

STORY BY JESSE EMSPAK

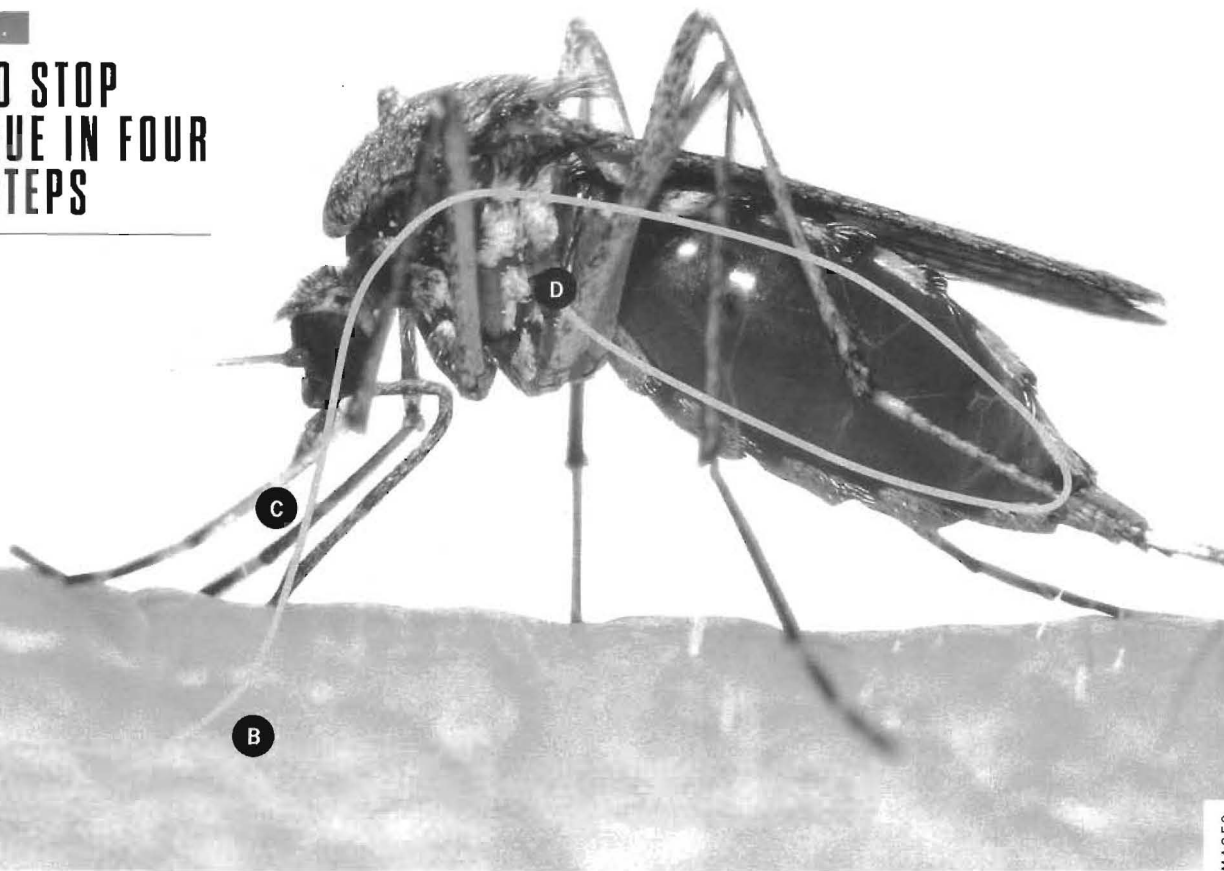
Vaccinating Mosquitoes Can Ward Off Malaria

IT'S NOT the mosquito's fault. Malaria is actually caused by the *Plasmodium* family of parasites, which is carried unwittingly by mosquitoes. And these parasites are tricky foes. Come up with a treatment or vaccine and the few that survive will still breed. But Johns Hopkins biologist Rhoel Dinglasan thinks he may have a way around that: vaccinating mosquitoes instead.

Dinglasan's team has found that *Plasmodium*—at a crucial stage in its life cycle—needs to bind to a protein in the mosquito's gut called AnAPN1. If you block this protein, you block transmission to humans. But how do you treat a mosquito? A teensy needle and steady hands? No. Here's the clever part: You give people a vaccine against AnAPN1, turning them into living mosquito-treatment factories for years; their immune systems produce antibodies against AnAPN1. When mosquitoes bite vaccinated people, they'll suck up the antibodies, which block AnAPN1 so that the mosquitoes can no longer pass along the disease. In lab tests, Dinglasan has shown that the antibodies can indeed make mosquitoes benign—although no less annoying.

BZZZZZ . . .

HOW TO STOP A PLAGUE IN FOUR EASY STEPS



A/VACCINATE

Give someone the vaccine against the mosquito-gut protein AnAPN1.

B/MANUFACTURE

The person's immune system produces antibodies against AnAPN1 in his blood.

C/BITE

A mosquito ingests the antibodies, which bind to AnAPN1 and block the malaria-causing parasite *Plasmodium*.

D/PREVENT

Plasmodium can't live in the mosquito gut and, therefore, can't be transmitted to people.

Name:

Period:

Vaccinating Mosquitoes Can Ward Off Malaria - Popular Science, September 2013

1. What causes Malaria and how is it transferred to people?
2. Explain why you would give the vaccine for AnAPN1 to people instead of mosquitoes?
3. Create a well worded hypothesis for Rhoel Dinglasan's experiment. (If... Then... Because...)
4. What is the independent variable for his experiment?
5. What is the dependent variable for his experiment?
6. What data would you collect?
7. **(on the back)** In 1962, the Kefauver-Harris Drug Amendment was passed by the United States Congress. This amendment required drug companies to prove both safety and effectiveness of their products. This means that drugs like the AnAPN1 vaccine must be tested in people before they can be sold to the public. Human research subjects must be provided with protection from physical, mental and emotional harm. What are two possible variables from this experiment that would need to be controlled to prevent harm to human test subjects. (In other words why can't we just give everyone the AnAPN1 vaccine today?)