



Vigorous to the last



**How can we age healthily?
Sport and extra protein help,
shows research from the
Human Nutrition department.
As for the effects of vitamin
supplements and omega 3 fatty
acids, the jury is still out.**

TEXT ASTRID SMIT PHOTOGRAPHY HOLLANDSE HOOGTE

We are getting older with every generation. In 1950 the average life expectancy was around 70 years, it is now around 80 and one third of the children being born now are expected to live to be 100 or more. These projections were published by the Dutch Interdisciplinary Demographic Institute at the end of September. Good prospects for the Dutch, then. At least, they are good if old age is accompanied by vitality and wellbeing: not shuffling after a Zimmer frame but jogging through the park or going Nordic walking along the beach.

But how can we make sure it goes that way? What elixir of life do we need? Of course it is partly a matter of having the right genes and a generous helping of good luck. But lifestyle and nutrition can also do their bit, and those are things you have some influence over. The department of Human Nutrition at Wageningen University, part of Wageningen UR, has been trying to determine systematically which nutrients help to keep us vital, protect our bones from becoming fragile and keep our minds sharp.

Michael Tieland has given away some clues over recent years. He does research on how loss of muscle mass and strength – sarcopenia – can be prevented or slowed by the right nutrition. ‘From the age of 30 you lose 0.5 percent of your muscle mass every year, and double that between the age of 65 and 70. We don’t know why yet,’ says Tieland. ‘The striking thing is that even fit elderly people who get a lot of exercise lose muscle mass.’

In his doctoral research, which he completed this summer, Tieland tested whether fragile seniors – pensioners who need support and are often unable to live alone – function better physically if they consume extra protein with one of their meals for six months. This appeared to be the case: they found it easier to get in and out of a chair, their balance was better and they walked >

faster than the seniors in the placebo group who did not get extra protein. But their muscle mass did not actually increase.

In a second experiment Tieland tested the effect of extra protein in combination with strength training. These test subjects exercised twice a week on special apparatus. And this did have a clear effect on their muscle mass, which increased by as much as 1.3 kilos in 24 weeks. Their muscle strength increased too: both the group receiving extra protein and the placebo group (who did the strength training as well) gained 40 percent more muscular strength. 'So you can achieve a big effect in just a short time,' says Tieland. 'Now we want to find out how we can improve muscle mass in the long term.'

TWENTY RESEARCHERS

Human Nutrition first ventured into the territory of nutrition and health 25 years ago by appointing a professor in the subject – Wija van Staveren – and several PhD students and postdocs. Now at least 20 researchers are working on the topic, among them Lisette de Groot, who succeeded Van Staveren in 2006 as professor of Nutrition and Ageing. The European epidemiological Seneca study launched by Human Nutrition and other European nutrition scientists in 1988 still provides key pointers in this field, says De Groot. 'In that study we analysed the health and nutritional status of 2600 European seniors.' One of the findings was that three quarters of the test subjects felt fit and got enough to eat. Nevertheless, 70 percent of them had one or more chronic disease (such as diabetes or arthritis), 40 percent of them experienced difficulties carrying out routine daily activities (such as shopping or walking upstairs), and osteoporosis, or slow bone loss, was present in 6 percent of the men and 18 percent of the women. At least 10 percent of the seniors also had memory problems. 'It was striking, too, that 40 percent of the Seneca seniors had too little vitamin D in their blood and 25 percent had too little vitamin B12,' says De Groot. These are factors which other studies have linked with suboptimal functioning of the brain, more brittle bones and declining muscle mass and strength.

MENTAL PERFORMANCE

'Partly because of the results of the Seneca study,' says De Groot, 'we have decided to focus on themes such as osteoporosis, cognitive decline and loss of muscle mass and strength. These are symptoms of aging which you can do something about through nutrition –

'The striking thing is that even elderly people who get a lot of exercise lose muscle mass.'

at least, that is what we expect.'

