

MBI-8005 ADVANCED ANTIMICROBIAL RESISTANCE COURSE, 3 EST

Schedule: Monday 18.10.2021 from 12.00 to Friday 22.10.2021 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 E. Sollid: 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 18.10.2021 **MH-building, auditorium X, room number X**

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
- 14.30 **Antimicrobial susceptibility testing and important clinical resistance mechanisms**
- *Antimicrobial susceptibility testing; concepts, methods and interpretation.* (30 min) Lecturer: AS
 - *Challenges in Gram-negative bacteria exemplified by beta-lactamases and colistin resistance.* (30+10 min) Lecturer: ØS
- 15.40-16.00 Break
- *Challenges in Gram-positive bacteria exemplified by glycopeptide and linezolid resistance in enterococci.* (30+10 min) Lecturer: Professor Kristin Hegstad (KH), K-res/UiT/CANS

16.40 End

Social gathering in the evening

Tuesday 19.10.2021 MH-building, auditorium X, room number X

Continue - theme: Antimicrobial susceptibility testing and important clinical resistance mechanisms

08.30 Group work and presentation of group work in plenum. (AS, ØS, KH)

09.45-10.00 Break

Themes: Resistance transmission: mechanisms and evolution.

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

- *Transduction/bacteriophages: examples and limitations.* Lecturer: Dr. Joao A. Gama, UiT/CANS

10.45-11.00 Break

- *Transformation: within and between species.* Lecturer: Senior scientist Daniel Straume, (DS) The Norwegian University of Life Sciences
- *Conjugation: promiscuity of mobile genetic elements (MGEs).* Lecturer: KH

12.30 **Poster/oral presentations from participants** and lunch break

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

- *Drivers in the development and spread of antimicrobial resistance.* Lecturer: Professor Gunnar Skov Simonsen (GSS), 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

16.00 End.

Wednesday 20.10.2021 MH-building, auditorium X, room number X

Continue - theme: Resistance transmission: mechanisms and evolution.

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

Themes: One Health perspectives and molecular epidemiology of AMR.

10.15 **One Health perspectives on AMR. 30 min lectures** 15 min for discussion

- *Environment* Lecturer: Professor Joakim Larsson, University of Gothenburg, Sweden
- *Animal/veterinary* Lecturer: Dr. Catherine Ludden, London School of Hygiene and Tropical Medicine, United Kingdom
- *Human/clinical* Lecturer: Professor Rob Willems, University Medical Center Utrecht, The Netherlands

- 12.30 **Poster/oral presentations from participants** and lunch break
- 14.30 **Whole genome sequencing in the molecular epidemiology of AMR. 30 min lectures** 15 min for discussion
- *Next generation sequencing in antimicrobial resistance research.* Lecturer: Senior scientist Jessin Janice (JJ), K-res/UiT/CANS
 - *How to use whole genome sequencing (WGS) in infection control and outbreak investigations in public health and clinics.* Lecturer: Henrik Hasman, Statens Serum Institut, Denmark
- 16.00 End.

Thursday 21.10.2021 MH-building, auditorium X, room number X

Themes: Laboratory demonstrations antimicrobial susceptibility testing (AST). Antibiotic discovery and development.

- 08.30 *Introduction to AST in practice.* 20 min lecture. Lecturer: Leading biomedical engineer Bjørg Haldorsen (BH), 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: BH, ØS, KH, JJ, Ellen Josefsen (K-res).
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- 11.00 Lunch
- 12.00 **The future of antibiotics. 30 min lectures** 15 min for discussion
- *Concepts in antibiotic/drug discovery.* Lecturer: To be announced
 - *At the interface of chemical kinetics and population biology: how to design dosing strategies?* Lecturer: Dr. Pia Abel zur Wiesch (PAzW), UiT
- 13.30-13.45 Break
- *Bioprospecting for novel antimicrobial agents.* Lecturer: Associate professor Teppo Rämä (TR), UiT/CANS
 - *Conjugate-antibiotics in a chemical perspective.* Lecturer: Associate professor Marius M. Haugland (MMH), UiT/CANS
- 15.15 Panel debate/group work/interaction: Questions from the students about development of new antibiotics – possibilities and limitations. Chair: AS, debaters: XX, PAzW, TR, MMH.

16.15 End.

Friday 22.10.2021 MH-building, auditorium X, room number X

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: Associate Professor Veronika K. Pettersen, UiT/CANS

11.00 International lecture: *Evolution of AMR clones.* Professor Alan McNally, University of Birmingham. 30 min lecture 15 min for discussion

11.45 Course evaluation.

12.30 End