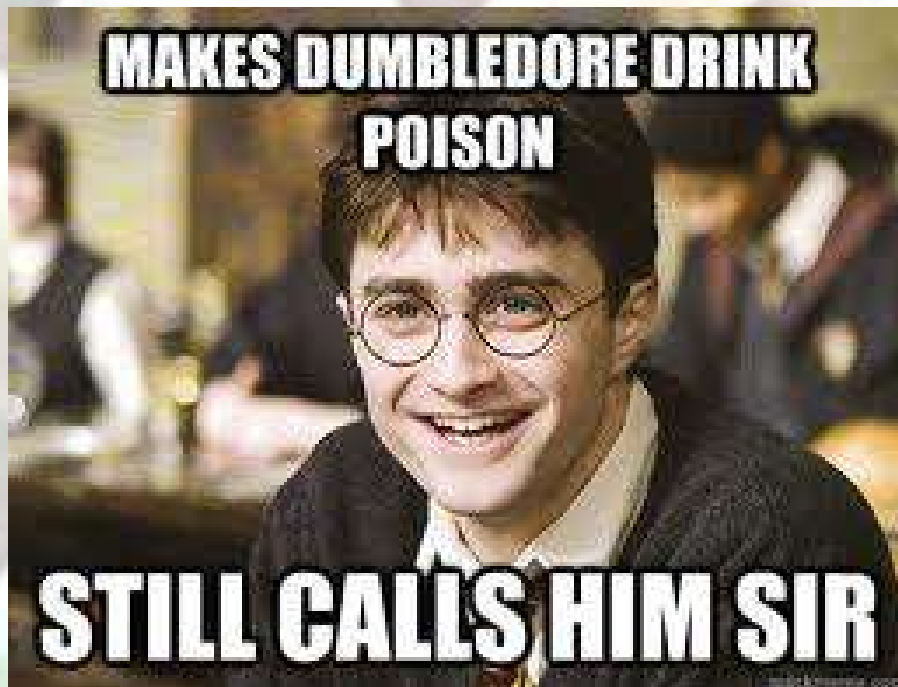


WHAT IS TODAY'S OBJECTIVE?



**Understanding
how we test
for drugs**

- Toxicology-related deaths are often determined days, weeks, or even months after autopsy performed
- **REMEMBER:** A *negative* result can be just as important as a *positive* result
- *When a death is suspected to be the result of drug toxicity, it is best to perform a **complete autopsy** to rule out a more convincing cause of death*

- Postmortem drug levels are not necessarily the same drug levels present at time of death
 - Drugs level may alter due to diffusion
 - Process is called **postmortem redistribution**
- The extent of postmortem redistribution of a drug depends on many factors: chemical characteristics of that drug, pH of tissues, and condition of body

- If it is a prolonged toxic death, person may metabolize drugs down to a “normal” level
 - Obtunded – comatose – hypotensive – dying
 - Can take many minutes – many hours

Autopsy clues suggesting this:

- Early patchy bronchopneumonia
- Pulmonary congestion mucus and/or frothy fluid in bronchi
- Moderate – large amnt of urine in bladder

DRUG OD CLUES

- “Foam cone” over nose &/or mouth
- Frothy liquid in bronchi & trachea
- Colorful discoloration of lips, tongue, oral mucosa, or stomach
- Granular, grainy, or pasty pill material in mouth &/or stomach
- Pulmonary congestion &/or edema (heavy lungs)
- Mucus in bronchi
- Increased amnt of urine in bladder

VIDEO: Drugs Makes You Go Crazy

POISONING

- Poison used usually not detected unless it is specifically looked for ☹️
- Most common poisons used: arsenic, cyanide, and heavy metals
 - **Cyanide**: bright red discoloration of blood and a faint odor of bitter almonds (50% can't smell cyanide b/c of genetics)
 - **Arsenic**: prolonged death w/ involvement of multiple organ systems & necrosis of GI tract

