Welcome to the 2018–2019 Keystone Symposia conference series featuring 59 conferences on four continents – Africa, Asia, Europe and North America – from October 2018 to June 2019. This season consists of many inaugural conferences for Keystone Symposia, including:

- Leveraging Genomic Diversity to Promote Animal and Human Health, Nov 25-29, 2018
- Role of the Genital Tract Microbiome in Sexual and Reproductive Health, Dec 11-15, 2018
- Host and the Environment in IBD: Scientific Advances Leading to New Therapeutics, Jan 13-17, 2019
- Digital Health: From Science to Application, Jan 21-25, 2019
- Unraveling the Secrets of Kidney Disease, Mar 3-7, 2019
- Mammalian Sensory Systems, Mar 15-19, 2019
- Cancer Metastasis: The Role of Metabolism, Immunity and the Microenvironment, Mar 15-19, 2019
- Imaging Across Scales: Leveraging the Revolution in Resolution, Apr 7-10, 2019
- Protein Replacement through Nucleic Acid Therapies, Apr 7-10, 2019
- Biomolecular Condensates: Phase-Separated Organizers of Cellular Biochemistry, Apr 10-13, 2019
- Delivering Therapeutics Across Biological Barriers, May 6-9, 2019

Note that the first listed meeting date is the date of arrival, registration and usually a welcome mixer, and the last day the date of the final organized sessions (in most cases closing plenary sessions and evening entertainment). We recommend return travel the day after this last listed date in order to fully experience the meeting. Please check each conference webpage as programs vary and may have been udpated since this catalog was printed; information in the catalog is current as of August 20, 2019.

JOIN THE CONVERSATION

Scan the QR code on each meeting webpage or go to the meeting-specific URL to view full, up-to-date meeting programs. And for regular communications about programs, deadlines and scholarship/travel award opportunities, make sure you are signed up to receive our emails. Please visit www.keystonesymposia.org/JoinList to select the categories of your scientific interests to receive the most relevant communications.

You can also connect to us via Facebook, Twitter, LinkedIn and Google+. Tag us in your tweets using @KeystoneSymp and the Twitter hashtags listed on the meeting pages that follow.

Lastly, don’t forget to take advantage of an abundant amount of video content via virtual.keystonesymposia.org (see page 23 for further details).


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The prevalence of diabetes mellitus is increasing worldwide and is a major threat to global public health that requires urgent action. Over the last few decades, significant advances have been made in terms of identifying novel susceptibility genes and signaling pathways that play pivotal roles in the pathogenesis of diabetes and its related metabolic disorders. However, a major gap in understanding the current global epidemic of diabetes is the lack of knowledge regarding how molecular interactions between the environment and susceptibility genes are regulated within an altered metabolic milieu. This conference will address these unresolved gaps in the etiopathogenesis of diabetes and focus on the latest advances that are linked to the molecular drivers of diabetes mellitus. Topics include: systemic regulation of adipocytes in diabetes; microvesicles, noncoding RNA and intercellular communications; physiological drivers in hunger and energy homeostasis; epigenetics and metabolic control in diabetes; novel signaling players related to insulin resistance; adaptation of beta cells to chronic metabolic stress; environmental triggers in diabetes and metabolic diseases; and molecular targets for nutrient sensing and signaling. The organizers anticipate that this meeting will bring about a major shift in addressing the causes of diabetes mellitus, as the topics emphasized in this meeting have not yet been widely explored. Through the novel diabetes research presented, this meeting should provide evidence-based insight to favorably impact people with diabetes worldwide.

Session Topics:
- Epigenetics and Metabolic Control in Diabetes
- Workshop 1
- Environmental Triggers in Diabetes and Metabolic Diseases
- Physiological Drivers in Hunger and Energy Homeostasis
- Microvesicles, Noncoding RNA and Intercellular Communications
- Novel Signaling Players Linking to Insulin Resistance
- Adaptation of Beta Cells to Chronic Metabolic Stress
- Molecular Targets for Nutrient Sensing and Signaling
- Workshop 2: Novel Therapeutic Targets for Diabetes Mellitus
- Systemic Regulation of Adipocytes in Diabetes

Visit [www.keystonesymposia.org/18S1](http://www.keystonesymposia.org/18S1) | Hashtag: #KSt2d
Emerging and re-emerging viruses have the potential to cause high morbidity and mortality and range from localized outbreaks to epidemics. Due to their emerging nature, most aspects of the biology and infectious potential of these viruses are poorly understood. Our continuing struggle to respond to a procession of pandemics, including SARS, avian influenza, MERS, Ebola and more recently Zika, highlights key gaps in our knowledge and should serve to motivate our re-thinking as to how we can better prepare and deal with future unknown viral threats. This conference will focus on important areas such as surveillance, diagnostics and countermeasures and other important advances in new technologies and how they are being applied to research. Furthermore, we will discuss how to facilitate the translation of research, data and candidate treatments through the development pipeline in a timely and cost-effective manner. The key themes to be covered include the need to understand why zoonotic diseases matter, their association with agriculture, the importance of surveillance and early detection, and the difficulties of dealing with diseases that involve both medical and veterinary communities. The conference will bring together experts in virology, immunology, vaccinology and epidemiology with those who seek to transfer knowledge between these groups, veterinarians and industry and government. Further, this meeting is designed to bring together individuals involved in the control of these diseases in government and non-government organizations, as well as those involved in study of zoonosis and countermeasures. The creation of global networks and sharing of information will ensure that we are better prepared for future outbreaks.

Session Topics:
- Mosquito-Borne Viruses: Biology and Host Interactions
- ZIKA Virus Countermeasures
- Ebola Virus: Biology and Host Interactions
- Ebola Virus: Vaccines and Therapeutics
- Zoonotic Influenza and MERS
- MERS
- Emerging Disease Detection and Surveillance
- Influenza: Immunity and Vaccines
- Vaccine and Therapeutic Strategies

Visit [www.keystonesymposia.org/18S2](http://www.keystonesymposia.org/18S2) | Hashtag: #KSvirus
Scientific Organizers:

Ken Duncan, Bill & Melinda Gates Foundation, USA
Elizabeth Winzeler, University of California, San Diego, USA
Lluís Ballell, GlaxoSmithKline, Spain

Part of the Keystone Symposia Global Health Series,
supported by the Bill & Melinda Gates Foundation

Infectious diseases cause substantial morbidity and mortality in the developing world. The medicines available today are often inconvenient to use or result in side effects, and many are being lost to emerging drug resistance. There remains an urgent need to discover and develop the next generation of transformative medicines that are more efficacious, more highly targeted, and have a better safety profile. This will only be achieved through the application of state-of-the-art drug discovery tools, technologies and approaches. This conference will focus on diseases caused by parasitic organisms and bacteria, including malaria, neglected tropical diseases, diarrheal disease and tuberculosis. The goals of the conference are to improve understanding of the disease burden and challenges faced in developing new therapies, to highlight examples of progress towards new drug candidates, and to foster communication and collaboration among communities of researchers working in global health across the spectrum from research to the clinic. The symposium will be of interest to basic scientists as well as drug discovery and development experts seeking to gain a better understanding of the challenges and opportunities in global health.

Session Topics:
- New Therapeutics for Global Health
- Robust Target Validation – What Does it Mean?
- Joint Keynote Session and Panel Discussion with Grand Challenges: Innovation in Drug Discovery
- Importance of Chemical Diversity in Seeking New Leads
- Alternative Approaches to Drug Delivery – Opportunities and Challenges
- Improving Target and Phenotypic-Based Approaches
- Workshop: Opportunities for Repurposing to Discover New Candidates or Mature Starting Points
- Translational Tools for Predicting Efficacy and Resistance

Visit www.keystonesymposia.org/18S3 | Hashtag: #KSdrugdisc
Work over the past 30 years has resulted in the identification of genes for approximately 50% of the estimated 7,000 rare genetic diseases; it is predicted that most of the remaining disease genes will be identified in the next 10 years. Approximately 500 medicinal products are currently on the market for rare diseases. The accelerating pace of rare disease gene identification means, in effect, an almost commensurate increase in molecularly defined, readily diagnosable, but nonetheless poorly understood and untreatable diseases. This symposium will examine the current and future bottlenecks to gene discovery, disease modeling and therapeutic approaches and suggest strategies to enable progress in this regard. Ultimately, successful deployment of precision medicine for rare diseases will inform such approaches more broadly.

Session Topics:
- Approaches to Discover the Causes of all Rare Diseases
- Organoids to Model Rare Disease
- Therapeutic Approaches to Rare Diseases
- Translation of Discoveries to Treatments for Immunological Disorders
- Discovery to Mechanism to Therapy for Rare Diseases
- The Future of Rare Diseases
Leveraging Genomic Diversity to Promote Animal and Human Health

Scientific Organizers:
Michèle Ramsay, University of the Witwatersrand, South Africa
Han G. Brunner, Radboud UMC, Netherlands
Appolinaire Djikeng, Centre for Tropical Livestock Genetics and Health, University of Edinburgh, UK

Part of the Keystone Symposia Global Health Series, supported by the Bill & Melinda Gates Foundation

Genomic variation is a driving force of animal and human health, and susceptibility to disease. Yet our knowledge rarely spans human ethnic genomic diversity and genomic variation between animal breeds, limiting their translational impact. This symposium aims to: 1) Highlight translational genomics in humans and animals (clinical medicine and animal breeding for health and productivity); 2) Explore synergies and cross-disciplinary learning; 3) Explore opportunities to leverage genomic diversity to push the current boundaries to translation; and 4) Address translation and affordability in low- and middle-income settings.

Large-scale genomics initiatives like Genomics England, the US Precision Medicine initiative, and the Human Heredity and Health in African Consortium, are providing extraordinarily large data sets to explore useful genotype-phenotype connections. Equivalent initiatives for animal data are starting. This meeting will explore the translation of genomic research in animals and humans, high and low-resourced environment, ethnic diversity, and cultural context. Identifying common strands in animal and human health opens up opportunities for repurposing of ideas and applications, and for finding innovative solutions for translational genomics through cross-boundary communities of practice.

Session Topics:
• Genomic Diversity in Health
• Workshop 1: Impact of Animal Pathogens on Human Health
• Human Translational Genomics
• Livestock Translational Genomics
• Technological Innovations for Tomorrow
• Solutions for Implementation of Genomic Tests

• Genomics in Animal and Human Health
• Enablers for Translational Genomics
• Panel Discussion: How Do We Build the Ideal Cattle Breeds for Different Ecological Niches?
• Panel: Ethical Dilemmas in the Application of Genomics to Health
• Toward a Perfect World – Emerging Themes

Visit www.keystonesymposia.org/18SS | Hashtag: #KSgenomediv
Leveraging Genomic Diversity to Promote Animal and Human Health

Scientific Organizers:
Janneke van de Wijgert, University of Liverpool and University Medical Center Utrecht, UK
Jeanne M. Marrazzo, University of Alabama at Birmingham, USA
Douglas S. Kwon, Harvard Medical School, USA
Jo-Ann S. Passmore, University of Cape Town, South Africa

Part of the Keystone Symposia Global Health Series, supported by the Bill & Melinda Gates Foundation

Bacteria and fungi residing in the female genital tract have been associated with elevated risks of HIV acquisition and transmission, pelvic inflammatory disease, miscarriage, preterm birth, and invasive maternal and neonatal infections. The increased availability of high-throughput genomic testing since the turn of the century has revealed a more detailed picture of these organisms than was possible when evaluation depended on microscopy and culture. The interrelationships between sexually transmitted infections, vaginal dysbiosis, vulvovaginal candidiasis, and vaginal pathobiont carriage are being elucidated, and their effects on the cervicovaginal mucosal barrier and immune system are being characterized. The mechanisms that may lead to adverse outcomes are being unraveled, and an increasing number of interventions are in clinical trials. In this meeting, the current understanding of female and male genital tract microbiology and immunology, including functional microbiology and biofilms, will be presented and knowledge gaps identified. Potential mechanisms leading to adverse outcomes, and a variety of potential prevention and/or treatment interventions, will be presented and discussed. The exponential progress made in recent years will hopefully lead to efficacious public health interventions to reduce the high prevalence of adverse sexual and reproductive health outcomes in women, especially in resource-poor settings.

Session Topics:
• Vaginal Microbiology
• Genital Tract Microbiology and Metabolomics
• Genital Tract Immunology
• Genital Tract Mucosal Defenses and Biofilms
• Genital Tract Microbiota Associations with HIV

Visit www.keystonesymposia.org/18S6 | Hashtag: #KSgtmicrobiome
This conference will bring together scientists studying the most fundamental aspects of DNA replication and recombination, the organization and regulation of these processes at the cellular and molecular level, and their links to human disease. The aims are to disseminate the latest progress in this area, provide young scientists with the opportunity to present their work in a short talk or poster format, discuss the challenges and opportunities in translating basic research knowledge for the treatment of disease; and discuss the relevance to genome instability and replication stress of emerging work in other fields. Through talks and specialized workshops led by leaders in the field, the conference will cover single-molecule to cellular and genome-level studies, providing an integrated view of the relationship between DNA replication, recombination and genome instability.

Session Topics:

- The Influence of Chromatin on Replication and Repair
- Workshop 1: Basic Mechanisms of Replication
- Workshop 2: Basic Mechanisms of Recombination
- Mechanisms of DNA Replication
- Mechanisms of Recombination and Repair
- Understanding and Exploiting Replication Stress
- Overcoming Replication Fork Obstacles
- Workshop/Panel Discussion 3: Translating Basic Science to the Clinic
- RNA-Induced Genome Instability
- Genomic Drivers of Tumorigenesis and Drug Resistance
- Workshop 4: Chromatin, Replication and Repair
- Workshop 5: Replication Stress and DNA Damage Signaling
- Linking DNA Damage Response to the Immune Response

Scholarship/Discounted Abstract Deadline: Sep 20, 2018;
Abstract Deadline: Oct 16, 2018; Discounted Registration Deadline: November 13, 2018
Visit www.keystonesymposia.org/19A1 | Hashtag: #KSdna

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Inflammatory bowel diseases (IBD), which afflict millions of patients, are rapidly increasing in incidence worldwide in parallel with industrialization. Pathogenesis involves both host genetic as well as environmental factors, with the most currently utilized therapeutics focusing on long-term host immunosuppression. Despite tremendous advances in our understanding of IBD genetics, the mucosal immune system, and environmental factors such as the gut microbiome, currently available therapeutic modalities for IBD remain suboptimal. The overall goal of this conference is to bring together world-class investigators and clinicians to discuss the latest scientific knowledge relevant to the pathogenesis of IBD and facilitate an interactive discussion to accelerate development of new opportunities to prevent and/or treat IBD. The specific aims of this conference are to: 1) Bring together a combination of clinical and basic investigators from both academia and industry to facilitate cross-disciplinary discussions focused on IBD; 2) Identify both opportunities and gaps in current knowledge in the pathogenesis of IBD important for the development of new diagnostics and therapeutics; and 3) Create a multidisciplinary environment that will inspire both young and established investigators by highlighting the currently available opportunities in IBD research. The anticipated outcome will be a better understanding of the advances and challenges in developing new therapeutics for patients with IBD.

Session Topics:
- Clinical Considerations of IBD – What’s the Goal?
- Workshop 1: Host Factors in IBD
- Advances in the Genetics of IBD
- The Mucosal Immune System in IBD: Innate Immunity
- The Mucosal Immune System in IBD: Adaptive Immunity
- The Environment in IBD Pathogenesis (Microbiome)
- Workshop 2: Environmental Factors in IBD
- Barrier Function in IBD
- Translational Opportunities (Bench to Bedside and Back Again)
- New Technologies and Collaborations between Industry and Academia

Scholarship/Discounted Abstract Deadline: Sep 20, 2018; Abstract Deadline: Oct 16, 2018; Discounted Registration Deadline: Nov 13, 2018

Visit www.keystonesymposia.org/19A2 | Hashtag: #KSibd
Mitochondrial Biology in Heart and Skeletal Muscle

Keystone Conference Center | Keystone, Colorado, USA | January 13–17, 2019

joint with the conference on Mitochondria in Aging and Age-Related Disease

Scientific Organizers:

E. Dale Abel, University of Iowa, Carver College of Medicine, USA
Andrea L. Hevener, University of California, Los Angeles, USA

Mitochondria are highly dynamic and communicative organelles that regulate a variety of cellular processes including energy homeostasis, redox status, thermogenesis and cell death via apoptosis. Mitochondria collaborate with a host of intracellular organelles including endoplasmic reticulum, peroxisomes, lysosomes and nuclei to maintain metabolic homeostasis. Mitochondrial dysfunction disrupts metabolism and is thought to underlie cellular aging as well as the development of chronic diseases such as type 2 diabetes, cardiovascular disease, heart failure and aging-associated sarcopenia. Since mitochondria are enriched in cardiac and striated skeletal muscle, and since these tissues are critical in regulating whole body metabolism, insulin action, and locomotion, the objective of this conference is to identify novel mechanisms controlling mitochondrial function and connect mitochondrial phenotypes with improved health and disease pathobiology. New insight into the biology and pathobiology of mitochondria will allow for the advance of therapeutic approaches that can be utilized to combat metabolic-related diseases associated with mitochondrial dysfunction. The ongoing convergence of the fields of muscle metabolism and mitochondrial biology since our understanding of the precise molecular signaling that links mitochondrial function (biogenesis, fission-fusion-mitophagy dynamics, and mitochondrial genome integrity) with integrative metabolism and muscle action remains inadequate. These deficiencies in our fundamental knowledge of mitochondrial biology and the implications of this knowledge gap in the treatment and clinical care of common and rare mitochondrial diseases underpin the importance of this proposed Keystone conference. Moreover, opportunities for interdisciplinary interactions will be further enhanced by the joint conference on “Mitochondria in Aging and Age-Related Disease.” This conference will bring together investigators from diverse areas of integrative biology and metabolism who typically do not interact or attend the same research symposia, sparking the development of new collaborations, novel biological concepts and innovative therapeutic strategies to harness the mitochondria for metabolic disease prevention.

