supplements. The study points to a promising avenue for further research, but does not support any immediate changes in clinical practice.

The study is titled "Omega-3 fatty acids suppress *Fusobacterium nucleatum*-induced placental inflammation originating from maternal endothelial cells" appeared online Feb. 7, 2019 in the journal *JCI Insight*.

More information: *JCI Insight*., [DOI: 10.1172/jci.insight](https://doi.org/10.1172/jci.insight)

Provided by Columbia University Irving Medical Center

Citation: Could omega-3 fatty acids help prevent miscarriages? (2019, February 7) retrieved 7 May 2023 from <https://medicalxpress.com/news/2019-02-omega-fatty-acids-miscarriages.html>

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