

Presents the Symposium

Lipids in Membrane Organization and Translational Medicine

Friday, November 8, 2024

Rutgers University New Brunswick, NJ

Lipids in Membrane Organization and Translational Medicine

Rutgers Center for Lipid Research Symposium November 8, 2024



Dear Colleagues,

We are pleased to welcome you to the ninth annual symposium of the Rutgers Center for Lipid Research (RCLR) entitled *"Lipids in Membrane Organization and Translational Medicine"* We have brought together scientists outside the RCLR family who will share

their knowledge, results, and insights into lipids. Additionally, a poster session will highlight the research of students and postdocs. We are certain that you will find the presentations, which are designed to facilitate your interaction with other scientists, stimulating, informative, and enjoyable.

The RCLR is a center of the New Jersey Institute for Food, Nutrition, and Health that promotes multidisciplinary research on the biochemical, biophysical, cellular, and molecular mechanisms involved in lipid metabolism, and extension of these endeavors to elucidate the underpinnings of lipid-based diseases such as obesity, lipodystrophy, diabetes, and heart disease. Our research utilizes model organisms, cells, tissues, and state-of-the-art instrumentation.

The center fosters interaction among faculty, postdoctoral associates, and students by holding monthly research meetings where postdoctoral associates and students have the opportunity to present their research and receive constructive feedback in a warm and friendly atmosphere. We hold an annual symposium and a monthly seminar series that brings renowned scientists to Rutgers. The RCLR founded the Big Ten Academic Alliance Lipid Symposium; this meeting brings lipid researchers at Big Ten schools to interact on a regular basis. In the end, we extend our research findings to address lipid-based diseases, thereby promoting optimum health.

In closing, we convey our appreciation to the School of Environmental and Biological Sciences (SEBS) for their support in bringing this symposium to fruition.

Sincerely,

Genge m. Claiman

George M. Carman



Organizing Committee



Alvaro Toledo



George Carman



Laura Amador (Administrative Assistant)

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RUTGERS

School of Environmental and Biological Sciences



Lipids in Membrane Organization and Translational Medicine

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Program

8:30 am	Registration (coffee/tea, and poster set up)
8:50 am	Laura Lawson (Executive Dean, SEBS) and George M. Carman (Director, RCLR) <i>Welcome and introductions</i>
	Session I chair: Alvaro Toledo (Department of Entomology, SEBS)
9:00 am	Wonhwa Cho (University of Illinois Chicago) <i>Cholesterol and cancer: new mechanisms and therapy</i> Discussion
9:40 am	Kandice R. Levental (University of Virginia) Asymmetric distribution of phospholipids and cholesterol results in unique plasma membrane properties Discussion
10:20 am	Break
	Session II chair: Eric Klein (Department of Biology-Rutgers Camden)
11:00 am	Erwin London (Stony Brook University) Role of lipid composition and asymmetry in plasma membrane ordered domain (raft) formation and function Discussion
11:40 am	Itay Budin (University of California San Diego) <i>Phospholipid curvature: a biophysical deep dive</i> Discussion
12:20 pm	Lunch and posters
	Session III chair: Judith Storch (Department of Nutritional Sciences, SEBS)
2:30 pm	Aaron Neiman (Stony Brook University) Mechanisms of transport by bridge-like lipid transport proteins Discussion
3:10 pm	Suzanne Jackowski (St. Jude Children's Research Hospital) <i>The challenge(s) of translational metabolic medicine</i> Discussion
3:50 pm	Alvaro Toledo and George M. Carman Awards
4:00 pm	Reception



