Scientific Programme

Saturday, 28 June 2014, 17:30-20:00

Structure of Serine and Metallo-Betalactamases

Moderators: Timothy Palzkill, James Spencer

17:30

Role of active site residues Ser237 and Arg276 in CTX-M-14 β-lactamase substrate binding and catalysis

Carolyn J. Adamski[1*], Ana Maria Cardenas[2*], Nicholas G. Brown[1], Lori B. Horton[2], **Timothy Palzkill**[1,2,3]

[1]Department of Biochemistry and Molecular Biology, [2]Department of Molecular Virology and Microbiology, [3]Department of Pharmacology, Baylor College of Medicine, Houston, TX USA

*equal contributors

17:50

Characterisation of metallo-beta-lactamases from environmental sources

Ramya Salimraj

School of Cellular and Molecular Medicine, Medical Sciences Building, University Walk, Bristol BS8 1LJ, United Kingdom

18:10

Structure and inhibition of metallo-beta-lactamases

James Spencer

School of Cellular and Molecular Medicine, Medical Sciences Building, University Walk, Bristol BS8 1LJ, United Kingdom

18:30

Studying the effect of active site loop mutations in metallo-beta-lactamases on substrate specificity

Peter Oelschlaeger[1], Alecander E. LaCuran[1], Kevin M. Pegg[2], Eleanor M. Liu[1]

[1]Department of Pharmaceutical Sciences, Western University of Health Sciences, Pomona, CA 91766. [2] Department of Biological Sciences, California State Polytechnic University, Pomona, CA 91768, the United States of America

Ligands and Ions Influencing Beta-lactamase Action

19:00

Protonation state change and short hydrogen bond formation induced by ligand binding during beta-lactamase catalysis

Yu Chen

Department of Molecular Medicine. University of South Florida, the United States of America

19:20

pH and basicity of ligands control the binding of metal-ions to *B. cereus* B1 β-lactamase

Hasina Motara, Dharmit Mistry, David R. Brown, Robert A. Cryan, Michael Nigen, **Michael I. Page**

Chemical and Biological Sciences. University of Huddersfield, United Kingdom

19:40

Effect of Zn(II) deprivation on MBL-mediated resistance

Lisandro J. González[1], G. Bahr[1], C. Bethel[2], R.A. Bonomo[2], A.J. Vila[1]

[1]IBR-CONICET, Rosario, Argentina; [2]Cleveland VAMC, Cleveland, Ohio, the United States of America

Sunday, 29 June 2014, 9:00-13:00

Epidemiology, Genetics and Evolution of Beta-Lactamases

ESBLs and Carpanemases (Part I)

Moderators: Jean-Marie Frère, Sergei Vakulenko

9:00
The NDM-1 β-lactamase: much ado about the wrong thing
Jean-Marie Frère
Emeritus professor
Centre for Protein Engineering, Université de Liège, Belgium.

9:10
NDM-type carbapenemases in Gram-negative rods; genetics and epidemiology
Laurent Poirel, Patrice Nordmann
Medical and Molecular Microbiology Unit, Dept of Medicine, Faculty of Science; University of Fribourg, Switzerland, and INSERM U914, South-Paris Medical School, France

9:30
Carbapenem-hydrolyzing class D β-lactamases
Sergei Vakulenko
Department of Chemistry and Biochemistry, University of Notre Dame, Notre Dame, IN 46656, the United States of America

9:50
NDM-1 emergence in *E. coli* is modulated by specific environmental bacteriophages
Mark A. Toleman
Dept. Infection and Immunity, Cardiff University, United Kingdom

10:10
Carbapenemase-producing multidrug resistant *Enterobacteriaceae* in Portugal: class A and B
Manuela Caniça, Vera Manageiro, Joana Almeida, Stephanie Barbosa, Constança Simões, Eugénia Ferreira
National Reference Laboratory of Antibiotic Resistances and Health Associated Infections, National Institute of Health Dr. Ricardo Jorge, Lisbon, Portugal

