



EUROPEAN VACCINE INITIATIVE

ZIKAVAX PARTNERSHIP

Today's Catalyst For Tomorrow's Vaccines

Dr Odile LEROY

DCVMN Seoul

26th September 2017

Product Development Partnership

THE EUROPEAN VACCINE INITIATIVE IS A **PRODUCT DEVELOPMENT PARTNERSHIP** WHICH AIMS TO ACCELERATE THE DEVELOPMENT OF VACCINES FOR DISEASES OF POVERTY



First European PDP

BY YEAR STARTED



Selected other public-private partnerships important for PDPs

Adapted from IAVI 2013



About EVI

Mission

To contribute to the global efforts to control diseases of poverty by supporting development and clinical assessment of vaccines for diseases of poverty

What we do?

Support translational vaccine R&D with focus on preclinical to early clinical development

Operational, managerial and financial support

What we do?

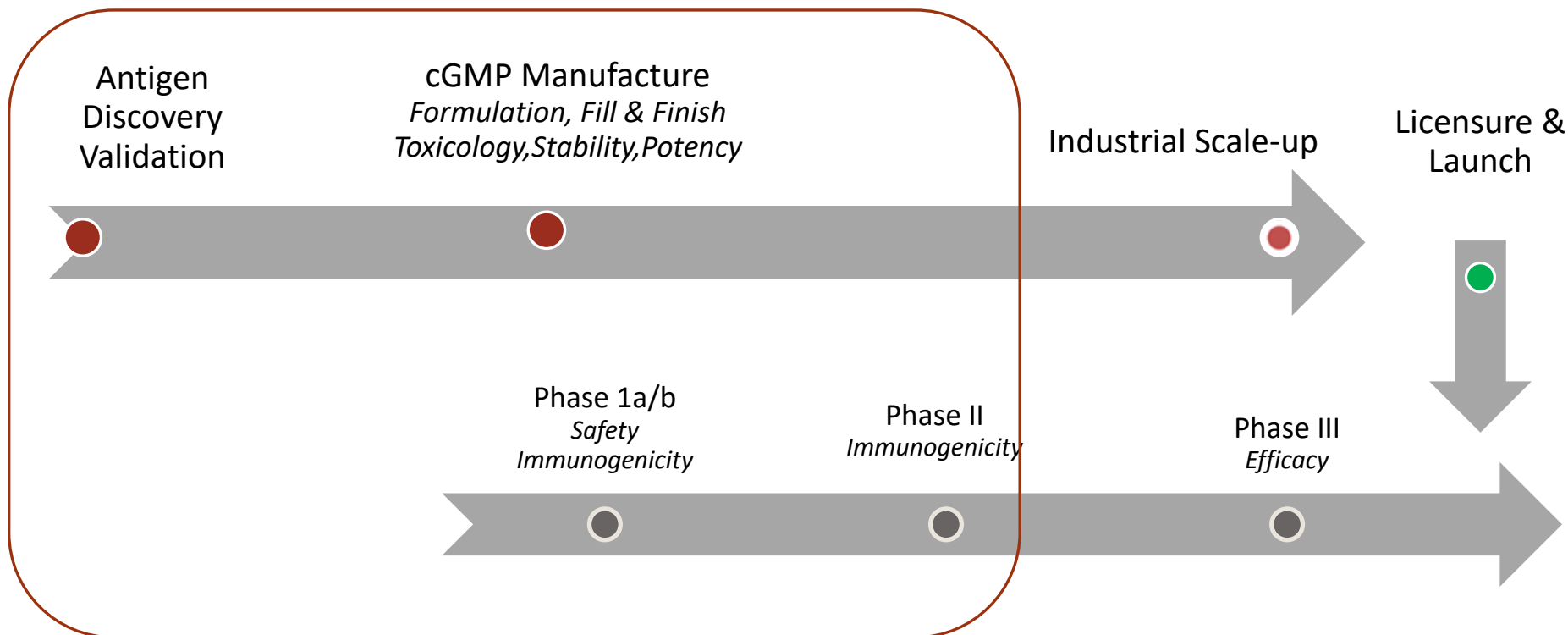
Support capacity strengthening in low-income target regions

What we do?

