



Membrane Physiology Symposium 2024

Napa Valley, California
Science, Networking, & A Little Wine

Membrane Physiology Symposium 2024 Schedule

Napa California, April 22nd and 23rd 2024

Monday, April 22nd

7:30 - 8:30 am

Arrival, Breakfast, & Poster Set Up

8:30 - 8:45 am

Wyatt Hall - Nanion Director of Sales

Welcome Introduction

8:45 - 9:15 am

Dr. Tamer Gamal El-Din - University of Washington

Remembering the Ion Channels' Biochemist, Bill Catterall

9:15 - 9:45 am

Dr. Al George Jr. - Northwestern University

Functional Consequences of Human Ion Channel Variants

9:45 - 10:15 am

Dr. Brady Maher - Lieber Institute

Assaying Native Sodium Channels in Human iPSC-Derived Neurons

10:15 - 10:45 am

Dr. Isabelle Deschenes - The Ohio State University

Impact of Heart Failure Activated T cells on Cardiac Electrophysiology

10:45 am - 1:15 pm

Networking Session & Lunch Break

1:15 pm - 1:30 pm

Dr. Markus Rapedius - Nanion Technologies

Patch 384: All the Small Things

1:30 - 2:00 pm

Dr. Doug Krafte - OmniAb Inc.

Advances in Targeting Ion Channels Across Therapeutic Modalities

2:00 - 2:30 pm

Dr. Jen Pan - The Broad Institute

A Tale of Two Channels

2:30 - 3:00 pm

Dr. Jose Mercado - DSM-Firmenich

Scrambling Mosquito Olfaction to Deter the Buzzing Menace

3:00 - 3:30 pm

Dr. Gail Robertson - University Wisconsin Madison

Coordinate Biogenesis of Ion Channels in Excitable Membranes

3:30 - 3:45 pm

Dr. Carlos Obejero-Paz - Stanford University

Making the most of impedance recordings from hiPSC-derived cardiomyocytes

3:45 - 5:30 pm

Networking Session

6:30 - 9:00 pm

Dinner Hosted by Nanion Technologies

Tuesday, April 23rd

7:30 - 8:30 am

Arrival, Breakfast, & Networking Session

8:30 - 8:45 am

Dr. Hector Valdivia - University Wisconsin

That Which Does Not Kill You, Makes You Stronger: The Salutary Effect of Scorpion Peptides on Ca²⁺-Dependent Arrhythmias

8:45 - 9:15 am

Dr. Dan Minor - UCSF

Covalent Chemogenetic K2P Channel Activators

9:15 - 9:45 am

Dr. Jean-Ju Chung - Yale University

CatSper Channel: Assay Development for Male Fertility Treatment and Contraceptives

9:45 - 10:15 am

Dr. Alyssa Petko - BlueRock Therapeutics

Physiological Characterization of iPSC-Derived Cardiomyocytes for the Treatment of Heart Failure

10:15 - 10:45 am

Dr. Ivy Dick - University of Maryland

Diverse Mechanisms Underlying the Pathogenesis of Calcium Channelopathies.

10:45 am - 11:15 am

Dr. Saverio Gentile - Medical University of South Carolina

Targeting Potassium Channels Unveils Cancer Vulnerability: From Bench-to-Bed Side

11:15 am - 1:45 pm

Networkings Session & Lunch

1:45 - 2:15 pm

Dr. Luis Cuello - Texas Tech University HSC

The Unforeseen Consequences of a Novel Mechanosensitive Gating Process & Crystallization Conditions in KcsA Ion Binding Affinity & Occupancy

