

MALARIA VACCINES FOR THE WORLD

8-10 May 2019, University of Oxford, Oxford, UK



FINAL ORAL & POSTER PROGRAMME

MVW 2019

SCIENTIFIC ADVISORY PANEL

Local Organiser: Simon Draper (*University of Oxford, UK*)

Jane Achan (*LSHTM/MRC, The Gambia*)

Evelina Angov (*Walter Reed Army Institute of Research, USA*)

Sumi Biswas (*University of Oxford, UK*)

Chetan Chitnis (*Institut Pasteur, France and ICGEB, India*)

Alassane Dicko (*University of Bamako, Mali*)

Carlota Dobaño (*Barcelona Institute for Global Health, Spain*)

Denise Doolan (*James Cook University, Australia*)

Sócrates Herrera (*Malaria Vaccine and Drug Development Center, Colombia*)

Stephen L. Hoffman (*Sanaria, USA*)

Adrian Hill (*University of Oxford, UK*)

Melissa Kapulu (*KEMRI-Wellcome Trust, Kenya*)

Shahid Khan (*Leiden University Medical Centre, Netherlands*)

Rick King (*PATH's Malaria Vaccine Initiative, USA*)

Francine Ntoumi (*Fondation Congolaise pour la Recherche Médicale, Republic of the Congo*)

Ally Olotu (*Ifakara Health Institute, Tanzania*)

Melissa Penny (*Swiss Tropical and Public Health Institute, Switzerland*)

Robert Seder (*National Institutes of Health, USA*)

Sodiomon Sirima (*Groupe de Recherche Action en Santé (GRAS), Burkina Faso*)

Takafumi Tsuboi (*Ehime University, Japan*)

Johan Vekemans (*World Health Organisation, Switzerland*)

Nicola Viebig (*European Vaccine Initiative, Germany*)

Eileen Villasante (*Naval Medical Research Center, USA*)

Hedda Wardemann (*German Cancer Research Centre, Germany*)

Rana Chattopadhyay (*CBER/FDA, Silver Spring, Maryland, USA*)

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MYMETICS

08.30 onwards

Registration

SESSION 1: OPENING PLENARY SESSION

Moderator: Simon Draper

(University of Oxford, Oxford, UK)

09.30-10.00

'Subunit vaccines for malaria – getting there!'

Adrian V.S. Hill

(University of Oxford, Oxford, UK)

10.00-10.30

'Developing vaccines to battle the complex parasites that cause malaria in heterogeneous populations is not for the faint of heart: The PfSPZ experience'

Stephen Hoffmann

(Sanaria Inc., Maryland, USA)

10.30-11.00

Coffee Break & Posters Set-Up

SESSION 2: PFSPZ-BASED VACCINES: PHASE 3 TO LICENSURE TO DEPLOYMENT TO USE IN ELIMINATION CAMPAIGNS TO NEXT GENERATIONS

Moderators: Said Jongo (Ifakara Health Institute, Ifakara, Tanzania)

and Marcel Tanner (Swiss TPH, Switzerland)

11.00-11.15

'Finalizing an immunization regimen for PfSPZ Vaccine for Phase 3 clinical trials in non-immunes'

Stephen L. Hoffman

(Sanaria Inc., Maryland, USA)

11.15-11.30

'Finalizing an immunization regimen for PfSPZ Vaccine for Phase 3 clinical trials in semi-immune adults in Africa'

Said Jongo

(Ifakara Health Institute and Bioko Island Malaria Elimination Program)

11.30-11.45

'Current status of and medium-term plans for PfSPZ Vaccine'

Thomas L. Richie

(Sanaria Inc., Maryland, USA)

11.45-12.00

'Plans for use of PfSPZ Vaccine for Geographically Focused Elimination Campaigns'

Salim Abdulla

(Ifakara Health Institute and Bioko Island Malaria Elimination Program)

12.00-12.15

'Developing a PfSPZ-CVAc regimen that provides high level protection against heterologous CHMI'

Agnes Mwakwingwe

(Laboratory of Malaria Immunology and Vaccinology, NIAID, NIH, Bethesda, Maryland, USA)

12.15-12.30

'Current status of early arresting genetically altered PfSPZ vaccines, PfSPZ-GA1'

Shahid Khan and Meta Roestenberg

(Leiden University Medical Center, Leiden, The Netherlands)

12.30-12.45

'Current status of early arresting genetically altered PfSPZ vaccines, PfSPZ-GAP3KO'

Ashley Vaughan

(Seattle Children's Hospital Research Foundation, Seattle, Washington, USA)

12.45-13.00

Discussion

13.00-13.45

Lunch Break & Posters

SESSION 3: PFSPZ-BASED VACCINES: INNOVATIONS AND IMMUNOLOGY TO IMPROVE EFFICACY AND REDUCE COST OF GOODS

Moderators: Patrick Duffy (LMIV, NIAID, NIH)

and Peter F. Billingsley (Sanaria Inc., Maryland, USA)

13.45-14.00

'Production of fully infectious, immunogenic PfSPZ in vitro'

Abraham Eappen

(Sanaria Inc., Maryland, USA)

14.00-14.15

'Hybrid strains and mixed strains of PfSPZ for increasing genetic diversity'

B. Kim Lee Sim

(Sanaria Inc., Maryland, USA)

14.15-14.30

'Development of late liver stage arresting genetically attenuated PfSPZ and parasites expressing heterologous antigens'

Shahid Khan and Chris Janse

(Leiden University Medical Center, Leiden, The Netherlands)

14.30-14.45

'Development of late liver stage arresting genetically attenuated PfSPZ and parasites expressing heterologous antigens'

Stefan Kappe

(Seattle Children's Hospital Research Foundation, Seattle, Washington, USA)

14.45-15.00

'Improving immunogenicity with adjuvants'

Sumana Chakravarty

(Sanaria Inc., Maryland, USA)

15.00-15.15

'What have we learned and not learned from immunological studies during vaccine efficacy studies?'

