Viral Hepatitis

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Objectives:

- Hepatitis definition & types.
- Differences between viruses that cause hepatitis.
- Hepatitis B:
  - Pathophysiology.
  - Sign & symptoms.
  - Key hepatitis serology markers.
  - Investigations.
  - Management.
  - Complications.

What is Hepatitis?

- *Inflammation of the liver leading to injury &necrosis.*
- Divided into acute & chronic > 6 months

What is Hepatitis?

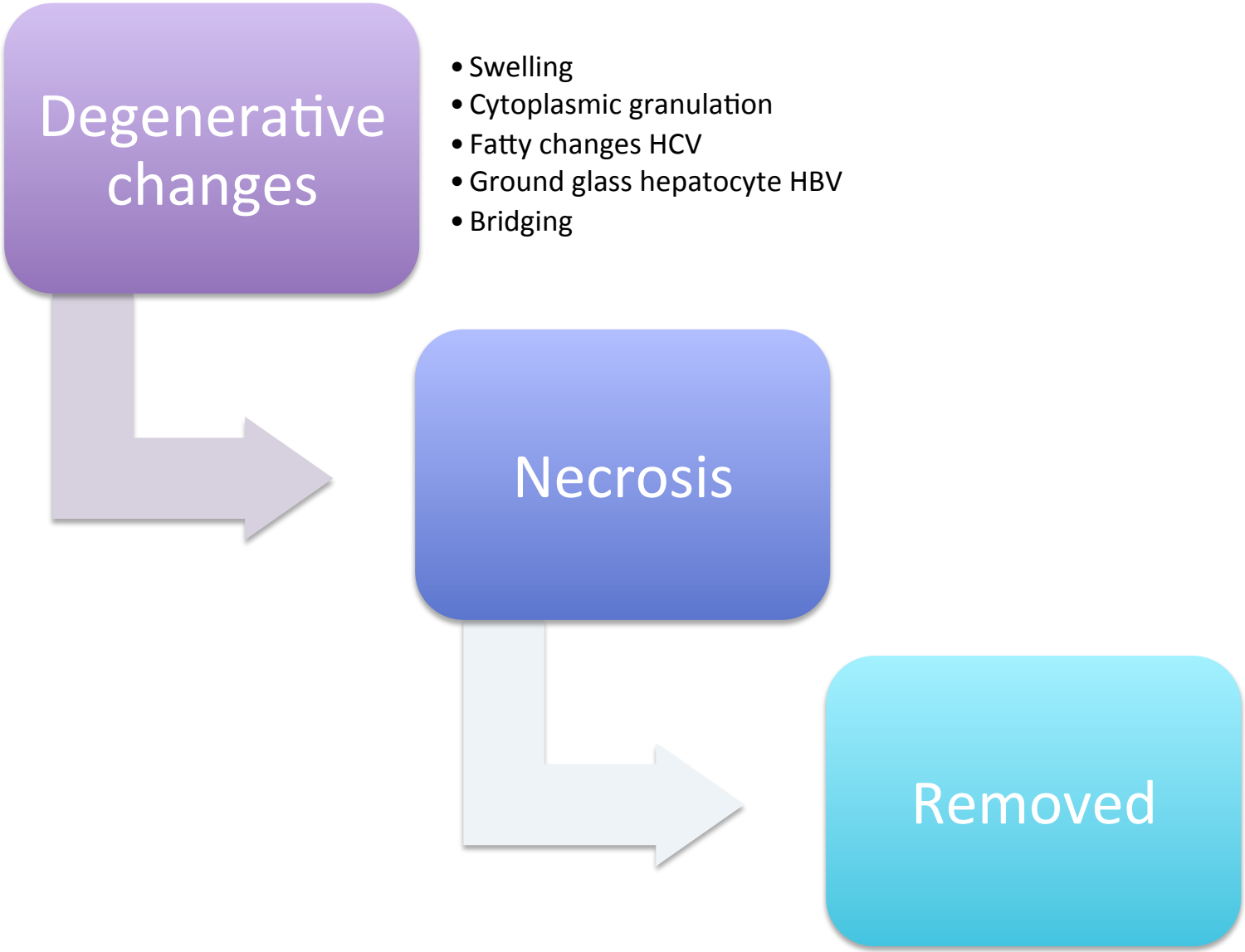
Chronic

- Viral infection
- Alcohol
- Autoimmune
- Metabolic syndromes

Acute

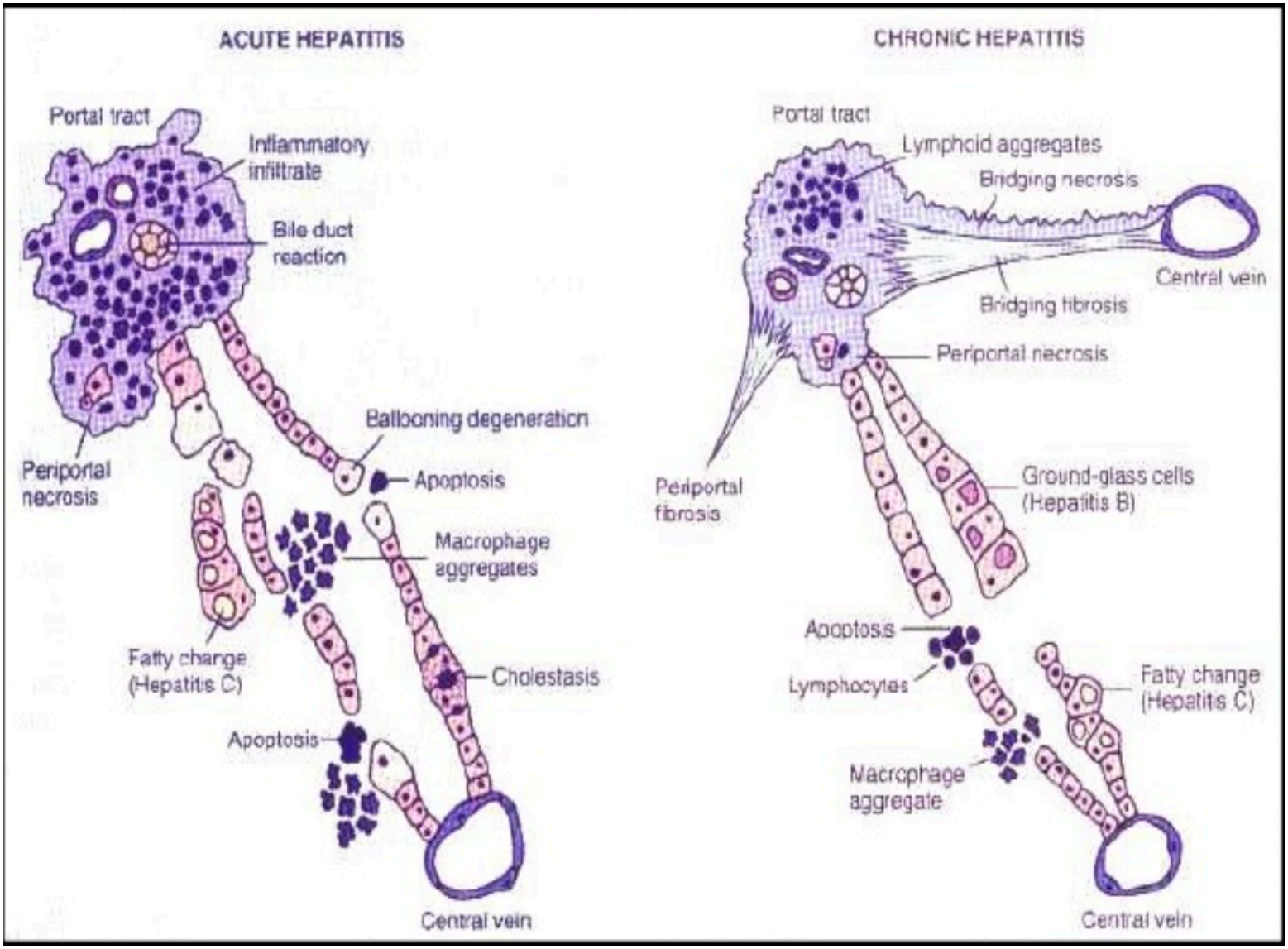
- Viral infection
- Drugs
- Alcohol

Acute Hepatitis



Chronic Viral Hepatitis

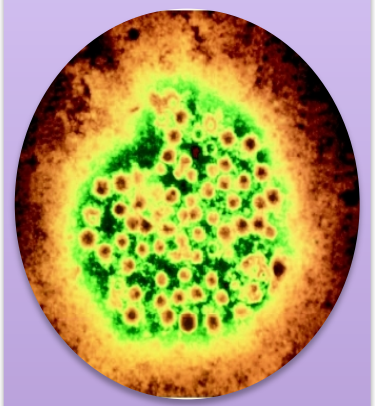
- Infiltration of the Portal tract with:
  - Lymphocytes
  - Plasma cells
  - Lymphoid follicles
- Liver changes may occur:
  - Focal lytic necrosis, apoptosis and focal inflammation.
  - Fibrosis.


