Medical researchers have a good understanding of type 1 diabetes—how it begins, how it harms the body and how to treat it. But getting people with type 1 diabetes to manage their disease can pose a challenge.

Type 1 diabetes develops when the body’s immune system mistakenly attacks pancreatic beta cells, which make insulin—the vital hormone that converts sugars and starches into energy and keeps sugar levels in their blood within a certain range. Because people with type 1 diabetes can no longer make insulin, they must measure their blood sugar frequently and take daily insulin—usually injections—to keep their blood sugar at healthy levels.

Properly managing the disease is crucial because high blood sugar levels are toxic to cells and eventually cause complications such as eye, nerve and kidney damage; poor circulation; and heart disease. Rubina A. Heptulla, M.D. (pictured above), the new chief of the division of pediatric endocrinology at Einstein and at Montefiore, the University Hospital and Academic Medical Center for Einstein, knows how dangerous those complications can be: four years ago, she lost her father to complications from type 1 diabetes. Recruited to Einstein in 2010 from Baylor College of Medicine in Houston, Dr. Heptulla is working on several fronts to spare children from a similar fate.
Q: What’s the difference between type 1 and type 2 diabetes?
A: In both types, there is insufficient insulin action to regulate metabolism. But:

- In type 1 diabetes, an autoimmune process has destroyed most or all of the pancreas’ ability to secrete insulin.
- In type 2 diabetes, the body can’t use the insulin it produces because of obesity, hypertension or high levels of fat in the blood, resulting in what is commonly referred to as insulin resistance.
A Common Cause

Michael A. Brownlee, M.D., the Anita and Jack Saltz Chair in Diabetes Research and associate director for biomedical sciences at Einstein’s DRC, is world renowned for his innovative discoveries about the molecular mechanisms responsible for diabetes complications—eye, nerve and kidney damage, and an accelerated atherosclerosis that causes heart attacks, strokes and leg amputations.

At Einstein, Dr. Brownlee discovered that nearly all known mechanisms implicated in diabetes complications share a common link: hyperglycemia (high blood sugar), which causes overproduction of toxic free radicals by mitochondria, the cell organelles that burn food to produce energy. In a 2010 study in Diabetes, Dr. Brownlee showed that these free radicals trigger the overabundance of a cell-surface receptor known as RAGE, which helps fuel the chronic inflammation that contributes to diabetic complications. Before this discovery, researchers had tried to block RAGE receptors by searching for drugs to inhibit them. Now that search is unnecessary, because finding drugs that eliminate toxic free radicals would also prevent RAGE activity.

Among the awards Dr. Brownlee has received for his research are the American Diabetes Association’s Outstanding Scientific Achievement Award and Banting Medal, and the Claude Bernard Award of the European Association for the Study of Diabetes.

Boys and Obesity

National surveys show that half of American adolescents are overweight or obese, and according to Einstein researchers, boys are more likely than girls to tip the scales. Carmen R. Isasi, M.D., Ph.D., assistant professor of epidemiology & population health, and her colleagues surveyed 1,600 local public school students and found that nearly 25 percent of the adolescent boys were obese, compared with 20 percent of the adolescent girls. The results surprised the researchers, especially because teenage boys generally report being more physically active than girls. “We don’t really understand what factors put boys at higher risk of obesity, but high-calorie sports drinks might be a suspect,” says Dr. Isasi. The researchers plan to investigate further, since obese adolescents tend to become obese adults—a trend that could boost the prevalence of diabetes. The study was published in a 2011 issue of Preventing Chronic Disease.

Fighting Kidney Complications

Diabetic nephropathy (kidney damage) is the most common cause of kidney failure worldwide, and it has a strong genetic component; up to one-quarter of patients have a relative in end-stage renal failure. Unfortunately, the animal models that scientists use to study diabetes have not developed kidney disease.

