Title:	Studies on the redox regulation of calcium channels in the yeast Saccharomyces cerevisiae
Authors:	Chandel, Avinash (/jspui/browse?type=author&value=Chandel%2C+Avinash)
Keywords:	Biological Sciences Glutathione Biosynthesis Thioredoxins and thioredoxin reductase Calcium homeostasis
Issue Date:	31-Aug-2018
Publisher:	IISERM
Abstract:	Glutathione depletion is a known regulator of apoptosis in the living cells and thus understanding the mechanism and sequence of events that lead to glutathione deletion mediated apoptotic cell death are important. To investigate this, I sought to look into the possible interplay between calcium homeostasis and glutathione depletion. In the present thesis, I demonstrate that glutathione depletion induced apoptosis in yeast is calcium dependent and can be significantly rescued by deletions in the two channels that pump calcium into the cytoplasm, Cch1p and Yvc1p. I also demonstrate that the activation of these transporters during glutathione depletion parallels the changes in the intracellular glutathione redox potential of the cell. In the second aspect of my work, I have investigated how Yvc1p (vacuolar calcium channel) is activated. Since it appeared that Yvc1p was post-transcriptionally regulated by redox, I have investigated if glutathionylation might play a role in the activation of Yvc1p. I show that Yvc1p glutathionylation occurs at specific cysteines and that the process is enzymatically catalyzed. Finally, I investigated in detail the redox sensitivity of plasma membrane calcium channel, Cch1p. The results described here show that Cch1p responds to the redox state of the cell. Subsequent studies revealed, both the rapid and the slow activation modes of Cch1p activation function in a conserved redox-dependent manner. Thus Cch1p is glutathionylated not only under oxidative stress but also under other channel activating conditions. Mutational analysis confirmed that Cch1p glutathionylation occurs at specific cysteine residues which results in channel activation and calcium influx into the cytoplasm. I demonstrate that specific glutathionylation and deglutathionylation contributes to Cch1p regulation.
URI:	http://hdl.handle.net/123456789/959 (http://hdl.handle.net/123456789/959)
Appears in Collections:	PhD-2010 (/jspui/handle/123456789/952)

Files in This Item:

File	Description	Size	Format	
PH10041.pdf (/jspui/bitstream/123456789/959/1/PH10041.pdf)		9.42 MB	Adobe PDF	View/Open (/jspui/bitstream/123456789/959/1/P

Show full item record (/jspui/handle/123456789/959?mode=full) (/jspui/handle/123456789/959/statistics)

Admin Tools

Edit...
Export Item
Export (migrate) Item
Export metadata