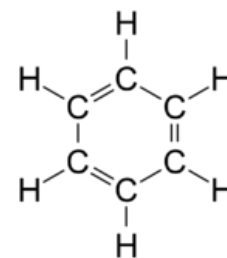


Intoxication with chlorinated hydrocarbons and benzene

This article has been translated from WikiSkripta; ready for the **editor's review**.

Benzene

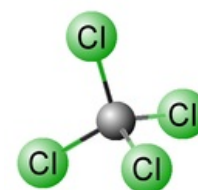
- high danger → only used to a limited extent (production of benzene derivatives, pharmaceutical industry)
- the work is under strict hygiene measures
- **source**: oil, coke plants (during coke production)
- **lethal dose**: **10-15 ml** p.o.
- **metabolism** – it is oxidized to benzepoxide (carcinogen), reacts with DNA, approx. **15 %** is excreted unchanged through the lungs ; in urine – phenol ((it is there even without exposure as a breakdown product of AMK), **phenyl mercapturic acid**, urine is collected at the end of the shift



benzene molecule

Clinical picture of intoxication

1. **acute intoxication** – **neurotoxic** manifestations in the foreground
2. **long-term exposure** – **hematotoxic** – effects dominate leukopenia, trombocytopenia, anemia, pancytopenia, there is an increased level of chromosomal aberrations in peripheral lymphocytes
 - after **10-20 years** AML or CML may develop



tetrachloromethane molecule

Tetrachloromethane and chloroform

- 50 % is metabolized by the liver, **50 %** is exhaled unchanged
- we have little data on metabolites

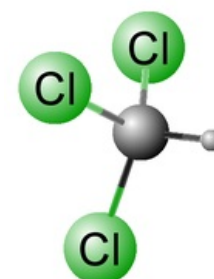
Acute effects

Central Nervous

- excitation, disorientation, dizziness, drunkenness, nausea, drowsiness and even unconsciousness

Hepatotoxicity

- dominates in oral poisoning, steatosis and necrosis occur, mainly in carbon tetrachloride
- steatosis is caused by damage to the endoplasmic reticulum, which leads to disruption of lipid transport
- necrosis is conditioned by the release of lysosomal enzymes by the action of free radicals
- Thanks to cytochrome P450, CCl₄ breaks down into Cl⁻ and trichloromethyl radical, then HCl and phosgene are formed – this damages
- therefore, alcoholics are more susceptible (they have more active cytochrome P450)
- with chloroform, damage used to be observed only at high concentrations



chloroform molecule

Nephrotoxicity

- CCl₄ damages **tubule cells**, glomeruli are not damaged

links

Related Articles

- Organic solvents

Source

- BENEŠ, Jiří. *Study materials* [online]. [cit. 24.02.2010]. <<http://jirben.wz.cz>>.



Acute manifestations of chloroform intoxication

References

- PELCLOVÁ, Daniela. *Occupational diseases and intoxication*. 2nd edition. Karolinum, 2006. 207 pp. ISBN 80-246-1183-X.