3D holograms of malaria sperm movement 'may stop spread'

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Tropical Diseases

Blood / Hematology

Featured Article

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Scientists have a developed a new 3D filming technique that creates moving digital holograms of malaria "sperm," which researchers say have provided "fresh insights" into how the organisms mate. This is according to a study published in the *Proceedings of the National Academy of Sciences*.

Researchers from the Institute of Evolutionary Biology at the University of Edinburgh in the UK, as well as from the Rowland Institute at Harvard University, say their findings may contribute to ongoing research aimed at stopping the spread of malaria.

Medical News Today recently reported on data from the Centers for Disease Control and Prevention (CDC) revealing that the number of malaria cases in the US has reached a 40-year high, with 1,925 cases reported in 2011, emphasizing the need for new ways to prevent and control the disease.

Malaria is a life-threatening blood disease caused by a parasite that is transmitted to humans by the Anopheles mosquito.

According to the researchers, malaria parasites mate in the gut of mosquitos in order to accumulate. The parasites are then passed on to humans through a mosquito bite.

Understanding how these parasites mate is important in findings ways to stop infection. Therefore, the researchers developed a 3D hologram technique that captures the parasites in action.

Malaria sperm freedom of movement

In order to swim, malaria sperm use microscopic structures called flagella.

The researchers note that these structures are important because they are used by many parasites to invade parts of the body, as well as to perform critical roles in embryonic development, reproduction and nutrient uptake in all animals.

From the 3D holograms, the researchers

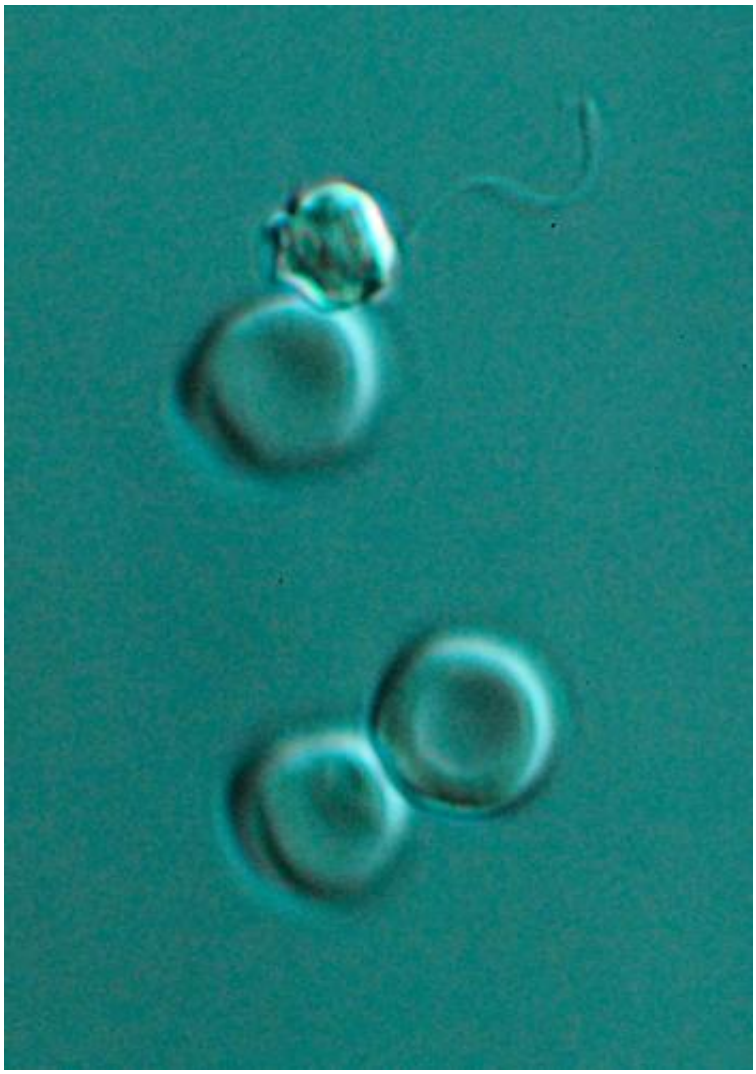
were able to see that malaria sperm move in a "lopsided corkscrew motion." This enables them to twist to the left or right and go forward or backward.

The researchers believe that this motion helps the sperm swim between red blood cells in the search for female mates.

They add that the "simple structure" of the malaria sperm makes it a good model system in which to study the mechanisms of flagella in animals.

Commenting on the findings, Dr. Sarah Reece, of the University of Edinburgh and co-author of the study, says:

> "Findings gained using our unique system provide us with a better understanding of how malaria parasites mate and spread this deadly disease, and have revealed that malaria sperm, and similar organisms, have greater freedom of movement than was previously thought."



Researchers have created moving digital holograms of malaria 'sperm,' helping them understand how the parasites move. Pictured is a malaria sperm swimming around a red blood cell. Photo Credit: University of Edinburgh.

Dr. Reece told *Medical News Today* that further research will look at how male sperm find females within the "blood meal."

"If we know how they do it, it might be possible to stop them and so prevent disease transmission," she added.

"We are conducting an experiment this week to ask if male gametes (sperm) locate female mates through chemotaxis (movement) and to investigate whether the jam-packed arrangement of red blood cells in the mosquito gut make it more difficult for males to swim around."

Medical News Today recently reported on a study detailing the discovery of a molecular switch in female mosquitos that could be targeted in order to prevent mosquitos reproducing.

Written by Honor Whiteman

References

High-speed holographic microscopy of malaria parasites reveals ambidextrous flagellar waveforms, doi: 10.1073/pnas.1309934110, Laurence G. Wilsona, Lucy M. Carter, Sarah E. Reece, published in the *Proceedings of the National Academy of Sciences*, 5 November 2013. Abstract

Holograms offer hope in fight against malaria, study from Edinburgh Infectious Diseases researchers suggests , news release from the University of Edinburgh, accessed 6 November 2013.

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