Aims & Scope:

Accumulating evidence indicates that mesenchymal stem cells can differentiate into each cell type in musculoskeletal tissues, including bone, cartilage and intervertebral disc tissues. Owing to the avascular, tissue-specific and immune privilege hallmarks, intervertebral disc degeneration is relatively complicated in terms of hypoxia, nutrition deprivation, deregulated cytokines and immune privilege scenarios, unbalanced synthesis and degradation. Moreover, the definite cell markers of annulus fibrosus and nucleus pulposus as main subparts of the disc remain elusive, which is fundamental for determining the efficiency of stem cell differentiation. It is noteworthy that progenitor cells have been identified in each subpart of human intervertebral disc, evidencing the endogenous repair potential of the disc per se. Furthermore, it has been noted that stem cells express functional FasL pertinent to novel function of immune privilege reinforcement other than differentiation and synthesis of extracellular matrix. To fully harness stem cells for disc tissue engineering, suitable biomaterial scaffolds are essential for facilitating effective delivery of the cells and providing optimized niche for tissue regeneration. The advances in biomaterials have expedited stem cell tissue engineering for disc regeneration. In this issue, we address each novel and traditional aspect in stem cell therapies for intervertebral disc degeneration in terms of various standpoints from different principal investigators, with the aim for clearing silos between basic research and clinical application of stem cells. Undoubtedly, the issue will distill the latest progression pertaining to stem cells and consequently provide beneficial insights for researchers and clinical professionals.

Key words:

Intervertebral disc degeneration; stem cells; nucleus pulposus; annulus fibrosus; bioreactors; scaffolds; immune privilege; toll-like receptors

Subtopics:

Defining NP cell phenotype: A necessity for stem cell therapies to treat intervertebral disc disease.

The endogenous repair potential of the intervertebral disc.

Harnessing the potential of Mesenchymal stem cells for IVD regeneration.

Engineering Bioreactors for the in vitro study of causes for human intervertebral disc degeneration.

Scaffold materials for stem cell therapies for intervertebral disc degeneration.

Toll like receptors and stem cells in intervertebral disc degeneration.
Stem Cell Therapies for intervertebral disc degeneration: immune privilege reinforcement by Fas/FasL regulating machinery.

Schedule:

Manuscript submission deadline: Dec 2014
Peer Review Due: Jan 2015
Revision Due: Feb 2015
Notification of acceptance by the Guest Editor: Feb 2015
Final manuscripts due: Feb 2015