

# VACCINES FOR ENTERIC DISEASES

6-8 November 2013, The Royal Orchid Sheraton Hotel & Towers, Bangkok, Thailand

# FINAL ORAL PROGRAMME & POSTER PROGRAMME VED 2013

## SCIENTIFIC ADVISORY PANEL

Duncan Steele (*Bill & Melinda Gates Foundation, USA*)  
 Timo Vesikari (*University of Tampere, Finland*)  
 Carol O. Tacket (*University of Maryland, USA*)  
 Mary Estes (*Baylor College of Medicine, USA*)  
 Myron M. Levine (*University of Maryland, USA*)  
 John D. Clemens (*ICDDR, Dhaka, Bangladesh*)  
 Kevin Killeen (*Matrivax Corporation, Boston, USA*)  
 Ann-Mari Svennerholm (*Göteborg University, Sweden*)  
 Margaret E. Conner (*Baylor College of Medicine, USA*)  
 Linda J. Saif (*Ohio State University, USA*)  
 Roger I. Glass (*Fogarty Center, NIH, Bethesda, USA*)  
 Harry B. Greenberg (*Stanford University, USA*)  
 Claire-Lise Chagnat (*WHO, Switzerland*)  
 John D. Clements (*Tulane University, USA*)

Umesh Parashar (*CDC, Atlanta, USA*)  
 Julie E. Bines (*Royal Children's Hospital, Melbourne, Australia*)  
 Thomas G. Brewer (*Bill & Melinda Gates Foundation, USA*)  
 Mark Riddle (*NMRC, Bethesda, Maryland, USA*)  
 Armelle Phalipon (*Pasteur Institute, Paris, France*)  
 Lou Bourgeois (*PATH, Washington DC, USA*)  
 Robert Hall (*NIAID/NIH, Bethesda, Maryland, USA*)  
 Sathit Pitchayangkul (*AFRIMS, Bangkok, Thailand*)  
 Serge Debrus (*GSK Biologicals, Wavre, Belgium*)  
 Ladaporn Bodhidatta (*AFRIMS, Bangkok, Thailand*)  
 Punnee Pittisutithum (*Mahidol University, Bangkok, Thailand*)  
 Carl J. Mason (*AFRIMS, Bangkok, Thailand*)  
 Bernd Benninghoff (*GSK Biologicals, Wavre, Belgium*)



07.30am onwards  
VED 2013 Registration

## SESSION 1: BURDEN & EPIDEMIOLOGY

Moderators: Carl Mason (*AFRIMS, Bangkok, Thailand*)  
Duncan Steele (*Bill & Melinda Gates Foundation, Seattle, Washington, USA*)

09.00-09.10

### 'Welcome & Opening Address'

Supamit Chunsuttiwat (*Ministry of Public Health, Bangkok, Thailand*)

09.10-09.40

### 'Aetiology and burden of diarrheal disease in Africa and Asia: GEMS'

Myron M. Levine (*University of Maryland, Baltimore, Maryland, USA*)

09.40-10.00

### 'Epidemiology of enteric infections and consequences for child development in 8 resource poor communities in the developing world'

Dennis Lang (*MAL-ED Network/NH, Bethesda, Maryland, USA*)

10.00-10.20

### 'Use of the TaqMan array cards for multiple enteropathogens'

James Platts-Mills, Jie Liu, Rashidul Haque, Anita Zaidi, Esto Mduma, Jean Gratz and Eric Houpt (*University of Virginia, Charlottesville, Virginia, USA*)

10.20-10.40

### 'Surveillance and immunomonitoring of *Shigella* natural infection towards vaccine development and evaluation'

Dani Cohen, Shiri Meron-Sudai, Adi Behar, Amit Hochberg, Anya Bialik, Ravit Bassal, Sophy Goren, Michal Perry-Markovich, Tamy Shohat and Shai Ashkenazi (*Tel Aviv University, Tel Aviv, Israel*)

10.40-11.00

Coffee Break & Poster Set-Up

## SESSION 2: ETEC VACCINES – UPDATES ON CLINICAL TRIALS

Moderators: John Clements (*Tulane University, New Orleans, Louisiana, USA*)  
Ann-Mari Svennerholm (*University of Gothenburg, Gothenburg, Sweden*)

11.00-11.20

### 'Introduction: Implications of ETEC genomics for vaccine development'

Ann-Mari Svennerholm (*University of Gothenburg, Gothenburg, Sweden*)

11.20-11.40

### 'Safety and immunogenicity of a single, oral dose of recombinant double-mutant heat-labile toxin (dMLT) derived from enterotoxigenic *Escherichia coli* (ETEC)'

Wilbur H. Chen, Samur S. El-Kamary, Mitchell B. Cohen, A. Louis Bourgeois, Lillian Van De Verg, Nicole Bauers, Mardi Reymann and Marcela F. Pasetti (*University of Maryland, Baltimore, Maryland, USA*)

11.40-12.00

### 'Excellent safety and immunogenicity of a complete tetravalent oral inactivated whole cell ETEC vaccine tested with and without dMLT adjuvant demonstrated in a placebo-controlled Phase I study'

Anna Lundgren, J. Adamson, L. Bourgeois, N. Carlin, J. Clements, B. Gustafsson, M. Hartford, J. Holmgren, J. Kaim, S. Koster, M. Lofstrand, M. Petzold, J. Tobias, R. Walker, G. Wiklund and A.-M. Svennerholm (*University of Gothenburg, Gothenburg, Sweden*)

12.00-12.20

### 'Evaluation of a lyophilized formulation of enterotoxigenic *Escherichia coli* (ETEC) ACE527 vaccine administered alone or with a double-mutant *E. coli* heat-labile toxin (dMLT) in healthy adult subjects'

