

# NOX Family NADPH Oxidases

*Gordon Research Conference*

NOX as Center of Redox Communication in Health and Disease

May 27 - June 1, 2018

Les Diablerets Conference Center

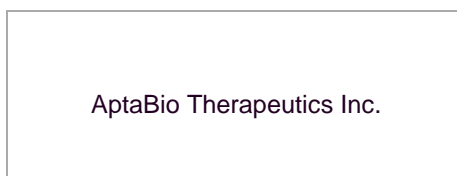
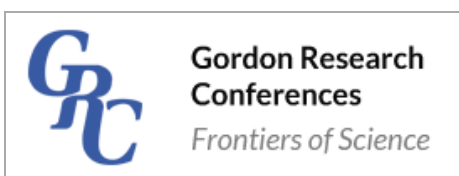
Les Diablerets, Switzerland

Chair: Ulla G. Knaus

Vice Chair: Albert Van Der Vliet

## Contributors

---



# Meeting Program

---

## Sunday

- 4:00 pm - 8:00 pm Arrival and Check-in
- 6:00 pm Dinner
- 7:30 pm - 7:40 pm Welcome / Introductory Comments by GRC Site Staff
- 7:40 pm - 9:30 pm **Intracellular Communication via ROS: Insights into Mitochondria**
- Discussion Leader: **Albert Van Der Vliet** (University of Vermont, USA)
- 7:40 pm - 7:50 pm Opening Remarks
- 7:50 pm - 8:00 pm Introduction by Discussion Leader
- 8:00 pm - 8:25 pm **Alicia Kowaltowski** (Universidade de Sao Paulo, Brazil)  
"Mitochondria, Dietary Interventions and Oxidants"
- 8:25 pm - 8:30 pm Discussion
- 8:30 pm - 8:55 pm **Fabio Di Lisa** (University of Padova, Italy)  
"Sources and Targets of Mitochondrial ROS Formation in Cardiac Pathophysiology"
- 8:55 pm - 9:00 pm Discussion
- 9:00 pm - 9:25 pm **Valentin Cracan** (Harvard Medical School / Massachusetts General Hospital, USA)  
"Genetically Encoded Tools for Compartment-Specific Manipulation of NAD<sup>+</sup>/NADH and NADP<sup>+</sup>/NADPH Ratios in Living Cells"
- 9:25 pm - 9:30 pm Discussion

## Monday

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **NOX Back to Basics: Bridging Knowledge for the Future**
- Discussion Leader: **Robert Clark** (University of Texas Health Science Center at San Antonio, USA)
- 9:00 am - 9:10 am Introduction by Discussion Leader
- 9:10 am - 9:30 am **Susan Smith** (Kennesaw State University, USA)  
"NOX Structure from Models to Crystals and Back"
- 9:30 am - 9:40 am Discussion
- 9:40 am - 10:00 am **Hideki Sumimoto** (Kyushu University, Japan)  
"Localization, Regulation and Function of NOX Family Oxidases"
- 10:00 am - 10:10 am Discussion

