Pre-Conference Session for BrightFocus

Common Features of Neurodegenerative Diseases: Exploring the Brain/Eye Connection and Beyond *(Pre-Conference Workshop to AD/PD™ 2023)*

USE IT OR LOSE IT: HOW TINY CHANGES IN ENERGY, METABOLISM AND MITOCHONDRIA CAN LEAD TO NEURODEGENERATIVE DISEASE

Tuesday, March 28, 2023 | 08:00 – 15:50 (CET)Co-Chairs: Diane Bovenkamp, Guojun Bu, Adriana Di Polo, Todd Golde**Session Description**

This day-long, CME credit-eligible workshop will provide participants with an understanding of the common and distinct features of neurodegenerative diseases, which include not only those affecting the brain, such as Alzheimer's disease, Parkinson's disease, dementia with Lewy bodies, vascular dementia, frontotemporal dementia, and mixed dementia; but also the ocular diseases including age-related macular degeneration, glaucoma, diabetic retinopathy, and inherited retinal degenerative diseases. Some questions that will be addressed during this fourth pre-conference workshop, starting from small (Section 1. Mitochondria In Health and Neurodegeneration; and Section 2. Glucose and Lipid Metabolism) and ending with a more wholistic (Section 3. System-level Energy Dysfunction and Metabolic Disorders) point of view:

- Why does the nervous system (including the brain and eyes) have a unique energy demand?
- How can one evaluate metabolic fitness?

- How can only tiny changes in energy, metabolism and/or mitochondria lead to neurodegenerative disease?
- Is there a definite ‘tipping point’ that could be prevented in humans to delay onset of disease?
- What role do comorbidities, like diabetes and other insulin/energy/metabolism-dysfunction diseases, play in neurodegenerative diseases?
- How can one study this in living humans?
- Are there common elements across these diseases that could give a clue to preventions and future treatments?

8:00-8:15

WELCOME AND INTRODUCTION INCLUDING WORKSHOP GENERAL DISCUSSION PRIMER

Diane Bovenkamp ,Guojun Bu, Adriana Di Polo, Todd Golde

Section 1: Mitochondria In Health and Neurodegeneration

Chair: Adriana Di Polo (University of Montreal, Canada)

Section 1 Summary: Mitochondria are essential organelles that regulate multiple processes essential for neuronal function including metabolic balance, intracellular calcium homeostasis, production of reactive oxygen species, and apoptotic signaling. Accumulating evidence indicates that mitochondrial defects play a central role in the pathogenesis of neurodegenerative diseases. This session will cover new insights into mitochondrial dynamics, trafficking, transmitophagy, and damage as well as novel therapeutic strategies to increase mitochondrial health in eye and brain diseases.

8:15 – 8:35

MITOCHONDRIA AS MICROLENSES: IMPLICATIONS FOR CONE PHOTORECEPTOR FUNCTION IN HEALTH AND DISEASE

Wei Li (United States of America)

8:35-8:55

THE ROLE OF TRANSMITOPHAGY IN NEURODEGENERATIVE DISEASES

Nicholas Marsh-Armstrong (United States of America)

8:55-9:15

PRE-RECORDED: DECODING MITOCHONDRIA DYSFUNCTION IN PARKINSON'S DISEASE

Valina Dawson (United States of America)

9:15-9:35

MITOCHONDRIA AND TAU IN FTD

Li Gan (United States of America)

9:35-9:55

ADAPTOR PROTEIN SUPPLEMENTATION TO RESTORE MITOCHONDRIAL TRANSPORT IN GLAUCOMA

Heberto Quintero (Canada)

09:55-10:25

GENERAL DISCUSSION WITH ALL SESSION 1 SPEAKERS

Adriana Di Polo, Nicholas Marsh-Armstrong, Valina Dawson, Li Gan, Heberto Quintero, Wei Li

10:25-10:40

BREAK/SNACK

Section 2: Glucose and Lipid Metabolism

Chair: Todd Golde (Emory University, USA)

Section 2 Summary: Individual cell-types in the brain have unique energy requirements and unique roles in meeting the energetic demands placed on the brain. Disruption in cellular cross-talk and cell-autonomous energy occur during the setting of neurodegenerative disease. A more refined disruption of the cellular and intercellular metabolic defects will likely offer new insights into neurodegenerative disease and perhaps illuminate novel therapeutic approaches.

10:40 – 11:00

HISTORY AND USE OF FDG PET IN ALZHEIMER'S DISEASE

Michael Schöll (Sweden)

11:00-11:20

APOE EFFECTS ON GLIAL METABOLISM: IMPLICATIONS FOR ALZHEIMER'S DISEASE

Lance Johnson (United States of America)

11:20-11:40

NUTRITIONAL METABOLISM AND CEREBRAL BIOENERGETICS IN ALZHEIMER'S DISEASE AND RELATED DEMENTIAS

Hussein Yassine, (United States of America)

11:40 –12:00

LIPID METABOLISM IN NEOVASCULAR DISEASES OF THE EYE

Lois Smith (United States of America)

12:00 – 12:30

GENERAL DISCUSSION WITH ALL SESSION 2 SPEAKERS

Todd Golde, Gil Rabinovici, Lance Johnson, Lois Smith, Hussein Yassine

12:30 – 13:30

LUNCH

Section 3: System-level Energy Dysfunction and Metabolic Disorders

Chair: Guojun Bu (USA)

Section 3 Summary: Metabolic conditions and diabetes are risk factors for both Alzheimer's disease and eye diseases. In addition to hypoperfusion restricting blood flow, they also impact brain energy metabolism including insulin signaling and glucose utilization. In this section, the speakers will discuss how brain metabolism and insulin signaling are impaired in these neurodegenerative conditions and how these pathways can be targeted for therapy to treat brain and eye diseases, and to promote healthy brain aging.