Session Topics:

• Mitochondria in Cardiovascular Aging and Disease (Joint)
• Skeletal Muscle Mitochondria and Metabolic Regulation
• Calcium Signaling in Muscle Mitochondria
• Novel Regulators of Mitochondrial Metabolism
• Mitochondria and Cell Death

• Mitochondrial Dynamics and Metabolism
• Mitochondria in Aging Muscle (Joint)
• Mitochondria, Energy Expenditure and Insulin Sensitivity
  plus two joint workshops

Scholarship/Discounted Abstract Deadline: Sep 25, 2018; Abstract Deadline: Oct 17, 2018; Discounted Registration Deadline: Nov 14, 2018
Visit www.keystonesymposia.org/19J1 | Hashtag: #KSmitomuscle

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of cardiac mitochondria courtesy of National Institutes of Health
Aging is the greatest risk factor for most human diseases, yet the underlying reasons for this are not clear and hence remain under intense investigation. Mitochondria have long been associated with aging as the cornerstones of the “mitochondrial” and “free radical” theories of aging. However, that the role of mitochondria in aging is simply due to declines in ATP production and increased oxidative stress via reactive oxygen species production is giving way to more complex hypotheses. These are driven by the realization that mitochondria are dynamic and have multiple additional roles in cell and organismal physiology (e.g., signaling and immunity). The goal of this conference is to bring together investigators working at the interface of mitochondria and aging to begin to develop network theories of mitochondrial contributions to aging and age-related diseases that take into account both “old” and “new” functions of mitochondria. Topics covered will include neurodegeneration, cancer, metabolic diseases, inflammation and mitochondrial signaling pathways. This conference is being held jointly with that on “Mitochondrial Biology in Heart and Skeletal Muscle,” allowing in-depth coverage of mitochondria in cardiovascular aging and sarcopenia. It is expected that this conference will facilitate new interactions and collaborations at the interface of aging and mitochondrial biology. This should catalyze new research toward therapies for age-related diseases based on selectively targeting mitochondrial functions and signaling pathways in specific physiological and disease contexts. Workshops will highlight work from exciting new investigators so they can receive constructive feedback and develop new collaborations and research networks.

Session Topics:
- Mitochondria in Cardiovascular Aging and Disease (Joint)
- Mitochondrial Quality Control in Aging and Longevity
- Mitochondria in Immunity and Inflammation
- Mitochondrial Metabolism in Aging
- Mitochondrial Signaling in Aging
- Mitochondria in Age-Related Pathology
- Mitochondria in Aging Muscle (Joint)
- Mitochondria Dynamics and Aging

plus two joint workshops

**KEYNOTE SPEAKERS**
- Andrew G. Dillin
- Vamsi K. Mootha

**CONFIRMED SPEAKERS**
- Zoltan P. Arany
- Johan Auwerx
- Judith Campisi
- Navdeep S. Chandel
- Jose M. Cuezva
- Monica Driscoll
- David J. Glass
- Marcia C. Haigis
- Cole M. Haynes
- Matthew D. Hirschey
- Tamas L. Horvath
- Michael Karin
- Siu Sylvia Lee
- Rong Li
- David J. Marcinek
- Michael P. Murphy
- Lisa Norquay
- Scott M. Pflafer
- Liza A. Pon
- Hesham A. Sadek
- Gerald S. Shadel
- Katja Simon
- James B. Stewart
- Holly Van Remmen
- Douglas C. Wallace

◊ Speaker in joint session
Individual cells are the building blocks of all metazoan organisms, and the importance of analyzing biology at the single cell level has long been recognized. However, only recently have technological developments allowed quantitative single cell analyses on a broad scale, leading to an explosion of international single-cell research. This is an interdisciplinary field with fast-developing data acquisition modalities together with bespoke computational approaches, and now is a major driver of progress across many areas of biology, diagnostics and therapy. Dedicated conferences bringing together scientists with different technological, computational and bio-medical focus are therefore crucial to ensure mutual communication and to shape future developments. Current single cell meetings focus on high-throughput molecular snapshot measurements and their computational analysis. This conference will go beyond by emphasizing biological and biomedical applications of single cell approaches, including dynamic live cell measurements, to better understand the molecular control of cell fates and multicellular tissue generation in health and disease.

Session Topics:
- Single Cell Computational Biology
- Development at Single Cell Resolution
- From Single Cell Measurements to Molecular Mechanisms
- Imaging in 3D and in vivo
- New Technology for New Biology
- Extracting Information from High-Dimensional Measurements
- Reconstructing Cell Lineages
- Neuroscience at Single Cell Resolution
plus two workshops

Scholarship/Discounted Abstract Deadline: Sep 26, 2018; Abstract Deadline: Oct 18, 2018; Discounted Registration Deadline: Nov 15, 2018

Visit www.keystonesymposia.org/19L1 | Hashtag: #KSSinglecell
The tuberculosis (TB) research and development landscape has seen many exciting breakthroughs over the past two decades. New diagnostics have emerged; innovative research has significantly reduced biological uncertainties; two novel drugs were launched; and public-private partnerships are dedicating massive efforts to dramatically shorten TB therapy, tackle resistant disease and discover new vaccines. Despite these achievements, TB remains the leading infectious disease cause of death globally. Meanwhile, shifts in funding priorities and a false sense of success could threaten the current focus and momentum, which would have catastrophic consequences. The broad themes covered in the main conference program and the three workshops will pursue the following goals: 1) Re-ignite collaborative and multidisciplinary research by bringing together experts in basic science, translational research, and drug discovery and development; 2) Bring together brilliant young minds and established investigators to encourage new discussions and the exchange of innovative ideas for strategies moving forward; and 3) Foster cross-fertilization at the interface between research and development, all aspects of which are critical if we are to tackle the TB pandemic and achieve the next innovation leap.

Session Topics:

- Pathogenic Strategies of Mycobacteria
- Workshop 1: Pediatric and Extrapulmonary TB
- Immune Responses to Mycobacterium Tuberculosis
- Host Cell Signaling and Invasion
- Workshop 2: TB Drug Targets and MOA
- Translation to the Treatment and Diagnosis of Disease
- Treatment and Diagnosis of Disease
- Molecular Dissection and Targeting of Mycobacterium Tuberculosis
- Exploiting Mycobacterial Vulnerabilities
- Panel: Careers in Biomedical Research
- Host Determinants of Disease Outcomes

Scholarship/Discounted Abstract Deadline: Sep 27, 2018; Abstract Deadline: Oct 23, 2018; Discounted Registration Deadline: Nov 20, 2018

Visit www.keystonesymposia.org/19A3 | Hashtag: #KStuberculosis

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of tuberculosis courtesy of National Institute of Allergy and Infectious Diseases, NIH
Integrated Pathways of Disease in NASH and NAFLD

Eldorado Hotel | Santa Fe, New Mexico, USA | January 20–24, 2019

Scientific Organizers:
Scott L. Friedman, Icahn School of Medicine at Mount Sinai, USA
Arun J. Sanyal, Virginia Commonwealth University Medical Center, USA
Brent A. Tetri, Saint Louis University, USA
Mary E. Rinella, Northwestern University, USA
Christopher R. Shepard, Evo Bio, USA

Sponsored by Gilead Sciences, Inc., Novo Nordisk A/S and Pfizer Inc.

The global prevalence of nonalcoholic fatty liver disease (NAFLD) has risen precipitously over the past two decades in parallel with the worldwide obesity epidemic; however, there are no approved therapies. The more advanced form of the disease, non-alcoholic steatohepatitis (NASH), is associated with progressive fibrosis and an increased risk of liver cancer. Despite the growing number of systemic and liver-specific abnormalities identified in patients with NAFLD, a clear hierarchy of the relative importance of specific defects has not emerged. Furthermore, a clear understanding of which individuals are at highest risk for progression to advanced liver disease and cancer remains elusive. Thus, the field lacks an integrated understanding of risk prediction, pathogenesis and validated biomarkers to predict or track disease progression without reliance on liver biopsies. Therefore, the goals of this conference are to: 1) Explore genetic and ethnic contributions to NAFLD development; 2) Clarify underlying pathogenic defects in NAFLD and NASH, focusing on the specific contributions of lipotoxicity, the microbiome, innate immune signaling and drivers of fibrosis; and 3) Highlight emerging prognostic and diagnostic biomarkers that are yielding new, more streamlined clinical trial designs to evaluate novel therapies.

As a result of this conference, attendees should gain a more holistic understanding of the unmet needs and new paths to advancing our understanding of NAFLD pathogenesis, diagnosis and therapy. The multidisciplinary nature of the topics and speakers promises to generate novel insights that represent convergent expertise and opinion. In doing so, new paradigms are likely to emerge that greatly inform the expanding number of emerging diagnostic markers and therapeutic agents. The conference comes at a propitious time when there is already sufficient basic translational and clinical research to extract important new insights, focus on unmet needs and refine research strategies for the future.

Session Topics:
• Genetic / Ethnic Determinants and Natural History of NAFLD
• Workshop 1: Biomarkers
• Metabolic Drivers of Cell Stress and Injury
• Drivers and Consequences of Hepatic Lipotoxicity in NAFLD
• Workshop 2: Therapeutics
• Innate Immune and Inflammatory Signaling
• Integrative and Systemic Biology of NAFLD
• Fibrosis and Cancer – Mechanisms and Markers
• Modalities of NAFLD Diagnosis and Prognosis Assessment
• Workshop 3: Animal Models
• Clinical Trial Design and Emerging Therapies

Scholarship/Discounted Abstract Deadline: Oct 2, 2018; Abstract Deadline: Oct 24, 2018; Discounted Registration Deadline: Nov 27, 2018

Visit www.keystonesymposia.org/19A4 | Hashtag: #KSliver

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
The success of immunotherapy in the treatment of cancer patients has proved the long-standing hypothesis that endogenous adaptive immune responses against the tumor can be harnessed to mediate protection by immune checkpoint blockade. This approach has shown impressive control of disease and improved survival in up to 50% of patients with certain tumors. Genetic and immune analysis of human cancers suggests that one mechanism of resistance to immune checkpoint blockade may be due to lack of tumor-specific T cells. In principle, vaccines have the potential to overcome this defect by either expanding low-level existing tumor-specific T cell responses or priming tumor-specific T cells. Recent advances in next-generation sequencing have improved our understanding of defining cancer antigens. Application of this will require vaccine delivery approaches that can induce potent and broad T cell immunity in an efficient manner for personalized therapy. This Keystone Symposia conference will highlight recent insights in the characterization of immunogenic cancer antigens, the biology and underlying mechanisms of T cell priming, and the development of novel approaches designed to expand T cell responses. Part of the meeting will also be devoted to the development of technologies to monitor T cell responses in response to immune interventions.

Session Topics:
- Identification of Mutated Neoantigens
- Workshop 1: Cancer Antigens
- Other Cancer Antigens
- Priming T Cells
- Workshop 2: Vaccine Platforms and Immune Monitoring
- Antigen-Presenting Cells
- Novel Cancer Vaccine Platforms I & II
- Tumor Microenvironment and Combination Therapies
- Workshop 3: Combination Therapies
- Immune Monitoring of T Cells
Digital Health: From Science to Application

Keystone Conference Center | Keystone, Colorado, USA | January 21–25, 2019

Scientific Organizers:
Geoffrey S. Ginsburg, Duke University, USA
Sue Siegel, GE Ventures, USA
Eric D. Perakslis, Datavant, USA

Sponsored by Biogen

This conference will be the first digital health meeting to focus specifically on the scientific foundations and health applications of digital technologies. Taking a novel sensor or new device from concept to clinic is remarkably complex, and the technologies are evolving rapidly. Digital technology offers novel capabilities that have great potential to drive chronic disease understanding and management at both an individual and population level, including the ability to deliver real-time interventions that can be connected to a healthcare system, in a community setting or limited-resource setting. The increased use of digital capture devices has become a universal part of everyday life; however, more research is needed to provide evidence that wearables and more sophisticated implantable medical devices will transform healthcare delivery quality and costs. The conference will explore the landscape at the intersection of digital technologies, molecular/genomic data and healthcare data by examining how these data streams can interface to enable precision health, drive research (patient-reported outcomes, continuous phenotypes) and impact clinical care (monitoring, feedback, adherence). Highlighted will be research on technology development and the evaluation required to impact specific diseases, populations and the achievement of specific outcomes in real-world settings, both in LMICs and in areas of with limited access to healthcare. Use cases in the pharmaceutical industry will highlight the opportunity for digital technologies to validate efficacy and safety of novel therapeutics, and the regulatory and health economic considerations of translating scientific findings to health outcomes, and the application of digital data for precision medicine in large cohort studies will also be highlighted. The conference aims to enhance participants’ understanding of the state of the art for capturing digital phenotyping and of consumer/patient access and comprehension, regulatory jurisdiction, health care provider/system readiness, clinical utility, personal utility, integration with the electronic health record, quality standards and ethical considerations. It will bring together clinicians, scientists, technology innovators, health economists and regulators to discuss and develop the new models of cross-disciplinary collaboration and business necessary to deliver quality digital health strategies and solutions, and to illuminate areas of synergy between the academic, public and private sectors to inform a research agenda for the next five years.

Session Topics:
• The Science Behind Digital Technology
• Digital Health and Genomics Convergence
• Applications of Digital Health to Personal Wellness
• Applications of Digital Health Technologies to Drug Development
• Developing Cohort Studies with Multiscale Multidimensional Data

Exercise and Panel:
• Workshop and Panel: Strategies for Successful Digital Health Implementation
• Workshop and Panel: Specific Disease Applications of Digital Health
• Workshop and Panel: Regulatory and Reimbursement Pathways
• Workshop and Panel: Digital Health – What’s the Value Proposition?

Scholarship/Discounted Abstract Deadline: Oct 2, 2018; Abstract Deadline: Oct 24, 2018; Discounted Registration Deadline: Nov 27, 2018
Visit www.keystonesymposia.org/19A5 | Hashtag: #KSdighealth

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of GeneChip loaded with hybridized RNA courtesy of National Institute of Arthritis, Musculoskeletal and Skin Diseases, National Institutes of Health and Rhoda Baer
Windows on the Brain: Formation and Function of Synapses and Circuits and their Disruption in Disease

Sagebrush Inn & Suites | Taos, New Mexico, USA | January 21–25, 2019

Scientific Organizers:
Kristin Scott, University of California, Berkeley, USA
Paola Arlotta, Harvard University, USA
Rui M. Costa, Columbia University, USA
Yimin Zou, University of California, San Diego, USA

Sponsored by Takeda Pharmaceutical Company Limited

A fundamental goal of neuroscience is to understand the molecular, cellular and activity-based mechanisms that control the formation and function of neural circuits and determine how these mechanisms become compromised in neurodevelopmental, psychiatric and neurodegenerative disorders. Over the past two decades, molecular neuroscientists have identified key molecules and mechanisms that underlie synapse development, activity and stability. Meanwhile, the study of neuronal circuits has been revolutionized by new methods to visualize and map circuits in living animals, as well as the development of approaches to control neuronal activity. Finally, disease researchers have identified genes associated with neurodevelopmental and psychiatric disorders and neurodegenerative diseases. Animal models of these diseases are proving useful to understand how dysfunction of affected genes and proteins contributes to disease pathology. Although these fields are working on the same process, no small highly interactive “Keystone Symposia-style” meeting brings these three groups together in the same room. This symposium will bring together leaders working on synapse development and function, circuit structure and function, and the study of brain disease, believing with confidence that mutually beneficial insights will emerge from discussing each other’s work.

