

2018

MitoCircle Journal Club 2018 Summary

Date	Name	
01/08	Shey	Meeting briefing ASCB 2017; Chakrabarti et al (Henry Higgs) 2018 JCB, INF2-mediated actin polymerization at the ER_mito Ca ²⁺ uptake_fragmentation. PMID 29142021
02/05	Michael (Young)	Thillaiappan et al (Colin Taylor) 2017 Nat Commun. Ca ²⁺ signals initiate at immobile IP3 receptors adjacent to ER-plasma membrane junctions. PMID: 29138405
02/26	Biophysics	Biophysical Society Meeting 2018
03/12	Mate	Filadi et al (Paola Pizzo) 2018 Curr Biol. TOM70 Sustains Cell Bioenergetics by Promoting IP3R3-Mediated ER to Mitochondria Ca ²⁺ Transfer. PMID: 29395920
04/09	Adam	Payne et al (Kevin Foskett) 2017 Cell Rep. MICU2 Restricts Spatial Crosstalk between InsP3R and MCU Channels by Regulating Threshold and Gain of MICU1-Mediated Inhibition and Activation of MCU. PMID: 29241542
04/23	Manan	Samanta et al (Anant Parekh) 2018 Nat Commun. Sequential forward and reverse transport of the Na ⁺ Ca ²⁺ exchanger generates Ca ²⁺ oscillations within mitochondria. PMID: 29323106
05/07	Erin	Benador et al (Orian Shirihi) 2018 Cell Metab. Mitochondria Bound to Lipid Droplets Have Unique Bioenergetics, Composition, and Dynamics that Support Lipid Droplet Expansion. PMID: 29617645
05/21	Tess (Cherlin)	Kaewsapsak et al (Alice Ting) 2017 eLife. Live-cell mapping of organelle-associated RNAs via proximity biotinylation combined with protein-RNA crosslinking. PMID: 29239719
06/04	RVS	Patron et al (Diego De Stefani) 2018 Cell Death Differ. MICU3 is a tissue-specific enhancer of mitochondrial calcium uptake. PMID: 29725115
06/18	Gyuri C	Mattie et al (Heidi McBride) 2018 JCB. A new mitofusin topology places the redox-regulated C terminus in the mitochondrial intermembrane space. PMID: 29212658
Break		
09/10	Gyuri H	Kamer et al (Vamsi Mootha) 2018 PNAS. MICU1 imparts the mitochondrial uniporter with the ability to discriminate between Ca ²⁺ and Mn ²⁺ . PMID: 30082385. & Wettmarshausen et al (Fabiana Perocchi) 2018 Cell Rep. MICU1 Confers Protection from MCU-Dependent Mn ²⁺ Toxicity. PMID: 30403999
09/24	Zuzana	Siegmund et al (Zachary Freyberg) 2018 iScience. 3D Analysis of Mitochondrial Crista Ultrastructure in a Patient with Leigh Syndrome by In Situ Cryoelectron Tomography. PMID: 30240627
10/15	Steve Hurst	Parks et al (Tish Murphy) 2018 Cardiovasc Res. Cyclophilin D-mediated regulation of the permeability transition pore is altered in mice lacking the mitochondrial calcium uniporter. PMID: 30165576
10/22	Dave Booth	Shanmughapriya et al (Madhesh) 2018 Nat Commun. FOXD1-dependent MICU1 expression regulates mitochondrial activity and cell differentiation. PMID: 30158529
11/05	Piyush	Huang et al. 2017 Cancer Lett. Mitochondrial fission forms a positive feedback loop with cytosolic calcium signaling pathway to promote autophagy in hepatocellular carcinoma cells. PMID: 28624623
11/19	Sergio	Hamilton et al (Nickolay Brustovetsky) 2018 JBC. Deletion of mitochondrial calcium uniporter incompletely inhibits calcium uptake and induction of the permeability transition pore in brain mitochondria. PMID: 30154242
12/10	Shamim	Chin et al (Grant Dewson) 2018 Nat Commun. VDAC2 enables BAX to mediate apoptosis and limit tumor development. PMID: 30478310

Thanks to Gyuri Csordas for the excellent organization!



MitoCircle

MitCare Center for Mitochondrial Imaging Research and Diagnostics
Department of Pathology, Anatomy and Cell Biology
Thomas Jefferson University

Location: MitoCare Center, Jefferson Alumni Hall Suite 527, 1020 Locust St.
Day/Time: Thursday, 9:30 AM (unless otherwise indicated)

Winter-Spring 2018

- Jan. 18 **Walter Koch, Ph.D.**, William Wikoff Smith Endowed Chair in Cardiovascular Medicine; Professor and Chair, Pharmacology; Professor and Director, Center for Translational Medicine, Lewis Katz School of Medicine, Temple University
Title: "Targeting GRK2 in the Failing Heart"
Time: 11:00 AM
- Feb. 1 **Martin Picard, Ph.D.**, Assistant Professor, Department of Psychiatry, Columbia University Medical Center
Title: "Origin and three-dimensional spreading of mutant Mitochondria in human skeletal muscle"
- Mar. 1 **Jyoti Jaiswal, Ph.D.**, Principal Investigator, Children's National Health System; Associate Professor, George Washington University School of Medicine and Health Sciences
Title: "How Mito Cares for the Injured Cell Membrane"
- Apr. 12 **Verónica Eisner, Ph.D.**, Assistant Professor, Dept. of Cellular and Molecular Biology, Pontificia Universidad Católica de Chile
Title: TBA
- May 3 **Erika Holzbaur, Ph.D.**, William Maul Measey Professor of Physiology, Perelman School of Medicine, University of Pennsylvania
Title: TBA



Seminars of the year:

Fall 2018

- Sept. 17 **John Elrod, Ph.D.**, Associate Professor, Temple University, Center for Translational Medicine
Title: "Mitochondrial calcium dynamics and heart failure"
Time: 4pm
- Oct. 29 **Melanie Paillard, Ph.D.**, Research Scientist, INSERM, Cardioprotection Group, Lyons, France
Title: "Altered reticulum-mitochondria interactions lead to mitochondrial Ca²⁺ signaling dysfunction in the diabetic mouse heart"
- Nov. 19 **Jerry Chipuk, Ph.D.**, Associate Professor, Department of Oncological Sciences, Icahn School of Medicine, Mount Sinai, NY
Title: "Mitochondrial control of cancer: causes and consequences"
Time: 11AM
- Dec. 17 **Zarazuela Zolkipli-Cunningham, M.D.**, Attending Physician, Center for Mitochondrial and Epigenomic Medicine, CHOP
Title: "Novel approach to defining mitochondrial myopathy phenotype"
Time: 11AM

