World Mitochondria Society

6th World Congress on

Targeting Mitochondria

October 28-30, 2015 - Ritz Carlton, Berlin, Germany

Program

www.targeting-mitochondria.com

Welcome to Targeting Mitochondria 2015

Dear Colleagues,

The Scientific Committee of World Mitochondria Society is honored to announce the organization of the **6th World Congress on Targeting Mitochondria** which will be held at **Hotel Ritz Carlton, Berlin** on **October 28-30, 2015.**

This 6th World Congress on Targeting Mitochondria will cover a variety of new strategies and innovations as well as clinical applications in Mitochondrial Medicine. Just as for the previous editions of "Targeting Mitochondria", the scientific committee has again succeeded in inviting an outstanding panel of speakers; each one of which a leader in their particular field.

Among hot topics which will be highlighted this year:

Recent Advances on Mitochondrial Dysfunctions in Chronic Diseases

- Mitochondria & Microbiota: the intriguing relationship
- Mitochondria & Redox Regulation
- Mitochondria & Viral Infection
- Mitochondria & Metabolic Syndrome
- Mitochondria & Neurodegenerative Diseases
- Mitochondria & Cancer

Devices, Methods & Biomarkers: Innovations & New Opportunities

- Mitochondria Quality Control
- Mitochondria Devices: New methods to detect mitochondria dysfunction
- Mitochondria as Biomarkers

Strategies to Target Mitochondria: Recent Clinical Data and Potential Therapeutic Studies

- Strategies to target Stem Cells
- Strategies to target Microbiota
- Strategies to target miRNA
- Strategies to reimplace mitochondria
- Clinical & Therapeutic Directions

Special Workshop dedicated to the Evaluation of Mitochondria in vivo and in Humans

The Scientific Committee of Targeting Mitochondria 2015 have decided to organize this workshop to highlight all methods which allow the investigation and studying of mitochondria in physiologic and pathologic conditions. We will talk more about mitochondria evaluation in human clinic.

We are pleased to invite all scientific and industrial teams to present their strategies and innovations during Targeting Mitochondria World Congress 2015.

With this exciting program, we look forward to welcoming you in Berlin for this particular event.

Marvin Edeas
Founder of World Mitochondria Society

Volkmar Weissig
President of World Mitochondria Society

Timetable of 3-days Congress

Day 1: Wednesday, October 28, 2015

Workshop: How to Evaluate Mitochondria Function/Dysfunction?

Chairs: Werner Koopman – Egbert Mik

8h30 **Registrations & Welcoming for Workshop**

9h25 **Opening Ceremony by Volkmar Weissig, President of World Mitochondria Society**

9h30 **Live-cell quantification of mitochondrial readouts**

Dr Koopman's research aims to quantitatively understand the molecular connection between mitochondrial metabolism and (ultra)structure with particular attention to redox signaling and biomolecule diffusion. To this end we study primary cells from mitochondrial disease patients, inhibitor-treated cells, a knockout mouse model of mitochondrial complex I (CI) deficiency and cancer cell lines to gain insight into the (tissue-specific) consequences and/or adaptation programs triggered by mitochondrial dysfunction. Given the tight integration of mitochondrial and cellular metabolism, the above aims are primarily addressed in living cell systems. As a key technology, protein-based and chemical fluorescent reporter molecules are introduced in the cells and their signals are quantified using life cell microscopy, image processing/quantification and data mining. Protein diffusion is studied by combining photobleaching strategies, single-molecule spectroscopy and in silico techniques. In primary fibroblasts from Leigh Syndrome (LS) patients, isolated CI deficiency is associated with mitochondrial morpho-functional changes and increased reactive oxygen species (ROS) levels.
Dr Koopman will highlight:

- ✓ *Mitochondrial morphology and membrane potential*
- ✓ *ROS and Redox homeostasis*
- ✓ *High content screening*

Werner Koopman, Radboud University Medical Centre, The Netherlands

10h15 **Measuring cellular oxygen metabolism in vivo: towards clinical monitoring of mitochondrial function**

Introduction/ why measure mitochondrial oxygenation and function at the bed site?
History / previous attempts to monitor mitochondrial function
Measuring mitochondrial oxygen tension / protoporphyrin IX technique
Measuring mitochondrial oxygen consumption in vivo
Preclinical data from animal studies and human volunteers
The development and launch of COMET: the first commercial device based on PpIX technology
Will become available early 2016. - Future perspectives

