Above: Barbara B. Kahn, MD (middle right), Harvard Medical School and Beth Israel Deaconess Medical Center, with members of her laboratory.
Research

OUR MISSION: TO PREVENT AND CURE DIABETES AND TO IMPROVE THE LIVES OF ALL PEOPLE AFFECTED BY DIABETES.

We support biomedical research projects with a high potential to significantly improve health outcomes for people with diabetes.

“We invest in research through the American Diabetes Association because diabetes runs rampant among our family and friends and has become an epidemic in our country. Solutions are needed now to better manage and hopefully eliminate this draconian disease, and we believe this investment will get us there faster.”

– Steve and Pamela Doctor, philanthropic supporters from Washington State
T1D Type 1 Diabetes

When the immune system destroys the body's beta cells—the cells that produce insulin—a person develops T1D. Often diagnosed in childhood, people with T1D have to rely on insulin delivered by injections or pumps to survive. We need to know more about what causes T1D so we can learn how to prevent it. We need to determine how to reverse T1D by effectively replacing the supply of insulin-producing beta cells. Until we can prevent and cure T1D, we need to advance technologies to make T1D management effortless for the people living with it every day.

Above: 3D rendering of antibodies. The regions where the polypeptide chains (blue lines) are more visible are the hypervariable regions, the antigen-binding sites. Credit: Juan Gaertner/Shutterstock
THOMAS DELONG, PhD  
University of Colorado, Denver  
$1.625M over five years (2015–2019)  
Recipient of the Pathway to Stop Diabetes® Accelerator Award

What causes the immune system to attack the body’s own beta cells? Dr. Delong, who himself has T1D, published a paper in the prestigious journal Science this year that points to a possible trigger for the autoimmune attack. This piece of the puzzle gives scientists a new target in the fight against T1D. If the trigger can be dismantled, perhaps we can prevent T1D or even reverse it in people already living with T1D.

LAWRENCE CHAN, MD  
Baylor College of Medicine, Houston  
$135,000 over two years (2014–2016)

Dr. Chan has developed a gene therapy that stimulates the production of new insulin-producing cells in the liver. In early studies in animals with T1D, the immune system quickly attacked newly formed cells. But Dr. Chan has engineered a novel combination gene therapy that prevents the autoimmune attack. The new cells survived with this therapy, which cured mice with T1D. Now Dr. Chan is testing the combination therapy in monkeys.

MAUREEN GANNON, PhD  
Vanderbilt University Medical Center, Nashville, Tenn.  
$345,000 over three years (2016–2018)  
Supported in part by a donation from the Roger and Camille Blume Charitable Fund

Important research advances are getting us ever closer to being able to use stem cell technologies to reverse T1D. But what if we could stimulate the body to make more of its own insulin-producing cells without the need for transplant surgery? Dr. Gannon started an Association-funded project this year to understand molecular signals that may do just that.

MICHELLE M. PERFECT, PhD  
University of Arizona, Tucson, Ariz.  
$540,000 over three years (2013–2016)  
Supported in part by a donation from the Amaranth Diabetes Foundation

Do the quantity and quality of sleep affect T1D management in young people? Dr. Perfect is exploring these connections. She has found that increased sleep duration may help reduce depression, a common condition for adolescents with T1D. This year, Dr. Perfect is leveraging the results of her Association grant to apply for federal funding to conduct a large-scale clinical trial on the links between sleep and T1D health outcomes.
GUILLERMO E. UMPIERREZ, MD
Emory University, Atlanta
$550,000 over three years (2014–2016)
Recipient of the American Diabetes Association-Lilly Award for Diabetes Care in Older Adults

Older adults who live in long-term care (LTC) facilities have a high prevalence of T2D. What are the best treatment strategies for these individuals? Dr. Umpierrez is comparing diabetes medications in people with T2D who live in LTC facilities to determine which therapy works best to improve glucose control and reduce complications.

FELICIA HILL-BRIGGS, PhD, ABPP
Johns Hopkins Medical Institutions, Baltimore
$85,272 over two years (2006–2008)

Dr. Hill-Briggs developed DECIDE (Decision-making Education for Choices in Diabetes Everyday), a problem-solving program for T2D self-management support. With an Association grant, she adapted the program for literacy and accessibility among the highest-risk adult T2D populations. This year, Diabetes Care published her comparative effectiveness clinical trial on delivery of the program.

