VIRAL HEPATITIS

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VIRAL HEPATITIS

- **Viral Hepatitis:** is a liver inflammation caused by five unrelated hepatotropic viruses Hepatitis A, Hepatitis B, Hepatitis C, Hepatitis D, and Hepatitis E.
- Other viruses can also cause liver inflammation include **Herpes simplex**, **Cytomegalovirus**, **Epstein-Barr virus**.
- It may present in acute (recent infection, relatively rapid onset) or chronic forms.

HEPATITIS VIRUSES

- Hepatitis A (HAV) Picornaviridae (1973)
- Hepatitis B (HBV) Hepadnaviridae (1970)
- Hepatitis C (HCV) Flaviviridae (1988)
- Hepatitis D (HDV) (1977)
- Hepatitis E (HEV) (Caliciviridae) (1983), Hepeviridae
- Hepatitis F – Not separate entity – Mutant of B Virus.
- Hepatitis G (HGV) Flaviviridae (1995)

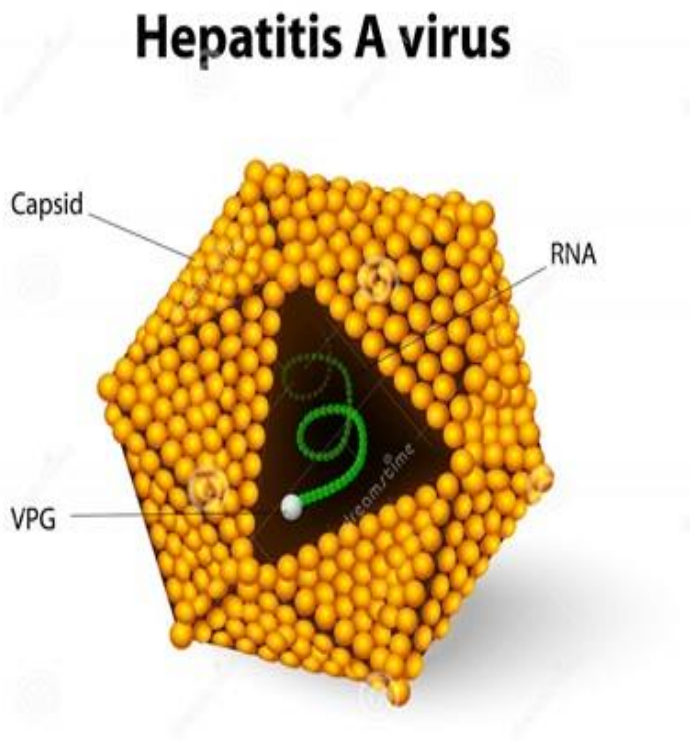
TYPES OF HEPATITIS

	Viral Hepatitis A	Viral Hepatitis B	Viral Hepatitis C	Viral Hepatitis D	Viral Hepatitis E
Agent	Hepatitis A virus (HAV); ssRNA; No envelope	Hepatitis B virus (HBV); dsDNA; envelope	Hepatitis C virus (HCV); ssRNA; envelope	Hepatitis D virus (HDV); ssRNA; envelope from HBV	Hepatitis E virus (HEV); ssRNA; no envelope
Route of Transmission	Fecal-oral	Parenteral, Vertical, Sexual.	Parenteral	Parenteral	Fecal-oral
Age affected	Children	Any age	Adults	Any age	Young adults
Carrier state	Nil	Common	Present	Nil (only with HBV)	Nil
Incubation period	10-50 days (avg. 25-30)	50-180 days (avg. 60-90)	40-120 days	2-12 weeks	2-9 weeks
Chronic infection	No	Yes	Yes	Yes	No
Specific Prophylaxis	Ig and Vaccine	Ig and Vaccine	Nil	HBV vaccine	Nil

Hepatitis A Virus

HEPATITIS A VIRUS

- Small, ssRNA, non-enveloped (Naked RNA virus) icosahedral particle, 27 nm in diameter.
- Related to enteroviruses, formerly known as enterovirus 72, now put in its own family.
- One stable serotype only.
- HAV is not cytolytic and is released by exocytosis.



