National Conference on Recent Trends in Engineering, Science, Humanities and Management (NCRTESHM – 2023)

29th January, 2023, West Bengal, India.

CERTIFICATE NO : NCRTESHM /2023/C0123172

THE UNCOATING AND DNA SYNTHESIS OF VIRUSES THROUGH REVERSE TRANSCRIPTION

MD MASUM RAJA

Research Scholar, Department of Microbiology,
Dr. A.P.J. Abdul Kalam University, Indore, M.P.

ABSTRACT

The viral capsid is uncoated in the cytoplasm of an infected cell. Uncoating is assumed to be promoted by a cascade of conformational changes and disassembly triggered by multiple, sequential changes in the cellular environment, sequential contact with diverse cellular stimuli, and the chemical rearrangements that accompany reverse transcription. After viral capsids are removed (PICs), pre-integration complexes (PICs) and reverse transcription complexes (RTCs) are formed. HIV-1 reverse-transcription complexes (RTCs) are the complexes responsible for converting the virus's positive, single-stranded RNA genome into double-stranded DNA. As a result, the RTC genomes are transitional molecules, either RNA or RNADNA. RNA has been completely eliminated from PICs, leaving only the DNA in its double helix form. Being integration-competent HIV-l complexes, PICs are very effective at integrating into target DNA in vitro. Reverse transcription begins with the production of the strong-stop DNA on the minus strand and continues with the synthesis of the complementary DNA on the minus strand. Two poly purine tracts (PPT) in the HIV-1 genome are resistant to degradation by Rnase H and serve as primers for the synthesis of plus-strand DNA. These PPTs are found in the 3' end of the genome and the Cppt in the middle of the chromosome. Reverse transcription, the process by which plus-strand DNA is synthesized, requires a second strand transfer event and is ended by a central termination sequence (CTS) located in the middle of the genome. There is a plus-strand displacement of 100 nucleotides in the middle of the genome as a result of the Cppt and 3' PPT serving as beginning sites for plus-strand synthesis.

Keywords: Uncoating, DNA Synthesis, Viruses, Reverse Transcription