



بِسْمِ الْمَلِكِ الَّذِي لَا يَنْهَرُ عَنْ اسْمِهِ
شَيْءٌ وَلَا فِي الْأَرْضِ وَلَا فِي السَّمَاءِ
وَهُوَ السَّمِيعُ الْعَلِيمُ ♡

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Hydrocarbon Toxicity



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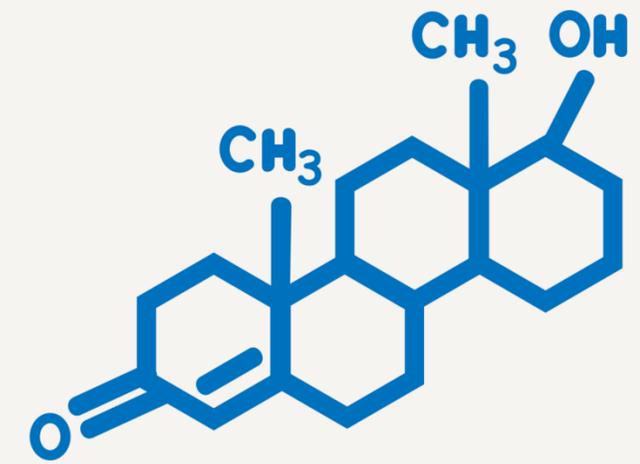
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chemistry



- Organic compounds made of only carbon and hydrogen atoms (1-60 C).

- Classified into 2 main classes :

- Aliphatic (open chain) as petroleum distillates.
- Aromatic (benzene ring) as benzene and toluene.

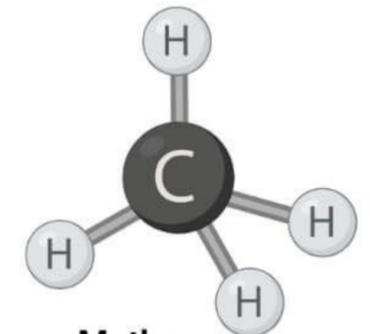
3. Halogenated hydrocarbon as carbon tetrachloride

- Physical properties of hydrocarbons vary by the number of carbon atoms and molecular structures.

Aromatic vs Aliphatic Compounds



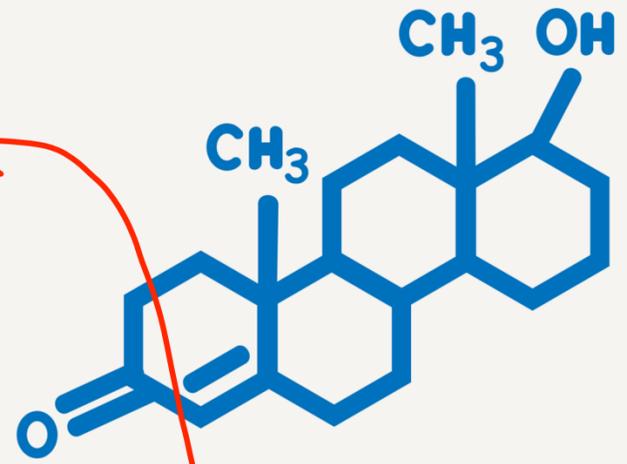
Benzene (ring)
(aromatic compound)



Methane
(aliphatic compound)

chemistry

كلما كانت أقل يكون more-toxic
لأنه spreading يتجه مزيد أكثر

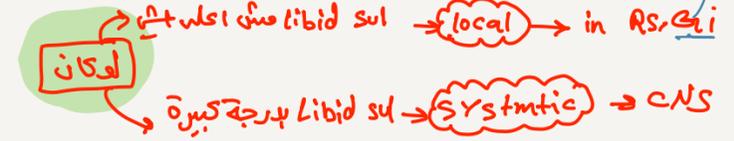


- The main problems of hydrocarbons are their volatility & viscosity.

↑ Gasoline * لكن حسب كمية ذرات الكربون * Volatility ↑
لأنه يتجه عام كل ال

مما لو كانت ال viscosity نتيجة كالمه حوي بجزئك بسير ال هضم

- Also, there is other factors can differentiate hydrocarbons such as lipid solubility, surface tension & molecular weight.