11:00- 11:30
COFFEE BREAK

ESBLs and Carbapenemases (Part II)

Moderators: Karen Bush, Alessandra Carattoli

11:30

The epidemiology of ESBLs and carbapenemases in the Midwestern United States

Karen Bush

Department of Biotechnology. Indiana University Bloomington. Indiana, the United States of America

11:50

Genomics and epidemiology of plasmids associated with extended-spectrum beta-lactamase and carbapenemase genes

Villa Laura[1], Daniela Fortini[1], Claudia Feudi[1], **Alessandra Carattoli**[1,2]

[1]Istituto Superiore di Sanità Rome, Italy; [2]Institute for Infectious Diseases, University of Bern, Bern, Switzerland

12:10

Assessment of Combination Therapy in Infections Caused by ESBL Producing Carbapenem Resistant *Enterobacteriaceae* in BALB/c Mice

Noor A. Salloum, Katia Cheaito, Kohar Kissoyan, **Ghassan M. Matar**

Dept. of Experimental Pathology, Immunology and Microbiology, Faculty of Medicine, American University of Beirut, Beirut, Lebanon

12:30

An IncF plasmid carrying *bla*$_{\text{CTX-M-15}}$ from *Escherichia coli* ST405

Carola Venturini, **Sally Partridge**

Centre for Infectious Diseases and Microbiology, Westmead Millennium Institute, The University of Sydney, Westmead Hospital, NSW 2145, Australia

LUNCH

Sunday, 29 June 2014, 15:00-17:00

New Drugs: Antibiotics and Inhibitors (Part I)

Moderator: Alejandro J. Vila

15:00

Inhibition kinetics of β-lactamases by avibactam and relation to human pharmacokinetics.

Jean-Marie Frère[1], Thomas Keating[2], Wright Nichols[2]

[1]CIP, Université de Liège, Liège, Belgium; [2]AstraZeneca, Waltham, Mass., the United States of America

15:20

Mechanism-based inhibitors of metallo-beta-lactamases

Alejandro José Vila

Institute of Molecular and Cell Biology of Rosario (IBR, CONICET-UNR), Rosario, Argentina

15:40

β-Lactamase inhibitor mechanisms

Rex Pratt

Department of Chemistry, Wesleyan University, Connecticut, the United States of America

16:00

Novel boron containing beta-lactamase inhibitors

Olga Lomovskaya

Department of Biology

Rempex Pharmaceuticals, The Medicines Company, San Diego, CA, the United States of America

16:20

Prevalent extended-spectrum β-lactamases in Argentina: structural insights into the interaction with oxyimino-cephalosporins and mechanism-based inhibitors.

Pablo Power[1], Paulette Charlier[2], Barbara Ghiglione[1*], Melina Ruggiero[1*],

Moreno Galleni[2], Gabriel Gutkind[1], Eric Sauvage[2] *Contributed equally on this study

[1]Laboratorio de Resistencia Bacteriana, Facultad de Farmacia y Bioquímica, Universidad de Buenos Aires, Junin 956 (1113), Buenos Aires, Argentina; [2]Centre for Protein Engineering, Université de Liège, B-4000 Sart Tilman, Liège, Belgium

16:40

Structure-based screening of inhibitors against KPC-2: designing potential drug candidates against multidrug-resistant bacteria

Arbab Khan[1], Mohd Danishuddin[1], Mohammad Faheem[1], Ponnusamy Kalaiarasan[2],Mohd Hassan Baig[1], Naidu Subbarao[3], Asad U. Khan[1]

[1]Interdisciplinary Biotechnology Unit, AMU, Aligarh 202002, India; [2]National Centre of Applied Human Genetics, School of Life Sciences, Jawaharlal Nehru University, [3]School of Computational and Integrative Sciences, Jawaharlal Nehru University, New Delhi, India

