Session 3b/4b: Emerging Contaminants
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Challenges and Novel Approaches to the Assessment of Endocrine Active Compounds (EACs) in the Aquatic Environment

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The recent history of endocrine active compound assessment reveals a confusing, sometimes contradictory, and always complex matrix of occurrences and effects. In reviewing field and laboratory studies conducted by the St. Cloud State University Aquatic Toxicology Laboratory since 2001, two fundamental challenges in EAC studies become apparent. First, the occurrence, concentrations, and mixture composition of EACs in the aquatic environment exhibit as-of-yet unpredictable temporal and spatial variability. Second, the sensitivity of biological organisms exposed to EACs cannot be explained by any simple, unified theory. As a result of these two challenges, multiple traditional experimental design considerations are compromised. First, periodic water sampling, even if it includes sample integration, is unlikely to capture the entire spectrum of EAC presence in an aquatic environment. Second, the unpredictability of EAC occurrence renders "Reference Sites" in field studies suspect. Third, the deployment of any one species, life stage, or biological endpoint in field or laboratory exposure experiments is likely to miss components of the EAC effect on exposed organsisms. Fourth, the one-compound-one-concentration exposure approach lacks environmental realism. The inherent difficulties in establishing valid and environmentally relevant experimental designs for the assessment of EACs call for a comprehensive review of current practices and the development of solutions to EAC specific design constraints. This presentation will provide a perspective of current EAC experimental design constraints and offer approaches that may circumvent some of these limitations.

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