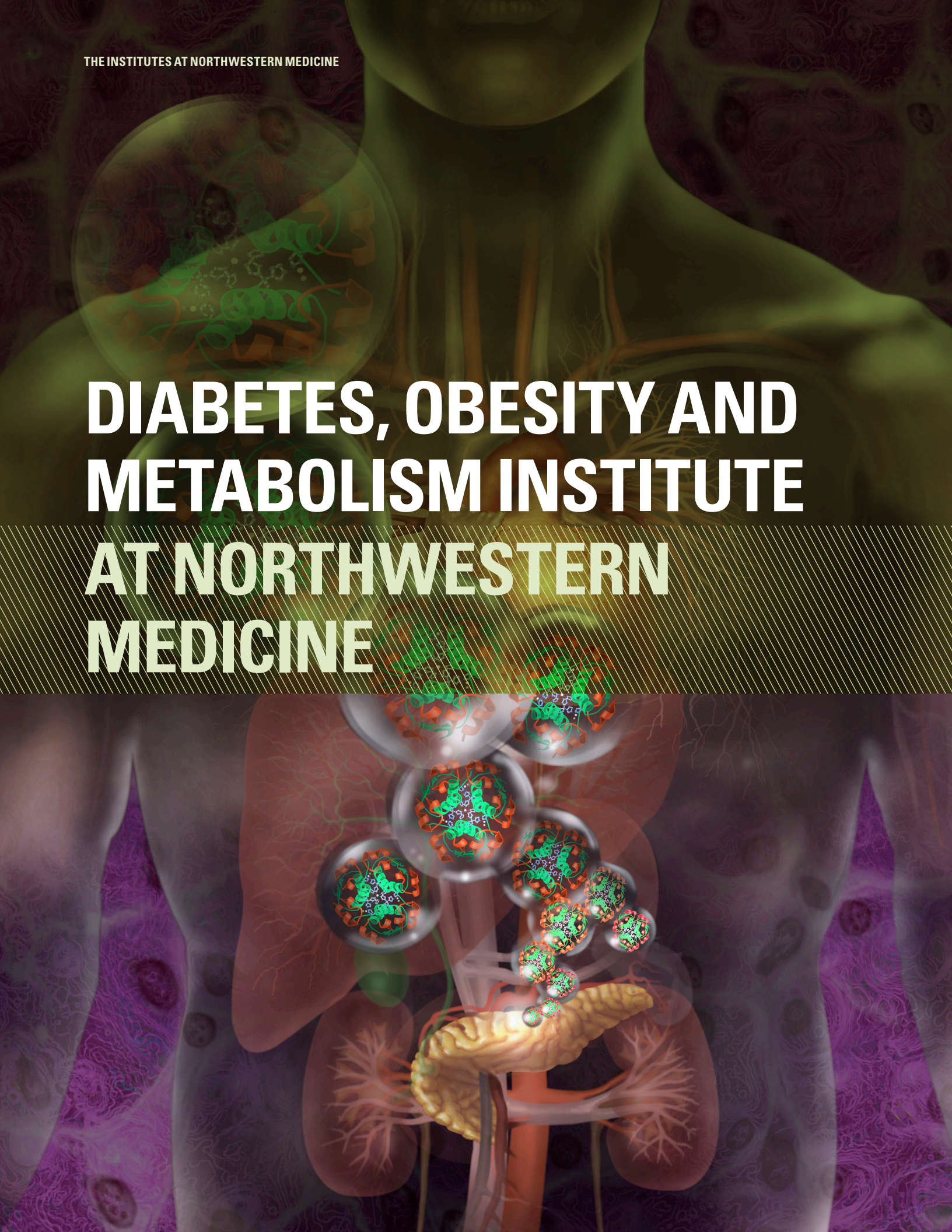


THE INSTITUTES AT NORTHWESTERN MEDICINE

# DIABETES, OBESITY AND METABOLISM INSTITUTE AT NORTHWESTERN MEDICINE





## DIABETES, OBESITY AND METABOLISM INSTITUTE AT NORTHWESTERN MEDICINE

Diabetes, obesity, and metabolic syndrome are disorders that arise from abnormalities in how sugar and other nutrients are used by our bodies.

Diabetes was recognized by the ancient Greeks as a disorder caused by the abnormal passage of sugar into the urine. Now, we recognize that it is a chronic disease characterized by high levels of glucose in the blood. The discovery of the hormone insulin in 1921 and the availability of laboratory-created insulin and other drugs to lower blood glucose brought new insight into the disease. Today, diabetes is the leading cause of cardiovascular diseases including heart disease, stroke, and high blood pressure, blindness, kidney disease, amputations, and pregnancy complications.

