

Polycyclic Aromatic Hydrocarbons (PAH)

Health Effects and Reducing Exposure



Learning Objectives

- Define and identify sources of PAH's
- Discuss health effects of PAH's
- Determine actions for reducing exposures to PAH's



Description

- Can be colorless, white or pale yellow/green solids
- 100 different chemicals, manufactured or occur in combinations
- Examples include Benzo(a)pyrene and Benzo(b)fluoranthene
- Found at 600 NPL sites



Sources of PAH's

● Formed during incomplete burning of:

- Coal
- Oil
- Gas
- Garbage
- Tobacco
- Charcoaled meat

● Released from:

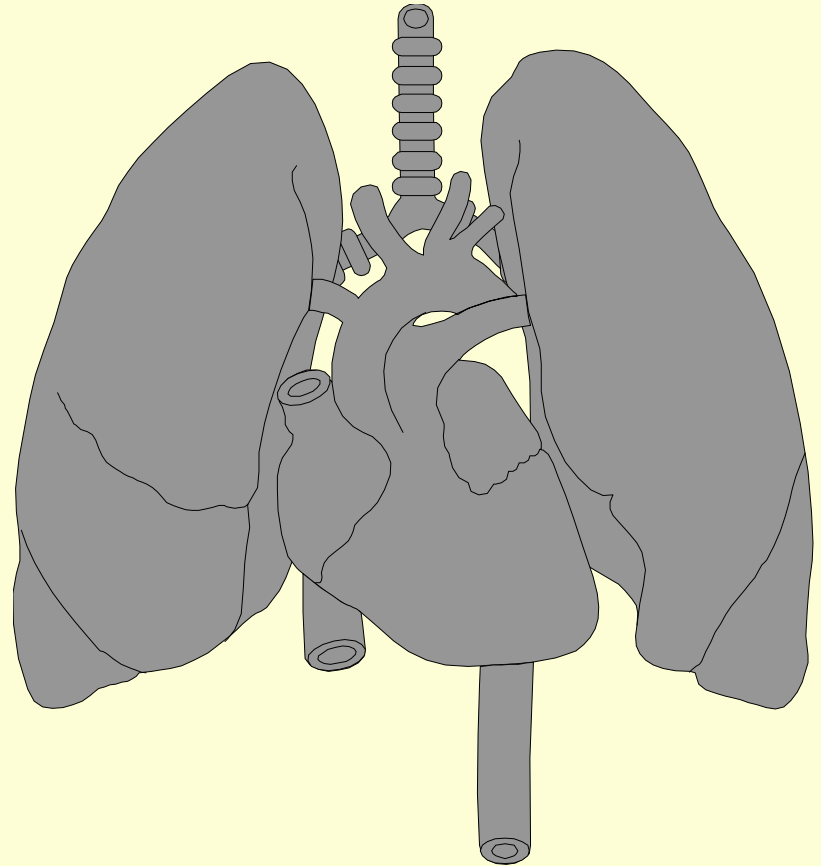
- Volcanoes
- Forest fires
- Auto exhaust

● Found in:

- Coal and roofing tar
- Crude oil
- Creosote
- Some dyes
- Plastics
- Pesticides

How Are We Exposed?

- Inhalation of air releases
- Contact with contaminated soil
- Ingestion of contaminated water or cow's milk



How Are We Exposed?

● Contaminated food:

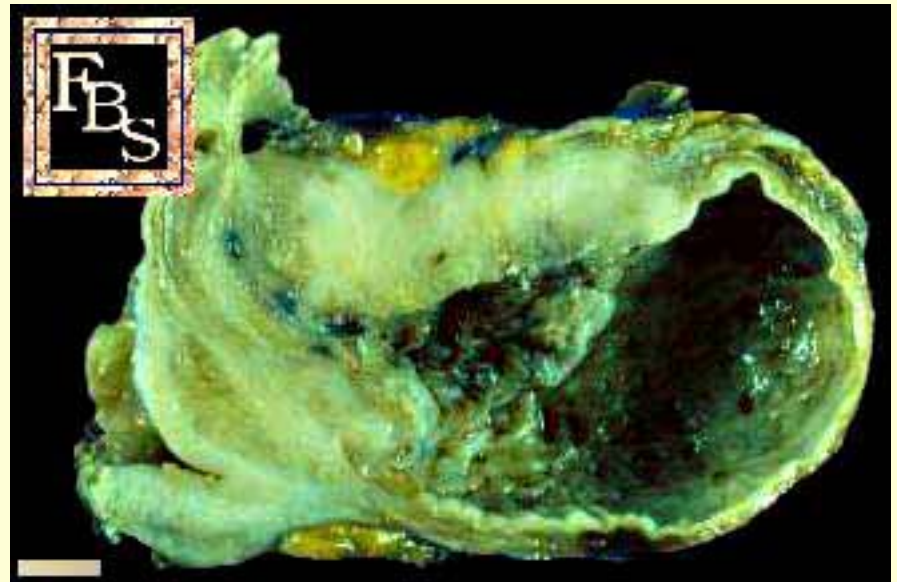
- Charred meats
- Cereals
- Flour
- Bread
- Vegetables
- Fruits
- Processed or pickled food
- Marine life in contaminated waters



