PLAGUES IN MAN

THE VIRUSES

I. INTRODUCTION AND HISTORICAL PERSPECTIVE
  A. DISCOVERY-
    1. 1892-IWANOWSKI (TMV FILTRATE)
    2. 1898-BEIJERINCK--"A FILTERABLE VIRUS"
    3. 1900-WALTER REED—FIRST HUMAN VIRUS (YELLOW FEVER)
    4. 1935-STANLEY--ISOLATED & CRYSTALLIZED TMV
  B. MANY KNOWN SERIOUS DISEASES
    1. SMALLPOX, HERPES
    2. POLIO, RABIES, MEASLES, INFLUENZA, ETC.
    3. RETROVIRAL DISEASES
      a. CANCER ?
      b. AIDS
    4. AND.....THE COMMON COLD (>100 DIFFERENT VIRUSES)
  C. IMMUNOLOGY AND VIROLOGY
  D. SINCE 1950--RAPID PROGRESS
    1. MODEL FOR EUKARYOTIC SYSTEMS
    2. VACCINES DEVELOPED
    3. RECOMBINANT DNA TECHNOLOGY
    4. MANY (MOST) NOW "SEQUENCED"
II. GENERAL CHARACTERISTICS
  A. LIFE CYCLE
    1. OBLIGATE INTRACELLULAR PARASITES
    2. <u>DO NOT REPLICATE LIKE CELLS</u>
      a. INFECT
      b. ECLIPSE
      c. REASSEMBLE
    3. DO NOT MAKE PROTEINS (NO RIBOSOMES, tRNA, ETC.)
    4. DO NOT GENERATE ENERGY (ATP)
  B. STRUCTURE
    1. SMALL SIZE
    2. GENOME--RNA OR DNA
      a. DIFFERENT FORMS (LINEAR, CIRCULAR, ENDS)
      b. STRANDEDNESS
    3. CAPSID OR COAT--PROTEIN
    4. MAY HAVE ENVELOPE (LIPID BILAYER FROM HOST)
      a. SPIKES OR "PEPLOMERS"
      b. USUALLY PLEOMORPHIC
    5. MORPHOLOGY
      a. HELICAL
      b. POLYHEDRAL (SPHERICAL OR ICOSAHEDRAL)
        1) 20-SIDED
        2) FACES ARE EQUILATERAL TRIANGLES
      c. COMPLEX
  C. TAXONOMY OF VIRUSES
    1. HOST
    2. NUCLEIC ACID
    3. MORPHOLOGY

THE VIRUSES (CONTINUED)

III. BACTERIAL VIRUSES -- BACTERIOPHAGE
  A. THE LYTIC PHAGE
    1. THE RNA PHAGE - MS2& Qß GROUPS
    2. DNA PHAGE

T-EVEN GROUP - T2; OTHERS: ϕX174, T7, etc.

B. THE TEMPERATE PHAGE
   1. PHAGE λ AND ITS RELATIVES
   2. LYSIS VS. LYSOGENY

IV. THE PLANT VIRUSES
   A. RNA VIRUSES
      a. MONOPARTITE VIRUSES -- TMV (tobacco mosaic v)
      b. BIPARTITE VIRUSES -- TRV (tobacco rattle v)
      c. TRIPARTITE VIRUSES -- BMV (brome mosaic v)
   B. DNA VIRUSES

VI. THE HUMAN DNA VIRUSES
   A. PAPOVAVIRUSES (PAPOVA=PAPILLOMA, POLYOMA, VACUOLATING)
      1. DOUBLE-STRANDED, CIRCULAR GENOME
      2. HUMAN PAPILLOMA VIRUSES (HPV1 - HPV60)
         COMMON WARTS & GENITAL WARTS - HPV16
   B. ADENOVIRUSES (FROM HUMAN ADENOIDS)
      1. MEDIUM-SIZED VIRUS WITH DS, LINEAR DNA
      2. CAUSES URTI AND CONJUNCTIVITIS
      3. POTENTIALLY ONCOGENIC
   C. HERPESVIRUSES (HERPES=TO CREEP)
      1. LARGE, ENVELOPED, POLYHEDRAL VIRUSES
      2. SEVERAL HUMAN INFECTIONS - LATENT/RECURRENT INFECTIONS
         HERPES SIMPLEX VIRUS & VARICELLA-ZOSTER VIRUS
         OTHERS: CMV and EBV
   D. POXVIRUSES (POX=POCKS=TO SWELL UP)
      1. LARGE "COMPLEX" VIRUSES
      2. MOLUSCUM CONTAGIOSUM & SMALLPOX (ERADICATED IN 1977)

VII. THE HUMAN RNA VIRUSES
   A. PICORNAVIRUSES (PICO=SMALL RNA)
      1. SMALL, + STRAND RNA VIRUSES
      2. POLIO & RHINOVIRUSES
   B. TOGAVIRUSES (TOGA=COAT, ONE FAMILY OF "ARBOVIRUSES")
      1. SMALL, ENVELOPED, POLYHEDRAL VIRUSES (+ STRAND)
      2. MANY TROPICAL DISEASES (INSECT-BORNE)
   C. RHABDOVIRUSES (RHABDO=ROD-SHAPED)
      1. ROD-SHAPED, ENVELOPED, MINUS STRAND VIRUSES
      2. RABIES IN ANIMALS AND MAN
   D. PARAMYXOVIRUSES (MYXO=MUCUS)
      1. PLEOMORPHIC, ENVELOPED, MINUS STRAND VIRUSES
      2. REPLICATE LIKE RHABDOVIRUSES
      3. MANY HUMAN PATHOGENS: MUMPS, MEASLES, RSV
   E. ORTHOMYXOVIRUSES (INFLUENZA VIRUSES)
      1. SHAPE AND SIZE LIKE PARAMYXOVIRUSES - MORE PLEOMORPHIC
      2. SEGMENTED SS RNA GENOME: 8 RNAs --> 10 PROTEINS
      3. INFLUENZA (EPIDEMICS AND PANDEMICS: 1918-19)
   F. RETROVIRUSES (MAKE DNA FROM AN RNA TEMPLATE)
      1. UNUSUAL LIFE CYCLE: RNA --> DNA (HOST) --> RNA
      2. ALL MAKE REVERSE TRANSCRIPTASE (*pol* GENE PRODUCT)
      3. RNA TUMOR VIRUSES AND LENTIVIRUSES (HIV & RELATIVES)