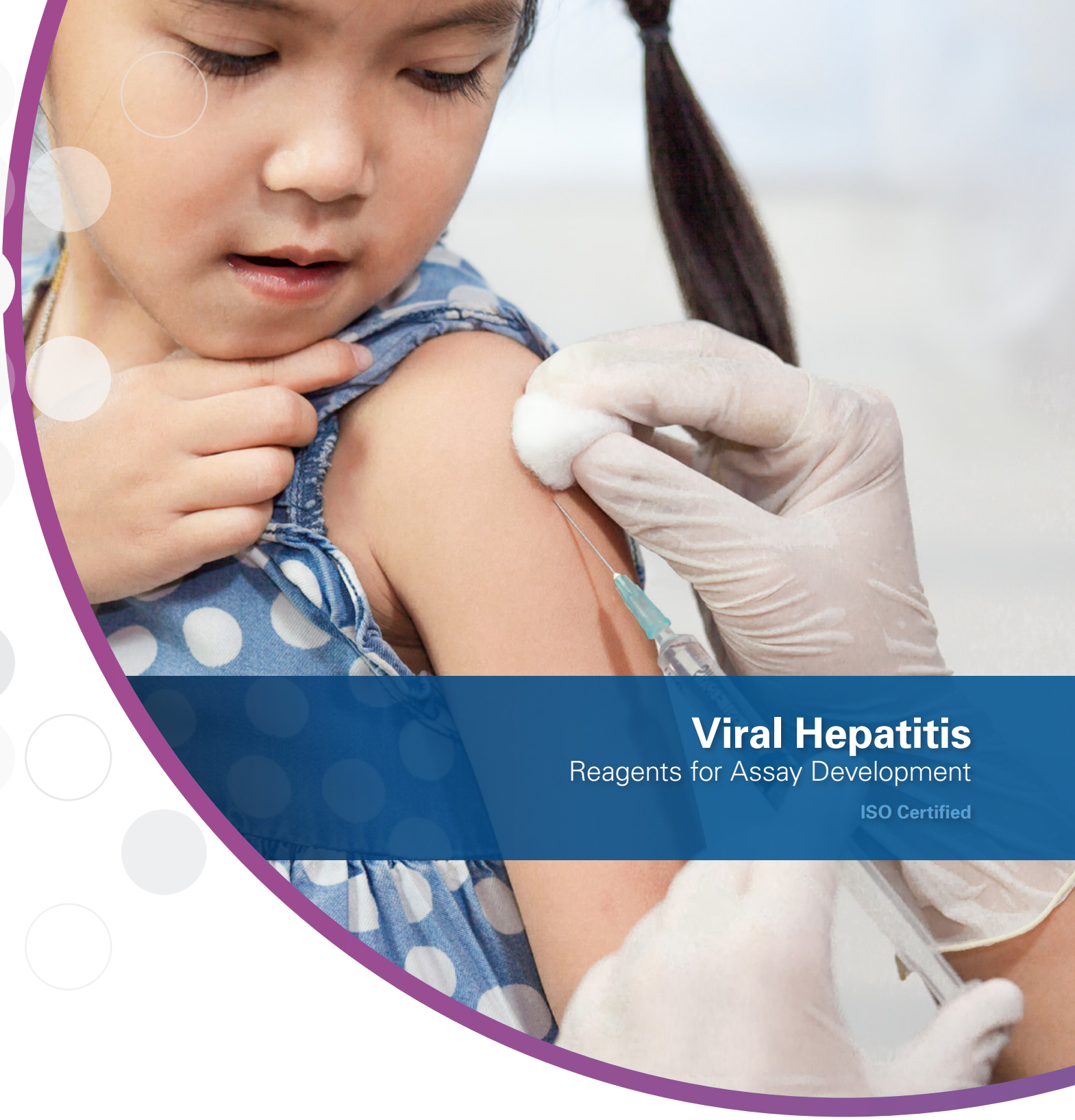

Viral Hepatitis

Reagents for Assay Development

ISO Certified

meridian BIOSCIENCE®
LIFE DISCOVERED. LIFE DIAGNOSED.

www.MeridianLifeScience.com

Company Overview

meridian BIOSCIENCE®
LIFE DISCOVERED. LIFE DIAGNOSED.

Meridian Life Science, Inc. is a leading large scale manufacturer of:

- Antibodies
- Viral antigens
- Recombinant proteins
- PCR enzymes
- Nucleotides
- Critical assay reagents

Meridian has been providing innovative life science solutions and building trusted partnerships for over 40 years. Meridian's focus is to offer products and services that help to advance the development of diagnostic assays and vaccine development.

- Commercial scale manufacturing of antigens and antibodies with protein purification expertise
- Full line of immunoassay reagents, including antigens, antibodies and blockers
- Large scale production of reagents for molecular assays
- Technical support with assay development experience
- Dedicated R&D and manufacturing teams
- Robust and mature Quality System

ISO certified

Extensive Capabilities and Services

Immunodiagnostics

- Antigens & Antibodies
- Recombinant Proteins
- Blocking reagents

Molecular Diagnostics

- Nucleotides
- enzymes
- qPCR/PCR reagents
- NGS reagents

Contract Services

- Antigens & Antibodies
- Cell & Viral Banking
- PCR/qPCR Assay Development

Global Presence

MERIDIAN BIOSCIENCE, INC.
Parent Company | Founded in 1977 | Nasdaq: VIVO
Headquartered in Cincinnati, OH | 750+ Employees | Presence in 70+ Countries.

North America

MEMPHIS, TN
Viral Antigens
Recombinant Proteins
In Vitro Antibodies
PCR Reagents

BILLERICA, MA
Magellan, Leadcare

BOCA RATON, FL
In Vivo Antibodies

QUEBEC, CANADA
GenePOC, Molecular Diagnostics

EMEA

LONDON, UK
PCR Manufacturing & Sales
PCR /qPCR Molecular Reagents

LUCKENWALDE, GERMANY
Large Scale Nucleotides
PCR Enzymes
Manufacturing

PARIS, FRANCE
EU Diagnostics Sales & Admin

WATERLOO, BELGIUM
EU Diagnostics Sales & Admin

MILAN, ITALY
EU Diagnostics Sales & Admin

MODI'IN, ISRAEL
BreathID® Breath Test Systems

Asia Pacific

SYDNEY, AUSTRALIA
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Wholly Owned
Subsidiary

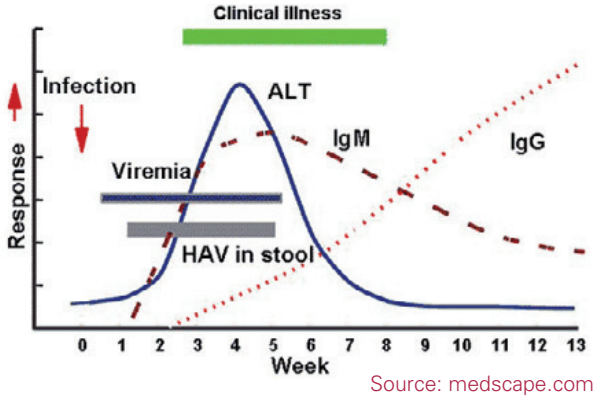
Hepatitis A (HAV)

Antibody Detection Assays

Hepatitis A (HAV) causes an acute infection of the liver that generally does not require treatment and can self-resolve. Young children infected with HAV typically have a milder form of the disease compared to adults who can be at risk of acute liver failure, especially if there is underlying chronic liver disease. HAV is highly contagious and the virus is detectable in the blood and feces more than two weeks before clinical symptoms appear.

Symptomatic HAV infections affect about 1.4 million people globally per year and the CDC estimates that 10% to 15% of people with HAV will have symptoms that persist or reoccur over a 6- to 9-month period. The virus is highly contagious and primarily transmitted by the fecal-oral route, by either person-to-person contact or through consumption of contaminated food or water. Currently, the most commonly identified risk factor among reported cases of acute HAV infection is contact with an infected household member or sexual partner. Antibodies produced in response to Hepatitis A last for life and protect against reinfection, although the best way to prevent Hepatitis A is by getting vaccinated.

