

## **Research Update from the Faustman Lab**

The Faustman Laboratory is progressing towards clinical trials with BCG, a generic drug that may help to remove the disease causing white blood cells of type 1 diabetes, also known as T cells. This trial is unique for many reasons. This is a trial for people who already have diabetes. The goal is to reverse established diabetes, not just halt new onset type 1 diabetes. Secondly this trial is unique in that it will use a generic drug, BCG, that is approved in the US for other disease indications and thus has a very safe toxicity profile. Thirdly, the goal of using BCG is targeted disease removal of only autoreactive cells in order for the pancreas to be able to regenerate and hopefully restore blood sugars.

As part of the effort to translate diabetic mouse cures to human cures for diabetes, the Faustman Laboratory is devising new blood tests to monitor for early signs of an effective dose of BCG. These blood tests require two development steps. First the Faustman laboratory must take blood and separate the T cells from the blood. For the past year, this important step has been successfully standardized. The standardization of this process involves being able to remove the T cells from blood with high yield, viability and purity. This process has been validated in over 266 human blood samples (half of those from type 1 diabetics), exceeding the goal of 50 human samples by this year. The Faustman Laboratory must also automate this T cell separation process, since all clinical tests must be standardized for clinical trials. Automation will remove the variable of manual blood separation procedures. Secondly, the very pure diabetic T cells will then be used in developing clinical assays to quantify the numbers of autoreactive cells before and after treatment with BCG.

In February of 2007, the Faustman laboratory had successfully created the first automated blood separation method for a tube of fresh human blood. The T cells after mechanical separations were pure, viable and represent high yields from the starting whole blood. Furthermore, the Faustman laboratory was also able to demonstrate continued improvement in their capacity to automate this process. It is likely this new robotic process will be applied to the upcoming clinical trials, which will commence in 2008.

The Iacocca Foundation has made payment for year two funding of this exciting project at the Massachusetts General Hospital. In year two, the funding for the Nathan/Faustman research program will be aimed to translate the diabetes 'cure' from mice to humans. The goals will be to: 1) recruit more type I diabetes patients; 2) implement a robotic clinical blood test to characterize the T cell defect in recruited patients; 3) continue drug dosing studies in the NOD diabetic mouse model; and 4) start the BCG administration of drug to patients.