SOCIETY FOR MUCOSAL IMMUNOLOGY

Principles of Mucosal Immunology Course

SCIENTIFIC PROGRAM

2023 VIRTUAL COURSE

COURSE CO-CHAIRS

JOANA F. NEVES, PHD

ANDREA REBOLDI, PHD

PABLO ROMAGNOLI, PHD

Principles of Mucosal Immunology Course

DAY 1 - TUESDAY, JUNE 27

14:00-14:05 - WELCOME & INTRODUCTION TO THE COURSE

14:05-15:05 - IMMUNE RESPONSES TO MYCOBIOME (FORUM DISCUSSION)

DAVID UNDERHILL, PHD, CEDARS SINAI
Immune responses to mycobiome

KYLA OST, PHD, UNIVERSITY OF COLORADO
Adaptive immunity shapes friendlier fungi in the gut

15:05-15:15 - BREAK

15:15-16:15 - NEW TECHNOLOGIES IN MUCOSAL IMMUNOLOGY (FORUM DISCUSSION)

FRANCISCO J. QUINTANA, PHD, HARVARD UNIVERSITY

EDUARDO VILLABLANCA, PHD, KAROLINSKA INSTITUTET
Unraveling the Molecular Architecture of the Intestinal Barrier

16:15-16:30 - BREAK

16:30-17:30 - EARLY LIFE IMMUNITY (FORUM DISCUSSION)

KATHY MCCOY, PHD, UNIVERSITY OF CALGARY
Early life immunity

TOMONORI NOCHI, PHD, TOHOKU UNIVERSITY
The gut microbiota

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DAY 2 - WEDNESDAY, JUNE 28

14:00-15:00 - INFLAMMATORY RESPONSES AT THE SKIN & ORAL BARRIERS (FORUM DISCUSSION)

CAROLINE SOKOL, MD, PHD, HARVARD UNIVERSITY

NIKI MOUTSOPOULOS, DDS, PHD, NIH
Neutrophils are sentinel cells in oral mucosal immunity

15:00-15:10 - BREAK

15:10-16:10 - NEUROIMMUNE INTERACTIONS AT MUCOSAL SITES (FORUM DISCUSSION)

DAVID ARTIS, PHD, CORNELL UNIVERSITY

DENISE MORAIS DA FONSECA, PHD, UNIVERSITY OF SÃO PAULO
Neural control of the immune tone in the mesentery

16:10-16:20 - BREAK

16:20-17:20 - LESSONS FROM CAREERS IN PUBLISHING (FORUM DISCUSSION)

GREGORY SONNENBERG, PHD, *MUCOSAL IMMUNOLOGY*
The Henry R. Erle, M.D

JODI GUILLICKSRUD, PHD, *IMMUNITY*

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DAY 3 - THURSDAY, JUNE 29

14:00-15:00 - MUCOSAL T CELL IMMUNITY (FORUM DISCUSSION)

BRIAN SHERIDAN, PHD, STONY BROOK UNIVERSITY
No guts, no glory: T cells in the intestinal mucosa

EMILY THORNTON, PHD, UNIVERSITY OF OXFORD

15:00-15:10 - BREAK

15:10-16:10 - IMMUNE RESPONSES IN THE LUNG (FORUM DISCUSSION)

KATRIN D. MAYER-BARBER, PHD, NIH
AN UNEXPECTED ROLE FOR EOSINOPHILS

BART LAMBRECHT MD, PHD, GHENT UNIVERSITY
Dendritic cells in the lung and implications for airways disease

16:10-16:20 - BREAK

16:20-17:20 - BENCH TO BEDSIDE (FORUM DISCUSSION)

JULIANA CASSATARO, PHD
INSTITUTO DE INVESTIGACIONES BIOTECNOLÓGICAS

ANA GUTIERREZ, MD, PHD
HOSPITAL GENERAL UNIVERSITARIO DR BALMIS OF ALICANTE, SPAIN
New and emerging therapies for Inflammatory Bowel Disease

