

# Flies' evasive move traced to sensory neurons

**When fruit fly larvae are poked or prodded, they fold themselves up and corkscrew their bodies around, a behavior that appears to be the young insects' equivalent of a "judo move," say researchers reporting online on November 29th in the journal , a publication of Cell Press. They now trace that rolling behavior to neurons resembling those that sense pain.**

The larvae display the same rolling behavior when attacked by tiny parasitoid wasps, the new report also shows, occasionally even managing to flip their assailants onto their backs. Those parasitoid wasps will lay eggs inside fly larvae. When the eggs hatch, the larval wasps devour the fly young from the inside out.

"We have identified a specific set of sensory neurons in the fly larva whose function is to protect the animal from injurious things in the environment," said W. Daniel Tracey of Duke University Medical Center. "These neurons look a lot like our own sensory neurons that trigger painful sensations when we encounter potentially tissue-damaging heat, mechanical or chemical stimuli."

Nonetheless, Tracey said, they "really don't think" that insects feel pain. Rather, it reveals that the larval nervous system has circuitry that encodes an innate escape behavior—probably more akin to a reflex, as occurs when a person touches a hot stove. In that case, the hand pulls away before any pain is actually felt.

The researchers earlier found that noxious heat or mechanical stimulation triggered the larvae to roll, a motion completely distinct from that the insects otherwise use to get around. In the new study, Tracey's group used a "genetic trick" to turn neurons on and off by using pulses of blue light. That allowed them to zero in on the specific sensory neurons that triggered the escape behavior—which have very fine, highly branched nerve endings just beneath the larvae's outer surfaces.

Surprisingly, the larvae initially roll toward the offending heat or prodding, they found. That led them to suspect the move might be a defense against prevalent parasitoid wasps. Consistent with that theory, they document that larvae can escape attack of one wasp species by rolling.

The findings are a useful reminder, Tracey said: "Biologists that spend their days in the lab often view their organisms as laboratory animals. We need to remember that they come from nature. They didn't originate in plastic vials on the shelf."

Source: Cell Press

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