

Index

- A**
- ALIX, 59, 64, 90
- ApoE, 136
- ATF-4, 105

- B**
- Bat, evolution of hepatoviruses and hepeviruses, 123, 125–126

- C**
- Capsid, hepatitis A virus
 - epitopes, 91–93
 - structure
 - overview, 83–87
 - pentamer boundary structure, 87
 - symmetry, 84
 - uncoating, 88–90
- CD9, 60
- CD63, 60
- CDK. *See* Cyclin-dependent kinase
- Chicken models, hepatitis E virus, 170–171, 211
- Chimpanzee. *See* Nonhuman primate models
- CHMP1A, 59
- CHMP1B, 59
- CHMP2A, 64
- CHMP4, 64
- CHMP4B, 59
- CHOP, 105
- Cricket paralysis virus (CrPV), 87
- CrPV. *See* Cricket paralysis virus
- CXCL10, hepatitis A immunopathogenesis, 284–285
- Cyclin-dependent kinase (CDK), 105
- CypA, 135

- D**
- DPP4, 59

- E**
- EGFR. *See* Epidermal growth factor receptor
- eIF2 α , 105
- Epidemiology
 - hepatitis A virus
 - globalization
 - international food trade, 220–221
 - international travel, 221–222
 - predictions, 222–225
 - overview, 4, 217–219, 230–232
 - risk factors, 219–220
 - transmission
 - parenteral transmission, 234
 - United States, 233–234
- hepatitis E virus
 - genotype distributions, 244
 - geographical distribution of gt3 and gt4
 - Africa, 267
 - Asia, 267–268
 - Europe, 265–266
 - Latin America, 267
 - North America, 266–267
 - Pacific region, 267
 - gt1
 - epidemics, 245–248
 - global burden, 245
 - risk factors, 248–251
 - gt2
 - epidemics, 248
 - global burden, 245
 - risk factors, 248–251
 - overview, 229–230, 234–236
 - pregnancy, 251–252
 - race and susceptibility, 251
 - tools for study
 - antigen detection, 260
 - overview, 258–259
 - RNA characterization, 260
 - serology, 259–260
 - transmission
 - enteric foodborne transmission, 261–262
 - gt3 and gt4, 260–265
 - maternal transmission, 265
 - nosocomial transmission, 265
 - organ transplant, 264
 - parenteral transmission, 238, 262–264
 - prevention, 268–270
 - United States, 236–237
 - waterborne transmission, 262
 - zoonotic transmission, 237, 262
- Epidermal growth factor receptor (EGFR), 106
- Epitopes
 - hepatitis A virus, 91–93
 - hepatitis E virus neutralizing epitopes, 380
- ESCRT, hepatitis A virus interactions, 63–64, 90

- F**
- Ferret models, hepatitis E virus, 165–168
- FMDV. *See* Foot-and-mouth disease virus
- Foot-and-mouth disease virus (FMDV), 85

Index

G

Genome

- genetic diversity, 30–32, 42–43, 46–48, 118–121, 164
- hepatitis A virus
 - composition and codon usage, 72–73, 76, 120–121
 - hot spot variability, 121
 - structure and organization, 55, 57
- hepatitis E virus
 - cloning and sequencing, 29–30
 - hot spot variability, 121
 - organization, 99–100
 - translation elongation rate, 73–75, 77

Gerbil models, hepatitis E virus, 168–169

GRP-78, 105

Guinea pig models, hepatitis A virus histopathology, 205–206

H

HAV. *See* Hepatitis A virus

HAVCR1, 60, 155

HCV. *See* Hepatitis C virus

Hecolin. *See* Vaccine

Helicase, hepatitis E virus, 104

Hematopoietic stem cell, hepatitis E virus screening, 269–270

Hepatitis A virus (HAV)

animal models. *See* Guinea pig models; Mouse models; Nonhuman primate models

capsid. *See* Capsid

cell culture propagation, 54–55

cell-mediated immunity. *See* *specific cells*

classification, 37–38, 115

clinical manifestations of acute infection

complications, 279–280

extrahepatic manifestations, 281–282

laboratory findings, 279

liver failure, 280–281

management, 282

signs and symptoms, 278–279

diversity and genotypes, 40–42, 118–121, 198

epidemiology. *See* Epidemiology

genome. *See* Genome

genotype distributions, 41–42

genotypes, 116

histopathology. *See* Histopathology

history of study

animal studies, 11

Feinstone's recollections, 14–20

overview, 1–2, 9–11

serologic studies, 11–13

immune response. *See* Humoral immunity; *specific cells*

innate immunity, 320–327, 330–331

natural history, 277–278

pathogenesis. *See* Pathogenesis

phylogeny and sequence divergence, 39

polyprotein processing, 56, 58

recombination and evolution, 121–124

stability, 85

vaccination. *See* Vaccine

virion. *See* Virion

Hepatitis B, history of study, 1–2, 24

Hepatitis C virus (HCV)

