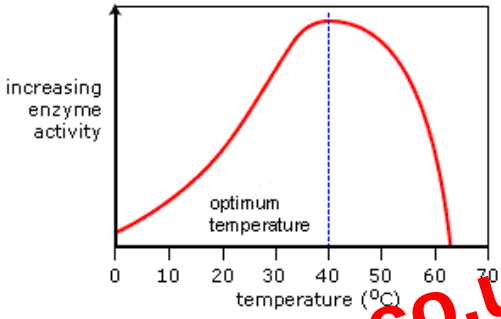
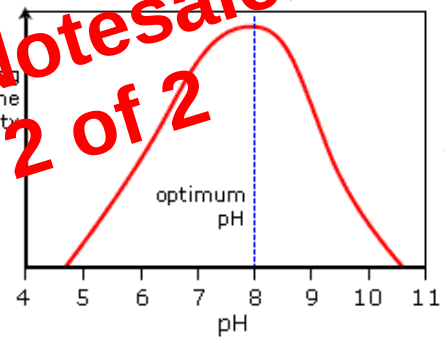
Temperature:

Once an enzyme reaches it's optimum temperature, any further increase causes a decrease in the rate of reaction. The decrease is caused by a permanent change in the shape of the enzyme and it's active site = enzyme is denatured = no longer complementary with substrate.



pH:

A change of pH from the optimum for a particular enzyme alters the electric charge carried by the amino acid units forming the active site = enzyme denatured = no longer complementary with substrate.



Enzyme Concentration:

Enzymes are not used up during catalysis = used over and over again = work well at low concentrations. Increasing the enzyme concentration provides more active sites so the rate of enzyme activity increases as long as the substrate is present in excess (more than enough).

Enzymes

A competitive inhibitor is a substance that combines with the active site preventing its normal substrate from binding with it. (its shape is similar to substrate).

Substrate Concentration:

An increase in the concentration of the substrate affects the rate of reaction for a fixed concentration enzyme. If there is excess of the enzyme = ROR is directly proportional to concentration of substrate. When all the enzyme active sites are occupied = ROR is limited and becomes constant.

A metabolic pathway is a sequence of reactions where a particular molecule is converted into another different one by way of a series of intermediate compounds.

A non-competitive inhibitor is a substance that combines with some part of an enzyme molecule other than its active site. The change in shape of the enzyme molecule causes a change of shape of active site = substrate molecule can't bind with active site.

The inhibition may be:

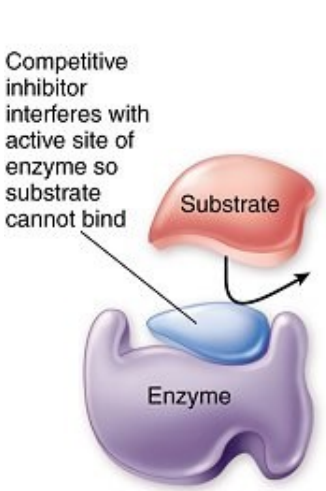
Reversible: breaking the inhibitor-enzyme complex is possible.

Irreversible: breaking the inhibitor-enzyme complex isn't possible.

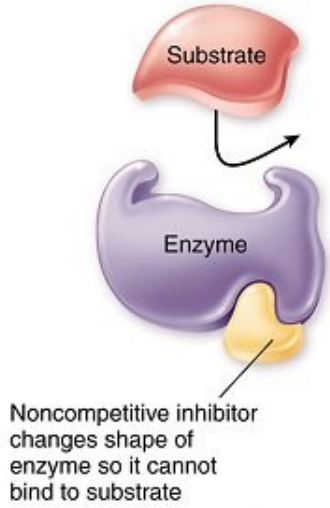
If the substrate concentration is increased, the effect of the inhibitor is reduced. Inhibitor isn't permanently bound to active site = when it leaves, either a substrate or inhibitor can take its place.

Sooner or later, all the substrate molecules will occupy an active site, but the greater the concentration of the inhibitor, the longer this will take.

An **allosteric Inhibitor** is a substance that reversibly combines with the allosteric site.



(a) Competitive inhibition



(b) Noncompetitive inhibition