Maastricht University (UM) has landed two Vici grants: one for professor Christian Weber's arteriosclerosis research, and one for professor Karin Bijsterveld's historical 'listening' study. Valued at €1.25 million, Vici is the most important grant on offer through the 'Renewal Impulse' (Vernieuwingsimpuls) of the Netherlands Organisation for Scientific Research (NWO).

Vici grants

for arteriosclerosis and sound research

By Femke Kools and Lucia Geurts

Christian Weber holds the Molecular Cardiology chair at RWTH Aachen University and a professorship at UM's School for Cardiovascular Diseases (CARIM). He was awarded the Vici grant for his project proposal 'Putting the brakes on arteriosclerosis'.

Malfunction

A healthy body has a very clever mechanism for clearing out detrimental substances. For instance, if there is too much fat in the blood vessels, white blood cells (macrophages) will actually eat this excess fat. "You can already see this in babies who drink fatty mother's milk", says Weber. "If everything goes according to plan, the macrophages simply do their job and then disappear again." Macrophages are controlled by chemokines, which are small proteins. The problem arises when these chemokines tell the macrophages to settle in the vascular wall instead of disappearing from the blood vessel. The macrophages form plaques, which may cause clots that roam around through the bloodstream. A blood clot can become so big that it closes off the entire blood vessel, exactly where the plaque is. The consequence: a heart attack, a stroke or a pulmonary embolism. Scientists have the important task of finding out why those chemokines give off the wrong signals, and how this can be prevented. "Of course you can fight them with antibodies", Weber suggests, "but this will also affect the good signals that chemokines give off. As a side effect, the immune system will stop functioning. So we're on the hunt for a treatment that eliminates the bad qualities of the chemokines, but not the good ones."


Christian Weber

Heteromers

There are approximately 50 chemokines. Why so many? Do these proteins all have a specific task or function? Weber and his colleagues published an article on this in the scientific journal Nature Medicine: "Certain chemokines appear to reinforce one another; they have what you might call a synergetic interaction. They form the compound units known as 'heteromers'. In certain infections, for instance, a cocktail of ten chemokines is active. We focus on these heteromers. First we analyse their structure, then we add peptides. Peptides are molecules that can serve as a building block for proteins. The key is to establish where in the structure those peptides are active. The ultimate goal is to fight and prevent arteriosclerosis."

Industry

The first results are positive and the industry has shown interest, according to Weber. "We've set up a small business called Carolus Therapeutics. It's important that we capture the peptides in small molecular units, wrapped in a synthetic structure. From there, the step to actually creating a medication is a very small one. We're still doing tests on mice, and the preliminary results are looking good. We hope to do our first tests on humans in 2011."
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Karin Bijsterveld is professor of Science, Technology and Modern Culture at the Faculty of Arts and Social Sciences. She has received a Vici grant for her research project 'Sonic Skills: Sound and Listening in the Development of Science, Technology and Medicine (1929-Now)'.


Karin Bijsterveld

She systematically studies where listening has been used in science, from the 1920s onwards. She also looks at what the results were, and when 'sonification' was replaced again with visual data. "The development of the stethoscope has been closely linked with the development of knowledge about lung diseases. But when doctors talk with their colleagues, visual representation tends to be prioritised again. Why is this visualisation so important in science?"
Karin Bijsterveld has long been fascinated by the phenomenon of 'sonification': the presentation of complex datasets in sound rather than in tables or graphs. The supporters of sonification form a small but growing group in the academic world. "Sonification puts the basic values in science up for debate", says Bijsterveld. "It's interesting to see where sonification can be used and why it has emerged again."
Her study focuses on four different listening methods, including 'diagnostic listening'. "What skills do you need for the various types of listening? What new knowledge does it yield, and why is listening often replaced with visuals? What role does technology play in this? We look at that in the Netherlands, England, the United States and Germany."

Engineers and car mechanics

The study has been set up in a broad and very systematic manner. To find out what role listening played in different areas at different times, the researchers will focus on things like trade magazines for engineers and car mechanics. "There, they discuss among themselves how they listen; they describe how noises sound and what they might mean. And we plan to talk with 'experience experts' from different fields and periods of time. In the hospital you have patient handover reports, in laboratories you have log books, and ornithologists for example use journals."

Sound designers

With this research, Bijsterveld hopes to offer new insights into the history of scientific innovation, but also into everyday sound innovation. The research team is collaborating with sound designers. "Loud sounds are associated with power. Some designers want to move away from this, but are finding it hard to have their approach accepted. For example: The prevailing attitude is that 'if a car doesn't make much sound, it can't possibly drive fast'. This is culturally determined: we learned it this way. It's important to have more insight into this."
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