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ABSTRACT SUPPLEMENT

ADAPTIVE IMMUNITY SHAPES FRIENDLIER FUNGI IN THE GUT

Kyla Ost, Assistant Professor
University of Colorado Anschutz School of Medicine

The gut microbiota is an important regulator of human health, playing many important roles in immune development, metabolism, and pathogen surveillance. Despite these benefits, this community also harbors microbes with significant pathogenic potential. Emerging research has now established that commensal fungi are among these potentially detrimental commensals. The Candida species that dominate the human intestinal fungal community are some of the most common human fungal pathogens, capable of causing life-threatening opportunistic infections. Candida can also be highly inflammatory and have been linked to worsened inflammatory bowel disease in people. Yet Candida are typically benign colonizers of the healthy human gut, raising the question of what keeps these fungi from causing damage during homeostasis. Here, we discovered an important role for adaptive immunity in sculpting commensal Candida albicans to suppress its pathogenic potential in the gut. Using gnotobiotic mouse models and novel flow cytometry techniques, we found that Candida fungi induce specific IgA antibody responses within the gut and are heavily targeted by these antibodies during colonization. Using a combination of fungal genetics and gnotobiotic mouse models, we demonstrated that immune responses target and suppress the expression of pathogenic, adhesive cell types and effector molecules. Interestingly, we found that this immune sculpting was mutually beneficial for both host and fungus; selection for less adhesive cell types enhances C. albicans competitive fitness within the gut, while IgA-targeted effectors exacerbate disease in a mouse model of intestinal colitis. Finally, we demonstrated that these immune responses can be enhanced to promote homeostasis. We found that a clinically tested vaccine, NDV-3A, that targets a single C. albicans adhesin protects animals from C. albicans-associated intestinal damage during colitis.

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ABSTRACT SUPPLEMENT

DENDRITIC CELLS IN THE LUNG AND IMPLICATIONS FOR AIRWAYS DISEASE

Bart Lambrecht, MD, PhD
VIB-UGent Center for Inflammation Research, Ghent, Belgium

This lecture will deal with the role of antigen presenting cells in polarizing type 2 immunity to allergens in the lung. It will describe the various phases of the pulmonary adaptive immune response, and the roles of various DC subsets in this process, and highlight the important role played by the epithelmium.

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ABSTRACT SUPPLEMENT

EARLY LIFE IMMUNITY

Kathy McCoy, PhD
University of Calgary

The innate and adaptive immune systems develop during both pre- and post-natal life in distinct phases over time. While development of the immune system is temporally regulated, it is also heavily influenced by environmental factors. After birth, the gut and other mucosal and barrier surfaces are colonized with microbes that are primarily transferred from the mother. The neonatal microbiome then plays a critical role in shaping the development and maturation of the neonatal immune system, which can influence early life immunity. However, even prior to birth microbial products and metabolites derived from the maternal microbiome are transferred to the offspring where they influence immune development. In this lecture I will discuss development and function of early life immunity and discuss how it is modulated by the microbiome.

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ABSTRACT SUPPLEMENT

THE HENRY R. ERLE, MD – ROBERTS FAMILY ASSOCIATE PROFESSOR OF MEDICINE, SENIOR EDITOR MUCOSAL IMMUNOLOGY

Gregory Sonnenberg, PhD
Weill Cornell Medicine / Mucosal Immunology

As an Editor-in-chief for the journal Mucosal Immunology, I will give an overview of the publishing process and journey in the publishing business while still pursuing an academic career.

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ABSTRACT SUPPLEMENT

IMMUNE RESPONSES TO MYCOBIOME

David Underhill, Professor
Cedars-Sinai Medical Center

This presentation will provide some background on the mycobiome and the developing interest in understanding how the immune system interacts with intestinal fungi to influence both gut health and immune responses at peripheral sites.

