

# Prenatal malaria exposure increases risk of malaria and anemia for some children

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Some babies who are exposed to malaria before birth develop a tolerant phenotype that increases their susceptibility to malaria and anemia in childhood, says a new study in the open access journal *PLoS Medicine*.

Indu Malhotra and Christopher King (Case Western Reserve University) and colleagues studied 586 newborns residing in a malaria-holoendemic area of Kenya to age three, assessing their malaria infection, malaria-specific immune responses, and anemia, and classifying them into three groups: "sensitized" babies in which cord blood cells made activating [cytokines](#) in response to malaria antigens; "exposed, not-sensitized" babies in which cord [blood cells](#) did not make activating cytokines but made an inhibitory cytokine (IL-10); and "not-exposed" babies born to uninfected mothers.

The authors report that in the first 3 years of life, the exposed, not-sensitized [newborns](#) had a 60% greater risk of malaria infection than the unexposed group and a slightly higher risk of malaria infection than the sensitized group. They also had lower hemoglobin levels, a sign of anemia, than the other babies. At 6 months, the T-cells of exposed, not-sensitized children were less likely to make activating cytokines in response to malaria antigens but made more IL-10 than the T-cells of the other children; malaria-specific antibody levels were similar in the three groups, say the authors.

Why some children exposed to malaria before birth become tolerant to the disease while exposure to malaria antigens "primes" the immune

system of other children to respond efficiently to malaria antigens is not clear. However, these findings could have important implications for the design of malaria vaccines for use in areas where children are often exposed to malaria before birth and for the design of strategies for the prevention of malaria during pregnancy, say the authors.

"Once the significance of fetal malaria experience is better understood," the authors say, "it should translate into more effective strategies for malaria chemoprophylaxis during pregnancy."

In a related Perspective on the study, Lars Hviid (not involved in the research) states that the research by Dr. King and colleagues "adds significantly to our understanding of prenatal exposure to *P. falciparum* antigens" and has "obvious clinical importance." But he outlines several areas for further investigation of pregnancy-associated malaria.

More information: Malhotra I, Dent A, Mungai P, Wamachi A, Ouma JH, et al. (2009) Can Prenatal [Malaria](#) Exposure Produce an Immune Tolerant Phenotype?: A Prospective Birth Cohort Study in Kenya. PLoS Med 6(7): e1000116. [doi:10.1371/journal.pmed.1000116](https://doi.org/10.1371/journal.pmed.1000116)

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