



# Oxidative Stress in Neurodegeneration: New Concepts in an Old Case

NEUROSCIENCE GRAND ROUNDS

Friday, January 27th, 2023 @0900 CST  
In person: Apotex Lecture Hall 050

ZOOM MEETING ID: 678 2369 4464  
Passcode: 057251

## SPEAKER

Dr. Eftekhar Eftekharpour  
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Max Rady College of Medicine, University of Manitoba

## BIO

Dr. Eftekhar Eftekharpour is an Associate Professor in the Department of Physiology and Pathophysiology, and the Regenerative Medicine Program, in Rady Faculty of Health Sciences, University of Manitoba. He is a cellular neurobiologist with interest in molecular biology, biochemistry and subcellular neuroimaging. Eftekhar holds a BSc in Animal Sciences and MSc in Human Histology from Tehran University of Medical Sciences in Iran, and is a PhD graduate from Department of Anatomy and Cell biology, University of Saskatchewan. His independent research at the University of Manitoba started in 2014 following a post-doctoral training in neurotrauma at University of Toronto. His research is focused on molecular mechanisms that regulate neuronal autophagy and apoptosis. Using molecular assays and imaging tools, his research has uncovered new concepts in structure and function of lysosome and nucleus in the context of in vitro and in vivo models, as well as human diseases. These discoveries are currently used for translational research in the fields of neurotrauma and neurodegenerative diseases. Eftekhar's research is supported by local, national and international funding agencies.

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## RESEARCH

Despite identification of few mechanisms of neuronal cell death in pathophysiology of Neurodegenerative Diseases, there is currently no effective treatments available, therefore finding new druggable targets remains an unmet clinical need. Damage to neuronal nucleus is a newly identified feature in some neurodegenerative diseases including Alzheimer's Disease. This is identified by proteolytic and physical changes to Nuclear lamina; a protein network at the interface of nuclear envelope and chromatin which plays an important role in regulation of gene expression. Damage to nuclear lamina has been shown to cause epigenetic changes and expression of ancient retroviruses, resulting in neuronal death. We examine the molecular systems that affect neuronal nuclei integrity and downstream changes in in vitro and in vivo models of neurodegeneration. We also show how downregulation cellular antioxidant capacity in aging and diseases affects the nucleus and induces neurodegeneration. This research will advance our knowledge in basic neurobiology and may lead to identification of new therapies.

## OBJECTIVES

1. To review the concept of oxidative distress and eustress and cellular antioxidants.
2. To discuss the involvement of neuronal nucleus in pathology of neurodegeneration.
3. To link oxidative stress to neurodegeneration in a novel mouse model of oxidative stress.