**Mapping toxicodynamic parameters in chemical space**

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At the core of ecotoxicology must be a conceptual idea of how chemicals affect organisms. The talk will explore how explicitly accounting for toxicokinetic and toxicodynamic processes enables a better understanding of organism recovery, modes of action and the interplay of hidden assumptions and conclusions about toxicity.

I will demonstrate that simple organism level endpoints, such as mortality, already contain information about the mode of action and organism recovery. After an overview of how to extract that information I will show how this opens new possibilities for chemical safety testing and assessment. Essentially toxicodynamic parameters exhibit patterns in chemical space. This important insight can be leveraged to identify the mode of action of new chemicals, to predict toxicity of untested chemicals with known modes of action and to facilitate in vitro to in vivo toxicity extrapolation.

The last third of the talk will discuss the challenge of biotransformation across species and chemicals and the relative importance of toxicokinetics and toxicodynamics. Finally an application of toxicokinetics for reverse dosing will be shown which enables the accurate predication of a sub-lethal endpoint in fish from in vitro data. The implications for ecotoxicology are that toxicokinetics are in many cases more important to solve today’s challenges than toxicodynamics and that simple toxicodynamic models yield powerful results.