PATHOGENESIS OF HEPATITIS A VIRUS

HAV invade into human body by fecal-oral route, multiplies in the intestinal epithelium and reaches the liver by hematogenous spread.

After one week, the HAV reach liver cells when replication will occur. Then enter intestine with bile and appear in feces.

Incubation Period : 2 to 6 weeks.

CLINICAL SYMPTOMS OF HEPATITIS A VIRUS

- Jaundice (yellow eyes and skin, dark urine)
- Abdominal pain
- Loss of appetite
- Nausea
- Fever
- Diarrhea
- Fatigue
- Children often have the disease with few symptoms.

HEPATITIS A VIRUS RESISTANCE

- Stable to: acid at pH 3
- Solvents (ether, chloroform)
- detergents
- saltwater, groundwater(months)
- drying(stable)
- Temperature
  - 4°C: stable for weeks
  - 56°Cfor 30minutes: stable
  - 61°Cfor 20minutes: partial inactivation

LAB.DIAGNOSIS

1. Demonstration of Virus in feces:
   By: Immunoelectron microscopy

2. Virus Isolation: by tissue culture.

3. Detection of Antibody :By ELISA

4. Biochemical tests:
   i) Alanine aminotransferase (ALT)
   ii) Bilirubin

5. Molecular Diagnosis : Real-Time PCR of feces

HEPATITIS A VIRUS VACCINE

- Hepatitis A vaccine in infants is safe and immunogenic without maternal antibody.
- Combined hepatitis A and hepatitis B vaccine approved by FDA in United states for persons above 18 years old.
- The schedule of this vaccine is: 0,1,6 months.

