

In January 2019, ENDIA published a paper titled “Distinct gut virome profile of pregnant women with type 1 diabetes in the ENDIA study” in the journal of Open Forum Infectious Diseases. You can access the full paper online here: <https://doi.org/10.1093/ofid/ofz025>. If you have trouble accessing the link, you can contact endia@adelaide.edu.au to request a copy of the paper. For your convenience, please find a summary below:

Why we did this research

We now know quite a lot about gut bacteria and their importance to health and wellbeing. We know that our gut bacteria carry out four important functions: (1) they help to maintain a strong barrier between our intestines and the bloodstream, (2) they defend us from harmful microbes, (3) they make helpful substances and nutrients that we can't make ourselves, and (4) they help to educate our immune system to respond appropriately when challenged. When a woman is pregnant, the bacteria that are passed onto the baby are often very similar to that of the mother.

In contrast to our knowledge of gut bacteria or the “microbiome”, very little is understood about the role that gut viruses, collectively referred to as the “virome”, may play in contributing to health as well as disease. To date, no studies have examined how the gut virome changes over time during pregnancy and what impact a chronic condition such as type 1 diabetes might impact on the viruses that are present. Our research aimed to fill this gap in knowledge. Knowing what viruses are present, and how they change in the leadup to childbirth is important as the virome may impact the health of the baby.

What we found

We examined the gut virome of 61 pregnant women participating in the ENDIA study; 35 living with type 1 diabetes and 26 without the condition. We analysed stool samples (a.k.a. poo) using a highly advanced and sensitive test called VirCapSeq that can identify more than 10,000 different types of virus. We found many viruses living in the gut of women during pregnancy. However, women with type 1 diabetes were more likely to have viruses called “picobirnaviruses” and “tobamoviruses” compared to women who did not have type 1 diabetes. We also found significant differences in the total amounts of viruses between the women with type 1 diabetes and those who did not have type 1 diabetes.

What does this mean for ENDIA families and the wider type 1 diabetes community?

Our results demonstrate a different profile of gut viruses in women living with type 1 diabetes during pregnancy compared to pregnant women who do not have type 1 diabetes. To date, neither picobirnaviruses nor tobamoviruses have been associated with type 1 diabetes. It is not yet clear whether these two types of virus could act as a trigger or provide protection against the development of type 1 diabetes. It also remains to be seen as to whether the viruses influence the risk of type 1 diabetes in babies born to women carrying these viruses. In the future, we will expand this important work by following the development of the gut virome in children that develop type 1 diabetes in early childhood compared to children that don't develop type 1 diabetes in the ENDIA study. If we can determine there are viral ‘culprits’ that contribute most significantly to the development of type 1 diabetes, we may be able to develop vaccines or antivirals that target them and prevent type 1 diabetes.