Mohamed M Emara et al., Madridge J Cancer Stud Res. 2018
http://dx.doi.org/10.18689/2640-5180.a3.006

madridge CONFERENCES

International Conference on
Stem Cells and Cell Biology
December 6-7, 2018 Valencia, Spain

Stress Granules as a Possible Modulator of Stem Cell Fate

Mohamed M Emara[1,3]*, Freshteh Palangi[1], Samson M. Samuel[2], Ian R Thompson[1] and **Chris R. Triggle[2]**
[1]Neurological Disorders Research Center, Hamad Bin Khalifa University, Qatar
[2]Weill Cornell Medical College-Qatar, Qatar
[3]Department of Virology, Cairo University, Qatar

Stress Granules (SGs) are dynamic ribonucleoprotein aggregates, which have been observed in cells subjected to environmental stresses, such as oxidative stress and heat shock (HS). Pluripotent stem cells (PSCs) are highly sensitive to oxidative stress, indicating the importance of SGs in regulating stem cell fate. In this study we compared the effects of oxidative (sodium arsenite (SA) and hydrogen peroxide (H_2O_2) and thermal HS) stressors on SG formation in human induced (hi) PSCs. The aim was to establish whether these granules have a role in regulating PSC self-renewal and differentiation. We found that SA and HS, but not H_2O_2, induce SG formation in hiPSCs. The analyses of these granules showed that they are canonical SGs, because (i) they contain the well-known SGs proteins (G3BP, TIAR, eIF4E, eIF4A, eIF3B, eIF4G, and PABP), (ii) they were found in juxtaposition to processing bodies (PBs), and (iii) they were disassembled after the removal of the stress. Consistent with the SG data, SA and HS, but not H_2O_2, promote eIF2α phosphorylation in hiPSCs forming SGs. An initial screening for pluripotent marker proteins recruited to SGs confirmed that LIN28A and L1TD1 were SG markers and identified DPPA5 as a novel pluripotent marker that was weakly recruited to SGs. Altogether; our data introduce new aspects of how hiPSCs respond to adverse environmental conditions.

Biography:

Dr. Mohamed M Emara is a scientist at the Qatar Biomedical Research Institute and an Assistant Professor at Hamad Bin Khalifa University, Qatar. He received a PhD in Molecular Genetics and Biochemistry from Georgia State University in 2007 and did his postdoctoral studies at Harvard Medical School. Dr. Mohamed M Emara main research focus is to use human hiPSCs in neurological diseases modeling with a specialinterest on neurodevelopmental (ASD) and neurodegenerative diseases (PD).Another branch Dr. Mohamed M Emara's lab is to understand the possible role of stress response program components in regulating stem cell self-renewal and differentiation, with special focus on neuronal differentiation.