BRI and Autoimmune Diseases
Autoimmune diseases strike one in 20 Americans, with conditions such as multiple sclerosis, Type 1 diabetes, rheumatoid arthritis, lupus, scleroderma, Crohn’s disease and many others. Autoimmune diseases happen when the body’s immune system, designed to protect the body, attacks it instead. There are more than 80 different autoimmune diseases. No tissue or organ is spared from autoimmune diseases. These diseases are chronic and can be life-threatening. Autoimmune disease is one of the top 10 leading causes of death in female children and women in all age groups up to 64 years of age. A close genetic relationship exists among autoimmune diseases, explaining clustering in individuals and families as well as a common pathway of disease.

BRI is one of the leading research institutes in the world devoted to discovering causes and cures to eliminate autoimmune diseases. The work of BRI scientists is generating new knowledge and opportunities for novel therapeutics, through a unique approach in which the patient’s genetics and immune properties are carefully evaluated. BRI’s research aims to block autoimmunity and to develop therapies to reverse disease by redirecting faulty immune systems so they won’t attack healthy tissues.

Arthritis and Allied Diseases
More than 46 million Americans suffer from arthritis and other chronic joint diseases. Arthritis and allied diseases encompass over 100 diseases and conditions. They are characterized by chronic pain and progressive physical impairment of the joints and soft tissues, but can sometimes affect any internal organ. These diseases include osteoarthritis, rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, systemic lupus erythematosus, scleroderma, vasculitis and gout. These diseases are among the most prevalent chronic conditions in the U.S. and a leading cause of disability, with potentially severe economic, psychological and social impact. Several of these diseases, including rheumatoid arthritis, are autoimmune diseases in which the body’s immune system, designed to protect against infection, attacks the body’s own tissues instead.

BRI Research
Currently, no true cures exist for any of these conditions, although recent advances in some fields have significantly improved the effectiveness of available therapies, and have furthered understanding of the underlying mechanism(s) which promote the diseases. At BRI, research programs study the cells which regulate these diseases in an effort to understand the progression of these diseases and translate these findings into novel therapeutic targets. BRI also conducts clinical trials to evaluate novel therapies in these diseases. Following are the areas that BRI is investigating.

Rheumatic Disease Registry
The rheumatic diseases encompass many very different diseases, each of which is caused by the immune system attacking healthy tissue, be it the joints in rheumatoid arthritis, the cartilage in relapsing polychondritis, the skin in scleroderma or the entire body in systemic lupus. BRI leaders in rheumatic disease research include VM rheumatologists, Jane Buckner, MD, BRI Director of the Translational Research Program; Stanford Peng, MD, PhD, BRI Director of Arthritis Clinical Research; Jeffrey Carlin, MD, Kori Dewing, DPN, ARNP; Elizabeth Jernberg, MD; Valerine Stone, MD; and Pedro Trujillo, MD. The rheumatic disease registry is procuring samples from individuals with rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), relapsing polychondritis (RP), early arthritis and scleroderma. These samples are being used for research at BRI but also by researchers across the U.S. who are collaborating with BRI to understand these diseases.

Rheumatoid Arthritis
RA is a chronic disease that can begin at any age. An estimated 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
Lupus is a chronic, autoimmune disease that can damage any part of the body. Importantly at BRI, scientists are also asking how the immune system contributes to this disease. Other signatures in scleroderma are being used to understand how the immune system contributes to this disease. Ongoing research in scleroderma at BRI includes studies to identify the immune mechanisms that cause this disease.

Another area of great interest for BRI researchers is the initiation of the disease. Dr. Peng is studying antibody profiles of people with very early arthritis. Dr. Buckner is involved with the Studies of the Etiology of Rheumatoid Arthritis (SERA) that is identifying established and new important blood and genetic markers. SERA is looking for the presence of various autoantibodies in the blood of healthy people. (An autoantibody is manufactured by the immune system and is directed against the individual's own body.) These autoantibodies may be present before physical symptoms of the disease are evident. SERA is also looking at possible environmental factors that could contribute to RA. SERA's findings may lead to earlier diagnosis and possible prevention of RA in the future. Dr. Peng is Principal Investigator at BRI for three clinical research trials that compare the efficacy of different drugs and combinations of drugs for RA.

Systemic Lupus Erythematosus
Lupus is a chronic, autoimmune disease that can damage any part of the body (skin, joints, and/or organs inside the body). At least 1.5 million Americans have lupus. The disease strikes mostly women of childbearing age (15-44). However, men, children, and teenagers develop lupus, too.

In 2008, BRI teamed up with the University of Washington to develop a systemic lupus erythematosus (SLE) registry. This project has been supported by the Life Science Discovery Fund and is now well underway with 115 SLE patients enrolled. One application of this registry is to study a group of genes known to be overrepresented in SLE to understand why people with SLE produce autoantibodies and to determine which individuals with SLE will respond to specific treatments. Three clinical research studies are also underway at BRI to find new, more effective and better-tolerated therapies for lupus.

Relapsing Polychondritis
Relapsing polychondritis (RP) is a rare disease which results in immune system attacks on cartilage. This includes pain and deformity of cartilage within the ear, nose, trachea and joints. Dr. Buckner has a longstanding interest in the immune mechanisms that cause this disease because of the need for better treatments. RP is also of interest because it is a true tissue-specific autoimmune disease which could enlighten our understanding of other autoimmune diseases such as RA. Currently, the RP registry is among the largest in the world with 264 participants, generously giving blood samples and clinical information sometimes from great distances. A clinical research study to test a new therapeutic for relapsing polychondritis is also underway.

Scleroderma
Scleroderma is an autoimmune disease of the connective tissue which causes skin thickening, spontaneous scarring, blood vessel disease and varying degrees of inflammation. Although scleroderma is a rare disease, it can be devastating and finding new treatments is vital. The Rheumatology Section at Virginia Mason Medical Center has had a long history of caring for patients with scleroderma and was the impetus for the development of the Scleroderma Registry. Currently, the registry includes 204 patients.

Ongoing research in scleroderma at BRI includes studies to identify the immune cells that cause disease. As with other studies at BRI, a key tool that is being used is our tetramer technology. In addition, studies of the genetic signature in scleroderma are being used to understand how the immune system contributes to this disease. Importantly at BRI, scientists are also asking what different diseases of the immune system share with each other.
The scleroderma registry has been central to these studies. Three clinical research studies are also underway to find better treatments for scleroderma.

Other Studies
BRI has studied and/or has plans to study other arthritis and allied diseases, such as osteoarthritis, spondyloarthritis conditions like psoriatic arthritis, or connective tissue diseases like Sjogren's syndrome. Please visit BenaroyaResearch.org to find the latest clinical research trials.

Community Support
BRI needs community support to continue its crucial work of unlocking the immune system and eliminating autoimmune diseases. For more information about supporting BRI please call (206) 583-6083 or visit BenaroyaResearch.org/donate-now.