Claudia Daubenberger

(Swiss TPH, Switzerland)

15.15-15.30

'Complementing protection with human monoclonal antibodies'

Stephen L. Hoffman

(Sanaria Inc., Maryland, USA)

15.30-16.00

Tea Break & Posters

* This final programme is correct at the time of publication. However the organizers reserve the right to make any alterations that may be required in the interests and integrity of the conference programme.



SESSION 4:

RECENT ADVANCES – BLOOD-STAGE VACCINES

Moderators: Evelina Angov (*Walter Reed Army Institute of Research, USA*)
and Chetan Chitnis (*Institut Pasteur, France & ICGEB, India*)

16.00-16.15

'Safety, immunogenicity and efficacy of the *Plasmodium falciparum* blood-stage vaccine RH5.1/AS01B in a Phase I/IIa clinical trial'

Angela M. Minassian¹, Sarah E. Silk¹, Jordan R. Barrett¹, Ian D. Poulton¹,
Celia H. Mitton¹, Ruth O. Payne¹, Thomas A. Rawlinson¹, Megan Baker¹,
Raquel Lopez Ramon¹, Fernando Ramos Lopez¹, Nick J. Edwards¹,
Katherine J. Ellis¹, Carolyn M. Nielsen¹, Doris Quinkert¹, Lea Barfod¹,
Kazutoyo Miura², Ababacar Diouf², Yrene Themistocleous¹, Pedro Folegatti¹,
Daniel Silman¹, Mehreen Dattoo¹, Willem A. de Jongh³, Robert Smith¹,
Eleanor Berrie¹, Danielle Morelle⁴, Marc Lievens⁴, Amy R. Noe⁵, Carter L. Diggs⁶,
Lorraine A. Soisson⁶, Rebecca Ashfield¹, Carole A. Long², Fay L. Nugent¹,
Alison M. Lawrie¹ and Simon J. Draper¹

(¹ *The Jenner Institute, University of Oxford, United Kingdom*; ² *Laboratory of Malaria and Vector Research, NIAID/NIH, USA*; ³ *ExpreS²ion Biotechnologies, Denmark*; ⁴ *GSK, Wavre, Belgium*; ⁵ *Leidos Life Sciences, USA*; ⁶ *Malaria Vaccine Development Program, USAID, USA*)

16.15-16.30

'Superior antigen-specific T follicular helper (Tfh) cell responses to blood-stage malaria antigen RH5 are induced with a protein/AS01 vaccine platform as compared to heterologous viral vectors'

Carolyn M. Nielsen, Ane Ogbe, Isabela Pedroza-Pacheco, Susanne Doeleman,
Sarah E. Silk, Jordan R. Barrett, Sean C. Elias, Ruth O. Payne,
Angela M. Minassian, Simon J. Draper and Persephone Borrow
(*University of Oxford, Oxford, UK*)

16.30-16.45

'Status of PfEMP1 vaccine development'

Louise Turner, Morten Nielsen, Ali Salanti, Thor G. Theande
and Thomas Lavstsen
(*University of Copenhagen, Copenhagen, Denmark*)

**SESSION 5:
RECENT ADVANCES – SPOROZOITE
AND LIVER-STAGE VACCINES**

Moderators: Johan Vekemans (*WHO, Geneva, Switzerland*)
and Eileen Villasante (*Naval Medical Research Center, USA*)

08.30-08.45

'Qualitative aspects of antibody responses to malaria vaccines after primary and booster vaccination'

Carlota Dobaño
(*ISGlobal Barcelona Institute for Global Health Hospital Clínic – Universitat de Barcelona, Barcelona, Catalonia, Spain*)

08.45-09.00

'In vitro and in vivo correlates for down-selection of CSP based immunotherapeutics against malaria'

Sheetij Dutta¹, Alexis Bitzer¹, Merricka Livingstone¹, Mark Langowski¹, Farhat Khan¹, Kim Soto¹, Cathy Zou², Rajeshwer S. Sankhala^{3,4}, Viseth Ngauy¹, M. Gordon Joyce^{3,4} and Adrian Batchelor¹
(¹ *Structural Vaccinology Laboratory, Malaria Vaccine Branch, Walter Reed Army Institute of Research, Silver Spring, Maryland, USA;* ² *Liver Stage Laboratory, Malaria Department, Naval Medical Research Center, Silver Spring, Maryland, USA;* ³ *Structural Biology, U.S. Military HIV Research Program, Walter Reed Army Institute, Silver Spring Maryland USA;* ⁴ *Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda, Maryland, USA*)

09.00-09.15

'N-terminal region of Plasmodium falciparum circumsporozoite protein mediates immune evasion by hijacking a complement inhibitor'

Ayman Khattab¹, Rauna Riva¹, Miku Kyrklund¹, Ossi Turunen², Adrian J.F. Luty³, Robert Sauerwein⁴ and Seppo Meri¹
(¹ *Translational Immunology Research Program, University of Helsinki, Finland;* ² *School of Forest Sciences University of Eastern Finland;* ³ *Institute of Research for Development, Paris Descartes University, France;* ⁴ *Radboud University Medical Center, Department of Medical Microbiology, Nijmegen, The Netherlands*)

09.15-09.30

'Intravenous administration of viral vectors for potent induction of liver resident T cells'

Alexandra J. Spencer, Andrés Noé, Marta Ulaszewska, Mehreen Dattoo, Daniel Jenkin, Duncan Bellamy, Amy Flaxman, Ali Husainy, Katie J. Ewer and Adrian V.S. Hill
(*The Jenner Institute, University of Oxford, Roosevelt Drive, Oxford, UK*)