Session Topics:
• Patterning and Wiring of the Nervous System
• Synapse Development and Function
• Activity-Dependent Synapse Formation and Plasticity
• Connectomics
• Neural Circuits for Sensory Processing
• Plasticity in Neural Circuits
• Therapeutics for Nervous System Disease
• Modeling Disorders of the Nervous System

Scholarship/Discounted Abstract Deadline: Oct 3, 2018; Abstract Deadline: Oct 25, 2018; Discounted Registration Deadline: Nov 28, 2018
Visit www.keystonesymposia.org/19A6 | Hashtag: #KSbrain

KEYNOTE SPEAKER
Anirvan Ghosh

CONFIRMED SPEAKERS
Nicola J. Allen
Paola Arlotta
Shernaz X. Bamji
Nils Brose
Albert Cardona
M. Eugenia Chiappe
Daniel Alfonso Colón-Ramos
Rui M. Costa
Yang Dan
Sandip Robert Datta
Graeme W. Davis
Christopher E. Henderson
Tony Koleske
A. Kimberley McAllister
Alex Pollen
Franck Polleux
Kristin Scott
Nenad Sestan
H. Sebastian Seung
Kim Thompson
Anne E. West
Ilana Witten
Anthony Zador
Yimin Zou

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Traditionally, differentiated cells were thought to be post-mitotic. However, we now know mature cells in diverse tissues can reprogram, re-enter the cell cycle, and spawn other lineages (e.g., they revert back to stem cells or adopt other identities). The scientific and health implications are substantial. For one, cellular plasticity might be harnessed to regenerate damaged tissue (e.g., insulin-secreting cells, liver, gut), but repeated reprogramming events – as cells respond to inflammation/injury – can also cause tissue derangement (metaplasia) that predisposes to cancer. Furthermore, cancer cells can harness such plasticity mechanisms to subvert therapy. Thus, defining the mechanisms that allow mature cells to switch identities holds great promise for understanding disease pathogenesis and developing new therapies. This conference gathers the diverse, dynamic field of plasticity/reprogramming together for the first time with the aim of understanding if similar mechanisms underlie plasticity in diverse organs and organisms. The hypothesis is that cellular reprogramming occurs via evolutionarily conserved cellular processes as fundamental to a multicellular organism as apoptosis. Specifically, the conference aims to: 1) Elucidate mechanisms of plasticity in diverse adult tissues; 2) Explore plasticity’s evolutionary context; 3) Elucidate its role in metaplasia/cancer; and 4) Investigate how it can be harnessed therapeutically.

Session Topics:
- Plasticity and Signaling in Development and Homeostasis (Joint)
- Stem Cell Recruitment and Metaplasia
- Cancer and Plasticity
- Reprogramming Cells to Assemble and Repair Organs
- Plasticity and Signaling in Regeneration and Tumorigenesis (Joint)
- Workshop – Nomenclature in Cell Plasticity: “Plasticity,” “Dedifferentiation,” “Transdifferentiation,” “Reprogramming,” “Reversion” – Can We Agree What These Mean?
- Transcriptional Regulation of Cell Plasticity
- Injury, Inflammation and Regeneration
- Applications of Cell Plasticity

Scholarship/Discounted Abstract Deadline: Oct 3, 2018; Abstract Deadline: Oct 25, 2018; Discounted Registration Deadline: Nov 28, 2018
Visit www.keystonesymposia.org/19J3 | Hashtag: #KSplasticity

Attending one conference in a joint pair enables participation in sessions of the other, pending space availability. Participants have the opportunity to hear talks from speakers at both conferences, and to interact with a wide range of investigators during the joint poster sessions and social hours.
The discovery and study of the major developmental signaling pathways (Notch, Hh, Wnt, TGF-beta, Hippo, RTK) have illuminated how patterning and growth are controlled in metazoans. These pathways are reiteratively used during development and adult life, acting to maintain stem cells and direct tissue repair and regeneration. When they are disrupted, cancer develops. This conference embraces recent progress in quantitative biology, mathematical modeling, single cell analysis and intravital imaging. It also presents a major opportunity to combine knowledge from developmental systems with adult homeostasis, regeneration and cancer, as well as to elucidate how different developmental signals are integrated to influence cellular decision-making processes. Bringing together cell/developmental biologists and stem cell, regeneration and cancer specialists, with a strong emphasis on multidisciplinary approaches that incorporate systems biology, mathematics and physics into the study of living systems, the conference aims to: 1) Explore the commonalities between signaling in development, regeneration and homeostasis; 2) Leverage quantitative, single cell and systems biology to study the dynamics and integration of developmental signaling across scales; and 3) Highlight how perturbations in developmental pathways cause diseases such as cancer. Pairing the conference with the symposium on “Cellular Plasticity: Reprogramming, Regeneration and Metaplasia” will also enhance the conferences’ impact and enable in-depth exploration of the parallels between plasticity/pluripotency in development, regeneration and disease.
Transcription and RNA Regulation in Inflammation and Immunity

Granlibakken Tahoe | Lake Tahoe, California, USA | February 2–5, 2019

Scientific Organizers:  
Silvia Monticelli, Institute for Research in Biomedicine, Switzerland  
K. Mark Ansel, University of California, San Francisco, USA  
Sarah Teichmann, Wellcome Sanger Institute, UK  
Gioacchino Natoli, Humanitas University, Italy

The immune system is a heavily armed but carefully tuned defense that must mount protective responses against invading pathogens, while at the same time avoiding excessive inflammation and inappropriate responses that can lead to severe tissue damage and disease. Properly regulated immune responses are the result of a complex interplay between chromatin modifications, transcription factors and post-transcriptional regulators that operate collectively within each cell to regulate the gene expression programs that control immune cell differentiation, maintenance of cell identity, and the orchestration of functional responses in a dynamic environment. Recent technical advances in genomics and single-cell analyses have brought new ideas and perspectives to investigation of the regulation of gene expression, and our understanding of the mechanisms and regulatory networks that operate in the immune system is advancing at an unprecedented rate. This conference will be important to define the most impactful open questions and future challenges in the field of transcriptional and post-transcriptional control of immune cells, and it will bring together rapidly expanding and evolving communities. The exchange of scientific knowledge and technical capabilities will foster opportunities for collaborations and interdisciplinary interactions among groups of scientists working on disparate aspects of regulation of gene expression in inflammation and immunity, highlighting the latest innovations and discoveries while shaping future directions for the field.

Session Topics:
• Transcriptional Mechanisms of Immune Cell Development  
• Single Cell Approaches to Immune System Complexity  
• Transcriptional and Epigenomic Control of Immune Responses  
• Workshop: The 3D Genome: Long-Range Interactions in Immune System Development and Function  
• Pathologic Dysregulation of Transcription  
• Noncoding Genome and Post-Transcriptional Control in Immunity  
• RNA Binding Proteins and RNA Methylation in Immunity  
plus two additional workshops

KEYNOTE SPEAKER
Stephen T. Smale

CONFIRMED SPEAKERS
Ido Amit  
K. Mark Ansel  
Kate A. Fitzgerald  
Richard A. Flavell  
Christopher K. Glass  
Muzlifah A. Haniffa  
Vigo Heissmeyer  
Jorge Henao-Mejia  
Dan R. Littman  
Alex Marson  
Silvia Monticelli  
Gioacchino Natoli  
John J. O’Shea  
Rab K. Prinjha  
Anjana Rao  
Ellen V. Rothenberg  
Andrea Schietinger  
Sarah Teichmann  
Martin Turner

Scholarship/Discounted Abstract Deadline: Oct 4, 2018; Abstract Deadline: Oct 30, 2018; Discounted Registration Deadline: Nov 29, 2018
Visit www.keystonesymposia.org/19B1 | Hashtag: #KStranscription

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of RNA polymerase II courtesy of National Institutes of Health
Virtual Keystone Symposia

Keystone Symposia now offers a wide range of scientific digital content, the majority at no cost. This initiative is designed to extend the reach of the science presented at Keystone Symposia to a wider global audience. The diverse content includes:

- **SciTalks** – Scientific presentations recorded on video (often at Keystone Symposia conferences).
- **ePanels** – Scientific panel discussions recorded on video (often at Keystone Symposia meetings) that feature scientific thought leaders discussing compelling topics within their field. Many of these feature live Q&A between panelists and audience for those who watch in real time.

**Virtual Access** – Complete packages of digital content including scientific talks, abstracts, ePosters and the conference books stemming from Keystone Symposia conferences.

**Virtual Access Recap** – Videos of presentations and panel discussions from partner conferences.

Visit [http://virtual.keystonesymposia.org](http://virtual.keystonesymposia.org) to access the wide array of content available, and stay tuned for many more programs in the coming months including ePanels on multiple sclerosis and reproducibility in science.

Available programming includes:

- **ePANELs** (free)
  - Health Disparities: Sickle Cell, Research and CRISPR
  - Health Disparities: Type 2 Diabetes, Research and Policy
  - Training Nex-Gen Underrepresented (UR) Biomedical Scientists: What Works, What’s Wrong, What’s Right on Target
  - Drug Discovery: Current Trends in Medicinal Chemistry
  - Tech Transfer for Medical Advances
  - Neuroinflammation: Causes, Concepts and Consequences
  - Rigor in Science: The Challenge of Reproducibility in Biomedical Research
  - Multiple Sclerosis: Conventional and Alternative Therapeutic Approaches
  - Malaria: From Innovation to Eradication
  - HIV: Antibody Functions Beyond Neutralization
  - Health Disparities: The Intersection of Science and Race
  - Noncoding RNAs: Current and Future Trends
  - Chewing the Fat: Autophagy and the Future of Autophagy Research
  - Autophagy: Controversies, Challenges and Opportunities
  - The Genome Editing Revolution: Translating Genome Editing Technologies into Human Therapies
  - From Neuroscience to Therapy – How Do We Get There?
  - HIV/AIDS: Strategies for an Endgame

- **VIRTUAL ACCESS** (100 USD per package)
  - Cancer Immunology and Immunotherapy (from March 2017 conference)
  - Single Cell Omics (from May 2017 conference)
  - Cancer Immunotherapy: Combinations (from March 2018 conference)
  - Mitochondrial Biology and Selective Autophagy (from April 2018 joint conferences)
  - Advances in Neurodegenerative Disease Research and Therapy and Neuroinflammation: What Happens When CNS and Periphery Meet? (from June 2018 joint conferences)

The Stanford Drug Discovery Symposium

Keystone Symposia was excited to partner recently with Stanford Cardiovascular Institute (led by Dr. Joseph Wu, a Keystone Symposia Scientific Advisory Board member) to produce a virtual access recap featuring talks and panel discussions from this year’s symposium, with numerous big pharma CEOs and other thought leaders. Watch for free at [http://bit.ly/SDDS18](http://bit.ly/SDDS18).
Molecular Approaches to Vaccines and Immune Monitoring

Keystone Conference Center | Keystone, Colorado, USA | February 10–14, 2019

Joint with the conference on B Cell-T Cell Interactions

Scientific Organizers:
Peter D. Kwong, NIAID, National Institutes of Health, USA
Brandon DeKosky, University of Kansas, USA
Jeffrey B. Ulmer, GSK Vaccines, USA

Vaccines address public health issues ranging from pandemic outbreaks to childhood disease. Despite this diversity, molecular approaches are beginning to find broad application. This Keystone Symposia conference seeks to bring together antibody aficionados, B cell immunologists, structural biologists and vaccine developers from government, academia, biotechnology and major pharmaceutical companies to review the utility of structure-based vaccine design and antibody-based immune monitoring, with the ultimate aspiration of transforming standard approaches of vaccine development. More specifically, the conference aims to: 1) Provide examples of the "antibody-to-vaccine" paradigm for RSV, CMV and other pathogens that have resisted standard vaccinology; 2) Detail procedures whereby B cells can be taught to make the right antibodies; 3) Describe molecular approaches for vaccine improvement; and 4) Discuss how molecular approaches can be used to speed development (as may be needed, for example, in the case of pandemics) and to reduce developmental and regulatory costs (for vaccines in general and in particular to enable provision to the developing world). Overall, the conference seeks to integrate molecular approaches for vaccine development and read-out with other transformative advances including mRNA delivery, next-generation sequencing of B cell transcripts, and control of B cell-T cell interactions, the topic of the jointly held Keystone Symposia conference.

Session Topics:
• Targeting Appropriate Immune Responses for Structure-Based Design
• Workshop 1: Molecular Characteristics of Serum Responses which Could Serve as Appropriate Templates for Vaccine Design
• Clinical Results from Structure-Based Vaccines
• B Cell Ontogenies as Vaccine Templates
• Workshop 2: Antibody Isolation and B Cell Sequencing
• Tackling Difficult Pathogens with Antibody-Based Vaccine Design
• Immune Monitoring of B Cell Responses
• Workshop 3: Molecular Approaches to Probe the Elicited Vaccine Response
• Optimizing Vaccine Responses
• Vaccines: Better, Faster and Less Expensive!
• Workshop 4: Molecular Approaches for Rapid Identification/Optimization of Target Antigens
• Reducing Vaccine Risks and Costs

Scholarship/Discounted Abstract Deadline: Oct 9, 2018; Abstract Deadline: Nov 7, 2018; Discounted Registration Deadline: Dec 6, 2018
Visit www.keystonesymposia.org/19JS | Hashtag: #KSvaccine

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
B cell-T cell interactions underlie the maturation and production of high-affinity antibodies, and are thus key to the establishment of effective humoral immunity. While this greatly enhances our ability to fight pathogens, it can also lead to the development of allergies and autoimmune disease. Although recent years have seen a burst in our understanding of how B cell-T cell interactions drive antibody affinity maturation, a number of gaps remain, including how these interactions influence the differentiation of B cells into effector fates and how they limit the emergence of autoreactive B cell clones. Most importantly, from the vaccine standpoint, it is likely that better understanding of how T cells help shape the B cell repertoire will allow us to better control the specificity of vaccine-induced immune responses. The aim of this Keystone Symposia conference are to: 1) Present the most recent advances in the basic biology of the T cell-dependent B cell response, focusing on Tfh development and function and B cell activation and differentiation; 2) Address the gap in our understanding of the differentiation of B cells into post-activation (memory and plasma cell) fates; 3) Discuss how furthering our understanding of B-T cell interactions can inform vaccine development; and 4) Present recent findings regarding the role of T-dependent B cell response in allergy and autoimmunity.

Session Topics:
- Tfh Biology
- Regulation of the GC Response
- Germinal Center Biology
- Workshop 2: Tfh/Tfr Differentiation and Function
- Programming T Cells to Help B Cells
- B Cell Responses in Infectious Disease
- Workshop 3: B Cell-T Cell Interactions in Disease
- Memory Humoral Responses
- Humoral Autoimmunity and Allergic Responses
- T-Dependent B Cell Differentiation

Scholarship/Discounted Abstract Deadline: Oct 9, 2018; Abstract Deadline: Nov 7, 2018; Discounted Registration Deadline: Dec 6, 2018

Visit www.keystonesymposia.org/19J6 | Hashtag: #KSbtcell
Obesity is a growing worldwide epidemic, increasing co-morbid conditions, such as diabetes. The joint conferences on “Obesity and Adipose Tissue Biology” and “Functional Neurocircuitry of Feeding and Feeding Disorders” are aimed to foster cross-talk between these research areas. Adipose tissue is an endocrine organ that is both controlled by and sends signals to the brain and other organs. In addition, obesity causes an inflammatory state in the adipose tissue. The recognition that brown/beige adipose tissue is active in adult humans has triggered interest in understanding the physiology and relative importance of these tissues. Exercise and bariatric surgery are known to elicit profound metabolic benefits in type 2 diabetes, although the underlying mechanisms remain unclear. This conference will bring together cell biologists, biochemists, geneticists, physiologists, drug developers and clinical researchers, thereby facilitating knowledge exchange and interactions leading to elucidation of better treatments for obesity and diabetes. Specifically, it will examine recent advances in our understanding of brown/beige adipose tissue function; obesity-induced adipose inflammation; control of adipose tissue, appetite and energy metabolism; endocrine and paracrine signaling via secreted factors; molecular mechanisms of metabolic signaling; emerging topics, including long noncoding RNA and the gut microbiome; and approaches to drug development and the treatment of obesity and diabetes.

Session Topics:
- Drug Discovery/Development in Obesity
- Brown/Beige/BRITE Fat Activation and Function
- Adipose Tissue and Immune Cells
- Adipose Tissue Heterogeneity
- Environment and Obesity
- How Can We Translate Novel Discoveries into Obesity Treatment?
- Disease Cachexia (Joint)
- Clinical Obesity Management – Roundtable Discussion
- Adipose Tissue Microenvironment

Scholarship/Discounted Abstract Deadline: Oct 10, 2018; Abstract Deadline: Nov 8, 2018; Discounted Registration Deadline: Dec 11, 2018

Visit www.keystonesymposia.org/19J7 | Hashtag: #KSobesity

Attending one conference in a joint pair enables participation in sessions of the other, pending space availability. Participants have the opportunity to hear talks from speakers at both conferences, and to interact with a wide range of investigators during the joint poster sessions and social hours.
The Keystone Symposia conference on neuronal control of appetite is traditionally the leading gathering for scientific exchange among those studying the central control of energy homeostasis. The monogenetic syndromes of obesity in mouse and man played a fundamental role in the development of this field, and hence the field has heavily emphasized the control of feeding in models of obesity. However, many disorders of feeding and energy storage, including anorexia nervosa, disease cachexia, pediatric failure to thrive, Prader-Willi disease and progeria, are important, untreated medical conditions. The goal of this conference is to gather world leaders in the neural control of feeding and energy homeostasis, along with leaders in the pathophysiology of feeding and energy homeostasis. There is currently no meeting in the field that brings together these disparate groups of scientists. The conference will broaden the field by covering fundamental advances in the neural circuitry underlying feeding, while including entire sessions devoted to anorexia nervosa, disease cachexia and feeding disorders across the lifespan. Additionally, while past Keystone Symposia conferences on the neuronal control of appetite have been heavily focused on the hypothalamic control of homeostatic feeding, this symposium will feature entire sessions devoted to brainstem and telencephalic control of feeding.

