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# Multi-Drug Efflux Systems

*From Molecular Mechanisms to Pharmacological Modulation*

## SUNDAY June 12th

- 4:00 pm - 8:00 pm Arrival and Check-in (Check-in Desk Closed 6:00 pm - 7:45 pm)
- 6:00 pm Dinner
- 7:30 pm - 7:35 pm Welcome / Introductory Comments by GRC Site Staff
- 7:35 pm - 7:40 pm **Olga Lomovskaya & Anthony George**, Co-Chairs for Conference  
Introductory Comments & Conference Welcome
- 7:40 pm - 9:30 pm **Keynote Session**
- 7:40 pm - 7:50 pm Discussion Leader: **Shimon Schuldiner** (Hebrew University, Jerusalem, Israel)
- 7:50 pm - 8:30 pm **Piet Borst** (University of Amsterdam, Amsterdam, Netherlands)  
"Drug efflux transporters and their role in cancer cell resistance and survival"
- 8:30 pm - 8:40 pm Discussion
- 8:40 pm - 9:20 pm **Hiroshi Nikaido** (University of California, Berkeley, USA)  
"Capture and transport of diverse substrates by transmembrane and cismembrane MDR pumps"
- 9:20 pm - 9:30 pm Discussion

## MONDAY June 13th

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Significance of Efflux in Multi-Drug Resistance**
- 9:00 am - 9:10 am Discussion Leader: **J.V. Piddock** (University of Birmingham, UK)
- 9:10 am - 9:30 am **Patrice Courvalin** (Institute Pasteur, Paris, France)  
"Efflux and Antibiotic Resistance in *Acinetobacter*"
- 9:30 am - 9:40 am Discussion
- 9:40 am - 10:00 am **Dominique Sanglard** (Vaudois University, Lausanne, Switzerland)  
"Participation of ABC transporters in drug resistance and virulence in the human pathogen *Candida glabrata*"
- 10:00 am - 10:10 am Discussion
- 10:10 am - 10:40 am Coffee Break
- 10:40 am - 11:00 am **Patrick Plesiat** (Hôpital Jean Minjoz, Besancon Cedex, France)  
"Active efflux as part of the stress response in Gram negative bacteria"
- 11:00 am - 11:10 am Discussion
- 11:10 am - 11:30 am **Susan Bates** (National Cancer Institute, Bethesda, USA)  
" Efflux Transporters and Drug Penetration: An Unproven Link "
- 11:30 am - 11:40 am Discussion

- 11:40 am - 12:00 pm **Francoise van Bambeke** (Catholic University of Louvain, Brussels, Belgium)  
"How do antibiotics play with efflux transporters in mammalian and bacterial cells?"
- 12:00 pm - 12:10 pm Discussion
- 12:10 pm - 12:25 pm **Frederica Theodoulou** (Rothamsted Research, Harpenden, UK)  
"ABC transporters in plants: multiple, broad or narrow substrate specificity?"
- 12:25 pm - 12:30 pm Discussion
- 12:30 pm Group Photo / Lunch
- 1:30 pm - 4:00 pm Free Time
- 4:00 pm - 5:30 pm Poster Session
- 5:30 pm - 7:30 pm **Diversity of Biological Functions**  
Discussion Leader: **Atilio Di Pietro** (CNRS Lyon, France)
- 5:30 pm - 5:50 pm **Michelle Haber** (Children's Cancer Institute for Medical Research, Australia)  
"Multidrug transporters as potential oncogenes"
- 5:50 pm - 6:00 pm Discussion
- 6:00 pm - 6:20 pm **Robert Tampe** (Frankfurt University, Germany)  
"Mechanism of ABC transporters in immunity"
- 6:20 pm - 6:30 pm Discussion
- 6:30 pm - 6:50 pm **David Fidock** (Columbia University, New York, USA)  
"Recent insights into antimalarial resistance mediated by Plasmodium falciparum multidrug efflux pumps"
- 6:50 pm - 7:00 pm Discussion
- 7:00 pm - 7:20 pm **Jesus Blazquez** (National Center for Biotechnology, Spanish Research Council, Madrid, Spain)  
"Role of MATE efflux pumps on oxidative damage protection and antimutation"
- 7:20 pm - 7:30 pm Discussion
- 8:00 pm Dinner