2:15 - 2:25 pm

Dr. Jim Brady - Maxcyte

Rapid Development of Membrane Physiology Assays Using Scalable Electroporation

2:25 - 2:55 pm

Dr. Alex Dopico - University Tennessee HSC

BK Channel Subunits and Steroids: A Tale of Two Subunits

2:55 - 3:25 pm

Dr. Justin Du Bois - Stanford University

Toxin-based Tools for Studies of Voltage-Gated Sodium Channels

3:25 - 3:55 pm

Dr. David Dalrymple - SB Drug Discovery

Utilizing SURF²R SSME Technology for SLC Transporter Drug Discovery

3:55 - 5:30 pm

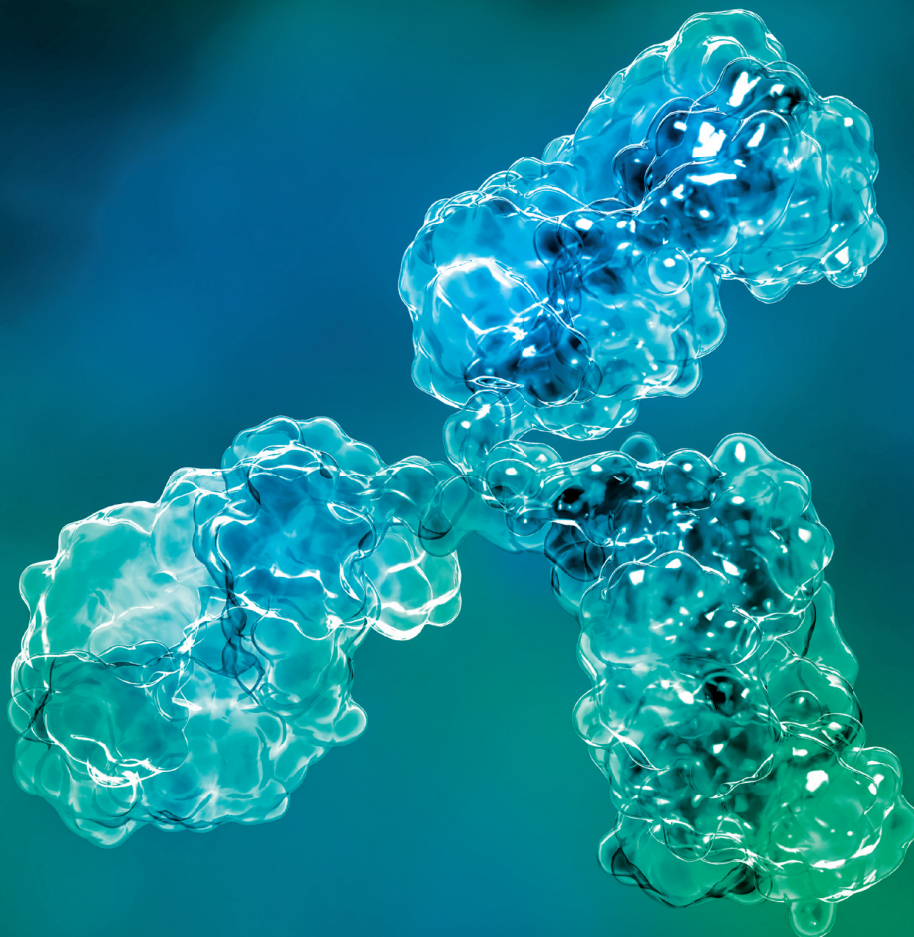
Networking Session

7:30 - 10:00 pm

Wine Tasting Hosted By SB Drug Discovery



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Science
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Join us in Munich!
October 22-23rd, 2024



Dr. Tamer Gamal El-Din

University of Washington

Remembering the Ion Channels' Biochemist, Bill Catterall

Bill Catterall is credited for discovering the voltage-gated sodium and calcium channels, the proteins that are responsible for the spark of life. Over 45 years, Bill's work elucidated the sodium and calcium channels structure and function in great detail. In this presentation I will try to shed light on the main milestones in Bill's scientific legacy.

Dr. Al George Jr.

Northwestern University

Functional Consequences of Human Ion Channel Variants

Channelopathies, particularly those involving voltage-gated sodium (Na_v) and potassium (K_v) channel genes, are associated with a variety of childhood epilepsy syndromes having diverse clinical severity. Among the many genes associated with epilepsy, those encoding Na_v and K_v channels have the highest cumulative variant burden. Differentiating pathogenic from benign variants and establishing genotype-phenotype relationships has become increasingly challenging because of explosive growth in the number of variants discovered in research and clinical medicine. We harnessed the high throughput capabilities of automated patch clamp recording to determine the functional consequences of hundreds of human ion channel variants. This presentation will illustrate use of this technology to investigate the functional diversity of Na_v and K_v channel variants associated with epilepsy and related neurodevelopmental disorders.



