



Excellence in Pathology and Laboratory Services

Herpes Simplex Virus (HSV1&2) DNA Detection by Real Time PCR

Test Update

May 27, 2005

Overview

PathGroup Labs are now offering a more sensitive, specific and rapid polymerase chain reaction (PCR) based test for detection of herpes simplex (HSV) virus infections.

HSV causes superficial and systemic infections within every major organ system of the body in both normal and immunocompromised patients. Severity of infection may range from mild to severe disease. Site of infection include the skin, lips, oral cavity, eyes, genital tract and central nervous system (1).

It is estimated that 500,000 to 1 million people acquire HSV infection each year, and at least 50 million individuals in the United States have genital herpes infection. Genital herpes has become the most common sexually transmitted disease among women (1).

Two distinct HSV genotypes exist, HSV type 1 and HSV type 2. HSV type 1 is considered to be primarily associated with ocular and oral infection, while HSV type 2 is considered to be associated with genital infection. However, these distinctions have blurred and either strain of HSV may be isolated from herpetic lesions, and can cause genital herpes. Genotyping of the virus is necessary for proper treatment of infected neonates and immunocompromised individuals, adequate management of pregnant women and effective STD counseling (2).

Laboratory diagnosis of HSV infection has traditionally relied on in viral cell culture and serological testing, or direct fluorescent antibody

testing (DFA) (3). However, viral cell cultures require up to one week of growth and identification and this might delay patient's diagnosis and treatment. In addition, culture technique can be compromised by quality of specimens, and transport conditions, and by bacterial growth, which might lead in false negative results (3).

Serological and other antigen testing are even more insensitive to HSV detection than culture as antibodies might cross react with other presented antigens, resulting in additional false positive results. Cultures for many viruses and bacteria are rapidly being replaced with more sensitive, specific and rapid PCR technologies.

HSV Real-Time PCR based assay are highly sensitive and specific, and it can detect the virus even during the low viral shedding. PCR based technique was shown to increase the overall rate of HSV detection by 61-71%. Even in patients with visible genital ulcerations PCR detected 88% more infections than virus culture (4). Real-Time PCR is a highly sensitive, specific and rapid method that can detect the virus from all samples. For detection of the virus this technology uses pair of fluorescent hybridization probes that are sequence specific for either HSV1, or HSV2. It also utilizes melting curve analysis for viral genotyping. In addition, this assay uses internal control to avoid false negative results that could be caused by presence of inhibitory factors in the samples.

Clinical Utility

- Rapid and sensitive detection of HSV for diagnosis of HSV infection in pregnant women.
- Rapid and sensitive detection of HSV for monitoring HSV infection in pregnant women regularly prior to delivery.
- Rapid and sensitive detection of HSV to identify a reactivation of infection in pregnant women.
- Rapid and sensitive detection of HSV in newborns suspected of having neonatal herpes or encephalitis.
- Rapid and sensitive detection of HSV in patients with genital infection (having sores and lesions).
- Rapid and sensitive detection of HSV in patients with ocular or oral infection.
- Rapid and sensitive detection of HSV viral infection in immunocompromised patients.

Specimen Collection & Storage

Urogenital swabs collected in M4 viral transport media, endocervical swabs from ThinPrep®, urine collected in sterile container, cerebrospinal fluid (CSF), and swabs from vesicles and/or other genital lesions (vesicles should be punctured and the vesicle fluid collected with a swab). The swab should be placed in M4 viral transport medium at 2-8°C.

Shipping and Handling

ThinPrep® and urine specimens are stable at room temperature (15-25°C) for 24 hours. CSF and M4 transport media should be refrigerated (2-8°C). Outside institutions ship specimens on ice packs via courier or overnight carrier.

Method

Real-Time Polymerase Chain Reaction (PCR)

Reference Ranges

Not Detected

Turnaround Time

Next Day

References

1. Espy MJ, Uhl JR, Mitchell PS, Thorvilson JN, Svien KA, Wold AD, Smith TF. Diagnosis of herpes simplex virus infections in the clinical laboratory by LightCycler PCR. *J Clin Microbiol.* 2000 Feb;38(2):795-9.
2. ACOG Practice Bulletin No. 57 Gynecologic Herpes Simplex Virus Infections. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2004;104:1111-7.
3. Slomka MJ. Current diagnostic techniques in genital herpes: their role in controlling the epidemic. *Clin Lab.* 2000;46(11-12):591-607.
4. Ramaswamy M, McDonald C, Smith M, Thomas D, Maxwell S, Tenant-Flowers M, Geretti AM. Diagnosis



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