IPNC 2014
Program Book

XIXth International Pathogenic Neisseria Conference
12-17th October 2014
Asheville, North Carolina, USA
History of the International Pathogenic Neisseria Conferences

In the 1970s a series of conferences were held dealing with issues of meningococcal epidemiology and vaccination. Some of these conferences were held in Milano, St. Paul de Vence, and Marseille. The first official IPNC was held in San Francisco, California in 1978.

1st International Pathogenic Neisseria Conference
1978, San Francisco, California, USA.
Chair: G.F. Brooks

2nd International Pathogenic Neisseria Conference
Chairs: S. Normark and D. Danielsson

3rd International Pathogenic Neisseria Conference
1982, Montreal, Canada.
Chair: I.W. DeVoe

4th International Pathogenic Neisseria Conference
1984, Asilomar; California, USA.
Chair: G.K. Schoolnik

5th International Pathogenic Neisseria Conference
Chair: J.T. Poolman

6th International Pathogenic Neisseria Conference
1988, Pine Mountain, Georgia, USA.
Chair: S.A. Morse

7th International Pathogenic Neisseria Conference
1990, Berlin, Germany.
Chair: M. Achtman

8th International Pathogenic Neisseria Conference
1992, Cuernavaca, Mexico.
Chair: C.I. Conde-Glez

9th International Pathogenic Neisseria Conference
Chair: M.C.J. Maiden and I Feavers

10th International Pathogenic Neisseria Conference
1996, Baltimore, Maryland, USA.
Chair: C.E. Frasch

11th International Pathogenic Neisseria Conference
1998, Nice, France.
Chair: X. Nassif

12th International Pathogenic Neisseria Conference
2000, Galveston, Texas, USA.
Chairs: F. Sparling and P. Rice

13th International Pathogenic Neisseria Conference
2002, Oslo, Norway.
Chair: E. Wedege

14th International Pathogenic Neisseria Conference
2004, Milwaukee, Wisconsin, USA.
Co-Conveners: M.A. Apicella and H. Seifert

15th International Pathogenic Neisseria Conference
2006, Cairns, North Queensland, Australia.
Co-Conveners: J. Davies and M. Jennings

16th International Pathogenic Neisseria Conference
Co-Conveners: L. van Alphen, P. van der Lay and G. van den Dobbelsteen

17th International Pathogenic Neisseria Conference
2010, Banff, Canada.
Co-Conveners: Anthony Schryvers and Scott Gray-Owen

18th International Pathogenic Neisseria Conference
2012, Würzburg, Germany.
Co-conveners: Matthias Frosch, Ulrich Vogel and Thomas Rudel

We thank Kai Lawson for designing the 2014 IPNC Logo
Welcome to IPNC 2014 Asheville

Welcome to the XIXth International Pathogenic Neisseria Conference and to Asheville, North Carolina and the Blue Ridge Mountains. We hope you find this conference scientifically stimulating and the setting enjoyable. The goal of the 2014 IPNC is to provide a balanced forum of basic and translational research, highlight cutting edge research through plenary oral and poster presentations, and stimulate new areas of investigation through round table discussion groups. It is also our goal to create a dynamic and interactive setting that facilitates interactions between established and junior researchers and among investigators from throughout the world to ensure the future of this important field.

The pathogenic Neisseria continue to rank high on the list of medically important bacteria, and research on these organisms is imperative for their eventual control. Study of these pathogens has also led to many fascinating paradigms of pathogenesis and continues to unveil the intricacy of host/bacterial interactions and the evolution and biological processes of bacteria. The major topics of the IPNC 2014 are the molecular and cellular biology of host/pathogen interactions, structure/function relationships of surface molecules and their roles in pathogenesis, physiological and metabolic processes that facilitate pathogen adaptation to different host microenvironments and may be targeted therapeutically, the role of gene regulation and genetics in in-host survival and the emergence of new strains, and host defenses and immunological responses that can influence susceptibility, carriage, symptomology, and disease pathology. Also highlighted are the epidemiology of invasive meningococcal disease and mechanisms and spread of antibiotic resistance in N. gonorrhoeae. Both of these latter areas are related to pathogenesis research and benefit from the field of population genetics, which can help identify bacterial factors that contribute to virulence or transmission. Finally, the development of vaccines and novel anti-infectives is critical for both pathogens, and thus an important focus of the conference.