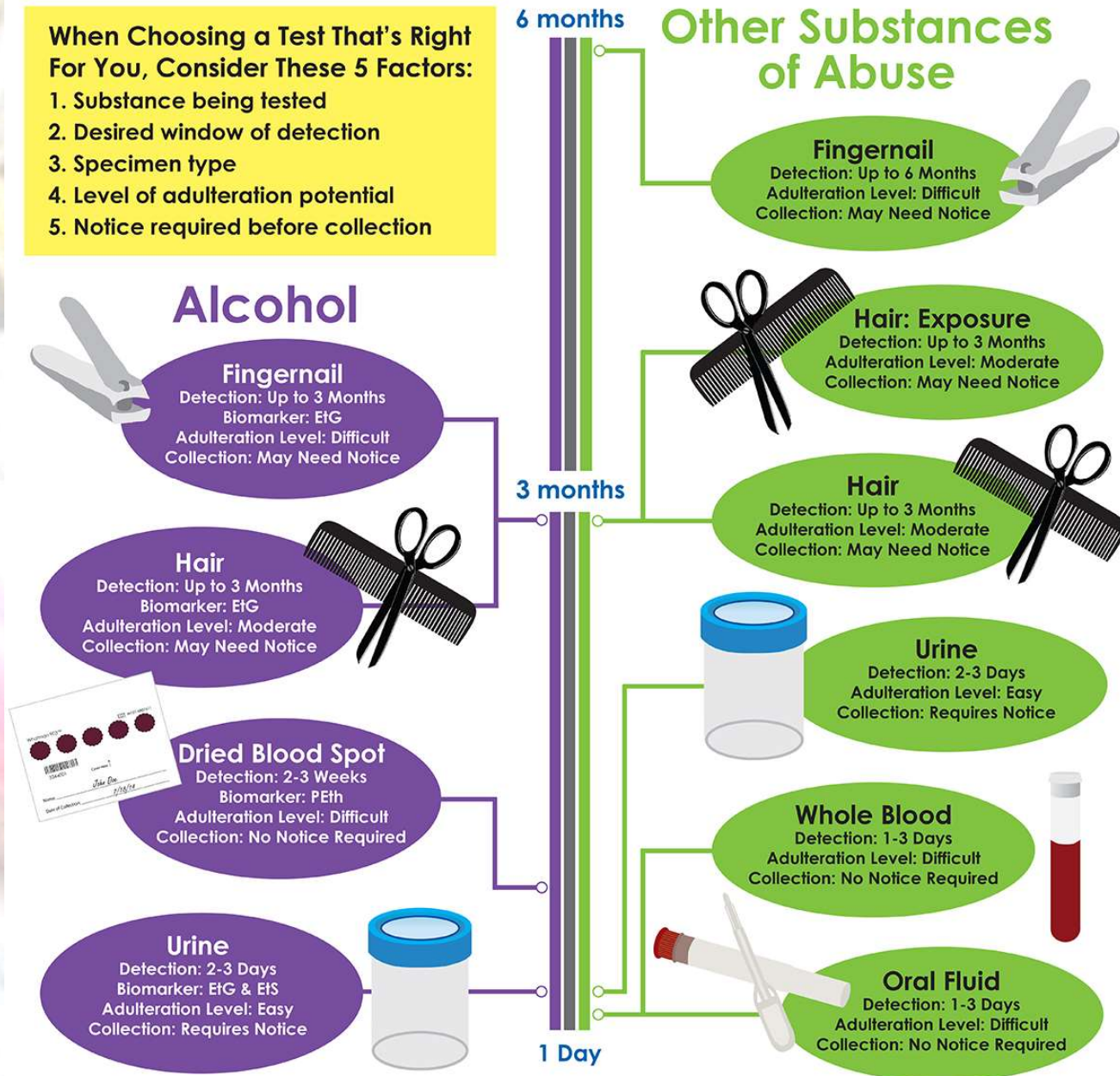
VIDEO: Why Cyanide Poisoning Is

Direct Alcohol Biomarkers and Other Substances of Abuse

Window of Detection / History of Use

When Choosing a Test That's Right For You, Consider These 5 Factors:

1. Substance being tested
2. Desired window of detection
3. Specimen type
4. Level of adulteration potential
5. Notice required before collection



