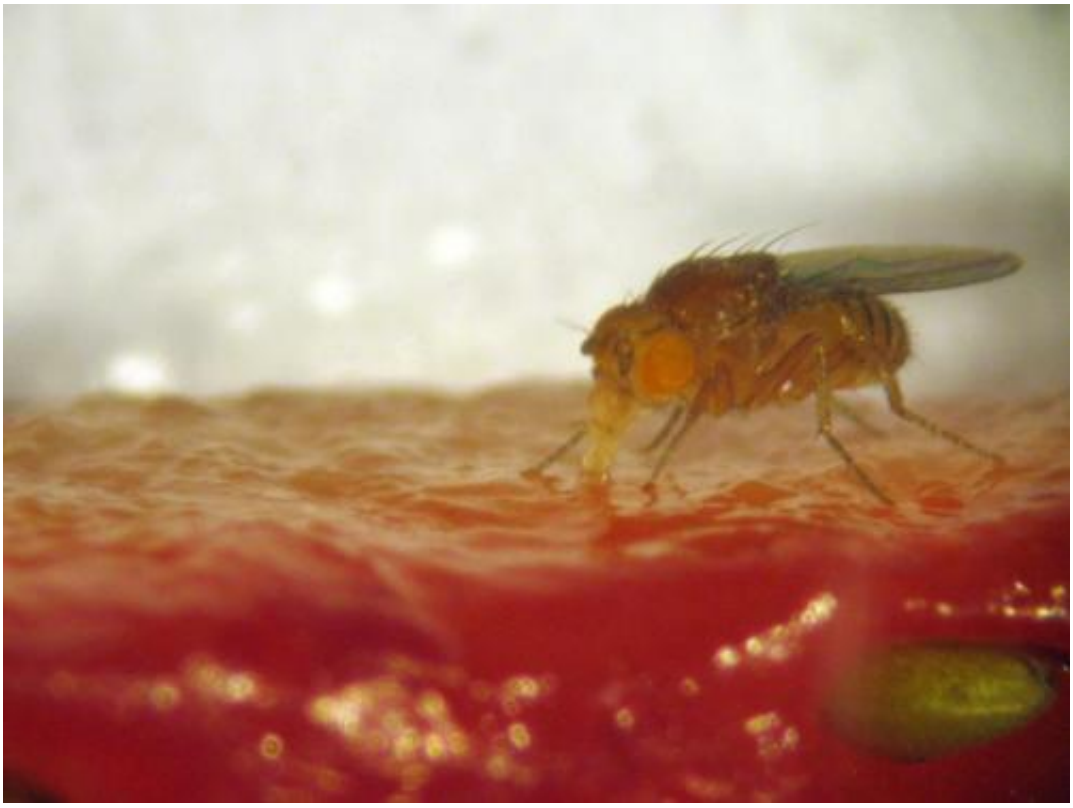
Fruit fly's 'sweet tooth' short-lived, research finds

October 16 2012



Fruit fly (Drosophila melanogaster) feeding on a strawberry. Credit: Michael Gordon, the University of British Columbia.

While flies initially prefer food with a sweet flavor, they quickly learn to opt for less sweet food sources that offer more calories and nutritional value, according to new research by University of British Columbia zoologists. The findings, published this week in the Journal of

Neuroscience, are the first to measure the shift in food preference over time, and the first to find that flies opt for nutritious food more quickly when they're hungry.

The humble fruit fly may have something to teach us about forgoing empty calories for more nutritional ones – especially when we're hungry.

While the flies initially prefer food with a sweet flavour, they quickly learn to opt for less sweet food sources that offer more calories and nutritional value, according to new research by University of British Columbia zoologists.

The findings, published this week in the *Journal of Neuroscience*, are the first to measure the shift in food preference over time, and the first to find that flies opt for nutritious food more quickly when they're hungry.

"The taste system is important for quick – often life and death – decisions about what to eat," says Michael Gordon, a UBC neurobiologist and senior author on the paper. "Typically the initial taste of sugar indicates a good source of carbohydrates, but longer-term feeding preferences integrate past experiences and learning. It appears that nutritional content is an important part of that."

"From a behavioural standpoint, it seems that mammals and flies can show similar responses to calorie sensing," adds Gordon, an assistant professor with the Department of Zoology. "But mechanistically we're still only beginning to understand how either senses the caloric value of food independently of taste after eating it."

The researchers allowed fruit flies (*Drosophila melanogaster*) to choose between sources of liquid sugar that varied in their ratios of sweetness to caloric value. In some instances it took the populations of flies as little as four hours to shift their preference towards more nutritious food sources

– typically based on sugars like sucrose, maltose and D-glucose.

Researchers also isolated several molecular pathways in a strain of flies that appear to affect taste and feeding preference and found that blocking insulin signaling increased preference for nutritious sugars.

More information:

Research Method

In addition to observing food preferences, the UBC research team also used mutant strains of fruit flies to isolate several molecular pathways that appear to affect taste and feeding preference. They found that developing a preference for caloric sugars depends on the cAMP pathway, which plays a wide array of roles in the nervous system but is best known for affecting learning and memory.

The researchers also found that blocking insulin signaling in a strain of flies increased their preference for nutritious sugars. Insulin plays important metabolic roles in both flies and mammals and is known to be regulated by feeding. The regulating of feeding behaviour by insulin signaling has also been demonstrated in mammals.

Provided by University of British Columbia