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Direct conversion of pluripotent human embryonic stem cells into functional human neuronal or cardiomyocyte cell therapy derivatives for regenerative medicine

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Given the limited capacity of CNS and heart for self-repair/renewal, cell-based therapy represents a promising therapeutic approach closest to provide a cure to restore normal tissue and function for neurological and cardiovascular disorders. Derivation of human embryonic stem cell (hESCs) from the in vitro fertilization (IVF) leftover embryos has brought a new era of cellular medicine for the damaged CNS and heart. Recent advances and technology breakthroughs in hESC research have overcome some major obstacles in moving stem cell research from animals towards humans trials, including resolving minimal essential human requirements for de novo derivation and long-term maintenance of clinically-suitable stable hESC lines and direct conversion of such pluripotent hESCs into a large supply of clinical-grade functional human neuronal or cardiomyocyte cell therapy products. Such breakthrough stem cell technologies have demonstrated the direct pharmacologic utility and capacity of hESC cell therapy derivatives for human CNS and myocardium regeneration and, thus, have presented the hESC cell therapy derivatives as a powerful pharmacologic agent of cellular entity for CNS and heart repair. The availability of human stem/progenitor/precursor cells in high quality and large commercial scales with adequate cellular neurogenic or cardiogenic capacity will greatly facilitate developing safe and effective cell-based regenerative therapies against a wide range of CNS and heart disorders. Transforming non-functional pluripotent hESCs into fate-restricted functional human cell therapy derivatives dramatically increases the clinical efficacy of graft-dependent repair and safety of hESC-derived cellular products, marking a turning point in cell-based regenerative medicine from current studies in animals towards human trials.

Biography

Xuejun H Parsons received her PhD in Biochemistry/Molecular/Cell Biology from Cornell University, and completed her PostDoc studies as a Leukemia and Lymphoma Society Research Fellow at University of California (UC). She has been supported by grants from NIH to become an independent investigator and leader in human embryonic stem cell research. She is the Founder of San Diego Regenerative Medicine (RM) Institute, Xcelthera, and California Consortium for RM Startup. Previously, she was a stem cell scientist/faculty at UC. She is inventor and corresponding author of more than 20 articles and serves on editorial boards of open access scientific journals.

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