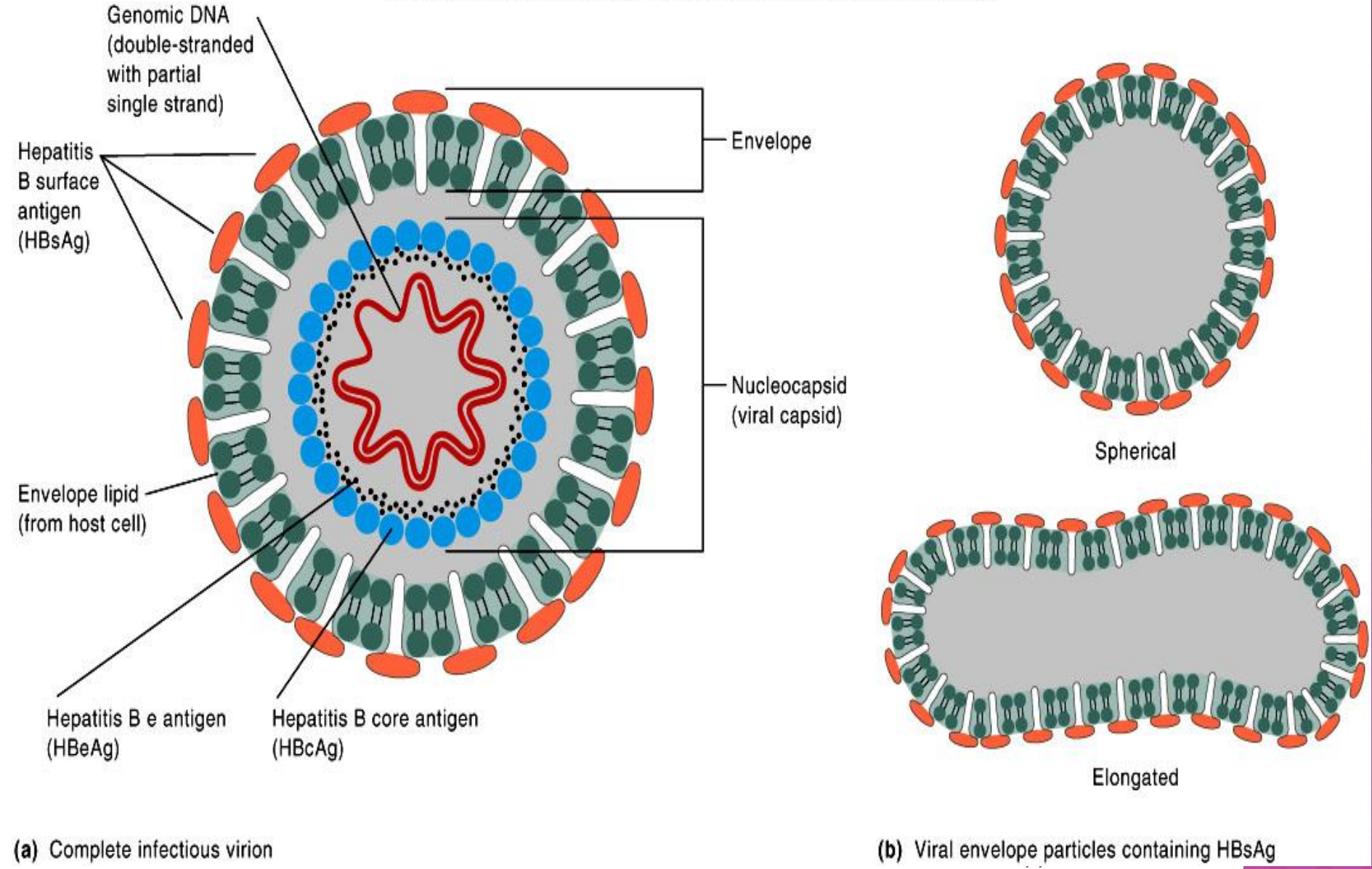
Hepatitis B Virus

HEPATITIS B VIRUS (HBV)

- Double stranded DNA enveloped virus.
- Complete particle 42 nm, the core of the virus containing HBcAg and HBeAg, and the coat contain HBsAg and at least 4 phenotypes of HBsAg are recognized.

- Hepatitis B virus (HBV) has been classified into 8 genotypes (A-H).

HBV : Structure



FOUR STAGES IN THE VIRAL LIFE CYCLE (HBV)

- The first stage is immune tolerance. The duration of this stage for healthy adults is approximately 2-4 weeks and represents the incubation period.

- In the second stage, an inflammatory reaction with a cytopathic effect occurs. HBeAg can be identified in the sera. The duration of this stage for patients with acute infection is approximately 3-4 weeks (symptomatic period).

FOUR STAGES IN THE VIRAL LIFE CYCLE (HBV)

- In the third stage, the host can target the infected hepatocytes and the HBV Viral replication no longer occurs. HBeAb can be detected.

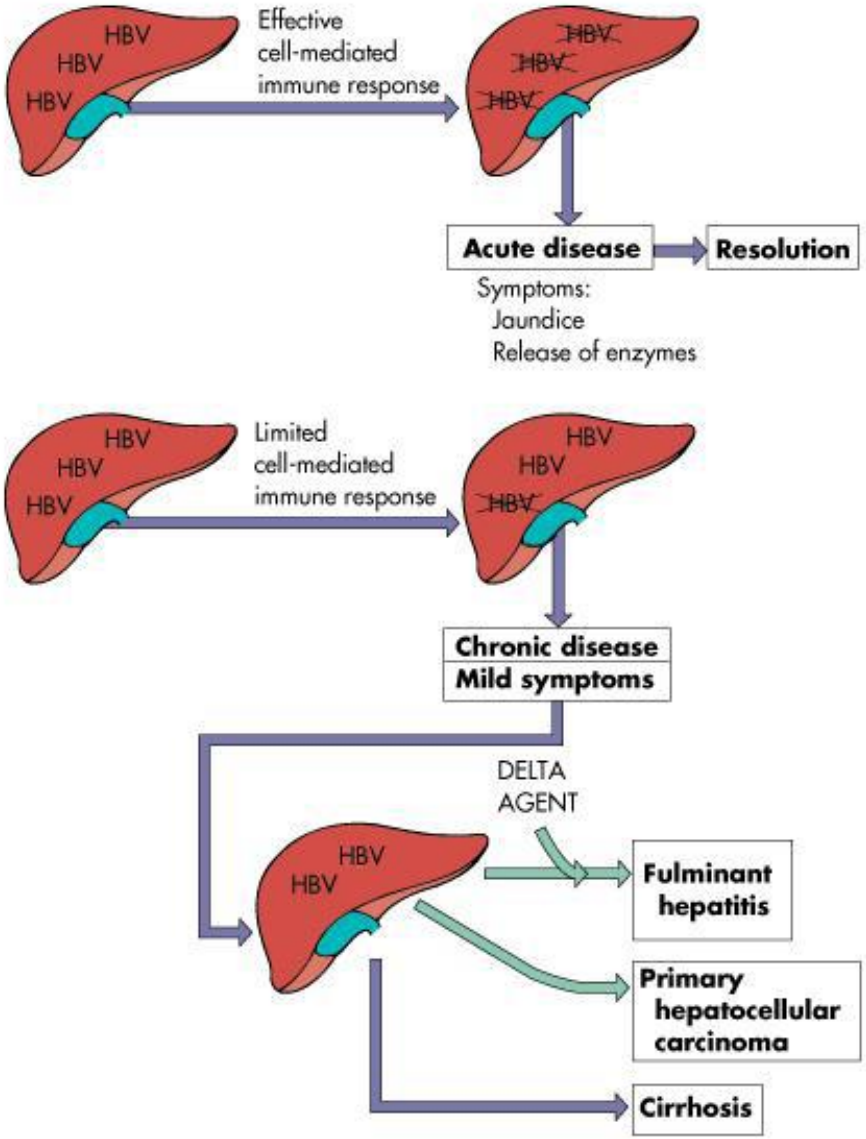
- In the fourth stage, the virus cannot be detected and antibodies to various viral antigens have been produced.