We thank the many individuals who have made this year’s conference possible, including the Scientific Board who met in Bethesda, Maryland in June, 2014 to review abstracts, select oral presentations and help develop the scientific program. We also thank the numerous individuals within the IPNC community who have agreed to serve as session moderators, round table facilitators, and poster judges. Finally, we thank the many sponsors who provided financial support.

Enjoy the conference!

Ann Jerse
Cynthia Nau Cornelissen
Joe Dillard
Co-Convenors, IPNC 2014 Asheville
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2014 IPNC Convenors

Ann E. Jerse, Ph.D.
Uniformed Services University
Bethesda, Maryland, U.S.A.

Cynthia N. Cornelissen, Ph.D.
Virginia Commonwealth University
Richmond, Virginia, U.S.A.

Joe Dillard, Ph.D.
University of Wisconsin
Madison, Wisconsin, U.S.A.

Scientific Board

Alison Criss, Ph.D.
University of Virginia,
Charlottesville, Virginia, U.S.A.

Matthias Frosch, M.D.
University of Würzburg,
Würzburg, F.R.G.

Gary Jarvis, Ph.D.
San Francisco Veteran's Affairs Hospital
San Francisco, California, U.S.A.

Vladimir Pelicic, Ph.D.
Imperial College
London, U.K.

Christoph Tang, M.D.
University of Oxford
Oxford, U.K.

Round Table Facilitators

Antibiotic Resistance
William M. Shafer, Ph.D.
Emory University
Magnus Unemo, Ph.D.
Örebro University Hospital

Non-coding RNAs
Joe Dillard, Ph.D.
University of Wisconsin
Hank Seifert, Ph.D.
Northwestern University

New Concepts in Regulatory Control of Neisseria Physiology
Cynthia N. Cornelissen, Ph.D.
Virginia Commonwealth University
Alastair McEwan, Ph.D.
Griffith University

Polymicrobial Infections/Colonization
Scott Gray-Owen, Ph.D.
University of Toronto
Ann Jerse, Ph.D.
Uniformed Services University

Gonorrhea Vaccine Workshop
Organizer: Carolyn Deal, Ph.D.
STD Branch, NIAID, NIH
Session Moderators

Joe Dillard
Kate Seib
Ellen Aho
Charlene Kahler
Martin Maiden
Christoph Schoen
Margaret Bash
Matthias Frosch
Sanjay Ram
Peter Beernink
Vladimir Pelicic
Robert Nicholas
David Trees
Michael Apicella
Thomas Hiltke
Mike Jennings
Gary Jarvis
Scott Gray-Owen
P. Frederick Sparling
Peter Rice
Dominique Caugant
Ray Borrow
Xavier Nassif
Alison Criss

Poster Judges

Guillaume Dumenil
Christopher Davies
Lisa Lewis
Yaramah Zalucki
Sunita Gulati
Myron Christodoulides
Joseph Duncan
Paola Massari
Marcia Hobbs
Ellen Aho
Susu Zughai
Yih-Ling Tseng
Ian Feavers
Aleksandra Sikora
Jay Lucidarme
Daniel Golparian

Conference Sponsors

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Pfizer
PTC Therapeutics
TherapyX, Inc.
2014 Igor Stojiljkovic Scholarship Recipients
Anne-Flore Imhaus, Ph.D.
PARCC - Paris Centre de Recherche Cardiovasculaire
Jessica Poole
Institute for Glycomics
Sozan Qarani
University of Nottingham/School of Life Science
Evgeny Semchenko, Ph.D.
Griffith University

Conference Management
Gina Carlton
Henry M. Jackson Foundation
Robyn Hulvey
Henry M. Jackson Foundation
Kimberly Boxley
Henry M. Jackson Foundation and Uniformed Services University

Finding Your Way
Plenary Sessions and Round Table Discussions
Crowne Ballroom

Poster Displays, Meals, Opening Reception, and Poster Receptions
Expo Center

Business Center Location and Hours
The hotel business center is located behind the front desk, is open 24 hours, and is complimentary to hotel guests.

