

Novel Flame Retardants: Toxicity Assessment and Policy Outreach

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Background

Science-Policy Connections

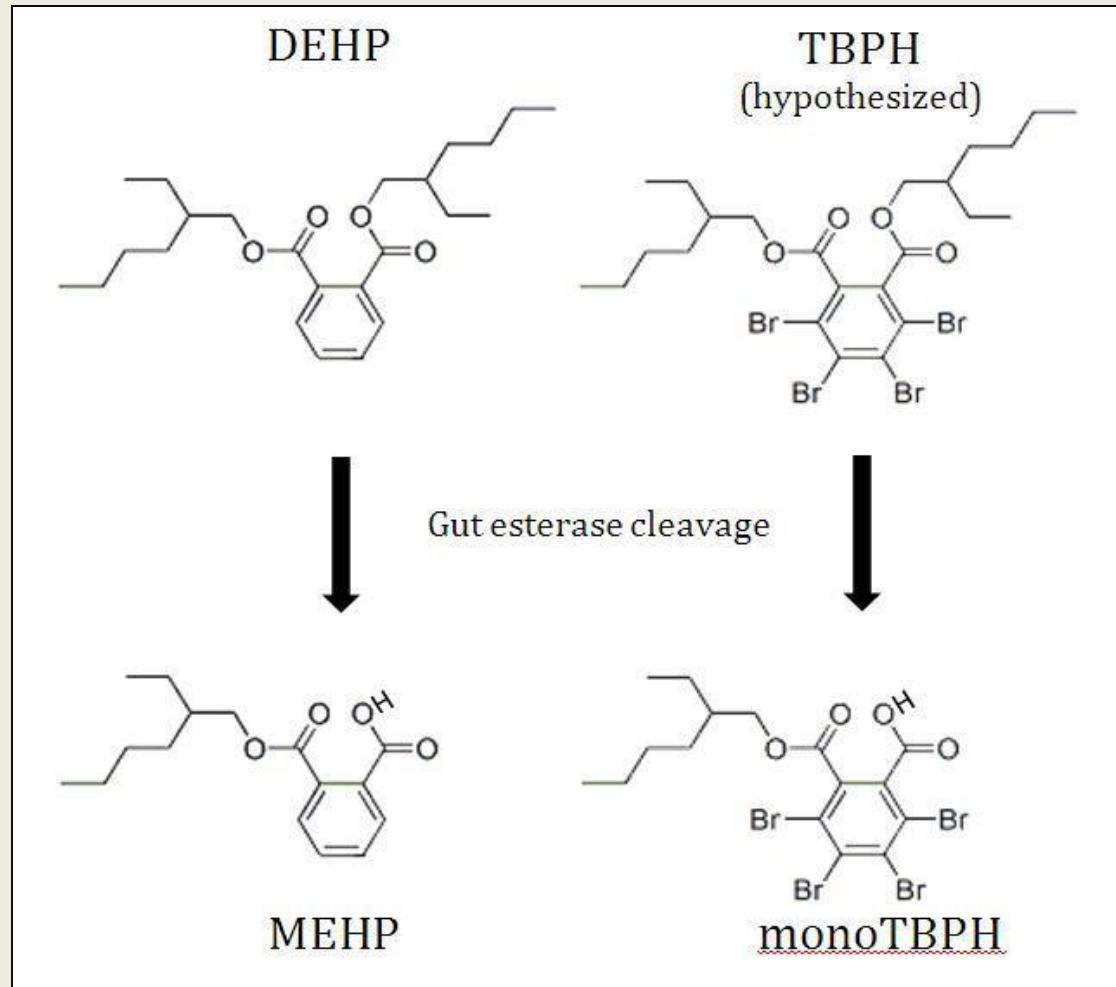
- Flame retardants – a public health concern?
- Regulatory history and trends
 - ~~– Tris 2,3 dibromopropyl phosphate (TBPP) 1977~~
 - ~~– Polychlorinated biphenyls (PCBs) 1979~~
 - ~~– Polybrominated diphenyl ethers (PBDEs) 2004/2009~~
 - Novel flame retardants **????**
- Toxic Substances Control Act

