

50 YEARS OF NUTRITION RESEARCH

‘There is so much more to nutrition than calories’

Two professors of Nutrition look ahead as Wageningen celebrates 50 years of nutrition research. One of them works at the DNA level; the other looks at the global picture.

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EDITH FESKENS, PROFESSOR OF GLOBAL NUTRITION

‘We must change the food system radically’

‘In large areas of the world there is not just undernutrition, but a lot of overweight as well. With all the diseases that go with it, such as diabetes, cardiovascular disease and cancer’, says Edith Feskens. She was appointed to the new chair in Global Nutrition at the beginning of this year. For the last 10 years of her academic career, she will be focusing on both undernutrition and overnutrition in the world.

What is your dream? Where do you want to end up with the research?

‘How can we feed 10 billion people in 2050 with a healthy, sustainable diet? Which means no vitamin deficiencies, overweight or underweight. It is theoretically possible: worldwide there is enough food available to provide us all with sufficient calories, protein, vitamins and minerals. It is just the distribution that goes wrong. Our contribution is modest, but I am optimistic. Just look at the impact of the discussion about climate change. In the past five years, vegetarian food has become enormously popular in the West. We couldn’t have dreamt of that 10 years ago. Big changes are possible. To achieve them we must change the food system radically. Less emphasis on increasing production, for instance, and more emphasis on sustainability and health. We want to support that line with our research. To start with, we are focusing on the continents of Asia and Africa. How can we ensure that the people living there get a healthy diet? What does it take? That is our core theme.’

To some extent, the new chair group is building on the work of the former professor Clive West, who died in 2004. He had set up a successful research line on micronutrients. Schoolchildren in Kenya were given a cassava variety that is rich in beta carotene, the precursor of vitamin A. As a result, fewer children went blind. Now there is a comparable project running in Nigeria. Feskens: ‘In the past, the topic of Global Nutrition was covered by another chair group; now it

has been given more prominence. Wageningen has a lot of knowledge to offer in this field, both in the area of nutrition and those of plant and livestock breeding.’

How are you going to approach it?

‘A large international research programme on Food Systems for Sustainable Diet is already up and running, led by Inge Brouwer. And we are setting up new projects as well. Our focus: what is a healthy diet in these countries, how sustainable is it to produce, and how does it reach the consumer? We also focus on a child’s first 1000 days and on adolescence. In those two periods, people are very vulnerable to deficiencies and overweight.’

What kinds of new projects do you have in mind?

‘In the Netherlands there is a project run by the Nutrition Centre called ‘The Healthy School Canteen’. Other countries would like to implement something like this with our help. The national public health institute in Ethiopia is interested, for example. There we research what schoolchildren consider healthy and why. A study by a PhD student showed that they don’t buy fresh fruit on their way to school because they are afraid it has suffered from air pollution. They eat a packet of crisps instead. They think that is healthier and of course, it has higher status. That is an interesting finding, and one you can use. Another example is our work in Vietnam, where a PhD student is doing research on which foods people eat, how much water they use, and what the options are for reducing water consumption.’ ➤

Until recently, you held the chair in Nutrition and Health in the Life Cycle. How have you ended up at Global Nutrition?

'I have actually finished most of my earlier research now. For years I have been working on the prevention of diabetes and overweight. I had started on that at the National Institute for Public Health and the Environment, and I carried on with it here as associate professor and later as full professor. The research resulted in a successful method called SLIMMER, for preventing diabetes and overweight with an adapted diet and exercise. People who take this programme achieve permanent weight loss, as one of our PhD students proved. The method is even covered by the basic health insurance now, so what more could a scientist want? I began to think about the last 10 years of my academic career. Since 2005, I have also led quite a few projects on diabetes and overweight in developing countries. Now I am going to expand that research line, precisely because the problem of overnutrition is growing in those countries.'

50 YEARS OF HUMAN NUTRITION AND HEALTH

Research on the link between nutrition and health started in the Netherlands in 1969, when the Human Nutrition department was opened in Wageningen. In the past 50 years, the department has grown into an internationally renowned chair group with relevant research results on topics including the relationship between diet and cardiovascular diseases, cholesterol or cancer.

The 50th anniversary will be celebrated on 18 October with a scientific symposium with international speakers, and on 19 October with an alumni day on the campus in Wageningen.

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SANDER KERSTEN, PROFESSOR OF NUTRITION, METABOLISM AND GENOMICS

'The way the body works is so wildly complex'

'There is more to nutrition than calories. Nutrition regulates our genes too,' says Sander Kersten, professor of Nutrition, Metabolism and Genomics. 'Nutrients continuously determine which genes become active or inactive. We are trying to find out how that works and why.'

How does nutrition activate our genes?

'Imagine you eat a meal that is rich in fatty acids. They get absorbed by cells in our bodies. The fatty acids serve as fuel, but they also bind to certain proteins in the cells, known as transcription factors. These ensure that parts of the DNA are transcribed, thus activating genes. We now know that there are transcription factors for fatty acids, glucose and amino acids. We wonder why it works like that. What is the underlying logic?'

What kinds of information has that delivered so far?

'We have mainly focused on the fatty acids. Using a new technique called RNA sequencing, we can see at a glance which of all the 25,000 genes a human being has are switched on in cells of a particular tissue type. We concentrate on two genes that are active in the digestion of fatty acids. One of them ensures that the cell absorbs less fat. The other regulates the storage of the fats as fat droplets. So switching on that gene is part of the feedback so that not too much fat gets into the cell, or that at least it is safely stored.'

Have you found a link between nutrients and diseases?

'To be honest, I try to steer clear of that subject. I concentrate on physiology, on the body's normal functioning. I wonder whether we can ever demonstrate how any

nutrient protects against diseases or causes them. The way the body works is so wildly complex.'

But have you got a better idea of how the body normally works?

'Yes, we are making progress on that. A nice example is the work of my colleague Lydia Afman. She discovered that in people on a diet containing saturated fats, genes were switched on that are active in inflammation processes. This didn't happen at all in people who ate equal amounts of unsaturated fats. A very significant result. The hypothesis is that this kind of diet increases the risk of diseases such as diabetes or cancer. We are researching it now for diabetes.'

What do you hope to achieve in the next few years?

'We hope to obtain some rock-solid scientific findings. Things that will get into the textbooks and never be dropped from them again. Then you have really left a legacy, I think.'

Isn't that what everyone wants? Why do you emphasize that so much?

'Because I'm worried about developments in our field. A lot of research results that get published in leading journals like *Nature* and *Cell* turn out not to be replicable or even to be wrong. An article in *Nature* in 2006 claimed that glucose controlled cells through a particular receptor. Now everyone knows that is not how it works, but the paper has never been retracted. That is very confusing and undermines the authority of our discipline. That really bothers me a lot. There is too much pressure to publish in top journals.'

How can that development be stopped?

'By putting up resistance. That is relatively easy for me, I have a permanent post. Young people don't always have any choice. They won't get anywhere without impressive results. We must protect them and allow them the time to do thorough research. We must build solid houses rather than straw facades.'

Years ago, the impression was created that we would soon be getting personalized dietary recommendations based on genetic data. What's your view on that?

'We have never invested in that kind of research and in the end, nothing much came of it. I do think there is a future for portable techniques such as a plaster with a little needle on your upper arm, which continuously

measures substances in your blood. They can keep consumers and patients informed about their physical health status. We are trying to work on that now. Perhaps we can benefit from the arrival of the Belgian research institute Imec in Wageningen. The scientists there are specialists in these techniques.' ■

