

BIOLOGY LAB: CATALASE

Observing an Enzyme

INTRODUCTION:

What would happen to your cells if they made a poisonous chemical? You might think that they would die. In fact, your cells are always making poisonous chemicals. They do not die because your cells use enzymes to break down these poisonous chemicals into harmless substances. **Enzymes** are proteins that speed up the rate of reactions that would otherwise happen more slowly. The enzyme is not altered by the reaction. You have hundreds of different enzymes in each of your cells. Each of these enzymes is responsible for one particular reaction that occurs in the cell.

In this lab, you will study an enzyme that is found in the cells of many living tissues. The name of the enzyme is catalase (KAT-uh-LAYSS); it speeds up a reaction which breaks down **hydrogen peroxide**, a toxic chemical, into 2 harmless substances--**water and oxygen**. The reaction is as follows:



This reaction is important to cells because hydrogen peroxide (H_2O_2) is produced as a byproduct of many normal cellular reactions. If the cells did not break down the hydrogen peroxide, toxic levels would accumulate and destroy the cell.

In this lab, you will study the catalase found in beef or chicken liver cells. Even though catalase is an enzyme found in many cells, it is found in high levels in liver cells because the liver often functions to break down toxins present in the blood. It might seem strange to use dead cells to study the function of enzymes. This is possible because when a cell dies, the enzymes remain intact and active for several weeks, as long as the tissue is kept refrigerated.

PRELAB REVIEW:

Recall that the substrate is the molecule that the enzyme acts on, the products are the molecules produced by the reaction and enzymes are "reusable."

Under certain conditions enzymes are **denatured**. An enzyme is denatured when the protein molecule loses its proper 3-dimensional shape and can no longer function. Some things that can denature an enzyme are high temperatures, extremes of pH, heavy metals, and alcohol.

MATERIALS:

- *8 Test tubes
- *10-ml Graduated cylinder
- *Fresh liver, chicken meat, and Potato
- *3% Hydrogen peroxide solution
- *Distilled water
- *Stirring rod

- *Test Tube rack
- *Tweezers
- *Waste cup
- *1 Beaker (to hold test tubes)
- *Petri dish

FOR THE CLASS:

- *Thermometers
- *Ice water bath (0°C)
- *water bath #1 (36°C)
- *water bath #2 (80°C)
- *Boiling water bath (100°C)

PROCEDURE:

****You are responsible for cleaning your group's lab supplies, lab table, and sink. Liquids may be poured down the sink, but solids (ex: potato cells, apple cells, paper towels) must be thrown away in the trash!!!****

Part I

Setting up the control.

NOTE: Be sure to clean your stirring rod (and test tubes) between steps.

1. Place 1 dropper full of liquid liver into a clean test tube.
2. Place **2 ml** of the 3% hydrogen peroxide solution into a graduated cylinder.
3. Add the hydrogen peroxide to the test tube and carefully observe the rate of reaction (how rapidly the solution bubbles/ its speed).
4. Throughout this investigation you will estimate the rate of the reaction (how rapidly the solution bubbles) on a scale of 0-5 (0=no reaction/no bubbles, 1=slow, ..., 5= very fast). **Assume that the reaction in step 3 proceeded at a rate of "4."**

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Коллектив авторов



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BASIC BIOLOGY CONTEXTUALIZE HOME LABORATORY MANUAL ANGEL LHI D. ALCALDE,2022-08-15 One of the most important aspects of successfully involving students in the teaching learning process is to contextualize the material so that students can make connections between it and their own lives It is essential to education By drawing connections between the students everyday lives and the concepts they are learning in school the lesson is given more depth and significance as a result Students will develop a conceptual understanding of a contextualized home laboratory in biology through the use of this manual Teachers in the Philippines are not unfamiliar with the concept of contextualization because it is already firmly entrenched in our organization s mission statement which reads as follows To protect and promote the right of every Filipino to quality and complete basic education **Biology Laboratory Manual** Sylvia S. Mader,2000-07 Mader includes revised coverage of animal behaviour and ecology as well as a wealth of new focus boxes which highlight topics of high interest and relate biology to everyday life This text is linked to a web site offering extended chapter outlines

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Cell Biology Ray Arters, The cell stands as the fundamental unit of life

representing the smallest structure that exhibits all the characteristics we associate with living organisms Understanding cell biology requires recognizing that every living thing from the simplest bacteria to the most complex multicellular organisms is composed of cells that carry out the essential processes of life including metabolism growth reproduction and response to environmental stimuli This remarkable universality of cellular organization reveals the common evolutionary origin of all life on Earth while highlighting the extraordinary diversity that has emerged from basic cellular mechanisms Cell theory established in the 19th century through the work of scientists including Matthias Schleiden Theodor Schwann and Rudolf Virchow provides the conceptual foundation for understanding life at its most basic level This theory states that all living organisms are composed of one or more cells that the cell is the basic unit of life and that all cells arise from pre existing cells These simple statements revolutionized biology by providing a unifying framework that connects all forms of life through their shared cellular basis while explaining how life perpetuates itself through cellular reproduction The diversity of cellular organization encompasses two fundamental types prokaryotic cells which lack membrane bound organelles and have their genetic material freely dispersed in the cytoplasm and eukaryotic cells which contain membrane bound organelles including a nucleus that houses their genetic material This distinction reflects a major evolutionary transition that occurred approximately 2 billion years ago when the first eukaryotic cells evolved from prokaryotic ancestors Despite these organizational differences both cell types share fundamental processes and molecular mechanisms that demonstrate their common evolutionary heritage

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web mar 17 2006 les fibres solubles son d avoine orge légumineuses légumes freinent l absorption des graisses et réduisent les taux de cholestérol de 5 à 10 en particulier celui du cholestérol ldl mauvais cholestérol et de triglycérides

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web jun 6 2023 les fibres insolubles incapables de se dissoudre dans l eau la lignine la cellulose et l hémicellulose présentes dans les enveloppes des végétaux comme dans la peau des amandes la peau des pommes ou les céréales complètes son ces fibres parcourent le tube digestif sans être modifiées

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web par où commencer comme pour les fibres alimentaires il est important d augmenter graduellement la dose et de boire amplement de liquides suivez les recommandations sur l étiquette du produit ou les instructions de votre médecin ou diététiste sur la façon d utiliser un produit spécifique l importance de l eau