Registration Location and Hours
Located in the Laurel Registration Area
Sunday, October 12, 2014  3:00 p.m. – 6:00 p.m.
Monday, October 13, 2014  7:00 a.m. – 5:00 p.m.
Tuesday, October 14, 2014  7:00 a.m. – 5:30 p.m.
Wednesday, October 15, 2014  7:00 a.m. – 12:00 p.m.
Thursday, October 16, 2014  7:30 a.m. – 5:30 p.m.
Friday, October 17, 2014  7:00 a.m. – 12:00 p.m.

Tour Desk Location and Hours
Located in the Laurel Registration Area
Sunday, October 12, 2014  3:00 p.m. – 6:00 p.m.
Monday, October 13, 2014  8:00 a.m. – 3:30 p.m.
Tuesday, October 14, 2014  8:00 a.m. – 3:45 p.m.
Wednesday, October 15, 2014  8:00 a.m. – 12:00 p.m.
Speaker Ready Room Location and Hours
Located in the Dogwood Room
Sunday, October 12, 2014  3:00 p.m. – 6:00 p.m.
Monday, October 13, 2014  7:00 a.m. – 5:00 p.m.
Tuesday, October 14, 2014  7:00 a.m. – 5:30 p.m.
Wednesday, October 15, 2014  7:00 a.m. – 12:00 p.m.
Thursday, October 16, 2014  7:30 a.m. – 5:30 p.m.
Friday, October 17, 2014  7:00 a.m. – 10:30 a.m.

Downtown Shuttle
A shuttle to downtown Asheville is available at $5.00 per person, round trip. (A taxi will cost approximately $8.00 each way.) The shuttle has 2–3 drop off and pick up areas in downtown Asheville and operates from 8:00 a.m. – 1:00 a.m.

On-site Restaurants
Pro’s Table Restaurant is open from 6:30 a.m. – 2:00 p.m. for breakfast and lunch; and 5:00 – 10:00 p.m. for dinner.

Mulligan’s Bar and Grille is open for dinner from 4:00 p.m. – 2:00 a.m.

A full food and beverage menu is available through room service from 6:30 a.m. until 10:00 p.m. daily.

Child Care Information
Please see the hotel front desk for a current list of child care providers.
Emergency Dialing
Always dial 911 first, then 0 from a house phone to call the front desk.

Emergency Information
Nearest Hospital
Mission Hospital
509 Biltmore Ave
Asheville, NC 28801
(828) 213-1111

Nearest Pharmacy
CVS
24 Westgate Pkwy
Asheville, NC 28806
(828) 253-2872
CONFERENCE AGENDA

SUNDAY, OCTOBER 12

5:00 WELCOME
Cynthia Nau Cornelissen, Ph.D., Virginia Commonwealth University

5:15 KEYNOTE ADDRESS
O1. “A mouse model for studying the genetic and immunologic mechanisms of Neisseria commensalism”
Magdalene So, Ph.D.
Director, Microbial Pathogenesis Program
Member, BIOS Institute
Professor, Department of Immunobiology
University of Arizona

6:00 – 8:00 OPENING RECEPTION

MONDAY, OCTOBER 13

7:00 BREAKFAST (Expo Center)
8:00 INTRODUCTORY REMARKS
Ann Jerse, Ph.D., Uniformed Services University

PLENARY SESSION I: PHYSIOLOGY AND METABOLISM

Moderators
Charlene Kahler, Ph.D., University of Western Australia, Kate Seib, Ph.D., Griffith University

8:20 O2 The dynamic ‘acetylome’ of Neisseria gonorrhoeae in biofilm formation
Bradford Gibson, Buck Institute for Research on Aging

8:40 O3 Localization and substrate specificity of lytic transglycosylases LtgA and LtgD contribute to high levels of peptidoglycan monomer production
Ryan Schaub, University of Wisconsin-Madison

9:00 O4 The two-component system NtrYX is a key regulator of respiratory gene expression in Neisseria gonorrhoeae
Alastair McEwan, University of Queensland

9:20 O5 A genetic screen reveals a periplasmic copper chaperone required for nitrite reductase activity in pathogenic Neisseria
Freda Jen, Griffith University

9:40 O6 Global analysis of HPr role in Neisseria meningitidis physiology and virulence and its implication during experimental infection in mice
Ana Antunes, Institut Pasteur

10:00 – 10:30 COFFEE BREAK
PLENARY SESSION II: SURFACE STRUCTURES

Moderators
Ellen Aho, Ph.D., Concordia University; Mumtaz Virji, Ph.D., University of Bristol

