# Principles and Practice of Clinical Virology

Zuckerman, Arie J.


## Table of Contents

- List of Contributors.
- Preface.
- 1 Diagnostic Approaches *(Katie Jeffery and Emma Aarons).*
  - Introduction.
  - Electron Microscopy.
  - Histology/Cytology.
  - Virus Isolation.
  - Serology.
  - Molecular Amplification Techniques.
  - Recommended Diagnostic Investigations.
  - Future Trends.
- 2 Viral Transmission: Infection Acquired by the Blood-borne Route *(Will Irving).*
  - Introduction.
  - Prevention of Exposure through Infection Control.
  - Prevention of Infection through Specific Pre- and Post-exposure Policies.
  - Patient-to-patient Transmission.
  - Patient-to-HCW Transmission.
  - HCW-to-patient Transmission.
- 3 Viral Transmission: Infection Acquired by All Other Routes (Respiratory, Eye–Nose–Mouth, Inoculation and Faeco-orally) *(Philip Rice).*
  - Introduction.
  - Measles, Mumps and Rubella.
  - Cytomegalovirus.
  - Varicella Zoster Virus.
  - Herpes Simplex Virus.
  - Noroviruses.
  - Rotavirus.
  - Parvovirus B19.
  - Respiratory Viruses.
- 4 Emerging Virus Infections *(Brian W.J. Mahy).*
  - Introduction.
  - Factors Contributing to Emergence.
Future Directions.

5 Vaccinology (*Francis E. Andre and Hugues H. Bogaerts*).
Introduction.
Burden of Viral Diseases and their Reproductive Rates.
The Immune System and its Role in Natural and Artificially-induced Immunity.
Discovery of Protective Antigens in Pathogens.
Presentation of Protective Antigens through Vaccines and Types of Vaccine.
Research and Development on Vaccines and their Commercial Introduction.
Social Marketing of Introduced Vaccines.
Planning and Implementation of Vaccination Programmes.
Surveillance of Disease Incidence and Adverse Events Before and After Implementation of Vaccination.
Rectification of Publicized Falsehoods and Maintenance of Vaccination Coverage.
Viral Vaccines on the Horizon and the Roadblocks to Future Vaccine Development.
Closing Comments.

6 Herpes Simplex Virus Type 1 and Type 2 (*Marianne Forsgren and Paul E. Klapper*).
Morphology.
Replication.
Epidemiology.
Viral Diagnosis.
Antiviral Chemotherapy.
Clinical Features, Diagnosis and Management.
Concluding Remarks.

7 Varicella Zoster (*Judith Breuer*).
Introduction.
The Virus.
Epidemiology.
Clinical Features.
Diagnosis of VZV Infection.
Treatment.
Prevention.

8 Cytomegalovirus (*Paul D. Griffiths*).
Introduction.
The Virus.
Epidemiology.
Routes of Infection.
Pathogenesis.
Clinical Features.
Diagnosis.
Management.
Prevention.
Treatment.

9 Epstein–Barr Virus (Tanzina Haque and Dorothy H. Crawford).
Introduction.
The Virus.
Epidemiology.
EBV-associated Diseases.
EBV Infection in the Immunocompromized Host.
Vaccine Development.

10 Roseoloviruses: Human Herpesviruses 6A, 6B and 7 (Katherine N. Ward and Duncan A. Clark).
Introduction.
Biology of the Viruses.
Epidemiology and Pathogenesis.
Disease Associations.
Laboratory Diagnosis.
Antiviral Therapy.
Concluding Remarks.

11 Kaposi's Sarcoma-associated Herpesvirus (Human Herpesvirus 8) (Cornelia Henke-Gendo, Abel Viejo-Borbolla and Thomas F. Schulz).
Introduction.
Origin and Evolution of KSHV.
Worldwide Distribution of KSHV in the General Population.
Transmission.
Clinical Manifestations.
Pathogenesis.
Diagnostic Assays.
Antiviral Therapy.

12 Hepatitis Viruses (Tim J. Harrison, Geoffrey M. Dusheiko and Arie J. Zuckerman).
Introduction.
Hepatitis A.
Hepatitis E.
Hepatitis B.
Hepatitis D.
Hepatitis C.

