PRE-CONGRESS WORKSHOP

HW3 – Body fluid identification through mRNA profiling or DNA methylation analysis

Organisers: Titia Sijen & Hwan Young Lee
Type: Half Day Workshop, Lecture
Date & Time: Monday, 9 September (9:00-13:00)

Human DNA profiling has the potential to present strong evidence for placing a suspect at a crime scene. Increasingly, forensic questions that go beyond the identity of the donor of a sample are asked. Knowledge regarding the cell types residing in an evidentiary trace can facilitate inference of activities. Body fluids such as blood, saliva, semen, vaginal mucosa and menstrual secretion are mostly assessed in both sexual assaults and violent crimes. The inference of organ tissues such as brain, lung, kidney, liver, heart and skeletal muscle can also be useful. Tissue identification may be achieved through various marker types: mRNAs, miRNAs, DNA methylation or microbial markers.

In this workshop, we will focus on mRNA profiling and DNA methylation analysis. mRNA profiling has been studied at the Netherlands Forensic Institute since 2009 and the mRNA assays have been applied to over 250 forensic cases. Around the same time, research on tissue-specific DNA methylation begun in several research groups, and the multiplex assays developed by Lee's group have been validated for practical application in forensic casework samples.

We will explain the foundations of assay design, share how the assays were developed and demonstrate the basic procedures regarding the application of the assays. We will discuss technical issues that may occur with compromised forensic samples and explain how data interpretation is achieved considering an accompanying DNA profile and the context of a case. Through casework examples we will illustrate the forensic possibilities and opportunities. Issues that were raised in court will also be discussed.

Participants will actively work with exemplar results to gain hands-on experience. An interactive format will be used throughout the session to stimulate discussions.