



## VACCINE DEVELOPMENT

# Production of Malaria Vaccine Antigens by Increased Stability and Expression of Malarial Circumsporozoite Proteins

### Brief Description of Technology

Modified proteins of malarial parasite that increase stability, expression, and include epitopes targeted by neutralizing antibodies not currently present in RTS,S vaccine.

#### BUSINESS OPPORTUNITY

Non-exclusive license  
Exclusive license  
Sponsored research

#### TECHNOLOGY TYPE

Vaccine development

#### STAGE OF DEVELOPMENT

Preclinical *in vivo*

#### PATENT INFORMATION

Patent pending

#### INVESTIGATOR

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#### LEARN MORE

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### Technology Overview

Malaria is a life-threatening disease that resulted in 405,000 estimated deaths in 2018. Children under 5 years are most vulnerable, and account for 67% of all deaths worldwide. However, malaria is both preventable and curable. Nevertheless, resistance to antimalarial drugs and insecticides is a recurring problem that has severely impacted control and elimination of this disease. RTS,S/AS01 is a promising candidate vaccine, which completed Phase III trial, that has significantly reduced the incidence of malaria caused by the most deadly parasite, *Plasmodium falciparum*. It consists of a truncated form of a protein of this parasite, *Plasmodium falciparum* Circumsporozoite protein [PfCSP]. Recent discoveries have shown that potent protective antibodies bind to epitopes of PfCSP not included in RTS,S. However, despite its significant advantages, expression of full length PfCSP, which includes these epitopes, in mammalian system consistently produce low yields. Dr. Pancera describes methods that increase the stability and yield of the mutated form of PfCSP by 100-300%, containing all PfCSP domains. Some were truncated in the repeat domains to lower its immunodominance.

### Applications

- The mutated/truncated PfCSP can be multimerized when used as a vaccine
- Compatible with nanoparticle delivery and can be administered with one or more vaccine adjuvants

### Advantages

- Superior stability and increased expression by 100-300% compared to existing systems
- Produced using any protein manufacturing technique
- Lower immunodominance through truncated repeat domains

### Market Overview

The global market size for malaria vaccines was valued at USD 12.3 million in 2018 and anticipated to grow at a CAGR of 33.2% from 2019 to 2026.