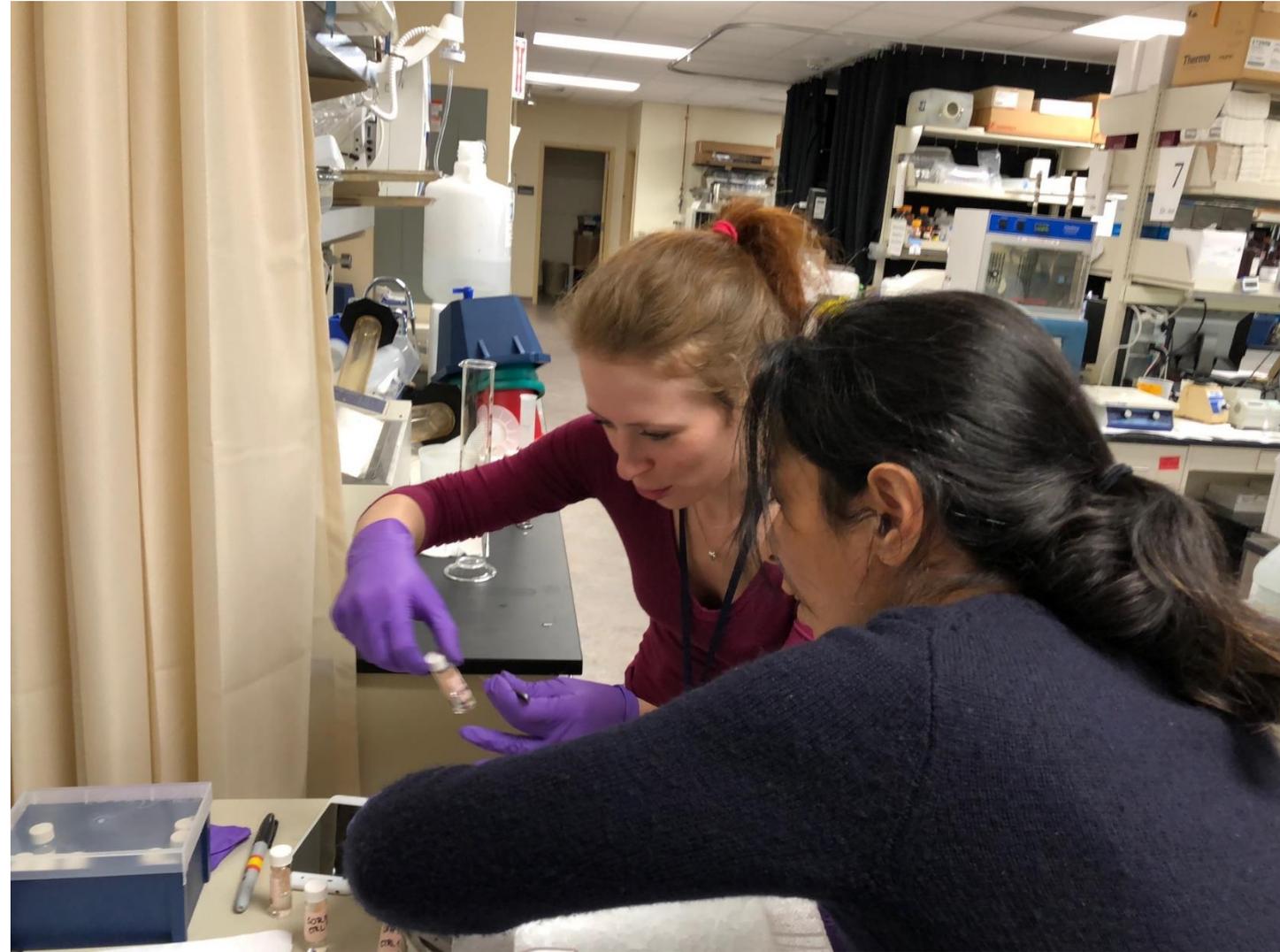


Thanks to Erin for the seamless organization!

MitoCare @ Super Bowl Parade Feb 9 2018!



More SuperBowl Parade





Mitochondria

February 4-8, 2018

The David Lopatie Conference Centre
Weizmann Institute of Science

Topics

- Mitochondrial proteome and lipidome
- Mitochondrial dynamics
- Mitochondrial channels
- Mitochondrial carriers & Mitophagy
- Mitochondrial metabolism
- Mitochondrial metabolism of stem cells
- Mitochondrial DNA
- Mitochondria-to-nucleus communication
- Mitochondria-to-other organelle communication
- Mitochondrial UPR

Organizers

Atan Gross
Weizmann Institute of Science
György Hajnóczky
Thomas Jefferson University, USA

Registration

www.weizmann.ac.il



Speakers

Abdussalam Azem, Tel Aviv	Jodi Nunnari, Davis
Andrew Dillin, Berkeley	Johan Auwerx, Lausanne
Anu Wartiovaara, Helsinki	Johannes Herrmann, Kaiserslautern
Ann Saada, Jerusalem	John M. Denu, Madison
Atan Gross, Rehovot	Luca Scorrano, Padova
Ayelet Erez, Rehovot	Maya Schuldiner, Rehovot
Christian Frezza, Cambridge	Mike Forte, Portland
Eli Arama, Rehovot	Navdeep Chandel, Chicago
Eyal Gottlieb, Haifa	Nika Danial, Boston
Gad Asher, Rehovot	Nikolaus Pfanner, Freiburg
Gerry Shadel, New Haven	Ophry Pines, Jerusalem
Gia Voeltz, Boulder	Orian Shirihai, Los Angeles
György Hajnóczky, Philadelphia	Paolo Bernardi, Padova
Hartmut Geiger, Ulm	Paul Frenette, New York
Heidi McBride, Montreal	Richard Youle, Bethesda
Janine Santos, Research Triangle Park	Thomas Langer, Cologne
Jared Rutter, Salt Lake City	Tsvee Lapidot, Rehovot
Jean-C. Martinou, Geneva	Varda S. Barmatz, Beer-Sheva

Coordinator & Accessibility Issues

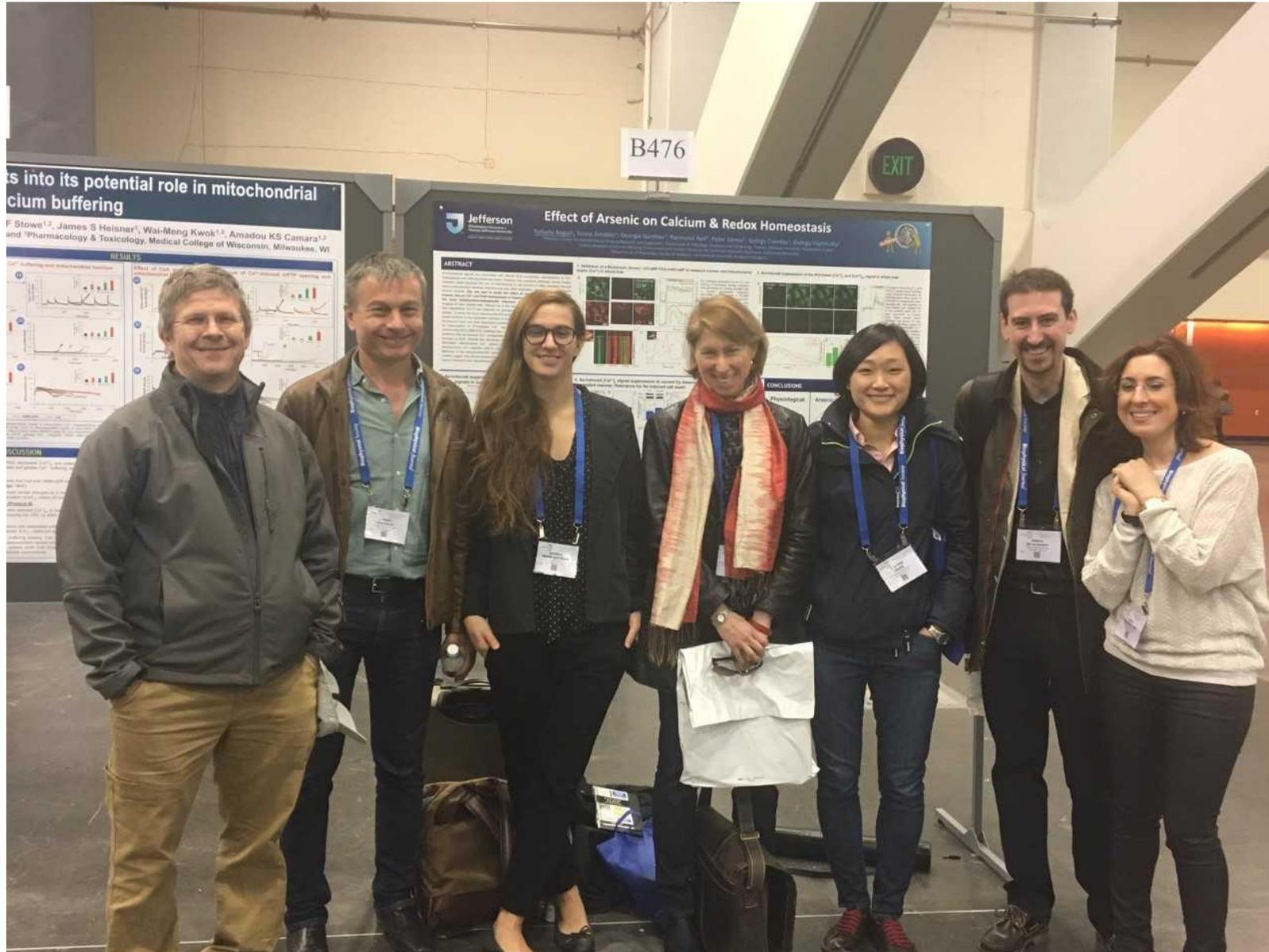
Reut Hershenhoren
reut.hershenhoren@weizmann.ac.il

Supported by

The Chorafas Institute for Scientific Exchange Supported by
Nikken Sohonsa Corp.

At the same time in Israel!