HEPATITIS A VIRUS INFECTION



Source: medscape.com

DIAGNOSIS

Hepatitis A cannot be distinguished from other types of viral hepatitis on the basis of clinical symptoms alone. For this reason, serologic testing for the presence of antibodies to HAV is the primary method for diagnosis. HAV specific anti-IgM indicates an acute infection and is detectable from 1-2 weeks after initial infection and persists for up to 14 weeks. A positive IgG result signifies that the acute stage of the illness past and the person is immune to further infection. IgG antibody to HAV is also found in the blood following vaccination.

Most commercial HAV immunoassays use native HAV antigen as opposed to recombinant HAV proteins for antibody detection. HAV has several critical immunogenic epitopes which require precise folding. To-date, recombinant techniques have not been able to mimic the conformation of these epitopes, and as a result have very limited use in diagnostic applications.

REAGENTS FOR SEROLOGY TESTING

8505 | **HAV Native Antigen, 10X Concentration**
- Partially purified HAV (strain pHM175) antigen, ~60% viral proteins
- Propagated in FRhK-4 cells
- Concentration: 20-70 µg/mL
- Buffer: 0.01 M Tris, 0.15 M NaCl, 1.0 mM EDTA, pH 8.0 – 8.4, Formalin <1:2000 by volume, 0.085% Sodium Azide

8198 | **HAV Native Antigen**
- Partially purified HAV (strain pHM175) antigen, ~60% viral proteins
- Propagated in FRhK-4 cells
- Concentration: <25 µg/mL
- Buffer: 0.01 M Tris, 0.15 M NaCl, 1.0 mM EDTA, pH 8.0 – 8.4, 0.085% Sodium Azide

IgG & IgM Detection for ELISA, CLIA and Bead-based Assays

Hepatitis B (HBV)

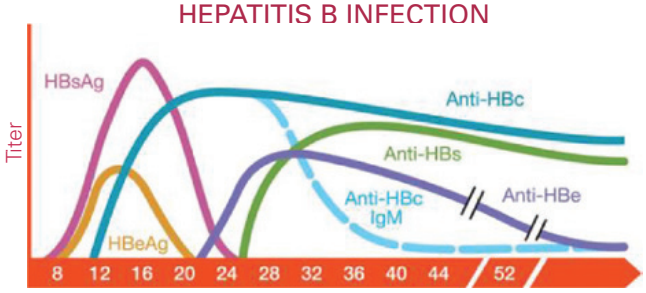
Antibody and Antigen Detection Assays

Hepatitis B (HBV) is virus that infects the liver and most adults (95%) who are infected are able to quickly recover. In babies and young children, HBV can develop into a chronic infection leading to liver cirrhosis or liver cancer later in life. 350 million people worldwide are infected with HBV and it is the cause of 620,000 deaths each year.

The likelihood of an infected individual resolving an acute HBV infection depends on their age and the strength of their initial immune response. Infection around the time of birth is the most frequent way HBV is acquired in areas of the world where the disease is common, as mothers pass the infection to their babies during childbirth. East Asia and Sub-Saharan Africa have the highest rates of infection which can be as high as 15% of the adult population. In contrast, rates in Europe and North America are less than 1%. Since 1982 the World Health Organization (WHO) has recommended vaccination on the first day of life. HBV testing of donated blood began in the United States in 1971, and since 2006, over 180 countries give the vaccine as part of a national program.

The virus is divided into four major serotypes (adr, adw, ayr, ayw) based on antigenic epitopes presented on its envelope proteins, and into eight genotypes (A-H) according to overall nucleotide sequence variation of the genome. The genotypes have a distinct geographical distribution and properties including disease severity, course and likelihood of complications, and response to treatment.

SEROLOGICAL TIMECOURSE OF HEPATITIS B INFECTION



Weeks after exposure

SOURCE: Adapted from CDC.gov

DIAGNOSIS

Serologic testing of HBV involves a panel of several HBV-specific markers:

- HBV surface antigen (HBsAg)
- HBV core antigen (HBcAg)
- HBV "e" antigen (HBeAg)

These markers help distinguish whether a patient is susceptible to primary infection, immune as a result of a resolved infection, immune as a result of vaccination, acutely infected, or chronically infected.

During acute infection, the appearance of virologic markers develop in a typical pattern. The first serologic marker to appear within 1-12 weeks of an acute infection is HBsAg, along with pre-S1 and pre-S2 antigens. Then, HBeAg becomes detectable which indicates that a person is highly infectious and clinical symptoms begin to develop. IgM antibody to HBcAg (anti-HBc) appears and remains present in high titer for up to 4 months, after which only IgG antibody to HBcAg remains and persists indefinitely. Anti-HBe appears after anti-HBc and its presence correlates to a decreased infectivity. Acute hepatitis patients who maintain a constant serum HBsAg concentration or whose serum HBeAg persists for 8-10 weeks after symptoms have resolved, are at risk of developing chronic liver disease.

Hepatitis B (HBV)

Antibody and Antigen Detection Assays

REAGENTS FOR SEROLOGY TESTING

Anti-HBc, IgM or Total

A positive anti-HBc IgM indicates a recent, acute infection (within the past 6 months). A positive anti-HBc Total is a non-specific assay used to detect acute, chronic, or resolved HBV infection. It may be used in pre-vaccination testing to determine previous exposure to an HBV infection but it is not a marker of immunity.

VTI610 | **Recombinant HBcAg**
- Entire Hep B core protein, 183 a.a. (19kDa)
- Produced in *P. pastoris*
- Buffer: 20 mM Potassium Phosphate, pH 6.5 ± 0.3

Suitable for ELISA Antibody Detection Assays

HBsAg

Used to screen for and detect HBV infections, either recent or chronic. HBsAg is the earliest indicator of acute Hepatitis B and frequently identifies infected people before symptoms appear. HBsAg is the most widely used diagnostic and blood screening Hepatitis B test worldwide.

PAIR

C18212M | **MAb to HBsAg (ad/ay)**
- Specific for Hepatitis B Surface Antigen, ad and ay subtypes
- Isotype IgG1
- Capture Antibody

C18286M | **MAb to HBsAg (ad/ay)**
- Specific for Hepatitis B Surface Antigen, ad and ay subtypes
- Isotype IgG1
- Detection Antibody

PAIR

C01458M | **MAb to HBsAg (ad/ay)**
- Specific for Hepatitis B Surface Antigen, ad and ay subtypes
- Isotype IgG1
- Capture antibody

C01465M | **MAb to HBsAg (ad/ay)**
- Detection antibody

Paired MAbs for Sandwich ELISA & Lateral Flow Antigen Detection Assays

PAIR

C01247M | **MAb to HBsAg (ad/ay)**
- Specific for Hepatitis B Surface Antigen, ad and ay subtypes
- Isotype IgG_{2a}
- Capture Antibody

C01248M | **MAb to HBsAg (ad/ay)**
- Specific for Hepatitis B Surface Antigen, ad and ay subtypes
- Isotype IgG_{2a}
- Detection Antibody

B65811R | **PAb to HBsAg (ad/ay)**
- Produced in rabbits using Hepatitis B surface antigen purified from human serum (mixture of subtypes ad & ay)
- > 95% pure, purified by Protein A Chromatography
- Alternate Detection Antibody

Paired MAbs for Sandwich ELISA & Antigen Detection Assays

REAGENTS FOR SEROLOGY TESTING (Continued)

Anti-HBs

Used to determine immunity status. Used to detect previous exposure to HBV or to establish vaccination status. Subtypes adw, ady, and adr are each found in different geographic regions of the world.

