International Course on Antibiotics and Resistance (ICARe)

Day by day programme

**DAY 1 (Saturday, November 11)**
14:00 **General orientation of the course**: P. Courvalin, M. Gilmore, and G. Wright

**Opening Lectures: Infectious disease management and antibiotic use**
14:30 The problem of antibiotic resistance in the developed world (G.-M. Rossolini, IT)
15:15 The problem of antibiotic resistance in the developing world (T. Walsh, UK)
16:00 Break
16:30 Evaluation of susceptibility by phenotypic techniques and clinical categorization (C. Giske, SE)
17:15 Biochemistry and genetics of resistance (P. Courvalin, FR)
18:00 Nuts and bolt of hit discovery: Overview of history and current strategies (T. Dougherty, US)
18:45 Pew's SPARK project (Joe Thomas, USA)
19:00 Mixer
19:30 Dinner

**DAY 2 (Sunday, November 12)**
**Modes of action and mechanisms of resistance of existing classes**

**Cell wall**
8:30 Cell wall structure, biosynthesis, and targets (H.-G. Sahl, DE)
9:30 β-lactams, β-lactamases, and β-lactamase inhibitors (J.-D. Docquier, IT)
10:15 Break
10:45 Glycopeptides, lipopeptides, lipoglycopeptides (G. Wright, CA)
11:30 Daptomycin (C. Arias, US)
12:00 Lunch
14:00 Inner membrane structure and function (H. G. Sahl)
14:45 Cationic peptides, polymixins, bacitracin (R. Hancock, CA)

**Ribosome**
15:30 Ribosome structure and function (A. Mankin, US)
16:30 Break
17:00 **Bioinformatics** (S. Lory, M. Gilmore, V. Cattoir, F. Lebreton, D. Rasko)
18:30 Mixer Presentation of the participants
19:30 Dinner
DAY 3 (Monday, November 13)
Modes of action and mechanisms of resistance of existing classes (continued)
  Ribosomes (end)
  8:30 Aminoglycosides: Mode of action and resistance (G. Wright)
  9:15 Tetracyclines, fusidic acid, chloramphenicol (V. Cattoir, FR)
  10:00 Break
  10:30 Macrolides-Lincosamides-Streptogramins, pleuromutilins, oxazolidinones (A. Mankin, US)
  11:30 Group picture
  12:00 Lunch
  Nucleic acid synthesis, replication, transcription
  14:00 Inhibitors of biosynthesis (E. Brown, CA)
  14:45 Quinolones (D. Hooper, US)
  15:30 Rifampicin, fidaxomicin (G. Wright)
  16:15 Break
  16:45 Bioinformatics (continued)
  18:30 Posters
  19:30 Dinner

DAY 4 (Tuesday, November 14)
Modes of action and mechanisms of resistance of existing classes (end)
  Efflux
  8:30 Structure-function of efflux systems and inhibitors (K. Pos, GE)
  9:15 Efflux in Acinetobacter (C. Grillot-Courvalin, FR)
  10:00 Break
  10:30 Efflux in Gram-positive cocci (D. Hooper)
  11:15 Outer membrane barrier (M. Trent, US)
  12:00 Lunch

Origin, mutations, and identification of antibiotic resistance mechanisms
  14:00 Origins of resistance genes (G. Wright)
  14:45 Mutations, selection, biological cost, compensation (D. Hughes, SE)
  15:30 Antibiogram interpretation (P. Courvalin)
  16:15 Break
  16:45 Bioinformatics (continued)
  18:30 Posters
  19:30 Dinner
**DAY 5 (Wednesday, November 15)**

**Antibiotic discovery**
8:30 Antibiotic chemical space: Gram-positives (S. Lahiri, US)
9:15 Antibiotic chemical space: Gram-negatives (H. Moser, US)
10:00 *Break*

**Antibiotic chemical matter : Natural products**
10:30 Overview of historical approaches, new sources (G. Challis, UK)
11:15 New strategies, synthetic biology (G. Challis)
12:00 *Lunch* and afternoon off

18:00 *Bioinformatics* (continued)
19:30 *Dinner*

**DAY 6 (Thursday, November 16)**

**Antibiotic discovery (continued)**
8:30 Antibiotic chemical matter: Synthetics (A. Myers, US)
10:00 *Break*
10:30 Target vs non-target based strategies (E. Brown, CA)
11:15 Screens and hit generation (M.-W. Tan, US)
12:00 *Lunch*

**Antibiotic development and approval**
14:00 Hit to lead (T. Dougherty)
14:45 PK/PD: key elements and optimizing leads (D. Andes, US)
15:30 Preclinical toxicity assessment, compound scale-up, GLP vs GMP, CMC needs (M. Page, CH)
16:15 Pathways to approval and commercialization (L. Chesnel, US)
17:00 *Break*
17:30 *Bioinformatics* (continued)
19:00 Posters
19:30 *Dinner*
DAY 7 (Friday, November 17)

New topics in antibiotic discovery
8:30 Systems biology to guide antibiotic discovery and MOA (E. Brown)
9:15 Antibiotic enhancers and inhibitors of resistance (G. Wright)
10:00 Break

Strategies for more focused applications of antibiotics
10:30 Narrow spectrum (K. Bush, US)
11:15 Targeting biofilm (D. Lopez, DE)
12:00 Lunch
14:00 Targeting virulence (M. Pucci, US)
14:45 Targeted delivery (M. Gilmore, US)
15:30 Antibody-antibiotic conjugates (M.-W. Tan)
16:15 Break
16:45 Bioinformatics (continued)
18:30 Posters
19:30 Dinner

DAY 8 (Saturday, November 18)

New technologies for determination of susceptibility and detection of resistance
8:30 Rapid techniques and point-of-care (J. Schrenzel, CH)
9:15 Mass spectrometry (J.P. Charrier, FR)
10:00 Break

New antiinfective strategies
10:30 Antibodies (S. Projan, US)
11:15 Vaccines (M. McCarthy, US)
12:00 Lunch
14:00 Bacteriophages (L. Debarbieux, FR)
14:45 CRISPR/Cas9 (D. Bikard, FR)
15:00 Break
15:30 Bioinformatics (continued)
17:30 Closure of the course and certificate awards (P. Courvalin, M. Gilmore, G. Wright)
19:30 Dinner

DAY 9 (Sunday, November 19)

8:45 Microbiome and antibiotics (Y. Taur, US)
9:45 Adaptation of microbes to their experience and impact on antibiotic susceptibility (M. Gilmore, US)
10:30 Break
11:00 How to return for the future (S. Projan)
12:00 Lunch