# A Vaccine to Block Malaria Transmission: Pfs230 Antigen Design and Display (T2016-207)

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# 1. Objective & Goals

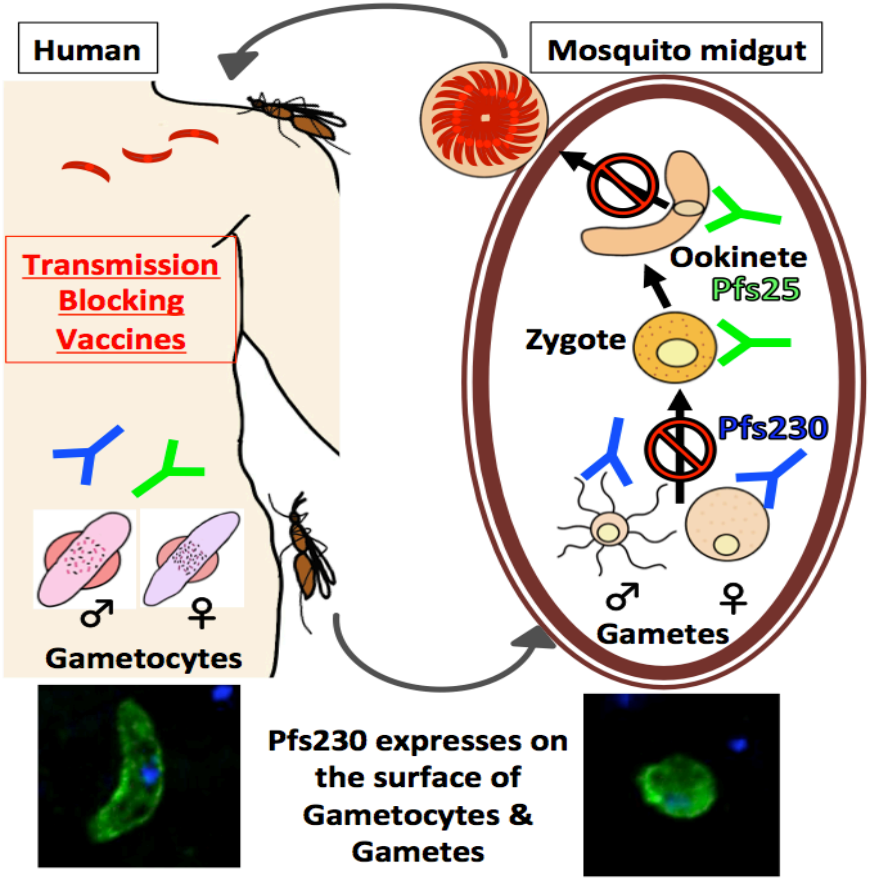
## Malaria transmission-blocking vaccine development

**WHO Malaria Vaccine Technology ROADMAP (2013)**
**Strategic Goals towards malaria eradication**

1. Protective efficacy >75% against clinical malaria
2. Vaccines that reduce transmission

**No efficacious transmission-blocking vaccine (TBV) to date**
**Only Pfs25 & Pfs230 tested in humans**

1. Pfs25 trial indicates immunogenicity in humans needs improvement.
2. New approaches to the discovery and optimization of Pfs230, as well as novel ways to augment the immune responses are needed.

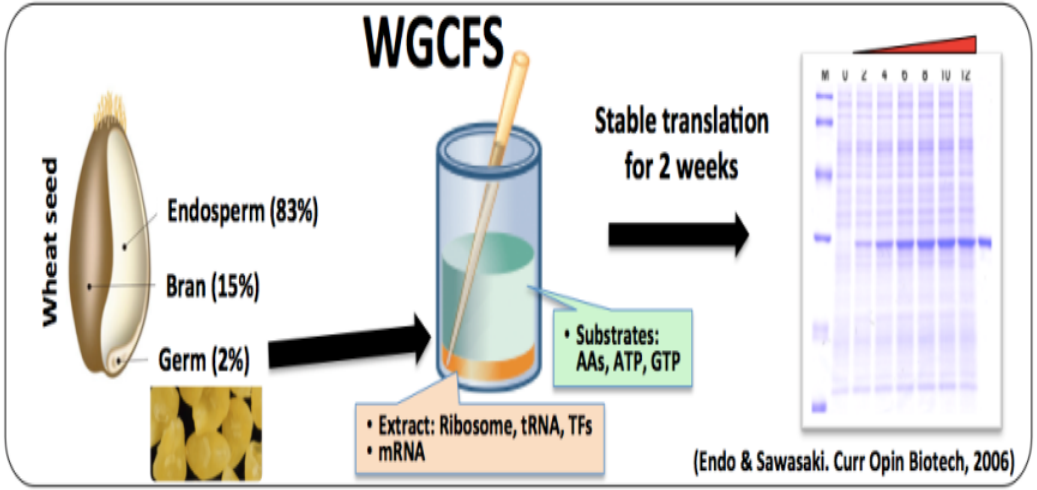


# 2. Partnership

## Why “EHIME : PATH MVI”?

### EHIME U: TBV basic research with WGCFS

- Candidate Discovery of TBV Antigens
- Wheat Germ Expression System (WGCFS) express quality malaria proteins
- Immunologic Evaluation



