

Enzymes

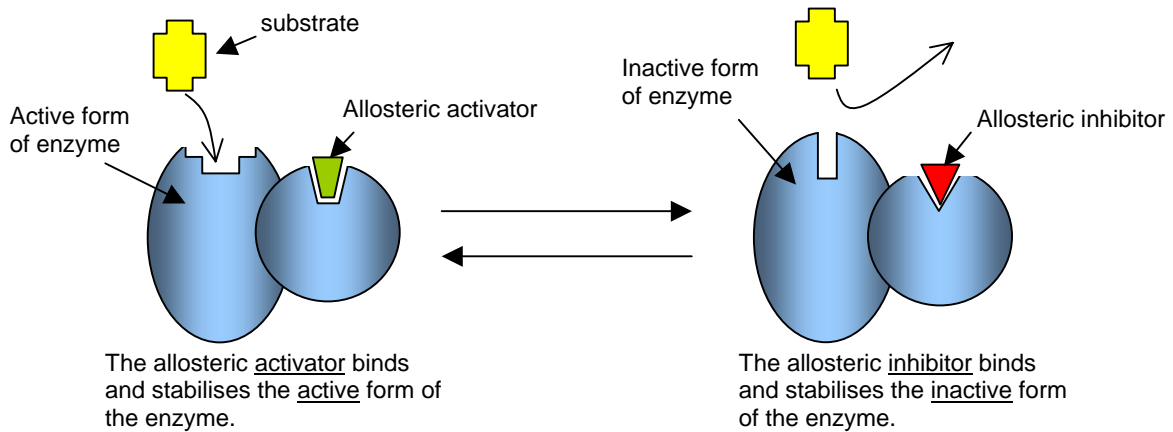
Allostery

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The example of non-competitive inhibition above (Sarin gas) is harmful, but in the body many examples exist where the property is used to regulate metabolic pathways. Enzymes that behave in this way are called **allosteric enzymes**. Instead of the term inhibitor the term **effector** is used.

Key points

- Quaternary level structure of the enzyme;
- At least two subunits;
- One subunit has the substrate active site;
- Other subunit has the effector binding site.
- The effector may be an activator or an inhibitor of the enzyme.
- The enzyme alternates between the active form that reacts with the substrate and the inactive form that does not.
- The allosteric activator stabilises the active form.
- The allosteric inhibitor stabilises the inactive form.



How then does this work to regulate a metabolic pathway? Phosphorylase is an enzyme in muscle that removes a glucose phosphate from the end of glycogen at the start of glycolysis. Remember that glycolysis is the first stage in producing ATP from glucose. If the muscle is resting it does not need much ATP and hence the relative concentration of ATP will be high. On the other hand if it is active then it will be using up ATP and the relative concentration of AMP (adenosine monophosphate) will be high. It therefore makes sense to regulate this key enzyme so that glycogen is not broken down unnecessarily and wasted. ATP and AMP act as the allosteric effectors.

