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Montreal researchers study new technique that could revolutionize stem-cell transplants

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Click on the following link (or cut and paste the link to your browser) to view the Canada AM interview with Dr Denis-Claude Roy of Maisonneuve-Rosemont Hospital in Montreal.

http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/20091130/stem_091130/20091130?hub=CanadaAMV2

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Montreal researchers are taking part in what could become a breakthrough in stem cell transplants, by leading the first transplant of a mismatched donor.

A 28-year-old father-to-be who has a form of leukemia called Ewing sarcoma is about to become the first person in North America to get a transplant from a mismatched donor.

The patient, Andrew Willette, needs the transplant to fight his cancer, but no one in his family is an appropriate match. So he will be using cells from his sister, who is only a partial match.

Usually, such transplants fail. That's because patients usually reject and attack the foreign donor cells. The ensuing response can kill the patient, or lead to infections or leukemia relapses.

But, the technique pioneered in a Montreal lab by Dr. Denis-Claude Roy of the Maisonneuve-Rosemont Hospital could change that.

Roy explains that his research team developed a new approach that preserves the cells that fight infection and leukemia while eliminating the cells that reject donor cells.

"We are letting Mother Nature decide which cells are going to react," he told CTV's Canada AM Monday morning.

Roy explains that the technique involves introducing donor cells to the patient cells in a lab.

"Those cells that recognize foreign patient cells become activated. The cells that are there to

fight infections or viruses or even leukemia aren't activated, they don't see their target, so they're actually sleeping. So we then kill those cells that are activated," he explained.

To kill the activated cells, a specially-designed photo-sensitizing product is introduced that makes the cells vulnerable to phototherapy.

"They accumulate the drug, and when we turn on the light, this energy transfer results in the killing of only the cells that recognize the patients. The cells that fight infection, that are dormant, don't accumulate the drug and are not killed," he said.

The technique, while 10 years in the making, is still experimental. But it is now poised to enter Phase 3 trials. Willette is the first patient set to receive the treatment.

Interestingly, while the technique was created in Roy's lab, his current hospital lab facilities fall short of international industry standards for stem cell treatment.

So technicians have taken a refrigerated container of stem cells harvested from Willette's sister to Maastricht, The Netherlands. There, they will be cultured and then flown home again to be injected into Willette.

If the process works, it could revolutionize treatment for patients with hard-to-treat cancers and congenital illnesses.

Currently, patients start their search for a stem cell donor within their own family. But a match is found in only 25 per cent of cases. The next option is to try to find a donor from registries of people who have offered to donate stem cells or bone marrow. In Canada, that registry is called One Match and is run by Canadian Blood Services.

The registry can find matches from registries from all over the world, which include about 13 million people willing to offer stem cells. But when no match is located, treatment options are few and patients often die while waiting for a donor.

This new technique would change all that," says Roy.

"It would be great if we could use this new strategy that eliminated mismatched cells. Because we would be able to basically find a donor for everyone," he said.

"It would be like finding a universal donor."

Roy notes that the technique is not without risks. The patient undergoing the transplant has to have their own immune system disabled before the transfer of donor cells.

"So patients are at high risk of infections and recurrence of their disease," he explained.

But Roy hopes that with the process they've developed, patients should be well-prepared to

fight infections because they will have immune cells along with the stem cells injected into them.

More study on patients is still needed to see whether the addition of immune cells is enough for patients to rebuild their immune systems.

"So there are still a number of questions that need to be answered, but we're pretty excited," Roy said.