Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ENZYMES notes

Speed up or allow

Chemical reactions

To take place without being “used up” in the process

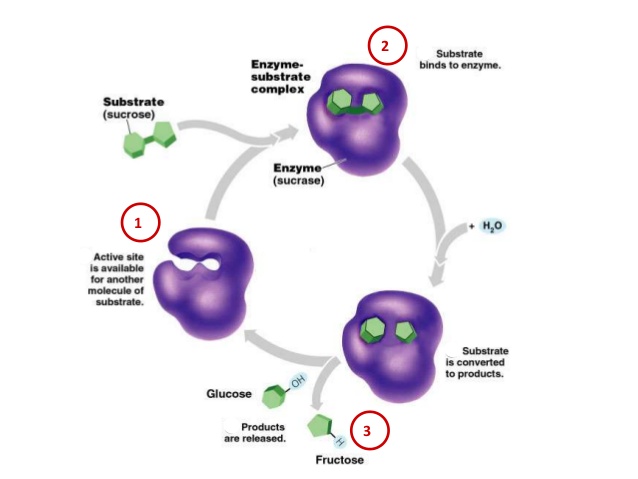
Metabolism sum of all the chemical reactions in body

Interactions of matter and energy

Protein (catalyst)

ENZYMES

**Enzyme function**:

Model 1: Lock and Key: Terms and things to note:

Which process is shown here? (hydrolysis)

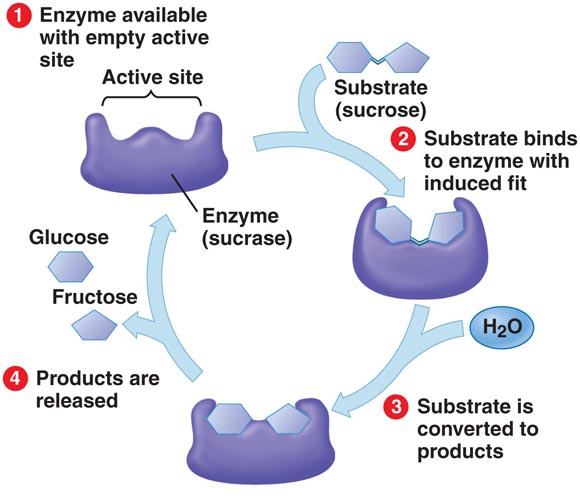
Why is the shape so important? Shape determines function = enzyme to breakdown sucrose

Enzyme prefix “matches” the substrate

Active site with shape for substrate to “fit”

Enzyme names end in –ase

Enzyme is not used up in the chemical reaction, and is still available for more substrate

Model 2: Induced Fit

This is the most widely accepted model for how enzymes work….

In induced fit model the shape of the enzyme can slightly change while interacting with the substrate. The end results and the concept of shape of the enzyme affecting function are the same.

*Like putting a rubber glove on your hand*

Factors that affect enzyme function: Another Goldilocks situation….

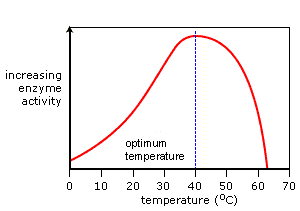
**TEMPERATURE:**

How does having a fever equate to you being cooked like an egg?

The proteins in your body will denature 🡪 lose their shape if the temperature is too hot.

Temperature = measure of heat

More heat = faster molecule movement and more collisions



IF IT IS TOO HOT = Denatured protein

Slow rate of reaction

Food lasts longer

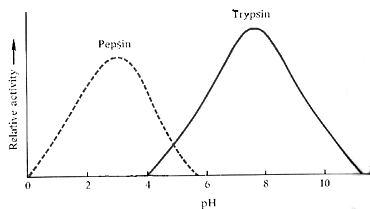
better chance of enzyme and substrate collision

Think Eggies … once you cook the eggs at a certain temperature the protein **denatures (loses it shape)** and can no longer go back to the way it was.

Same thing applies to the proteins in your body

Very little heat = slow molecule movement

faster rate of chemical reactions

**pH:**

The pH also effects the rate of reaction. If the pH is too high or low for a particular enzyme it will denature.

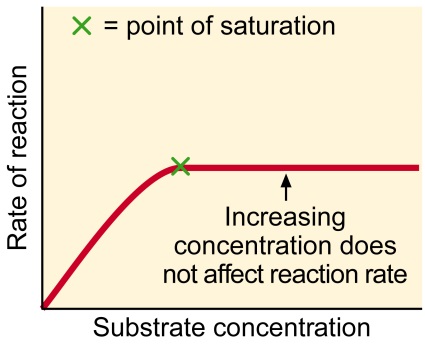
What is the optimum pH for pepsin? \_\_\_\_\_

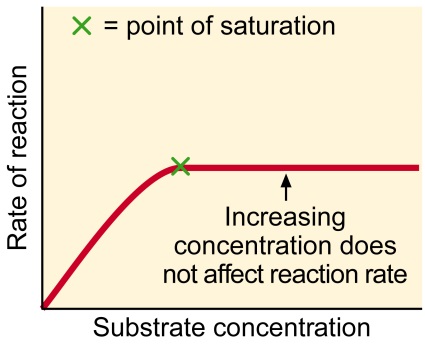
What is the optimum pH for Trypsin? \_\_\_\_\_

Pepsin is a protein that helps to break down the proteins you eat. Where do you think this enzyme is located in your body? Why?