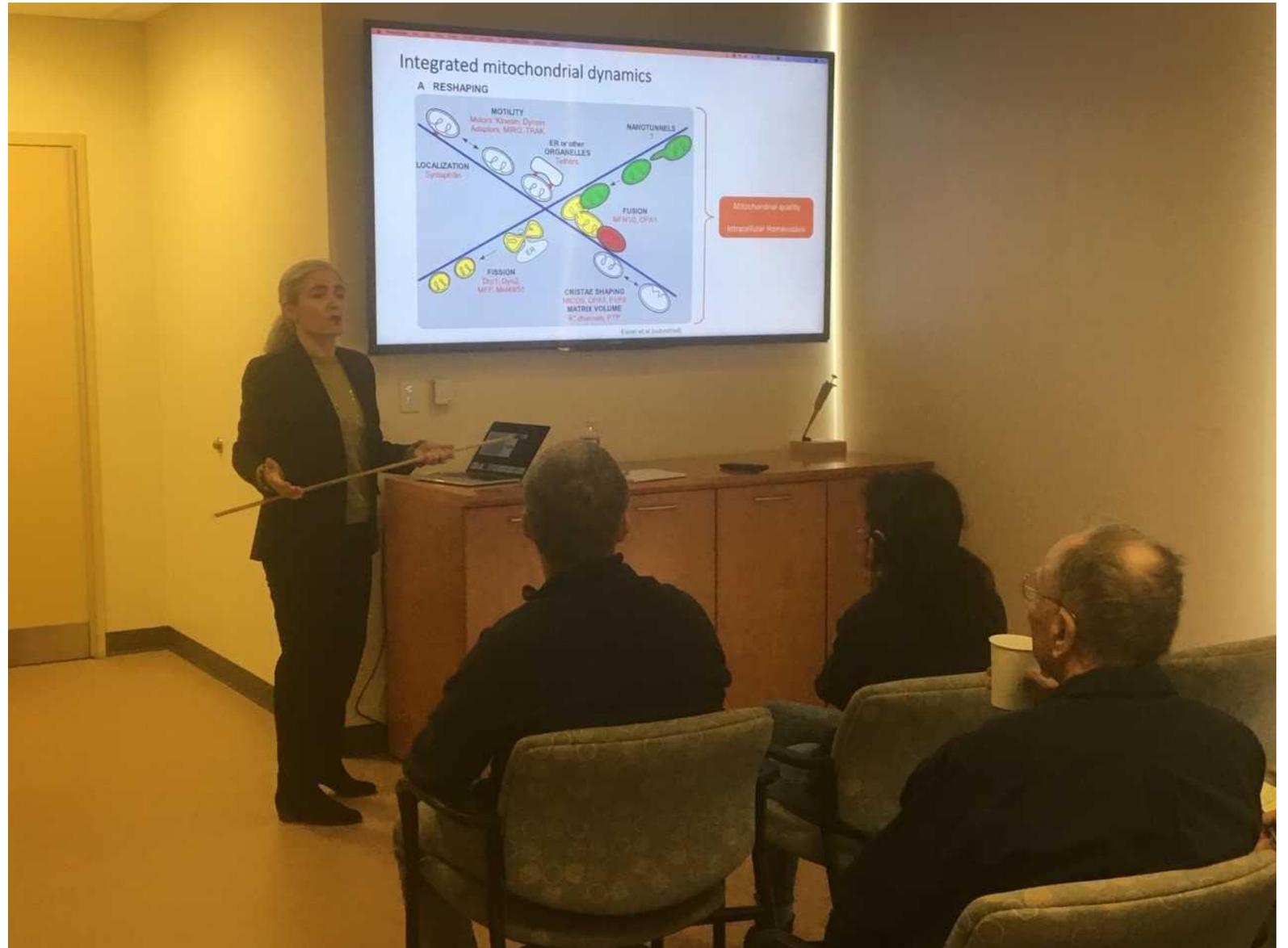
2018 Biophysical Society Meeting, San Francisco



Biophysics HotPot feast



Veronica Eisner returns for a MitoCircle presentation on Mitochondrial dynamics & disease and collaboration



Taste of Chile: Pisco Sour with Veronica and Ben (April 2018)



Group photo with Veronica and Ben



Broad Street 10 miler..... last one for Kai & Adam



Thanks to Erika & Adam for the brilliant utilization of the Philly highlights in the cristae!
(look at closely the mitochondrion in the front of the T shirt)

New NIH grants:

Gyuri H, John Elrod, Erin and Joe

Notice of Award

Federal Award Date: 04/19/2018

RESEARCH

Department of Health and Human Services
National Institutes of Health

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Grant Number: 1R01HL142271-01

FAIN: R01HL142271

Principal Investigator(s):

John William Elrod, PHD
Gyorgy Hajnoczky (contact), MD

Project Title: Molecular composition of the mitochondrial calcium uniporter and cardiac pathophysiology

Mrs Johnston, Jeanmarie
Assistant to the Director
125 S. 9th Street
Philadelphia, PA 191075125

Award e-mailed to: resadmin@jefferson.edu

Period Of Performance:

Budget Period: 05/01/2018 – 02/28/2019

Project Period: 05/01/2018 – 02/28/2022

Gyuri H, Shamim

Notice of Award

Federal Award Date: 05/22/2018

RESEARCH

Department of Health and Human Services
National Institutes of Health

NATIONAL CANCER INSTITUTE

Grant Number: 1R01CA216254-01A1

FAIN: R01CA216254

Principal Investigator(s):

Gyorgy Hajnoczky, MD

Project Title: (PQ5) Relevance of VDAC2 heterogeneity for hepatic tumor growth and targeting

Mrs. Jeanmarie Johnston
Admin Assistant I
125 S. 9th Street
Philadelphia, PA 191075125

Award e-mailed to: resadmin@jefferson.edu

Period Of Performance:

