

Plasmodium—a brief introduction to the parasites causing human malaria and their basic biology

ABSTRACT

Malaria is one of the most devastating infectious diseases of humans. It is problematic clinically and economically as it prevails in poorer countries and regions, strongly hindering socioeconomic development. The causative agents of malaria are unicellular protozoan parasites belonging to the genus *Plasmodium*. These parasites infect not only humans but also other vertebrates, from reptiles and birds to mammals. To date, over 200 species of *Plasmodium* have been formally described, and each species infects a certain range of hosts. *Plasmodium* species that naturally infect humans and cause malaria in large areas of the world are limited to five—*P. falciparum*, *P. vivax*, *P. malariae*, *P. ovale* and *P. knowlesi*. The first four are specific for humans, while *P. knowlesi* is naturally maintained in macaque monkeys and causes zoonotic malaria widely in South East Asia. Transmission of *Plasmodium* species between vertebrate hosts depends on an insect vector, which is usually the mosquito. The vector is not just a carrier but the definitive host, where sexual reproduction of *Plasmodium* species occurs, and the parasite's development in the insect is essential for transmission to the next vertebrate host. The range of insect species that can support the critical development of *Plasmodium* depends on the individual parasite species, but all five *Plasmodium* species causing malaria in humans are transmitted exclusively by anopheline mosquitoes. *Plasmodium* species have remarkable genetic flexibility which lets them adapt to alterations in the environment, giving them the potential to quickly develop resistance to therapeutics such as antimalarials and to change host specificity. In this article, selected topics involving the *Plasmodium* species that cause malaria in humans are reviewed.