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Trypanosoma cruzi releases different types of extracellular vesicles that distinctly modulate host immune system

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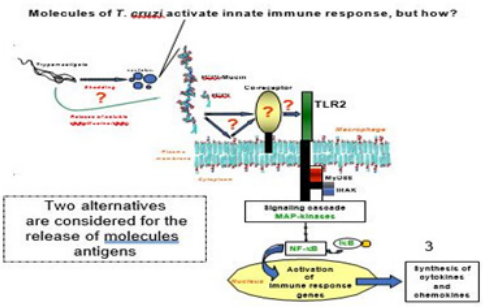
Abstract

Extracellular Vesicles (EV) released by infective forms of Trypanosoma cruzi, the agent of Chagas' disease, modulate inflammatory response of macrophages through the activation of Toll 2 receptor (TLR2) via mitogen-activated protein kinase pathway. This induces the production of nitric oxide (NO) and expression of the cytokines TNF-α, IL-12 and IL-6, which could explain the inflammation observed in experimental Chagas' disease, and eventually in the progression of human disease. EVs released by the parasite are heterogeneous and it is unknown which factor, or factors present in the different vesicle populations act during the interaction with host cells. Objectives. The goal of the present work was to characterize and isolate the different populations of EVs released by T. cruzi and test their effects on macrophages. Methods. EV released by trypomastigotes forms of T. cruzi (Y strain) were purified by Asymmetric flow field-flow fractionation (AF4) and characterized by Nanoparticles tracking analysis (NTA). The different populations of EVs were incubated with host human monocytes cells (THP-1) and cytokines production determined by ELISA and qPCR. The different EV populations were also incubated with LLCMK-2 epithelial cells and the infection by T. cruzi determined. Results. We found two distinct populations of EVs. A population with 50 to 50 nm (EV1) and another with 100 to 120 nm (EV2). EV1 induced more TNF-alpha, IL-6, IP-10 and CCL20 than EV2. It was also more effective in promoting T. cruzi infection in epithelial cells. Conclusion. T. cruzi released two EV populations that affects differently host cells. Identification of these EVs composition might help to better understand the role of EVs in the modulation of T. cruzi infection.



Biography

Ana Claudia Torrecilhas Associate Professor from the Department of Biological Sciences, UNIFESP, is leading a lab focused on biology of Trypanosoma cruzi– the Chagas Disease parasite. My research concerns interaction parasite host interaction by secretion of extracellular vesicles and modulate host immune system. This is a new area of Chagas Disease research and only little is currently known about the precise mechanisms of parasite-derived extracellular vesicle cargo delivery and function. This research will lead to important advances in our fight against it as well as to the interesting findings at the field of cell–cell communication and pathogen–host interaction.

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