Researchers at Benaroya Research Institute at Virginia Mason (BRI) used cutting-edge tetramer technology developed at BRI to find the T cells that drive rheumatoid arthritis (RA). “By using tetramer technology, we were able to examine whether T cells in people with rheumatoid arthritis were increased in number or were unique in other ways,” says BRI Associate Director Jane Buckner, MD, who led the study with BRI Tetramer Core Laboratory Manager Eddie James, PhD. The findings were recently reported online in Arthritis & Rheumatology.

This tool now allows scientists to study how RA starts, how current therapies may impact the immune response directed to the joint and how to specifically target these cells therapeutically. “For the first time, we were able to demonstrate that T cells that recognize proteins in the joint were increased in the blood of people with RA and that these cells had a unique set of markers. Further we were able to demonstrate that the number of these cells changes over time in patients and with treatment.” BRI is an international leader in developing tetramer technology, which allows scientists to isolate these cells to study their role in RA.

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FOOD ALLERGIES MOTIVATE BOYS TO CONTRIBUTE TO RESEARCH

Most kids take a backpack to school for their books and lunches. But since they were 4 and 7 years old, Aaron and Justin carry their backpacks everywhere. They are filled with lifesaving medications including epinephrine auto injectors and Benadryl. Aaron also carries an asthma inhaler.

The Newton boys both have peanut allergies. Living with a food allergy is different, says Justin, now 12. “You can’t eat everything and you have to look at labels to see if the food is safe. It’s harder to go out with friends because you can’t always eat everything.”

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Mary Farrington, MD, a Virginia Mason allergy specialist, informed them about the study. Justin now takes time out from his karate and running to give blood for the research. “I hope that this will be helpful for others and help me too,” he explains. “Maybe there will be a cure someday,” Aaron loves to play baseball and other sports, and hopes to help people with allergies too.

DID YOU KNOW?
• Up to 15 million Americans have food allergies.
• This potentially deadly disease affects 1 in every 13 children (under 18 years of age) in the U.S.
• Allergies occur when the body’s immune system overreacts to a foreign substance (an allergen), such as food, pollen or animal dander, that in most people is generally harmless.
• People react to the proteins in these allergens with an antibody that releases chemicals that cause sneezing; itching in the nose, eyes and ears; and in rare cases the life-threatening reaction anaphylaxis.

“We talk about the studies and how they help us learn more about their allergies,” says Lori. “It’s exciting to think that our experiences can help us and others so that kids won’t have to worry about not breathing from eating an allergen.” She has high hopes for allergy immunotherapies delivered by patches or orally. “Dr. Farrington believes that we can lead wonderful, productive lives despite our allergies. As my kids grow older, she is helping them take ownership of their care and action plans.”

Learn more at BenaroyaResearch.org.
Have you considered volunteering for a clinical research study, but were unsure if it was something you could do comfortably and confidently? Below are answers to your questions.

What are clinical studies?
Clinical studies are medical research studies in which people participate as volunteers. These studies, also called trials, are a way of developing new treatments and medications for diseases and conditions. There are strict rules for clinical trials, which are monitored by the National Institutes of Health and the U.S. Food and Drug Administration. Volunteers receive access to new experimental approaches and the opportunity to contribute to learning about and treating their disease.

Why are they necessary?
Researchers at BRI are keenly aware of the expression “in vivo, veritas.” Truth (veritas) in clinical research comes from testing in real life (vivo), not in test tubes. When laboratory and preclinical studies indicate a high probability of success, people are invited to participate as research team members, volunteering to help advance science and medicine through clinical trials and biorepositories that study blood and tissue samples. Joining a trial may mean that some participants will receive an investigational drug, treatment or device. Whereas joining a biorepository means donating a sample rather than receiving something investigational.

