

AIMS Update November 2024



on the microbiome in young children. In this newsletter, we continue with researcher Daniel Mende from the AMC in Amsterdam, who analyses the DNA of gut bacteria in children to uncover how the microbiome develops and its role in young children's health.

Research on the Microbiome in Children (0 to 4 years)



Daniel Mende studies the microbiome, the bacteria in the body, of both adults and children. In this research, we want to understand how these bacteria can help us. About 4.5 years ago, I got involved with the

AIMS study after moving to Amsterdam.

Because I am an expert in this field of research, they asked me to join the project.'

In the March 2024 AIMS update, we followed the journey of your samples from Amsterdam to Leiden, where they were prepared for DNA research. From the careful collection and storage by GGD analysts to processing at BaseClear's laboratory, we explore the process behind the AIMS study

The AIMS study looks at how the bacteria in children's intestines, the microbiome, develop in the first years of their lives. We spoke with Daniel Mende, a researcher at the AMC. Daniel explains how he analyses DNA (the building blocks of life) and what he discovers about the health of young children.

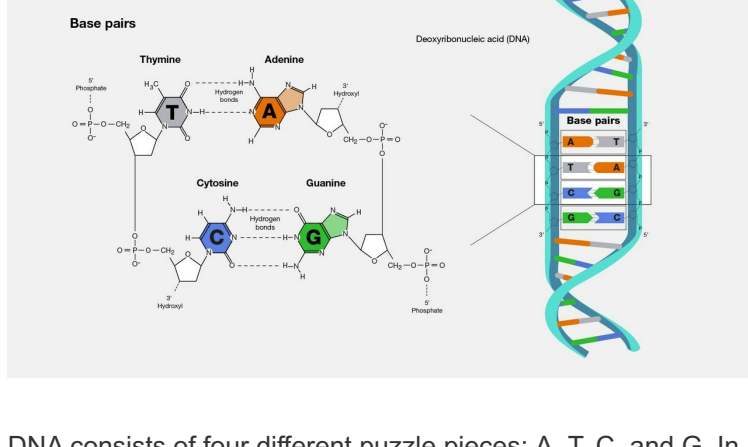


Research Steps

Mende explains: 'First, we send the DNA to a company called BaseClear. They prepare the DNA for analysis and send it back to the GGD. At the GGD, the DNA is attached to a code number, which means scientists can't tell whose DNA it is anymore. After that, our work begins. We examine which bacteria are in the samples and look at their DNA. BaseClear sends us DNA fragments, and we piece them back together, like putting together a puzzle. This helps us learn more about the bacteria in the samples.' Luuk Haring adds: 'We receive pieces of DNA made up of four letters: A, T, C, and G. These letters are the building blocks of DNA. We arrange the pieces in the correct sequence to see the DNAs appearance.'

What Happens on the Computer?

Mende: 'On the computer, we see large files with the letters A, T, C, and G, which together make up the DNA. There's also information about the sequence quality, which is the order of the DNA fragments. If the quality is good, we use the data; if not, we discard it. Then we examine which bacteria are in the sample. This is called a taxonomic profile, meaning we can see exactly which types of bacteria are present. We also look at what these bacteria do in the body.' Luuk asks: 'How do you know the DNA comes from bacteria and not from human cells?' Mende replies: 'There can be dead human cells in the samples, but the lab at the GGD uses a reference to recognise and remove the human DNA, leaving only the bacteria for our study.'



