

Cell metabolism discovery could lead to treatments for cancer, common cold

April 2 2014, by Shaun Mason

(Medical Xpress)—Scientists at UCLA's Jonsson Comprehensive Cancer Center have published the first study explaining in detail how viruses reprogram the metabolism of the cells they invade to promote continued viral growth within an organism.

The findings could have implications for cancer treatments based on similarities between [viruses](#) and cancer-cell mechanisms and may even lead to drugs that could inhibit the virus that causes the common cold, the scientists say.

The research, which was led by postdoctoral scholar Minh Thai and assistant professor of molecular and medical pharmacology Heather Christofk, appears April 1 in the online edition of the journal *Cell Metabolism* and will be published in a future print issue of the journal.

A cell's metabolism—its inner workings—is the group of physical and chemical processes that feed and maintain the cell, allow it to reproduce and eventually decide when it will die off and be replaced by its [daughter cells](#).

When a virus infects a cell, it triggers changes in this metabolism, essentially reprogramming the cell in such a way that it promotes maintenance and reproduction of the virus. Although it has been known that viruses reprogram cells, the molecular mechanisms that a virus uses to accomplish this have remained unknown until now.

Previous research has shown that when [normal cells](#) become cancer cells, they are reprogrammed to act in certain ways that are very similar to virus-infected cells; the cells change their metabolism to support the maintenance and reproduction—and thus the spread—of the cancer.

"In our laboratory, we've always been interested in how cancer cells acquire metabolic changes, compared to normal cells," Christofk said. "We decided to look at viruses and how they change the metabolism of cells they invade because we thought they might be using mechanisms similar to those in cancer cells and that there might be some crossover in the way the mechanisms work. We hoped that by finding out how viruses reprogram cell [metabolism](#), we could learn more about how cancer cells do it."

In their research, Thai, Christofk and their colleagues discovered that the adenovirus—the type of virus that causes the common cold—reprograms the cell it invades to be able to take on more glucose, an important nutrient for cells and viruses. The virus also instructs the cell to increase its use of the glucose to create energy and grow larger. These metabolic alterations enable the virus to begin replicating inside the cell.

"With this knowledge we hope to begin designing drugs that can inhibit the increased [glucose uptake](#) in these cells," Thai said. "This could lead to drugs that stop the growth of viral infections, the most common being like cold or flu, but also meningitis or some types of pneumonia. Then it might be possible to use the same type of drug to stop the growth of [cancer cells](#)."

Provided by University of California, Los Angeles

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