

Series Editor: William W. Huang, MD, MPH

## Viruses, Part 1: DNA Viruses

Jenna O'Neill, MD

Dr. O'Neill is from Buffalo Medical Group, New York. The author reports no conflict of interest.

Virus	Classification	Clinical Presentation	Treatment	Miscellaneous
<b>Hepadnaviridae</b>				
Hepatitis B virus (HBV)	Enveloped, dsDNA	May lead to cirrhosis of the liver and hepatocellular carcinoma	Lamivudine + pegylated interferon alfa-2a; prevention via hepatitis B vaccine	
<b>Herpesviridae</b>				
Herpes simplex virus type 1 (HHV-1)	Enveloped, dsDNA; Alphaherpesvirinae subfamily	Orolabial herpes (most common cause) <sup>a</sup>	Acyclovir, valacyclovir, famciclovir <sup>b</sup>	80% of recurrent erythema multiforme cases are associated with herpes simplex virus
Herpes simplex virus type 2 (HHV-2)	Enveloped, dsDNA; Alphaherpesvirinae subfamily	Genital herpes (most common cause) <sup>a</sup> ; multiple painful ulcers, often with LAD	Acyclovir, valacyclovir, famciclovir <sup>b</sup> ; foscarnet or cidofovir for resistant strains	80% of recurrent erythema multiforme cases are associated with herpes simplex virus
Varicella-zoster virus (HHV-3)	Enveloped, dsDNA; Alphaherpesvirinae subfamily	Chickenpox (primary varicella infection), shingles (herpes zoster)	Acyclovir, valacyclovir, famciclovir <sup>c</sup> ; prevention via live (attenuated) varicella virus vaccine in children (administered SC in 2 doses: first at 12–15 mo, second at 4–6 y) and zoster vaccine in adults ≥50 y (administered SC in a single dose)	
Epstein-Barr virus (HHV-4)	Enveloped, dsDNA; Gammaherpesvirinae subfamily	Infectious mononucleosis, oral hairy leukoplakia, endemic Burkitt lymphoma, nasopharyngeal carcinoma, posttransplant lymphoproliferative disorders, Gianotti-Crosti syndrome	Supportive care, steroids only for complicated cases (eg, patients with splenomegaly or risk for end organ damage) of infectious mononucleosis, Epstein-Barr virus-associated lymphoproliferative disorders: reduction in immunosuppression	Posttransplant lymphoproliferative disorder may be a complication in both solid organ and hematopoietic stem cell transplantation, usually in first year posttransplantation

continued on next page

(continued)				
Virus	Classification	Clinical Presentation	Treatment	Miscellaneous
<b>Herpesviridae (continued)</b>				
Cytomegalovirus (HHV-5)	Enveloped, dsDNA; Betaherpesvirinae subfamily	Congenital cytomegalovirus infection: hearing loss, seizures, growth and mental retardation, HSM, chorioretinitis, intracranial calcifications; cutaneous findings are nonspecific: classic presentation is "blueberry muffin baby" due to extramedullary hematopoiesis; cytomegalovirus retinitis in AIDS	Ganciclovir, valganciclovir; foscarnet and cidofovir in resistant cases; prevention via screening of transplant donors and recipients	Most common congenital viral infection (90% asymptomatic); leading cause of congenital deafness and mental retardation in the United States
Human herpesvirus 6 (HHV-6), herpesvirus 7 (HHV-7)	Enveloped, dsDNA; Betaherpesvirinae subfamily	Roseola infantum (exanthema subitum, sixth disease): high fever followed by exanthem of rose red macules as fever subsides; red papules on soft palate (Nagayama spots)	Supportive care	Most cases caused by HHV-6
Kaposi sarcoma-associated herpesvirus (HHV-8)	Enveloped, dsDNA; Gammaherpesvirinae subfamily	Kaposi sarcoma (subtypes: classic, AIDS related, immunosuppression associated, African/endemic), Castleman disease, primary effusion lymphoma	Cryosurgery, radiotherapy, topical alitretinoin, intralesional interferon alfa, systemic chemotherapy; HAART in AIDS-related Kaposi sarcoma	May affect oral mucosa (especially in AIDS-related Kaposi sarcoma), lymph nodes, and GI and respiratory tracts; predilection for lower legs and feet in classic Kaposi sarcoma; primarily occurs in Mediterranean and Central/Eastern European male populations
<b>Papillomaviridae</b>				
Human papillomavirus (HPV)	Nonenveloped, dsDNA	HPV-1: plantar warts; HPV-2, HPV-4: common warts; HPV-3, HPV-10: flat warts; HPV-7: butcher's warts; HPV-5, HPV-8, others: EV; HPV-6, HPV-11: condyloma acuminatum (genital warts), Buschke-Lowenstein tumor, recurrent respiratory papillomatosis; HPV-16, HPV-18, others: EQ, bowenoid papulosis, invasive carcinoma; HPV-13, HPV-23: Heck disease (focal epithelial hyperplasia)	Local destructive therapies (cryosurgery, surgical excision, laser vaporization, TCA, curettage); podophyllin; imiquimod; intralesional mumps or <i>Candida</i> injections, or interferon; prevention via quadrivalent vaccine of HPV-6, HPV-11, HPV-16, and HPV-18, and bivalent vaccine of HPV-16 and HPV-18	Use of radiation therapy controversial in treatment of Buschke-Lowenstein tumors due to reports of transformation to high-grade SCC

continued on next page

(continued)

