

Proposal Title – *Investigation of estrogenic nature of BPA derivatives by a yeast assay and structure-property relationship development of the resultant epoxy-resins.*

Program of Study – Cell Biology

Presentation Type – Poster

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Category – Theoretical Proposal

Abstract:

Formerly ubiquitously used in the manufacture of plastics, BPA (bisphenol A) has since declined in popularity due to potential health risk to human and animal health. BPA has been implicated in disrupting hormone synthesis, homeostasis, bone metabolism, reproduction, and increased cancer risk. These concerns have resulted in legislation limiting its use in many products. BPA is able to mimic the effects of estrogen and is termed an environmental estrogen and an endocrine disruptor. In attempts to find alternatives to BPA, many manufacturers have turned to related bisphenol analogues.

In the “classical” estrogen pathway, estrogen enters the cell by diffusing through the plasma membrane and binding to estrogen receptors. Once bound, the ER dissociates from the complex and dimerizes. The ER dimer binds to a specific DNA sequence, termed estrogen response element (ERE), and recruits coactivators to the promoter region of the gene. The ER regulates DNA transcription by interacting with basal transcription factors to regulate gene expression. We hypothesize that bisphenol derivatives used to replace BPA will also induce an active ER dimer.

To test the hypothesis, we will use a yeast genetics system previously developed by Dr. Cameron Sheeler to screen for environmental estrogens and study their mechanism of action. Ligand-dependent receptor dimerization and estrogen-induced ERE-dependent transactivation of the ER will be observed using a yeast two-hybrid system. The goal is to experimentally test common bisphenol analogues used in manufacturing of plastics, pesticides, and consumer

products, which are also able to mimic the effect of estrogen by functioning through the “classical” estrogen pathway. Additionally, our partners in the Chemistry department are working on developing new BPA-derivatives and metabolites to be tested by our assay. Future experimentation will determine the effect bisphenol analogues used in this study have on development and potential to function through alternative estrogen pathways.