ACUTE HEPATITIS
Portal tract
Inflammatory infiltrate
Bile duct reaction
Ballooning degeneration
Periportal necrosis
Apoptosis
Macrophage aggregates
Fatty change (Hepatitis C)
Cholestasis
Apoptosis
Central vein
CHRONIC HEPATITIS
Portal tract
Lymphoid aggregates
Bridging necrosis
Central vein
Bridging fibrosis
Periportal necrosis
Periportal fibrosis
Ground-glass cells (Hepatitis B)
Apoptosis
Lymphocytes
Fatty change (Hepatitis C)
Macrophage aggregate
Central vein

Fulminant Hepatitis

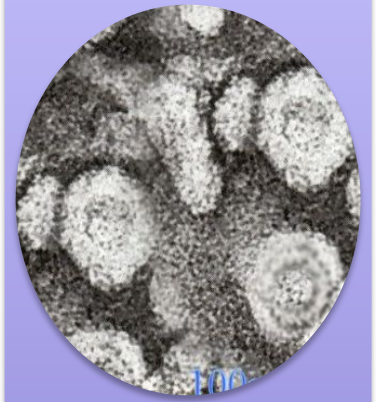
- **Reactivation** of acute or chronic hepatitis.
- Failure within 2-3 weeks complicated by hepatic encephalopathy.
- Massive necrosis.
- Inflammation!

Viruses



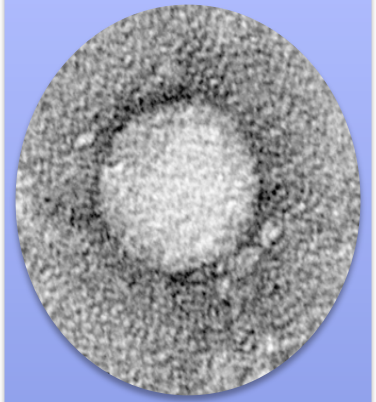
Hep A

- SS-RNA
- Picornavirus
- Non-enveloped
- Feco-oral
- **Acute**



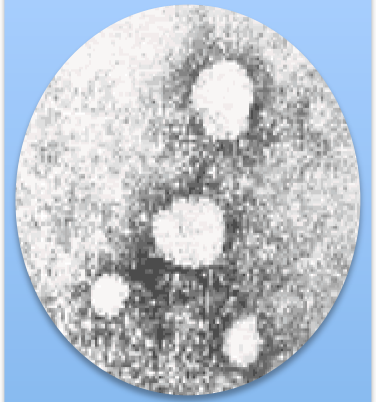
Hep B

- SS-DNA
- Hepadnavirus
- Enveloped
- Blood – body fluid- vertical
- **Acute & chronic**
- HCC



Hep C

- SS-RNA
- Flavivirus
- Enveloped
- Blood – body fluid- vertical- IVDU
- **Acute & chronic**
- HCC rare



Hep D

- SS-RNA
- Deltavirus
- Enveloped
- Co-infection with Hep B
- **Acute & chronic**
- HCC

Hep E

- SS-RNA
- Herpesvirus
- Non-enveloped
- Feco-oral
- **Acute**

Serology Markers

- Two types of markers
  - Antigen
    - H#SAG
    - H#EAG
    - H#CAG
  - Antibody
    - H#SAB
    - H#EAB
    - H#CAB

