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ILSI Health and Environmental Sciences Institute

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DEVELOPMENT OF METHODS FOR A TIERED APPROACH TO ASSESS BIOACCUMULATION OF CHEMICALS SUBCOMMITTEE IN VITRO ADME WORKSHOP MARCH 3-4, 2006

Breakout Session I: Available In Vitro Approaches

Break out group 1: What are the *in vitro* (and physical) approaches and what data can they generate for fish B assessments?

Goals
- Produce a state-of-the-art overview on existing in vitro assays and physical systems used to model in vivo chemical behavior that can yield information useful to understand bioaccumulation potential
- Identify applications and the pros and cons to effectively use the individual approaches in B assessments
- Recommend steps to standardize tests
- (If time allows) Identify pros and cons of a tiered/combined approach integrating in vitro (and physical) systems with other non-animal approaches (e.g. computational and physiological models) to assess bioaccumulation.

Key questions

1. What *in vitro* and physical systems have been used to study…
   - Bioaccumulation?
   - Biotransformation and methods to evaluate "M" in ADME
   - Bioavailability? Absorption and/or membrane permeability methods to evaluate "A and D" in ADME (e.g. CaCo2, SPMDs, PAMPA)
   - Excretion? Other forms of depuration?
   a) What information is obtained from the various systems (e.g. metabolite profile?)
   b) Which chemicals/chemical classes have been analysed in the various systems?
   c) What are the pros and cons for each method?

2. What computational and physiological models have been used to study…
   - Bioaccumulation?
   - Biotransformation of chemicals?
   - Bioavailability?
   - Absorption and/or membrane permeability?
   - Excretion? Other forms of depuration?
   a) What information is obtained from the various models (e.g., rate constants?)
   b) Which chemicals/chemical classes have been analysed in the various models?
   c) What are the pros and cons for each method?

3. What is needed to standardize approaches and facilitate comparisons among research groups?

Outcomes

- Consolidated list of existing in vitro and physical systems as well as computational and physiological models to assess bioaccumulation and related processes, as well as the nature/quality of data that can be generated by these systems.
- List of major knowledge gaps (e.g., insufficient comparative database, lack of systems/models for specific processes, inappropriate experimental conditions)
- Description of alternative approaches / techniques not already applied to fish which could be reapplied in piscine studies.