**Mosquito Biology Group Finds Important Pathway for Human Detection**

A recent study conducted by Matthew DeGennaro, a neurogeneticist from Florida International University in Miami, discovered a potential sensory pathway that is essential to for mosquitos to detect humans. DeGennaro says that, “These olfactory receptors are important for mosquitos to detect humans.”

This research opens up a world of possibilities in the future of mosquito repellant and disease control. The further understandings of mosquito detection pathways allow scientists to find compounds that “hide” humans from mosquitos at a molecular level. Furthermore, this research continues to push the boundaries of understanding these vectors for infectious disease, which could produce larger clinical results in countries with lack of proper medication and resources to prevent disease spread.

DeGennaro and his team conducted this investigation through a comparison of female mosquitos with the IR8a pathway and modified female mosquitos without it. The team used CRISPR techniques, a genetic editing process, to modify the mosquitos, then tested the two groups on their ability to detect lactic acid—a main component of human sweat.

The scientists placed the mosquitos at the end of a long tube with the odorant source released on the other end of the tube. The number of mosquitos drawn to this side indicated the number attracted by the odorant. The variables of this study modified the odorants present, the genetic variant of mosquito, and the presence of carbon dioxide.

Wild-type mosquitos were not attracted to the odorant side of the tank when no odorant or just CO2 was present. Secondly, the CRISP variant groups showed no signals of attraction to the odorant side even with CO2 and lactic acid present (as opposed to the wild-type which showed the most attraction of all the groups).

The study suggests that the IR8a pathway is vital for mosquito detection. The team believes these findings could carry impactful clinical results. Compounds could be targeted as potential repellants. “The repellant odors that we would search for would work by blocking this pathway. And we hope that these compounds that we would identify would be useful to either supplement the current repellants we have and make them more effective or be part of a whole new next generation repellant” says DeGennaro.

Another mosquito biologist in the field, Lawrence Zweibel of Vanderbilt University in Nashville, Tennessee, also believes in the clinical importance of this research. He says about this pathway, “If you had a tool that you knew was targeting a gene that was not found in anything other than your target, that would give you a good starting point at least to say it might not be toxic to people.”

However, Zweibel also has hesitations on the full ability of this study. He says, “They’re very important obviously in the role they play in the things that were discussed in [DeGennaro’s] paper but it’s also important to know that because they’re so conserved to [receptors in our brain], probably targeting these ionotropic receptors is not going to be a good idea for mosquito control. A molecule that is likely to target that 8a receptor might also unfortunately turn out to have neurological effects. It might not, but it’s just an additional barrier to developing a tool.”

The research group plans to continue to understand more about the IR8a pathway and start searching for compatible components in future studies.

Raji, J. I., Melo, N., Castillo, J. S., Gonzalez, S., Saldana, V., Stensmyr, M. C., & DeGennaro, M. (2019). Aedes aegypti Mosquitoes Detect Acidic Volatiles Found in Human Odor Using the IR8a Pathway. *Current Biology*. https://doi.org/10.1016/j.cub.2019.02.045