- 10:10 am - 10:30 am **Edgar Pick** (Tel Aviv University, Israel)  
"The N-Terminal SH3 Domain of p67-Phox: An Orphan Region in Search of a Ligand"
- 10:30 am - 10:40 am Discussion
- 10:40 am - 11:05 am Coffee Break
- 11:05 am - 11:15 am Introduction by Discussion Leader
- 11:15 am - 11:30 am **Vincent Jaquet** (University of Geneva, Switzerland)  
"How to Measure NOX Activity and Validate NOX Inhibitors"
- 11:30 am - 11:40 am Discussion
- 11:40 am - 11:55 am **Katrin Schröder** (Goethe University Frankfurt, Germany)  
"Advantages and Challenges of Membrane Assay Systems to Measure ROS"
- 11:55 am - 12:05 pm Discussion
- 12:05 pm - 12:20 pm **Becky Diebold** (Emory University, USA)  
"Detecting NADPH Oxidases by PCR and Western Blots: Not So Simple"
- 12:20 pm - 12:30 pm Discussion
- 12:30 pm Group Photo / Lunch
- 1:30 pm - 4:30 pm Free Time
- 4:30 pm - 6:00 pm Poster Session
- 6:00 pm - 8:00 pm **From Structural Mechanisms to NOX Drug Development**  
Discussion Leader: **Susan Smith** (Kennesaw State University, USA)
- 6:00 pm - 6:25 pm **Andrea Mattevi** (University of Pavia, Italy)  
"Looking at the Three-Dimensional Structure of NOX"
- 6:25 pm - 6:35 pm Discussion
- 6:35 pm - 6:55 pm **Marie Erard** (University of Paris-Saclay, UMR 8000, CNRS, France)  
"The Cytosolic Complex of the Phagocyte NADPH Oxidase: From Quantitative Live Cell Imaging to 3D Model"
- 6:55 pm - 7:00 pm Discussion
- 7:00 pm - 7:20 pm **Franck Fieschi** (Université Grenoble Alpes, France)  
"NOX-Related Membrane Proteins and the Prokaryotic World"
- 7:20 pm - 7:25 pm Discussion
- 7:25 pm - 7:50 pm **Philippe Wiesel** (Genkyotex SA, Switzerland)  
"Targeting Inflammatory Pain and Angiogenesis with the Selective NOX1 Inhibitor GKT771"
- 7:50 pm - 8:00 pm Discussion
- 8:00 pm Dinner

## Tuesday

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **ROS Signaling and Networking**
- Discussion Leader: **Miklós Geiszt** (Semmelweis University, Hungary)
- 9:00 am - 9:25 am **Harald Schmidt** (Maastricht University, The Netherlands)  
"Systems Medicine of ROS-Related Diseases"
- 9:25 am - 9:35 am Discussion
- 9:35 am - 10:00 am **Melissa Kemp** (Georgia Institute of Technology / Emory University, USA)  
"NOX Activity in Systems Biology Modeling of Redox Signaling and Metabolism"
- 10:00 am - 10:10 am Discussion
- 10:10 am - 10:40 am Coffee Break
- 10:40 am - 11:05 am **Nancy Hynes** (Friedrich Miescher Institute for Biomedical Research, Switzerland)  
"Memo1, a Redox Protein with Roles in Aging and in Cancer"
- 11:05 am - 11:15 am Discussion
- 11:15 am - 11:35 am **Fabian Hahner** (Universitätsklinikum Frankfurt, Germany)  
"The NADPH Oxidase NOX4 Promotes Endothelial Differentiation"
- 11:35 am - 11:45 am Discussion
- 11:45 am - 11:55 am **Lucia Lopes** (University of Sao Paulo, Brazil)  
"Redox Activation of NOX1 Involves an Intermolecular Disulfide Bond Between Protein Disulfide Isomerase and p47phox in Vascular Smooth Muscle Cells"
- 11:55 am - 12:00 pm Discussion
- 12:00 pm - 12:10 pm **Yukio Nishimoto** (Chubu University, Japan)  
"Constitutively Active NADPH Oxidase 4 Functions as a Hydrogen Peroxide Sensor"
- 12:10 pm - 12:15 pm Discussion
- 12:15 pm - 12:25 pm **Isabel Fabregat** (Bellvitge Biomedical Research Institute (IDIBELL), Spain)  
"Dissecting the Role of the NADPH Oxidase NOX4 During Liver Regeneration"
- 12:25 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:30 pm Free Time
- 4:30 pm - 6:00 pm Poster Session

6:00 pm - 8:00 pm

## Hallmarks of NOX Function - Immunity and Inflammation

Discussion Leader: **Nancy Hynes** (Friedrich Miescher Institute for Biomedical Research, Switzerland)

