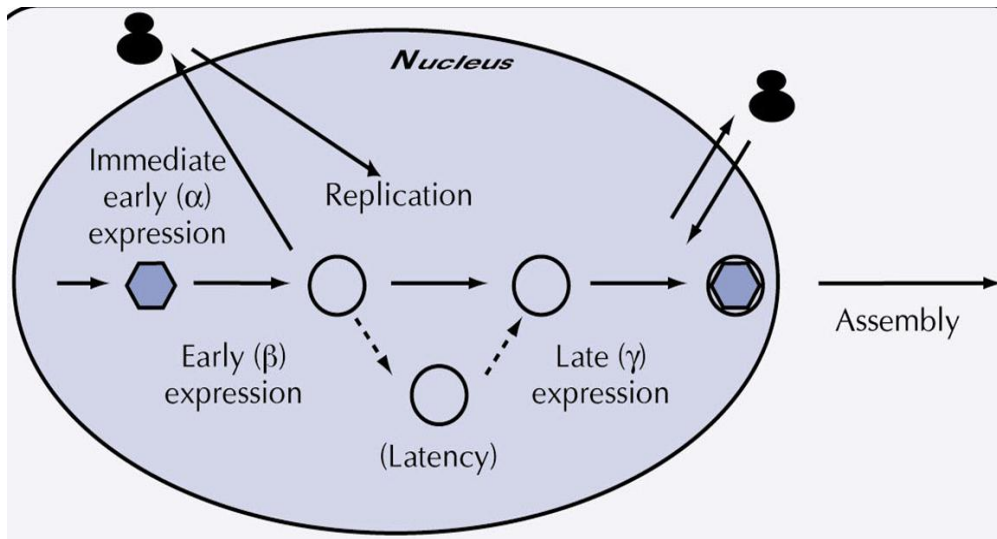


# Class I: Double-stranded DNA



**TABLE 1**  
**GENOMES OF THE MAJOR VIRUSES INFECTING HUMANS**

Group	Family	Example	Genome
<b>I</b> ( ds DNA genome)	Papovaviridae	Papillomaviruses (HPVs)	8 Kbp
	Adenoviridae	Adenovirus	40 Kbp
	Poxviridae	Smallpox and Vaccinia	120 Kbp
	Hesperiviridae	Herpes simplex 1 and 2,	150 Kbp
		Varicella-Zoster,	125 Kbp
		Epstein-Barr,	175 Kbp
		Cytomegalovirus	240 Kbp
<b>II</b> ( ss DNA genome)	Parvoviridae	Parvovirus	5 Kb
<b>III</b> ( ds RNA genome)	Reoviridae	Rotavirus (11 pieces)	22 Kbp
<b>IV</b> (+ ss RNA genome)	Picornaviridae	Polio-, Rhino-, Hep. A	8 Kb
	Coronaviridae	Coronavirus	28 Kb
	Togaviridae	Rubella	12 Kb
	Flaviviridae	Hepatitis C (HCV)	10 Kb
<b>V</b> (- ss RNA genome)	Rhaboviridae	Rabies	11 Kb
	Paramyxoviridae	Mumps and measles	14 Kb
	Orthomyxoviridae	Influenza (8 pieces)	12 Kb
	Bunyaviridae	Hantavirus (3 pieces)	18 Kb
	Arenaviridae	Lassa (2 pieces)	12 Kb
	Filoviridae	Ebola and Marburg	13 Kb
<b>VI</b> (RNA reverse transcribing)	Retroviridae	HIV	10 Kb
<b>VII</b> (DNA reverse transcribing)	Hepadnaviridae	Hepatitis B	3 Kbp

papilloma virus

HPV stands for human papilloma virus. It is a very common virus. There are about 100 types of HPV that affect different parts of the body. About 30 types of HPV can affect the genitals — including the

vulva, vagina, cervix, penis, and scrotum — as well as the rectum and anus. Of those, about 14 types are considered "high risk," for leading to cervical cancer.

**Type of infection :**

Cutaneous HPVs , Lung cancer , Throat cancer , Genital HPVs , Skin warts , Genital warts  
Respiratory papillomatosis.

**Mod of transmitted**

Genital HPV is spread through contact with (touching) the skin of someone who has an HPV infection. Contact includes vaginal, anal, and oral sex. Some types of HPV cause genital warts, which are hard, rough lumps that grow on the skin. Anyone who is sexually active can get HPV and genital warts.

In women, genital warts most often appear in the following areas of the body:

On the vulva (the outer female genital area ).

In or around the vagina

In or around the anus

On the groin (where the genital area meets the inner thigh).

On the cervix.

**Diagnosed HPV**

There are no blood tests for HPV, but some tests can help your health care provider diagnose the infection:

**Pap test** — During this test, the health care provider removes a sample of cells from the cervix. The cells are then examined under a microscope to look for any changes in the cells, even if the patient does not have genital warts.

**Colposcopy** — For this test, a health care provider uses an instrument — called a colposcopy — that shines a light and enlarges the view of the cervix. A vinegar solution is placed on the cervix. The solution turns abnormal cells that are infected with HPV white, so they can be seen more easily.

**HPV DNA test** — This test looks directly for the genetic material (DNA) of the HPV within a sample of cells. The test can detect the type of HPV connected to cervical cancer. The sample used for this test is generally collected at the same time as a Pap test.

