

## Technical Brief

## Hepatitis B “e” Antigen (HBeAg) Assay

### Background Information

Hepatitis B virus (HBV) infection is a major cause of chronic hepatitis, cirrhosis and hepatocellular carcinoma worldwide. Several serological tests for HBV infection are available that measure antigens or antibodies produced at various stages of infection. These include HBsAg, Anti-HBs, total Anti-HBc, Anti-HBc IgM, HBeAg and Anti-HBe. Together with the clinical information, hepatic enzyme levels and viral molecular studies, these serological markers help in the diagnosis, prognosis and direction of treatment of HBV patients.

The presence of Hepatitis B “e” antigen (HBeAg) in the serum/plasma is considered to be a marker of HBV replication and infectivity, and is usually associated with the detection of HBV DNA. Transmission rates of HBV infection are much higher when the source is HBeAg positive. During acute infection, HBeAg appears shortly after the appearance of HBsAg. In patients who recover, HBeAg to anti-HBe seroconversion precedes HBsAg to anti-HBs seroconversion, and anti-HBe antibodies can persist after resolution of acute hepatitis B. In contrast, patients with chronic infection can have persistence of HBeAg for years to decades. During the HBeAg positive phase, most patients have detectable HBV DNA and active liver disease. Seroconversion from HBeAg to anti-HBe is usually associated with the disappearance of HBV DNA in serum and remission of liver disease. However, a small proportion of anti-HBe positive patients continue to have active liver disease and detectable HBV DNA in serum. This may be due to low levels of wild-type HBV or the presence of pre-core mutants.

### Indications

The ADVIA Centaur® HBeAg Assay is an *in vitro* diagnostic immunoassay for the qualitative determination of the hepatitis B “e” antigen (HBeAg) in human serum and plasma from individuals who have signs and symptoms of hepatitis or who may be at risk for hepatitis B virus (HBV) infection. This assay, in conjunction with other serological and clinical information, can be used for:

- Determining infectivity of hepatitis B virus (HBV) carriers.

- Monitoring infection status of chronically HBV-infected patients.
- Monitoring serologic response of chronically HBV-infected patients who are receiving antiviral therapy.

### Methodology

The ADVIA Centaur HBeAg Assay is an antibody-capture microparticle chemiluminometric immunoassay used to detect human hepatitis B e antigen in human serum and plasma. A sample of the patient's serum is added to a small tube with the test reagents. Any HBeAg present in the sample will bind to labeled monoclonal antibodies directed against HBeAg to produce a light signal. The amount of relative light units (RLUs) detected by the system shows the amount of HBeAg present in the patient sample.

### Interpretation

HBeAg results are reported as qualitative results of positive (reactive) or negative (nonreactive). As described above, measurable HepBe antigen is associated with the presence of replicating HBV in the circulation.

### Limitations of the Assay

- The ADVIA Centaur HBeAg assay is limited to the detection of antigen to HBV in human serum or plasma (potassium EDTA plasma, lithium-heparinized or sodium-heparinized plasma). The performance of the ADVIA Centaur HBeAg assay has not been established with cord blood, neonatal specimens, tissue donors or body fluids other than serum or plasma, such as saliva, urine, amniotic or pleural fluids.
- HBV mutants lacking the ability to produce HBeAg have been reported. In patients infected with these mutants, the HBeAg assay will be negative, but DNA-based testing for Hepatitis B will be positive. These mutant strains are more common in Asian and Mediterranean regions.
- A reactive HBeAg result does not exclude the possibility of co-infection by another hepatitis virus.

**References**

1. CDC website  
<http://www.cdc.gov/hepatitis/HBV/HBVfaq.htm>
2. FDA website  
<http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/Recently-ApprovedDevices/ucm276641.htm>
3. Krajden M. The laboratory diagnosis of hepatitis B virus. *Canadian Journal of Infectious Diseases and Medical Microbiology*. 2005 Mar-Apr; 16(2): 65-72. PMID: PMC2095015
4. Shah S. Hepatitis B virus serology: Use and interpretation. *Hepatitis B Annals*. 2007; 4 (1):39-54.
5. van Helden J. Performance evaluation of the ADVIA Centaur anti-HBe and HBeAg assays. *Journal of Clinical Virology*. 2008 Oct;43(2):169-75. Epub 2008 Jul 16.

**Test Overview**

<b>Test Name</b>	Hepatitis Be Antigen (HBeAg)
<b>Methodology</b>	Antibody-capture microparticle chemiluminometric immunoassay
<b>Specimen Requirements</b>	Volume/Size: 1 mL; Type: Serum; Collection Temperature: N/A; Transport Temperature: Refrigerated
<b>Minimum Specimen Requirements</b>	Volume/Size: 0.5 mL
<b>Alternate Specimen Requirements</b>	Volume/Size: 1 mL; Type: Plasma; Tube/Container: EDTA (Lavender); Collection Temperature: N/A; Transport Temperature: Refrigerated Volume/Size: 1 mL; Type: Serum; Tube/Container: No additive (Red); Collection Temperature: N/A; Transport Temperature: Refrigerated
<b>Special Information</b>	Test should only be performed in patients who are positive for HBsAg.
<b>Reference Range</b>	Negative
<b>Clinical Information</b>	Positive test indicates an active Hepatitis B virus infection and implies a high level of infectivity.
<b>Billing Code</b>	86290
<b>CPT Code</b>	87350

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