13 GB Virus C (GBV-C) and Torque Teno Virus (TTV) (Shigeo Hino).
Introduction.
GB Virus C (GBV-C).
Torque Teno Virus (TTV).
14 Rotaviruses (Ulrich Desselberger and Jim Gray).
Introduction.
Rotavirus Structure, Genome and Gene–Protein Assignment.
Classification.
Replication.
Pathogenesis.
Immune Responses and Correlates of Protection.
Illness, Diagnosis and Treatment.
Epidemiology.
Vaccine Development.

15 Viruses other than Rotaviruses Associated with Acute Diarrhoeal Disease (Jim Gray and Ulrich Desselberger).
Introduction.
Enteric Adenoviruses.
Noroviruses and Sapoviruses (Human Caliciviruses).
Astroviruses.
Gastrointestinal Viruses Not Regularly Associated with Acute Diarrhoeal Disease.

16 Influenza (Maria Zambon and Chris W. Potter).
Introduction.
Viral Variation.
Virus Classification.
Pathogenesis.
Clinical Features.
Diagnosis of Infection.
Treatment and Prevention.

17 Parainfluenza Viruses (Stelios Psarras, Nikolaos G. Papadopoulos and Sebastian L. Johnston).
Introduction.
Taxonomy.
Structure and Physical Properties.
Receptors, Virus Entry and Host Range.
Replication.
Viral Transmission, Incubation and Shedding.
Pathogenesis.
Antigenicity and Immunity.
Epidemiology.
Clinical Features.
Diagnosis.
Prevention.
Treatment.

18 Respiratory Syncytial Virus (Caroline Breese Hall).
Introduction.
The Virus.
Epidemiology.
Pathogenesis.
Immunity.
Clinical Features.
Diagnosis.
Management.
Prevention.

**19 Adenoviruses (Marcela Echavarría).**
Introduction.
Description and Characteristics of the Virus.
Pathogenesis.
Immune Response.
Epidemiology.
Clinical Features.
Respiratory Infections.
Ocular Infections.
Gastrointestinal Infections.
Haemorrhagic Cystitis.
Adenoviruses Infections in Immunocompromized Patients.
Other Clinical Manifestations.
Diagnosis.
Treatment.
Prevention.
Future Prospects.

**20 Rhinoviruses (Nikolaos G. Papadopoulos, Maria Xatzipsalti and Sebastian L. Johnston).**
Introduction.
Taxonomy.
Physical Properties.
Incubation and Transmission.
Host Range.
Pathogenesis.
Immunity.
Epidemiology.
Clinical Features.
Diagnosis.
Prevention and Treatment.
21 Coronaviruses and Toroviruses (J.S. Malik Peiris and L.L.M. Poon).

Introduction.
The Viruses.
Initiation of Infection and Pathogenesis.
Epidemiology.
Clinical Features.
Diagnosis.
RT-PCR.
Prophylaxis: Active and Passive Immunization.
Therapy.
Acknowledgements.

22 Measles Virus (Sibylle Schneider-Schaulies and Volker ter Meulen).

Introduction.
The Virus.
Virus Morphology.
Genome Structure.
MV Protein Functions.
The Replication Cycle.
Biological Properties of the Measles Virus.
Epidemiology and Relatedness of Different Virus Isolates.
Clinical Manifestations.
The Pathogenesis of Measles and its Complications.
Diagnosis.
Management.
Prevention.

23 Rubella (Jennifer M. Best, Joseph P. Icenogle and David W.G. Brown).

Historical Introduction.
The Virus.
Postnatally Acquired Infection.
Congenitally Acquired Infection.
Laboratory Techniques and Diagnosis.
Prevention—Rubella Vaccination.

