

Joseph O. Jones

- 1 System Director, North Louisiana Crime Lab
- 2 Doctoral Candidate - Oklahoma State University CHS
- 3 M.S. - Philadelphia College of Osteopathic Medicine (2007)
B.S. - Baylor University (2004)
- 4 Serves on the Louisiana Governor's Drug Policy Board and trains Drug Recognition Experts nationwide.

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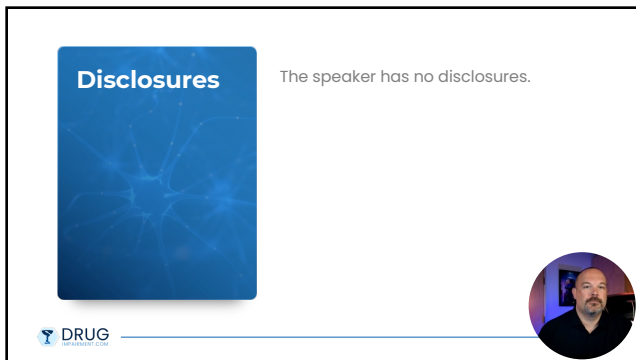
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Ethanol Absorption

JOSEPH O. JONES, M.S.




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Disclosures

The speaker has no disclosures.



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Learning Objectives

- 1 Routes of Administration
- 2 Physiological Aspects of Absorption
- 3 Various factors which impact on achieving peak BAC and the timing to peak BAC

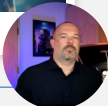

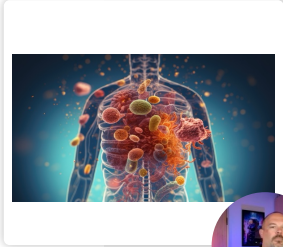


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Definitions

Absorption describes the process...
By which a drug or poison passes from outside of the body into the blood stream.

By any extra-vascular route...
e.g., oral, intramuscular, intra-dermal, sublingual, or rectally.





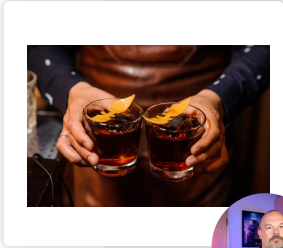
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Site of Administration

Oral Route (PO)
Most common way - Everyday Situations. Complicated due to various factors.

Intravenously (IV)
Poisonings from methanol / ethylene glycol

Inhalation / Skin / Others
Unique yet sometimes ineffective...or expensive (e.g., Wine baths)





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Inhalation as a Method of Ingestion

It is possible...but keep in mind
 Research shows that for ethanol vapors to significantly affect blood alcohol concentration (BAC), the concentrations in the ambient air must be extremely high—higher than what is typically tolerable in controlled settings.

Influencing Factors

- Size of the Room
- Ventilation
- Duration of Exposure
- Concentration of Ethanol in the Air
- Respiratory Rate

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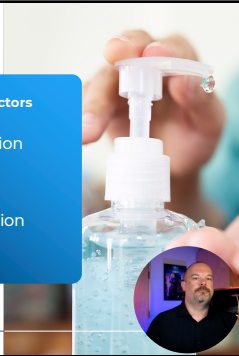

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Dermal Absorption

Lacks Efficiency
 Studies indicate that even with prolonged exposure, the amount of ethanol that can be absorbed through the skin is typically insufficient to elevate BAC above very minimal levels, such as 0.02 g% (Brown et al., 2007, Kramer et al., 2007)

Influencing Factors

- Skin condition
- Duration of Exposure
- Ethanol concentration

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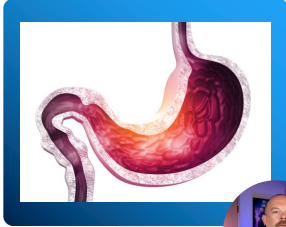

Uptake from the Gut

Absorption

- Can hold 1.5 L of fluid (Ganong, 1979)
- Stomach Wall – 20%
- Duodenum / Small Intestine – 80%

