



Dalhousie Medical Student Melissa Wallace is working with Dr. Ian Alwayn, QEII Foundation Endowed Chair in Transplantation Research, to improve the quality of fatty livers prior to transplant.

Improving organ quality: Research chair seeks solution to fatty liver challenge

The tragic fact that hundreds of people die each year waiting for a transplant is compounded by another tragic fact: as many as 20 per cent of potential graft organs must be discarded, instead of transplanted, because they are not healthy enough to withstand the procedure or function well enough after.

“We have a particular problem with liver transplants, due to ever-increasing rates of fatty liver disease,” says the MOTP’s surgical lead, Dr. Ian Alwayn, a QEII surgeon and Dalhousie professor who holds the QEII Foundation Endowed Chair in Transplantation Research. “Fatty livers do not do well after transplant... we often can’t use these organs.”

An organ has to be in good condition to tolerate the rigours of transplant – being removed from the donor’s body, drained of blood, perfused with protective solutions and stored on ice takes a toll. Exposure to the recipient’s blood upon transplant triggers inflammatory responses that can further damage the organ. Known as ischemia reperfusion injury, if this damage is severe enough, the organ will fail.

Dr. Alwayn and his team have developed a new technology to protect donor livers from ischemic reperfusion injury. “Our invention uses small protein chains, or peptides, that penetrate the cell walls of the organ to deliver a cargo of injury-protecting agents,” he explains. “If we can protect fatty livers from this injury, we will be able to use a lot of organs that would otherwise not be suitable for transplant.” A patent application is in the works for the new technology.

Meanwhile, Dr. Alwayn is co-supervising Dalhousie medical student, Melissa Wallace, on a project to see if fatty livers can be de-fatted prior to transplant, to improve their viability. They’re working with Dalhousie lipid scientist, Dr. Neale Ridgway, to see if their experimental system for metabolizing the fat before transplant enables the liver to function well in its new owner.

Even healthy organs are subject to damage upon transplant. Dr. Alwayn and his team are looking into molecules known as DAMPS, released by an organ’s cells in response to stress. “We think the level of DAMPS in an organ could be used as a marker of how much it is likely to be damaged upon transplant. This would help us determine an organ’s suitability.” Better yet, Dr. Alwayn would like to find a way to block the DAMPs from being released altogether.