TOPIC: ALCOHOL METABOLISM

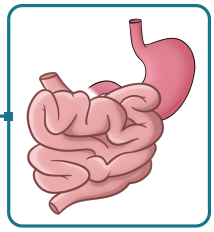
Alcohol Absorption & Metabolism

◆ Alcohol is processed through A) _____ and B) _____ → no _____.

A) Absorption

◆ *Begins in*: _____. *Most absorption*: _____ intestine.

- Blood from GI tract next goes to the _____.



B) Metabolism

◆ Chemically modified into non-toxic forms using _____.

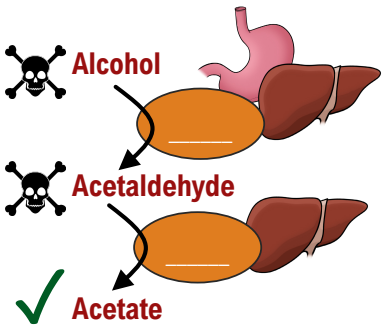
◆ Steps to alcohol metabolism.

1) Alcohol dehydrogenase (_____): ethanol → acetaldehyde.

- *Begins in*: _____. *Primarily*: _____.

2) Acetaldehyde dehydrogenase (_____): acetaldehyde → acetate.

- *Primarily*: _____.
- Acetate can be used for _____ by the cells.



EXAMPLE

In the box below, both the steps to process alcohol and the enzymes that facilitate alcohol metabolism are listed.

Match each step and enzyme to the organ(s) where the step occurs or the enzyme is active.

Steps to process alcohol:

a) Absorption.

b) Conversion of alcohol to acetaldehyde.

c) Conversion of acetaldehyde to acetate.

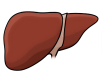
Enzymes:

d) Alcohol dehydrogenase (ADH).

e) Acetaldehyde dehydrogenase (ALDH).

Stomach: _____

Small Intestine: _____



Liver: _____

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PRACTICE

Where in the body is most alcohol processed by alcohol dehydrogenase?

a) Stomach. b) Kidneys. c) Liver. d) Blood.

PRACTICE

The options below show the reactants, products, and enzymes involved in alcohol metabolism. Reactions are indicated with arrows, with the enzymes that catalyze those reactions written in italics. Which option indicates the correct order for alcohol metabolism in the body?

a) Alcohol → *ADH* → Acetate → *ALDH* → Usable calories.

b) Methanol → *ALDH* → Acetaldehyde → *ADH* → Usable calories.

c) Alcohol → *ALDH* → Acetate → *ADH* → Acetaldehyde.

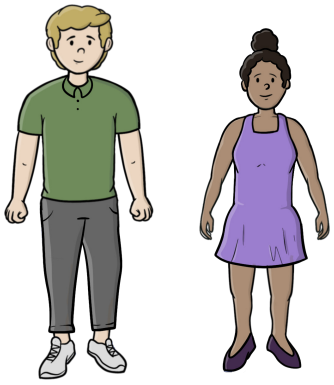
d) Ethanol → *ADH* → Acetaldehyde → *ALDH* → Acetate.

TOPIC: ALCOHOL METABOLISM

Differences in Alcohol Metabolism

- **Blood Alcohol Content (____):** amount of alcohol in blood; reported as a _____.
  - Greater BAC → ___ effect on body.
- Certain factors influence how much one's _____ will rise in response to alcohol:

- **Factors affecting dilution of alcohol in _____:**
  - **Size:** larger body size → _____ blood volume → _____ BAC.
  - **Body composition:** muscle has more _____ than fat → ___ dilution.



- **Factors affecting metabolism:**
  - **Sex:** males have ~30%-50% _____ ADH in the stomach than females.
  - **Stomach contents:** when consumed with _____, alcohol is in the stomach longer → more time to be metabolized by _____.

- Some individuals have a non-functional ALDH gene, leading to the buildup of _____ acetaldehyde.
  - Most common in some _____ Asian populations (Asian Flush).

EXAMPLE

Josie, a 5'2" tennis player, is hanging out with Will, a 5'10" soccer player. She is keeping up with his level of alcohol consumption, drink for drink.

a. How is Josie's BAC likely to compare to Will's? _____

b. Give two reasons for your answer in part a:

_____

_____

c. What could Josie do to try to lessen the amount her BAC rises?

_____

PRACTICE

On average, males will have a lower BAC compared to females when drinking the same amount of alcohol. Which statement below is NOT a contributing factor to this difference?

a) Males are more likely to have functional ALDH enzyme compared to females.

b) Males tend to have more ADH in the stomach compared to females.

c) Males tend to have higher lean body mass than females.

d) Males tend to have a larger overall body size compared to females.