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# AMNIOTIC FLUID DERIVED MESENCHYMAL STEM CELLS AND THEIR POTENTIAL APPLICATIONS IN REGENERATIVE MEDICINE

**Seyed Mehdi Hoseini<sup>1</sup>, Seyed Mehdi Kalantar<sup>2</sup>, Behrouz Aflatoonian<sup>3</sup> and Maryam M Matin**

<sup>1</sup>Ferdowsi University of Mashhad, Iran

<sup>2</sup>Research and Clinical Center for Infertility, Shahid Sadoughi University of Medical Sciences, Iran

<sup>3</sup>Stem Cell Biology Research Center, Yazd Reproductive Sciences Institute, Shahid Sadoughi University of Medical Sciences, Iran

**I**ntroduction: Based on self-renewal/differentiation capacity and the origin, stem cells are classified into three major categories, pluripotent, fetal and adult. Fetal stem cells can be derived either from fetus or extra-embryonic structures including umbilical cord blood, Wharton's jelly, amniotic fluid, amniotic membrane and placenta. Amniotic fluid contains a mixture of different cell types sloughed from the fetal skin, respiratory, alimentary and urogenital tracts, as well as the amnion membrane. As amniotic fluid develops prior to the process of gastrulation, many cells found in its heterogeneous population do not undergo lineage specialization. Therefore amniotic fluid-derived mesenchymal stem cells (AF-MSCs) may correspond to a new class of stem cells with properties of intermediate plasticity between pluripotent and adult stem cell types. Thus they have some unique features which make them fascinating for researchers, such as differentiation into cells derived from three germ layers, high clonal capacity, ability to form embryoid bodies, expression of pluripotent markers, high self-renewal capacity (over 250 population doublings) with normal karyotype at late passages, long telomere length due to continued telomerase activity, specially non-tumorigenicity, low immunogenicity, anti-inflammatory and immunomodulatory properties for their applications in regenerative medicine.

smkalantar@yahoo.com