TESTING PROCESS

Specimen Collection

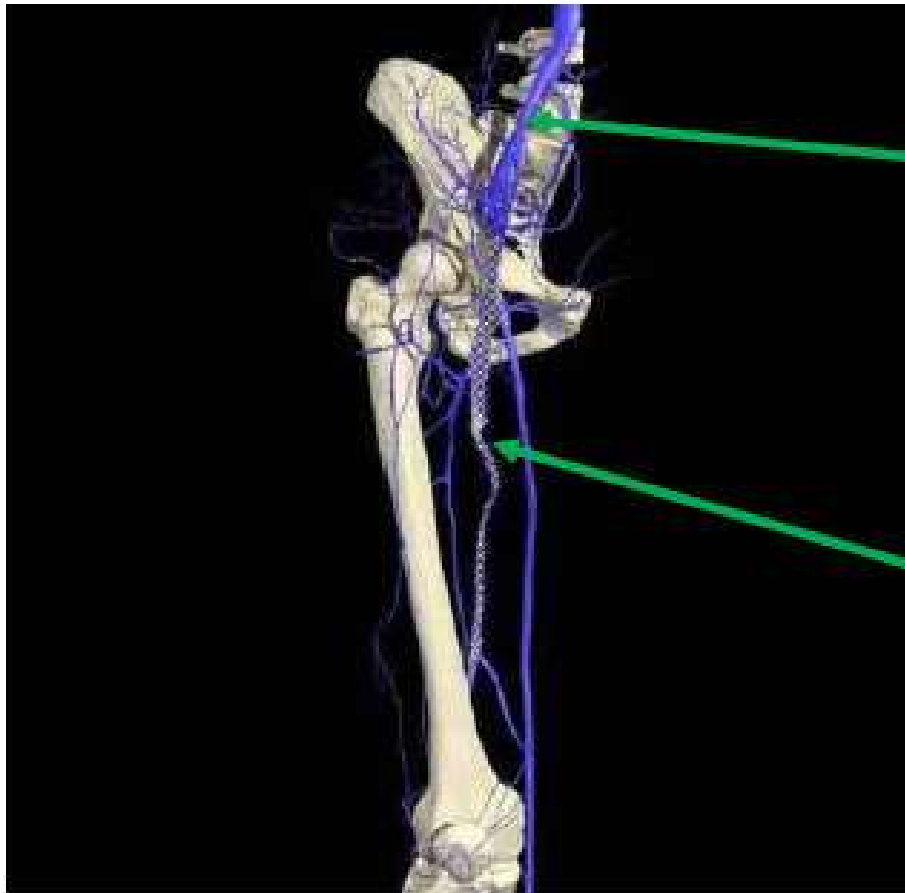
1. **BLOOD**: collect b4 autopsy done



collect from peripherally located femoral veins (**femoral blood**) b/c isolated from internal organs (=accurate levels of drugs)