Bringing together and aligning stakeholders

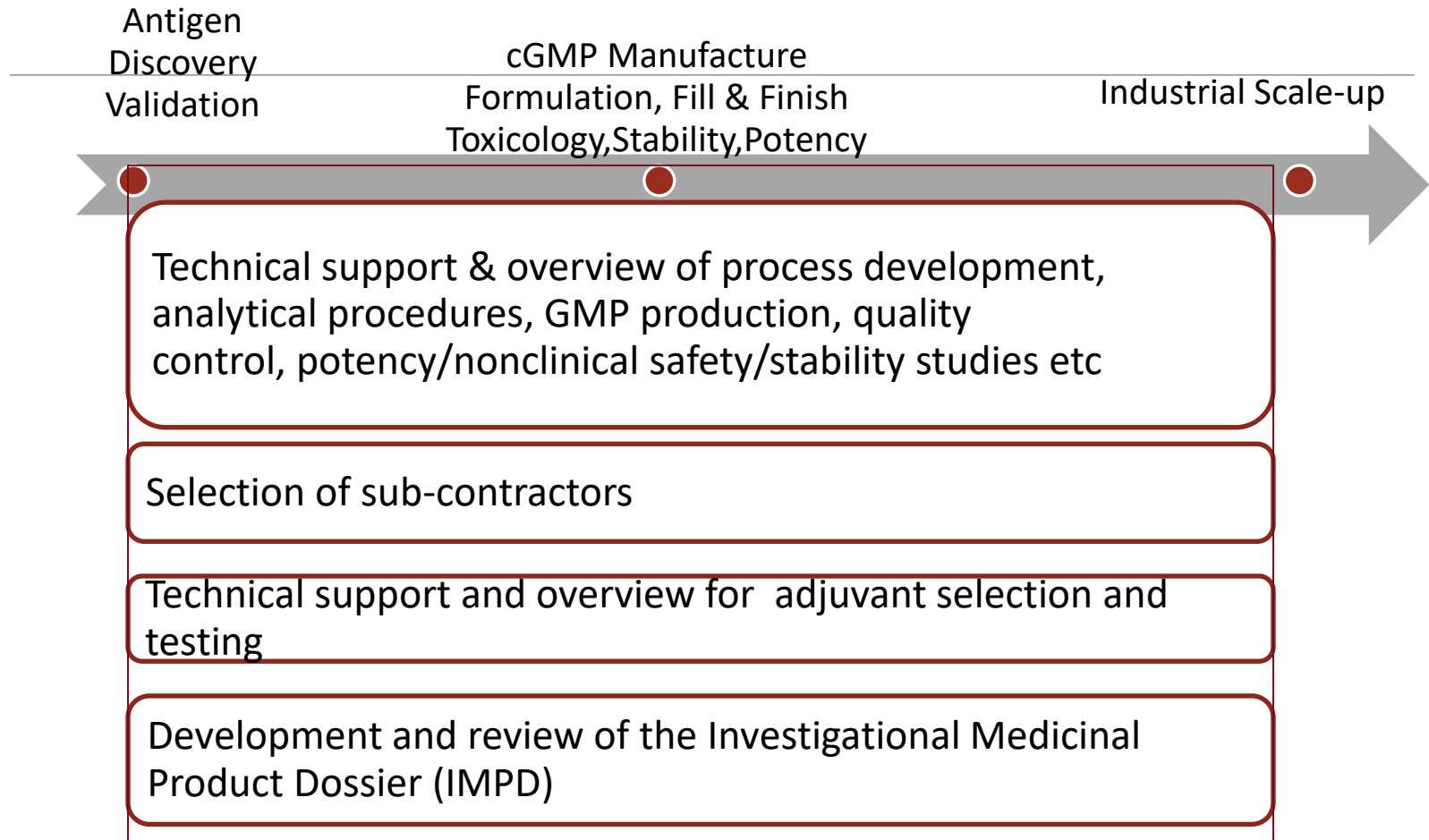


Initiatives Address the Entire Pipeline



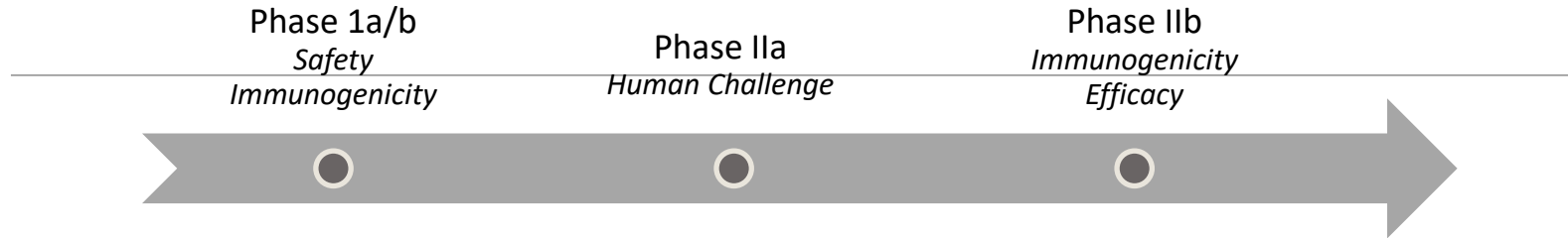


Support in Vaccine Development





Support in Vaccine Development



Selection of sponsor and investigational site

Development and review of the clinical development plan,
clinical trial protocol, methodology etc

Technical support for clinical trial application/review to ethic
committee and regulatory agency



How is EVI addressing the global need for new vaccines?

- ❖ Feed the pipeline FIRST! - PDP
- ❖ Coordination – connecting the chain
- ❖ Harmonisation – guidelines, procedures
- ❖ Building European infrastructure with global network
 - ❖ **TRANSVAC2 project**
1st call 15/10/2017



Public-Private Partnership for Product Development

Heidelberg University
Germany



The Jenner Vaccine
Foundation
United Kingdom



Stockholm University
Sweden



Biomedical Primate
Research Centre
The Netherlands



Royal College of
Surgeons in Ireland
Ireland



Institute for Translational
Vaccinology, Bilthoven
The Netherlands



Institut Pasteur, Paris
France





Partnership Principles and Strategy for Success

- To **involve affected population** and their policy makers in strategy for development plan et setting priorities (diseases, products):
 - objectives developed together
- ✓ product development (including analysis of the results (both safety and efficacy) AND
- ✓ capacity building – infrastructure and training) Need to call funding agencies to have a global portfolio management (as for malaria, tb and hiv vaccine) for PRND assessing gaps and defining priorities
- To call funding agencies to have a **global portfolio management** assessing gaps and defining priorities
 - global portfolio management AND
 - connecting the chain