Session Topics:
- Neural Circuitry Underlying Feeding Behavior
- Workshop 1: Research Opportunities in Eating Disorders
- Genetic Disorders of Feeding and Energy Storage
- Anorexia Nervosa
- Neural Circuits Underlying Nausea, Emesis and Aversive Responses
- Telencephalic Control of Feeding Behavior
- Feeding Across the Lifespan
- Disease Cachexia (Joint)
- Workshop 2: Late-Breaking Topics from Abstracts
- Drug Discovery for Eating Disorders

Scholarship/Discounted Abstract Deadline: Oct 10, 2018; Abstract Deadline: Nov 8, 2018; Discounted Registration Deadline: Dec 11, 2018
Visit [www.keystonesymposia.org/19J8](http://www.keystonesymposia.org/19J8) | Hashtag: #KSfeeding

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Autophagy is a homeostatic process strategically positioned at the intersection of metabolism and intracellular quality control, with broad physiological and medical manifestations ranging from metabolic imbalance to neurodegeneration, infections, immune disorders, cancer and aging. In yeast, the formation and organization of the autophagosomal apparatus follows a highly prescribed sequence, starting with the pre-autophagosomal structure and ending in autophagosomal fusion with the yeast vacuole. However, in other model organisms, as well as in mammals, the autophagy machinery and its regulators show both similarities and notable differences relative to yeast. The goals/aims of the conference are to: 1) Compare and contrast autophagy in yeast and higher organisms with a focus on both the shared regulators and on those factors that have no counterparts in yeast; 2) Cover the intersection of autophagy with energy metabolism, innate immune signaling and endomembrane damage; and 3) Investigate how signaling cascades regulate the process of selective autophagy whereby substrates are recruited to forming autophagosomes by receptors and molecular tags such as ubiquitin, galectins or through other modalities. The conference will cover fundamental principles as outlined above and how they apply to basic and translational aspects of human disease. Intersections with several other stress response processes will also be addressed.

Session Topics:
- Autophagy Fundamentals
- Workshop 1: Structural Biology and Proteomics and Autophagy
- mTOR, AMPK, TFEB – Relationship to Autophagy and Other Pathways
- Membrane Trafficking and its Role in Autophagy
- Autophagy Regulation and Processes
- Autophagy, Proteostasis and Organellar Homeostasis
- Panel: Women in Science at All Career Stages
- Autophagy in Aging and Degenerative and Inflammatory Disease
- Autophagy in Metabolism, Growth Control and Cancer
- Workshop 2: Current Controversies
- Autophagy from Model Systems to Humans – Closing the Circle

Scholarship/Discounted Abstract Deadline: Oct 16, 2018; Abstract Deadline: Nov 15, 2018; Discounted Registration Deadline: Dec 13, 2018

Visit [www.keystonesymposia.org/19B2](http://www.keystonesymposia.org/19B2) | Hashtag: #KSautophagy

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Uncovering Mechanisms of Immune-Based Therapy in Cancer and Autoimmunity

Beaver Run Resort | Breckenridge, Colorado, USA | February 18–22, 2019

Scientific Organizers:
Daniel J. Cua, Merck Research Laboratories, USA
E. John Wherry, University of Pennsylvania, USA
Carla V. Rothlin, Yale University, USA

Held in honor of cancer immunotherapy research pioneers Dr. Alan Korman and Dr. Nils Lonberg, thanks to generous support from an anonymous donor.

Organized in collaboration with Cancer Research UK

Sponsored by BioLegend, Inc.; EMD Serono Research and Development Institute, Inc.; Incyte Corporation; MacroGenomics, Inc.; OncoMed Pharmaceuticals, Inc.; Roche, Surface Oncology and Takeda Pharmaceutical Company Limited

Significant progress has been made in the field of immunology over the past two decades. Therapeutic agents such as anti-TNF, anti-CD20, anti-CTLA4 and more recently anti-PD1 have benefited countless patients. This is a unique time for immunologists and clinical scientists to learn from the sheer number of clinical trials assessing immune targets for treatment of cancer and autoimmunity. Currently, there are more than 500 clinical studies testing combinations of checkpoint inhibitors with other pathway antagonists, which will begin to uncover the “immune mechanisms” driving the disease process. This is highlighted by the observation that more than 10-20% of patients treated with anti-PD1 and/or CTLA-4 linked to IBD). The response rate to cancer treatment is greater in patients with autoimmune predisposition; therefore, the autoimmune side effect is in part associated with patient genetics.

Conference topics will include discussions of combination immunotherapies, the genetics of patient response and strategies to reprogram adaptive and innate immunity, which are key to harnessing the immune system to fight cancer and autoimmune diseases. The symposium will end with a special closing lecture on the future of immunotherapy.

Session Topics:
• Checkpoint Blockade Predisposes Patients to Autoimmunity
• Genetics of Autoimmunity and Cancer: What Are the Common Denominators?
• Cellular Reprogramming: Regulatory vs. Functional Fate
• Workshop 1: Immune Monitoring of Checkpoint Blockade Therapies
• Cellular Reprogramming: CD8 T Cell Exhaustion and CD4 T Cell Lineages
• Macrophage Biology, Tissue Repair, Autoimmunity and Cancer
• Neutrophils and MDSCs in Host Defense and Cancer
• Finding the Cure for Cancer
• Integrated Themes Across Preclinical and Clinical Treatment of Cancer and Autoimmunity

Visit www.keystone symposia.org/19B3 | Hashtag: #KSimmtherapy

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Image of cancer immunotherapy courtesy of National Cancer Institute, National Institutes of Health
The use of programmable nucleases such as CRISPR-Cas systems, ZFNs and TALENs has revolutionized cell biology by providing the ability to manipulate specific genetic and epigenetic states within living cells. These systems have been broadly applied as tools in research settings and increasingly are being used to develop improved models of disease and engineer cells for therapeutic purposes. Together with other DNA-modifying systems such as recombinases, integrases and transposases, it is now possible to introduce mutations that will model human disease, build complex synthetic signaling networks to perform regulated functions, and design cells to target specific disease states. Improvements to the methods involved requires understanding enzyme structures and mechanisms and how they intersect with cellular DNA repair systems. The intersection of this basic science with engineering approaches and improved cellular models is revolutionizing our understanding and treatment of human disease. The goal of this Keystone Symposia conference is to bring together those developing and studying genome engineering tools with groups who are applying them to build new disease models, identify disease mechanisms and drug targets, and develop cell-based therapeutics and genetic medicines. In addition to covering engineering of human and animal cells, this conference will also highlight the emerging field of genome engineering to identify new anti-microbial and anti-viral drugs and applications toward next-generation antibiotics. Invited talks will explore a broad range of topics covering new technologies, fundamental basic research, through the development of screening approaches, stem cell-based models of disease and design, and development of cellular therapeutics.
Research over the past decade has considerably enhanced our understanding of metabolic changes that occur as cancers emerge from normal tissues, and it has become apparent that tumors evolve numerous mechanisms to obtain the nutrients they need to grow and to cope with the reactive oxygen species that are generated during high rates of growth. This Keystone Symposia conference will focus on approaches to identify and therapeutically exploit the various metabolic vulnerabilities of tumor cells compared to normal tissues. The major goal is to discuss how to develop new therapies to kill tumors based on emerging knowledge about metabolic vulnerabilities. As new drugs that target metabolism enter the clinic, we need biomarkers that reveal which tumors are likely to be vulnerable and biomarkers that reveal mechanisms of resistance. Specific aims are to: 1) Understand how and why different tumor types evolve different mechanisms to obtain nutrients; 2) Explore how tumor cells protect themselves from reactive oxygen species; 3) Investigate differences in metabolism of metastatic tumors compared to primary tumors; 4) Understand how whole body metabolism relates to tumor metabolism; and 5) Enhance our ability to monitor tumor metabolism via minimally invasive imaging. The anticipated outcomes are the sharing of unpublished discoveries about mechanisms used by primary and metastatic tumors to obtain nutrients from their environment as emerging technologies for monitoring tumor metabolism in vivo and ex vivo. The conference will bring together scientists and clinicians with widely different backgrounds in preclinical models of cancer, drug discovery, drug development, imaging and clinical trials to share information about: 1) The diverse ways that tumors alter metabolism; 2) New drug targets suggested from this knowledge of tumor metabolism; 3) New technologies to monitor tumor metabolism in vivo and ex vivo; 4) Progress being made in pre-clinical studies with experimental approaches that alter tumor metabolism; and 5) Progress in human clinical trials with new drugs that target metabolism.

Session Topics:
- Cancer Cell Metabolism
- Feeding the Cancer
- Metabolism and Metastasis
- The Metabolism of ROS and Survival
- Metabolism Outside the Tumor
- Metabolic Adaptation and the Response to Therapy
- Imaging Cancer Metabolism in vitro and in vivo
- Modeling Cancer Metabolism in vitro

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Visit [www.keystonesymposia.org/19BS](http://www.keystonesymposia.org/19BS) | Hashtag: #KStumor
Cell competition represents a radical departure from the established view that embryonic development is simply a matter of following a preprogrammed set of rules. Instead, it is a highly conserved process that promotes the context-dependent elimination of less fit cells and stimulates growth of more fit cells during growth and homeostasis. Although it has long been known that the basis of competition is the ability of growing cells to monitor fitness of their neighbors, and can be induced via differences in protein production capacity, Myc levels and apico-basal cell polarity, only recently have signaling and effector mechanisms been identified. This conference aims to bring together, for the first time, researchers from diverse fields who study competitive and cooperative interactions between cells. It will cover recent findings on quality control systems, developing tissues, stem cell populations and tumorigenesis, as well as address important evolutionary aspects of competitive and cooperative behavior in diverse model systems. New technologies have uncovered the prevalence of cell competition in humans, with surprising outcomes and implications for human disease. As the first broad conference of this sort, it will define critical questions shared by the diverse investigators and help shape this exciting and emerging field. Given the wide range of developmental and homeostatic systems that are controlled by cell competition, understanding the mechanisms and consequences of competitive interactions may permit the manipulation of these processes for therapeutic purposes.

Session Topics:
- Cell Competition in Development
- Evolution of Competition and Cooperation
- Stem Cell Competition
- Workshop 1: Technologies for Clonal Tracking
- The Germline
- Mosaicism and Selection in Normal Tissues
- Workshop 2: Oncogenes and Tumor Suppressors as Drivers in Competition
- Cell Selection in Human Disease
- Aging and Pre-Malignancy
- Workshop 3: Modeling Cell Competition
- Competition in Cancer

Scholarship/Discounted Abstract Deadline: Oct 24, 2018; Abstract Deadline: Nov 28, 2018; Discounted Registration Deadline: Jan 8, 2019
Visit www.keystonesymposia.org/19B6 | Hashtag: #KScellcomp

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Myeloid Cells

Eldorado Hotel | Santa Fe, New Mexico, USA | February 24–28 2019

Scientific Organizers:
Tiffany Horng, ShanghaiTech University, China
Gregory M. Barton, University of California, Berkeley, USA
Ajay Chawla, University of California, San Francisco, USA

Sponsored by Boehringer Ingelheim Pharmaceuticals, Inc.

Myeloid cells regulate tissue homeostasis, immunity and inflammation, whereas their dysregulation contributes to cancer, metabolic diseases, inflammatory diseases and degenerative diseases. This Keystone Symposia conference will cover areas of long-standing interest as well as topical areas in the field of myeloid cell biology, including ontogeny and tissue specification, myeloid cell activation, immunometabolism, immunity and infection, mucosal immunity and cancer immunology. Multiple myeloid cell populations will be discussed, including tissue-resident macrophages, monocytes, dendritic cells and neutrophils. The conference will highlight the diverse approaches being used to study myeloid cell biology, including genomic analyses, single-cell profiling, imaging and metabolic profiling. Both basic and translational aspects of myeloid cell research will be covered. The goals of the conference are to share recent advances in this rapidly evolving field, stimulate interactions between interdisciplinary groups of scientists, and define future areas of investigation in myeloid cell research.

Session Topics:
• Innate Immune Receptors and Myeloid Cell Activation
• Workshop 1: Myeloid Cell Activation
• Myeloid Cells in Metabolism
• Myeloid Cells in Metabolic and Inflammatory Diseases
• Macrophage Specification in the Tissue Environment
• Myeloid Cells in Immunity and Infection
• Myeloid Cells in Mucosal Immunity
• Myeloid Cells in Cancer
• Workshop 2: Myeloid Cells in Health and Disease
• Tissue-Resident Macrophages

KEYNOTE SPEAKER
Ruslan Medzhitov

CONFIRMED SPEAKERS
Ido Amit
Gregory M. Barton
Yasmine Belkaid
Ajay Chawla
Marco Colonna
Vishva M. Dixit
Frederic Geissmann
Catherine Hedrick
Andrés Hidalgo
Tiffany Horng
Jonathan C. Kagan
Thirumala-Devi Kanneganti
Amira Klip
Matthew F. Krummel
Paul Kubes
Ira Mellman
Denise M. Monack
Kathryn J. Moore
Daniel Mucida
Chandrashekhar Pasare
Kaoru Sajjo
Michael H. Sieweke
Stephen T. Smale
Jenny P.Y. Ting
Peter Tontonoz
Judith A. Varner
Steven F. Ziegler

Visit www.keystonesymposia.org/19B7 | Hashtag: #KSmyeloid

Scholarship/Discounted Abstract Deadline: Oct 24, 2018; Abstract Deadline: Nov 28, 2018; Discounted Registration Deadline: Jan 9, 2019

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of macrophage courtesy of National Institutes of Health
Recent evidence suggests that the human genome encodes ~1500 RNA binding proteins (RBPs), and this number may further increase by identifying additional RBPs that do not contain canonical RNA binding motifs. These proteins control gene expression at transcriptional and post-transcriptional levels in development and disease. As mutations in many RBPs have been linked to human diseases, various RBPs and their regulated events may be potential drug targets. This conference will address some long-standing problems as well as emerging paradigms in this field. In particular, it will bring together leaders in RNA research to: 1) Brainstorm around novel concepts; 2) Share new technology developments; and 3) Explore new disease mechanisms. The conference will be highly mechanism-oriented, rather than centering on a specific biological process or disease theme, which will bring together scientists across multiple fields. Since individual regulatory RNAs must enlist specific RBPs to execute their biological functions, coupling the conference with another on “Long Noncoding RNAs: From Molecular Mechanism to Functional Genetics” will thus present a cohesive theme focused on RNA biology and medicine.

Session Topics:
- Functional RNA Elements in Mammalian Genomes (Joint)
- RNP in Phase Transition
- Coding and Noncoding RNAs on Chromatin (Joint)
- Dissecting RNP Functions in vivo
- RNA Transport and Localization
- Structure and Function of RBPs
- RNP Machines and Regulation
- RNA and RBP in Disease (Joint)

plus two workshops

Scholarship/Discounted Abstract Deadline: Oct 25, 2018; Abstract Deadline: Nov 29, 2018; Discounted Registration Deadline: Jan 10, 2019

Visit www.keystonesymposia.org/19X1 | Hashtag: #KSrnaprotein
Although emerging evidence points to the critical importance of the long noncoding transcriptome in human physiology and pathology, the clinical potential of long noncoding RNAs (lncRNAs) as therapeutic and prognostic targets remain largely unexplored. The increasing availability of high-throughput technologies and newly developed computational methodologies is rapidly making it possible to address this gap in our knowledge. However, optimal use of these new capabilities and recognition of their power in transforming the field of lncRNA research requires the formation of new collaborative and training efforts. This conference specifically aims to: 1) Communicate the latest available technologies and developing methodologies for lncRNA functional genetics to the lncRNA community; 2) Promote collaborations and new research directions that will bridge the already thriving lncRNA mechanistic and basic research to the clinical need for novel, effective diagnostic, prognostic and therapeutic targets; 3) Contribute to attracting the attention of biotech and pharmaceutical industry and clinically-oriented funding agencies to the lncRNA field; and 4) Integrate lncRNA research into other biological fields through the joint pairing with the conference on "RNA-Protein Interactions."

