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.

Maria G. Dominguez-Bello1 and Martin J. Blaser1

1Department of Biology, University of Puerto Rico, San Juan, Puerto Rico; 2Departments of Medicine and Microbiology, New York University School of Medicine, New York.

References