Section 5: Organic Molecules - Proteins and Nucleic Acids - Notes

Objectives:

- Explain how carbon is uniquely suited to form biological macromolecules.
- Describe how biological macromolecules form from monomers.
- Compare the structure and function of carbohydrates, lipids, proteins, and nucleic acids in organisms.
- Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction.
- Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.

Warm-up:

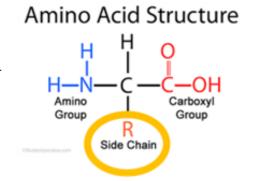
- Explain the difference between monomers and polymers.
- What is a monomer of carbohydrates?
- What is a polymer of carbhoydrates?

Protein:		PROTEIN: RAW MATERIAL
Protei	n: a macromolecule that contains the principle	FOR GROWTH
compo	onents of organisms:	-6-5
0	Proteins perform a variety of	4 kcal/gram
	and functions for cells	FUNCTION Once proteins are broken down, the amino acids are used as the raw materials to build new complex proteins, such as hemoglobin and muscle.
0	Can have and	The most of the master.
	regions depending on the R groups found	• Animals: egg whites, shrimp, tuna, poultry, and meat • Plants: grains and vegetables, such as beans
	throughout the protein	STORAGE • Amino acids are usually stored for less than half a day before
0	The instructions to make proteins are in	being reassembled into proteins throughout the body Can be converted to fat and stored in fat cells
• Mono	mers of Protein:	

Monomers of Protein:

There are _____ different _____ used to make protein
 Each amino acid has a different _____

• Humans can synthesize ______ of the _____ amino acids that they need.



We must get the other _____ amino acids from the _____. • These are called _____ amino acids. Amino acids will join together through ______ These bonds are called _______ Amino Acids Peptide Bond Protein (polypeptide) **Polymers of Protein:** These are ______ of amino acids Amino Acids of _____ amino acids make up _____ proteins When _____ are being constructed, they will start to take on O The polypeptides can then interact with other polypeptides to form STRUCTURAL Hair, fingernails, feathers, horns, cartilage, tendons PROTECTIVE Help fight invading microorganisms, coagulate blood When protein is consumed, it is mostly used for REGULATORY _____, _____ structures, Control cell activity, constitute some hormones and replacement of used _____

O Although protein contains chemical energy, it is not the





venun	ough proteins are all built the		, they perfori	m many
		_ functions.		
Protein	s can be very	molecules.		
0	If there is an extreme change in		or	
	the protein can lose its	(it		
	becomes)	Normal protein	Extreme
	 If the protein loses its 	. it loses its	Mary Comments	environment (heat, pH) disrupts
	!		The same	protein shape and function.
		(Tunction.
Chack f	or Understanding: A protein's fund	tion is most dependent	on	
	Its size	cion is most dependent	OII	
В.	Its shape			
C.	Its color			
D.	Its location			
Tompor	rature: a measure of the			
-				
or parti	cles in a sample of matter.			
0	This can determine	and	_ of which chem	ical reactions
	can occur within living systems.			
There a	re many		that need to	o occur within
cells. A	lot of these reactions	take place on	their own. They	need the help
of prote	eins called	·		
				Substrate
_		the street and the street street and the street		
0	Enzyme: a			
0	of a chemical react	tion without being	Anthus M	Lactose
0		tion without being	Active site	
0	of a chemical react	tion without being ion.		Lactose
	of a chemical reacti	tion without being ion.		
	of a chemical reacti by the reacti • Enzyme names usually en	tion without being ion. d with		
An enzy	of a chemical react by the reacti Enzyme names usually end mume is an organic	tion without being ion. d with s a chemical reaction to		

•			that has a very specific		
		A molecule called a	will fit into tha	t active site.	
		• <u>Substrate:</u> a substance on which a	n enzyme		
•	The en	nzyme works by	the	needed to start	
	the ch	emical reaction			
	0	Activation Energy (Ea): the	er	nergy required to	
		a specific chem	ical reaction		
•	Once t	the chemical reaction is over, the	will lea	ve the active site.	
	0	The enzyme remains	!		
•	If an e	nzyme is built	, the active	e site will not have the	
		to fit wit	h LACTOSE		
		bstrate.	INTOLERANCE Even a slight alte	eration to an	
	0	The chemical reaction will be a	enzyme's active	site can disrupt	
		to occur.	lactase is not bui	ot digest milk	
•	An enz	zyme could also become	properly, a cond lactose intolerar		
		if there is a ch	nange in or		
		-			
Check 1		erstanding:			
•	_	aph shows how the activity of an enzyme charactures. Which statement best describes wh	-	Enzyme Activity vs. Temperature	
	-	ratures. Which statement best describes who e when the temperature of the reaction incr		15	
	A.	The enzyme is used up and the reaction sto	ops.	Activ	
	В.	The enzyme begins to decrease the rate of	the reaction.	Enzyme Activity increasing	
	C.	The enzyme continues to increase the rate	of the reaction.	0 10 20 30 40 50 60 7	
	D.	The enzyme changes shape and can no lon reaction.	ger speed up the	Temperature (°C)	
Nucleio	Acids:	e Acide a higherical macromologula compaca	d of the elements		
•		c Acid: a biological macromolecule compose , and that stores			
					
	0	or			

	0	
	Composed of three parts:	, and a
	Sugar Phosphate Nitrogenous Base	
	sugar and phosphate molecules make up the "" ucleic acids.	Bas
OI II	ucieic acids.	
• The	e are five possible nitrogenous bases:,	Sugar-
	,, and	phosphate backbone
		Backbone
	O Genetic information is stored in the of these bases.	
• Poly	mers of Nucleic Acids:	S 3
_	0 and	<i>\(\Beta\)</i>
		DNA RNA
Chack for U	nderstanding:	× 3
	ch part of a nucleotide can be different in a DNA molecule?	
	A. The sugar	
	B. The nitrogen base	
	C. The phosphate group	
	Solar Energy + Carbon Dioxide	
	Conversion:	
• Orga	anisms can use organic molecules as sources of	1
	within	vesting
• Hun	nans have found ways to use this	Carbon
	outside of	

Biofuels