Dr. Brady Maher

Lieber Institute

Assaying Native Sodium Channels in Human iPSC-Derived Neurons

The advent of human induced pluripotent stem cells (hiPSCs) has created an exciting new opportunity to study the physiology of human neurons and their native ion channels. These human models have immense potential to improve both our ability to model complex human disorders and to develop novel therapeutics. During my presentation, I will discuss my lab's use of hiPSCs to model schizophrenia and describe the associations we have observed between sodium channel function and clinically relevant features of schizophrenia. As part of our efforts to translate these findings into drug targets, I will discuss our recent work using the Nanion SyncroPatch 384 system for high throughput recordings of native sodium channel currents in hiPSC-derived neurons.

Dr. Isabelle Deschenes

The Ohio State University

Impact of Heart Failure Activated T cells on Cardiac Electrophysiology

Heart diseases are the leading causes of mortality. Activation of CD4+ T-cells post-myocardial infarction (MI) promotes wound-healing and scar formation. However, by 8 weeks post-MI, CD4+ T-cells undergo a temporal phenotypic switch that promotes pathological left-ventricular (LV) remodeling and the development of ischemic heart failure (HF). Importantly, we have shown that adoptive transfer (AT) of HF-activated CD4+ T-cells to naïve mice induce cardiac dysfunction and LV-remodeling, suggesting that CD4+ T-cells contribute to cardiac dysfunction in HF. We show that upon AT, significantly higher numbers of HF-activated CD4+ T-cells infiltrate the myocardium of naïve mice and induce significant cardiac dysfunction and arrhythmic events in naïve mice. Co-culture of HF-activated T-cells with adult mouse cardiomyocytes alter electrophysiological function of cardiac myocytes in a contact-dependent fashion. This, contact-dependent alteration of cellular electrophysiology and overall cardiac dysfunction induced by pathological CD4+ T-cells represent a heretofore-unappreciated mechanism contributing to HF and arrhythmia mechanisms.



Dr. Markus Rapedius

Nanion Technologies

Patch 384: All the Small Things

Intracellular organelles, such as lysosomes, have received increasing attention recently given their potential roles in connecting lysosomal homeostasis with pathophysiological conditions such as Parkinson's disease & cancer. To accommodate the interest to explore intracellular ion channels as therapeutic targets in a more native environment, Nanion developed special consumables dedicated to pursuing organellar patch clamp recordings in combination with the high flexibility of the SyncroPatch 384. In collaboration with our customers, we have successfully applied this approach to explore intracellular ion channels, including TPC2, TMEM175 and TRPML1, from freshly isolated lysosomes. In addition to organellar recordings, we have also used the new consumables to extend our range of applications to include targets which are usually difficult to study, e.g. patch clamp of smaller primary cells including immune -, red blood - or sperm cells. We will share our experience so far with data recorded on the SyncroPatch 384.

April 22nd

1:15 - 3:45 pm

Dr. Doug Krafte

OmniAb Inc.



Advances in Targeting Ion Channels Across Therapeutic Modalities

Ion channels represent a well-validated class of drug discovery targets that continue to see great interest across all therapeutic areas, particularly in neuroscience. At OmniAb®, we are advancing innovative approaches to identify novel ion channel therapeutics in both the small molecule and biologics space. This presentation will highlight advances in analytic methods designed to identify modulators with desired functional target product profiles using data generated on high-throughput electrophysiology platforms. In addition, application of our multispecies engineered transgenic animals along with high throughput B-cell screening on our proprietary xPloration platform is opening the door to identification of antibody-based therapeutics for ion channels. These technological advances will enable discovery and development of more therapeutics targeting this important class of proteins.



Dr. Jen Pan

The Broad Institute

The Tale of Two Channels

We characterized the de novo missense variants of two genes that encode voltage-gated calcium channels (CACNA1A and CACNA1G) identified in patients of a large developmental disorder cohort using automated SyncroPatch recordings. We discovered that many de novo variants significantly impact the function of the channels. Both gain-of-function and loss-of-function mutations are identified in patient-derived mutations. We found distinct molecular functions may underlie specific clinical phenotypes in the patients. Our study paves the way for precision medicine for treating channelopathy in developmental disorders.

Dr. Jose Mercado

DSM-Firmenich



Scrambling Mosquito Olfaction to Deter the Buzzing Menace

Dr. Jose Mercado is a Sr. Scientist at DSM-Firmenich in San Diego. DSM-Firmenich is a global research company focusing in the areas of fragrance, taste, health, and nutrition. DSM-Firmenich, San Diego, focused primarily in the discovery and development of new taste and flavor modulators using our expertise on the neurobiology of human taste and somatosensation. Recently, we have expanded our research on mosquito olfaction and taste with the goal of identifying scents present in our fragrances to help keep mosquitoes away and take the bite out of the world's deadliest animal.