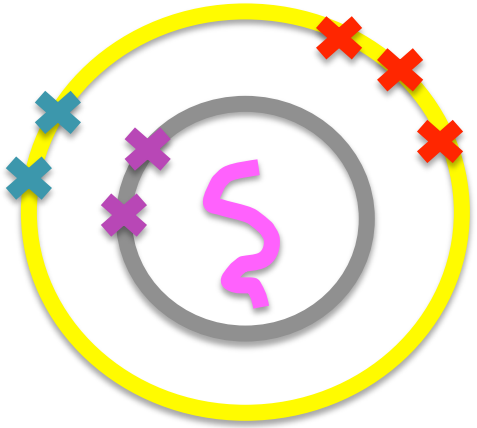
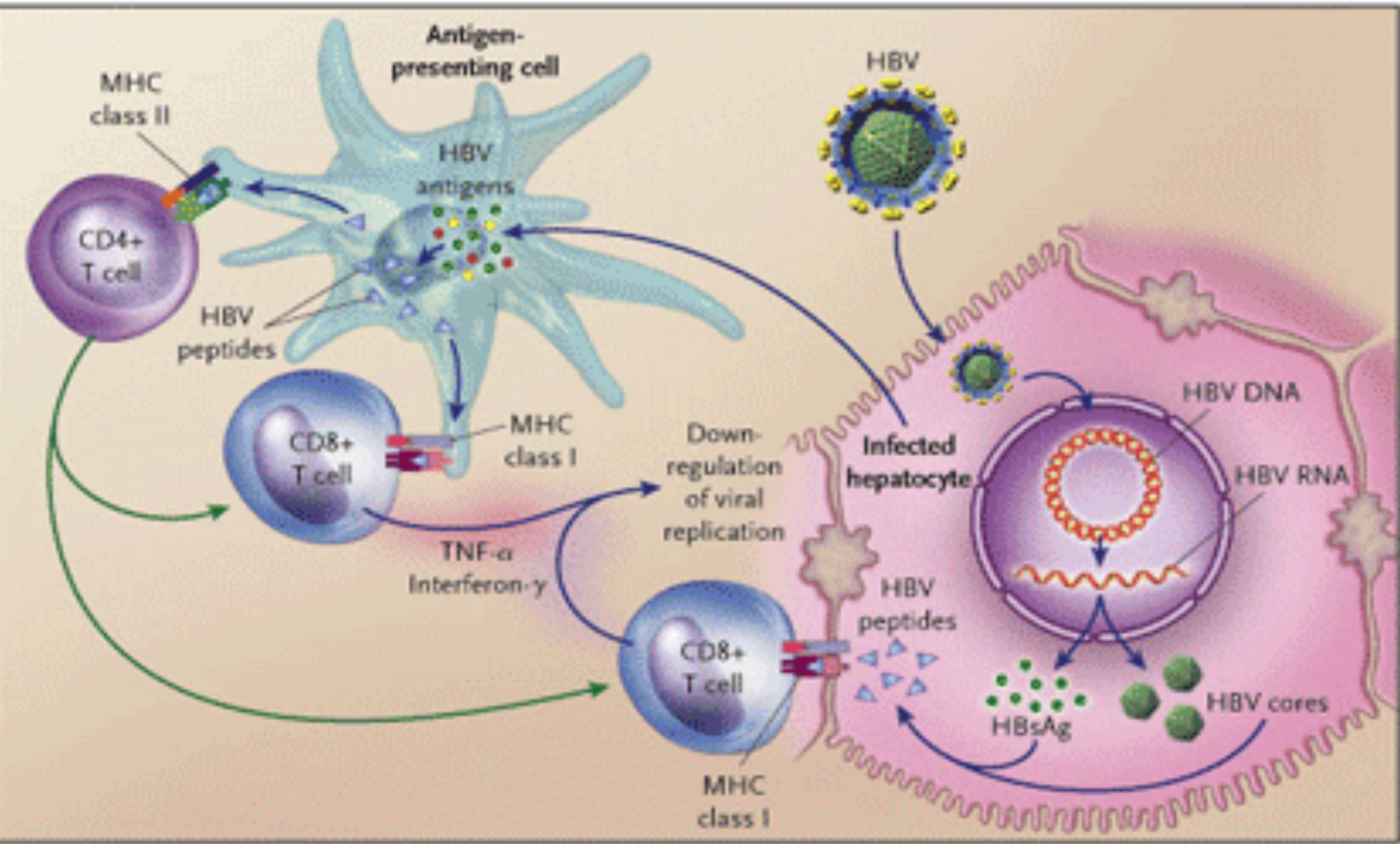


Fig. 6.24 Viral hepatitis. (HAV IgM = hepatitis A virus immunoglobulin M; HBsAg = hepatitis B virus surface antigen; HBeAg = hepatitis B virus e antigen; HBc IgM = hepatitis B virus core immunoglobulin M; anti-HCV = anti-hepatitis C virus; PCR = polymerase chain reaction; HDD Ag = hepatitis D virus antigen; HDV IgM = hepatitis virus immunoglobulin; HEV IgG = hepatitis E virus immunoglobulin G; HBIG = hepatitis B immunoglobulin; HNIG = human normal immunoglobulin.) (Data courtesy of Dr Tilzey, St Thomas's Hospital, London.)

