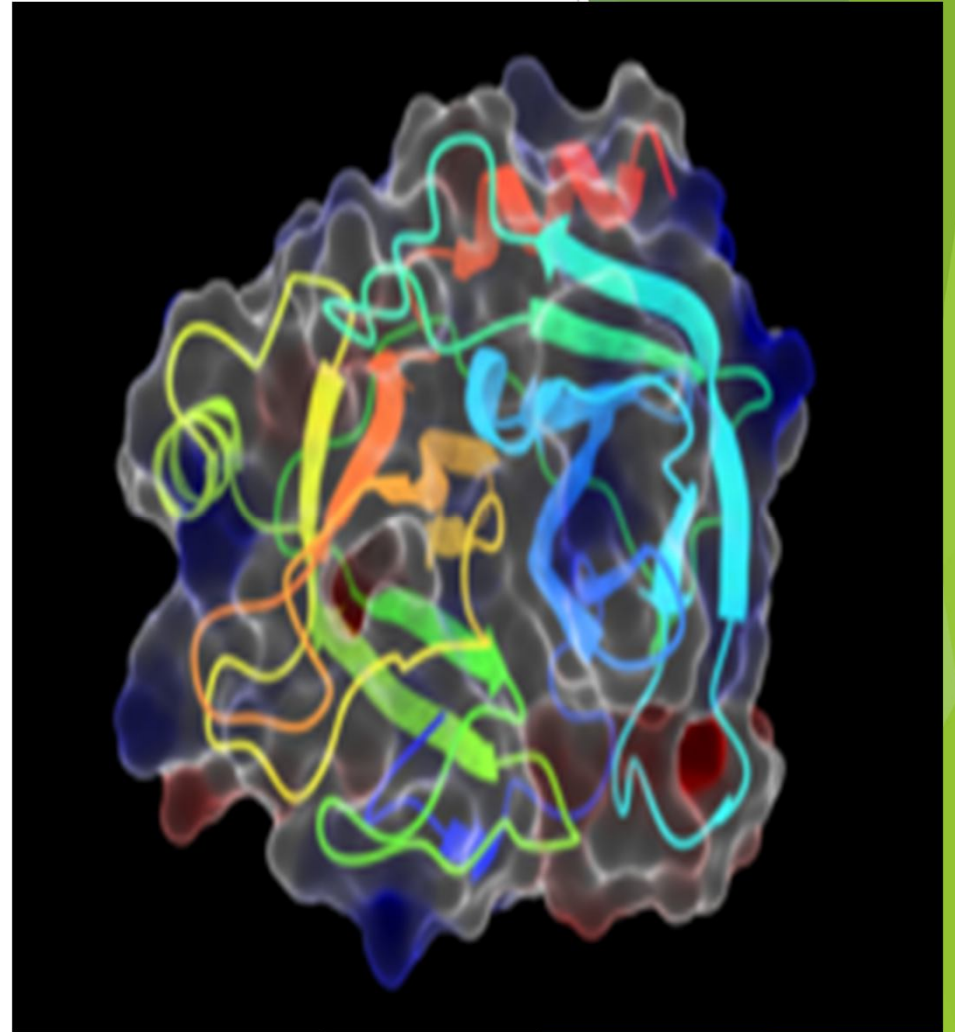


Practical Biotechnology

Lab 6

The effect of PH on enzymes activity

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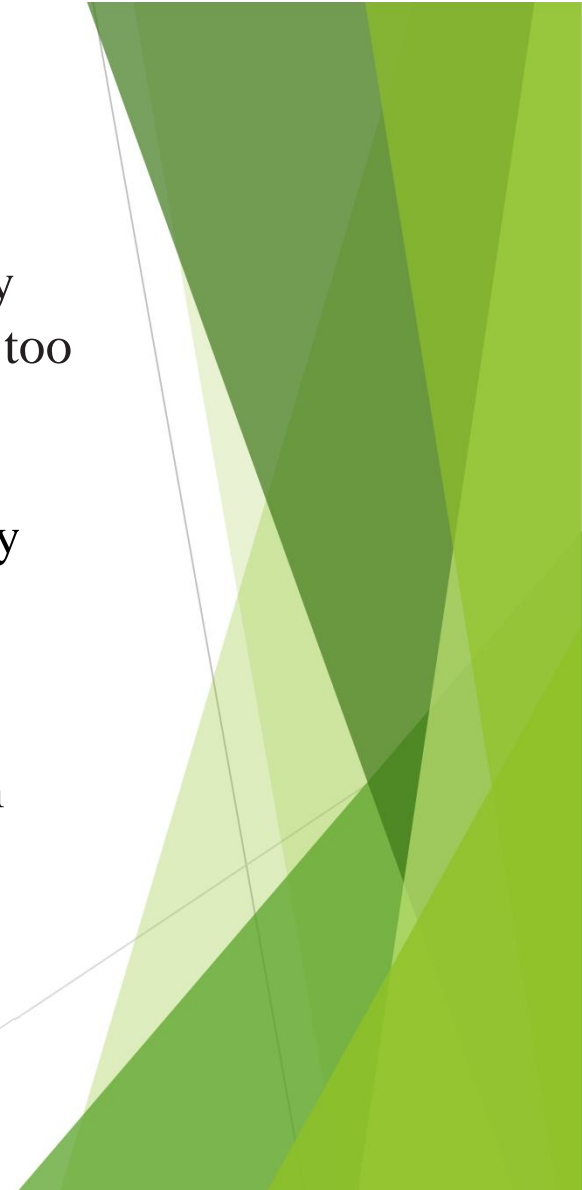


