Research Highlights

Highlights from the latest articles on malaria

Will zoonotic human malarias spoil the global eradication euphoria?

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Evaluation of: Ollomo B, Durand P, Prugnolle F *et al.*: A new malaria agent in African hominids. *PLoS Pathog.* 5, E1000446 (2009).

A striking difference between the many arboviral diseases transmitted by mosquitoes and malaria is the fact that human *Plasmodium* parasites are only found in man and mosquitoes. This simple fact, that the *Plasmodium* lifecycle is restricted to these species, has made control of the disease comparatively easy. By attacking the parasites through vector control and rigorous case management, the battle against malaria has been won in substantial parts of the world, with an estimated 700 million people now living in areas where transmission no longer occurs (e.g., Europe, USA, Russia and Taiwan). The current optimism that reigns in the malaria world is largely based on these successes. Armed with new insecticides, new drugs and, perhaps one day, a potent vaccine, it is now felt that even the heartland of malaria (Africa) can be tackled, and disease be eradicated from major parts of the continent [1]. Road maps to 'shrink the malaria map' were recently drawn up by the Malaria Elimination Group [101].

Unlike malaria, mosquito-borne zoonoses not only have a mosquito and human host, but also maintain a pathogen reservoir in nature, which poses tremendous difficulties for managing, let alone, eradicating them. A good example is the West Nile virus. It reached New York (USA) in 1999 and spread to the west coast through migratory birds, causing thousands of human cases and several hundred deaths [102]. Considering the impossible task of eliminating the virus reservoir in birds, the only remaining hope to protect humans is through vaccination. The story is similar for yellow fever, which maintains a reservoir in primates, where the 17D vaccine became the tool to protect travelers to endemic regions and overcome epidemics in resident populations through mass-vaccination campaigns.

Ollomo *et al.* reported on the discovery of a new malaria parasite, *Plasmodium gaboni* sp. nov., in two chimpanzees in Gabon, West Africa, which is closely related to the most deadly form of the parasite, *Plasmodium falciparum*, and its sister lineage, *Plasmodium reichenowi*, known to infect chimpanzees [2]. From a purely scientific point of view this discovery opens up the possibility of exploring lineage-specific evolution through comparative genomics, which may ultimately shed light on genetic changes that have driven *Plasmodium*-specific adaptation to humans. Although important, the authors also caution against the risk of primate to human transfer of this new parasite, especially since local villagers kept both infected chimpanzees as pets. What are the risks of this happening and how would this affect the malaria eradication effort?

P. gaboni was found to be remarkably similar to *P. falciparum* under the microscope, which suggests that the parasite may have been misdiagnosed in humans reporting with malaria in the villages where the chimpanzees are kept. Just like the recent surge of reported *Plasmodium knowlesi* infections in humans in Asia, which were thought to represent infections with *Plasmodium malariae*, possible misdiagnosis calls for a closer examination of human infections to determine if the shift has already occurred. In Borneo, *P. knowlesi* was more common in humans than originally thought [3], and now represents the first example of zoonotic human malaria. If *P. gaboni* is already present in humans, then competent local anopheline vectors are present and transmission dynamics

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become important. Little is known about the frequency at which African anophelines that transmit human malarias also consume blood from other primates, and nothing is known regarding their competency to develop *P. gaboni* and their vectorial capacity for this new parasite. If these vectors feed indiscriminately on chimpanzees and humans (when these are in close proximity) and they are competent vectors than there is reason to be worried. A second zoonotic malaria, now in Africa, is bad news indeed, and may spoil the eradication party. The recently posed question 'Do we still need a malaria vaccine?' [4], will then have to be answered with a firm 'Yes'.

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