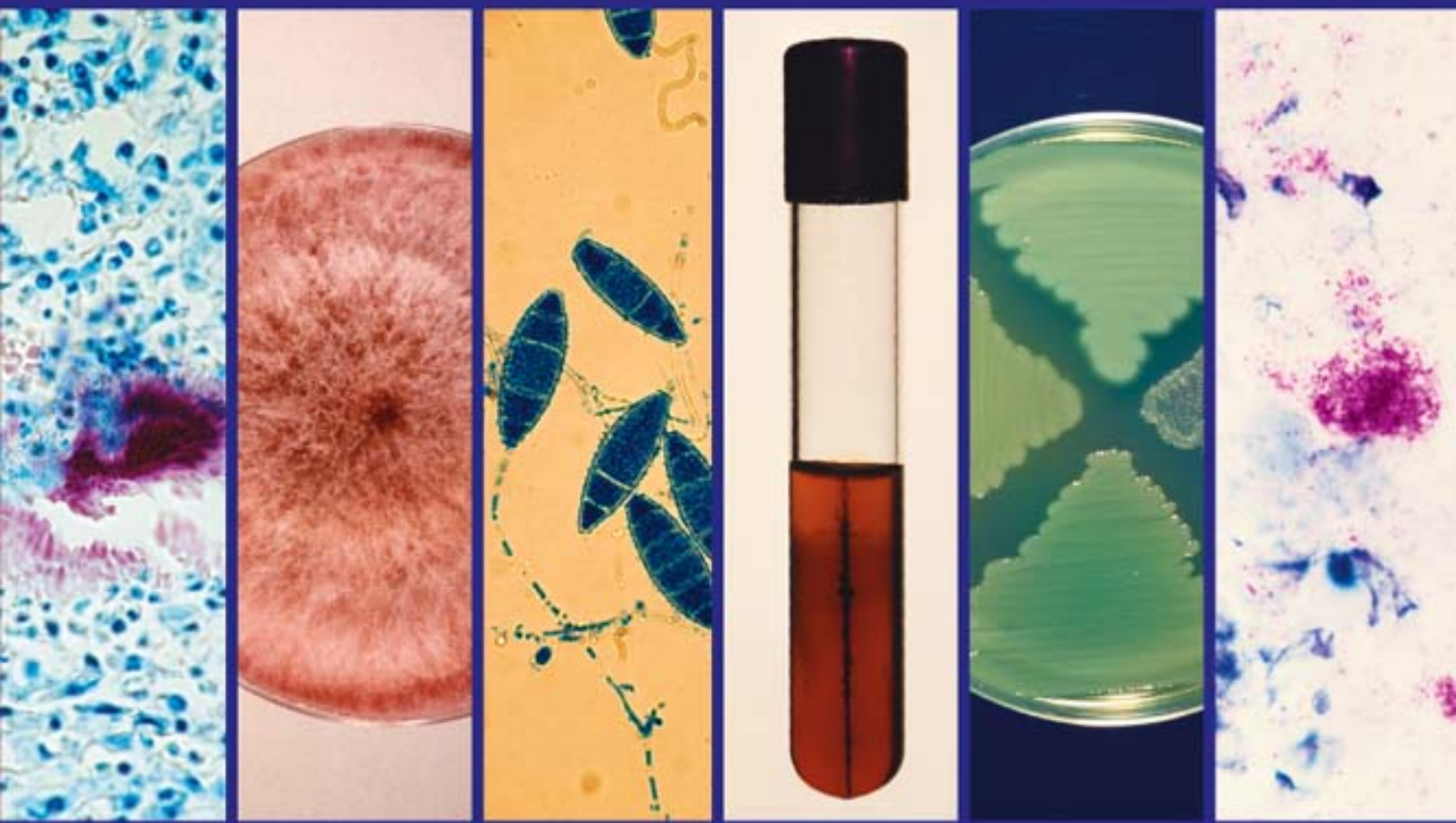


Veterinary Microbiology and Microbial Disease

P J Quinn
B K Markey
F C Leonard
E S FitzPatrick
S Fanning
P J Hartigan

Second Edition



Contents

Preface

Acknowledgements

Author biographies

Section I Introduction to Microbiology Infection Immunity and Molecular Diagnostic Methods

*1 Microbiology microbial pathogens
and infectious disease*

Further reading

*2 Subdivisions classification and
morphological characterization of
infectious agents*

