Malaria's Secret Language: Decoding the Signaling Role of Extracellular Vesicles

Pathogens like the malaria parasite, *Plasmodium falciparum (Pf*), exploit secreted extracellular vesicles (EVs) to enhance their growth and manipulate the host's response. We found that while residing inside the host red blood cells, *Pf* secretes EVs carrying RNA, genomic DNA, and even a fully assembled, functional 20S proteasome complex-each playing a role in modulating host systems. Moreover, we discovered that these EVs transfer three specific *Pf* mRNAs, which are rapidly imported into the nucleus of human monocytes, where they interfere with the splicing machinery to inhibit target protein expression. Lastly, our results provide mechanistic insights into how *Pf*-EVs enter into diverse host cells. We demonstrated that the uptake route of *Pf*-EVs is governed by the membrane deformability of the target host cells. These findings open new avenues for investigating parasite-host communication, shedding light on the virulence-promoting strategies of one of the deadliest pathogens in humans.

https://www.weizmann.ac.il/Biomolecular_Sciences/regev/

Short Bio

Prof. Neta Regev-Rudzki, from the Department of Biomolecular Sciences at the Weizmann Institute of Science in Israel, leads a lab dedicated to studying the biology of Plasmodium falciparum-the parasite responsible for the most severe form of malaria.

Prof. Regev-Rudzki earned her BSc in Chemistry and MSc in Biochemistry and Genetics (2002) from the Hebrew University of Jerusalem. She completed her PhD in 2009 at the Hadassah Medical School, focusing on mitochondrial transport in a yeast model. Following postdoctoral training in malaria, at the Walter and Eliza Hall Institute (WEHI) in Melbourne, Australia, she established her lab in 2015.

Her groundbreaking research focuses on the communication mechanisms of the malaria parasite, particularly through the secretion of extracellular vesicles (EVs). Her lab investigates the roles of EV cargo components, including proteins, RNA, and DNA. By exploring these cellular communication mechanisms, her research has revealed how the parasite interacts with various host systems, providing insights that could open new therapeutic avenues in the battle against malaria.