# Linking PAH Exposure to Health Outcomes Using a Primary Human *In Vitro* Respiratory Model

**Susan C. Tilton**
Project Lead

*Team*

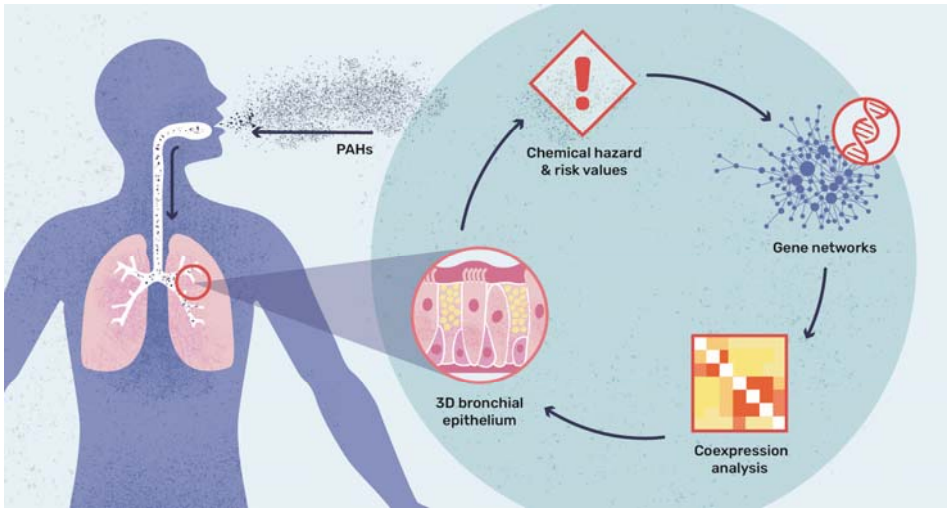
*D. Williams*
*W. Altemeier*
*S. Randell*
*Y. Tesfaigzi*

# Linking PAH Exposure to Health Outcomes Using a Primary Human *In Vitro* Respiratory Model

**Overall objective:**

To understand how PAHs contribute to toxicity in mixtures and establish a relationship between chemical exposure and toxicity in a human lung model.

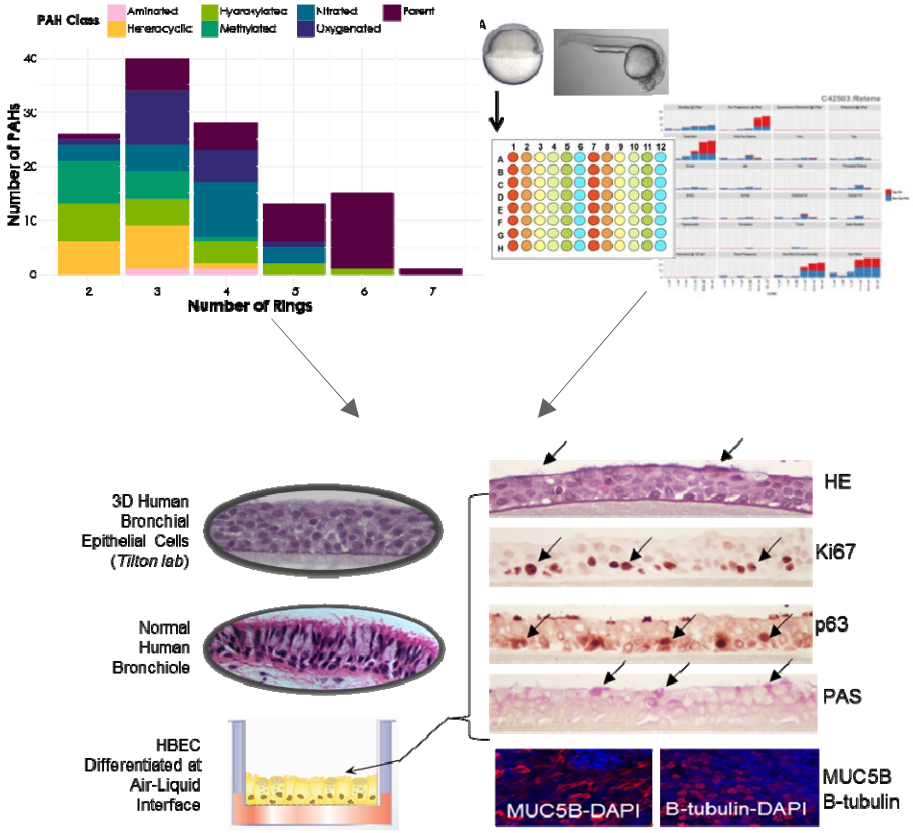
- *Quantify the toxicity of individual PAHs and PAH mixtures in the 3D human lung model.*
- *Assess the role of metabolism on the toxicity of individual PAHs*
- *Elucidate the mechanisms of PAH toxicity in the 3D human lung model.*



