

Human breast milk is a rich source of multipotent mesenchymal stem cells. Patki S, Kadam S, Chandra V, Bhonde R.

Source

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Abstract

Putative stem cells have been isolated from various tissue fluids such as synovial fluid, amniotic fluid, menstrual blood, etc. Recently the presence of nestin positive putative mammary stem cells has been reported in human breast milk. However, it is not clear whether they demonstrate multipotent nature. Since human breast milk is a non-invasive source of mammary stem cells, we were interested in examining the nature of these stem cells. In this pursuit, we could succeed in isolating and expanding a mesenchymal stem cell-like population from human breast milk. These cultured cells were examined by immunofluorescent labeling and found positive for mesenchymal stem cell surface markers CD44, CD29, SCA-1 and negative for CD33, CD34, CD45, CD73 confirming their identity as mesenchymal stem cells. Cytoskeletal protein marker analysis revealed that these cells expressed mesenchymal stem cells markers, namely, nestin, vimentin, smooth muscle actin and also manifests presence of E-Cadherin, an epithelial to mesenchymal transition marker in their early passages. Further we tested the multipotent differentiation potential of these cells and found that they can differentiate into adipogenic, chondrogenic and osteogenic lineage under the influence of specific differentiation cocktails. This means that these mesenchymal stem cells isolated from human breast milk could potentially be "reprogrammed" to form many types of human tissues. The presence of multipotent stem cells in human milk suggests that breast milk could be an alternative source of stem cells for autologous stem cell therapy although the significance of these cells needs to be determined.