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ABSTRACT SUPPLEMENT

NEURAL CONTROL OF THE IMMUNE TONE IN THE MESENTERY

Denise Fonseca, Assistant Professor of Immunology, Head of the Laboratory of Mucosal Immunology
Institute of Biomedical Sciences - University of Sao Paulo - Brazil

Several neural mechanisms have been studied in the control of the immune response in the mucosal tissues, including the intestinal mucosa. However, little is known about the importance of acetylcholine (Ach) signaling in adipose tissue immune homeostasis, particularly in the mesenteric adipose tissue adjacent to the gut. Here, we aimed to understand the impact of cholinergic pathway on cellular changes at different adipose depots and the consequence of this for restoring immune homeostasis post-infection. We describe that the cholinergic signaling controls type 2 responses specifically in the mesentery, but not in other adipose tissue compartments. This control is mediated by the regulation of IL-33 secretion, which can be impacted by gastrointestinal pathogens.

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ABSTRACT SUPPLEMENT

NEUTROPHILS ARE SENTINEL CELLS IN ORAL MUCOSAL IMMUNITY

Niki Moutsopoulos, Senior Investigator
National Institutes of Health, Bethesda, MD

Mucosal tissues as tasked to strike a constant balance with the outside environment, which maintaining tissue integrity, functionality and homeostasis. Herein, we discuss the critical roles of neutrophils in homeostatic and pathogenic mucosal immunity, which become of particular importance at the oral mucosal barrier.

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ABSTRACT SUPPLEMENT

NEW AND EMERGING THERAPIES FOR INFLAMMATORY BOWEL DISEASE

Ana Gutierrez, MD, PhD
Hospital General Universitario Dr Balmis of Alicante, Spain

The exact cause of inflammatory bowel disease (IBD) is still not fully understood. Although the traditional drugs that reduce inflammation or modulate the immune system are generally effective in many cases, understanding the underlying causes has led to the development of targeted therapies for more severe cases over the past two decades. In summary, as our understanding of the overactive signaling pathways in the immune response of the gut lining has improved, and with better understanding of how immune cells migrate, several new types of drugs have been developed for IBD treatment. These include biological agents and small molecule drugs that target various mechanisms, such as adhesion molecules, sphingosine-1-phosphate receptors, cytokines (IL-12/23, TL1A, and IL-36), Janus kinase (JAK), and phosphodiesterase. While the previous biological agents have significantly changed the approach to treating IBD, some patients still require alternative therapies due to treatment failure or side effects. New treatments are now being developed to provide better effectiveness with fewer adverse events. Additionally, research has highlighted new therapeutic concepts that show promise, such as modulating interactions between the host and the gut microbiome, stem cell therapy for perianal fistulas, controlling fibrosis, regulating the gut-brain axis, and targeting previously overlooked immune cells like B cells and innate lymphoid cells.

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ABSTRACT SUPPLEMENT

NO GUTS, NO GLORY: T CELLS IN THE INTESTINAL MUCOSA

Brian Sheridan, PhD
Renaissance School of Medicine, Stony Brook University

Barrier tissues like the gastrointestinal tract serve as primary points of entry for numerous human pathogens. Consequently, mucosal tissues harbor a substantial population of T cells that play crucial roles in eradicating pathogens, maintaining barrier integrity, and mitigating inflammation following pathogen elimination. These T cells comprise a diverse range, including both conventional T cells and a spectrum of unconventional T cells. In my lecture, I will present a comprehensive overview of mucosal T cell immunity, with a specific focus on conventional CD8 T cells and unconventional T cells within gastrointestinal tissues.

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ABSTRACT SUPPLEMENT

THE GUT MICROBIOTA INDUCES PEYER'S-PATCH DEPENDENT SECRETION OF MATERNAL IGA INTO MILK

Tomonori Nochi, Professor
Tohoku University

The evolutionary strategy of transferring maternal antibodies via milk profoundly impacts the survival, lifelong health, and wellbeing of all neonates, including a pronounced impact on human breastfeeding success and infant development. While there has been increased recognition that interorgan connectivity influences the quality of a mother's milk, potentially to personalize it for her offspring, the underlying bases for these processes are incompletely resolved. Here, we define an essential role of Peyer's patches (PPs) for the generation of plasma cells that secrete maternal immunoglobulin A (IgA) into milk. Our metagenomic analysis reveals that the presence of certain residential microorganisms in the gastrointestinal (GI) tract, such as Bacteroides acidifaciens and Prevotella buccalis, is indispensable for the programming of maternal IgA synthesis prior to lactational transfer. Our data provide important insights into how the microbiome of the maternal GI environment, specifically through PPs, can be communicated to the next generation via milk.

