

Development of a whole parasite blood-stage malaria vaccine



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Laboratory of Vaccines for the Developing World

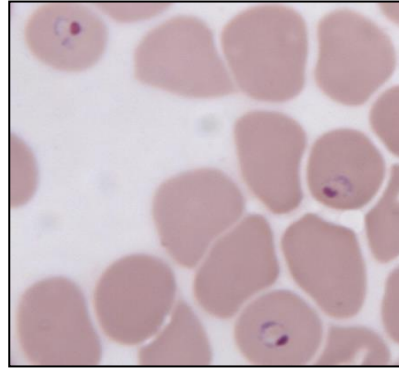
Institute for Glycomics, Griffith University

What is malaria?

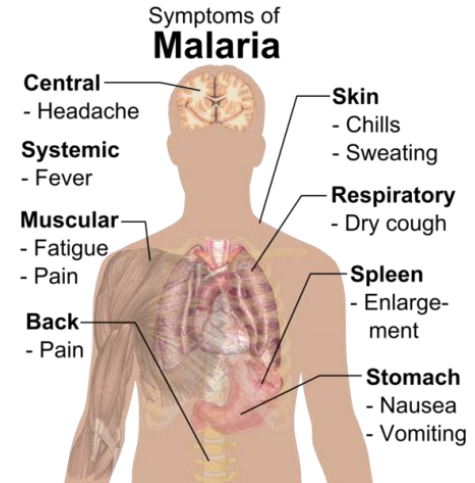
- Mosquito-borne parasitic disease transmitted by the *Anopheles* mosquito
- Causative agent: Apicomplexan parasite, *Plasmodium* spp.



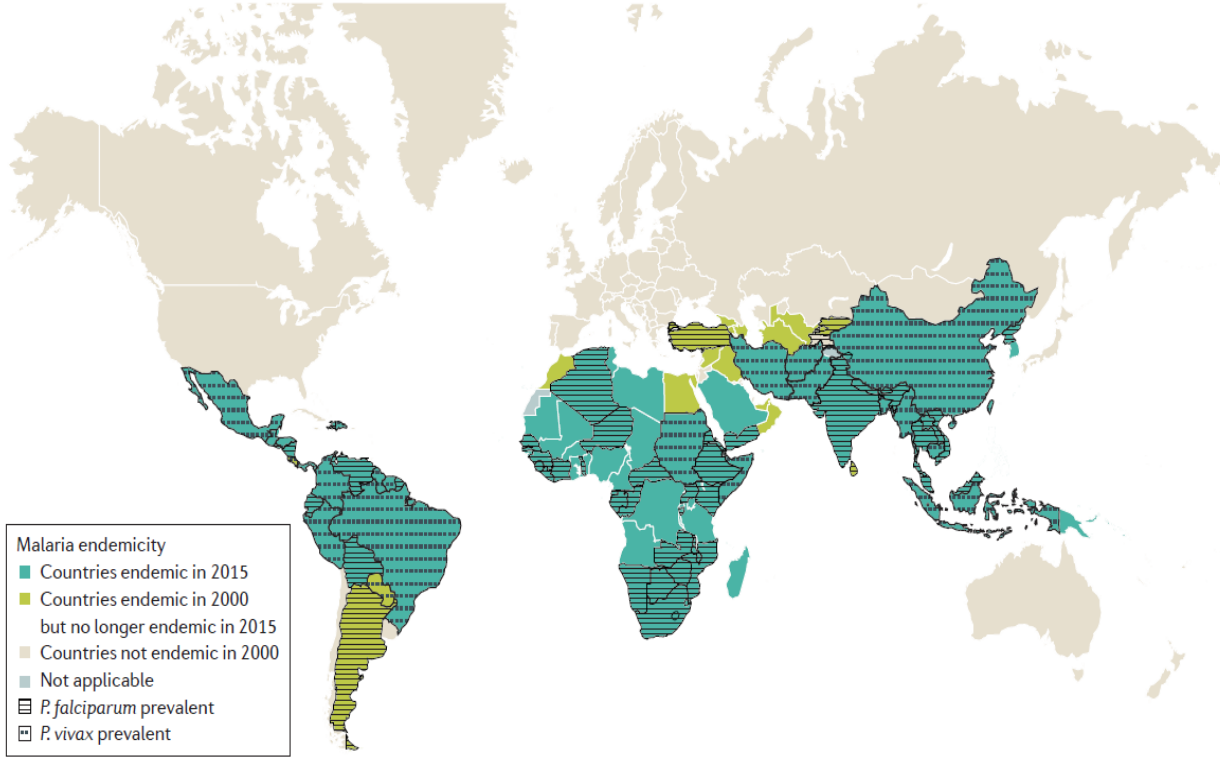
**Sporozoite stage
(injected by mosquito)**



Blood-stage



Map of malaria risk



Malaria eradicated in Australia: declared malaria-free in 1981.

