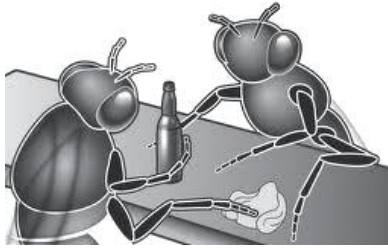


ScienceWatch – A Fly Walks into a Bar ...



“You see that the mated males actually have an aversion to the alcohol-containing food and the rejected males have a high preference to that food with alcohol.” – G. Shohat-Ophir

It’s become a film noir cliché: the rejected suitor heads for the nearest bar and drowns his sorrows in a glass of whiskey. Only now we know that flies do it too.

Writing in the March 16, 2012 issue of *Science*, a team headed by Galit Shohat-Ophir, describes a study done at the University of California, San Francisco, CA, showing that the lowly fruit fly, *Drosophila melanogaster*, responds to sexual rejection by female flies by preferentially consuming alcohol-laced food.

Drosophila, as the flies are known by biologists, has been a genetic subject for 100 years because of its fast generation time (10 days), small size and easily distinguishable characteristics. In recent decades the flies have been useful for determining the link between genes and behavior, and Dr. Shohat-Ophir continues to study the genetics and biochemistry of addictive behaviors at the Howard Hughes Medical Institute, Ashburn, VA.

The team studied the relationship between sexual rejection and alcohol consumption by subjecting male flies to two distinct sexual experiences. One group experienced three-hourly sessions each day for four days surrounded by female flies that had already mated. Each male tried to entice the females by singing with his wings, rubbing their bellies, and tapping their genitals, but failed miserably in achieving copulation. The other group was similarly placed with virgin females who were highly receptive to their advances and readily mated. Starting on day five “mated” and “rejected” males were given a choice between a normal food slurry and one laced with 15% alcohol, equivalent to 30 proof whiskey. Mated males consumed about equal amounts of both foods, while rejected males preferred four times as much whiskey. But if rejected males copulated at a later time, the alcohol preference disappeared.

The researchers already knew that a certain brain chemical (neuropeptide Y) influences alcohol consumption in mammals, and they suspected that a similar chemical in flies (neuropeptide F, NPF) might connect alcohol consumption to sexual experience. So they looked for its presence in the brain tissue of both groups of males. They found that rejected males produced barely a third of the high levels found in the brains of mated males.



Scientists know that correlations don't mean cause-and-effect. To determine a cause-and-effect relationship between NPF levels and alcohol consumption, the team performed two genetic manipulations on male flies. First they blocked the production of NPF-receptors in the brains of male flies, causing their brains to no longer receive the peptide signal. Even after mating, these males preferred the alcohol because their brains couldn't make NPF. Next they activated the NPF-producing neurons in the brains of other male flies and these males did not prefer alcohol even after rejection because their brains made it anyhow.

The authors conclude that NPF is part of a reward system in *Drosophila*. According to them, "In this model, sexual deprivation would create an NPF deficit that increases reward-seeking behavior such as ethanol consumption. Conversely, successful copulation would create an NPF surfeit that reduces reward seeking."

Since humans have a similar peptide (NPY), they conclude that *Drosophila* can serve as a model system for alcohol/drug abuse in humans.

So have you heard the one about the man who walks into a bar to drown his sorrows in a glass of NPY?

Saul Scheinbach