

A potential sugar fix for tumors

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Researchers at the Duke School of Medicine apparently have solved the riddle of why cancer cells like sugar so much, and it may be a mechanism that could lead to better cancer treatments.

Jonathan Coloff, a graduate student in Assistant Professor Jeffrey Rathmell's laboratory in the Duke Department of Pharmacology and Cancer Biology, has found that the tumor cells use glucose sugar as a way to avoid programmed cell death. They make use of a protein called Akt, which promotes glucose metabolism, which in turn regulates a family of proteins critical for cell survival, the researchers shared during an April 15 presentation at the American Association of Cancer Research Annual Meeting in San Diego.

In normal cells, growth factors regulate metabolism and cell survival. Removing these factors leads to loss of glucose uptake and metabolism and cell death. Cancer cells, however, maintain glucose metabolism and resist cell death, even when deprived of growth factors.

To study how Akt might affect these processes, Coloff and colleagues introduced a cancer-causing form of Akt called myrAkt, into cells that depend on growth factor to survive. The mutant form of Akt allowed cells to maintain glucose usage and survive even when no growth factors were present, allowing them to bypass a normal safeguard used by cells to prevent cancer development.

The death of normal cells after growth factors are removed is partly accomplished by two proteins called Mcl-1 and Puma. But the cancer-

causing version of Akt prevents these two proteins from accomplishing their tasks, allowing the cell to survive when it shouldn't.

Once glucose was withdrawn from the environment, however, Akt was no longer able to maintain regulation of the key targeted proteins Mcl-1 and Puma, and the cells died.

“Akt's dependence on glucose to provide an anti-cell-death signal could be a sign of metabolic addiction to glucose in cancer cells, and could give us a new avenue for a metabolic treatment of cancer,” said Dr. Rathmell.

Source: Duke University Medical Center

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