TYPE 1 DIABETES
RESEARCH FACT SHEET

Type 1 diabetes is an autoimmune disease in which the body's immune system attacks and destroys the beta cells in the pancreas that make insulin. People with this disease must inject themselves with insulin to stay alive. They must carefully monitor their blood sugar, and also balance their food intake and exercise. Long-term complications of type 1 diabetes include disabling or even life-threatening organ damage, such as heart disease, kidney disease, blindness and nerve damage.

Up to 1.5 million Americans have type 1 diabetes, and the worldwide incidence of the disease is growing with the greatest increase in children under five-years-old. The disease accounts for 5 to 10 percent of all diagnosed diabetes in the U.S. Type 1 diabetes, once called juvenile diabetes, usually occurs in children or young adults and is especially prevalent among people of Northern European heritage.

BRI Leads Diabetes Research

Benaroya Research Institute at Virginia Mason (BRI) is an international leader in type 1 diabetes research and has investigated it for more than 30 years, starting with identification of a genetic marker for the disease. Exciting achievements over this time period have led to success in finding causes of type 1 diabetes, early diagnosis and new therapies. Reflecting this impactful role in the type 1 diabetes community, the major agencies looking for an institute to lead international centers for research have chosen BRI to direct collaborative work worldwide.

Global Impact Through Partnerships and Collaboration

TrialNet: In June 2015, Carla Greenbaum, MD, BRI director of the Diabetes Research Program, became chair of the Type 1 Diabetes TrialNet network, supported by the National Institutes of Health (NIH). The network includes 21 clinical centers working in cooperation with more than 200 screening and clinical research sites throughout the U.S. and seven other countries. TrialNet is dedicated to the study, prevention and early treatment of type 1 diabetes. Clinical trials have identified markers for risk and disease progression in diabetes and are testing therapies to intervene prior to onset of clinical symptoms, by blocking the immune attack on pancreatic beta cells that produce insulin. In 2014, BRI became the TrialNet Hub with a mission to increase the efficiency of critical Network activities by supporting collaborative and innovative approaches for screening, recruitment, and trial implementation. BRI also directs the TrialNet Northwest Clinical Center.

JDRF CAV: The JDRF Core for Assay Validation (CAV) is located at BRI where scientists are working to isolate type 1 diabetes biomarkers. These will be used to identify people at risk for the disease, predict progression rates and assess how well treatments are working. The CAV is a hub for numerous projects throughout the international biomarker research community. Alice Long, PhD, and Cate Speake, PhD, lead the CAV.

Immune Tolerance Network: BRI leads the Immune Tolerance Network (ITN), a large international clinical research consortium supported by the National Institute of Allergy and Infectious Diseases of the NIH, conducting clinical trials and studies in transplantation, allergy and autoimmunity. The network's aim is to reprogram the immune system so that disease-causing immune responses are stopped while maintaining the immune system's ability to combat infection. For type 1 diabetes, the ITN conducts clinical and pre-clinical studies designed to extend people's ability to produce insulin when they are newly diagnosed with type 1 diabetes by rescuing beta cells from immunological attack. Gerald Nepom, MD, PhD, is director of the ITN.

Fighting Type 1 Diabetes

Gene Editing

BRI and Seattle Children's Research Institute (SCRI) are pioneering the use of gene editing techniques in efforts to control type 1 diabetes. The long-term goal would be to take blood cells that target the pancreas from a person who has type 1 diabetes or is at high risk for the disease. Scientists would edit the cells to turn them into regulatory T cells and inject them back into the patient's bloodstream. The cells would travel to the pancreas and stop any T cell attacks in the pancreas.

Prevention

Many encouraging results have occurred recently in efforts to prevent type 1 diabetes. Researchers are now able to predict who is at risk for developing the disease and when they might develop it. New therapies have been shown to preserve insulin secretion for a while in people newly diagnosed with type 1 diabetes. These are now being tested to see how they work in people at risk for the disease. Family members of people with type 1 diabetes can be tested to determine their risk of developing diabetes and to determine if they're eligible for a prevention trial.

Scientists have learned that family members of someone with type 1 diabetes have 15 times the chance of developing the disease relative to the general population. A simple blood test for these relatives may detect autoantibodies that show an increased risk years before symptoms appear. Researchers now know that essentially all individuals with two or more autoantibodies will develop type 1 diabetes. Family members may be tested at no cost through a study called TrialNet Pathway to Prevention. Researchers will closely monitor participants identified to be at risk to help in early diagnosis and management of the disease. People at risk may be eligible to enter a prevention trial. Currently, two therapies are being tested to see if they can stop or slow down the immune system reaction that destroys insulin-making cells.

Researchers are also working to promote a new type 1 diabetes classification system through TrialNet and other organizations. The classification system describes three stages of developing type 1 diabetes and is vital to understanding how the disease progresses. Equally important is TrialNet's ability to diagnose the disease in its earliest stages, allowing for prompt intervention.

Intervention and Reversal

Studies through TrialNet and the Immune Tolerance Network (ITN) are looking at how to extend people's ability to produce insulin when they are newly diagnosed with type 1 diabetes. Researchers have found at the time of diagnosis that many people continue to produce small amounts of insulin. Since even small amounts of natural insulin production can decrease the long-term effects of diabetes and improve short-term clinical management, scientists search for ways to keep these remaining cells producing insulin. Researchers are also launching studies for patients with longer-term diabetes and investigating an artificial pancreas to help people better manage their disease.

Biorepository

BRI uses biorepositories to better understand biomarkers associated with the progression of type 1 diabetes and to identify targets for new therapies. A biorepository consists of blood and tissue samples linked to medical and demographic information collected from people with a specific disease or condition. BRI maintains one of the world's most robust biorepositories for the study of autoimmune disorders including type 1 diabetes. BRI also shares information with scientists internationally to accelerate discoveries.

Personalized Medicine

In clinical trials, not all individuals respond in the same way to particular immunological therapies. In the laboratory, BRI scientists are investigating the molecular mechanisms of the type 1 diabetes autoimmune response, and of immune interactions with each therapy, to better understand disease progression and uncover new approaches to treatment. These studies also are developing methods to better predict a person's disease risk and provide earlier diagnoses so that patients can begin treatments sooner, at a time when more beta cells remain and more of the insulin production function can be saved. Teams of BRI investigators, led by Alice Long, PhD, and Peter Linsley, PhD, are developing "discovery pipelines" for analysis of clinical trial samples to better understand the way different individuals respond to different therapies. This information is a cornerstone for tailoring therapy specifically to individuals — the right treatment for the right person at the right time.

For More Information

To learn more about risk testing, joining a biorepository and clinical studies, please call 800-888-4187 or visit BenaroyaResearch.org/our-research or e-mail Diabetes@BenaroyaResearch.org.

Community Support

BRI needs community support to continue its crucial work of finding the causes and cures to eliminate these autoimmune diseases. For more information about supporting BRI call (206) 583-6083 or visit BenaroyaResearch.org/donate-now.