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Analysis of mitochondrial metabolism using live cell imaging technique

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In the process of energy production, mitochondrial networks are a key element to allow metabolism of substrates into ATP. Many pathological conditions have been associated with mitochondrial dysfunction as mitochondria are associated with a wide range of cellular processes. Therefore any disruption in the energy production can have devastating effects that can ultimately lead to cell death due to chemical ischemia. To address the mitochondrial health and function there are several bioenergetic parameters reflecting either whole mitochondrial functionality or individual mitochondrial complexes. Particularly, metabolism of nutrients in the tricarboxylic acid cycle provides substrates used to generate electron carriers (nicotinamide adenine dinucleotide [NADH] and flavin adenine dinucleotide [$FADH_2$]) which ultimately donate electrons to the mitochondrial electron transport chain. The levels of NADH and $FADH_2$ can be estimated through imaging of NADH/NAD(P)H or FAD autofluorescence. Mitochondrial membrane potential, level of mitochondrial calcium, reactive oxygen species production also can be estimated using live cell imaging. And, importantly, the level of ATP in mitochondria or cytosol now can be measured in live cells and tissues that may give us information about basic physiological processes in the cell and mechanisms of pathology.

Curriculum Vitae

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1995: **Master of Sciences (Biophysics)**

1989-1995 **Undergraduate Student,** Department of Biophysics, Tashkent State University, Uzbekistan

PROFESSIONAL EXPERIENCES

10/2013-present **Professor,** Department of Molecular Neuroscience, Institute of Neurology, University College London

5/2008-06/2013 **Principal Research Associate; Parkinson's Disease Society Senior Research Fellow**, Department of Molecular Neuroscience, Institute of Neurology, University College London.

6/2001-5/2008 **Postdoctoral Research Fellow – Senior Research Fellow**, Department of Physiology, University College London.

2000-2001 **Royal Society/NATO Postdoctoral Research Fellowship,** Department of Physiology, University College London, UK (lab of Professor M.R. Duchen)

1998-1999 **Research Fellow,** Department of Biophysics, Tashkent State University, Uzbekistan

1995-1998 **Research Assistant** lab "Membrane Biophysics", Tashkent State University, Uzbekistan

PUBLICATIONS

1. Zamaraeva M.V., Hagelgans A.I., Abramov A.Y., Ternovsky V.I., Merzlyak P.G., Tashmukhamedov B.A., Saidhodjaev A.I. Ionophoretic properties of ferutinin. 1997, **Cell Calcium**, V.22. N.4, P.235-243

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