Clayton Harro, David Sack, Subhra Chakraborty, Barbara DeNearing, A. Louis Bourgeois, Michael Darsley, Alicia Marcum, Denise Adams, Len Dally, Nicole Bauers, Alan Fix and Richard Walker (*The Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA*)

12.20-12.40

### 'Preclinical investigation of novel antigens for ETEC vaccines'

James Fleckenstein, Qingwei Luo, Pardeep Kumar, Alaullah Sheikh, Timothy Vickers and Firdausi Qadri (*Washington University School of Medicine, St. Louis, Missouri, USA*)

12.40-13.00

### 'Prevalence of toxin types and CFs of ETEC strains in Bangladesh for vaccine development'

Firdausi Qadri (*ICDDR, Dhaka, Bangladesh*)

### 'Phase I clinical evaluation of adhesin-based ETEC vaccines'

Ramiro Gutierrez, M. Riddle, C. Porter, M. Maciel, S. Poole, R. Laird, M. Lane, G. Turiansky, A. Jarell, A. Castellano and S. Svarino (*Naval Medical Research Center, Silver Spring, Maryland, USA*)

13.00-14.00

Lunch Break & Posters

## SESSION 3: TYPHOID VACCINES

Moderators: Chris Nelson (*Sabin Vaccine Institute, Washington DC, USA*)  
Mike Levine (*University of Maryland, Baltimore, Maryland, USA*)

14.00-14.20

### 'Epidemiology and genomics of typhoid fever – Mapping of the distribution of drug resistance in *S. typhi* and *S. paratyphi*'

Gordon Dougan (*Wellcome Trust Sangar Institute, Cambridge, UK*)

14.20-14.40

### 'Phase 1 and 2 trial of live, oral *Salmonella enterica* Serovar Paratyphi A vaccine harbouring mutations in *guaBA* and *cipX*'

Karen L. Kotloff, Marcelo B. Szein, Debbie-Ann T. Shirley, Marcela F. Pasetti, Sofie Livio, Christopher Vindurampulle, James Galen, and Myron M. Levine (*University of Maryland, Baltimore, Maryland, USA*)

14.40-15.00

### 'Cross protection mediated by live attenuated non-typhoidal *Salmonella* vaccine strains'

Sharon M. Tennant, Jin-Yuan Wang, Patrick Schmidlein, Deanna Toema, Girish Ramachandran, Mary A. Boyd, Raphael Simon, James E. Galen, Marcela Pasetti and Myron M. Levine (*University of Maryland, Baltimore, Maryland, USA*)

15.00-15.20

### 'Bharat Biotech's Typbar-TCV™ (Vi-TT): New generation typhoid conjugate vaccine for the ones who need it most'

B.N. Patnaik, V. Krishna Mohan, R. Venkatesan, K. Gopinathan and Anit Singh (*Bharat Biotech International, Hyderabad, India*)

15.20-15.35

### 'Estimation of typhoid cost of illness in developing countries'

Vittal Mogasale, B. Maskery, Y.E. Kim, R.L. Ochiai and T.F. Wierzbza (*International Vaccine Institute, Seoul, Republic of Korea*)

15.35-15.50

### 'The typhoid fever surveillance program in Africa programme (TSAP)'

Florian Marks, L.M. Cruz Espinoza, V. Kalkcreuth, U. Panzer, S.E. Park, M. Ali, G.D. Pak, J. Im, F. Konings, J. May, H. Schutt-Gerowit and T.F. Wierzbza (*International Vaccine Institute, Seoul, Republic of Korea*)

15.50-16.05

### 'Predicting the potential impact of typhoid vaccination in South Asia'

Virginia Pitzer (*Yale School of Public Health, New Haven, Connecticut, USA*)

16.05-16.20

### 'Development of a typhoid fever protein capsular matrix vaccine (PCMV) candidate'

Kevin Killeen (*Matrivax Inc., Boston Massachusetts, USA*)

16.20-16.40

Tea Break & Posters

## SESSION 4: FRONTIERS IN ENTERIC VACCINE DEVELOPMENT

Moderator: Fred Cassels (*NIAID/NIH, Bethesda, Maryland, USA*)

16.40-17.00

### 'Oral formulations for vaccines against enteric diseases'

Dexiang Chen and Manjari Lal (*PATH, Seattle, Washington, USA*)

17.00-17.20

### 'Targeting aminopeptidase N, an intestinal receptor of F4+ ETEC in the pig'

Eric Cox, Ph. Bellot, V. Melkebeek, B. Devriendt and B.M. Goddeeris (*University of Gent, Gent, Belgium*)

17.20-17.40

### 'New integrated multidisciplinary systems oriented approach to improved *Salmonella* vaccines'

Pietro Mastroeni (*University of Cambridge, Cambridge, UK*)

17.40-18.00

### 'Towards a protein-based vaccine against ETEC and *Shigella*'

G. Renauld-Mongenie, P. Chauv, B. Guy, M. Gregory, M. Maciel Jr., P. Erlich, R. Kaminski, P. Dinadayala, M. Garinot, D. Poncet, Y. Liu, S. Poole, M. Riddle, A. Phalipon, F.X. Weill, T. Pierson, E. Oaks, P. Sansonetti and S. Savarino (*Sanofi Pasteur, Marcy l'Etoile, France*)

18.00-18.20

### 'Development of a novel oral typhoid-ETEC vaccine'

Rocky Cranenburgh (*Prokarium Ltd, Keele, UK*)

18.20-18.40

### 'Temperature-stabilized, acid resistant Ty21a-vectored oral enteric fever-shigellosis vaccine: Advances in development'

Dennis J. Kopecko (*Protein Potential LLC, Rockville, Maryland, USA*)