Egbert Mik, Erasmus MC, The Netherlands

11h00 Coffee Break & Network Session

11h30 **The central role of mitochondrial dysfunction in brain and other tissues pathophysiology evaluated in vivo**
The CritiView - A unique device for real time evaluation of mitochondrial function and microcirculatory blood flow and oxygenation In vivo

Most of the oxygen consumed by the brain is utilized by the mitochondria during the oxidative phosphorylation process. The brain is dependent on continuous oxygen supply regulated by cerebral blood flow (CBF) and the level of hemoglobin oxygenation. Normal brain activity is an integration of many biochemical and physiological processes including hemodynamic, metabolic, ionic homeostasis and electrical activities. In order to evaluate the functional state of the brain, it is necessary to monitor in real time as many parameters as possible. We developed the concept of "Brain Physiological Mapping" that describes the interrelations between the various parameters measured by the multiparametric monitoring system developed in our laboratory. We used these monitoring systems in experimental animal models exposed to pathophysiological conditions. Changes in oxygen supply were induced by hypoxia, ischemia or hypeoxia. The level of brain activity was changed by epilepsy or cortical spreading depression. The key monitored parameter, in all monitoring systems, was the oxidation-reduction state of NADH, representing the mitochondrial function in vivo and in real-time. This parameter provided information on oxygen supply as well as oxygen balance in the brain. In the current review, the various systems developed since 1972 will be presented including a typical record of the results obtained. The following subject will be described in the presentation:

Avraham Mayevsky, Bar-Ilan University, Ramat-Gan, Israel

12h15 **Discussion**

12h30 Lunch Break & Network Session

14h00 **Mitochondrial function in live cells - how it can be detected by live cell imaging**

Measurement of mitochondrial membrane potential, NADH, FAD++, ATP synthesis and production of reactive oxygen species and calcium in mitochondria can give vital information about the involvement of this organelle in different physiological and pathological conditions. These measurements can only be done in live cells by using live cell imaging, especially in the case of simultaneous measurement of two or more parameters in a single cell

Andrey Y. Abramov, UCL Institute of Neurology, United Kingdom

14h30 **Methods to study composition and dynamics of mitochondrial protein complexes**

Ilka Wittig, University of Frankfurt, Germany

15h00 **In vivo time-lapse imaging of mitochondria in healthy and diseased peripheral myelin sheath**

Nicolas Tricaud, INSERM, France

15h30 Coffee Break & Network Session

16h00 **Short Oral Presentations** (10 minutes)

Novel Fluorescent Probes for Visualizing Cell Structures and Function

Yuning Hong, University of Melbourne, Australia

Noninvasive assessment of mitochondrial dysfunction in brain disorders with proton magnetic resonance spectroscopy

Dikoma C. Shungu, Weill Medical College of Cornell University, USA

New mitochondrial-targeted probes for free radical detection in single live cells by fluorescent lifetime micrososcopy

Anne-Cécile Ribou, Université de Perpignan Via Domitia, France

The method of estimation of succinate dehydrogenase activity by using a flow cytometer

Olga Kurbatova, FSBI "Research Center for Obstetrics, Gynecology and Perinatology " Ministry of Healthcare of the Russian Federation, Russia

Detection of S-(2-succinyl)cystein (2SC) in cultured cells and human serum by LC-MS/MS as a marker for mitochondrial metabolic abnormalities

Ryoji Nagai, Tokai University, Japan

Intravital multiphoton imaging of AT1A receptor-mediated uptake of angiotensin II and mitochondrial function in the proximal tubule of the kidney

Long Jia Zhuo, University of Mississippi Medical Center, United States

A novel methodology to indirectly assess mitochondrial function and by means of measuring fat and lactate response to exercise across different populations

Inigo San Millan, University of Colorado School of Medicine, United States

An electronic assay of cell death

John Peter Burke, UC Irvine, United States

Super-resolution microscopy provides new insights into neuronal mitochondria organization

Elena Pohl, University of Veterinary Medicine Vienna, Austria

Session supported by Seahorse

17h30 **Using Seahorse XF Technology to measure mitochondrial function and more**