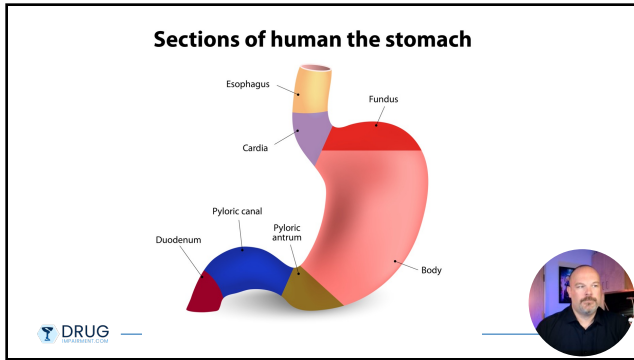
Key Anatomical Structures

- Duodenum
- Pyloric Antrum
- Pylorus Valve

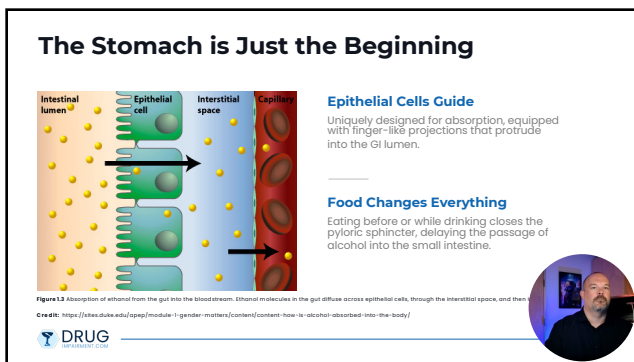



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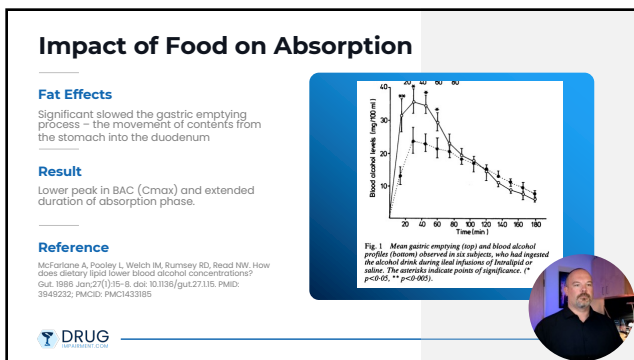
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Factors Influencing the Rate of Absorption



Slow Rate of Absorption

- Food in the stomach
- Various carbohydrates and amino acids (fructose, glycerin)
- Smoking cigarettes
- Drugs that delay gastric emptying (anticholinergic agents, propantheline)
- Beers with high content of carbohydrates
- Trauma, shock, and massive blood loss

Fast Rate of Absorption

- Drinking in the morning after an overnight fast
- Drinks with high concentrations of ethanol
- Carbonated drinks
- Drugs that accelerate gastric emptying (e.g., cisapride, metoclopramide, erythromycin)
- Low blood sugar level
- Surgery to the guy (e.g., gastrectomy, gastric bypass)

Credit: Caplan YH, Goldberger BA. *Garriott's Medicolegal Aspects of Alcohol*. Lawyers & Judges Publishing Company, Incorporated; 2015.

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Gender Differences



Volume of Distribution

Aqueous volume in men vs. women

An Area of Further Investigation

Some preliminary insights suggest that hormonal influences, phases of the menstrual cycle, and the use of oral contraceptive steroids might play significant roles. These factors could potentially explain why men and women metabolize alcohol at different rates, but more extensive studies are needed with larger groups to draw definitive conclusions.

Credit: Caplan YH, Goldberger BA. *Garriott's Medicolegal Aspects of Alcohol*. Lawyers & Judges Publishing Company, Incorporated; 2015.

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Social Drinking vs. Bolus Drinking

Administration 2x

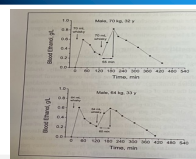


Figure 3-20 Blood ethanol profiles after ethanol was administered as one whiskey in divided doses after an overnight fast (Dines, unpublished data).

Real-World Application



Social drinking typically involves consuming multiple drinks over several hours, and the dynamics of alcohol absorption and elimination of alcohol under these conditions can be quite different.

Impact on Retrograde Extrapolation

Where was the person when the incident or crash occurred?

- BAC still rising?
- BAC Stable?
- BAC falling?

Credit: Caplan YH, Goldberger BA. *Garriott's Medicolegal Aspects of Alcohol*. Lawyers & Judges Publishing Company, Incorporated; 2015.

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CONTACT ME

Joseph O. Jones, M.S.
jojonestox@gmail.com



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