Could metabolism play a role in epilepsy?

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Dr. Kuehner and his lab have discovered that metformin, a drug commonly used to treat Type 2 diabetes, is effective in reducing seizures in seizure-prone fruit flies. Credit: *JoVE*, the *Journal of Visualized Experiments*

Researchers from the Franciscan University of Steubenville, Ohio are exploring a possible link between metabolic defects and seizures. They determined that diet could influence susceptibility to seizures, and they

have identified a common diabetes drug that could be useful in treating disorders such as epilepsy.

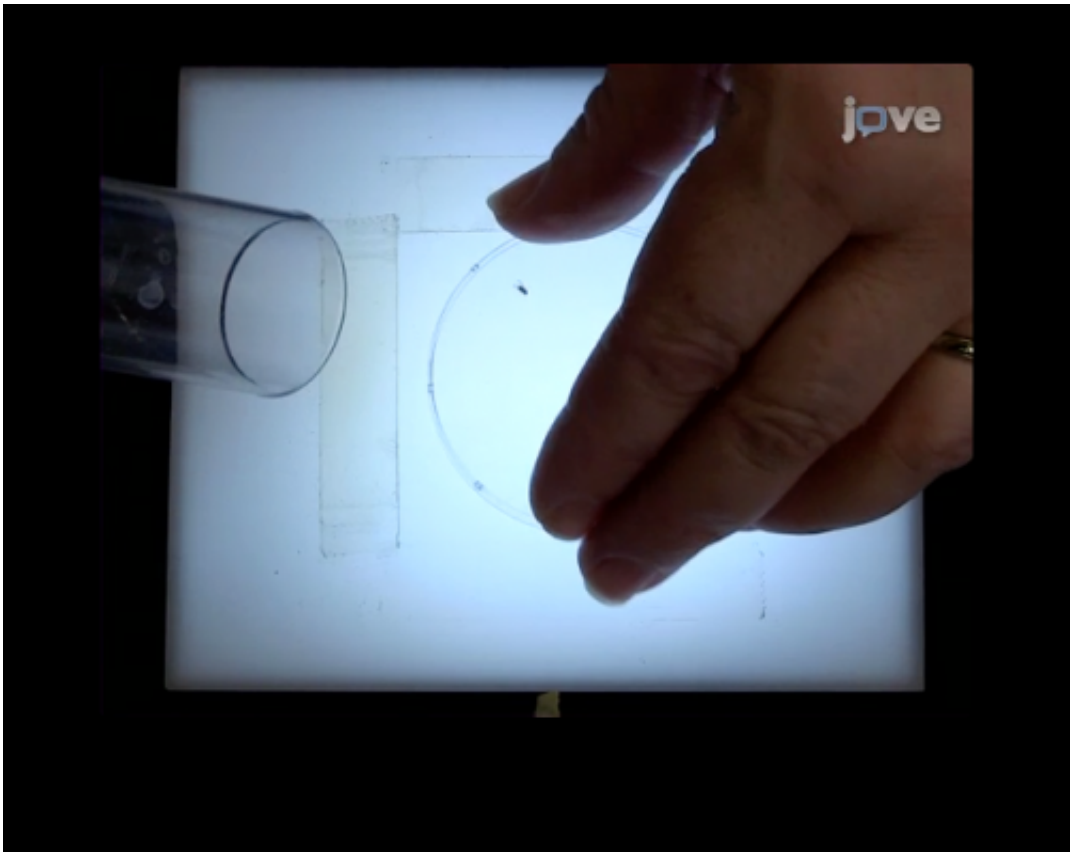
Dr. Daniel Kuebler, the principal investigator behind the experiment, and his lab made the connection by measuring fruit fly movement with inexpensive web-cams. They have published a peer-reviewed, video demonstration of their method in *JoVE*, the *Journal of Visualized Experiments*, to assist others in reproducing and further applying the method.

"This technique has allowed us to identify a number of metabolism-altering drugs that affect seizure susceptibility," said Dr. Kuebler, "It has opened up a new line of research looking at the effect dietary modifications have on seizure susceptibility." As published in the article, his lab team determined that metformin, a drug commonly used to treat type II diabetes, reduces the intensity of seizures.

The drug-screening model system is especially ideal for labs on a tight budget, said Dr. Kuebler. According to the article, "Video tracking systems have been used widely to analyze *Drosophila melanogaster* movement and detect various abnormalities in locomotive behavior. [But] while these systems can provide a wealth of behavioral information, the cost and complexity of these systems can be prohibitive for many labs." Unlike similar experiments, which study the behavior of these flies in aggregate, Dr. Kuebler and his team's approach studies fly behavior one at a time. This is beneficial in that it can determine subtle differences in behavior and seizure alterations, he said.

While there is no known trigger behind seizures in people with epilepsy, Dr. Kuebler and his lab are using their drug-screening technique to investigate potential metabolic causes—using genetically modified, seizure-prone flies (a family of *Drosophila* flies called Bang-sensitive paralytic mutants). "It is well known that certain diets, such as the

ketogenic diet, have effects on seizures, but there is little agreement on the mechanism behind this diet," said Dr. Kuebler, "This technique allows us to better address this question."



Researchers at the Franciscan University of Steubenville, Ohio, demonstrate how they use a webcam and inexpensive software to explore the effectiveness of a common diabetes drug in treating seizures. Credit: *JoVE*

Dr. Kuebler chose to publish his method in a video format because of its capacity to communicate scientific procedures better than text. "The ability to show the seizure behavior visually, [showing] exactly how the recording is done, made the journal a much more attractive option than print only journals," said Dr. Kuebler, "This low cost system is simple

enough to set up in an undergraduate teaching lab and can allow for students to do some inquiry based learning labs on a budget."

Provided by The Journal of Visualized Experiments