Introduction

A stem cell is a cell that has the ability to divide for indefinite periods – often throughout the life of an organism . The stem cells, when provided with the right signals , have the potential to differentiate into different types of cells that constitute an organism . These cells when differentiated can have a characteristic shape and specialized functions , such as heart cells , skin cells or nerve cells. In short, stem cells have two distinctive properties , one they can make identical copies of themselves for a long period of time (self renewal) and two give rise to mature cells that have a characteristic morphology and function . (1)

Typically stem cell generates an intermediate cell type or different cell types prior to achieving a mature differentiated state. The intermediate cell is called a precursor or progenitor cell . (1.2)

Precursor or progenitor cells in fetus or adults are partially differentiated cells and eventually divide and give rise to mature differentiated cells. These cells tend to differentiate only along a particular cellular development pathway; however, some recent studies have shown that this may not be as definitive as was once thought. (1.2)

Their use in orthopedics has gained significant momentum in past few years and researches were done on their use in various orthopedic subspecialties .[3]

Femoral head osteonecrosis most frequently occurs in young individuals , and because the results of arthroplasties for this group indicate that many patients will need to have more than one procedure in their life time so a treatment preserving femoral head instead of replacing it is preferable whenever possible . [4]

Aseptic non-traumatic osteonecrosis of the femoral head is a painful disorder of the hip that can lead to femoral head collapse and the need for total hip replacement . [4]

Core decompression of the hip is one of the most commonly done surgical procedures to treat the early stages of osteonecrosis of the femoral head . [5]

Stem cells (mononuclear cells derived from bone marrow) are able to elicit formation of new blood vessels by the presence of endothelial cell progenitors or hemangioblasts in this cell fraction . [6]

This may be due to both supply of progenitor cells and angiogenic cytokines produced by stem cells . [7]

Replacement of necrotic bone at an early stage of the disease to promote osteogenesis and angiogenesis using genetically engineered bone marrow stem cells may provide better outcomes for patients with the disease.[8]