

Extracellular Vesicles: Potential Applications in Animal Sciences / Vesículas extracelulares: Aplicaciones potenciales en ciencias animales

Lorena Franco-Martínez

Clinic for Internal Diseases, Faculty of Veterinary Medicine, University of Zagreb, Heinzelova Street 55, 10000 Zagreb, Croatia.

lorena.franco2@um.es

Resumen

Extracellular vesicles (EVs) act as essential messengers in cell-to-cell communication. Released by all functional cells into the extracellular space, these nanosized particles (typically ranging from 50 to 1000 nm in diameter, similar to the size of a virus) transfer their specific cargo into recipient cells to trigger biological responses. This cargo comprises a diverse array of active biomolecules from the donor cell, including metabolites, lipids, nucleic acids, and mainly proteins, all protected from degradation by a lipid bilayer membrane. Because EVs are ubiquitous and capable of inducing targeted responses, it has been widely demonstrated that they play a key role in the regulation of both physiological and pathological processes across all body organs.

In human medicine, the interest in EVs has grown exponentially in recent years, revealing their enormous potential for diagnostic, prognostic, and therapeutic applications. However, within the framework of the One Health concept—which emphasizes the interconnectedness of human, animal, and environmental health—the translation of these advancements to veterinary and animal sciences remains limited.

This presentation aims to provide an accessible overview of EV biology, including current methodologies for their isolation and characterization. Furthermore, it will address the current gap between human and animal EV research, illustrating this disparity through a comparative analysis of the current scientific literature. Finally, selected examples of the potential applications of EVs in animal sciences will be presented.

Overall, despite their undeniable biological relevance, EV research in animal sciences is still in its infancy. Adopting a One Health approach in this field offers a unique opportunity to leverage the progress made in human biomedicine to drive innovation in animal health, breeding, and production strategies.

Keywords: Biomarkers, Extracellular vesicles, One-Health

Agradecimientos: L.F.-M. is supported by the European Union under the Marie Skłodowska-Curie Postdoctoral Fellowship grant agreement No. 101199910 (Project SepBiEV-D).