09.30-09.45

'Prime-target immunisation with liver-stage malaria vaccines: A first-in-human challenge trial'

Daniel Jenkin*, Mehreen Dattoo*, Fernando Ramos-Lopez, Megan Baker, Amy Flaxman, Duncan Bellamy, Nick J. Edwards, Andres Noe, Richard Morter, Ian Poulton, Daniel Silman, David Lewis, Saul Faust, Rachel Roberts, Alison M. Lawrie, Alexandra J. Spencer, Katie J. Ewer and Adrian V.S. Hill
(*University of Oxford, Oxford, UK*)

09.45-10.00

'Clinical safety and protective efficacy after immunization with genetically modified Plasmodium berghei sporozoites expressing P. falciparum circumsporozoite protein in a first-in-human Phase1/2a trial'

António M. Mendes
(*on behalf of the PbVac consortium*)

10.00-10.15

'Systems-based approaches to defining effective targets for intervention against malaria'

Denise L. Doolan¹, C. Proietti¹, D.P. Pattinson¹, M. Seid¹, M.M. Cooper¹, S.H. Apte², C. Loiseau¹, P.L. Groves², F.H. Amante² and J.M. McCarthy²
(¹ *Australian Institute of Tropical Health and Medicine, James Cook University, Cairns, Queensland, Australia;* ² *QIMR Berghofer Medical Research Institute, Brisbane, Queensland, Australia*)

10.15-10.45

Coffee Break & Posters

**SESSION 6:
SPECIAL PATH/WHO SESSION**

'The Phased Introduction and Evaluation of the RTS,S/AS01 Malaria Vaccine in Children in Ghana, Kenya, and Malawi'

Organizers: World Health Organization, Geneva, Switzerland

10.45-11.00

'The need for New Tools to Fight Malaria'

Mary Hamel
(*WHO, Geneva, Switzerland*)

11.00-11.15

'Vaccine Introduction of the RTS,S/AS01 Malaria Vaccine: Implementation Progress and the Response of Communities'

Temwa Mzengeza
(*Manager of the Expanded Programme on Immunization, Ghana Health Service*)

11.15-11.30

'Evaluation of RTS,S/AS01 in the Context of Routine Use: Measuring Feasibility, Safety, and Impact'

Patricia Njuguna
(*Medical Officer, World Health Organization*)

11.30-12.00

'Obstacles to and Opportunities for Reaching High Vaccine Uptake'

Margaret Gyapong
(*Centre for Health Policy and Implementation Research, University of Health and Allied Science, Ghana*)

12.00-12.15

'Post-authorization Evaluation: Concurrent Phase IV Studies'

Nekoya Otsyula
(*GSK Vaccines, Kenya & East Africa*)

12.15-12.30

Closing Remarks:

'The Path Forward'

Mary Hamel
(*WHO, Geneva, Switzerland*)

12.30-13.15

Lunch Break & Posters

**SESSION 7:
CELLULAR AND ANTIBODY VACCINE IMMUNOLOGY**

Moderators: Carlota Dobaño (*ISGlobal Barcelona Institute for Global Health Hospital Clínic – Universitat de Barcelona, Barcelona, Catalonia, Spain*)
and Ally Olotu (*Ifakara Health Institute, Tanzania*)

13.15-13.30

'Immune escape and immune camouflage may reduce the efficacy of RTS,S vaccine in Malawi'

Sundos Khan¹, Matthew Parrillo¹, Andres H. Gutierrez², Frances Terry², Leonard Moise^{1,2}, William D. Martin² and Anne S. De Groot^{1,2}
(¹ *Institute for Immunology and Informatics, University of Rhode Island, Providence, RI, USA;* ² *EpiVax, Inc., Providence, Rhode Island, USA*)

13.30-13.45

'Prime-target immunisation with liver-stage malaria vaccines enhances T cell immunogenicity'

Amy Flaxman, Duncan Bellamy, Rebecca Makinson, Jonathan Sheridan, Kate Harrison, Richard Morter, Mehreen Dattoo, Daniel Jenkin, Fernando Ramos-Lopez, Ian Poulton, Rachel Roberts, Alison M. Lawrie, Alexandra J. Spencer, Katie J. Ewer and Adrian V.S. Hill
(*The Jenner Institute, University of Oxford, Oxford, UK*)

13.45-14.00

'The adjuvant GLA-SE promotes strong circulating Tfh cell expansion and emergence of public TCR clonotypes in malaria pre-exposed volunteers vaccinated with P27A'

Danika L. Hill¹, Wim Pierson¹, Daniel J. Bolland¹, Catherine Mkindi², Edward J. Carr^{1,3}, Jiong Wang⁴, Sophie Houard⁵, Steven W. Wingett⁶, Regine Audran⁷, Elizabeth F. Wallin⁸, Said A. Jongo², Kassim Kamaka², Martin Zand⁴, Francois Spertini⁷, Claudia Daubenberger^{9,10}, Anne E. Corcoran¹ and Michelle A. Linterman¹

(¹ Babraham Institute, Cambridge, UK; ² Ifakara Health Institute (IHI), Bagamoyo, Tanzania; ³ Department of Medicine, University of Cambridge, Cambridge, UK; ⁴ Division of Nephrology, Department of Medicine and Clinical and Translational Science Institute, University of Rochester Medical Center, Rochester New York, USA; ⁵ European Vaccine Initiative (EVI), Heidelberg, Germany; ⁶ Babraham Bioinformatics Facility, Babraham Institute, Cambridge, UK; ⁷ Division of Immunology and Allergy, CHUV, Lausanne, Switzerland; ⁸ Renal Department, Lister Hospital, Stevenage, UK; ⁹ Swiss Tropical and Public Health Institute, Basel, Switzerland; ¹⁰ University of Basel, Basel, Switzerland)