6:00 pm - 6:25 pm

**Yun Soo Bae** (Ewha Womans University, South Korea)  
"Regulation of NOX Activity by TLR in Inflammation"

6:25 pm - 6:35 pm

Discussion

6:35 pm - 7:00 pm

**Rikard Holmdahl** (Karolinska Institutet, Sweden)  
"ROS Regulation of Autoimmune Disease"

7:00 pm - 7:10 pm

Discussion

7:10 pm - 7:35 pm

**Harry Malech** (National Institute of Allergy and Infectious Diseases, NIH, USA)  
"Progress Towards CRISPR Mediated Gene Editing Correction of Chronic Granulomatous Disease in Patient CD34+ Hematopoietic Stem Cells"

7:35 pm - 7:45 pm

Discussion

7:45 pm - 7:55 pm

**Marie Jose Stasia** (Université Grenoble Alpes, France)  
"Downregulation of NOX2 Activity in Phagocytes Mediated by ATM Kinase Dependent Phosphorylation"

7:55 pm - 8:00 pm

Discussion

8:00 pm

Dinner

## Wednesday

7:30 am - 8:30 am

Breakfast

9:00 am - 12:30 pm

## ROS as Key Player in Interkingdom Crosstalk at Barriers

Discussion Leader: **Marie Jose Stasia** (Université Grenoble Alpes, France)

9:00 am - 9:05 am

Introduction by Discussion Leader

9:05 am - 9:30 am

**Gerard Clarke** (University College Cork, Ireland)  
"Crosstalk in the Microbiome-Gut-Brain Axis and Host Behavior: Focus on Microbial Regulation of Tryptophan Metabolism"

9:30 am - 9:40 am

Discussion

9:40 am - 10:05 am

**Helmut Grasberger** (University of Michigan, USA)  
"DUOX in Gut Health and Disease"

10:05 am - 10:15 am

Discussion

10:15 am - 10:40 am

Coffee Break

10:40 am - 11:05 am

**Kim Orth** (Howard Hughes Medical Institute / University of Texas Southwestern Medical Center, USA)  
"*Vibrio*: Subverting ROS for Survival and Proliferation in a Host Cell"

11:05 am - 11:15 am

Discussion

11:15 am - 11:35 am

**Silvia Cellone Trevelin** (King's College London, United Kingdom)  
"Regulatory T Cells Deficient in NOX2 Limit Angiotensin II-Induced Hypertension and Cardiovascular Remodeling"

11:35 am - 11:45 am

Discussion

- 11:45 am - 11:55 am **Ashish Singh** (University College Dublin, Ireland)  
"Hydrogen Peroxide Production by Lactobacilli Prevents Colitis and Intestinal Infection"
- 11:55 am - 12:00 pm Discussion
- 12:00 pm - 12:10 pm **Sjoerd van der Post** (Washington University in St. Louis, USA)  
"NOX1-Dependent Redox Signaling Mediates Colonic Stem Cell Proliferation via EGFR Potentiated by Microbial Components"
- 12:10 pm - 12:15 pm Discussion
- 12:15 pm - 12:25 pm **Corinne Dupuy** (Institut Gustave Roussy / CNRS, France)  
"Conformation of the N-Terminal Ectodomain Elicits Different Effects on DUOX Function: A Potential Impact on Congenital Hypothyroidism Caused by a H<sub>2</sub>O<sub>2</sub> Production Defect"
- 12:25 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:30 pm Free Time
- 4:30 pm - 6:00 pm Poster Session
- 6:00 pm - 8:00 pm **Redox Signals in Cancer - From NOS to NOX**
- Discussion Leader: **David Lambeth** (Emory University, USA)
- 6:00 pm - 6:05 pm Introduction by Discussion Leader
- 6:05 pm - 6:30 pm **Douglas Thomas** (University of Illinois at Chicago, USA)  
"Epigenetics: The Third Pillar of Nitric Oxide Signaling in Cancer"
- 6:30 pm - 6:40 pm Discussion
- 6:40 pm - 7:05 pm **James Doroshov** (National Cancer Institute, NIH, USA)  
"NADPH Oxidases, Pro-Inflammatory Cytokines, and Inflammation-Related Cancers"
- 7:05 pm - 7:15 pm Discussion
- 7:15 pm - 7:40 pm **Thomas Leto** (National Institute of Allergy and Infectious Diseases, NIH, USA)  
"NOX4 Involvement in Cancer Progression"
- 7:40 pm - 7:50 pm Discussion
- 7:50 pm - 8:00 pm General Discussion
- 8:00 pm Dinner

