



Epigenetic Epidemiology for Epidemiologists

January 22-24, 2015

Faculty

Prof. Caroline Relton, PhD (course co-ordinator)
MRC Integrative Epidemiology Unit, University of Bristol, UK

Prof. George Davey Smith, MD, DSc
MRC Integrative Epidemiology Unit, University of Bristol, UK

Place

Hotel Edelweiss, Wengen (see map on <http://www.epi-winterschool.org/hotels>)

Introduction

There is an increasing level of interest in the role of epigenetic processes in health and disease and the generation and analysis of epigenetic data is becoming commonplace in epidemiological studies. This course will provide an overview of epidemiological principles that are relevant to epigenetic studies (and more broadly to molecular phenotypes). Participants will gain tuition in the design, execution and interpretation of population-based epigenetic studies.

Course objectives

By the end of the short course participants should be able to

- Design epigenetic epidemiology studies and justify choice of design
- Understand the strengths and weaknesses of various epigenetic epidemiology study designs
- Understand principles of epigenetic measures as exposure and outcome variables
- Be aware of statistical methods appropriate for the analysis of epigenetic data
- Interpret findings of epigenetic epidemiological studies
- Be aware of bioinformatic resources to explore the functional relevance of epigenetic associations
- Understand the requirement for and possible approaches to strengthen causal inference in epigenetic epidemiology
- Critically appraise epigenetic epidemiological literature

This course is intended for individuals engaged in population-based studies who wish to incorporate epigenetic measures into their research. Attendees may have a background in epidemiology, statistics, public health or a clinical specialty. The course includes information on laboratory based methods but this will be aimed at the non-specialist (i.e. those without first hand lab experience).

What you have to bring

Students will bring their own portable computers.

Outline of course

The course will run over three days and consist of lectures in the morning and some group tasks and practical web-based exercises will supplement lectures in the evenings. During the extended break in the afternoon, participants review course materials, catch up on emails or go skiing.

Thursday, January 22nd (8:30 – 12:00 | 17:00 – 19:00)

- Introduction to epigenetics
- Epigenetic terminology
- Study design options in epigenetic epidemiology
- Epigenome-wide association studies
- The epigenome as a phenotype
- The epigenome as an exposure indicator
- Mediation of exposure-outcome associations by epigenetic processes
- Group work: study design exercise

Friday, January 23rd (8:30 – 12:00 | 17:00 – 19:00)

- Epigenetic mechanisms in development and disease
- Handling epigenetic data
- Methylation scores
- Selecting target loci for detailed analysis
- Practical exercise: Interpretation of findings in epigenetic studies

Saturday, January 24th (8:30 – 12:00 | 17:00 – 19:00)

- Strengthening causal inference in epigenetic epidemiology
- Genetics of DNA methylation
- Beyond DNA methylation (microRNA, histones)
- Transgenerational epigenetics
- Practical exercise: Critical appraisal of epigenetic literature

Credit

1.5 ECTS

Maximum number of participants

The maximum number of participants on this course will be 22.

Course fee

Academic: CHF 900

Industry: CHF 1800

Registration

Registration on the Winter School website www.epi-winterschool.org.

Course hotels

The participants have to book their accommodation themselves (see map and recommendation on www.epi-winterschool.org/hotels).