Novel Flame Retardants

- Firemaster 550
 - Di-2-ethylhexyl-tetrabromo phthalate (TBPH)
 - High Production Volume chemical
 - Detected in house dust, wastewater effluent, and marine mammals



TBPH and monoTBPH



monoTBPH: Toxicity assessment

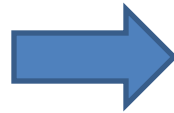
- Experimental design



General Toxicity

Data Endpoints:

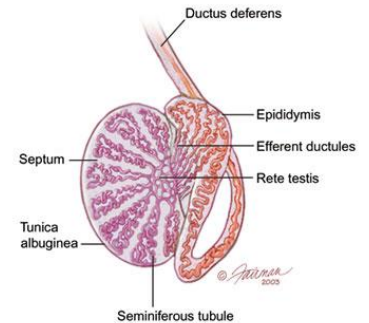
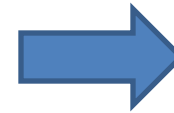
- Histology
- Clinical chemistry



Male Developmental Reproductive Toxicity

Data Endpoints:

- Histology
- Testosterone production assay



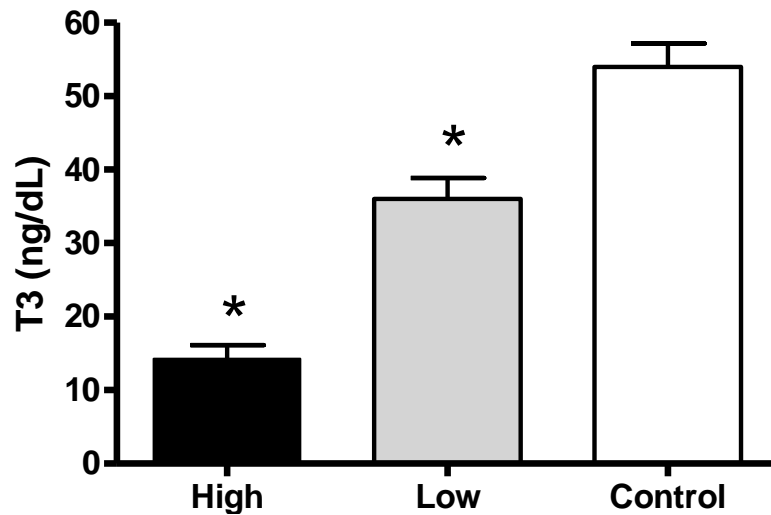
monoTBPH: Results

- General Toxicity

- Thyroid

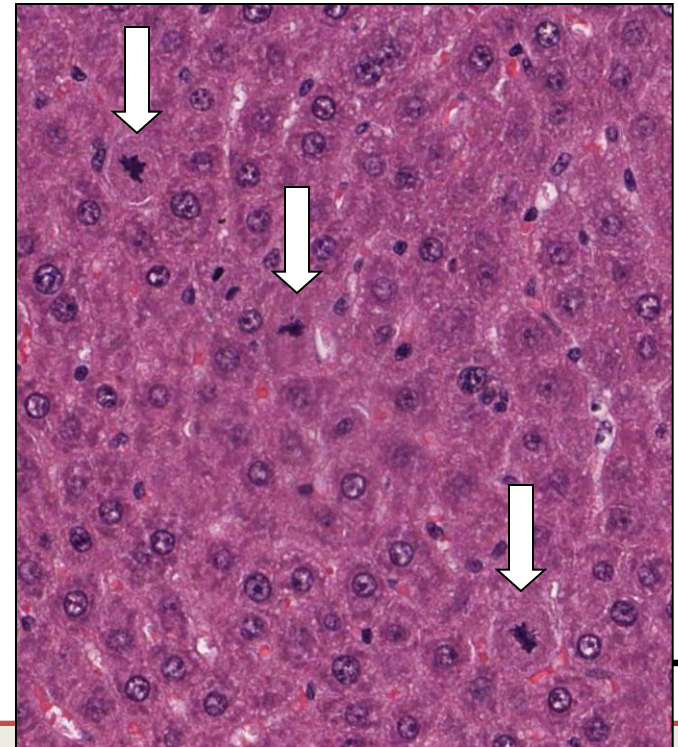
- Deiodinase inhibition

Triiodothyronine (T3)



