# Mismatch repair

Mismatch repair is a cellular process that corrects mismatches that can occur during DNA replication, recombination, and repair. Mismatches are errors that arise when the nucleotides (A, C, G, T) in the newly synthesized DNA strand do not match the nucleotides in the template strand. These errors can be caused by mistakes made during DNA synthesis or by damage to the DNA, such as from exposure to radiation or certain chemicals.

Mismatch repair is a highly conserved process that is present in nearly all organisms. It involves several proteins that recognize and remove the mismatched nucleotide and its neighboring nucleotides. The process is initiated by the recognition of the mismatch by a protein complex called MutS, which then recruits another protein complex called MutL. Together, these complexes recruit an exonuclease, which removes the mismatched nucleotide and several adjacent nucleotides. Finally, DNA polymerase fills in the gap and DNA ligase seals the nick.

Mismatch repair is important for maintaining the integrity of the genome and preventing the accumulation of mutations that can lead to cancer and other diseases. Mutations in genes that encode proteins involved in mismatch repair have been associated with several types of cancer, including colon, endometrial, and stomach cancer.