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Viruses, Part 1: DNA Viruses

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

Virus	Classification	Clinical Presentation	Treatment	Miscellaneous
Hepadnaviridae				
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	
Herpesviridae				
Herpes simplex virus type 1 (HHV-1)	Enveloped, dsDNA; Alphaherpesvirinae subfamily	Orolabial herpes (most common cause) ^a	Acyclovir, valacyclovir, famciclovir ^b	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) ^a ; multiple painful ulcers, often with LAD	Acyclovir, valacyclovir, famciclovir ^b ; 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 ^c ; 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

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Virus	Classification	Clinical Presentation	Treatment	Miscellaneous
Herpesviridae (continued)				
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
Papillomaviridae				
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

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Virus	Classification	Clinical Presentation	Treatment	Miscellaneous
Parvoviridae				
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
Poxviridae				
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 vaccinatum, 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.

^aOverlap exists between clinical manifestations of HSV-1 and HSV-2.

^bDosing 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.

^cDosing 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.