Speaker Biographies



Dr. Wonhwa Cho is Head of the Department of Chemistry at the University of Illinois Chicago. He received his B.A. and M.S. degrees from Seoul National University in Korea and Ph.D. degree from the University of Chicago. His postdoctoral training was at the California Institute of Technology. Dr. Cho's laboratory is recognized internationally for its pioneering work on lipid sensors, lipid signaling, and lipid-targeting drug development. He has authored over 180 refereed publications and has written several review articles on lipid binding domains and lipid signaling. Dr. Cho is a Fellow of the American Association for the Advancement

of Science and is the recipient of the Biophysical Society Avanti Award in Lipids. He is a former chair and organizer of Federation of American Societies for Experimental Biology (FASEB) Summer Research Conference on Phospholipases. He served on the Biochemistry and Biophysics of Membranes Study Section of the National Institutes of Health. He has also served on the editorial board of *Progress in Lipid Research* and *Journal of Biological Chemistry*. Dr. Cho currently serves as a Head of the Membrane Biological Physics Section, Faculty Opinions and an Associate Editor of the *Frontiers in Cell and Developmental Biology* and *Frontiers in Molecular Biosciences*.



Dr. Kandice R. Levental is Associate Professor in the Department of Molecular Physiology and Biophysics, Center for Membrane and Cell Physiology at the University of Virginia. She received her B.S. degree in Chemical Engineering from The University of Texas at Austin in 2003. Her doctoral training was with Dr. Valerie Weaver at the University of Pennsylvania. She received her PhD in Bioengineering in 2008. She did postdoctoral training in the field of tissue engineering and biomaterial design under Dr. Carsten Werner at the Leibniz Institute of Polymer Research in Dresden, Germany from 2008 to 2012. Since 2012, Dr. Levental has been co-PI of the Levental Laboratory of Membrane Biology with her husband Dr.

Ilya Levental, first starting at the University of Texas Health Science Center at Houston and now at the University of Virginia. The long-term interests of the laboratory are to understand how lipids are regulated and organized in mammalian membranes and how their resulting biophysical properties ultimately affect cell signaling at and through membranes. The Levental Lab has become among the world leaders in understanding how dietary lipids influence biomembrane properties and cell physiology. Dr. Levental has co-authored over 40 manuscripts with over 13,000 citations. She is the co-winner of the 2024 Biophysical Society Avanti Award in Lipids. She is the former Secretary-Treasurer of the Biophysical Society Membrane Structure and Function subgroup, current member of the BPS Dissertation Award Review Committee, and a co-organizer of the ASBMB Lipid Research Division Seminar Series.



Dr. Erwin London is Distinguished Professor in the Department of Chemistry and Department of Biochemistry and Cell Biology at Stony Brook University. He received his B.A. degree from Queens College of the City University of New York and a Ph.D. degree from Cornell University, in Ithaca, NY. Postdoctoral training was at the Massachusetts Institute of Technology. Dr. London's laboratory has studied membrane structure and organization both for membrane lipids and membrane proteins. His laboratory is most known for pioneering work on the principles of organization of membranes into co-existing ordered and disordered lipid domains. The laboratory has also developed methods to manipulate the lipid

composition and asymmetry of both artificial and natural membranes. He is a Fellow of the American Association for the Advancement of Science and a recipient of the Schroepfer Medal for advances in the steroid or sterol field from the American Oil Chemists Society. He has served on the Biochemistry and Biophysics of Membranes Study Section of the National Institutes of Health and has served on the editorial board or editorial advisory board of the journals *Biochemistry*, the *Journal of Membrane Biology*, and *Protein Science*.



Dr. Itay Budin is an Assistant Professor in the Departments of Chemistry & Biochemistry and Bioengineering at UCSD. Trained as a biophysicist, his lab investigates the interplay between lipid chemistry and cell membrane biology in a wide range of systems. Itay completed Ph.D. studies at Harvard University with Jack Szostak on model membranes relevant to the early evolution of cells. He then carried out postdoctoral studies as a Miller Fellow at UC Berkeley, working with Jay Keasling on applications of synthetic biology tools to lipids. He is the recipient of the Walter Shaw Young Investigator Award in lipid biology from the American Society

for Biochemistry and Molecular Biology and early career awards from the National Science Foundation and Department of Energy.