لأنه كلما كانت ↓ كلما كانت ↑ toxic = Pulmonary - spreading
لأنه يزيد ال spreading

- Most commercial hydrocarbon like gasoline and kerosene products are variable mixtures of individual hydrocarbon compounds.

كثير موجود بالبينة
↓ viscosity

Household products containing hydrocarbon

▶ Adhesives (glues)

▶ Baby oil.

▶ Cod liver oil

▶ Paint removers

▶ Furniture polishes. *دهان الخشب*

▶ Gasoline

▶ Kerosene.

▶ Solvents *حماز / تتر*

▶ Stain removers



kerosene poisoning

- ▶ Kerosene is a **domestic volatile hydrocarbon**
- ▶ These compounds are derived from plants (e.g. Pine oil) or from fractional distillation of crude petroleum.

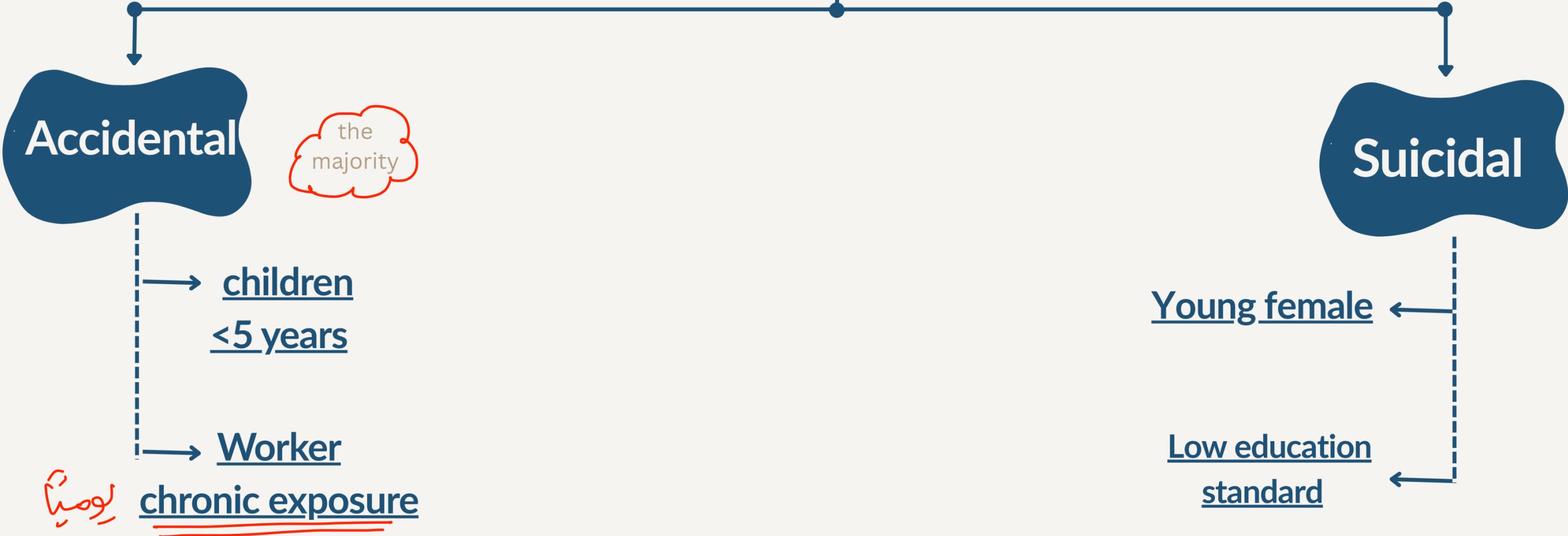
Uses :

degreaser, cleaner

fuel oil in Kerosene "Paraffin" lamps & stoves solvent for many insecticides e.g. Parathion