10:30  O7  nagZ triggers gonococcal biofilm disassembly
Dan Stein, University of Maryland

10:50  O8  The neisserial outer membrane protein SLAM is required for translocation of surface lipoproteins across the outer membrane of Neisseria
Trevor Moraes, University of Toronto

11:10  O9  Concerted spatio-temporal dynamics of imported DNA and ComE DNA uptake protein during gonococcal transformation
Christof Hepp, University of Cologne

11:30  O10  Mechanobiology of a commensal Neisseria species
Nicholas Biais, CUNY Brooklyn College

11:50  LUNCH (Expo Center)

1:45  O11  Modulation of gonococcal type IV pilus expression and function
Hank Seifert, Northwestern University

2:05  O12  Structural and functional investigations of the DUS (DNA Uptake Sequence) receptors in the Neisseriaceae family
Jamie Berry, Imperial College London

2:25  O13  The number of Neisseria meningitidis type IV pili determines host cell interaction
Anne-Flore Imhaus, Paris Centre de Recherche Cardiovasculaire

2:45-3:15  COFFEE BREAK

PLENARY SESSION III: POPULATION GENETICS

Moderators
Martin Maiden, Ph.D., University of Oxford; Christoph Schoen, Ph.D., University of Würzburg

3:15  O14  Sexual transmission of meningococci may account for an outbreak of meningococcal disease among men who have sex with men
Heike Claus, University of Würzburg

3:35  O15  Genomic analysis of the evolution and global spread of hyperinvasive meningococcal lineage 5
Odile Harrison, University of Oxford

3:55  O16  The ST-11 clonal complex: Core genome MLST reveals a complex population structure
Jay Lucidarme, Public Health England

4:15  O17  Ancestral acquisition of the capsule locus in Neisseria meningitidis occurred multiple times
Charlene Kahler, University of Western Australia

4:35  O18  Length modulation of horizontal gene transfer in in-silico evolution explains Neisseria meningitidis population structure
Duccio Medini, Novartis Vaccine Research

5:00 – 8:00  DINNER (on your own)

POSTER SESSION I

8:00-10:00  EXPO CENTER
Physiology and Metabolism, Population Genetics, Surface Structures, Meningococcal Vaccines, Antibiotic Resistance, and Novel Anti-Infectives
TUESDAY, OCTOBER 14

7:00 BREAKFAST (Expo Center)

PLENARY SESSION IV: MENINGOCOCCAL VACCINES

Moderators
Margaret Bash, M.D., Center for Biologics and Evaluation, FDA; Matthias Frosch, M.D., University of Würzburg

8:00 O19 Epidemic meningococcal meningitis in Africa: Success using a Group A conjugate vaccine and a development update on a new pentavalent vaccine (A/C/Y/W/X)
F. Marc LaForce, Serum Institute of India

8:30 O20 Safety and immunogenicity of a meningococcal serogroup B outer membrane vesicle vaccine with constitutive expression of the iron receptor FetA: a phase I, open-label, dose escalation clinical trial in healthy adult volunteers
Christina Dold, University of Oxford

8:50 O21 Exploring the capsule biosynthesis machinery of Neisseria meningitidis A with regard to its suitability for in vitro vaccine production
Francesco Berti, Novartis Vaccines

9:10 O22 Use of a Novel Serogroup B Meningococcal Vaccine in Response to Two University Outbreaks in the US
Manisha Patel, US Centers for Disease Control and Prevention

9:30 – 10:00 COFFEE BREAK

PLENARY SESSION V: FACTOR H/FACTOR H-BINDING PROTEIN

Moderators
Sanjay Ram, M.D., University of Massachusetts; Peter Beernink, Ph.D., Children's Hospital Oakland Research Institute

10:00 O23 Factor H binding protein as a meningococcal vaccine candidate: Are we there yet?
Sanjay Ram, University of Massachusetts Medical School

10:20 O24 Identification of several bactericidal epitopes on factor H binding protein, a meningococcal vaccine component using deuterium-hydrogen exchange mass spectroscopy
Gary Zlotnick, Pfizer Vaccines Research

10:35 O25 Human complement FH impairs protective serum anti-FHbp antibody by skewing antibody repertoire and enhancing FH binding
Isabella Costa, Children's Hospital Oakland Research Institute

