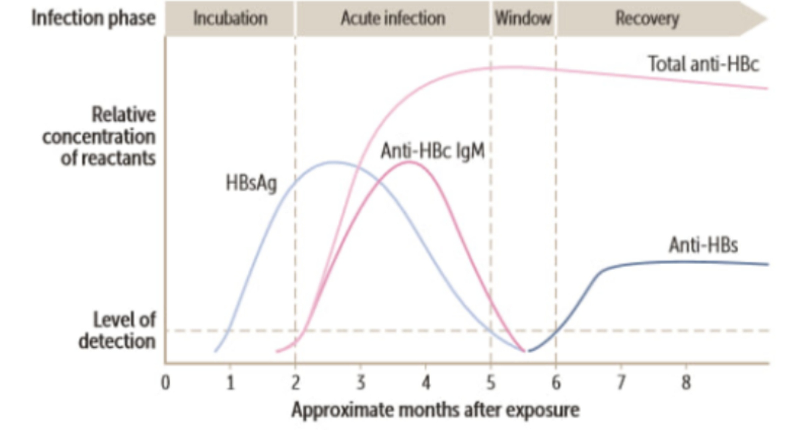
Hepatitis Viruses

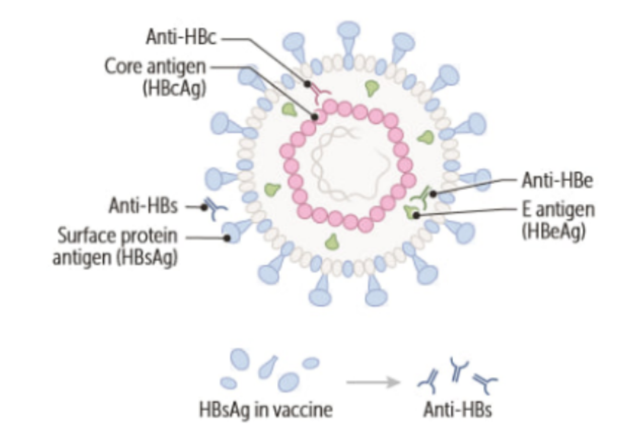
HAV

- **Classification:** Icosahedral nucleocapsid — Non-enveloped — Ss(+)-sense non-segmented — Picornoviridae — Hepatovirus A (hepatitis A)
- **Transmission:** Fecal-oral (shellfish, travelers, day care)
- **Incubation:** Short (weeks
- **Clinical course:** Acute and self limiting (adults), Asymptomatic (children
- **Prognosis:** Good
- **HCC risk:** No
- **Liver biopsy:** Hepatocyte swelling, monocyte infiltration, Councilman bodies
- **Notes:** Absent (no) carrier state
- **Diagnosis**
  - Anti-HAV (IgM) IgM antibody to HAV; best test to detect acute hepatitis A
  - Anti-HAV (IgG) IgG antibody indicates prior HAV infection and/or prior vaccination; protects against reinfection.

HBV

- **Classification:** Icosahedral nucleocapsid — Enveloped — Ds-circular — Hepatitis B
- **Transmission:** Parenteral (Blood), sexual (Bedroom), perinatal (Birthing)
- **Incubation:** Long (months
- **Clinical course:** Initially like serum sickness (fever, arthralgias, rash); may progress to carcinoma
- **Prognosis:** Adults mostly full resolution; neonates worse prognosis
- **HCC risk:** Yes
- **Liver biopsy:** Granular eosinophilic "ground glass" appearance due to accumulation of surface antigen within infected hepatocytes; cytotoxic T cells mediate damage
- **Notes:** Carrier state common
- **Diagnosis:**





	HBsAg	Anti-HBs	Anti-HBc	HBeAg	Anti-HBe
Incubation	+				
Acute infection	+		+ (IgM)	+	
Window			+ (IgM)		+
Recovery		+	+ (IgG)		+
Chronic infection (high infectivity)	+		+ (IgG)	+	
Chronic infection (low infectivity)	+		+ (IgG)		+
Immunized		+			

HBsAg ⟹ Antigen found on surface of HBV; indicates hepatitis B infection.
Anti-HBs ⟹ Antibody to HBsAg; indicates immunity to hepatitis B due to vaccination or recovery from infection.
HBcAg ⟹ Antigen associated with core of HBV.
Anti-HBc ⟹ Antibody to HBcAg; IgM = acute/recent infection; IgG = prior exposure or chronic infection. IgM anti-HBc may be the sole ⊕ marker of infection during window period.
HBeAg ⟹ Secreted by infected hepatocyte into circulation. Not part of mature HBV virion. Indicates active viral replication and therefore high transmissibility and poorer prognosis.
Anti-HBe ⟹ Antibody to HBeAg; indicates low transmissibility.

HCV

- **Classification:** Icosahedral nucleocapsid — Enveloped — Ss(+)-sense non-segmented — Flaviviridae — Hepatitis C
- **Transmission:** Primarily blood (injection drug use, posttransfusion)
- **Incubation:** Long
- **Clinical course:** May progress to Cirrhosis or Carcinoma
- **Prognosis:** Majority develop stable, Chronic hepatitis C
- **HCC risk:** Yes
- **Liver biopsy:** Lymphoid aggregates with focal areas of macrovesicular steatosis
- **Notes:** Carrier state very common

HDV

- **Classification:** RNA-viruses — Icosahedral nucleocapsid — Enveloped — Ss(-)sense circular — Deltavirus (hepatitis D)
- **Transmission:** Parenteral, sexual, perinatal
- **Incubation:** Superinfection (HDV after HBV) = short; Coinfection (HDV with HBV) = long
- **Clinical course:** Similar to HBV
- **Prognosis:** Superinfection-worse prognosis
- **HCC risk:** Yes
- **Liver biopsy:** Similar to HBV
- **Notes:** Defective virus, Depends on HBV HBsAg coat for entry into hepatocytes

HEV

- **Classification:** Icosahedral nucleocapsid — Non-enveloped — Ss(+)-sense non-segmented — Herpeviridae — Hepatitis E
- **Transmission:** Fecal-oral, especially waterborne
- **Incubation:** Short
- **Clinical course:** Similar to HBV Fulminant hepatitis in Expectant (pregnant) patients
- **Prognosis:** High mortality in pregnant patients
- **HCC risk:** No
- **Liver biopsy:** Patchy necrosis
- **Notes:** Enteric, Epidemic (eg, in parts of Asia, Africa, Middle East), no carrier state

Signs and symptoms of all hepatitis viruses: episodes of fever, jaundice, increase ALT and AST. Naked viruses (HAV and HEV) lack an envelope and are not destroyed by the gut: the vowels hit your bowels.