manner of poisoning



mode of poisoning

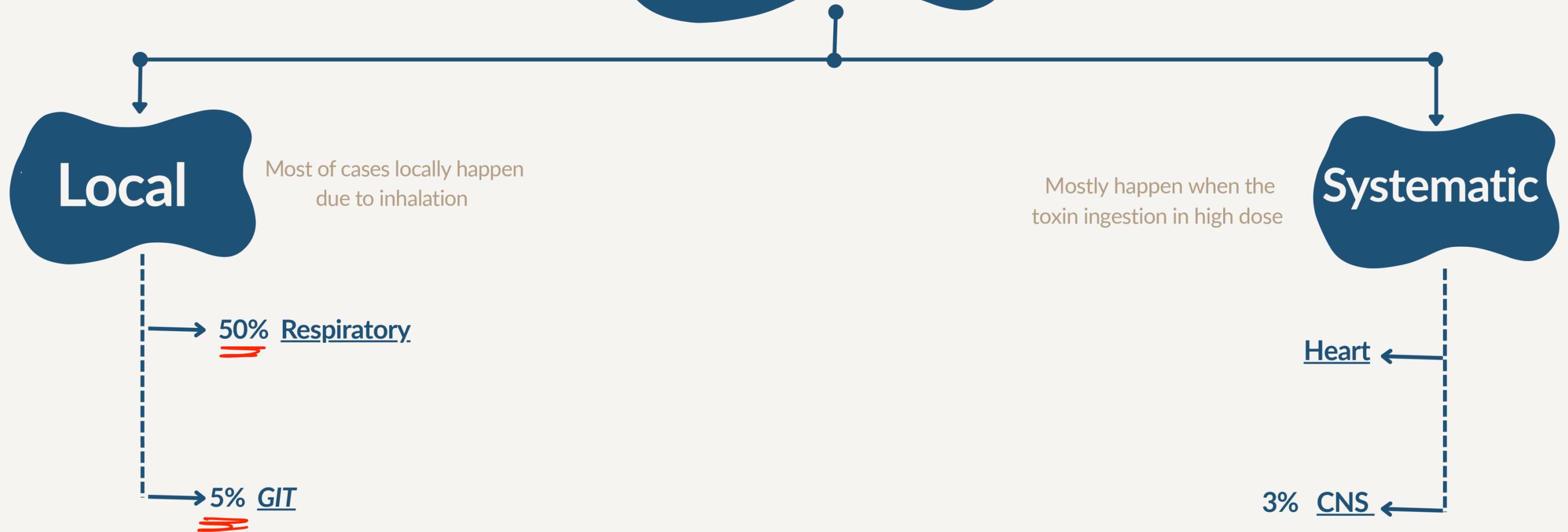
inhalation

~~locally~~
mostly rs

ingestion

~~systemic~~
cns, heart

The mechanism of action



Pathophysiology of Hydrocarbon Toxicity

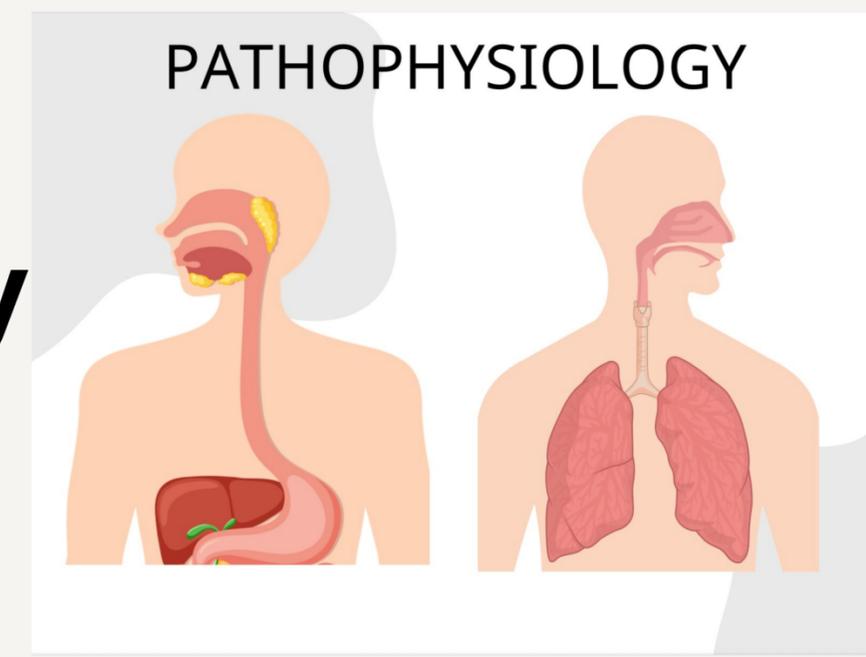
Hydrocarbons (kerosene, gasoline) enter mainly via inhalation or aspiration.