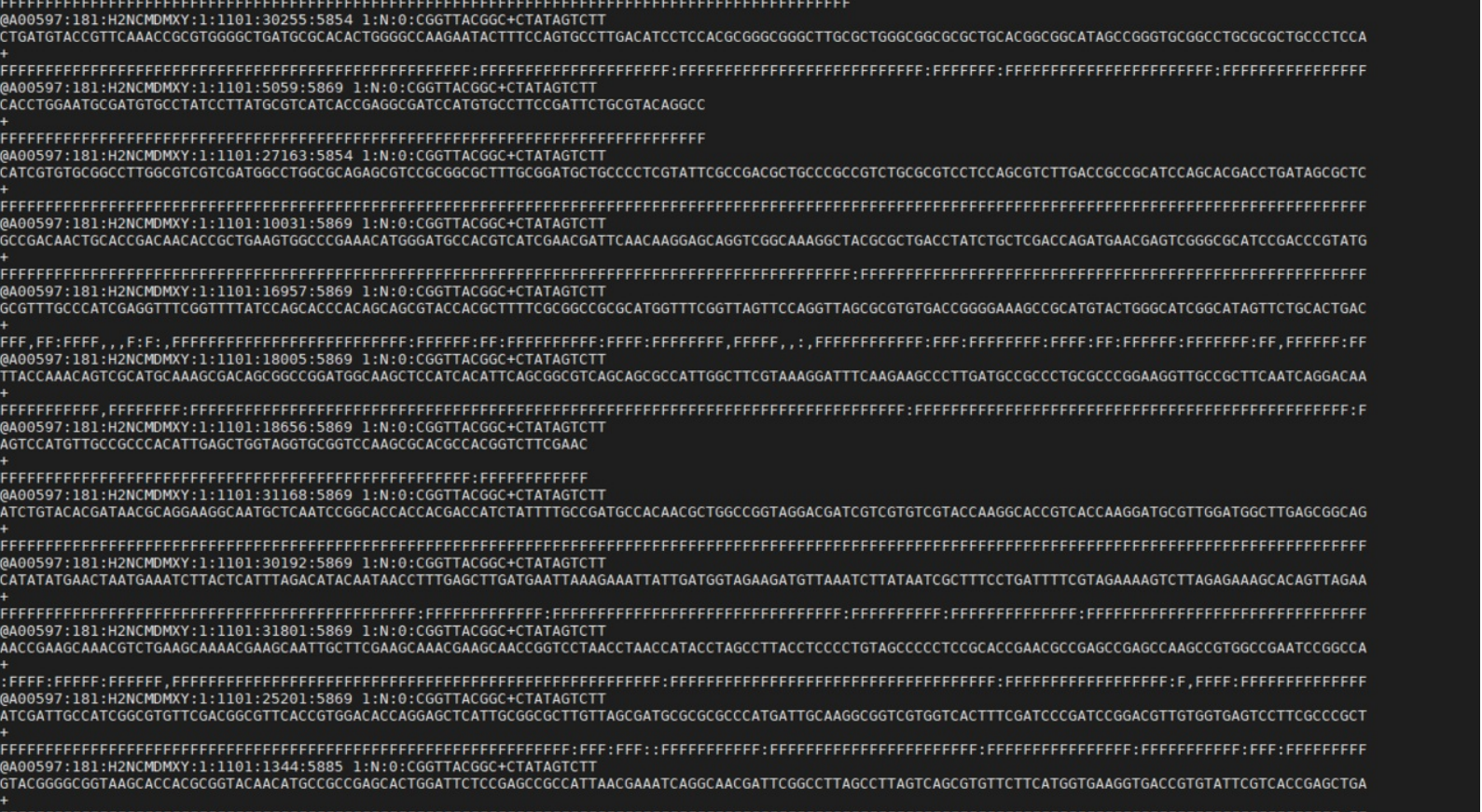
DNA consists of four different puzzle pieces: A, T, C, and G. In various sequences, these form the basis of all life on Earth.

Bacteria and Health

The AIMS study also aims to find out if there's a link between the bacteria in the body and breastfeeding, for example. Mende: 'We are investigating whether certain bacteria are more common in babies whose mothers breastfeed. This enables us to focus our research to answer which bacteria are healthy for babies.'



Mende: 'On the computer, we see large files with the letters A, T, C, and G, which together make up DNA.'



This is what DNA looks like on a computer. Sequences of A,T,C,G coding for all life.

What Is the Biggest Challenge in the Research?

Mende: 'One of the most difficult things is storing and analysing the vast amount of data. We work with terabytes of information, which is an enormous amount. We carefully consider what to keep for a long time and what for a short time. We must also always be able to go back if something goes wrong. We use special computer servers to help us perform calculations.'



First Results and Thanks to the Participants

The first results of the AIMS study reveal interesting findings. These will be published in a scientific magazine. Mende: 'For example, one-month-old babies already have a type of bidfidobacteria (Also in yoghurts and probiotics) normally found in adults. Later, we see that specific bacteria appear typical for babies.'

Finally, Daniel Mende wants to thank the participants in the AIMS study: 'Without their help, we couldn't have done this research. I hope they can one day tell their children were part of an important study on bacteria and health.'



Logo's AIMS, Images: Pixabay 2024

450+ Babies

The recruitment of new pregnant participants is now coming to an end. over 450 babies are recruited. The last AIMS children will be born by the end of this year.



AIMS on the Road

Come rain or shine, our researchers cycle to you. So far, they have cycled 11,570 km across Amsterdam and the surrounding areas to collect samples. This distance is equivalent to travelling from Amsterdam to Hong Kong.

AIMS Oral Research



Dentist-researcher Marije Kaan has examined the mouths of a lot of children over the past year. Will you participate too? When your child is one and a half and again when they are three, you will receive an invitation from us.

AIMS in Numbers

- 5 twins
- 116 three-year-olds
- 452 births
- 986 food diaries
- 3,405 questionnaires
- 31,754 stored (bio)samples

Timeline

- July 2024 – Export samples from 65 families for DNA extraction
- August 2024 – 400th birth of an AIMS participant
- September 2024 – Digital environment (SURF) ready with de-identified AIMS data for researchers
- October 2024 - end of recruitment for AIMS

Participants, thank you
On behalf of GGD Amsterdam and the AIMS researchers, we want to extend our heartfelt thanks for participating in this study. Without your involvement, our research would not be possible. As a participant, you are contributing to the health of all children in Amsterdam. Do you have questions or would you like more information? Send us a message, and we will contact you as soon as possible via 020 5555 495 or aims@sarphati.amsterdam.

About AIMS Through GGD Amsterdam (AIMS research), samples (bio-samples) are collected from approximately 500 families until the child is three years old. As a participant in the AIMS study, you provide samples for microbiome analysis. AIMS is a research project by GGD Amsterdam. We hope that after reading this letter, you feel excited about our research and will inform friends, family, and acquaintances in Amsterdam about the opportunities of our study.