18.40-19.00

### 'Non-typhoidal *Salmonella* (NTS) core O-polysaccharide (COPS) conjugated to the homologous flagellin as candidate vaccines for protection against invasive NTS infections'

Raphael Simon, Sharon M. Tennant, Jin Y. Wang, Robert K. Ernst, Marcella Pasetti, Andrew Lees, James E. Galen and Myron M. Levine (*University of Maryland, Baltimore, Maryland, USA*)

19.00

VED 2013 Poster Session

**SESSION 5:  
MUCOSAL IMMUNOLOGY**

Moderators: Jan Holmgren (*University of Gothenburg, Gothenburg, Sweden*)  
Shahida Baqar (*NIAID/NIH, Bethesda, Maryland, USA*)

08.30-08.50

**'Evaluation of immune response to an oral typhoid vaccine, Ty21a in children 2-5 years of age in Bangladesh'**

Taufiqur Rahman Bhuiyan, Feroza Kaneez Choudhury, Farhana Khanam, Amit Saha, Md. Saruar Bhuiyan, Md. Abu Sayeed, Umme Salma, Anna Lundgren, David A. Sack, Ann-Mari Svennerholm and Firdausi Qadri (*ICDDR, Dhaka, Bangladesh*)

08.50-09.10

**'A novel, inexpensive oral killed single strain cholera vaccine providing intestinal IgA immunity against Inaba and Ogawa serotypes and cholera toxin'**

Michael Lebens, Jan Holmgren and Stefan Karlsson (*University of Gothenburg, Gothenburg, Sweden*)

09.10-09.30

**'Memory B cell responses to colonization factor antigens and LT toxin following experimental ETEC infection and immunization with the ACE527 vaccine'**

Subhra Chakraborty, Mohamed Mohasin, Jessica Brubaker, Clayton Harro, Barbara DeNearing, Michael Darsley, Nicole Bauers, August Bourgeois, Richard Walker and David Sack (*The Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA*)

09.30-09.50

**'Live oral typhoid vaccines, Ty21a and CVD909, induce opsonophagocytic functional antibodies in humans which cross react with *S. paratyphi A* and *S. paratyphi B*'**

Rezwani Wahid, Shah J. Zafar, Monica A. McArthur, Marcela F. Pasetti, Myron M. Levine and Marcelo B. Sztein (*University of Maryland, Baltimore, Maryland, USA*)

09.50-10.10

**'Complex cell mediated immunity elicited by *Salmonella typhi* in humans'**

Marcelo Sztein, Andrew J. Pollard, Myron M. Levine, Stephanie Fresnay, Monica A. McArthur, Rezwani Wahid, Franklin R. Toapanta, Claire Jones, Thomas C. Darton, Claire S. Waddington, Christoph J. Blohmke, Liqing Zhou and Rosangela Salerno-Goncalves (*University of Maryland, Baltimore, Maryland, USA*)

10.10-10.30

**'Cross-talks between *Shigella* and B and T lymphocytes'**

Armelle Phalipon (*Pasteur Institute, Paris, France*)

10.30-11.00

Coffee Break & Posters

**SESSION 6:  
SHIGELLA VACCINES**

Moderators: Armelle Phalipon (*Pasteur Institute, Paris, France*)  
Lillian Van Der Verg (*PATH, Washington, USA*)

11.00-11.20

**'Protective capacity of an IpaB/IpaD fusion protein against *Shigella*'**

Francisco J. Martinez-Becerra, Xiaotong Chen, Shyamal P. Choudhari, Kelly Harrison, John D. Clements, Lillian L. Van De Verg, Richard I. Walker, William D. Picking and Wendy Picking (*Oklahoma State University, Stillwater, Oklahoma, USA*)

11.20-11.40

**'A *Shigella sonnei* vaccine based on generalized modules for membrane antigens: Towards proof-of-concept for a novel vaccine platform'**

Christiane Gerke, Silvia Sanzone, Anna Maria Colucci, Carlo Giannelli, Luigi Sollai, Omar Rossi, Oscar Vassallo, Enrica Cannizzaro, Graziella Di Salvo, Alessandra Anemona, Kristin Bloink, Allan Saul and Vito Di Cioccio (*Novartis Vaccines Institute for Global Health NVGH, Siena, Italy*)

11.40-12.00

**'Development of a non-human primate (*Aotus nancymae*) challenge model for *Shigella* immunogenicity and efficacy studies'**

Robert W. Kaminski, Michael Gregory, Luis A. Lugo-Roman, Hugo Galvez Carrillo, Drake Hamilton Tilley, Christian Baldeviano, Nathanael D. Reynolds, Ryan T. Ranallo, Akamol E. Suvarnapunya, Malabi M. Venkatesan and Edwin V. Oaks (*WRAIR, Silver Spring, Maryland, USA*)

12.00-12.20

**'A phase I study to evaluate the safety, tolerability and immunogenicity of an oral, inactivated whole cell *Shigella flexneri* 2a vaccine in adult subjects'**

Clayton Harro, Subhra Chakraborty, David Sack, Lillian Van De Verg, Barbara DeNearing, Nicole Bauers, A. Louis Bourgeois, Jorge Flores and Richard Walker (*The Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA*)

12.20-12.40

**'Intradermal vaccination with *Shigella* IpaB and IpaD type III secretion proteins adjuvanted with an *E. coli* enterotoxin mutant elicit robust protective immunity across serotypes'**

Marcela F. Pasetti, Shannon J. Heine, Jovita Diaz-Mcnair, Abhay Andar, Cynthia Beskow Drachenberg, Lillian Van De Verg, Richard Walker and Wendy L. Picking (*University of Maryland, Baltimore, Maryland, USA*)