#Children are more susceptible due to accidental exposure .

بچوں کی زیادہ کمیہ کبیرہ سے

#Lungs are the main site of injury

بچوں کی زیادہ کمیہ کبیرہ سے
accidental
لہذا باقی جسم کے محتاج ہر وہ کبیرہ
عشاق بیاتر
* بخاف والبرہ اکثر ایسی *



Mechanism of Lung Injury:

1- *Physical Properties & Direct Effect*

↓ لانخفاضه
عشوائيه ⇒ more toxic

Low viscosity, high volatility, and low surface tension

Allow rapid spread into alveoli .

Cause extensive direct damage to lung tissues.

2-Surfactant Inhibition & Alveolar Collapse

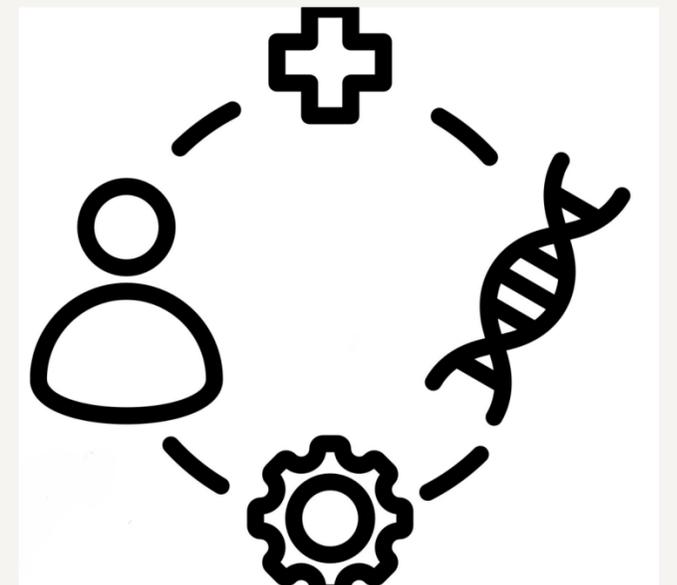
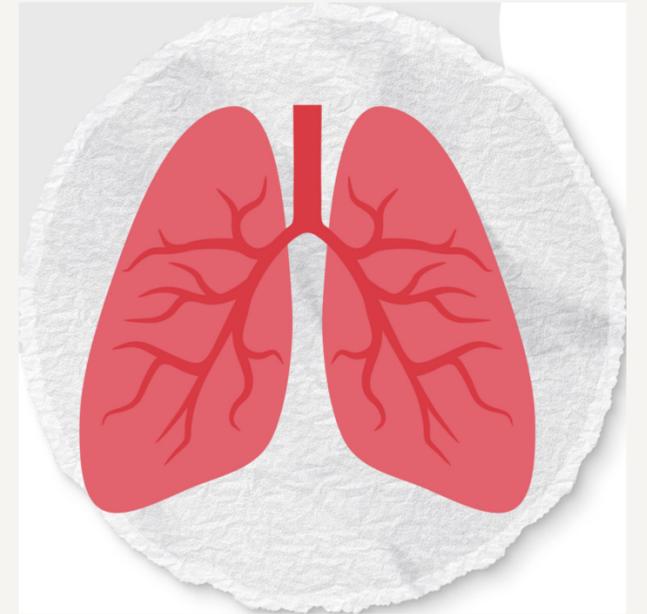
The lung rely on surfactant to keep alveoli open and maintain gas exchange.

