Hepatitis B Virus Characteristics

Hepatitis B Virus (HBV) is in the Hepadnavirus family and is an enveloped DNA virus with a partially double-stranded circular genome. Hepadnavirus DNA replication is unique because it occurs via reverse transcription of viral RNA. Reverse transcriptase activity is also seen in retroviruses but this transcription pathway differs significantly from the retroviruses. Within the host cell, the circular genome is converted via a DNA dependent DNA polymerase, which serves as the template for transcription of viral RNA. This RNA is converted back to DNA via reverse transcription that is used as the virion genome. This virus causes hepatitis B and is transmitted via IV drug use, sex, and maternal fetal routes. This infection has a relatively long incubation period of 3 months.

PLAY PICMONIC

Hepadnavirus

Liver-virus

Hepatitis B Virus (HBV) is in the Hepadnavirus family.

Enveloped

Envelope

This virus has an envelope, which is an outer membrane that covers the protein capsid and helps viral entry of host cells.

Circular

Circular-object

HBV virion contains a partially double-stranded circular genome.

Partially Double-stranded DNA

Partial Double-stranded train tracks

The genome is partially double-stranded DNA that forms a covalently closed circle with 5' end of the full length minus strand which is linked to the viral DNA polymerase.

Has Reverse Transcriptase

Reverse Train

A reverse transcriptase is also known as RNA-dependent DNA polymerase, which transcribes single stranded RNA into single stranded DNA. It also has DNA-dependent DNA polymerase activity which synthesizes a second strand of complementary DNA to the reverse-transcribed singled stranded DNA.

IV Drug Use

IV Drugs

In the United States, IV drug abuse with sharing of contaminated needles and syringes is one of the chief modes of HBV transmission.

Sex

Male and female sex signs

In the United States, unprotected heterosexual or homosexual intercourse is one of the chief modes of HBV transmission.

Maternal Fetal Routes

Pregnant Mom

In areas with high prevalence of HBV, perinatal transmission with transmission of the pathogen from mother to baby accounts for 90% of HBV cases.

3 Month Incubation Period

(3) Tree

HBV has a prolonged incubation period that can last 4-26 weeks with an average of 3 months. This incubation period is much longer than the average of 3 week incubation period observed in HAV.