Expert analysis refutes claims that humans are colonized by bacteria before birth

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University College Cork & APC Microbiome Ireland Principal Investigator Prof. Jens Walter assembled a trans-disciplinary team of 46 leading experts from around the world to evaluate the evidence for microbes in human fetuses. Credit: UCC

Scientific claims that babies harbor live bacteria while still in the womb

are inaccurate, and may have impeded research progress, according to University College Cork (UCC) researchers at APC Microbiome Ireland, a world-leading Science Foundation Ireland (SFI) Research Center, which led a perspective published today in the journal *Nature*.

Prior claims that the human placenta and amniotic fluid are normally colonized by bacteria would, if true, have serious implications for clinical medicine and pediatrics and would undermine established principles in immunology and reproductive biology.

To examine these claims, UCC & APC Principal Investigator Prof. Jens Walter assembled a trans-disciplinary team of 46 leading experts in reproductive biology, microbiome science, and immunology from around the world to evaluate the evidence for microbes in human fetuses.

A healthy human fetus is sterile

The team unanimously refuted the concept of a fetal microbiome and concluded that the detection of microbiomes in fetal tissues was due to contamination of samples drawn from the womb. Contamination occurred during vaginal delivery, clinical procedures or during laboratory analysis.

In the report in *Nature*, the international experts encourage researchers to focus their studies on the microbiomes of mothers and their newborn infants and on the microbial metabolites crossing the placenta that prepare the fetus for post-natal life in a microbial world.

According to Prof. Walter, "This consensus provides guidance for the field to move forward, to concentrate research efforts where they will be most effective. Knowing that the fetus is in a sterile environment, confirms that colonization by bacteria happens during birth and in early

post-natal life, which is where therapeutic research on modulation of the microbiome should be focused."

The expert international authors also provide guidance on how scientists in the future can avoid pitfalls of contamination in the analysis of other samples where microbes are expected to be absent or present at low levels, such as internal organs and tissues within the human body.

More information: Jens Walter, Questioning the fetal microbiome illustrates pitfalls of low-biomass microbial studies, *Nature* (2023). DOI: 10.1038/s41586-022-05546-8.
www.nature.com/articles/s41586-022-05546-8

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