Title: The unknown face of IRE1α - Beyond ER stress

Authors: Ahmad Abdullah, Palaniyandi Ravanan

PII: S0171-9335(18)30024-4
DOI: https://doi.org/10.1016/j.ejcb.2018.05.002
Reference: EJCB 51013

To appear in:

Received date: 1-2-2018
Revised date: 3-5-2018
Accepted date: 3-5-2018

Please cite this article as: Abdullah A, Ravanan P, The unknown face of IRE1α - Beyond ER stress, *European Journal of Cell Biology* (2010), https://doi.org/10.1016/j.ejcb.2018.05.002

The unknown face of IRE1α - Beyond ER stress

Ahmad Abdullah and Palaniyandi Ravanan*

Apoptosis and Cell Survival Research Lab, Department of Biosciences, School of Biosciences and Technology, VIT University, Vellore.

*For Correspondence: Dr. P. Ravanan, Associate Professor and Head of the Department of Biosciences, School of Biosciences and Technology, VIT University, Vellore, Tamil Nadu, India - 632014. Email: ravanan.p@vit.ac.in; Fax: 91-416-2243092

Abstract:
IRE1α (Inositol Requiring kinase Enzyme 1 alpha), a transmembrane protein localized to the endoplasmic reticulum (ER) is a master regulator of the unfolded protein response (UPR) pathway. The fate determining steps during ER stress-induced apoptosis are greatly attributed to IRE1α's endoribonuclease and kinase activities. Apart from its role as a chief executioner in ER stress, recent studies have shown that upon activation in the presence or absence of ER stress, IRE1α executes multiple cellular processes such as differentiation, immune response, progression and repression of the cell cycle. Besides its crucial role in protein misfolding, the versatile contributions of IRE1α in other cellular functions are greatly unknown. In this review, we have discussed the structural conservation of IRE1 among eukaryotes, the mechanisms underlying its activation and the recent understandings of the non-apoptotic functions of IRE1 other than ER stress-induced cell death.

Keywords: RIDD, UPR, endoribonuclease, XBP1.

Abbreviations: ER – endoplasmic reticulum; UPR – unfolded protein response ; IRE1 – inositol requiring kinase enzyme 1; XBP1 – x-box binding protein 1; bZIP – basic leucine zipper domain ; HAC1 – histone acetyl transferase 1; ATF – activating transcription factor; RIDD – regulated IRE1 dependent decay; ERAD – ER associated protein degradation; JNK – c-JUN N-terminal kinase; TRAF2 – TNF receptor associated factor 2; NLS - nuclear localization signal; LD - luminal domain; AKT – AK strain transforming; mTOR - mammalian target of rapamycin; BLOC1s1 - biogenesis of lysosome-related organelles complex 1 subunit 1; Bim - Bcl-2 interacting mediator of cell death; Bcl2 – B cell lymphoma 2; DR5 – death receptor 5; CHOP - CCAAT-enhancer-binding protein homologous protein; ERdj4 – endoplasmic reticulum DnaJ 4; GRP78 – glucose regulated protein 78; BiP - binding immunoglobulin protein; PPM1L - protein phosphatase Mg2+/Mn2+ dependent 1L; ROS – reactive oxygen species.