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Animals and people: how One Medicine can help developing cell therapies

According to the World Health Organization, the One Health approach considers the health of humans, animals and the environment as a coherent system that needs to be accounted as a whole. Within this frame, the concept of One Medicine has evolved to pursue a joint advancement of the human and veterinary medicines. There are many disorders with analogous pathogenesis in people and animals, thus requiring a similar management. Veterinary patients often benefit from advancements in human medicine, while they can also provide very important pre-clinical knowledge for human pathologies.

In comparison with rodents or rabbits often used as animal models, large species such as dogs, sheep, pigs or horses better resemble the anatomy and physiology of humans, and their greater lifespan allows for longer-term follow-up. In addition, naturally occurring pathologies affecting veterinary species reflect more accurately the complexity of the pathogenesis and can diminish the need for experimental models. Several organizations such as the European Medicines Agency, the U.S. Food and Drug Administration, and the International Society for Stem Cell Research are recommending the use of large animal models to evaluate the efficacy, durability, dose response, and safety of cell therapies. Horses are especially relevant to this end and are recognized models for metabolic syndrome, asthma, wounds, melanoma, or autoimmune uveitis, among others.

The musculoskeletal injuries are of particular importance in the equine species, with osteoarthritis being responsible for >80% of chronic lameness. Because of this unmet need for effective treatments also in veterinary, developing cell therapies for osteoarthritis is important for both horses and humans, and can benefit from their similarities, including comparable cartilage thickness, cellular organisation and biomechanics. Furthermore, the horse's large size facilitates sampling, clinical assessment, advanced imaging and rehabilitation protocols. Therefore, progress in animal models is mutually beneficial for animals, researchers, and human and veterinary patients.