

# MALARIA VACCINES FOR THE WORLD

2-4 May 2016, Leiden University Medical Center LUMC, Leiden, The Netherlands



# FINAL ORAL PROGRAMME & POSTER PROGRAMME MVW 2016

## SCIENTIFIC STEERING COMMITTEE

Shahid Khan (*LUMC, Leiden University, Leiden, The Netherlands*)

Rick King (*MVI-PATH, Washington DC, USA*)

Adrian V.S. Hill (*University of Oxford, Oxford, UK*)

Stephen L. Hoffman (*Sanaria Inc., Rockville, Maryland, USA*)

## SCIENTIFIC SESSION LEADERS

Ogobara Doumbo (*University of Bamako, Bamako, Mali*)

Chris Ockenhouse (*PATH, Seattle, Washington, USA*)

Simon Draper (*University of Oxford, Oxford, UK*)

Bob Seder (*NIH, Bethesda, Maryland, USA*)

Odile Leroy (*European Vaccine Initiative, Heidelberg, Germany*)

Salim Abdulla (*Ifakara Health Institute, Dar Es Salaam, United Republic of Tanzania*)

Rana Chattopadhyay (*CEBR, USFDA, Silver Spring, Maryland, USA*)

Vaseeharan Sathiyamoorthy (*WHO, Geneva, Switzerland*)

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07.30 Onwards  
Registration & Coffee

08.45-09.00

**Welcome Address**

Dean of LUMC, Leiden

**SESSION 1:  
GENERAL PLENARY SESSION I**

Session Leader: Ogobara Doumbo (*University of Bamako, Bamako, Mali*)

09.00-09.40

**'Multi-component malaria vaccines: Challenges and new solutions'**

Adrian Hill (*The Jenner Institute, University of Oxford, Oxford, UK*)

09.40-10.20

**'PfSPZ Vaccine: The March Toward Licensure'**

Steve Hoffman (*Sanaria Inc., Rockville, Maryland, USA*)

10.20-11.00

**'PATH Malaria Vaccine Initiative transmission-blocking vaccine strategy: Challenges and recent progress'**

C. Richter King (*PATH Malaria Vaccine Initiative, Washington DC, USA*)

11.00-11.30

Coffee Break & Poster Set-Up

**SESSION 2:  
RTS,S**

Session Leader: Chris Ockenhouse (*PATH, Seattle, Washington, USA*)

11.30-11.40

**'Session Introduction'**

Chris Ockenhouse (*PATH, Seattle, Washington, USA*)

11.40-11.55

**'Benefit-risk balance of the RTS,S/AS01 malaria vaccine candidate and plans to address remaining questions'**

Lode Schuerman, Elodie Garric, Pascale Vandoolaeghe and Yolanda Guerra Mendoza (*GSK Vaccines, Wavre, Belgium*)

11.55-12.10

**'Designing epidemiological studies for the post approval plan of the RTS,S/AS01 malaria vaccine in sub-Saharan African countries'**

Laurence Baril<sup>1</sup>, Jean-Yves Pirçon<sup>1</sup>, Marie-Cécile Bozonnat<sup>2</sup>, Valérie Haine<sup>3</sup>, Effua Usuf<sup>4</sup>, Elodie Garric<sup>1</sup> and Yolanda Guerra<sup>1</sup> on behalf of the RTS,S Safety Post Approval Plan Partnership Committee

(<sup>1</sup> GSK Vaccines, Wavre, Belgium; <sup>2</sup> 4 Clinics, Paris, France; <sup>3</sup> Keyrus Biopharma, Lasne, Belgium; <sup>4</sup> Consultant for GSK Vaccines)

12.10-12.25

**'Addressing the methodological and logistical challenges of performing malaria vaccine effectiveness studies in sub-Saharan African countries'**

Jean-Yves Pirçon and Laurence Baril (*GSK Vaccines, Wavre, Belgium*)

12.25-12.40

**'Mathematical modelling to prioritize second generation malaria vaccines: Insights following from mathematical modelling prior to RTS,S recommendation'**

Melissa A. Penny and Thomas A. Smith (*Swiss Tropical and Public Health Institute, Basel, Switzerland and University of Basel, Basel, Switzerland*)

12.40-12.55

**'Decreasing RTS,S vaccine efficacy with increase in genetic mismatch of malaria, yet some efficacy remains against highly mismatched malaria'**

Michal Juraska<sup>1</sup>, Daniel E. Neafsey<sup>2</sup>, Trevor Bedford<sup>1</sup>, David Benkeser<sup>1</sup>, Marc Lievens<sup>3</sup>, Bronwyn MacInnis<sup>2</sup>, Sarah K. Volkman<sup>2,4</sup>, Christian F. Ockenhouse<sup>5</sup>, Peter B. Gilbert<sup>1</sup> and Dyann F. Wirth<sup>2,4</sup> (*<sup>1</sup> Vaccine and Infectious Disease Division,*

*Fred Hutchinson Cancer Research Center; <sup>2</sup> Broad Institute of MIT and Harvard; <sup>3</sup> GlaxoSmithKline Vaccines; <sup>4</sup> Harvard T.H. Chan School of Public Health; <sup>5</sup> PATH Malaria Vaccine Initiative, Washington DC, USA*)