10:50 O26 Impact of reducing complement inhibitor binding on the immunogenicity of an outer membrane vesicle-based vaccine against serogroup B Neisseria meningitidis
Christine Rollier, University of Oxford

11:05 O27 Resistance of meningococci to anti-FHbp bactericidal activity can be mediated by functional binding of complement FH to PorB3 and overcome by non-bactericidal anti-NspA antibody
Dan Granoff, Children's Hospital Oakland Research Institute

11:20 O28 Molecular epidemiology and global expression profiling of Neisseria meningitidis factor H binding protein (fHbp) by quantitative mass spectrometry
Vega Masignani, Novartis Vaccines

11:35 O29 Native outer membrane vesicle vaccine with over-expressed factor H binding protein confers protection against meningococcal colonization in human CEACAM1 transgenic mice
Rolando Pajon, Children's Hospital Oakland Research Institute
PLENARY SESSION VI: ANTIBIOTIC RESISTANCE

Moderators
Robert Nicholas, Ph.D., University of North Carolina; David Trees, Ph.D., US Center for Disease Prevention and Control

1:45 O30 Antimicrobial resistance in Neisseria gonorrhoeae – crucial public health actions and research to retain gonorrhea treatable
Magnus Unemo, Örebro University Hospital

2:15 O31 Whole genome sequencing of Neisseria gonorrhoeae isolates with reduced cephalosporin susceptibility collected in Canada from 1989 to 2012
Amrita Bharat, Public Health Agency of Canada

2:35 O32 Structural analysis of penicillin-binding protein 2 from the cephalosporin-resistant N. gonorrhoeae strain H041 – molecular mechanism underlying treatment failures in the clinic
Christopher Davies, Medical University of South Carolina

2:55 O33 In vivo-selected compensatory mutations increase fitness of ceftriaxone-resistant Neisseria gonorrhoeae
Leah Vincent, Uniformed Services University

3:15-3:45 COFFEE BREAK

PLENARY SESSION VII: NOVEL ANTI-INFECTIVES

Moderators
Michael Apicella, M.D., University of Iowa; Thomas Hiltke, Ph.D., National Institutes of Health

3:45 O34 LpxC inhibitors as a novel class of antibiotics against Neisseria gonorrhoeae
Pei Zhou, Duke University Medical Center

4:05 O35 Utilizing sialic acid analogues to define the molecular basis of complement resistance mediated by sialylation of Neisseria gonorrhoeae lipooligosaccharide and to design novel therapeutics
Sanjay Ram, University of Massachusetts Medical School

4:25 O36 Characterization of a novel outer membrane protein, NGO1985, as a potential target for the development of pharmacological interventions against gonorrhea
Igor Wierzbicki, Oregon State University

4:45 O37 Novel factor H-Fc chimeric immunotherapeutic molecules against pathogenic Neisseria
Jutamas Shaughnessy, University of Massachusetts Medical School

5:05 O38 Development of novel 2-pyridones for the treatment of Neisseria gonorrhoeae infections
Melissa Dumble, PTC Therapeutics

5:30 DINNER (on your own)

ROUND TABLE DISCUSSIONS

8:00 p.m. – 10:00 p.m.

ANTIBIOTIC RESISTANCE AND SPREAD

Facilitators
William Shafer, Ph.D., Emory University; Magnus Unemo Ph.D., Örebro University Hospital

This roundtable discussion focuses on the current problem of antibiotic resistance expressed by increasing numbers of clinical isolates of Neisseria gonorrhoeae. Following introductory remarks by P.F. Sparling M.D. on the evolution and emergence of resistance, the roundtable session will have three sub-sessions with
invited speakers who will discuss current issues regarding the epidemiology and molecular mechanisms of resistance as well as contemporary diagnostic methods to detect resistant strains and resistance-encoding genes and the development of new drugs to combat resistance. Each sub-session will be followed by a group discussion. The roundtable will conclude with a wrap-up discussion period.

