# Using restriction enzymes to digest DNA

The animation starts with a piece of DNA that will be digested by restriction enzymes. The DNA is a long chain of nucleotides bound by phosphodiester bonds and it is double stranded.

In this strand of DNA there are restriction sites (bold text) for two different restriction enzymes. Restriction enzymes are derived from bacteria and therefore their name reflects the type of bacteria they came from. For instance, EcoRl comes from bacteria called E. coli.

Let us get a closer look at the restriction sites in the strand of DNA. We will start with the restriction site for EcoRl. Like many other restriction enzymes, EcoRl's restriction site is a palindromic sequence is a sequence that is read from left to right on one strand and the same way but right to left on the complimentary. All restriction enzymes cut the phosphodiester bonds between two nucleotides. However, the site that is cut and the way that the DNA is digested is unique to each restriction enzyme.

The restriction enzyme and the DNA will be added to a test tube together with a buffer. The test tube will be put for one hour in an incubator set 37ºc.

The restriction enzyme binds the DNA at its unique restriction site and cuts each strand of DNA that are not paired, giving the DNA a step-like appearance. These step-like ends are also called overhangs. These overhangs have a tendency to reattach themselves to the complimentary DNA strands that have complimentary overhangs. For this reason, overhangs are referred to as "sticky ends".

## The Task

When using restriction enzymes to digest DNA, there are steps in the process that are the same regardless of which enzyme is used. The animation that you have just watched shows the DNA being digested by the restriction enzyme EcoRl. The following statements describe the steps needed to cut DNA using a different restriction enzyme called Alul. Click on the following buttons to put the statements in the right order. The statements will be arranged in the order that you have chosen and in the end you will be able to see an animation demonstrating the process of the DNA being digested by the restriction enzyme Alul.

* Binding of the enzyme Alul to its restriction site
* Incubation at 37ºc for one hour
* Disruption of the phosphodiester bonds at the restriction site Formation of blunt ends.
* Addition of the enzyme Alul to the DNA.

The correct answer:

1. Addition of the enzyme Alul to the DNA.
2. Incubation at 37ºc for one hour
3. Binding of the enzyme Alul to its restriction site
4. Disruption of the phosphodiester bonds at the restriction site Formation of blunt ends.