-4 outbreaks since then in north Queensland (last in 2002).

-vector is mosquito: *Anopheles farauti*.

-several hundred imported cases every year.

MALARIA ACROSS THE GLOBE

WORLDWIDE IN 2020



241 million

malaria cases in 87 countries



12%

increase in malaria deaths
compared with 2019



627,000

estimated deaths due to malaria



829,000

babies born with low birthweight
related to malaria during pregnancy

GLOBAL



over 95%

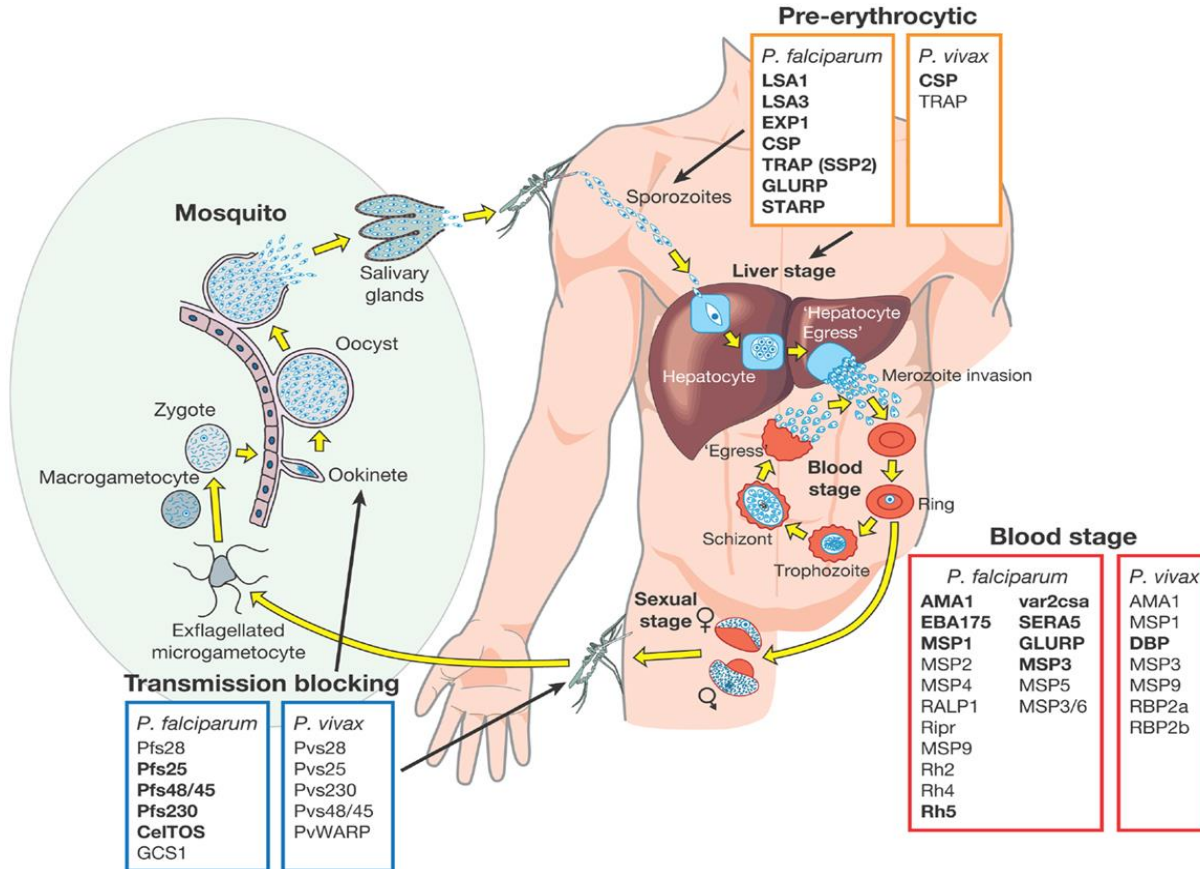
of cases occurred in the
WHO African region



