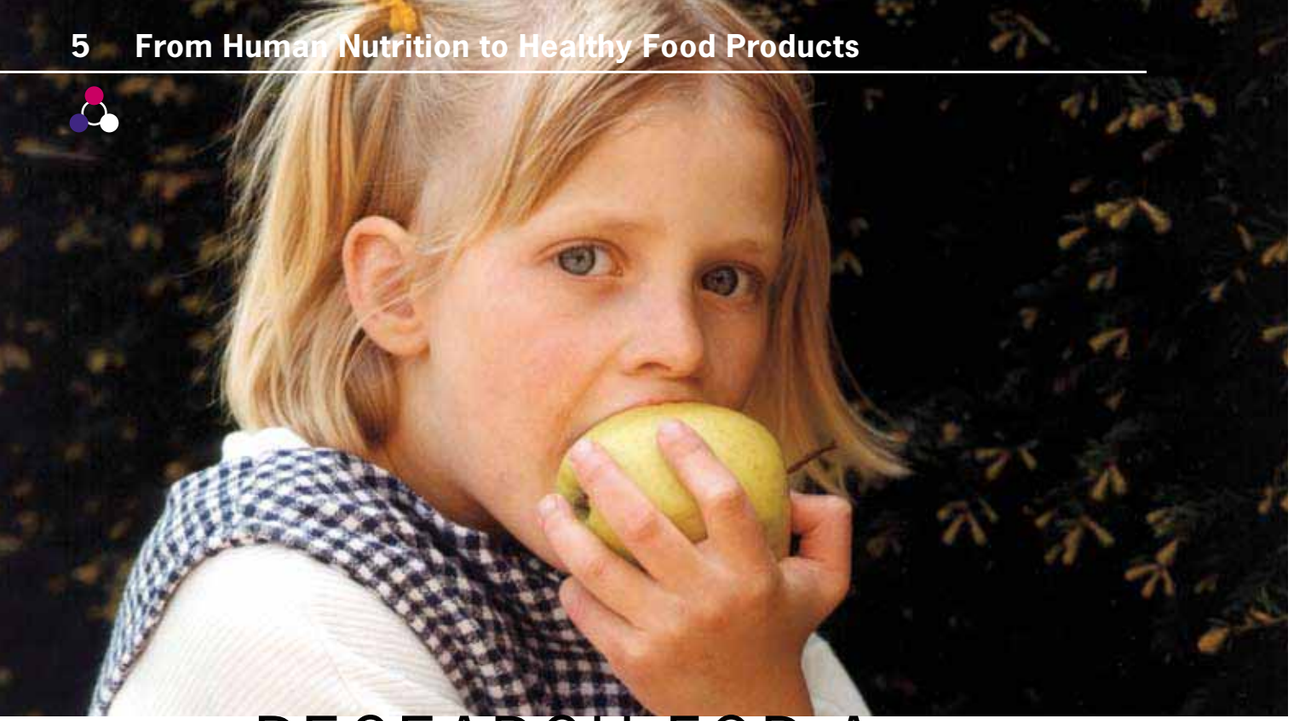


RESEARCH FOR A HEALTHY NUTRITION

According to Wageningen University scientists, the elderly benefit mentally from additional B-vitamins

'The Wageningen research on nutrition and health is unique,' says Professor Frans Kok of the Division of Human Nutrition. 'In our work, we try to approach nutrition issues on three different levels: Cellular, Individual and Population. This multidisciplinary approach is exclusive to Wageningen.'

Cellular – Individual – Population

A fine example of the Wageningen nutrition research on a cellular level are the studies by Professor Michael Müller and his colleagues into PPARs. A PPAR is a molecular sensor which warns cells that fatty acids are nearby. It is sensitive to the poly-unsaturated fatty acids in our food – especially those in fish. This line of research helps us to better understand why a diet with a relatively high level of unsaturated fatty acids is healthy and why food with excessive amounts of saturated fatty acids poses a risk. It seems that the human body stores and burns healthy unsaturated fatty acids more easily than the unhealthy saturated fatty acids.

The Wageningen research into fatty acids and health is based on a tradition that can be traced to the 1970s. Back then Wageningen scientists proved that the saturated fatty acids which we mostly ingest from animal products raise the level of the bad LDL-cholesterol. The strongest cholesterol-increasing factor was found in trans fats, which used to be in margarines and can still be found in cookies and pastry.

'In this research we investigated the health effects on an individual level,' Kok tells us. 'And we still do so today. For instance, we are currently investigating how parents can stimulate their children to eat vegetables. It is not easy: the aversion to the bitter taste of many vegetables is probably for a large part based on genetics. Many toxic substances in nature taste bitter and we have many taste buds in our mouth warning us against bitter-tasting substances.'

Another research project at the level of the individual organism concerns the need for elderly people in nursing homes to receive extra vitamins. Shortages of vitamins D and B12 occur in this group on a large scale. Wageningen nutritionists published a study in The Lancet which proved that the elderly benefited mentally from additional B-vitamins.

On a population level, the Division of Human Nutrition conducts large epidemiological studies such as the research into the lifestyle factors that raise blood pressure. These studies confirmed that dietary fibre and potassium in vegetables and fruit lower blood pressure, while sodium in the form of kitchen salt raises it.

It cuts both ways

'The idea that you can impact your health by eating healthily only really started to sink in with the general public over the last decade,' Kok continues. 'This consciousness cuts both ways. On the one hand this means unmistakable support for nutrition research. Companies are more interested in what we do as they wish to create healthier products. On the other hand, we must be careful not to exaggerate the promotion of foods with added ingredients as this could jeopardise the credibility of the nutrition sciences.'