The effect of PH on enzymes activity

Thousands of different chemical reactions must happen inside every cell in order for them to function. If these cellular reactions happen too slowly the cell may die.

The rate of a chemical reaction can be increased in the laboratory by increasing the temperature.

However, in the body high temperature cannot be used to speed up reactions as this would damage cell proteins and prevent them from functioning.

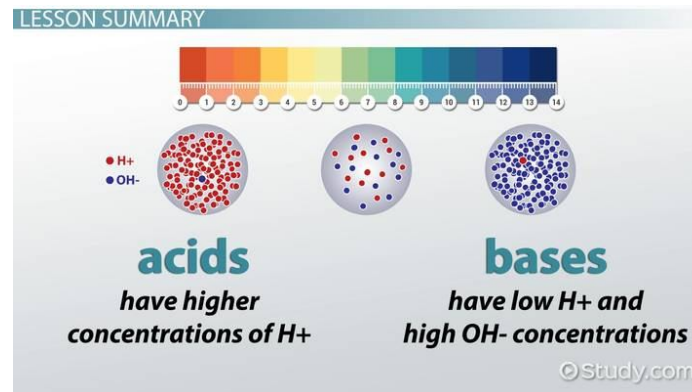


Living cells solve this problem by producing proteins called **enzymes**. Enzymes speed up cellular reactions at body temperature.

The chemicals that enzymes act upon are called **substrates**. The chemicals produced by the action of an enzyme are called **products**.



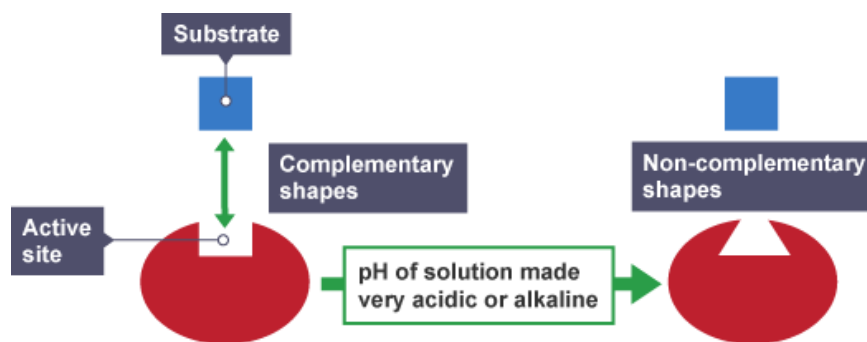
Each enzyme has an optimum pH but it also has a working range of pH values at which it will still work well. This depends on the type of enzyme.



Enzyme activity is at its maximum value at the optimum pH. As the pH value is increased above or decreased below the **optimum** pH the enzyme activity decreases.

The change in pH changes the shape of the enzyme which prevents the attachment of the substrate at the active site and terminates the reaction.

This effect can be permanent and irreversible and is called denaturation.



Trypsin

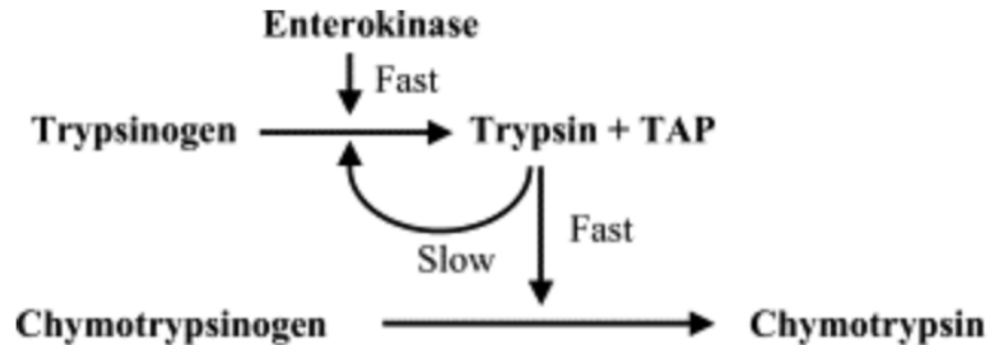
is an important digestive enzyme that produced by the pancreas in an inactive form called trypsinogen. breaks down proteins, continuing the process of digestion that began in the stomach.