Type	Virus	Spread	Incubation period	Carrier state/ chronic infection	Diagnosis of acute infection	Specific prevention	Treatment
A	Hepatovirus	Faecal–oral	2–3 weeks	No	HAV IgM	Vaccine HNIG	N/a
B	Hepadnavirus	Contaminated blood and body fluids: • percutaneous • sexual • mother to baby	2–6 months	Yes Adults 5–10% Neonates 70–90%	HBsAg HBeAg HBcIgM	Vaccine, HBIG	α-interferon
C	Pestivirus-like	Contaminated blood and body fluids: • percutaneous • sexual • mother to baby	6–8 weeks	Yes Adults 60–90%	Anti-HCV PCR	N/a	α-interferon
D	Defective RNA virus coated with HBsAG	Contaminated blood and body fluids: • percutaneous • sexual Note: requires HBsAg for propagation and hepatotropism	N/a	Yes	HD Ag HDV IgM (up to 6 wks) HDV IgM (after 6 wks)	Prevent HBV	N/a
E	Calicivirus	Faecal–oral	2–9 weeks	No	HEV IgM	N/a	N/a

Hep. B Pathogenesis

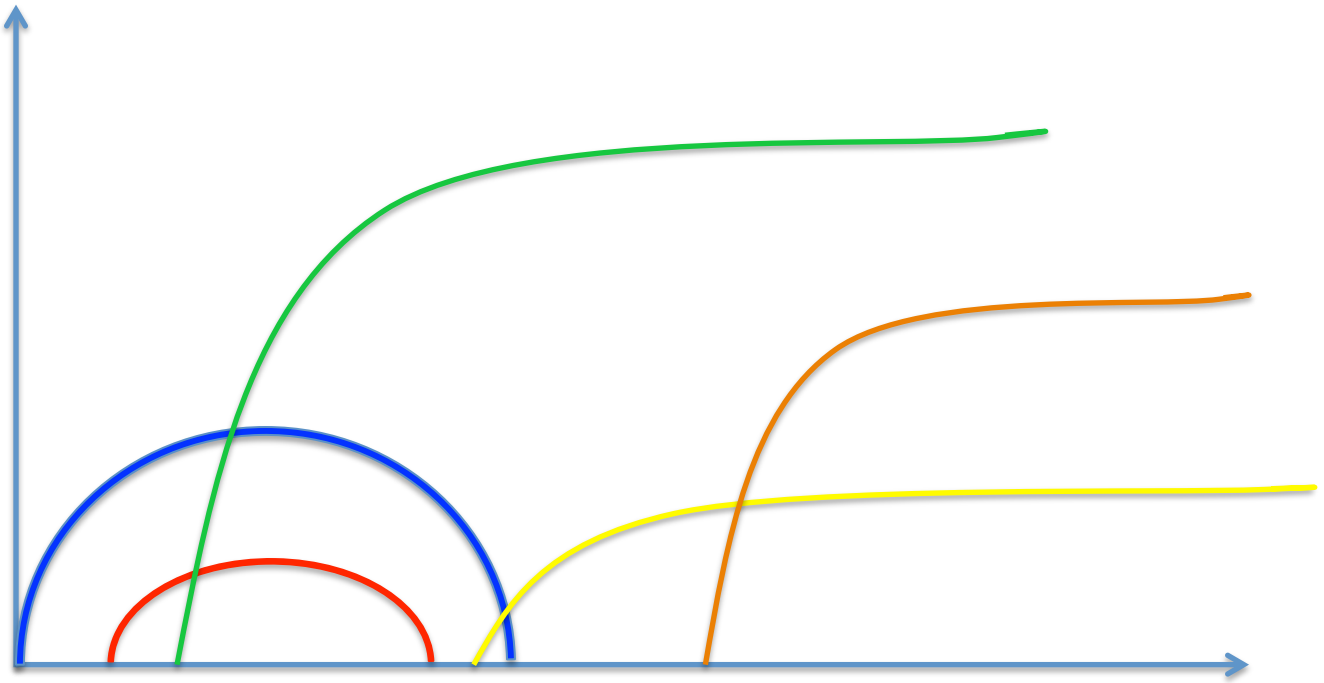


Hep. B Pathogenesis

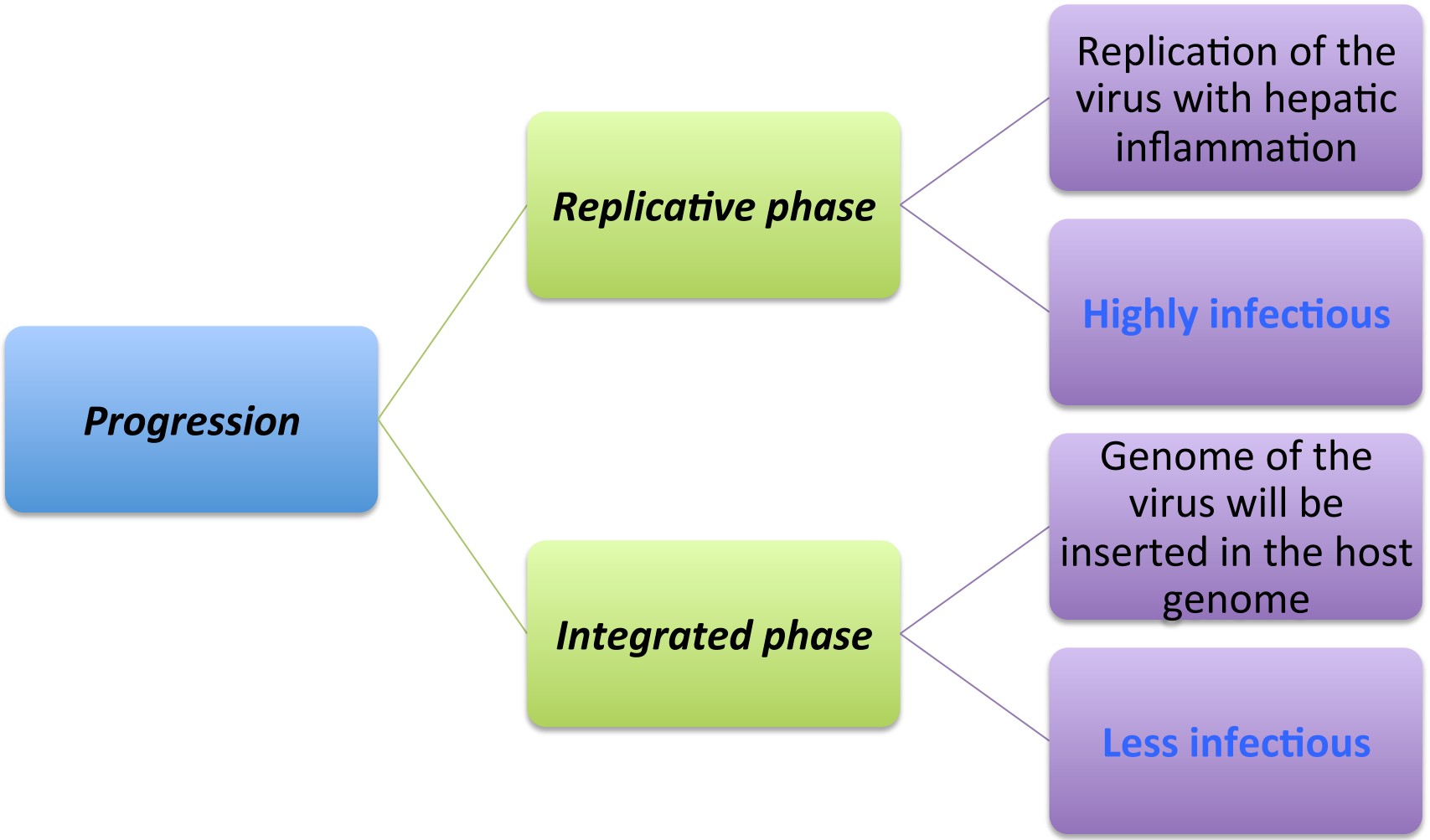
- Long incubation period 4-26 weeks
- Entry of the virus aided by pre-S1&2
- Virus start to replicate using the host enzyme
- HBV-specific cytotoxic CD8 T cells recognize the infected hepatocyte through HLA class-1
- Regulatory T cell try to suppress CD8 T to preserve the hepatocyte.
- Thus, chronic infection will develop.

