

Enzyme NOTES

WHAT is an enzyme? HOW do they work?

THE BIG IDEA: An **ENZYME** is a **PROTEIN** that functions as a **catalyst** to **SPEED UP** a **CHEMICAL REACTION** in the body; it is **NOT** used up in the chemical reaction, rather it is recycled and used over and over again

All enzymes are **proteins**.

Enzymes are **biological catalysts**.

- Catalyst speed up reactions.
- These reactions would take place anyway... the enzymes just speed them up!

CHARACTERISTICS of Enzymes –

1. Enzymes do not make anything happen that couldn't happen on its own, just makes it **happen faster**.
2. Enzymes are **not used up** in reactions. They can be used over and over again!
3. Enzymes are only needed in **small amounts**.
4. Each enzyme is **highly selective** about its substrate.
5. Enzymes chemically recognize, bind and **modify substrates**.

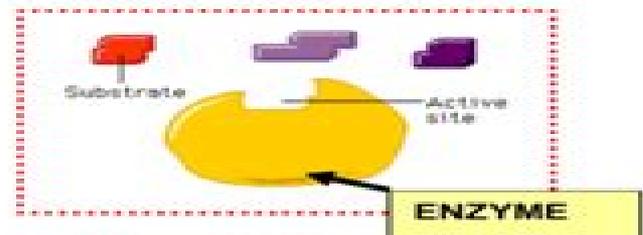
HOW is an enzymes SHAPE related to its FUNCTION??

THE BIG IDEA: An enzyme's **STRUCTURE DETERMINES** its **FUNCTION!!!!**

1. Enzymes are **highly specific**: they catalyze only one chemical reaction, having a specific **substrate**. This specificity results from an enzyme's **specific 3-dimensional shape**.
2. The part of the enzyme that binds to the substrate is called the **active site**. The active site has a 3-dimensional shape that precisely **matches** the 3-dimensional shape of the molecule to be reacted, called the **substrate**.
3. When the substrate and enzyme bind temporarily, an **enzyme-substrate complex** is formed.
4. The activation **energy** needed for the reaction to occur is **reduced**.
5. After the reaction is complete, the substrate has formed a **new product or products** and the **enzyme** is released to be **reused**.
6. Enzyme specificity is often described using the "lock-and-key" model of enzyme action: The shape of the active site (the "lock") determines which substrate (which "key") will "fit" into the enzyme. If the substrate ("key") can't fit into the active site ("lock"), the enzyme cannot catalyze the chemical reaction
7. Remember these key ideas...
 - a. The **SUBSTRATE** is the **REACTANT** in the chemical reaction that is catalyzed by the enzyme, the substance that is **CHANGED**
 - b. The **ACTIVE SITE** is the region on the enzyme where the substrate attaches; the shape of the active site determines which substrates the enzyme can bind.
 - c. Imagine a **KEY (the SUBSTRATE)** fitting a **LOCK (the ACTIVE SITE)**.
 - d. The **PRODUCT** is what you end up with after the chemical reaction has occurred.

ENZYME ACTION – can occur two ways:

1. Lock and Key model – the substrate molecule has a specific 3-dimensional shape that allows it to fit into the specific 3-dimensional shape of an enzyme's active site. Both enzyme and substrate already exist in these specific 3-dimensional shapes.
2. Induced Fit model – An interaction between the enzyme and substrate induces or changes the shape of the molecules to produce a suitable fit.



Chemistry Of Life Enzyme Notes What Is An Enzyme Quia

James B. Sumner, G. Fred Somers



Chemistry Of Life Enzyme Notes What Is An Enzyme Quia:

General Catalogue of Printed Books British Museum. Department of Printed Books,1969 **Introduction to Enzyme and Coenzyme Chemistry** T. D. H. Bugg,2012-08-13 Enzymes are giant macromolecules which catalyse biochemical reactions They are remarkable in many ways Their three dimensional structures are highly complex yet they are formed by spontaneous folding of a linear polypeptide chain Their catalytic properties are far more impressive than synthetic catalysts which operate under more extreme conditions Each enzyme catalyses a single chemical reaction on a particular chemical substrate with very high enantioselectivity and enantiospecificity at rates which approach catalytic perfection Living cells are capable of carrying out a huge repertoire of enzyme catalysed chemical reactions some of which have little or no precedent in organic chemistry The popular textbook *Introduction to Enzyme and Coenzyme Chemistry* has been thoroughly updated to include information on the most recent advances in our understanding of enzyme action with additional recent examples from the literature used to illustrate key points A major new feature is the inclusion of two colour figures and the addition of over 40 new figures of the active sites of enzymes discussed in the text in order to illustrate the interplay between enzyme structure and function This new edition provides a concise but comprehensive account from the perspective of organic chemistry what enzymes are how they work and how they catalyse many of the major classes of enzymatic reactions and will continue to prove invaluable to both undergraduate and postgraduate students of organic bio organic and medicinal chemistry chemical biology biochemistry and biotechnology *Chemistry of Enzymes* A.n. Shukla,2009 The Chemistry of Enzyme Action ,1983-12-01 The Chemistry of Enzyme Action Enzyme Intelligence and Whence and Whither Nels Quevli,1925 Chemistry and Methods of Enzymes James B. Sumner,G. Fred Somers,1948 *An Introduction to Enzyme and Coenzyme Chemistry* Tim Bugg,2000 **The Enzyme Molecule** W. Ferdinand,1976 Written for use as a textbook for undergraduate courses on enzymology this book covers bioenergetics protein structure enzyme structure and function kinetics of independent active sites kinetics of interacting sites and metabolic control **General chemistry of the enzymes** Hans von Euler,1912 *Enzyme Chemistry* ,1937 *An Introduction to Enzyme Chemistry* P. F. Leadlay,1978 This monograph provides a concise account of the extent to which an enzyme s catalytic function can now be related to its detailed structure **The Chemistry of Enzyme Actions** Kaufman George Falk,1924 **Enzyme Chemistry** Sungman Cha,1971* Essential Enzyme Kinetics Daniel L. Purich,2020-06-01 *Essential Enzyme Kinetics* A Textbook for Molecular Life Scientists describes the theoretical basis and best practice approaches for using initial rate fast reaction and kinetic isotope effect experiments to define enzyme catalysis Because a detailed knowledge of enzyme transition states is the main driver for the rational design of slow tight binding inhibitors destined to become tomorrow s small molecule drugs *Essential Enzyme Kinetics* is the must have reference for chemists biochemists and pharmacologists intent on pursuing careers in Big Pharma Given the interdisciplinary nature of contemporary drug development this book provides a lucid short course that

will also benefit nonspecialists seeking to understand the scope and reach of modern enzyme kinetics Provides practical information about how to work with enzymes and design experiments to identify new inhibitors or activators Includes detailed step by step derivations of rate equations showing tried and true ways to confirm that the equations obtained are correct Arranged for use both as a desk reference with over 200 equations and more than 400 key references or as a textbook with 8 10 problems exercises at the end of each chapter

Introduction to the Chemistry of Enzyme Action Andrew Williams,1979
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Chemistry And Control Of Enzyme Reactions K. G. Scrimgeour,1981
Enzymes and Equilibria John Christopher Marsden,Colin Frank Stoneman,1974
Enzyme Mechanisms Michael I. Page,Andrew Williams,1989
Chemistry of Enzymes Uday Kumar (Assistant professor in chemistry),2012

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