Anti-malarial shows promise in human clinical study

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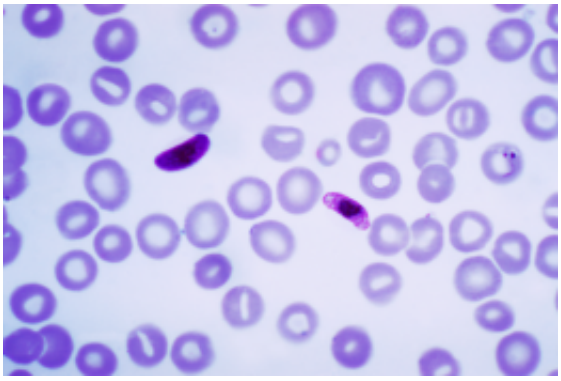

This photomicrograph of a blood smear contains a macro- and microgametocyte of the Plasmodium falciparum parasite. Credit: Wikipedia.

An experimental drug, called DSM265, cured seven volunteers of a *Plasmodium falciparum* infection, a malaria parasite that is a major cause of morbidity and mortality worldwide. The goal of this research is to find a cure for malaria with a single dose, and ultimately, eradicate the parasite. The research is published March 11 in *Antimicrobial Agents and Chemotherapy*, a journal of the American Society for Microbiology.

In 2016, 216 million people fell sick due to the *Plasmodium falciparum* parasite and 441,000 died of malaria, according to the report.

The study demonstrated that a single oral dose of 400 mg DSM265—given seven days after blood stage infection was

experimentally induced in healthy subjects who had not previously been exposed, is sufficient to clear low-level *P. falciparum* parasitemia.

The study confirmed multiple previous studies collectively comprising more than 100 subjects, which also found that DSM265 could clear the disease-causing, non-sexual stage parasites from infected humans.

Currently, it takes three days of combination therapy to cure malaria. "A single dose cure would provide a treatment that could improve compliance, reduce development of resistance, and eventually contribute to the eradication of this disease," said coauthor Jörg Möhrle, Ph.D., VP Head of Translational Medicine, of the product development partnership, Medicines for Malaria Venture (MMV), Geneva, Switzerland, and Associate Professor of Infection Biology and Epidemiology, University of Basel, Switzerland. "DSM265 has the potential to become part of such a single dose cure."

Clearing the asexual stage parasites is a cure, despite the lack of clearance of sexual stage parasites, called gametocytes, because the gametocytes don't cause disease, and they cannot complete the life cycle in humans, which would be necessary to generate more asexual stage parasites.

Cure notwithstanding, a companion drug is needed to prevent development of resistance. Resistance is a numbers game, caused by the emergence of random mutations that block a drug's action. The chance of random mutations arising concurrently to block both drugs' action is vanishingly small.

Additionally, a companion drug is needed to advance the goal of eradicating malaria. Gametocytes can perpetuate the life cycle if they are taken up in a mosquito bite. Thus, the need to kill them along with the asexual stage parasites.

In the study, the investigators injected eight volunteers with blood stage malaria parasites. (Unexpectedly, one participant did not develop parasitemia.) On day 7, the volunteers were treated with an initial 400 mg dose of DSM265. The investigators tracked the numbers of gametocytes using a technique called qPCR (quantitative polymerase chain reaction), a method of quantifying the numbers of a microbe in a sample.

On day 23, seven participants received a second dose of 400 mg DSM265, which also did not clear the gametocytes. At the end of the study, on day 28, all eight participants received systemic rescue treatment with the registered antimalarial treatments, artemether-lumefantrine and primaquine.

"The results obtained in this study support the prediction of the efficacious dose of DSM265, and provide further evidence that DSM265 is generally safe and well tolerated," according to the report.

In this study, as well as the other studies of DSM265, there were no severe adverse effects. "The overall favorable safety profile for DSM265 observed in this study agrees with the safety findings from the previous (three) clinical studies," said Dr. Möhrle. In the current study, there were three adverse effects, in two subjects—mild abdominal tenderness and moderate skin rash with moderate to severe itching.

"Currently, MMV is working to improve the formulation of DSM265 and to identify the optimal partner drug to achieve a single dose treatment of *P. falciparum* malaria," said Dr. Möhrle.

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