14.00-14.15

'In-depth characterization of the antibody response to vaccination with R21/Matrix M'

Georgina Bowyer, Jonathan R. McDaniel, William N. Voss, Navin Venkatraman, Duncan Bellamy, Daniel Silman, Amy Flaxman, Mehreen Dattoo, Scott Gregory, George Georgiou, Adrian Hill, Greg Ippolito and Katie Ewer (University of Oxford, Oxford, UK)

14.15-14.30

'Non-neutralising human anti-RH5 antibodies potentiate neutralizing antibodies against malaria'

Daniel G.W. Alanine^{1,2}, Doris Quinkert¹, Rasika Kumarasingha³, Shahid Mehmood⁴, Francesca R. Donnellan¹, Nana K. Minkah⁵, Bernadeta Dadonaite¹, Ababacar Diouf⁶, Francis Galaway⁷, Sarah E. Silk¹, Abhishek Jamwal², Jennifer M. Marshall¹, Kazutoyo Miura⁶, Lander Foquet⁶, Sean C. Elias¹, Geneviève M. Labbé¹, Alexander D. Douglas¹, Jing Jin¹, Ruth O. Payne¹, Joseph J. Illingworth¹, David J. Pattinson¹, David Pulido¹, Barnabas G. Williams¹, Willem A. de Jongh⁸, Gavin J. Wright⁷, Stefan H.I. Kappe⁹, Carol V. Robinson⁴, Carole A. Long⁶, Brendan S. Crabb³, Paul R. Gilson³, Matthew K. Higgins² and Simon J. Draper¹
(¹ The Jenner Institute, University of Oxford, Oxford, UK; ² Department of Biochemistry, University of Oxford, Oxford, UK; ³ Burnet Institute, Melbourne, Victoria, Australia; ⁴ Department of Chemistry, University of Oxford, Oxford, UK; ⁵ Center for Global Infectious Disease Research, Seattle Children's Research Institute, Seattle, Washington, USA; ⁶ Laboratory of Malaria and Vector Research, NIAID/NIH, Rockville, Maryland, USA; ⁷ Cell Surface Signalling Laboratory, Wellcome Trust Sanger Institute, Cambridge, UK; ⁸ ExpreS²ion Biotechnologies, Denmark)

14.30-15.00

Tea Break & Posters

SESSION 8:

STRUCTURE-GUIDED VACCINE DESIGN AND RECENT ADVANCES IN TRANSMISSION-BLOCKING VACCINES

Moderators: Takafumi Tsuboi (Ehime University, Japan) and Denise Doolan (James Cook University, Australia)

14.45-15.00

'Structural basis for development of a Plasmodium falciparum transmission blocking vaccine targeting the 6-cysteine rich Pfs230 or the Pfs230-Pfs48/45 protein complex'

Kavita Singh¹, Martin Burkhardt², Raul Herrera², Apostolos Gittis¹, Sofia Nakuchima², Olga Muratova², Emily Kelnhofer², Karine Reiter², Margery Smelkinson³, Bruce J. Swihart⁴, Baoshan Zhang⁵, Nicholas J. MacDonald², Patrick E. Duffy², David Garboczi¹ and David L. Narum²
(¹ Structural Biology Section, Research Technologies Branch, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Rockville, Maryland, USA; ² Laboratory of Malaria Immunology and Vaccinology, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Rockville, Maryland,

USA; ³ Biological Imaging Section, Research Technologies Branch, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland, USA; ⁴ Biostatistics Research Branch, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Rockville, Maryland, USA; ⁵ Vaccine Research Center, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland, USA)

15.00-15.15

'Improving the potency and therefore durability of transmission-blocking vaccines through structure-based vaccine design'

C. Richter King¹, Randall MacGill¹, Kazutoyo Miura², Robert W. Sauerwein³, William R. Schief⁴ and Jean-Philippe Julien⁵
(¹ PATH's Malaria Vaccine Initiative, Washington DC, USA; ² National Institute of Allergy and Infectious Diseases, National Institutes of Health, Rockville, Maryland, USA; ³ Radboud University Medical Center, Nijmegen, Netherlands; ⁴ The Scripps Research Institute, La Jolla, California, USA; ⁵ Program in Molecular Medicine, The Hospital for Sick Children Research Institute, Toronto, Ontario, Canada and Departments of Biochemistry and Immunology, University of Toronto, Toronto, Ontario, Canada)

15.15-15.30

'Maturation of potent cross reactive antibodies to Plasmodium falciparum circumsporozoite protein in humans'

Rajagopal Murugan (German Cancer Research Centre, DKFZ, Heidelberg, Germany)

15.30-15.45

'Characterization of antimalarial monoclonal antibodies reveals synergistic epitopes in the Plasmodium falciparum RH5-CyRPA-Ripr invasion complex'

David Pulido, Barnabas G. Williams, Daniel G.W. Alanine, Doris Quinkert, Rebecca R. Dabbs, Lea Barfod, Amelia M. Lias, Lloyd D. King, Jee Sun Cho, Jing Jin, Joseph J. Illingworth, Adéla Nacer, Vinayaka Kotraiah, Timothy W. Phares, Amy R. Noe, Paul W. Bowyer, Matthew K. Higgins and Simon J. Draper (University of Oxford, Oxford, UK)

15.45-16.00

'From structure to malaria vaccine immunogen'

Matthew Higgins (University of Oxford, Oxford, UK)

16.00-16.15

'Pfs48/45 as a malaria transmission-blocking vaccine'