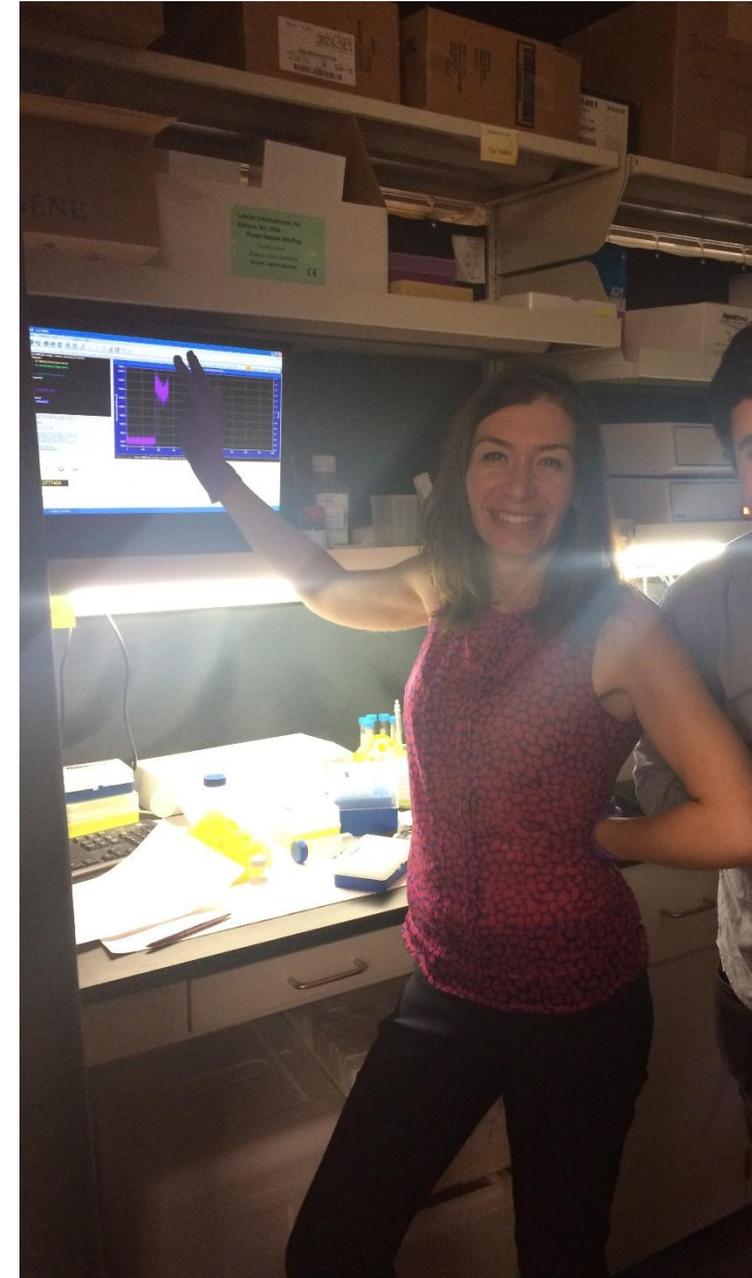
Budget Period: 05/22/2018 – 04/30/2019

Project Period: 05/22/2018 – 04/30/2023

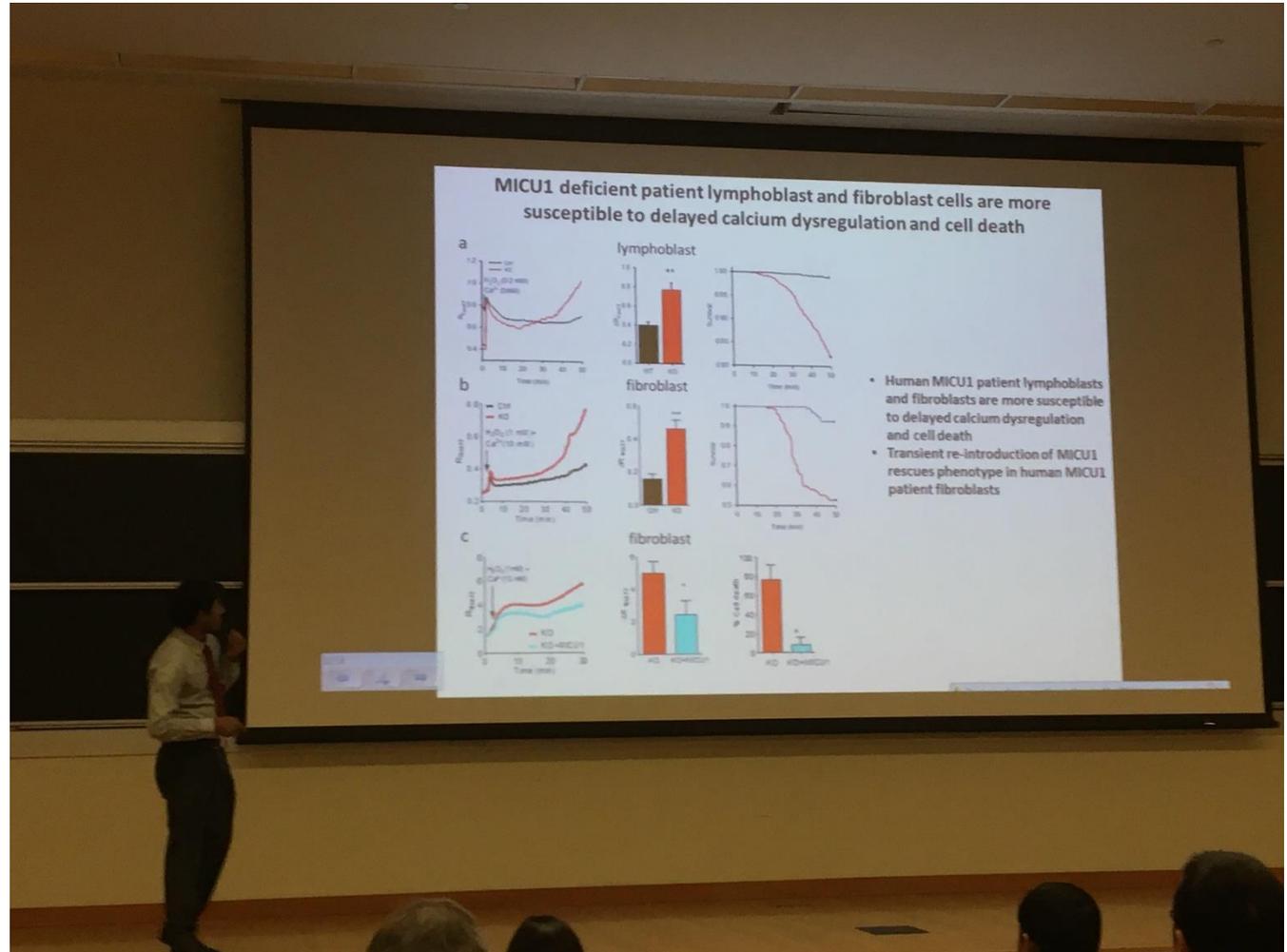
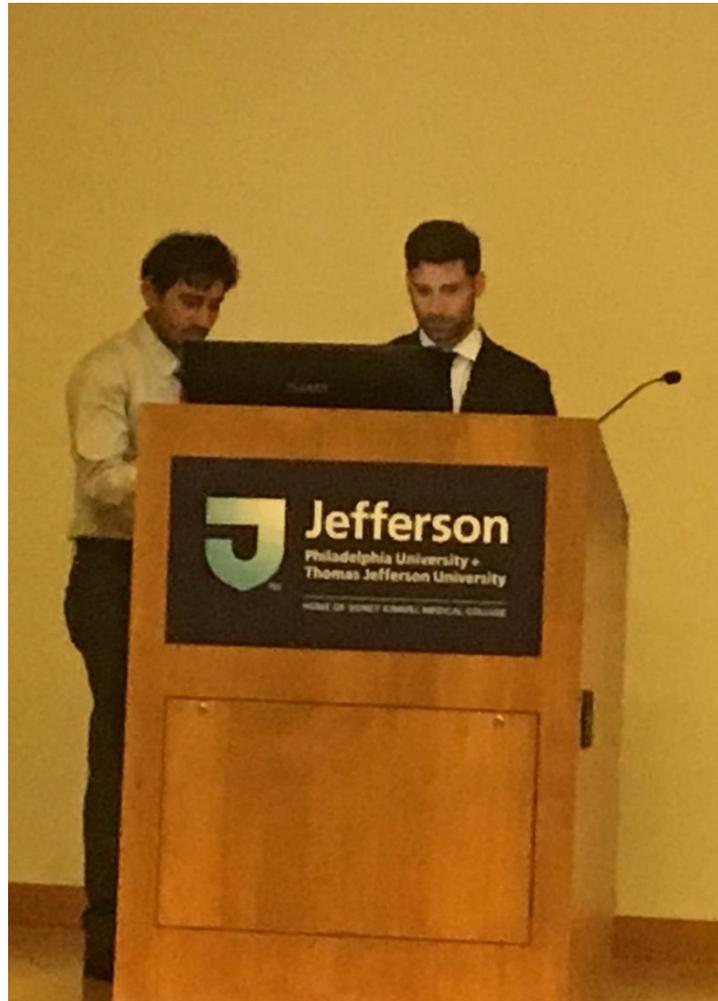
Lauren's medical school graduation



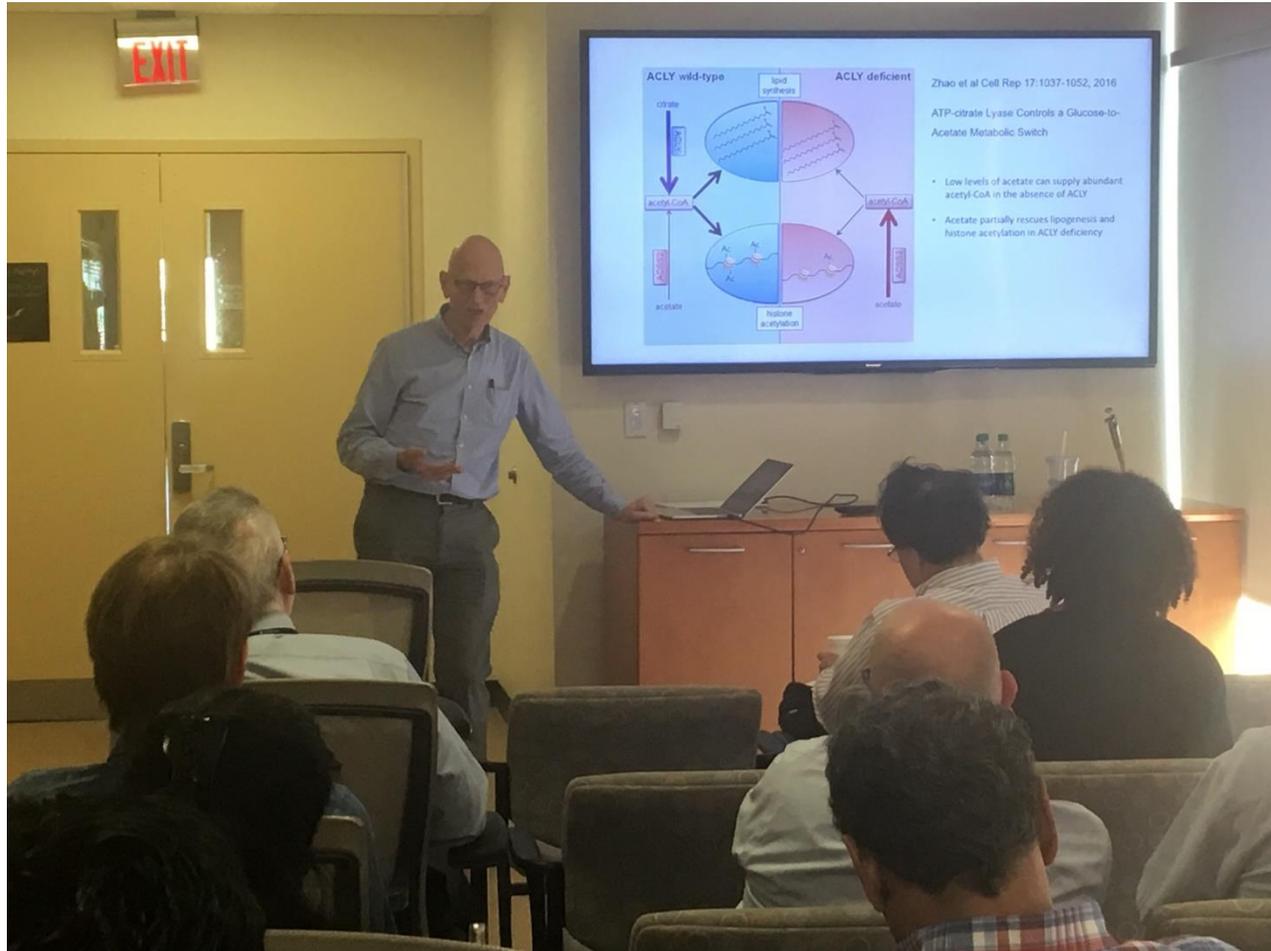
PTI Ca²⁺ transfer
from one
generation to the next
(June 2018)



