

Mitochondria and ROS signaling training school report (June 12-14, 2018)

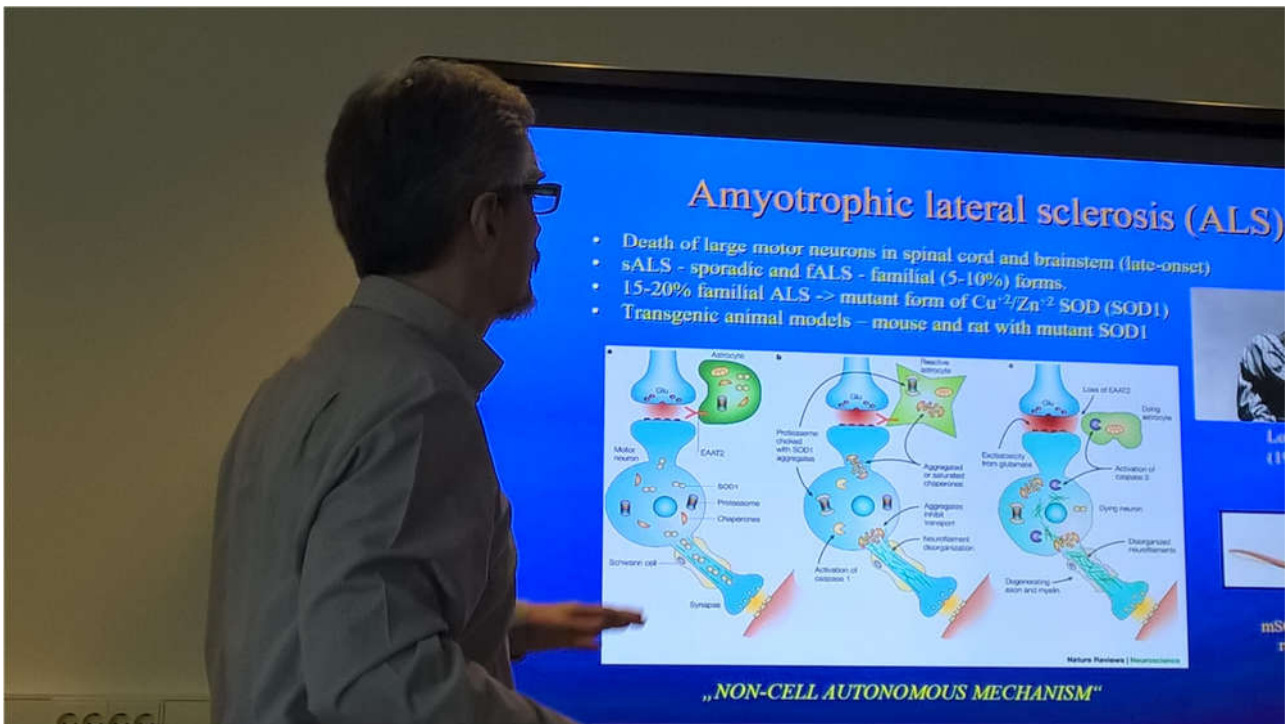
Venue AIV Institute, University of Eastern Finland, Kuopio, Finland

Organizers A.I. Virtanen Institute for Molecular Sciences
Rashid Giniatullin, MD, PhD, Professor
Tarja Malm, PhD, Docent, Associate Professor in Neuroinflammation
Katja Kanninen, PhD, Docent, Academy Researcher



Around 70 people participated in this training school. Among them, there were 14 speakers from the United Kingdom, Serbia, Finland, Spain and Russia.

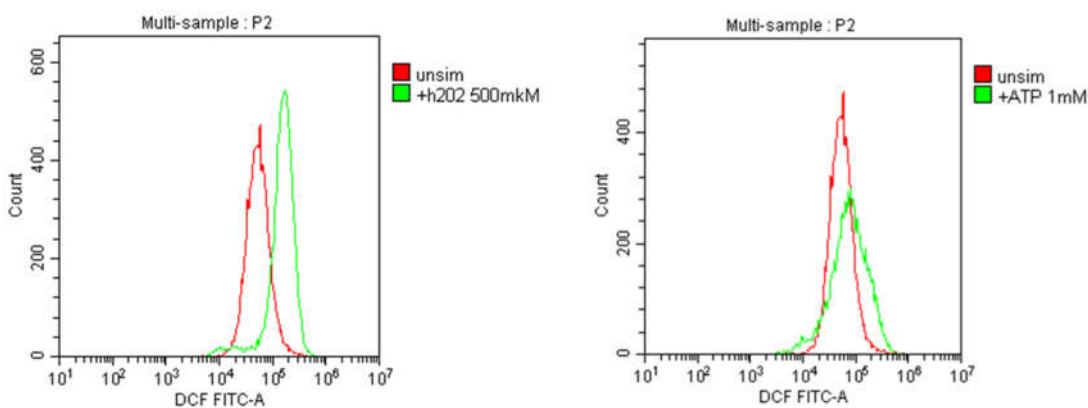




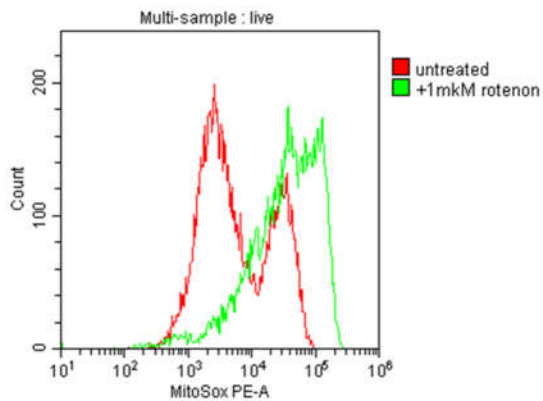
Practical demonstrations

An important part of this training school were practical demonstrations of Imaging of ROS with Flow cytometry and Imaging of ROS in neurons and cell lines with pharmacological ROS sensors.