Dr. Gail Robertson

University Wisconsin Madison

Coordinate Biogenesis of Ion Channels in Excitable Membranes

The mechanisms by which the relative abundance of different ion channels is established – the “stoichiometry of excitability” – are critical to electrical signaling in the heart and brain. We recently demonstrated that mRNA transcripts encoding different ion channels producing the cardiac ventricular action potential are physically associated during translation. These channels are synthesized in heterotypic pairs and are subject to coregulation that mitigates the risk of arrhythmia when a single channel type is downregulated. Our studies reveal a new paradigm for the control of excitability that also applies more generally to macromolecular assemblies in which stoichiometry is critical for function.

Dr. Carlos Obejero-Paz

Stanford University



Making the Most of Impedance Recordings from hiPSC-Derived Cardiomyocytes

Impedance recordings in the frequency range of 4 to 10 kHz have been employed to evaluate the contractile function of human induced pluripotent stem cell-derived cardiomyocyte 2D cultures. These recordings capitalize on the phenomenon whereby motion events alter the pathways for electrical current flow between cardiomyocytes and between cardiomyocytes and the recording electrode, resulting in a transient change in impedance. This change is notably reduced by inhibitors of myosin II ATPase, indicating its association with contractile activity. The residual impedance signals correspond to events related to excitation-contraction coupling, including the activation of L-type calcium currents. Sampling the entire frequency spectrum up to 100 kHz has been used to characterize 2D cardiomyocyte cultures comprehensively. The parametrization of these cultures based on robust models is anticipated to yield valuable insights into cardiac disease modeling, as it provides a more detailed and nuanced understanding of the manner cardiomyocytes interact with each other and with other cardiac cell types.





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Axol Biosciences - Stuart Prime



Functional & Pharmacological Differences Between the Contractility of axoCells™ iPSC Derived Atrial & Ventricular Cardiomyocytes Assessed on the FLEXcyte 96

Commercial human iPSC-derived ventricular cardiomyocytes are used for research, drug development, and toxicology testing. Less work has been performed on human iPSC-derived atrial cardiomyocytes despite the clear phenotypic and pharmacological differences.

Atrial fibrillation (AF) is the most common arrhythmia worldwide, affecting over 33M people. There are currently limited therapeutic options with poor success rates and a 1-year mortality rate of 25%. With a clear need for better, more human models of AF, Axol Bioscience have partnered with innoVibro GmbH to examine the phenotypic and pharmacological differences in contractility of axoCells™ atrial and ventricular cardiomyocytes on their FLEXcyte 96 platform.

Anatomic - Patrick Walsh



Comparative Transcriptome Profiling of Multiple Human Induced Pluripotent Stem Cell Derived Sensory Neuron Populations and Functional Validation of Pain Targets on Automated Patch Clamp Systems

Nociceptors are a subset of sensory neurons that relay painful stimuli from the peripheral tissues. Multiple nociceptor subtypes exist and can respond to different thermal, mechanical, or chemical noxious stimuli. Recent findings with transcriptomics have identified gene expression patterns that classify these sub-types by different ion channels including $Na_v1.7$, $Na_v1.8$, $Na_v1.9$, TRPV1, TRPA1, P2X₃, HCN and a number of others that have been implicated in pain. In this study, we have identified a method to rapidly generate a novel TRPA1+ human induced pluripotent stem cell (hiPSC)-derived sensory neuron population and thoroughly characterized it molecularly and functionally. Neurons were matured through four weeks and samples were processed on a weekly basis for bulk RNA sequencing and RNAscope. We found that this population was more similar to primary human DRG than other hiPSC-derived sensory neurons with RNA data sets publicly available, and specifically looked at differences in expression of ion channels, GPCRs, neuropeptides, and cell adhesion molecules. We also quantified this population via RNAscope and found 60% of the neurons express TRPA1+. Using high throughput automated patch clamp electrophysiology, we also explored properties of: voltage-gated sodium and potassium ion channels; TRP, GABA, and P2X ligand-gated ion channels; hyperpolarization-activated, cyclic nucleotide-gated channels; and mechanosensitive Piezo channels. Excitability properties in current clamp mode including resting membrane potential, spontaneous and evoked action potentials were also studied. These results were compared to a different hiPSC-derived sensory neuron population to determine the optimal sub-type and for target discovery and validation in high-throughput pain drug discovery screens.