David Mekhaie¹, Arianna Marini¹, Florian Brod¹, Rebecca Dabbs¹, Katherine Ellis¹, Yuanyuan Li¹, Marija Zaric¹, Gaurav Gupta¹, Kazutoyo Miura², Carole A. Long² and Sumi Biswas¹
(¹ The Jenner Institute, Nuffield Department of Medicine, University of Oxford, Oxford, UK; ² Laboratory of Malaria and Vector Research, National Institute of Allergy and Infectious Disease, National Institutes of Health, Rockville, Maryland, USA)

16.15-16.30

'HBsAg-based VLP vaccine platforms for transmission-blocking malaria vaccines'

Arianna Marini¹, Yu Zhou¹, Yuanyuan Li¹, Iona J. Taylor¹, Marija Zaric¹, David Mekhaie¹, Katherine Ellis¹, Gaurav Gupta¹, Kazutoyo Miura², Carole A. Long² and Sumi Biswas¹
(¹ The Jenner Institute, Nuffield Department of Medicine, University of Oxford, Oxford, UK; ² Laboratory of Malaria and Vector Research, National Institute of Allergy and Infectious Disease, National Institutes of Health, Rockville, Maryland, USA)

16.30-16.45

'Modelling and simulations to investigate alternative use of vaccines for malaria control, elimination and prevention of resurgence'

Flavia Camponovo^{1,2} and Melissa A. Penny^{1,2}
(¹ Swiss Tropical and Public Health Institute, Basel, Switzerland; ² University of Basel, Basel, Switzerland)

**SESSION 9:
LATEST ADVANCES IN VACCINES
AND CHMI FOR *P. VIVAX***

Moderator: Shahid Khan

(Leiden University Medical Centre, Netherlands)

09.00-09.15

'Reticulocyte-derived exosomes: A new antigen discovery and vaccine delivery platform against *Plasmodium vivax* malaria'

Miriam Díaz-Varela¹, Melisa Gualdrón-López^{1,2}, Joan Seguí-Barber¹, Ricardo Lauzurica-Valdemoros³, Nuria Izquierdo-Useros⁴, Javier Martínez-Picado^{4,5}, Carmen Fernández-Becerra^{1,2} and Hernando A. del Portillo^{1,2,5}
(¹ ISGlobal, Hospital Clínic – Universitat de Barcelona, Barcelona, Spain; ² IGTP Institut d'Investigació Germans Trias i Pujol, Badalona, Spain; ³ Nephrology Service, Hospital Universitari Germans Trias i Pujol, Badalona, Spain; ⁴ IrsiCaixa AIDS Research Institute, Badalona, Spain; ⁵ Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain)

09.15-09.30

'Assessment of *P. vivax* sporozoite and blood-stage CHMI in healthy UK adults'

Angela M. Minassian¹, Yrene Themistocleous¹, Sarah E. Silk¹, Jordan R. Barrett¹, Carolyn M. Nielsen¹, Doris Quinkert¹, Ian D. Poulton¹, Fernando Ramos Lopez¹, Celia H. Mitton¹, Thomas A. Rawlinson¹, Nick J. Edwards¹, Katherine J. Ellis¹, Megan Baker¹, Raquel Lopez Ramon¹, Jee-Sun Cho¹, Florian Bach², Wiebke Nahrendorf², Alison C. Kemp³, Philip Spence², Andrew M. Blagborough⁴, Iona J. Taylor¹, Fay L. Nugent¹, Kimberly J. Johnson¹, Alison M. Lawrie¹, Julian C. Rayner³, Wanlapa Roobsoong⁵, Jetsumon Sattabongkot⁵, Sumi Biswas¹ and Simon J. Draper¹

(¹ The Jenner Institute, University of Oxford, Oxford, UK; ² School of Biological Sciences, University of Edinburgh, Edinburgh, UK; ³ Wellcome Sanger Institute, Wellcome Genome Campus, University of Cambridge, Cambridge, UK; ⁴ Infection & Immunity Section, Sir Alexander Fleming Building, Imperial College of Science, Technology and Medicine, London, UK; ⁵ Mahidol Vivax Research Unit (MVRU), Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand)

09.30-09.45

'Malaria vaccine candidate based on Duffy binding protein elicits strain transcending functional antibodies in a Phase I trial'

Kavita Singh¹, Paushali Mukherjee¹, Ahmad Rushdi Shakri², Ankita Singh¹, Gaurav Pandey^{1,3}, Meenakshi Bakshi¹, Geetanjali Uppal¹, Rajender Jena¹, Ankita Rawat¹, Purnima Kumar², Rukmini Bhardwaj², Syed Shams Yazdani², Dhiraj Hans¹, Shantanu Mehta¹, Ajay Srinivasan¹, K. Anil⁴, R.L. Madhusudhan⁴, Jaya Patel⁴, Amit Singh⁴, Rajeshwar Rao⁴, Santosh Gangireddy⁴, Rudrappa Patil⁴, Swarnendu Kaviraj⁵, Sanjay Singh⁵, Darrick Carter⁶, Steve Reed⁶, David C. Kaslow⁷, Ashley Birkett⁷, Virander S. Chauhan² and Chetan E. Chitnis^{2,8}
(¹ Multi-Vaccines Development Program, New Delhi, India; ² International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi, India; ³ USBT, Guru Gobind Singh Indraprastha University, New Delhi; ⁴ Syngene International Ltd., Bangalore, India; ⁵ Gennova Biopharmaceuticals Ltd., Pune, India; ⁶ Infectious Disease Research Institute (IDRI), Seattle, USA; ⁷ PATH Malaria Vaccine Initiative, Seattle, USA; ⁸ Institut Pasteur, Paris, France)

09.45-10.00

'Molecular basis for inhibition of *Plasmodium vivax* reticulocyte invasion by a vaccine-induced broadly neutralising human monoclonal antibody'

