

Mechano-*Wolbachia*

Uncovering the mechanisms of action of
an antiviral bacterium



Ewa Chrostek

Jagiellonian University | University of Liverpool

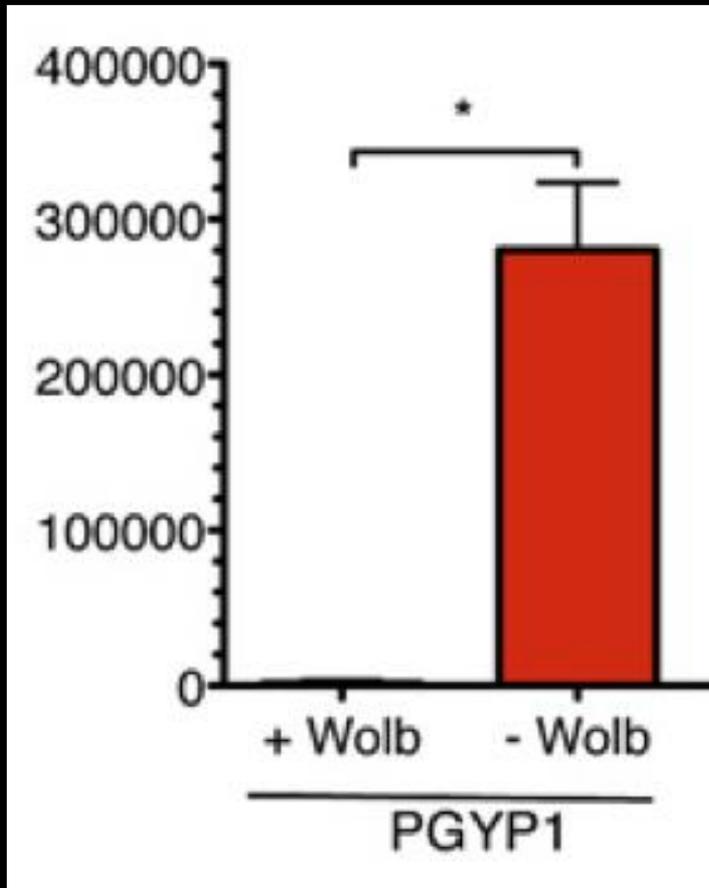
Wolbachia

Intracellular bacterium



Wolbachia protects mosquitoes from viruses

Dengue virus
RNA copies



Teixeira *et al.* 2008 PLoS Biol

Hedges *et al.* 2008 Science

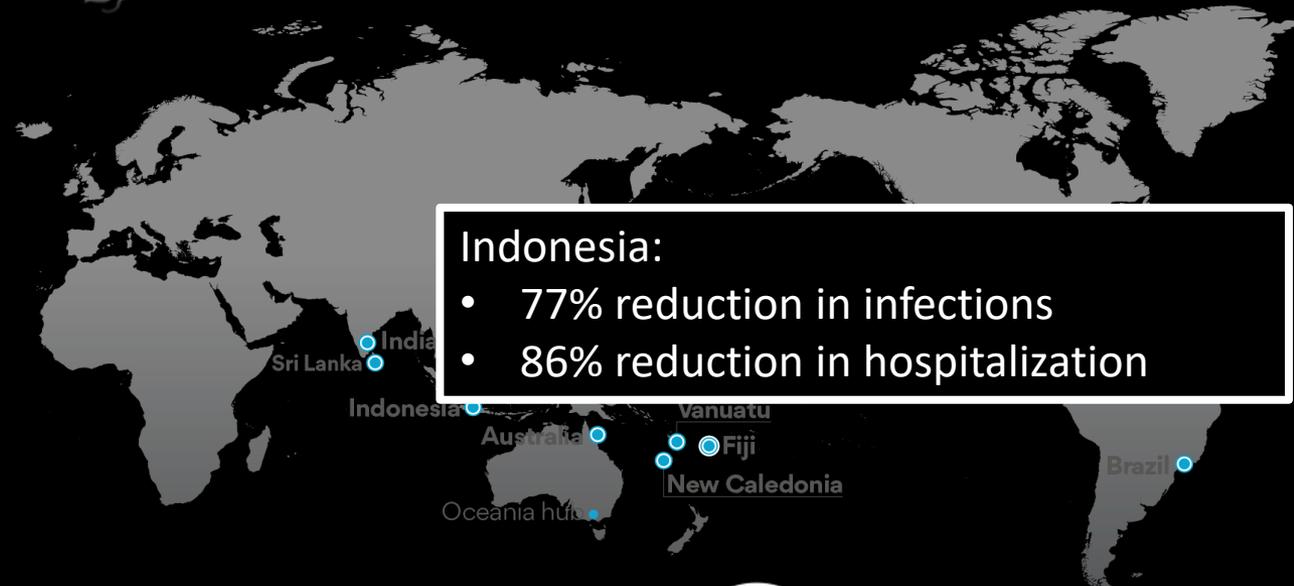
Moreira *et al.* 2009 Cell

Wolbachia-infected mosquito releases to fight dengue



World
Mosquito
Program™

Wolbachia-infected mosquito releases to fight dengue



Indonesia:

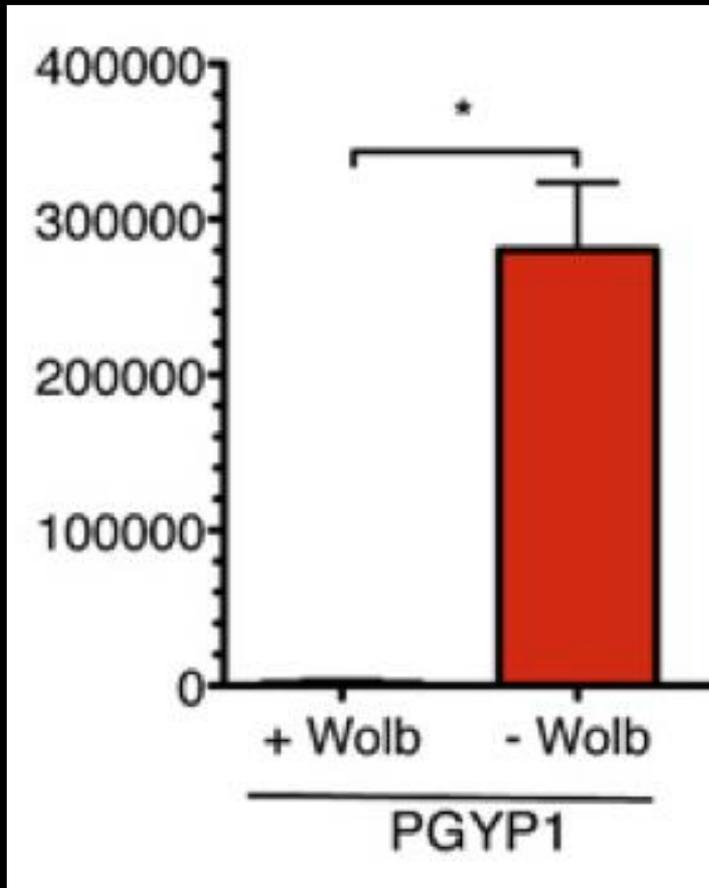
- 77% reduction in infections
- 86% reduction in hospitalization