Why should I participate?
The health of millions has been improved because volunteers joined clinical research studies. Without research participants, advancements in health cannot be made. Whether testing a new drug therapy, studying a combination of drugs in a new way or monitoring immune cells in response to a novel treatment, BRI’s clinical and translational research programs provide a coordinated system for participants. Staff members work with the volunteers to monitor health, safety and changes in their diseases profiles.

Is there a cost to participate?
Typically, costs associated with the study, such as study medication, physical exams and education are paid by the study. Sometimes the study covers travel expenses as well as a small stipend for your time and effort.

Can I participate if I am healthy?
A volunteer with no known significant health problems who participates in research to test a new drug, device or intervention is known as a “healthy volunteer.” At BRI, disease-free people who want to help advance knowledge can join the BRI biorepositories. In a typical study, blood samples, tissue samples, medical history and other data from healthy volunteers are being compared with those with autoimmunity such as type 1 diabetes, rheumatoid arthritis or multiple sclerosis to understand how healthy immune systems work.

Must I be a Virginia Mason patient to participate?
You don’t need to be a Virginia Mason patient. Anyone who qualifies for a study can participate.

How can I find out which studies are open?
BRI’s biorepositories and clinical research trial disease areas are listed on the BenaroyaResearch.org website or you can call the numbers below.

Biorepositories: 1-877-202-5200
Clinical Research Studies: 206-342-6915
Diabetes Research Studies: 1-800-888-4187
N
ear the end of her second pregnancy, Katie Cleary noticed pink dots all over her legs. Her doctor said they would go away, but when they became worse after her baby was born, she went to a dermatologist. She was diagnosed with pleva, a skin disease characterized by a recurrent red rash. Around the same time, Katie was diagnosed with Hashimoto’s disease, an autoimmune disease causing inflammation of the thyroid gland and then reactive hyperglycemia. She notes there is a genetic connection with others in her family who have autoimmune diseases, mainly type 1 diabetes.

As she grappled with her diseases and extreme fatigue while trying to be a good mom, she turned to the internet for more information. “I couldn’t find the information I wanted online and thought that other people must have the same problem,” Katie says. Since she and her husband have website expertise, Katie had the idea to publish the website AutoimmuneMom.com along with a Facebook page of the same name.

“Our goal is to provide part information and part community support for moms and others that are struggling with autoimmune diseases,” she explains. “While there are websites providing information and support for one autoimmune disease, we discuss having several autoimmune diseases at the same time and also talk about rare autoimmune diseases.” People are grateful for the communication with the site, which has thousands of visits each week.

When Katie learned about Benaroya Research Institute and its approach to studying the commonalities between autoimmune diseases to find causes and cures for all of them, she was excited. “I wanted to increase awareness of Autoimmune Mom and let people know about the good work BRI is doing.” To get the word out, the Autoimmune Mom Facebook site donated $2,500 to BRI for “likes” received during a certain time period.

“We so much appreciate the efforts of Autoimmune Mom to support awareness of autoimmune diseases and our research,” says BRI Director Gerald Nepom, MD, PhD. “It is so difficult to be a mom with autoimmune diseases and we applaud these women for sharing their stories and support. We are all committed to work together to eliminate these diseases.”

“I hope that BRI can eventually make their research broadly available so people can be diagnosed quickly and diseases can even be prevented,” says Katie. “It’s important to fund autoimmunity research as an umbrella for treatments for all autoimmune diseases. I don’t want my children to suffer from them.”

Learn more at BenaroyaResearch.org.

**USING DATA FOR PUBLIC GOOD**

The Immune Tolerance Network’s (ITN) TrialShare Clinical Trials Research Portal has won the National Academy of Sciences Data and Information Challenge. The theme of this year’s competition was “Using Data for the Public Good.”

The ITN is a research cooperative led by Benaroya Research Institute and funded by a grant from the National Institute of Allergy and Infectious Disease (NIAID), part of the National Institutes of Health (NIH).