77%

of deaths were in children
under 5 years of age

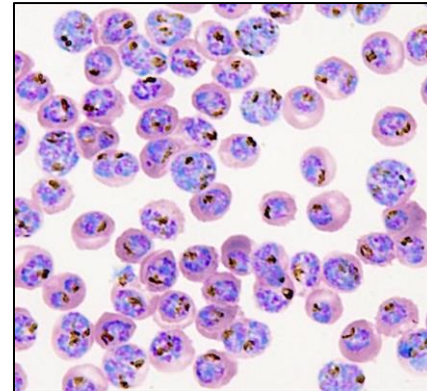
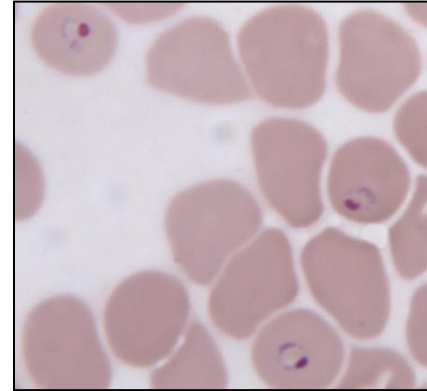
Sub-unit malaria vaccine candidates – individual proteins



Whole Parasite Vaccines

- Many different protein targets (approx. 5,000) presented to the immune system (including those that are the same between parasite strains).
- Must induce a different type of immune response than during natural infection and the immunity must be gained quickly.

Chemically attenuated blood-stage vaccine

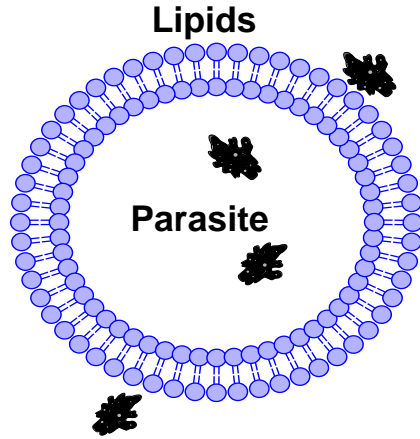


Griffith University's Malaria Vaccine Programme

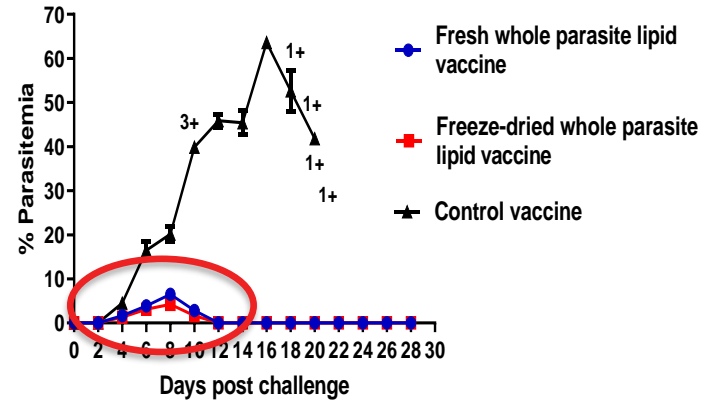
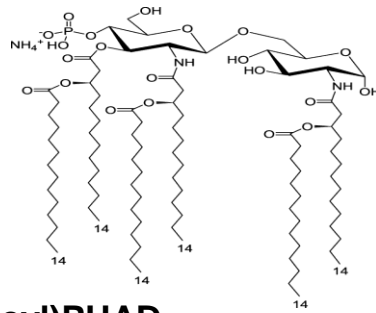
- Pre-clinical development of whole parasite blood-stage vaccine candidates using animal models.
- Developed 2 novel and distinct culture-based *P. falciparum* blood-stage cell banks for clinical studies.
- Developed human blood-stage challenge model for cultured malaria parasites.
- GMP-compliant vaccine manufacture on-site at Griffith University.
- Human clinical trials at Griffith University.
- Whole parasite blood-stage vaccine candidates in the development pipeline.



Our field-deployable whole parasite malaria vaccine



3D(6-acyl)PHAD



MALARIA VACCINE PROJECT

Griffith University researchers have developed a whole-parasite blood-stage malaria vaccine candidate PlasProtect that can be freeze-dried making it easy to transport and store.

2013

THE FIRST PRE-CLINICAL studies evaluating PlasProtect were published. These studies demonstrated that PlasProtect was broadly protective against different malaria parasite strains.

2014-15

GRIFFITH UNIVERSITY CONDUCTED a world-first pilot study to evaluate PlasProtect in malaria-naive human volunteers. It was safe and stimulated an immune response.

2022-2023

GRIFFITH UNIVERSITY WILL CONDUCT a phase 1 clinical study to evaluate a field-deployable version of PlasProtect in malaria-naive human volunteers.

2015

THE RESEARCHERS PUBLISHED details of the first cultured malaria cell banks that would be used to manufacture PlasProtect for use in clinical studies.

2018-2020

GRIFFITH UNIVERSITY CONDUCTED a world-first pilot clinical study to evaluate whether PlasProtect could prevent malaria-naive individuals from developing malaria infection.

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