T. Rawlinson*¹, N. Barber*², F. Mohring³, J. Cho¹, V. Kosaisavee⁴, F. Nosten^{5,6}, L. Renia⁷, A. Minassian¹, R. Payne¹, J. Marshall¹, J. Jin¹, D. Quinkert¹, S. Silk¹, S. Elias¹, G. Labbe¹, S. Gerard², D. Alanine¹, B. Russell⁸, R. Moon³, M. Higgins² and S. Draper¹

(¹ The Jenner Institute, University of Oxford, Oxford, UK; ² Department of Biochemistry, University of Oxford, Oxford, UK; ³ Department of Immunology and Infection, London School of Hygiene and Tropical Medicine, London, UK; ⁴ Faculty of Public Health, Mahidol University, Bangkok, Thailand; ⁵ Shoklo Malaria Research Unit, Mae Sot, Thailand; ⁶ Centre for Tropical Medicine and Global Health, University of Oxford, Oxford, UK; ⁷ Singapore Immunology Network, Singapore, Singapore; ⁸ Department of Microbiology and Immunology, University of Otago, Dunedin, New Zealand)

10.00-10.30

Coffee Break & Posters

**SESSION 10:
NOVEL APPROACHES TO ANTIGEN DISCOVERY,
VACCINE DELIVERY AND ADJUVANTS**

Moderator: Sumi Biswas (University of Oxford, Oxford, UK)

and Rick King (PATH's Malaria Vaccine Initiative, USA)

10.30-10.45

'Bacterial superglues to accelerate malaria vaccine generation'

Mark Howarth (University of Oxford, Oxford, UK)

10.45-11.00

'Strategic Overview: WRAIR's Next Generation Adjuvanted *P. falciparum* CSP Vaccine Candidates in Clinical Development, PfCSP-SAPN and full length, soluble PfCSP'

Evelina Angov¹, Sheetij Dutta¹, Zoltan Beck², Gary Matyas² and Viseth Ngauy¹
(¹ Walter Reed Army Institute of Research, Malaria Vaccine Branch, Silver Spring, Maryland, USA; ² Walter Reed Army Institute of Research, Military HIV Research Program, Silver Spring, Maryland, United States)

11.00-11.15

'APC-targeted DNA vaccination against RH5 induces *Plasmodium falciparum*-specific neutralizing antibodies and T cell responses'

Louise Bjerkan¹, Arnar Gudjonsson¹, Ganesh Ram Visweswaran¹, Geneviève M. Labbé², Doris Quinkert², Simon J. Draper², Bjarne Bogen¹ and Ranveig Braathen¹
(¹ Institute of Clinical Medicine, University of Oslo and Oslo University Hospital, Oslo, Norway; ² Jenner Institute, University of Oxford, Oxford, UK)

11.15-11.30

'Safety, tolerability and immunogenicity of ChAd63 and MVA expressing *P. falciparum* RH5 in African adults, young children and infants'

Ally Olotu^{1,2}, Saumu Ahmed¹, Maximillian Mpina¹, Wilmina Kalinga¹, Florence Milando¹, Mohamed Rashid¹, Said Jongo¹, Yrene Themistocleous³, Jordan R. Barrett³, Alison M. Lawrie³, Fay L. Nugent³, Sarah E. Silk³, Angela M. Minassian³ and Simon J. Draper³
(¹ Health Institute; ² KEMRI-Wellcome Trust Research Programme; ³ The Jenner Institute, University of Oxford, Oxford, UK)

11.30-11.45

'Post-genome unbiased strategies for discovery of malaria vaccine candidates by innovative wheat germ cell-free technology'

Takafumi Tsuboi
(Division of Malaria Research, Proteo-Science Center, Ehime University, Japan)

11.45-12.00

'Identification of novel antigens presented by MHC class I using immunopeptidomics for vaccines against malaria'

Paulo Bettencourt¹, Camila R.R. Barbosa², Valerie Souillard³, Julius Müller¹, Ahmed Salman^{1,4}, Katie Plummer¹, Mallaury Bordessoulles³, Annalisa Nicastrì¹, Shahid M. Khan⁴, Chris J. Janse⁴, Hiroshi Suemizu⁵, Alex J. Spencer¹, Nicola Ternette¹, Robert Sauerwein⁶, Dominique Mazier³, Caroline Junqueira^{2,7,8} and Adrian V.S. Hill¹
(¹ The Jenner Institute, University of Oxford, Oxford, UK; ² Instituto René Rachou, Fundação Oswaldo Cruz, Belo Horizonte, Brazil; ³ Sorbonne Universités, UPMC, CR7, INSERM, U1135, CNRS, ERL 8255, Centre d'Immunologie et des Maladies Infectieuses (CIMI-Paris), Paris, France; ⁴ Department of Parasitology, Leiden University Medical Center, Leiden, The Netherlands; ⁵ Central Institute for Experimental Animal, Kawasaki, Kanagawa, Japan; ⁶ Parasitology, Department of Medical Microbiology, Radboud University Medical Centre, Nijmegen, The Netherlands; ⁷ Program in Cellular and Molecular Medicine, Boston Children's Hospital, Boston, Massachusetts, USA; ⁸ Department of Pediatrics, Harvard Medical School, Boston, Massachusetts, USA)

12.00-12.15

'Overview of Malaria Vaccines Regulation by FDA'

Rana Chattopadhyay and R. Douglas Pratt
(Division of Vaccines and Related Product Applications (DVRPA), Office of Vaccines Research and Review (OVR), Center for Biologics Evaluation and Research, Food and Drug Administration, Silver Spring, Maryland, USA)

12.15-12.30

Closing Remarks

12.30

Lunch Break & Posters Breakdown & Departure

Poster 101

'Novel methods to determine liver-stage malaria correlates of protection: Kinetics, deep immune phenotyping and transcriptomics'