Ion Biosciences - Derek Hernandez



A Cell- And Organelle-Targetable Thallium Indicator For Fluorescence-Based Ion Channel Assays

Fluorescent ion indicators allow researchers to study ion channel activity by measuring the flux of ions through an ion channel of interest. More specifically, Thallo, a thallium-selective indicator, has been the gold standard for decades to identify modulators of potassium channels. In this work, we synthesized ION Thallo-HTL, a thallium indicator that is a substrate for the self-labeling protein HaloTag. Fluorescence titrations and fluorescence polarization data demonstrate that this new indicator remains sensitive towards thallium ions as the HaloTag conjugate, and exhibits a higher fluorescence response than its parent compound. Specific labeling of cells and intracellular compartments is also demonstrated.

FujiFilm Cellular Dynamics - Ravi Vaidyanathan



iCell® Cardiomyocytes² enable a reliable and straightforward approach to cardiac safety liability testing and proarrhythmic risk assessment across multiple platform technologies

The great promise of induced pluripotent stem cell-derived cardiomyocytes (iPS-CM) as human-based in vitro models for the assessment of cardiac safety liability and proarrhythmic risk was extensively studied and evaluated by the Comprehensive In Vitro Proarrhythmia Assay (CiPA) initiative. As a result, iCell Cardiomyocytes² (FUJIFILM CDI) were validated as the preferred cell type for cardiac safety testing from the CiPA effort. Here, we showcase the use of iCell Cardiomyocytes² on the Patchliner system (Nanon) for analysis of single cells via automated patch clamp (APC), and on two plate-based cell analytic devices: 1) CardioExcyte 96; and 2) FLEXcyte 96 systems for recording both contractility and electrophysiology of intact cardiomyocyte networks.

Electrical currents were measured on the Patchliner from multiple cells simultaneously in both voltage clamp or current clamp mode, also combined with dynamic clamp, to obtain reliable action potential (AP) recordings. We recorded the effects of known calcium, sodium, late sodium, and hERG channel modulators on AP parameters. For the cell analytic devices, mono-culture (CardioExcyte 96) or co-culture (FLEXcyte 96) of iCell Cardiomyocytes² with iCell Cardiac Fibroblasts were used to assess real-time cellular

readouts such as impedance, extracellular activity, and contractile force. These data demonstrate that cardiac ion channel pharmacology can be successfully recorded using iCell Cardiomyocytes² in both APC and cell analytic devices for real-time cellular readouts. Additionally, we reinforce the fact that iCell Cardiomyocytes² are a reliable tool for cardiac safety screening and the study of cardiac ion channel diseases in a model system closer to in vivo physiology.

Elizabeth Rose Park - *Stanford University*
Chemogenetic Inhibition of Single Sodium Channel Isoforms

Pablo Simon Gaete - *University of California Davis*
Large-Pore Connexin Hemichannels Function as Molecule Transporters Independently of Ion Conduction

Khoa Ngo - *University of California Davis*
Harnessing AlphaFold to Reveal State Secrets: Prediction of hERG Closed and Inactivated States

Kyle Rouen - *University of California Davis*
In-Silico Predictions of State-Specific Drug Binding to Cardiac Ion Channels

Woori Choi - *University of California Davis*
Influence of the Selectivity Filter Serine and Threonine Residues on the Stability and Conductivity of Human Small-Conductance Calcium-Activated Potassium Channels

Ryan Woltz - *University of California Davis*
MD Simulation Identifies a Novel and Direct Mechanism for PIP2 Activation of SK2 Channel

April 23rd

8:30 - 10:15 am

Dr. Hector Valdivia

University of Wisconsin-Madison



That Which Does Not Kill You, Makes You Stronger: The Salutary Effect of Scorpion Peptides on Ca²⁺-Dependent Arrhythmias

During periods of stress or exercise, β -adrenergic stimulation of ventricular myocytes activates PKA, which phosphorylates target proteins to increase Ca²⁺ entry and SR Ca²⁺ uptake. This β -adrenergic-induced increase of intracellular Ca²⁺ (Ca²⁺ overload) is a natural and efficient mechanism to increase cardiac performance. However, Ca²⁺ overload also increases arrhythmia vulnerability because it brings ryanodine receptors (RyR2) closer to threshold for spontaneous Ca²⁺ release (SCR), and this threshold is even lower in CPVT due to RyR2 instability. A selected group of scorpion venoms contain calcins, a family of cell-permeable peptide agonists of RyRs. I will present evidence that imperacalgin, the founding member of the calcin family, paradoxically decreases arrhythmia burden in animal models of CPVT. We hypothesized that this unexpected anti-arrhythmic effect of IpCa is due to partial and controlled depletion of SR Ca²⁺ load, which decreases the propensity of SCR events and thus dissipates the arrhythmogenic substrate in CPVT.



