CHARACTERIZATION OF MULTIPOTENT EQUINE ADIPOSE TISSUE-DERIVED PROGENITOR CELLS. CLINICAL CASE REPORTS OF ALLOGENEIC CELL THERAPY IN HORSES.

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Introduction. In horses, stem cell therapies are a promising tool to the treatment of many injuries, which are common consequences of athletic endeavor, resulting in high morbidity and often compromising the performance. Previously, we reported the isolation and differentiation of equine adipose tissue-derived progenitor cells (eAT-PC) into mesodermal derivates and also showed the potential of these cells to maintain their stemness even after cryopreservation. The aim of this study was further characterization of eAT-PC differentiation potential and application of eAT-PC for the treatment of tendinopathy in horses.

Methods. eAT-PCs were isolated from biopsies of the thigh, with informed consent of horse owners under signature of a veterinary service contract. Cell expansion was performed in a humidified incubator with 5% CO2 at 37°C. The cells were harvested at passage 6 (P6) for protein and RNA extraction and at P8 for differentiation experiments.

Results. After the induction of mesodermal differentiation, the cells presented first stages of morphological changes similar to muscle cells, as day 3. Myosin, α-actinin and MyoD1 antibodies showed positive immunostaining with progenitor cells confirming muscle cells differentiation. Neural cells differentiation was evidenced by morphological changes, which lead to increased cell flattening and nucleus dislocation. Osteogenic differentiation was evidenced by mineralization of extracellular matrix and positivity for osteogenic markers at 14 days of differentiation. Chondrogenic differentiation was evidenced by calcified extracellular matrix in experimental culture and positivity for chondrogenic markers.

Conclusion. Our findings classify eAT-PC isolated and cultured from horse adipose tissue explants as a promising tool for cell therapy, and our preliminary results provide new insights into the mechanisms underlying their regenerative effects. Further studies are needed in order to understand the mechanisms of their action on damaged tissues recuperation.

Supported by: [List of funding agencies if available]