MBI-8005 ADVANCED AND INTERACTIVE ANTIMICROBIAL RESISTANCE COURSE, 3 EST

Schedule: Monday 16.10.2023 from 12.00 to Friday 20.10.2023 12.30
The course is held every second year.

Course committee:

- Professor Arnfinn Sundsfjord. Committee leader - Department of Medical Biology (IMB), Faculty of Health Sciences, UiT/ Norwegian national advisory unit on detection of antimicrobial resistance (K-res)/Norwegian working group on antibiotics (NWGA), Centre for New Antibacterial Strategies (CANS).
- Professor Kristin Hegstad: IMB UiT/K-res/CANS.
- Professor Johanna U. Ericson: IMB UiT/CANS.
- Professor Ørjan Samuelsen: Department of Pharmacy (IFA) UiT/K-res/ CANS
- Professor Gunnar Skov Simonsen: IMB UiT/Norwegian surveillance system for antimicrobial drug resistance (NORM)/University Hospital of North-Norway (UNN)/CANS.
- Professor Pål Jarle Johnsen: IFA UiT/CANS.

Program:
Monday 16.10.2023 MH-building, UiT
Themes: Antibiotics, antibiotic resistance, antimicrobial susceptibility testing methods and resistance epidemiology.

12.00 Welcome and introduction to the course. Arnfinn Sundsfjord (AS), UiT/K-res/NWGA/ CANS
Presentation of the participants from presubmitted biosketches (1 min each)

12.50 **Basic concepts in antibiotics and antibiotic resistance**

- *Antimicrobial resistance in a clinical perspective.* (25+5 min) Lecturer: Professor Arnfinn Sundsfjord (AS)
- *Basics concepts of antibiotics and antibacterial resistance* (30+10 min) Lecturer: Professor Ørjan Samuelsen (ØS), K-res/UiT/CANS

14.00 Break – put up posters

14.30 **Antimicrobial susceptibility testing and important clinical resistance mechanisms**

- *Antimicrobial susceptibility testing; concepts, methods, and interpretation*. (30 min) Lecturer: AS

15.00 **Poster walk** (3 min to present your poster 5-8 min to discuss)

16.30 End

Social gathering in the evening

Tuesday 17.10.2023 MH-building, UiT

08.30 **Continue - theme: Antimicrobial susceptibility testing and important clinical resistance mechanisms. 30 min lectures** 10 min for discussion

- *Challenges in Gram-negative bacteria exemplified by beta-lactamases and multi-drug resistance.* Lecturer: ØS
- *Challenges in Gram-positive bacteria exemplified by glycopeptide and linezolid resistance in enterococci.* Lecturer: Professor Kristin Hegstad (KH), K-res/UiT/CANS

09.50 Group work and disclosing of group work in plenum. (AS, ØS, KH)

11.40 Lunch break

Themes: Resistance transmission: mechanisms and evolution.

12.10 **Genetic mechanisms for resistance spread. 30 min lectures** 15 min for discussion

- *Transduction/bacteriophages: examples and limitations.* Lecturer: Dr. Joao A. Gama, UiT/CANS
- *Transformation: within and between species.* Associate professor Daniel Straume, The Norwegian University of Life Sciences

13.40-13.50 Break

- *Conjugation: promiscuity of mobile genetic elements* (MGEs). Lecturer: KH

14.35 Break

14.45 **Evolution of resistance. 30 min lectures** 15 min for discussion

- *Drivers in the development and spread of antimicrobial resistance.* Lecturer: Professor Gunnar Skov Simonsen, UNN/UiT/NORM/ CANS
- *Evolution and reversibility of antibiotic resistance – easy to get and hard to get rid of.* Professor Pål Jarle Johnsen (PJJ), UiT/CANS

16.15 End.

Wednesday 18.10.2023 MH-building, auditorium X
Continue - theme: Resistance transmission: mechanisms and evolution.

08.30 Group work and disclosing of group work in plenum. (AS, JAG, KH, PJJ)

Themes: One Health perspectives and molecular epidemiology of AMR.

10.15 **One Health perspectives on AMR from Low- and Middle-Income Countries (LMIC) versus High-Income Countries (HIC) perspectives. 30 min lectures**

- *LMIC perspective.* Lecturer: To be announced
- *HIC perspective*. Lecturer: Professor Hajo Grundmann, University of Groningen, The Netherlands
- 30 min discussion

11.45 Lunch break

12.30 **Case work**

14.30 **On the concepts of adaptive resistance, heteroresistance and persistence. 30 min lectures** 15 min for discussion

- *Concepts and methods to study adaptive resistance and heteroresistance.* Lecturer: Associate professor Christian Lentz, UiT/CANS
- *Bacterial persisters and infection.* Lecturer: Francoise Van Bambeke, Université catholique de Louvain, Brussels, Belgium

16.00 End.

Thursday 19.10.2023 MH-building, UiT
Themes: Laboratory demonstrations antimicrobial susceptibility testing (AST). Antibiotic discovery and development.

08.30 *Introduction to AST in practice.* 20 min lecture. Lecturer: Senior biomedical laboratory scientists Siv-Heidi Barkhald (SHB) and Ellen Josefsen (EJ), K-res

09.00 **Laboratory demonstrations of AST methods** (disk diffusion, gradient test, micro broth dilution, rapid phenotypic of biochemical detection of resistance mechanisms, WGS and bioinformatic detection). Demonstrators: SHB, ØS, KH, AS, Anna Pöntinen, EJ, Bjørg Haldorsen (K-res).

11.00 Lunch

12.00 **Challenges in antibiotics discovery. 30 min lectures** 15 min for discussion

- *Concepts and challenges in antibiotic discovery*. Lecturer: To be announced
- *Fighting microbial communities in biofilms.* Lecturer: Associate professor Jorunn Pauline Cavanagh, UiT/CANS

13.30-13.45 Break

- *Bioprospecting for novel antimicrobial agents.* Lecturer: Associate professor Teppo Rämä, UiT/CANS
- *Conjugate-antibiotics in a chemical perspective.* Lecturer: Associate professor Marius M. Haugland, UiT/CANS

15.15 **Case presentations**

16.15 End.

Friday 20.10.2023 MH-building, UiT
Themes: Alternative anti-infective strategies.

08.30 **Alternative anti-infective strategies. 30 min lectures** 15 min for discussion

- *Bacteriophage therapy* Lecturer: Associate Professor Gabriel De Freitas Almeida, UiT/CANS
- *Anti-virulence strategies: know your enemies and disarm them.* Lecturer: Professor Mona Johannessen, UiT/CANS

10.00-10.15 Break

- *Microbiome based strategies for decolonization of multidrug resistance and infection prevention*. Lecturer: To be announced

11.00 *Alternative approaches in the battle against AMR - crowd funding and public awareness.* Lecturer: Professor Adam P. Roberts, Liverpool School of Tropical Medicine, UK. 30 min lecture 15 min for discussion

11.45 Course evaluation.
12.30 End