Session Topics:
- Functional RNA Elements in Mammalian Genomes (Joint)
- lncRNAs, Transposons and Evolution of the Genome
- Coding and Noncoding RNAs on Chromatin (Joint)
- Regulation of Differentiation and Development by lncRNAs
- lncRNAs in Disease: Tools for Discovery
- Novel Insights into Functional Mechanism of IncRNAs
- IncRNAs: Diversity in Form and Function
- RNA and RBP in Disease (Joint)

Scholarship/Discounted Abstract Deadline: Oct 25, 2018; Abstract Deadline: Nov 29, 2018; Discounted Registration Deadline: Jan 10, 2019
Visit [www.keystonesymposia.org/19X2](http://www.keystonesymposia.org/19X2) | Hashtag: #KSIncRNA
Joint with the conference on *Unraveling the Secrets of Kidney Disease*

**Scientific Organizers:**

**Philip J. Larsen**, Grünenthal Group, Germany  
**Melina Claussnitzer**, Harvard Medical School, Beth Israel Deaconess Medical Center, USA  
**Tina Vilsbøll**, Steno Diabetes Center Copenhagen, Denmark

Sponsored by Lilly USA, LLC and MedImmune

Diabetes remains a public health challenge of epidemic proportions. Modern treatment algorithms are evolving to recommend higher focus on personalized approaches to diabetes care. However, as diabetes remains a disease characterized by excess elevation of a plasma biomarker, glucose, further refinement of our understanding of the disease and its comorbidities is required to provide optimal guidance for precision medicine. Advancement of research technologies and the ability to handle large data sets have enabled systems biology approaches to unravel different etiologies and pathophysiological consequences of diabetes. Future diabetes discovery efforts will focus on pairing knowledge about genetic risk and environmental triggers of diabetes-associated pathologies. Using deep phenome characterization and molecular network analyses diabetes, researchers will be able to launch modern translational approaches to diabetes care innovation. The objectives of the conference are to provide directional guidance for future pressure points of diabetes care, and focus on specific diabetes complications representing particular unmet needs. Further, forefront discoveries of genetic risk determinants and their molecular mechanisms will be presented together with lively debates about the translatability of such insights into novel curative therapies.

**Session Topics:**

- State of the Union for Diabetes Care anno 2019: What Should We Expect from a Stellar Novel Diabetes Drug?  
- Workshop and Panel Discussion  
- Diabetes and its Many Phenotypes  
- Genetics and Epigenetics of Diabetes and Complications (Joint)  
- Deciphering Cellular Function of Target Tissues of Relevance for Diabetes  
- Complications of Diabetes (Joint)  
- Omics Stuff and Profiling  
- Epigenomics of T2D  
- Metabolic Surgery

Scholarship/Discounted Abstract Deadline: Nov 6, 2018; Abstract Deadline: Dec 4, 2018; Discounted Registration Deadline: Jan 11, 2019  
Visit [www.keystonesymposia.org/19X3](http://www.keystonesymposia.org/19X3) | Hashtag: #KSdiabetes

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Close to 1 in 11 people in the world suffers from kidney disease, and the incidence is increasing, especially in the developing world. This issue was recently reviewed and emphasized in a Lancet article (Global Health Atlas). Acute and chronic kidney disease is associated with a highly significant increase in cardiovascular death, and chronic kidney disease (CKD) represents a leading cause of death in the United States. There is no cure for this disease, with current treatment strategies relying on blood pressure control through blockade of the renin-angiotensin system. Such approaches only delay the development of end-stage kidney disease and can be associated with serious side effects. Recent identification of several novel mechanisms contributing to CKD development - including vascular changes, loss of podocytes and renal epithelial cells, matrix deposition, inflammation and metabolic dysregulation - has revealed new potential therapeutic approaches for CKD. This conference will review clinical and observational studies in the kidney disease area, highlight recent advances in basic biology of kidney and kidney disease, assesses emerging strategies and agents for CKD treatment, and discuss major obstacles in drug development. The conference will also encourage collaborations among clinicians and researchers from academia and pharma and accelerate innovation in this field. Furthermore, since more than half of kidney disease is caused by diabetes, the symposium will greatly benefit from the joint pairing with the conference on “Diabetes: Innovations, Outcomes and Personalized Therapies.”

Session Topics:
• Podocyte Diseases
• Immune Injury
• Genetics and Epigenetics of Diabetes and Complications (Joint)
• Tubule Injury and Regeneration
• Complications of Diabetes (Joint)
• Endothelial Dysfunction in CKD
• Precision Medicine
• Novel Approaches for Drug Discovery plus a workshop

Scholarship/Discounted Abstract Deadline: Nov 6, 2018; Abstract Deadline: Dec 4, 2018; Discounted Registration Deadline: Jan 11, 2019
Visit www.keystonesymposia.org/19X4 | Hashtag: #SKidney

Attending one conference in a joint pair enables participation in sessions of the other, pending space availability. Participants have the opportunity to hear talks from speakers at both conferences, and to interact with a wide range of investigators during the joint poster sessions and social hours.

Left image of fluorescent microscopy of kidney tissue courtesy of National Institutes of Health
Unlike conventional target-centric drug discovery, Phenotypic Drug Discovery (PDD) places its focus on disease-relevant phenotypes and agnosticism with regard to molecular mechanism of action. The unique opportunities it offers in terms of discovery of novel biology and first-in-class therapeutics are matched with significant challenges, a number of which can be addressed by recent advances in chemical and systems biology. A key aspect of this conference will be to share information/processes on how best to employ phenotypic strategies to discover novel biology and effectively prosecute drug discovery programs. Specific topics will include chemical biology advances and case studies in target identification, case studies of recently advanced clinical candidates and approved drugs, functional genomics and systems biology advances and case studies, project prosecution: lessons learned from lead optimization and pre-clinical development, and complex cell-based models and new assay modalities. The conference will bring together accomplished and influential scientists from industry and academia and will cover the entire range of activities and technologies from phenotypic assay systems, to target identification and FDA approval of novel therapeutics. The hope is that the symposium can be instrumental in further promoting a shift in mindset and contributing to the consolidation of PDD as an integral part of the drug discovery paradigm.

Session Topics:
• Clinical Success Stories
• Workshop 1: Safety De-Risking
• New Opportunities and Under-Represented Indications
• Chemical Biology and Novel Molecular Mechanisms of Action
• Project Prosecution and Pre-Clinical Advancement
• Physiologically Complex and Realistic Disease Assays
• Workshop 2: Clinical, Regulatory Case Studies with PDD Project Prosecution
• Functional Genomics and Systems Approaches
• Compound Profiling and Repositioning
• Target Identification / Deconvolution

Scholarship/Discounted Abstract Deadline: Oct 30, 2018; Abstract Deadline: Dec 4, 2018; Discounted Registration Deadline: Jan 11, 2019

Visit www.keystonesymposia.org/19C1 | Hashtag: #KSpdd

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Cancer Immunotherapy: 
Mechanistic Insights to Improve Clinical Benefit

Whistler Conference Centre | Whistler, British Columbia, Canada | March 10–14, 2019

Scientific Organizers:
Padmanee Sharma, University of Texas MD Anderson Cancer Center, USA
Aviv Regev, Massachusetts Institute of Technology/Broad Institute, USA
Crystal L. Mackall, Stanford University, USA
Kristen Hege, Celgene, USA

Sponsored by Autolus Therapeutics; BioLegend, Inc.; Bristol-Myers Squibb Company; Cell Research; Immunogen, Inc.; Incyte Corporation; Roche; Surface Oncology; TESARO, Inc. and Takeda Pharmaceutical Company Limited

Cancer immunotherapy is now an established field that has led to remarkable clinical benefit for a subset of patients. However, a deeper understanding of the mechanisms of response and resistance to current immunotherapy strategies is needed to help develop new treatments that will increase the number of patients who will benefit. This conference will explore mechanisms related to response and resistance, including novel methodologies to identify these mechanisms, and provide insights into new targets and combinatorial therapies that are being developed.

Session Topics:
• Response and Resistance Mechanisms to Cancer Immunotherapy
• Technological Advances for Dissecting Immune Responses
• Improving Anti-Tumor Immune Responses
• Engineering T Cells
• Immune Checkpoints: Basic Mechanisms and Novel Targets
• Combinatorial Immunotherapy Strategies
• Progress Report on Immune Monitoring and Clinical Trials
• The Future of Cancer Immunotherapy

Scholarship/Discounted Abstract Deadline: Nov 7, 2018; Abstract Deadline: Dec 5, 2018; Discounted Registration Deadline: Jan 15, 2019
Visit www.keystonesymposia.org/19C2 | Hashtag: #KScancerimm

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of oral squamous cancer cell immunotherapy courtesy of National Institutes of Health
Both the Unified Microbiome Initiative (Alivisatos et al., Science, 2015) and the National Microbiome Initiative have emphasized the need to move beyond sequencing to better understand the fundamental molecular and chemical mechanisms that shape microbial communities in host and environmental habitats. Understanding the chemistry of microbiomes has broad implications, including providing functional annotations for the vast “dark matter” of microbial genomes, insights into the chemical languages that link microbes to each other and to their habitat, and translational implications for precision medicine, environmental health, and sustainable living. This symposium will bring together scientists with innovative, paradigm-shifting research programs in chemistry, synthetic biology, genome editing and precision medicine who rarely interact to address common questions. The interdisciplinary collaborations that result will accelerate basic microbiome research as well as help understand the role of the microbiome in human health and disease. Specifically, this conference aims to: 1) Provide a platform for microbiome researchers to be acquainted with cutting-edge research actively performed at the interface of chemistry and biology; 2) Introduce and discuss new technological advances and methodological platforms that complement and accelerate microbiome research efforts in academia and industry; and 3) Provide an engaging atmosphere with open innovative discussion among both senior and junior scientists focused around the current successes of microbiome research, the limitations of today’s approaches, and the future of chemical and biological microbiome research.

Session Topics:
- Microbiome Biochemistry Insights and Innovations
- Workshop 1: Chemical Biological Methods in Microbiome Studies
- Small Molecules in Host-Microbiome Crosstalk
- Microbiome Toxicology and Pharmacology
- Workshop 2: Roles of Pharmaceutical Industry in Microbiome Research
- Antibiotics and the Microbiome
- Microbiome Enzyme Discovery and Characterization
- Workshop 3: Cutting-Edge Insights into Host-Microbiome Interactions
- Emerging Technologies and Applications
- Microbiome-Based Natural Products
- Synthetic and Systems Microbial Ecology

Scholarship/Discounted Abstract Deadline: Nov 8, 2018; Abstract Deadline: Dec 6, 2018; Discounted Registration Deadline: Jan 16, 2019
Visit www.keystonesymposia.org/19C3 | Hashtag: #KSmicrobiome
The importance of innate immune receptors was first appreciated in infectious diseases and autoinflammatory disorders. However, it is now clear that their roles extend beyond innate immunology. The crucial roles of these receptors in many clinically relevant fields and their newly documented role in non-immune cells underscore their importance in biologic processes and diseases such as cancer cell death and signaling, DNA damage, stress response, stem cell proliferation/differentiation, vaccine adjuvanticity, age-related dementia, metabolic disorders and microbiome balance. This conference will bring together an interdisciplinary group of investigators to explore the broad and important role of innate immune receptors.
Scientific Organizers:
Stephen Liberles, Harvard Medical School, USA
David D. Ginty, HHMI/Harvard Medical School, USA
Jeffrey R. Holt, Boston Children’s Hospital, USA
Melanie Samuel, Baylor College of Medicine, USA

Sponsored by the Allen Institute

Our basic external sensory systems – touch, taste, vision, hearing, and smell – enable us to perceive the world around us, and other internal sensory systems enable us to perceive the secret world within us. Recent advances have revealed the molecular logic of how some sensory systems work, while other sensory systems remain uncharted. Fields of sensory biology often maintain separate cultures, and are at varying levels of maturity, with different frontiers, unknowns, and perspectives. The goal of this conference is to bring leading experts from different sensory fields together, and to broadcast conceptual and technical advances achieved in one sensory system that may enable new findings in others. It will highlight recent advances in each external sense: vision, olfaction, taste, hearing and touch/pain/temperature sensation, as well as new developments in the emerging field of internal organ sensation. Speakers will be included to discuss a range of topics including: 1) Receptors and sensory mechanisms; 2) Neural circuits; 3) Behavioral and physiological responses; and 4) The genetic basis of sensory deficits.

Session Topics:
• Structure and Function of Chemoreceptors
• Structure and Function of Mechanoreceptors
• Cell Biology of Sensory Neurons
• Genetic and Translational Approaches for Sensory Deficits
• Evolution of Sensory Systems
• Early Sensory Processing
• Sensory Control of Limbic and Autonomic Systems
• Cortical Processing of Sensory Information
plus two workshops

Scholarship/Discounted Abstract Deadline: Nov 14, 2018; Abstract Deadline: Dec 11, 2018; Discounted Registration Deadline: Jan 17, 2019
Visit www.keystonesymposia.org/19C4 | Hashtag: #KSsensory
In disease states, immune cells must compete for available resources to control tissue homeostasis or mediate protective functions. This is particularly true in cancer, where rapidly proliferating and metabolically dysregulated tumors exert metabolic pressure on cells within the tumor microenvironment. Understanding how immune and non-immune cells respond to these conditions and restrain tumor growth and metastasis is critical for developing new cancer therapies. Often cancer biologists and immunologists have little crossover, and this presents a significant barrier to furthering knowledge. This interdisciplinary conference will present the latest, cutting-edge research regarding novel and integrated mechanistic underpinnings that lead to cancer progression/regression and metastasis. The conference goals are to: 1) Bring together cancer biologists and immunologists who have a common interest in how cellular metabolism influences cell function; 2) Raise awareness of the metabolic intersection between tumor biology and immunology; and 3) Encourage junior researchers to actively participate at this interface. Attendees will leave the conference with a stronger understanding of how metabolism in immune cells and non-immune cells influences cell function in metastasis and the tumor microenvironment. An ultimate goal is that researchers from cancer biology and immunology will, as a result of their interactions, forge new collaborations founded in their mutual appreciation that engagement of particular metabolic pathways shapes cell function and fate.

Session Topics:

• Interactions via the Tumor Microenvironment
• Mitochondria and Oxidative Stress in Cancer Metastasis and Immunity
• Cancer and Immunity in the Tumor Microenvironment
• Metastasis, Tumor Vessels and Immunity
• Therapeutic Strategies for Metabolism and Immune Modulation

• Stem Cells in Inflammation, Cancer and Metastasis
• Metabolism Meets Cancer Metastasis
• Commensal Interactions: Implications for Immunity and Cancer

plus two workshops

Scholarship/Discounted Abstract Deadline: Nov 14, 2018; Abstract Deadline: Dec 11, 2018; Discounted Registration deadline: Jan 17, 2019

Visit www.keystone symposia.org/19M2 | Hashtag: #KSmetastasis

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Epigenetics
and Human Disease

Fairmont Banff Springs | Banff, Alberta, Canada | March 17–21, 2019

Joint with the conference on 3D Genome: Gene Regulation and Disease

Scientific Organizers:
Cheryl Arrowsmith, University of Toronto, Canada
Anne Schaefer, Mount Sinai School of Medicine, USA
Mark A. Dawson, Peter MacCallum Cancer Centre, Australia

Sponsored by Cell Research, Incyte Corporation, Novartis Institutes for BioMedical Research and Pfizer Inc.

Epigenetics is a major mechanism in human health and disease. Data from a range of diseases (cancer, neurological and immunological disorders) have uncovered altered epigenomes arising from mutations, altered expression and/or copy number alterations of numerous epigenetic factors (histones, DNA and chromatin modifying enzymes, reader proteins, chromatin modulators and noncoding RNAs). Genome-wide analyses have illustrated the relationship between altered epigenetic states (e.g., modified DNA, histones and chromatin packaging) and disease onset and progression. Furthermore, both local and long-range nuclear chromatin architecture are increasingly recognized as major contributors to normal and pathologic epigenetic states. This conference will cover the most current knowledge of epigenetic events modulating nuclear function (gene expression regulation, enhancer modulation, domains and structural organization as well as cell division and differentiation), while relating this to normal and disease models. In addition, this conference will highlight the impact that preclinical and clinical epigenetic therapeutics have on multiple diseases including cancer and immunological and neurological disorders. An interdisciplinary panel of speakers encompasses both thought leaders in the field as well as young investigators to survey the latest research results and conceptual understanding of fundamental mechanisms of epigenetic signaling, especially as it relates to regulation of gene expression programs. Presentations and workshops will highlight the latest technologies and methodologies for studying epigenetic states and 3D chromatin architecture in cells, tissues and organisms.

Session Topics:
• 3D Epigenome/Epigenetics and Disease (Joint)
• Workshop 1: Epigenetic Memory and Inheritance in Health and Disease
• Epigenetic Dysregulation in Neurobiology
• Understanding and Targeting Epigenetic Dysregulation
• Workshop 2: Post-Translational Modifications, Novel Methods of Detection and Quantification, and Functional Significance
• Infectious Diseases and Autoimmunity
• Chromatin Signaling and Epigenetic Mechanisms
• Roundtable Discussion: Women in Science (Joint)
• Workshop 3: Epigenetic Therapy
• Metabolic Diseases and Aging
• Epigenetic Regulation in Immunoncology and Cancer Therapeutics
• Roundtable Discussion: Careers in Industry (Joint)
• 3D Genome and Disease (Joint)

Scholarship/Discounted Abstract Deadline: Nov 15, 2018; Abstract Deadline: Dec 12, 2018; Discounted Registration Deadline: Jan 22, 2019

Visit www.keystonesymposia.org/19X5 | Hashtag: #KSepigen

Attending one conference in a joint pair enables participation in sessions of the other, pending space availability. Participants have the opportunity to hear talks from speakers at both conferences, and to interact with a wide range of investigators during the joint poster sessions and social hours.
Transcription of the eukaryotic genome is not only driven by the cis regulatory elements embedded in the linear DNA sequence but also by the way chromosomes fold in the three-dimensional (3D) nuclear space. Growing evidence has pointed to a key role of the 3D genome architecture in gene regulation and human disease; however, the details of dynamic chromatin organization in different cell types remain opaque. Additionally, how chromatin organization shapes the gene regulatory program and influence disease pathogenesis has not been fully elucidated. The major objective of this conference is to accelerate the study of 3D genome organization; particularly with regard to gene regulation and human disease. The program will highlight recent technological advances, such as omics-based and imaging-based technologies, as well as discuss emerging concepts of chromatin organization and its role in cancer and other human diseases. Finally, the conference program will provide workshops and tutorials on the latest computational tools and data resources for 3D genome analysis. Because epigenetic processes such as chromatin remodeling and DNA methylation are intimately linked to the 3D genome architecture, this conference is jointly held with the Keystone conference on “Epigenetics and Human Disease,” further contributing to the goal of stimulating cross-disciplinary interactions among researchers from the genomics, epigenomics, computational biology, cell biology and molecular biology fields.