One talk, two speakers: Adam & Raghavendra at the Jefferson Postdoctoral Symposium



A familiar speaker and the subject of his talk



Commentary

Introduction to the Virtual Issue Alcohol and Epigenetic Regulation: Do the Products of Alcohol Metabolism Drive Epigenetic Control of Gene Expression in Alcohol-Related Disorders?

Rajanikanth Vadigepalli ✉, Jan B. Hoek

Vale's good bye.... Thanks for the 5 years!



Kai's diligent closing of her projects before starting graduate school

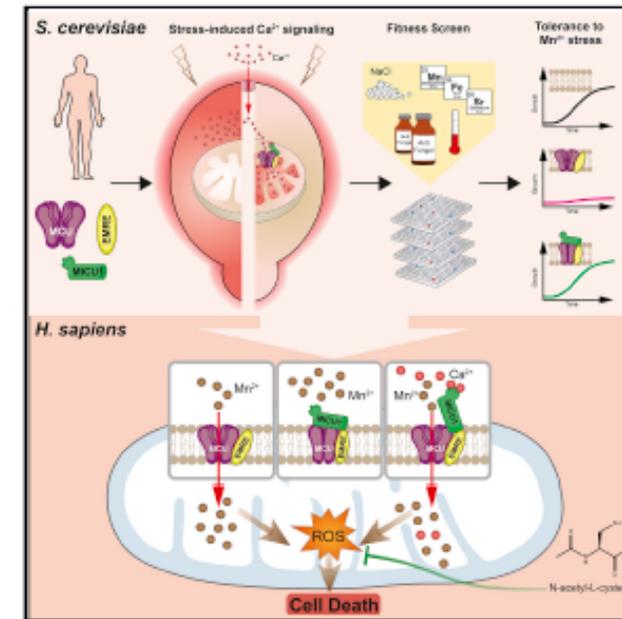


Cell Reports

report

MICU1 Confers Protection from MCU-Dependent Manganese Toxicity

Graphical Abstract



Authors

Jennifer Wetmarshausen, Valerie Goh, Kai-Ting Huang, ..., Dejana Mokranjac, György Hajnóczky, Fabiana Perocchi

Correspondence

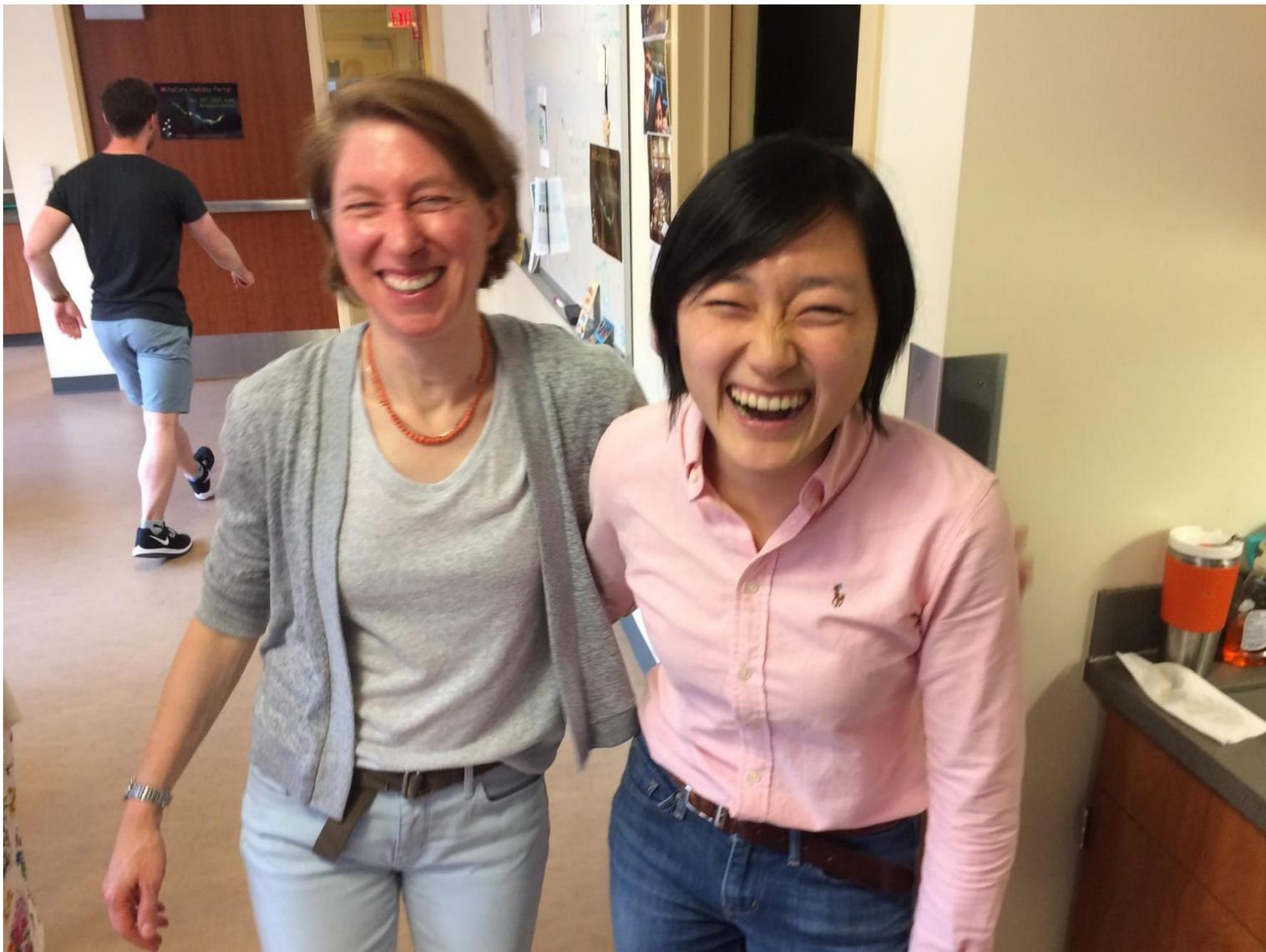
fabiana.perocchi@helmholtz-muenchen.de

In Brief

Wetmarshausen et al. develop a synthetic biology approach for *in vivo* dissection of functional interconnections between components of the mitochondrial calcium uniporter channel. They demonstrate an essential role of MICU1 in regulating MCU ion selectivity, finding that MICU1 prevents MCU-mediated Mn^{2+} overload and protects from Mn^{2+} -induced cell death.

One of the final efforts

Kai good bye June 7 2018



Help for the MitoCare mice: training of Viki and Nikki by Aish



Reviews of mitochondrial matters

Trends in Cell Biology

CellPress
REVIEWS

Review

Endoplasmic Reticular–Mitochondrial Contactology: Structure and Signaling Functions

György Csordás,^{1,*} David Weaver,^{1,*} and György Hajnóczky^{1,*}

nature
cell biology

FOCUS | REVIEW ARTICLE

<https://doi.org/10.1038/s41556-018-0133-0>

Mitochondrial dynamics in adaptive and maladaptive cellular stress responses

Verónica Eisner¹, Martin Picard² and György Hajnóczky^{3*}

Mitochondria sense and respond to many stressors and can support cell survival or death through energy production and signalling pathways. Mitochondrial responses depend on fusion–fission dynamics that dilute and segregate damaged mitochondria. Mitochondrial motility and inter-organellar interactions, such as with the endoplasmic reticulum, also function in cellular adaptation to stress. In this Review, we discuss how stressors influence these components, and how they contribute to the complex adaptive and pathological responses that lead to disease.