Partnership Principles and Strategy for Success

- To have **sustainable pipeline** populated with enough candidate to increase chance of success
- To advocate for **pooled funding mechanisms** with FRESH funding to manage global portfolios.
- ✓ Funders should explicitly include product development aspect into their funding mechanism, as well as the requirement for the applicants to outline their access policies.



ZIKAVAX

Fast track development of a Zika vaccine based on measles vector



EUROPEAN VACCINE INITIATIVE

Duration: 48 months

Total grant: €4,918,137.50



EC-funded project under H2020



Institut Pasteur





Objectives

1. To construct and characterise recombinant MV expressing Zika virus proteins as soluble secreted antigens
2. To demonstrate preclinical immunogenicity and protective efficacy of the recombinant MV-Zika vaccine candidate(s) in a mouse model and in a non-human primate (NHP) model of Zika virus infection
3. To manufacture a good manufacturing practice (GMP) clinical lot of the MV-Zika vaccine candidate using scalable platform technology
4. To assess the safety and immunogenicity of the MV-Zika vaccine candidate in a phase I dose-escalation clinical trial



ZIKAVAX Methodology

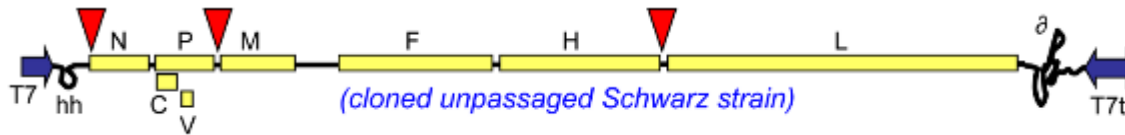
- Delivery platform technology: measles vaccine vector (live attenuated)
 - demonstrated proof of principle in clinical and pre-clinical studies.
- Rapid adaptability and effectiveness for a variety of pathogens (Chikungunya virus, West Nile virus, Ebola, *Plasmodium*, *Mycobacterium*)
- Optimised manufacturing process
- high yields and purity using standards equipment → Rapid transfer to other manufacturers for any outbreak
- Ultimate objective is the demonstration of safety and immunogenicity in adults in a Phase 1 clinical trial