In Japan, China, and Southeast Asia, the r determinant predominates and in Europe, the US, Africa, India, Australia, and Oceania, the w determinant predominates. The y determinant is found in Africa and in Australia aborigines. (WHO, 2014)

R86872 | **Recombinant HBsAg (adw)**
- Comprises the full-length of the S-gene (227 a.a.)
- Produced in *S. cerevisiae*, no fusion partner/tag, >98% pure
- Molecular weight of 24kDa
- Buffer: 0.05 M Phosphate, 0.2 M NaCl, pH 7.2
- Tested as solid-phase coating antigen in ELISA with anti-HBsAg antibodies

R86870 | **Recombinant HBsAg (ayw)**
- Produced in *S. cerevisiae*, no fusion partner/tag, >98% pure
- Molecular weight of 24kDa
- Buffer: 0.05 M Phosphate, 0.2 M NaCl, pH 7.2
- Tested as solid-phase coating antigen in ELISA with anti-HBsAg antibodies

R01652 | **Recombinant HBsAg (adr)**
- Produced in CHO cells >95% pure
- Molecular weight of 23-27kDa
- Buffer: 20 mM Phosphate, 154 mM NaCl, pH 7.2 ± 0.2

R01289 | **Recombinant HBsAg (ad)**
- Produced in *S. cerevisiae*, no fusion partner/tag, >95% pure
- Molecular weight of 24kDa
- Buffer: PBS, pH 7.2

R01403 | **Recombinant HBsAg (ayw)**
- Produced in Pichia pastoris, no fusion partner/tag
- Molecular weight of 24kDa
- Buffer: 20 mM $NaHCO_3$, pH 9.3, 100 mM NaCl, 3 mM EDTA, 15% Glycerol

R01507 | **Native HBsAg (ad)**
- Purified from human blood, > 99% pure ("ad" subtype purity)
- Buffer: 50 mM Phosphate, pH 7.4 ± 0.2 containing 150 mM NaCl

R01508 | **Native HBsAg (ay)**
- Purified from human blood, ≥ 99% pure ("ay" subtype purity)
- Buffer: 50 mM Phosphate, pH 7.4 ± 0.2 containing 150 mM NaCl

Suitable for ELISA Antibody Detection Assays

Hepatitis B (HBV)

Antibody and Antigen Detection Assays

REAGENTS FOR SEROLOGY TESTING (Continued)

HBeAg

A marker of a high degree of infectivity as it correlates with a high level of viral replication. Primarily used to monitor the effectiveness of treatment for chronic sufferers. However, some strains of HBV do not make "e" antigen, especially those found in the Middle East and Asia.

PAIR

C01693M | **MAb to HBeAg**
- Specific for Hepatitis B "e" Antigen
- Isotype IgG2a
- Capture antibody

C01692M | **MAb to HBeAg**
- Specific for Hepatitis B "e" Antigen
- Isotype IgG2b
- Detection antibody

Paired MAbs for Sandwich ELISA and Lateral Flow Antigen Detection Assays

PAIR

C31170M | **MAb to HBeAg**
- Specific for Hepatitis B "e" Antigen
- Isotype IgG2a
- Capture antibody

C31160M | **MAb to HBeAg**
- Specific for Hepatitis B "e" Antigen
- Isotype IgG1
- Detection antibody

Paired MAbs for Sandwich ELISA Antigen Detection Assays

Anti-HBe

Used to diagnose and monitor the treatment of a chronic infection. Its presence suggests a low viral titer and a low degree of infectivity in persons with a chronic infection.

R01401 | **Recombinant HBeAg**
- Represents the Hepatitis B "e" antigen immunodominant regions
- Molecular weight of 44kDa, Contains a GST fusion partner
- Produced in *E. coli*
- Buffer: 50 mM Tris-HCl pH 8.0, 60 mM NaCl, 10 mM Glutathione, 25% Sarkosyl and 50% Glycerol

Suitable for ELISA Antibody Detection Assays

R18915 | **Recombinant HBeAg**
- Contains the immunodominant region of Hepatitis B "e" antigen
- Molecular weight of 43.9kDa, contains a GST tag
- Produced in *E. coli*, 95% pure
- Buffer: 25 mM Tris-HCl, pH 8.0, 1.5 M Urea, 50% Glycerol

Suitable for ELISA and Western Blot Antibody Detection Assays

Hepatitis C (HCV)

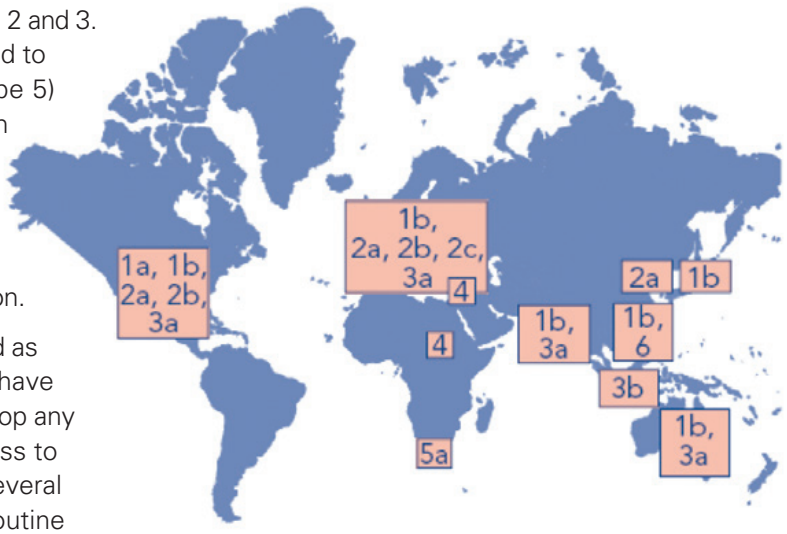
Antibody and Antigen Detection Assays

Hepatitis C virus (HCV) is an infectious disease that primarily affects the liver. It is the most serious type of hepatitis virus and can lead to cirrhosis and liver failure or cancer. It is estimated that 150–200 million people, or about 3% of the world's population, are living with chronic HCV.

There are 6 major strains (genotypes) of HCV worldwide, which vary in their geographic distribution. Genotype 1 is the most common strain worldwide and it is considered to be the most aggressive, followed by genotypes 2 and 3. Genotypes 4, 5 and 6 are more regionally focused to areas such as Africa (type 4), South Africa (type 5) and Southeast Asia and China (type 6). Although HCV genotyping assays are not required to diagnose an HCV infection, it is critical information for prescribing HCV treatment since each strain responds differently to the various medications used to treat an HCV infection.

Most acute hepatitis infections do not get treated as infected individuals are usually not aware they have been exposed to the virus and they do not develop any symptoms. About 85% of infections will progress to chronic hepatitis and remain undiagnosed for several decades until liver damage is detected during routine medical exams. A chronic HCV infection that is left untreated can cause serious complications including liver cirrhosis, liver cancer and liver failure.

