

# New Bioanalytical Screening Tools to Monitor Constituents of Emerging Concern

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# Challenges To Current CEC Monitoring

- There are >10,000 Constituents of Emerging Concern (CECs)
  - Hundreds of new CECs each year
- Most do not have standardized chemical analysis methods
  - Especially metabolites and breakdown products
- Relevant toxicity data on long-term effects often unavailable
  - Chronic sublethal toxicity is of concern
  - Toxicity potential of CEC mixtures understudied



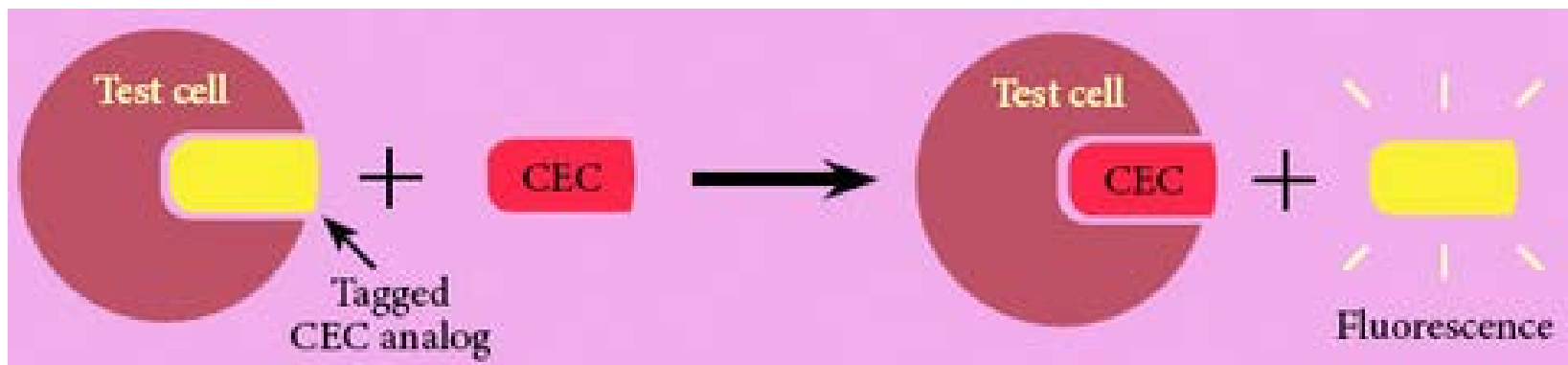
# Advantages of Cell Bioassays

- Rapid method to screen for hundreds of contaminants simultaneously in one assay
- Cost-effective approach to prioritize sites requiring more chemical/toxicity testing
- Adopted and refined technology used by pharmaceutical and industrial companies utilize to develop CECs



# Cell Assays As Screening Tools

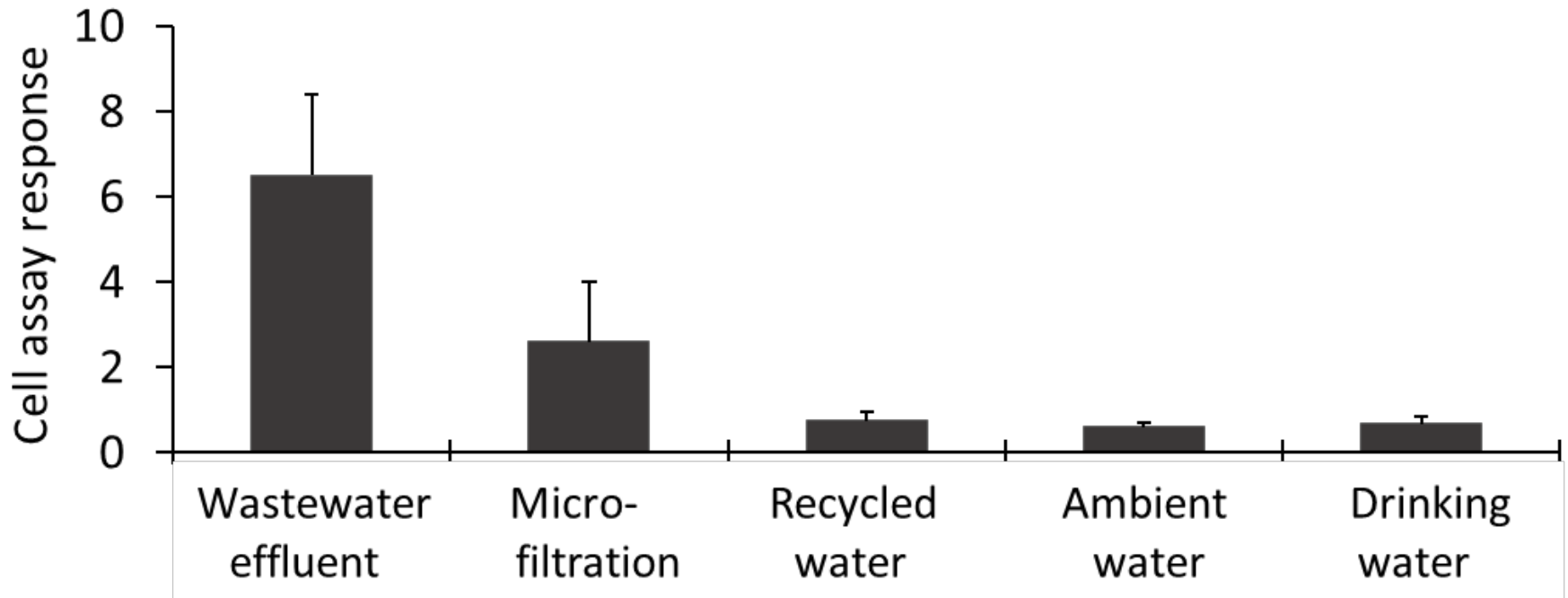
- Integrates the response of all known and unknown chemicals with a common mode of action
- Light intensity is proportional to the concentration of bioactive chemicals
- Cell responses can be linked to whole organism toxicity