REBECCA HASSON, PhD
University of Michigan, Ann Arbor, Mich.
$386,254 over three years (2014–2016)
Supported in part by a donation from Prince Hall Shriners

Why are African American and Latino youth at increased risk for T2D? Dr. Hasson is examining how psychological stress may be involved in this disparity. By measuring the stress hormone cortisol, she has already found that African American and Latino children have higher stress levels. Following the cortisol measures over time will allow her to determine whether stress is linked to higher rates of T2D. If ethnic differences in stress pathways exist, this information could help guide our diabetes therapies.

SIMEON I. TAYLOR, MD, PhD
University of Maryland School of Medicine, Baltimore
$600,000 over three years (2016–2018)
Supported in part by a donation from The Kahlert Foundation Inc.

How does a doctor know which T2D medication works best for each person? To get that answer, we need more information on the characteristics of patients who respond best to particular therapies. Dr. Taylor began an Association-funded grant this year to determine whether genetic differences affect the response to a particular type of T2D medication. The results may lead to a DNA test that will help doctors decide which medication is best suited for each individual.

GUILLERMO E. UMPIERREZ, MD
Emory University, Atlanta
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People with T2D are usually diagnosed as adults. In T2D, the body continues to make some of its own insulin, but is not able to make enough insulin to keep up with demands. An estimated 95 percent of the nearly 30 million people living with diabetes in the United States have T2D, making it one of the biggest health concerns of our time. Rates of T2D are higher among Hispanics, non-Hispanic blacks, American Indians, Alaska Natives, and Asian Americans than non-Hispanic whites. One in four Americans over the age of 65 has diabetes. We need to know more about all of the causes of T2D so we can best treat and prevent it. We need new therapies that can treat the individual causes for each person’s T2D.

Above: Model of insulin molecule, 3D illustration. Credit: Kateryna Kon/Shutterstock Source
Complications

No matter the type, all forms of diabetes put people at risk of the same complications. Diabetes is the leading cause of blindness among working-age adults. Diabetes nearly doubles the risk of having a heart attack, and it is the leading cause of lower-limb amputations, kidney disease, and kidney failure. We need to understand how to avoid the serious complications of diabetes to promote longer, healthier, more comfortable lives.

DENISA D. WAGNER, PhD
Boston Children’s Hospital, Boston
$90,000 over two years (2013–2015)

Poor wound-healing is a common complication of diabetes that contributes significantly to amputation. Dr. Wagner showed that high glucose levels actually alter the way a natural wound-healing molecule operates. The study results, recently published in the prestigious journal *Nature Medicine*, have laid the groundwork for her laboratory’s ongoing studies into whether the same dysfunction is responsible for other complications of diabetes.

PRABHLEEN SINGH, MD
University of California, San Diego
$345,000 over three years (2015–2018)
Recipient of the American Diabetes Association and Boehringer Ingelheim Research Award in Chronic Kidney Disease and Renal Insufficiency

The factors involved in the early development of kidney disease in diabetes are not well understood. Dr. Singh is working to determine whether low levels of oxygen contribute to kidney disease progression. Her goal is to identify new treatment approaches that can prevent permanent kidney damage. She is also investigating whether two existing diabetes medications can improve oxygenation of the kidney, thereby helping to prevent kidney disease.
How does diabetes raise the risk of heart attack and stroke? Dr. Bogan (left, shown with postdoctoral fellow Estifanos Habtemichael) found that insulin controls the movement of vesicles in muscle and fat cells that contain two important molecules. One stimulates glucose uptake and the other controls a hormone that helps regulate blood pressure. This work suggests that insulin resistance and high blood pressure may result, at least in part, from impairment of a shared molecular mechanism, raising the possibility of developing a single therapy to treat both conditions.

One in three people with diabetes develops retinopathy, which causes blindness. Current treatment approaches can limit vision loss, but we still don’t know how to prevent the condition. Dr. Dennis is investigating how glucose levels alter the proteins that are made in the eye. He has identified a set of molecules involved in the development of diabetic retinopathy. Learning more about these molecules may lead to new therapies, offering hope that we can one day prevent diabetes-related blindness.
While it is critical to biomedical research, federal research funding has decreased over the past 20 years. And only a small fraction is allocated to diabetes research.

