



Libyan International Medical University
Faculty Of Pharmacy (Pharm-D)



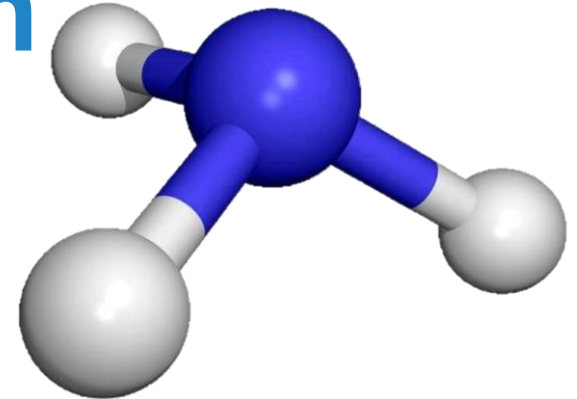
Ammonia intoxication

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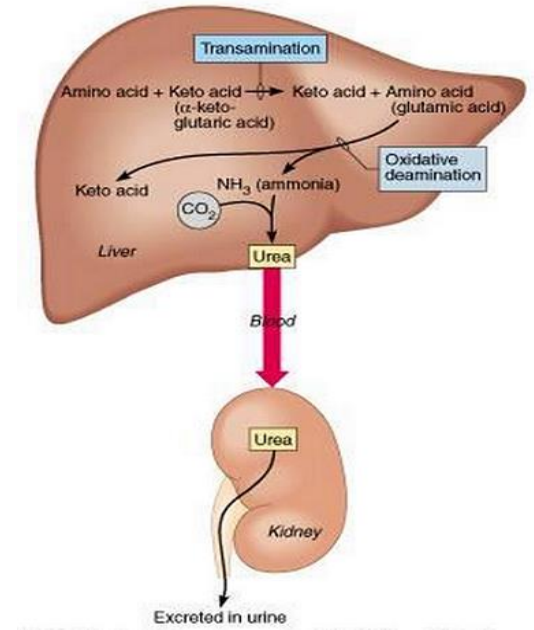


Learning outcome

- 1. Discuss the causes of ammonia intoxication**
- 2. List the symptoms of ammonia intoxication**
- 3. Describe the mechanism of ammonia intoxication**
- 4. Discuss the treatment of ammonia intoxication**

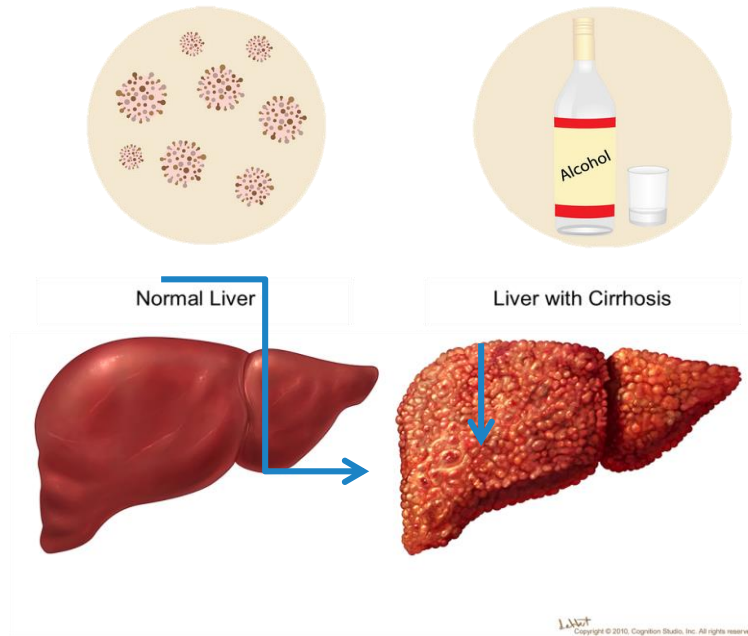
Introduction:

- ▷ Ammonia (NH₃) is a colorless irritant gas
- ▷ It is a natural product in the human body as an intermediate in several metabolic reactions such as in amino acid synthesis.
- ▷ The blood ammonia level in a healthy adult is in a range of 15 to 45 micrograms/dL.