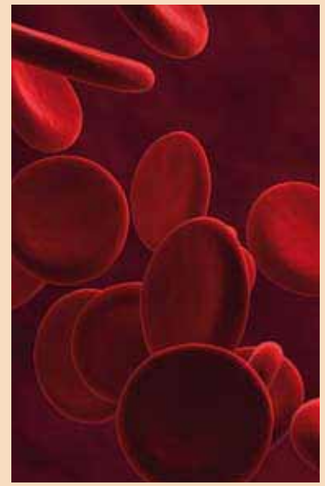
Professor Daan Kromhout, also affiliated with the Human Nutrition division and vice-president of the Health Council of the Netherlands, cites the example of tomato products with added lycopene. 'Lycopene is a compound in the cell wall of tomatoes, and epidemiological studies have indicated that it may offer protection against prostate cancer. Scientists have shown that you absorb

Below **Blood cells flowing through an artery**

Improving products

If a consensus is reached among nutrition scientists that food compounds such as flavonoids, lycopene or glucosinolates indeed protect people's health, Wageningen food scientists have the processes ready for use.

Professor Tiny van Boekel's Product Design and Quality Management group developed a new type of apple juice, for instance, with a much higher flavonoid content than normal. While flavonoids are largely discarded in the production process of normal apple juice, recent studies suggest that they might reduce the risk of cardiovascular diseases. However, as always, the key issue remains that sufficient evidence must be available that a given substance has a significant effect on health.



Upper left **Chef Pierre Wind gives tasting lessons to primary school children**

Below left **Meals in a care facility**

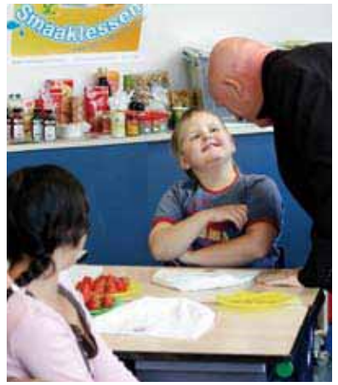
more lycopene if the tomatoes are processed as tomato juice or puree. However, it has not convincingly been shown that you have a low risk of prostate cancer if you consume more of these products. Nonetheless, food companies and technologists who try to make their products healthier emphasise this epidemiological connection. They produce products with more lycopene, while the foundation for the product's effectiveness has yet to be established.'

For the prevention of chronic diseases the emphasis should be on the dietary pattern not on individual nutrients or foods

Kromhout and Kok have warned against these and similar products. Kok urged manufacturers of margarines with fatty acids from fish to be more careful with their advertising campaigns. 'The manufacturers suggest that these margarines are good for the cognitive development of children. If consumers later read in the papers that these *improved* products they spent so much money on are not so favourable after all, the credibility of nutrition science will be damaged.'

Guidelines for a Healthy Diet

Another issue of concern is that products with added nutrients start from a reductionistic perspective: focusing on the effects of a single ingredient on a person's health. This ignores the fact that the total dietary pattern is far more important in terms of overall health, as Kromhout explains. 'Our research showed that the Mediterranean diet, for instance, is healthy and offers a longer life expectancy for the elderly. Scientists from our group published an article on this subject in the Journal of the American Medical Association in 2004.'



What a healthy diet should look like according to current scientific insights is further emphasised by the revised Guidelines for a Healthy Diet published by the Health Council of the Netherlands in 2006. Wageningen scientists played a prominent part in the development of these guidelines.

This does not, however, mean that nutrition science cannot provide the food industry with important insights. 'It is certainly worthwhile to optimise the composition of foods,' Kromhout says. 'But rather than adding ingredients with unproven health effects, we would be better off producing dairy and meat products with less salt and saturated fat; bread, soups and pizzas with less salt; and ready-to-eat meals with less salt and more vegetables. This should be the priority.'

Developing countries

Different nutritional problems prevail in developing countries, as Kok explains: 'Our group has been working in Africa and Asia for decades. In those countries we see a so-called double burden: in large cities there is a growing epidemic of obesity, but in the rural areas we still encounter major deficiencies of key nutrients.'

African girl with maize flour at a market stall

Wageningen scientists help the countries concerned with analysing the situation and finding solutions. An example is a recent PhD research project that was performed in Kenya and published in The Lancet in 2007. With financial support from Unilever, a study was carried out among schoolchildren who did not ingest sufficient iron. These children were given iron-EDTA – an iron supplement developed by Akzo-Nobel. This type of iron is better absorbed in the human body. 'The diet of Africans contains relatively high levels of phytates,' Kok says. 'Phytates form a complex with iron, which is poorly absorbed. EDTA, however, forms a compound with iron, which improves the bio-availability.'
Enriched nutrients can have excellent effects in different areas. Kok continues: 'Iron is essential for a wide range of bodily functions. Children need iron for their mental development, among other things. The main reason for failing to introduce such products in poor regions in Africa and Asia is money. It is such a waste that we fight expensive wars while the money could be used in so many better ways.'

More important matters

After Professor Jo Hautvast came to Wageningen from Nijmegen in 1972 to lead the current department of Human Nutrition, he altered the course of Wageningen nutrition research. 'In those days, Wageningen scientists were working on the flavour of the tomato,' Hautvast says. 'That wasn't my cup of tea. I had been the director of a hospital in Tanzania and the nutrition problems I encountered there were much more important than researching the flavour of a tomato.' Hautvast was equally resolute in the early 1990s. When he gave the Foundation Day speech of the University, he foresaw the establishment of a Dutch Food Valley in which scientists and the food industry worked together for better tasting, safer and healthier nutrition. 'We really need this Food Valley,' Hautvast stated. 'Because, let's be realistic, the food industry is what keeps the Dutch economy afloat.' Although not everyone agreed with him at the time, the Food Valley is now a fact.