

## **GCSE Biology – Enzymes - Transcript**

Our bodies need food to function. Enzymes help break down the food we eat so its nutrients can be absorbed into our bloodstream. So, how do they do it?

Well, enzymes are biological catalysts. Take metabolism, the sum of all chemical reactions happening in the cells in the body. These reactions keep you alive, but they're slow.

Enzymes are proteins that speed up those reactions without being used up themselves. Digestive enzymes break down large nutrients in food, such as proteins and carbohydrates, into smaller molecules like amino acids and sugars that can be more easily absorbed.

Each enzyme has a uniquely shaped active site. Only the right molecule, the substrate, can fit into the active site, a bit like a lock and key.

An enzyme only works with a specific substrate we call this enzyme specificity. When they bind, they form an enzyme–substrate complex. The enzyme then helps break down the substrate into smaller molecules, or products. The enzyme is then free to catalyse more reactions.

But it's not just breaking down big molecules into smaller ones. Enzymes can also help join two substrates together to build a larger product.

Enzymes work best in conditions that are just right. If the temperature is too low, all the molecules move slowly, so the reactions happen slowly too. As the temperature heats up the reactions speed up as enzymes and substrates collide more frequently.

The top of the graph shows the optimum temperature. This is where the enzyme functions most efficiently. But if it gets too hot, the bonds holding the enzyme's shape break. The active site changes, and the substrate no longer fits. The enzyme is denatured. It doesn't die as it was never alive, but it does stop working.

Enzymes also have an optimum pH. In a pH lower or higher than the optimum, the shape of the active site changes as the bonds break. Again, the enzyme becomes denatured.

Different enzymes have different optimum pHs.

So enzymes break down our food, fuelling our metabolism with the nutrients we need and keeping the body active all day long.