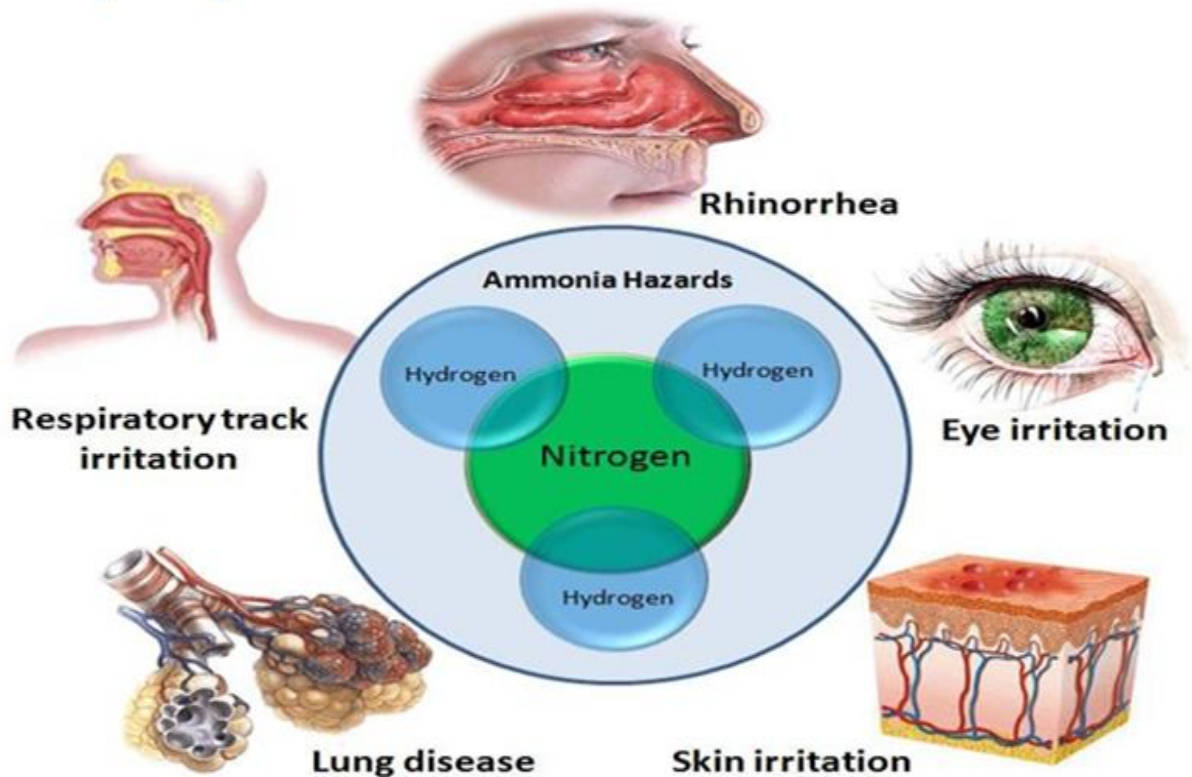
Causes of ammonia intoxication:

- Ammonia toxicity occurs when the ammonia content in the blood supersedes the liver's capacity to eliminate it.
- Liver disease (for example, viral hepatitis, ischemia, or hepatotoxins; Cirrhosis of the liver caused by alcoholism).
- Congenital: Genetic deficiencies of each of the five enzymes of the urea cycle.



Symptoms

- ▷ Tremors.
- ▷ slurred speech.
- ▷ vomiting.
- ▷ blurred vision.
- ▷ At high concentrations ammonia can cause coma and death.

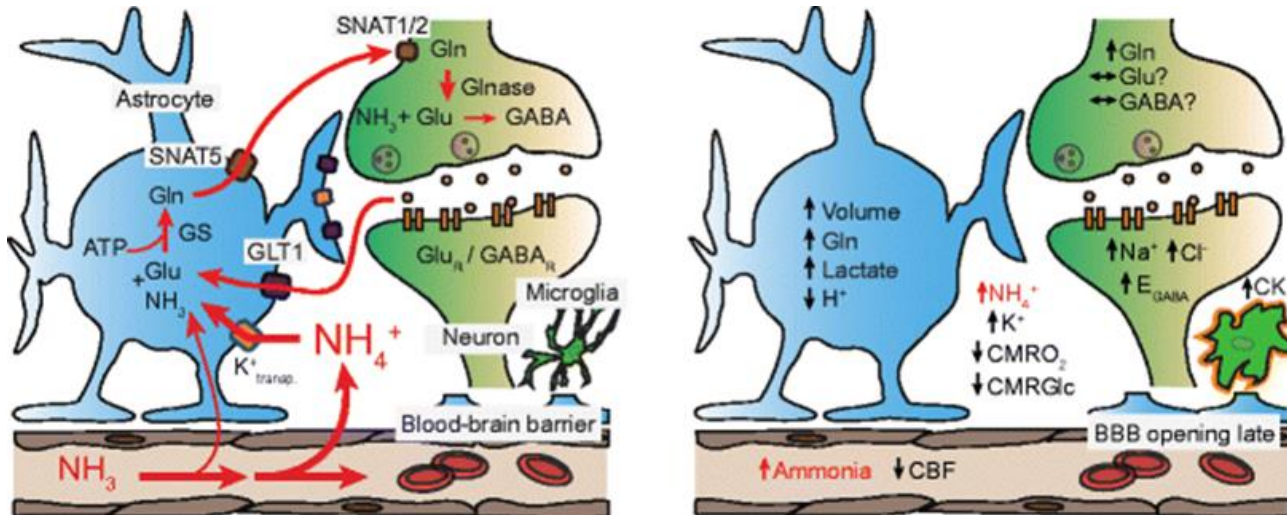


Mechanism of ammonia intoxication ...