CLINICAL SYMPTOMS OF HEPATITIS B VIRUS

Signs and symptoms of hepatitis B, ranging from mild to severe, usually appear about one to four months after infection. Signs and symptoms of hepatitis B may include:

- Abdominal pain
- Dark urine
- Fever
- Joint pain
- Loss of appetite
- Nausea and vomiting
- Weakness and fatigue
- jaundice

CLINICAL OUTCOMES OF HEPATITIS B INFECTIONS



LABORATORY DIAGNOSIS

- Acute HBV infection is characterized by the presence of HBsAg and immunoglobulin M (IgM) antibody to HBcAg detected by EIA (Enzyme Immunoassay).

- During the initial phase of infection, patients are seropositive for HBeAg, which is a marker of high levels of replication of the virus. The presence of HBeAg indicates that the blood and body fluids of the infected individual are highly contagious.

LABORATORY DIAGNOSIS

- Chronic infection is characterized by the persistence of HBsAg for at least 6 months.

- Persistence of HBeAb is the principal marker of risk for developing chronic liver disease and liver cancer (hepatocellular carcinoma) later in life.

TREATMENT

- There is no specific treatment for acute hepatitis B. Therefore, care is aimed at maintaining comfort and adequate nutritional balance, including replacement of fluids lost from vomiting and diarrhea. Chronic hepatitis B infection can be treated with drugs, including oral antiviral agents, such as tenofovir or entecavir.
- Treatment can slow the progression of cirrhosis, reduce incidence of liver cancer and improve long term survival.

HEPATITIS B VACCINE

- Infants: several options that depend on status of the mother
- If mother HBsAg negative: birth, 1-2m,6-18m.
- If mother HBsAg positive: vaccine and Hep B immune globulin within 12 hours of birth, 1-2m, <6m.
- Adults: 0,1, 6 months.
- Vaccine recommended in All those aged 0-18, and those at high risk.

