The *Bordetella pertussis* human challenge model induces immunising colonisation in absence of symptoms

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Facts & Figures

Start date:	01/03/2016
End date:	28/02/2021
Contributions	
IMI funding:	20 999 998 €
EFPIA Funding:	7 125 114 €
Other:	1 801 573 €
Total Cost:	29 926 685 €
Project website :	www.periscope-project.eu

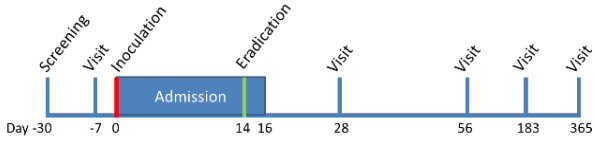
Challenge

Bordetella pertussis (*Bp*) is one of the leading causes of vaccine preventable death and morbidity globally. Recently, pertussis has resurged worldwide, even in countries with high immunisation coverage.

One objective of the PERISCOPE consortium is development of a safe controlled human *Bp* infection model and to define natural immune responses against wild type *Bp* in order to facilitate improvement of bioassays and next generation pertussis vaccines.

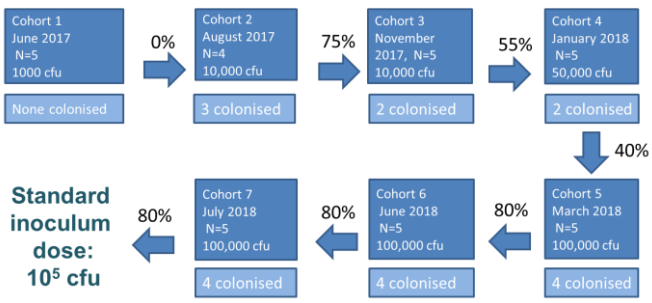
Approach & Methodology

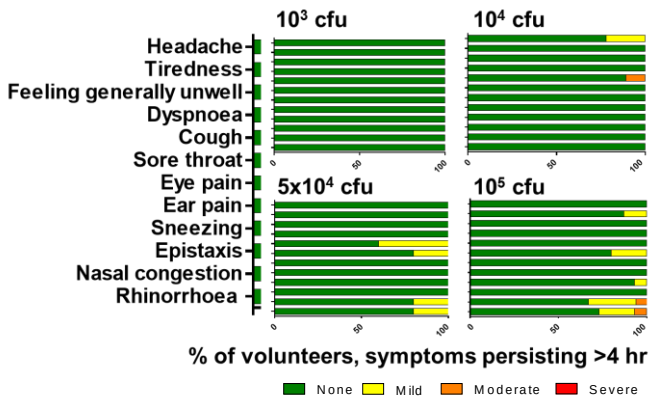
Healthy volunteers aged 18-45 years were inoculated intranasally with *Bp* strain B1917. Safety, colonisation and environmental shedding were monitored over a 17 day inpatient period. Colonisation was assessed by culture and qPCR of nasal washes and nasopharyngeal swabs. Azithromycin eradication therapy was commenced on day 14. The dose of inoculum was escalated to a colonisation rate of approximately 70%. The immunological response will be assessed at various time-points over one year.

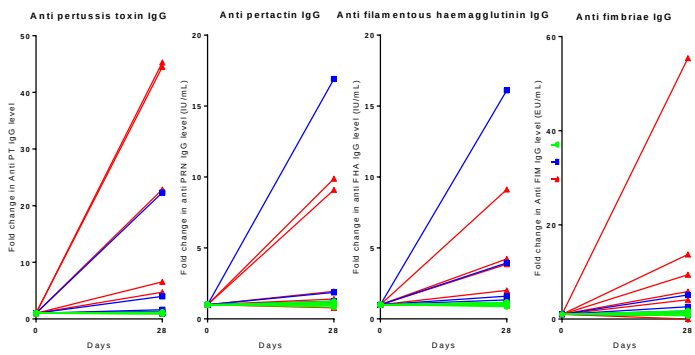


Results

A total of 34 volunteers were enrolled.







Culture day 0-16 (n=34)		Nasopharyngeal swab Positive	Nasopharyngeal swab Negative	
Nasal wash	Positive	18	63	81
	Negative	0	157	157
		18	220	238

Nasal wash day 0-14 (n=15)		PCR Positive	PCR Negative	
Culture	Positive	34	14	48
	Negative	1	26	27
		35	40	75

No environmental shedding of *Bp* was observed.

Value of IMI collaboration

Developing this model has been possible due to support by public and private experts working together within PERISCOPE.

Impact & take home message

Asymptomatic *Bp* colonisation occurs, and causes a systemic immune response. The model that we have developed will be a valuable tool to further investigate *Bp* colonisation and vaccine development.

This work has received support from the EU/EFPIA/BMGF Innovative Medicines Initiative 2 Joint Undertaking PERISCOPE grant no 115910.