Obesity is defined as excessive body fat and causes resistance to insulin, which is why obesity is the most common cause of diabetes. There is still much about obesity as a disease that is not fully understood. Why are some obese patients more likely to develop complications than others? Why are they susceptible to weight gain in situations where others would resist it? It is not fully understood why, but obesity is also an independent risk factor for cardiovascular diseases and cancer.

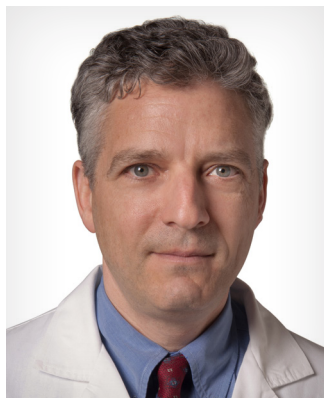
Metabolic syndrome is a precursor of diabetes and heart disease characterized by obesity, resistance to insulin, and abnormal levels of blood fats like cholesterol. It is present in over one third of the population, placing these individuals at higher risk of cardiovascular disease, diabetes, and stroke.

Metabolic syndrome is caused by health behaviors such as poor diet, physical inactivity, and predetermined genetic factors. Better detection of early stages of metabolic syndrome is sorely needed.

The vision for the **Diabetes, Obesity and Metabolism Institute** at Northwestern Medicine is a center that catalyzes integrated clinical care, discovery, education, and prevention and builds on the thought-leadership and breakthrough research that exists at Northwestern in diabetes, obesity, and related complications. Our goal is to develop an infrastructure to deliver cutting-edge therapies that help people living with diabetes today and to curtail its spread in the future.

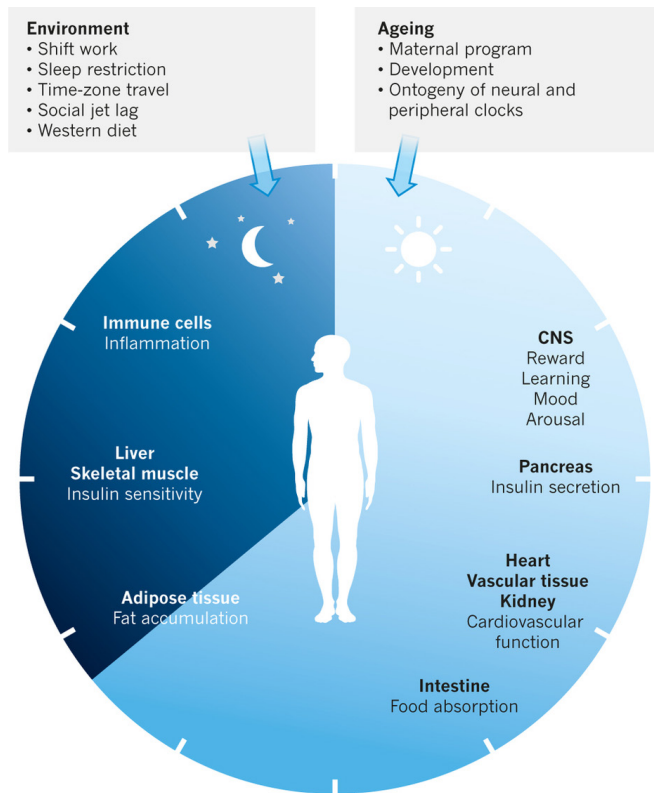
### Juvenile Type 1 Diabetes

Juvenile type 1 diabetes is a childhood subtype that is caused by the autoimmune destruction of a person's pancreatic beta cells, which secrete insulin. Standard treatment involves lifelong insulin dependence and is associated with significant neural, ocular, and vascular complications. Exciting emerging strategies for effective therapies of type 1 diabetes tap into Northwestern's strengths in immunology and transplantation. One approach is to reverse the onset of type 1 diabetes in high-risk patients by preventing beta cell destruction. This strategy involves inducing specific tolerance to prevent the autoimmune destruction of insulin-producing beta cells without compromising the patient's immune system. This tolerance scheme may have implications beyond type 1 diabetes for other autoimmune disorders, as well as allergy and transplantation. It provides hope for



"As we launch the Diabetes, Obesity and Metabolism Institute at Northwestern Medicine, I am excited and confident that we are uniquely poised to establish a premier center to implement team-based clinical care for individuals with these disorders. We envision that the new Institute will foster an interdisciplinary environment to inspire new inroads to fight disease—catapulting Northwestern to international eminence in this rising epidemic."

Joe Bass, MD, PhD, Chief of the Division of Endocrinology, Metabolism and Molecular Medicine  
Charles F. Kettering Professor of Medicine



new treatments for type 1 diabetes that will obviate the need for insulin therapy. And, it exemplifies interdisciplinary research and treatment breakthroughs within Northwestern Medicine.

