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Characterization of Alpaca (*Vicugna pacos*) adipose derived mesenchymal stem cell population

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Alpaca (*Vicugna pacos*) is a domesticated species of South American Camelid, being one of the most valuable fiber-bearing animals, which is of great interest in the textile industry. On the other hand, family *Camelidae* is in the spotlight in antibody engineering, because of possessing unique functional heavy chain antibodies, which can be produced and modified in vitro as a single domain antibody (sdAb or nanobody) with full antigen binding ability. Adult mesenchymal stem cells (MSC) are multipotent cells able to differentiate into adipogenic, condrogenic and osteogenic lineages. Initially MSC source has been bone marrow, however in recent years currently adipose tissue-derived stem cells (ADSCs) has been shown as an interesting alternative source, making these cells particularly attractive for therapeutic exploitation and also as a prominent prophylactic remedial, in many species. The aim of this work was to develop a protocol to isolate, grow and characterize alpaca MSCs from adipose tissue. Gene expressions of stem cell marker and early transcription factors have been evaluated. In addition considering the role of metalloproteinases in migration and facilitating homing to the injured tissue, a study of *MMP-2* gene expression has been done. Adipose tissue was taken from the omentum, after Alpaca were slaughtered, in a slaughterhouse from Perú. The tissue was digested with collagenase I for 60 minutes at 38ºC and then isolated by filtration and centrifugation. MSCs were cultured in DMEM medium at 7000 cell/cm2 with 10% alpaca serum and incubated at 38ºC, 5% CO2 and 90% humidity. At 3rd passage, cells were characterized by flow cytometry and RT-PCR. Phase contrast microscopy showed spindle-shaped fibroblastic cell morphology. Flow cytometry analyzed cells in terms of size, as measured by the forward scattered light (FSC), and granularity, measured by the side ward scattered light (SSC). RT-PCR reveals the expression of *Oct4, Runx2, Sox9, PPAR* and *MMP-2*. We point out particular attention, to splice isoforms founds in RunX2. In conclusion, as far as we know, we described for the first time an Alpaca mesenchymal stem cell population. Further investigations on MSC differentiation into specific tissues may lead to the development of novel strategies related with textile industry as well as to implement veterinary medicine treatment of lessons to the locomotors system and also as a novel prophylactic remedies against respiratory infectious diseases that decreased animal production.

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