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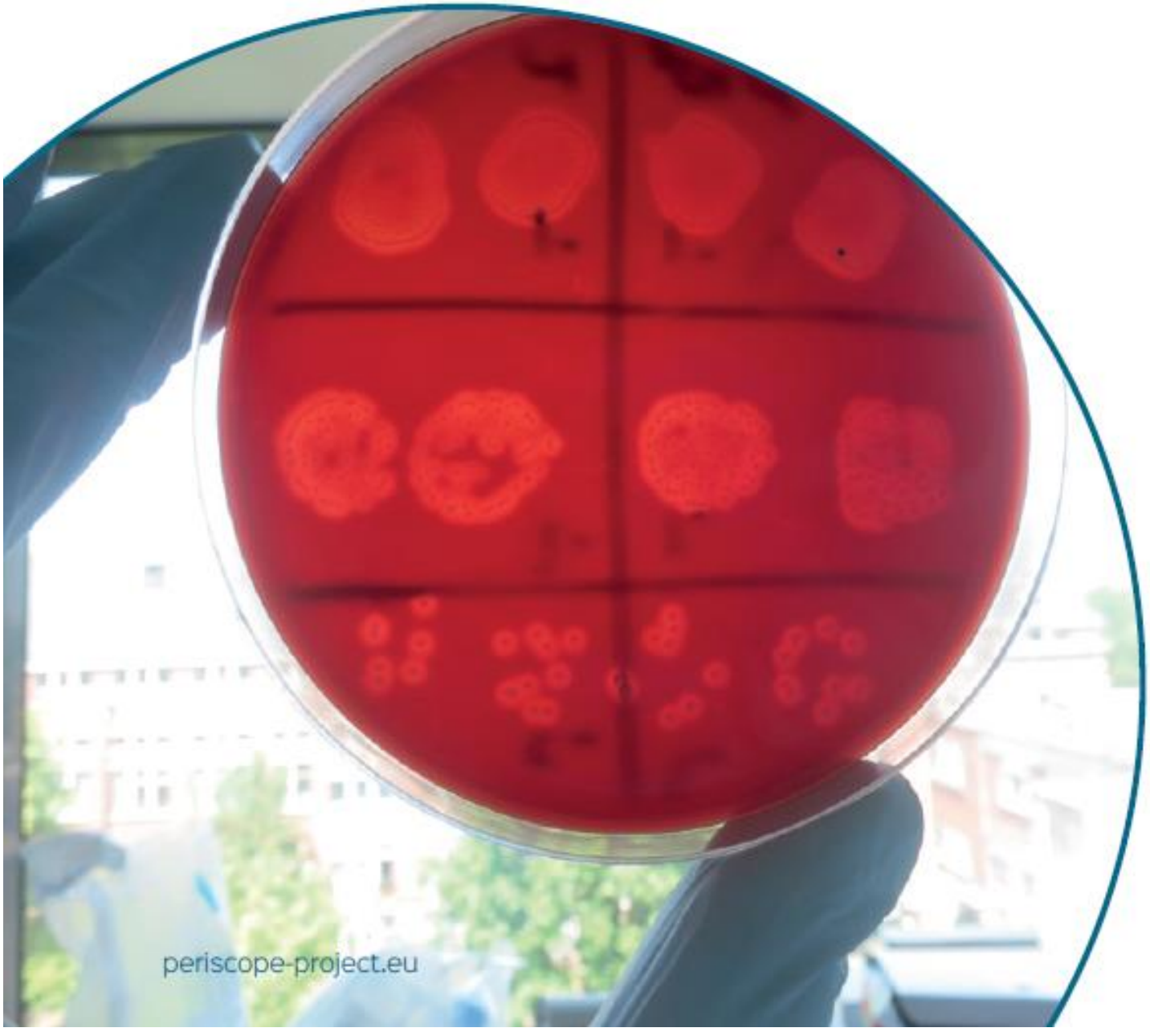
PERtussIS COrrelates of Protection Europe

Newsletter Issue 11 - January 2022



periscope-project.eu

Editorial

Dear colleagues and followers of the PERISCOPE Newsletters,

the PERISCOPE consortium wishes you all a healthy, happy and peaceful 2022!

PERISCOPE's activities in 2021 were again largely impacted by the COVID-19 pandemic, but we continued our efforts to reach our objectives. It also gives us the opportunity to take a step back and reflect on infectious diseases epidemiology and prevention.