12.40-13.00

**'Phase 1 and 2 trials of CVD 1208S, a live, oral  $\Delta$ guaB,  $\Delta$ sen,  $\Delta$ set *Shigella flexneri* 2a vaccine'**

Karen L. Kotloff, Marcela Pasetti, Debbie-Ann Shirley, Marcelo B. Sztein, Sofie Livio, Eileen Barry and Myron M. Levine (*University of Maryland, Baltimore, Maryland, USA*)

13.00-13.45

Lunch Break & Posters

**SESSION 7:  
NEGLECTED ENTERIC PATHOGENS**

Moderators: Lou Bourgeois (*PATH, Washington DC, USA*)  
Ladaporn Bodhidatta (*AFRIMS, Bangkok, Thailand*)

13.45-14.00

**'Making the case for a *Campylobacter* vaccine'**

David Tribble, Mark Riddle, Frederic Poly, Alexander C. Maue, Nelum Dorabawilla, Brian Pike, Mario A. Montiero and Patricia Guerry (*Naval Medical Research Center, Silver Spring, Maryland, USA*)

14.00-14.15

**'Campylobacteriosis: Comparison of clinical and immunological outcomes between natural and experimental infection'**

David Tribble, Beth Kirkpatrick, Shahida Baqar, Mark Riddle and Chad Porter (*Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA*)

14.15-14.30

**'The Development of Protective Immunity to *Campylobacter jejuni* infections in children vs. adults: Addressing the gaps in our knowledge'**

Shahida Baqar, Beth Kirkpatrick, David Tribble, Mark Riddle and Chad Porter (*NIAID/NIH, Bethesda, Maryland, USA*)

14.30-14.45

**'Campylobacter capsule type distribution and disease association within rural setting in Iquitos, Peru'**

Frederic Poly, Brian L. Pike, Gwenyth Lee, Jesus Rojas, Pablo Penataro Yori, Rosa Burga, Chad K. Porter, Margaret Kosek and Patricia Guerry (*Naval Medical Research Center, Silver Spring, Maryland, USA*)

14.45-15.00

**'An association between *Helicobacter pylori* infection, serum pepsinogen I and II levels and vibriocidal antibody seroconversion following oral immunization of children with live oral cholera vaccine CVD 103-HgR'**

Khitam Muhsen, Rosanna Lagos, Mardi K. Reymann, David Y. Graham, Marcela F. Pasetti and Myron Levine (*University of Maryland, Baltimore, Maryland, USA*)

15.00-15.15

**'Cryptosporidium: What we know and what we need to know'**

Ibrahim Khalil (*Bill and Melinda Gates Foundation, Seattle, Washington, USA*)

15.15-15.35

Tea Break & Posters

**SESSION 8:  
CHOLERA VACCINES**

Moderators: David Sack (*Johns Hopkins University, Baltimore, Maryland, USA*)  
John Clemens (*ICDDR, Dhaka, Bangladesh*)

15.35-15.50

**'Impact of baseline micronutrient status on immune responses to V. cholera O1 LP5 in Bangladesh'**

Firdausi Qadri (*ICDDR, Dhaka, Bangladesh*)

15.50-16.05

**'A randomized controlled trial to evaluate immunogenicity of two doses of the modified killed whole cell oral cholera vaccine under two alternative vaccination schedules'**

Suman Kanungo, Sachin N. Desai, Byomkesh Manna, Mihir K. Bhattacharya, Ranjan Nandy, Deok Ryun Kim, Thomas F. Wierzbza, Mohammad Ali, John D. Clements and Dipika Sur (*National Institute of Cholera and Enteric Diseases, Kolkata, India*)

16.05-16.20

**'An open labelled controlled trial to evaluate the immune response of a boosting regimen with Shanchol™, a killed whole cell oral cholera vaccine (WC-OCV), in previously immunized children and adults in Eastern Kolkata, India'**

Sachin N. Desai, Dipka Sur, Byomkesh Manna, Ranjan Nandy, Jayanta Saha, Denk Ryun Kim, Thomas F. Wierzbza and Suman Kanungo (*International Vaccine Institute, Seoul, Republic of Korea*)

16.20-16.35

**'Africhol Informing cholera prevention and control: population-based cholera surveillance in Africa'**

Martin Mengel and B.D. Gessner (*Agence de Medecine Preventive, Paris, France*)

**SESSION 8A: SYMPOSIUM ON IMPLEMENTING  
ORAL CHOLERA VACCINES**

Moderators: David Sack (*Johns Hopkins University, Baltimore, Maryland, USA*)  
Robert Hall (*NIH/NIAID, Bethesda, Maryland, USA*)

16.35-18.50 Session Duration

**'Introduction'**

David Sack (*Johns Hopkins University, Baltimore, Maryland, USA*)

**'Shanchol trial in Kolkata'**

Dipika Sur (*NICED, Kolkata, India*)

**'Shanchol project in Dhaka'**

Firdausi Qadri (*ICDDR, Dhaka, Bangladesh*)

**'Use of OCV in Orissa'**

Sah Binod (*International Vaccine Institute, Seoul, Republic of Korea*)

**'OCV project in Thailand'**

Kashmira Date and Chris Phares (*CDC, Atlanta, Georgia, USA*)

**Facilitators**

Lorenz von Seidlein, Ann Lena Lopez, Mohammad Ali, Martin Mengel and Tom Weirzbza

**'National OCV program in Vietnam'**

Dang Duc Anh (*NIHE, Hanoi, Vietnam*)

**'Guinea and South Sudan'**

Francisco Luquero (*Epicentre/MSF, Paris France*)

**'OCV in Haiti'**

Louise Ivers (*Partners in Health, Boston, Massachusetts, USA*)