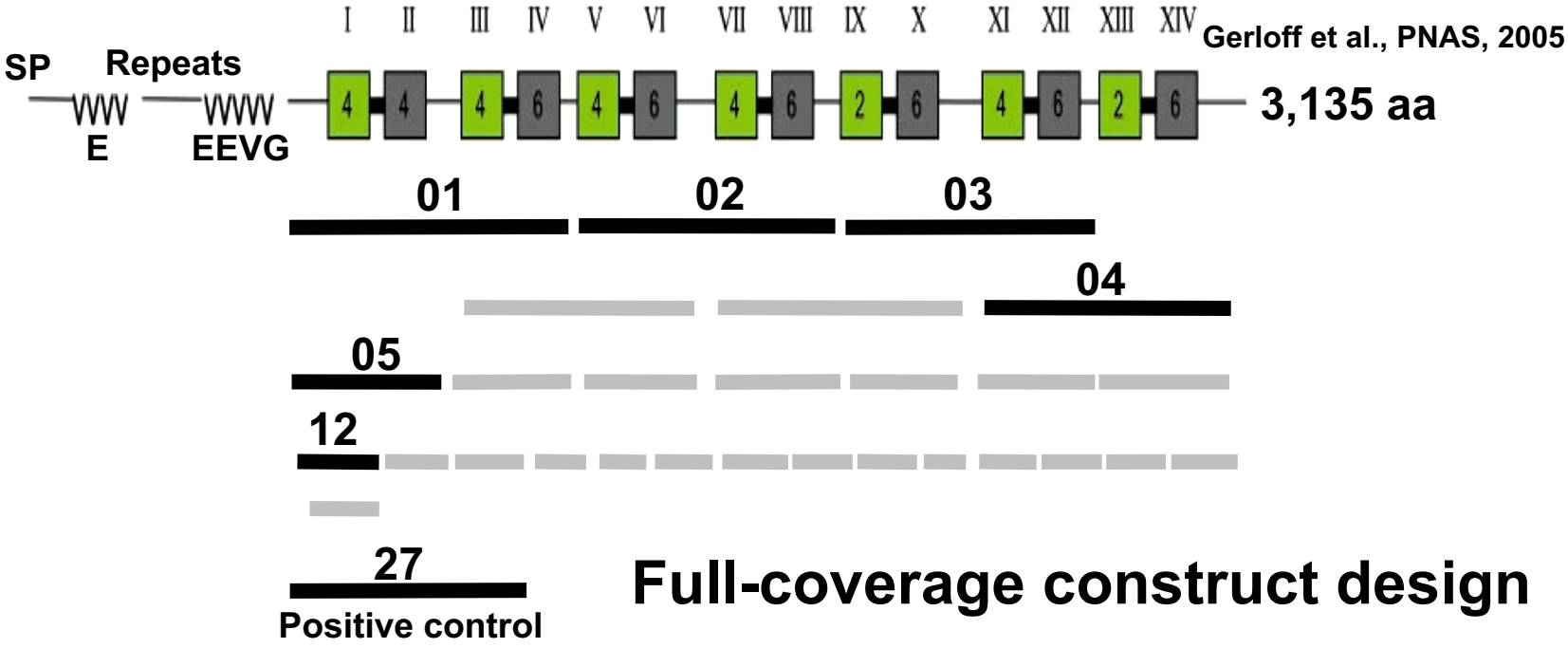

### PATH MVI: TBV development

- Candidate Optimization & Production
  - Partnerships & capacities for optimization & production in scalable system
  - Adjuvant and formulation
- Candidate Evaluation
  - LMVR/NIH Ref Lab functional assays (SMFA)
- Translational Development
  - Human challenge models
  - Regulatory pathway