The continued circulation of pertussis in vaccinated populations shares many similarities with SARS-CoV-2 and highlights the need to develop new strategies that confer better mucosal protection against infection. Although the PERISCOPE project is focused on pertussis, the knowledge, tools and models that have been developed within the project may also accelerate the development of more effective preventative interventions for other respiratory diseases. As such, PERISCOPE is uniquely positioned to address major international societal needs and challenges posed by infectious diseases.

The consortium is currently working on a framework for access to and use of the biological materials and reagents that have been generated within the project, after the PERISCOPE project has ended. A Biobank Sustainability Committee (BSC) has been installed, focusing on various aspects of sustainability, including the regulatory requirements, access procedures as well as practical issues such as cost and funding etc.

We begin 2022 with optimism and enthusiasm, confident that the PERISCOPE consortium will achieve its objectives of facilitating the development of new and improved pertussis vaccines through the development of immunological tools and better understanding of vaccines-induced immune response.

Facts

The PERISCOPE consortium unites internationally-renowned experts in the largest public-private partnership in Pertussis Vaccine Research in Europe. It was launched in March 2016 receiving support from the Innovative Medicines Initiative (IMI), a joint undertaking of the European Commission and the European Federation of Pharmaceutical Industries and Associations (EFPIA). Additionally, PERISCOPE is the first IMI project to receive funding from the Bill & Melinda Gates Foundation (BMGF). The participating experts combine many years of experience in *Bordetella pertussis* (Bp) research, clinical trials, bioinformatics, immunology and public health.

Acronym:	PERISCOPE
Full title:	PERtussIS COrrelates of Protection Europe
Call Topic:	IMI2-2015-03-05 - Vaccines
Contract N°:	115910
Duration:	60 months (01/03/2016 -28/02/2021) No cost extension until 31/08/2022
Funding:	28.000.000 €
Partners:	21
Website:	http://periscope-project.eu/

PERISCOPE has received funding from the Innovative Medicines Initiative 2 Joint Undertaking under grant agreement No 115910. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and EFPIA and BMGF.

Objectives of the PERISCOPE project

The PERISCOPE consortium seeks to create an environment conducive to the development of a new generation of pertussis vaccines by facilitating collaboration between Pertussis stakeholders, particularly from vaccines manufacturing and the academic and public research communities in Europe.

The key objective of the project is to gain a better understanding of the immune mechanisms needed to ensure long lasting immunity to Pertussis in humans. This will be achieved by investigating of the immune response generated by infection and colonization of *Bordetella pertussis* and comparing the immune response to whole-cell and acellular Pertussis vaccines in humans and preclinical models. To achieve this goal, the consortium aims to develop an extensive toolbox of bioassays to apply in vaccine studies in Europe and the Gambia. It is expected that the data generated will ultimately allow the vaccine R&D-community to define an ideal immunological profile or signature that vaccines need to generate to ensure durable protection against Pertussis infection and disease in humans.

Welcome to Martina Ochs as new EFPIA coordinator of PERISCOPE !

In 2021, Martina Ochs succeeded Patricia Londono-Hayes, both from Sanofi Pasteur, as coordinator and representative of the European Federation of Pharmaceutical Industries and Associations (EFPIA). We would like to thank Patricia one more time for the tremendous work she has done for the consortium. Martina Ochs, previously WP7 leader, is now committed to take on this new responsibility in the consortium's management team to achieve the program's objectives. We asked her a few questions.

As EFPIA-lead what is your impression with the consortium so far?

The consortium has been very successful. It has delivered on its objectives such as the development of a human challenge model and multiple assays elucidating responses to pertussis immunization. PERISCOPE is conducting several immunization studies some of which have been strongly impacted by the COVID-19 pandemic, however, investigators persevere and continue to deliver. Similarly, a large amount of work has been completed with regards to the mechanisms of vaccine-elicited immune responses and peer-reviewed publications attest to this success. Further testimony is that in 2020 the Innovative Medicines Initiative highlighted PERISCOPE as success story on their website. On a personal note, it is a pleasure and privilege to be part of this consortium and work with this collaborative, energetic and innovative group of scientists.

What is your impression of the results obtained until now?

The results obtained so far provide new insights into the mechanisms by which pertussis vaccines stimulate immune responses. And PERISCOPE created new tools and infrastructure in support of pertussis vaccine development.

