Improved functional recovery of osteoarthritic knee joint after treatment with chondrogenically induced multipotent cells

ABSTRACT

The aim of this study was to quantify the functional improvements of osteoarthritic (OA) knee joints after treatment with chondrogenically induced pluripotent stem cells. OA was induced in the right knee joints by the resection of the anterior cruciate ligament and medial meniscus. Nine sheep were divided equally into 3 groups. Two treatment groups received either autologous chondrogenically induced adipose-derived stem cells (ADSCs) or bone marrow stem cells (BMSCs), while the control group received basal medium. Electromyography evaluations (EMGs) were conducted at week 0 (pre-OA), 8 (post-OA) and 24 (post-treatment), and compared to ascertain recovery in joint function. Multifocal subchondral lesions were developed after OA inductions and the treatment groups demonstrated the presence of regenerated neocartilages, evidenced by the presence of PKH26 tracking dye. Post-treatment EMGs showed that the controls retained significant reductions in amplitude compared to the pre-OA values, whereas ADSCs and BMSCs samples had no further significant reductions in amplitude post treatments ($p<0.05$). ADSCs and BMSCs treated knee joints had structural regeneration of cartilage; confirmed by PKH26 dye. The EMG analysis provided evidence of functional recovery associated to the structural regenerations.

Keyword: Cell therapy; Cartilage regeneration; Mesenchymal stem cells; EMG