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**Title:** The effect of parasitic co-infections on immune responses in Gabon : particular emphasis on malaria and helminths

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## Stellingen

1. The decreased level of antibodies to *P. falciparum* sexual stage antigens in helminth infected individuals could translate into a role for helminths in sustaining malaria transmission. (*this thesis*)
2. In chronically infected individuals *Schistosoma haematobium* infection leads to an increased frequency of memory B cells and a decreased frequency of naive B cells. This alteration in the distribution of B cells extend to B cells function that are more activated upon stimulation but proliferate less and produce less TNF-  $\alpha$ . (*this thesis*)
3. Although schistosomes have the potential to modulate the immune system, the degree of immune modulation is not sufficient to dampen the cell mediated immune response triggered by *P. falciparum* in the blood stream. (*this thesis*)
4. The frequency of regulatory T cells of new-borns from filaria infected mothers negatively correlate with those of pro-inflammatory T helper 1 cells suggesting that regulatory T cells acquire functional capacity already before birth as a consequence of *in utero* exposure to helminths. (*this thesis*)
5. The default condition of the mammalian ancestral immune system was to be parasitized by gastrointestinal nematodes and other helminths, therefore the acute responses to microparasites were fine-tuned in the face of a strong T helper 2 and regulatory T cell skewing. (M. Nacher 2011, Malaria Journal ; 10:259)
6. The controversies in the hygiene hypothesis might stem from the fact that one bacterial lipopolysaccharide can be very different from another bacterial LPS (Vatanen et al 2016, Cell; 165:842-53).
7. Variation in the pattern of innate cytokine production following PRR stimulation in infancy varies in different geographic regions (Smolen et al. 2014, J Allergy Clin Immunol; 133:818-

26) and could have important consequences for vaccination programs.

8. We should reconsider the strategies used for mass deworming in Africa given that in affluent countries, the deliberate infection of patients with worms is being explored as a possible treatment for inflammatory diseases. (Wammes et al 2014, Lancet Infect Dis; 14(11):1150-62.).
9. Not to know is bad. Not to wish to know is worse (African Proverb)
10. It is in the character of growth that we should learn from both pleasant and unpleasant experiences (*Nelson Mandela, 1997*)
11. A guest never forgets the host who has treated him kindly. (*Homer, 8th century BC*)
12. Doing research in Africa is like living the past, the present and the future of science in a single moment and dealing with different cultures and realities that are sometimes conflicting in their nature.