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.