## Thursday

- 7:30 am - 8:30 am Breakfast
- 8:30 am - 9:00 am Business Meeting  
*Nominations for the Next Vice Chair; Fill in Conference Evaluation Forms; Discuss Future Site and Scheduling Preferences; Election of the Next Vice Chair*
- 9:00 am - 12:30 pm **NOXes in Disease Pathophysiology**  
Discussion Leader: **Isabel Fabregat** (Bellvitge Biomedical Research Institute (IDIBELL), Spain)
- 9:00 am - 9:25 am **David Brenner** (University of California, San Diego, USA)  
"The Role of NOXs in Liver Fibrosis and Cancer"
- 9:25 am - 9:35 am Discussion
- 9:35 am - 10:00 am **Louise Hecker** (University of Arizona, USA)  
"Pre-Clinical Development of Novel NOX4 Inhibitors for Targeting Age-Associated Pathological Fibrosis"
- 10:00 am - 10:10 am Discussion
- 10:10 am - 10:35 am Coffee Break
- 10:35 am - 11:00 am **Karl-Heinz Krause** (University of Geneva, Switzerland)  
"NOX Enzymes in Inner Ear Pathology"
- 11:00 am - 11:10 am Discussion
- 11:10 am - 11:35 am **Simone Di Giovanni** (Imperial College London, United Kingdom)  
"NOX2 Signaling Pathways Underpin Injury and Environmentally Driven Axonal Regeneration Following Nerve and Spinal Injuries"
- 11:35 am - 11:45 am Discussion
- 11:45 am - 11:55 am **Ildiko Szanto** (Geneva University Hospitals, Switzerland)  
"Beta-Cell Specific Overexpression of the NADPH Oxidase 5 (NOX5) Deteriorates Islet Cell Function in High-Fat Diet Exposed Mice"
- 11:55 am - 12:00 pm Discussion
- 12:00 pm - 12:10 pm **Natalie Torok** (University of California, Davis, USA)  
"NOX2 Activation by p52Shc Leads to Accelerated Liver Fibrosis in Aging Mice"
- 12:10 pm - 12:15 pm Discussion
- 12:15 pm - 12:25 pm **Carmen Veith** (Maastricht University, The Netherlands)  
"Profibrotic Signaling by TGF- $\beta$ 1 Involves NADPH Oxidase 4-Dependent Activation of the Tyrosine Kinase Fyn"
- 12:25 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:30 pm Free Time
- 4:30 pm - 6:00 pm Poster Session

6:00 pm - 8:00 pm

## **NOX-Mediated ROS Signaling in Metabolism and Cardiovascular Disease**

Discussion Leader: **Rhian Touyz** (University of Glasgow, United Kingdom)

6:00 pm - 6:25 pm

**Jun Sadoshima** (Rutgers New Jersey Medical School, USA)  
"The Cell Type-Specific Function of NOX4 During Heart Failure"

6:25 pm - 6:35 pm

Discussion

6:35 pm - 7:00 pm

**Ajay Shah** (King's College London, United Kingdom)  
"NOX4 and Metabolic Reprogramming"

7:00 pm - 7:10 pm

Discussion

7:10 pm - 7:35 pm

**Lev Becker** (University of Chicago, USA)  
"NOX2 Signaling in Macrophages Supports Detrimental and Beneficial Functions in Obesity and Type 2 Diabetes"

7:35 pm - 7:45 pm

Discussion

7:45 pm - 8:00 pm

Closing Remarks

8:00 pm

Dinner

## Friday

7:30 am - 8:30 am

Breakfast

9:00 am

Departure

---

Research reported in this publication was supported by the National Institute Of Allergy And Infectious Diseases of the National Institutes of Health under Award Number R13AI138268. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

---