Newly discovered malaria mechanism gives hope to pregnant women

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Credit: AI-generated image (disclaimer)

Resistance to malaria drugs means that pregnant women are unable to overcome the anaemia caused by the malaria parasite – and their babies are born undersized. A study carried out at Karolinska Institutet, however, exposes the effects of malaria in pregnant women and shows how the PTEF protein is central to the infection. The study, which is

published in the scientific journal *Nature Microbiology*, opens the way for new malaria drugs.

Some 50 million pregnant women contract malaria every year. The most common and most dangerous parasite, "Plasmodium falciparum", affects both female carriers of the malaria parasite and their unborn babies. The parasite retards fetal growth by consuming vital nutrients and the babies are born undersized. The women are also affected by anaemia when the parasite infects the placenta.

When the parasite sends a 'glue protein' to the infected red blood membrane, tens, even hundreds of thousands of parasites can accumulate in the placental vessel wall and cause inflammation. First-time mothers, who have not built up immunity to the glue molecule, develop serious, chronic infections unless given prophylactic treatment. Due to growing resistance to modern malaria drugs, the treatments are not always that efficacious.

An alternative to antibiotics

The team behind the study found a certain protein in the parasite, PTEF, that is vital to the synthesis of the glue molecule to which the parasites attach themselves. The researchers show how PTEF binds direct to the cell's protein-manufacturing ribosome, where it speeds up the production of new glue molecules.

"However, we can now stop this happening, and will one day be able to develop drugs that prevent the accumulation of parasites in the placenta," says Professor Mats Wahlgren at Karolinska Institutet's Department of Microbiology, Tumor and Cell Biology who was involved in the study. "We think that it will be possible in the future to deliver small molecules rather than traditional antibiotics to prevent pregnant women and the babies they are carrying from contracting malaria."

The researchers also collaborated with Professor Suparna Sanyal at Uppsala University, who examined how the PTEF protein affected the ribosomes in E. coli bacteria models and found that it could stimulate protein synthesis in bacteria too.

More information: Sherwin Chan et al. Regulation of PfEMP1–VAR2CSA translation by a Plasmodium translation-enhancing factor, *Nature Microbiology* (2017). DOI: 10.1038/nmicrobiol.2017.68

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