Development of serological biomarkers as indicators of recent and asymptomatic infections for innovative tools to accelerate malaria elimination

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Targeting *P. vivax* malaria for elimination

- More than 2 billion people at risk to transmit *P. vivax* in Asia-Pacific, American, and African countries
- Estimated clinical *P. vivax* malaria cases may exceed 80 million per year
- Accounts for some 41% of all clinical malaria episodes outside Africa
- Elimination of *P. vivax* essential for a malaria-free Asia-Pacific region by 2030

P. vivax malaria: difficult to control and eliminate

- Vast majority of infections are asymptomatic and thus not detected
- Transmits efficiently early in the infection and at relatively low density
- 80-90% of all infections are relapses caused by hypnozoites in the liver
- Hypnozoites carriers can not be identified with present diagnostic tests
- The only drugs to treat hypnozoites are potentially toxic and/or ineffective in 10-20% of patients

Development of serological biomarkers for *P. vivax* malaria

- Human immune system “very effective” in detecting parasites
- Antibodies against parasite proteins remain for certain time after infection
- Hence such antibodies against parasite proteins can be used to identify recent and asymptomatic infections
- *Goal: Serological test to identify possible hypnozoite carriers for treatment (POCT)*
- *Goal: Serological test for surveillance of ongoing transmission (Laboratory Settings)*

Development partnership

- Epidemiological data on *P. vivax*
- Naturally acquired antibody response
- Patient cohorts for post infection monitoring
- HTP screening *P. vivax* proteins

- Selection of 55 target proteins
- Production of 40 target proteins
- Screening patient cohorts (~2,500 samples from Thailand, Brazil, Solomon Islands)
- Selection of biomarker sets

- Target Product Profiles with help of external expert panel (TPPs)
- Technology landscape analysis of near-patient multiplex immunoassay platforms (POCT)

WEHI

Ehime University

FIND

Other groups

WEHI

Ehime University

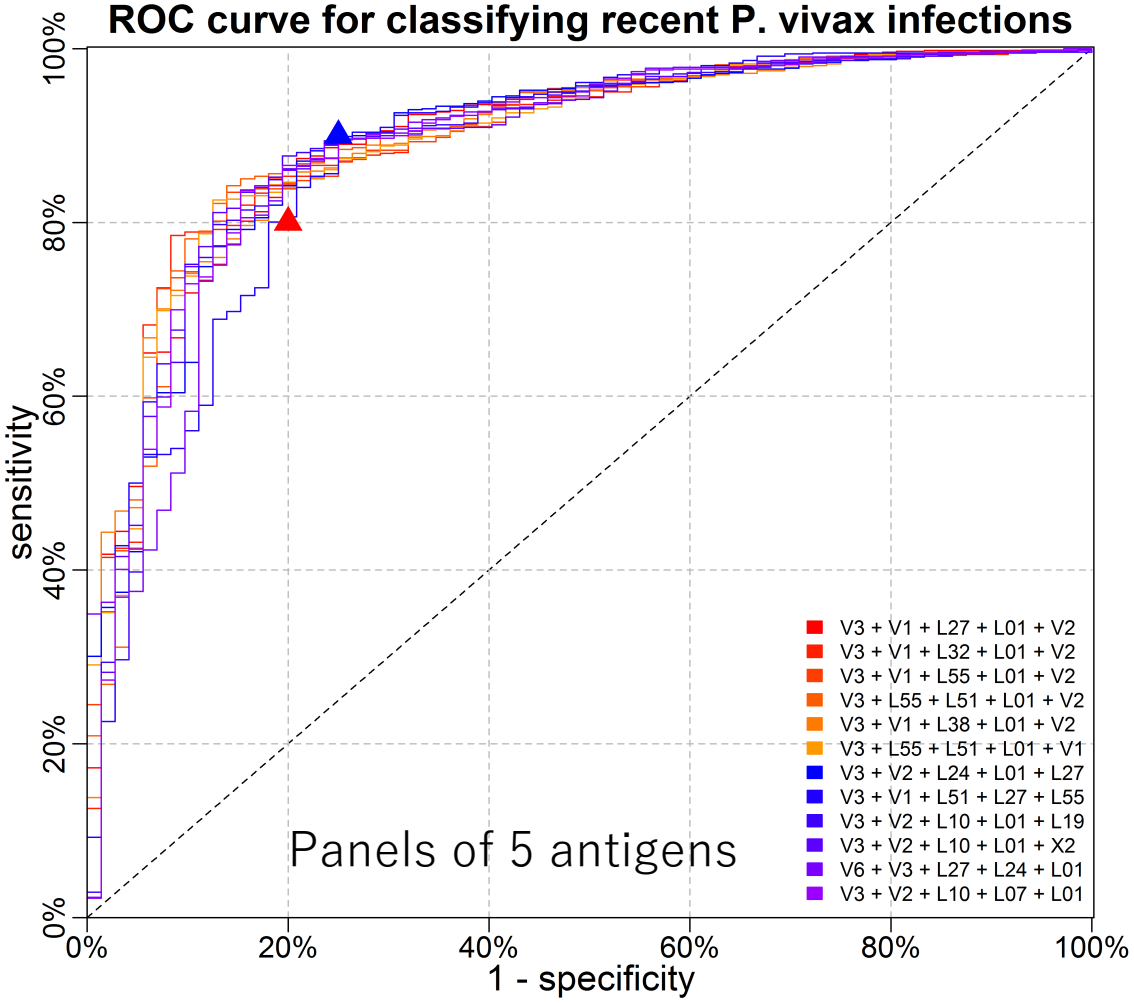
CellFree Sciences

Sample providers

FIND

Project identified serological markers of recent exposure

- Serological biomarkers can identify concurrent and recent past infections
- These individuals are the most likely hypnozoite carriers
- Enables targeted of mass-drug administration to individuals with confirmed *P. vivax* exposure
- Allows surveillance and stratification of areas according to transmission risk



Lessons learned

- We had been successful in our research because the group had worked together very well!
- Regular project meetings in person and doing telephone conferences
- Very good network for doing malaria research and getting access to clinical samples/volunteers
- FIND' s expertise in diagnostics (landscape analysis for POCT platform, expert panel for TPPs)
- *The group keeps on working together using our marker set to develop POCT test for P. vivax!*

Acknowledgements

Walter+Eliza Hall Institute of Medical Research
100 YEARS 1915-2015
FIAT LUX
DISCOVERIES FOR HUMANITY

愛媛大学
EHIME UNIVERSITY

FIND
Because diagnosis matters

Ivo Mueller

Takafumi Tsuboi

Iveth Gonzalez

Rhea Longley

Eizo Takashima

Xavier Ding

Michael White

Romain Wyss

Our sample providers and their patients

GHIT Fund
Global Health Innovative Technology Fund

For making this project possible!