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ABSTRACT SUPPLEMENT

AN UNEXPECTED ROLE FOR EOSINOPHILS IN THE PULMONARY RESPONSE TO MYCOBACTERIUM TUBERCULOSIS INFECTION

Kat Mayer-Barber, PhD
NIAID/NIH

Eosinophils are typically associated with type-2 immune responses that occur during allergic diseases or parasitic infections. In contrast, pulmonary infections caused by intracellular bacteria, for example Tuberculosis and Mycobacterium tuberculosis, are triggering protective type 1 immune responses with Th1 dependent cellular immunity. In fact, Tuberculosis is the leading cause of death worldwide due to a single bacterial respiratory pathogen and we still do not have a highly effective vaccine. Understanding the earliest events in the lungs after exposure of alveolar macrophages with the bacilli is important to develop prevention of infection vaccine strategies. I will highlight our recent studies where have revealed a surprising role for eosinophils in the granulocytic response to Mtb infection, in mice, nonhuman primates and through clinical studies in patients.

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ABSTRACT SUPPLEMENT

UNRAVELING THE MOLECULAR ARCHITECTURE OF THE INTESTINAL BARRIER: INSIGHTS FROM SPATIAL TRANSCRIPTOMICS

Eduardo Villablanca, Associate Professor
Karolinska Institutet

The complex cellular network that constitutes the intestinal barrier is crucial for maintaining health and preventing diseases. In this talk, I will present the remarkable capabilities of spatial transcriptomics (ST) in unveiling the molecular organization of the entire colonic tissue during mucosal healing and tumorigenesis. By leveraging ST, we revealed a previously undiscovered regionalization of the colon's transcriptomic landscape under steady state conditions, which undergoes dramatic changes during mucosal healing. We identified spatially organized transcriptional programs that define compartmentalized mucosal healing, including regions exhibiting dominant wired pathways. Furthermore, I will discuss the translational potential of our findings by mapping transcriptomic modules associated with human diseases.

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FACULTY BIOS

DAVID ARTIS, PHD
WEILL CORNELL MEDICINE

David Artis, PhD, Director, Jill Roberts Institute for Research in Inflammatory Bowel Disease Director, Friedman Center for Nutrition and Inflammation Michael Kors Professor of Immunology, Department of Medicine; and Professor of Microbiology and Immunology, Department of Microbiology and Immunology Dr. Artis completed his doctoral research training at the University of Manchester, UK focusing on regulation of immunity and inflammation in the intestine. Following receipt of a Wellcome Trust Prize Traveling Fellowship, he undertook his post-doctoral fellowship training at the University of Pennsylvania where he continued his research training in examining the regulation of immune responses at barrier surfaces. Dr. Artis joined the faculty at Penn in 2005 and became a Professor of Microbiology in 2014. Dr. Artis moved to Cornell University and became the inaugural Michael Kors Professor of Immunology and Director of the Jill Roberts Institute for IBD Research at Weill Cornell Medicine, Cornell University in New York City in 2014. Dr. Artis subsequently assumed the launch of the Friedman Center for Nutrition and Inflammation at WCM. Dr. Artis has developed a research program focused on dissecting the pathways that regulate innate and adaptive immune cell function and host-microbiota interactions at barrier surfaces in the context of health and disease. He has alos pioneered multidisciplinary approaches to dissect cellular and molecular pathways that control the gut-brain axis, including single nucleus sequencing, untargeted metabolomics, CRISPR targeting of the microbiota and chemo- and optogenetic tools to manipulate the nervous system. His research program also encompasses a significant effort to translate research findings in pre-clinical models into patient-based studies of immune-mediated diseases. Dr. Artis is funded by NIH, CCFA and BWF and has been the recipient of Young Investigator Awards from AAI, CCFA and ICIS, the Colyton Prize, the Stanley Cohen Prize and the AAI-BD Biosciences Investigator Award.

