

Enzyme specificity

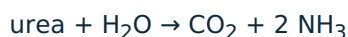
Enzyme specificity limits the range of action of a certain enzyme. We distinguish two types of specificity:

1. Substrate specificity

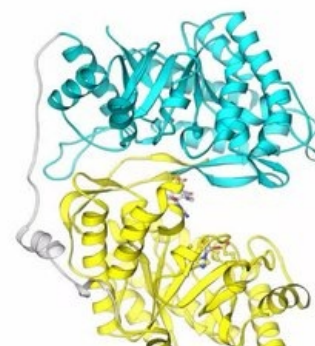
The enzyme acts only on **a limited group of substrates** and will not catalyze the reaction for other substrates. Depending on the extent, substrate specificity can be:

Absolute:

The enzyme catalyzes the reaction of only **one specific substrate**, but will no longer catalyze reactions involving, for example, derivatives of this substrate. An example is urease catalyzing the reaction:



However, urease cannot catalyze the hydrolysis of methylurea or thiourea.



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Substrate specificity

Group:

This is a more common form of specificity. An enzyme catalyzes the reaction of **several similar substrates** (typically containing the same functional groups). The affinity for each substrate can be different (K_M therefore differs for individual substrates). An example is *carboxypeptidase B*, which hydrolyzes peptides from their carboxy-terminus. It preferentially cleaves peptide bonds containing charged amino acids (arginine, lysine).



Urease catalyzing the reaction - scheme

2. Reaction (effect) specificity

An enzyme generally catalyzes **one type of reaction**. An example can be lipase – enzymes that hydrolyze lipids.

Many enzymes act **stereospecifically**. They attack only certain configurational isomers of the (for example only the L- or only the D- form) probably due to the necessity of binding the substrate to at least three specific sites of the active center of the enzyme (which is a chiral compound) – the opposite stereoisomer does not bind.

Links

Related articles

- Enzymes
- Enzymopathy

External links

Enzyme specificity (czech Wikipedia) (<https://cs.wikipedia.org/wiki/Enzym#Specifita%7C>)