



Discoveries in *Diabetes*

A publication for those who support diabetes research, education, and care at the University of Minnesota through the Minnesota Medical Foundation

The obesity-diabetes link

U scientists are advancing treatments for type 2 diabetes

It's a vicious circle: The more resistant your body is to insulin, the higher your blood sugar goes. The higher your blood sugar, the more insulin your pancreas secretes. Left unchecked, high insulin levels result in your body's inability to compensate for elevated blood sugars, the failure of pancreatic islets, and, ultimately, type 2 diabetes.

Those who are obese—more than 30 percent of the U.S. population, according to the Centers for Disease Control and Prevention—are at an especially high risk for developing type 2 diabetes.

University of Minnesota researcher David Bernlohr, Ph.D., has studied adipose biology—the biology of fat tissue—for more than 25 years. A Distinguished McKnight Professor and head of biochemistry, molecular biology, and biophysics at the Medical School, Bernlohr also leads a Center for Diabetes Research lab that's focused on projects related to obesity-linked insulin resistance.

Battling insulin resistance

"Initially, we began studying the lipolysis, the process by which fat cells release fatty acids and those lipids circulate in the bloodstream and affect processes in the liver, muscle, and beta cells," he says. "Over time, the work has shifted to focus more on how inflammation affects insulin resistance."

That's because inflammation plays a key role in diabetes. In type 2, insulin resistance results from the inflammation of fatty tissue, the liver, and other peripheral tissues.

In 2009, Bernlohr's lab published a paper in the *Journal of Medicinal Chemistry* identifying a small molecule inhibitor of the fatty acid-binding protein. The inhibitor blocks the protein's ability to traffic fatty acids within a cell and allows the cell to perform its normal function. This, in turn, leads to increased sensitivity of fat cells to

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David Bernlohr, Ph.D.

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Diabetes: Just the facts

Diabetes affects more than 25.8 million people in the U.S.

Type 1 diabetes is an autoimmune disease in which the body attacks insulin-producing islet cells, found in the pancreas.

Type 2 diabetes is caused by insulin resistance.

The World Health Organization estimates that 220 million people have diabetes.

Approximately 90 percent of people with diabetes have type 2.

insulin and reduced inflammation—both key to reducing the risk of type 2 diabetes.

New research approaches, treatments

Now University researchers, including Ann V. Hertz, Ph.D., assistant professor and Bernlohr's long-time project collaborator, are looking for additional or better molecules to treat type 2 diabetes.

"This is a new target that potentially will lead to a drug that will improve patients' insulin sensitivity," Hertz says.

Such small-molecule drug treatments would provide an alternative treatment for patients who don't respond well or lose the ability to respond well to classic type 2 drugs called insulin sensitizers.

Such treatments could help individuals who are insulin resistant and those who are obese.

Bernlohr notes that insulin resistance doesn't just lead to diabetes but also to neuropathy and cardiovascular disease—health challenges that these small-molecule drugs could lessen.

Philanthropy making a difference

Bernlohr and his colleagues are also trying to determine when a fat cell loses its ability to convert energy into usable forms.

In 2010, Minnesota philanthropists Wendy and Douglas Dayton made a gift to support type 2 diabetes and breast cancer research at the University. Part of the gift was used to purchase a Seahorse XF24 Analyzer, which measures metabolic activity in muscle, stem cells, beta cells, and the liver. It allows Bernlohr to evaluate drugs that could improve insulin action.

"Without [those funds], we wouldn't be able to do our experiments," he says.

What would it mean to develop a drug that would help the millions of people affected by insulin resistance? "That's the overall goal of most scientists," says Hertz. "It's what we always hope and dream will come from our work."

—Karin Miller

Don't miss your chance to make an IRA gift

To learn more about this opportunity, contact MMF's gift planning team at 612-625-1440, 800-922-1663, or giftplanning@mmf.umn.edu.

There is still time to take advantage of the Tax Relief Act signed into law last year and make the most of your charitable donations. You can make a gift of up to \$100,000 directly from your IRA to the Minnesota Medical Foundation (MMF) to support diabetes research at the University of Minnesota and avoid paying income tax on the amount of your gift. But the extended IRA Charitable Rollover option is set to expire on December 31, 2011.

These rules apply to IRA Charitable Rollovers:

- Only IRAs are eligible (other types of retirement accounts are not).
- The donor must be over age 70 1/2.

- The gift must come directly from the IRA custodian to MMF.
- The maximum amount allowed is \$100,000 per year, per donor.
- Gifts cannot fund a charitable remainder trust or gift annuity.
- Tax deductions are not available when completing an IRA Charitable Rollover.

