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First link of oral bacteria and preterm birth found in human

In pilot study by Case Western Reserve University and MetroHealth Medical Center

A 37-year-old-mother, who gave birth to a low-weight preemie at 24 weeks, exhibited the first-found link in a human between bacteria found in the mouth and the amniotic fluid of a woman in preterm labor.

Using new DNA finger-printing techniques to find bacteria that cannot be cultured and grown in the lab, researchers from Case Western Reserve University School of Dental Medicine and the Department of Obstetrics and Gynecology at MetroHealth Medical Center in Cleveland made the discovery.

They report their finding in the *Journal of Clinical Microbiology* online article, "[Transmission of an Uncultivated *Bergeyella* Strain from the Oral Cavity to the Amniotic Fluid in a Case of Preterm Birth](#)" in the April issue.

Yiping Han, the lead researcher and a Case microbiologist in the Department of Biological Sciences at the Case School of Dental Medicine, has spent approximately three years searching for this link.

Assisting in her investigation were Akihiko Ikegami, Nabil Bissada and Raymond Redline from Case and Graham Ashmead and Melissa Herbst from the Department of Obstetrics at Case School of Medicine and MetroHealth Medical Center.

The researchers report that they found the link during a pilot study of 34 women undergoing amniocentesis at MetroHealth.

The women in their second or last trimester had sought testing for genetics, fetal development or suspected infections.

Six of the women delivered before 30 weeks and had a higher risk for possible infections. Only the one mother had an infection.

But Han points out that in this small study it was one in six of the mothers under 30 weeks and in the overall population could mean many more women with infections that bring on early labor or the need to induce labor to protect the baby from an infection during the pregnancy.

Women can contract intrauterine infections vaginally while pregnant. Another pathway of infection has been suspected through the mouth in pregnant mothers where the oral bacteria enter the blood through bleeding gums.

Han said the infections play a bigger role in premature deliveries prior to 30 weeks than those that happen later in pregnancy and can result in babies born with many health challenges and who struggle to thrive at their low-birth weights.

According to [2003 statistics](#) from the March of Dimes, hospital charges for newborns without complications averaged \$1,700. In contrast, hospital costs for infants born too soon to too small averaged a startling \$77,000. Also in 2003, hospital charges for all infants totaled \$36.7 billion. Nearly half of that, \$18.1 billion, was for babies with a diagnosis of prematurity or low birth weight. Today 1,300 babies in the U.S. will be born prematurely. While doctors have made tremendous advances in caring for babies born too soon and too small, scientists have not yet

developed effective ways to help prevent premature delivery.

Finding why mothers give birth prematurely is important for the health of the baby and mother and to drive down medical costs, said Han.

The mother, who had the presence of *Bergeyella*, came to MetroHealth when in preterm labor and dilated at 24 weeks. She was induced after it was determined by low glucose levels and elevated white blood cell counts in her amniotic fluid that she had an infection. An examination of the placenta, fetal lining and umbilical cord following the birth supported the infection.

Han's tests of the amniotic fluid found the *Bergeyella* bacteria.

This study continues Han's research into the suspicion that oral bacteria, once entering the blood, can cause a host of health problems including preterm labor.

She confirmed the harm oral bacteria can cause in a mice study in April 2004 when she injected the common oral bacteria of *Fusobacterium nucleatum* into the blood of pregnant mice. It resulted in premature delivery for the mouse mothers and fetal death for some of their fetuses.

The pilot study is one of the first studies done on humans.

The mother, who had the presence of *Bergeyella*, regularly visits the dentist and showed no signs of post-partum periodontal disease—a suspected facilitating condition for bacteria to enter the bloodstream.

"If periodontal disease is not present, then this raises more questions about how the bacteria got into the amniotic fluid," said Han.

Bergeyella is one of the 700 bacteria found in the mouth. It is also one of approximately 60% of the bacteria that cannot be grown in a culture, and until now, could not be studied. Since new techniques like PCR (polymerase chain reaction) became available to track the DNA of the bacteria, it now allows for the study of those other bacteria.

Now that a link was found, Han plans to more research to answer questions that have arisen from this finding.

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