How an emerging tick-borne pathogen evades detection

June 20 2019, by Jami Larue

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Human babesiosis is an emerging infectious disease transmitted to humans by ticks. A team of Yale researchers has discovered how *Babesia microti*, one of the two *Babesia* parasite species that transmit the disease in the United States, communicates with its host.

Parasites and other pathogens usually secrete proteins to evade the immune system or change the structure of the host's cells to adapt and survive. Using various techniques, including electron microscopy, the Yale researchers explored how *B. microti* exports its antigens—foreign substances or toxins that trigger an immune response—to the host. They found that *B. microti* encapsulates antigens into vesicles that emerge out of the parasite's membrane and form chains of vesicles within the host's red blood cells. These vesicles are subsequently exported out of the infected red blood cells into the host plasma.

"We've just touched the tip of the iceberg in our understanding of Babesia pathogenesis," said Choukri Ben Mamoun, associate professor of infectious diseases and microbial pathogenesis. "From a diagnostic standpoint, now we know how multiple antigens can be exported by the parasite, a finding that will help us employ new technologies to develop sensitive tests for detection of active *Babesia* infections."

Compared to other parasites, the two major Babesia species that infect humans, *B. microti* and *B. duncani*, are highly resistant to current treatments. If these parasites use the same vesicle machinery to detoxify drugs designed to treat babesiosis infection, that could explain why the drugs are not potent or why a high dose is needed, say the researchers.

More information: Jose Thekkiniath et al. Evidence for vesicle-mediated antigen export by the human pathogen Babesia microti, *Life Science Alliance* (2019). DOI: 10.26508/lsa.201900382

Provided by Yale University