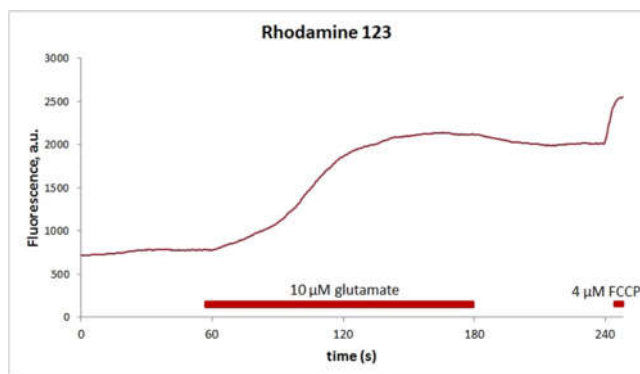
For flow cytometry, freshly isolated mouse peritoneal cells were stained with cell-permeant H_2DCFDA , which used as an indicator for reactive oxygen species (ROS). Cells were stimulated with hydrogen peroxide and ATP. Population of granulocytes was further assessed, increase in fluorescence was observed in response to stimulation. Samples were analyzed using flow cytometry.



Then, BV2 cells were stained with MitoSox – a novel fluorogenic dye specifically targeted to mitochondria in live cells, which allows to assess the production of superoxide. For demonstration, cells were treated with rotenon 1 μM , which caused ROS production leading to increase in fluorescence. Samples were analyzed using flow cytometry.



For live imaging with pharmacological ROS sensors culture of cortical neurons was loaded with Rhodamine 123, a dye enabling monitoring of mitochondrial membrane potential. During demonstration we applied glutamate and as a positive control FCCP – a pharmacological agent that disrupts the membrane potential.



Training school program

Lectures June 12-13, 2018

Tuesday, 12 June 2018

- 09.45-10.00 Registration
- 10.00-10.15 Opening the training school: Rashid Giniatullin and Tarja Malm
- 10.15-11.00 Mitochondria as generators of ROS. Andrey Abramov (UCL, London)
- 11.00-11.45 ROS induction of ALS IGGs. Pavle Andjus (Belgrade)
- 11.45-12.00 AH Diagnostics
- 12.00-13.00 Lunch
- 13.00-13.45 Mitochondrial ROS signaling in heart development. Jaakko Pohjoismäki (Joensuu)
- 13.45-14.30 Junior leader's talk. Shifting gears: Mitochondrial membrane potential of astrocytes deprived of glucose and oxygen. Andrej Korenić (University of Belgrade, Serbia)
- 14.30-15.00 Coffee
- 15.00-15.45 The role Nrf2 and downstream enzymes in prevention of the oxidative stress. Anna-Liisa Levonen (UEF)
- 15.45-16.30 Ferroptosis, a new form of cell death associated with accumulation of lipid peroxides. Gundars Goldsteins (UEF)
- 16.30-16.50 Junior leader's talk. Mitochondrial ROS determine glutamate signal transduction of frontotemporal dementia. Noemi Esteras Gallego (UCL, London)
- 17.00 Chosen oral presentations of posters and poster viewing & Get together

(Restaurant Hyvä Huomen, Bioteknia 2nd floor)

Wednesday, 13 June 2018

- 09.00-09.45 Effects of physical exercise against oxidative stress and aberrant redox regulation in ER stress. Mustafa Atalay (UEF)
- 09.45-10.30 Neuroprotective effects of Nrf2 in neurodegeneration. Antonio Cuadrado (Madrid)
- 10.30-11.00 Coffee
- 11.00-11.15 Thermo Fisher
- 11.15-12.00 Imaging ROS with FACS. Igor Kudryavtsev (St-Petersburg)
- 12.00-12.45 Transmitophagy: Novel Transcellular Means for Degradation of Mitochondria. Katja Kanninen (UEF)
- 12.45-13.45 Lunch
- 13.45-14.30 Two-photon imaging of mitochondria fragmentation in stroke and brain injury. Evgeny Pryazhnikov (Helsinki)
- 14.30-15.15 Junior leader's talk. Mitochondrial ROS in oxygen sensing and regulation of breathing. Plamena Angelova (UCL, London)
- 15.15-15.30 Coffee
- 15.30-16.15 ROS mediated signaling in stem cells. Riikka Martikainen (UEF)

Demonstrations

Thursday, 14 June 2018

- 10.00-14.00 Laboratory demonstrations: Imaging ROS with Flow cytometry. Organized by group of Dr. Tarja Malm (UEF); Imaging of ROS in neurons and cell lines with pharmacological ROS sensor. Organized by Prof. Rashid Giniatullin (UEF)