chimpanzee infection comparison with

hepatitis A virus infection, 188–190

hepatitis E virus infection, 187–188

history of study, 2, 4

mouse models, 144–145

Hepatitis E virus (HEV)

animal models. *See* Chicken models; Ferret models; Gerbil models; Mouse models; Nonhuman primate models; Pig models; Rabbit models; Rat models; Tree shrew models

animal reservoirs, 117–118, 131

cell culture models. *See also* Stem cell–derived hepatocyte-like cell, hepatocyte E propagation

hepatoma cells, 132–133

overview, 132

primary hepatocytes, 133, 137

cell-mediated immunity. *See* *specific cells*

classification, 37–38, 42–43, 98–99

clinical manifestations of infection

gt1 and gt2

acute icteric hepatitis, 292–293

acute liver failure, 294

anicteric hepatitis, 294–295

hematological involvement, 296

neonates, 296

neurological involvement, 295

pancreatitis, 295

pregnancy, 296

prolonged cholestasis, 207

superinfection, 296–297

gt3 and gt4

elderly, 310–311

neurological manifestations, 312–313

normal individuals, 309–310

renal injuries, 313

transplant patients, 311–312

treatment, 313–314

overview, 244–245

codon usage, 120–121

epidemiology. *See* Epidemiology

genotype distributions, 46–47, 244

histopathology. *See* Histopathology

history of study, 2, 23–29

innate immunity, 327–331

natural history of gt1 and gt2 infection, 292

ORF1

helicase, 104

hypervariable region, 103–104

methyltransferase, 101

overview, 100–101

papain-like cysteine protease, 101, 103

RNA-dependent RNA polymerase, 104

X domain, 104

Y domain, 101

ORF2, 104–105

- ORF3, 105–106
- ORF4, 106
- persistence, 32–34
- recombination and evolution, 121–124
- replication. *See* Replication
- virion. *See* Virion
- Hepatitis virus*
 - genetic diversity, 116–117
 - species, 38, 40
- HEV. *See* Hepatitis E virus
- Histopathology
 - hepatitis A virus infection
 - guinea pig, 205–206
 - human acute infection, 198–200
 - mouse, 206–207
 - nonhuman primates
 - chimpanzee, 201
 - cynomolgus macaque, 201–203
 - marmoset, 204–205
 - owl monkey, 203–204
 - tamarin, 204–205
 - prospects for study, 211–212
 - hepatitis E virus infection
 - chicken, 211
 - human infection, 207–208
 - nonhuman primates
 - chimpanzee, 209
 - cynomolgus macaque, 209–210
 - marmoset, 210
 - overview, 208–209
 - owl monkey, 210
 - rhesus macaque, 210
 - pig, 211
 - prospects for study, 211–212
 - rabbit, 210–211
 - rodents, 211
- HPEV-1. *See* Human parechovirus-1
- HSC70, 107
- Hsp72, 105
- HSP90, 107
- Human parechovirus-1 (HPEV-1), 87
- Humoral immunity
 - hepatitis A virus
 - history of study, 336
 - kinetics and durability of antibody response, 337–338
 - neutralizing antibodies and evasion, 337, 339, 341–342
 - postexposure antibody therapy, 340–341
 - protection against infection, 339–340
 - hepatitis E virus
 - kinetics and durability of antibody response, 342–345
 - neutralizing antibodies and evasion, 345–347
 - overview, 342
 - postexposure antibody therapy, 3
 - protection against infection, 345–346
- HVR. *See* Hypervariable region
- Hypervariable region (HVR), hepatitis E virus, 103–104
- I**
 - IFIT2, 327
 - IG. *See* Immune globulin
 - IgM. *See* Immunoglobulin M
 - Immune globulin (IG), hepatitis A virus short-term protection, 361–362
 - Immunoglobulin M (IgM), hepatitis A immunopathogenesis, 284
 - IMPDH. *See* Inosine monophosphate dehydrogenase
 - Innate immunity
 - hepatitis A virus, 320–327, 330–331
 - hepatitis E virus, 327–331
 - Inosine monophosphate dehydrogenase (IMPDH), 314
 - Interferon
 - hepatitis A
 - innate immunity, 321–323, 326, 330
 - knockout mouse model, 145–146, 148–151
 - hepatitis E
 - innate immunity, 330
 - resistance in persistently infected cells, 328–330
 - hepatitis virus blocking in hepatocytes, 329–330
 - polymorphisms and infection outcome, 330
 - Internal ribosome entry site (IRES), hepatitis A virus, 61, 73–75
 - IRES. *See* Internal ribosome entry site
 - IRF3, 104, 152–153, 320, 326
 - IRF7, 152–153, 326
 - ISG15, 328
 - IST, 59
- J**
 - JNK, 106
- L**
 - Ljungan virus (LV), 86–87
 - LV. *See* Ljungan virus
- M**
 - Macaque. *See* Nonhuman primate models
 - Marmoset. *See* Nonhuman primate models
 - MAVS. *See* Mitochondrial antiviral signaling protein
 - MDA5, 151, 320
 - MERS. *See* Middle East respiratory syndrome
 - Methyltransferase, hepatitis E virus, 101
 - Middle East respiratory syndrome (MERS), 118
 - Mitochondrial antiviral signaling protein (MAVS), 40, 126, 151–153, 189, 323–324, 326
 - Mouse models
 - hepatitis A virus
 - Alb-uPA/SCID beige mice with chimeric human livers, 146–148
 - histopathology, 206–207
 - immune response
 - antibodies, 155–156
 - monocyte-derived suppressor cells, 156–157
 - overview, 155

