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Water biosensor challenge to address toxicity of water

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An ongoing concern for water treatment systems and resource managers is the need to monitor for the presence of increasing number of pollutants from agricultural, municipal, and industrial outfalls that are present in US source waters. The associated environmental compounds can include pesticides, heavy metals, personal care products, natural toxins such as *cyanobacteria*l toxins, and a host of other organic and inorganic chemical pollutants and their transformation products. Current methods for detecting and identifying many of these contaminants are expensive, time-consuming, and require the use of specialized laboratories. Moreover, multiple methods are needed to detect the variety of contaminants of interest. In addition, if the identity of the potential contaminants is unknown, water monitoring becomes even more complex. A chemically "agnostic" approach to water quality testing could allow for detection of multiple contaminants that are biologically active and trigger specific toxicity or adverse health outcome pathways. Biosensors, (i.e. those sensors which take advantage of biological phenomenon that are altered in the presence of contaminants), can potentially provide faster detection as well as portability, continuous monitoring, and/or detection in complex matrices using minimal sample preparation. The EPA has over the past years used a challenge approach that uses crowd-sourcing to find solutions to difficult problems. In particular, the Water Biosensor Challenge has the goal of producing design solutions for a biologically-based effects, monitor/biosensor capable of responding to multiple environmental contaminant exposures that result in toxicity or adverse health effects when host organisms are exposed. This presentation will describe the challenge process as well as provide information related to the challenge of designing a Water Biosensor to analyze the toxicity of water.

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