If you are not eligible to make a gift through the IRA Charitable Rollover option, you can still support the University of Minnesota's diabetes research by naming MMF as a beneficiary in your estate plans.

Building excitement for a cure

Edward “Ned” Dayton considers himself lucky. He survived childhood polio with no long-term effects.

Today, Dayton is engaged in the battle against another formidable disease—type 1 diabetes—which his youngest son, Michael, now 43, has had since age 4.

Another family member suffered from diabetes as well. “My cousin Corinne was diagnosed with type 1 diabetes at age 14,” says Dayton’s wife, Sherry Ann. “She eventually succumbed to the disease at age 58.”

But the Daytons are hopeful that diabetes research at the University of Minnesota’s Schulze Diabetes Institute (SDI) will bring about a cure. “In the course of my lifetime, I’ve seen polio eradicated and, hopefully, we can see the same for diabetes,” says Ned Dayton.

To help make that happen, the Edward Dayton Family Foundation recently contributed \$150,000 to support a new SDI initiative to solve the shortcomings of immunosuppressive drugs. Islet transplants are already curing diabetes, but are not as widely used, in part because the immunosuppression drugs recipients must take have toxic side effects.

The SDI immunology initiative will help resolve the side effects related to immunosuppression, thus making islet transplantation treatment available to more people with diabetes.

“I think the U is doing a fabulous job—it’s one of the top research institutions,” Dayton says. “The work that they’ve done with transplants is simply extraordinary.”

Dayton’s earlier careers were in retail and real estate. Now he is focused on supporting philanthropic causes close to his heart through his family foundation, which he started with Sherry Ann and their five children.

The Daytons’ friends, MMF board chair Tom Olson and his wife, Meredith, encouraged

their support of the University’s work. In 2004, the Olsons established the Carol Olson Memorial Diabetes Research Fund through MMF in memory of Tom’s sister, who died from complications of type 1 diabetes.

Last December, the Daytons and Olsons hosted an event in Wayzata, Minn., to educate friends and community members about the University’s quest for a type 1 diabetes cure. “I don’t think some people realized the work being done at the University and how far they’ve come,” says Dayton. “They definitely learned a lot, and some got really excited.”

Following that event, Olson also made a gift to the SDI’s new immunology initiative.

“I was inspired,” Dayton says of the Olsons’ gifts—adding that it prompted him to make his own gift.

Still, Dayton says, he wants to do more to help spread the word about the University’s work. That’s why he joined the MMF Diabetes Development Committee, which Olson chairs. Committee members serve as ambassadors to help advance diabetes fundraising efforts at the University of Minnesota.

“I think people *should* be excited about the research going on at the University,” he says. “They’re making great progress.”

U of M Immunology initiative

The University of Minnesota is raising funds to engage a world-renowned transplant immunology expert on a consulting basis and fill four full-time immunology positions to work on this high-impact program.

Supporters of U’s diabetes research become community advocates and donors



Submitted photo

Ned and Sherry Ann Dayton

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**Upcoming
events:
Learn
more
about
U of M
diabetes
research**

Diabetes Symposium
Tuesday, September 27, 2011
Registration begins at 6 p.m.
Best Buy Corporate Campus
7601 Penn Avenue South
Richfield, Minn. 55423

Join us to learn how islet transplantation can cure type 1 diabetes. Hear from patients who are living insulin-free lives, and talk with leading researchers and surgeons in the field. Space is limited and reservations are required.

Visit <https://give.mmf.umn.edu/diabetes2011> to register.

Sponsored by the Richard M. Schulze Family Foundation and the Schulze Diabetes Institute.

Leap of Faith and Continuing Commitment to Diabetes Research
Sunday, Oct. 16, 2011, 3-7 p.m.
6 Island Road, North Oaks, Minn.

This annual event highlights the latest advances in diabetes research, fantastic auction items, a light dinner, and music. This event is hosted by supporters of the University of Minnesota Schulze Diabetes Institute (SDI). Special guests include recent islet transplant recipients and researchers from the SDI.

\$125 per person
(Groups of 10 receive a reduced rate of \$100 per person)

RSVP by Oct. 10 to Karen Hanson at 612-281-5842 or Ellie Cadmus at 612-920-7249.

Upcoming campus tour: Stem Cell Institute
Tuesday, November 15, 3-4:30 p.m.

To register, contact Angela Lillie at a.lillie@mmf.umn.edu or 612-625-9646.

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