From now until the end of the consortium what are the next steps and what will happen afterwards?

The immediate next steps are to complete the objectives set out by the consortium, and I hope the tools created will be applied to future pertussis vaccine research. The consortium is currently discussing how to sustain the collaborative momentum that developed over the last years, but whatever the consortium will decide, the opportunities PERISCOPE offered to students and young scientists already have a lasting impact.

What opportunities does PERISCOPE offer to young scientists ?

Education of young scientists in vaccinology, especially targeting pertussis, and in the use of state-of-the-art technological tools to discover biomarkers of protection is an important priority for the PERISCOPE consortium. Many training courses (e.g. workshops on specific assays, EuroFlow training courses, GSK Vaccine Development Course) have been and continue to be organized by PERISCOPE members.

We asked three junior scientists involved in the project, what opportunities the PERISCOPE consortium offered them to develop their expertise and networks.

Mathilde Galhaut, Preclinical Study Manager, CEA/DRF/IBFJ/ImVA-HB_UMR1184/IDMIT, France

“As a project manager at IDMIT, PERISCOPE gives me the opportunity, first of all, to participate in the management of a large-scale European program, thus allowing me to develop my skills. Then, to have the chance to communicate with national and international partners, which allows me to extend my professional network and therefore to initiate potential future collaborations. Working in this consortium allows me to take part in the exciting advances in whooping cough research. Finally, PERISCOPE offers me the opportunity to study the baboon model in research, at different life stages, which is a great opportunity that could have never happened. “

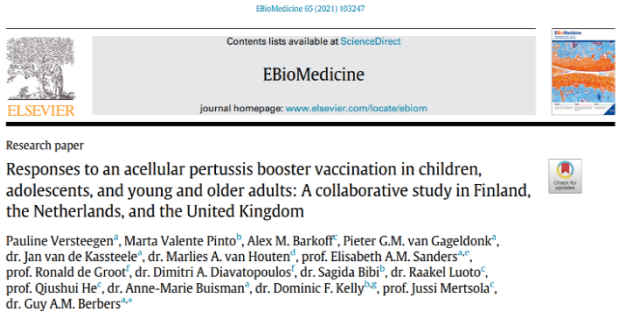
Breeze Cavell, Research Scientist, UK Health Security Agency (formally Public Health England), UK

"I have been fortunate enough to be involved in the PERISCOPE consortium since the first AGM in Dublin, and it's been a privilege to see the project develop. The advantage of having a large, multidisciplinary consortium is the range of expertise and the unique insight this provides to drive research in the project. On a personal level, the exposure to research from a broad range of disciplines from an early point in my career has been invaluable. Working on such a large project with multiple clinical trials across numerous sites has really highlighted the importance of developing reproducible and robust assays which allow for comparisons to be made over the course of several years. Whilst this has been challenging it has allowed me to develop my skills and expertise and ultimately has been a rewarding experience. PERISCOPE actively encourages input from young scientists, and I have had the opportunity to present data at several meetings and engage with a wide variety of people. The friendly and open nature of everyone involved has allowed me to develop professional networks and build a platform for further collaborations which I hope to extend far into the future. "

Thibaut Naninck, Head of PET/CT programs, CEA/DRF/IBFJ/ImVA-HB_UMR1184/IDMIT, France

« The PERISCOPE consortium first gave me the opportunity to perform my PhD project on *Bordetella pertussis* colonization in baboons. However, in my mind PERISCOPE was not limited to provide resources to implement this model of whooping cough in Europe. The PERISCOPE consortium also gave me the opportunity to exchange, collaborate and discuss with other students and international experts (in both industrial and academic areas) in this field and then to reinforce my professional network. These collaborations led to several publications and participations at international conferences and then offers me a first visibility at the beginning of my researcher career."