Andrés Noé, Duncan Bellamy, Amy Flaxman, Mehreen Dato, Daniel Jenkin, Ali Husainy, Katie J. Ewer, Adrian V.S. Hill and Alexandra J. Spencer
(The Jenner Institute, University of Oxford, Oxford UK)

Poster 102

'Safety and Immunogenicity of ChAd63/MVA Pfs25-IMX-313 in a Phase I First-in-Human Trial'

Hans de Graaf¹, Ruth O. Payne², Iona Taylor², Kazutoyo Miura³, Carol A. Long³, Sean C. Elias², Angela M. Minassian², Sarah E. Silk², Marija Zarić², Lee Li², Ian D. Poulton², Megan Baker², Simon J. Draper², Diane Gbesemete¹, Nathan J. Brendish¹, Filipa Martins¹, Arianna Marini², David Mekhaie², Nick J. Edwards², Rachel Roberts², Johan Vekemans^{4,5}, Sarah Moyle⁶, Saul N. Faust¹, Eleanor Berrie⁶, Alison M. Lawrie², Fergal Hill⁷, Adrian V.S. Hill² and Sumi Biswas²

(¹ NIHR Clinical Research Facility, University Hospital Southampton NHS Foundation Trust and Faculty of Medicine, University of Southampton, Southampton, UK; ² The Jenner Institute, University of Oxford, Oxford, UK; ³ Laboratory of Malaria and Vector Research, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Rockville, Maryland, USA; ⁴ GSK Vaccines, Wavre, Belgium; ⁵ Initiative for Vaccine Research, World Health Organization, Geneva, Switzerland; ⁶ Clinical Biomanufacturing Facility, University of Oxford, Oxford, UK; ⁷ OSIVAX, Lyon, France)

Poster 103

'Targeting PfrH5 to APCs via MHC class II potentiates viral vector immunization against malaria'

Arnar Gudjonsson¹, Louise Bjerkan¹, Geneviève M. Labbé², Simon J. Draper², Ranveig Braathen¹ and Bjarne Bogen¹

(¹ Institute of Clinical Medicine, University of Oslo and Oslo University Hospital, Oslo, Norway; ² Jenner Institute, University of Oxford, Oxford, UK)

Poster 104

'Synergistic antigen discovery for a blood-stage malaria vaccine'

Jee-Sun Cho, Joseph J. Illingworth, Doris Quinkert, Amelia M. Lias, Sarah E. Silk, Jordan R. Barrett, David Pulido and Simon J. Draper
(University of Oxford, Oxford, UK)

Poster 105

'Memory B responses and functional antibodies induced by a vaccine candidate against malaria in pregnancy using *in vitro* assays'

T. Hountohotegbe^{3,5}, D. Berry⁵, K. Gbedande⁵, W. Hasang^{1,2}, S. Rogerson^{1,2} and A. Luty^{3,4,6}

(¹ University of Melbourne, Department of Medicine, Australia; ² Peter Doherty Institute, Laboratory of Malaria, Department of Immunology and Microbiology, University of Melbourne, Australia; ³ Université Paris DESCARTES, UMR216-MERIT, Department of Immunology, Paris, France; ⁴ Institut de Recherche Clinique du Bénin, Cotonou, Benin; ⁵ Centre d'Etude et de Recherche sur le Paludisme Associé à la Grossesse et à l'Enfance, Faculté des Sciences de la Santé de Cotonou, Benin; ⁶ Institut de Recherche pour le Développement, Laboratory of Parasitology, Cotonou, Bénin)

Poster 106

'The Toll-Like Receptor 2 agonist PEG-Pam₂Cys as an immunochemoprophylactic and immunochemotherapeutic against the liver and transmission stages of malaria parasites'

Medard Ernest¹, Carol Hunja¹, Yuka Arakura¹, Yohei Haraga¹, Hussein M. Abkhallo¹, Weiguang Zeng², David C. Jackson^{2,3}, Brendon Chua^{2,3} and Richard Culleton¹

(¹ Malaria Unit, Department of Pathology, Institute of Tropical Medicine, Nagasaki University, 1-12-4 Sakamoto, Nagasaki, Japan; ² Department of Microbiology and Immunology, The Peter Doherty Institute for Infection and Immunity, The University of Melbourne, Parkville, Victoria, Australia; ³ Research Center for Zoonosis Control, Hokkaido University, Sapporo, Japan; Global Institution for Collaborative Research and Education, Hokkaido University, Sapporo, Japan)

Poster 107

'Reference reagents to support *Plasmodium falciparum* and *Plasmodium vivax* vaccine development and diagnostics'

Lynne M. Harris, Eleanor Atkinson, Peter Rigby and Paul W. Bowyer
(National Institute for Biological Standards and Control (NIBSC), South Mimms, UK)

Poster 108

'Can the RTS,S /AS01 vaccine be used to accelerate *P. falciparum* elimination?'