Acute Hep.B with Recovery

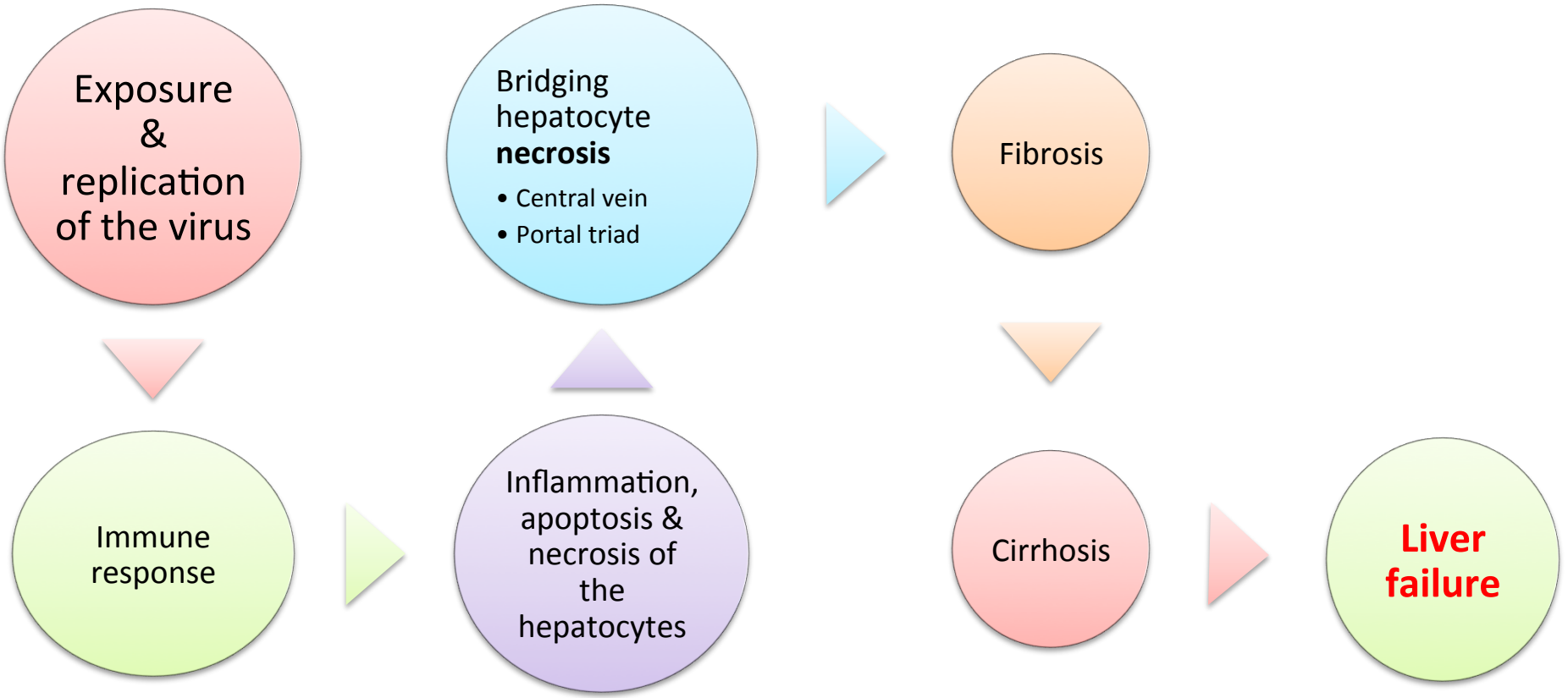
- Titer VS. Time



Chronic Hep. B



Hep. B Pathogenesis



Signs & Symptoms

- Acute viral hepatitis:
  - Asymptomatic.
  - Flu like symptoms: fatigue, anorexia, nausea & vomiting.
  - Very high ALT & AST > 1000 U\L
- Chronic viral hepatitis:
  - Symptoms
    - Only if cirrhosis developed: jaundice, fatigue &ascites.
    - 80% of HCV and 10% of HBV will develop chronic hepatitis.

Investigations

- <u>Acute viral hepatitis:</u>
  - Increase in ALT,AST and bilirubin\alkaline phosphate.
  - Serology
- <u>Chronic viral hepatitis:</u>
  - Persistent increase in ALT and AST

Hepatitis Panel

- Hepatitis A :
  - Anti-HAV IgM antibody +ve : Acute disease.
  - Anti-HAV IgG antibody +ve : previous infection or immunization (Chronic).
- Hepatitis C :
  - Anti-HCV IgM +ve : acute infection.
  - Anti-HCV IgG +ve : represents chronic infection.

