

# Prevent asthma? Let kids get **dirty**

Hermelijn Smits, immunologist and parasitologist at the Leiden LUMC, leads an international group of renowned researchers. They have only one goal: to prevent asthma in children. 'The key lies in the immune system, which you have to train in the earliest years of your life.'



**Dr Hermelijn Smits, immunologist and parasitologist:** 'Since corona, I rarely have to explain what an immunologist does. This field fascinates me immensely, ever since my PhD research on how the immune system goes haywire in asthma. If one single component in your immune system is not working properly, you can develop all kinds of health problems. A healthy person hardly ever realises this.'

*Your research focuses on the prevention of asthma. What leads you to believe that asthma is preventable?*

'A few notable things got us thinking. In developed countries, more and more children are developing allergies and asthma. But these conditions are rare in children growing up on small, traditional farms in Bavaria and Switzerland. The same is seen with the Amish in the United States. This suggests that there is a link between our modern lifestyle and the development of asthma. Due to urbanisation, better hygiene and different nutrition, we are probably missing some training of the immune system.'

*What makes you so enthusiastic about this research?*

'In the Netherlands alone, 2,800 children with asthma end up in the hospital every year, with shortness of breath. There are 600,000 people in our country with this disease. To date, we can only fight the symptoms and not prevent or cure asthma. The scientists in our study, paediatricians, immunologists, epidemiologists and other experts, are therefore extremely motivated to find a solution. Moreover, the first results are very hopeful.'

*A well-functioning immune system plays a major role in our health. We realise this all the more because of corona. So do you think our immune responses can be trained?*

'We start our lives with a blank immune system. Then the defence is built up; the body learns which bacteria are potentially dangerous and which are harmless or even good for us. As with learning a language, the more you practice, the better. In children with allergies and asthma, this process goes awry at some point. Their immune system overreacts to harmless stimuli, causing inflammatory reactions and damage to the lungs. The first thousand days are crucial for forming a robust defence system. The hypothesis in our research is that we can lend a helping hand with that.'

*Manipulating the immune system does not sound easy.*

'In practice, we find three clues: unprocessed cow's milk, farm dust and worm parasites. That's what our research strategies focus on. Previous research has shown that children who drink unprocessed cow's milk are less likely to develop asthma and allergies. The same applies to regularly inhaling the air in and around cowsheds. We find the third clue in the tropics. Just like us in the old days, children get parasitic worm infestations there. The fascinating thing is that asthma is rare. The fact that these worms play on the immune system in an ingenious way almost certainly has to do with this. They secrete substances that suppress the immune response so that they can survive in the gut. We think that this also suppresses allergic reactions and asthma. Our researchers naturally want to understand exactly how this works. What can we learn from that trick of parasitic worms? Which microorganisms, or their

metabolites (intermediate or end products), in farm dust and in raw cow's milk make the immune system so strong? And how can we use those active substances to train the immune system of children?'

*You mention our changed lifestyle as an important factor in the development of asthma. But we can't go back in time.*

'Exactly, we can't all live on a farm. Our research, therefore, focuses on understanding the underlying processes and developing practical and safe tools that fit today's world. Think of special toddler milk with the right bacteria. We brainstorm a lot about it, maybe we can make capsules or vaporizers with the same effect as that farm air.'

*You started this research in 2018. Will it be possible to make asthma prevention possible in the near future?*

'We are definitely on the right track, the first active ingredients are being identified. I expect that products made from unprocessed cow's milk will be on the market in a few years' time. With this, we can probably prevent asthma in ten to fifteen per cent of children. The complete mapping of the routes in the immune system will take longer, those immune processes are very complicated. International collaboration in our research is accelerating the pace enormously. We don't have to wait for results to be published in scientific journals but share our discoveries directly with each other. We would not have been able to set up such a great collaboration without the financing from Longfonds.'

*Longfonds believes it is important that patients are involved in the research. Do you share that view?*

'I think it is important to have patients as a sounding board so that you know who you are doing it for. The Patient Advisory Committee has great added value for this research. For example, they highlighted the importance of diversity and contributed ideas on how we will reach all children in the future. Because if we want to prevent asthma, we have to get everyone on board, not just the interested, highly educated parents.'

*Finally, what can parents and grandparents already do to give children a strong immune system?*

'Great research has been done in Finland. This showed that by applying a few lifestyle recommendations, the number of food allergies in children up to four years of age decreased by no less than forty per cent. Let kids play outside a lot and get dirty. A healthy diet with vegetables, fruit and fermented products such as yoghurt and sauerkraut is important. Furthermore, we now know that you do not have to avoid allergens such as soy and peanuts. It is good if children get used to it early on. Having a pet also has a beneficial effect. When you come into contact with many different substances, you develop a strong immune system. This reduces the risk of allergies, serious viral respiratory infections and asthma.'