Lab6: Polymerase Chain Reaction

PCR How to Copy DNA

Polymerase chain reaction (PCR) is an efficient and cost-effective way to copy or "amplify" small segments of DNA or RNA or even a gene.

Using PCR, millions of copies of a section of DNA are made in just a few hours, yielding enough DNA required for analysis.

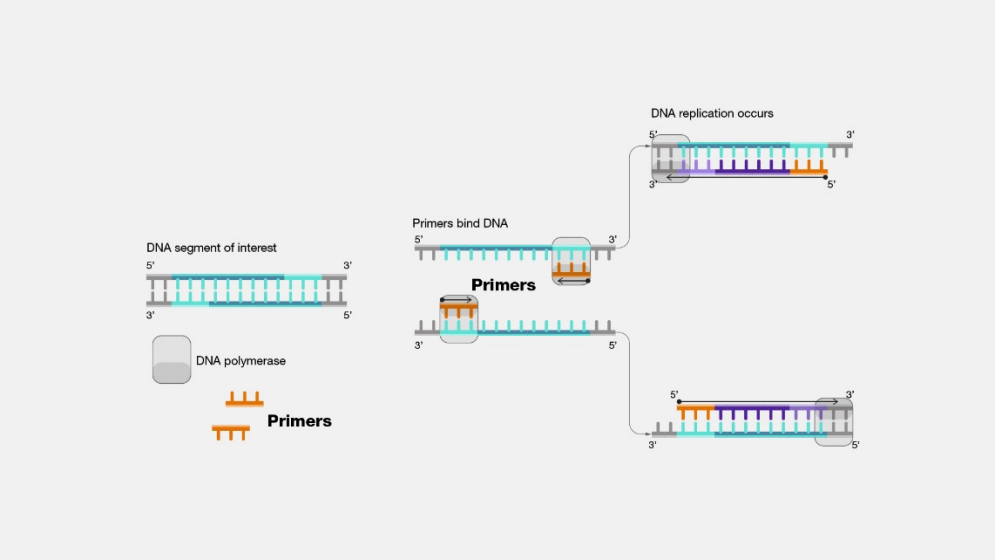
It is a common tool used in medical and biological research labs. It is used in the early stages of processing DNA for sequencing, for detecting the presence or absence of a gene to help identify pathogens during infection, and when generating forensic DNA profiles from tiny samples of DNA.

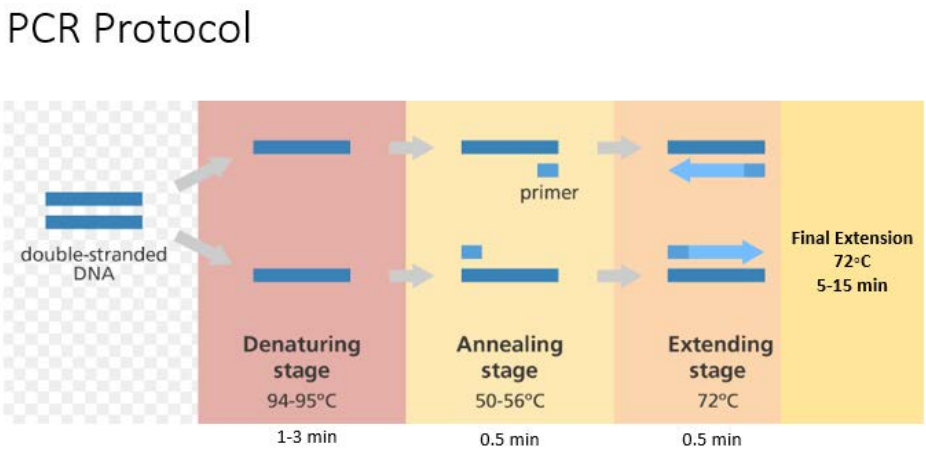
Why Polymerase and Chain

- It is called "polymerase" because the only enzyme used in this reaction is DNA polymerase.
- It is called "chain" because the products of the first reaction become substrates of the following one, and so on.

The Reaction Components

- **Target DNA**: contains the sequence to be amplified
- **Pair of Primers**: oligonucleotides that define the sequence to be amplified (short stretches of DNA that initiate the PCR reaction, designed to bind to either side of the section of DNA you want to copy) Or (A primer, as related to genomics, is **a short single-stranded DNA fragment** used in certain laboratory techniques, such as the polymerase chain reaction (PCR).
- **dNTPs**: DNA nucleotides bases (A, C, G and T) are the building blocks of DNA and are needed to construct the new strand of DNA
- **DNA Polymerase**
- **Buffer** to ensure the right conditions for the reaction (Maintains pH and ionic strength of the reaction).





What is PCR used for

Once DNA amplification is done, the DNA produced by PCR can be used in many different laboratory procedures.

PCR is also valuable in a number of laboratory and clinical techniques, including detection of bacteria or viruses (particularly AIDS) and recently Covid19, and diagnosis of genetic disorders or some plant systematic diseases.

Application of PCR

1. Classification of organisms
2. Genotyping
3. Molecular archaeology
4. Mutagenesis and Mutation detection

5. Sequencing
6. Detection of pathogens
7. DNA fingerprinting
8. Drug discovery
9. Genetic matching
10. Genetic engineering
11. Cancer research