

Study on genetics in fruit flies leads to new method for understanding brain function

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A team of University of Oklahoma researchers studying neurobiology in fruit flies (*Drosophila*) has developed a new method for understanding brain function with potential applications in studies of human neurological diseases.

The work is carried out in the laboratory of Bing Zhang, a professor in the OU Department of Zoology, using [fruit flies](#) as a model for understanding what happens in the human brain because they share thousands of the same genes with a human.

Zhang and his students use a 'reverse engineering' approach to understand how the brain works. "If we know how cells behave in fruit flies, we may better understand how they work in humans," says Zhang. "A key experimental step to achieving this goal is to manipulate [brain cells](#) and observe their effects on animal behavior. This is usually done by targeting one or two cells at a time or a small group of cells."

How to target brain cells depends largely on advances in [genetic techniques](#) or tools. In the past 20 years, *Drosophila* researchers have developed sophisticated tools for cell and gene manipulation. However, one current and widely used method, called the GAL4/UAS system, is limited in its applicability to target small subsets of cells.

The method developed by Zhang's group takes advantage of two additional [genetic tools](#) that when used in combination with the GAL4/UAS system, greatly expands its utility. The new method

represents a significant advance, enabling researchers to now more precisely manipulate a small subset of brain cells.

Zhang stressed that Rudolf Bohm, a talented postdoctoral fellow in his laboratory, was instrumental in developing the initial ideas for this method. Furthermore, a group of highly driven and capable undergraduate students made significant contributions to the project, including Will Welch, Lindsey Goodnight, Logan Cox, Leah Henry and Tyler Gunter.

According to Zhang, "There is no limit to the types of studies that can be done using fruit flies." For example, fly neurobiologists can learn a lot about the brain in stroke patients by studying similar cell behavior in fruit flies. The same method can be applied with studies of human diseases, such as Alzheimer's or Parkinson's disease. Zhang and his colleagues even study drug and alcohol addiction in fruit flies to understand human substance addiction and abuse.

More information: An article on this study was recently published in the scientific journal, *Proceedings of the National Academy of Sciences*.

Provided by University of Oklahoma

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