Cynthia K. Lee
(PATH's malaria Vaccine Initiative, Washington DC, USA)

Poster 109

'Preclinical generation and evaluation of an RH5.2-VLP vaccine for blood-stage malaria'

Lloyd D.W. King, David Pulido, Doris Quinkert, Amelia M. Lias, David J. Pattinson, Yu Zhou, Jing Jin, Matthew K. Higgins, Mark Howarth, Sumi Biswas, Jenny M. Reimer, Karin Lövgren Bengtsson and Simon J. Draper
(University of Oxford, Oxford, UK)

Poster 110

'Immune protection in a relapsing *P. cynomolgi* rhesus model induced by a chemoprophylaxis with sporozoite (CPS) immunization under atovaquone-proguanil followed by primaquine'

S. Pichyangkul¹, M.D. Spring^{1,2}, K. Yongvanitchit¹, U. Kum-Arb¹, A. Limsalaketch¹, R. Im-Erbsin¹, R. Ubalee¹, P.L. Smith¹, B.A. Vesely¹ and N.C. Waters¹

(¹ Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok, Thailand; ² The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., USA)

Poster 111

'Characterisation of monoclonal antibodies to *Plasmodium falciparum* CyRPA reveals multiple synergistic epitopes'

Anne S. Knudsen¹, Maria Bassi¹, Melanie R. Walker¹, Simon J. Draper² and Lea K. Barfod¹
(¹ University of Copenhagen, Department of Immunology & Microbiology, Centre for Medical Parasitology, Copenhagen, Denmark; ² University of Oxford, Jenner Institute, Oxford, UK)

Poster 112

'Reduced immunogenicity of an experimental vaccine against malaria is associated with prior exposure to infection: A role for Regulatory T cells?'

Richard Morter¹, Oliver Hague¹, Amy Flaxman¹, Issa Nebie², Alfred Tiono², Sodiomon B. Sirima^{2,3}, Adrian V.S. Hill¹ and Katie J. Ewer¹

(¹ Jenner Institute, Nuffield Dept of Medicine, University of Oxford, UK; ² Centre National de Recherche et de Formation sur le Paludisme, Ouagadougou, Burkina Faso; ³ Groupe de Recherche Action en Santé (GRAS), Ouagadougou, Burkina Faso)

Poster 113

'Investigation of two vaccine-delivery platforms to enhance immunogenicity and transmission-blocking activity of malaria vaccine candidate *Pvs25*'

A. Marini¹, D. Nikolaeva², Y. Li¹, I. Taylor¹, Y. Zhou¹, K. Ellis¹, W. Roobsoong², S. Thongpoon², J. Sattabongkot² and S. Biswas¹

(¹ Jenner Institute, University of Oxford, Oxford, UK; ² Mahidol Vivax Research Unit, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand)

Poster 114

'Validation of a *Plasmodium falciparum* qPCR assay, suitable for real time follow up and use as the primary diagnosis tool in Phase IIa CHMI clinical trials'

Nick J. Edwards¹, Katherine J. Ellis¹, Caitlin Blundell¹, Susannah Blundell¹, Ming Chang², Sean Murphy², Mehreen Dato^{1,2}, Daniel Jenkin^{1,2} and Katie Ewer¹

(¹ The Jenner Institute, University of Oxford, Oxford, UK; ² Centre for Clinical Vaccinology and Tropical Medicine, Churchill Hospital, Headington, Oxford, UK; ³ Malaria Human Challenge Center, Center for Infectious Disease Research, Seattle, Washington, USA)

Poster 115

'Characterisation of the humoral responses induced by the *Plasmodium falciparum* Blood-Stage Vaccine RH5.1/AS01B'

Jordan R. Barrett¹, Sarah E. Silk¹, Angela M. Minassian¹, Ian D. Poulton¹, Celia H. Mitton¹, Ruth O. Payne¹, Thomas A. Rawlinson¹, Megan Baker¹, Raquel Lopez Ramon¹, Fernando Ramos Lopez¹, Nick J. Edwards¹, Katherine J. Ellis¹, Carolyn M. Nielsen¹, Doris Quinkert¹, Lea Barfod¹, Kazutoyo Miura², Ababacar Diouf², Yrene Themistocleous¹, Pedro Folegatti¹, Daniel Silman¹, Mehreen Dato¹, Willem A. de Jong³, Robert Smith¹, Eleanor Berrie¹, Amy R. Noe⁴, Carter L. Diggs⁵, Lorraine A. Soisson⁵, Rebecca Ashfield¹, Carole A. Long², Fay L. Nugent¹, Alison M. Lawrie¹ and Simon J. Draper¹

(¹ The Jenner Institute, University of Oxford, United Kingdom; ² Laboratory of Malaria and Vector Research, NIAID/NIH, Bethesda, Maryland, USA; ³ ExpreS²ion Biotechnologies, Denmark; ⁴ Leidos Life Sciences, Fredrick, MD, USA; ⁵ USAID (United States Agency for International Development), Washington D.C., USA)

Poster 116

'Synergistic antigen discovery for a blood-stage malaria vaccine'

Jee-Sun Cho, Joseph J. Illingworth, Doris Quinkert, Amelia M. Lias, Sarah E. Silk, Jordan R. Barrett, David Pulido and Simon J. Draper
(University of Oxford, Oxford, UK)

Poster 117

'Evaluation of humanised mice for blood-stage malaria vaccines'

Adéla Nacer¹, James Keeble¹, Gathoni Kamuyu^{2,3}, Christine Zverev¹, Rose Leahy¹, Luke Gurney¹, Vicky Rannow¹, Alan Haynes¹, Shaun Baker¹, Faith Osier^{2,3} and Paul Bowyer¹
(¹ National Institute for Biological Standards and Control, MHR, Blanche Lane, Potters Bar, UK; ² Centre for Infectious Diseases, Parasitology, Heidelberg University Hospital, Heidelberg, Germany; ³ Kenya Medical Research Institute - Wellcome Trust Research Program, Centre for Geographic Medicine Research-Coast, Kilifi, Kenya)

Poster 118

'Prime-Target Immunisations: Comparing Cellular and Humoral Immune Responses after administration of intramuscular and intravenous vaccinations against ME-TRAP'

Duncan Bellamy, Amy Flaxman, Rebecca Makinson, Jonathan Sheridan, Mehreen Dato, Daniel Jenkin, Fernando Ramos-Lopez, Nick Edwards, Andrés Noe, Richard Morter, Ian Poulton, Alexandra J. Spencer, Katie J. Ewer and Adrian V.S. Hill
(University of Oxford, Oxford, UK)

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