Autoimmune diseases take a terrible toll on America and the world. One in every 20 Americans suffers from an autoimmune disease such as type 1 diabetes, multiple sclerosis (MS), Crohn’s disease and rheumatoid arthritis. Autoimmune diseases are one of the top 10 leading causes of death in female children and women in all age groups up to 64 years of age. The National Institutes of Health estimates annual direct health care costs for autoimmune diseases to be in the range of $100 billion. And because many causes of autoimmune diseases are shared, people living with an autoimmune disease are more likely to suffer from more than one of these destructive diseases.

What if medical research could discover the commonalities between these diseases and find therapies that work for more than one disease? That’s exactly what Benaroya Research Institute at Virginia Mason (BRI), is doing. The scientists aren’t focused on eliminating one or two autoimmune diseases — they’re taking on all 80.

Continued on page 5
FREE OF MANAGING TYPE 1 DIABETES FOR A DAY

Annie Shultz is determined that history won’t repeat itself. Her father, Richard Shultz, was diagnosed at age 19 with type 1 diabetes. Annie watched her father struggle with complications her entire life. He suffered from eye, kidney, heart and nerve diseases, all complications attributed to type 1 diabetes. Annie knew she was at higher risk for developing type 1 diabetes but was still shocked when at age 21 she found out she had the disease. Although diagnosed at a similar age as her father, Annie’s journey with type 1 diabetes has been vastly different. She manages her disease vigilantly and participates in research to improve diabetes management. Annie, now 34, is participating in a groundbreaking clinical research trial at BRI. Annie will be free of managing her type 1 diabetes for a day while she is connected to an experimental artificial pancreas.

In these exciting new studies, BRI is testing an artificial pancreas that automatically dispenses insulin based on real-time changes in blood glucose levels. The device is comprised of existing technologies used to manage type 1 diabetes — an insulin pump and a continuous glucose monitor — in conjunction with a unique software program. The hope is that this would someday relieve adults, children and their families from the arduous 24/7 manual maintenance of their diabetes.

This past year, BRI tests of the artificial pancreas showed that blood glucose levels under highly controlled conditions could be managed through a personalized automated artificial pancreas in several participants with diabetes. Most patients with diabetes cannot achieve tight glucose control with traditional diabetes tools and spend less than half of their days at healthy glucose levels. Studies show that tight control of levels significantly reduces or delays the development of complications.

HOMETOWN TECHNOLOGY

While other systems are being tested at selected locations worldwide, BRI is the only center nationally testing this unique software program for the artificial pancreas. The program was developed by Richard Mauseth, MD, a long-time Pacific Northwest pediatric endocrinologist, and Boeing software engineers Robert Kircher and Don Matheson. This BRI artificial pancreas study is funded by JDRF, who has designated 15 centers internationally to test various approaches to these devices. JDRF is aiming to develop a first-generation artificial pancreas with the hope of helping millions of people with type 1 diabetes.

“I count on JDRF and BRI to support research to find new treatments and cures for this disease,” says Annie. “It would make such a difference in so many people’s lives.”

For more information, visit BenaroyaResearch.org or call 1-800-888-4187.

How the Artificial Pancreas Works

1) The glucose sensor/transmitter, which goes through the skin, wirelessly transmits glucose readings to the receiver.
2) The receiver is an external device that can be clipped to a person’s pants. The glucose readings from the receiver are then transmitted to the laptop.
3) The laptop contains an algorithm that determines an insulin dose based off the glucose reading and sends the suggested dose to the insulin pump wirelessly.
4) The pump then delivers the dose. This process repeats itself every five minutes.
Rheumatoid arthritis (RA) is a chronic autoimmune disease that causes joint pain and inflammation. It can lead to substantial loss of mobility and decreased quality of life for the 1.3 million Americans suffering from the condition. RA results when the body’s immune system mistakenly attacks the membranes that line the joints. Benaroya Research Institute has recently been a part of clinical trials for two RA drugs that provide hope for many patients that have not found relief with previously approved treatment options.