**'Update on the OCV stockpile'**

Stephen Martin (*WHO, Geneva, Switzerland*)

**SESSION 9:  
ROTAVIRUS VACCINES**

Moderators: Umesh Parashar (*CDC, Atlanta, Georgia, USA*)  
Debbie Atherly (*PATH, Seattle, Washington, USA*)

08.30-08.50

**'RV3 human neonatal rotavirus vaccine: Targeting protection from rotavirus disease from birth'**  
C. Kirkwood, Julie E. Bines, J. Buttery, E. Watts, J. At Thobari, C. Dewi Satria, Y. Soenarto, A. Adriansjah, N. Sjafrif Bachtiar, P. Jackson, A. Mulock, B. Taylor, K. Lee, J. Standish, M. Danchin, A. Handley, D. Cowley, F. Justice, F. Orsini, G. Barnes and R. Bishop (*University of Melbourne, Parkville, Victoria, Australia*)

08.50-09.05

**'Impact of different dosing schedules on the immunogenicity of human rotavirus vaccine in children in Pakistan – a randomized controlled trial'**

S. Asad Ali, Momin Kazi, Margaret Cortese, Jessica Fleming, Umesh Parashar, Baoming Jiang, Monica McNeal, Duncan Steele, Zulfiqar Bhutta and Anita Zaidi (*Aga Khan University, Karachi, Pakistan*)

09.05-09.20

**'Effect of supplementation with zinc and probiotics on immune responses to oral vaccines in Indian infants'**

Jacob John, Rajiv Sarkar, Jacqueline Tate, Jessica Flemming, Prabhakar Moses, Jayaprakash Muliyl and Gagandeep Kang (*Christian Medical College, Bagayam, Tamil Nadu, India*)

09.20-09.35

**'Delayed vaccination not withholding breast feeding is associated with increased immunogenicity to rotavirus vaccine among Bangladeshi children'**

K. Zaman, Stephen P. Luby, Md. Yunus, Mustafizur Rahman and Tasnim Azim (*ICDDR, Dhaka, Bangladesh*)

09.35-09.50

**'Immunogenicity of the human rotavirus vaccine given on alternative dosing schedules in rural Ghana'**

George Armah, Kristen Lewis, Margaret Cortese, Umesh Parashar Akosua Ansah, Lauren Gazley and John C. Victor (*University of Ghana, Legon, Ghana*)

09.50-10.10

**'The rotavirus NSP1 protein inhibits IFN-mediated STAT1 tyrosine 701 activation in both infected and bystander intestinal epithelial cells during infection'**

Harry B. Greenberg, Adrish Sen, Lusijah Rott, Nguyen Phan and Gourab Mukherjee (*Stanford University, Stanford, California, USA*)

10.10-10.30

**'Safety and immunogenicity of a parenterally administered rotavirus VP8 subunit vaccine in healthy adults'**

Alan Fix, Clayton Harro, Monica McNeal, Nicole Meyer, Barbara DeNearing, Alicia Cage, Denise Adams, Jorge Flores, John Boslego and Stanley Cryz (*PATH, Washington DC, USA*)

10.30-10.45

**'Incidence of rotavirus gastroenteritis by age in African and European infants and the impact of a human rotavirus vaccine'**

B. Benninghoff, A.D. Steele, S.A. Madhi, N.A. Cunliffe, T. Vesikari, N. Karkada, S. Debrus and H.H. Han (*GlaxoSmithKline Vaccines, Philadelphia, Pennsylvania, USA*)

10.45-11.15

Coffee Break & Posters

**SESSION 10:  
ENTERIC VACCINES IN PUBLIC HEALTH**

Moderators: Duncan Steele (*Bill & Melinda Gates Foundation, Seattle, Washington, USA*)  
Anita Zaidi (*Aga Khan University, Karachi, Pakistan*)

11.15-11.30

**'Incidence and risk factors of intussusceptions among Israeli children before the introduction of universal rotavirus vaccine immunization in Israel'**

Khitam Muhsen, Elias Kassem, Sigalit Efraim, Dani Cohen and Moshe Ephros (*University of Maryland, Baltimore, Maryland, USA*)

11.30-11.45

**'Rotavirus disease in Australian Children: What has happened since vaccine introduction?'**

Carl D. Kirkwood (*Royal Children's Hospital, Parkville, Victoria, Australia*)

11.45-12.00

**'Potential health impact and market demand for Shigella and ETEC vaccines'**

Sonia Pelkowski, A. Louis Bourgeois, Lillian Van De Verg, Cynthia Roberts, Mark Riddle, Thomas L. Hale, Ingrid K. Friberg, Yvonne Tam and Deborah Atherly (*PATH, Seattle, Washington, USA*)

12.00-12.15

**'Distributional impact of rotavirus vaccination in India'**

Rick Rheingans (*University of Florida, Gainesville, Florida, USA*)

12.15-12.30

**'With the arrival of cholera vaccine come questions of integration, evaluation and a research agenda'**

Robert H. Hall (*NIAID, NIH, Bethesda, Maryland, USA*)

12.30-12.45

**'Effectiveness of monovalent rotavirus vaccine in Bolivia: A case-control study'**

Volga Iniguez, Manish Patel, Maritza Patzi, Desiree Pastor, Aleida Nina, Yelin Roca, Leovigildo Alvarez, Rosario Rivera, Ka Ian Tam, Osbourne Quaye, Michael Bowen, Umesh Parashar and Lucia Helena De Oliveira (*Universidad Mayor de San Andres, La Paz, Bolivia*)

12.45-13.00

**'The impact of universal rotavirus immunization program on the incidence of hospitalizations for rotavirus gastroenteritis among children less than five years of age in Israel'**

