

‘Detective’ Works to Crack the Code on How Fat Influences Cancer

Meet the Scientist: Curtis Henry, PhD, associate professor, immunology and microbiology

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Imagine your body is like a big city filled with lots of neighborhoods. Each neighborhood has unique features that influence the behavior of its residents. Now, think of cancer cells as troublemakers who move into these neighborhoods and create chaos. In some parts of your body, such as fatty areas, cancer cells seem to behave differently; they cause even more trouble than in less-fatty neighborhoods.

[Curtis Henry](#), PhD, is an immunologist and cancer research scientist at the [University of Colorado Anschutz Medical Campus](#). Curtis is a scientist “detective” trying to understand why cancer cells in fatty areas of the body cause more trouble. He studies cancer cells in fatty areas, looking for clues about what changes when they live in fatty areas compared to other non-fatty areas. By understanding these changes, Curtis hopes to find new ways to help the immune system – the body’s mobile defense system – stop cancer from spreading and causing harm.

Built-in defense system

Henry and his research team study how immune cells interact with cancer cells and aim to use their discoveries to improve current cancer treatments. They study a type of cancer called leukemia. More specifically, they study leukemia in people living with obesity, a state in which there are fatty areas throughout the body.

Leukemia is a term used to describe cancers that are found in the blood. The blood is home to many immune cells and serves as their roadway to travel around the whole body. When we drive on the road, we use signals to communicate with other drivers such as traffic lights, road work signs, blinkers and horns. In a similar way, cells have a variety of signals that they send to one another to convey important information. Determining how immune cells and cancer cells signal or communicate with one another will give Curtis and his team clues on how to slow down or stop cancer from causing so much trouble in the body.

Fat influences the growth of cancer

The Henry lab has learned that excess fat is linked with worse cancer outcomes because those fat cells can change which signals are sent to other cells in the body. This information is especially important when considering how we use current cancer treatments in people with obesity. Curtis's lab has determined that fat cells (also known as adipocytes) can send signals to immune cells (non-cancerous and cancerous) to slow down and stop growing, like seeing a "reduced speed ahead" sign on the road. You might think that slowing growth would be good for a cancer cell. However, most cancer treatments are like cops with radar guns targeting the speediest, fast-growing and dividing cells. The average cancer cell is chronically speeding. When a speedy cancer cell has lots of adipocytes around them, it slows down to pass undetected, making standard cancer treatments not as effective at removing those cancer cells from the body.

Why is this research important?

Specifically, the lab has found that a protein on the surface of some cells – Galectin-9 – is increased on cancer cells that are near adipocytes. Galectin-9 acts like the brake of a car, slowing a cell down. Curtis's team is studying a new treatment that targets Galectin-9 to destroy the message of slowing the cell down. This treatment effectively cuts those brakes so that the cancer cell continues speeding down the road to be caught by the cop. The Galectin-9 targeted therapy is effective at helping the cancer cell be taken care of by lower amounts of standard chemotherapy treatment which reduces the sickness and side effects that patients feel during cancer treatment.

Henry's work shows just how important it is to study all aspects of a patient population. In this case, he has learned that people with obesity are not treated as effectively by the standard chemotherapy treatments due to different signaling patterns from their increased adipocytes. Designing research experiments to consider a range of patient types (young vs. old, female vs. male, average weight vs. obese, etc.) is an important aspect of improving patient treatment options.

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