Researchers at the University of South Florida have developed a novel synthetic protein based on the ligand of the *Plasmodium vivax* duffy binding protein (DBP) for use as a new vaccine against malaria.

Malaria is a prevalent vector-borne disease that causes massive mortality and morbidity worldwide. Of the five malaria species, *P. vivax* has the most widespread distribution. Further, *P. vivax* DBP is the most promising vaccine candidate for *P. vivax* malaria because the disease progression is known to be based on the interaction between *P. vivax* DBP and immature red blood cells. This interaction can therefore be targeted as a potential treatment mechanism. However, DBP is polymorphic, resulting in a natural immunity that is often strain-specific and short-lived. This highlights the need for a more efficient malaria vaccine to be developed.

USF researchers have developed an engineered protein for use as a new vaccine against malaria. This protein contains specific point mutations at the most polymorphic sites of the *P. vivax* duffy binding protein region II (DBPII). Via crystallography, small angle X-ray scattering, mutational mapping, and binding assays, our researchers have defined epitopes for four monoclonal antibodies (mAbs) that engage DBPII. The engineered protein is then able to elicit a broadly neutralizing immune response by targeting these *P. vivax* epitopes. The mAbs containing the identified epitopes include 2D10, 2H2, 2C6 and 3D10. Further, it was found that 2D10 potently reduces *P. vivax* growth in vivo, indicating that the 2D10/2H2 epitope is broadly neutralizing. This approach may lead to a whole new generation of vaccines for the treatment and prevention of *P. vivax* malaria.

**Advantages:**
- A potential *P. vivax* malaria vaccine
- Elicits a neutralizing immune response
- A longer lasting treatment option
- May lead to a new generation of malaria vaccines

**A New Type of Vaccine Against P. Vivax Malaria**

The mean inhibition (% ± SD) of each mAb on *P. Vivax* Invasion

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