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Amniotic derived progenitor cells in different animal species in view of cell therapy applications

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The human amnion membrane is a source of mesenchymal stem cells (AMCs). For the first time, AMCs in horse, cow, dog and cat were characterized by immunocytochemical studies which showed the expression of specific embryonic markers (TRA-1-60, SSEA-3, SSEA-4 and Oct-4) and by molecular studies which proved the positivity to CD105, CD73, CD90, CD29, CD166, and CD44, confirming the stemness of these cells. AMCs showed high proliferative capacity for prominent telomerase activity and high differentiate potential toward osteogenic, adipogenic, chondrogenic and neurogenic lineages (mesodermic and ectodermic).

Moreover, equine AMCs were compared to bone marrow-derived cells (BM-MSCs) demonstrating, *in vitro*, higher proliferative and differentiative potential and, *in vivo*, lower rate (4%) of re-injury when allogenic cryopreserved AMCs were, for the first time, transplanted in spontaneous tendon injuries in horses compared to fresh autologous BM-MSCs group (23.08%). Moreover, horse AMCs have immunomodulatory capacity demonstrated by their ability to inhibit PBMC proliferation not only when cultured in cell-cell contact with responder cells but also when separated from them by a transwell membrane. This ability could be attributed to soluble factors released by AMCs. This hypothesis was further supported by the inhibition of the PBMC proliferation exerted by the conditioned medium secreted by AMCs (AMC-CM). When AMC-CM was used to treat spontaneous horse tendon and ligament injuries, regenerative/repairative responses were achieved. Our outcomes demonstrated that the AMCs transplantation results in improved tendon healing and that the AMC-CM could be a novel therapeutic biological cell-free product in spontaneous tendon and ligament diseases.

Biography

Anna Lange-Consiglio is a Doctor in Animal Science. She completed her PhD from the Veterinary School of the University of Milan and she is in charge of the Reproduction Laboratory at the Large Animal Hospital of University of Milan. Her field of research is focused on stem cells-based regenerative medicine and reproductive biotechnologies, as *in vitro* fertilization and cloning, with the purpose of *in vivo* and *in vitro* studies and clinical trials. Lange-Consiglio collaborates with Italian and foreign research groups. She has published more than 40 papers in international journals with impact factor and peer review.

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