



Generation of bovine (*Bos indicus*) and buffalo (*Bubalus bubalis*) adipose tissue derived stem cells: isolation, characterization, and multipotentiality

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ABSTRACT. Adult stem cells are known for their plasticity and their potential to differentiate into several different cell types; these characteristics have implications for cell therapy and reproductive biotechnologies. In this study, we report on the isolation and characterization of mesenchymal stem cells (MSC) derived from bovine and buffalo adipose tissue. Cells isolated using enzymatic digestion of

bovine and buffalo adipose-tissue biopsy samples were grown *in vitro* for at least 15 passages, verifying their capacity to proliferate. These cells were also subjected to immunophenotypic characterization for the presence of CD90, CD105, and CD79, and the absence of CD45, CD34, and CD73, which are positive and negative markers of MSC, respectively. To prove their multipotency, the cells were induced to differentiate into three different cell types, chondrocytes, osteoblasts, and adipocytes, which were stained with tissue-specific dyes (Chondrogenic-Alcian Blue, Osteogenic-Alizarin Red, and Adipogenic-Oil-Red O, respectively) to confirm differentiation. Gene expression analysis of pluripotency-related genes was also conducted. Our results suggest that adipose tissue from bovines and buffalos can be used as a source of MSC, making adipose tissue-derived cells an interesting option for cell therapy and regenerative medicine. Additionally, these findings have implications for reproductive biotechnology because the use of MSC as nuclear donors has been linked to an increase in the efficiency of nuclear transfer.

Key words: Cell therapy; Mesenchymal stem cells; Adipose tissue; Cattle; Buffalo