Technology platform: Measles Vector

Inventor: Dr Frederic Tangy – Institut Pasteur (France)

Development: Themis Bio (Austria)



MV genes are indicated: N (nucleoprotein), PVC (phosphoprotein and V/C proteins), M (matrix), F (fusion), H (hemagglutinin), L (polymerase), T7 (T7 RNA polymerase promoter), hh (hammerhead ribozyme), T7t (T7 RNA polymerase terminator), δ (hepatitis delta virus ribozyme), red arrows (additional transcription units).



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Global Portfolio

WHO **DRAFT** Target Product Profile:

A vaccine to protect against congenital Zika virus syndrome in neonates, for use during an emergency

Joachim Hombach, Initiative for Vaccine Research, WHO
on behalf of the WHO PDVAC ZIKV vaccine working group



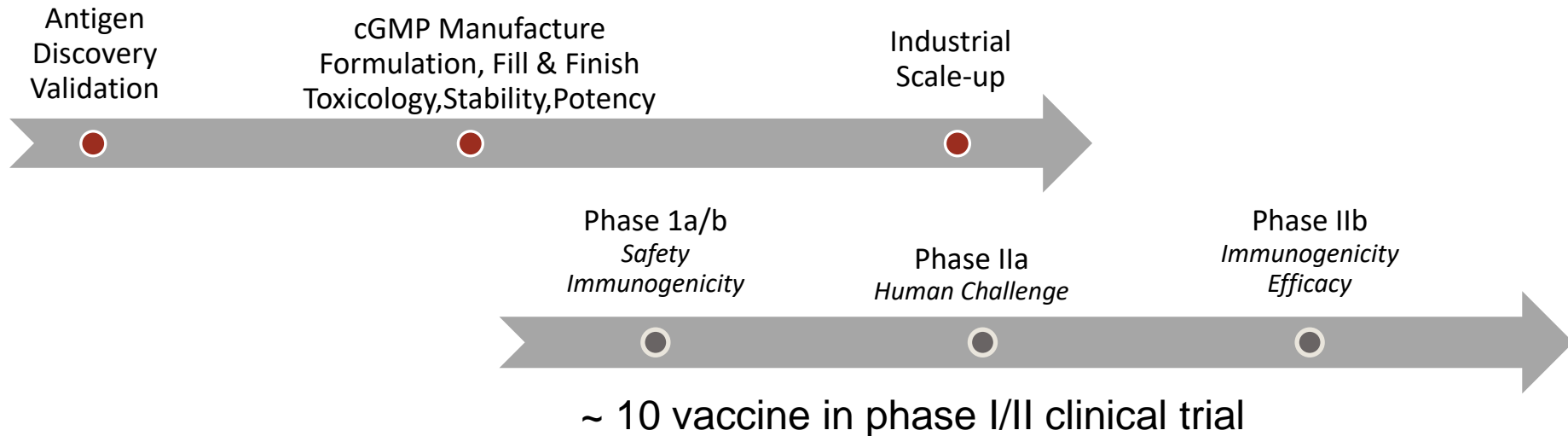
6th June 2016



World Health
Organization



Vaccine Pipeline : ~ 50 projects from 27 institutions/organisations



- *5 inactivated whole virus vaccines*
- *5 live attenuated whole virus vaccines*
- *11 recombinant sub-unit non VLP/VLP*
- *11 recombinant viral vector vaccine*
- *4 DNA or RNA or peptide*