Evolution and emergence of resistance  P. Frederick Sparling
Magnitude of the problem  Peter Rice, Magnus Unemo
Mechanisms, diagnostics and alternative treatments  Robert Nicholas, David Trees, Daniel Golparian, Kevin Karem
Opening the pipeline  Thomas Hiltke, Erin Duffy, Clive Mason, Chris Murphy
Summary and the Future  William M. Shafer, Magnus Unemo, P. Frederick Sparling

NONCODING RNAs
Facilitators
Joe Dillard, Ph.D., University of Wisconsin; Hank Seifert, Ph.D., Northwestern University
In this roundtable, investigators working in the area of non-coding RNAs in Neisseria will discuss the field in general, methods for identifying, validating, and investigating regulatory RNAs; and also provide perspectives on the significance and future possibilities of such research. Discussion with audience members will be highly encouraged.

Overview of non-coding RNAs in bacteria  Hank Seifert
Methods for the discovery of non-coding RNAs  Thomas Rudel
Validation and investigation of non-coding RNAs  Yvonne Pannekoek
Research perspective on the future of non-coding RNAs in Neisseria  Caroline Genco
Pharmaceutical perspective on the future of non-coding RNAs in Neisseria  Isabel Delany

WEDNESDAY, OCTOBER 15
7:00  BREAKFAST (Expo Center)

PLENARY SESSION VIII: GENE REGULATION AND GENETICS
Moderators
Mike Jennings, Ph.D., Griffith University; Vladimir Pelicic, Ph.D., Imperial University London

8:00  O39 Connection between the twin sRNA regulon and the stringent response in Neisseria meningitidis  Yvonne Pannekoek, Academic Medical Center, Amsterdam

8:20  O40 Regulation of the gonococcal type IV secretion system involves two transcriptional repressors, two proteases, and an RNA switch  Joe Dillard, University of Wisconsin

8:40  O41 The ModD1 epigenetic methyltransferase and transcriptional regulator from pathogenic Neisseria meningitidis  Aimee Tan, Griffith University

9:00  O42 Characterization of the complete gonococcal transcriptome during natural mucosal infection reveals expression of numerous gonococcal regulatory, phage, and hypothetical proteins  Caroline Genco, Boston University

9:20  O43 Comparative genome sequencing reveals within-host evolution of Neisseria meningitidis during invasive disease  Christoph Schoen, University of Würzburg
PLENARY SESSION IX: HOST DEFENSES AND IMMUNE RESPONSES (1)

Moderators
Gary Jarvis, Ph.D., San Francisco Veterans Affairs Medical Center; Scott Gray-Owen, Ph.D., University of Toronto

10:10 O44 Neisseria gonorrhoeae infection and female hormonal risk factors: menstruation and ovulation
Stephanie McLaughlin, Johns Hopkins University

10:30 O45 Neisseria gonorrhoeae-mediated immune suppression: mechanisms and consequences in coincident chlamydia infection
Joseph Duncan, University of North Carolina

10:50 O46 N. gonorrhoeae induces localization of the inhibitor of apoptosis protein cIAP2 to Exosomes
Kathleen Goodmon, Boston University

11:10 O47 An LD-Carboxypeptidase (LdcA) controls the release of NOD1 agonist peptidoglycan from Neisseria gonorrhoeae
Jonathan Lenz, University of Wisconsin

11:30 O48 Neisserial-derived heptose is a novel microbial-associated molecular pattern that elicits a TIFA-dependent innate immune response
Ryan Gaudet, University of Toronto

11:50 FREE AFTERNOON

POSTER SESSION II
7:00 – 9:30 EXPO CENTER
Host Defenses and Immune Responses, Gene Regulation and Genetics, Epidemiology, Molecular and Cellular Biology, and Gonococcal Vaccines

THURSDAY, OCTOBER 16
7:30 BREAKFAST (Expo Center)

GONORRHEA VACCINE WORKSHOP
8:30-10:00
Moderator
Carolyn Deal, Ph.D., Sexually Transmitted Diseases Branch, Division of Microbiology and Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institute of Health, U.S.A.

This workshop will focus on gaps, challenges, and potential for development of a vaccine to prevent gonorrhea. Last year the World Health Organization and the National Institute of Allergy and Infectious Diseases convened a technical consultation on development of vaccines for STIs. This meeting focused on five STIs: herpes simplex virus, Chlamydia trachomatis, Neisseria gonorrhoeae, Trichomonas vaginalis and Treponema pallidum infections. Gaps in knowledge and challenges to development were outlined in the broad areas of epidemiology, basic and translational research, clinical development, and targeted vaccine indication. Specific details vary for each vaccine, but key themes emerged as a roadmap. Carolyn Deal will
discuss the Roadmap and how STIs may fit into the overall goals of the Decade of Vaccines and the Global Vaccine Action Plan. This will be followed by three talks discussing the practical and regulatory challenges of vaccine development, what industry needs to know to advance a product towards clinical trials, and some of the data that FDA considers in the regulation of bacterial vaccines.