GLOBAL GEOGRAPHIC DISTRIBUTION OF HCV GENOTYPES



SOURCE: Zein NN. Clin Microbiol Rev 2000; 13: 223-35

DIAGNOSIS

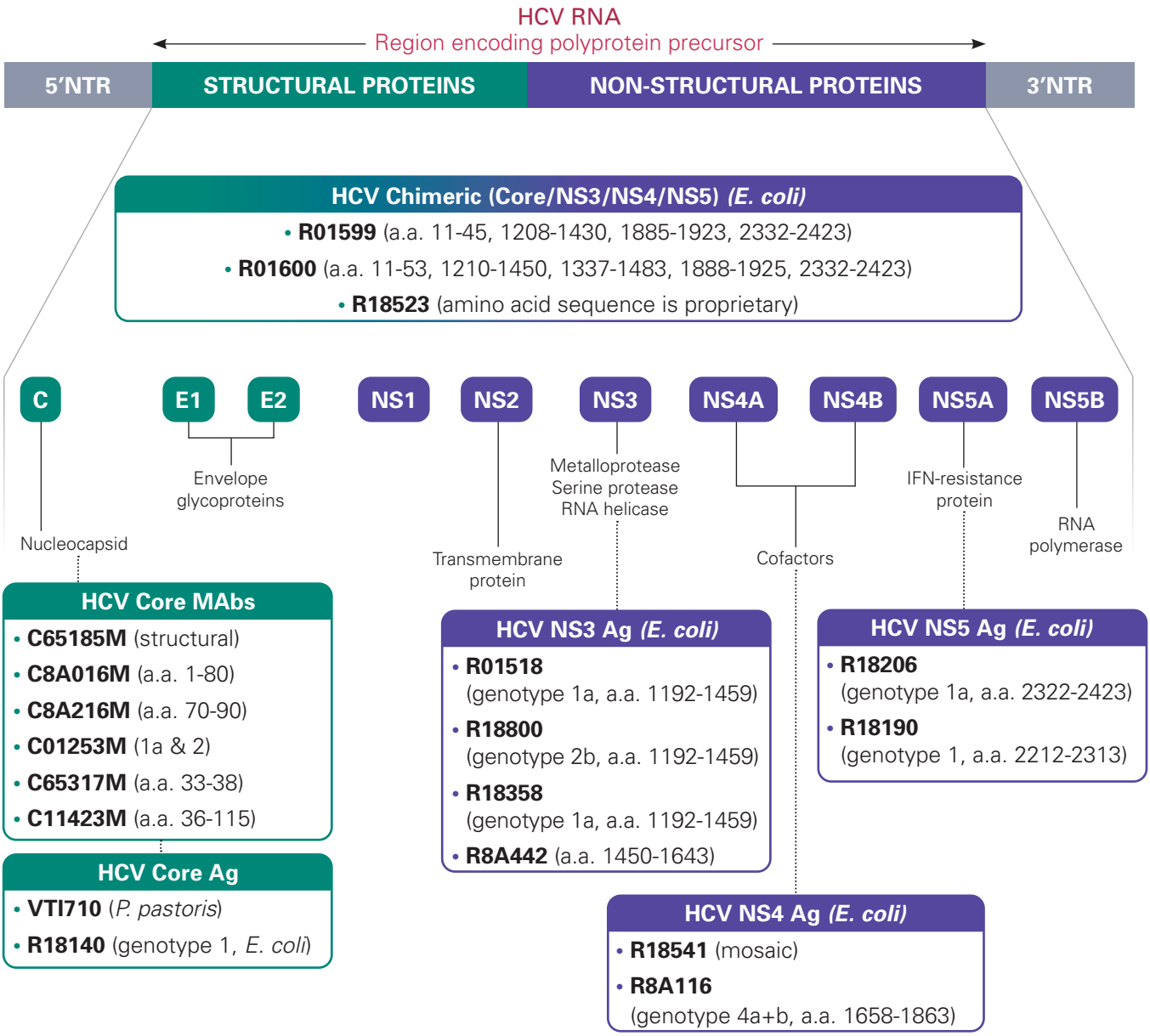
There are two main types of diagnostic tests for HCV (1) serological assays that detect antibody or antigen to HCV and (2) molecular assays that detect, quantify, and/or characterize HCV RNA genomes within an infected patient. Since 1990, serologic-based assays have been used to screen blood donations and to diagnose an HCV infection in symptomatic patients. Molecular assays such as PCR-based tests are generally only used as confirmation or to determine the HCV genotype.

Over the years, four generations of anti-HCV tests have been developed, and each generation has resulted in an improvement in the sensitivity of detecting HCV. New-generation tests are now able to detect the total nucleocapsid core antigen whose sequence is highly conserved across all HCV genotypes, allowing for the earlier detection of an HCV infection. These assays employ a cocktail of all genotype recombinant antigens derived from the core, NS3, NS4, and NS5 regions of multiple HCV genotypes and an anti-HCV core antibody with specificity for multiple genotypes.

Hepatitis C (HCV)

Antibody and Antigen Detection Assays

QUICK PRODUCT SELECTION BASED ON HCV GENOME



REAGENTS FOR SEROLOGY TESTING

HCV Core Antigen Test

Hepatitis C core antigen can be detected soon after infection, before the development of antibodies to the virus, and remains detectable throughout chronic infection. Evaluations in transfusion settings have shown that the HCV Core Ag assay detects HCV infection as effective as NAT, about 40-50 days earlier than the current third generation anti-HCV screening assays. HCV core antigen levels closely follow HCV RNA dynamics, and allow clinical monitoring of a patient's therapy, independently of HCV genotype.

MAb to HCV

C65185M	• Specific for a structural sequence of HCV core protein • Isotype IgG_1
C8A216M	• Recognizes amino acids 70-90 of HCV core antigen • Isotype IgG_1
C8A016M	• Recognizes amino acids 1-80 of HCV core antigen • Isotype IgG_{2a} • Suitable for use in ELISA employing native viral lysates
C11423M	• Reacts with an epitope located between amino acids 36 and 115 of the HCV core antigen • Isotype IgG_1

Suitable for ELISA Antigen Detection Assays

PAIR

C01253M	• Reactive with genotypes 1a and 2 • Isotype IgG_1
C65317M	• Recognizes amino acids 33-38 of HCV core antigen • Isotype IgG_1

Paired MAbs for Sandwich ELISA Antigen Detection Assays

HCV Antibody Test

The HCV antibody test is commonly used to screen individuals with risk factors, people who have symptoms associated with hepatitis or liver disease, or those who have been exposed to the virus. It is generally followed by a confirmatory nucleic acid test to detect HCV RNA, which indicates an active viral infection. The confirmatory test is essential because between 15 and 50% of people with HCV antibodies will have spontaneously cleared HCV infection during the first six months after exposure and do not have chronic infection. Anti-HCV persists indefinitely in patients who develop chronic infection, although antibodies may become undetectable in hemodialysis patients or in cases of profound immunosuppression.

HCV Core Recombinant Antigens

VTI710	• Represents a.a. 1-120 of HCV core (nucleocapsid protein p22), fused with a 6-His tag • Produced in *P. pastoris* • Molecular weight of ~19 kDa (monomer) • Buffer: 0.05 M Sodium Phosphate, 0.15 M NaCl, pH 7.0
R8A115	• Represents a.a. 2-192 of HCV core, genotype 1, fused with a Beta-galactosidase taq at the N-terminus • Produced in *E. coli* (>95% pure) • Buffer: 8 M Urea, 20 mM Tris-HCl, pH 8.0, 10 mM beta-Mercaptoethanol

Suitable for ELISA and Western Blot Antibody Detection Assays

Suitable for ELISA, Western Blot, Colloidal Gold and Latex Bead Antibody Detection Assays

Hepatitis C (HCV)

Antibody and Antigen Detection Assays

REAGENTS FOR SEROLOGY TESTING (Continued)

HCV NS3 Recombinant Antigens

R01518
- Represents a.a. 1192-1459 of HCV NS3, genotype 1a, fused with a GST tag
- Produced in *E. coli* (>95% pure)
- Molecular weight of 55kDa
- Buffer: 1.5 M Urea, 25 mM Tris-HCl pH 8.0, 5 mM GSH, 0.2% Triton X-100, 50% glycerol

Suitable for ELISA Antibody Detection Assays

R18358
- Represents a.a. 1192-1459 of HCV NS3, genotype 1a, fused with a 6-His tag
- Produced in *E. coli* (>95% pure)
- Molecular weight of 26kDa
- Buffer: 50 mM Sodium Phosphate, pH 8.3 containing 10 mM DTT

R18800
- Represents a.a. 1192-1459 of HCV NS3, genotype 2b, fused with a GST tag
- Produced in *E. coli* (>95% pure)
- Buffer: 25 mM Tris-HCl, 1 mM EDTA, 1.5 M Urea containing 50% glycerol

Suitable for ELISA and Western Blot Antibody Detection Assays

R8A442
- Represents a.a. 1450-1643 of HCV NS3, fused with a β-gal tag at the N-terminus
- Produced in *E. coli* (>95% pure)
- Molecular weight of 22kDa for HCV polyprotein
- Buffer: 8 M Urea, 20 mM Tris-HCl pH 8.0, 10 mM β-Mercaptoethanol

Suitable for ELISA, Western Blot and Lateral Flow Antibody Detection Assays

HCV NS4 Recombinant Antigens

R18541
- A chimeric constructed from fragments of the NS4 immunodominant region of 11 different HCV genotypes, fused with a GST tag
- Produced in *E. coli* (>95% pure)
- Molecular weight of 66kDa
- Buffer: 8 M Urea, 20 mM TRIS, pH 9.0 containing 10 mM DTT, 1 mM EDTA and 0.5% Tween-20