Dr. Dan Minor

UCSF

Some Assembly Required: A First Structural View of Ion Channel Biogenesis

Voltage-gated ion channels (VGICs) comprise multiple structural units whose assembly is required for function. Despite having exemplar structures from essentially every VGIC class, there is scant structural understanding of how VGIC subunits assemble and whether chaperone proteins are required. High-voltage activated calcium channels (Ca_vs) are paradigmatic multi subunit VGICs whose function and trafficking is powerfully shaped by interactions between pore forming Ca_v1 or Ca_v2 Ca_v α ₁ and auxiliary Ca_v β , and Ca_v α ₂ δ subunits. We recently determined cryo electron microscopy structures of human brain and cardiac Ca_v1.2 bound with Ca_v β 3 to a chaperone, the endoplasmic reticulum membrane protein complex (EMC), and of the fully assembled Ca_v1.2/Ca_v β 3/Ca_v α ₂ δ -1 channel. These structures provide the first view of an EMC:client complex and partially assembled VGIC. This view of an ion channel assembly intermediate and EMC:client complex indicates that the EMC acts as a holdase that facilitates channel assembly and has broad implications for understanding VGIC biogenesis and drug action.

Dr. Jean-Ju Chung

Yale University

CatSper Channel: Assay Development for Male Fertility Treatment and Contraceptives

Ca²⁺ signaling mediated by the sperm specific CatSper Ca²⁺ channel is required for male fertility in mammals by regulating sperm motility maintenance, hyperactivation, acrosome reaction and their navigation in the female reproductive tract. In humans, mutations in CatSper genes are reported in infertile male patients. Thus, CatSper channel is a validated target for a male contraceptive development and to enhance sperm motility in assisted reproductive technology. However, CatSper channels have not been successful candidates for direct screening for compounds that modulate their activity due to an inability to achieve functional expression of the channels in mammalian systems suitable for high throughput screening. Here, we report engineering chimeric channels by fusing the transmembrane domains of human CatSper and the soluble domains of single-domain cation channels from a diatom species. The chimeric channels traffic to the plasma membrane and assemble functional channels that conducts calcium ions. These findings will serve a foundation for establishing platforms to screen ligands and modulators that can directly bind to the transmembrane domains and the pore of the CatSper channel and to study mechanisms of action for the identified hits and lead compounds from screening.



Dr. Alyssa Petko

Bluerock Therapeutics

Physiological Characterization of iPSC-Derived Cardiomyocytes for the Treatment of Heart Failure

Dr. Alyssa Petko is a Scientist at BlueRock Therapeutics and functional lead of the Cell Physiology team. With several years of electrophysiological experience in neuroscience and cardiac fields, she seeks to leverage functional output with molecular comparison to build robust cell therapy products. BlueRock Therapeutics is a wholly-owned, independently operated subsidiary of Bayer AG as a cornerstone of its Cell & Gene Therapy Platform. Their team is committed to realize the potential of regenerative medicine to help patients by developing new and impactful cellular therapies. Currently in pre-clinical development, BR-CM01 seeks to replace damaged cells in heart tissue with new, healthy cardiomyocytes, potentially restoring function to help people live longer and more fulfilling lives.



Dr. Ivy Dick
University of Maryland

Diverse Mechanisms Underlying the Pathogenesis of Calcium Channelopathies

Ca_v1.2 Ca²⁺ channels are a critical conduit for Ca²⁺ entry into a diverse array of excitable cells. As such, these channels must employ specialized regulatory mechanisms enabling appropriate Ca²⁺ entry for each cell type and physiologic state. However, a growing number of mutations which disrupt these regulatory processes have been identified in patients, and lead to severe neurological and cardiac phenotypes. Timothy Syndrome (TS) represents one such class of mutations, in which a single point mutation within Ca_v1.2 leads to a severe multisystem disorder characterized by developmental delays, autism and profound long QT syndrome (LQTS). Thus far, conventional treatments, including Ca²⁺ channel blockers (CCBs), have had limited efficacy on TS, demonstrating a need for increased mechanistic understanding of the underlying pathogenesis. Here, we will probe the mechanisms underlying the tissue specific effects of TS mutations, gaining increased understanding of the pathogenesis and treatment options for TS.