Human Nutrition is now testing this hypothesis by means of intervention studies: experiments on the effect of certain nutrients under controlled conditions. Among the studies, Ondine van de Rest's PhD research examined to what extent omega 3 fatty acids from fish can aid the ageing brain. The hypothesis was that it could slow memory loss and reduce depression. This link has been found by various epidemiological studies such as the Seneca one, and by a few experimental studies. Van de Rest conducted several experiments with a view to gaining greater clarity on this point. She looked at the extent to which taking capsules with high or low doses of fish oil had an effect on the mental performance of Dutch seniors, she examined the correlation between the amount of fish consumed by elderly American men and their cognitive performance, and she studied the link between symptoms of depression and fish intake. Sadly, none of the studies brought out a clear significant difference.

Van de Rest: 'That was disappointing. When I started on my research, almost everyone was convinced that omega 3 fatty acids had a positive effect on the brain. Perhaps the problem is with the setup of my experiment. I studied relatively healthy elderly people. Perhaps they were 'too healthy' to be able to quantify a difference.'

AGEING BRAIN

The research on omega 3 fatty acids is now on hold, in anticipation of the approval of research proposals. But the search for a link between nutrition and cognition goes on. Two PhD students are currently studying how much of a role vitamins can play in counteracting



NOT ENOUGH VITAMIN D AND B12

It is not entirely clear why a large proportion of elderly people have low levels of vitamin D and vitamin B12. 'A vitamin B12 shortage could arise because old people suffer more often from gastritis, an inflammation of the lining of the stomach,' says Professor Lisette de Groot. The inflammation of the stomach changes the pH, reducing the availability of B12, which is usually bound to protein in food. 'We don't know why older people suffer from gastritis more often, but the use of medicines could play a role. There is a suspicion that the elderly suffer from more inflammatory diseases in general, without noticing it themselves.'

A shortage of vitamin D occurs for other reasons. We get about one third of our vitamin D from our food, and the other 70 percent is made by the skin with the help of sunlight. But the aging skin makes four times less vitamin D than the youthful skin. 'That is why even healthy old people can still develop a shortage of vitamin D,' says De Groot.

deterioration in the ageing brain. 'The brain is full of vitamin D receptors, proteins which can bind themselves to vitamin D. They are not there for nothing. Epidemiological research shows that people with normal levels of vitamin D perform better cognitively than those with a low vitamin D status. Vitamin B12 and folic acid play an important role in the brain as well, according to epidemiological research,' says Van de Rest, now a senior researcher who supervises PhD students. The results of these studies are now being analysed so the conclusions are still unknown. But even if they prove disappointing, Van de Rest will not give up. 'Then we can look for the answers in the synergy between all these nutrients. Perhaps the combination of omega 3 fatty acids, vitamin B12 and vitamin D does slow down cognitive decline. This combination would also be a more accurate reflection of our everyday diet.' Human Nutrition is not only studying the effect of vitamin B12 and folic acid on the brain, but is also looking into their effect on osteoporosis, the gradual loss of calcium from the bones which takes place in old age.

MUSCLE MASS IS IMPORTANT

Michael Tieland's involvement in research on muscle mass did not stop once he got his doctorate. Increasing muscle mass is not just crucial for the mobility of the elderly, says Tieland, but also for the way the whole of the body functions. 'Most people do not realize that muscle mass is an important metabolic organ. Food reserves are stored in the muscles, and you can draw on these reserves in times of illness.' Tieland – now a postdoc and supervisor of PhD students – is now studying the extent to which vitamin D influences muscle function and mass. His own literature review – the last component of his PhD research – showed that seniors with a low vitamin D status functioned less well physically. 'Vitamin D is a hot item at the moment in the research on vitality among the elderly. Expectations are high, especially in relation to muscle mass,' says Tieland. 'It's very exciting.'

And so for the researchers at Human Nutrition, the search for the elixir of life for the elderly goes on. It is one gigantic puzzle, but eventually they will find out what the aging person needs in order to remain vital for as long as possible. And it will not necessarily be a packet of vitamin pills or high protein drinks. 'I think that the elderly already stay very fit by just following general nutritional guidelines, and the diet of many Dutch seniors does not meet those standards,' says De Groot. ■

www.wageningenur.nl/healthyageing