12.55-13.00

**Session Discussion**

13.00-14.00

Lunch Break & Posters

**SESSION 3:  
PRE-ERYTHROCYTIC VACCINES I**

Session Leader: Steve Hoffman (*Sanaria Inc., Rockville, Maryland, USA*)

14.00-14.10

**Session Introduction**

Steve Hoffman (*Sanaria Inc., Rockville, Maryland, USA*)

14.10-14.30

**'A unique collaborative approach to successful malaria vaccine development: Lessons from the international PfSPZ Consortium'**

Peter F. Billingsley for the International PfSPZ Consortium

14.30-14.45

**'Long term heterologous protection: The pot of gold at the end of the malaria vaccine rainbow'**

Kirsten E. Lyke and Thomas L. Richie for the International PfSPZ Consortium

14.45-15.00

**'Successful establishment of a PfSPZ vaccine immunization regimen that protects non-immune, short-term travellers against Pf malaria'**

J. E. Epstein for the International PfSPZ Consortium

15.00-15.15

**'Manufacturing PfSPZ vaccines for malaria elimination'**

B.K.L. Sim, A. Manoj, A. Eappen, T. Li, E.R. James, S. Chakravarty, M. Li, R. Stafford, A. Ruben, Y. Wu, P.F. Billingsley and S.L. Hoffman (*Sanaria Inc., Rockville, Maryland, USA and Protein Potential LLC, Rockville, Maryland, USA*)

15.15-15.30

**'Identification of protection associated HLA-allele specific epitopes within standard and novel Plasmodium falciparum antigens in human research subjects immunized with radiation attenuated sporozoites'**

Martha Sedegah<sup>1</sup>, Santiago Carmona<sup>2</sup>, Maria Belmonte<sup>1</sup>, Arnel Belmonte<sup>1</sup>, Harini Ganeshan<sup>1</sup>, Jun Huang<sup>1</sup>, Sandra Inoue<sup>1</sup>, Rachael Velasco<sup>1</sup>, Bradley Hickey<sup>1</sup>, Nimfa Teneza-Mora<sup>1</sup>, Joanne Lumsden<sup>1</sup>, Bjoern Peters<sup>2</sup> and Eileen Villasante<sup>1</sup> (*<sup>1</sup> Naval Medical Research Center, Silver Spring, Maryland, USA; <sup>2</sup> La Jolla Institute for Allergy and Immunology, La Jolla, California, USA*)

15.30-15.45

**'Safety and efficacy of immunization by mosquito bite with radiation attenuated sporozoites evaluated in a phase 1 clinical trial: Final results'**

Nimfa Teneza-Mora<sup>1</sup>, Bradley Hickey<sup>1</sup>, Sharina Reyes<sup>2</sup>, Joanne Lumsden<sup>2</sup>, Jo Glenna Banania<sup>2</sup>, Charlotte Fedders<sup>2</sup>, Yolanda Alcorta<sup>2</sup>, Anatalio Reyes<sup>2</sup>, Carlos Vasquez<sup>2</sup>, Santina Maiolatesi<sup>2</sup>, Harini Ganeshan<sup>2</sup>, Jun Huang<sup>2</sup>, Maria Belmonte<sup>2</sup>, Arnel Belmonte<sup>2</sup>, Esteban Abot<sup>2</sup>, Alexandra Singer<sup>1</sup>, Cindy Tamminga<sup>2</sup>, James Moon<sup>3</sup>, Michelle Spring<sup>3</sup>, Patrick Twomey<sup>3</sup>, Megan Dowler<sup>3</sup>, Lindsay Garver<sup>3</sup>, Silas Davidson<sup>3</sup>, Martha Sedegah<sup>1</sup>, Thomas Richie<sup>1</sup>, Eileen Villasante<sup>1</sup> and Judith Epstein<sup>1</sup> (*<sup>1</sup> Naval Medical Research Center, Silver Spring, Maryland, USA; <sup>2</sup> Henry M. Jackson Foundation, Bethesda, Maryland, USA; <sup>3</sup> Walter Reed Army Institute of Research, Silver Spring, Maryland, USA*)

15.45-15.50

**Session Discussion**

15.50-16.10

Tea Break & Posters

## SESSION 4: PRE-ERYTHROCYTIC VACCINES II

Session Leader: Adrian Hill (*University of Oxford, Oxford, UK*)

16.10-16.20

### Session Introduction

Adrian Hill (*University of Oxford, Oxford, UK*)

16.20-16.40

### 'Viral vector malaria vaccines induce potent T cell and antibody responses in West African infants'

Katie Ewer (*University of Oxford, Oxford, UK*)

16.40-16.55

### 'Induction of high levels of liver-resident CD8+ T-cells that protect against liver-stage malaria'

Anita Gola<sup>1</sup>, Adam A. Walters<sup>1</sup>, Benedict R. Halbroth<sup>1</sup>, Ahmed M. Salman<sup>1,2</sup>, Shahid M. Khan<sup>2</sup>, Chris J. Janse<sup>2</sup>, Alexandra J. Spencer<sup>1</sup> and Adrian VS Hill<sup>1</sup>  
(<sup>1</sup> *Jenner Institute, University of Oxford, Oxford, UK*; <sup>2</sup> *Leiden University Medical Center, Leiden, The Netherlands*)

