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Xenogenic application of amniotic fluid derived goat mesenchymal stem cells on wound healing model

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The aim of the present study was to evaluate the wound healing potential of fully characterized caprine amniotic fluid derived mesenchymal stem cells(cAF-MSCs) in full skin thickness excisional wounds on rabbit model. Amniotic fluid MSCs were isolated, expanded and characterized by MSC specific cell surface markers (CD-73, CD-105, CD-34, STRO-1). Furthermore, characterized MSCs were differentiated into adipogenic, osteogenic and chondrogenic lineages under appropriate culture conditions and were flow cytometrically quantified using antibodies against lineage specific markers (PPAR- α , osteopontin and type-2 collagen). To check the wound healing potential of the characterized cAF-MSCs, full-skin thickness excisional wounds were created on either side of the dorsal midline (thoracolumabar region) of the New Zealand white rabbits (4n). Thesewounds (8n) were randomly assigned to subcutaneous injection of either cAF-MSCs (4n), or sterile phosphate buffered saline (PBS; 4n), which served as control. The wound healing was assessed by periodic evaluation of wound contraction, epithelisation, neovascularization and collagen characteristics up to 28 days after creation of the wound. Wound contraction was found significantly (p<0.05) higher in cAF-MSCs treated wounds as compared with PBS wounds especially on 14th and 21st day post-surgery. Histomorphological examination of the healing tissue showed better epithelisation along with significantly advanced neovascularisation, and collagen development in cAF-MSCs treated wounds than in control wounds. In conclusion, cAF-MSCs represents a promising source of mesenchymal stem cells with high proliferative and differentiation potential andthese cells offer their scope for multiple regenerative therapies.