### Adult-onset Type 2 Diabetes

As the most common form of diabetes, adult-onset type 2 diabetes affects 90 to 95 percent of the 26 million Americans with diabetes, and is now affecting children at alarming rates as well. Individuals with type 2 diabetes are resistant to insulin. Their pancreatic beta cells produce insufficient insulin to overcome insulin resistance and maintain normal glucose metabolism. Thus, a major treatment goal is to eliminate the insulin resistance by enhancing the response to insulin throughout the body. Some novel therapeutic strategies underway at Northwestern apply insight into the connection between genes, genomes, and metabolic processes to develop new treatments. For example, gene-mapping and molecular techniques are used to identify pathways underlying the development of diabetes and related complex disorders. Recruiting top talent with expertise in integrating genomics, diabetes, nutrition, and cardiovascular disease is a priority for the Institute.

Other approaches at Northwestern have been groundbreaking in the battle against type 2 diabetes and evolve from our understanding of the role of sleep and our internal body clock—a timing system that causes us to wake up and eat at specific times during the day and night. Why then do people with diabetes have trouble controlling blood sugar in the middle of the night? And, why are some

people driven to eat when they should instead be going to bed? What are the nutritional drivers of diabetes? These questions strike at the fundamental link between our body timing process and our susceptibility to both diabetes and obesity. Our researchers have taken a leading role on discovery into how our body responds to glucose and to the hormone insulin according to the time of day and night. A cornerstone of work in the Diabetes, Obesity and Metabolism Institute will translate such work into new drug targets to control blood sugar and facilitate weight loss.

Diabetes, obesity, and metabolic syndrome complications affect many tissues and organs including heart, eyes and vision, feet, skin, kidneys, nerves, as well as fetuses. Northwestern Medicine is tackling the cardiovascular complications of diabetes from all sides. At the molecular level, we are looking at the bio-molecular connections between diabetes and cardiovascular disease. Using genome-wide strategies, we are identifying genes associated with blood levels of glucose and insulin and atherosclerosis. At the population level, we are addressing epidemiological and public health questions of cardiovascular complications of diabetes.

Northwestern has long been a leader in studying the impact of gestational diabetes, pre-existing diabetes, and the impact of altered nutrition during pregnancy on the intrauterine, perinatal, and lifelong health of fetuses and infants. Our ongoing research seeks to determine how exposure of the developing fetus to high sugar levels and obesity in the mother increases the offspring's lifelong risk of obesity and altered lipid and sugar metabolism.

We are growing the integration of organ disease expertise and the diabetes, obesity, and metabolic syndrome connections. We are examining the evidence that metabolic disruptions are tightly connected to increased risks for cancer, and we are uncovering new strategies towards regulating obesity-associated metabolism disruption that impacts cancer-cell metabolism.

Nutrition, behavior, obesity, and wellness are inextricably linked. Northwestern Medicine has a unique research platform, specialized intellectual strengths, and unmatched clinical infrastructure on which to build a prominent Institute. We are known for excellence in diabetes basic, clinical and population research, glucose management services, and diabetes and cardiovascular complications. We have been at the forefront in caring

for pregnant diabetic patients. Our population science and public health team has a strong record in integrating proven therapies for diabetes for the communities at highest risk.

Northwestern Medicine is creating regional, national, and international leadership to combat the escalation of diabetes, obesity, and metabolic syndrome by incorporating genetic, molecular, and physiological breakthroughs into the development of effective nutritional interventions and wellness and healthy lifestyle programs. Thus, we will propel our Diabetes, Obesity and Metabolism Institute into an internationally recognized comprehensive “one-stop shop” care center for the treatment and prevention of diabetes and obesity-related metabolic disorders across all age groups.

## THROUGH NORTHWESTERN MEDICINE, WE ARE CREATING A NATIONAL EPICENTER FOR HEALTHCARE, EDUCATION, RESEARCH, COMMUNITY SERVICE, AND ADVOCACY.

### Northwestern Medicine

Northwestern Memorial HealthCare and Northwestern University Feinberg School of Medicine are seeking to impact the health of humankind through Northwestern Medicine. We aspire to be the destination of choice for people seeking quality healthcare; for those who provide, support, and advance care through leading-edge treatments and breakthrough discoveries; and for people who share our passion for educating future physicians and scientists. Our commitment to transform healthcare and

to be among the nation’s top academic medical centers will be accomplished through innovation and excellence. Through the Diabetes, Obesity and Metabolism Institute at Northwestern Medicine, we will establish an international model for improving the outcomes, overall health, and quality of life of countless individuals affected by diabetes and its related conditions. The new therapies that will emerge from our researchers have the potential to help millions of Americans living with diabetes.