R8A116
- Represents residues 1658-1863 of NS4a+b, fused with a β-gal tag at the N-terminus
- Produced in *E. coli* (>95% pure)
- Molecular weight of 19kDa, plus 114kDa (β-gal)
- Buffer: 8 M Urea, 20 mM Tris-HCl, pH 8.0, 10 mM β-Mercaptoethanol

Suitable for ELISA and Western Blot Antibody Detection Assays

REAGENTS FOR SEROLOGY TESTING (Continued)

HCV NS5 Recombinant Antigens

R18206
- Represents a.a. 2322-2423 of NS5 genotype 1a, fused with a GST tag at the N-terminus
- Produced in *E. coli* (>95% pure)
- Molecular weight of 37.9kDa
- Buffer: 50 mM Tris-HCl, 5 mM EDTA, pH 8.0

R18190
- Represents a.a. 2212-2313 of NS5, genotype 1, fused with a GST tag
- Produced in *E. coli* (>95% pure)
- Molecular weight of 37.9kDa
- Buffer: 50 mM Tris-HCl, 5 mM EDTA, pH 8.0

Suitable for ELISA and Western Blot Antibody Detection Assays

HCV Chimeric Core/NS3/NS4/NS5 Recombinant Antigens

R18523
- Represents immunodominat regions of HCV core, NS3, NS4 and NS5
- Produced in *E. coli* (>95% pure)
- Molecular weight of 70.8kDa
- Buffer: 50 mM Sodium Phosphate, pH 8.5 containing 2.4 mM EDTA, 5 mM DTT, 0.1% SDS

Suitable for ELISA and Western Blot Antibody Detection Assays

PAIR

HCV Chimeric Core/NS3/NS4/NS5 Recombinant Antigens

R01599
- Contains four antigens expressed in *E. coli* in a chimera: HCV Core Fragment (a.a. 11-45), HCV NS3 Fragment (a.a. 1208-1430), HCV NS4 Fragment (a.a. 1885-1923), HCV NS5 Fragment (a.a. 2332-2423)
- Produced in *E. coli* (>90% pure)
- Molecular weight of 33kDa
- Buffer: 20 mM phosphate, pH 7.4

R01600
- Contains four antigens expressed in *E. coli* in a chimera: HCV Core Fragment (a.a. 11-53), HCV NS3 Fragment (a.a. 1210-1450, 1337-1483), HCV NS4 Fragment (a.a. 1888-1925), HCV NS5 Fragment (a.a. 2332-2423)
- Produced in *E. coli* (>90% pure)
- Molecular weight of 71kDa
- Buffer: 20 mM phosphate, pH 7.4

Antigen Pair for Lateral Flow Antibody Detection Assays

Hepatitis E (HEV)

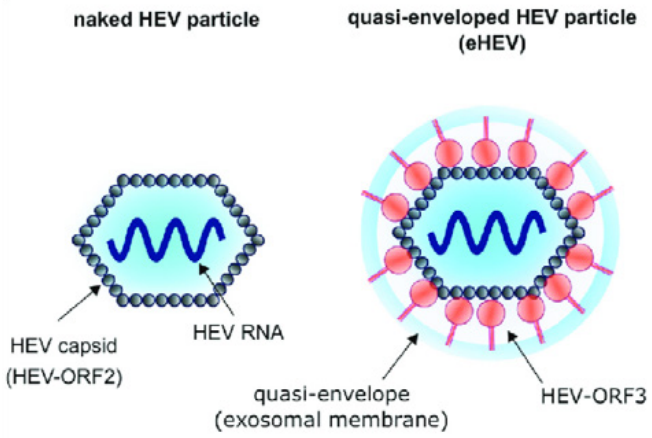
Antibody Detection Assays

Hepatitis E virus (HEV) is a waterborne disease mainly found in areas with poor sanitation and typically results from ingesting fecal matter that contaminates the water supply. The disease is usually acute but can be particularly dangerous in pregnant women.

Hepatitis E infection has a clinical course comparable to Hepatitis A and is mostly a self-limiting disease with low death rates. However, in individuals with a weakened immune system, there is a high risk of developing chronic hepatitis. In addition, in pregnant women (particularity those in the third trimester), the disease can be severe with a death rate of 25% and it is often associated with a clinical syndrome called fulminant liver failure. HEV was once an understudied and neglected virus. However, in recent years, the safety of blood products with respect to HEV has increasingly been considered to be a public health problem.

In total there are four main genotypes of Hepatitis E. Genotypes 1 and 2 have been found only in humans. Genotypes 3 and 4 are linked to zoonotic transmission (pigs, wild boar and deer) and cause sporadic infections in industrialized countries through ingestion of undercooked animal meat. Structurally, HEV is a nonenveloped virus with a genome consisting of three open reading frames (ORFs). ORF1, which encodes the nonstructural proteins (NS) necessary for replication, ORF2 which encodes the core protein for the viral capsid, and ORF3 which partially overlaps ORF1 and encodes a viroporin-like protein.

GENOME ORGANIZATION OF THE HEPATITIS E VIRUS



ORF2 encodes the core protein that forms the capsid, and the ORF3 protein is essential for viral release via the ESCRT pathway

DIAGNOSIS

The commonly used tests for HEV infection include detection of IgM and IgG anti-HEV antibodies and detection of HEV RNA. HEV IgM antibodies appear early (from 1-4 weeks) in the course of illness and disappear over 4–5 months. Assays detecting anti-HEV are usually qualitative sandwich immunoassay developed with recombinant HEV antigens that provide broad coverage of all 4 major HEV genotypes. The antigens typically represent part of the ORF2 and ORF3 proteins.

Simultaneous assessment of anti-HEV IgA has been recommended to improve specificity as the IgM assay may cross-react with other IgM-based assays such as rheumatoid factor IgM.

REAGENTS FOR SEROLOGY TESTING

HEV Antibody Test

Tests for HEV generally detect both IgM and IgG. Studies have shown that assays based on open reading frame 2 (ORF2) can be more sensitive in detecting anti-HEV than those based on ORF3. Overall recombinant-protein-based tests have demonstrated an ability to detect anti-HEV in 90 to 95% of symptomatic HEV cases.

R18250 | **HEV ORF2 and ORF3 Recombinant Antigen**
- Contains the HEV immunodominant regions from ORF2 and ORF3
- Immunoreactive with HEV positive sera
- Produced in *E. coli*
- Buffer: 25mM Tris-HCl, 1mM EDTA, 0.5M urea containing 50% glycerol

R8A310 | **HEV ORF2 Recombinant Antigen**
- Represents amino acids 633-659 of ORF2
- Immunoreactive with HEV positive sera
- Produced in *E. coli*
- Buffer: 1 X Phosphate Buffered Saline, pH 7.2

R8A330 | **HEV ORF2 Recombinant Antigen**
- Represents amino acids 403-461 of ORF2
- Immunoreactive with HEV positive sera
- Produced in *E. coli*
- Buffer: 8M Urea, 20mM Tris-HCl, pH 8.0 containing 10 mM β-mercaptoethanol

R8A320 | **HEV ORF3 Recombinant Antigen**
- Represents amino acids 92-123 of ORF3
- Immunoreactive with HEV positive sera
- Produced in *E. coli*
- Buffer: 8M Urea, 20mM Tris-HCl, pH 8.0 containing 10 mM β-mercaptoethanol

Suitable for ELISA Antibody Detection Assays

Product list

Hepatitis A (HAV)