16.55-17.10

### 'Clinical evaluation of the cell-traversal protein for ookinetes and sporozoites from *Plasmodium falciparum* (pfcelts) vaccine in a phase 1 trial with controlled human malaria infection'

Jason W. Bennett<sup>1</sup>, Donna Tosh<sup>1</sup>, Elke S. Bergmann-Leitner<sup>1</sup>, Kristopher Paolino<sup>1</sup>, Jason A. Regules<sup>1</sup>, Elizabeth Duncan<sup>1</sup>, Patrick Twomey<sup>1</sup>, James E. Moon<sup>1</sup>, April Kathcart<sup>1</sup>, Heather E. Hosie<sup>1</sup>, Casey K. Storme<sup>1</sup>, Michele D. Spring<sup>1</sup>, Kevin Hauns<sup>1</sup>, Jack Komisar<sup>1</sup>, Aziz Qabar<sup>1</sup>, Silas Davidson<sup>1</sup>, Christian F. Ockenhouse<sup>4</sup>, Johan Vekemans<sup>2</sup>, Lorraine Soisson<sup>3</sup>, Ripley Ballou<sup>2</sup>, Carter Diggs<sup>3</sup>, Norman C. Waters<sup>1</sup>, Robert M. Paris<sup>1</sup> and Evelina Angov<sup>1</sup>  
(<sup>1</sup> *Walter Reed Army Institute of Research, Silver Spring, Maryland, USA*; <sup>2</sup> *GSK Vaccines, Rixensart, Belgium*; <sup>3</sup> *United States Agency for International Development, Washington DC, USA*; <sup>4</sup> *PATH Malaria Vaccine Initiative (MVI), Washington DC, USA*)

17.10-17.25

### 'Why high numbers of CD8+ T cells are required to mediate protection against liver-stage malaria'

Alexandra J. Spencer, Rhea J. Longley, Anita Gola, Teresa Lambe and Adrian V.S. Hill (*The Jenner Institute, University of Oxford, Oxford, UK*)

17.25-17.40

### 'Evaluation of *Plasmodium falciparum* SPECT-1 as a novel pre-erythrocytic vaccine candidate'

Ahmed M. Salman<sup>1,2</sup>, Ana Rodríguez-Galán<sup>1</sup>, Naif Khalaf Alharbi<sup>1</sup>, Florian Brod<sup>1</sup>, Aadil El Turabi<sup>1</sup>, Paulo Bettencourt<sup>1</sup>, Alexandra J. Spencer<sup>1</sup>, Chris J. Janse<sup>2</sup>, Shahid M. Khan<sup>2</sup> and Adrian V.S. Hill<sup>1</sup>  
(<sup>1</sup> *The Jenner Institute, University of Oxford, Oxford, Oxfordshire, UK*; <sup>2</sup> *Leiden Malaria Research Group, LUMC, Leiden, The Netherlands*)

17.40-17.50

### Session Discussion

17.50-19.00

MVW 2016 Poster Session & Welcome Drinks

**SESSION 5:  
TRANSMISSION BLOCKING VACCINES**

Session Leader: C. Richter King

(PATH Malaria Vaccine Initiative, Washington DC, USA)

09.00-09.15

**Session Introduction**

C. Richter King (PATH Malaria Vaccine Initiative, Washington DC, USA)

09.15-09.30

**'Pre-clinical and clinical development of novel virus-like-particles for induction of high titre functional antibody responses against the transmission-blocking candidate antigen, Pfs25'**

Yuanyuan Li<sup>1</sup>, Darren Leneghan<sup>1</sup>, Karl D. Brune<sup>2</sup>, Jing Jin<sup>1</sup>, Iona Brian<sup>1</sup>, Kazutoyo Miura<sup>3</sup>, Carole A. Long<sup>3</sup>, Simon J. Draper<sup>1</sup>, Adrian V.S. Hill<sup>1</sup>, Mark Howarth<sup>2</sup>, Fergal Hill<sup>4</sup> and Sumi Biswas<sup>1</sup>

(<sup>1</sup> The Jenner Institute, University of Oxford, Oxford, UK; <sup>2</sup> Department of Biochemistry, University of Oxford, Oxford, UK; <sup>3</sup> NIAID/NIH, MD 20852, USA; <sup>4</sup> Imaxio SA, Lyons, France)

09.30-09.45

**'Clinical development of a Pfs48/45-based transmission blocking malaria vaccine'**

Robert Sauerwein<sup>1</sup>, Will Roeffen<sup>1</sup>, Susheel Kumar Sing<sup>2</sup>, Sanjay Singh<sup>3</sup> and M. Theisen<sup>2</sup>

(<sup>1</sup> Radboud University Medical Center, Nijmegen, The Netherlands; <sup>2</sup> SSI, Copenhagen, Denmark; <sup>3</sup> Gennova, Pune, India)

09.45-10.15

**'Assessment of the potential effectiveness of transmission blocking vaccines by the use of an experimental lab-based transmission population model'**

Andrew Blagborough (Imperial College, London, UK)

10.15-10.45

**'Analysing TBV vaccine efficacy in the field'**

Sara Healy (NIAID/NIH, Bethesda, Maryland, USA)

10.45-11.00

**Session Discussion**

11.00-11.20

Coffee Break

**SESSION 6:  
BLOOD STAGE AND COMBINATION VACCINES**

Session Leader: Simon Draper (University of Oxford, Oxford, UK)