Hydrocarbons inhibit surfactant production
(Type II pneumocytes)

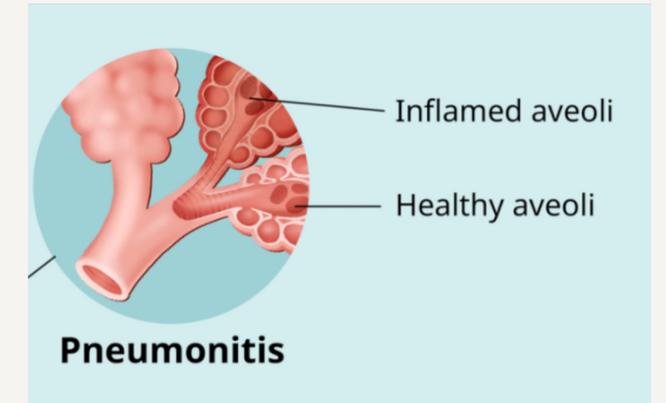
Keep alveoli open + prevent collapse
سواء ← Surfactant ← تستخدم في ← المرئيات

Leads to alveolar collapse (atelectasis)

Impaired gas exchange and oxygenation
سيف



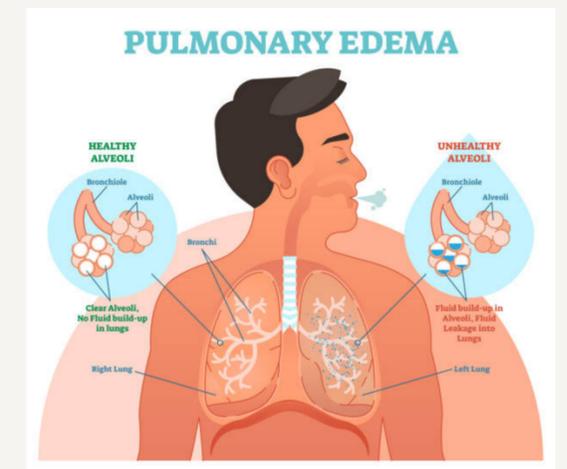
3-Inflammation & Pulmonary Edema



Hydrocarbons irritate lung tissues → chemical pneumonitis.

Inflammation causes increased capillary permeability, resulting in fluid leakage into the alveoli.

Pulmonary edema → impaired oxygen exchange and dyspnea

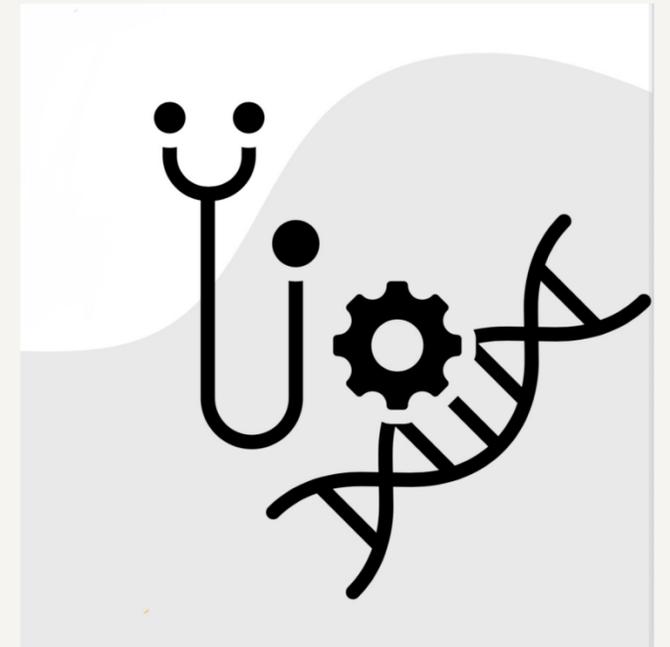


4- Systemic Effects & Complications

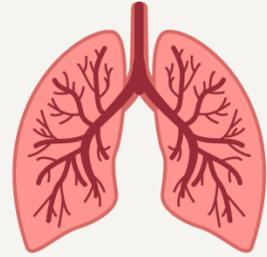
Hyperemia (increased blood flow) and mucosal irritation → cough, wheezing, distress.

