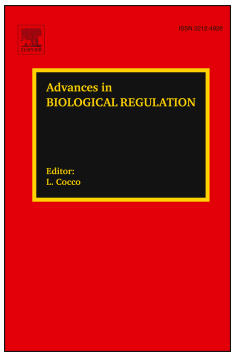
Accepted Manuscript



Systematic analysis of GSK-3 signaling pathways in aging of cerebral tissue

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PII: S2212-4926(18)30108-8

DOI: 10.1016/j.jbior.2018.06.001

Reference: JBIOR 227

To appear in: *Advances in Biological Regulation*

Received Date: 31 May 2018

Revised Date: 19 June 2018

Accepted Date: 20 June 2018

Please cite this article as: Drulis-Fajdasz D, Rakus D, Wiśniewski JR, McCubrey JA, Gizak A, Systematic analysis of GSK-3 signaling pathways in aging of cerebral tissue, *Advances in Biological Regulation* (2018), doi: 10.1016/j.jbior.2018.06.001.

Systematic Analysis of GSK-3 Signaling Pathways in Aging of Cerebral Tissue.

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Abstract

Glycogen synthase kinase-3 (GSK-3) is a constitutively active kinase, involved in regulation of multiple physiological processes. In brain, changes in GSK-3 signaling are related to neurodegenerative issues, including Alzheimer's disease. Due to the wide range of GSK-3 cellular targets, a therapeutic use of the enzyme inhibitors entails significant risk of side effects. Thus, altering the ratio of specific pool of GSK-3 or specific substrates instead of changing the global activity of GSK-3 in brains might be a more appropriate strategy. This paper provides a comprehensive data on abundances of proteins involved in GSK-3 signaling in three regions of young and old mouse brains. It might help to identify novel protein targets with the highest therapeutic potential for treatment of age-related neurodegenerative diseases.

Keywords: GSK-3, brain, cerebellum, cortex, hippocampus, proteome

1. Introduction

Glycogen synthase kinase-3 (GSK-3) is an enzyme playing multiple roles in animal tissues and organs, and brain is not an exception. Apart from involvement in regulation of apoptosis and survival GSK-3 influences neuronal morphology, synapse formation, memory reconsolidation in adult brains, and is a target for treatment of several neurological disorders, including Alzheimer's disease (AD), schizophrenia and bipolar disorder (for review see e.g. Cole, 2012; Guo et al., 2017; Hur and Zhou, 2010; Jope and Roth, 2006; McCubrey et al., 2017; Salcedo-Tello et al., 2011). GSK-3 senses growth factors and other extracellular stimuli