The ITN’s entry, entitled “ITN TrialShare: Enabling True Clinical Trial Transparency,” describes the unique data sharing portal developed by the Network. The system provides clinical trial investigators an unprecedented ability to share data with other researchers. Among ITN’s TrialShare team that created the data sharing portal.

its unique features are the ability to access raw de-identified participant level study data, review published analysis methods, and perform real-time interactive graphical analyses in collaboration with other researchers.

Learn more at BenaroyaResearch.org or itntrialshare.org.
How does bioinformatics help scientists research autoimmune diseases?

About 25 years ago when the Human Genome Project began, scientists started to study a human’s complete set of DNA, which includes an estimated 25,000 genes. This led to new technology to collect vast amounts of data. This data was extremely valuable to scientists but it needed to be accumulated and analyzed correctly. A new field of bioinformatics, which is the application of computer technology to analyze biological information, emerged.

At Benaroya Research Institute, scientists work with the Bioinformatics Core Laboratory to accelerate research in two ways:

1) **Experiment Design.** Scientists can come to us with their hypothesis for any experiment and we can help them determine how to create a statistically significant study. After the data is collected, we can review it, perform a quality assessment and provide a complete analysis.

2) **Biomarker Discovery.** BRI benefits from having a great deal of information on specific diseases through its volunteer biorepositories. We can perform biomarker discovery analysis to look for certain factors crucial to identifying autoimmune diseases. For instance, our bioinformatics team is helping scientists find the key biomarkers that are indicators for type 1 diabetes.

Our team has experience in biology, chemistry, physics, math, biostatistics, computer science, engineering and other skills to enable us to accomplish this work.

The bioinformatics core works with the Data Management & Software Development Core Laboratory under the Director of Research Technology Thomas Skillman, to provide scientists with a full complement of resources. The data core creates systems for scientists to explore data more easily. Together we provide innovative tools that support BRI scientists in accomplishing their mission of fighting autoimmune diseases.

DID YOU KNOW?

- About 1.3 million people in the United States have RA—almost 1 percent of the nation’s adult population.
- There are nearly three times as many women as men with the disease.
- In addition, as many as 300,000 children are diagnosed with a distinct but related form of inflammatory arthritis called juvenile arthritis.

This work was funded by an Autoimmune Disease Prevention grant from the National Institutes of Health. A new grant of $1.3 million from the U.S. Department of Defense will extend the discovery to ask in-depth questions about whether these T cells reflect disease activity and if they change in patients who respond to therapy. Drs. Buckner and James will lead the study with Bernard Ng, MD, chief of Rheumatology, Veterans Affairs Puget Sound Healthcare System. Research will include biorepository studies of samples voluntarily provided by Veterans Affairs and BRI research participants who help to advance science.

*Learn more at BenaroyaResearch.org.*
TOUR BRI
What: Attend our Science Friday Tour to learn more about BRI and autoimmune diseases research. It includes a light breakfast, conversation with a leading researcher and a lab tour led by scientists.
When: 8 – 9:30 a.m., Sept. 12 and Oct. 24
Contact: Rachel Martin at 206-342-6519 or RMartin@BenaroyaResearch.org.

ATTEND ILLUMINATIONS LUNCHEON
What: A luncheon benefiting BRI featuring Diabetes Research Program Director Carla Greenbaum, MD, highlighting the discoveries being made to prevent, treat and ultimately eliminate type 1 diabetes.
When: Oct. 31, 11:30 a.m. – 1 p.m., The Fairmont Olympic Hotel, Seattle
Contact: Event Manager at 206-583-6514 or Events@vmmc.org.

SIGN UP FOR THE LUPUS EVENT
What: An educational symposium focused on lupus presented by the Lupus Foundation of America, Pacific Northwest Chapter, and Sisters Against Lupus.
When: Nov. 1, 1 – 4 p.m., Virginia Mason Medical Center, Volney Auditorium
Contact: Visit lupuspnw.org.