Virus	Classification	Clinical Presentation	Treatment	Miscellaneous
<b>Parvoviridae</b>				
Parvovirus B19 (B19V)	Nonenveloped, ssDNA, Parvovirinae subfamily	Erythema infectiosum (fifth disease, slapped cheek syndrome): bright red macular erythema on cheeks, reticulate erythematous macules more frequently on extremities than trunk; disease is evanescent and may recur with overheating; PPGSS; aplastic crisis in susceptible individuals; hydrops fetalis	Supportive care, transfusion in aplastic crisis	Aplastic crisis may be precipitated in sickle cell anemia, thalassemia, hereditary spherocytosis, and hemolytic anemias
<b>Poxviridae</b>				
Molluscum contagiosum virus (MOCV), monkeypox virus, orf virus, tanapox virus, vaccinia virus, variola virus	Enveloped, dsDNA, Chordopoxvirinae subfamily		MOCV: cantharidin, curettage, topical keratolytics; lesions resolve spontaneously; others: supportive care; smallpox prevention via vaccinia vaccine	Complications of vaccinia vaccination: generalized vaccinia infection, eczema vaccination, progressive vaccinia, postvaccinal encephalitis

Abbreviations: dsDNA, double-stranded DNA; LAD, lymphadenopathy; SC, subcutaneous; HSM, hepatosplenomegaly; HAART, highly active antiretroviral therapy; GI, gastrointestinal; EV, epidermodysplasia verruciformis; EQ, erythroplasia of Queyrat; TCA, trichloroacetic acid; SCC, squamous cell carcinoma; ssDNA, single-stranded DNA; PPGSS, papular-purpuric gloves and socks syndrome.

<sup>a</sup>Overlap exists between clinical manifestations of HSV-1 and HSV-2.

<sup>b</sup>Dosing regimens for oral herpes: oral valacyclovir 2000 mg twice daily for 1 d or oral famciclovir 1500 mg for 1 dose; genital herpes first episode: oral acyclovir 200 mg 5 times daily for 10 d or 400 mg 3 times daily for 10 d, oral valacyclovir 1000 mg twice daily for 10 d, or oral famciclovir 250 mg 3 times daily for 10 d; recurrent genital herpes: oral acyclovir 200 mg 5 times daily for 5 d or 400 mg 3 times daily for 5 d, oral valacyclovir 500 mg twice daily for 3–5 d, or oral famciclovir 1000 mg twice daily for 1 d or 125 mg twice daily for 5 d.

<sup>c</sup>Dosing regimens for varicella: oral acyclovir 20 mg/kg 3 times daily for 5 d (maximum of 800 mg daily); zoster: oral acyclovir 800 mg 5 times daily for 7–10 d, oral valacyclovir 1000 mg 3 times daily for 7 d, or oral famciclovir 500 mg 3 times daily for 7 d.

## Practice Questions

- 1. Which human papillomavirus (HPV) subtype causes epidermodysplasia verruciformis?**
  - a. HPV-1
  - b. HPV-3
  - c. HPV-7
  - d. HPV-8
  - e. HPV-13
- 2. Which is the appropriate treatment regimen for a patient presenting with the first episode of genital herpes?**
  - a. acyclovir 20 mg/kg intravenously 4 times daily for 10 d
  - b. famciclovir 125 mg orally twice daily for 5 d
  - c. human papillomavirus vaccination
  - d. valacyclovir 1000 mg orally twice daily for 1 d
  - e. valacyclovir 1000 mg orally twice daily for 10 d
- 3. Which is the most common congenital viral infection?**
  - a. adeno-associated virus
  - b. cytomegalovirus
  - c. Epstein-Barr virus
  - d. herpes simplex virus type 1
  - e. varicella-zoster virus
- 4. Which virus can cause aplastic crisis in patients with thalassemia?**
  - a. hepatitis B virus
  - b. herpes simplex virus
  - c. human papillomavirus
  - d. parvovirus B19
  - e. variola virus
- 5. Which herpesvirus belongs to the Gammaherpesvirinae subfamily?**
  - a. HHV-3
  - b. HHV-5
  - c. HHV-6
  - d. HHV-7
  - e. HHV-8

*Fact sheets and practice questions will be posted monthly. Answers are posted separately on [www.cutis.com](http://www.cutis.com).*