REGIONAL CENTRE FOR BIOTECHNOLOGY

Journal Club

"Nitric Oxide Regulates Mitochondrial Fatty Acid Metabolism Through Reversible Protein S-Nitrosylation"
Science Signaling 6; 256 (2013)

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Wednesday, 23rd April, 2014 ,4.00 PM
Seminar room

Abstract

Cysteine S-nitrosylation is a post translational modification by which nitric oxide regulates protein function and signaling. Studies of individual proteins have elucidated specific functional roles for S-nitrosylation, but knowledge of the extent of endogenous S-nitrosylation, the sites that are nitrosylated, and the regulatory consequences of S-nitrosylation remains limited. We used mass spectrometry–based methodologies to identify 1011S-nitrosocysteine residues in 647 proteins in various mouse tissues. We uncovered selective S-nitrosylation of enzymes participating in glycolysis, gluconeogenesis, tricarboxylic acid cycle, and oxidative phosphorylation, indicating that this post translational modification may regulate metabolism and mitochondrial bioenergetics. S-nitrosylation of the liver enzyme VLCAD [very long chain acyl–coenzymeA (CoA) dehydrogenase] at Cys238, which was absent in mice lacking endothelial nitric oxide synthase, improved its catalytic efficiency. These data implicate protein S-nitrosylation in the regulation of beta-oxidation of fatty acids in mitochondria.