Session Topics:
- 3D Epigenome/Epigenetics and Disease (Joint)
- Workshop 1: 4DN Nucleome Consortium Resources
- Single Cell Analysis of Genome Architecture
- Analysis of 3D Genome with Advanced Microscopy
- Workshop 2: ENCODE Consortium Resources
- Chromatin and Epigenetics
- 3D Genome and Gene Regulation
- Roundtable Discussion: Women in Science (Joint)
- Workshop 3: International Human Epigenome Consortium
- Genome Architecture and Development
- Computational Analysis of 3D Genome
- Roundtable Discussion: Careers in Industry (Joint)
- 3D Genome and Disease (Joint)
Allergic diseases have been on the rise globally in recent decades. Although it has long been known that IgE-mediated immune responses are associated with the manifestations of a wide spectrum of allergic disorders (asthma, atopic dermatitis, atopic rhinitis, food allergy, eosinophilic esophagitis), the exact factors leading to these aberrant immune responses are not well understood. Recent insights into disease origins support a broader realm of factors that may predispose, initiate or exacerbate altered immunity in allergic diseases such as inherent epithelial barrier dysfunction, loss of immune tolerance at central and specific sites, disturbances in gut and organ specific microbiomes, diet and age. However, these studies are in their infancy and have only been considered in a reductionist, disease or tissue-specific manner to date. Few studies have addressed the cross-talk between various organs leading to the concept of allergy as a system disease. A better understanding of the distinct or shared complex web of factors underlying the spectrum of allergic disorders and the successes/failures of the current armature of therapies may lead to the development of safer, disease-modifying interventions in the future. Thus, the major goal of this conference is to explore the potential microbial-epithelial-immune interactions underlying the etiology of allergic disorders in order to promote the development of novel disease prevention or intervention strategies.

Session Topics:
- Allergic Disease Phenotypes
- Workshop 1: Novel Approaches to Defining Epithelial-Microbial Interactions in Allergy
- Immunological Mechanisms of Allergic Disease and Tolerance
- Early-Life Origins of Allergic Disease
- Microbes, and Metabolites Controlling Tolerance in Allergic Disease
- Barrier Dysfunction in Allergic Diseases
- Workshop 2: Exploring the System Disease Concept of Allergic Disorders
- Immunotherapeutic Opportunities in Allergic Disease
Immunotherapy has revolutionized the treatment of many cancer types over the past five years. T cell checkpoint inhibitors have led the way and are the focus of most immunotherapy trials. However, innate and non-classical T cells contribute extensively to the tumor infiltrate and significantly affect the tumor immune response both in the tumor microenvironment and in circulation. This symposium aims to bring together academic and industry opinion leaders in the fields of innate immune cells, natural killer cells, tumor microenvironment, tumor immune suppression, novel immunotherapeutic strategies and clinical cancer immunotherapy to define the next wave of immunotherapy breakthroughs that reach beyond the current T cell checkpoints. The conference offers a unique opportunity for an audience of diverse immunology and cancer research backgrounds to come together and share cutting-edge insight into cancer immunology and rational approaches for therapeutic intervention that could be used as stand-alone or in combination with T cell checkpoint therapies. A key aim is to bring together experts with complementary interest in cancer immunotherapy who would not normally be drawn to common symposia and thereby foster new, dynamic collaborations to advance our understanding of tumor immunity.

Session Topics:
- Clinical and Industry Advances in Cancer Immunotherapy
- Workshop 1: Recent Advances in Drugging the Innate Immune Response
- Myeloid Cells
- ADCC and Phagocytosis
- Tumor Microenvironment
- Innate Checkpoints
- Immune Evasion and Metastasis
- NK Cells and ILCs
- Workshop 2
- Emerging Techniques in Immunotherapy

Visit www.keystonesymposia.org/19CS | Hashtag: #KSimmcancer
Despite dramatic progress in prevention and treatment of HIV, the pandemic continues: 2 million people are newly infected each year. Thus, the need for a preventive vaccine for HIV is as urgent as ever. Intensive research in basic immunology and virology as well as empirical clinical trial data continue to yield insights that inform vaccine efforts. This conference will present the latest research results regarding human clinical studies of candidate vaccines as well as the use of monoclonal antibodies for prevention; novel HIV-neutralizing antibodies and their developmental pathways; T cell functions in killing and B cell help; structural insights and immunogen design; and the intersection of research for HIV eradication/cure with research on HIV vaccines, including interventions after very early antiretroviral therapy. Also included will be a session on the process of bringing candidate vaccines to clinical trial, told from the diverse perspectives of laboratory investigators, industrial production and funders.

Session Topics:
• Antibodies for Prevention, Treatment and Cure (Joint)
• Clinical Trials for Prevention: Vaccines and Antibodies
• New Technologies for Studying and Inducing B Cells
• Antibody-Virus Coevolution: Vaccines and Lessons from Infection
• Therapeutic Vaccines and Cure Strategies (Joint)
• T Cells in HIV Vaccination
• Env Immunogen Design and Evaluation
• From the Lab to the Clinic: A Reality Check for Investigators
plus two workshops

Global Health Travel Award Deadline: Oct 23, 2018; Scholarship/Discounted Abstract Deadline: Nov 28, 2018;
Abstract Deadline: Dec 18, 2018; Discounted Registration Deadline: Jan 24, 2019
Visit www.keystonesymposia.org/19X7 | Hashtag: #KShivvax

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Human Immunodeficiency Virus type 1 (HIV) causes a persistent infection and results in acquired immunodeficiency syndrome (AIDS). AIDS has remained a global pandemic for over 40 years as HIV integrates into the genome of infected individuals and remain latent for years. While much emphasis over the last decade has been centered on pathogenesis and vaccine development, an emerging paradigm shift is taking place whereby targeted therapeutics are being developed to both control virus expression as well as possibly target viral infected cells for eradication. This conference will for the first time bring together an interdisciplinary group of basic and applied scientists working on various aspects of HIV treatment and eradication strategies in an effort to translate our current understanding of HIV biology into meaningful therapeutic and/or eradication of HIV from infected individuals. To accomplish this goal the conference will aim to: 1) Introduce the state of the art in vaccine and neutralizing antibody strategies used to compact HIV; 2) Focus on transcriptional control and modulation of viral latency; and 3) Highlight synthetic biological approaches and genetic therapies currently being developed and clinically validated to combat HIV infection. The overall goal of this symposium is to bring together basic and applied scientists working on functional cures and eradication of HIV in an effort to not only better understand HIV treatment strategies but also the emerging technologies and approaches that will lead to the eventual eradication of HIV infection from infected individuals.

Session Topics:
- Antibodies for Prevention, Treatment and Cure (Joint)
- Development of the Innate Cell and Antibody Responses to HIV
- Mechanisms of Viral Expression and Control of Host Cell Function
- Mechanism and Modulation of Latency
- Therapeutic Vaccines and Cure Strategies (Joint)
- Experimental Molecular Approaches to Targeting Viral Reservoirs
- Targeting and Eradication of HIV
- Protect and Kill Strategies to a Functional Cure plus two workshops

Global Health Travel Award Deadline: Oct 23, 2018; Scholarship/Discounted Abstract Deadline: Nov 28, 2018; Abstract Deadline: Dec 18, 2018; Discounted Registration Deadline: Jan 24, 2019
Visit [www.keystonesymposia.org/19X8](http://www.keystonesymposia.org/19X8) | Hashtag: #KShiv

Attending one conference in a joint pair enables participation in sessions of the other, pending space availability. Participants have the opportunity to hear talks from speakers at both conferences, and to interact with a wide range of investigators during the joint poster sessions and social hours.
Recently, our understanding of lipid metabolism has significantly advanced, at least in part by applying state-of-the-art lipidomic mass spectrometry approaches to cellular, cohort and animal models. A large body of evidence now exists demonstrating that bioactive lipids play key roles in regulation of biological processes important for health and disease. However, lipidomics also reveals major gaps in our knowledge, highlighting the enormous numbers, functional and structural diversity of bioactive lipids, their interactions, spatial and temporal changes and the complicated systems biology of lipid metabolism. This Keystone Symposia conference will cover areas of bioactive lipid research that have been particularly impacted by these new technologies, all of which have the potential to transform precision medicine. In particular, it will cover recent progress and perspectives in the studies of bioactive lipid metabolic pathways, how these interconnect and are cross-regulated, and their involvement in regulation of disease. The key goals are to: 1) Summarize new approaches and state-of-the-art mass spectrometry technology combined with informatics and statistics, in bioactive lipid research and to gain broad understanding of limitations and potential of these, and their potential application to precision medicine and better understanding of their functions in diseases; 2) Acquire a broader understanding of how lipidomics can be integrated with proteomics/genomics and other ‘omics technologies, to develop a systems-wide view of the lipidome; 3) Gain new knowledge in spatial and temporal interactions of bioactive lipids in cellular and sub-cellular systems, to better understand their functions in health and diseases; and 4) Present recent findings on the biological importance of newly discovered lipids and their roles in immunity and inflammation.

Session Topics:
- Resolution of inflammation, Infection and Tissue Regeneration
- Workshop: LIPID MAPS Tools and Advances in Lipidomics Techniques
- Lipidomics/Metabolomics – Global Profiling vs. Targeted Analysis
- Novel Approaches to Lipid Metabolism
- Systems Biology of Lipids/‘Omics
- Lipidomics and Metabolic Syndrome
- Cancer Lipidomics
- Lipid Signaling in Inflammation
- Lipid Recognition by the Adaptive Immune System

Scholarship/Discounted Abstract Deadline: Nov 29, 2018; Abstract Deadline: Dec 19, 2018; Discounted Registration Deadline: Jan 30, 2019

Visit www.keystonesymposia.org/19C6 | Hashtag: #KSlipid
Cellular processes are orchestrated by a large number of biomolecules in both spatially and temporally coordinated manners within a small volume. To uncover the underlying organizational principles and their functional relevance, light and electron microscopy are indispensable tools. Light microscopy is exquisitely suited for mapping the spatial localization, temporal dynamics and activity profiles of biomolecules in individual cells and tissues. Advanced electron microscopy technologies support studies for determining the high-resolution structures of isolated biomolecules, as well as biomolecule structure and location within the context of an intact cell. Recent technical breakthroughs have supported the generation of crystal-clear pictures and coordination to biological function of biomolecules from the molecular scale to tissue scale. Further technical advancements and biological discoveries call for seamless integration and correlation of different microscopy modalities, labeling methods and analysis/modeling platforms, as well as close communications between technique developers and biologists. Researchers from these very different disciplines, however, do not often sit in the same room and discuss new developments and opportunities for bridging across fields. Instead, their interactions have been limited to brief encounters at sessions of large society meetings and sporadic small symposiums. This conference aims to bring together investigators from these research communities in order to stimulate new ideas and forge new collaborations, which will help not only to extend the frontiers of microscopy, but also to bridge new technique developments and their potential applications for addressing the complexity of cell structure and function.

Session Topics:
• Microscopy Techniques I & II
• Molecular Probes I & II
• Visualizing Cellular and Molecular Structures I & II

Scholarship/Discounted Abstract Deadline: Dec 11, 2018; Abstract Deadline: Jan 8, 2019; Discounted Registration Deadline: Feb 5, 2019

Visit www.keystonesymposia.org/19D1 | Hashtag: #KSimaging

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of confocal microscope courtesy of National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health
Protein replacement therapy based on recombinant protein has so far been limited to genetic diseases in which the mutated protein acts extracellularly. Nucleic acid therapies such as gene therapy and messenger RNA enable replacement of intracellular proteins, or extracellular proteins too complex to manufacture. This opens up the potential to treat many previously unapproachable diseases. After early setbacks in gene therapy, a new generation of therapeutics is showing progress in the clinic. Novel messenger RNA and RNA delivery technologies are also in development, the potential of which is only beginning to be demonstrated. These represent exciting areas of therapeutic development which also touch on fundamental questions about regulation of gene expression, protein production and immunity. This conference brings these communities together to discuss common challenges and complementarities, providing an opportunity for cross-fertilization.
Antibodies as Drugs: New Horizons in the Therapeutic Use of Engineered Antibodies

Beaver Run Resort | Breckenridge, Colorado, USA | April 7–11, 2019

Scientific Organizers:
Christian Klein, Roche, Switzerland
Mark S. Cragg, University of Southampton, UK
Germaine Fuh, 23andMe, USA

Sponsored by AbbVie, Inc.; Bioverativ Therapeutics; ImmunoGen, Inc.; Incyte Corporation; Roche; and Valerion Therapeutics

Over the last 20 years, recombinant antibodies have been established into clinical practice for the treatment of diseases ranging from cancer to autoimmune and infectious diseases. While the first approved antibodies were native IgG antibodies, in recent years the field has rapidly advanced and therapeutic antibodies in preclinical and clinical development now include many non-canonical formats including Fc-engineered antibodies, antibody drug conjugates, bispecific antibodies and antibody-like scaffolds. This Keystone Symposia conference aims to bring together experts in antibody therapeutics, engineering and mechanisms of action from industry and academia to discuss and review the state of the art in the field and discuss their future potential. The symposium aims to foster cross-fertilization between different engineering technology disciplines and scientists from different therapeutic areas. It also aims to initiate collaboration on the development of state-of-the-art antibody therapies with the aim to improve therapeutic options for patients. For participants in training, the conference will be an opportunity to gain insight into various aspects of therapeutic antibodies and to discuss their projects and ideas face-to-face with experts in the field.

Session Topics:
- Mechanisms of Action for Depleting Antibodies
- Workshop 1: Engineering (Bispecific) Antibodies
- Antibody Engineering
- Bispecific and Engineered Antibodies for Cancer Immunotherapy
- Antibodies for Infectious Diseases
- Next-Generation Antibody Drug Conjugates
- Delivering Antibodies into the Brain
- Bispecific Antibodies and Antibody-Like Molecules
- Workshop 2: Antibodies for Immunological Applications
- Beyond Checkpoint Blockade: Novel Approaches for Immunotherapy

KEYNOTE SPEAKERS
Jennifer R. Cochran
George D. Yancopoulos

CONFIRMED SPEAKERS
Kartik Chandran
Yvonne Y. Chen
Nai-Kong V. Cheung
Mark S. Cragg
John R. Desjarlais
James A. Ernst
Per-Ola Freskgård
Germaine Fuh
Richard J. Gregory
David D. Ho
Allan Jensen
Mikael C. I. Karlsson
W. Michael Kavunauh
Christian Klein
Maria H. Kosco-Vilbois
Sean Hua Lim
Ronit Mazor
Falk Nimmerjahn
Elaine M. Paul
Andreas G. Plückthun
Christoph Rader
Janine Schuurman
JoAnn A. Suzich
Feng Wang
Joy Yu Zuchero

Scholarship/Discounted Abstract Deadline: Dec 11, 2018; Abstract Deadline: Jan 9, 2019; Discounted Registration Deadline: Feb 6, 2019

Visit www.keystonesymposia.org/19D2 | Hashtag: #KSantibodies

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of antibody binding to HIV courtesy of NIAID, NIH
Proteomics methods have advanced tremendously in just the last few years. Apart from increasingly powerful mass-spectrometric methods, global antibody-based methods, chemical biology approaches and genetics/genomics approaches and their combinations are now offering a rich toolbox to study the proteome in many different dimensions. Given this background and the recent completion of in-depth proteomes, clearly the time is right to apply proteomics in a more translational context to patient-derived primary cells, organoids, xenograft models and indeed the clinic. Such activities are well underway and will be the focus of this conference. Mass spectrometry-based proteomics, in particular interaction proteomics in combination with chemical and structural proteomics, is making crucial contributions to drug development and producing deeper molecular understanding of disease mechanisms. The analysis of post-translational modifications has become orders of magnitude more comprehensive, quantitative and accessible, now enabling in vivo and time-resolved studied of a large range of signaling processes. In combination with genome engineering, this opens up entirely new perspectives in precision investigation of deregulated signaling processes in models of oncology, immunology or metabolic diseases. Finally, proteomic profiling of body fluids has matured to a degree that it enables informative “phenotyping” of humans in health and disease, supporting “wellness” and patient stratification/biomarker studies.