24 Mumps (Pauli Leinikki).

Introduction.
The Virus.
Pathogenesis.
Clinical Picture.
Laboratory Diagnosis.
Epidemiology and Control.
25 Enteroviruses (Philip D. Minor and Peter Muir).
Introduction.
The Viruses.
Pathobiological and Clinical Aspects of Human Enteroviruses.
Laboratory Diagnosis of Enterovirus Infections.
Prevention and Treatment of Enterovirus Infections.
Future Prospects.
26 Poxviruses (Peter B. Jahrling).
Introduction.
Virus Characteristics.
Clinical Aspects of Orthopoxvirus Infections.
Diagnosis.
Medical Management.
Other Poxviruses Infecting Humans.
Diagnosis.
27 Alphaviruses (Graham Lloyd).
Introduction.
The Virus.
Spectrum of Diseases Caused by Alphaviruses.
Diagnosis of Alphavirus Infections.
Management and Prevention.
Alphaviruses Associated with Fevers and Polyarthritis.
Alphaviruses Associated with Encephalitis.
Other Alphaviruses.
28 Flaviviruses (Barry D. Schoub and Marietjie Venter).
Introduction.
Properties of the Virus.
Yellow Fever.
Other Members of the ‘Unassigned’ Subgroup of Flaviviruses.
Dengue.
Zika.
Japanese Encephalitis.
St Louis Encephalitis.
West Nile Virus.
Murray Valley Encephalitis.
Tick-borne Encephalitis.
Omsk Haemorrhagic Fever.
Kyasanur Forest Disease.
**29 Bunyaviridae** (Robert Swanepoel and Felicity J. Burt).

**Introduction.**

**The Virus.**

Laboratory Diagnosis.

Genus Orthobunyavirus.

Genus Phlebovirus.

Genus Nairovirus.

Genus Hantavirus.

Bunyaviruses Unassigned to Genus.

**30 Arenaviruses** (Colin R. Howard).

**Introduction.**

Ultrastructure of Arenaviruses and Infected Cells.

Chemical Composition.

Replication.

Diagnosis of Human Arenavirus Infections.

Antigenic Relationships.

Clinical and Pathological Aspects.

Persistent Infection.

Pathology of Arenavirus Infections: General Features.

Other Arenavirus Infections.

**Summary.**

**31 Filoviruses** (Susan P. Fisher-Hoch).

**Introduction.**

Epidemiology.

Ecology.

Transmission and Risk Factors.

Clinical Spectrum.

Laboratory Diagnosis.

Patient Management.

Past Infection and Persistence.

Virology.

Animal Models.

Serological Studies.

Pathogenesis and Immunology.

Control.

Perspective.

**32 Rabies and Other Lyssavirus Infections** (Mary J. Warrell).

**Introduction.**
Introduction.
Human Parvovirus B19 (B19V).
Pathogenesis.
Epidemiology.
Clinical Features.
Laboratory Diagnosis.
Treatment and Prevention.

36 Human Retroviruses (Robin A. Weiss).
Introduction.
Retrovirus Replication and Genomes.
Taxonomy.
Human and Zoonotic Retrovirus Infections.
Retroviral Vectors.

37 The Human T-lymphotropic Viruses (Graham P. Taylor).
Introduction.
History.
The Virus.
Diagnosis.
Viral Variation.
Epidemiology.
Transmission.
HTLV-associated Disease.
Pathogenesis.
Treatment.
Prevention of Disease.
HIV and HTLV Co-infection.

38 Human Immunodeficiency Viruses (Deenan Pillay, Anna Maria Geretti and Robin A. Weiss).
Introduction and Classification.
Epidemiology.
Replication.
Host Genetic Determinants for HIV/AIDS.
Viral Dynamics and Pathogenesis.
Immune Responses.
The Laboratory Diagnosis of HIV Infection.
The Natural History of HIV Infection and Its Clinical Manifestations.
Antiretroviral Therapy—A Historical Perspective.
Monitoring of Antiretroviral Therapy and Resistance.
Antiretroviral Drug Classes.
Transmission of Drug Resistance.
Prevention.
Vaccines.

**39 Human Prion Diseases (John Collinge).**

Introduction to Prions and Historical Perspective.
Structural Biology of Prions.
Normal Cellular Function of PrP.
Prion Strains.
Neuronal Cell Death in Prion Disease.
The ‘Species Barrier’.
Pathogenesis.
Animal Prion Diseases.
Aetiology and Epidemiology of Human Prion Disease.
Clinical Features and Diagnosis.
Molecular Diagnosis of Prion Disease.
Pre-symptomatic and Antenatal Testing.
Prevention and Public Health Management.
Prognosis and Treatment.
Concluding Remarks.
Useful Websites.

Index.