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HOFFMAN

Physician leads efforts to rid world of malaria

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Dr. Stephen L. Hoffman is knocking on the door of a preeminent group of scientists. A physician who has dedicated much of his life to understanding and fighting tropical diseases, Hoffman is also the founder and CEO of Sanaria, Inc., a company that is extremely close to marketing a vaccine against Plasmodium falciparum, the deadliest of malaria-causing parasites.

Malaria kills more than one million people each year, "most of them young children in [Sub-Saharan] Africa," according to the Centers for Disease Control and Prevention. An estimated 90 percent of these deaths are caused by Plasmodium falciparum.

"Falciparum kills more children worldwide than any other infectious agent," Hoffman said at the University Chapel Tuesday as part of the "Global Health: Voices from the Vanguard" lecture series.

The University's Center for Tropical and Emerging Global Diseases, a sponsor of the series, is part of a research endeavor looking at schistosomiasis, another tropical parasitic disease. The Bill and Melinda Gates Foundation awarded an $18.7 million grant to the University Research Foundation in December to support this effort.

Sanaria, Inc.'s ultimate goal is the eradication of falciparum malaria, a process that by no means occurs quickly or smoothly, Hoffman said.

Eliminating an entire disease is not easy. Even the well-known vaccine developed in 1952 by Jonas Salk failed to completely eradicate poliomyelitis. According to the CDC Web site, despite recent global efforts to eradicate polio, around 1,300 diagnoses were reported in 2007.

If Hoffman's vaccine is approved and does eventually eradicate falciparum malaria, it would be only the second time in human history that mankind has pushed a disease into extinction. Smallpox was eliminated in 1979.

Hoffman, who received his medical degree from Cornell University, has been working to develop his vaccine since the early 1980s. The trouble in producing the vaccine, Hoffman explained, can be partly attributed to the diversity and complexity of the parasite.

"One kid in Kenya will be infected with 10 different strains of falciparum malaria," he said, that differ by only a single protein epitope - the tiny areas of infectious agents our antibodies and immune cells recognize and respond to.

The parasite, which is spread among humans by only a few dozen species of mosquitoes, invades the host's liver cells within minutes of a bite. Here the parasite reproduces and differentiates during a one- to two-week incubation period, which produces no outward symptoms. It's only when the parasite "ruptures out and invades the red blood cells" that trouble begins, Hoffman said. The parasite continues to multiply inside red blood cells, quickly rupturing them and moving on to fresh ones.

"Every 48 hours the number of parasites in the body increases tenfold," Hoffman said.

It is for this reason that Hoffman's company designed a vaccine that would take action during the pre-erythrocytic stage, the window of time before the parasite attacks red blood cells.

Now, after several years of fine-tuning and nearly $60 million, Sanaria, Inc. has a vaccine "that reproducibly protects non-immune people for at least 10 months."

Sanaria, Inc.'s own trials of the drug produced data that show "complete protection against malaria in 93 percent of volunteers and 94 percent of challenges."

Hoffman said that by the end of this month a proposal will be submitted to the Federal Drug Administration in order to begin federal clinical trials. The FDA is allowed 30 days to respond to the request, and barring an objection, the initial round of clinical trials will take place less than two months from now.
