

Advancing research on parasitic infections: Standardized extracellular vesicle guideline

Parasitic diseases (protozoan and helminths parasites) stand as a significant global health challenge, affecting over a billion people worldwide and claiming millions of lives annually. At the heart of these diseases lie parasites, which instigate a myriad of neglected tropical and infectious diseases. Despite their significant impact on public health, these diseases present challenges in diagnosis, treatment and prevention, largely due to the complex life cycles of the parasites and the intricate nature of host–parasite interactions.

In recent years, the emergence of extracellular vesicles (EVs) as a topic of study has revolutionized our understanding of parasitic infections. These tiny vesicles, secreted by pathogenic protozoa and helminths parasites or infected cells, engage in crucial interactions with host cells, dictating the course of infection and disease progression. These interactions encompass a spectrum of activities crucial for the parasite's survival, including facilitating infection, modulating the host immune response, enhancing host adaptability and transferring factors that confer drug resistance. As conduits of communication between parasites and hosts, EVs hold immense potential as biomarkers for asymptomatic infections and as prognostic indicators for disease outcomes post-therapy.

However, despite the burgeoning interest in EVs, current methodologies for isolating, sizing and characterizing these vesicles often lack the requisite rigor, standardization and quality controls. Recognizing this gap, efforts are underway to establish comprehensive standards drawn from a growing collective understanding.

The journey towards understanding parasite-derived EVs has been marked by collaborative efforts and interdisciplinary dialogues. Workshop titled “Cross-Organism Communication by Extracellular Vesicles: Hosts, Microbes, Parasites (<https://doi.org/10.1080/20013078.2017.1407213>)” organized by the International Society for Extracellular Vesicles (ISEV) workshop in 2016 - São Paulo Brazil” have served as platforms for high-level scientific discussions, exploring the nature, origin, and potential applications of EVs in infectious diseases. These gatherings underscore the need for standardized protocols and techniques for the purification and characterization of EVs, taking into account the unique characteristics of each parasite species and strain.

Our recently published guideline in the *Journal of Extracellular Biology* (Fernandez-Becerra et al., 2023), titled “Guidelines for the Purification and Characterization of Extracellular Vesicles of Parasites,” marks a big step forward in this effort. The guideline, written by 31 scientists from around the world, offers a structured framework for isolating, characterizing and investigating EVs obtained from parasite-infected cell cultures, experimental animals and patients.

This editorial aims to highlight the significance of the guideline and the potential impact on advancing research in parasitology. The work is organized into sections that address key technical issues encountered in the field of parasite-derived EVs research. From isolation and purification methods to molecular characterization and functional assays, the guidelines offer detailed protocols and recommendations to ensure standardized practices and comparative analysis. By promoting transparency and sharing of insights, these guidelines aim to enhance the reliability and reproducibility of EV-related research in parasitic diseases.

Moreover, the guideline underscores the importance of understanding the diverse array of parasites and their unique characteristics. From taxonomic overviews to specific methodologies for different parasites, moreover provides a comprehensive overview of EV research in the context of parasitic diseases. By addressing challenges such as EV isolation and characterization, the guidelines aim to unlock new insights into the mechanisms of parasite illnesses and pave the way for innovative therapeutic interventions.

In conclusion, the establishment of standardized guidelines for parasitic EV research represents a significant milestone in our understanding of parasitic diseases. By fostering collaboration and common understanding, these guidelines provide a solid foundation for advancing research in this critical field. As we continue to unravel the complexities of parasite–host interactions, the guidelines serve as a roadmap for driving progress and improving health outcomes worldwide.

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