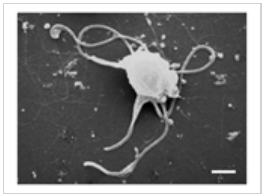
Posted on Thursday, 7 November 2013

Holographic microscopy of Plasmodium microgametes reveals new findings on how malaria parasites mate



During the life cycle of Plasmodium, male and female gametocytes are taken up by the anopheline mosquitoes when feeding on an infected host. Microgametes and macrogametes are then quickly generated in the midgut of the mosquitoes and fertilization must occur within 30-60 minutes for the parasites to reach the next stage of their life cycle. The microgametes contain only four compartments: a nucleus, a cytoplasm, a cell membrane and a flagellum, which consists of an axoneme formed by a central pair of singlet microtubules surrounded by nine microtubule doublets. The acquisition of data on the shape and motion of the flagellum has previously proven challenging because of the beat frequency and the 3D waveform nature of the organelle. Reporting in a recent article published in the Proceedings of the National Academy of Sciences, a team of scientists at the University of Edinburgh and at Rowland Institute at Harvard University reveals new findings on the motility of the microgametes of the malaria parasite. The researchers developed a new high-speed holographic microscope to study the movement, frequency and speed of the microgametes and build a 3D dynamics model. Their data show that microgametes move in an irregular, lopsided corkscrew motion which enables them to twist to the left or the right, as well as go forwards and backwards. The authors believe this great freedom of movement would help the microgametes to swim between red blood cells to find female macrogametes. These findings provide a better understanding of how malaria parasites mate.

The details of this study are accessible here:

http://www.pnas.org/content/early/2013/11/04/1309934110.abstract?sid=804f3fb1-24bb-4c31-ab1f-c08d53bc7ed0