- Liver

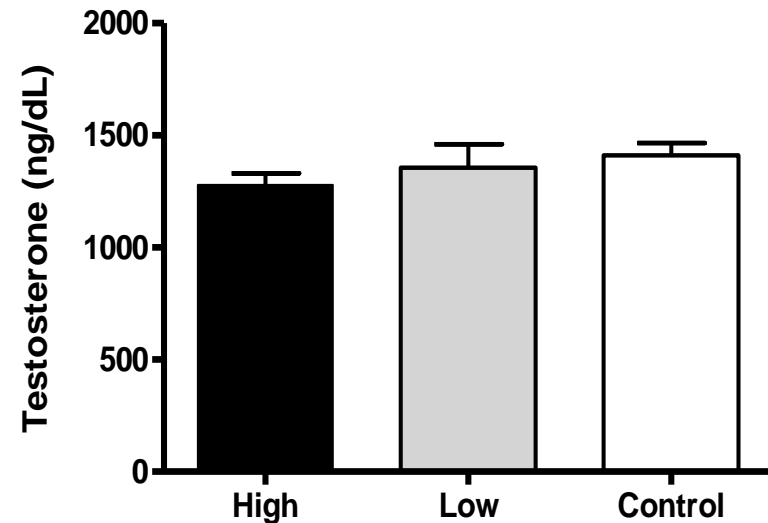
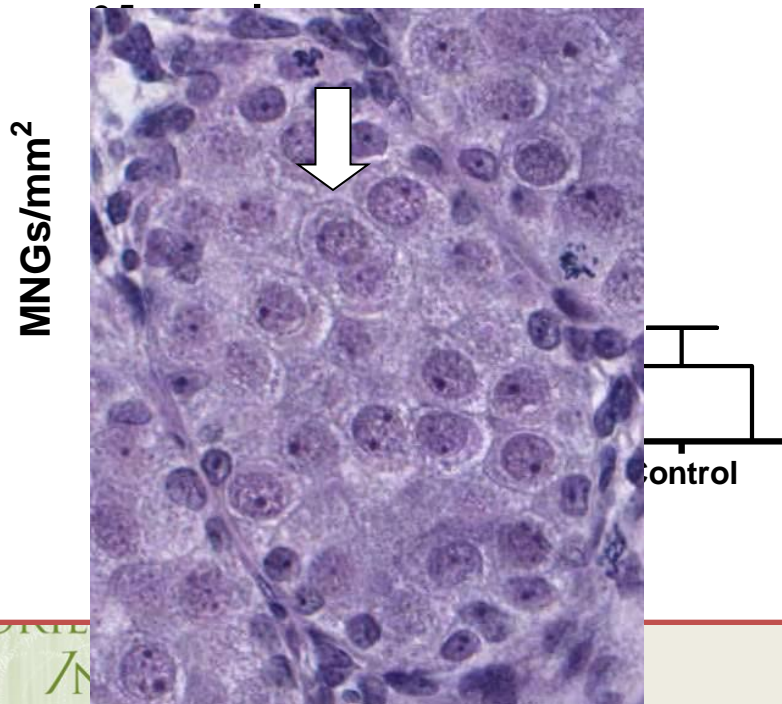
Avg. # of abnormal nuclear events per high-powered field



monoTBPH: Results

- Developmental male reproductive toxicity
 - MNG induction
 - Testosterone production

MNG Induction



monoTBPH: Discussion

- Potential thyroid, liver, developmental male reproductive toxicity
- Metabolism: TBPH → monoTBPH?
- Environmental relevance

Rhode Island: Policy Recommendations

- 2006: Hazardous Chemicals – Contamination of Breast Milk and the Environment
- Increased information on flame retardants and public health
- Ultimate goals: comprehensive policy, regional partnerships

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