Stomach= very acidic with pH of ~3 which matches the ideal pH of pepsin

**Amount of substrate:**

As substrate concentration increase so does the reaction rate… until every enzyme is “busy” with a substrate molecule At all times.

**Amount of enzyme**:

Similarly if you increase the enzyme concentration once enough enzymes are present to engage every substrate molecule an extra enzymes will have “nothing to do” and therefore not help increase the rate of reaction.

Enzyme concentration

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ENZYMES notes

Speed up or allow

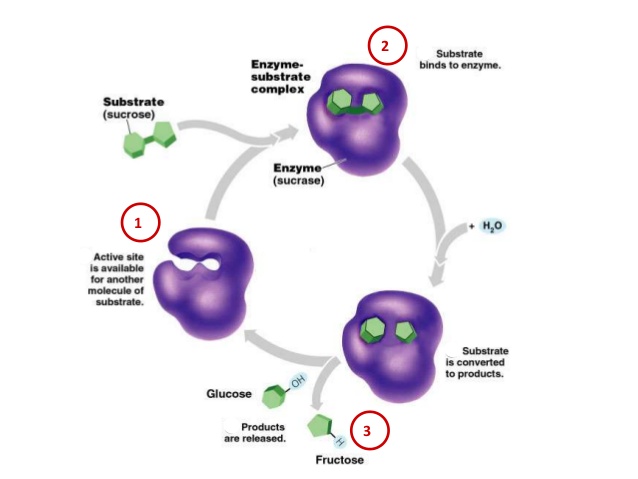
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - sum of all the chemical reactions in body

Interactions of matter and energy

Protein

ENZYMES

**Enzyme function**:

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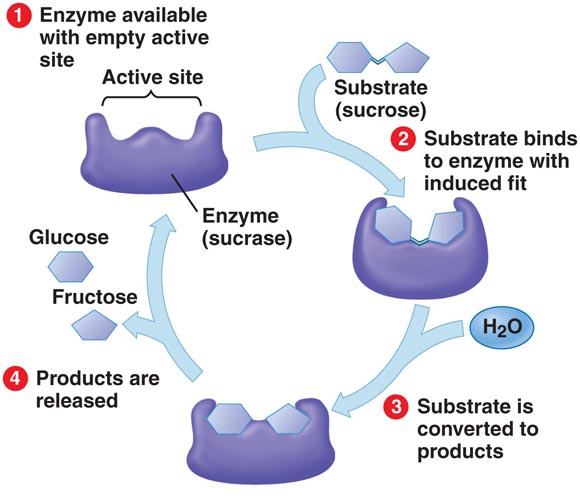
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Enzyme prefix “matches” the substrate

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ with shape for substrate to \_\_\_\_\_\_\_\_\_\_

Enzyme names end in –ase

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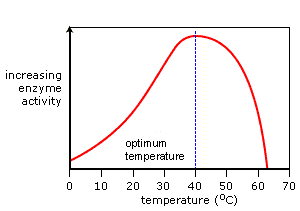
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More heat =



IF IT IS TOO HOT =

Slow

Food lasts

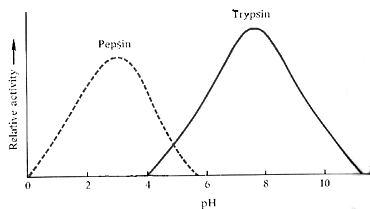
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Very little heat =

faster rate

**pH:**

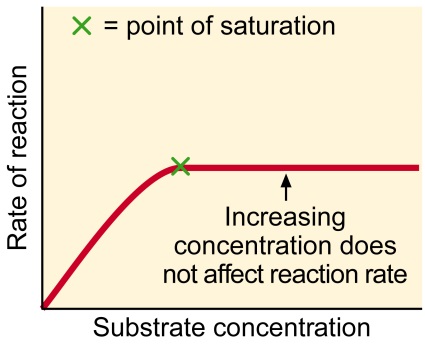
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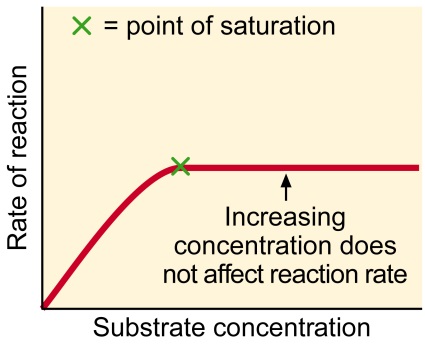
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