## TUESDAY June 14th

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Structure and Mechanism of Multi-Drug Efflux Pumps 1**
- 9:00 am - 9:10 am Discussion Leader: **Robert Ford** (University of Manchester, UK)
- 9:10 am - 9:30 am **Markus Gruetter** (University of Zurich, Zurich, Switzerland)  
"Structure and mechanism of heterodimeric ABC transporters"
- 9:30 am - 9:40 am Discussion
- 9:40 am - 10:00 am **Suresh Ambudkar** (National Cancer Institute, Bethesda, USA)  
"The mechanism of action of P-glycoprotein (ABCB1)"

- 10:00 am - 10:10 am Discussion
- 10:10 am - 10:40 am Coffee Break
- 10:40 am - 11:00 am **Frances Sharom** (University of Guelph, Ontario, Canada)  
"Probing the drug-binding pocket and drug transport mechanism of P-glycoprotein (ABCB1)"
- 11:00 am - 11:10 am Discussion
- 11:10 am - 11:30 am **Richard Callaghan** (University of Oxford, Oxford, UK)  
"Molecular mechanisms associated with multidrug resistance mediators"
- 11:30 am - 11:40 am Discussion
- 11:40 am - 12:00 pm **Lutz Schmitt** (Heinrich Heine University Duesseldorf, Germany)  
"X-ray meets flexible membrane transporters - pitfalls, challenges and insights"
- 12:00 pm - 12:10 pm Discussion
- 12:10 pm - 12:25 pm **Alice Rothnie** (Aston Triangle, Birmingham, UK)  
"Detergent free purification of ABC transporters using SMA polymer"
- 12:25 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:00 pm Free Time
- 4:00 pm - 5:30 pm Poster Session
- 5:30 pm - 7:30 pm **New Methods to Study Membrane Transporters**  
Discussion Leader: **Helen Zgurskaya** (Oklahoma University, Norman, USA)
- 5:30 pm - 5:50 pm **Fraser MacMillan** (University of East Anglia, Norwich, UK)  
"Watching membrane proteins move using EPR spectroscopy"
- 5:50 pm - 6:00 pm Discussion
- 6:00 pm - 6:20 pm **Anna Seelig** (University of University of Basel, Switzerland) "New methods to monitor P-glycoprotein activity: Microphysiometry and NMR in living cells" "
- 6:20 pm - 6:30 pm Discussion
- 6:30 pm - 6:50 pm **Arnaud Ducruix** (Paris Descartes University, Paris, France)  
"Structural and Dynamical Insights into the Opening and assembly Mechanism of *P. aeruginosa* efflux pumps"
- 6:50 pm - 7:00 pm Discussion
- 7:00 pm - 7:20 pm **Xiao-Hong Nancy Xu** (Old Dominion University, Norfolk, USA)  
"Nanoassay for Real-Time Molecular Probing of Multidrug Membrane Transporters"
- 7:20 pm - 7:30 pm Discussion
- 8:00 pm Dinner

## WEDNESDAY June 15

- 7:30 am - 8:30 am Breakfast

- 9:00 am - 12:30 pm **Structure and Mechanism of Multi-Drug Efflux Pumps 2**
- 9:00 am - 9:10 am Discussion Leader: **Martin Pos** (University of Frankfurt, Germany)
- 9:10 am - 9:30 am **Hendrik van Veen** (University of Cambridge, UK)  
"Mechanisms of drug and ion transport by the MFS multidrug transporter LmrP"
- 9:30 am - 9:40 am Discussion
- 9:40 am - 10:00 am **Eitan Bibi** (Weizmann Institute of Science, Rehovot, Israel)  
"Molecular aspects of secondary multidrug transport"
- 10:00 am - 10:10 am Discussion
- 10:10 am - 10:40 am Coffee Break
- 10:40 am - 11:00 am **Hassane S. Mchaourab** (Vanderbilt University, Nashville, USA)  
"Structural Dynamics of Multi-Drug Transporters"
- 11:00 am - 11:10 am Discussion
- 11:10 am - 11:30 am **Paolo Ruggerone** (University of Cagliari, Italy)  
"Molecular modeling of antibiotic translocation coupled to functional rotation in AcrB"
- 11:30 am - 11:40 am Discussion
- 11:40 am - 12:00 pm **Edward Yu** (Iowa State University, Iowa, USA)  
"Crystal structures of the CusA efflux pump"
- 12:00 pm - 12:10 pm Discussion
- 12:10 pm - 12:25 pm **Ute Andrea Hellmich (Goethe University Frankfurt, Germany)**  
"Extensive conformational changes throughout the ATP hydrolysis cycle of the ABC multidrug transporter LmrA"
- 12:25 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:00 pm Free Time
- 4:00 pm - 5:30 pm Poster Session
- 5:30 pm - 7:30 pm **Control of Gene Expression / Modulation of Activity**
- Discussion Leader: **Karl Kuchler** (Medical University Vienna, Austria)
- 5:30 pm - 5:50 pm **William Shafer** (Emory University School of Medicine, Georgia, USA)  
"Genetic control of drug efflux pump gene expression in *Neisseria gonorrhoeae*: implications for pathogenesis"
- 5:50 pm - 6:00 pm Discussion
- 6:00 pm - 6:20 pm **Scott Moye-Rowley** (University of Iowa, Iowa City, USA)  
"Regulation of Multidrug Resistance in Fungi"
- 6:20 pm - 6:30 pm Discussion
- 6:30 pm - 6:50 pm **Gert Fricker** (University of Heidelberg, Heidelberg, Germany)  
"Regulation of ABC drug transporters by nuclear receptors"
- 6:50 pm - 7:00 pm Discussion