11.20-11.30

**Session Introduction**

Simon Draper (University of Oxford, Oxford, UK)

11.30-11.45

**'Development of a PfrH5-based vaccine against the Plasmodium falciparum merozoite'**

Simon Draper (University of Oxford, Oxford, UK)

11.45-12.00

**'Development of a semi-synthetic whole parasite vaccine'**

Ashwin Kumar Giddam<sup>1</sup>, Jennifer M. Reiman<sup>2</sup>, Mehruz Zaman<sup>2</sup>, Mariusz Skwarczynski<sup>1</sup>, Istvan Toth<sup>1,3,4</sup> and Michael F. Good<sup>2</sup>

(<sup>1</sup> The University of Queensland, School of Chemistry and Molecular Biosciences, Australia; <sup>2</sup> Griffith University, Institute for Glycomics, Australia; <sup>3</sup> The University of Queensland, School of Pharmacy, Australia; <sup>4</sup> The University of Queensland, Institute for Molecular Bioscience, Australia)

12.00-12.15

**'DEKnull: A rational design for a strain-transcending vaccine against vivax malaria'**

Francis B. Ntumngia<sup>1</sup>, Edwin Chen<sup>2</sup>, Miriam T. George<sup>1</sup>, Camilla Valente Pires<sup>1</sup>, Lenore Carias<sup>3</sup>, Nichole D. Salinas<sup>2</sup>, Samantha J. Barnes<sup>1</sup>, Christopher L. King<sup>3</sup>, Niraj H. Tolia<sup>2</sup> and John H. Adams<sup>1</sup>

(<sup>1</sup> Center for Global Health & Infectious Diseases Research, College of Public Health, University of South Florida, Tampa, USA; <sup>2</sup> Departments of Molecular Microbiology & Microbial Pathogenesis, and Biochemistry & Molecular Biophysics, Washington University School of Medicine, Saint Louis, USA; <sup>3</sup> Center for Global Health and Diseases, Case Western Reserve University, Cleveland, USA)

12.15-12.30

**'Development of efficacious targeted DNA vaccines against malaria'**

Ganesh Ram Visweswaran<sup>1</sup>, Ranveig Braathen<sup>1</sup>, Louise Bjerkan<sup>1</sup>, Genevieve Labbe<sup>2</sup>, Simon J. Draper<sup>2</sup> and Bjarne Bogen<sup>1</sup>

(<sup>1</sup> University of Oslo, Oslo, Norway; <sup>2</sup> University of Oxford, Oxford, United Kingdom)

12.30-12.45

**'Plasmodium falciparum virulence genes (var) expressed in severe pediatric malaria characteristically encode EPCR-binding PfEMP1'**

Thomas Lavstsen (University of Copenhagen and Department of Infectious Diseases, Rigshospitalet, Copenhagen, Denmark)

12.45-12.50

**Session Discussion**

12.50-13.30

Lunch Break & Posters

**SESSION 7:  
VACCINE IMMUNOLOGY**

Session Leader: Robert A. Seder (NIH, Bethesda, Maryland, USA)

13.30-13.40

**Session Introduction**

Robert A. Seder (NIH, Bethesda, Maryland, USA)

13.40-14.00

**'Immune correlates of durable protection'**

Robert A. Seder for the International PfSPZ Consortium (NIH, Bethesda, Maryland, USA)

14.00-14.15

**'Establishing Luminex assay for measuring human serum anti-malarial IgG subclasses'**

Christian Darko, Aziz Qabar, Christina McCray, Kingsley Jarret, Nancy Richie, Tanmaya Atre, Sheetij Dutta, Norman Walters and James Moon (Walter Reed Army Institute of Research, Silver Spring, Maryland, USA)

14.15-14.30

**'Protection and immune responses after whole sporozoite immunization in humans'**

Robert Sauerwein (Radboud University Medical Center, Nijmegen, The Netherlands)

14.30-14.45

**'Decoding the immunological basis of protective efficacy with PfSPZ vaccines against malaria'**

Sumana Chakravarty and Stephen L. Hoffman (Sanaria Inc., Rockville, Maryland, USA)

14.45-15.00

**'Cellular immune correlates induced by RTS,S/AS01E in children and infants from a phase III trial in Africa'**

G. Moncunill<sup>1,2</sup>, M. Mpina<sup>3</sup>, A.J. Nhabomba<sup>2</sup>, R. Aguilar<sup>1</sup>, A. Ayestaran<sup>1</sup>, H. Sanz<sup>1</sup>, J.J. Campo<sup>1,2</sup>, C. Jairoce<sup>2</sup>, D. Barrios<sup>1</sup>, Y. Dong<sup>4</sup>, N. Díez-Padrís<sup>1</sup>,

J.S. Fernandes<sup>5</sup>, S. Abdulla<sup>3</sup>, J. Sacarlal<sup>2</sup>, P.L. Alonso<sup>1,2</sup>, N.A. Williams<sup>1</sup>,  
 J. Harezlak<sup>4</sup>, B. Mordmüller<sup>6,5</sup>, S.T. Agnandji<sup>5,6</sup>, J.J. Aponte<sup>1,2</sup>,  
 J.J. Daubenberger<sup>3,7</sup>, C. Valim<sup>8</sup> and C. Dobaño<sup>1,2</sup>  
 (<sup>1</sup> ISGlobal, <sup>2</sup> CISM, <sup>3</sup> IHI, <sup>4</sup> IUPUI, <sup>5</sup> CERMEC, <sup>6</sup> UKT, <sup>7</sup> SwissTPH, <sup>8</sup> HSPH-MSU)

