Tracking the cell transitions that cause cancer

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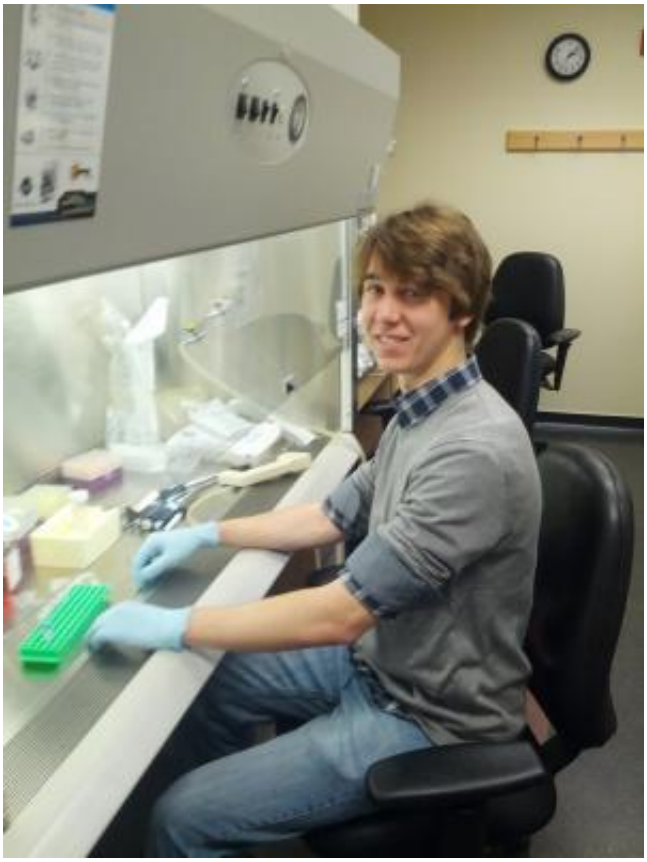

Credit: Tristan Bepler

Researchers think that for cancer to develop, damaged cells have to undergo certain transitions that cause them to spread, or metastasize. Junior Tristan Bepler, a biology and computer science major, is testing this hypothesis, studying two types of cell transitions scientists have

linked to the spread of cancer. He works in the lab of Mariano Garcia-Blanco, professor of molecular genetics and microbiology, and looks at the mesenchymal-to-epithelial transition, or MET, and the epithelial-to-mesenchymal transition, or EMT. Mesenchymal cells are more motile, while epithelial cells tend to be fixed in rows.

The hypothesis is that when epithelial cells form tumors, like in colon, prostate or breast cancer, the cells at the edge of the tumor have to turn to mesenchymal cells for the cancer metastasize. Then, "the mesenchymal cells can leave the tumor, get into the blood stream and spread around your body," Bepler said.

In order for cells to latch onto cells in new locations, they have to transition back to epithelial cells through MET. Bepler's research focuses on whether MET or EMT are necessary for metastasis.

Most of Bepler's daily activities involve culturing cells and handling the rats the lab uses in for the research.

The scientists grow tumors in the rats, they inject them under the skin on their flank. "When we're growing tumors, we have to measure the size of the tumors and weigh the rats to make sure they're not gaining too much weight," Bepler said. "Once the tumors get too large, we have to sacrifice the rats and dissect them. We collect their tumors and their lungs, then we can section them and look at fluorescence, which is how we track MET and EMT."

Although the project is in the basic sciences, it has the potential for clinical use. If EMT is necessary for diseased cells to spread, drugs that block the transition may be effective in treating certain types of cancer. Clinical application is still a long way down the road, though, Bepler said.

Choosing to study metastasis, rather than viruses, which the lab also investigates, "really wasn't driven by a desire to study cancer at the time," Bepler said. "I really didn't know anything, so I decided I would do the cancer side."

A Durham, N.C. native, Bepler began his lab work the summer before his freshman year. "When you first start working in the lab, you basically work as a lab tech. Your mentor says, 'do this experiment,' and you do the experiment," he said. "It's sometimes hard to feel like what you're doing is important or like you're really involved in the project because you're just working as a lab tech, you're not intellectually involved."

"The key is to get into the biology of what's going on or think about the experiments and then it becomes a lot more interesting, because after a while you come up with good ideas for experiments, and you become a little more independent and can do your own experiments," he said.

Bepler added that he prefers working with rats, as opposed to mice, because they are more friendly and do not bite as often.

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