Title

Mosquito-borne pathogens and their vectors

Dates

7th to 10th June 2022

Content Overview

The aim of this 2 ECTS NDPIA course is to provide an in depth understanding of pathogen-vector interaction and transmission dynamics of mosquito-borne pathogen. It will provide better understanding of mosquitoes as vectors of arboviruses and parasites most of which are zoonotic in nature and affect both humans and animals. The course will include various aspects of the mosquito vector including; ecology, biology, population genetics, competence, capacity and how these factors influence transmission to the susceptible host. The course will also cover vector surveillance, identification, diagnostics, prevention and control, as well as application of high-throughput sequencing platforms in virus discovery.

At the end of the course the participants should be able to;

1. Understand mosquito biology in relation to mosquito-borne pathogen transmission
2. Sample mosquitoes in different developmental stages and understand how mosquitoes are morphologically identified.
3. To explore different approaches in mosquito identification for example genetic identification of mosquitoes especially sibling- or cryptic species using a barcoding approach.
4. Know how to screen mosquitoes for diverse viruses
5. Understand the concepts of laboratory colonization of mosquitoes
6. Understand vector competence, virus-vector-host interaction and transmission dynamics of arthropod-borne viruses.
7. Understand the application of high-throughput sequencing in the detection and characterization of mosquito-borne pathogens
8. Know about vector control, surveillance, detection, remote sensing and response system for emerging mosquito-borne viral diseases

Programme

Day 1 Tuesday 7th June 2022

12:30-12:40
Course introduction (***Olivia Wesula Lwande***, ***Clas Ahlm*** **and** ***Magnus Evander*** - Minor groove)
12:40-13:10
Mosquito-borne viruses and their diseases (***Magnus Evander*** – Minor groove)
13.15-14:00
Vectorial Capacity and R0, its dependence on vector biology and potential impacts from climate change (***Joacim Rocklöv*** - Hybrid)

14:00-14:15 Coffee break

14:15-15:15
Medical entomology (***Hans Jørgen Overgaard*** – Hybrid)
15:20-16:20
Swedish mosquitoes (***Anders Lindström*** - Minor groove)
16:25-16:50
Short (2 min) presentations by the course participants of themselves and their research activities – (***All participants***- Minor groove)
16:50-17:00
10 minutes break for changing to field attires
17:00-18:30

Field trip with mosquito trapping and dipping (***Anders Lindström - Field site in Umeå***).
19:30

Day 2 Wednesday 8th June 2022

7:00-8:30
Collect mosquitoes from previous day's sampling (***Anders Lindström - Field site in Umeå***)

08:35-8:50 Coffee Break

08:50-10.50
Swedish mosquito identification workshop (***Anders Lindström*** - Minor groove)

10:55-12:55
Morphological identification of Swedish mosquito adults and larvae using standardized keys (***Anders Lindström*** – White Lab)

12:55-13:25 Lunch

13:25-14:25
Mosquito-borne parasites with a focus on Plasmodium (***Oliver Billker*** - Minor groove)

14:30-14:45 Coffee break

15:00 -17:00
Visit to Oliver Billker's mosquito-laboratory (*Building 6L*)

Day 3 Thursday 9thJune 2022

8:00-9:00
Past-, ongoing research and international networks **(**EdeNext, VectorNet, AMSAR Scopes, IAEA, ZikAlliance, Infravec2, ISIDORe and VEO) - (***Eva Veronesi*** - Minor groove)

9:00-10:00
Vector ecology, surveillance and control aspects – (***Eva Veronesi-*** Minor groove)

10:00-10:15 Coffee Break

10:15-11:15
Application of viromics in the discovery of novel RNA viruses in mosquitoes (***Anne-Lie Blomström*** - Minor groove)

11:15-12:15 Lunch

12:15-13:15
Evolution of insect-specific viruses and their influence on vector competence (***Anne-Lie Blomström*** - Minor groove)

