

# Metabolomic Investigation of Zebrafish Responses to PAHs and Oxy-PAHs

## Frontiers in Biological Sciences

### Seminar Series

#### Presented by...

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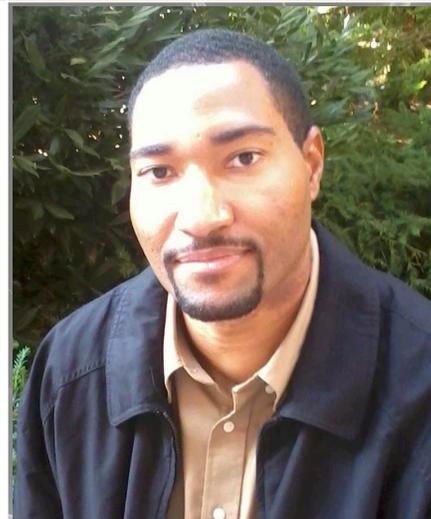
#### Abstract

Despite a plethora of information on the biological effects of polycyclic aromatic hydrocarbons (PAHs), relatively little is known about the toxicity of their oxygenated derivatives, particularly in urban areas. These derivatives, termed oxy-PAHs, are found in diesel exhaust or particulate matter alongside parent PAH compounds. Therefore, inhalation or non-dietary ingestion of PAHs and oxy-PAHs are major exposure routes for people living in urban areas. Studies have shown that, in contrast to parent compounds, some oxy-PAHs are direct-acting mutagens and do not require metabolic activation to exhibit their toxic properties. However, investigations of the induced metabolic changes resulting from parent PAHs and oxy-PAHs exposures have not been reported.

Recently, we described the differential developmental toxicity of parent and oxy-PAHs using the developing zebrafish model. To assess the potentially different metabolic responses, zebrafish embryos were exposed between 6 and 120 hours post fertilization to 4  $\mu\text{M}$  of benz[a]anthracene or benz[a]anthracene-7,12-dione. These compounds have been simultaneously detected in the environment at similar concentrations. Each embryo was assessed for mortality, developmental malformations, and behavioral abnormalities. Subsequently, embryos were pooled and homogenized, and extracts were analyzed using GC/MS and LC-MS/MS. One set of extracts was analyzed to measure the uptake of the compounds and determine any differences in overall bioavailability within the embryos. The resulting metabolic profile was determined using an untargeted metabolomics approach with multivariate statistical methods, including principal component analysis (PCA) and discriminant analysis (DA). Features deemed to be statistically significant ( $p < 0.05$  and twofold change) were identified using multiple data based on  $m/z$  values and fragmentation patterns. The discussed results will help elucidate the effects of oxy-PAHs and PAHs on the metabolome during embryonic exposure, and may further explain mechanisms associated with toxicity and developmental outcomes.

#### More info?

<http://ehsc.oregonstate.edu/>



Date: Thursday, July  
17, 2014

Location: EMSL  
Boardroom

Time: 11:00 a.m.