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FACULTY BIOS

JULIANA CASSATARO, PHD
INSTITUTO DE INVESTIGACIONES BIOTECNOLÓGICAS

Dr. Juliana Cassataro leads a research group on Immunology, infectious diseases, and vaccine development at the University of San Martin (UNSAM) Biotechnology Research Institute in Argentina.

She has a degree in Biological Sciences from the National University of Mar del Plata and a PhD in Immunology from the University of Buenos Aires. She is currently Principal Researcher of CONICET and Associate Professor at UNSAM.

There, the team studies the usefulness of different compounds to improve the immune response of vaccines against infectious diseases. She was a grant recipient of the Bill & Melinda Gates Foundation (BMGF). She has published 58 scientific publications, 3 patents and obtained national and international grants. For her work on the development of vaccines she obtained many Argentine awards such as the Award of Bunge y Born Foundation Prize for Young Scientists, Houssay Award, UNESCO LOREAL mention, Konex award among others.
In 2020 the project presented by her group was selected in the IP COVID19 call of the ANPCyT and MinCyT and from that moment her group together with Pablo Cassará Laboratory have focused on developing a booster subunit vaccine against SARSCOV-2 that can be produced in Argentina. This vaccine is now in phase III.

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FACULTY BIOS

DENISE FONSECA, ASSISTANT PROFESSOR OF IMMUNOLOGY, HEAD OF THE LABORATORY OF MUCOSAL IMMUNOLOGY
INSTITUTE OF BIOMEDICAL SCIENCES - UNIVERSITY OF SAO PAULO - BRAZIL

Denise Morais da Fonseca is an Assistant Professor and head of the Laboratory of Mucosal Immunology at the Institute of Biomedical Sciences – University of Sao Paulo – Brazil. The current research developed at the Laboratory of Mucosal Immunology has been focused on understanding the mechanisms involved in the breakdown of mucosal immune homeostasis during environmental changes, such as infection and dietary changes. Acute infectious challenges are frequent occurrences worldwide and have been proposed as initiating factors for tumors, chronic inflammatory and metabolic disorders. However, identifying specific mechanisms mediating the association between defined infectious agents and the initiation of chronic disease has remained elusive. In this context, a major question to be addressed is how immune homeostasis in the gut and adjacent tissues, such as the mesentery, would be impacted by changes in the local production of microbiota metabolites, hormones and neural mediators.

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FACULTY BIOS

ANA GUTIERREZ, MD, PHD
HOSPITAL GENERAL UNIVERSITARIO DR BALMIS OF ALICANTE, SPAIN

Family Name: Gutiérrez Casbas First name: Ana Date and place of Birth: Madrid, 12 of August 1968 Nationality: Spanish Pre-grade studies: - 1986-1992: Medicine School, Miguel Hernandez University, Elche, Spain Post-grade studies: - 1993-1996 Gastroenterology and Hepatology Residency. Hospital General Universitario de Alicante. - 1997 PhD Degree in Medicine (cum laude) at Miguel Hernández University Elche, Spain in the Prognostic value of fibrinolytic tests for hospital outcome in patients with acute upper gastrointestinal hemorrhage. Professional Experience: - 1997-2003: Gastroenterologist at Hospital General Universitario de Elche - 2003-2019: Gastroenterologist at Hospital General Universitario de Alicante. - From 2020: Head of Gastroenterology Section at Hospital General Universitario de Alicante. - From 2006: Head of IBD Unit of Hospital General Universitario de Alicante Scientific Organisation Membership: - Colegio de Médicos de Alicante - Sociedad Valenciana de Patología Digestiva. - Grupo Español de Enfermedad de Crohn y Colitis Ulcerosa (GETECCU). How to Optimize Treatment With Ustekinumab in Inflammatory Bowel Disease: Lessons Learned From Clinical Trials and Real-World Data.Frontiers in medicine. 8, pp. 640813. 01/01/2021. ISSN 2296-858X. Caparrós E, Wiest R, Scharl M, Rogler G, Gutiérrez A, Yilmaz B, Wawrzyniak M, Francés R. Dysbiotic microbiota interactions in Crohn's disease. Gut Microbes 2021 . Risk of immunomediated adverse events and loss of response to infliximab in elderly patients with inflammatory bowel disease. A cohort study of the ENEIDA registry. Calafat M, Mañosa M, Ricart E, Nos P, Iglesias-Flores E, Vera I, López-SanRomán A, Guardiola J, Taxonera C, Mínguez M, Martín-Arranz MD, de Castro L, de Francisco R, Rivero M, Garcia-Planella E, Calvet X, García-López S, Márquez L, Gomollón F, Barrio J, Esteve M, Muñoz F, Gisbert JP, Gutiérrez A, Hinojosa J, Argüelles-Arias F, Busquets D, Bujanda L, Pérez-Calle JL, Sicilia B, Merino O, Martínez P, Bermejo F, Lorente R, Barreiro-de Acosta M, Rodríguez C, García-Sepulcre MF, Monfort D, Cañete F, Domènech E; ENEIDA Study Group of GETECCU. J Crohns Colitis.

