

Teachers and lectures at course

Line Fredslund, Jacob Bælum, Pia Jacobsen and Carsten Suhr Jacobsen, Geological Survey of Denmark and Greenland, GEUS

William E Holben and Linda Schimmelpfening, University of Montana, US

Per Eric Lindgren University of Linköping, Sweden

Eva Møller Nielsen, Serum Institute

Anders Dalsgaard, University of Copenhagen

Dang Doung Bang, Technical University of Denmark

Aaron Saunders, Danish Technological Institute

Søren Bastholm Olesen, Amphi-Bac

Price:

The course will have a fee of 3000 DKK to cover lab expenses, lunch and social events.

Application:

Informal enquiries as well as registration should be sent to course responsible Carsten Suhr Jacobsen at csj@geus.dk

Limit:

The limit of the course is 20 students—apply before March 15th 2010

PH.D. COURSE IN MOLECULAR MICROBIAL ECOLOGY 12-16 APRIL 2010

PATHOS is a research centre funded by The Danish Strategic Research Council and hosted by The Geological Survey of Denmark and Greenland, GEUS

Address: Øster Voldgade 10, 1350 Copenhagen, Denmark
Phone +45 3814 2000

PH.D. COURSE IN MOLECULAR MICROBIAL ECOLOGY 12-16 APRIL 2010

mRNA and DNA quantification in Water, Fecal and Soil Microbial Ecology

*Practical course 12-16. April 2010
GEUS, Øster Voldgade 10
1350 Copenhagen K*

*Contact:
Carsten Suhr Jacobsen*

+45 3814 2000

mRNA and DNA in microbial ecology

Assessment of presence and activity of microorganisms in natural waters, fecal samples and soil has during the last years been revolutionized by introduction of highly reliable methods to extract both DNA (for presence) and mRNA (for activity) from microorganisms present in the environmental sample.

The newest technology is the extraction of mRNA directly from water and soil samples using snap freezing and beadbeating in the presence of phenol and chloroform. This technology has been proved to work in quantification of gene



The course will contain hands on exercises in the advanced GEUS-lab

expression of functional genes in soil samples, and the activity has been shown to be linked to the activity of the organisms. In the

course mRNA and DNA quantification of the *invA* gene in *Salmonella* directly in soil and water.

The potential of using quantitative PCR for tracking of pathogens in the environment based on direct extracted DNA from water, fecal and soil samples will be an other element of the course—targeting different types of pathogens and indication organisms including *E.coli* and *Bacteroides* sp.

Source tracking by PCR

One major achievement of the new techniques used in understanding microbial ecology of fecal indicator bacteria as coliforms is that these organisms indeed is present also in waters that are not influenced by human activities. However using sequence knowledge of the organisms specific PCR based detection can be used in tracking the source of the indicator bacteria. In the course we will be working with an integrated approach comparing growth dependent and direct methods for assessing the survival of pathogens in waters, fecal and soil samples.

Ecology of infectious diseases

The ecology of infectious diseases will be exemplified by presentations of studies spanning from highly intensive animal production in Asia, over viral pathogens in Scandinavian waste water to the use of molecular microbial ecology in tracking the ecology of wildlife in the Rocky Mountains.

Expected practical skills obtained during the course

Hands on ability to extract mRNA from water and soil, convert it into cDNA and quantify the expression of the gene.

Hands on ability to extract DNA from water, fecal and soil samples, perform RealTime PCR including the use of polymerase inhibitor con-

trol and the production of standards for use in quantitative PCR.

Hands on experience with DGGE including introduction into computer aided band-pattern interpretation tools.

Hands on experience with source tracking of indicator bacteria in natural waters influenced by human wastewater as well as animal fecal samples.

**PH.D. COURSE IN MOLECULAR
MICROBIAL ECOLOGY
12-16 APRIL 2010**

PATHOS is a research centre funded by The Danish Strategic Research Council and hosted by The Geological Survey of Denmark and Greenland, GEUS

Address: Øster Voldgade 10, 1350
Copenhagen, Denmark
Phone +45 3814 2000