

Mosquitoes -- how we smell is why they bite, research shows

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Now that the summer season is in full swing, many of us will be hosting picnics and barbecues and socializing outside. Chances are, we'll also have some unwanted guests in the form of mosquitoes.

Mosquitoes seem to have an uncanny ability to locate us and Zainulabeuddin Syed, a mosquito biologist with the University of Notre Dame's Eck Institute for [Global Health](#), has gone a long way toward to determining how they do it.

In short, it's because of the way we smell.

Zain studies olfaction in [mosquitoes](#) and other insects and he points out that mosquitoes have an extraordinary [sense of smell](#). A big part of their brains are devoted to this sense. Only female mosquitoes feed on blood meals and they use the blood to produce eggs. And female mosquitoes find their blood meals through the use of smell.

For example, *Culex* mosquitoes, which transmit West Nile and other life-threatening illnesses, are able to detect even minute concentrations of nonanal, a [chemical substance](#) given off by humans. They detect nonanal through [receptor neurons](#) on their [antennae](#). Birds are the main hosts of mosquitoes and they also give off nonanal. Birds are the main source of the [West Nile virus](#) and when mosquitoes move on to feast on humans and other species, they transmit the virus to them.

An understanding of the olfactory behavior of mosquitoes that leads

them to feed on humans can play an important role in developing more effective methods of mosquito and disease control.

Syed is also researching the role that plants play in mosquito behavior. He points out that despite our occasional feeling that we're surrounded by hordes of hungry mosquitoes, they spend a relatively short amount of time feeding. Rather, they spend considerable time on plants taking the sugars that provide energy for those occasions when they do feed.

The Notre Dame researcher's lab is studying what smells plants that mosquitoes are attracted to give off. Again, a deeper understanding of the role of the chemicals produced by plants and how mosquitoes select plants to obtain their energy sources can lead to better control and elimination strategies.

Syed points out that DEET still is an effective mosquito repellent and he was one of a team of researchers who revised the conventional understanding of how it works. The prevailing wisdom among researchers was that DEET was effective because it masked odors that attract mosquitoes. However, research by Syed and his colleagues showed that mosquitoes smell DEET directly and avoid it.

For many of us, better mosquito control techniques would result in greater comfort and convenience when we're outdoors. In many areas of the world, however, mosquito control is a matter of life and death. In Africa alone, malaria, one of the many diseases transmitted by mosquitoes, takes a human life, most frequently a child's, every 30 seconds. A better understanding of the role smell plays in mosquito behavior can offer important clues that may lead to new control strategies.

Provided by University of Notre Dame

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