Index

- Mouse models (*Continued*)
 T cells, 156
 infection route and transmission to naïve mice, 158
 interferon knockout, 145–146, 148–151
 MAVS-dependent pathogenesis, 151–154
 prospects for study, 159
 receptor usage, 154–155
 refinements, 158
 hepatitis E virus, 169–170
 overview, 144–146
Mycophenolic acid, hepatitis E management, 314
- N**
NEMO, 189
NF- κ B. *See* Nuclear factor κ B
NHP models. *See* Nonhuman primate models
NLRP3, 325–326
NLRs. *See* NOD-like receptors
NLRX1, 326
NOD-like receptors (NLRs), hepatitis A response, 325–326
Nonhuman primate (NHP) models
 chimpanzee hepatitis C virus infection comparison with
 hepatitis A virus infection, 188–190
 hepatitis E virus infection, 187–188
 hepatitis A virus
 cell culture-passaged and recombinant virus
 infections, 179–182
 chimpanzee infection, 175
 histopathology
 chimpanzee, 201
 cynomolgus macaque, 201–203
 marmoset, 204–205
 owl monkey, 203–204
 tamarin, 204–205
 historical perspective, 177–179
 vaccine development, 182
 hepatitis E virus
 histopathology
 chimpanzee, 209
 cynomolgus macaque, 209–210
 marmoset, 210
 overview, 208–209
 owl monkey, 210
 rhesus macaque, 210
 historical perspective, 183–185
 pathogenesis studies, 185–186
 vaccine development
 bacterially expressed ORF2 vaccines, 186
 baculovirus-expressed ORF2 immunogens,
 186–187
 DNA vaccines, 187
 overview, 175–176
Nuclear factor κ B (NF- κ B), 105, 320
- O**
Orthohepevirus, species, 43–44, 98
Owl monkey. *See* Nonhuman primate models
- P**
PAMP receptors, 73
Pancreatitis, hepatitis E virus, 295, 301–302
Papain-like cysteine protease (PCP), hepatitis E virus, 101,
 103, 328
Pathogenesis
 hepatitis A virus
 immunopathogenesis, 284–286
 liver injury, 283
 replication, 282
 hepatitis E virus
 gt1 and gt2 infection
 cell-mediated immunity, 300
 extrahepatic manifestations, 301–302
 humoral immunity, 299
 innate immunity, 299–300
 mutation and disease severity, 300
 overview, 297–299
 pregnancy, 300–301
 gt3 and gt4 infection, 308–309
PCP. *See* Papain-like cysteine protease
Pig models, hepatitis E virus histopathology, 211
PKR, 320, 326
Plasma, hepatitis E virus screening, 269
Pregnancy, hepatitis E, 251–252, 296, 300–301
PYST1, 106
- R**
R10 epitope, 91–93
Rab5, 107
Rab7, 107
Rabbit models, hepatitis E virus, 165, 210–211
Rat models, hepatitis E virus, 168
RCDI. *See* Relative codon deoptimization index
RdRp. *See* RNA-dependent RNA polymerase
Relative codon deoptimization index (RCDI), 73
Replication
 gut virus replication, 331
 hepatitis A virus
 cell entry, 60–61, 84
 genome uncoating, 61
 pathogenesis, 282
 protein translation, 61, 77–78
 quasi-envelope and egress, 63–65
 RNA synthesis, 61–62, 73–75, 77
 virion assembly, 62
 hepatitis E virus
 assembly and release, 108
 attachment and entry, 106–107
 RNA transcription and translation,
 107–108
Ribavirin, hepatitis E management, 252, 313–314
RIG-I, 103, 151, 320, 328
RIP1, 106
RNA-dependent RNA polymerase (RdRp), hepatitis E virus,
 104, 108
RNase L, 120

