Using a locust's brain and antennae to detect mouth cancer

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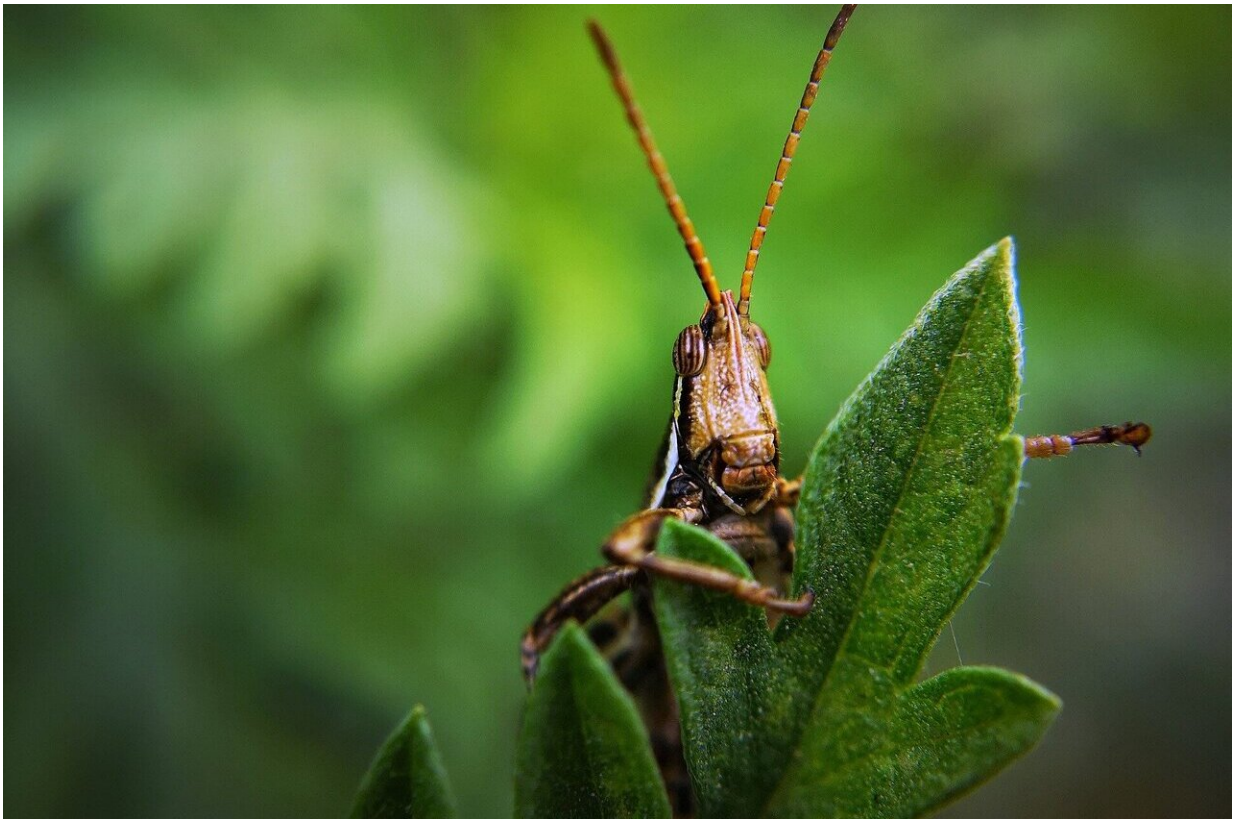

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A team of researchers at Michigan State University has found a way to use a locust's brain and antennae to sniff out mouth cancer. Their work has not yet been peer-reviewed, but they have posted a paper describing

their work on the *bioRxiv* preprint server.

Prior research has shown that some animals, such as dogs, can smell the changes in chemicals that are emitted when humans perspire or breathe out. Dogs were tested for use in detecting COVID-19 in people, for example. But raising, training and keeping dogs for such work involves a lot of time and effort. In this new effort, the researchers wondered if such work could be done more efficiently using a different creature known to have a keen sense of smell—the locust.

Locusts are a type of grasshopper typically found in the tropics. In addition to their long bodies and jumping legs, they have large antennae they use for detecting chemical changes in the air around them. The researchers in this new effort took advantage of that ability. They surgically implanted probes into the brains of several live specimens to allow them to record brain wave patterns as the bugs were introduced to gases coming off cancer specimens grown in a jar.

More specifically, they were exposed to gases emitted from three types of mouth cancer growing in human tissue. As the gases were introduced to the antennae, the brain waves of the locusts were recorded. After many rounds of testing, the researchers found that they were able to detect and recognize different brain wave patterns as the locusts were exposed to the different kinds of cancer—and a control group of mouth cells that were non-cancerous. The researchers note that their effort is the first to use a living insect brain to detect cancer.

The researchers also note that their method requires using six to ten locusts to get signals that are clear enough to use as a cancer detection system. They plan to continue with their work, hoping to narrow that down to just one locust brain. Doing so, they suggest, could allow their system to become portable.

More information: Alexander Farnum et al, Harnessing insect olfactory neural circuits for noninvasive detection of human cancer, *BioRxiv* (2022). DOI: 10.1101/2022.05.24.493311