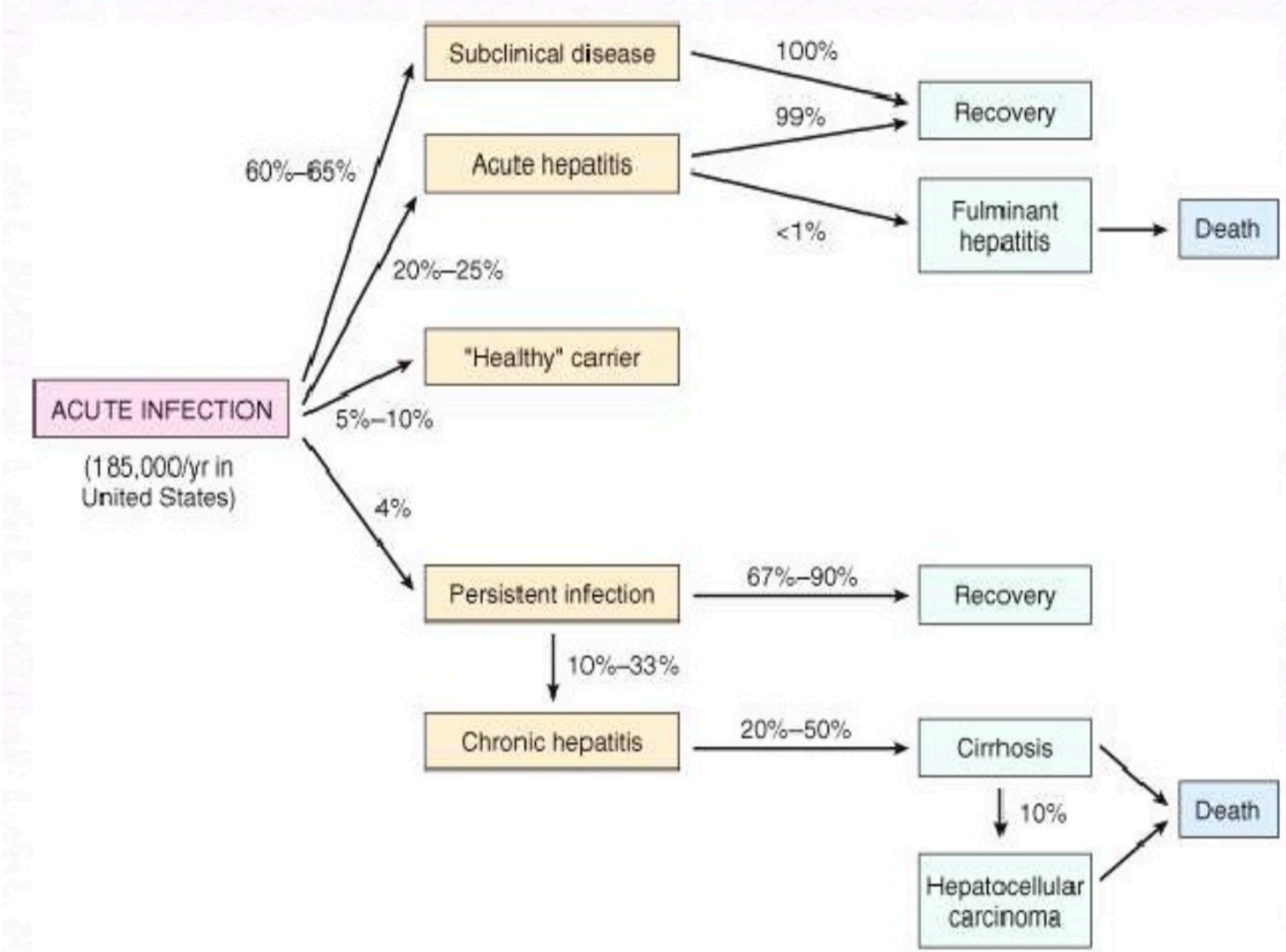
Serology Interpretation

Test	Result	Interpretation
HBsAg anti-HBc anti-HBs	negative negative negative	Susceptible (vaccinate)
HBsAg anti-HBc anti-HBs	negative positive positive	Resolved HBV infection
HBsAg anti-HBc anti-HBs	negative negative positive	Vaccinated
HBsAg anti-HBc anti-HBs	positive positive positive	Active HBV infection (usually chronic) *If anti-HBc IgM present, may represent acute infection.
HBsAg	negative positive negative	Various possibilities: distant resolved infection (most common) recovering from acute infection false positive occult hepatitis B

Management

- Acute Hep.B:
  - Supportive
- Chronic Hep. B:
  - Treatment with **IFN Alfa**, it has anti viral and immuno-mudularoty properties.

The potential outcome of hepatitis B in adults



Complication

- Chronic active hepatitis.
- Cirrhosis & hepatic failure.
- Hepatocellular carcinoma.

Remember!!

- The vowels (hepatitis A and E) never cause chronic hepatitis, ***only acute hepatitis***.
- Only the consonants (hepatitis B, C, D) have the ***potential to cause chronic disease*** (C for consonant and for chronic)
- Hepatitis D, the delta agent, is a defective virus, requiring ***hepatitis B co-infec***tion for its own capacity to infect and replicate.

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