TOPIC: WHY DO WE NEED PROTEIN?

Proteins Are Required in Our Diet

◆ It's recommended that proteins make up _____-_____% of your total *daily* energy intake.

◆ Why are proteins required? There are MANY reasons!

Reasons We Need Proteins	Examples/Details
Proteins Form Many Biological Compounds	Enzymes – speed up chemical reactions. Hormones – chemical messengers (e.g. Insulin, glucagon). Transport Proteins – transport nutrients (e.g. Hemoglobin) and facilitate movement across membranes. Neurotransmitters – transmit signals between neurons. Blood Clotting Factors – prevents wounds from staying open.
Proteins Provide Immunity	**Antibodies –** _____ proteins that bind & neutralize harmful pathogens.
Proteins Provide Structural & Mechanical Support	Collagen – crucial for structural support in skin, bones, ligaments, tendons & muscle. Actin & Myosin – allow muscles to move.
Proteins Allow Growth & Repair	Baby → Child → Teenager → Adult
Proteins Maintain Balance	Fluid Balance – proteins "draw" fluid back into the bloodstream from tissues, preventing edema (swelling). Electrolyte Balance – protein pumps (e.g. Na^+/K^+ pump) in cell membranes control ion gradients. Acid-Base Balance – proteins act as *buffers* to regulate blood pH.
Proteins Are a Backup, "Last-Resort" Energy Source	**Deamination** (removal of _____ group) produces keto acid. Keto acid is used for energy (4 kcal/g) or converted to glucose/fat.

EXAMPLE

Proteins are vital in maintaining the blood's pH as they can act as a _____. When proteins are needed for energy or before being converted to glucose/fat, they must first undergo _____ in the liver.

a) Buffer; detoxification.
c) Base; detoxification.
b) Buffer; deamination.
d) Base; neutralization.

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PRACTICE

Which of the following crucial biological molecules are considered proteins?

a) Vitamin D.
b) Bile.
c) Triglycerides.
d) Enzymes.

PRACTICE

A diet that's very high in carbohydrates, fiber & fats but low in protein may cause which of the following?

a) A lack of energy.
b) Impaired immune function, & therefore increased susceptibility to disease.
c) Constipation & other issues with the GI tract.
d) A lack of insulation in the skin.

PRACTICE

Which of the following is the most likely symptom of not having enough protein in your body?

a) You won't have any stored energy because protein is mostly used for energy storage.
b) You will be at significantly higher risk of cardiovascular disease.
c) Your tissues may become swollen (edema) as there isn't enough protein in the blood to draw fluid back in.
d) All of the above.

PRACTICE

Which of the following statements is true?

a) Proteins are a primary source of energy, along with carbohydrates & fat.
b) Proteins are not a primary energy source, but they can be stored in the body for later energy use.
c) Deamination is the removal of a single nitrogen atom from a protein, & this nitrogen is excreted in urine.
d) Deamination is the removal of the amine group from a protein, which is converted to urea & then excreted.