The way forward: A global roadmap for progress toward STI vaccine development and introduction
Carolyn Deal, Ph.D. STD Branch, DMID, NIAID, NIH
Vaccine product development - overview of the practical and regulatory challenges
Steven L Giarding, Ph.D. Senior Life Scientist, Leidos
Factors industry considers in moving a product towards clinical trials
Gary Zlotnick, Ph.D., Pfizer, Inc.
FDA regulation of bacterial vaccines
Scott Stibitz, Ph.D., Center for Biologics Evaluation and Research, US FDA

10:00-10:30    COFFEE BREAK

PLENARY SESSION X:  GONOCOCCAL VACCINES

Moderators
P. Frederick Sparling, M.D., University of North Carolina; Peter Rice, M.D., University of Massachusetts

10:30  O49    Modeling the potential impact of gonococcal vaccines
Kate Seib, Griffith University

10:50  O50    Proteomics-drive reverse vaccinology for gonorrhea
Aleksandra Sikora, Oregon State University

11:10  O51    Development of MtrE, the outer membrane channel of the MtrCDE and FarAB,MtrE active efflux pump systems as a gonorrhea vaccine
Amanda DeRocco, Uniformed Services University

11:30  O52    Neisseria gonorrhoeae methionine receptor GNA1946 confers protection from host-mediated killing
Evgeny Semchenko, Griffith University

11:50 – 1:30    LUNCH (Expo Center)

PLENARY SESSION XI:  HOST DEFENSES AND IMMUNE RESPONSES (2)

Moderators
Michael Russell, Ph.D., University of Buffalo, Wenxia Song, Ph.D., University of Maryland

1:30  O53    Inflammatory microRNAs induced by neisserial OMPs support adjuvant activity
Lee Wetzler, Boston University Medical School

1:50  O54    Global analysis of neutrophil responses to Neisseria gonorrhoeae reveals a self-propagating inflammatory program
Anna Sintsova, University of Toronto

2:10  O55    Insights into Neisseria meningitidis infection and immunity from the CEACAM-humanized mouse model
Carolyn Buckwalter, University of Toronto

2:30  O56    Recruitment of CD46 to the cortical plaque serves to confer resistance to serum killing on Neisseria gonorrhoeae
Nathan Weyand, University of Arizona

2:50  O57    Resistance to serum and antibody-mediated bacteriolysis dependent on neisserial immunoglobulin-binding protein TspB
Gregory Moe, Children’s Hospital Oakland Research Institute
3:10-3:30  COFFEE BREAK

ROUND TABLE DISCUSSIONS
3:30-5:30

NEW CONCEPTS IN REGULATORY CONTROL OF NEISSERIAL PHYSIOLOGY
Facilitators
Cynthia N. Cornelissen, Ph.D., Virginia Commonwealth University, Alastair McEwan, Ph.D., Griffith University
This round table session will focus on new regulators and regulatory pathways that influence physiology and metabolism in the pathogenic Neisseria species. Two component regulatory systems, efflux regulators, small RNAs and repeat motifs will be discussed in the context of their influence on piliation, nutrient acquisition, and general metabolism.

A two-component system regulates pilE transcription in Neisseria elongata  María A. Rendón
Regulation of Neisseria gonorrhoeae misSR two component system  John Kirby
GadhR belongs to the gonococcal MtrR regulon and is a transcriptional activator of the genes encoding GdhA glutamate dehydrogenase and GltT glutamine symporter  Corinne Rouquette-Loughlin
MtrA is a global regulator of genes in N. gonorrhoeae with roles in iron acquisition and glutamate metabolism  Yaramah Zalucki, Ph.D.
Multi-tasking by transcriptional regulators of the Mtr efflux system integrates antimicrobial resistance, pathogenesis and metabolism of Neisseria gonorrhoeae  William Shafer, Ph.D.
Quantitation of proteins regulated by the RNA chaperone protein Hfq of Neisseria meningitidis using LC-MSE  Robert Huis in’t Veld, M.D.
Identification and characterization of novel pil RNAs and promoters of Neisseria gonorrhoeae  Stuart Hill, Ph.D.
The Correia enclosed repeat element: How it is affected by temperature, pH, CO2, and non-coding RNAs in the Neisseria spp.  Sabrina Roberts, Ph.D.

