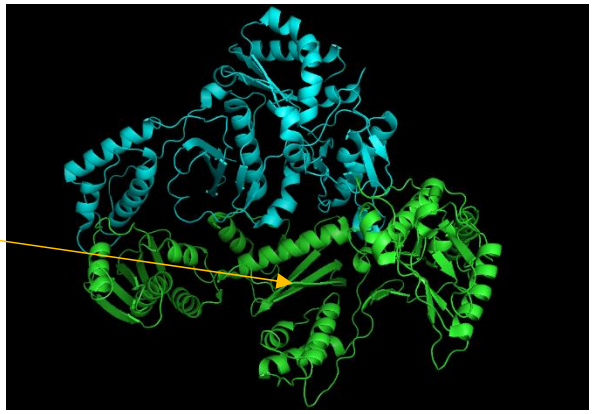
TB10 - Reverse Transcriptase

Introduction

Reverse transcriptase is an enzyme that makes complementary DNA (cDNA) from an RNA template, in a process called reverse transcription.

PDBe: 2yni

Green chain is reverse transcriptase with p51 RT (blue chain).



Use by retroviruses

Retroviruses are a type of virus which insert a copy of their genetic material into human DNA in order to replicate. Retroviruses like HIV use reverse transcriptase to make a complementary strand of DNA from their own viral RNA. This complementary DNA is then inserted into the human genome, where it produces viral proteins, thus facilitating its replication. Anti-viral drugs used to treat (but not cure) HIV sometimes use reverse transcriptase inhibitors as humans don't use reverse transcriptase, thus the host cell itself will not be affected.

Use in making DNA fragments

As each cell has only two copies of a single gene, it can be often difficult to find and extract a specific gene. Active cells (like β-cells in the pancreas for insulin production) usually produce thousands of RNA molecules complementary to the DNA of a specific gene. Reverse transcriptase can be used to produce these genes from the complementary mRNA; mRNA is removed from the cell, and mixed with DNA nucleotides and reverse transcriptase. The mRNA is used as a template for the reverse transcriptase to make complementary DNA (cDNA).

Produced by Alex Greer at Newcastle University as part of a Nuffield Research Placement.

References

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