

Malaria mosquitoes guided by bacteria

December 8 2010, By Albert Sikkema

The composition of our skin bacteria determines whether we are attractive to malaria mosquito. This insight should make it possible to develop an effective odor trap for mosquitoes.

The various species of bacteria on our skins turn sweat into specific odors which [malaria](#) mosquitoes recognise with great precision. Staphylococci are attractive to the malaria mosquito, whereas pseudomonas bacteria are less so. The more different types of skin bacteria you harbor, the more attractive you are to the mosquito. This discovery was made by PhD researcher Niels Verhulst.

The characteristic odor of human sweat does not consist of sweat alone, explains Verhulst. People only begin to stink once the skin bacteria have got to work on the sweat - that is why you do not smell sweat straightaway.

Sweat odor

Verhulst tested how mosquitoes reacted to five skin bacteria, both in Wageningen and in Kenya. He then tested the sweat odor of 48 volunteers on the [Anopheles gambiae](#) mosquito. One skin bacterium - the pseudomonas - did not attract a single mosquito. The other four all generate odors that attract mosquitoes, Verhulst discovered. In order to find out which odors made the sweat so attractive, Verhulst had odour analyses done in Germany. About fifteen odors were identified. It is hoped that further research in Kenya will reveal for each bacterium which odors attract the mosquitoes.

Gates

The Gates Foundation funds Verhulst's research. The aim is to develop an odor trap for mosquitoes. A handful of odors that lure mosquitoes into a trap have already been identified, but they are not successful enough. The mosquitoes still prefer human sweat to these isolated odors. 'We now have a few odors that work well', says Verhulst. 'We keep on adding odours to these top candidates, and then the mosquitoes let us know which odor they find most attractive. Like this we hope to get a more and more complex and effective blend.'

A human being (plus skin bacteria) produces about 300 different odors. Getting the right combination of these odors for an odour trap is a tricky job. One [bacterium](#) produces about fifteen odors. So it seems easier to create an odor blend via the five skin bacteria.

Genetic

Verhulst has also researched whether our attractiveness for mosquitoes is genetically based. Previous research had shown that genes determine our odour profile. If women smell the T shirts of ten men, they pick out the one belonging to the man with the gene profile the most different to their own. Could the same process be at work among mosquitoes? Verhulst has evidence that one particular gene corresponds strongly with our attractiveness to [mosquitoes](#), but the correlation fell just short of statistical significance.

Provided by Wageningen University

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