

CONTENTS

1. Prokaryotic Microorganisms

1—32

Metabolic Diversity, Anaerobic Chemotrophs, Anoxygenic Phototrophs, Oxygenic Phototrophs, Aerobic Chemolithotrophs, Aerobic Chemoorganotrophs, Ecophysiology, Thriving in Terrestrial Environments, Thriving in Aquatic Environments, Animals as Habitats, Archaea that Thrive in Extreme Conditions.

2. Eukaryotic Microorganisms

33—60

Algae, Classification of Algae, Algal Habitats, Structure of Algae, Algal Reproduction, Paralytic Shellfish Poisoning, Protozoa, Classification of Protozoa, Protozoan Habitats, Structure of Protozoa, Protozoan Reproduction, Protozoa and Human Disease, Fungi, Classification of Fungi, Fungal Habitats, Fungal Disease in Humans, Symbiotic Relationships Between Fungi and other Organisms, Economic Importance of Fungi, Slime Molds and Water Molds, Acellular and Cellular Slime Molds, Oomycetes (Water Molds), Multicellular Parasites: Arthropods and Helminths. Arthropods, Helminths.

3. Bacterial Taxonomy

61—83

Species : The Units of Classification, Characterization of Species, Naming of Species, Problems of Taxonomic Arrangement, Phylogenetic Approach to Taxonomy, Numerical Taxonomy, New Approaches to Bacterial Taxonomy, Base Composition of DNA: Its Determination and Significance, Taxonomic Implications of DNA Base Composition, Nucleic Acid Hybridization, Techniques and Interpretations of Reassociation Experiments, Nucleic Acid

Sequencing, DNA Sequencing, RNA Fingerprinting and Sequencing, Bacterial Phylogeny, Primary Division of Cellular Organisms, Constituent Groups of Archaeobacteria, Constituent Groups of Eubacteria, Taxonomic Implications of Bacterial Phylogeny.

4. Structure of Bacteria

84—94

Molecular Structure of Flagella and Pili, Basal Structure of the Flagellum, Synthesis of the Flagellar Filament, Mechanisms of Flagellar Movement, Chemotactic Behaviour of Motile Bacteria, Special Prokaryotic Organelles, Gas Vesicles and Gas Vacuoles, Chlorosomes, Carboxysomes (Polyhedral Bodies), Magnetosomes, Isolation of Bacterial Nuclei.

5. Archaeobacteria

95—106

Archaeobacterial Cell Walls, Archaeobacterial Lipids and Membranes, Genetics and Molecular Biology, Metabolism, Archaeobacterial Taxonomy, Methanogenic Archaeobacteria, Archaeobacterial Sulfate Reducers, Extremely Halophilic Archaeobacteria, Cell Wall-less Archaeobacteria, Extremely Thermophilic S_0 -Metabolizers.

6. Viruses

107—113

Discovery of Viruses, Classification of Viruses, Viral Replication Cycle, Entry of Viruses into Host Cells, Replication of Chromosomes of RNA Viruses, Induction, Lysogenic Conversion, Viroids, Prions.

7. Infectious Agents of Animals and Plants

114—146

Structure and Classification of Animal Viruses, Classification of Animal Viruses, Grouping Based on Routes of Transmission, Methods used to Study Viruses, Cultivation of Host Cells, Quantitation, Interactions of Animal Viruses with their Hosts, Acute Infections, Persistent Infections, Virus-Induced Tumours—General Aspects, Viruses and Animal Tumours, Tumour Viruses and Cell Transformation, How Retroviruses Transform Animal Cells, Viruses and Human Tumours, Retroviruses and Human Tumours, Viral Host Range, Exchange of Protein Coats—Phenotypic Mixing, Genome Exchange in Segmented Viruses, Plant Viruses, Spread of Plant Viruses, Insect Transmission of Plant Viruses, Other Infectious Agents, Prions, Viroids.

8. Fungal Microbiology

147—155

Distribution, Importance, Structure, Nutrition and Metabolism, Reproduction, Characteristics of the Fungal Divisions, Division

Zygomycota, Division Ascomycota, Division Basidiomycota, Division Deuteromycota, Slime Molds and Water Molds, Division Myxomycota, Division Acrasiomycota, Division Oomycota.