Severe cases may cause:

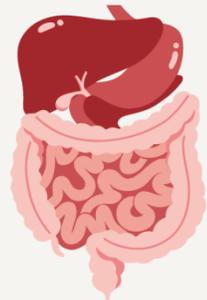
- Respiratory failure**
- Secondary bacterial infection**
- Acute Lung Injury (ALI)**



clinical picture

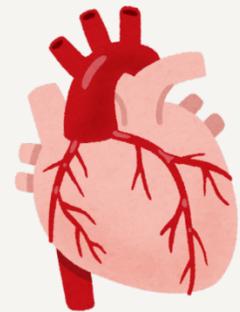


Lung: Gagging, coughing, choking, leading to aspiration with bronchospasm, rales, tachypnea, hypoxia; later hemorrhagic pulmonary edema, with cyanosis.



GIT: nausea and vomiting (SMELL OF KEROSENE).
diarrhea, hematemesis.

irritation →
amount of vomit →
seizure



Heart: ventricular premature beats, tachycardia, fibrillation due to sensitization of myocardium to epinephrine may occur



CNS: drowsiness, stupor and then coma. Seizures may occur

Investigation



Chest X ray of a child developed right middle lobe and bilateral middle lobe infiltrates within hours which strongly suggest aspiration pneumonitis

X-ray

- Most important. *→ after 6 h*
- To detect chemical pneumonitis, aspiration, or pulmonary edema
May be normal early; changes appear within 6 hours.

Blood gases

Can help assess hypoxia and oxygen saturation levels
To detect the alkalinity in blood due to tachypnea that excrete more CO₂.

ECG

Hydrocarbons can cause arrhythmias
(ventricular fibrillation, "sudden sniffing death")

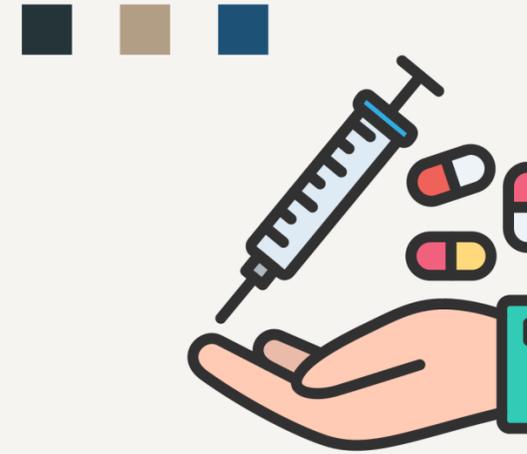
Electrolyte levels

May be altered due to dehydration, acidosis, or other effects

CT or MRI of the Brain

In cases of chronic exposure, especially with substances like toluene, imaging may reveal leukoencephalopathy

