Using Stem Cells to Repair the Damaged Brain

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CURRENT RESEARCH

Harnessing mechanical cues to improve neural stem cell transplant therapy

Loss of healthy brain tissue is central to debilitating neurological diseases such as Alzheimer's disease, Parkinson's disease, spinal cord injury, stroke, etc. In these *neurodegenerative diseases*, many different types of brain cells are damaged or die. Without these cells, the brain is unable to perform the complicated computations needed for even simple everyday tasks. Dr. Medha Pathak, of the University of California, Irvine, combines sophisticated approaches from biology and physics with the goal of developing stem-cell based treatments for repairing the damaged brain.

Neural stem cells can generate the variety of cell types required for healthy brain function. By transplanting neural stem cells into the brain of patients, one hopes to replace and repair damaged brain cells. This therapy promises to improve the quality of life for millions patients suffering from neurodegenerative diseases. However, several challenges remain in successful neural stem cell transplant therapy.

One significant bottleneck is directing the fate of cells after transplantation. Physicians need to be able to coax the transplanted cells to migrate towards the region of the damage and to produce the kinds of cells or molecules needed for repair. Mechanical cues encountered by neural stem cells such as stiffness, texture and movement in the surrounding tissue, powerfully modulate these processes. Understanding how mechanical signals affect neural stem cells is key in creating more effective neural stem cell transplant therapy.

Current projects include:

- Stem cell therapy: Dr. Pathak and colleagues have recently discovered how mechanical signals direct neural stem cell...

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AFFILIATION

University of California, Irvine

EDUCATION

- Ph.D., in Biophysics, 2006 , University of California, Berkeley
- M.Sc., in Life Sciences (Neuroscience), 2000 ,National Centre for Biological Sciences, Bangalore, India
- B.Sc,. in Biochemistry, 1996 , St. Xavier's College, Ahmedabad, India

AWARDS

- UCI Department of Physiology Research Accomplishments Award, 2014
- Helen Hay Whitney Postdoctoral Fellowship, 2008-2011
- Junior Research Fellowship, National Centre for Biological Sciences, India, 1996-2000
- Summer Research Fellowship, Jawaharlal Nehru Centre for Advanced Scientific Research, 1996
- The Siddharth Bhatt Memorial Prize for all-round performance, St. XavierÃ¢??s College, Ahmedabad, India, 1996
- and 1 more...

RESEARCH AREAS

Health & Wellness, Longevity, Immortality Research

FUNDING REQUEST

Your contributions will support the continued research of Dr. Medha Pathak as she discovers ways to convert external mechanical information into biochemical signals in human neural stem cells. Your donation will fund the necessary $300K per year for researcher salaries, stem cell reagents, lab supplies, in vivo experiments and equipment. Your help will fund research responsible for treatments for neurodegenerative disorders of all kinds!