

DNA replication

What is DNA replication?

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Why is DNA replication needed in multicellular organisms?

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Semi-conservative replication

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How does complementary base pairing make replication accurate?

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Role of helicase

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General role of DNA polymerase

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The three PCR stages and temperatures

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What are primers in PCR?

For reproduction, and for growth and tissue replacement, since every new cell needs a full copy of the genome.

The production of exact copies of DNA with identical base sequences.

Each template base determines the base added (A-T, C-G), so the new strand's sequence is exactly complementary to the template.

Each new DNA molecule contains one strand from the original molecule and one newly synthesised strand.

Links free DNA nucleotides, paired to the template by complementary base pairing, into a new strand.

Unwinds the double helix and breaks hydrogen bonds between bases, separating the strands.

Short single-stranded DNA sequences that bind to the ends of the target sequence and give DNA polymerase a starting point.

Denaturation about 95 °C (strands separate); annealing about 55 °C (primers bind); extension about 72 °C (Taq polymerase builds new strands).

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Why is Taq polymerase used in PCR?

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Basis of separation in gel electrophoresis

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What does DNA profiling compare?

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Why does using more markers improve DNA profiling?

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Paternity test rule

Negatively charged DNA moves towards the positive electrode; smaller fragments move faster and travel further through the gel.

It is from the hot-spring bacterium *Thermus aquaticus*, so it is not denatured at 95 °C and works best at about 72 °C.

It reduces the probability of a false match between two different people, increasing reliability.

Lengths of short tandem repeat (STR) regions, amplified by PCR and separated by gel electrophoresis.

Every band in the child's profile must be present in either the mother's or the father's profile.