Item	Specificity	Isotype	Source	Format	Applications
8198	Hepatitis A Virus (HAV) Antigen, >60% Viral Protein	N/A	FRhK-4 Cells	Purified	CLIA-EIA-WB
8505	Hepatitis A Virus (HAV) Antigen, Concentrate, >60% Viral Protein	N/A	FRhK-4 Cells	Purified	CLIA-EIA-WB
R18210	Hepatitis A Virus (HAV) P2C-P3A, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18710	Hepatitis A Virus (HAV) VP1, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18810	Hepatitis A Virus (HAV) VP1-P2A, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18610	Hepatitis A Virus (HAV) VP3, Recombinant	N/A	*E. coli*	Purified	EIA-WB
C65881M	Hepatitis A Virus (HAV)	IgG1	Ascites	Purified	EIA-IFA-IHC
C65885M	Hepatitis A Virus (HAV) Surface Protein	IgG2a	Ascites	Purified	EIA
C01853M	Hepatitis A Virus (HAV)	IgG1	Mouse	Purified	EIA-IFA
C01854M	Hepatitis A Virus (HAV)	IgG2b	Mouse	Purified	EIA-IFA

Hepatitis B (HBV)

Item	Specificity	Isotype	Source	Format	Applications
HBcAg					
VTI610	Hepatitis B Core Virus (HBcAg) (183 a.a.) Recombinant	N/A	*Pichia pastoris*	Purified	EIA-WB
R65914	Hepatitis B Core Antigen (HBcAg) (184 a.a.) 19kDa, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R8A100	Hepatitis B Core Antigen (HBcAg) (a.a. 1-144) 14kDa, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R8A120	Hepatitis B Core Antigen (HBcAg) (a.a. 1-183) 18kDa, Recombinant	N/A	*E. coli*	Purified	EIA-WB
C01556M	Hepatitis B Core Antigen (HBcAg)	IgG2b	Ascites	Purified	EIA-Pr
C01557M	Hepatitis B Core Antigen (HBcAg)	IgG2a	Ascites	Purified	EIA-Pr
C01558M	Hepatitis B Core Antigen (HBcAg)	IgG2a	Ascites	Purified	EIA-Pr
C86317M	Hepatitis B Core Antigen (HBcAg)	IgG2a	Ascites	Purified	EIA-Pr-WB
C86340M	Hepatitis B Core Antigen (HBcAg)	IgG2a	Ascites	Purified	EIA-Pr-WB
C8A035M	Hepatitis B Core Antigen (HBcAg) (ayw) (~80 a.a.)	IgG2b	Ascites	Dil.Ascites	EIA-IB-IHC-IP-WB
C8A036M	Hepatitis B Core Antigen (HBcAg) (ayw) (a.a. 1-10)	IgG2a	Ascites	Dil.Ascites	EIA-IB-IHC-IP-WB
C8A038M	Hepatitis B Core Antigen (HBcAg) (ayw) (a.a. 130-140)	IgG2a	Ascites	Dil.Ascites	EIA-IB-IHC-IP-WB
C8A034B	Hepatitis B Core Antigen (HBcAg) (ayw) (a.a. 135-140)	IgG2b	Ascites	Biotin	EIA-IB-IP-WB
C8A034M	Hepatitis B Core Antigen (HBcAg) (ayw) (a.a. 135-140)	IgG2b	Ascites	Purified	EIA-IB-IP-WB
C8A037M	Hepatitis B Core Antigen (HBcAg) (ayw) (a.a. 138-145)	IgG2b	Ascites	Dil.Ascites	EIA-IB-IHC-IP-WB
C8A033M	Hepatitis B Core Antigen (HBcAg) (ayw) (a.a. 70-80)	IgG2a	Ascites	Purified	EIA-IFA-WB
HBsAg					
R01289	Hepatitis B Surface Antigen (HBsAg) (ad) Recombinant	N/A	*S. cerevisiae*	Purified	EIA-WB
R01290	Hepatitis B Surface Antigen (HBsAg) (ay) Recombinant	N/A	*S. cerevisiae*	Purified	EIA-WB
R01403	Hepatitis B Surface Antigen (HBsAg) (adw) Recombinant	N/A	*Pichia pastoris*	Purified	EIA
R01437	Hepatitis B Surface Antigen (HBsAg) (ad)	N/A	Human Plasma	Purified	EIA
R01507	Hepatitis B Surface Antigen (HBsAg) (ad)	N/A	Human Blood	Purified	EIA
R01508	Hepatitis B Surface Antigen (HBsAg) (ay)	N/A	Human Blood	Purified	EIA
R01579	Hepatitis B Presurface S1+S2	N/A	*E. coli*	Purified	EIA
R01580	Hepatitis B Presurface S2	N/A	*E. coli*	Purified	EIA
R01652	Hepatitis B Surface Antigen (HBsAg) (adr) Recombinant	N/A	CHO Cells	Purified	EIA-IFA-WB
R18560	Hepatitis B Surface Antigen (HBsAg) (adw) Recombinant	N/A	*Pichia pastoris*	Purified	EIA-WB
R65913	Hepatitis B Presurface S1 (108 a.a.) 13.5kDa, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R86870	Hepatitis B Surface Antigen (HBsAg) (ayw) Recombinant	N/A	*S. cerevisiae*	Purified	EIA
R86872	Hepatitis B Surface Antigen (HBsAg) (adw) Recombinant	N/A	*S. cerevisiae*	Purified	EIA
C01246M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-Pr
C01246M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-Pr
C01247M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-Pr
C01247M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-Pr
C01248M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-LF-Pr
C01248M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-LF-Pr
C01249M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-LF-Pr

Hepatitis B (HBV) continued

Item	Specificity	Isotype	Source	Format	Applications
C01249M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a	Ascites	Purified	EIA-LF-Pr
C01250M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-IP-RIA
C01250M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-IP-RIA
C01455M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2a,k	Mouse	Purified	EIA-LF-Latex Agglutination
C01456M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1,k	Mouse	Purified	EIA-LF
C01457M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1,k	Mouse	Purified	EIA-LF-Pr
C01458M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Mouse	Purified	EIA-LF-Pr
C01465M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2b,l	Mouse	Purified	EIA-LF-Pr
C01815M	Hepatitis B Surface Antigen (HBsAg)	IgG1	Cell Culture	Purified	EIA-IFA-WB
C18212M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-RIA
C18212M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-RIA
C18286M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-IFA
C18286M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-IFA
C45098M	Hepatitis B Surface Antigen (HBsAg) (ad)	IgG1	Ascites	Purified	EIA-Pr
C45098M	Hepatitis B Surface Antigen (HBsAg) (ad)	IgG1	Ascites	Purified	EIA-Pr
C45100M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-IP-RIA
C45100M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG1	Ascites	Purified	EIA-IP-RIA
C45704M	Hepatitis B Surface Antigen (HBsAg) (ay)	IgG1	Ascites	Purified	EIA-Pr
C45704M	Hepatitis B Surface Antigen (HBsAg) (ay)	IgG1	Ascites	Purified	EIA-Pr
C86303M	Hepatitis B Surface Antigen (HBsAg)	IgG2a	Ascites	Purified	EIA-IP-RIA
C86303M	Hepatitis B Surface Antigen (HBsAg)	IgG2a	Ascites	Purified	EIA-IP-RIA
C86312M	Hepatitis B Surface Antigen (HBsAg) (ayw)	IgG1	Mouse	Purified	EIA-Pr
C86313M	Hepatitis B Surface Antigen (HBsAg) (ayw)	IgG1	Ascites	Purified	EIA-Pr
C86313M	Hepatitis B Surface Antigen (HBsAg) (ayw)	IgG1	Ascites	Purified	
C86322M	Hepatitis B Surface Antigen (HBsAg) (ayw)	IgG1	Ascites	Purified	EIA-Pr
C86322M	Hepatitis B Surface Antigen (HBsAg) (ayw)	IgG1	Ascites	Purified	EIA-IFA-WB
C86401M	Hepatitis B Surface Antigen (HBsAg)	IgG1	Ascites	Purified	EIA-Pr
C86401M	Hepatitis B Surface Antigen (HBsAg)	IgG1	Ascites	Purified	EIA-Pr
C86401P	Hepatitis B Surface Antigen (HBsAg)	IgG1	Mouse	HRP	EIA
C86600M	Hepatitis B Surface Antigen (HBsAg) (ayw)	IgG1	Mouse	Purified	EIA-Pr
C86612M	Hepatitis B Surface Antigen (HBsAg)	IgG1	Mouse	Purified	EIA-Pr
C8A031M	Hepatitis B Presurface Antigen (adw) (a.a. 132-137)	IgG1	Culture	Purified	EIA-IFA-WB
C8A032M	Hepatitis B Surface Antigen (HBsAg) (adw/ayw)	IgG1	Ascites	KLH	EIA-Pr
C8A032M	Hepatitis B Surface Antigen (HBsAg) (adw/ayw)	IgG1	Ascites	KLH	EIA-Pr
C92100M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2b	Ascites	Purified	EIA-Pr
C92100M	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	IgG2b	Ascites	Purified	EIA-Pr
MAV18-004	Hepatitis B Surface Antigen (HBsAg) (ay)	IgG2a,k	Ascites	Purified	EIA-Pr
MAV18-004	Hepatitis B Surface Antigen (HBsAg) (ay)	IgG2a,k	Ascites	Purified	EIA
MAV18-511	Hepatitis B Surface Antigen (HBsAg)	IgG1,k	Ascites	Purified	EIA-Pr
MAV18-511	Hepatitis B Surface Antigen (HBsAg)	IgG1,k	Ascites	Purified	EIA-Pr
B01435G	Hepatitis B Surface Antigen (HBsAg)	N/A	Goat	Aff.Pur.	
B03504C	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Horse	Aff.Pur.	EIA-IFA-IHC(f)-IP-WB
B65180G	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Goat	Purified	EIA
B65803F	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Goat	FITC	EIA-IEP
B65804P	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Goat	HRP	EIA
B65807B	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Goat	Biotin	EIA-IEP
B65811B	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Rabbit	Biotin	EIA
B65811F	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Rabbit	FITC	IFA
B65811P	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Rabbit	HRP	EIA-Pr
B65811R	Hepatitis B Surface Antigen (HBsAg) (ad/ay)	N/A	Rabbit	Purified	EIA

