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Past Experience

Uma Ladiwala completed her MBBS and MD (Path) degrees from the Grant Medical College, Mumbai University. Shifting tracks to basic research in the field of neuroimmunology, in Mumbai and later in Sweden (Karolinska Institutet, Huddinge Hospital, Stockholm) and Canada (Montreal Neurological Institute, Montreal; and Calgary) her postdoctoral work included the study of neuro-immune mechanisms of leprosy, and neural-immune interactions leading to damage and regeneration in multiple sclerosis. On returning to Mumbai, she joined the Tata Institute of Fundamental Research as Visiting Scientist. Focussing on adult neural stem cells, she worked on several collaborative projects and also studied the effects of pro-and anti-inflammatory cytokines on adult neural stem cells. She was briefly Principal Scientist at the Stem Cell Centre, Manipal Hospital, Bangalore and joined CBS, Mumbai, in November 2009.

Research Interests

1. The discovery of stem/progenitor cells in the adult mammalian brain by several studies in the last decade, have put to rest the dogma that new neurons are not formed in the adult brain. These neural stem/progenitor cells have the ability to produce new neurons and glial cells, and are found specifically in the subventricular zone and the dentate gyrus of hippocampus. The brain, however, is unable to repair itself adequately after injury or other insult such as trauma, ischaemia or neurodegeneration, despite the presence of these cells, raising questions of how these stem/progenitor cells respond to such insults and whether the outcome can be improved. These insults to the brain are usually accompanied by production of immune mediators including the pro- and anti-inflammatory cytokines. Preliminary data indicate that pro-inflammatory cytokines have damaging effects on these adult neural stem cells which can be prevented by some of the anti-inflammatory cytokines. Further studies to identify mechanisms and signaling pathways involved will be carried out.

2. Two broad categories of stem cells- the embryonic and adult stem cells- are being investigated for cell replacement therapy. Their potential for cell replacement, though promising, is limited by various factors. To overcome these, very recent, groundbreaking research has resulted in the generation of customized, patient-specific stem cells. These cells, known as induced pluripotent stem (iPS) cells are generated by reprogramming adult somatic cells using a set of transcription factors. Much further work is required to generate and differentiate these cells efficiently and without the use of transcription factors that are potentially tumorigenic. Further approaches will use nanofibre scaffolds to study neural differentiation of these iPS cells.

Membership of professional bodies

The Society for Neuroscience
The Asia-Pacific Society for Neurochemistry, India

Selected Publications

Ladiwala U, Lachance C, Simoneau SJJ, Bhakar A, Barker PA, Antel JP. p75 neurotrophin receptor expression on adult human oligodendrocytes : Signaling without cell death in response to NGF. ***J Neuroscience*** *1998; 18 (4): 1297-1304*

Ladiwala U, Li H, Antel JP, Nalbantoglu J. p53 induction by TNF- and involvement of p53 in cell death of human oligodendrocytes. ***J Neurochemistry*** *1999; 73(2): 605-611.*

Hassan-Zahraee M, Ladiwala U, Lavoie PM, McCrea E, Sekaly RP, Owens T, Antel JP. Superantigen presenting capacity of human astrocytes. ***J Neuroimmunol*** *2000; 102(2):131-136*

Corley SM, Ladiwala U, Besson A, Yong VW. Astrocytes attenuate oligodendrocyte death in vitro through an α6 integrin-dependent mechanisms. ***Glia*** *2001; 36:281-294.*

DeSouza L and Ladiwala U*, Daniel S, Agashe S, Vaidya R, Vaidya V. Adult – onset hypothyroidism decreases hippocampal neurogenesis in the rat brain.* ***Mol Cell Neurosci*** *2005; 29: 414-426. (* Joint first authors)*