POLYMICROBIAL INFECTIONS/colonization
Facilitators
Scott Gray-Owen, Ph.D., University of Toronto, Ann Jerse, Ph.D., Uniformed Services University
Polymicrobial research is a rich, but relatively untapped area of Neisseria research. However, significant advances in this field are now attainable through microbiome technology, animal and tissue culture co-infection models, and a wealth of detailed information on adaptation mechanisms used by the pathogenic Neisseria in the absence of other microbes. This round table will build a case for increased focus on polymicrobial research, discuss current knowledge in this area, and identify areas of research need.

Overview: Microbiomes of the respiratory and genital tracts  Anthony Schryvers
Overview: Co-infections with N. gonorrhoeae and other sexually transmitted microbes  Peter Rice
Gonorrhea-HIV co-infections  Scott Gray-Owen
Gonorrhea-chlamydial co-infections  Joseph Duncan
Impact of vaginal lactobacilli on Neisseria gonorrhoeae  Ann Jerse
Interactions between Neisseria elongata and Neisseria gonorrhoeae  Magdalene So
Overview: Meningococcal co-infections with respiratory pathogens  Xavier Nassif
Impact of Neisseria lactamica on Neisseria meningitidis  Andrew Gorringe, Ph.D.

CONFERENCE BANQUET - Ticket Required
7:30 p.m.  The Venue
21 North Market Street, Asheville
Transportation to the banquet will begin at 6:30 p.m. (specifics to be announced)
FRIDAY, OCTOBER 17

7:00 BREAKFAST (Expo Center)

PLENARY SESSION XII: EPIDEMIOLOGY

Moderators
Dominique Caugant, Ph.D., Norwegian Institute of Public Health, Ray Borrow, Ph.D., Public Health England

8:00 O58 Molecular epidemiology of serogroup A meningococcus in South Africa, 2003-2012
Mignon du Plessis, National Health Laboratory Service, Johannesburg

8:15 O59 Capsular switching and global spread of Neisseria meningitidis serogroup W ST-11
Mustapha Mustapha, University of Pittsburg

8:30 O60 New hypervirulent clones of Neisseria meningitidis evade herd immunity through homologous replacement of loci for cell surface protein antigens and protein glycosylation
Araceli Lamelas Cabello, Swiss Tropical and Public Health Institute

8:45 O61 Relationship between carriage of Neisseria meningitidis and meningococcal disease in Burkina Faso, 2009-2012
Lucy McNamara, US Centers for Disease Control and Prevention

9:00 O62 Association of meningococcal type with disease outcome
Johannes Elias, University of Würzburg

PLENARY SESSION XIII: MOLECULAR AND CELLULAR BIOLOGY

Moderators
Xavier Nassif, M.D., INSERM, France, Alison Criss, Ph.D., University of Virginia

9:15 O63 MDAΦ, the invasive filamentous bacteriophage of Neisseria meningitidis, increases bacterial colonization onto epithelial cells by mediating bacteria-bacteria interaction
Emmanuelle Bille, INSERM, France

9:35 O64 Neisserial phage protein contributes to neisserial pathogenesis
Wenxia Song, University of Maryland

9:55 O65 Gonococcal restriction endonucleases cause double-strand breaks and distort mitosis in epithelial cells
Helena Aro, Stockholm University

10:15 – 10:35 COFFEE BREAK

10:35 O66 Gonococcal association with human CEACAMs during infection of the female genital tract
Epshita Islam, University of Toronto

10:55 O67 Neisseria meningitidis differentially activates the acid sphingomyelinase-ceramide system to induce its uptake into brain endothelial cells
Alexandra Schubert-Unkmeir, University of Würzburg

MEETING CLOSING
11:15 Roundtable reports
12:00 Conference Farewell
12:05 Announcement of 2016 IPNC
## ANTIBIOTIC RESISTANCE

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**PHYSIOLOGY AND METABOLISM**

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**POSTER SESSION II**  
Wednesday, October 15, 7:00 – 9:30 p.m.

**EPIDEMIOLOGY**

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