15.00-15.30

Tea Break & Posters

## SESSION 8: NEW VACCINE TECHNOLOGIES

Session Leader: Shahid Khan (*LUMC, Leiden University, Leiden, The Netherlands*)

15.30-15.40

### Session Introduction

Shahid Khan (*LUMC, Leiden University, Leiden, The Netherlands*)

15.40-16.00

### 'The use of transgenic parasites in malaria vaccine research'

Shahid Khan (*LUMC, Leiden University, Leiden, The Netherlands*)

16.00-16.15

### 'A human immune system (HIS) mouse model for a malaria vaccine research'

Moriya Tsuji (*Aaron Diamond AIDS Research Center, The Rockefeller University, New York, USA*)

16.15-16.30

### 'A rodent Plasmodium platform for immunization against human malaria'

Miguel Prudencio (*Instituto de Medicina Molecular, Lisbon, Portugal*)

16.30-16.45

### 'Vaccination approaches that protect humanized HLA transgenic mice against Plasmodium falciparum'

Sai Majji<sup>1</sup>, Wathsala Wijayalath<sup>1</sup>, Luis Pow Sang<sup>2</sup>, Soumya Shashikumar<sup>1</sup>, Timothy King<sup>1</sup>, Eileen Villasante<sup>1</sup>, Teodor-Doru Brumeanu<sup>2</sup> and Sofia Casares<sup>1</sup>  
 (<sup>1</sup> Naval Medical Research Center / Walter Reed Army Institute of Research, Silver Spring, Maryland, USA; <sup>2</sup> Uniformed Services University of Health Sciences, Bethesda, Maryland, USA)

16.45-17.00

### 'Inference of parasite genetic determinants of PfSPZ Vaccine efficacy from field trial samples'

J.C. Silva<sup>1</sup>, K.A. Moser<sup>1</sup>, A. Ouattara<sup>2</sup>, A. Dara<sup>2</sup>, E.F. Drábek<sup>1</sup>, M. Adams<sup>2</sup>, B.K. Sim<sup>3</sup>, K.E. Lyke<sup>2</sup>, M.A. Travassos<sup>2</sup>, M.B. Laurens<sup>2</sup>, S. Takala-Harrison<sup>2</sup>, S.L. Hoffman<sup>3</sup> and C.V. Plowe<sup>2</sup>  
 (<sup>1</sup> Institute for Genome Sciences, University of Maryland School of Medicine, Baltimore, Maryland, USA; <sup>2</sup> Institute for Global Health, University of Maryland School of Medicine, Baltimore, Maryland, USA; <sup>3</sup> Sanaria Inc., Rockville, Maryland, USA)

17.00-17.15

### 'Plasmodium falciparum infections in humanized DRAG mice upon challenge with sporozoites delivered by the intravenous route or by mosquito bites'

Wathsala Wijayalath<sup>1</sup>, Sai Majji<sup>1</sup>, Timothy King<sup>1</sup>, Soumya Sashikumar<sup>1</sup>, Megan Dowler<sup>2</sup>, Eileen Villasante<sup>1</sup>, Teodor D Brumeanu<sup>3</sup> and Sofia Casares<sup>1</sup>  
 (<sup>1</sup> Naval Medical Research Center / Walter Reed Army Institute of Research, Silver Spring, Maryland, USA; <sup>2</sup> Entomology Branch, Walter Reed Army Institute of Research, Silver Spring, Maryland, USA; <sup>3</sup> Uniformed Services University of Health Sciences, Bethesda, Maryland, USA)

17.15-17.30

### Session Discussion

**SESSION 9:  
GENERAL PLENARY SESSION II**

Session Leader: Odile Leroy (*European Vaccine Initiative, Heidelberg, Germany*)

09.00-09.10

**Session Introduction**

Odile Leroy (*European Vaccine Initiative, Heidelberg, Germany*)

09.10-09.25

**'Development of a placental malaria vaccine'**

Arnaud Chêne<sup>1</sup>, Stéphane Gangnard<sup>1</sup>, Sebastien Dechavanne<sup>1</sup>, Anand Srivastava<sup>1</sup>, Nicola K. Viebig<sup>2</sup>, Nicolas Havelange<sup>2</sup>, Sophia Hundt<sup>2</sup>, Odile Leroy<sup>2</sup> and Benoît Gamain<sup>1</sup>

(<sup>1</sup> *Institut National de la Santé et de la Recherche Médicale, Paris, France;*

<sup>2</sup> *European Vaccine Initiative, UniversitätsKlinikum, Heidelberg, Germany*)

09.25-09.40

**'Controlled Human Malaria Infection (CHMI) in Malaria Vaccine Development: A U.S. Food & Drug Administration (FDA) Perspective'**

Rana Chattopadhyay and Douglas Pratt (*Center for Biologics Evaluation & Research, US FDA, Silver Spring, Maryland, USA*)

09.40-09.55

**'A Phase 1 trial to assess the safety, attenuation and immunogenicity of triple gene deletion-attenuated *Plasmodium falciparum* (PfGAP3KO) strain'**