The first successful recording of the uniporter current in mitoplasts by Adam in MitoCare



Closing out the UO1 alcohol project with Joaquim in Barcelona



Great news for Gyuri C & Shey:



RESEARCH
Department of Health and Human Services
National Institutes of Health

Notice of Award

Federal Award Date: 08/10/2018

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Grant Number: 1R01HL142864-01
FAIN: R01HL142864

Principal Investigator(s):
GYORGY CSORDAS, MD
Shey-Shing Sheu (contact), PHD

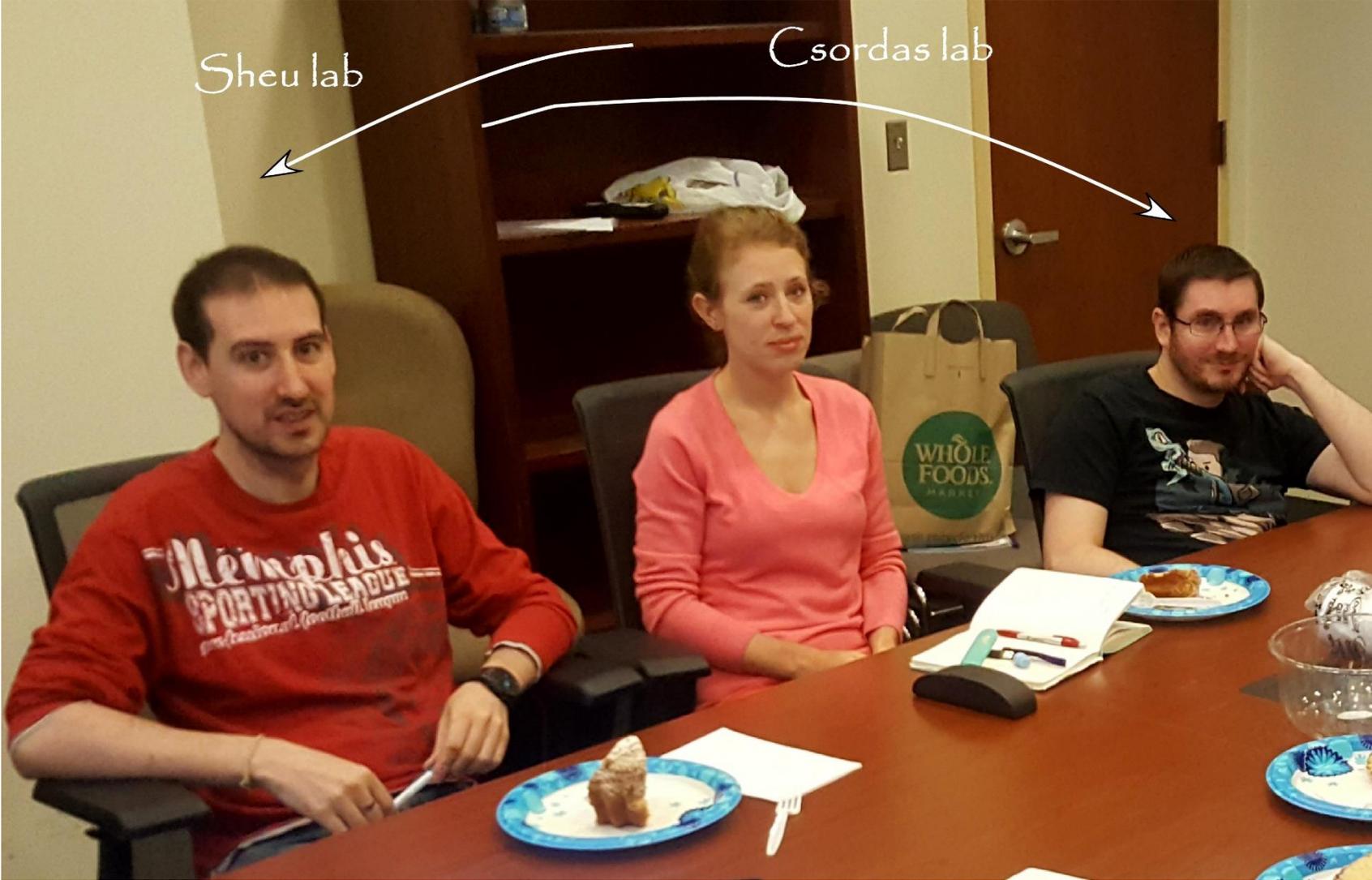
Project Title: Structural-functional zoning of the mitochondrion in cardiac Ca²⁺, ROS, and energetics regulation

Margaret Burwell
Associate Director, Pre-Award
Office of Research Administration
125 South 9th Street
Philadelphia, PA 191075125

Award e-mailed to: resadmin@jefferson.edu

Period Of Performance:
Budget Period: 08/15/2018 – 04/30/2019
Project Period: 08/15/2018 – 04/30/2022

Trading places:



Raghavendra's wedding:



Expanded Erin Lab (July 2018)



Rafaela's farewell:



Review and research article on Alcohol:



Review

Epidemiology of Moderate Alcohol Consumption and Breast Cancer: Association or Causation?

Samir Zakhari ^{1,*} and Jan B. Hoek ^{2,*}

Naghdi et al. *Cell Death and Disease* (2018)9:1028
DOI 10.1038/s41419-018-1070-3

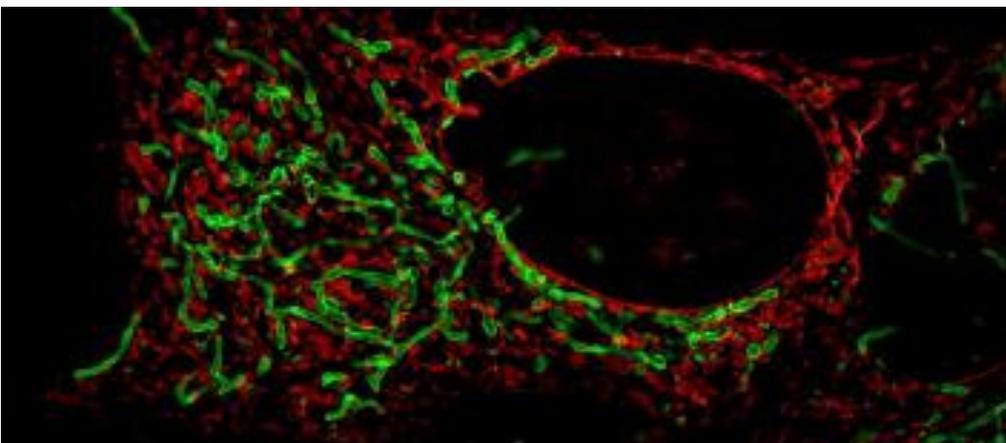
Cell Death & Disease

ARTICLE

Open Access

Mitochondrial fusion and Bid-mediated mitochondrial apoptosis are perturbed by alcohol with distinct dependence on its metabolism

Shamim Naghdi¹, William S. Slovinsky¹, Muniswamy Madesh¹, Emanuel Rubin¹ and György Hajnóczky¹ 



EMBO Workshop Membrane Contact Sites in Health and Disease

21-25 September Arosa, Switzerland



SESSION 8 REDOX AT MEMBRANE CONTACT SITES. Chair: T. Simmen

19:15: Michael Schrader, Exeter, UK

Peroxisome-organelle contacts in mammals – implications for health and disease

19:40: Petar Kim, Toronto, CAN

Oxysterol-binding protein-related proteins at the Peroxisome contact sites.

Short Talks

20:05: György Ceordas, Philadelphia, USA

Arsenic Targets Local ROS and Calcium Homeostasis at the Mitochondria-ER interface

SESSION 9 CALCIUM. Chair: N. Demaurex

16:30: György Hajnoczky, Philadelphia, USA

Calcium and ROS nanodomain signaling at the ER-mitochondrial contacts



Joe's resilience with JBC paid out!

