

WG1-WG2-WG3-WG5-WG6

## Monitoring exposure associated with non-communicable diseases among workers

**DiMoPEX**



**Aurelie Berthet<sup>1</sup>, Nancy B. Hopf<sup>2</sup>, Guillaume Suárez<sup>3</sup>, Jacques Pralong<sup>4</sup>, Brigitta Danuser<sup>4</sup>, Collaborators<sup>1,2,3,4</sup>**

Institute for Work and Health, Switzerland

in collaboration WG 2 -WG5-WG1-WG6

### Aim of the project

Identify and monitor biomarkers among workers or volunteers exposed to a chemical potentially associated with a specific non-communicable disease

#### A. Identification of exposures suspected to be associated with health problems

**1** Selection of chemicals of interest  
 Criteria: among the WG 2 products of interest and available epidemiological data from WG 3 (e.g., pesticides and neurotoxicity, formaldehyde and cancer, asthmatogens and COPD, ...)



**1** Selection of non-communicable diseases and biomarkers of interest  
 Criteria: among the WG 1, 5 and 6 of interest (e.g., MN and cancer, oxidative stress (ROS)/immunomarkers and OA and COPD ...)

**2** Selection of an occupational cohort based on occupations of interest (workers from different countries may be included)



#### B. *In vitro* testing and biomarkers of effect and exposure

**3** Absorption dose estimation

- *In vitro* percutaneous permeation assay
  - Permeation rate through human skin
  - Potential metabolism identified
  - ROS measurements
- *In vitro* inhalation assay (human cells)
  - Amount of substance delivered
  - Permeation rate through respiratory cells
  - ROS and inflammatory response measurements

Systemic concentration in blood

**4** Identification of potential biomarkers

- *In vitro* percutaneous permeation assay
  - Assess toxic effects
  - Dose-response of specific effects
  - ROS measurements
  - Identification of potential biomarkers
- Volunteers exposed under controlled conditions
  - Elucidate toxicokinetic parameters
  - Measure biomarkers of exposure/effect

#### C. Biomarker validation – human endpoints

**6** Medical evaluation of workers

- Occupational non-communicable disease questionnaire (e.g., validated asthma questionnaire)
- Development and validation of specific diagnostic work-up procedures and clinical scores for occupational non-communicable disease

**5** Monitoring in workers

**Biomonitoring**

- Urine collection: Quantification of chemical and its metabolites (i.e., biomarkers of exposure)
- Exhaled air collection: Quantification of biomarkers of exposure & effect
- Blood collection: Quantification of pesticide and its metabolites (i.e., biomarkers of exposure), Detection of potential biomarkers of effect (MN)
- Other matrices (saliva, hair)

**Air pollution monitoring**

- Occupational hygiene sampling (wipe) associated with job tasks (frequency, compounds, duration, practice,)
  - Development of wearable sensing devices

  Involve all WGs

  Involve WG 1, 2 and 5

  Involve WG 6