17:00- 17:30

COFFEE BREAK & POSTER VIEWING

17:30-18:30

POSTER SESSIONS (PART I) & DISCUSSION

Sunday, 29 June 2014, 18:30-18:50
EVENING ORAL SESSION

18:30
Assays for the development of broad spectrum metallo-β-lactamase inhibitors
Jürgen Brem
Department of Chemistry, University of Oxford, Oxford, United Kingdom

Monday, 30 June, 9:00- 11:00

Opening of Sessions on Other Mechanisms of Antimicrobial Resistance

Shahriar Mobashery

Part I. Penicillin-Binding Protein 2a (PBP2a) of Methicillin Resistant *Staphylococcus aureus*

Moderators: Shahriar Mobashery, Juan A. Hermoso

9:00

Allostery in the function of penicillin-binding 2a of methicillin-resistant *Staphylococcus aureus* (MRSA)

Shahriar Mobashery

Department of Chemistry and Biochemistry, University of Notre Dame, Notre Dame, IN 46656, the United States of America

9:20

Discovery of novel classes of antibiotics, based on the structure of penicillin-binding 2a of methicillin-resistant *Staphylococcus aureus* (MRSA)

Mayland Chang

Department of Chemistry and Biochemistry, University of Notre Dame, Notre Dame, IN 46656, the United States of America

9:40

Structural basis of the allosteric mechanism of *Staphylococcus aureus* penicillin-binding protein 2a governing methicillin-resistance and physiological function

Juan A. Hermoso

Departamento de Cristalografía y Biología Estructural, Instituto de Química- Física "Rocasolano", CSIC, Serrano 119, 28006-Madrid, Spain

10:00

The kinetic mechanism of the reaction of ceftobiprole with *Staphylococcus aureus* PBP 2a

Malcolm G.P. Page

Basilea Pharmaceutica Intl Ltd, Basel, Switzerland

10:20

Molecular characterization and epidemiology of methicillin-resistant *Staphylococcus aureus* isolates that are non-susceptible to ceftaroline – a global perspective

Richard A. Alm, Jane E. Ambler, Sushmita D. Lahiri

Infection Innovative Medicines, AstraZeneca R&D Boston, MA, the United States of America

Part II. Efflux Pumps

10:40

Structure and operation of bacterial tripartite multidrug efflux pumps

Philip Hinchliffe, Colin Hughes, Vassilis Koronakis

Department of Pathology, University of Cambridge. United Kingdom

11:00- 11:30

COFFEE BREAK

Monday, 30 June, 11:30- 13:10

Epidemiology, Genetics and Evolution of Beta-Lactamases

ESBLs and AmpC Beta-Lactamases (Part III)

Moderator: Gian Maria Rossolini

11:30

Molecular characterization of ceftazidime-avibactam-resistant AmpC mutants in *Pseudomonas aeruginosa*

Sushmita D. Lahiri, Grant K. Walkup, Richard A Alm
Infection Bioscience, AstraZeneca R&D Boston

11:50

OXA-372, a new carbapenem-hydrolyzing class D β-lactamase from a *Citrobacter freundii* isolated from a hospital wastewater plant

Alberto Antonelli
University of Siena, Italy

12:10

Changing and collaborating, from *bla*$_{\text{CTX-M-2}}$/*aac(6')Ib* and *bla*$_{\text{SHV-5}}$ to *bla*$_{\text{CTX-M-15}}$/*qnrB*/*aac(6')Ib-cr* in thirty months

V. García-Fulgueiras[1], I. Bado [1], N. Cordeiro[1], G. Algorta[1,2], **R. Vignoli**[1]
[1]Depto. de Bacteriología y Virología, Facultad de Medicina (UDELAR), [2]Centro Hospitalario Pereira Rossell (CHPR). Uruguay

12:30

On the physicochemical traits that constrain the sequence of functional proteins: insights from TEM lactamases

Luciano A. Abriata
École Polytechnique Fédérale de Lausanne and Swiss Institute of Bioinformatics, Lausanne, Switzerland

