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TGen researchers join international scientists in discovering how malaria protein could some day help stop cancer

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Researchers at the Translational Genomics Research Institute (TGen) joined an international team of scientists in discovering how a protein from malaria could some day help stop cancer.

Collaborators at the University of Copenhagen, while exploring why pregnant women are particularly susceptible to malaria, found that the mosquito-borne parasite that causes malaria also produces a protein that binds to a particular type of sugar molecule in the placenta.

Researchers found that the same type of sugar molecule also is present in many types of cancer.

Scientists at the University of British Columbia, Vancouver Coastal Health and the BC Cancer Agency, working with those from Copenhagen, realized that the sugar molecule -- oncofetal chondroitin sulfate -- could be a target for anti-cancer drugs, and that the malarial protein, called VAR2CSA, could provide the tool for carrying such drugs to tumors.

TGen scientists were called in to help test the theory.

"Based on our clinical data, we helped validate that this could be applied to melanoma and lung cancers," said Dr. Nhan Tran, an Associate Professor in TGen's Cancer and Cell Biology Division, and one of the authors of the study. "This specific type of developmental protein -- oncofetal chondroitin sulfate -- is expressed in the placenta, and is also expressed in lung cancer and in melanoma."

Malaria uses VAR2CSA to embed itself in the placenta -- hiding itself from the immune system -- by binding to oncofetal chondroitin sulfate.

In laboratory experiments, researchers found that if they used the malarial protein, VAR2CSA, and attached an anti-cancer drug to it, it would bind with the oncofetal protein in the cancer, delivering the drug to the tumor.

The results of the scientific study -- Targeting Human Cancer by a Glycosaminoglycan

Binding Malaria Protein -- were published Oct. 12 in the journal *Cancer Cell*.

"Scientists have spent decades trying to find biochemical similarities between placenta tissue and cancer, but we just didn't have the technology to find it," said project leader Mads Daugaard, an assistant professor of urologic science at UBC and a senior research scientist at the Vancouver Prostate Centre, part of the Vancouver Coastal Health Research Institute. "When my colleagues discovered how malaria uses VAR2CSA to embed itself in the placenta, we immediately saw its potential to deliver cancer drugs in a precise, controlled way to tumors."

"This is an extraordinary finding that paves the way for targeting sugar molecules in pediatric and adulthood human cancer, and our groups are vigorously pursuing this possibility together," said Poul Sorensen, a UBC professor of Pathology and Laboratory Medicine and distinguished scientist with the BC Cancer Agency and co-senior investigator on the study.

"There is some irony that a disease as destructive as malaria might be exploited to treat another dreaded disease," said Ali Salanti, a professor of immunology and microbiology at the Centre for Medical Parasitology, at University of Copenhagen.

Two companies, Vancouver-based Kairos Therapeutics and Copenhagen-based VAR2 Pharmaceuticals, are developing the compound for clinical trials in humans, which will take another three to four years.

Source:
The Translational Genomics Research Institute
