

Microenvironmental factors involved in human amnion mesenchymal stem cells fate decisions

Abstract

Human amnion mesenchymal stem cells (HAMCs) show great differentiation and proliferation potential and also other remarkable features that could serve as an outstanding alternative source of stem cells in regenerative medicine. Recent reports have demonstrated various kinds of effective artificial niche that mimic the microenvironment of different types of stem cell to maintain and control their fate and function. The components of the stem cell microenvironment consist mainly of soluble and insoluble factors responsible for regulating stem cell differentiation and self-renewal. Extensive studies have been made on regulating HAMCs differentiation into specific phenotypes; however, the understanding of relevant factors in directing stem cell fate decisions in HAMCs remain underexplored. In this review, we have therefore identified soluble and insoluble factors, including mechanical stimuli and cues from the other supporting cells that are involved in directing HAMCs fate decisions. In order to strengthen the significance of understanding on the relevant factors involved in stem cell fate decisions, recent technologies developed to specifically mimic the microenvironments of specific cell lineages are also reviewed.