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CANCER COMBAT

JAIME BLAIS TARGETS THE TOUGHEST TUMOUR CELLS TO HELP FIND A CURE FOR CANCER.

By Jennifer Paterson

Curing cancer is the holy grail of medicine and remains an incredible challenge for the best scientists and doctors. So when Jaime Blais decided to join the fight at age 23, she didn't beat around the bush—she went straight for the toughest, most resistant cells in a tumour.

Solid tumours have terrible blood circulation, so they are peppered with pockets that have almost no oxygen. While you would think this would make for a hostile environment for any cell, it is actually in these unfriendly pockets that the super-resistant cancer cells live.

These cancer cells can survive without oxygen by going into a sort of hibernation. They stop dividing and their metabolism slows down. In this quiet state, they are able to avoid the effects of chemotherapy and radiation much more so than other cancer cells. So in order to cure cancer, you must figure out how to get rid of these tricky cells.

Jaime, now a PhD student at the University of Ottawa, has been working on the problem for five years. She used a **gene chip [1]** in a novel way to figure out which of the 30,000 human genes cancer cells are using this low oxygen hibernation state.

Jaime's research has shown that many of the genes expressed during oxygen deprivation are also expressed during other stressful situations like viral infection. "You might call this an integrated stress response," she says.

In other words, the same genes that make cancer cells resistant to low oxygen may also allow the cells to resist all sorts of assaults, including cancer treatments. Now, if scientists can figure out how to turn off this protective stress response, it could go a long way in treating the toughest cancer cells.

Jaime traces her interest in biology back to her grade 11 teacher Paul Hutton. "I have to say it started with him, and I think very fondly of him," she says. "I hope that every student can have that experience at some point in their life—that they are so influenced by someone that they always remember."

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Indeed, Jaime has tried to bring that experience back to students at her old high school through volunteer work with the science outreach organization, **Let's Talk Science [2]**. "It's always fun to be able to reach out and touch the same people who were in your position," she says.

Jaime is one of just 83 students to win a Canadian Graduate Scholarship doctoral research award from the Canadian Institutes for Health Research this year. She is motivated by the people she sees everyday.

"You can't walk through the cancer centre and see the number of people lined up waiting for their treatment without it affecting you on a very deep level," Jaime emphasizes. "You feel like you're making a difference. At least you hope that some day you can make a difference."

Dr. John Bell has supervised Jaime's work at the Ottawa Centre for Cancer Therapeutics. "Jaime has all the attributes necessary to succeed in science," he says. "First and perhaps foremost, she is naturally very curious and needs to know how things work. Add to this a great work ethic, a bright mind, a flair for experimentation and a good sense of humour, and you have every supervisor's dream student."

When asked how her project fits in with the rest of the lab, she admits, "It doesn't." Almost all the students in Dr. Bell's lab are working together on viral treatments for cancer.

"There are times during your degree that you wish you were working on what everyone else is working on just to feel like you were part of something bigger," says Jaime. "Then there are times when you're glad you're not, because you get yourself into a self-discovery mode.

"Overall, I think I've benefited from working more independently," she continues. "I've been very self-directed, and I hope the people I've worked with have benefited too. In science, you get used to studying things in great detail and if somebody brings something different to the group, it's to everybody's advantage."

[1] A Gene Chip

A gene chip (or microarray) can measure the expression of every gene in the human genome. It works like so: genes are made of DNA, and every cell in your body has the same DNA. But not all genes are being used all the time. Different cells use different subsets of genes, depending on what the cell's job is. Cells will also use different genes when they are exposed to different conditions. Jaime used a gene chip to measure which genes were being expressed by cancer cells in low oxygen. She then went a step further, and used the gene chip to measure only those genes that were being used to make large amounts of protein.

[2] Let's Talk Science

Let's Talk Science is a national university-based volunteer organization. It pairs up graduate students in all areas of science with local elementary schools and high schools. Graduate students visit science classes and lead students through experiments in DNA forensics, chemistry, and many other subjects.