

EDITED BY KATIE BUNKER

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News from the American Diabetes Association



When Good T-Cells Go Bad

BY ANDREW CURRY

research



In a way, type 1 diabetes is a case of mistaken identity, one that plays out in a vicious battle at the cellular level. The battle's victim is the pancreas, the organ responsible for producing the insulin the body needs to regulate the amount of glucose in the blood.

Every once in a while, the systems that protect us from infection and disease go wrong. When that happens, they can mistake the insulin-producing cells in the pancreas for something else entirely and attack—ravaging those cells and preventing them from producing the insulin the body needs. The result is type 1 diabetes.

With a grant from the American Diabetes Association, William Kwok, PhD, an immunologist based at the Benaroya Research Institute at Seattle's Virginia

William Kwok, PhD

Occupation

Principal Investigator, Benaroya Research Institute, Seattle

Focus

Immunology

Research Funding

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RICK DAHMS

Lacing up for loved ones: Participants in ADA's Step Out: Walk to Fight Diabetes share stories of tragedy and triumph. Page 72



A Meeting of the Minds

ADA's 68th Annual Scientific Sessions

▼ This is the big one. It's where results for two major studies of glycemic control in people with type 2 diabetes—ADVANCE and the VA Diabetes Trial—will be revealed, and it's where experts will ponder the implications of another glycemic control study, ACCORD, and its surprising findings of higher death rates among study subjects with type 2 in the tight blood glucose control group. In addition, researchers will be talking about the future of islet cell transplantation, early insulin treatment in type 2, and hundreds of other crucial issues in diabetes treatment and research.

The 68th annual American Diabetes Association Scientific Sessions are being held June 6 through June 10 in San Francisco. More than 13,000 research scientists, physicians, endocrinologists, nurses, dietitians, pharmacists, and other health care professionals are meeting for five days of presentations, panel discussions, and more. To get the scoop straight from the experts, visit scientificsessions.diabetes.org. You can also read daily blogs from former *USA Today* reporter Anita Manning and ADA Youth Advocate Tesch West at diabetes.org/ssblog. And stay tuned for coverage in *Diabetes Forecast*.

Mason Hospital and Medical Center, is leading a lab full of researchers in a search for the causes of this potentially deadly mix-up.

The keys, Kwok says, are T-cells, our immune system's front-line forces. The human body is stocked with a range of T-cells that act as a defense against potentially infectious invaders. "T-cells are very specific," Kwok says. "If you have a flu infection, some of the T-cells react against the flu." Others target entirely different infections or invaders—from cat dander to herpes.

As long as they are working properly, T-cells are a vital part of the body's resistance to illness. It's when they go wrong that the problems start. "T-cells as far as we understand it are one of the major first steps to set up an immune attack against insulin-producing cells," Kwok says. When that happens, some T-cells mistake cells in the pancreas for harmful invaders, turning against them and destroying their ability to produce insulin.

Kwok and his team are trying to find out why some T-cells go bad. To understand what's going on at the cellular level, they use a recently developed substance called a tetramer, a synthetic protein that mimics the texture and appearance of cellular structures.

First developed about a decade ago, these reagents can be used to identify T-cells that recognize different targets, including those that attack the insulin-producing cells in the pancreas. "It's like a fish taking the bait," says Eddie James, a researcher in Kwok's lab.

The tetramers allow scientists to study T-cells' behavior in a laboratory setting. The technique has been used to look at the role of T-cells in a variety of immune system diseases and illnesses, from simple springtime allergies to genetic conditions like multiple sclerosis. Kwok and his team have themselves used tetramers to study everything from herpes and hepatitis to anthrax. But untangling the causes of type 1 diabetes "is among the tougher cases," James says. "It's a complex disease, genetically and environmentally."

Kwok, James, and their colleague Xinhui Ge lure the T-cells that cause type 1 diabetes onto special tetramer-coated chips. These specially prepared pieces of glass are about the length and width of a finger and painted with tetramers in different mixtures, designed to "hook" different types of T-cells.

The tetramer-coated chips are incubated with T-cells from blood samples taken from type 1 diabetes patients. The aggressive, problematic T-cells latch on to the tetramer-coated chips, forming little clusters of cells that can then be analyzed.

The process is still in its earliest stages. Kwok and his team

The team's ultimate goal is to develop a test that can tell which T-cells are likely to go after the insulin-producing beta cells in the pancreas.

currently need about two weeks to perform a single “assay,” or T-cell test. “The ideal situation, if things develop really well, is we could do it in a couple of hours,” Kwok says. The team’s ultimate goal is to develop a laboratory test that can tell which T-cells are likely to go after the insulin-producing beta cells in the pancreas. That way, doctors would know in advance which patients have malfunctioning T-cells long before they begin attacking the pancreas.

The head start would be critical. “By the time diabetes is diagnosed, most of the damage has already been done,” says James. “It would be ideal to diagnose beforehand.” And, ultimately, scouting out the cellular battlefield could yield other insights on how to fight type 1 diabetes. ▲

Andrew Curry is a freelance writer.

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In Your Corner

Networks of lawyers and health professionals volunteering their time

advocacy

» **Trying to find** a job can be stressful enough, but what about when a potential employer says “No one with diabetes need apply”? Over the years, people with diabetes have been shut out or denied access to care at school, at work, in correctional institutions, and in places of public accommodation—like concert venues and public transportation. Fortunately, people with diabetes are now better armed to combat discrimination, thanks to the efforts of attorneys and diabetes health care professionals who have offered their services to educate, negotiate, and—when necessary—litigate and legislate to end discrimination against people with diabetes. But the struggle continues—and the American Diabetes Association needs more of these dedicated professionals to join the fight for fairness.

Together, the over 900 members of the ADA Advocacy Attorney Network and the ADA Health Care Professionals Legal Advocacy Network have racked up scores of victories for people with diabetes. Thanks to these passionate advocates, people with diabetes who want to be truck drivers, law enforcement officers, or fire fighters now have the right to be evaluated based on how diabetes affects them in particular. Network members collaborate to develop educational materials, win lawsuits, and change state laws that stand in the way of safety and equality for students with diabetes as part of ADA’s Safe at School Campaign. And they have worked together to develop standards of care, model policies, and training materials for jails and prisons in response to people with diabetes being denied access to even the most basic medical care.

Yet, while great progress has been made, much more remains to be done. Just ask the hundreds of people with diabetes who call ADA each month seeking help on discrimination matters. ▲

? To learn more about the advocacy networks and how you can get involved, contact Steve Bieringer, ADA’s director of Legal Advocacy Major Projects, at sbieringer@diabetes.org. If you are experiencing discrimination based on diabetes and need help, call 1-800-DIABETES.

SMART FOODS



“What Can I Eat? The Diabetes Guide to Healthy Food Choices” includes sample meals as well as information on carbohydrate counting, the glycemic index, eating at restaurants, and quick meal ideas. Call 1-800-DIABETES for your free copy.