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FACULTY BIOS

JODI GULLICKSRUD, PHD, SCIENTIFIC EDITOR
CELL PRESS - IMMUNITY

Jodi earned her PhD from the University of Iowa, where she studied transcriptional regulation of T cell differentiation in the laboratory of Dr. Hai-Hui Xue. Her postdoctoral research on immune responses to the intestinal parasite, Cryptosporidium, was performed under the joint mentorship of Dr. Chris Hunter and Dr. Boris Striepen at the University of Pennsylvania. Jodi joined the editorial staff at Immunity in 2020.

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FACULTY BIOS

BART LAMBRECHT, MD, PHD
VIB-UGENT CENTER FOR INFLAMMATION RESEARCH, GHENT, BELGIUM

Bart N. Lambrecht, MD, PhD is professor of Pulmonary Medicine at ErasmusMC, The Netherlands and at Ghent University, Belgium. He heads the Center for Inflammation Research of the Flanders Institute of Biotechnology in Ghent, hosting 350 scientists working on various basic and translational aspects of inflammation and immunology, at the interface of academia and industry. His own research group studies the immunological basis of asthma. His current work aims to unravel why patients with asthma build up protein crystals in their airways. These crystals wrap mucus like barbed wire, causing irreversible airway obstruction. His group developed an antibody that can dissolve these crystals as a new target in asthma treatment. He also studies how a Western life style can promote the allergy epidemic, and how this can be prevented by life-style interventions.

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FACULTY BIOS

KAT MAYER-BARBER, PHD
NIAID/NIH

Dr. Mayer-Barber received her diploma in biology from the University of Würzburg, Germany, in 2002. In 2003 she came to the United States for her Ph.D. thesis work in the laboratory of Dr. Markus Mohrs at the Trudeau Institute in Saranac Lake, New York. There she specialized on multi-parameter flow-cytometry analysis of pulmonary CD4 effector T cells after viral and parasitic infections and studied immune cell-derived interferon responses in vivo. She obtained her doctoral degree in 2006 from the University of Würzburg, Germany and joined NIAID in 2007 as a postdoctoral fellow in the Laboratory of Parasitic Diseases. There she studied pulmonary innate effector cells, such as inflammatory monocytes and dendritic cells, and delineated the role of inflammatory mediators including IL-1, type I Interferons and prostaglandins in host resistance to tuberculosis. Dr. Mayer-Barber was awarded the Earl Stadtman Tenure-Track Investigator position in the NIAID Laboratory of Clinical Infectious Diseases in 2015. Her work is focused on innate immune effector cells, including granulocyte subsets, inflammatory cytokines and lipid mediators as targets for improved adjuvant design, and host-directed therapies for TB and other lung infections and in murine and nonhuman primate models of disease.