# 3. Activities (approach)

## WGCF system to identify superior Pfs230 domains

### Pfs230: Cysteine-rich very complex domains




**Full-coverage construct design**

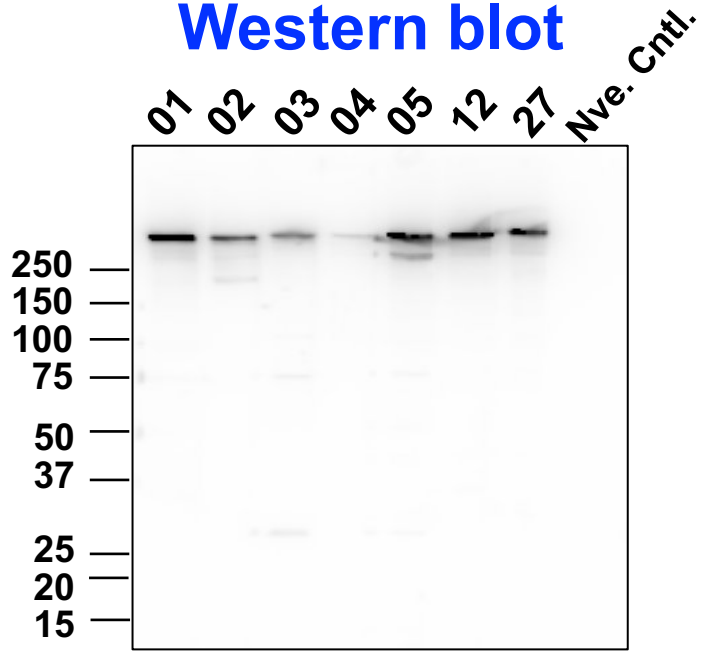
(unpublished)

# 3. Activities to date (result 1)

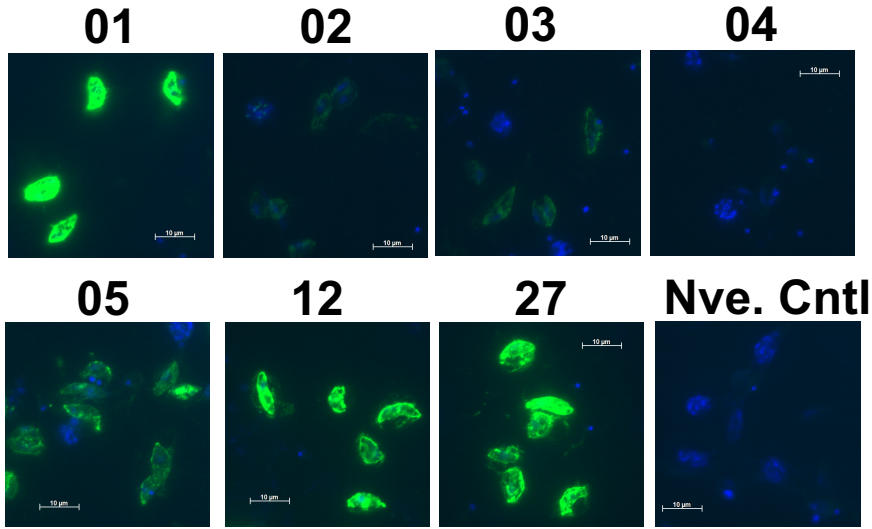
## Mouse antibodies recognize parasite Pfs230 proteins

