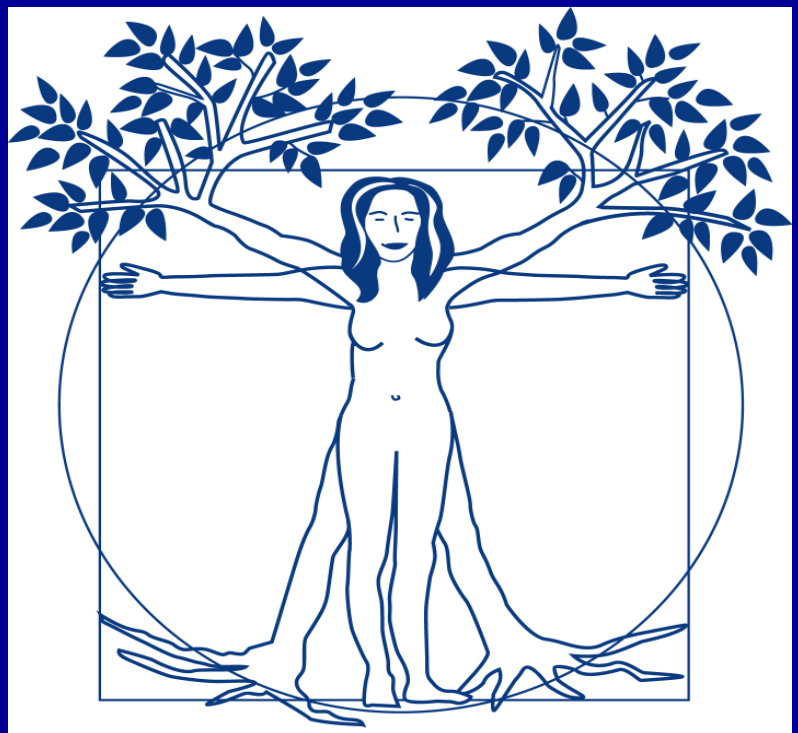

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Biomonitoring

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Biomonitoring

- What is biomonitoring?
- What biomonitoring reveals
- Limits of biomonitoring
- Importance of study design
- Utility of biomonitoring

What is biomonitoring?

- Measurement of a parent chemical or metabolite in a body fluid, organ, tissue (rarely, exhaled air is tested; e.g. TEAM)
- Examples:
  - Lead in blood or bone
  - Brominated flame retardants in breast milk
  - DDE, a metabolite of DDT, in adipose tissue
  - Phthalate metabolite in urine
  - Mercury in hair

What biomonitoring reveals

- The presence of a chemical means that an exposure has occurred; that some dose has been internalized
- What the measured level implies with respect to level of exposure depends on:
  - Toxicokinetics of the chemical, including half-life, metabolism, tissue distribution, excretion

Limits of biomonitoring

- Single, one-time samples are of little value when T ½ is short, unless the sample is obtained shortly after exposure
- Tissue distribution may make monitoring difficult; e.g., a chemical stored in a solid organ
- Technical aspects may be complex; e.g., volatile compounds with short T ½; sample storage and analysis

Importance of study design

- Study design should fit the purpose:
  - Individual exposure levels? For what reason?
  - Population wide?
  - Occupational?
  - Subpopulations?
    - Most highly exposed?
    - Most vulnerable?

Importance of study design

- What tissue, fluid, organ to sample?
  - Will vary with the purpose of the study and the chemical of interest. E.g., for occupational exposures might sample at the end of shift or end of work week in some cases
- Study power? How large a population to sample?

Utility of biomonitoring

- Documenting exposure
- Facilitating health impact studies
- Prioritizing safety assessment of chemicals of concern
- Identifying sources of exposure
- Truth testing risk assessments (be careful)
- Political action