Brandon K. Sack<sup>1</sup>, James G. Kublin<sup>1,2</sup>, Sebastian A. Mikolajczak<sup>1</sup>, Matt Fishbauger<sup>1</sup>, Annette Seilie<sup>3</sup>, Lisa Shelton<sup>1</sup>, Tracie VonGoederdt<sup>1</sup>, Melike Firat<sup>1</sup>, Sara Magee<sup>1</sup>, Emma Fritzen<sup>1</sup>, Will Betz<sup>1</sup>, Heather S. Kain<sup>1</sup>, Ryan Steel<sup>1</sup>, Dorender A. Dankwa<sup>1</sup>, Ashley M. Vaughan<sup>1</sup>, D. Noah Sather<sup>1</sup>, Sean C. Murphy<sup>1,3,4,5</sup>, and Stefan H.I. Kappe<sup>1,2</sup> (<sup>1</sup> *Center for Infectious Disease Research, formerly Seattle Biomedical Research Institute, Seattle, Washington, USA;* <sup>2</sup> *University of Washington, Seattle, Washington, USA;* <sup>3</sup> *Vaccine and Infectious Disease Division, Fred Hutchinson Cancer Research Center, Seattle, Washington, USA;* <sup>4</sup> *Department of Laboratory Medicine, Seattle, Washington, USA;* <sup>5</sup> *University of Washington, Seattle, Washington, USA*)

09.55-10.10

**'Developing a malaria vaccine for the military: A multi-disciplinary collaborative effort'**

Eileen Franke Villasante (*Naval Medical Research Center, Silver Spring, Maryland, USA*) and Norman C. Waters (*Walter Reed Army Institute of Research, Silver Spring, Maryland, USA*)

10.10-10.25

**'Malaria vaccines: A update from WHO'**

Vaseeharan Sathiyamoorthy (*WHO, Geneva, Switzerland*)

10.25-10.40

**Session Discussion**

10.40-11.10

Coffee Break & Posters

**SESSION 10:  
LATE BREAKER PRESENTATIONS**

Session Leader: Salim Abdulla

(*Ifakara Health Institute, Dar Es Salaam, United Republic of Tanzania*)

11.10-11.25

**'Transcriptome and antibody analysis of Immunization with Radiation Attenuated Sporozoites'**

Ken Stuart et al.

(*Center for Infectious Disease Research, Seattle, Washington, USA/NMRC/WRAIR IMRAS Team, USA*)

11.25-11.50

**'Proteomic antibody profiling of U.S. and African volunteers in multiple clinical trials of PfSPZ vaccine'**

Joseph J. Campo<sup>1</sup>, Sumana Chakravarty<sup>2</sup>, Jozelyn Pablo<sup>1</sup>, Andy Teng<sup>1</sup>, Adam Shandling<sup>1</sup>, Tim Le<sup>1</sup>, Cassidy Walker<sup>1</sup>, Minglin Li<sup>3</sup>, Natasha KC<sup>3</sup>, Neville Kisalu<sup>4</sup>, Barbara Flynn<sup>4</sup>, Azza Idris<sup>4</sup>, Ogobara Doumbo<sup>5</sup>, Mahamadou Soumana Sissoko<sup>5</sup>, Sara Healy<sup>6</sup>, Patrick Duffy<sup>6</sup>, Preston Church<sup>2</sup>, Said Jongo<sup>7</sup>, Seif Shekalaghe<sup>7</sup>, Salim Abdulla<sup>7</sup>, Claudia Daubenberger<sup>8,9</sup>, Judith E. Epstein<sup>10</sup>, Robert Seder<sup>4</sup>, Philip L. Felgner<sup>1</sup>, Xiaowu Liang<sup>1</sup> and Stephen L. Hoffman<sup>2</sup>

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11.50-12.05

**'Discovery of a novel, highly protective pre-erythrocytic *Plasmodium* vaccine antigen candidate'**

Joao Aguiar, Keith Limbach, Elena Curti, Nonenipha Rangel, Andrea Renner, Sharvari Sonawane, Kalpana Gowda, Jessica Bolton, Rebecca Danner, Noelle B. Patterson, Thomas L. Richie, Eileen D. Villasante and Emily Smith (*NMRC, Silver Spring, Maryland, USA*)

12.05-12.25

**'Targeting malaria infection with antibodies against the pre-erythrocytic stage of malaria'**

Brandon K. Sack<sup>1</sup>, James G. Kublin<sup>1,2</sup>, Sebastian A. Mikolajczak<sup>1</sup>, Matt Fishbauger<sup>1</sup>, Annette Seilie<sup>3</sup>, Lisa Shelton<sup>1</sup>, Tracie VonGoederdt<sup>1</sup>, Melike Firat<sup>1</sup>, Sara Magee<sup>1</sup>, Emma Fritzen<sup>1</sup>, Will Betz<sup>1</sup>, Heather S. Kain<sup>1</sup>, Ryan Steel<sup>1</sup>, Dorender A. Dankwa<sup>1</sup>, Ashley M. Vaughan<sup>1</sup>, Vladimir Vigdorovich<sup>1</sup>, Sara Carbonetti<sup>1</sup>, Joshua Obiero<sup>4</sup>, Philip L. Felgner<sup>4</sup>, D. Noah Sather<sup>1</sup>, Sean C. Murphy<sup>1,2,3</sup> and Stefan H.I. Kappe<sup>1,2</sup>