Microscopical techniques

Pathogenic microorganisms

Biological classification and nomenclature

References

Further reading

3 Infection and immunity

Normal flora

Comparative aspects of innate and adaptive immunity

Recognition of pathogens

Cells involved in innate immune responses

Complement

Adaptive immunity

Immunity to bacteria

Immunity to fungi

Immunity to viruses

Concluding comments

References

Further reading

4 Immunodeficiency diseases

Severe combined immunodeficiency diseases

Thymic aplasia or hypoplasia

Wiskott-Aldrich syndrome

Primary immunodeficiency diseases involving B lymphocytes

Secondary immunodeficiency

Further reading

5 Vaccines and vaccination

Vaccination

Inactivated vaccines

Live attenuated vaccines

Vaccines produced by recombinant nucleic acid technology

Synthetic peptide vaccines

DNA vaccines

Reverse vaccinology

Adjuvants

Administration of vaccines

Adverse reactions following vaccination

Vaccination failure

References

Further reading

6 Molecular diagnostic methods

Analytical properties of nucleic acid

Molecular hybridization

DNA sequencing

Polymerase chain reaction (PCR)

Real-time PCR

Diagnostic approaches to surveillance and subtyping of bacteria a comparison of phenotyping and genotyping methods

Molecular subtyping for definitive identification of bacteria

Plasmid profiling

Restriction endonuclease analysis (REA)

Ribotyping

Pulsed-field gel electrophoresis (PFGE)

PCR-based subtyping methods

Multilocus sequence typing (MLST)

DNA microarray technology

Whole bacterial genome sequencing

References

Further reading

Section II Introductory Bacteriology.

7 The structure of bacterial cells

Capsule

Cell wall

Cytoplasmic membrane

Cytoplasm

Ribosomes

Nuclear material

Flagella

Pili

Biofilms

Protein secretion systems

Endospores

Reference

Further reading

8 Cultivation preservation and inactivation of bacteria

Bacterial growth

Bacterial nutrition

*Physical and chemical factors which
influence growth*

[Preservation of microorganisms](#)
[Physical methods for inactivating microorganisms](#)
[Biosafety cabinets](#)
[Reference](#)
[Further reading](#)

[9 Bacterial genetics mechanisms of genetic variation and gene databases](#)

[Replication of bacterial DNA](#)
[Transcription and translation the expression of genetic information](#)
[Mechanisms contributing to genetic variation](#)
[Examples of mobile genetic elements](#)
[Genetic engineering of bacteria in the laboratory](#)
[Genetic databases and bioinformatics](#)
[Further reading](#)

[10 Laboratory diagnosis of bacterial disease](#)

[Selection collection and transportation of specimens](#)
[Identification of pathogenic bacteria](#)
[Serology](#)
[Further reading](#)

[11 Antibacterial agents](#)