XF Extracellular Flux technology is now commonly used to measure cellular bioenergetics in cells and has been cited in over 1,500 peer reviewed publications since the introduction of the XF Extracellular Flux Analyzer in 2006. XF analysis has evolved from measuring basic mitochondrial function to include assays for the measurement of glycolysis, substrate selectivity, and metabolic switching/reprogramming. XF Analyzers are also used to measure the function of isolated mitochondria, enabling the examination of mitochondria from multiple samples simultaneously, saving valuable time and resources. This workshop will include: - an overview of the gold standard XF Stress Tests for measuring mitochondrial function and glycolysis - examples of the XF Stress Test in recent publications, including the recently proposed “Bioenergetic Health Index” [BHI] - an experimental blood test that can determine a patients’ baseline bioenergetic status by indexing the performance of mitochondria - a demonstration of the XF Mito Stress Test assay with the new XFp Analyzer

Hasse Hedeby, Seahorse Biosciences, Denmark

17h45 **Discussion & Concluding Remarks by the chairs**

18h00 **End of the First Day**

14h30 – 17h30 Registration & Posters Installation for Targeting Mitochondria Conference

Day 2: Thursday, October 29, 2015

Targeting Mitochondria 2015 Conference

7h30 **Registrations – Posters Installation**

8h55 **Introduction remarks by Volkmar Weissig, President of WMS & Marvin Edeas, Founder of WMS**

Targeting Mitochondria: Recent Advances & Perspectives
Mitochondria, Microbiota & Metabolites

Chairs: Marvin Edeas - Volkmar Weissig

9h00 **Introduction Lecture: Mitochondria, Microbiota or Metabolites: Where is the target?**
Marvin Edeas, Chairman of Targeting Mitochondria 2015, France

9h25 **Mining the gut microbiome for novel mitochondrial therapeutics**
Anurag Agrawal, CSIR Institute of Genomics and Integrative Biology, India

9h50 **Antibiotics that target mitochondria effectively eradicate cancer stem cells, across multiple tumor types: Treating cancer like an infectious disease**
Rebecca Lamb, University of Manchester, United Kingdom

10h15 **Reactive oxygen species and their lifelong regulation of the metabolome**
Luis Vitetta, University of Sydney, Australia

10h40 Coffee Break, Posters & Exhibition Session

Targeting Mitochondria Dysfunctions: Mechanistics & Lessons

Des Richardson – Luis Vitetta –

11h10 **The emerging role of Nrf2 in mitochondrial bioenergetics**
Albena Dinkova-Kostova, University of Dundee, United Kingdom

11h35 **Crosstalk Signaling between Mitochondrial Ca^{2+} and ROS: Its Physiological and Pathological Relevance**
Shey-Shing Sheu, Jefferson University, USA

12h00 **Progeroid Cockayne syndrome reveals a novel paradigm for mitochondria and aging**
Miria Ricchetti, Institut Pasteur, France

12h20 **Short Oral Presentations**

Upregulated cytochrome B5 may rescue normal androgen production in mitochondrial respiratory chain-deficient Leydig cells from prematurely aging mice
Irina G. Shabalina, Stockholm University, Sweden

Inter-organelle communication via specialized mitochondrial synapses
Martin Picard, Columbia University, United States

Mitochondrial dysfunction in chronic thromboembolic pulmonary hypertension
Constanza Moren, University of Barcelona-Hospital Clínic of Barcelona-CIBERES, Spain

Nitrite is a mitochondria targeted inhibitor of oxidative stress
Andrey Kozlov, L. Boltzmann Institute for Experimental and Clinical Traumatology in AUVA Center, Austria

Mitochondrial targeting of trans-cleaving ribozymes reveals transcriptome control and genetic coordination
André Dietrich, CNRS, France

12h55 Lunch Break, Posters & Exhibition Session

14h30 **The rusty mitochondrion in Friedreich's ataxia: identification of non-ferritin mitochondrial iron deposits and the paradoxical oxidative stress response in a mouse model of this disease**
Des Richardson, University of Sydney, Australia

14h55 **Rescuing mitochondria in Wilson disease avoids acute liver failure**
Hans Zischka, Institute of Molecular Toxicology and Pharmacology, Germany

15h20 **Mitochondrially-localized Parkin and its role in innate immunity**
Aleem Siddiqui, University of California, USA

15h45 **Mitochondria and Parkinson's and ALS**
Sonia Gandhi, UCL Institute of Neurology, United Kingdom

16h10 Coffee Break, Posters & Exhibition Session

One-Hour Posters Session & Networking around Snacks & Drinks

Aleem Siddiqui – Miria Ricchetti

17h10 **Short Oral Presentations**

CX9C proteins as new stress-responsive bi-organellar regulators and disease modifiers
Lawrence Grossman, Wayne State University School of Medicine, United States

