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Cell-cell communication between *Plasmodium* and host immune via exosomes

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Malaria, kills up to a million people each year, is caused by the protozoa of the genus *Plasmodium falciparum* (Pf). These vector-borne parasites cycle between mosquitoes and humans and, in both contexts, are faced with an unstable and hostile environment. To ensure survival and transmission, the malaria parasite must infect and survive in the human host and differentiate into sexual forms that are competent for transmission to mosquitoes. We found for the first time that Pf-infected red blood cells (iRBCs) directly exchange cargo between them using nano-vesicles (exosomes). These tiny vesicles are capable of delivering protected genes to target cells. Cell-cell communication is a critically important mechanism for information exchange that promotes cell survival. How Pf parasites sense their host environment and coordinate their actions remain one of the greatest mysteries in malaria. Moreover, our understanding in the mechanism regulate human immune response to malaria infection is poor. Here, we found that malaria-derived exosomes carry remarkable cargo providing a secure and efficient mode for signal delivery. We developed an exosomes tracking assay and could measure Pf exosomes uptake by different cell types. Moreover, although early life-stages of Pf-iRBC are considered immunologically inert, our initial observations show that ring-stage derived exosomes are immunogenic. We show that exosomes can specifically activate and induce pro-inflammatory responses, resulting in interferon type I response. This is a new area of malaria research which may shed a light on the ability of malaria parasite to manipulate their host response.

Biography

Yifat Ofir-Birin is pursuing her Post-doctorate Degree at Dr. Neta Regev - Rudzki's lab. She is leading an area of research which focuses on "Intercellular communication between malaria parasites and its human host via extracellular vesicles, exosomes". During 2013-2015, She was a Senior Scientist at Evogene R&D while leading an innovative research team in order to find new genes which improve crops traits. She completed her PhD thesis under the supervision of Professor Ehud Razin. Her thesis demonstrates "The structure and function of the Ap4A-LysRS-MITF pathway in mast cells."

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