

# Looking At Common Drugs

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**BELLRINGER:**

***WHAT IS THE DEFINITION OF TOXICOLOGY AS IT  
RELATES TO FORENSIC SCIENCE?***





# Introduction



- Every little bit helps when trying to get to the bottom of a possible poisoning.
- The medical examiner and the toxicologist use any and all evidence, including the results of toxicological testing, the autopsy examination, and statements from investigating officers and witnesses.



# To Use This Information They Must...

- **Know** the chemical makeup, physiological actions, and byproducts of drugs and potential poisons.
  - **Understand** how the drugs are metabolized by the body and the potentially toxic properties of those metabolites.
  - **Know** how these chemicals affect healthy people in addition to people with various illnesses and addictions.
  - **Recognize** the symptoms and signs produced by these chemicals.
- I plan to provide you with a peek @ many of the poisons, toxins, legal and illegal drugs, and chemicals that the Medical Examiner and Toxicologist are likely to encounter 😊





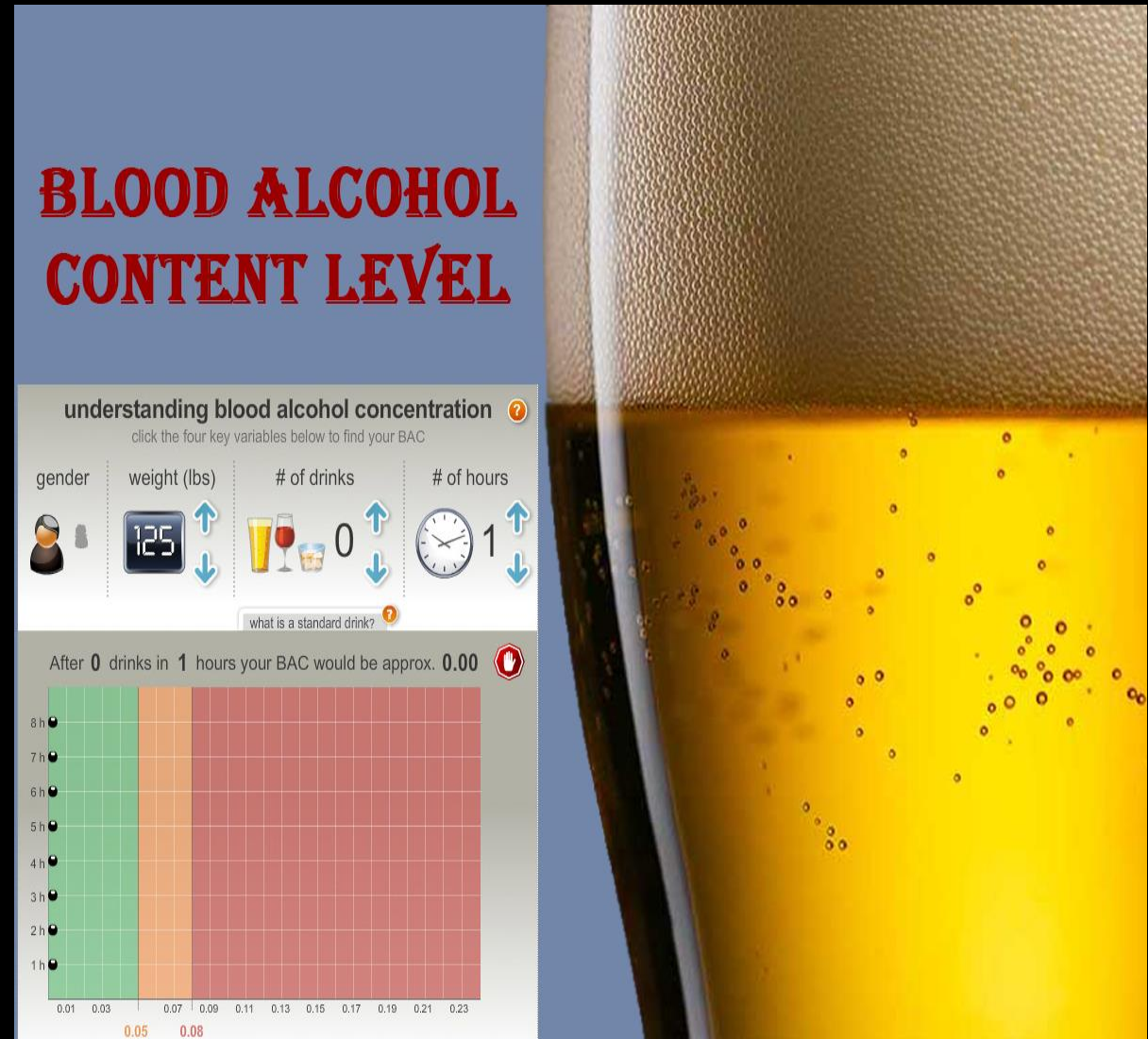
# Understanding Alcohol

- **Ethanol**, or drinking alcohol, is by far the most commonly abused drug.
- Its toxic effects are potentially lethal, and the loss of coordination and poor judgment associated with its use can lead to violent and negligent acts.
- **Alcohol** is physically addictive, and withdrawal can be an arduous and danger process.
- Without proper medical treatment for alcohol addiction death rates from withdrawal syndromes such as delirium tremens (DT's) can be 20% or more.



# Blood Alcohol

- **Blood-Alcohol levels** correlate very well with the degree of intoxication. The level is expressed in grams percent, or the number of grams of alcohol in 100 ml of blood
- As the level rises, the toxic effect of the alcohol becomes more pronounced.