**Herpes simplex**

**Herpes simplex** is a viral disease caused by the herpes simplex virus. Infections are categorized based on the part of the body infected. **Oral herpes** involves the face or mouth. It may result in small blisters in groups often called cold sores or fever blisters or may just cause a sore throat. **Genital herpes**, often simply known as herpes, may have minimal symptoms or form blisters that break open and result in small ulcers. These typically heal over two to four weeks. Tingling or shooting pains may occur before the blisters appear. The first episode is often more severe and may be associated with fever, muscle pains, swollen lymph nodes and headaches. **herpes of the eye, herpes infection of the brain, and neonatal herpes** when it affects a newborn, among others.

There are two types of herpes simplex virus, type 1 (HSV-1) and type 2 (HSV-2). HSV-1 more commonly causes oral infections while HSV-2 more commonly causes genital infections.

**Diagnosis**

Primary orofacial herpes is readily identified by clinical examination of persons with no previous history of lesions and contact with an individual with known HSV-1 infection.

Genital herpes can be more difficult to diagnose than oral herpes, since most HSV-2-infected persons have no classical symptoms. Further confusing diagnosis, several other conditions resemble genital herpes, including fungal infection, lichen planus, atopic dermatitis, and urethritis. **Laboratory testing** is often used to confirm a diagnosis of genital herpes. Laboratory tests include **culture of the virus**, **direct fluorescent antibody** (DFA) studies to detect virus, skin biopsy, and **polymerase chain reaction** to test for presence of viral DNA. Although these procedures produce highly sensitive and specific diagnoses, their high costs and time constraints discourage their regular use in clinical practice. Until recently, serological tests for antibodies to HSV were rarely useful to diagnosis and not routinely used in clinical practice. The older IgM serologic assay could not differentiate between antibodies generated in response to HSV-1 or HSV-2 infection. However, the new Immunodot glycoprotein G-specific (IgG) HSV test is more than 98% specific at discriminating HSV-1 from HSV-2. Some believe the new IgG test should always be preferred to the old IgM test.

### **Cytomegalovirus (CMV)**

**Cytomegalovirus (CMV)** is recognized as the most common congenital viral infection in humans and an important cause of morbidity and mortality in immunocompromised hosts. This recognition of the clinical importance of invasive CMV disease in the setting of immunodeficiency and in children with congenital CMV infection has led to the development of new diagnostic procedures for the rapid identification of immunocompromised individuals with CMV disease, as well as fetuses and infants with congenital infection.

Although they may be found throughout the body, HCMV infections are frequently associated with the salivary glands. HCMV infection is typically unnoticed in healthy people, but can be life-threatening for the immunocompromised, such as HIV-infected persons, **organ transplant recipients**, or **newborn infants**. **Neonatal** infection with CMV can lead to significant morbidity and even death. After infection, HCMV remains latent within the body throughout life and can be reactivated at any time. Eventually, it may cause mucoepidermoid carcinoma and possibly other malignancies such as prostate cancer.

### **DIAGNOSTIC METHODS FOR CMV**

#### **Serology**

Serological tests are useful for determining whether a patient has had CMV infection in the past, determined by the presence or absence of CMV IgG. Many different assays have been described and evaluated for the detection of CMV IgG antibodies. Among these are **complement fixation**, **enzyme-linked immunosorbent assay (ELISA)**, **anticomplement immunofluorescence**, **radioimmunoassay**, and **indirect hemagglutination**. The detection of IgM antibodies has been used as an indicator of acute or recent infection.

#### **Cell culture**

The traditional method for detecting CMV is through conventional cell culture. This approach utilizes clinical specimens which are inoculated onto human fibroblast cells and incubated and observed for a period of time ranging from 2 to 21 days. In the standard tube cell culture technique, CMV exhibits a typical cytopathic effect.

#### **Antigenemia**

The antigenemia assay has been commonly used for more than a decade for CMV virus quantification in blood specimens. This assay depends on the use of monoclonal antibodies that detect the viral pp65 antigen, a structural late protein expressed in blood leukocytes during the early phase of the

CMV replication cycle. Antigenemia is measured by the quantitation of positive leukocyte nuclei, in an immunofluorescence assay .

### **Polymerase Chain Reaction Amplification**

Polymerase chain reaction (PCR) is a widely available rapid and sensitive method of CMV detection based on amplification of nucleic acids. The techniques usually target major immediate early and late antigen genes in their well conserved regions, but a number of other genes have been used as targets for detection of CMV DNA.

### **Immunohistochemistry**

Immunohistochemistry is performed primarily on tissue or body fluid samples. Slides are made from frozen sections of biopsy tissue samples (liver, lung) or by centrifuging cells onto a slide. Then monoclonal or polyclonal antibodies against early CMV antigens are applied and visualized by fluorescently labeled antibodies or enzyme labeled secondary antibodies which are visualized by the change of color of the substrate.

### **Nucleic acid sequence-based amplification (NASBA)**

The assay allows the specific nucleic acid sequence-based amplification of unspliced viral mRNAs (late pp67 mRNA expression) in a background of DNA using a specific isothermal technique of amplification. Studies suggest that NASBA may be more sensitive than the antigenemia assay for the detection of CMV infection in blood .

### **Hybrid capture assay**

Hybrid capture assay uses RNA probes to detect and quantify viral DNA in an ELISA-type format where the resulting signal is measured. Because it detects DNA without amplification its sensitivity is questionable .