The Envirogenomarkers project aims at the investigation of a new generation of biomarkers and at the study of the role of environmental agents in human cancer.

**Experimental Design**

**Envirogenomarkers: Breast Cancer and Lymphoma case-control study within 2 cohorts from Italy and Sweden.**

Analysis of 600 blood samples (300 from Italy and 300 from Sweden) for % of methylation at three CpG islands of LINE-1.

**Methods:**

A. Blood measurements of Persistent Organic Pollutants (POPs) and Heavy Metals (Lund University)

B. LINE-1 methylation

- Isolation of blood DNA
- DNA-bisulfite treatment
- PCR-Pyrosequencing of three CpG sites of LINE-1

**Statistical analysis:** Comparison between % of LINE-1 methylation and exposures

**Findings:**

Strong association of methylation with exposure at all sites

Evidence of association between methylation and exposure

Apparent differences between the two cohorts

**Linear Regression model:** Association of LINE-1 methylation with exposure controlling for different demographic parameters

A. All samples (Italy and Sweden)

B. Comparison between the two cohorts

**Multinomial Logistic:** Methylation of LINE-1 versus exposure

Italian cohort

Dependent variable: methylation in quartiles (versus 4th)

Independent variables: POPs and heavy metals exposure in addition to demographic parameters

Controlling for: disease type, sex, smoking status, DDE and continue

**Verification of the linear regression model**

**Our study suggests that cumulative exposure to PCBs and heavy metals may alter the Cpg methylation pattern and affect the epigenetic regulation of cellular functions.**