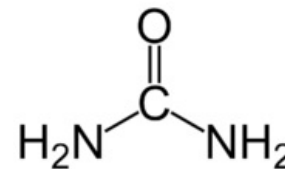


# Ammonia

**Ammonia** (**azan**), also known by the trivial name **ammonia**, is normally a gas with the general formula  $\text{NH}_3$ . It is naturally present in the human body and is also a very important substance in the chemical industry.

## Physico-chemical properties

- It is **toxic** (severe exposure can cause **poisoning** - see below)
- Colorless**, pungent **smelly flammable gas**  $\rho_{\text{v}} = -33.34$  & nbsp; ° C and density  $0.86 \text{ kg / m}^3$  </ sup >
- Ammonia molecules are polar, with a free electron pair on the nitrogen
- Nitrogen can **bind a proton**, resulting in the ammonium cation  $\text{NH}_4^+$  (so it is **basic in nature**)
- Well soluble in water and partially reacts with it to form hydroxide and ammonium ions
- May form significant salts (eg 'salmiak' ') and complexes where the electron pair donor is
- In nature, it is formed by the decomposition of nitrogenous substances (some microorganisms, such as the genus *Azotobacter*, bind atmospheric nitrogen and catalyze it to ammonia using the enzyme nitrogenase)



Structural formula of urea

## Meaning in the human body

Physiological levels of ammonia in peripheral blood are very low ( $10\text{-}20 \mu\text{g / 100 ml}^{[1]}$ ), its' *production **may increase**, for example **in metabolic alkalosis** (ammonia is involved in the regulation of acid - base balance and the retention of some cations).*

Ammonia is formed by deamination of the  $\alpha$ -amino nitrogen contained in amino acids. In the liver, it is rapidly metabolized to **urea**( urea), which is non-toxic - so it is part of the urea cycle. Urea synthesis is energy intensive - 3 moles of ATP are consumed per 1 mole of urea. In hepatic impairment (eg hepatitis or liver cirrhosis, or in collateral communication between the systemic and portal bloodstreams, ammonia may accumulate in the blood and cause clinical signs typical of its increased concentration. Symptoms of poisoning include '[tremor] tremor', blurred vision, blurred speech, and coma death.

File:Glucose-alanine cycle.jpeg  
Glucose-alanine cycle

Ammonia can be formed in most tissues, but the **urea cycle** is only present in the **liver**. Therefore, it can also be degraded in the "glucose-alanine" cycle, or by the formation of "glutamine".

Bacteria can produce a significant amount of ammonia in the large intestine, which can cause liver coma. This situation usually occurs when eating a protein-rich meal or bleeding into the gastrointestinal tract. In this case, the amount of ammonia produced can be reduced by oral administration of neomycin.

## Links

## Source

- ws:Amoniak

## Related Articles

- Urea
- Urea cycle
- Hepatic encephalopathy

## Reference

- MURRAY, Robert K, et al. *Harper's biochemistry*. 2. edition. H&H, 2002. 871 pp. pp. 306-310, 651. ISBN 80-7319-013-3.

## Used Literature

- MURRAY, Robert K, et al. *Harper's biochemistry*. 2. edition. H&H, 2002. 871 pp. pp. 306-310, 651. ISBN 80-7319-013-3.
- VACÍK, George, et al. *Overview of high school chemistry*. 42. edition. SPN - pedagogické nakladatelství, 1999. 0 pp. pp. 189-190. ISBN 80-7235-108-7.

- {Cite

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