It may also be referred to as a proteolytic enzyme, or proteinase.



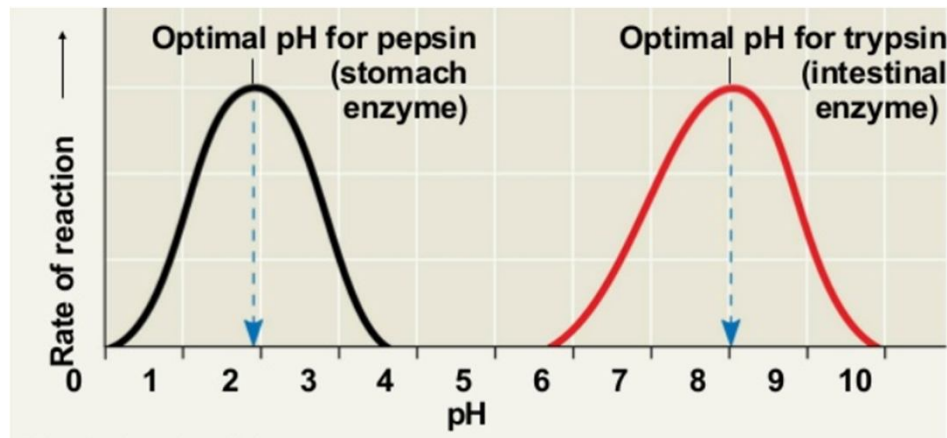
Physiological Functions

The pancreas releases trypsinogen, when protein reaches the duodenum (small intestines). Once trypsinogen touches enterokinase which is secreted by the mucosal cells of the small intestines, trypsin is activated.



Trypsin and pepsin are both enzymes in the digestive system which break protein chains in the food.

Pepsin works in the highly acidic conditions of the stomach. It has an optimum pH of about 1.5. On the other hand, **trypsin** works in the small intestine, parts of which have a pH of around 7.5. Trypsin's optimum pH is about 8.



Procedure

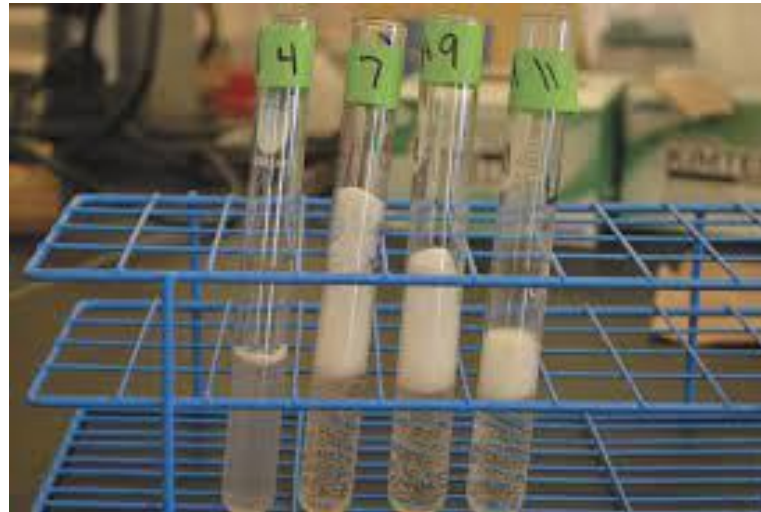
2. Label the test tubes from 1-6 and place them in the test tube rack.
3. Add 5 ml of H_2O_2 solution to all the tubes.
4. In test tube 1-2 add 5ml of 2M Hcl.
5. In test tube 3-4 add 5ml of 2M NaOH .
6. In test tube 5-6 add 5ml of Water.



7. Using universal indicator paper measure the pH of each of the test tubes.

8. Add 1 ml of yeast to the test tubes .

9. Measure the level of bubbles that rise up in each of the test tubes after 5 minute and record them in a table.





Photographic film has a protein called gelatin that coats its surface. If it is removed, a whitish stain will appear.

Thank you for
listening

