

## Amnion derived epithelial stem cells for the treatment Osteochondritis in a equine model

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Repair of articular cartilage defect, occurring as a result of osteoarthritis, fracture, fragmentation, or surgical debridement of Osteochondritis dissecans (OCD) lesions or subchondral bone cysts, represents a significant challenge for orthopaedic surgeons.

Articular cartilage regeneration, following injury is impaired by inherently poor vascular supply and the limited cellular content of hyaline cartilage. Greater Challenges present with larger defect and with subchondral bone involvement and currently no "gold standard" technique exists for repair of such defects.

OCD, a disruption of endochondral ossification, is a common orthopaedic developmental disease in many species, including humans and horses, and results in separation and instability of the overlying articular cartilage.

Equine models are currently recommended for preclinical assessment of new strategies for cartilage repair as they provide the closest approximation to humans in terms of cartilage thickness.

Amnion-derived epithelial stem cells (AECs) are considered a promising source for the treatment of orthopedic diseases. AECs demonstrated to be very effective in tendon tissue regeneration both in experimental and clinical studies, but a direct response of the synovial joint to intra-articular injection of heterologous AECs was never been performed. Furthermore, recent studies demonstrated the low immunogenicity of these cells and their immunomodulatory effect. We tested and studied the clinical response to repeated intra-articular injection of AEC in a 3 year-old saddle horse with spontaneous bilateral OCD of the knee. Clinical signs included joint swelling and light bilateral lameness; radiographs showed a typical OCD picture with involvement of the femoral trochlear ridges and of the patella. After aseptic preparation of the knees, an aliquot of  $10^6$  AECs in 500  $\mu$ l of  $\alpha$ MEM was injected into each joint. The procedure was repeated after two months. Neither adverse reactions nor signs of discomfort were noted following the injection. Clinical and radiographic details showed a significant improvement during the year after the treatment. Actually the horse is used for pleasure and jumping activities with satisfaction of the owner. The repeated injection of ovine AECs into the joints of a horse did not cause any negative reaction but rather a clinical improvement and this confirms the immunomodulatory properties of these cells. The clinical and radiographic data suggest that repeated intra-articular injection of AECs could help the recovery of OCD affected joints.

Further studies are needed but these promising results could demonstrate the effective clinical use of this cell-based therapy and could show potential for clinical translation to human patients.