Product list

Hepatitis B (HBV) continued

Item	Specificity	Isotype	Source	Format	Applications
HBeAg					
R65915	Hepatitis B 'e' Antigen (HBeAg) (160 a.a.) 17kDa, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R01401	Hepatitis B 'e' Antigen (HBeAg) Recombinant	N/A	*E. coli*	Purified	EIA
R18915	Hepatitis B 'e' Antigen (HBeAg) Recombinant	N/A	*E. coli*	Purified	EIA-WB
C01548M	Hepatitis B 'e' Antigen (HBeAg)	IgG2a	Ascites	Purified	EIA-LF-Pr
C01549M	Hepatitis B 'e' Antigen (HBeAg)	IgG2b	Ascites	Purified	EIA-Pr
C01692M	Hepatitis B 'e' Antigen (HBeAg)	IgG2b	Ascites	Purified	EIA-Pr
C01693M	Hepatitis B 'e' Antigen (HBeAg)	IgG2a	Ascites	Purified	EIA-Pr
C65218M	Hepatitis B 'e' Antigen (HBeAg)	IgG1	Ascites	Purified	EIA-Pr
C65318M	Hepatitis B 'e' Antigen (HBeAg)	IgG2a	Ascites	Purified	EIA-Pr
C65814M	Hepatitis B 'e' Antigen (HBeAg)	IgG2a	Ascites	Purified	EIA-Pr
C86334M	Hepatitis B 'e' Antigen (HBeAg)	IgG2b	Ascites	Purified	EIA-Pr
C86534M	Hepatitis B 'e' Antigen (HBeAg)	IgG2b	Ascites	Purified	
C86743M	Hepatitis B 'e' Antigen (HBeAg)	IgG1	Ascites	Purified	
C86843M	Hepatitis B 'e' Antigen (HBeAg)	IgG2b	Ascites	Purified	EIA-Pr

Hepatitis C (HCV)

Item	Specificity	Isotype	Source	Format	Applications
HCV Core					
VTI710	Hepatitis C Virus (HCV) Nucleocapsid Protein, Recombinant	N/A	*Pichia pastoris*	Purified	EIA-WB
R18140	Hepatitis C Virus (HCV) Core Antigen (a.a. 2-120) Genotype 1, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18170	Hepatitis C Virus (HCV) Core Antigen (a.a. 2-120) Genotype 5, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18180	Hepatitis C Virus (HCV) Core Antigen (a.a. 2-120) Genotype 6, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R8A115	Hepatitis C Virus (HCV) Core Antigen (a.a. 2-192), Recombinant	N/A	*E. coli*	Purified	EIA-WB
R01548	Hepatitis C Virus (HCV) Core NS3/NS4, Recombinant	N/A	*E. coli*	Purified	EIA
R01599	Hepatitis C Virus (HCV) Core NS3/NS4/NS5, Recombinant	N/A	*E. coli*	Purified	EIA-LF-Pr
R01600	Hepatitis C Virus (HCV) Core NS3/NS4/NS5, Recombinant	N/A	*E. coli*	Purified	EIA-LF-Pr
R18523	Hepatitis C Virus (HCV) Nucleocapsid NS3/NS4/NS5, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18206	Hepatitis C Virus (HCV) Nucleocapsid NS3/NS4/NS5, Recombinant	N/A	*E. coli*	Purified	EIA-WB
C65185M	Hepatitis C Virus (HCV) Core Antigen	IgG1	Ascites	Purified	EIA-IFA-WB
C8A117M	Hepatitis C Virus (HCV) Core Antigen (a.a. 2-192)	IgG2a	Ascites	Purified	EIA-WB
C65317M	Hepatitis C Virus (HCV) Core Antigen (a.a. 33-38)	IgG1	Ascites	Purified	EIA-IFA-IHC-Pr-WB
C01251M	Hepatitis C Virus (HCV) Core Antigen 1a and 2	IgG2a	Ascites	Purified	EIA-Pr
C01252M	Hepatitis C Virus (HCV) Core Antigen 1a and 2	IgG1	Ascites	Purified	EIA-IFA-Pr
C01253M	Hepatitis C Virus (HCV) Core Antigen Genotypes 1a and 2	IgG1	Ascites	Purified	EIA-IFA-Pr-WB
C8A016B	Hepatitis C Virus (HCV) Core Antigen (a.a. 1-80)	IgG2a	Culture	Biotin	EIA-IHC(f)
C8A016F	Hepatitis C Virus (HCV) Core Antigen (a.a. 1-80)	IgG2a	Culture	FITC	EIA-IFA-IHC(f)
C8A016M	Hepatitis C Virus (HCV) Core Antigen (a.a. 1-80)	IgG2a	Culture	Purified	EIA
C8A116M	Hepatitis C Virus (HCV) Core Antigen (a.a. 2-192)	IgG1	Culture	Supernatant	EIA-WB
C8A216M	Hepatitis C Virus (HCV) Core Antigen (a.a. 70-90)	IgG1	Culture	Purified	EIA-IHC(f)-WB
C8A017B	Hepatitis C Virus (HCV) Core Antigen (a.a. 80-120)	IgG2a	Culture	Biotin	EIA
C8A017M	Hepatitis C Virus (HCV) Core Antigen (a.a. 80-120)	IgG2a	Culture	Purified	EIA
C11423M	Hepatitis C Virus (HCV) Core Antigen	IgG1	Mouse	Purified	EIA-Pr
B65168G	Hepatitis C Virus (HCV) Core Antigen (a.a. 1-120)	N/A	Goat	Purified	EIA-WB

