"Extracellular vesicle (EV) derived from equine mesenchymal stem cells: isolation, characterization and evaluation in tissue regeneration *in vitro*"

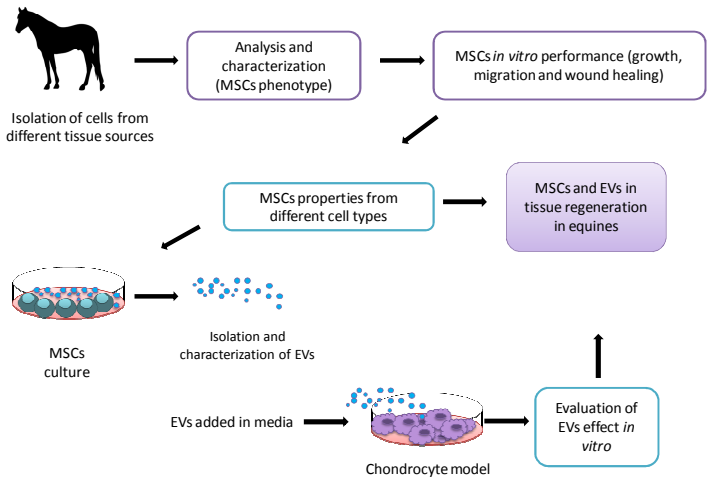
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Abstract (300 word limit)

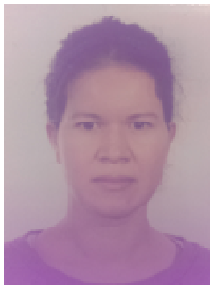
Mesenchymal stem cells (MSCs) have been used as an alternative therapy in equine regenerative medicine. MSCs are usually implanted in horses' damaged tissue to activate tissue regeneration. Extracellular vesicles (EVs) are released by MSCs. The interest on EVs relies on their participation in cell therapy by inhibition of cell apoptosis, stimulation of regeneration and activation of cell programs during an injury. To date, little is known about EVs from equines and their regeneration properties. The purpose of this study was to obtain MSCs from different tissue sources to evaluate their characteristics and performance *in vitro*. Subsequently we isolated EVs from MSCs to characterize them and evaluate their biological effects *in vitro*. MSCs were harvested from different tissue sources (bone marrow, synovial fluid and adipose tissues). We confirmed their MSCs phenotype by the expression of cell surface markers. Cell growth, migration and wound healing capacities were evaluated *in vitro*. MSCs were grown under specific culture conditions and EVs were isolated from the media. The EVs concentration obtained from MSCs type and EVs size were analyzed by nanoparticle tracking analysis (Nanosight). EVs morphology was evaluated by transmission electron microscopy (TEM). To study EVs effect during an inflammatory process, equines chondrocyte cells served as an *in vitro* model. Our results showed that isolated cells from different tissue sources have a MSCs phenotype. Cells isolated from bone marrow showed a higher migration capacity and better performance in wound healing assays. Derived synovial fluid showed a higher cell growth. Isolated EVs did not show significant differences among the different MSCs types. Altogether, isolation and characterization of EVs from different MSCs types, their performance during an injured tissue provide knowledge about their participation and influence on tissue repair and regeneration.

Image



Recent Publications (minimum 5)

1. Arévalo-Turrubiarte, M., Olmeo, C., Accornero, P., Baratta, M., Martignani, E., 2019. Analysis of mesenchymal cells (MSCs) from bone marrow, synovial fluid and mesenteric, neck and tail adipose tissue sources from equines. Stem Cell Res. 37, 101442. doi:10.1016/J.SCR.2019.101442
2. Perruchot, M.-H., **Arévalo-Turrubiarte**, M., Dufreneix, F., Finot, L., Lollivier, V., Chanat, E., Mayeur, F., Dessauge, F., 2016. Mammary Epithelial Cell Hierarchy in the Dairy Cow Throughout Lactation. Stem Cells Dev. 25. doi:10.1089/scd.2016.0098
3. Arevalo Turrubiarte, M., Perruchot, M.-H., Finot, L., Mayeur, F., Dessauge, F., 2015. Phenotypic and functional characterization of two bovine mammary epithelial cell lines in 2D and 3D models. Am. J. Physiol. Cell Physiol. ajpcell.00261.2015. doi:10.1152/ajpcell.00261.2015
4. Arévalo-Turrubiarte, M., González-Dávalos, L., Yabuta, A., Garza, J.D., Dávalos, J.L., Mora, O., Shimada, A., 2012. Effect of 2,4-thiazolidinedione on Limousin cattle growth and on muscle and adipose tissue metabolism. PPAR Res. doi:10.1155/2012/891841



Biography (150 word limit)

Magdalena Arévalo Turrubiarte has been working with stem cells from large animals and from different cell types and different physiological functions. She has worked on animal production and currently in veterinary science approaches. This study provides of information about the different tissue sources available to obtain MSCs from horses and about their characteristics. In addition, that for the first time a general study of the EVs derived from bone marrow, synovial and adipose cells from equine. This would informs about the influence of EVs during inflammation towards the regeneration processes suggested in litterature (Malda et al., 2016; Tetta et al., 2012). The importance of studying MSCs and EVs in *in vitro* cultures provide knowledge and the foundation for future experiments and *in vivo* trials for equine repair and regeneration medicine.

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Notes/Comments: