Protection against malaria: A matter of balance

November 15 2018

A balanced cytokine production in the first years of life may protect against malaria. Credit: Max Pixel

A balanced production of pro and anti-inflammatory cytokines at two years of age protects against clinical malaria in early childhood, according to a study led by the Barcelona Institute for Global Health (ISGlobal). The results also indicate that early exposure to the parasite does not affect the risk of developing the disease, although it could affect the parasite-specific immune response later in life.

Malaria particularly affects children under five years of age, who need to develop effective immunity against the most severe forms of the disease. Certain parasite-specific antibodies are known to protect, but little is known about the protective role of mediators (cytokines) produced by cells of the immune system. Furthermore, it is not clear whether the timing of first parasite exposure during infancy affects the secretion of such cytokines.

In this study, Carlota Dobaño and her team evaluated whether the cytokines produced in the first two years after birth affect the risk of subsequent malaria. They also analysed whether the timing of parasite exposure alters the cytokine response. The study included over 300 newborns from Magrara, a village in Southern Mozambique, some of whom received preventive malaria treatment during their first year of life. Cytokine production by blood cells was measured at different points during the first two years, and the participants were followed up for clinical malaria until four years of age.

The results show that a pro-inflammatory signature (IL-1, IL-6 and TNF cytokines) followed by an anti-inflammatory (IL-10 cytokine) signature between the first and second year of life is associated with a lower risk of clinical malaria between ages three and four. "This makes sense, since IL-10 suppresses excessive inflammation," explains Dobaño.

In contrast, timing of parasite exposure did not have a clinical effect. Children who received preventive treatment—and were therefore exposed later to the parasite—had an altered cytokine profile, but this did not reduce the risk of developing malaria in the following two years. "Preventive malaria treatment during the first year after birth does not decrease the risk of malaria in early childhood, but it could be relevant later in life by influencing the development of parasite-specific immunity," adds the ISGlobal researcher.

More information: Dobaño C, Nhabomba A, Manaca M, et al. A balanced pro-inflammatory and regulatory cytokine signature in Young African children is associated with lower risk of clinical malaria. *Clin Infect Dis*. 2018. doi/10.1093/cid/ciy934/5151218