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FACULTY BIOS

KATHY MCCOY, PHD
UNIVERSITY OF CALGARY

Dr. Kathy McCoy is a Professor in the Department of Physiology and Pharmacology, Cumming School of Medicine, member of the Snyder Institute, Scientific Director of the International Microbiome Center, and holds the Killam Memorial Chair at the University of Calgary, Canada. Her research group uses germ-free and gnotobiotic models to investigate the cellular and molecular mechanisms by which the microbiome regulates host immunity and physiology. She is particularly interested in the dynamic interplay between the gut microbiota and the innate and adaptive immune systems. Her research aims to understand how exposure to intestinal microbes, particularly during early life, educates and regulates the mucosal, systemic and neuronal immune systems and how this can affect susceptibility to diseases, such as allergy, autoimmunity, and neurodevelopmental disorders. Her lab also investigates how the microbiome regulates the immune system throughout life with the aim to identify microbial therapies that can be employed to enhance current therapeutic approaches, such as in cancer.

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FACULTY BIOS

NIKI MOUTSOPOULOS, SENIOR INVESTIGATOR
NATIONAL INSTITUTES OF HEALTH, BETHESDA, MD

Dr. Moutsopoulos is a clinician-scientist working in the field of mucosal immunology. She is currently the Chief of the Oral Mucosal Immunity and Infection Section at the National Institutes of Health, in Bethesda, MD. She leads a clinical and basic science program focused on oral mucosal immunology.

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FACULTY BIOS

TOMONORI NOCHI, PROFESSOR
TOHOKU UNIVERSITY

Tomonori Nochi received his PhD degree on mucosal immunology from Tohoku University Graduate School of Agricultural Science in 2005. Dr. Nochi belonged to Institute of Medical Science in the University of Tokyo from 2005 to 2009 and Center for AIDS Research in the University of North Carolina at Chapel Hill from 2009 to 2013 as a post-doctoral fellow. Dr. Nochi served Tohoku University Graduate School of Agricultural Science as an Associate Professor from 2013 to 2020 and was promoted to Professor in 2021. Dr. Nochi is a vice director of the International Education and Research Center for Food and Agricultural Immunology (CFAI) in Tohoku University Graduate School of Agricultural Science. Dr. Nochi are also involved the University of Tokyo, University of Guelph, and Taipei Medical University with adjunct professor status.

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FACULTY BIOS

KYLA OST, ASSISTANT PROFESSOR
UNIVERSITY OF COLORADO ANSCHUTZ SCHOOL OF MEDICINE

Kyla Ost is an assistant professor at the University of Colorado Anschutz School of Medicine. Her lab uses fungal genetics and mouse colonization models to understand how immune interactions regulate commensal fungi in the gut.

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FACULTY BIOS

FRANCISCO J. QUINTANA, PHD
HARVARD UNIVERSITY

The Quintana Lab combines advanced genomic and proteomic tools with innovative experimental models (e.g. zebrafish and humanized mice) to study the regulation of the immune response in the central nervous system, with a focus on the following areas: Regulation of CNS local immunity. Astrocytes and microglia control CNS inflammation and neurodegeneration in multiple sclerosis (MS) and other disorders. We developed new human, mouse and zebrafish experimental models to study astrocytes and microglia and identify potential targets for therapeutic intervention. These studies identified a new gut/brain axis by which commensal metabolites control CNS resident cells. This gut/brain axis is also relevant for the control of immunity against brain tumors and Zika virus. These studies guided the development of synthetic probiotics and compounds that are currently being evaluated as new therapeutic agents.

Regulation of the adaptive immune response. Dysregulated T cells drive MS pathogenesis. Using genomic and proteomic data we identified molecular pathways that control T cells and identified potential targets for therapeutic intervention. Based on these findings we developed nanoparticles to arrest T-cell autoimmunity, which are being developed as new therapies for MS and other autoimmune diseases.

Role of environmental factors in MS. Complex interactions between genes and the environment control MS onset and development, but our understanding of gene-environment interactions in MS is limited. To address this point we developed novel zebrafish models, which identified melatonin, the aryl hydrocarbon receptor (AHR) and the unfolded protein response as important regulators of CNS inflammation.

