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**WHAT IS PCR**

PCR is a technique used in the laboratory to make millions of copies of a particular section of DNA. It was first developed in the 1980s.

The polymerase chain reaction (PCR) was originally developed in 1983 by the American biochemist Kary Mullis. He was awarded the Nobel Prize in Chemistry in 1993 for his outstanding works.

PCR is used in molecular biology to make many copies of (amplify) small sections of DNA.

It is a technique used to make thousands to millions of copies of a specific section of DNA from a very small amount of DNA.

**PROCEDUR**

**1. Denaturation**

The DNA template is heated to 94° C. This breaks the weak hydrogen bonds that hold DNA strands together in a form of helix, allowing the strands to separate creating single stranded DNA.

**2. Annealing**

The mixture is cooled to anywhere from 50-70° C. This allows the primers to bind (anneal) to their complementary sequence in the template DNA.

**3. Extension**

The reaction is then heated to 72° C, the optimal temperature for DNA polymerase to act. DNA polymerase extends the primers, adding nucleotides onto the primer in a sequential manner, using the target DNA as a template.

With one cycle, a single segment of double-stranded DNA template is amplified into two separate pieces of double-stranded DNA. These two pieces are then available for amplification in the next cycle. As the cycles are repeated, more and more copies are generated and the number of copies of the template is increased exponentially.

**ELECTROPHORESIS**

Electrophoresis is a technique commonly used in the lab to separate charged molecules, like DNA, according to size.

**AGAROSE GEL ELECTROPHORESIS**

Agarose gel electrophoresis one of the most common electrophoresis technique which is relatively simple and straightforward to perform but possesses great resolving power. The agarose gel consists of microscopic pores that act as a molecular sieve which separates molecules based upon the charge, size and shape.

It is a powerful separation method mostly used to analyze DNA fragments produced by restriction enzymes, and it is a convenient analytical method for separating DNA fragments of different sizes ranging from 100 bp to 25 kb. DNA fragments smaller than 100 bp are more effectively separated using polyacrylamide gel electrophoresis whereas pulse-field gel electrophoresis is used to separate DNA fragments larger than 25 kb.

Agarose gel electrophoresis can also be used to separate other charged biomolecules such as RNA and proteins.

The separation medium is a gel made from agarose. Agarose is isolated from the seaweed genera Gelidium and Gracilaria and consists of repeated agarobiose subunits. During gelation, agarose polymers associate non-covalently and form a network of bundles whose pore sizes determine a gel’s molecular sieving properties. In general, the higher the concentration of agarose, the smaller the pore size.