New centre of excellence for medicine

University of Manitoba researchers and students will benefit from a new Centre of Excellence for Regenerative Medicine thanks to a $1.7 million investment from the Government of Canada through Western Economic Diversification.

Regenerative medicine is an emerging field focused on accelerating the healing process to fully restore the health of damaged tissues and organs. Regenerative therapies have been demonstrated (in trials or the laboratory) to heal broken bones, bad burns, blindness, deafness, heart damage, nerve damage, Parkinson’s and other conditions. Regenerative medicine will lead to improved patient care while eliminating the cost of treatments such as insulin injections or dialysis.

The new centre will allow the university’s regenerative medicine program to expand its research endeavors and collaborations with industry and attract the highly qualified personnel required to support the growing life sciences cluster in Manitoba. The centre will also provide students with the opportunity to access the modern scientific equipment necessary for research and development of products and technologies.

In Brief

NO damage control for muscles

BY SEAN MOORE

It was during a seminar on the liver that Judy Anderson decided to see if nitric oxide (NO) played a role in muscle development and repair.

“I knew nothing of nitric oxide but I like going to seminars that have nothing to do with my work because I gain new perspectives. This seminar was about NO as a mechanism for something in liver and I just began to wonder if it had anything to do with muscles. So I thought about it, read a few papers, and designed an experiment,” he head of biological sciences said.

That seminar was 11 years ago, and now, in a recent paper published in Molecular Pharmacuetics, Anderson and her colleagues Frank Buchyński and Guqi Wang, showed that by attaching NO to an over-the-counter muscle relaxant, they activated a specific group of cells that stimulate skeletal muscle repair and growth.

Hugging every skeletal muscle cell or fiber is a group of satellite cells, stem cells that divide and then join the old cells that have been replaced. Damaged muscles send a get-to-work signal to satellite cells. Anderson reported on this signaling in 2000. When NO is added to the mix, the discovery revealed a few new paths for her research to take.

One path revealed that muscular dystrophy does the opposite from what you might first think. It doesn’t under stimulate satellite cells, it over stimulates and exhausts them. A drug, therefore, needs to turn the NO tap in the “off” direction. But sometimes, Anderson found, the tap needs to be turned towards “on”, as in the case of atrophy.

Another path that her research may soon take involves growing muscle for food in a variety of species.

“It might be that if you use more than one method to stimulate the growth of muscles in fish or chicken, you might get food more effectively because you are also using the muscle stem cells to add tissue rather than supplementing nutrition or hormones to force the animal to get bigger.”

MyoNovin is the drug designed in her lab that can potentially do all this; for you chemists, it’s a guanifenesin dinitrate compound. The muscle-relaxant used in this compound seems to act like a molecular taxi cab, giving NO a ride to the muscle.

In adult mice, an ointment formulation of MyoNovin on the skin increased satellite cell activation in the back and thigh compared to mice given a placebo; and the results were the same when an oral dose was given, so it’s systemic. Anderson doesn’t know if it travels anywhere else, but has so far found no side-effets of the drug.

The published studies were on healthy mice, and the lab is now examining MyoNovin effects on dystrophic mice and old mice to see the outcome and how it happens.

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