Our funding supports diabetes researchers early in their careers and diabetes projects that may be too early in development to successfully compete for traditional funding sources. Our approach broadens both the number of people who commit their careers to diabetes research and the potentially groundbreaking research ideas that might otherwise go unexplored.

With the funding to pursue their ideas, these individuals go on to successful careers as top diabetes experts.

Above: Ji Li, PhD, University of Mississippi Medical Center
MAYER B. DAVIDSON, MD
Charles R. Drew University of Medicine and Science
and the University of California, Los Angeles

First funded by the Association in 1970, Dr. Davidson has been a volunteer leader ever since. Over the past 46 years, he co-founded the Los Angeles Chapter of the Association, became a member of the Board of Directors, was elected president, and served as editor-in-chief of *Diabetes Care*. Having devoted his career to the care of people with diabetes, particularly among the poor and underserved, Dr. Davidson was the recipient of the Association’s 2016 Outstanding Physician Clinician in Diabetes Award.

TODD M. BRUSKO, PhD
University of Florida Diabetes Institute,
Gainesville, Fla.

Dr. Brusko received his first Association grant in 2013. The funding supported his research into how the immune system fails in TID. Because of his successful research program, he was promoted to a tenured associate professor position in 2016.

BARBARA B. KAHN, MD
Harvard Medical School and Beth Israel Deaconess Medical Center, Boston

Since 1993, Dr. Kahn has received nine Association grants for research and mentoring. These funds have helped support her pioneering discoveries into the molecular biology of obesity and T2D. In 2016, Dr. Kahn’s outstanding scientific contributions were recognized with the Banting Medal for Scientific Achievement, the highest scientific award of the American Diabetes Association.

JULIE A. WAGNER, PhD
University of Connecticut Health Center,
Farmington, Conn.

Dr. Wagner published the results of her first randomized clinical trial in 2016. The study examined a stress management intervention for Latinos with T2D. Her Association-funded grant also helped her advance her research and successfully apply for subsequent funding from the National Institutes of Health to study the effects of a community health worker-delivered diabetes prevention intervention for refugees with depression.
By the Numbers

Nearly $770M invested in research since 1952

>9 OUT of 10 of our researchers secure new funding within five years to expand their work, leveraging every dollar we invest into $7.36 in additional research resources

4,600+ research projects funded by the American Diabetes Association since 1952

378 research projects supported in 2016
$34.5M+ made available for research in 2016 alone

99% of researchers we fund remain committed to diabetes research careers for at least 5 years

351 funded scientists at 150 institutions across the United States in 2016

378 research projects supported in 2016

24/7
Support Diabetes Research

Biomedical research is the only path forward to ultimately realize our vision: **LIFE FREE OF DIABETES AND ALL ITS BURDENS.**

In 2016 alone, the American Diabetes Association® made more than $34.5 million available for research in all types of diabetes and diabetes complications.

The researchers we support are making a difference. But due to funding limitations, we cannot support all of the worthy applications we receive.

Help us do more. Please donate to support diabetes research at diabetes.org/supportresearch or call 1-888-700-7029.

“We have supported several Association research projects exploring the fundamental science of diabetes. Two of these projects, including one led by Dr. Maureen Gannon and featured in this report, have been conducted at Vanderbilt University. We have visited the researchers’ labs and have been impressed with both the professionalism and progress on these projects.”

– Roger and Camille Blume
2016 Research Funding

**Grant Type**

**Dollars in Millions**
- Core Research: $18.9
- Core Development: $6.4
- Core Training: $3.9
- Collaborative Targeted Pathway: $0.8
- Clinical and Translational Science: $4.5

**Diabetes Type**

**Percent of Dollars**
- Type 1 Diabetes: 31%
- Both Type 1 and Type 2: 17%
- Type 2 Diabetes: 12%
- Gestational Diabetes: 16%
- Obesity: 3%
- Prediabetes/Insulin Resistance: 65%

**Research Type**

**Percent of Dollars**
- Basic Science: 35%
- Clinical and Translational Science: 65%