subclavian blood is next best source then blood from root of aorta



External Iliac Vein

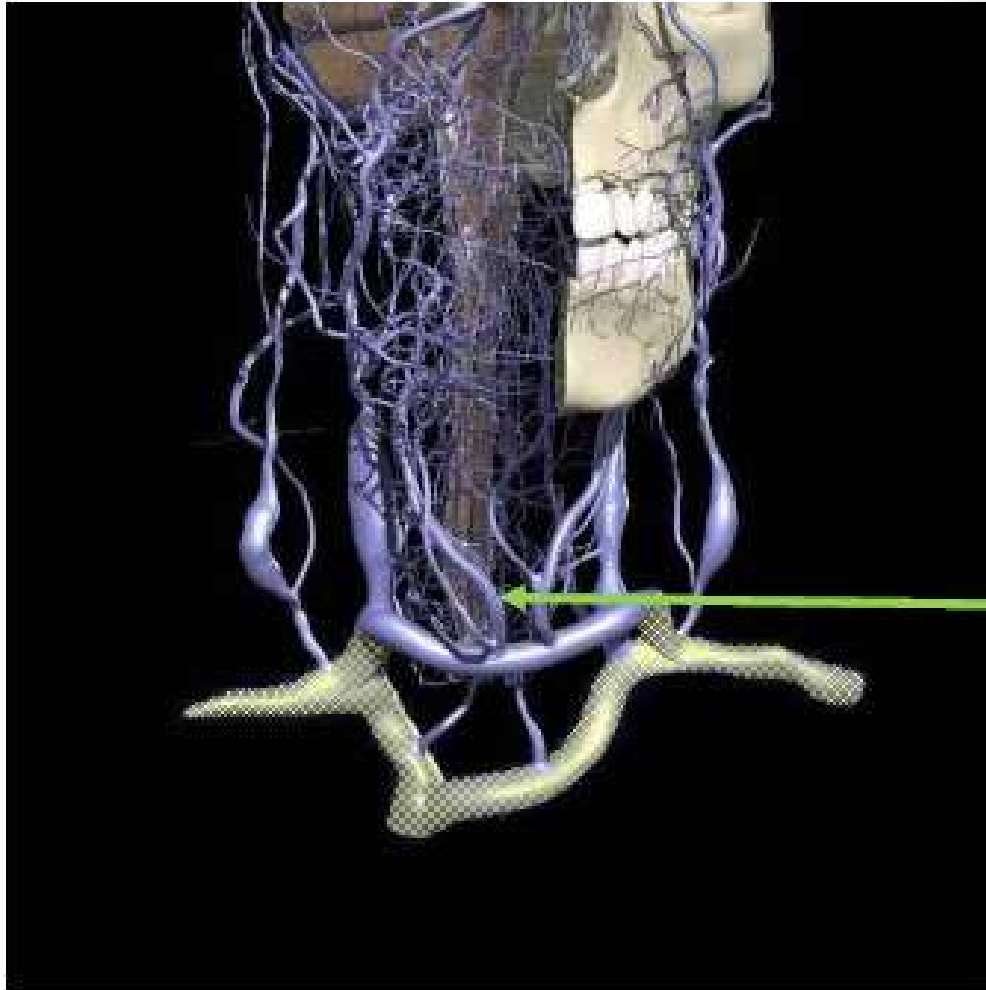
✓

Femoral Vein

✓ ✓

Image courtesy of <http://www.fcoa.co.uk/default.aspx>

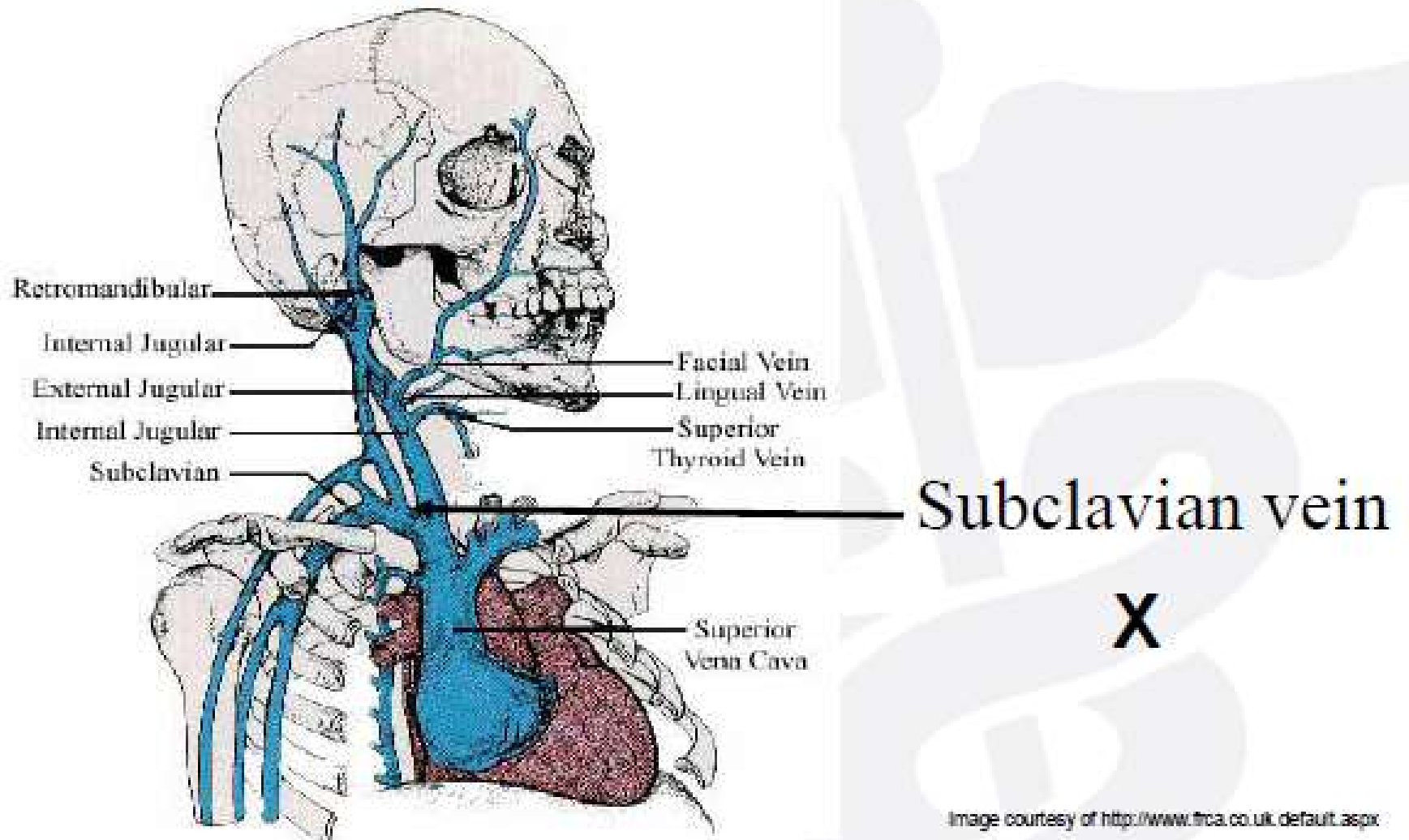
- What is peripheral blood?