Both drugs investigated in these clinical trials function by inhibiting Janus kinase (JAK) enzymes, which in turn modulate the immune system response. The idea is that through their impact on the immune system pathway, the progression of RA will be halted and symptoms of the disease will be alleviated.

One BRI clinical trial contributed to the November 2012 FDA approval of Xeljanz® (tofacitinib) for use in patients who have had inadequate responses to one or more disease-modifying anti-rheumatic drugs (DMARDs). Xeljanz® is the first new oral treatment for RA in over a decade. A second trial is evaluating a second oral JAK inhibitor, baricitinib, for use in RA.

“It is exciting to see new RA therapies like these which may help some patients who haven’t been helped by existing RA treatments,” says Stanford Peng, MD, PhD, the principal investigator for these studies at BRI.

There are currently many treatment options for RA that generally take care of up to 70 percent or more of symptoms, but they work for only about 30 percent of patients. “The real problem is finding treatments that will resolve the remaining symptoms and work well for the other majority of patients,” notes Dr. Peng. “This is why it is so important that new therapies and therapy combinations continue to be evaluated through clinical research studies.”

BRI Clinical Investigator Stanford Peng, MD, PhD (left), researches new therapies for arthritis.

DID YOU KNOW?
There are more than 100 different types of arthritis and allied diseases. There are several diseases where joint pain is primary and is considered the main feature. Generally when a person has “arthritis” it means that they have one of these diseases:

- Osteoarthritis
- Rheumatoid arthritis
- Gout and pseudo-gout
- Septic arthritis
- Spondyloarthritis
- Juvenile idiopathic arthritis
- Still’s disease

CLINICAL RESEARCH STUDIES
BRI offers clinical research studies for a variety of rheumatic diseases to evaluate novel therapies in these diseases. Studies may be available in the following areas: axial spondyloarthritis, lupus, relapsing polychondritis and rheumatoid arthritis. Contact the Rheumatic Diseases Clinical Research Program at 206-342-6524.

BIOREPOSITORIES
Healthy volunteers and people with rheumatic diseases can help scientists move rheumatic disease research forward by donating a blood sample and answering some questions about personal and family health history. Contact toll-free (1-877-202-5200) or email biorepository@BenaroyaResearch.org.

For more information on rheumatic diseases and clinical trials, visit BenaroyaResearch.org.
Gaylia Meitzen lived her life with joy and courage. Though she was diagnosed with type 1 diabetes at age 16, she enthusiastically took up fishing, boating, golfing and traveling, and she even climbed Mount Rainier. She loved talking with young people with type 1 diabetes to encourage and mentor them.

And when she learned about BRI’s mission to fight autoimmune diseases including type 1 diabetes, it became her passion to support the Institute and research. She joined the BRI Board of Directors in 2007, served as chair of the BRI Development Committee and spoke at numerous events about living with type 1 diabetes and the research at BRI. She also provided generous and inspiring philanthropic support. On March 23, 2013, Gaylia passed away. In her honor, the BRI auditorium has been named The Gaylia R. Meitzen Auditorium, acknowledging her extraordinary commitment to nurture and foster BRI’s mission.

“Gaylia Meitzen was a tremendous advocate for BRI and for our diabetes research efforts, serving on our Board of Directors for many years,” says BRI Director Gerald Nepom, MD, PhD. “Her advice, energy and commitment to our mission will be sorely missed. We are honored to dedicate The Gaylia R. Meitzen Auditorium in her memory and to continue her legacy.”

“For Gaylia, it’s always been about the promise of research, as she’s demonstrated through her support for many years,” says her husband, Steve Quintrell. “She saw research as hope for the cure.”

Many individuals have been inspired by the work of BRI and the hope it represents for the prevention, treatment and elimination of autoimmune diseases. They have supported BRI in a number of ways. Find out more about getting involved at BenaroyaResearch.org.

• Stay current about our work. Visit our website at Benaroya Research.org, share our newsletter or join our Facebook page at Facebook.com/BenaroyaResearch.

• Attend an event. You can participate in a fundraising event or a community event to support the fight against autoimmune diseases.