(<sup>1</sup> *Center for Infectious Disease Research, Seattle, Washington, USA;* <sup>2</sup> *University of Washington, Seattle, Washington, USA;* <sup>3</sup> *Fred Hutchinson Cancer Research Center, USA;* <sup>4</sup> *University of California, Irvine, California, USA*)

12.25-12.40

**Session Discussion**

12.40-14.00

Lunch Break & Poster Breakdown

**SESSION 11:  
PANEL DISCUSSION**

14.00-15.30

**Strategy and Future Directions**

**Panel Leader:**

To be confirmed


\* *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 final conference programme.*

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Poster 101

**'How to achieve pre-defined objectives for reducing malaria burden at the lowest budget? Application of an outcome optimization approach to Ghana'**

Christophe Sauboin<sup>1</sup>, N. Van de Velde<sup>1</sup>, I. Van Vlaenderen<sup>2</sup> and L.-A. Van Bellinghen<sup>2</sup>  
(<sup>1</sup> GSK Vaccines, Wavre, Belgium; <sup>2</sup> CHES in Health, Bonheiden, Belgium)

Poster 102

**'Functional cross-reactive antibody responses to heterologous PvDBP-II variants: Implication for vivax malaria development'**

Vahideh Valizadeh, Sedigheh Zakeri, Akram Abouie Mehrizi and Navid Dinparast Djadid (Malaria and Vector Research Group, Pasteur Institute of Iran, Tehran, Iran)

Poster 103

**'Functional assays for characterization and evaluation of potential vaccine candidates targeting Plasmodium vivax and P. falciparum pre-erythrocytic stages'**

Alison Roth<sup>1</sup>, Steven P. Maher<sup>1</sup>, Swamy Rakesh Adapa<sup>1</sup>, Rays H.Y. Jiang<sup>1</sup>, Ratawan Ubalee<sup>2</sup>, Nicole Salinas<sup>3</sup>, John Jimah<sup>3</sup>, Niraj Tolia<sup>3</sup>, Amy Conaway<sup>1</sup>, Friedrich Frischknecht<sup>4</sup>, Dennis E. Kyle<sup>1</sup>, Silas Davidson<sup>2</sup> and John H. Adams<sup>1</sup>  
(<sup>1</sup> College of Public Health, University of South Florida, Tampa, Florida, USA; <sup>2</sup> Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok, Thailand; <sup>3</sup> Washington University, St. Louis, Missouri, USA; <sup>4</sup> Heidelberg University, Heidelberg, Germany)

Poster 104

**'Protection against malaria at 1 year and immune correlates following PfSPZ vaccination'**

Andrew S Ishizuka<sup>1</sup>, Kirsten E Lyke<sup>2</sup>, Adam DeZure<sup>1</sup>, Andrea Berry<sup>2</sup>, Thomas L. Richie<sup>3</sup>, Floreliz H Mendoza<sup>1</sup>, Mary E Enama<sup>1</sup>, Ingelise J. Gordon<sup>1</sup>, Eric R. James<sup>3</sup>, Peter F Billingsley<sup>3</sup>, Sumana Chakravarty<sup>3</sup>, Anita Manoj<sup>3</sup>, Adam J. Ruben<sup>3</sup>, Tao Li<sup>3</sup>, Barbara Flynn<sup>1</sup>, Brandon K Sack<sup>4</sup>, Stefan HJ Kappe<sup>4</sup>, Martha C. Nason<sup>5</sup>, Barney S Graham<sup>1</sup>, Mario Roederer<sup>1</sup>, B Kim Lee Sim<sup>3</sup>, Stephen L. Hoffman<sup>3</sup>, Julie E Ledgerwood<sup>1</sup> and Robert A Seder<sup>1</sup>  
(<sup>1</sup> VRC, NIAID, NIH, Bethesda, Maryland, USA; <sup>2</sup> Institute for Global Health, UMD SOM, Baltimore, Maryland, USA; <sup>3</sup> Sanaria, Inc., Rockville, Maryland, USA; <sup>4</sup> Center for Infectious Disease Research, Seattle, Washington, USA; <sup>5</sup> NIAID, NIH, Bethesda, Maryland, USA)

Poster 105

**'Development of a platform for assessment of protective antibody responses for pre-erythrocytic vaccine immunogens'**

Vladimir Vigdorovich, Sara Carbonetti, Brandon K. Sack, Silvia A. Arredondo, Brian G. Oliver, Nicholas Dambrauskas, Stefan H.I. Kappe and D. Noah Sather (Center for Infectious Disease Research, Seattle, Washington, USA)

Poster 106

**'Designing TRAP-CSP fusion antigens as malaria vaccines'**

Chafen Lu<sup>1</sup>, Gaojie Song<sup>1</sup>, Kristin Beale<sup>1</sup>, Jiabin Yan<sup>1</sup>, Flaminia Catteruccia<sup>2</sup> and Timothy A. Springer<sup>1</sup>  
(<sup>1</sup> Boston Children's Hospital, Harvard Medical School, Boston, USA; <sup>2</sup> Harvard T.H. Chan School of Public Health, Boston, USA)

