Researchers discover surprising drug that blocks malaria

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Northwestern University researchers have discovered how malaria parasites persuade red blood cells to engulf them -- and how to block the invading parasites. The malaria marauders hack into the red cell's signaling system and steal the molecular equivalent of its password to spring open the door to the cell. But researchers have found that a common blood pressure medication – propranolol – jams the signal to prevent the parasite from breaking in.

Scientists had long been perplexed by malaria's ability to hijack red blood cells, then wildly multiply and provoke its life-threatening symptoms.

"This opens the possibility for important new drugs for malaria that won't become resistant. New drugs are urgently needed because the parasite has evolved resistance against virtually all types of commonly used drugs," said Kasturi Haldar, principal investigator for the study and the Charles E. and Emma H. Morrison Professor in the department of pathology at the Feinberg School of Medicine at Northwestern. Sean Murphy, a Medical Sciences Training Program student, is the study's lead author.

The study was published in *PLoS Medicine*.

Malaria, one of the top three deadliest diseases in the developing world, is resurging worldwide because of drug resistance and the lack of an effective vaccine, Haldar said. Jamaica recently reported an outbreak of malaria after it had been eradicated in that country for 50 years.

A blood-borne illness, malaria is transmitted by infected mosquitoes. The symptoms include high fevers and flu-like symptoms such as chills, headache, muscle aches and fatigue. The disease kills an estimated 2 million people a year, mostly African children under five. It also poses a risk to travelers. An estimated 500 million cases of malaria were expected in 2006.

Commonly used drugs against malaria attack the parasite, but it rapidly changes its molecular structure to become resistant to those drugs. It would be difficult, however, for the malaria parasite to develop resistance to a drug that acts on a person's red blood cells as the blood pressure medication does, Haldar said.

When Haldar and her colleagues tested propranolol in combination with existing anti-malarial drugs in human cell cultures and mice, it reduced the dose of the anti-malarial drugs needed to kill the parasites by tenfold. That's significant because high doses of anti-malarial drugs – increasingly necessary as resistance to them builds -- can be toxic. In addition, blood pressure medication like propranolol is cheap and safe for use even in pregnant women, a group particularly vulnerable to malaria.

"We're working on developing a unique drug that would combine anti-malarial drugs with blood pressure medication. We think it has a high likelihood of success," Haldar said. The next step is human clinical trials.

Source: Northwestern University