Dani Cohen, Khitam Muhsen, Lester Shulman, Elias Kassem, Uri Rubinstein, Jacob Shachter, Adi Kremer, Sophy Goren, Ilana Zilberstein, Gabby Chodick and Moshe Ephros (*Tel Aviv University, Tel Aviv, Israel*)

13.00-14.00

Lunch Break & Posters

**SESSION 11:  
NOROVIRUSES**

Moderators: Timo Vesikari (*University of Tampere, Tampere, Finland*)  
Ben Lopman (*CDC, Atlanta, Georgia, USA*)

14.00-14.20

**'Development and preclinical testing of a non-live rotavirus VP6-norovirus VLPs vaccine for prevention of acute viral gastroenteritis in children'**

Timo Vesikari, Kirsi Tamminen, Suvi Lappalainen, Leena Huhti, Maria Malm and Vesna Blazevic (*University of Tampere, Tampere, Finland*)

14.20-14.35

**'Development of a norovirus bivalent VLP vaccine'**

Joel R. Haynes (*Takeda Vaccines (Montana) Inc., Bozeman, Montana, USA*)

14.35-14.50

**'Norovirus disease burden in the United States: Review of recent progress and improved estimates'**

Aron J. Hall, Ben A. Lopman, Daniel C. Payne, Manish M. Patel, Paul A. Gastanaduy, Jan Vinje and Umesh D. Parashar (*CDC, Atlanta, Georgia, USA*)

14.50-15.05

**'Modelling norovirus transmission to improve understanding of disease, asymptomatic infection and immunity'**

Ben Lopman, Kirsten Simmons, Manoj Gambhir, Juan Leon, Jan Vinje and Umesh Parashar (*CDC, Atlanta, Georgia, USA*)

15.05-15.20

**'The global prevalence of norovirus among cases of gastroenteritis'**

Ben A. Lopman, Sharia M. Ahmed, Anne Robinson, Linda Verhoef, Marion Koopmans and Aron J. Hall (*CDC, Atlanta, Georgia, USA*)

15.20-15.35

**'Biomarkers of post-infectious chronic GI disorders following norovirus'**

Chad K. Porter, Brian Pike, Robert Gormley, Alexander Maue, Ashley Alcalá, Shan Putnam, Ramona McCaffrey, Robert Bergatze and Mark Riddle (*Naval Medical Research Center, Silver Spring, Maryland, USA*)

15.35-15.55

Tea Break & Posters Breakdown

**SESSION 12:  
LATE BREAKER SESSION**

Moderators: Thomas Brewer (*Bill & Melinda Gates Foundation, Seattle, Washington, USA*)  
Ladaporn Bodhidatta (*AFRIMS, Bangkok, Thailand*)

15.55-16.10

**'Influence of enteric infections on response to oral poliovirus vaccine: A systemic review and meta-analysis'**

Edward P.K. Parker and Nicholas C. Grassly (*Imperial College, London, UK*)

16.10-16.25

**'Rational design of a vaccine against the heat-stable toxin of enterotoxigenic Escherichia coli'**

Pal Puntervoll, John D. Clements, Yuleima Diaz, James P. Nataro, Arne M. Taxt, Weiping Zhang, Rein Aasland and Halvor Sommerfelt (*University of Bergen, Bergen, Norway*)

16.25-16.35

**'A genetic fusion antigen elicits antibodies inhibiting adherence of E. coli expressing CFA/II, CFA/III and CFA/IV and neutralizing both LT and STa enterotoxin'**

Weiping Zhang, Xiaosai Ruan and David A. Sack (*South Dakota State University, Brookings, South Dakota, USA*)

16.35-16.45

**'Heat-stable (STa) toxoids of enterotoxigenic Escherichia coli for toxoid fusions with double mutant heat-labile toxin (dmLT) elicit neutralizing anti-STa antibodies'**

Weiping Zhang, Xiaosai Ruan, John D. Clements, Donald C. Robertson, James P. Nataro, Pål Puntervoll, Halvor Sommerfelt, Eileen M Barry and David H. Francis (*South Dakota State University, Brookings, South Dakota, USA*)

16.45-17.00

**'Next generation oral cholera vaccines: Landscape analysis of live attenuated vaccine candidates'**

Ajit Pal Singh, Anuj Battachan, Vijayalaxmi Magasale and Thomas F. Wierzbza (*International Vaccine Institute, Seoul, South Korea*)

17.00-17.15

**'Safety and immunogenicity assessment of an oral cholera vaccine through Phase I clinical trial in Korea'**

Y.O. Baik, J.W. Kim, S.K. Choi, J.S. Yang and J.H. Hong (*EuBiologics Co Ltd., Gangwon-do, Republic of Korea*)

17.15-17.30

**'Tunable resistive pulse sensing: Particle-based approach to enteric vaccines formulation'**

Dimitri Aubert (*IZON Ltd, Oxford, UK*)

**CLOSING VED 2013 PLenary PRESENTATIONS**

17.30-17.50

**'Performance of oral vaccines in the developing world with special reference to malnutrition and mucosal (gut) immunity'**

Cecil Czerkinsky (*University of Gothenburg, Gothenburg, Sweden*)

17.50-18.10

**'New generation approaches to enteric vaccines and the application of new technologies like T6SS and CRISPRs to develop the next generation of vaccines and 'probiotic' therapeutics derived from pathogenic organisms'**

John Mekalanos (*Harvard University, Cambridge, Massachusetts, USA*)

18.10

Conference Closing Remarks

Tom Brewer (*Gates Foundation, Seattle, Washington, USA*)

VED 2013 Closing Reception – Sponsored by the Bill & Melinda Gates Foundation

## Poster 101

**'Clinical profile of children with norovirus disease in rotavirus vaccine era'**  
Aron J. Hall et al. (CDC, Atlanta, Georgia, USA)