13:15-14:00 Coffee Break

14:00-15:00
Molecular identification of mosquitoes (***Tobias Lilja*** - Minor groove)
15:15-17:00
Informatic workflow after barcoding and comparison of mosquito sequence data (***Tobias Lilja*** - Minor groove. Computer needed and internet access)

Dinner with facilitators and course participants (***Restaurant, downtown,*** Umeå)

Day 4 Friday 10th June 2022

8:00-09:30
Pathogen-vector interaction mechanisms for arboviruses (West Nile, zika, dengue, chikungunya, usutu, bluetongue, schmallenberg, lumpy skin) within exotic and indigenous mosquitoes (***Eva Veronesi*** - Minor groove)

09:30-09:45 Coffee break

09:45-11:45
Laboratory demonstration: oral mock infection of mosquitoes and dissection of body parts (***Eva Veronesi***– White Lab/Insectary located at building 6F)

11:45-12:45 Lunch

12:45-14:00
Past and ongoing research – (***Göran Bucht***, ***Magnus Evander*** and ***Clas Ahlm*** - Minor groove)

13:45-14:00 Coffee Break

14:00 – 17:00
Oral examination in group discussions based on the course aims Course evaluation and issuing of certificates – (***Clas Ahlm*** **and** ***Ahmed Osama Ahmed Hassan*** - Minor groove and Hybrid)

Facilitators

Kristoffer Ahlm
Lukas Karl Axel Wilkman
Malte Bergner
Rashmi Mishra
Verah Nafula Luande

Lecturers

Ahmed Osama Ahmed Hassan, Department of Clinical Microbiology, Umeå University
Anders Lindström, the Swedish National Veterinary Institute (SVA)
Anne-Lie Blomström, Department of Biomedical Sciences and Veterinary Public Health at the Swedish University of Agricultural Sciences (SLU)
Clas Ahlm, Department of Clinical Microbiology, Umeå University
Eva Veronesi, National Centre for Vector Entomology, Institute of Parasitology University of Zürich, Switzerland
Göran Bucht, Department of Clinical Microbiology, Umeå University
Hans Jørgen Overgaard, Norwegian University of Life Sciences, Norway
Joacim Rocklöv, Department of Public Health and Clinical Medicine, Section of Sustainable Health, Umeå University, Sweden
Magnus Evander, Department of Clinical Microbiology, Umeå University
Oliver Billker, Molecular Infection Medicine Sweden (MIMS)
Olivia Wesula Lwande, Department of Clinical Microbiology, Umeå University, Sweden
Tobias Lilja, the Swedish National Veterinary Institute (SVA)

Venue
Lecture hall: Minor groove
Group discussions/Fika: Open space adjacent to the Minor- and Major groove
Laboratory: White Lab
Oliver Billker's mosquito laboratory: Building 6L

Insectary located: Building 6F
Field-work: Umeå

Required course material to be supplied by the participants

1. Laptop
2. Notebook and pen
3. Laboratory gear (labelled clean lab coat and closed comfortable shoes)
4. Field gear – Gumboots, rain coat

Responsible Person

Olivia Wesula Lwande (olivia.lwande@umu.se), Department of Clinical Microbiology, Section for Virology, Umeå University, Phone: +46 702476884

Dead-line for registration

30th April 2022

Type of examination

Oral examination in the form of group discussions based on the course aims

Target audience

PhD students and postdocs (and master students) in the field of medicine, microbiology, virology, entomology, veterinaries, immunology, ecology, etc.

Suggested accommodation: Hotell Björken (Lasarettsbacken 10, 907 46 Umeå)
NDPIA members can register below and have priority to attend the course (registered persons will be admitted when at least 10 persons have registered to the course). Please also indicate if you would like NDPIA co-funding for travel and accommodation costs (not for participants at Umeå University).

Non-NDPIA members: please contact debra.l.milton@umu.se to announce your interest in attending the course.