Heterologous parkin loss of fucntion induces mitochondrial fragmentation and decreases mitochondrial network volume in dopaminergic neurons in a drosophila model of Parkinson's disease
Lori M. Buhlman, Midwestern University, Glendale, United States

Viral alteration of cellular metabolism as exemplified by rubella virus
Claudia Claus, University of Leipzig, Germany

Mitochondrial dynamics during Legionella infection
Pedro Escoll, Institut Pasteur, France

A link between the evolutionary history of mitochondrial ribosomal proteins of S18 family and GLY132 polymorphism in colon cancer
Muhammad Mushtaq, Karolinska Institutet, Sweden

Role of Mitofusin coiled-coil domains in mitochondrial fusion
David Tareste, INSERM, France

Mitochondrial fusion in human HIV-pregnancies
Mariona Guitart-Mampel, University of Barcelona, Spain

MtDNA segregation in heteroplasmic tissues and possible implications for mitochondrial donation
Patrick Joerg Burgstaller, University of Veterinary Medicine Vienna, Austria

Impaired fission and fusion balance in skeletal muscle from HD patients and HD mice
Kerstin Kojer, University Medical Center Ulm, Germany

Cytokine profile alteration with mitochondrial targeting to prolong survival following hemorrhagic shock
Raghavan Raju, Georgia Regents University, United States

Mitochondrial dysfunction in a TAU model of neurodegeneration
Noemi Esteras Gallego, Institute of Neurology, University College London, United Kingdom

NDUFV1 subunit of complex 1 is a major target of nobiletin
Maia Sepashvili, Ilia State University, Georgia

UCP2 expression in neuroblastoma cells is regulated during cell metabolic adaptation to nutrient stress
Anne Rupprecht, University of Veterinary Medicine Vienna, Austria

New answer to an old question: the pyruvate supply to synaptosomal mitochondria is regulated by changing the cytosolic calcium concentration
Frank Norbert Gellerich, Neurologische Universitätsklinik Magdeburg, Germany

Mitochondrial DNA deletions in sporadic inclusion body myositis are associated with depletion and reduced expression of mitofusine-2
Marc Catalán-García, Faculty of Medicine-University of Barcelona, Spain

18h45 **General Discussion of the Second Day**

19h00 **End of the Second Day**

20h00 **Targeting Mitochondria Dinner**
You can register online until October 15, 2015.

Day 3: Friday, October 30, 2015

8h25 **Welcome Note**

Targeting Mitochondria 2015 & Strategies

Chairs: Martin Bergö – Volkmar Weissig

8h30 **Delivery of biologically active molecules to mammalian mitochondria**
Volkmar Weissig, Midwestern University, USA

8h55 **The impact of antioxidant supplementation on malignant melanoma progression**
Martin Bergö, Sahlgrenska Cancer Center, Sweden

9h20 **Short Oral Presentations**

Is mitochondrial targeting the next anxiolytic treatment?
Michaela Filiou, Max Planck Institute of Psychiatry, Germany

Imeglimin, a new mitochondria-targeted agent for type 2 diabetes treatment
Sébastien Bolze, POXEL SA, France

Mitochondrial calcium channels as novel targets for therapy development
Peter Koulen, University of Missouri - Kansas City, School of Medicine, United States

Bypassing mitochondrial complex i dysfunction using cell permeable succinate prodrugs – metabolic rescue in leigh syndrome patient fibroblasts
Sarah Piel, Lund University, Sweden

Novel mitochondria-targeted peptide iron chelators for iron sensing and protection against oxidative stress-induced mitochondrial damage
Olivier Reelfs, University of Bath, United Kingdom

Losartan reverses age-related mitochondrial dysfunction
Peter M. Abadir, Johns Hopkins University, United States

10h05 **Coenzyme Q10: Controversies & Credibility**
Discussion with the scientific committee

10h30 Coffee Break, Posters & Exhibition Session
One-Hour Posters Session & Networking around Snacks & Drinks

Mitochondria, Cancer & Stem Cells

Vladimir Gogvadze - Anurag Agrawal

11h30 **PSC-based drug discovery of mitochondrial disorders: Neural cells from patient-derived iPSCs as a novel system for drug discovery of mtDNA disorders**
Alessandro Prigione, Max Delbrueck Center for Molecular Medicine, Germany