World
Mosquito
Program™

Wolbachia protects mosquitoes from viruses

Dengue virus
RNA copies

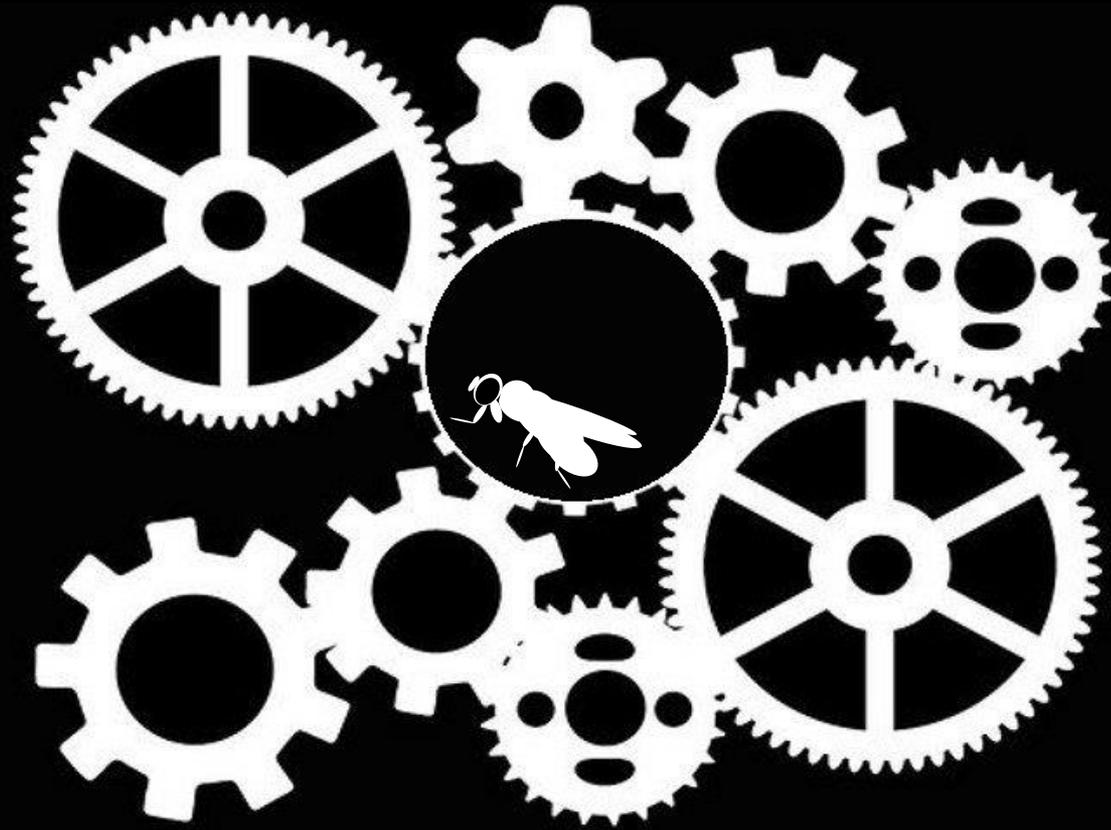


Teixeira *et al.* 2008 PLoS Biol

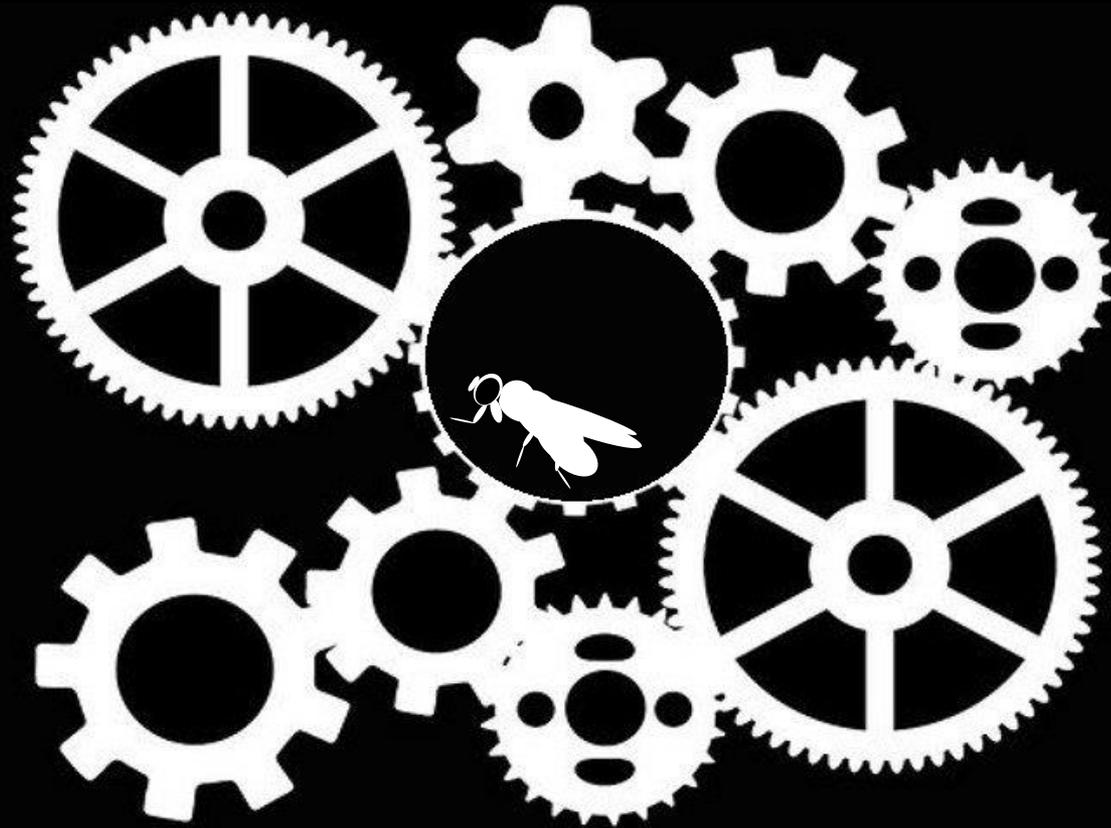
Hedges *et al.* 2008 Science

Moreira *et al.* 2009 Cell

What is the mechanism of *Wolbachia*-conferred antiviral protection?

