

Comparative analysis of in vitro proliferative, migratory and pro-angiogenic potentials of bovine fetal mesenchymal stem cells derived from bone marrow and adipose tissue

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Mesenchymal stem cells (MSCs) are found in virtually all tissues, where they self-renew and differentiate into multiple cell types. Cumulative data indicate that MSCs secrete paracrine factors that may play key roles in the treatment of various acute and chronic pathological conditions in diverse animal species including cattle. The aim of the present study was to compare the potentials for proliferation, migration and pro-angiogenesis of bovine fetal BM-MSCs and AT-MSCs under in vitro conditions. Growth curves and population doubling time (PDT) were determined for BM-MSCs and AT-MSCs in order to compare in vitro cell proliferation potentials. The ability of BM-MSCs and AT-MSCs to migrate was evaluated by scratch plate and transwell migration assays. The pro-angiogenic potential of conditioned medium from BM-MSCs and AT-MSCs was compared using an endothelial cell (EC) tubule formation assay. BM-MSCs displayed higher proliferation curves and doubled their populations in fewer days compared to AT-MSCs. No significant differences were detected in the number of migrant cells between BM-MSCs and AT-MSCs; however, a higher migration value was detected for BM-MSCs compared to fibroblasts (FBs), and a higher number of migrant cells were attracted by DMEM supplemented with 5% fetal bovine serum (FBS) compared to stromal cell-derived factor-1 (SDF-1). More tubules of ECs were formed after exposure to

concentrated conditioned medium from AT-MSCs compared to BM-MSCs, FBs or DMEM controls. Despite common mesodermal origin, BM-MSCs display higher proliferative capacity and lower pro-angiogenic potential compared to AT-MSCs; however, both cell types possess similar migratory ability.