

Proteins

What is protein?

Serving Size 1 Servings Per C	cup (228 Container		cts
Amount Per Serv	ving		
Calories 250	Calo	ries from	Fat 110
		% Dai	ily Value*
Total Fat 12g			18%
Saturated Fat 3g			15%
Trans Fat 3c	1		
Cholesterol 30mg			10%
Sodium 470mg			20%
Total Carboh	ydrate	31g	10%
Dietary Fibe	r Og		0%
Sugars 5g			
Protein 5g			
Vitamin A			4%
Vitamin C			2%
Calcium			20%
Iron			4%
* Percent Daily Value Your Daily Values m your calorie needs	es are basec ay be higher 3.	l on a 2,000 o r or lower de	calorie diet. pending or
	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Cholesterol	Less than	20g 300ma	∠og 300mg
Sodium	Less than	2.400ma	2.400mc
Total Carbohydrate		300g	375g
Dietary Fiber		25a	30a

Sample label for

Dietary Fiber	25g	30g	
Iotal Carbohydrate	300g	375g	

Major Types of Proteins

There are many types of proteins. Most fall into the following 3 major categories:







Enzymes control and initiate chemical reactions

Enzymes initiate synthesis reactions

Enzyme initiated lysis or cleavage



Enzymes control and initiate chemical reactions

Enzymes lower activation energy and promote rapid reactions to occur

Without enzymes, organisms would have to heat to a lethal temp or else life sustaining rxns would occur too slowly.



Function of Proteins

Each cell contains hundreds of different enzymes that work together to release energy from food molecules and to use that energy to build new cellular materials



What is a protein made of?

Like DNA, Proteins are made of long strings of individual building blocks.

DNA is made of nucleotides while proteins are made up of amino acids.



A generalized amino acid:

Each amino acid has the same basic structure. Only the "R" group changes.



What is an amino acid?

Amino acids are organic molecules

They come in 20 different types that are all slightly different from one another

These structural differences give rise to their different properties





Where do amino acids come from?

Some amino acids humans can make for themselves

Others cannot be synthesized and must be obtained through consumption

These are commonly referred to as essential amino acids



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A protein is a chain of amino acids (aa): ...aa-aa-aa-aa-aa...

Think of a beaded **necklace** where the different colored beads are the **different amino acids**

Individual amino acids are held together by peptide bonds

These are formed through a dehydration synthesis reaction

More than two amino acids joined together are called a polypeptide

Proteins are organic macromolecules

A protein might contain many hundreds of amino acids.

Ex: the enzyme hexokinase. To scale in the corner its substrates: **ATP** and **glucose**.

If just one of these amino acids is changed, the function of the protein might change drastically



DNA codes for Proteins

- Enzymes do the nitty-gritty jobs of every living cell.
- The importance of DNA is that it contains the information that is used to make all of the proteins on which life depends.
- DNA is the blueprint
 Proteins are the product



But how do we get from DNA to proteins? (2:53)



The Central Dogma

The central dogma states that information flows in one direction from DNA to RNA to proteins.