# Assessing Toxicity of PAHs and Mixtures

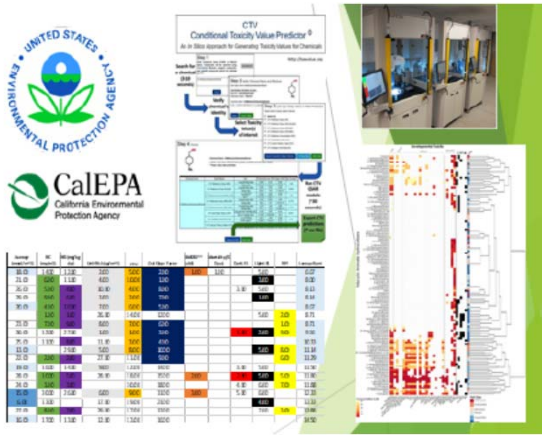
**Goals:**

- Assess the toxicity of diverse PAHs and mixtures using benchmark dose modeling and threshold dose analyses.
- Determine whether individual PAHs contribute to the toxicity of PAH mixtures in an additive manner.
- Determine whether remediation reduces the threat that PAHs and complex PAH environmental mixtures pose to human health.

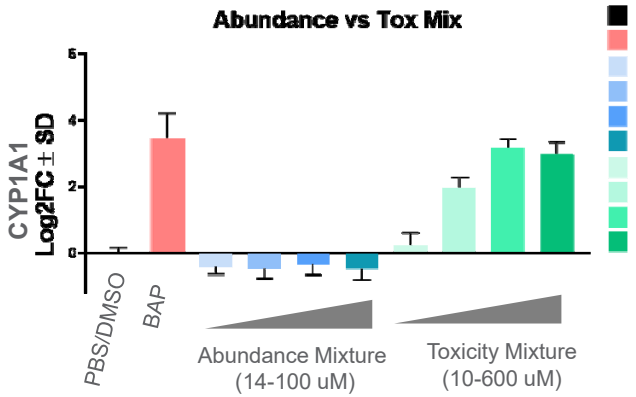


# Developing sufficiently similar mixtures for testing

- Comparison of mixture formations from legacy creosote site sampling formed at environmentally relevant ratios
- Determine whether individual PAHs contribute to toxicity in additive manner