Dr. Aaron M. Neiman is Professor in the Department of Biochemistry and Cell Biology at Stony Brook University. He received a B.A.S. degree from Stanford University and then performed his doctoral work with Ira Herskowitz at University of California San Francisco. He did his postdoctoral training with Rolf Sternglanz at Stony Brook University. He joined the faculty at Stony Brook in 1999. Aaron is a Fellow of the American Academy of Microbiology and serves as the Cell Biology, Metabolism, and Physiology Section Editor-in-Chief for the *Journal of Fungi*. The Neiman laboratory has spent the last 25 years investigating the process of spore formation in the yeast *Saccharomyces cerevisiae* as a model system to explore the molecular mechanisms by which cells rearrange their internal organization during

differentiation.



Dr. Suzanne Jackowski is Member of the St. Jude Children's Research Hospital (retired) and Member of the Scientific Advisory Boards of CoA Therapeutics, Inc. and Norachem. She received her B.A. degree from Canisius College, and Ph.D. degree from the University of Tennessee at Oak Ridge National Laboratory. Her postdoctoral training was at the University of Connecticut Health Center and the University of Illinois, Champaign-Urbana. Her laboratory is recognized as expert in membrane phospholipid metabolism and she is known internationally as a leader in coenzyme A regulation and therapeutics. She has authored over 135 refereed

publications and 37 topical review articles on the controlling factors that maintain membrane phospholipid homeostasis, and separately, on the mechanisms that regulate the coenzyme A supply in metabolic disease models. Dr. Jackowski received the Lipmann Medal from the International Association for Cellular Coenzymes in recognition of her contributions to coenzyme A research. She is a former chair and organizer of the Gordon Research Conference on the Molecular and Cellular Biology of Lipids, and the focused meeting on "CoA and CoA-derivatives..." sponsored by the American Society for Biochemistry and Molecular Biology, and a former Executive Editor of *Biochimica et Biophysica Acta-Molecular and Cellular Biology of Lipids*. Dr. Jackowski served on the Cellular Biochemistry Advisory Committee for the National Science Foundation, the Physiological Chemistry, the Medical Biochemistry, and the Macromolecular Biophysics Study Sections for the National Institutes of Health, the Scientific and Medical Advisory Board of the NBIA Disorders Association, and the Tennessee Rare Disease Advisory Council.

Posters

Nuclear Vesicle Release During Neuronal Extrusion Events Rebecca Androwski

Investigating the Dynamics of Phosphatidylinositol Phosphates (PIPs) within Lipid Bilayers with ssNMR Spectroscopy

Gertrude Asante Ampadu

Phosphorylation Mutation of Pregnane X Receptor (PXR) at Ser347 Alters Bile Acid Metabolism during MASH Development in Mice

Veronia Basaly

The Lipogenic Enzyme Acetoacetyl-CoA Synthetase and Ketone Body Utilization for Denovo Lipid Synthesis

James Bergstrom

RBP4 is required for the regulated secretion of glucagon from pancreatic islets and co-secreted when glucagon secretion is stimulated Pierre-Jacques Brun

Role of intestinal stearoyl-CoA desaturase-1 in modulating systemic bile acid and energy metabolism Natalie Burchat

Lipid Droplet Dynamics in Lung Fibroblasts Seth Calindas

Effects of bacterial sphingolipids on the properties of synthetic liposomes Joshua Chamberlain

Biosensing and Bioimaging Platforms Using Novel Small Molecules and Nucleic Acids Sarah Cho and Dorsa Ebrahimi

Sphingolipid synthesis and its trafficking in Caulobacter crescentus Anupam Dalmia

Characterization of CCNA_1210 – Intro to Novel Bacterial Chemistry Tanisha Dhakephalkar

A Role for Intestinal Stearoyl-CoA Desaturase in Modulating Acute Colonic Inflammation Camille Duchamp

Playing with Power: Increasing ATP Synthase Activity Truman Dunkley

Small molecule and peptide inhibitors of ricin and Shiga toxin-ribosome interaction Arkajyoti Dutta

Phosphatidylserine scramblases on cancer cells enhance tumor progression Varsha Gadiyar

Sexual Dimorphism of Retinoid Metabolism in the Adult Lung Olivia Groh

Mechanical Force Triggers Extrusion of Large Vesicles from Caenorhabditis elegans Neurons Mariia Ivanova