## Poster 102

**'Comparison between protective efficacy of whole cell killed oral cholera vaccine and vibriocidal response: Evidence from a study in Kolkata, India'**  
Byomkesh Manna et al. (National Institute of Cholera & Enteric Diseases, Kolkata, India)

## Poster 103

**'Oral immunization with *Lactococcus lactis* expressing EspB induces clearance of *Escherchia coli* O157:H7 in a murine model of colonization'**  
Daisy Vanrompay et al. (University of Ghent, Ghent, Belgium)

## Poster 104

**'Structure and cellular matrix proteins binding mechanism of aggregative adherence fibriae type I from the *Escherchia coli* strain that caused an outbreak of haemolytic uremic syndrome in Germany'**  
Anton Zavialov et al. (University of Turku, Turku, Finland)

## Poster 105

**'History of cholera in a long-standing refugee camp, Thailand, 2005-2012'**  
Christina R. Phares et al. (Thailand MOPH/CDC, Bangkok, Thailand)

## Poster 106

**'Distribution of rotavirus strains after national Rotarix® vaccine introduction in Morocco: 2 Year follow-up study'**  
Mohammed Benhafid et al.  
(National Institute of Hygiene, Ministry of Health, Rabat, Morocco)

## Poster 107

**'Lowered immune responses seen in micronutrient deficient malnourished cholera cases: Analysis of responses to the toxin-co regulated pilus antigen, TepA and LPS over a long term follow up'**  
Fahima Chowdhury et al. (ICDDR, Dhaka, Bangladesh)

## Poster 108

**'Impact of baseline micronutrient status on immune responses to Vibrio cholera O1 lipopolysaccharide in Bangladeshi patients with acute cholera'**  
Ashraf Islam Khan et al. (ICDDR, Dhaka, Bangladesh)

## Poster 109

**'Prevalence of toxin types and colonization factors on enterotoxigenic *Escherchia coli* (ETEC) isolated from diarrheal patients in Bangladesh with an objective for better understanding the requirements for a broad based ETEC vaccine'**  
Yasmin Begum et al. (ICDDR, Dhaka, Bangladesh)

## Poster 110

**'Effectiveness of monovalent rotavirus vaccine in Bolivia: A case-control study'**  
Volga Iniguez et al. (Universidad Mayor de San Andreas, La Paz, Bolivia)

## Poster 111

**'A live, attenuated EHEC-based vaccine for *C. difficile*'**  
Edgar Boedeker et al. (The University of New Mexico, Albuquerque, New Mexico, USA)

## Poster 112

**'Detection of Rotateq vaccine-derived G1P[8] double reassortant virus in previously healthy children'**  
Maria Hemming and Timo Vesikari (University of Tampere, Tampere, Finland)

## Poster 113

**'Safety and immunogenicity of Peru-15 (CholeraGarde®), a live attenuated oral cholera vaccine, in HIV-seropositive adults in Thailand'**  
Y.H. Kim et al. (International Vaccine Institute, Seoul, South Korea)

## Poster 114

**'Highly efficient antigen expression for combined Shigella-ETEC vaccine development'**  
Eileen Barry et al. (University of Maryland, Baltimore, Maryland, USA)

## Poster 115

**'Impact of vitamin A and vitamin D status on memory T cell responses in Bangladeshi children receiving two doses of a killed oral cholera vaccine'**  
Daniel T. Leung et al.  
(ICDDR/IMGH/Harvard Medical School, Boston, Massachusetts, USA)

## Poster 116

**'Distribution of *C. jejuni* capsular antigens, a target for Campylobacter vaccine development, in South and Southeast Asia'**  
Ladaporn Bodhidatta et al. (AFRIMS, Bangkok, Thailand)

## Poster 117

**'The initiative against diarrheal and enteric diseases in Africa and Asia: A contribution of field factors to the fight against cholera'**  
Anna Lena Lopez and Firdausi Qadri (University of the Philippines, Manila, Philippines)

## Poster 118

**'Development and use of vaccine site grading scale for local vaccine site reactions after cutaneous and intradermal vaccination with adhesion based ETEC vaccine candidates'**  
Ramiro L. Gutierrez et al.  
(Naval Medical Research Center, Silver Spring, Maryland, USA)

## Poster 119

**'Prevalence and molecular epidemiology of viral gastroenteritis in adults and children at a University Malaya Medical Centre (UMMC), Kuala Lumpur, Malaysia'**  
Maria Kahar-Bador et al. (UMMC, Kuala Lumpur, Malaysia)

## Poster 120

**'Heat-stable (STa) toxoids of enterotoxigenic *Escherchia coli* for toxoid fusions with double mutant heat-labile toxin (DMLT) elicit neutralizing anti-STa antibodies'**  
Weiping Zhang et al. (South Dakota State University, Brookings, South Dakota, USA)

## Poster 121

**'Optimal buffer and volumes required to neutralize gastric acid: A study of different buffer compositions to maximize viability of an oral *Shigella* vaccine'**  
Lakshmi Chandrasekaran et al.  
(Walter Reed Army Institute of Research, Silver Spring, Maryland, USA)

## Poster 122

**'A phase II study of a live attenuated tetravalent (G1-G4) bovine-human reassortant rotavirus vaccine (BRV-TV) to evaluate the safety, tolerability and immunogenicity (dose response) of a three administration series in healthy infants in India'**  
T. Saluja et al. (Shantha Biotechnics Ltd, Hyderabad, India)

## Poster 123

**'Immunogenicity of Rotateq in 84 infants with and without breastfeeding withholding: A pilot study in Nicaragua'**  
Sylvia Becker-Dreps et al.  
(University of North Carolina, Chapel Hill, North Carolina, USA)