- A level of 0.08% is the legal limit for intoxication in most jurisdictions.





# Blood Alcohol Levels



- At a level of **0.03%**, which for most people is the consumption of a single beer or shot, you become giddy, but your motor skills show few ill effects.
- **Between 0.03 and 0.08%**, coordination, reaction time, and judgment all decline.
- At **levels above 0.12%**, nausea and vomiting can occur, and at a level of 0.25% you are likely to go into a coma.
- **Levels @ or above 0.30%** often lead to deep coma, and above
- **0.40 percent**, death is likely.





# You Have Now Gotten Pulled Over

- A police officer who detains you as a suspect for driving under the influence goes through several steps to determine whether you are, indeed, intoxicated.
- The first is a **FIELD SOBRIETY TEST**, in which the officer will ask you stand on one foot, stand steady with your eyes closed, repeatedly touch one finger to your nose, or walk a straight line in a heel-to-toe manner to determine how much alcohol you have consumed is affecting the coordination and balance centers of the brain.
- Alcohol makes performing each of these tasks clumsy or even impossible for you to complete.
- You can't fake a field sobriety test. Physiology conspires against you, and you end up stumbling, wavering, or poking yourself in the eye.



# Breathalyzer Testing

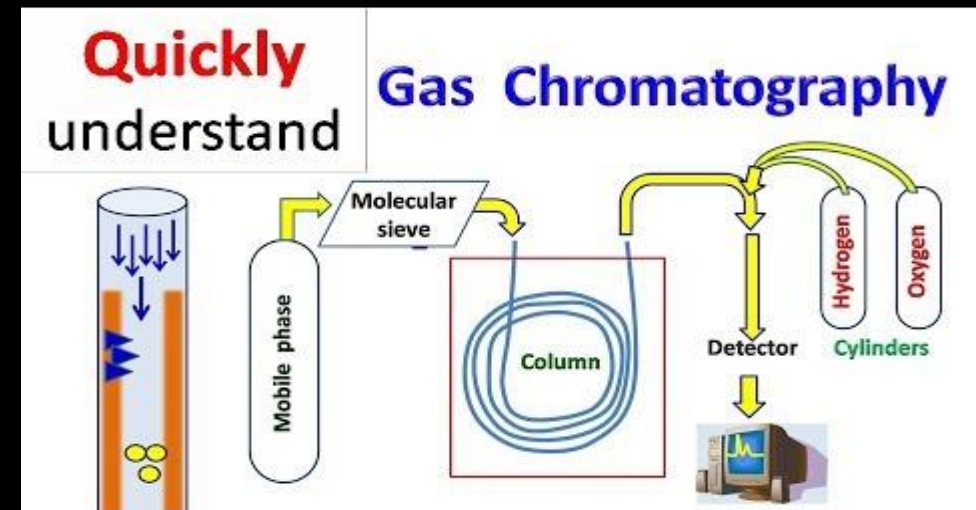
- The officer may ask you to take a **Breathalyzer Test**. If so, you're toast!
- **Alcohol** passes unchanged through the lungs, going directly into the blood stream into the air sacs of the lungs and out with each breath, so you can't fake a breath test, either.
- The alcohol content in your lungs directly correlates with your blood-alcohol level.
- The higher the level in your blood, the higher the concentration in your exhaled breath. You will fail the breath test!





