



# Evolution of Treatments in Malaria with the Involvement of Female Anopheles Mosquito

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## DESCRIPTION

Insects and vertebrates are the only two hosts for the unicellular eukaryote species *Plasmodium*. *Plasmodium* species have life cycles that require development in a blood-eating insect host, which injects parasites into a vertebrate host during a blood meal. A female *Anopheles* mosquito carrying *Plasmodium* during a blood meal can spread the infectious disease malaria, which is brought on by the protozoan parasite *Plasmodium spp.* A recurrent cycle of fever paroxysms, shivering, body pains, abdominal pain, and other flu-like symptoms are among the classic malaria symptoms. Other clinical symptoms of severe malaria include cerebral malaria, Acute Respiratory Distress Syndrome (ARDS), placental malaria, anemia, liver failure, and renal failure. When high-risk persons including newborns, young children, pregnant women and their unborn children, older adults, and travelers from non-endemic malaria countries are not promptly diagnosed and treated, these symptoms can be fatal. From asymptomatic infections to potentially fatal circumstances, *P. falciparum* malaria clinical signs vary from patient to patient. Malaria episodes start as a result of the interaction between phagocytic cells of the innate immune system and malarial toxins generated after red blood cell rupture. Pathogen-Associated Molecular Patterns (PAMPs) are the names given to the toxins released by malaria. Toll-Like Receptors (TLRs) are the main method of identifying them.

The most common malaria parasite, *Plasmodium falciparum*, has a complicated life cycle that involves a human host and a mosquito vector in a favourable environment. Malaria symptoms can develop as parasite densities rise throughout the 48-hour intra erythrocytic cycle after the release of merozoites (erythrocyte invasion stages) into the human bloodstream. However, in certain people who live in endemic areas, immunity is developed after repeated exposure to malaria parasites. Immunity can reduce parasite density and prevent malaria symptoms, which can result in asymptomatic *Plasmodium* carriage even if it does not always prevent infection. The two

main classes of contemporary anti-malarial drugs, artemisinin and quinine derivatives, are derived from traditional herbal remedies. Traditional herbal remedies may be a significant and long-term source of treatment due to the issues of rising levels of medication resistance and the challenges of accessing and affording effective antimalarial treatments in underdeveloped areas. Weed with pan tropical origins that was first discovered in Mexico, is a member of the Papaveraceae family and has a long history of use in traditional medicine. A wide range of illnesses, including malaria, have been treated with the plant in Indian folk medicine. It is also utilised as an antimalarial agent in a number of African nations. 87% of uncomplicated malaria cases in Mali were initially treated at home with traditional remedies, according to a population survey done.

In malaria patients treated with artemisinin monotherapy delayed parasite clearance is a sign of artemisinin resistance. An initial genomic analysis of Cambodian isolates with elevated survival rates in an *in-vitro* ring stage survival assay (RSA0-3h) and long parasite clearance half-lives in patients led to the discovery of four Kelch Protein K13 (K13) mutations (Y493H, R539T, I543T, and C580Y) as molecular markers of artemisinin resistance. Despite the fact that artemisinin is still effective at lowering parasitaemia, longer treatment plans and new formulations are needed to maintain therapeutic efficacy, which can put more pressure on parasites to develop drug resistance. In regions with a high prevalence of artemisinin-resistant parasites, resistance to companion medications appears to be expedited.

Adverse reactions and high satisfaction with regard to effectiveness, both community and traditional healers disclosed the availability and usage to treat malaria. Because of this, we can see that this plant is popular and widely used in this specifically for the treatment of malaria. Future studies are required to determine whether it is beneficial in the environment against malaria, particularly given the low endemicity and the co-occurrence of *P. vivax* and *P. falciparum*.

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