Chapter 19 : ALCOHOL

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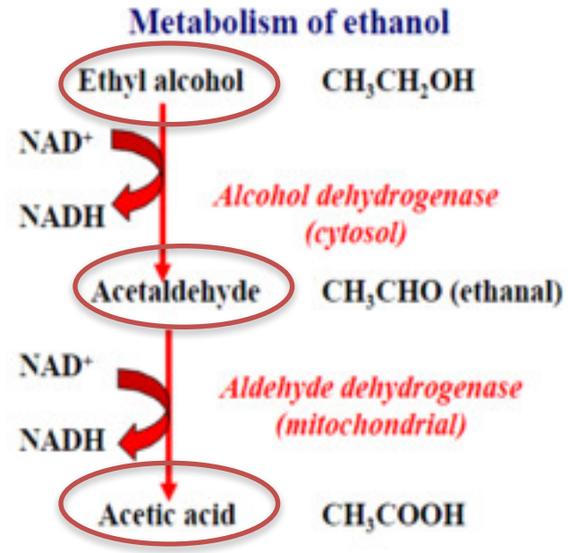
General facts about alcohol (ethanol):

- **Blood alcohol concentration (BAC)** can be measured by **Winnek's formula:**

BAC = (150/body weight in pounds) (% ethanol/50) (ounces consumed) (0.025).

- Eg: If a 200-pound (90.7 kg) man drank five 12-ounce (354.9 mL cans of beer, that contain 4% his BAC will be: BAC = (150/200) (4/50) (60) (0.025) = 0.090% (90 mg%).
- Ethanol absorption:
- Alcohol is absorbed from the stomach and small intestine by diffusion, with most of the absorption occurring in the small intestine.
- The rate of absorption **increase** by: High alcohol concentration.
- The rate of absorption **decrease** by: Food, High fluid volume, low alcohol concentration.
- Elimination of alcohol:
- **Acetaldehyde** is **responsible for most of the clinical side effects of alcohol.**
- The measured alcohol concentration depends on both **weight and sex** because these two factors determine the total volume of body water. Eg: someone who is obese or has a greater proportion of body fat will have a lower BAC than a thin person. Women have more fat tissue than men of the same weight and, therefore, a smaller volume of body water. As a result, BAC will be slightly higher in women than in men after consuming an equal amount of alcohol.
- **High total body water = Low alcohol concentration**.
- Ethanol measurement:
- **Breath testing** is used by most enforcement agencies in most countries with respect to road traffic (driving) offences.
- ethanol contained in the sample is oxidized with an electrochemical sensor. If done correctly, the value measured is directly proportional to the concentration of the ethanol present in the body.
- 'Breathalyser' type devices have repeatedly been proven accurate and reliable, and they do not react with acetone, which might be present in a poorly controlled diabetic.

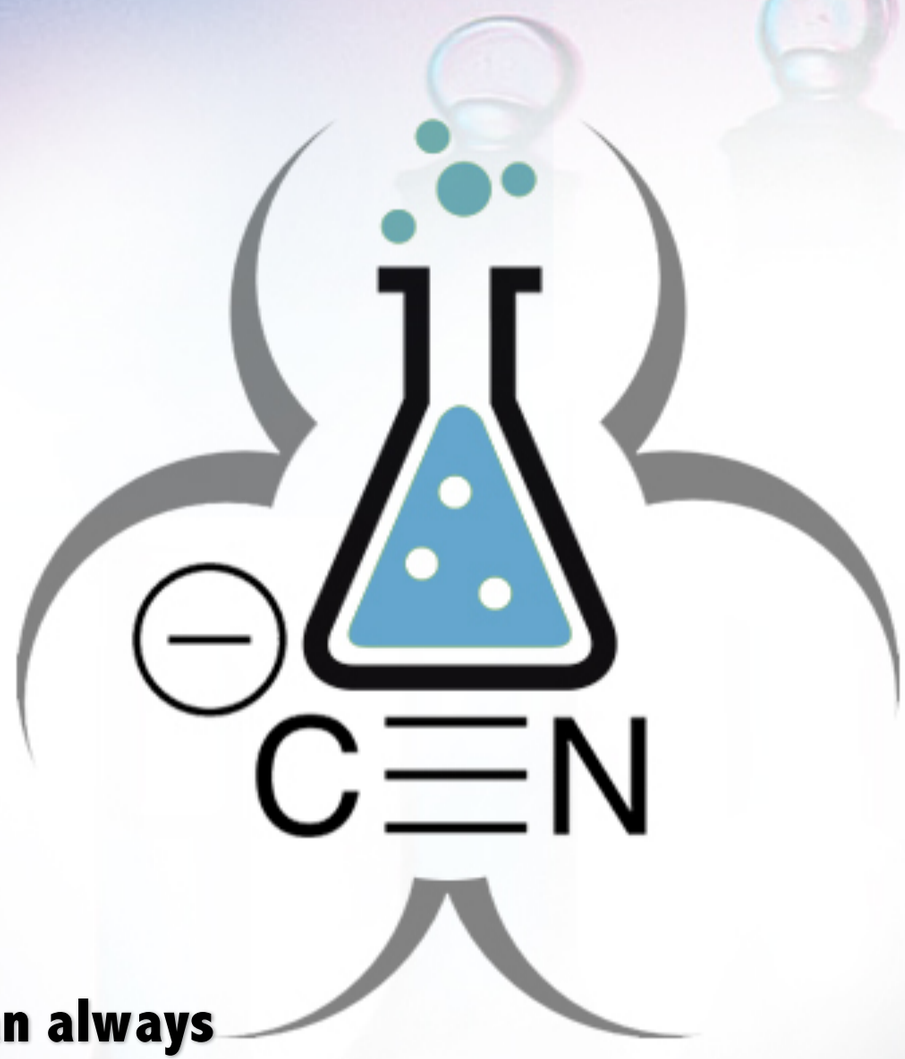


Clinical effects of alcohol:

- **Ethanol** is a **potent central nervous system depressant**.
- **Initial feelings of relaxation and cheerfulness give way to blurred vision, loss of**
- **coordination and behavioral issues**.
- **After excessive drinking, unconsciousness ➔ alcohol poisoning and death.**
- **In case of severe intoxication, vomit aspiration may lead to asphyxiation & death**.
- **Chronic alcoholics are able to tolerate higher BAC than non-alcoholics.**

❖ Post-mortem considerations :

- **After death**, **bacterial enzymes** (predominantly alcohol dehydrogenase and acetaldehyde dehydrogenase) act upon carbohydrates within the cadaver. Glycogen or lactate is converted to pyruvate and then ethanol.
- Postmortem ethanol production will be greater in some tissues than in others depending on the amount **of glycogen or substrate available**. *(e.g. postmortem ethanol production will be greater in liver compared to vitreous humour).*
- **Factors increase postmortem ethanol production: High terminal hyperthermia, bowel trauma, severe body disruption *(trauma)*, high glycogen/substrate amount**.
- We compare the **ethanol content of urine (UAC)** and/or **vitreous humour** with the **amount measured in blood (BAC)** to know whether alcohol detected was formed before or after death.
- **UAC:BAC ratio:**
- **is less than 1:2,** this is generally considered confirmation that ethanol concentrations were **rising at time of death.**
- **A ratio of greater than 1:3** suggests that the **decedent was in the post- absorptive stage**.
- **Ratios much greater than 1:3** indicate **heavy consumption over a long period of time.**



If you have any questions You can always contact us at : forensic433@gmail.com

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