# Shining a Light on Diabetes

For patients living with severe type 1 diabetes, a life free from insulin injections could be sweet news. Clinical research studies show that some patients no longer need insulin injections, nor experience episodes of dangerously low blood sugar, after receiving islets obtained from a healthy pancreas. But monitoring the survival of these transplanted islets—a step critical to success—has often been challenging.

Now cell biologist Anna Moore and her colleagues at Harvard Medical School are proposing an intriguing method to track the viability of transplanted islets in this experimental technique. By labeling them with microscopic nanoparticles of iron in the laboratory prior to injection, the researchers were able to spot transplanted islets in living mice through the use of magnetic resonance imaging (MRI). "We have turned the light on diabetes, by being able to follow these cells," says Moore.

Currently, how many islets survive transplantation is estimated by measuring levels of either glucose or insulin in the blood. But insulin and glucose levels fluctuate in response to eating and exercise and may be affected by stress and illness.

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A more precise alternative would be to biopsy the tissue and count the islets, an invasive procedure. Moore's approach sidesteps these tests by tagging the cells directly, making them distinct from other cells and readily identifiable when the mouse is placed within an MRI machine. "We now have the power to see islets in vivo," she says.

Moore injected the labeled islets into the space between the mouse kidney and its thin tissue surface, and then tracked them through MRI scans as they restored normal insulin levels in diabetic mice. She found that labeling of the islets neither caused toxicity nor kept them from producing insulin.

This original approach may one day benefit patients who have type 1 diabetes. By using labeled islets and performing periodic MRI scans after transplantation, physicians might be able to quickly determine if islets are dying and whether additional transplants are needed.

**Cell biologist Anna Moore prepares insulin-producing islets for transplantation into diabetic mice.**

Critical to Moore's research was the ability to obtain purified human islets from several NCRR-supported Islet Cell Resource (ICR) Centers. Originally established to produce and distribute clinical-grade islets for human transplantation, the ICRs have expanded their scope of responsibility to also provide human islets for basic laboratory and preclinical investigations like Moore's, that advance research in diabetes. "Our studies depend on having access to these islets," says Moore. "We wouldn't be able to do the job without them." (*Nature Medicine* 12:144-148, 2006) **—AL STAROPOLI**

**NCRR RESOURCES:** The nation's 10 Islet Cell Resource Centers were created in 2001 to harvest, purify, store, and ship human pancreatic islets for experimental transplantation into patients with severe type 1 diabetes. Through a unique partnership with the Juvenile Diabetes Research Foundation International, the ICRs also provide islets for basic research studies at no cost to approved investigators. Detailed information on the ICRs—which are funded by NCRR and the National Institute of Diabetes and Digestive and Kidney Diseases— and how to request islets, are available at http://icr.coh.org.

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