

## AUTOIMMUNITY RESEARCH AT THE MOUNT SINAI IMMUNOLOGY INSTITUTE

**Percio S. Gulko MD:** rheumatoid arthritis and psoriatic arthritis. The Gulko laboratory has been using a combination of genetic, genomic and functional studies with synovial cells to discover and characterize new genes involved in the regulation of arthritis severity and joint damage. We have discovered new genes implicated in arthritis including the cation channel TRPV2, nuclear receptors, and a new role for CXCL10 in joint damage. We are currently developing new compounds to modulate those genes and to improved disease control aiming for arthritis remission.

**Brain Brown PhD:** tissue specificity and tolerance of the autoimmune response. The Brown laboratory is working to understand how different tissues interact with the immune system, and working to develop novel tolerogenic vaccines for preventing autoimmune disease.

**Dirk Homann MD:** Autoimmune diabetes. Work in the Homann laboratory is focused on specific T cell immunity in autoimmune and infectious disease. We study the targeted modulation of auto reactive T cell responses in *in vivo* model of type 1 diabetes and, more recently, have launched several complementary efforts to better define the histopathological landscape of the diabetic human pancreas.

**Adrian Ting PhD:** Apoptosis. The Ting laboratory is interested in understanding how dysregulation of cell death leads to inflammation and autoimmunity.

**Charlotte Cunningham-Rundles MD:** B cells. Twenty-five percent (25%) of subjects with common variable immune deficiency (CVID) have autoimmunity, and we have approached this problem genetically and from the standpoint of mechanisms. With whole exome sequencing, we can genetically recognize these subjects so that the most targeted therapy can be instituted. Mechanistically with our collaborators we have examined at a single cell level, the genes and gene projects required to establish tolerance. We find that the same gene products required for immune competence are also engaged in stepwise elimination of autoimmune clones, leading to precise dissection of these processes in the human immune system.

**Jean-Frederic Colombel MD:** Inflammatory Bowel Disease Center. Mount Sinai continues to be at the forefront of translational and clinical advances in inflammatory bowel diseases (IBD) through a multi-disciplinary approach. We believe this to be possible because of factors unique and distinctive to our center: 1) world-renowned clinicians and key opinion leaders, with an extensive experience in clinical care; 2) top-level scientists in the fields of immunology, genetics, microbiome, and bioinformatics research, working in close collaboration with the clinical team; and 3) patient volume, unparalleled in any other center, allowing access to multiple samples, multiple patients phenotypes, and multiple data sets that can be used to translate work from the more basic disciplines.

**Yaron Tomer MD:** Autoimmune Thyroid Disease and Type 1 Diabetes. The Tomer's Group is studying genetic, epigenetic, and environmental triggers of thyroid autoimmunity and type 1 diabetes. In addition they perform translational studies aimed at blocking antigen presentation in these disorders.

**Julie Magarian Blander PhD:** Antigen presentation. The Blander laboratory studies the regulatory mechanisms that prevent the MHC class I and class II presentation of self-antigens and favor presentation of microbial antigens during infection. The laboratory also investigates disease conditions where self-antigens are inappropriately presented during bacterial or viral infections leading to the activation of self-reactive CD4 or CD8 T cells.

**Judy Cho MD:** Inflammatory Bowel Disease. I examine the genetic and genomic factors that increase susceptibility to inflammatory bowel disease.