Dr. Saverio Gentile
Medical University of South Carolina

Targeting Potassium Channels Unveils Cancer Vulnerability: From Bench-to-Bedside

Years of research on ion channels have extensively illuminated their crucial roles in numerous physiological and pathological processes. However, the involvement of ion channels in cancer biology remains largely uncharted territory.

During this presentation, we will showcase data illustrating the effectiveness of pharmacologically activating potassium channels in suppressing various cancer hallmarks. We will utilize a range of experimental models, including in vitro, in vivo, and ex vivo systems. Additionally, we will outline the underlying principles of a clinical trial designed to assess the impact of the FDA-approved Kir6.1 activator, Minoxidil, in patients with ovarian cancer.



Dr. Luis G. Cuello
Texas Tech University HSC

The Unforeseen Consequences of a Novel Mechanosensitive Gating Process & Crystallization Conditions in KcsA Ion Binding Affinity & Occupancy

In potassium channels ion permeation, selectivity and C-type inactivation are processes that structurally converge at the canonical 4 ion binding sites selectivity filter. In this convoluted environment measuring individual ion binding sites dissociation constants is a task that has eluded us for decades. My laboratory has found a backdoor strategy to make these thermodynamic measurements and in doing so has discovered that KcsA is also a mechano-gated channel, which has profound detrimental effects when measuring ion binding energetics.

Dr. Jim Brady
MaxCyte

Rapid Development of Membrane Physiology Assays Using Scalable Electroporation

Commercially available cell lines simplify membrane physiology assay development, but they are costly and may not be suited to specific assay requirements. In-house stable cell lines are cheaper but more time-consuming to produce. Moreover, cell line development is complicated by the complex, multi-subunit nature of many membrane proteins. Transiently transfected cells are a cheaper, faster option, but commonly used lipid reagents may impact membrane composition and cell health, highlighting the need for an alternative. MaxCyte's electroporation technology efficiently transfects virtually any cell type, at any scale – even with multiple plasmids – while maintaining cell health, enabling the rapid development of membrane physiology assays.



April 23rd

2:25 - 3:55 pm

Dr. Alex Dopico

University of Tennessee HSC



Of BK Channel Subunits and Steroids: A Tale of Two Subunits

Regulation of physiology by steroids has been classically attributed to steroid recognition by cytosolic and membrane-bound (GPCR) receptors. In the last decade, however, direct interactions between lipids and ion channel proteins, and the physiological consequences of such interactions have been increasingly recognized. Here we summarize data from our laboratory documenting the direct interaction between several steroids (cholesterol, cholanes, and pregnanes) and big-conductance, calcium- and voltage-gated potassium (BK) channels. Results show differential contributions to steroid action of two subunit types that are essential to define the phenotype of native BK channels in cerebrovascular smooth muscle (channel-forming alpha and regulatory beta1). The pathophysiological and therapeutical implications of direct steroid-BK channel subunit interactions are discussed.



Dr. Justin Du Bois

Stanford

Toxin-based Tools for Studies of Voltage-Gated Sodium Channels

The Du Bois lab is interested in the molecular physiology of sodium channels in electrogenesis and nociception, work that may ultimately inform the development of new analgesic medicines. Their studies rely on molecular biology and electrophysiology to measure ionic currents in cells and capitalize on the availability of potent neurotoxins and derivatives thereof as selective reagents for manipulating channel function. This lecture will focus specifically on efforts to 'map' toxin-channel receptor sites and to design tool compounds that target and enable regulation of select channel subtypes.

Dr. David Dalrymple

SB Drug Discovery



Utilizing SURFE²R SSME Technology for SLC Transporter Drug Discovery

Solid Supported Membrane-based Electrophysiology (SURFE²R) technology has emerged as a powerful tool in the field of drug discovery, offering high throughput, direct measurement of electrogenic transporter activity. SB Drug Discovery will showcase how it is integrating SURFE²R technology into workstreams to accelerate the identification and optimization of novel therapeutics.

Join us for a wine tasting tonight!
Hosted by SB Drug Discovery

Event will take place tonight in
the Trinitas Tasting Room.



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