12:50

Molecular detection of genes encoding to broad spectrum beta-lactamase in gram-negative rods isolated from ready to eat vegetables in Mexico City

Rosalino Vázquez-López [1], Sandra Solano Gálvez [2], **Moisés Daniel Serrano Merlín**[3], Jorge Alberto Basurto-Serrano [3], Karen Marrufo-Castillo [3], Jorge Alberto Ascencio-Aragon [3], Tanya Hernandéz Martínez[4], Selene Ivonne Larios Fernández[4], Guillermina Rosas Sandoval[5], Juan Antonio González Barrios[5]
[1] Microbiology and Parasitology department, Health Science Faculty, Universidad Anáhuac México Norte. [2] Microbiology and Parasitology department, Medicine Faculty, Universidad Nacional Autónoma de México. [3] 6th Medicine student of Health Science Faculty, Universidad Anáhuac México Norte. [4]10th Medicine student, Medicine Faculty, Universidad Nacional Autónoma de México. [5] Genomic Medicine Laboratory, Hospital Regional "1º de Octubre", ISSSTE. Mexico.

LUNCH

Monday, 30 June, 15:00- 16:00

Beta-Lactamases: Detection and Identification

Moderator: Laurent Poirel

15:00

Rapid diagnostic of ESBL and carbapenemase producing Gram negatives; a new paradigm

Laurent Poirel, Laurent Dortet, Patrice Nordmann

Medical and Molecular Microbiology Unit, Dept of Medicine, Faculty of Science, University of Fribourg, Switzerland, and INSERM U914, South-Paris Medical School, France

15:20

Characterization of substrate and inhibitor binding to different β-lactamases using Surface Plasmon Resonance based biosensors

Tony Christopeit[1], Trine Josefine O. Carlsen[1], Susann Skagseth[1], Bjarte Aarmo Lund[1], Ørjan Samuelsen[2], Hanna-Kirsti Schrøder Leiros[1]

[1]NorStruct, Department of Chemistry, UiT-The Arctic university of Norway, Tromsø, Norway [2]Reference Centre for Detection of Antimicrobial Resistance, University Hospital of North Norway, Tromsø, Norway

15:40

Unraveling the molecular details of antibiotic resistance through high-performance computing

Nisanth N. Nair

Department of Chemistry. Indian Institute of Technology Kanpur. Kanpur, 208016, India

Monday, 30 June, 16:00- 16:40

New Drugs: Antibiotics and Inhibitors (Part II)

Moderator: Rex Pratt

16:00

Probing metallo-β-lactamase activity and inhibition

Anne Makena, Sander S. van Berkel, Clarisse Lejeune, Raymond J. Owens, James Spencer, Jürgen Brem, Christopher J. Schofield

The Department of Chemistry, Chemistry Research Laboratory, University of Oxford, 12 Mansfield Road, Oxford, OX1 3TA, United Kingdom.

16:20

***In silico* fragment based design of metallo-β-lactamase inhibitors**

Ricky Cain[1]**,** Jürgen Brem[2], Christopher Schofield[2], Colin Fishwick[1]

[1]School of Chemistry, University of Leeds, Leeds, LS2 9JT

[2]Department of Chemistry, University of Oxford, Oxford, OX1 3TA, United Kingdom

Monday, 30 June, 16:40- 17:00

Beta-Lactamase Nomenclature

Special Session

Beta-Lactamase Nomenclature with respect to the Lahey Site

Karen Bush [1]***, George A. Jacoby*** [2]

[1]Department of Biotechnology. Indiana University Bloomington. Indiana, the United States of America

[2]Lahey Clinic, Burlington, MA, the United States of America

17:00-17:30

COFFEE BREAK & POSTER VIEWING

17:30-18:30

POSTER SESSIONS (PART II)

& DISCUSSION

18:30-19:00

CONCLUDING REMARKS

20:00

CLOSING DINNER