• Join a biorepository. You can move research forward by donating blood, a cheek swab or a tissue sample to a biorepository.

• Participate in a clinical study. Be a part of translating research into reality by participating in a clinical research study.

• Donate funds. BRI is a nonprofit organization that benefits from the support of thousands of individuals every year. Gifts of all sizes are welcomed and appreciated.
If one person in my family has an autoimmune disease, what are the chances that someone else in my family will have an autoimmune disease?

Inherited genes play an important role in determining risk of autoimmune diseases. Some genes confer a large risk, other genes confer a small risk, and some genes even provide protection from autoimmunity, so it can get a bit complicated. A precise answer to this question, therefore, depends on exactly which autoimmune disease and which genes are involved.

In general, risk is increased among close relatives within a family, due to the likelihood that genes are shared. That risk ranges from a few percent increase all the way up to an increase of 10- to 20-fold. It is important to realize, however, that even these large increases mean that the overall disease risk can be fairly small. For example, an increased 10-fold risk for an autoimmune disease that occurs in one in 1,000 people means that the risk becomes one in 100. So while family members have a high likelihood of inheriting disease-associated genes, and they are at higher than normal risk of also getting autoimmune diseases, in most cases the odds are still reasonably low.

BRI DIRECTOR
GERALD NEPOM, MD, PHD

For Families of People With Type 1 Diabetes

BRI offers a free screening test to determine if you’re at high risk for type 1 diabetes. If so, you may be eligible to join one of three important prevention trials. Contact 1-800-888-4187 or diabetes@BenaroyaResearch.org.

DID YOU KNOW?

A total of 16 million Americans — 12 million women and 4 million men — suffer from autoimmune diseases. Below are some of the most common autoimmune diseases. People in the Pacific Northwest have a higher rate of these diseases. Though the reasons why aren’t known, some likely factors that contribute to this geographic effect are vitamin D deficiency from lack of natural sunlight, genetic predisposition in the North European/Scandinavian heritage and environmental triggers.

Americans living with autoimmune diseases (in millions)

- Crohn’s disease and colitis
- Type 1 diabetes
- Lupus
- Multiple sclerosis
- Rheumatoid arthritis

Autoimmune diseases happen when the body’s immune system, designed to protect the body, attacks it instead. BRI scientists work together to study the genes, molecules, cells and function of the immune system to discover the common elements that — no matter what type of tissue is affected — will explain the disease course and help identify the best approach for therapy.

“Bringing together researchers and clinicians studying multiple autoimmune diseases is a catalyst for discovery — not only learning how similar mistakes by the immune system can cause different diseases, but also using this information to test therapies that have been initially developed for one disease and apply them to a different disease,” says BRI Director Gerald Nepom, MD, PhD.

BRI recently launched a public awareness campaign, BRING IT ON, in Seattle. It provides information about autoimmune diseases and the way BRI is fighting them. To learn more, visit BenaroyaResearch.org.

IF YOU HAVE QUESTIONS FOR ASK THE RESEARCHER, PLEASE SEND THEM TO NEWS@BENAROYARESEARCH.ORG
UPCOMING EVENTS

STEP OUT TO FIGHT DIABETES WALK          SEPT. 28
What: Step Out: Walk to Stop Diabetes is the American Diabetes Association’s signature fundraising walk.
Visit: stepout.diabetes.org

ILLUMINATIONS LUNCHEON                  NOV. 1
What: The Illuminations Luncheon is an opportunity for guests to learn more about the latest discoveries at Benaroya Research Institute and support autoimmune disease research.
Visit: BenaroyaResearch.org/events or call 206-223-7521

LIFE SCIENCES RESEARCH WEEKEND          NOV. 1–3
What: Life sciences companies and research institutions from around the state will host interactive exhibits that reflect the cutting-edge research that is taking place in our state. It is held at the Pacific Science Center in Seattle.
Visit: nwabr.org

Copyright © 2013 Benaroya Research Institute at Virginia Mason (BRI). All rights reserved.
BRI is a world-renowned nonprofit medical research institute in autoimmune diseases. For more information, visit BenaroyaResearch.org or call 206-342-6500.