**Mouse antibodies react specifically but differently against parasite Pfs230.**

### Western blot




### IFA

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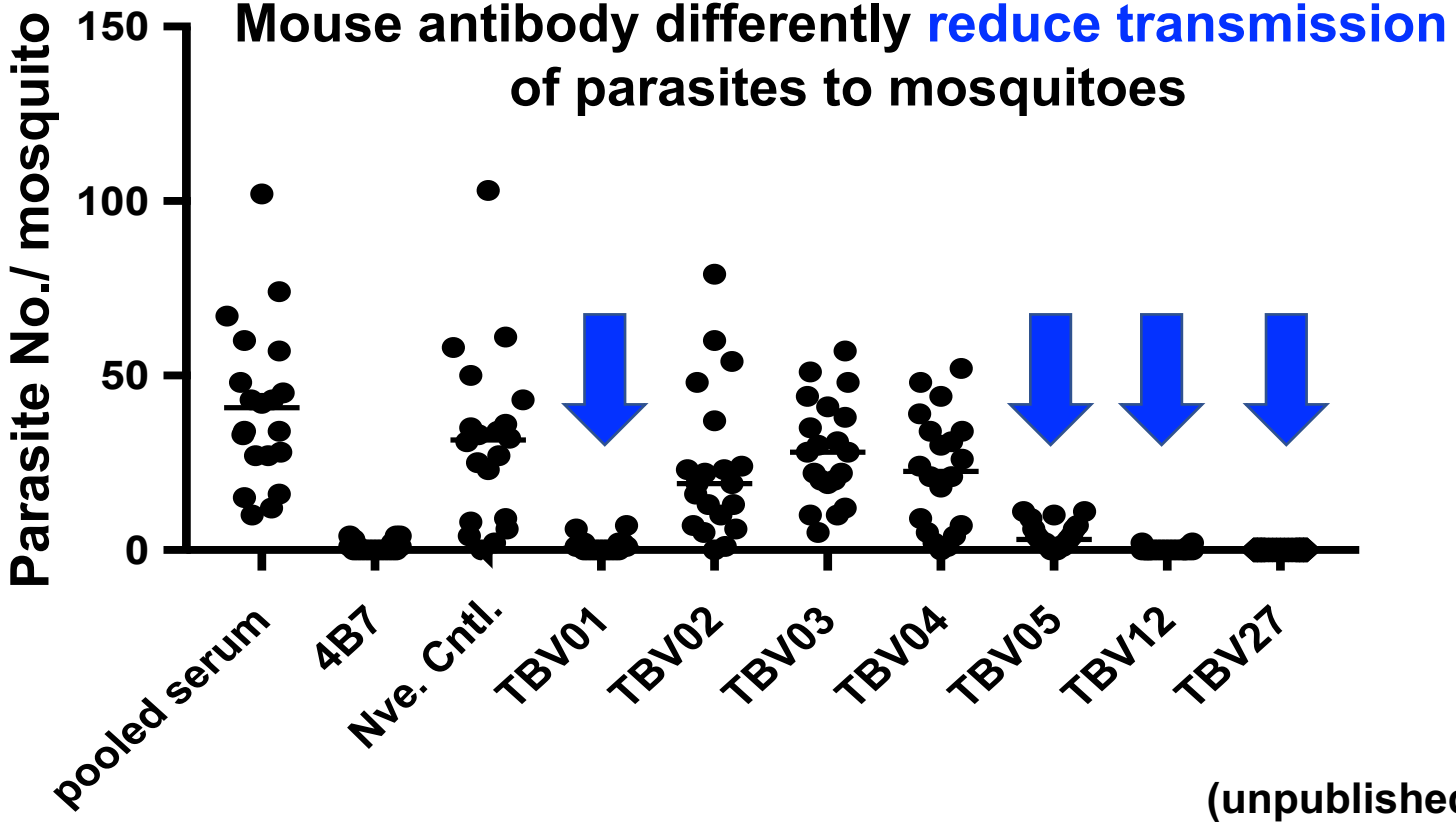
# 3. Activities to date (result 2)

## Anti-Pfs230 antibodies block transmission

LMVR/NIH SMFA Reference Center

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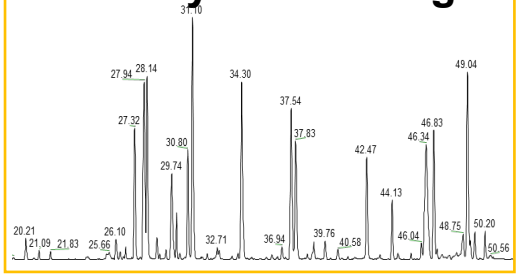
# 3. Activities in 2018
# Ag production using scalable expression system with novel delivery platform

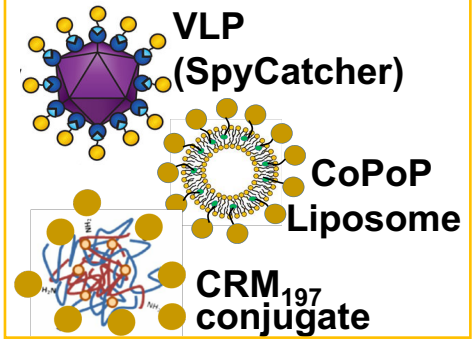
## Leveraging existing MVI technology platforms

**Select 5 potent Pfs230 domains** (by Mar. 2018)

**Analytical Testing**




**Multi-valent delivery**




**LMVR/NIH SMFA Reference Center**

**Selection of Pfs230 vaccine candidate**

**Manufacturing & clinical studies (2019~)**

# 4. Lessons learned

- **What lessons did project members take out of the project?**

1) Ehime U (Academia): Learned how to proceed basic science research towards product development such as malaria TBV.
2) PATH MVI (PDP): PATH MVI benefits from expertise provided by Ehime U regarding the biology of Pfs230 and the expression of challenging proteins.

- **How can these lessons be implemented in future projects?**

1) Ehime: Get ideas for the basic science research which will be useful for the future product development.
2) PATH MVI: Continue to seek the best mix of partners with complementary experience for future projects.

- **What could have been done to make the project better?**

Include additional partner with specific expertise in product development. (ie. adjuvant expert)

# 5. Comments

- **Message to GHIT Fund and R&D experts**

1) **This type of partnership under GHIT Fund is very important for the effective product development towards malaria elimination.**

2) **GHIT funding allows us to pursue goals and objectives that are synergistic with our other funding. It maximizes the probability of success by enabling targeted translational research toward a malaria vaccine.**

**Thank you very much**