## Poster 124

**'Investigation of immunogenicity and safety of combined *Shigella sonnei* and *Shigella flexneri* 2a vaccine candidate on experimental animals'**  
V.A. Ledov and M.E. Shekht (ATVD Team Ltd, Moscow, Russia)

## Poster 125

**'Reductions in health care utilization in US children associated with rotavirus vaccination program'**  
Daniel C. Payne et al. (CDC, Atlanta, Georgia, USA)

## Poster 126

**'Molecular genotyping and quantification assay for rotavirus surveillance'**  
Jie Liu et al. (University of Virginia, Charlottesville, Virginia, USA)

## Poster 127

**'Evaluation of antibody in lymphocyte supernatant (ALS) as a replacement for ELISPOT analysis in an enterotoxigenic *Escherchia coli* (ETEC) phase 1 clinical trial of CfaE and CfaE-sCTA-sCTA2/LTB5+LTR192G by intradermal vaccination'**  
Renee M. Laird et al. (Naval Medical Research Center, Silver Spring, Maryland, USA)

## Poster 128

**'Evaluation of memory B cell generation following skin vaccination with enterotoxigenic *E. coli* CFA/I\* tip adhesion protein, CfaE, or adhesion-toxin chimera, CfaE-sCTA2/LTB5 admixed with the adjuvant LTR192G'**  
Renee M. Laird et al. (Naval Medical Research Center, Silver Spring, Maryland, USA)

## Poster 129

**'Comparison of the immunogenicity and adjuvanticity of LTR192G and LTR192G/L211A when co-administered intradermally with CfaEB, a prototype enterotoxigenic *E. coli* adhesion-pilin subunit vaccine'**  
Milton Maciel Jr. et al. (Naval Medical Research Center, Silver Spring, Maryland, USA)

## Poster 130

**'Comparison of the local reactogenicity of LTR192G and LTR192G/L211A when co-administered intradermally with CfaEB, a prototype enterotoxigenic *E. coli* adhesion-pilin subunit vaccine'**  
Milton Maciel Jr. et al. (Naval Medical Research Center, Silver Spring, Maryland, USA)

Poster 131

**'Synergistic contribution of A and B subunits of *Escherchia coli* heat-labile toxin (LT) to immunogenicity and protection from diarrheal secretion'**

Elizabeth B. Norton et al. (Tulane University, New Orleans, Louisiana, USA)

Poster 132

**'The first identification of Rotavirus B from children and adults with acute diarrhoea in Kathmandu, Nepal'**

O. Nakagomi et al. (Nagasaki University, Nagasaki, Japan)

Poster 133

**'Estimating the risk of intussusceptions during the first week after the first dose of the monovalent human rotavirus vaccine to Japanese infants 6-20 weeks of age'**

T. Nakogomi and O. Nakagomi (Nagasaki University, Nagasaki, Japan)

Poster 134

**'Molecular evolution of G2 rotavirus detected in Japan between 1980 and 2011'**

Yen Hai Doan et al. (Nagasaki University, Nagasaki, Japan)

Poster 135

**'Impact of withholding breast feeding around the time of vaccination on the immunogenicity of the human rotavirus vaccine in children in Pakistan'**

S. Asad Ali, Momin Kazi, Margaret Cortese, Jessica Fleming, Umesh Parashar, Baoming Jiang, Monica McNeal, Duncan Steele, Zulfiqar Bhutta and Anita Zaidi (Aga Khan University, Karachi, Pakistan)

Poster 136

**'Immunogenicity of human rotavirus vaccine (RIX4414) when co-administered with routine childhood vaccines: A phase III, randomized, double-blind trial in Chinese infants'**

Htay Htay Han et al. (GlaxoSmithKline Vaccines, Philadelphia, Pennsylvania, USA)

Poster 137

**'Preclinical testing of a trivalent combination vaccine against norovirus and rotavirus'**

Vesna Blazevic et al. (University of Tampere, Tampere, Finland)

Poster 138

**'In vivo protection from rotavirus infection by rotavirus VP6 protein'**

Suvi Lappalainen et al. (University of Tampere, Tampere, Finland)

Poster 139

**'Norovirus detection in children from acute gastroenteritis in Bhutan, Nepal and Thailand'**

Dilara Islam et al. (AMRIMS, Bangkok, Thailand)

Poster 140

**'Rotavirus genotype surveillance in children in Bhutan, Nepal and Thailand'**

Nattaya Ruamsap et al. (AMRIMS, Bangkok, Thailand)

Poster 141

**'Evaluation of immune response for Vi/CRM197 conjugated vaccine against *Salmonella enterica* serovar Typhi in mice'**

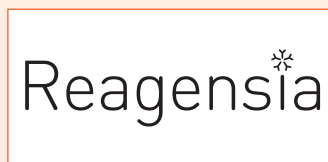
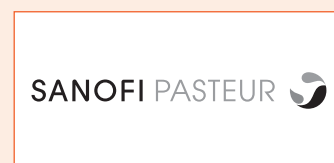
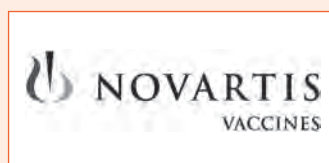
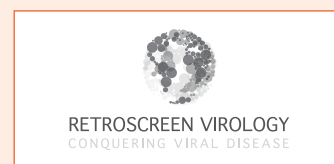
Tae-Wook Hahn et al. (Kangwon National University, Chuncheon, Korea)

Poster 142

**'Impact and clinical significance of GII.4 Sydney norovirus – United States, 2012-2013'**

Aron J. Hall et al. (CDC, Atlanta, Georgia, USA)

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