

# Human insulin suppresses mosquito immune system: Increasing cases of type 2 diabetes could abet malaria's spread

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Human insulin suppresses the mosquito immune system, according to a paper in the June *Infection and Immunity*. And while mosquitoes and malaria might seem to go together like baseball and hotdogs, mosquitoes' immunological resistance to the malaria parasite actually slows its spread among *H. sapiens*.

"A fair portion actually fight off the infection," says first author Nazzy Pakpour of the University of California, Davis.

But now the rate of [type 2 diabetes](#) is climbing in Africa as in most of the rest of the world, to the point where by 2030, one in five adults there are predicted to be so-afflicted. More diabetes means more hyperinsulinemia—more human insulin to inhibit mosquitoes' immune response to *Plasmodium falciparum*, thus aiding and abetting transmission of this dread disease.

As horrific as the medical consequences of all this might be, the science is intriguing. "It's crazy to think something in our blood could change how mosquitoes respond to parasites," says Pakpour.

In earlier work, Pakpour and collaborators showed that ingested human insulin activates the insulin/IGF-1 signaling pathway in *Anopheles stephensi* [mosquitoes](#), making them more vulnerable to invasion by *P. falciparum*. The new study showed that insulin signaling reduced

expression of certain mosquito immunity genes that are under the same regulatory control, and that human insulin suppressed mosquito immunity by activating the so-called PI3K signaling pathway, and that artificially inhibiting that pathway could reverse the immunosuppressive effects of human insulin.

**More information:** N. Pakpour, V. Corby-Harris, G.P. Green, H.M. Smithers, K.W. Cheung, M.A.Riehle, and S. Luckhart, 2012. Ingested human insulin inhibits the mosquito NF-KAPPAB-dependent immune response to *Plasmodium falciparum*. *Infect. Immun.* 80:2141-2149. Download the journal article at <http://bit.ly/asm061912a>

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