JBC ARTICLE

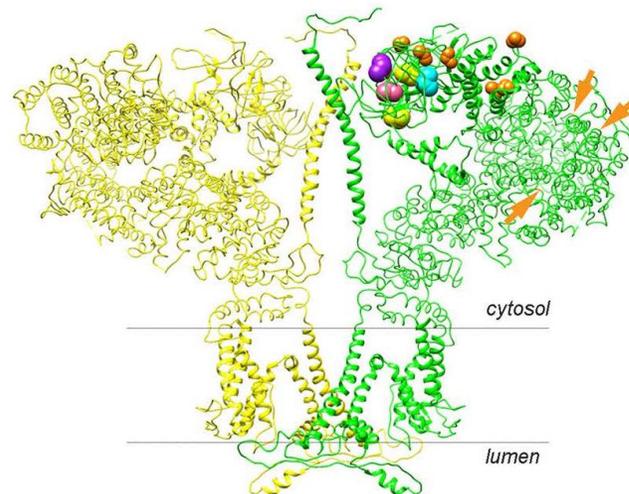


Redox regulation of type-I inositol trisphosphate receptors in intact mammalian cells

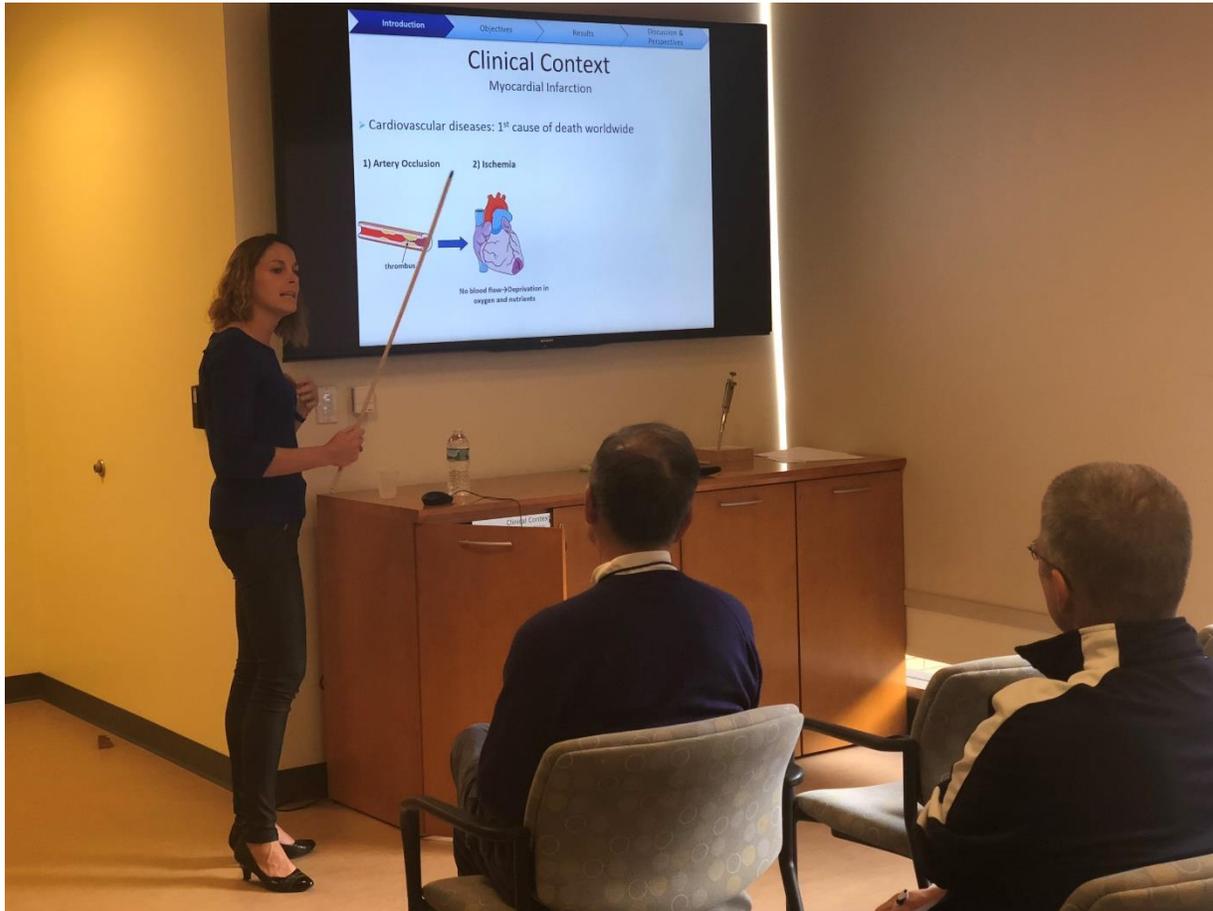
Received for publication, August 31, 2018, and in revised form, September 9, 2018. Published, Papers in Press, September 18, 2018, DOI 10.1074/jbc.RA118.005624

Suresh K. Joseph^{‡1}, Michael P. Young[‡], Kamil Alzayady[§],  David I. Yule[§], Mehboob Ali¹, David M. Booth[‡], and György Hajnóczky[‡]

From the [‡]MitoCare Center, Department of Pathology, Anatomy, and Cell Biology, Thomas Jefferson University, Philadelphia, Pennsylvania 19107, the [§]Department of Pharmacology & Physiology, University of Rochester, Rochester, New York 14642, and the ¹Center for Perinatal Research, Research Institute, Nationwide Children's Hospital, Columbus, Ohio 43205



Melanie, Ludo and family return for presentation and meeting friends

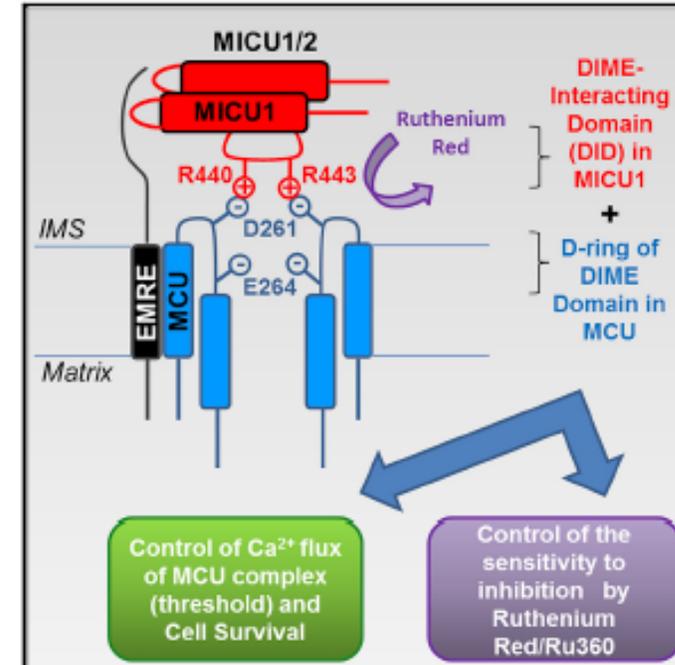


Molecular Cell

Short Article

MICU1 Interacts with the D-Ring of the MCU Pore to Control Its Ca^{2+} Flux and Sensitivity to Ru360

Graphical Abstract



Authors

Melanie Paillard, György Csordás, Kai-Ting Huang, Peter Várnai, Suresh K. Joseph, György Hajnóczky

