Hepatitis B Virus Surface Antigen Mutants

Creative Diagnostics has established a global-leading Hepatitis B Virus Surface Antigen Mutants manufacture platform using Yeast expression system. With years of exploration, different highly purified HBsAg/their mutants were obtained. Our products are the best choice for multiple purposes.

HBV Surface Antigen and Mutants

Hepatitis B virus (HBV) is a partially double-stranded DNA virus and enveloped virus, belonging to the Hepadnaviridae family. This virus will lead to hepatitis B. The structure is shown in Figure 1 below.

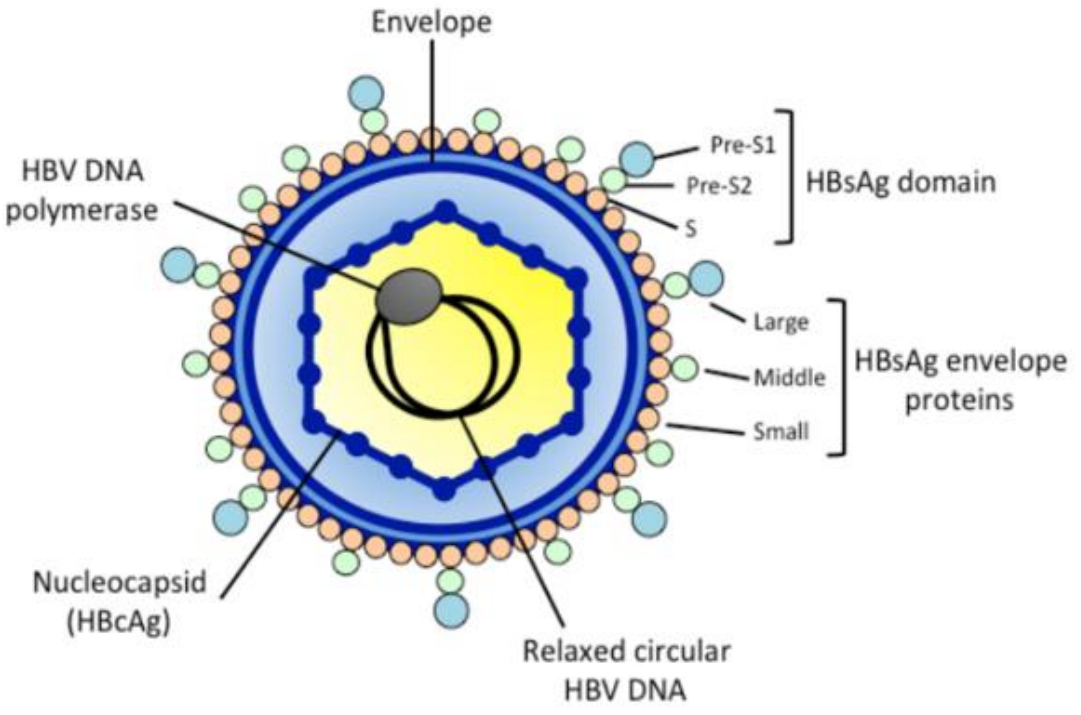

Figure 1. the Structure of HBV

Although Hepatitis B virus belongs to a sort of DNA virus, the polymerase within does not possess proofreading activity which confers a high mutation rate. HBV surface antigen (HBsAg) is the main component of HBV to be recognized by immune system. It is composed of 226 amino acids with high heterogeneity, but there are some conserved regions in the protein that define the genotype.

The HBsAg mutant with substitution of a single amino acid in the major hydrophilic region or antigenic region of HBsAg, known as "a" determinant, is related to immune evade, failure of HBV detection and HBsAg vaccination.

Up to now, creative diagnostics has developed large variety of subtypes of HBsAg mutants with certain point mutation, such as Mutant K-141-E implies the Lysine is replaced by Glutamic acid at the position of 141, Mutant M-133-H implies the Methionine is replaced by Histidine at the position of 133, Mutant M-133-L implies the Methionine is replaced by Leucine at the position of 133, Mutant P-142-S, implies the Proline is replaced by Serine at the position of 142, Mutant Q-129-H, implies the Glutamine is replaced by Histidine at the position of 129, Mutation T-126-N, implies the Threonine is replaced by Asparagine at the position of 126, Mutation T-143-K. implies the Threonine is replaced by Lysine at the position of 143, Mutation Q-129-L, implies the Glutamine is replaced by Leucine at the position of 129, Mutant G-145-R implies the Glycine is replaced by Arginine at the position of 145.

Among those, Mutant G-145-R is the most commonly described vaccine-evade mutant, which is horizontally transmissible and stable over time. Nearly all of the detection assays for HBsAg depends on the antibodies against the "a" determinant, the substitution of amino acid within this region may result in the failure of detection. Consequently, HBsAg mutants related to detection failure of HBsAg were also noted in acute Hepatitis B patients. Therefore, it is highly required to produce antibodies specific to the subdominant regions within "a" determinant of HBsAg, which is the focus of many recent studies. HBsAg mutants can also be identified by nucleic acid detection of HBV in serum. At present, a variety of molecular analysis essays are developed to detect HBsAg mutants, which includes sequencing, real-time PCR, gap ligase chain reaction (gLCR) and limiting dilution cloning PCR (LDC PCR).

Application of HBsAg and Its Mutants

HBsAg and its mutant is a biomarker of HBV infection, which has been qualitatively utilized in the diagnosis of HBV, and the quantitative analysis of HBsAg is helpful to figure out the phase of chronic Hepatitis B. The level of HBsAg or its mutant in patients can reflect the prognosis status of Hepatitis B, the decline of HBsAg level as well as HBV DNA implies a critical milestone to desired prognosis. Virologically, compared to the information of HBV DNA level, a complementary information regarding the replication activity of the virus provided by HBsAg or its mutant level can confer a more comprehensive understanding of the patient's infection. HBsAg and its mutant can be regarded as a biomarker for therapeutic response in chronic Hepatitis B, both in peginterferon treatment and nucleos(t)ide analogue (NA) therapy.