Innovation through partnership with PDPs
Outline

1. Overview of our partnerships
   1) How the partnership started?
   2) How the partnerships with PDPs started?
   3) How the partnerships with PDPs advanced?

2. Goal settings on global health research in academia

3. Summary: Partnership with PDPs
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### How the partnership started?

<table>
<thead>
<tr>
<th>Projects</th>
<th>Ehime U: Role</th>
<th>Partners: Role</th>
<th>Funders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodent malaria model</td>
<td>• Gene cloning</td>
<td>• No Partner</td>
<td>1997-99 TDR/WHO</td>
</tr>
<tr>
<td>TBV candidate discovery</td>
<td>• mAbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plasmodium vivax</td>
<td>• Bioassay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify 1st TBV antigen</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Our goal settings**
- Scientific achievements

**Malaria Genome in 2002**

**Innovative Protein Synthesis Technology**

**(WGCFS: Wheat Germ Cell-Free System)**

- Suitable for malaria protein expression

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**1990-1996**

- TBV: Malaria transmission-blocking vaccine

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**1997-1999**

- NIAID: Protein
- Mahidol U: Field-based Bioassay

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**Funders**
- Ehime U: Role
- TDR/WHO
### Vaccine Projects

<table>
<thead>
<tr>
<th>Year</th>
<th>Stage</th>
<th>Pathogen</th>
<th>Ehime U: Role</th>
<th>Partners: Role (PDPs)</th>
<th>Funders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-</td>
<td>Blood-stage vac. discovery</td>
<td><em>P. falciparum</em></td>
<td>• Protein (WGCFS) • Bioassay</td>
<td>• WEHI: Gene KO</td>
<td>• 2008-11 BMGF</td>
</tr>
<tr>
<td>2010-</td>
<td>TBV discovery</td>
<td><em>P. falciparum</em></td>
<td>• Protein (WGCFS)</td>
<td>• NIAID: Bioassay</td>
<td>• 2010- PATH-MVI</td>
</tr>
<tr>
<td>2014-</td>
<td>Novel TBV development</td>
<td><em>P. falciparum</em></td>
<td>• Protein (WGCFS) • Bioassay</td>
<td>• PATH-MVI: Project mgmt., Bioassay</td>
<td>• 2014-GHIT-PDP</td>
</tr>
</tbody>
</table>

### Diagnostic Project

<table>
<thead>
<tr>
<th>Year</th>
<th>Pathogen</th>
<th>Stage</th>
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<th>Partners: Role (PDPs)</th>
<th>Funders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-</td>
<td><em>P. vivax</em></td>
<td>Hypnozoite diagnostics development</td>
<td>• Protein (WGCFS) • HT-immunoassay</td>
<td>• WEHI: Project mgmt., Cohort sample, antibody measurement, data analysis • CFS: WGCFS large scale production • FIND: Develop TPP, Technology selection for future POC diagnostics</td>
<td>• 2015-GHIT-TRP • 2017-FIND</td>
</tr>
</tbody>
</table>

**How the partnerships with PDPs started?**

**Our goal settings**

Scientific achievement to Product development

Ref. Longley et al., Nat Med 26:741-749, 2020
How the partnerships with PDPs advanced?

Malaria vaccine GHIT-funded projects

1. **Transmission-blocking vaccine**
   - **Ehime U: Role**
     - Protein (WGCFS)
     - Bioassay
   - **Partners: Role (PDPs)**
     - PATH-MVI: Project mgmt., Platform selection, Bioassay
   - **Year**
     - 2017
     - 2020

2. **Pre-erythrocytic vaccine**
   - **Ehime U: Role**
     - Bioassay
   - **Partners: Role (PDPs)**
     - PATH: Project mgmt., Preclin. develop.
     - Sumitomo: Adjuvant production
   - **Year**
     - 2021

3. **Blood-stage vaccine**
   - **Ehime U: Role**
     - Protein (WGCFS)
     - Bioassay
   - **Partners: Role (PDPs)**
     - EVI: Project mgmt., Adjuvant selection
     - iBET: Antigen production
   - **Year**
     - 2019
     - 2021

- **Our roles in the partnerships**
  - Scientific expertise

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Goal settings on global health research

A researcher in global health

Projects
1st
2nd
3rd

Scientific achievement
Goal settings on global health research

A researcher in global health

1: Target discov.
2: Validation
3: Optimization

Malaria vaccine projects

Global health needs

Products with Global Health Impact

Scientific achievement

“GAP” for example:

- Lack of budget to progress toward pre-clinical development
- No idea how to contact PDPs
- Risk of policy change in the partners even after the project progressed
- Etc.
Goal settings on global health research

A researcher in global health

Projects

1st

2nd

3rd

Scientific achievement

Partnership
PDPs
Academia
Company

GHIT Fund
Global Health Innovative Technology Fund

Products with Global Health Impact

Global health needs
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Summary: Partnership with PDPs

Q1. How did we first learn about PDPs?
   a) PATH-MVI: since malaria TBV consortium started in 2000
   b) FIND: introduced by our collaborator in the *P. vivax* hypnozoite Dx. project
   c) EVI: met and started discussion at the GHIT Annual Partners Meeting 2016

Q2. What were the merits/impacts to us by the projects with PDPs?
   “Product development” became a visible goal of our research activities.

Q3. Lessons learned and challenges from the partnerships
   a) Proceed basic science research towards product development
   b) Establish mutually complementary relationship with the partners
   c) Most importantly, establishment of trustiness through project activities

Q4. How these lessons can be implemented in future projects with PDPs?
   a) Get ideas for the basic science research which will be useful for the future product development
   b) Continue to seek the best mix of partners with complementary expertise for future projects