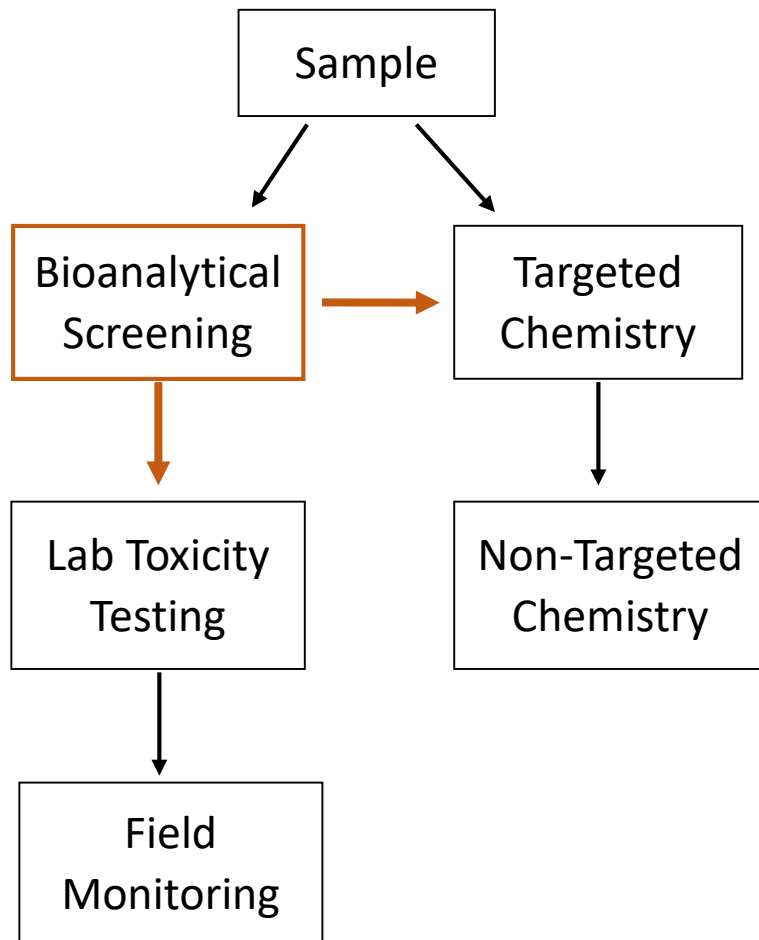
# Existing Cell Assays

POTENTIAL TOXICITY	CHEMICALS SCREENED	CELL ASSAY ENDPOINT
Feminization, reduced reproduction	Estrogens, alkylphenols	Estrogen receptor
Development, diabetes	Anti-inflammatory steroids	Glucocorticoid receptor
Impaired reproduction	Musks, phthalates	Androgen receptor
Tissue damage	Dioxin-like chemicals	Aryl hydrocarbon receptor
Poor immune functions	Pharmaceuticals, phthalates	Peroxisome proliferator activated receptor

# Cell Assays to Benchmark Water Quality



# The State Water Board is Considering Using Cell Assays for CEC Monitoring



Monitoring of Constituents of Emerging Concern (CECs) in California's Aquatic Ecosystems - Pilot Study Design and QA/QC Guidance

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SCCWRP Technical Report 854

The cover features a map of California, a chemical structure of a steroid-like compound with a hydroxyl group and a methyl group, and a photograph of a multi-well plate with pipette tips.