Results from the PERISCOPE consortium published in EBioMedicine and Vaccines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Research paper

Responses to an acellular pertussis booster vaccination in children, adolescents, and young and older adults: A collaborative study in Finland, the Netherlands, and the United Kingdom

Pauline Versteegen[a], Marta Valente Pinto[b], Alex M. Barkoff[c], Pieter G.M. van Gageldonk[a], dr. Jan van de Kassteele[a], dr. Marlies A. van Houten[d], prof. Elisabeth A.M. Sanders[a,e], prof. Ronald de Groot[f], dr. Dimitri A. Diavatopoulos[f], dr. Sagida Bibi[b], dr. Raakel Luoto[c], prof. Qiushui He[c], dr. Anne-Marie Buisman[a], dr. Dominic F. Kelly[b,g], prof. Jussi Mertsola[c], dr. Guy A.M. Berbers[a,*]

Pertussis can lead to serious disease and even death in infants. Older adults are more vulnerable to complications as well. In high-income countries, acellular pertussis vaccines are used for priming vaccination. In the administration of booster vaccinations to different age groups and target populations, there is a substantial between-country variation.

PERISCOPE's partners from Finland, the Netherlands and the United Kingdom investigated the effect of age on the response to acellular pertussis booster vaccination in three European countries. In all three countries, children aged 7-10 years, adolescents aged 11-15 years, young adults aged 20-34 years, and older adults aged 60-70 years old were recruited. They all responded well to the aP booster vaccination as measured after one month and one year post-vaccination. The influence of age and epidemiological background of pertussis in the countries seems limited on the IgG vaccine responses, however increasing age does seem to have an enhancing effect on IgA responses.

Therefore, acellular pertussis booster vaccination might also be considered for older adults and individuals with pulmonary morbidities in order to reduce the health and economic burden of pertussis in the population.

Klick here for the full article.


Open Access Article

Age and Primary Vaccination Background Influence the Plasma Cell Response to Pertussis Booster Vaccination

by Annieck M. Diks [1], Pauline Versteegen [2], Cristina Teodosio [1], Rick J. Groenland [1], Bas de Mooij [1], Anne-Marie Buisman [2], Alba Torres-Valle [3,4], Martín Pérez-Andrés [3,4], Alberto Orfao [3,4], Guy A. M. Berbers [2], Jacques J. M. van Dongen [1,3,4,*], Magdalena A. Berkowska [1] and on behalf of the IMI-2 PERISCOPE Consortium †

In this exploratory study, PERISCOPE partners applied high-dimensional flow cytometry to investigate changes in B cells in individuals of different ages and distinct priming backgrounds upon administration of an acellular pertussis booster vaccine. Participants were divided over four age cohorts; children aged 7-10 years, adolescents aged 11-15 years, young adults aged 20-34 years, and older adults aged 60-70 years old. We then compared changes over time within each cohort and between the different cohorts. We also correlated these changes in B cells with the vaccine-specific antibody levels. Expansion and maturation of plasma cells 7 days postvaccination was the most prominent cellular change in all age groups and was most pronounced for more mature IgG1+ plasma cells. Moreover, we observed that plasma cell responses were stronger in individuals primed with whole-cell vaccine than in individuals primed with acellular vaccine. Both IgG1+ and IgA1+ plasma cell expansion correlated with FHA-, Prn-, or PT- specific serum IgG or IgA levels. Altogether scientists from PERISCOPE partners LUMC, USAL and RIVM worked together to increase the understanding of differences in immune responses between age groups and primary vaccination backgrounds.

Klick here for the full article.

Virtual PERISCOPE Stakeholder and annual meeting 2022

Due to the COVID-19 pandemic, most of our 2022 meetings will be virtual.

The continuation of fruitful collaborations and the network will be discussed during the stakeholder meeting on February 15 and 16, 2022 and will link the academic partners of PERISCOPE and some key external participants willing to share their respective experiences on potential collaborations after project end.
It will be followed by the annual PERISCOPE meeting in May where scientists will share their recent progress and discoveries, as we approach the end of the project

About PERISCOPE- *Progress beyond state of the art*

Beyond the public health objectives of PERISCOPE, the project stimulates connections among the Pertussis research community in Europe and beyond. It is expected that this network of stakeholders will continue to contribute to the development of novel vaccines and immunization methodologies beyond the life of the project. A variety of virtual discussion forums and meetings have been held throughout this fourth year of the program. Through these discussions, areas for future work were identified, new interfaces created among partners and long-standing collaborative links strengthened. This has already had a positive impact on the Pertussis community in Europe and beyond.

Bringing together industrial and academic partners with different approaches and working practices means that both learn from each other, not only about what they do, but also how they do it.

Partners and experts in PERISCOPE

The PERISCOPE consortium brings together internationally renowned scientists with many years of experience in *Bordetella pertussis* (Bp) research, clinical trials, bioinformatics, immunology and public health.