9. Protozoal Diseases

156—169

Malaria, Disease Caused by Leishmanias, Diseases Caused by Trypanosomes, Amebic Dysentery, Giardiasis, Trichomoniasis, Toxoplasmosis, Pneumocystis Pneumonia, Viral Diseases, Diseases Caused by Herpesviruses, Diseases Caused by Poxviruses, Serum Hepatitis, Diseases Caused by Picornaviruses, Influenza, Measles, Mumps, and Rubella, Rabies, Disease Caused by Rotaviruses, Diseases Caused by Togaviruses, Diseases Caused by Retroviruses.

10. Regulation

170—199

Type of Control Mechanisms, Coordination of Control Mechanisms: Synthesis of an Amino Acid, Coordination of Control Mechanisms: Synthesis of Ribosomes, Mechanisms of End-product Inhibition: Allosteric Proteins, Mechanisms of Control of Transcription, Transcription Control: DNA-binding Proteins, Transcription Control: Attenuation, Transcription Control: Multiple Sigma Factors, Control of Translation, Post Translational Control, Alteration of Gene Structure, Patterns of Regulation, End-Product Inhibition in Branched Pathways, Enzyme Repression in Branched Biosynthetic Pathways, Examples of Regulation of Complex Pathways, Diversity of Bacterial Regulatory Mechanisms, Regulation of DNA Synthesis and Cell Division.

11. Symbiosis

200—230

Types of Symbiosis, Mutualistic Symbioses, Parasitic Symbioses, Parasitism as an Aspect of Ecology, Functions of Symbiosis, Protection, Provision of a Favourable Position, Provisions of Recognition Devices, Nutrition, Establishment of Symbioses, Direct Transmission, Reinfection, Evolution of Symbioses, Symbiotic Associations between Photosynthetic and Nonphotosynthetic Partners, Symbioses in which the Photosynthetic Partner is a Higher Plant, Rhizosphere, Mycorrhizas, Symbioses in which the Photosynthetic Partner is a Microorganisms, Endosymbionts of Protozoa, Symbioses with Fungi: The Lichens, Endosymbioses of Algae with Aquatic Invertebrates, Symbiotic Associations between Two Nonphotosynthetic Partners, Symbioses in which both Partners are Microorganisms, Bacterial Endosymbionts of Protozoa, Symbioses between Microorganisms and Metazoan Hosts,

Ectosymbioses of Protozoa with Insects: The Intestinal Flagellates of Wood-Eating Termites and Roaches, Endosymbioses of Fungi and Bacteria with Insects, Ruminant Symbiosis.

12. Antimicrobial Chemotherapy **231—259**

Development of Chemotherapy, General Characteristics of Antimicrobial Drugs, Determining the Level of Antimicrobial Activity, Dilution Susceptibility Tests, Disk Diffusion Tests, Etest, Measurement of Drug Concentration in the Blood, Mechanisms of Action of Antimicrobial Agents, Factors Influencing the Effectiveness of Antimicrobial Drugs, Antibacterial Drugs, Sulfonamides or Sulfa Drugs, Quinolones, Penicillins, Cephalosporins, Tetracyclines, Aminoglycoside Antibiotics, Erythromycin and other Macrolides, Vancomycin and Teicoplanin, Chloramphenicol, Drug Resistance, Mechanisms of Drug Resistance, Origin and Transmission of Drug Resistance, Antifungal Drugs, Antiviral Drugs.

13. Yeast in Industries **260—276**

Transformation, Procedures, Genetic Markers for Yeast Transformation, Yeast Cloning Vectors, Integrating Vectors, Extrachromosomally-Replicating Vectors, DNA Cloning in Yeast Plasmids, DNA Cloning in Yeast Cosmids, Fusion Plasmids, Vectors for High Level Gene Expression, Industrial Applications.

14. Fermentation Techniques **277—294**

Growth Cycle, Lag Phase, Exponential Phase, Stationary Phase and Cell Death, Maintenance and Survival, Diauxic Growth, Growth Yield, Fermentation Balance, Carbon Balance, Redox Balance, Efficiency of Central Metabolism.

Index **295—307**