

Scientists identify immune cells linked to malaria-induced anaemia through autoantibody production

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Credit: CDC

An autoimmune attack on uninfected red blood cells likely contributes to anaemia—a shortage of red blood cells—in people with malaria, according to a new study published in *eLife*.

Anaemia is a common and sometimes deadly complication of [malaria](#) infections. While the [immune system](#) must destroy [red blood cells](#) infected with the [malaria parasite](#) to clear the infection, the study suggests the infection can trigger an ongoing [autoimmune attack](#) on uninfected red blood cells, ultimately causing anaemia.

Previous studies in mice with malaria showed that autoimmune antibodies attach to a molecule called phosphatidylserine (PS) on uninfected cells, marking them for destruction by the immune system. These autoimmune antibodies were also found in patients with malaria-induced anaemia, suggesting they may be the cause of red blood cell loss.

However, it has been difficult to study these immune processes in patients living in areas where malaria is endemic, who may experience repeated infections. To address this, lead author Dr. Juan Rivera-Correa, a former postdoctoral fellow in the Department of Microbiology at NYU Grossman School of Medicine in New York City, US, and his colleagues decided to study the [immune response](#) in people from Germany exposed to malaria for the first time while travelling in Africa. "Studying the immune cells that produce these autoantibodies during new malaria infections in European travelers represented a unique opportunity," Dr. Rivera-Correa explains.

In their experiments, the team identified the production of an unusual type of immune B-cell—FcRL5+T-bet+ B-cells—that increases anti-PS antibody production associated with the development of anaemia in these patients. These immune cells also developed and produced anti-PS antibodies in blood drawn from uninfected people that was then exposed to broken remnants of malaria-infected red blood cells in the laboratory.

"Our results provide the first mechanistic evidence of autoimmune-mediated anaemia in malaria patients and highlight these atypical [immune cells](#) as major promoters of this complication," Rivera-Correa says.

Ana Rodriguez, Professor of Microbiology at NYU Grossman School of Medicine, adds: "There is a great need for novel targeted treatments for malaria-induced anaemia, which is common and can be fatal for many malaria patients. The unique phenotype and specificity of these immune B-cells could allow them to be used as a biomarker for anaemia or as a target for new therapies."

More information: Juan Rivera-Correa et al,

Atypical memory B-cells are associated with Plasmodium falciparum anemia through anti-phosphatidylserine antibodies, *eLife* (2019). DOI: [10.7554/eLife.48309](https://doi.org/10.7554/eLife.48309)

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