Poster 107

**'Evaluation of DNA prime-ChAd63 boost malaria vaccine candidates in BALB/c mice'**

Noelle B. Patterson<sup>1,2</sup>, Maureen E. Stefaniak<sup>1,2</sup>, Keith Limbach<sup>1,2</sup>, Martha Sedegah<sup>2</sup>, Arnel Belmonte<sup>1,2</sup>, Maria Belmonte<sup>1,2</sup>, Katie J. Ewer<sup>3</sup>, Alison Lawrie<sup>3</sup>, Lorraine Soisson<sup>4</sup>, Ann-Marie Cruz<sup>5</sup>, Rich Weltzin<sup>5</sup>, Thomas L. Richie<sup>2</sup>, Adrian Hill<sup>3</sup> and Eileen Villasante<sup>2</sup>  
(<sup>1</sup> Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. Bethesda, Maryland, USA; <sup>2</sup> Naval Medical Research Center, Silver Spring, Maryland, USA; <sup>3</sup> University of Oxford, Oxford, UK; <sup>4</sup> Malaria Vaccine Development Program, U.S. Agency for International Development, Washington, D.C., USA; <sup>5</sup> Malaria Vaccine Initiative, PATH, Washington, D.C., USA)

Poster 108

**'Novel malaria vaccines by Vaccibody DNA immunization'**

Louise Bjerkan<sup>1,2</sup>, Ganesh Ram Visveswaran<sup>1,2</sup>, Ranveig Braathen<sup>1,2</sup>, Genevieve Labbe<sup>3</sup>, Simon J Draper<sup>3</sup>, Bjarne Bogen<sup>1,2</sup>  
(<sup>1</sup> K.G. Jebsen Centre for Research on Influenza Vaccines, Oslo, Norway; <sup>2</sup> Centre for Immune Regulation Institute of Immunology, University of Oslo and Oslo University Hospital, Oslo, Norway; <sup>3</sup> The Jenner Institute, University of Oxford, Oxford, United Kingdom)

Poster 109

**'Identification of protective regions of Plasmodium falciparum circumsporozoite protein using the inhibition of liver stage development assay (ILSDA)'**

Kimberly A. Edgel<sup>1</sup>, Xiaoyan Zou<sup>2</sup>, Sri Hadiwidjojo<sup>2</sup>, Eileen F. Villasante<sup>1</sup> and Emily Locke<sup>3</sup>  
(<sup>1</sup> Naval Medical Research Center, Silver Spring, Maryland, USA; <sup>2</sup> Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda, Maryland, USA; <sup>3</sup> PATH Malaria Vaccine Initiative, Washington, DC, USA)

Poster 110

**'Evaluation of the first WHO anti-malaria (Plasmodium falciparum) human serum reference reagent as a standard for competitive ELISA and growth inhibition assay'**

Bhagwati Khatri, Adéla Nacer, Peggy Riese, Ed Remarque, Carlos A. Guzmán Paul Bowyer and Mei Mei Ho (MHRA-NIBSC, South Mimms, Potters Bar, UK)

Poster 111

**'Development of a safe and reproducible controlled human malaria infection for Plasmodium vivax in healthy adults in the United States and ethical consideration of challenge studies in the endemic regions'**

Chuang Ilin (Naval Medical Research Center, Silver Spring, Maryland, USA)

Poster 112

**'Assessing the effector functions of peripheral blood Plasmodium falciparum antigen-specific T lymphocytes in human subjects immunized by radiation attenuated sporozoites'**

Emily C. Smith<sup>1,2</sup>, Jessica S. Bolton<sup>1,2</sup>, Rebecca Danner<sup>1,2</sup>, Nonenipha Rangel<sup>2,3</sup>, Kyosuke Oda<sup>2</sup>, Andrea K. Renner<sup>2,3</sup>, Sharvari Sonawane<sup>1,2</sup>, Martha Sedegah<sup>2</sup>, Keith Limbach<sup>1,2</sup>, Eileen D. Villasante<sup>2</sup>, Joao C. Aguiar<sup>2,3</sup> and the NMRC Clinical Trials Team<sup>2</sup>  
(<sup>1</sup> The Henry M. Jackson Foundation, Bethesda, Maryland, USA; <sup>2</sup> Malaria Department, Naval Medical Research Center, Silver Spring, Maryland, USA; <sup>3</sup> CAMRIS International, Inc., Bethesda, Maryland, USA)

Poster 113

**'Using controlled human malaria infection to assess transmission blocking interventions'**

Katharine A. Collins<sup>1</sup>, Matthew Adams<sup>1</sup>, Hayley Mitchell<sup>1</sup>, Romal Stewart<sup>1</sup>, Claire Wang<sup>2</sup>, Caroline Dobbin<sup>1</sup>, Teun Bousema<sup>3</sup>, Robert Sauerwein<sup>3</sup>, Stephan Chalou<sup>4</sup>, Joerg Moehrle<sup>4</sup> and James McCarthy<sup>1,5</sup>  
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Poster 114

**'Discussion of meningitis, cerebral malaria and all-cause mortality following immunization of children with the RTS,S/AS01 malaria vaccine in the phase III efficacy trial'**

Yolanda Guerra Mendoza, Elodie Garric, Lode Schuerman, Marc Lievens, Pascale Vandoolaeghe and Opokua Ofori-Anyinam (GSK Vaccines, Wavre, Belgium)