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* 1. Environmental Toxicants

1. Polyaromatic hydrocarbons (PAHs)

Exposure:

Polyaromatic hydrocarbons (PAHs) are formed from the incomplete combustion of   plant or animal matter, or carbon fuels, such as coal or petroleum. Automobile exhaust, industrial emissions and smoke from burning wood, charcoal and tobacco contain high levels of PAHs

Many products contain PAH’s such as mothballs, blacktop, and creosote wood preservatives and some special-purpose skin creams and anti-dandruff shampoos that contain coal tars. Grilled, smoked and charbroiled foods, especially meats, are a source of some PAH exposure 1

Toxicokinetics/Toxicodynamics:

PAH’s are known to be carcinogenic in humans and linked to, lung, skin, gastro-intestinal and bladder cancers4

In humans, the major routes of uptake of PAH are thought to be through:

(i) the lungs and the respiratory tract after inhalation of PAH-containing aerosols or of particulates to which a PAH, in the solid state, has become to be absorbed

(ii) the gastro-intestinal tract after ingestion of contaminated food or water

(iii) the skin as a result of contact with PAH-bearing materials.2

Owing to the high lipophilicity of this class of compounds, their bioavailability after ingestion and inhalation must be considered to be significant. Investigations have shown that (i) detectable levels of PAH occur in almost all internal organs, (ii) organs rich in adipose tissue can serve as storage depots from which the hydrocarbons are gradually released, and (iii) the gastrointestinal tract contains high levels of hydrocarbon and metabolites, even when PAH are administered by other routes, as a result of mucociliary clearance and swallowing or hepatobiliary excretion.3

PAH’s are eliminated in feces and urine.

Sulfur dioxide (SO2) is added to wine during its production. Discuss what is known about acute and chronic toxicity and other toxicodynamic features. Can wine be produced without using it? Are there are alternatives

Sulfur dioxide (SO2) is added to wine to inhibit or kill unwanted yeasts or bacteria. It is also used as a preservative in foods. Sulfer dioxide is considered safe for ingestion in healthy individuals that are not asthmatic. In sensitive individuals , it can induce asthma when inhaled or ingested, even in high dilution.5  Some anecdotal reports suggest a link between sulfites in wine and headaches, skin rashes, flushing, itching or swelling but there is no clear evidence to back this up. No studies show a link between cancer and long term exposure via ingestion.

One can limit sulfite exposure by drinking organic or sulfite free wine. This however only minimizes exposure as there is no such thing as 100% free sulfite wine. Sulfites form naturally during the fermentation process and are therefore unavoidable in wine. Naturally occurring sulfites are generated in very small amounts ranging from 6 to 40 parts per million (ppm)6. Wines with total SO2 concentrations below 10 ppm do not require "contains sulfites" on the label in the US. The upper limit of total SO2 allowed in wine in the US is 350 ppm7

Drug-Nutrient Interactions. Select any of the drugs or drug classes below and explain how it affects diet (nutrient absorption). Either suggest an alternative drug and/or explain how an individual can compensate for any effect on nutrition  
1.Antacids

Antacids work by  preventing, neutralizing, or counteracting acidity. Magnesia or sodium bicarbonate are two common compounds used to neutralize stomach acids. Proton pump inhibitors (PPI’s) work via long lasting inhibition of acid production. Long term PPI usagecan diminish B12 absorption leading to pernicious anemia. Supplementation via B12 intramuscular injection can offset losses in gastrointestinal absorption.

Dietary changes can help to control stomach acid issues. Some foods contain enzymes to help with digestion and/or produce an alkalizing effect on the body. These include: yogurt, ginger, peppermint, wheatgrass, aloe vera juice, papaya, pineapple, and apple cider vinegar among others.

Sexual dysfunction therapy. A medication for hypoactive sexual arousal disorder recently was in the news. This medication, flibanserin, is being called a “female Viagra.”  
(a) Discuss the effect of the drug both at clinical and molecular level

Flibanserin was developed as an antidepressant. The proposed mechanism of action is via modulation of neurotransmitters involved in the excitation and inhibition of sexual arousal. The excitatory activity is driven by dopamine and norepinephrine, while the inhibitory activity is driven by serotonin. Flibanserin, a 5-HT1A receptor agonist, D4 receptor very weak partial agonist/antagonist, and 5-HT2A receptor antagonist, may improve the balance between these neurotransmitter systems.8

Women receiving Flibanserin showed a 2.8-4.5 increase in reported “satisfying sexual events” per month. Studies did not show an increase in sexual desire and therefore Flibanserin has not met the agreed upon criteria for efficacy in treatment of Hypoactive Sexual Desire Disorder.

References:

* 1. <https://www.dhs.wisconsin.gov/chemical/pah.htm>
  2. <https://www.dhs.wisconsin.gov/chemical/pah.htm>
  3. <http://www.inchem.org/documents/ehc/ehc/ehc202.htm#SectionNumber:1.6>
  4. <http://repository.ubn.ru.nl/bitstream/handle/2066/113360/mmubn000001_044583273.pdf?sequence=-1>
  5. <http://www.ncbi.nlm.nih.gov/pubmed/7426352>
  6. <http://www.wines.com/sulfite-free-wine/>
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  8. https://en.wikipedia.org/wiki/Flibanserin