Helminthic infections may be beneficial against HIV-1

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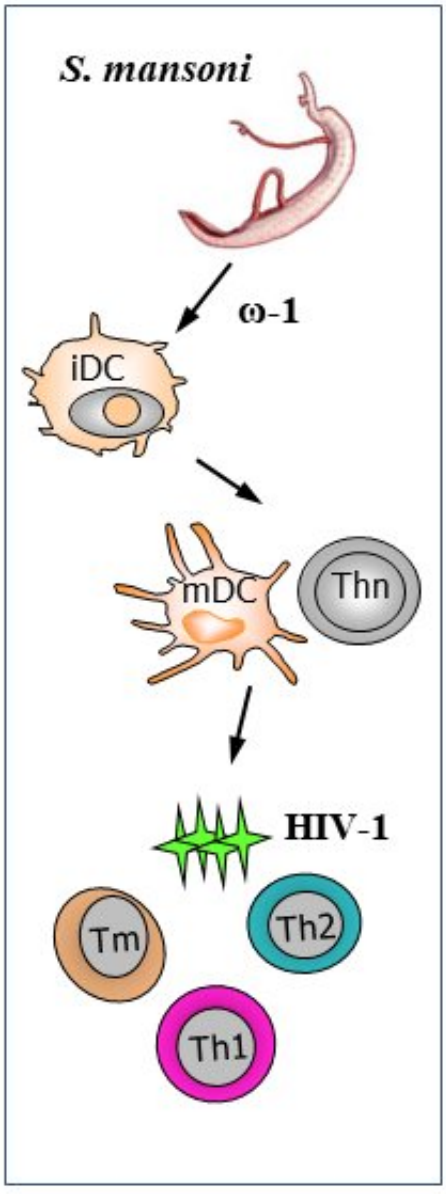

Schistosoma mansoni egg antigen and more so ω-1 can induce dendritic cells to stimulate T cell responses with lowered infection for HIV-1 Credit: Mouser EE, et al. (2019)

Infection with parasitic helminths can reduce the susceptibility of T-cells to HIV-1 infection, according to a study published September 5 in the open-access journal PLOS Pathogens by Esther de Jong of the University of Amsterdam and William Paxton of the University of Liverpool, and colleagues.

Parasitic helminths such as *Schistosoma mansoni* (*S. mansoni*) have developed a number of strategies to evade, skew and dampen human immune responses, including the modulation of CD4+ T-lymphocyte responses. Since CD4+ T-lymphocytes are the main cell type infected with HIV-1, the immune responses mounted against the array of co-infecting pathogens will likely influence HIV-1 transmission and disease progression. Moreover, many areas endemic for *S. mansoni* infection have high HIV-1 prevalence rates, indicating that co-infection is likely. However, clear epidemiological evidence to date is lacking for the assumption that treating *S. mansoni* in co-infected individuals would be beneficial for their HIV-1 disease, as studies have reported contradictory findings.

In the new study, de Jong and Paxton analyzed the effect of soluble egg antigen (SEA) - an extract from the eggs of *S. mansoni*—on HIV-1 infection. SEA efficiently blocked HIV-1 trans-infection -a process by which immune cells called dendritic cells capture HIV-1 and promote infection of CD4+ T-lymphocytes. The underlying mechanism involved the binding of Kappa-5—a major molecular component of SEA—to DC-SIGN—a molecule expressed on dendritic cells. Under certain

conditions, exposure of dendritic cells to SEA reduced the susceptibility of T-cells to HIV-1 infection. They also found that omega-1—an abundant component of SEA—can modulate HIV-1 infection and potentially influence disease course in co-infected individuals. According to the authors, these results should be considered in the context of HIV-1 vaccine trials being conducted in regions of the world where *S. mansoni* infections are endemic.

"Co-infection with HIV-1 and an array of pathogens can potentially modulate HIV-1 infection and therefore disease course," the authors add. "We demonstrate that specific molecules from the Schistosomula monsoni parasite can block both HIV-1 interactions with dendritic cells as well as induce CD4 lymphocytes which down-modulate infection with HIV-1."

More information: Mouser EE, Pollakis G, Smits HH, Thomas J, Yazdanbakhsh M, de Jong EC, et al. (2019) Schistosoma mansoni soluble egg antigen (SEA) and recombinant Omega-1 modulate induced CD4+ T-lymphocyte responses and HIV-1 infection in vitro. *PLoS Pathog* 15(9): e1007924. doi.org/10.1371/journal.ppat.1007924

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