Manipulating the immune system like a parasite

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One day it may be possible to mimic the tactics used by parasites to trick the body into accepting transplanted tissues or organs.

That is the hope of Dr Shane Grey from the Garvan Institute for Medical Research and Professor John Dalton from the Institute for the Biotechnology of Infectious Diseases at the University of Technology (UTS). The pair has been awarded a $400,000 grant through the Australian Islet Transplantation Program, administered jointly by the Juvenile Diabetes Research Foundation (JDRF) and the Commonwealth Department of Health and Ageing.

The grant will be divided equally between Garvan and UTS over a period of two years, and will combine Professor Dalton's expertise in parasitology and biochemistry with Dr Grey's expertise as a transplant immunologist.

When parasites invade humans, they secrete compounds that appear to change the way the immune system sees them. In other words, they alter the immune response.

"Over time our immune system has evolved different ways to deal with different organisms and challenges," explained Dr Grey. "What the parasite does is deviate the immune system from an effective response to one that's more suited to attacking other organisms or pathogens. It's quite cunning."

“By effectively disarming its host, the parasite is doing the equivalent of replacing the weaponry of a modern army with bows and arrows.”

The Australian Islet Transplantation Program funds much innovative transplant therapy work in the hope of one day finding a way for recipients to tolerate islet (insulin producing cells in the pancreas) transplants without having to take highly toxic immunosuppressive drugs for the rest of their lives. Many people believe that effective islet transplantation offers the greatest hope for curing Type 1 diabetes, or insulin dependent diabetes.

Before applying for the grant, the Garvan and UTS teams undertook a short pilot study to test their approach. The initial test results left Dr Grey feeling very optimistic about the proposed collaboration.

“The UTS team sent us some biochemically pure compounds which we delivered over three weeks to mice that had received an islet transplant. Stacey Walters, a member of my research team, found that the optimal combination of compounds gave permanent graft survival. In that type of model, the outcome we achieved was extraordinary.”

“Our first step now that we have received funding will be to repeat our initial result on a larger cohort of animals. Then our challenge will be to work out exactly what the compounds do to a recipient’s immune system. Obviously we’d like to tease out the good bioactive components and remove any that could be harmful.”

“Ideally, we’d like to bring about an alteration of the immune system to allow the retention of a graft yet perform other functions as normal. If we achieve that, we will be very happy.”

Source: Research Australia