Chapter 10 - Enzymes and Energy Carriers

Higher level only

Learning objectives

- To use the active site theory to explain the function and specificity of enzymes
- To define the term 'optimum activity' in relation to pH
- To describe the nature and roles of ATP and $NADP^+$
- To describe heat denaturation of proteins and investigate the heat denaturation of one particular enzyme.

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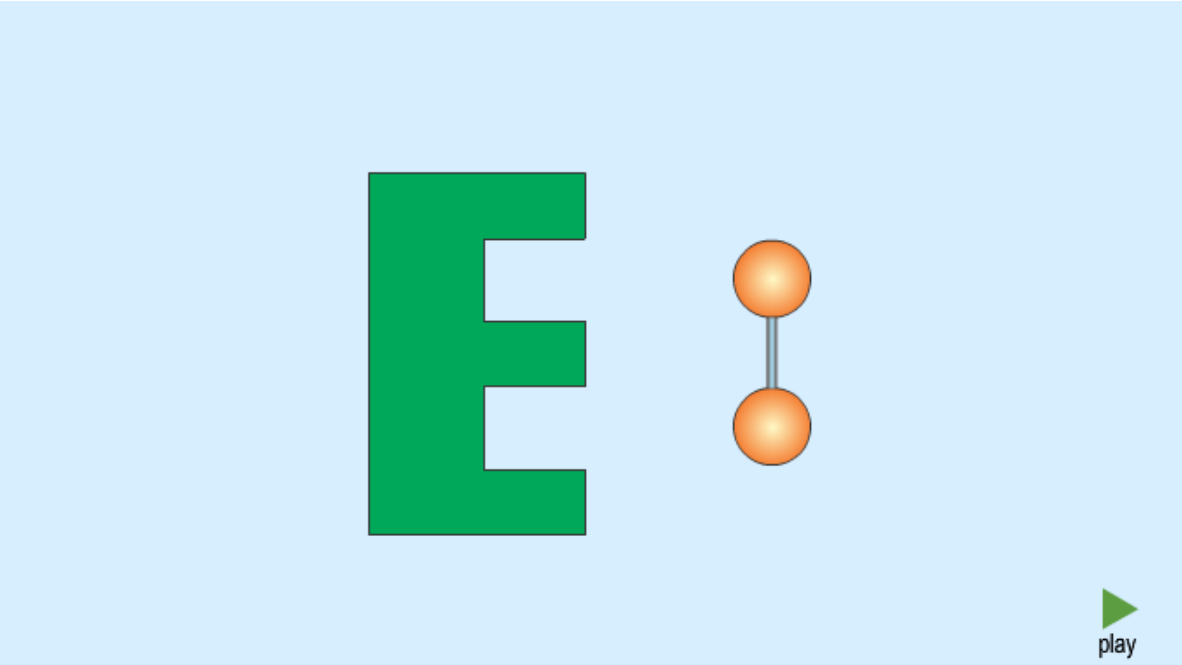
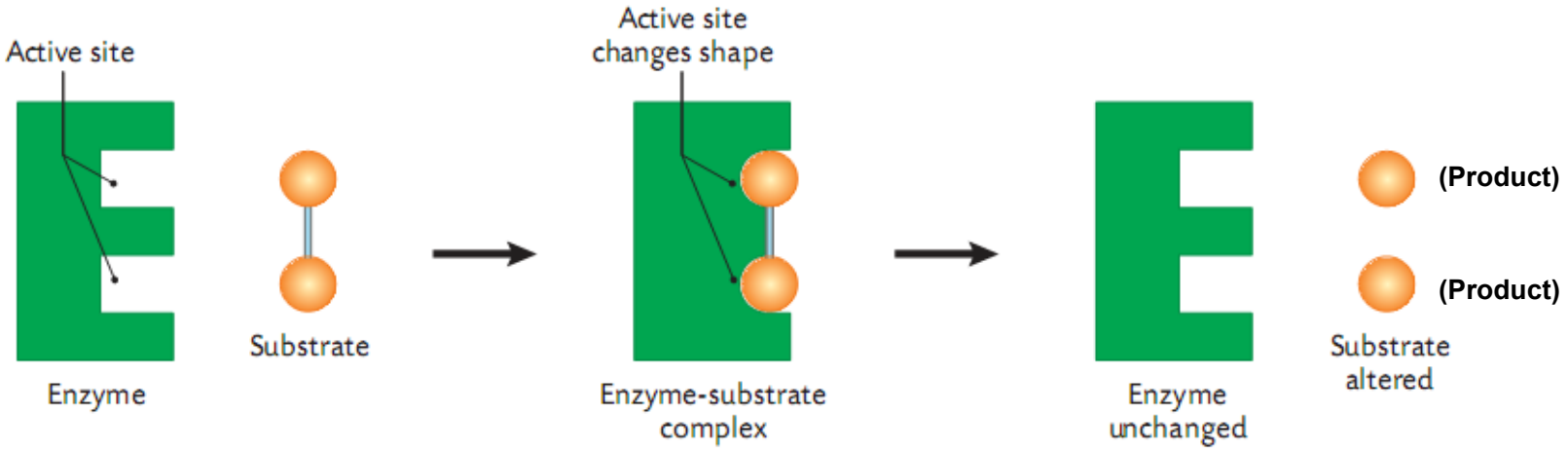
Induced Fit Model