Development of chemotherapy for bacterial infections

Mode and site of action

Combined antibacterial therapy

Factors influencing a antibacterial activity

Further reading

12 Antibacterial resistance

Resistance mechanisms

Multiple drug resistance

Strategies for limiting a antibacterial resistance

Antibacterial susceptibility testing

References

Further reading

13 Bacterial colonization tissue invasion and clinical disease

Commensals

Pathogens

Colonization and growth

Pathogen-host interactions

Virulence factors

Responses of the host to bacterial pathogens

The clinical spectrum of bacterial disease

References

Section III Pathogenic Bacteria

14 Staphylococcus species

Usual habitat

Differentiation of Staphylococcus species

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

15 Streptococci

Usual habitat

Differentiation of the streptococci

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

16 Actinobacteria

Actinomyces Arcanobacterium and Actinobaculum species

Nocardia species

Dermatophilus congolensis

Crossiella equi

References

Further reading

17 Corynebacterium species

Usual habitat

Differentiation of the corynebacteria

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

18 Rhodococcus equi

Usual habitat

Clinical infections

References

Further reading

19 Listeria species

Usual habitat

Differentiation of Listeria species

Pathogenesis and pathogenicity

Clinical infections

References

Further reading

20 Erysipelothrix rhusiopathiae

Usual habitat

Definitive identification of Erysipelothrix rhusiopathiae

Pathogenesis and pathogenicity

Clinical infections

References

Further reading

21 Bacillus species

Usual habitat

Differentiation of Bacillus species

Clinical infections

Infections with Bacillus licheniformis

References

Further reading

22 Clostridium species

Usual habitat

Specimen collection and cultural requirements

Detection and differentiation of clostridia

Clinical conditions caused by neurotoxic clostridia

Clinical conditions caused by histotoxic clostridia

Enteropathogenic and enterotoxaemia-producing clostridia

References

Further reading

23 Mycobacterium species

Usual habitat

Differentiation of pathogenic mycobacteria

Clinical infections

References

Further reading

24 Enterobacteriaceae

Usual habitat

Differentiation of the Enterobacteriaceae

Escherichia coli

Salmonella serotypes

Yersinia species

Opportunistic pathogens

References

Further reading

25 Pseudomonas aeruginosa and Burkholderia species

Usual habitat

Differentiation of Pseudomonas and Burkholderia species

Clinical infections

References

Further reading

26 Actinobacillus species

Usual habitat

Differentiation of Actinobacillus species

Pathogenesis and pathogenicity

Clinical infections

References

Further reading

27 Pasteurella species Mannheimia haemolytica and Bibersteinia

trehalosi

Usual habitat

Differentiation of Pasteurella Bibersteinia and Mannheimia species

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

28 Francisella tularensis

Usual habitat

Epidemiology

Clinical infections

References

29 Histophilus somni Haemophilus parasuis and Avibacterium paragallinarum

Usual habitat

Differentiation of Histophilus somni

Haemophilus parasuis and Avibacterium paragallinarum

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

30 Taylorella species

Usual habitat

Clinical infections

References

Further reading

31 Bordetella species

Usual habitat

Differentiation of Bordetella bronchiseptica and B. avium

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

32 Moraxella species

Moraxella bovis

References

33 Brucella species

Usual habitat

Differentiation of Brucella species

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

34 Campylobacter and Helicobacter species

Campylobacter species

Helicobacter species

References

Further reading

35 Lawsonia intracellularis

Usual habitat

Pathogenesis and pathogenicity

Clinical signs

Diagnosis

Treatment and control

References

Further reading

36 Spirochaetes

Leptospira species

Borrelia species

Brachyspira and Treponema species

References

Further reading

37 Pathogenic anaerobic non-spore-forming Gram-negative bacteria

Usual habitat

Diagnostic procedures

Differentiation of the non-spore-forming Gram-negative anaerobes

Pathogenesis and pathogenicity

Clinical infections

References

Further reading

38 Mycoplasmas

Usual habitat

Differentiation of the mycoplasmas

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

39 Chlamydia and Chlamydophila species

Usual habitat

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

40 Rickettsiales and Coxiella burnetii

Epidemiology

Pathogenesis and pathogenicity

Recognition and differentiation of members of the Rickettsiales

Clinical infections

References

Further reading

41 Bacterial species of limited pathogenic significance

Acinetobacter species

Bartonella species

Aeromonas species Plesiomonas shigelloides and Vibrio species

Chromobacterium violaceum

Ornithobacterium rhinotracheale

Riemerella anatipestifer

Streptobacillus moniliformis

References

Section IV Mycology.