Session Topics:
- In-Depth Proteomics of Normal and Diseased Tissues
- Large-Scale Study of Signaling Pathways
- Chemical Proteomics and Drug Discovery
- Complexes and Networks
- Cancer and Other Diseases
- Neurodegenerative and Immunological Diseases
- Biomarkers and Patient Stratification
- Workshop: Precision Medicine from Proteomics
- Integrative Omics for Prevention and Personalized Treatment

Scholarship/Discounted Abstract Deadline: Dec 12, 2018; Abstract Deadline: Jan 9, 2019; Discounted Registration Deadline: Feb 6, 2019

Visit [www.keystonesymposia.org/19D3](http://www.keystonesymposia.org/19D3) | Hashtag: #KSproteomics

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
The skin is the largest human organ and the primary interface between the body and the environment. It provides the first line of defense against invading pathogens and trauma via its physical barrier properties but also via active defense mechanisms orchestrated by a coordinated interplay between epithelial and immune cells. Recently, the skin microbiota has emerged as an important third player that critically influences skin homeostasis and inflammation by interacting with epithelial and immune cells. This conference aims to illustrate these reciprocal interactions and describe their impact on skin physiology and pathophysiology. A central focus will be to discuss how the composition of the skin microbiota regulates homeostasis and determines susceptibility to inflammatory, allergic and neoplastic diseases of the skin and other epithelial tissues. Emerging concepts concerning the mechanisms influencing epithelial-immune-microbiota crosstalk and opportunities for therapeutic interventions will be discussed. The symposium will also provide a unique setting for in-depth, cross-disciplinary discussions between basic skin scientists and biologists studying immune responses in other barrier organs, dermatologists, cancer biologists, immunologists and many researchers from disparate fields who normally do not have opportunities to meet. Finally, the conference will also foster interaction with potential industry partners, who increasingly see the skin as a major focus for gaining insights into immune mechanisms and for development of targeted therapies for patients with chronic inflammatory diseases, allergic diseases and cancer.

Session Topics:
• Epithelial-Microbiome Interactions in the Skin
• Epithelial-Immune Interactions in the Skin
• Microbiota-Immune Interactions in Skin and other Epithelial Surfaces
• Workshop: Therapeutic Innovation for Skin Diseases
• Skin Dysbiosis and Allergic Inflammation

• Epithelial-Microbiota-Immune Interactions in Tumorigenesis and Systemic Diseases
• Emerging Therapeutic Concepts Treatment plus one additional workshop

Global Health Travel Award Deadline: Nov 13, 2018;
Scholarship/Discounted Abstract Deadline: Dec 12, 2018; Abstract Deadline: Jan 10, 2019; Discounted Registration Deadline: Feb 7, 2019
Visit www.keystonesymposia.org/19D4 | Hashtag: #KSskin

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of skin cell courtesy of NIH.
Biomolecular condensates are cellular compartments that concentrate proteins and nucleic acids without an encapsulating membrane. They act in processes across the biological spectrum, from RNA metabolism to signaling and gene regulation. Macromolecular phase separation, akin to the separation of oil from water, has emerged over the past several years as a key organizer both of condensates and of micron-scale cell organization in general. This conference brings together for the first time scientists studying biomolecular condensates and macromolecular phase separation from varied perspectives and across different scales of length and time. Theory, biophysics, biochemistry, cell biology and developmental biology will be joined together to address central questions in the field – how is molecular specificity in condensates achieved, how are the material properties and spatial structure of condensates controlled, how do composition and physical properties lead to emergent functions, how does aberrant formation of condensates lead to diseases such as neurodegeneration and cancer? By bringing together leading scientists from diverse areas impacted by phase separation, the conference seeks to clarify the current state of knowledge in this exciting new field and identify important future directions.

Session Topics:
- Physical Mechanisms of Macromolecular Phase Separation and Regulation
- Structure and Substructure of Biomolecular Condensates
- Biochemical and Biological Function of Biomolecular Condensates
- New Phase Separating Systems
- Specificity
- Biomolecular Condensates in Disease

Scholarship/Discounted Abstract Deadline: Dec 13, 2018; Abstract Deadline: Jan 10, 2019; Discounted Registration Deadline: Feb 12, 2019

Visit www.keystonesymposia.org/19D5 | Hashtag: #KSbiochem

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of separating proteins by molecular weight courtesy of National Institute of Arthritis and Musculoskeletal and Skin Diseases, NIH
Highly ordered interactions between immune and metabolic responses are evolutionarily conserved and paramount for tissue and organismal health. Disruption of these interactions underlie the emergence of many pathologies, particularly chronic non-communicable diseases such as obesity and diabetes. Understanding the complex immunometabolic signaling networks and the cellular and molecular events that occur in the setting of altered nutrient and energy exposures has the potential to lead to tangible therapeutic advancements to promote health. This conference will engage scientists at the forefront of the efforts to translate this biology into clinical approaches, to discuss the successes and limitations of this work so far. This conference will cover the molecular mechanisms and physiological outcomes of immunometabolic interactions in the context of chronic metabolic diseases. Topics will range from the most evolutionarily conserved interactions studied in model organisms to human studies. There will be two sessions devoted to translational paths, covering both opportunities and challenges. Overall, this symposium will be an opportunity for experts in the fields of immunology and metabolism to come together to discuss and share their diverse perspectives on the integration of metabolism and immunity.

Session Topics:
- Immunometabolic Framework in Model Organisms
- Workshop: Immuno-Inflammation and the Gut
- Components of Immunometabolic Interactions
- Immunometabolic Positioning of Innate versus Adaptive Immune Cells
- Signaling Networks Regulating Immunometabolic Responses
- Organelle Dynamics and Function in Immunometabolism
- Nutrients and Metabolites Critical for Immunometabolic Responses
- Translation of Immunometabolism
- Immunometabolic Links in Human Studies

Scholarship/Discounted Abstract Deadline: Dec 18, 2018; Abstract Deadline: Jan 15, 2019; Discounted Registration Deadline: Feb 12, 2019
Visit [www.keystonesymposia.org/19D6](http://www.keystonesymposia.org/19D6) | Hashtag: #KSmetaflam

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of metabolic enzyme courtesy of National Institutes of Health
Small Regulatory RNAs

Daejeon Convention Center | Daejeon, South Korea | April 14–18, 2019

Scientific Organizers:
V. Narry Kim, Institute for Basic Science, South Korea
Gregory J. Hannon, University of Cambridge, UK
Lin He, University of California, Berkeley, USA

Developed in collaboration with the Institute for Basic Science

Small regulatory RNAs are integral players in eukaryotic gene regulation, and are involved in numerous developmental and pathological pathways. Although the field has been making remarkable progresses in recent years, it still has a number of seminal questions. We need to understand how cell signaling pathways are connected to small RNA pathways, how small RNAs are regulated and function during cell fate transition, how small RNAs interact with subcellular compartments, if and how they are transported between cells, and how small RNAs participate in immune response. We also need to gain a systemic view of small RNAs and their targets in the context of gene network, and to understand their involvements in human diseases, not just cancer but also other genetic and metabolic disorders. This conference brings together scientists studying diverse animal and plant model organisms, which will offer an opportunity to understand the mechanism and function of small RNAs in an evolutionary and physiological context. The symposium will also bridge the gaps between fundamental knowledge, clinical needs and technical development by addressing issues such as small RNA involvement in diseases, in vivo delivery of RNA and technical challenges in RNA detection at single-molecule and single-cell levels. Compared with other conferences on RNA, this conference is unique in that it focuses on small regulatory RNAs, yet it is highly diverse in research approaches and biological systems. It will serve as a central forum for the small RNA community.

Session Topics:
• MicroRNA Biogenesis and Turnover
• MicroRNA Function in Development and Stem Cells
• MicroRNA Function in Disease
• Small RNAs as Therapeutic and Diagnostic Tools
• Mechanism of RNA Silencing
• Lessons from CRISPR
• Diverse Small RNA Pathways I & II
plus two workshops

Scholarship/Discounted Abstract Deadline: Dec 19, 2018; Abstract Deadline: Jan 16, 2019; Discounted Registration Deadline: Feb 13, 2019
Visit www.keystonesymposia.org/19D7 | Hashtag: #KSsmallrna

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of RNA in cell nucleus courtesy of National Cancer Institute, NIH
Delivering Therapeutics Across Biological Barriers

Royal Dublin Society | Dublin, Ireland | May 6–9, 2019

Scientific Organizers:
David Brayden, UCD School of Veterinary Medicine, Ireland
Claus-Michael Lehr, Saarland University, Germany
Kathryn Whitehead, Carnegie Mellon University, USA

Sponsored by Astellas Pharma Inc.

This is the first Keystone Symposia conference devoted to the topic of drug delivery. The multi-disciplinary theme of crossing of biological barriers encompasses biology, chemistry, pharmaceutical formulation, polymeric and materials science, advanced cell biology, imaging, microfluidics and drug-device combination research. The conference is at the interface between cell biology and the use of technologies to exploit such understanding in order to translate therapies to patients. The program comprises leading researchers from academia, institutes, as well as from the pharmaceutical and medical device industry. The goal of the conference is to profile cutting-edge research in specific areas of achieving drug delivery across biological barriers where a large translational impact would result for both industry and patients. Having cell biologists at the same delivery conference as technology developers and formulators will provide a thorough perspective on the tissue and cell barriers that must be crossed, and this will help guide technology approaches to achieve that.

Session Topics:
• Delivery Across Mucosal Sites: Oral and Pulmonary
• Nanoparticles and Polymers for the Efficient Crossing of Biological Barriers
• Materials and Devices for Diagnostics and Therapeutic Delivery
• Overcoming the Blood-Brain Barrier to Treat CNS Disease
• Delivery Solutions for Gene Medicines
• Human Cell and Tissue Models of Biological Barriers to Assist Translation
• Summary and Analysis
plus two workshops

Scholarship/Discounted Abstract Deadline: Jan 8, 2019; Abstract Deadline: Feb 6, 2019; Discounted Registration Deadline: Mar 6, 2019
Visit www.keystonesymposia.org/19E1 | Hashtag: #KSbiobarriers

CONFIRMED SPEAKERS
Anja Boisen
Joke A. Bouwstra
David Brayden
Roland Burli
Julie A. Champion
Elizabeth de Lange
Elias Fattal
Svetlana Gelperina
Paula T. Hammond
Donald E. Ingber
Claus-Michael Lehr
Kinam Park
Renata Pasqualini
John S. Patton
Dan Peer
Chris Porter
W. Mark Saltzman
David V. Schaffer
Josué Sznitman
Tanja Weil
Kathryn Whitehead

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Scientific Organizers:
Julian Schroeder, University of California, San Diego, USA
Julia Bailey-Serres, University of California, Riverside, USA

Organized in collaboration with Volkswagen Foundation

Current and anticipated impacts of climate change and atmospheric gases on water availability and weather extremes affect the production of crops that provide food and fiber to meet the growing needs of humanity. Innovative research on crops, related wild species and model plant species is enabling the identification of stress signaling and metabolic and developmental strategies that limit yield loss in zones with increased climate stress and variability. The use of functional genomics to dissect abiotic stress sensing and signaling networks and the downstream adjustments in metabolism and development continue to provide solutions for crop improvement. These advances are accelerated by tools such as genome editing and use of synthetic biology to fine-tune key pathways. Moreover, advances in genomics and GWAS approaches provide powerful platforms toward identifying new genes and mechanisms for increasing plant vigor while limiting yield losses in agriculture. New advances in physiological and molecular phenotyping and recognition of synergistic multigene combinations that provide stress resiliency without limiting productivity promise to enable rapid deployment of advantageous genetic combinations. This conference will bring together experts pursuing advances on the cutting edge of climate change-linked stress tolerance in plants and provide a dynamic interactive setting to map future challenges and solutions.

Session Topics:
- Harnessing Stress Tolerance from Genetic Diversity
- Workshop 1: Advances in GWAS and Gene-Editing Toward Stress Tolerance
- Responses to Elevated Greenhouse Gases: Physiology to Productivity
- Resilience through Synthetic Solutions
- Workshop 2: New Sustainable Alternatives for Meeting Protein and Nutrient Needs of the Future
- Developmental Reprogramming under Stress
- Genomes to Stress Resilience Mechanisms
- Workshop 3: GWAS and Abiotic Stress Resistance
- Discovery of New Stress Tolerance Mechanisms and Loci

Global Health Travel Award Deadline: Dec 18, 2018;
Scholarship/Discounted Abstract Deadline: Jan 15, 2019; Abstract Deadline: Feb 13, 2019; Discounted Registration Deadline: Mar 13, 2019

Visit [www.keystonesymposia.org/19M4](http://www.keystonesymposia.org/19M4) | Hashtag: #KSplant

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.
Scientific Organizers:
Frank van Kuppeveld, Utrecht University, Netherlands
Andrea Gamarnik, Fundación Instituto Leloir, Argentina

Part of the Keystone Symposia Global Health Series,
supported by the Bill & Melinda Gates Foundation

The Keystone Symposia conference on Positive-Strand RNA provides an international forum for research on human, animal, insect, plant and bacterial viruses with +RNA genomes. This group of viruses contains many clinically relevant and well-known pathogens (e.g. poliovirus, hepatitis C virus, Dengue and West Nile virus). Furthermore, the enormous diversity of +RNA viruses in animals and insects, combined with their evolutionary and adaptive potential following a species-jump, poses a threat to the human population as demonstrated by the growing list of emerging viruses, including zoonotic as well as arbovirus-transmitted pathogens such as MERS-CoV, Chikungunya and Zika virus. Detailed insight into the “virosphere”, the “virome”, virus evolution, as well as in the molecular details of virus replication and spreading, tissue tropism, and virus recognition by the host immune system is critical to understand virus transmission, viral pathogenesis as well as to develop novel therapeutic and preventive measures. This meeting brings together experienced and junior experts to discuss the latest developments in molecular biology, cell biology, vector biology, immunology, vaccinology, and the antivirals drug development field on +RNA viruses.

Session Topics:
• The Virosphere and the Virome
• Workshop: Burning Questions and Issues in RNA Virology
• Virus Structure and Entry
• RNA Structure and Function
• Virus Replication, Evolution and Virus-Cell Interactions
• Immunology of Infection and Viral Evasion Mechanisms
• Vaccines, Therapeutic Antibodies and Antiviral Drugs
• Virus Transmission, Tissue Tropism and Pathogenesis
• Invertebrate Viruses and their Vectors
• plus two additional workshops

Global Health Travel Award Deadline: Jan 8, 2019; Scholarship/Discounted Abstract Deadline: Feb 7, 2019; Abstract Deadline: Mar 6, 2019; Discounted Registration Deadline: Apr 9, 2019
Visit www.keystonesymposia.org/19E2 | Hashtag: #KSrnavirus

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of MERS coronavirus courtesy of NIAID, National Institutes of Health
Neural Environment in Disease: Glial Responses and Neuroinflammation

Keystone Conference Center | Keystone, Colorado, USA | June 16–20, 2019

Joint with the conference on Neurodegenerative Diseases: New Insights and Therapeutic Opportunities

Scientific Organizers:
Richard Daneman, University of California, San Diego, USA
Dorothy Schafer, University of Massachusetts Medical School, USA
Michael V. Sofroniew, David Geffen School of Medicine at UCLA, USA
Vanda A. Lennon, Mayo Clinic, USA

Sponsored by BioLegend, Inc.

The response of the central nervous system to injury and disease is a complex physiological process that involves the coordinated actions of many different cell types. The interplay of neural cells and vascular cells along with the innate and adaptive immune systems determines the response to different injury and disease stimuli and whether the nervous system will repair or degenerate. Understanding these complex cellular environments is essential to understanding disease pathogenesis, elucidating underlying disease etiology, and developing treatments for neurological and psychiatric diseases. The goal of this meeting will be to bring together people who study different aspects of neurological diseases and facilitate the interchange of ideas necessary for identifying new mechanisms underlying complex intercellular interactions in the diseased nervous system. This will include people who study resident neural cells (neurons, astrocytes, oligodendrocytes), vascular cells (blood-brain barrier, lymphatics, glymphatics) and immune cells (microglia, innate peripheral immune cells, adaptive immune cells) in the context of a variety of neurodegenerative, neuroinflammatory, and neuropsychiatric diseases. Further, we will also attract people who implement different techniques including genetic mouse models, human iPSCs, invertebrate models, imaging, cell biology, and behavior in their research which will further facilitate exchange of ideas and foster collaboration. With the combined expertise at this meeting, we will accelerate our ability to understand the complex neural response to injury and disease—a necessary step towards developing novel therapeutics for complex neurological diseases.

