Novel discovery links anti-cancer drugs to muscle repair

October 16 2012

Few drugs are available to treat muscle injury, muscle wasting and genetic disorders causing muscle degeneration, such as Duchenne muscular dystrophy. A compelling discovery that may change this was made recently by a research group led by Dr. Robert Korneluk, distinguished professor at University of Ottawa's Faculty of Medicine and founder of the CHEO Research Institute's Apoptosis Research Centre, was reported today in *Science Signaling*.

"We know of five pharmaceutical companies pursuing phase one clinical trials with specific drugs to treat cancer patients," says Dr. Korneluk. "These anti-cancer drugs target the IAP genes, an important family of proteins related to tumour survival that were discovered by the Children's Hospital of Eastern Ontario (CHEO) group over 15 years ago. At that time, we were looking at the role of the IAP genes in cancer as well as in muscle disease. So it was only logical for us to explore the effectiveness of these drugs in both disease conditions."

Dr. Korneluk's research team has now discovered that the IAP-targeting drugs that promote the death of cancer cells also induce the growth and repair of muscle. Furthermore, the team has identified the mechanism by which this process happens, through the activation of a specific cell-signalling or communication pathway. This pathway governs muscle growth and repair by promoting the fusion of muscle cells to create new muscle fibres or repair damaged fibres.

"We think it's reasonable to move into clinical trials with this

methodology within the next couple of years," says Eric LaCasse, CHEO associate research scientist. "Regulatory bodies need proof that the drug is safe, which the existing cancer trials will offer, and they need to see an evidence-based rationale—which we've worked hard to be able to announce today."

The research team has also found that some of the muscle-enhancing effects of the drugs can be repeated using a growth factor normally found in the body, called TWEAK. When low levels of TWEAK were administered, the same signalling pathway was activated, promoting repair of damaged muscle tissue.

Provided by Children's Hospital of Eastern Ontario Research Institute