13:30 - 13:50

PRE-RECORDED:METFORMIN AND AGE-RELATED MACULAR DEGENERATION

Dimitra Skondra, (United States of America)

13:50 - 14:10

DIABETES-MEDIATED COGNITIVE DECLINE; LESSONS FROM TYPE 1 AND TYPE 2 DIABETES

Heather Ferris (United States of America)

14:10 - 14:30

INTERACTION BETWEEN APOE GENOTYPE AND DIABETES IN LONGEVITY AND DEMENTIA

Naoyuki Sato (Japan)

14:30 - 14:50

CLINICAL TRIALS AND NAD SUPPLEMENTATION FOR GLAUCOMA

Pete Williams (Sweden)

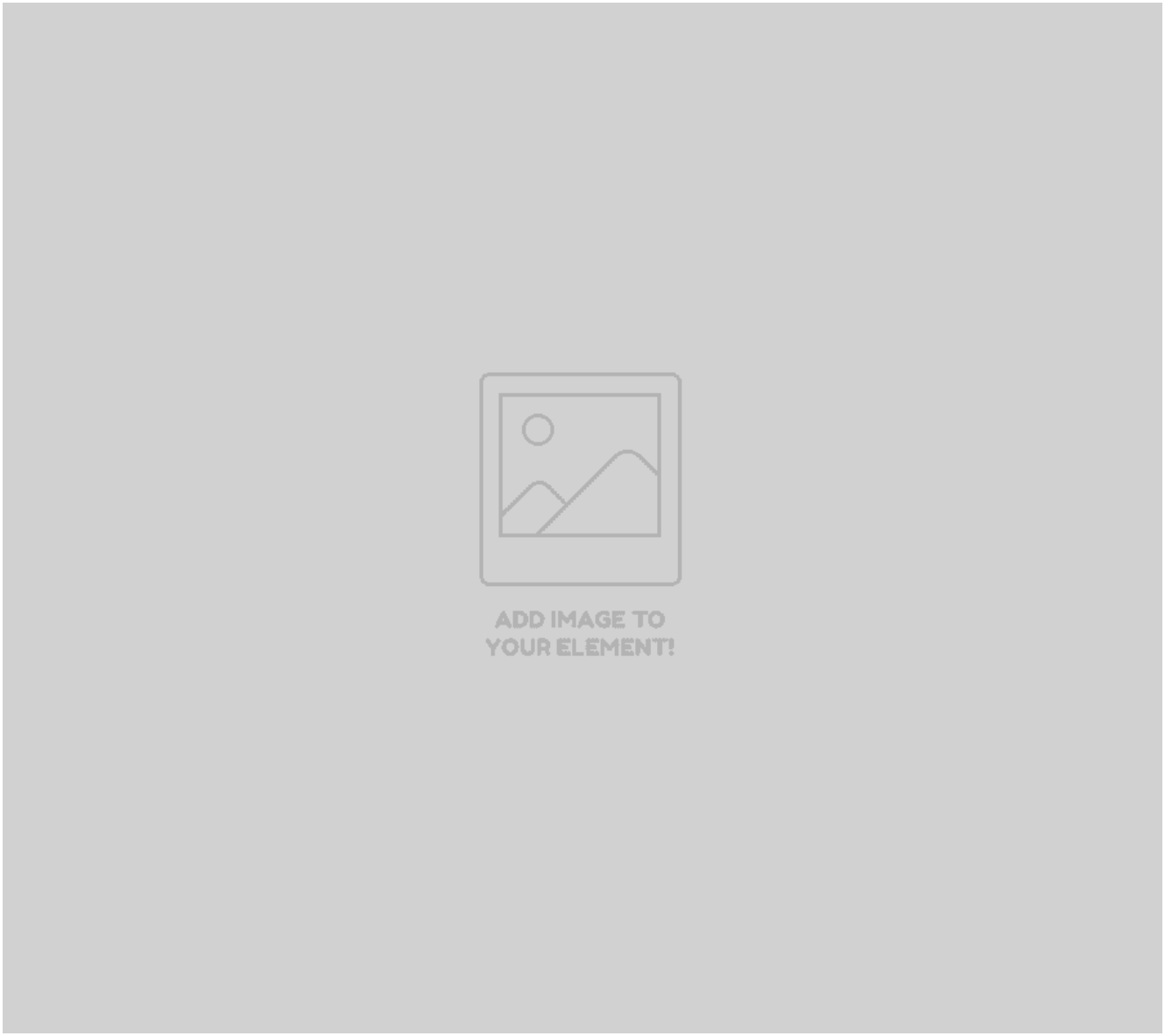
14:50 - 15:20

GENERAL DISCUSSION WITH ALL SESSION 3 SPEAKERS

Guojun Bu, Heather Ferris, Naoyuki Sato, Pete Williams, Dimitra Skondra

15:20 - 15:50

CLOSING REMARKS



FULL CONFERENCE PROGRAM