Correspondence

gyorgy.hajnoczky@jefferson.edu

In Brief

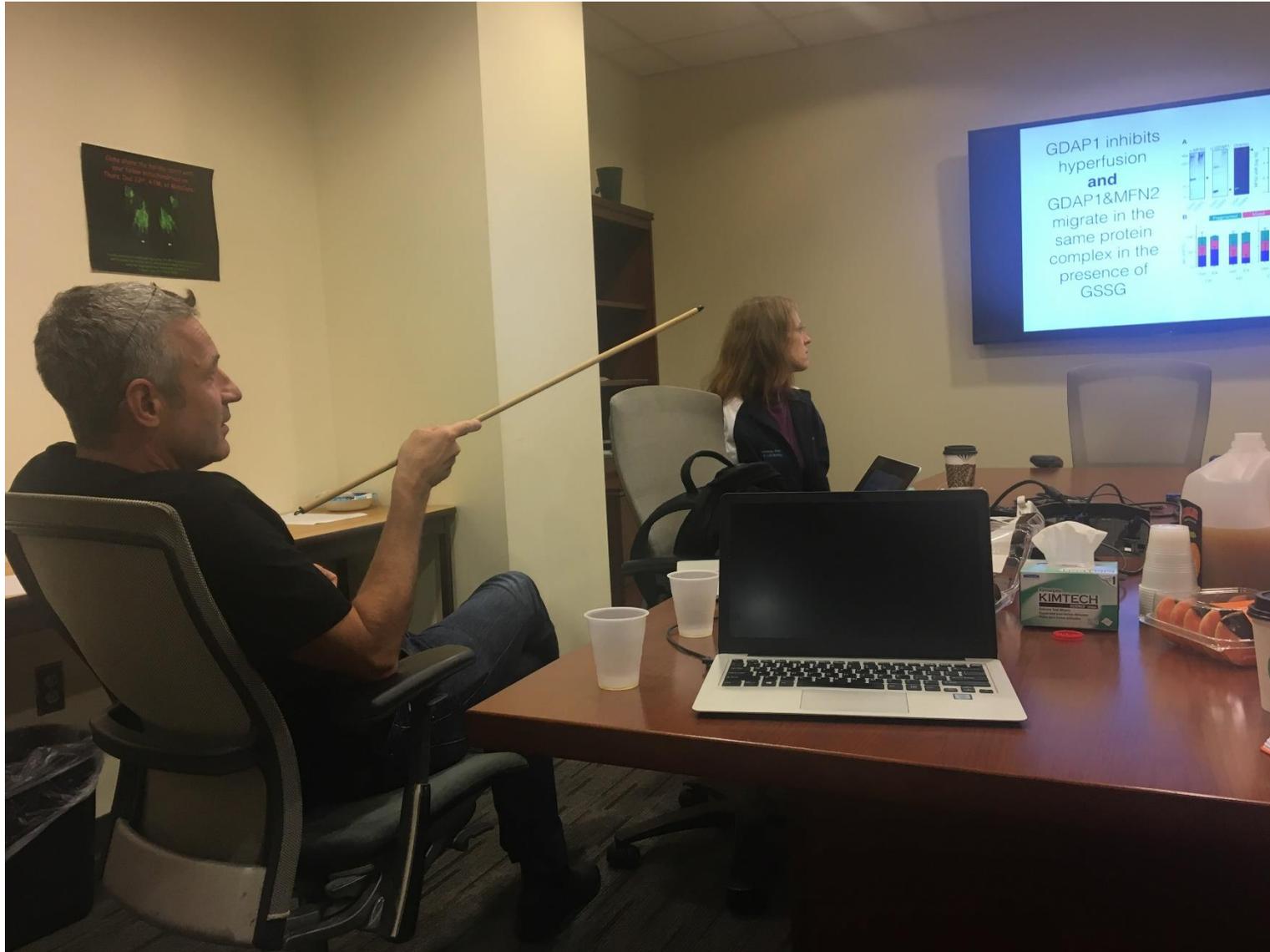
Paillard et al. report that mitochondrial Ca^{2+} uptake 1 (MICU1) interacts with the D-ring of MCU, the pore-forming protein of the mitochondrial Ca^{2+} uniporter, through a DIME interacting domain involving the arginines 440 and 443 to control both the Ca^{2+} flux and the ruthenium red sensitivity of the MCU complex.

Melanie visit Oct 2018





Axel Methner (Mainz) visits to talk about Calcium & Mitochondrial Diseases



Adam Goodbye Nov 21 2018

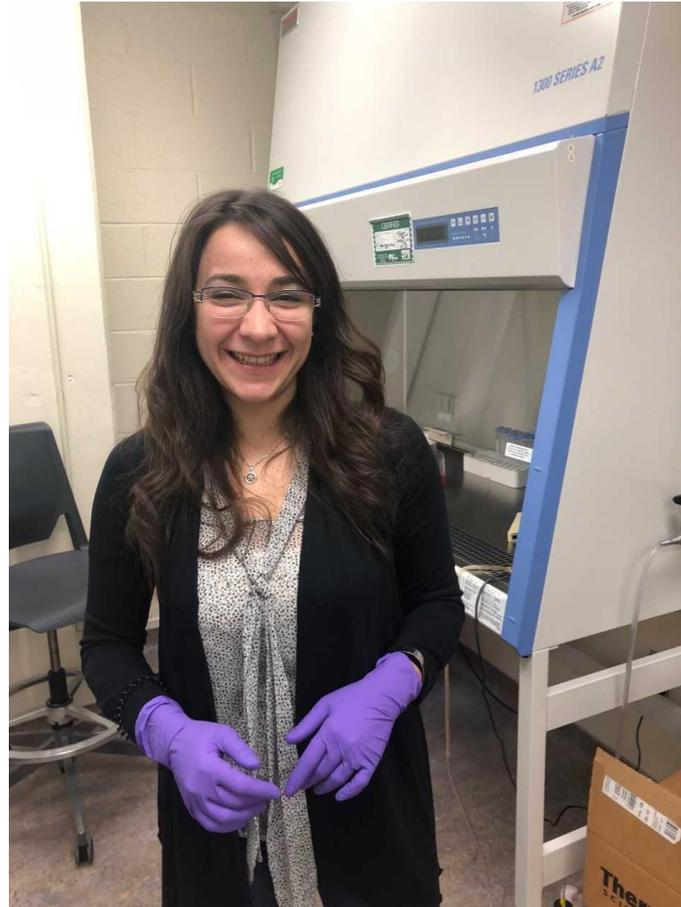


Palinka drinking:

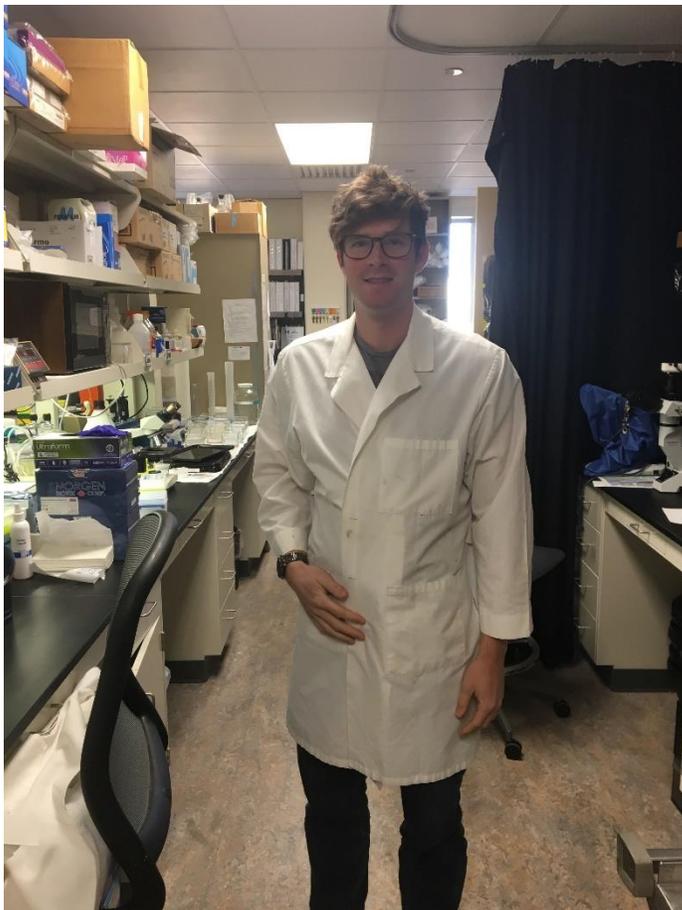


And the 2018 Enhancement of our team:

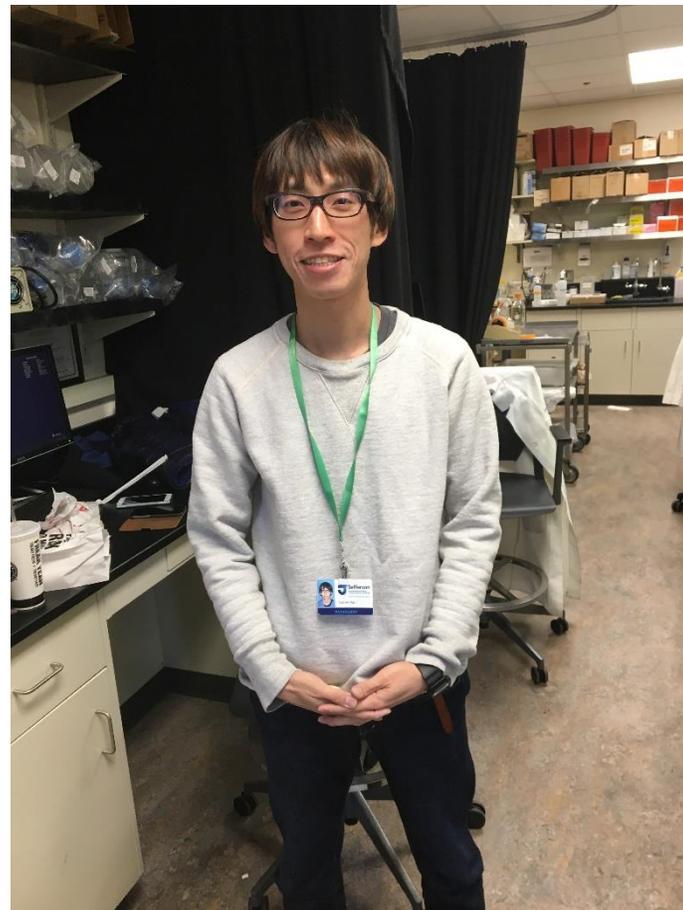
Pyush Macarena Elena



David



Toshiki



Preparation for the Paella Feast of the Holidays



A Happy and
Productive
2019!
from
Mit⑈Care

