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Inducing apoptosis: A possible mechanism for anti-cancer property of the amniotic epithelial stem cells

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Abstract

Amniotic membrane (AM), the innermost layer of human placenta, is a rich source of pluripotent stem cells like amniotic epithelial cells. Several studies have proposed a possible anti-cancer effect for the AM. However, the AM cannot be used to control cancer as it may induce angiogenesis and therefore promote metastasis. We have previously reported that the amniotic epithelial cells have anti-angiogenesis properties. This study was designed to evaluate the mechanism and strength of the anti cancer effect of the amniotic epithelial cells and compare it with the anti cancer effect of the AM. Cancer cells from different cell lines were cultured in presence of amniotic epithelial cells or amniotic membrane derived medium. The cultures were evaluated during several 24-hour periods via multimedia technique. We found that both amniotic epithelial cells and condition medium of the AM significantly reduced the cancer cells proliferation, viability and motility. After MTT assay for confirmation of the decrease in cancer cells viability, we further evaluated the possible induction of apoptosis using immunocytochemistry. We observed a significant increase in caspase-8 and caspase-3 expression in cancer cells that were co-cultured with amniotic epithelial cells. This study confirms anti-cancer effect of the amniotic epithelial cells, probably through induction of apoptosis; an effect that makes amniotic epithelial cells a new potential candidate for treating different types of cancer.

Biography

Mahsa Khayat-Khoei is a final year medical student in Shahid Beheshti University of Medical Sciences. She has been among the exceptionally talented students since middle school. She has been involved in many research projects and has a great interest in different aspects of stem cell research. Apart from her publication, she has patented a new drug derived from the amniotic membrane to control cancer. She has presented her different researches in many national and international congresses, most recently in the second cell science and stem cell research congress in San Antonio, TX.

Hassan Niknejad has his Pharm.D from Tehran University and completed Ph.D at the age of 32 years from Shahid Beheshti University of Medical Sciences in Iran. He is the research director and assistant professor in Nanomedicine and Tissue Engineering Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. He has published about 7 papers in reputed journals and a chapter on Stem Cells in Parkinson's Disease in the book: Mechanisms in Parkinson's Disease.