Subclavian vein

Image courtesy of <http://www.fica.co.uk/default.aspx>

- What is peripheral blood?



DECOMPOSED BODIES

- Often can't retrieve fluid from heart/blood vessels
- Collect **decomposition fluid** found in pleural cavity or collect **skeletal muscle** from an extremity
- Collect **maggots** and test the maggots for drugs
 - *Maggots can detect cocaine, opiates, barbiturates, benzodiazepines, and antidepressants*

2. URINE: preferred in employment b/c large volumes can be collected (and no venipuncture).

Urine should be collected **postmortem** to look for toxins that appear more in urine than blood

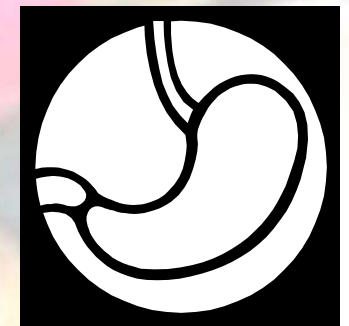


| Urine | |
|-----------|------------|
| 0.05% | Ammonia |
| 0.18% | Sulphate |
| 0.12% | Phosphate |
| 0.6% | Chloride |
| 0.01% | Magnesium |
| 0.015% | Calcium |
| 0.6% | Potassium |
| 0.1% | Sodium |
| 0.1% | Creatinine |
| 0.03% | Uric acid |
| 2% | Urea |
| 95% Water | |



3. GASTRIC CONTENTS:

For highly toxic substances, very low concentrations may be in blood, but high in the stomach

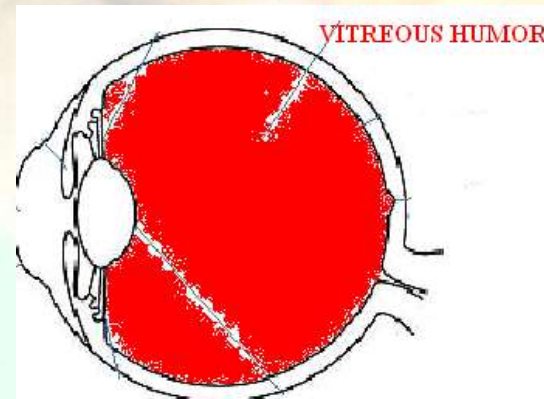


(Gastric contents can also help you determine the time of death... based upon how digested the food is)

4. VITREOUS FLUID:

resistant to putrefaction; helpful in determining time of death

- May be the only fluid remaining in a cadaver
- In addition to drugs, shows glucose, urea N, Na, Cl, and electrolytes (*dehydrated?*)
 - High glucose + presence of acetone = antemortem diabetic ketoacidosis



5. LIVER and BILE:



Liver is the organ most heavily involved in drug metabolism.

- liver tissue useful in analysis of tricyclic antidepressants, or any drugs that are highly protein bound

Bile drains from the liver and is very rich in certain types of drugs, like opiates.

6. HAIR:

- drugs in hair in low concentrations
- active or passive drug exposure?

Advantage: useful for detecting chronic heavy metal poisoning and chronic (*life time*) drug abuse



7. MECONIUM:

- the bowel contents of the fetus, or first few stool specimens of the neonate
- can act as a “depot” of drugs maternally consumed ... can reflect drug abuse during pregnancy