Stress may cause cancer, study suggests

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Courtesy Yale University
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Stress may cause cells to become cancerous, Yale University scientists have found, in a study that also suggests new ways to attack the deadly disease.

Until now, most researchers thought more than one cancer-causing mutation had to occur in the same cell to make tumors grow. But the Yale team, led by geneticist Tian Xu, found this can occur even if the mutations arise in different, nearby cells.

“The bad news is that it is much easier for a tissue to accumulate mutations in different cells than in the same cell,” said Tian, whose research was published online Jan. 13 in the journal *Nature*.

His team worked with fruit flies to study the activity of two genes involved in cancer: a gene called RAS that has been implicated in 30 percent of cancers, and a tumor-suppressing gene called scribble, which contributes to tumor development when mutated. Neither defective gene alone can cause cancer.

Researchers in the Xu lab previously showed that a combination of the two within the same cell could trigger malignant tumors.

The Yale team has now found these mutations need not co-exist in one cell to cause tumors. A cell with only mutant RAS can develop into a malignant tumor if helped by a nearby cell with defective scribble. The group also found stress conditions such as a wound could trigger cancer formation. For instance, RAS cells developed into tumors when a wound was induced in the tissue. The culprit underlying both phenomena turned out to be a chemical signaling process called JNK, which is activated by environmental stress conditions, Xu explained.“A lot of different conditions can trigger stress signaling: physical stress, emotional stress, infections, inflammation,” Xu said. It’s more “bad news for cancer,” he added.

But the good news is that the research also identifies new targets to prevent and

treat one of the deadliest diseases in the developed world, Xu said. The Yale team found that the JNK stress signaling travels from one cell to the next, but that the propagation can be blocked.

“Better understanding of the underlying mechanism causing cancer always offers new tools to battle the disease,” Xu said.