The conserved hydrophobic residues in Nem1 C-terminal domain are required for Nem1-Spo7 complex formation and role of Nem1-Spo7/Pah1 phosphatase cascade in yeast lipid synthesis Ruta Jog

Posters

Recovering damaged cardiolipin, the heart of the mitochondria, and the heartbeat of the cell Patricia Kane

Phosphatidate phosphatase Pah1 is required for sporulation in yeast Shoily Khondker

Retinoic acid regulates pregnancy-induced heart remodeling Youn-Kyung Kim

Ablation of glutamine synthetase in adipocytes impacts milk composition and maternal glutamine metabolism in mice

Huyen Le

Novel Role of Intestinal Fatty Acid Binding Proteins in Systemic Energy Homeostasis Margie Lenis

Using phospholipids to reduce sterol accumulation in Niemann-Pick C Disease Nancy Lin

Exploring biology through synthetic lipids Dresel Mark

Genome-wide expression patterns observed under conditions that produce Exopher reveal potential candidate genes for Exophergenesis Nelson Mejia

High Fat Diet Induces Metabolic Endotoxemia and Intestinal Permeability, without Altering Gut Proteobacteria in Older Adults with Obesity Anna Ogilvie

Trichothecenes target the plant chloroplast- Implications for pathogen virulence John McLaughlin

Modulating ATP synthase activity as a Therapeutic strategy for Mitochondrial Diseases Labenyimoh Patrick

Kisspeptin alleviates human hepatic fibrogenesis by inhibiting TGFβ signaling in hepatic stellate cells

Kavita Prasad

Use of extracellular substrates by alveolar type II pneumocytes for surfactant lipid synthesis Dativo Sanchez-Gonzalez

Improved Broad Spectrum Antifungal Drug Synergies with Cryptomycinamide, a Cdc50 Inspired Antifungal Peptide Tancer Robert

SCD1 Upregulation Partially Compensates for Loss of SCD2 Matthew Selby

Mechanosensory Channels in Neuronal Exophergenesis Timothy Smyth and Lily Zhou

Identification of three conserved motifs in the HAD-like domain of Pah1 from Saccharomyces cerevisiae

Parth Sharma

The antidepressant drug sertraline is a novel inhibitor of yeast Pah1 and human lipin 1 phosphatidic acid phosphatases

Geordan J. Stukey

Posters

SCD regulates intestinal stem cell maintenance by modulating endoplasmic reticulum stress Priyanka Sharma

Spatial Organization of bacterial sphingolipid synthesis enzymes Chioma Uchendu

Bioactivity of proanthocyanidin-derived microbial metabolites Yue Wu

The Role of Fibroblast Growth Factor 15 (FGF15) in Preventing Hepatocellular Carcinoma (HCC) Development in Mice

Zhenning Yang

Carman Prize in Lipids



The George M. and Maureen D. Carman Prize in Lipids is an endowed prize established to encourage research and to provide financial assistance to graduate students and postdoctoral fellows/associates in the School of Environmental and Biological Sciences (SEBS). The prize is awarded for outstanding research achievement in the area of lipid biochemistry. You can contribute to the endowment via the <u>Rutgers Foundation</u> web site and earmark the funds for the Carman Prize in Lipids.



Hyeon-Son Choi (2007)



Wen-Min Su (2012)



Yeonhee Park (2016)



Natalie Burchat (2021)



nibal Soto-Cardalda (2008)



John Douglass (2013)



Inna Nikonorova (2017)



William Jonsson (2021)



Geordan Stukey (2023)



Younkyung Kim (2009)



Yixuan Qiu (2014)



Prabuddha Dey (2018)



Priyanka Sharma (2022)



Huyen Le (2024)



Stylianos Fakas (2011)



Marc Tuazon (2014)



Joanna Kwiatek (2019)



Shoily Khondker (2022)



Lesley Wassef (2011)



Lu-Sheng Hsieh (2015)



KevinTveter (2020)



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