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A new weapon against cancer stem cells

McMaster researchers discover way of 'picking apart' cancer cells

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Mercury News Services

McMaster University researchers have discovered a way to tell the difference between healthy and cancerous stem cells.

They believe their study will pave the way for scientists developing treatments and therapeutic drugs for cancer patients.

The study, published last week in the journal Nature Biotechnology, will help cancer therapy drug designers target only the cancer cells and spare the healthy ones, said Mick Bhatia, lead researcher.

"Now we can really pick apart the cancer cells," said Bhatia, scientific director of the McMaster Stem Cell and Cancer Research Institute in the Michael G. DeGroote School of Medicine.

Using human stem cells, Bhatia's team of 70 researchers were able to spot the difference between normal and cancerous ones, an important distinction as most scientists use mice in their research.

Stem cells are like the body's super cell -- unlike mature cells, they can make copies of themselves and can produce any type of tissue, like blood, lung, heart or skin.

Cancer stem cells only have the ability to make copies -- and do so with "a heavy foot on the accelerator and no discretion on when to put on the brakes," Bhatia said.

These become the seeds that grow into malignant tumors.

The difficulty has been that the normal and cancerous stem cells have been difficult to differentiate and much more complicated than researchers originally thought, he said.

Now they can use this information to test different therapies to target only the cancerous stem cells.

When cancer patients go through chemotherapy and radiation treatment, their bodies are often left weakened, and their immune systems are compromised.

Their hair falls out, they lose weight and their skin becomes paper-thin.

This is because the current anti-cancer treatments don't just target the malignant cells, they kill the healthy cells surrounding the cancer.

"Right now, we can shrink a tumor, but it comes back," he said.

"Think of it like a dandelion -- you pick the stem off, but if you leave the root, it grows back.

"We don't want it to grow back. We don't want to just shrink the tumor. We want to get rid of it."

Using a \$15-million grant from philanthropist David Braley, they are using robotic screening to test hundreds of thousands of cancer treatments on the malignant stem cells.

They have funding from the Canadian Institute of Health Research and the Canadian Cancer Society.

Also providing funding are the National Cancer Institute of Canada and the Ontario Institute of Cancer Research.

This has been an ongoing five-year study for McMaster.

Bhatia, who was recruited to the university in 2006, has since been involved in a number of major breakthroughs and discoveries in stem cell research.