- The major reason of encephalopathy in liver failure is Hyperammonemia
- Ammonia crosses blood brain barrier and enters brain cells
- α -ketoglutarate in the brain cells react with ammonia to form glutamate
Brain cells are starved of α -ketoglutarate, so no TCA cycle, no ATP;
therefore encephalopathy
- Increased glutamate is converted to GABA (gamma amino butyric acid)
which is an inhibitory neurotransmitter, another reason for encephalopathy

Mechanism of ammonia intoxication

- Elevated levels of ammonia increases entry of aromatic amino acids across blood brain barrier
- More tryptophan in brain; increased synthesis of serotonin, a neurotransmitter.
- Loss of balance between neurotransmitters-another reason for encephalopathy



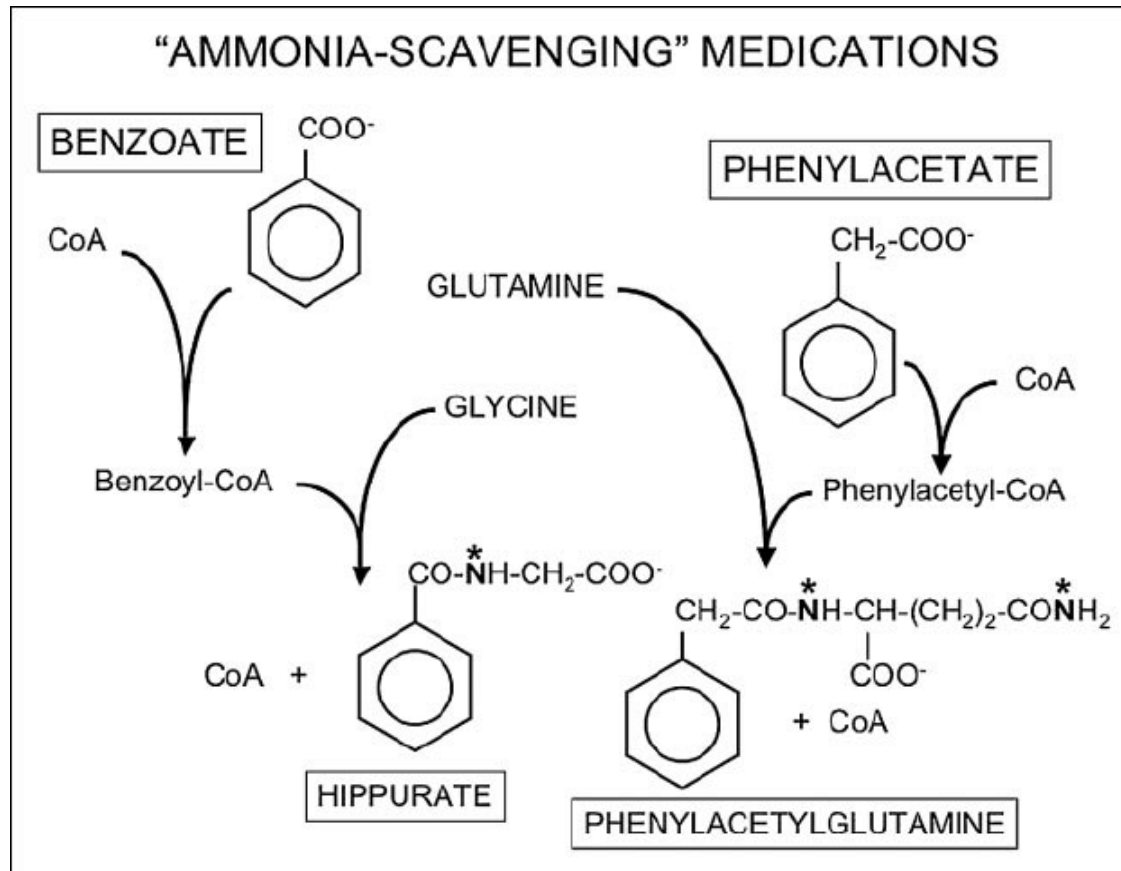
Treatment of ammonia intoxication

There is no antidote for ammonia poisoning. Treatment consists of supportive measures. These include administration of humidified oxygen and bronchodilators and airway management; treatment of skin and eyes with copious irrigation; and dilution of ingested ammonia with milk or water..

Treatment of ammonia intoxication

- included restriction of dietary protein, glutamate injection, alpha ketoglutarate acid.
- Protein intake should be stopped.
- Calories should be supplied by giving hypertonic 10% glucose.
- Hemodialysis should be started promptly in all comatose
- Intravenous sodium benzoate and phenylacetate should be started once the plasma ammonium level falls to 3-4 times the upper limit of the reference range.
- Intravenous arginine should be provided

Mechanism Treatments



Summary

Ammonia (NH₃) is a colorless irritant gas as an intermediate in several metabolic reactions.

The causes of ammonia intoxication are:

- Congenital: Genetic deficiencies of each of the five enzymes
- Cirrhosis of the liver caused by alcoholism.

At high concentration of ammonia in the body; can cause coma and death.

The major reason of encephalopathy in liver failure is Hyperammonemia.

More tryptophan in brain; increased synthesis of serotonin, a neurotransmitter.

Reference



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Thanks you