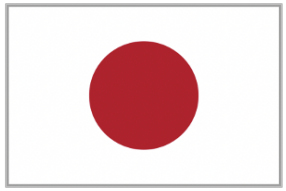


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SERIES 75 (2022-05-30)

Dr. Priyanka Singh, NIEHS/NIH, NC, USA

Series – 75

Date and Time : 2022-05-30 (13:00 – 15:00 JST | 9:30 - 10:30 IST)
Venue : Zoom
Speaker : Dr. Priyanka Singh
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Role of mortalin in pluripotency of human neural fetal progenitor cells

Stemness is a key characteristic property of neural progenitor cells, which encompasses the capability of a cell for self-renewal and differentiation. Their maintenance is a highly organized and strictly controlled with various signaling and pathways. Heat shock proteins (HSP) plays an important role in regulating the stem cell properties using distinct mechanisms such as either by directly regulating the stem cell markers or through controlling the stress, a major factor in inducing differentiation and reducing the progenitor pool. Among various HSPs, mortalin, a HSP70 family protein is known to regulate and alter cell cycle in various conditions such as in cancer cells. In this study, immunocytochemistry analysis showed enriched expression of mortalin in human fetal brain derived neural progenitor cells, which is spread out in axons of differentiated neurons in 21 days of neural differentiation process. Further results showed that downregulation of mortalin reduces the proliferation in these cells examined by Ki67 staining by arresting the cells in the “S phase” of the cell cycle. Interestingly, mortalin downregulation not only arrested the cell cycle but also altered the stemness of these neural progenitor cells by altering the protein and mRNA expression of SOX2 and nestin. Various reports showed the anti-stress properties of mortalin in both stem cells (hematopoietic stem cells) and in non-stem cells. Similar observation was noted in human neural fetal progenitor cells, downregulation mortalin increased the cytokine production and mitochondrial fragmentation (by dysregulating the Drp1 and Mfn2 levels) and increased ATP production. Effect of downregulation mortalin was examined by detecting the size of neurosphere formation, a 3D model of progenitor cells, which was found to be significantly reduced. Suggest, mortalin regulates the stem cell properties and cell cycle in these cells. In addition, the elevated cytotoxic levels also indicate towards the anti-stress property of mortalin in non-toxic conditions as well.

All together, this study highlighted the role of mortalin in regulating the stem cell property of human neural progenitor cells and also suggest its potential strategy in stem cell therapy.