Health Effects: Cancer

● “Reasonably expected to be carcinogen” (US Department of Health and Human Services)

- Lung
- Bladder
- Skin



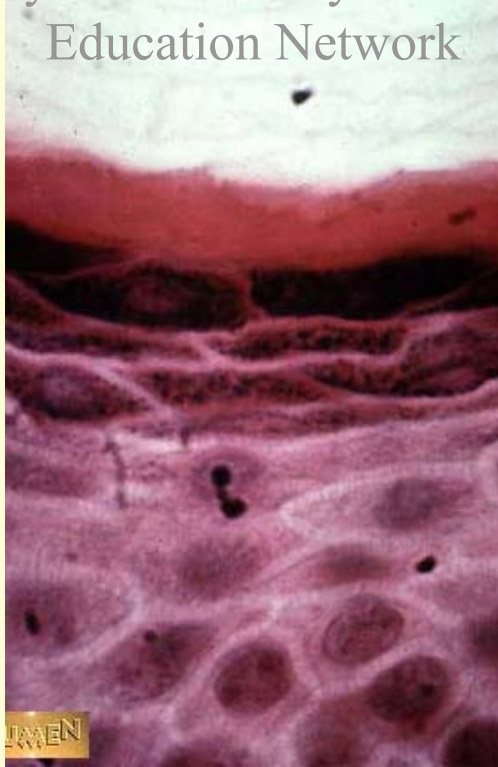
Health Effects: Developmental

- Fetus is at greater risk and susceptibility:
 - Growth retardation
 - Low birth weight
 - Small head circumference
 - Low IQ
 - Damage DNA
 - Disrupt endocrine systems, such as estrogen, thyroid, and steroids



Health Effects: Skin

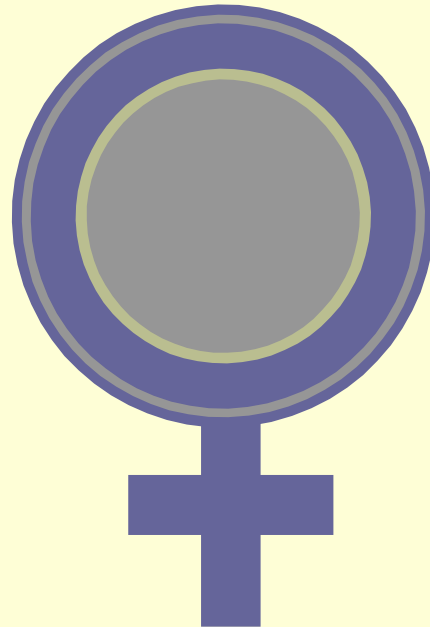
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- Irritation and burning following contact
- Exposure to sunlight increases effect
- Skin changes:
 - Thickening
 - Darkening
 - Pimples

Health Effects: Reproductive

- Early menopause related to the destruction of ovum (egg).



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Indications of Exposure

- Tests are available for some PAH's or their byproducts, but only at special facilities with required equipment
 - Urine
 - Blood
 - Body tissues
- Can indicate exposure but not whether health effects will develop



How to Reduce Risk

- Work exposure:
 - Ensure proper enclosure, ventilation, and protective equipment
 - Wash immediately after exposure and before going home
 - Change clothes at work, launder separately
- Avoid ingestion and inhalation of contaminated air, water, and food. (Current ambient exposure for general public is estimated at 3 mg/day)



Policy

OSHA

- limit is 0.2 mg/cubic meter and an 8 hour air Permissible Exposure Level of 5 mg/cubic meter.

NIOSH

- Average workplace air levels for coal tar products not to exceed 0.1 mg/cubic meter for a 10-hour workday 40-hour work week.



Policy

- If the air levels in the workplace exceed these levels, the interventions are needed to safeguard workers health
 - Substituting safer products and chemicals
 - Improving ventilation
 - Use of personal protective equipment – respirators, etc



Resources

- ATSDR ToxFAQs

www.atsdr.cdc.gov/tfacts69.pdf

- ATSDR Public Health Statement

<http://atsdr1.atsdr.cdc.gov/toxprofiles/phs69.html>



In Review

- What are PAH's and how are we exposed to them
- How do PAH's effect our health
- How can we reduce our exposure to PAH's



References

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