11h55 **Acquisition of mitochondrial DNA by cancer cells devoid of mitochondrial genome is a prerequisite for tumour formation**
Jiri Neuzil, Griffith University, Australia

12h20 **Targeting energy producing metabolic pathways for cancer therapy**
Vladimir Gogvadze, Karolinska Institutet, Sweden

12h45 **Short Oral Presentations**

Mitochondria Transplantation: Why?
Hakan Ozturk, Sifa University, Turkey

Discovering new mitochondrial DNA repair pathways using mitochondria-targeted DNA damaging agents
Simon Wisnovsky, Lab of Shana O. Kelley, University of Toronto, Canada

Protein import into mitochondria mediated by localized translation near the outer membrane
Yoav Arava, Technion - Israel Institute of Technology, Israel

13h05 Lunch Break, Posters & Exhibition Session

14h15 Short Oral Presentations

Early ERK1/2 activation promotes DRP1-dependent mitochondrial fission necessary for cell reprogramming
Josema Torres, University of Valencia, Spain

Intracytoplasmic sperm injection with the addition of autologous mitochondria from egg precursor cells
Yaakov H. Bentov, TCART Fertility Partners, University of Toronto, Canada

Interplay between mitochondrial ribosomal protein S18-2 and retinoblastoma protein in regulation of cell stemness and differentiation
Elena Kashuba, Karolinska Institutet, Sweden

Regulatory mechanisms of dynamin-related protein 1 (drp1) and its influence on apoptosis in breast cancer
Kelly Jean Craig, Colorado Mesa University, United States

Targeting of Leishmania mitochondria by acyl phloroglucinol derivatives (APD)
Lars Gille, University of Veterinary Medicine Vienna, Austria

PGC-1α and its role in promoting metastasis
Sylvia Andrzejewski, McGill University, Canada

Heteroplasmy shifting in mice transmitochondrial embryonic stem cells due to cultivation in low-glucose conditions
Romuald Loutre, UNISTRA-CNRS, France

Mitochondria & RNA
Jiri Neuzil – Alessandro Prigione

14h50 Recent advances on the role of mitochondria in RNA interference by miRNA activity
Samarjit Das, John Hopkins University, USA

15h15 Mitochondrial targeting of recombinant RNA: Delivery strategies and therapeutic applications
Nina Entelis, University of Strasbourg/CNRS, France

15h40 Long and small non-coding RNA in mitochondria and crosstalk between mitochondrial and nuclear genome
Eric Barrey, INRA, France

16h05 MicroRNA-126 induces autophagy by altering mitochondrial metabolism in malignant mesothelioma
Marco Tomasetti, Polytechnic University of Marche, Italy

16h10 Coffee Break, Posters & Exhibition Session

16h30 Short Oral Presentations

Critical role of JNK in promoting mitochondrial dysfunction and liver injury
Byoung-Joon Song, National Institute on Alcohol Abuse and Alcoholism, NIH, United States

ATP citrate lyase: a novel regulator of skeletal muscle metabolism and growth
Suman Kumar Das, Novartis Institute for Biomedical Research, Switzerland

Effect of low citrate synthase activity on physiological and behavioral responses of mice to high fat diet feeding
Yosra Alhindi, University of Aberdeen, United Kingdom

Cytochrome C phosphorylation: Regulation of mitochondrial respiration and apoptosis
Maik Huttemann, Wayne State University, United States

The use of clinical samples to study the role of inter-individual variation on susceptibility to mitochondrial toxicants in drug-induced liver injury
Amy Elizabeth Chadwick, The University of Liverpool, United Kingdom

Novel in vivo human model for transient mitochondrial dysfunction: simvastatin-induced mitochondrial dysfunction in healthy subjects and its reversibility by the reduced form of co-enzyme q10
Marcus van Diemen, Centre for Human Drug Research, The Netherlands

17h15 Discussion & Concluding Remarks of Targeting Mitochondria 2015 by Marvin Edeas & Volkmar Weissig
With the presence of organizers & speakers

- *Horizon 2020 Proposal & next Mitochondria projects*
- *Presentation of WMS Open Access Journal*

Targeting Mitochondria 2015 Awards:

- *Scientific Contribution Award 2015*
- *Scientific Contribution for Short Oral Presentation*
- *Scientific Contribution for Poster Presentation*

17h30 End of Targeting Mitochondria 2015