Hepatitis C (HCV) continued

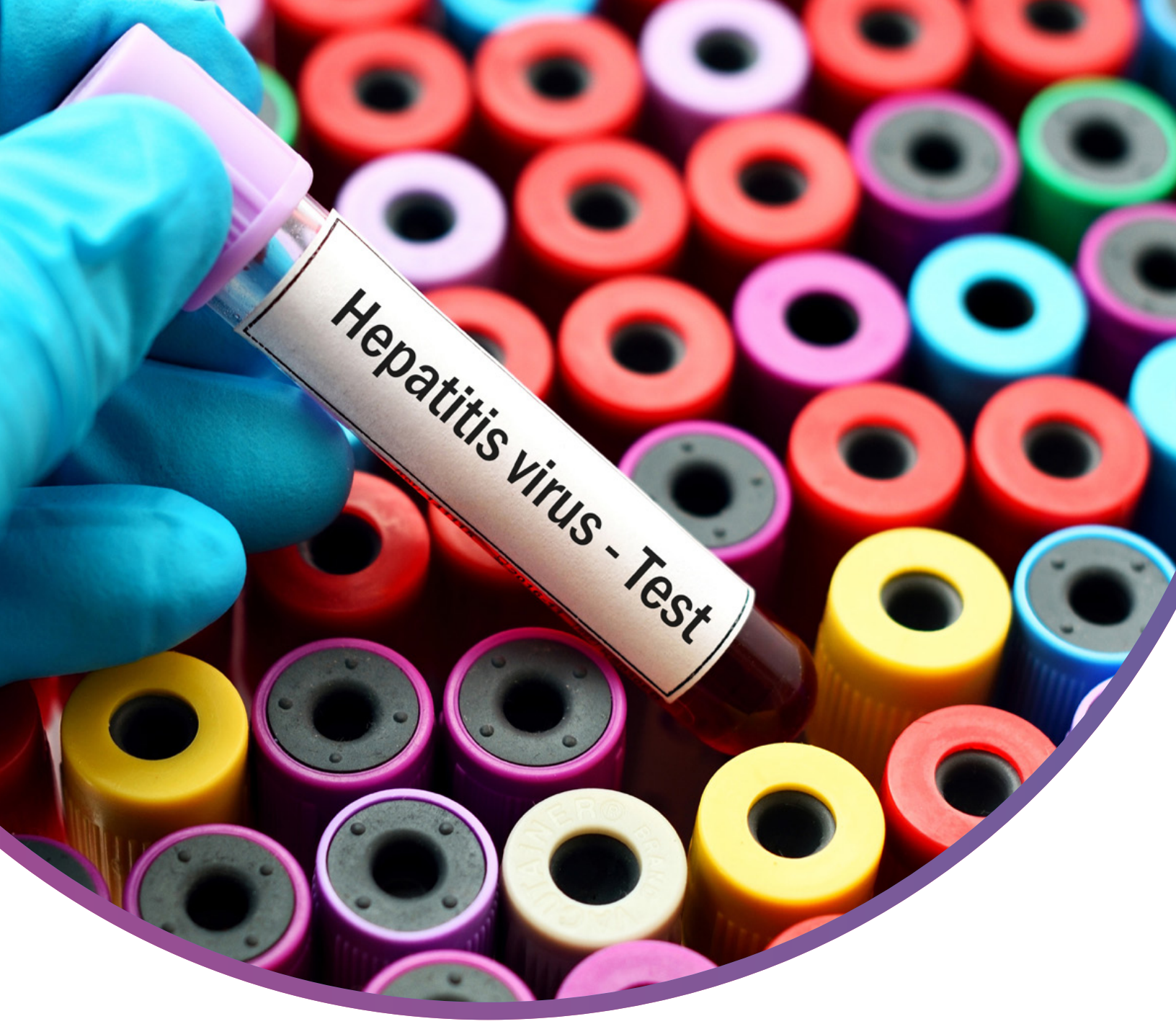
Item	Specificity	Isotype	Source	Format	Applications
HCV Other					
C65198M	Hepatitis C Virus (HCV) E1	IgG1	Ascites	Purified	EIA-IFA-WB
C65167M	Hepatitis C Virus (HCV) E2	IgG1	Ascites	Purified	EIA-IFA-WB
C65371M	Hepatitis C Virus (HCV) NS-3	IgG1	Ascites	Purified	EIA-IFA-WB
C65859M	Hepatitis C Virus (HCV) NS-3 Region (a.a. 1252-1477)	IgG2	Ascites	Purified	EIA-WB
C8A217M	Hepatitis C Virus (HCV) NS-3 Region (a.a. 1350-1460)	IgG1	Ascites	Purified	EIA-IHC(f)
C8A018F	Hepatitis C Virus (HCV) NS-4 Region (Recomb. & Native)	IgG2a	Ascites	FITC	EIA-IFA-IHC(f)-WB
C8A018M	Hepatitis C Virus (HCV) NS-4 Region (Recomb. & Native)	IgG2a	Ascites	Purified	EIA-WB
C8A236M	Hepatitis C Virus (HCV) NS-4a Region (a.a. 1700-1710)	IgG1	Ascites	Purified	EIA-IHC(f)-WB
C01237M	Hepatitis C Virus (HCV) NS-4b Region (a.a. 1689-1735)	IgG1	Ascites	Purified	EIA-WB
C8A246M	Hepatitis C Virus (HCV) NS-4b Region (a.a. 1710-1730)	IgG2b	Ascites	Purified	EIA-IHC(f)-WB
C65388M	Hepatitis C Virus (HCV) NS-5a Region	IgG2a	Ascites	Purified	EIA-IFA-WB
C8A256M	Hepatitis C Virus (HCV) NS-5a Region (a.a. 2190-2300)	IgG1	Ascites	Purified	EIA-IHC(f)-WB
R8A442	Hepatitis C Virus (HCV) NS-3 Antigen (a.a. 1450-1643) Recombinant	N/A	*E. coli*	Purified	EIA-WB
R01518	Hepatitis C Virus (HCV) NS-3 c33c (a.a. 1192-1459) Genotype 1a, Recombinant	N/A	*E. coli*	Purified	EIA
R18358	Hepatitis C Virus (HCV) NS-3 c33c (a.a. 1192-1459) Subtype 1a, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18800	Hepatitis C Virus (HCV) NS-3 c33c (a.a. 1192-1459) Subtype 2b, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R01234	Hepatitis C Virus (HCV) NS-3, C-Terminal, Recombinant	N/A	*E. coli*	Purified	EIA
R18541	Hepatitis C Virus (HCV) NS-4 Ag, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R8A611	Hepatitis C Virus (HCV) NS-4a+b Antigen (a.a. 1658-1863) Recombinant	N/A	*E. coli*	FITC	EIA-WB
R8A116	Hepatitis C Virus (HCV) NS-4a+b Antigen (a.a. 1658-1863), Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18190	Hepatitis C Virus (HCV) NS-5 (a.a. 2212-2313) Genotype 1, Recombinant	N/A	*E. coli*	Purified	EIA-WB
R18206	Hepatitis C Virus (HCV) NS-5 (a.a. 2322-2423) Genotype 1a, Recombinant	N/A	*E. coli*	Purified	EIA-WB
B01437G	Hepatitis C Virus (HCV) E1	N/A	Goat	Purified	EIA-IFA-WB
B65581G	Hepatitis C Virus (HCV) E2 (a.a. 384-665)	N/A	Goat	Purified	EIA-IFA-WB
B65178G	Hepatitis C Virus (HCV) NS-3 Region	N/A	Goat	Purified	EIA-IFA-WB
B65188G	Hepatitis C Virus (HCV) NS-4 Region	N/A	Goat	Purified	EIA-WB

Hepatitis D (HDV)

Item	Specificity	Isotype	Source	Format	Applications
R18420	Hepatitis D Virus (HDV) Recombinant	N/A	*E. coli*	Purified	EIA-WB

Hepatitis E (HEV)

Item	Specificity	Isotype	Source	Format	Applications
R18250	Hepatitis E Virus (HEV) ORF2 and ORF3 Antigen Recombinant	N/A	*E. coli*	Purified	EIA-WB
R8A330	Hepatitis E Virus (HEV) ORF2 Antigen (a.a. 403-461) Recombinant	N/A	*E. coli*	Purified	EIA-WB
R8A310	Hepatitis E Virus (HEV) ORF2 Antigen (a.a. 633-659) Recombinant	N/A	*E. coli*	Purified	EIA-WB
R8A320	Hepatitis E Virus (HEV) ORF3 antigen (a.a. 92-123), Recombinant	N/A	*E. coli*	Purified	EIA-WB



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February 2021