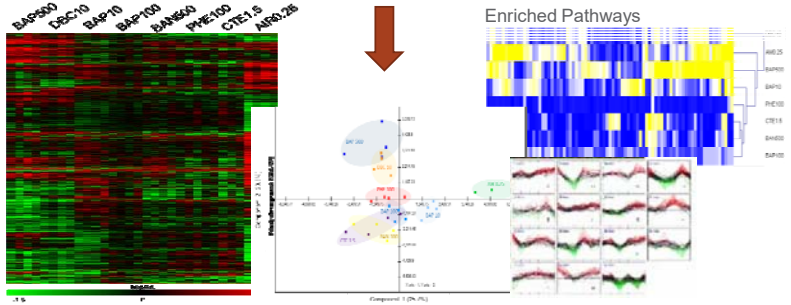


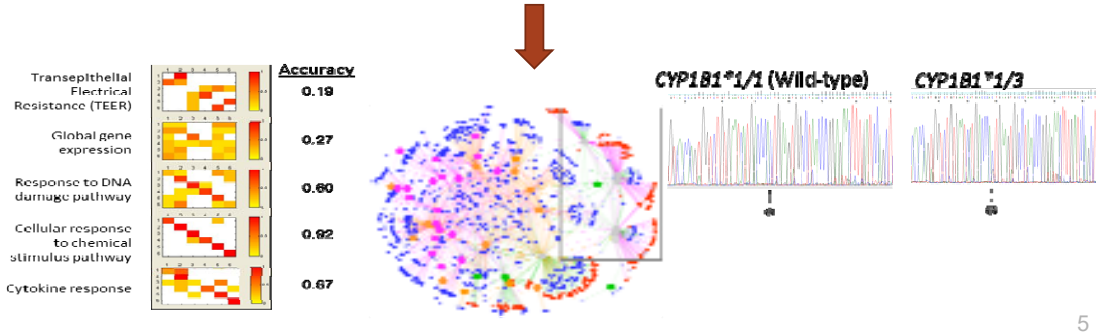
| Tox Mix Components | Abundance Mix Components |
|---|---|
| retene | naphthalene |
| benzo[a]fluorene | acenaphthene |
| benzo[b]fluorene | 2-methylnaphthalene |
| benzo[c]fluorene | 1-methylnaphthalene |
| triphenylene | fluorene |
| benzo[e]pyrene | phenanthrene |
| benzo[g,h,i]perylene | |



# Assessing Toxicity of PAHs and Mixtures

- Identify gene and metabolite signatures linked to toxicity.
- Model signatures predictive of cancer risk
- Assess mechanisms of chemical toxicity
- Evaluate contributors to disease susceptibility

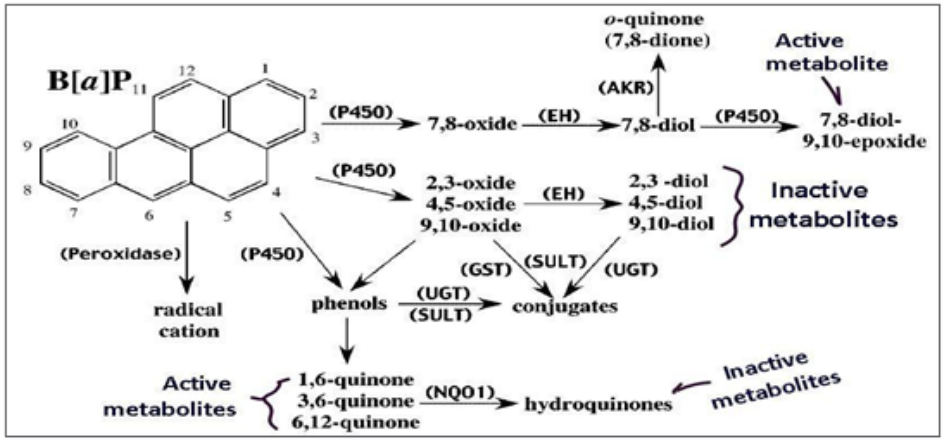


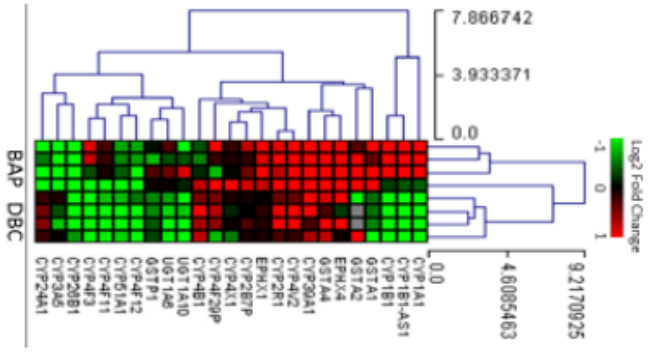



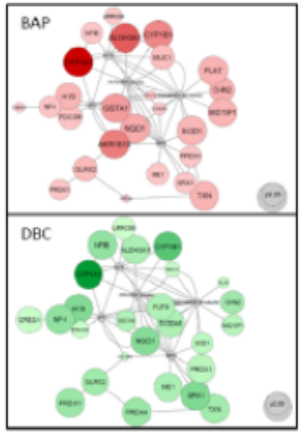
# Assess the role of metabolism on PAH toxicity in the 3D human lung model

***Goals:***

- Measure uptake and metabolism of biologically active PAHs in 3D human lung model.
- Determine how gene-environment interactions influence the toxicity of PAHs in the 3D human lung model.
- Assess human health hazards associated with environmental PAH exposures measured at Superfund sites.



# Thank you

More Information:
https://superfund.oregonstate.edu/