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More to come



Issues and concerns for vaccine development

• Animal models

ZIKV AG129 Mouse Model

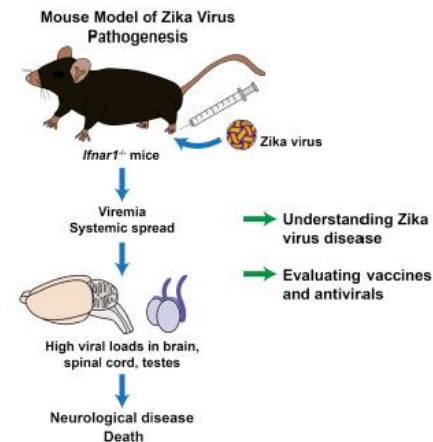


- Neurologic disease
- Conjunctivitis
- Hunching, lethargy, and excitability @ late stage
- Measurable viremia
- Hindlimb paralysis

Appropriate for antiviral and vaccine studies except evaluation of interferon pathway agents

- AG129 (Aliota et al. 2016; Rossi et al., 2016; Zmurko, et al.; 2016; Julander et al., unpublished data; review by Sarathy et al. 2015 (Dengue))

A129 (IFNAR -/-) Mice Develop Neurological Disease and Succumb to Infection



Lazear Cell Host Microbe 2016

June 6, 2016
 Heather Greenstone, PhD
 Program Officer for Small Animal Models
 Virology Branch
 Division of Microbiology and Infectious Diseases
 National Institute of Allergy and Infectious Diseases
 National Institutes of Health
 hgreenstone@niaid.nih.gov





Issues and concerns for vaccine development

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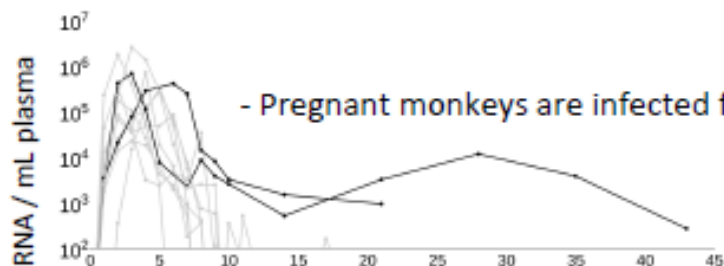
- Animal models**



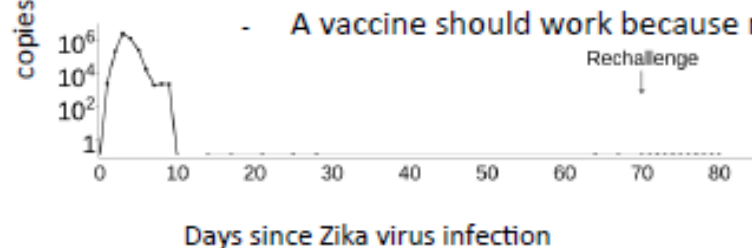
National Institute of
Allergy and
Infectious Diseases



- Macaque monkeys are susceptible to infection with Zika virus



- Pregnant monkeys are infected for an unusually long time



- A vaccine should work because monkeys resist reinfection



And more ...

Further development needed for vaccine development

1. Human challenge models

VALIDATION & FEASIBILITY

1. Definition and validation of correlates/surrogates of protection

HARMONISATION & STANDARDISATION OF IMMUNO-ASSAYS

Further investigations needed for vaccine development

1. Cross reactivity with other flavivirus
2. Epidemiology pattern



Acknowledgements

EVI donors

DGIS (NL)
Irish Aid (IE)
BMBF via KfW (DE)
BMBF (DE)
FP6/FP7 (EC)
EDCTP (EC & EU MS)
IMI-IMI2
GHIT
Nobelpharma

Subjects in EVI funded clinical trials

**EVI sub-contractors,
CMOs, CROs, Consultants**

Scientific Community

Europe, Africa, India, Japan, USA

EVI EEIG members

- Stockholm University, SE
- Heidelberg University , DE
- Royal College of Surgeon in Ireland, IE
- Jenner Vaccine Foundation-University of Oxford, UK
- Biomedical Primate Research Centre, NL
- Intravacc, NL
- Institut Pasteur, FR

Many thanks for your attention!

contact.us@euvaccine.eu -

www.euvaccine.eu

<https://youtu.be/ToU9Pl4HyY4>



You can

**Contribute to make a better
world
free of diseases of poverty**

