

## **IMPROVED HEPATITIS B VIRUS (HBV) IMMUNOASSAY TO DETECT MUTATED FORMS OF THE SURFACE ANTIGEN**

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**Background:** Due to its mode of replication by reverse transcription of its pre-genomic RNA, HBV has a high rate of mutation relative to other DNA viruses. Amino acid substitutions have been described in all HBV DNA encoded viral proteins such as polymerase, nucleocapsid protein (HBcAg) and surface antigen (HBsAg). There are increasing concerns about the contribution of variant HBsAg to vaccine escape, immune prophylaxis failure and false negatives in serological HBV diagnosis. The group-specific “a” determinant region (amino acids 124-147) has attracted most attention, not only because mutations in the “a” determinant were found in 10-20% vaccine escapes, but also because of the fact that high-affinity antibodies in response to this region have been used in most HBV diagnoses.

**Methods:** Rabbit and murine monoclonal antibodies were characterized based on the binding patterns as well as their linear versus conformational recognition specificity.

**Results:** (1) Common HBsAg mutations can be detected with mixed monoclonal antibodies incorporated in the assay. (2) Rabbit monoclonal antibody has demonstrated a broad immunoreactivity and higher affinity to HBsAg mutant antigens.

**Conclusion:** By understanding the HBsAg major immunodominant region structure and by using a combination of rabbit and murine monoclonal antibodies with specificity covering all key mutation locations, maximal anti-HBs-based protection and highly sensitive diagnosis to HBV variants can be achieved.