Correspondence

Are Iron-Scavenging Parasites Protective against Malaria?

To the Editor—Nyakeriga et al. [1] showed that, in Kenyan children, anemia was associated with a reduction in the incidence of clinical malaria. We provide a hypothesis that is based on this finding.

Malaria has been a strong selector of human genes, since inherited conditions such as sickle-cell trait, thalassemias, and glucose-6-phosphate dehydrogenase deficiency provide partial protection against malaria. Because erythrocytes are central to the life cycle of *Plasmodium falciparum*, chronic anemia may lower host susceptibility to infection. A protective effect of iron deficiency against malaria has been supported by studies of animals [2] and humans [1]. Iron-supplementation treatment of anemia increases the risk of *P. vivax* malaria [3–5].

In contrast, anemia-inducing parasites, including particular helminths and nematodes [4–6], appear to offer a benefit against malaria to humans who are infected with these organisms and who live in regions in which malaria is endemic [7]. Bacteria that induce iron-deficiency anemia in humans also might confer resistance to malaria. *Helicobacter pylori*, a longtime colonizer of humans [8] that has been shown to cause iron-deficiency anemia [9–12], commonly colonizes human populations in tropical areas. One biological cost of infection with *H. pylori*, in exchange for a possible benefit in protection against malaria, might be a higher risk of peptic ulcer disease. Just as malaria may have shaped host responses to *H. pylori* [13], *H. pylori* may affect the severity of malaria in infected populations through its role in iron homeostasis.

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References