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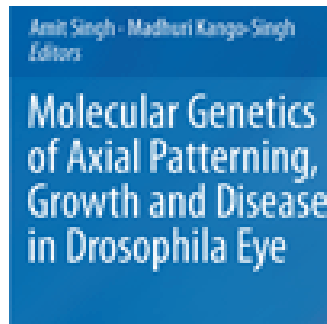
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Tiny But Mighty Fruit Fly

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Two University of Dayton biologists know a tiny fruit fly's eye may hold the key to understanding the cause and progression of diseases like Alzheimer's and cancer.

Since no one has written a book that chronicles breakthroughs in this hot research field in the last decade, they collaborated on one. Amit Singh and Madhuri Kango-Singh — a husband-wife research team — wrote a portion of the book, tapped the best minds in the field for other chapters and co-edited the newly published *Molecular Genetics of Axial Patterning, Growth and Disease in the Drosophila Eye* (Springer, 2013).

Shree Ram Singh, a scientist in the National Cancer Institute in Frederick, Md., calls the book "an outstanding contribution to the literature in eye research

The 368-page tome "provides a blueprint of future research directions and frontiers in this exciting field," he said. "It will be useful in understanding several human diseases, such as neurodegenerative diseases and cancer."

Justin Kumar, associate professor of biology at Indiana University, praised the book as "an excellent summary of eye development and disease," one that "will inform both the beginning and experienced scientist." Both Shree Ram Singh and Kumar contributed chapters in the book.

Scientists are fascinated with the *Drosophila* (fruit fly) eye because it has similar genetic traits as humans. Researchers use fruit flies to model human diseases both at the cell and molecular levels.

"Fruit flies are referred to as the Cinderella of modern genetics. Their entire life cycle is just 12 days, so, roughly, you can study at least 24 generations in a year. The genes of these flies are similar to those of humans. Therefore, what we learn from flies can be extrapolated to mice and, eventually, humans," said Amit Singh, assistant professor of biology, who is studying fruit flies to investigate early detection of Alzheimer's disease, an incurable disease that afflicts an estimated 5.4 million Americans.

Under a National Institutes of Health grant, he's also studying the genetics of fruit flies in an effort to gain a greater understanding of how birth defects happen in eyes. His wife, Madhuri, has worked with other fly researchers to identify a new network of tumor suppressant genes that they hope will shed light on how to stop the growth of cancer cells. Her research has been funded by the Knights Templar Eye Foundation.

Part of their book summarizes research milestones in the field over the last century; the rest examines how the eye of a fruit fly can be used to unravel questions about human diseases.

"How can we use the eye as a test tube to look at diseases like Parkinson's, Alzheimer's and cancer?" Amit Singh asked. "How do we draw the common thread?"

Springer, an international scientific, technical and medical publisher, approached the Singhs two years ago about producing a book. They delayed jumping in for about a year because of the amount of time it would take away from their own research.

"It didn't sound like an easy task," Madhuri Kango-Singh said with a laugh. "To make it bite-sized was a real challenge."

The initial response to the book is strong, with pre-orders running high. "In our field, this book is big," Amit Singh said.

With the book now behind them, the Singhs are turning their attention back to the lab, where they work with 1,500 strains of fruit flies. They conduct research with more than 20 researchers from six academic departments and the University of Dayton Research Institute in the Center for Tissue Regeneration and Engineering at Dayton (TREND) Center. These researchers perform more than \$1 million annually in sponsored biomedical research and have compiled more than 500 peer-reviewed articles. In 2010, the state of Ohio named TREND an Ohio Center of Excellence.

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