VIRAL DISEASES, DNA VIRAL DISEASES


DISCOVERY:
Chamberland 1884  developed porcelain filter to remove bacteria
Iwanowski 1892  used filter to try to remove tobacco mosaic disease, "filterable virus"
Beijerinck 1898  showed could be diluted out, destroyed by heat
Forsh & Loeffler 1898  foot and mouth disease caused by filterable agent
Walter Reed 1901  yellow fever also filterable disease (in Cuba)
Twort & d'Herrelle 1917  bacteriophage

FEATURES of viruses: (p383)
capsid  protein coat composed of capsomeres, can contain penetration enzymes
genome  may be DNA or RNA, double stranded, single stranded, (+ = mRNA) or (-)
Spikes  Some possess: glycoprotein for attachment, enzymes to assist attachment
Envelope  Some possess, derived upon release by budding from host, replication of enveloped virus , p 284

Enveloped: inactivated by hi temp, hi or low pH, lipid solvents, some disinfectants (Cl₂, H₂O₂, phenol)
Naked: lack an envelope, resist many of the above

Host range = which species infected
specificity = which tissue affected, determined by ability to attach, multiply and release

three morpologies:  icosaehedral (20 faces)  herpess, polio, cytomegalovirus
(p 382 for sizes and shapes)  helical  rabies, TMV
complex  small pox, coronavirus, influenza

VARIETY OF VIRUSES, p 383, characterized by comp of genome, enveloped or not, geometry, size

VIRAL REPLICATION
Obligate Intracellular parasites, replicate inside  STAGES:  bacteriophage (386)  mammalian virus (391, 393)
absorption  p 386  p 391
Penetration
Synthesis
Maturation
Release  p 393

Bacteriophage parts  p 386:  capsid, genome, tail assembly, tail piece, tail fibers, tail sheath, tailcore
bacteriophage replication:  p 386
lysogeny:  p 389  in bacteria called a lysogen. In mammalian cells, called provirus

HUMAN DNA VIRUSES  p 680
POXVIRUSES  p 680 large, double stranded DNA, enveloped, complex capsids,
Smallpox  p 681 transmission by inhalation, close contact. Then macule, papule, vesicle, pustule, crust, scar. Vaccination by cowpox (cross reaction). Now eradicated.?
HERPES VIRUSES  p 684 Oral Herpes: (mostly herpes simplex 1) latent in trigeminal nerve, recurrence with debilitation (stress, fever, cold, menstruation, UV, etc)
H. Simplex  p 685 Genital Herpes: (mostly HSV-2) latent in sacral dorsal root ganglia.
H. Zoster  p 687 highly infectious, fever, malaise, skin lesions. Provirion in dorsal root ganglia.
Teratogenic (TORCH: Toxoplasma, Other, Rubella, Cytomegalovirus and Herpes)
Shingles are recurrence in adult (elderly), dermatomes are affected

EPSTEIN-BARR VIRUS  p 690 Burckitt's lymphoma, neoplasm of the jaw
"Mono" Infectious Mononucleosis: transmitted in saliva: pharynx & parotid, viremia, B cells become infected (apoptosis suppressed). T cells try to kill infected B cells (civil war of immune system): sore throat, fever, enlarged spleen, fatigue. The disease is mild in the young. 70% of adults have antibodies against EBV.

CYTOMEGALOVIRUS  p 691 transmitted by bodily fluids, often intercourse. (50% of US adults infected, latency). Can cause mono-like symptoms. Teratogenic: low IQ, hearing, vision, death...
PAPILLOMA VIRUSES  p 693 papilloma = wart. Infectious. Genital warts, esp strain 18 can lead to cervical CA

ADENOVIRUSES  p 695, 697 DS DNS, naked, spikes, 30 strains can cause “common cold” (and 100+ RNA viruses).

HEPADNAVIRUSES  p 698 hepatitis B: (“serum hepatitis”) shed in bodily fluids, thru breaks in tissue, sex (esp anal), IV drugs, liver damage in 10%.