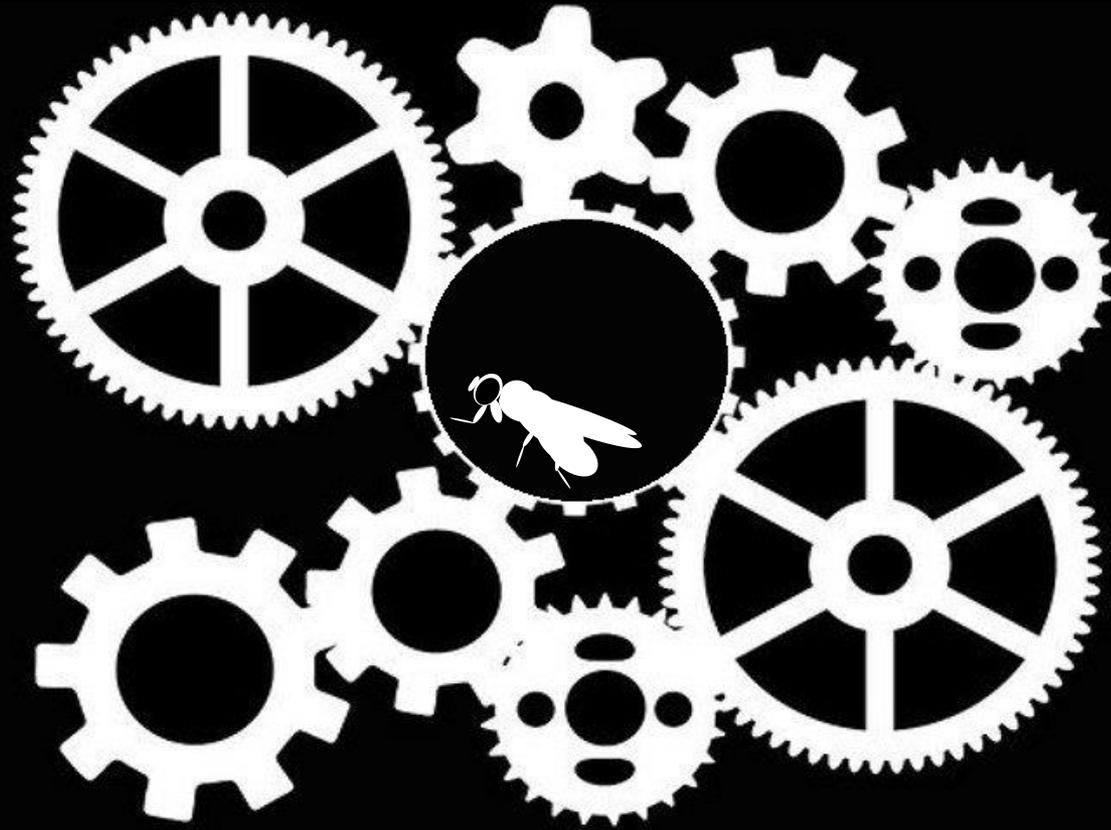


What is the mechanism of *Wolbachia*-conferred antiviral protection?



None of the known antiviral mechanisms...

Mechano-*Wolbachia* will find the antviral *Wolbachia* mechanism



Mechano-*Wolbachia* outputs

Understanding a new antiviral mechanisms

Long-term gains:

- Improve vector control efforts
- Preserve health of beneficial insects
- Explore the antiviral mechanism in non-insect systems
- Use beyond *Wolbachia* or insects...





GLOBAL ARBOVIRUS INITIATIVE

Preparing for the next pandemic
tackling mosquito-borne viruses with
epidemic and pandemic potential



World Health
Organization

Mechano-*Wolbachia* outputs

Understanding a new antiviral mechanisms

Long-term gains:

- Improve vector control efforts
- Preserve health of beneficial insects
- Explore the antiviral mechanism in non-insect systems
- Use beyond *Wolbachia* or insects...



Acknowledgements



Team:

Ndhi Shrivastava

Navina Francis

Wiktor Jakubowski

Yuliya Chykunova

Aleksandra Błazejowska

--

Amirah Rashid

Lorna Glenn

India Cullen

Mentors:

Greg Hurst

Andrea Betancourt

Kayla King

Raquel Oliveira



European Research Council
Established by the European Commission

Collaborators:

Krzysztof Kus

Sungsu Park

Greg Hurst

Andrew Jackson

Marcus Blagrove

Venera Tyukmaeva

Alistair Darby

Ben Makepeace

Liam Good

Luis Teixeira