Session Topics:
- Neuronal Response to Injury
- Astrocytes
- Microglia and Innate Immunity
- Blood-Brain Barrier
- Glymphatics, Lymphatics and Wound Healing
- Adaptive Immune Responses
- Oligodendrocytes
- Hot Topics

Scholarship/Discounted Abstract Deadline: Feb 13, 2019; Abstract Deadline: Mar 13, 2019; Discounted Registration Deadline: Apr 16, 2019

Visit www.keystonesymposia.org/19Z1 | Meeting hashtag: #K5neuroinflam

KEYNOTE SPEAKER
Li-Huei Tsai

CONFIRMED SPEAKERS
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Rita Balice-Gordon
Richard Daneman
Cagla Eroglu
Alexander Flugel
Marc R. Freeman
Kim N. Green
David M. Holtzman
Eric J. Huang
Baljit S. Khakh
Robyn S. Klein
Jin-Moo Lee
Maria Lehtinen
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Iben Lundgaard
Sarkis K. Mazmanian
Kelly Monk
Alexandre Prat
Daniel S. Reich
David H. Rowitch
Dorothy Schafer
Eric V. Shusta
Julie Siegenthaler
Michael V. Sofroniew
Neurodegenerative Diseases: New Insights and Therapeutic Opportunities

Keystone Conference Center | Keystone, Colorado, USA | June 16–20, 2019

Joint with the conference on Neural Environment in Disease: Gial Responses and Neuroinflammation

Scientific Organizers:
Valina L. Dawson, Johns Hopkins University School of Medicine, USA
Joseph W. Lewcock, Denali Therapeutics, USA
Fred (Rusty) H. Gage, The Salk Institute for Biological Studies, USA

Sponsored by BioLegend, Inc.; Biogen; Ionis Pharmaceuticals, Inc.; Roche; and Takeda Pharmaceutical Company Limited

The global burden of neurodegenerative disease is staggering and growing at an alarming rate as the world’s populations age. While Alzheimer’s disease and related dementias and Parkinson’s disease and related disorders account for the majority of those afflicted, there are also less common but equally devastating diseases. Technical and conceptual advances are revealing disease mechanisms and providing new therapeutic opportunities. Misfolded proteins have been understood to be at the center of neurodegenerative diseases but recently there is an appreciation that these misfolded proteins may serve as seeds to template the misfolding of normal proteins, that transmission of these seeds may underlie disease progression, and that there may be different strains of these seeds with differential toxicities. Biophysical analysis of these proteins reveals a role for phase transition and liquid demixing of these intrinsically disordered proteins. Synaptic loss is an important feature of neurodegeneration which may occur long before neuronal loss, but may be critically important in disease presentation and loss of function. Glia and immune activation contribute to neurodegeneration and synaptic loss, and must be understood and controlled if the disease process is to be tempered or stopped. This conference aims to address the current state of knowledge in these emerging areas, to provide advanced discussion of these topics, to provide the opportunity for interaction between scientists from different fields of research and foster new collaborations that may lead to new therapeutic opportunities to combat the coming crisis in providing medical care for those suffering from neurodegenerative diseases.

Session Topics:
• Aggregation-Mediated Toxicity
• Transmission and Spread of Disease Pathology
• New Therapeutic Opportunities
• Developing Effective Preclinical Disease Models
• Translating Therapeutics for Neurodegeneration to the Clinic
• Roundtable Discussion with Industry and Academia – Challenges and Opportunities
• Molecular Mechanisms of ALS/FTD
• Drivers of Synaptic Loss in Disease
• Glial Contributors to Neurodegeneration plus two workshops

Scholarship/Discounted Abstract Deadline: Feb 13, 2019; Abstract Deadline: Mar 13, 2019; Discounted Registration Deadline: Apr 16, 2019

Visit www.keystonesymposia.org/19Z2 | Hashtag: #KSneurodegen

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Left image of mouse brain with neurodegenerative disease courtesy of NIH
Central to Keystone Symposia’s mission is to develop the next generation of life science researchers. To make the conferences as accessible as possible to those in the early stages of their scientific careers, Keystone Symposia offers discounted registration rates for students (listed on page 65) as well as various types of financial assistance. In the 2017–2018 season, Keystone Symposia was able to award 373 Scholarships and 181 Global Health Travel Awards. These were made possible thanks to the support of many generous individual, government, foundation and corporate donors. To make a donation in support of this cause, as well as for information on named scholarship opportunities, please visit our website at www.keystonesymposia.org/FSF.

KEYSTONE SYMPOSIA SCHOLARSHIPS – These are available for students and postdoctoral fellows; the number varies depending on funding from the National Institutes of Health, the National Science Foundation, Keystone Symposia’s Future of Science Fund and other sources. Scholarship recipients are selected based on the quality of science of their submitted abstracts and the relevance of the abstract to the conference topic. Awards are up to 1,200 USD in value and require the submission of eligible receipts (e.g., for conference registration, travel, lodging). Application deadlines precede conferences by four months and require mentor verification of one’s status as well as abstract submission. Learn more and apply at www.keystonesymposia.org/scholarships.

EARLY-CAREER INVESTIGATOR TRAVEL AWARDS – Awards of up to 1,200 USD are also available for US citizens or permanent residents at the assistant professor level or industry equivalent (no more than four years into their appointment) who belong to one of these populations: Native American or Alaska Native, Native Hawaiian or Pacific Islander, African American, or Hispanic American. Candidates must also be committed to promoting diversity in the life sciences throughout their careers. These awards are made on a first-come, first-serve basis. Please visit our website at www.keystonesymposia.org/EarlyCareerAward for more information.

GLOBAL HEALTH TRAVEL AWARDS – Keystone Symposia is offering Global Health Travel Awards funded by the Bill & Melinda Gates Foundation for seven conferences in the 2018-2019 meeting season:

- 21st-Century Drug Discovery and Development for Global Health (application process closed)
- Leveraging Genomic Diversity to Promote Animal and Human Health (application process closed)
- Role of the Genital Tract Microbiome in Sexual and Reproductive Health (application process closed)
- Tuberculosis: Translating Scientific Findings for Clinical and Public Health Impact (application process closed)
- HIV Vaccines
- Functional Cures and Eradication of HIV
- Positive-Strand RNA Viruses

In addition, Volkswagen Foundation is funding travel awards for two conferences:

- Skin Health and Disease: Immune, Epithelial and Microbiome Crosstalk
- Climate Change-Linked Stress Tolerance in Plants

Global Health Travel Awards cover all conference registration and travel/lodging expenses and are available to students, postdoctoral fellows, investigators and clinicians from low- and middle-income countries, especially nations where the topic of the conference is an endemic and acute problem. Candidates must complete a brief application about their background and why the conference would be beneficial to them, and their mentor or supervisor must also complete a brief verification form. Application deadlines precede conferences by five months. Please visit www.keystonesymposia.org/GlobalHealth for more information on this program.

LOCAL REGISTRATION AWARDS – The Keystone Symposia conferences in November 2018 on Genomic Diversity in Kampala, Uganda and in December 2018 on the Reproductive Microbiome in Cape Town, South Africa offer special local registration awards covering the cost of the registration fee for investigators in the local area where the conference is held.
More Information about Abstracts, Posters and Attendance

ABSTRACTS & POSTERS

Keystone Symposia encourages abstract submission. Presenting during a poster session gives excellent exposure to your work and the opportunity to interact with many different investigators and receive valuable feedback. Organizers also review all abstracts submitted by the abstract deadlines to select short talks for plenary sessions and workshops. Selections are made based on quality and relevance to the session, and invitations are issued by Keystone Symposia. To maintain fairness of the selection process, requests to speak are not accepted.

Abstracts are viewable by all meeting participants on their online Keystone Symposia accounts and through the meeting mobile app. You can view our abstract and poster formatting guidelines and additional information online at www.keystonesymposia.org/abstracts. Contact us at 1.800.253.0685 (US & Canada) or 1.970.262.1230 or email us at info@keystonesymposia.org if you have other questions about abstracts and posters. Please note that submission of your abstract does not constitute registration. The fee for abstract submission is 100 USD. There is a 50 USD discount if you submit your abstract by the discounted abstract deadline (four months before meetings begin). If you register for the meeting, a 50 USD abstract credit will be applied to the registration fee.

REGISTRATION

Online – The easiest way to register is via our secure website, with payment by credit card. If you have ever attended a Keystone Symposia meeting, you already have an account on our site. After logging in or creating your account, you will be able to register for a conference and submit your abstract online. You will also be able to:

- Upload and edit your abstract;
- View and print other abstracts for the meeting(s) for which you are registered 30 days before (pending author approval) and 90 days after the conference;
- View and print full participant lists for the conference(s) for which you are registered;
- Edit/update your contact information and mail/email preferences;
- View and print invoices, attendance letters, invitation letters and scholarship status;
- Find information about lodging and ground transportation;
- Access our roommate bulletin board, mobile app and, seven days before the meeting, a PDF of the meeting book.

Fax/Mail – Registration forms are available for download on our website. Fax your form to 1.970.262.1525 or mail it to Keystone Symposia, PO Box 1630, 160 US Highway 6, Suite 200, Silverthorne, CO 80498-1630, USA. The registration form and payment must be received by the discounted registration deadline in order to receive the discounted registration rate.

Telephone – Contact our Attendee Services Department at 1.800.253.0685 (US & Canada) or 1.970.262.1230 during our regular office hours – 7:30 a.m. to 4:00 p.m. (US Mountain Time). Please have your credit card ready.

On-Site – You may also register on-site with a credit card once the conference convenes, provided it is not oversubscribed.

REGISTRATION RATES – Rates vary as follows depending on whether you register before or after the discounted registration deadline (two months before conferences begin):

FOR CONFERENCES IN AFRICA & USA

| 4-Day Conferences: | Early/Discounted Registration: 845 USD / 620 USD student | Regular Registration: 1045 USD / 820 USD student |
| 3-Day Conferences: | Early/Discounted Registration: 795 USD / 570 USD student | Regular Registration: 995 USD / 770 USD student |

REGISTRATION RATES FOR CONFERENCES IN ASIA, CANADA & EUROPE

| 4-Day Conferences: | Early/Discounted Registration: 945 USD / 720 USD student | Regular Registration: 1145 USD / 920 USD student |
| 3-Day Conferences: | Early/Discounted Registration: 895 USD / 670 USD student | Regular Registration: 1095 USD / 870 USD student |

Note: Pro-rated registration rates are not available. Registration rates include abstract submission if submitted by the first (i.e., discounted) abstract deadline, meeting book, secure mobile app, admission to all scientific sessions, and meal/refreshment functions listed in the program. Registration rates do not include lodging and transportation. Inclusion of lunch or dinner in registration rates varies by site. Registration fees are not used to fund alcohol or entertainment at the meeting, which are funded by other sources.

Cancellation – It is possible to transfer registration or receive a partial refund for cancellations received by Keystone Symposia at least 15 days before meetings begin. Visit our website at www.keystonesymposia.org/cancel for full cancellation guidelines.

Lodging & Travel – The first meeting date listed usually features registration and a welcome mixer, while the last is typically the last day of scheduled sessions. However, programs vary. Please check the meeting webpage for the schedule before making travel and lodging reservations to ensure arrival before the first scheduled activities and departure after the closing activities. Although Keystone Symposia negotiates rates with lodging facilities and ground transportation providers, all travel and lodging reservations and cancellations are the responsibility of each meeting participant. Check with the providers for their own booking and cancellation policies. Note that the venue listed on the preceding pages for each meeting is where the conference sessions occur and not necessarily the lodging venue(s). Useful travel tips are available on our website at www.keystonesymposia.org/traveltips.

Please do not hesitate to contact us at 1.800.253.0685 (US & Canada), 1.970.262.1230 or info@keystonesymposia.org if you have any special needs. We are committed to making every Keystone Symposia participant’s experience an enjoyable one.
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Barry P. Sleckman, MD, PhD
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*Indicates nominated SAB members awaiting formal vote by the Keystone Symposia Board of Directors plus representatives to be announced from:

Genmab A/S
Incyte Corporation
Sangamo Therapeutics, Inc.
Takeda Pharmaceuticals Co. Ltd.
Keystone Symposia conferences are developed through a rigorous peer-review system that involves the coordinated efforts of a Scientific Advisory Board (SAB) comprised of more than 90 leading scientists from academia, industry and government worldwide, as well as approximately 200 programming consultants who provide additional expertise in specific scientific areas.

Meeting topic development starts more than two years in advance through online discussion forums involving SAB members and study group programming consultants. This process generates information on trending scientific areas where it becomes important to bridge communities together and on new meeting ideas. The SAB then convenes in Keystone, Colorado in January and uses the study group-generated information to identify conference topics, suggest potential scientific organizers, make recommendations regarding meeting content and identify meetings that could be held jointly. Based on the recommendations of the SAB, Keystone Symposia staff solicits conference organizers and helps them prepare programs for peer review. The staff also receives approximately 20 additional “organizer-initiated” proposals during this time.

The SAB meets again in June to review all submitted meeting proposals (both solicited and organizer-initiated), recommend whether proposals should be accepted and provide constructive feedback to organizers. The SAB also reviews the entire meeting portfolio to determine whether any additional meetings need to be “fast-tracked” to fill gaps in the portfolio. While the key focus of the SAB is the quality of the scientific content, considerable attention is also paid to speaker diversity in the programs, including gender, stage of career, ethnicity, affiliation, geographical distribution and speaker return rates. In addition, efforts are made to ensure appropriate representation of basic, clinical and industry research in the programs, depending on the scientific topic. Finalized meeting programs are received by September, after which Keystone Symposia staff starts to invite speakers. Speaker invitations are usually sent out over a year in advance of each meeting, thereby enhancing the overall speaker acceptance rate.

To ensure the best-quality science unencumbered by commercial interests, Keystone Symposia does not accept requests to speak on the programs. Similarly, corporate sponsors do not receive speaking slots and are not given preference when organizers invite speakers for the programs.

Like the SAB members and study group programming consultants, scientific organizers serve in an entirely volunteer capacity. Organizers fine-tune their programs and select speakers, using guidelines from Keystone Symposia to encourage fresh and diverse participation. A number of slots are left open for late-breaking developments to be later filled by short talks that organizers select from submitted abstracts.

**SUBMIT A MEETING PROPOSAL**

Keystone Symposia welcomes the submission of “organizer-initiated” meeting proposals through an online mechanism available on our website at [www.keystonesymposia.org/submitconcept](http://www.keystonesymposia.org/submitconcept).

Programs for 2020-2021 will be initially reviewed by the SAB in January 2019 and finalized in June 2019, along with all the Keystone Symposia-solicited proposals. For the best chance of success, follow the guidelines outlined on the website for advice and help when preparing your proposal. It is also advisable to contact Keystone Symposia’s Chief Scientific Officer to discuss the submission process in advance.

**CONFERENCE VENUES**

Keystone Symposia chooses conference venues that are able to accommodate the expected number of participants, provide cost-effective facilities and offer an atmosphere conducive to information exchange and informal networking. Keystone Symposia staff negotiate discounted lodging rates, and every attempt is made to select sites that are environmentally conscientious.

**MEETING COSTS**

Keystone Symposia receives revenue from two sources: registration fees (approximately 65-70%) and generous support from corporations, foundations, government entities and individuals (approximately 30-35%). This support provides funding for scholarships as well as speaker travel expenses (speaker and organizer subsidies are based on economy-rate travel and no honoraria are paid), allowing registration fees to be kept as low as possible.

Please note that alcohol and entertainment at the meetings are not funded by registration fees or US government grants. Funding for this expense is generously provided by other supporters of Keystone Symposia.
Keystone Symposia Announces Dr. Deborah Johnson as Next President and Chief Executive Officer

We are pleased to announce that Dr. Deborah L. Johnson of Baylor College of Medicine has been named President and Chief Executive Officer of Keystone Symposia on Molecular and Cellular Biology. Dr. Johnson will be the nonprofit organization’s sixth CEO/Executive Director, succeeding Dr. Jane L. Peterson upon her retirement this year. The appointment is effective October 1, 2018 and concludes a year-long search.

Dr. Johnson has been on the faculty of Baylor College of Medicine in Houston in the Department of Molecular and Cellular Biology since 2013 and served for two years as Dean of its Graduate School of Biomedical Sciences. Prior to that, she was Associate Dean for Graduate Affairs at the Keck School of Medicine at the University of Southern California in Los Angeles.

She received a PhD from Georgetown University in chemistry and a Bachelor of Science degree from Albright College in Pennsylvania. Following her doctoral work, she completed a postdoctoral fellowship at Yale University in molecular biophysics and biochemistry.

In addition to research on gene regulation and its consequences for cancer biology, Dr. Johnson’s career has been marked by a dedication to mentoring and teaching. While at Keck, she received the USC Mellon Mentoring Award and the Outstanding Graduate Student Teaching Award. For the past 16 years, she has co-organized bi-annual RNA polymerase conferences and therefore has a strong appreciation for the international collaboration that scientific meetings can foster.

Dr. Gary Nabel, Chair of Keystone Symposia’s Board and Chief Scientific Officer at Sanofi, said of the selection: “Throughout her career at esteemed institutions such as Baylor and USC, Dr. Johnson has demonstrated a passion for scientific research and a commitment to mentoring, teaching and inclusion, all vital components of the Keystone Symposia mission. We thank Dr. Jane Peterson for her dedicated leadership of the organization over the past four years, especially her work expanding its global reach in Africa, Asia and Europe.”

Dr. Johnson added, “I am delighted to be joining Keystone Symposia, an organization that serves a vital and increasingly global role in catalyzing research collaboration and enhancing scientific communication and accessibility. I am looking forward to working with the staff and Board to promote Keystone Symposia’s core values and further advance its mission.”

Dr. Jane Peterson, who will assist with the leadership transition this summer, commented, “I have been honored to serve as CEO of Keystone Symposia, an outstanding organization that is truly unique in the life sciences. I am excited to leave it in the capable hands of Dr. Johnson.”
Scholarship deadlines precede meetings by four months, abstract deadlines by three months and discounted registration deadlines by two months. View details for each conference at www.keystonesymposia.org/meetings.