

The fly on the wall offers clues to help fight cancer

By Joe Montgomery

Flies can be a pesky nuisance. But the next time you reach for a swatter, you may want to reconsider. It turns out that flies may hold a key for unlocking some secrets about how cancer tumors grow.

Thanks to research by Kansas State University cancer biologist Jianzhong Yu, a relatively simple concept is being examined at a microscopic level.

Recently, Yu, an assistant professor of anatomy and physiology, unveiled promising results by studying the behaviors of specific proteins in fruit flies. The proteins have known counterparts in humans.

Revealing a previously elusive process, Yu and his collaborators — Naren Li, postdoctoral fellow; Yulan Xiong, assistant professor; and Qinfang Liu, doctoral student, all in anatomy and physiology — revealed that if you cut off the nutrient supply, you can suppress the growth of tumors.

“We published a study where we identified ‘Headcase,’ called Hdc, and ‘Unkempt,’ or Unk, as two nutrient-restriction-specific tumor suppressor proteins that form a complex that acts to restrict cell-cycle progression and tissue growth in response to nutrient stress in *Drosophila*, or fruit flies,” Yu said.

Their article, “Headcase and Unkempt Regulate Tissue Growth and Cell Cycle Progression in Response to Nutrient Restriction,” was published in the journal *Cell Reports*. The study was supported by the Johnson Cancer Research Center, Kansas INBRE and the College of Veterinary Medicine.

“Given the role of the human counterparts of these proteins, our results suggest that Hdc and Unk may function as tumor suppressors in mammals,” Yu said. “Although the human ortholog of Unk has not been studied in the context of cell proliferation, we showed that both Hdc and Unk are able to inhibit tissue growth in vivo in the *Drosophila* model. Thus, it is worthwhile in the future

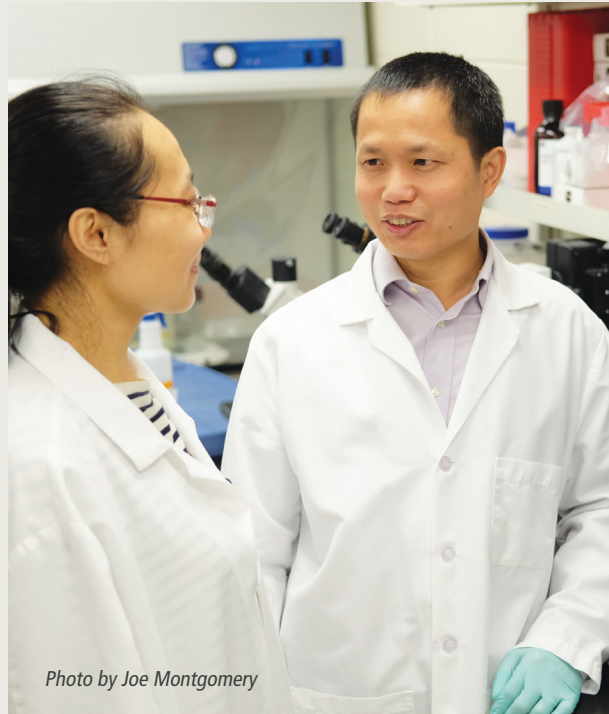
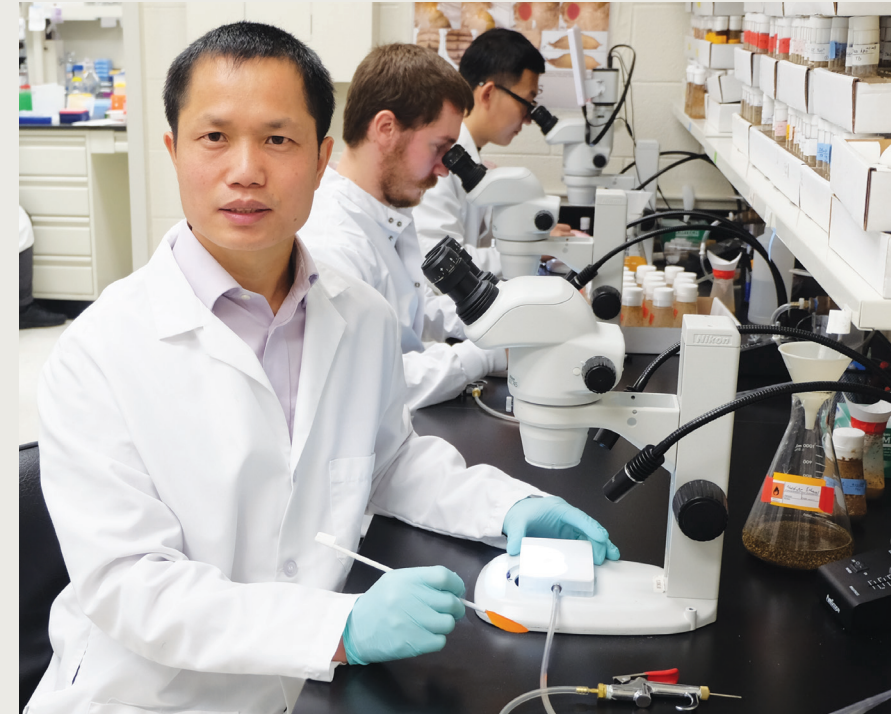


Photo by Joe Montgomery

\$37,250 supported laboratory equipment purchases in 2019. But hundreds of thousands of dollars are needed.



to investigate the growth control function of these two proteins, especially in regard to the formation of cancer tumors.”

Yu appreciates the \$25,000 Innovative Research Award he received from the JCRC in spring 2019 for supporting his study of the regulation of cell proliferation and cell cycle progression in response to nutrient restriction in mammalian cells.

“Our preliminary results so far suggest conserved function of the two human counterpart proteins in the mammalian system,” Yu said. “We are currently working on the underlying molecular mechanisms.”

Yu is grateful to the JCRC for its long support of his lab through other grants as well.

“The Johnson Cancer Research Center has been very important from the start of my research at K-State in 2016,” Yu said. “The center helped us obtain the incubator where we do all of our fruit fly research. The center has also supported a salary during the summer for a graduate student. The center plays a very important role in what we do.”

Yu has been able to leverage the JCRC’s support. He said it has helped him procure more funding from other sources to advance his research.

Perhaps only the fly on the wall knows what new discoveries are waiting to be made.