Now, Einstein’s Streamson Chua, Jr., M.D., Ph.D., professor in the department of medicine (endocrinology) and in the Dominick P. Purpura Department of Neuroscience, and his collaborators at Columbia University have bred diabetic mice that experience renal decline. Working with these animals, the researchers have narrowed their search for the gene that raises susceptibility to diabetic nephropathy to a small region on mouse chromosome 8. Identifying the gene that underlies diabetic nephropathy could lead to better ways of treating or even preventing this potentially fatal syndrome. The study appeared in a 2010 issue of Kidney International.

DRC Tweets!

Last December, two DRC members took part in a popular weekly Twitter event called “#MDChat.” Elizabeth Walker, Ph.D., R.N., professor of medicine (endocrinology) and of epidemiology & population health, and Joel Zonszein, M.D., professor of clinical medicine in the department of medicine (endocrinology), were among a group of professionals who discussed diabetes, resources for its management and its global impact. The live chats typically stimulate hundreds of tweets. The chat was hosted by Einstein’s Paul Moniz, director of communications and marketing; its participants included M.D.s, R.N.s, patients, patient advocates, policy makers and other stakeholders. To see the transcript or to follow the conversation between Dr. Walker (@ElizabethWPhD), Dr. Zonszein (@Zonszein) and others, go to www.einstein.yu.edu/diabetes and click on News & Events.
The Albert Einstein Diabetes Research Center (DRC) gratefully acknowledges the generosity of the individuals and organizations whose support is critical to advancing its mission.

NOTABLE GIFTS

Jackie Heim-Natanson has made a generous gift in support of Einstein’s Global Diabetes Initiative (GDI). Led by its founding director, Meredith Hawkins, M.D., the initiative harnesses Einstein’s outstanding resources in medical research and education to combat the growing global diabetes epidemic.

The gift will contribute to the support of research programs studying malnutrition diabetes in India, and help Dr. Hawkins and colleagues expand the innovative diabetes training programs they have developed for healthcare personnel in Africa, India and other areas.

Ms. Heim-Natanson’s decision to invest in the GDI was inspired by family members who were supporters of the College of Medicine and members of its Society of Founders: her grandfather, Max N. Natanson; her father, Norbert Natanson; and her aunt, Marjorie E. Myers. She was also impressed by Einstein’s work in addressing these important global health issues.

EVENTS

Einstein supporters and friends gathered at the Harmonie Club in New York City on January 19 to participate in “The Diabetes Epidemic: Are You at Risk?,” a panel discussion and reception hosted by the DRC.

Guest speakers included Jeffrey Pessin, Ph.D., the Judy R. & Alfred A. Rosenberg Endowed Professorial Chair in Diabetes Research and director of the DRC; Norman Fleischer, M.D., the Jacob A. and Jeanne E. Barkey Professor of Medicine, chief of the division of endocrinology and co-director of the DRC; and Meredith Hawkins, M.D., professor of medicine, division of endocrinology, and director of Einstein’s Global Diabetes Initiative. They discussed research developments at Einstein and their potential impact on diabetes management, treatment and prevention, and answered thoughtful questions from guests about type 1 and type 2 diabetes.

Meredith Hawkins, M.D., left, director of Einstein’s Global Diabetes Initiative, with Elizabeth Stoner, M.D., ’77.

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To learn more about supporting the work of the DRC, please contact:

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Einstein Overseer Ronald Lissak, center, with Ruth Gottesman, Ed.D., chair of the Board of Overseers, left, and Meredith Hawkins, M.D.

John Van Gorder, executive director of the Leon Lowenstein Foundation, right, with DRC co-director Norman Fleischer, M.D., left, and DRC director Jeffrey Pessin, Ph.D.

DIABETES RESEARCH CENTER

Our mission:

• To support and conduct basic and clinical research related to diabetes and its causes, treatment and complications
• To encourage research that will rapidly lead to diabetes therapies, especially in minority and underserved populations

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