# After Failing The Breathalyzer Test

- If you **failed a field sobriety test** or a breath test, a blood alcohol level test may be analyzed to determine the exact level, particularly if you have been involved in an accident or caused property damage, bodily harm, or death of another.
- Most hospitals and crime labs can accurately and rapidly determine blood alcohol levels. The preferred test used is **Gas Chromatography**.



# The Oxidation Reaction

- Water + Silver Nitrate + Sulfuric Acid + Potassium Dichromate
- (Air Immediately oxidizes (the above) into Acetic Acid and Potassium Dichromate.)
- Potassium Dichromate in proportion to the amount of alcohol-the more alcohol present in the breath, the more potassium dichromate destroyed.



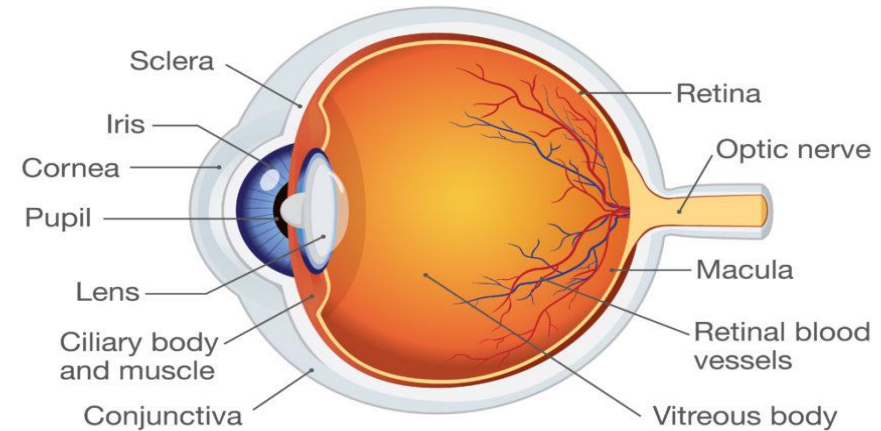


# When Alcohol Causes Death

- The **medical examiners** measure the alcohol level in the cadaver blood to determine whether the intoxication level is high enough to have caused or contributed to the death.
- However, the blood alcohol for some corpses increases because of the action of bacteria, some of which produce alcohol.
- To get around this problem, the medical examiner makes a determination of the alcohol level in the **vitreous humor of the eye** because it reflects a blood alcohol level with a one-to-two-hour lag. So, the vitreous humor can tell the ME what the blood alcohol level was one to two hours before death.



## Human Eye Anatomy





# After Death

- **Embalming a body** may make determining the blood alcohol level at the time of death is difficult, if not impossible.
- During the **embalming process**, embalming fluid replaces most of the blood, leaving behind little for testing, in most cases.
- Because the alcohol in the embalming material doesn't enter the vitreous humor after death, the **toxicologist** can test the vitreous for ethanol. If ethanol turns up in the vitreous humor, it had to have been in the victim's blood before death.



# Thanks For Your Attention!