10.1 *The induced fit model of enzyme action*

Induced Fit Model

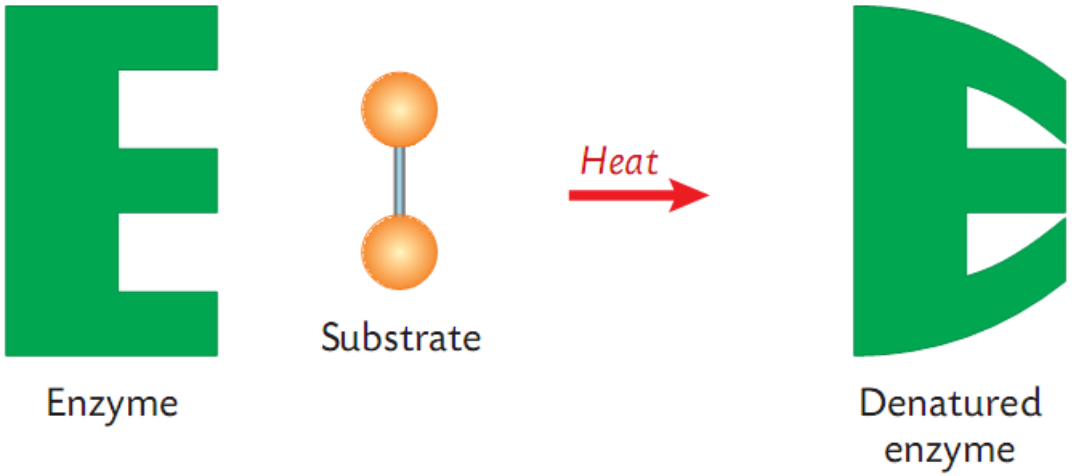


1. The substrate causes the **active site** to change shape slightly.
2. The enzyme and substrate form an enzyme-substrate complex.
3. The substrate is broken (altered) into a **product**.
4. The enzyme stays the same and the active site goes back to its normal shape.

Denatured Enzymes

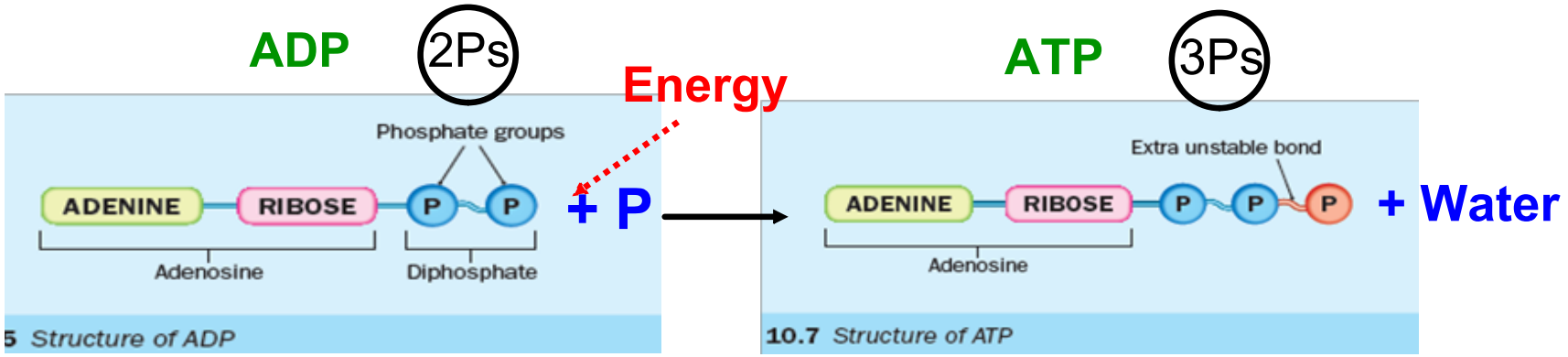
A denatured enzyme is one that has lost its shape.

This is usually due to high Temperatures.



Energy Carriers

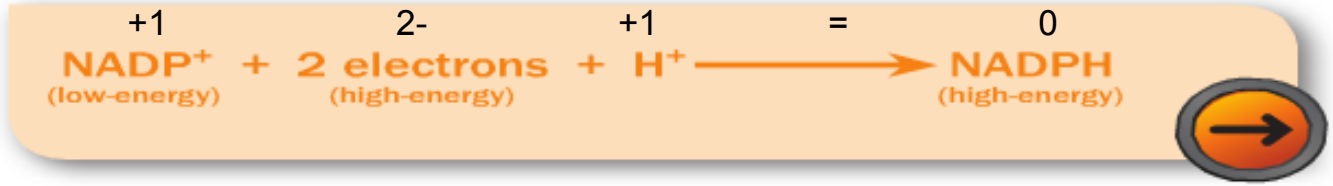
In photosynthesis plants catch sunlight **energy**.
Some areas of the leaf don't get light, so the plants must move the energy.
They store energy in a type of molecule that acts like a **battery**.
The main energy carrier is called **ATP - Adenosine TriPhosphate**
To make ATP we add 1 Phosphate to ADP (Adenosine DiPhosphate)
The adding of a P is called **Phosphorylation**.



Mitochondria make ATP in all living things (except bacteria)

Energy Carriers

NADP+ is a low energy molecule.
When energy (electrons) and a H (proton) are added then it forms NADPH
NADPH is a high-energy molecule that acts like ATP.
It stores and releases energy. It carries a lot more energy than ATP.



Energy carriers		
Process	**Low-energy**	**High-energy**
Photosynthesis	ADP, $NADP^+$	ATP, NADPH
Respiration	ADP, NAD^+	ATP, NADH

P in plants for Photosynthesis