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The presence of stem cells in potential stem cell niches of the inter-vertebral disc region: An *in vitro* study on rats

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International

The potential of stem cell niches (SCNs) in the inter-vertebral disc (IVD) region, which may be of great significance in the regeneration process, was recently proposed. To the best of our knowledge, no previous *in vitro* study has examined the characteristics of stem cells derived from the potential SCN of IVD (ISN). Therefore, increasing knowledge on ISN-derived stem cells (ISN-SCs) may provide a greater understanding of IVD degeneration and regeneration processes. We aimed to demonstrate the existence of ISN-SCs and to investigate their characteristics in vitro. Sprague-Dawley rats (male, 4-weeks-old) were used in this study. ISN tissues were separated by ophthalmic surgical instruments under a dissecting microscope according to the anatomical areas. Cells isolated from the ISN tissues were cultured and expanded *in vitro*. Passage 4 (P4) populations were used for further analysis with respect to colony-forming ability, cellular immune phenotype, cell cycle, stem cell-related gene expression, and proliferation and multi-potential differentiation capacities. In general, the ISN-SCs met the minimal criteria for the definition of multi-potent mesenchymal stromal cells (MSCs), including adherence to plastic, specific surface antigen expression and multi-potent differentiation potential. The ISN-SCs also expressed stem cell-related genes that were comparable to those of bone marrow mesenchymal stem cells (BMSCs), and had colony-forming and self-renewal abilities. To the best of our knowledge, this is the first *in vitro* study aimed towards determining the existence and characteristics of ISN-SCs, which belong to the MSC family according to our data. This finding may be of great significance for additional studies that investigate the migration of ISN-SCs into the IVD, and may provide a new perspective on different biological approaches for IVD self-regeneration.

Biography

Rui Shi completed his MD from Southeast University and is currently pursuing PhD at Southeast University.

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