- 7:00 pm - 7:20 pm **Toshihisa Ishikawa** (RIKEN, Yokohama, Japan)  
"Pharmacogenomics of human ABC transporters"
- 7:20 pm - 7:30 pm Discussion
- 7:30 pm - 8:00 pm Business Meeting  
*Nominations for the next Vice Chair; Fill out Conference Evaluation Forms; Discuss future Site & Scheduling preferences; Election of the next Vice Chair*
- 8:00 pm Dinner

## THURSDAY June 16th

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Approaches to Overcome/Modulate Multiple Drug Resistance**
- 9:00 am - 9:10 am Discussion Leader: **Susan Bates** (National Cancer Institute, Bethesda, USA)
- 9:10 am - 9:30 am **Zhe-Sheng (Jason) Chen** (St. John's University, New York, USA)  
"PDE5 inhibitors as modulators of ABC transporter-mediated multidrug resistance in cancer"
- 9:30 am - 9:40 am Discussion
- 9:40 am - 10:00 am **Heidrun Potschka** (Ludwig Maximilian University, Munich, Germany)  
"Targeting regulation of P-glycoprotein: a novel approach to overcome drug resistance"
- 10:00 am - 10:10 am Discussion
- 10:10 am - 10:40 am Coffee Break
- 10:40 am - 11:00 am **Gergely Szakacs** (Institute of Enzymology, Budapest, Hungary)  
"Exploiting the paradoxical hypersensitivity of MDR cells: hitting cancer's Achilles' heel"
- 11:00 am - 11:10 am Discussion
- 11:10 am - 11:30 am **Charles Thompson** (University of British Columbia, Vancouver, Canada)  
"Chemical inactivation of drug efflux systems to increase the activities of clinically proven antibiotics against Mycobacterium tuberculosis"
- 11:30 am - 11:40 am Discussion
- 11:40 am - 12:00 pm **Jean-Michel Bolla** (School of Medicine, Marseille, France)  
"Competitive- and noncompetitive inhibition of efflux pumps: from a natural source to the synthesis of new compounds"
- 12:00 am - 12:10 pm Discussion
- 12:10 pm - 12:20 pm Short talk (TBD)
- 12:20 pm - 12:30 pm Discussion

12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 5:30 pm	<u>Poster Session</u>
5:30 pm - 7:30 pm	<b>Polyspecific Transporters in Drug Discovery, Development and Response</b>
5:30 pm - 5:40 pm	Discussion Leader: <b>Wright Nichols</b> (AstraZeneca, Waltham, USA)
5:30 pm - 5:50 pm	<b>Charles Dean</b> (Novartis, Cambridge, USA) "Efflux and Gram negative antimicrobial drug discovery: always the twain shall meet"
5:50 pm - 6:00 pm	Discussion
6:00 pm - 6:20 pm	<b>Mark Warren</b> (Optivia Biotechnology, Menlo Park, USA) "Transporting Drug Development Past Roadblocks on the Critical Path"
6:20 pm - 6:30 pm	Discussion
6:30 pm - 6:50 pm	<b>Joseph Polli</b> (GSK, USA) "What's all the flux about? Case studies of the importance of drug transporters in drug discovery and development"
6:50 pm - 7:00 pm	Discussion
7:00 pm - 7:20 pm	<b>William Guggino</b> (John Hopkins University, Baltimore, USA) "Processing mutations in ABCG2, newly recognized as a urate efflux pump, are associated with high plasma urate and gout"
7:20 pm - 7:30 pm	Discussion
8:00 pm	Dinner

## FRIDAY June 17th

7:30 am - 8:30 am	Breakfast
9:00 am	Departure

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