Different regenerative strategies for the treatment of degenerative joint disease in a large animal model

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Degenerative joint disease (DJD) is a major cause of reduced athletic function and retirement in human and equine performers. Medical treatment for DJD may include anti-inflammatory and analgesic drugs to reduce inflammation and pain, and so-called disease-modifying drugs. Nevertheless, the aforementioned therapies are merely aimed at alleviating the symptoms or enhancing clinical recovery, without inducing an actual regeneration of the affected joint. The field of equine regenerative medicine is drawing increasing attention in the scientific community for its treatment strategies of joint pathologies. Mesenchymal stem cells (MSCs) are of specific therapeutic interest as they can differentiate in vitro towards cells with chondrocyte morphology and produce cartilage-specific components such as collagen type II and glycosaminoglycans. Moreover, horses may serve as a valuable large animal model for the evaluation of new human therapies concerning in vivo efficiency and safety, due to interspecies similarities in thickness of the non-calcified cartilage of the stifle joint. Twenty horses with naturally occurring DJD in the fetlock joint were divided in 4 groups and injected with: 1) platelet-rich plasma (PRP); 2) MSCs; 3) MSCs and PRP; or 4) chondrogenic induced MSCs and PRP. Evaluation was performed after 6 weeks (T₁), 12 weeks (T₂), 6 months (T₃) and 12 months (T₄). Subsequently, 30 horses with the same medical background were randomly assigned to one of the two combination therapies and evaluated at T₁. The combined use of PRP and MSCs significantly improved the functionality and sustainability of damaged joints from 6 weeks until 12 months after treatment, compared to PRP treatment alone. The highest short-term clinical evolution scores were obtained with chondrogenic induced MSCs and PRP.

Biography

Jan H Spaas, Veterinarian, graduated from the Faculty of Veterinary Medicine, Ghent University (Belgium) in 2010. In that year he also won the prize for young authors of the Flemish Veterinary Journal. He completed his PhD at the Department of Comparative Physiology and Biometrics of the Faculty of Veterinary Medicine, Ghent University. Since 2012, he became the laboratory Director of Global Stem Cell Technology, an organization that is specialized in regenerative therapies for horses. He is the industrial promotor of PhD and master students who actively participate in the company’s research program.

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