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FACULTY BIOS

BRIAN SHERIDAN, PHD
RENAISSANCE SCHOOL OF MEDICINE, STONY BROOK UNIVERSITY

Dr. Brian Sheridan holds the position of Associate Professor in the Department of Microbiology and Immunology at the Renaissance School of Medicine, Stony Brook University. His research focuses on unraveling the fundamental mechanisms responsible for the formation and maintenance of conventional and unconventional memory T cells within mucosal tissues. To achieve this, his lab employs a diverse array of bacterial pathogens, such as Listeria monocytogenes, Yersinia pseudotuberculosis, and Salmonella Typhimurium, to investigate the intricacies of T cell biology in the gastrointestinal mucosa. Ultimately, their objective is to leverage this knowledge to devise effective strategies to combat mucosal infections and gastrointestinal tumors.

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FACULTY BIOS

CAROLINE SOKOL, MD, PHD
MASSACHUSETTS GENERAL HOSPITAL

Dr. Sokol is a practicing allergist and principal investigator at Massachusetts General Hospital (MGH) and an Assistant Professor at Harvard Medical School. Her laboratory studies the cutaneous neuro-immune interactions promoting allergic immune disease and underlying allergen induced itch responses. She has provided several seminal contributions to the field, establishing the cysteine protease activity of allergens as Type-2 adjuvants, illustrating a role for basophils in the skewing of Th2 cells, and identifying a requirement for CCR8 in the entry of allergic-skewing dendritic cells into the lymph node. Most recently her laboratory established sensory neurons as crucial in linking allergen detection with dendritic cell activation and the initiation of the allergic immune response. In addition to these roles, Dr. Sokol is the Associate Program Director for the Physician-Scientist Pathway in the Internal Medicine Residency at MGH.

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FACULTY BIOS

GREGORY SONNENBERG, PHD
WEILL CORNELL MEDICINE / MUCOSAL IMMUNOLOGY

Dr. Sonnenberg is The Henry R. Erle, M.D.-Roberts Family Associate Professor of Medicine at Weill Cornell Medicine, Cornell University, as well as a Senior Editor at Mucosal Immunology.

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FACULTY BIOS

EMILY THORNTON, PHD
UNIVERSITY OF OXFORD

We are interested in the mucosal immune system, particularly the behavior and control of T cell compartments in the intestine and the lungs.

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FACULTY BIOS

DAVID UNDERHILL, PROFESSOR
CEDARS-SINAI MEDICAL CENTER

David Underhill got his Ph.D. in Cell Biology and Physiology from Washington University in St. Louis followed by postdoctoral training in innate immunity and macrophage biology at The Rockefeller University in New York and the University of Washington in Seattle, Dr. Underhill joined the Institute for Systems Biology in Seattle at its founding. In 2005 he moved to Cedars-Sinai Medical Center in Los Angeles where he is currently Professor and Chair, Department of Biomedical Sciences, and the Janis and William Wetsman Family Chair in Inflammatory Bowel Disease. Dr. Underhill's work focuses on understanding how the body recognizes bacterial and fungal microbes in order to mount immune responses that are either inflammatory and protective against infection or tolerant and permissive to commensal microbes.

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EDUARDO VILLABLANCA, ASSOCIATE PROFESSOR
KAROLINSKA INSTITUTET

Dr. Villablanca was trained as a developmental biologist, with expertise in cell migration using zebrafish as an in vivo model. As a doctoral student in the molecular medicine program at San Raffaele University in Milan, Italy, Dr. Villablanca began his training as an immunologist. Pursuing his interest in intestinal leukocyte trafficking, he joined the Rodrigo Mora's lab at Harvard Medical School (Boston, USA) as postdoctoral trainee in mucosal immunology. After four years, he was promoted Instructor in Medicine at Harvard Medical School. In his new role, he joined Dr. Xavier's lab to study the function of Inflammatory Bowel diseases (IBD) risk genes in the context of intestinal immune homeostasis. By the end of 2014, Dr. Villablanca was recruited to establish his own laboratory at the division of immunology and allergy, Karolinska Institute, Sweden. Today, his lab combines studies in developmental biology and immunology, with a final focus on the mechanisms whereby intestinal homeostasis is maintained and how failure of these mechanisms may lead to disease. Please check the Villablanca lab webpage for further information https://villablancalab.com/ Or take a look at to his research video summary at https://youtu.be/eBeMm1zHnVM Twitter: @ejvillablanca.

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