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The effects of amniotic membrane on angiogenesis

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A mniotic membrane (AM), the closest layer of human placenta to the foetus, is composed of a single layer of epithelial cells, A basement membrane and an avascular stroma containing mesenchymal cells. The AM secretes several growth factors and chemokines which give the AM its properties including anti-microbial, anti-fibrosis and immunoregulatory. There are, however, controversial reports on the effect of the AM on angiogenesis. It has been reported that the AM contains anti-angiogenic factors including interleukin (IL)-1 receptor antagonist, TIMP3, TIMP4, anti-inflammatory proteins and natural inhibitors of various proteases. On the other hand, the amniotic mesenchymal cells secrete several angiogenic factors such as IL-6, IL-8, growth-related oncogene, monocyte chemoattractant protein-1 and intravascular adhesion molecules. These cells also have the capability to differentiate into endothelial cells. Moreover, the basement membrane of the AM, which contains extracellular matrix components such as types I, III, IV, V collagen, laminin, fibronectin and perlecan, can induce proliferation of endothelial cells. Due to this fact that the majority of anti-angiogenic factors are mostly secreted from the amniotic epithelial cells and not the whole AM, this study was designed to evaluate the effects of the AM with or without epithelial cells on angiogenesis.

Evaluated by the aorta ring assay and invital microscopy in rat, we found that the AM without amniotic epithelial cells can promote angiogenesis. The angiogenic effect of the AM was side dependent and mesenchymal side of the AM induced a higher level of angiogenesis. This effect of the AM can be beneficial in treating ischemic vascular diseases

Biography

Mahsa Khayat-Khoei is a last 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 interest in stem cell therapy. She has one publication and one patent submission.

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