Blood-thinning copycat enters malaria fight

June 1 2010

New treatments for malaria are possible after Dr. James Beeson and Michelle Boyle, from the Walter and Eliza Hall Institute in Melbourne, Australia, found that molecules similar to the blood-thinning drug heparin can stop malaria from infecting red blood cells. Credit: Czesia Markiewicz, Walter and Eliza Hall Institute

New treatments for malaria are possible after Walter and Eliza Hall Institute scientists found that molecules similar to the blood-thinning drug heparin can stop malaria from infecting red blood cells.

Malaria is an infection of red blood cells that is transmitted by mosquitoes. The most common form of malaria is caused by the parasite Plasmodium falciparum which burrows into red blood cells where it rapidly multiplies, leading to massive numbers of parasites in the blood stream that can cause severe disease and death.

At the moment, all anti-malarials licensed for use in humans block the

development of the parasite within the red blood cell.

But Dr James Beeson, Ms Michelle Boyle and Dr Jack Richards from the institute's Infection and Immunity division, along with colleagues at the Burnet Institute and Imperial College London, have identified a new approach that could stop the parasite infecting red blood cells in the first place.

Using real-time video microscopy of red blood cell infection, the team showed that heparin-like carbohydrates blocked the ability of the malaria parasite to infect cells, Dr Beeson said.

"The malaria parasite needs a protein called MSP1 if it is to infect red blood cells as MSP1 is involved in the initial attachment of the parasite to the cells," Dr Beeson said.

"We have shown that heparin-like carbohydrates bind to MSP1 which stops the parasite from properly attaching to the red blood cell and, therefore, from invading."

The findings are published today in the international journal *Blood* and have raised the prospect of developing new anti-malarials that are based on the structure and activity of heparin-like molecules.

Although humans produce heparin-like molecules naturally, they do not occur at high enough levels in the blood to have anti-malarial activity, Dr Beeson said. "Heparin itself wouldn't be suitable as an anti-malarial as it prevents blood clotting. However, we have identified related compounds that are more potent against malaria than heparin but do not prevent blood clotting- these could form the basis of new antimalarial drugs."

Each year more than 400 million people contract malaria, and around one million people, mostly children, die from the disease.

Medical Xpress

Provided by Walter and Eliza Hall Institute

Citation: Blood-thinning copycat enters malaria fight (2010, June 1) retrieved 25 April 2024 from https://medicalxpress.com/news/2010-06-blood-thinning-copycat-malaria.html

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