- S**
- SARS. *See* Severe acute respiratory syndrome
- Severe acute respiratory syndrome (SARS), 149
- Sofosbuvir, hepatitis E management, 314
- Stem cell–derived hepatocyte-like cell, hepatocyte E propagation
- adaptations to alter virus biology, 134–135
 - cell polarity effects on virus biology, 136–138
 - overview, 133–134
 - personalized models, 135–136
- T**
- Tamarin. *See* Nonhuman primate models
- TAP1, 189
- TBK-1, 103, 328
- T cell
- hepatitis A virus infection response
 - CD8 T-cell response, 348–349
 - chimpanzee, 190
 - immunopathogenesis
 - CD8 T cells, 284, 349
 - natural killer T cells, 284, 349–350
 - regulatory T cells, 285
 - mice, 156, 285–286
 - prospects for study, 353–355
 - hepatitis E virus infection response
 - CD8 T cells, 300, 352–353
 - helper T cells, 352–353
 - natural killer T cells, 299
 - prospects for study, 353–355
- TIM1, 60, 87, 155, 351
- TLRs. *See* Toll-like receptors
- Toll-like receptors (TLRs)
- hepatitis A response, 324–325
 - hepatitis E response, 328
 - liver, 320
- TRADD, 106
- TRAIL, 156
- Transmission. *See* Epidemiology
- Tree shrew models, hepatitis E virus, 169
- Triatoms virus (TrV), 87
- TRIF, 151, 189, 320, 324, 326
- TrV. *See* Triatoms virus
- TSG101, 105
- U**
- UpA, 120
- V**
- Vaccine
- hepatitis A virus
 - development in nonhuman primate models, 182
 - efficacy
 - assessment, 364–365
 - inactivated vaccines, 366
 - live attenuated vaccines, 367
 - postexposure prophylaxis, 367–368
 - immune globulin for short-term protection, 361–362
 - immunogenicity and immune memory
 - inactivated vaccines, 365–366
 - live attenuated vaccines, 366
 - overview, 4
 - strategies
 - populations at risk, 368
 - prospects, 372–373
 - regional childhood vaccination, 368
 - safety, 372
 - single-dose immunization, 369, 371
 - universal vaccination, 368–370
 - vaccine types, 362–364
- hepatitis E virus
- development in nonhuman primate models
 - bacterially expressed ORF2 vaccines, 186
 - baculovirus-expressed ORF2 immunogens, 186–187
 - DNA vaccines, 187
 - historical perspective, 378–379
 - HEV 239 vaccine (Hecolin)
 - clinical development, 384–387
 - preclinical studies, 383–384
 - regulatory approval, 387, 389–390
 - World Health Organization recommendations, 390–391
 - neutralizing epitopes, 380
 - overview, 377–378
 - prevention, 252, 270
 - prospects, 391
 - safety, 388–389
 - SAR-55 antigen vaccine
 - animal studies, 379–380
 - clinical development, 381–383
 - human immunity, 380–381
- Virion**
- hepatitis A virus
 - assembly, 62–63
 - structure
 - naked virion, 58–59
 - quasi-enveloped virion, 59–60
 - hepatitis E virus structure, 98
- X**
- X domain, hepatitis E virus, 104
- Y**
- Y domain, hepatitis E virus, 101
- Z**
- Zinc, deficiency in hepatitis E, 314

This is a free sample of content from Enteric Hepatitis Viruses.
[Click here](#) for more information on how to buy the book.