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Eawag Seminar Invitation

Using Multidimensional Zebrafish Data to Advance Environmental Health

Speaker **Prof. Robert Tanguay**
Oregon State University, Corvallis, USA

When **February 23, 11.00 – 12.00 a.m.**

Where **Forum Chriesbach, room C20, Eawag Dübendorf**

Abstract The field of toxicology is challenged to assess the biological activity of huge swaths of chemical-structural space. The research community is increasingly moving towards the utilization of high-throughput approaches to capture and predict chemical activity and much of this work is conducted in cell-based systems as these research platforms are considered more cost effective and scalable. A major challenge in using in vitro data streams is that the results often lack meaningful biological context. It is therefore, predictably challenging to make risk decision solely on simple cellular response data. It is our view that integrated whole organism systems will help meet the growing challenges posed to 21st century toxicologists which is to identify hazardous chemicals and mixtures, and more importantly, to discover the mechanisms by which these exposures produce adverse outcomes. Over the past several years, we have aggressively advanced the use of zebrafish to more rapidly classify chemical activity. Early embryonic development is an ideal life stage to detect chemical activity, as this period is when the full genome is expressed and called upon to build the organism. The presence of the entire expressed genome offers a unique and sensitive opportunity to 'hit' these genomic targets by exogenous chemicals. The resulting phenotypes are used to anchor transcriptomic assessments to discover the biological networks perturbed by the active chemicals. To help accelerate these goals, we have developed and implemented high throughput screening infrastructure, methods, and data analysis tools to assess individual chemicals and complex chemicals mixtures. Much of the work has centered on early life stages, but increasingly we measure the impacts of transient developmental exposures on adult neurobehavior and cardiovascular fitness. This presentation, through illustrative examples, will highlight the advantage of the zebrafish system for rapid hazard identification, in vivo mechanistic evaluations and predictive toxicology.