

Advances in

VIRUS RESEARCH

Edited by

KARL MARAMOROSCH

Department of Entomology
Rutgers University
New Brunswick, New Jersey

FREDERICK A. MURPHY

School of Veterinary Medicine
University of California, Davis
Davis, California

AARON J. SHATKIN

Center for Advanced Biotechnology and Medicine
Piscataway, New Jersey

VOLUME 44



ACADEMIC PRESS

San Diego New York Boston
London Sydney Tokyo Toronto

CONTENTS

Pararetroviruses and Retroviruses: A Comparative Review of Viral Structure and Gene Expression Strategies

HELEN M. ROTHNIE, YVAN CHAPDELAINE, AND THOMAS HOHN

I.	Introduction	1
II.	Viral Genomes	6
III.	Promoters and Transcripts	17
IV.	RNA 3' End Formation	26
V.	Translation	33
VI.	Virus Structure and Assembly	45
VII.	Concluding Remarks	55
	References	57

Molecular Biology of Rubella Virus

TERYL K. FREY

I.	Introduction	69
II.	Current Medical Significance	70
III.	Togavirus Taxonomy Revisited	76
IV.	Virion Structure	78
V.	Genomic RNA: Structure, Sequence, and Coding Strategy	95
VI.	Virus Replication Cycle	102
VII.	Rubella Virus and Togavirus Evolution	140
VIII.	Future Directions	148
	References	150

Rotaviruses: Immunologic Determinants of Protection against Infection and Disease

PAUL A. OFFIT

I.	Introduction	161
II.	Rotavirus Structure	162
III.	Immune Response in Experimental Animals	163
IV.	Immune Response in Infants and Young Children	174
V.	Summary	185
VI.	Future Directions	187
	References	189

Human Immunodeficiency Virus Type 1 Associated CD4 Downmodulation**ROMAS GELEZIUNAS, STEPHANE BOUR, AND MARK A. WAINBERG**

I. Introduction	203
II. Retroviral Interference/Superinfection Immunity	207
III. Structure and Function of CD4 and p56 ^{lek}	212
IV. CD4 Downregulation HIV-1: Mechanisms and Viral Genes	230
V. Conclusion	246
References	247

Antisense Treatment of Viral Infection**J. LINDSAY WHITTON**

I. Introduction	268
II. Ribozymes	273
III. Classic Antisense Approaches	285
IV. Antisense in Living Organisms	292
V. Summary	294
References	294

**The Structure, Function, and Regulation of Papillomaviral Genes
in Infection and Cervical Cancer****LUBOMIR P. TUREK**

I. Introduction	306
II. History	307
III. Papillomaviral Genome Structure: Human Papillomavirus Type 16 and Bovine Papillomavirus Type 1	309
IV. Papillomaviral Replication: <i>E1</i> and <i>E2</i> Genes	311
V. Papillomaviral Transforming Genes: <i>E5</i> , <i>E7</i> , and <i>E6</i>	315
VI. Integration of Human Papillomaviral DNA Fragments in Cervical Carcinomas: Selective Preservation of <i>E6</i> and <i>E7</i> , Disruption of <i>E2</i> and/or <i>E1</i> Genes	325
VII. Regulation of Papillomaviral Gene Expression by Cellular Transcription Factors	327
VIII. Regulation of Papillomaviral Gene Expression by Viral Gene Products	337
IX. Papillomaviral Gene Regulation in Active Infection, Latency, and Cervical Cancer: A Recapitulation	344
X. Conclusions	347
References	348

Equine Herpesviruses 2 and 5: Comparisons with Other Members of the Subfamily Gammaherpesvirinae

CATHERINE T. AGIUS AND MICHAEL J. STUDDERT

I.	Introduction	357
II.	Gammaherpesviruses and Their Genome Compositions	360
III.	Identification of EHV2 and EHV5 as Gammaherpesviruses	361
IV.	Molecular Biology of EHV2 and EHV5	361
V.	Heterogeneity of EHV2 Isolates and Identification of EHV5 as a New Equine Herpesvirus	364
VI.	Characteristics of Growth of EHV2 in Cell Culture	365
VII.	Pathogenesis and Clinical Features of EHV2 and EHV5 Infections and Comparisons with Other Gammaherpesviruses	368
VIII.	Epidemiology of EHV2 and EHV5	371
IX.	Concluding Remarks	372
	References	373

The Molecular Biology of Tombusviridae

MARCELLO RUSSO, JÓZSEF BURGYAN, AND GIOVANNI P. MARTELLI

I.	Introduction	382
II.	Taxonomic Structure of Family Tombusviridae	382
III.	Virus Particle Structure	383
IV.	Genome Organization	385
V.	Genome Expression	389
VI.	Function of Virus-Coded Proteins	391
VII.	Defective Interfering RNAs	401
VIII.	Satellite RNAs	410
IX.	Replication	414
X.	Transgenic Plants	416
XI.	Related Genera	419
XII.	Concluding Remarks	422
	References	424

SpV1 and SpV4, Spiroplasma Viruses with Circular Single-Stranded DNA Genomes, and Their Contribution to the Molecular Biology of Spiroplasmas

J. RENAUDIN AND J. M. BOVE

I.	Introduction	429
II.	Spiroplasma Virus SpV4	432
III.	Spiroplasma Virus SpV1	443
IV.	Conclusion	456
	References	458

INDEX	465
-------------	-----