42 General features of fungi associated with disease in animals

Structure

Growth reproduction and colonial formation

General features of fungal disease

Diagnosis of fungal diseases

Differentiation of fungal species

Antifungal chemotherapy

References

Further reading

43 Dermatophytes

Usual habitat

Laboratory recognition and differentiation

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

44 Aspergillus species

Usual habitat

Recognition of Aspergillus species

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

45 Yeasts and disease production

Candida species

Cryptococcus species

Malassezia pachydermatis

*'Megabacteria' (Macrorhabdus
ornithogaster)*

Trichosporon beigeli

Geotrichum candidum

References

Further reading

46 Dimorphic fungi

Blastomyces dermatitidis

Histoplasma capsulatum

Coccidioides species

Sporothrix schenckii

References

Further reading

47 Zygomycetes of veterinary importance

Mucorales and Mortierellales

Entomophthorales

References

Further reading

48 Fungus-like organisms of veterinary importance

Pythium insidiosum

Rhinosporidium seeberi

Lacazia loboi

References

Further reading

49 Pneumocystis carinii

Usual habitat

Pathogenesis and pathogenicity

Diagnostic procedures

Clinical infections

References

Further reading

50 Opportunistic infections caused predominantly by phaeoid fungi

Usual habitat

Clinical infections

Diagnosis

Treatment

References

Further reading

51 Mycotoxins and mycotoxicoses

Aflatoxicosis

Citrinin toxicosis

Cyclopiazonic acid toxicosis

Diplodiosis

Ergotism

Facial eczema

Fescue toxicosis

Fumonisin toxicoses

Mouldy sweet potato toxicity

Mycotoxic lupinosis

Ochratoxicosis

Mycotoxic oestrogenism

Patulin toxicosis

Slaframine toxicosis

Sterigmatocystin toxicosis

Tremorgen intoxications

Trichothecene toxicoses

References

Further reading

52 Pathogenic algae and cyanobacteria

Prototheca species

Chlorella species

The cyanobacteria

References

Further reading

53 Antifungal chemotherapy

Antifungal drugs

Resistance to antifungal drugs

References

Further reading

Section V Introductory Virology

54 Nature structure and taxonomy of viruses

The origin of viruses

Structure of viruses

Taxonomy of viruses

References

Further reading

55 Replication of viruses

Replication of DNA viruses

Replication of RNA viruses

Protein synthesis

Assembly and release of virions

References

Further reading

56 Genetics and evolution of viruses

Mutation

Viral recombination

Viral genomic sequence analysis

Evolution of viruses

References

Further reading

57 Propagation of viruses and virus-cell interactions

Propagation of viruses

Determination of virus concentration

Virus-host cell interactions

Further reading

58 Pathogenesis of viral diseases

Routes of infection

Dissemination in the host

Clinical signs

Virus shedding and patterns of infection

Further reading

59 Laboratory diagnosis of viral infections

Collection preservation and transportation of samples

Detection of virus viral antigens or nucleic acid

Diagnostic serology

Interpretation of test results

Further reading

60 Antiviral chemotherapy

Introduction

Development of antiviral drugs

Viral infections and strategies for interrupting virus replication

Immunomodulators

Ion channel blocking compounds

Neuraminidase inhibitors

Antiviral drugs which inhibit viral genome replication

Antiretroviral drugs

Resistance to antiviral drugs

Future developments

References

Further reading

Section VI Viruses and Prions

61 Herpesviridae

Clinical infections

References

Further reading

62 Papillomaviridae

Clinical infections

References

Further reading

63 Adenoviridae

Clinical infections

References

Further reading

64 Poxviridae

Clinical infections

References

Further reading

65 Asfarviridae

Africans wine fever

References

Further reading

66 Parvoviridae

Clinical infections

References

Further reading

67 Circoviridae

Clinical infections

[*References*](#)

[*Further reading*](#)

[**68 Retroviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**69 Reoviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**70 Birnaviridae**](#)

[*Clinical infections*](#)

[*Further reading*](#)

[**71 Orthomyxoviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**72 Paramyxoviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**73 Rhabdoviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**74 Bornaviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**75 Bunyaviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**76 Picornaviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[**77 Caliciviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[*Further reading*](#)

[**78 Astroviridae**](#)

[*Clinical infections*](#)

[*References*](#)

[**79 Coronaviridae**](#)

[*Clinical infections*](#)

[*References*](#)

Further reading

80 Arteriviridae

Clinical infections

References

Further reading

81 Flaviviridae

Clinical infections

References

Further reading

82 Togaviridae

Clinical infections

References

Further reading

83 Prions: unconventional infectious agents

Clinical infections

References

Further reading

Section VII Microbial Agents and Disease Production

84 Tissue and system preferences of bacterial fungal and viral pathogens

**and the nature of the diseases
caused by these infectious agents**

References

Further reading

**85 Interactions of microbial
pathogens with the nervous system**

Haematogenous bacterial infections

Haematogenous viral infections

Infection via peripheral nerves

Infections with lentiviruses

**Viral infections which cause developmental
anomalies**

**Transmissible spongiform encephalopathies
(TSEs)**

Algal bacterial and fungal neurotoxicity

Algal and fungal infections

Further reading

**86 Interactions of microbial
pathogens with the male and female
reproductive systems**

Infections of the male reproductive system

Infections of the non pregnant uterus

Infections of the pregnant uterus

Further reading

87 The role of microbial pathogens in intestinal disease

Intestinal structure and function

Normal flora

Pathogenetic mechanisms in enteritis

Further reading

88 The role of microbial pathogens in respiratory disease

Defence mechanisms in the conducting airways

Defence mechanisms in the lungs

Microbial diseases of the conducting airways

Microbial diseases of the lungs

References

Further reading

89 Interactions of microbial pathogens with the renal system

Ascending infection of the excretory pathway

Structure and function of the excretory passages

Virulence factors of uropathogens

Responses of the host to ascending bacterial infection of the excretory pathway

Infectious diseases of the kidneys

References

90 Microbial diseases of the cardiovascular system

The heart: structural and functional relationships

Infections of the heart

Infections of the vascular channels

References

91 Interactions of microbial pathogens with the musculoskeletal system

Responses of muscle to microbial pathogens

Distinctive structural features of skeletal muscle

Responses of muscle to injury

Responses of muscle to bacterial infection

Responses of bone to microbial pathogens

Responses of joints to microbial pathogens

Foot infections of cattle sheep and pigs associated with microbial agents

References

92 The role of microbial pathogens in diseases of the integumentary system

Structural and functional perspectives

Responses of the skin to microorganisms

Bacterial diseases of skin

Viral diseases of skin

Fungal diseases of skin

References

93 Bacterial causes of bovine mastitis

Mammary gland defence mechanisms

Contagious mastitis

Environmental mastitis

Diagnosis

Treatment

Prevention and control

References

94 Disinfection biosecurity and other aspects of disease control

Survival of infectious agents in the environment

Transmission of infectious agents

Biosecurity

Animals

Feed

Water

Environment of domestic animals

Vehicular and pedestrian traffic

Equipment

Animal waste

Wild mammals and birds

Cleaning and disinfection of farm buildings