Treatment



within 6 hours

depends on the presence of symptoms and x-ray findings

No symptoms
normal x-ray



No ttt

Symptoms
abnormal chest x-ray



Hospitalization

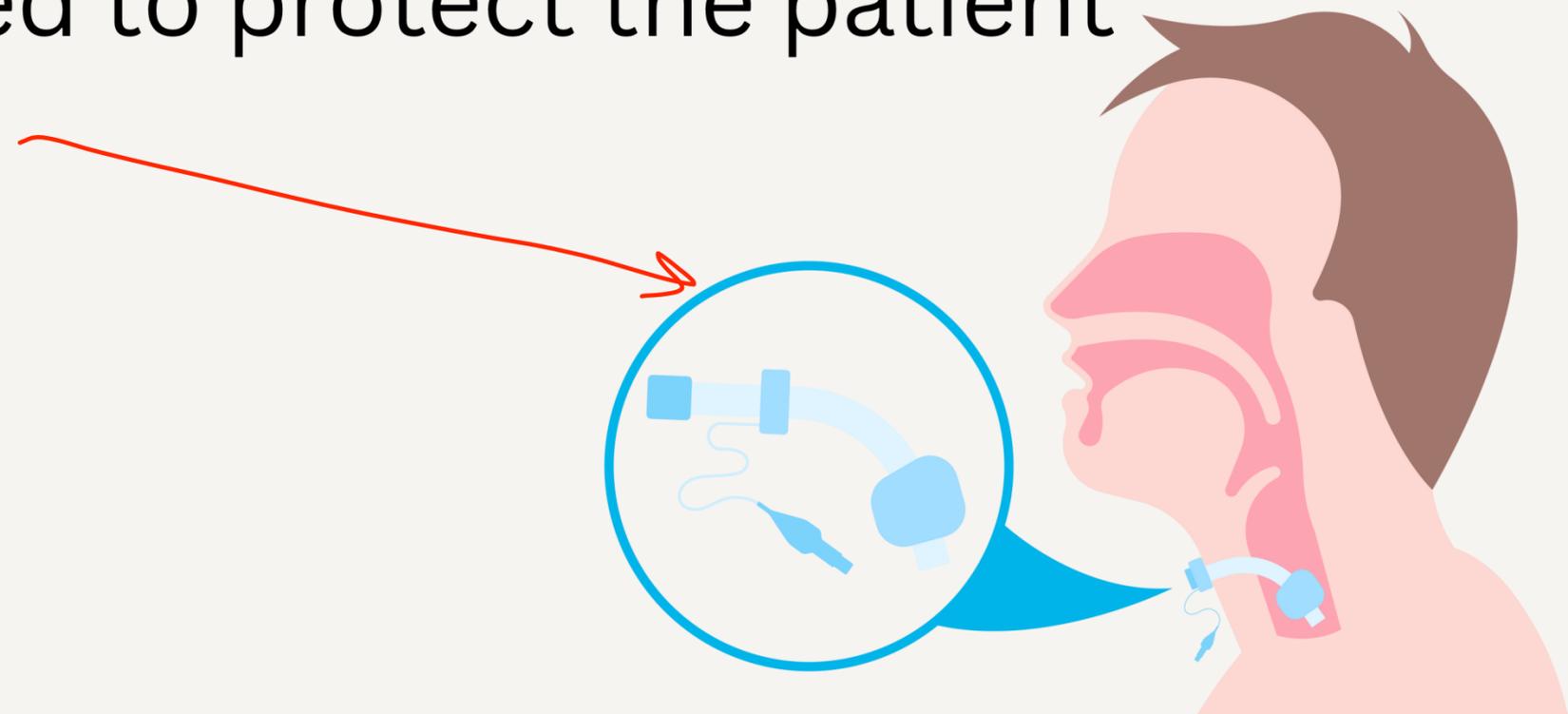
Treatment

1. Emergency measures : oxygen inhalation if the patient is conscious
2. symptomatic treatment : antibiotics for bronchopneumonia and corticosteroids for chemical pneumonitis.
3. General measures : **skin** wash with soap and water
GIT decontamination: **emesis ,gastric lavage**

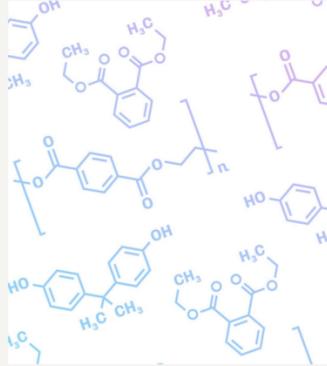
They are contraindicated , why ?
they cause aspiration and mild system toxicity

what are indications and precautions of gastric lavage in kerosene poisoning :

- **concomitant ingestion** (if the person has swallowed a significant amount of kerosene along with other highly toxic substance)
- **cuffed endotracheal tube** (used to protect the patient lungs from aspiration)



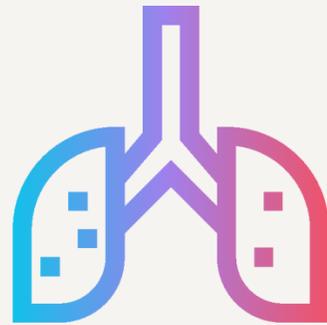
01



Hydrocarbons are widely used substances with significant potential for toxicity. Exposure can occur via inhalation, ingestion, or skin contact, leading to respiratory, CNS, and GI effects.

Wanel Medjayat

02



Aspiration into the lungs is the most serious complication, causing chemical pneumonitis.

Summery

03



Public awareness and safe handling reduce the risk of exposure and morbidity.



Thank you

