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Human induced pluripotent stem cells are invaluable tools in the investigation of *in-vitro* disease modeling, drug testing, and *in-vivo* cell replacement therapies

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An adult heart has an intrinsically limited capability to regenerate damaged myocardium, regardless of the underlying etiology. Embryonic and induced pluripotent stem cell (ESC/iPSC)- based therapies offer a unique strategy for developing cell replacement therapies for numerous, varied disorders including cardiac diseases. iPSCs hold great promise in the field of regenerative medicine because of their ability to grow indefinitely and give rise to all cells of the body. Both ESC and iPSCs have been invaluable tools in the investigation of *in-vitro* disease modeling, drug testing, and *in-vivo* cell replacement therapies. The major advantages of iPSCs for cell transplantation are that these cells are patient-specific, thereby reducing the risk for graft rejection and secondly, evade the moral and ethical issues concerning ESCs. Human iPSCs have now been generated from several human tissues using a variety of approaches. Most commonly, human iPSCs are generated from dermal fibroblasts due to their accessibility and relatively high efficiency of reprogramming. Many doctors are exploring the use of stem cell therapy for many diseases including neurodegenerative, diabetes, rheumatological and hematological disease. Even though iPSCs have been used in preclinical animal models of cardiac failure with promising results, but it still has many limitations. Recently investigators shown that pluripotent stem cells produce tissue-specific lineages through the programmed acquisition of sequential gene expression patterns that function as a road map for organ formation, therefore, identifying a procardiogenic network that promotes iPSCs differentiation to favor a cardiac lineage is of great interest. Since adult human hearts have very little ability to regenerate postnatally, stem-cell-based cardiac regeneration has also been considered as a therapeutic approach to treat ischemic heart disease. Since these cells have been shown to migrate to sites of injury and inflammation in response to soluble mediators including the chemokine stromal cell derived factor-1 (SDF-1 also known as CXCL12). Here we studied the role of SDF-1 and its receptors; CXCR4 and CXCR7 in transformation of pluripotent stem cells into IPSC-derived cardiomyocytes and also in SDF-1-directed migration of IPSCs with the premise that their improved recruitment could translate to therapeutic benefits

Biography

Sima T Tarzami is currently the Assistant Professor in Howard University, USA.

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