Hepatitis C Virus

HEPATITIS C VIRUS (HCV)

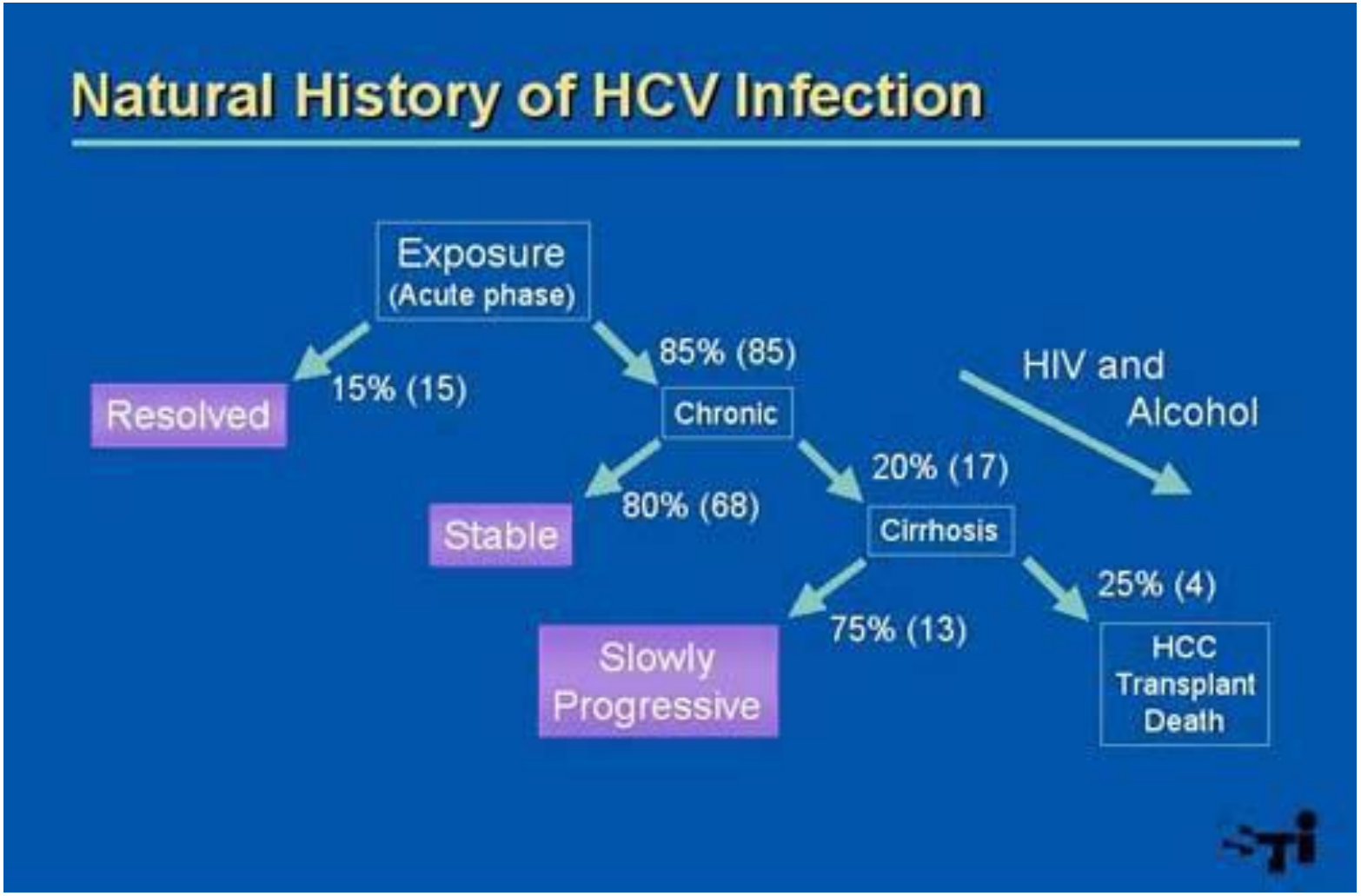
- Positive stranded RNA genome of around 10,000 bases
- Enveloped virus, virion, 30-60nm in diameter
- Morphological structure remains unknown
- HCV has been classified into a total of six genotypes (type 1 to 6).
- Genotype 1 and 4 has a poorer prognosis and response to interferon therapy.

CLINICAL SYNDROMES OF HCV

- HCV can cause acute infections but is more likely to establish chronic infections.

- All the manifestations of chronic hepatitis B infection may be seen, but with a lower frequency i.e. chronic persistent hepatitis, chronic active hepatitis, cirrhosis, and hepatocellular carcinoma.

NATURAL HISTORY OF HCV



Hepatitis D Virus

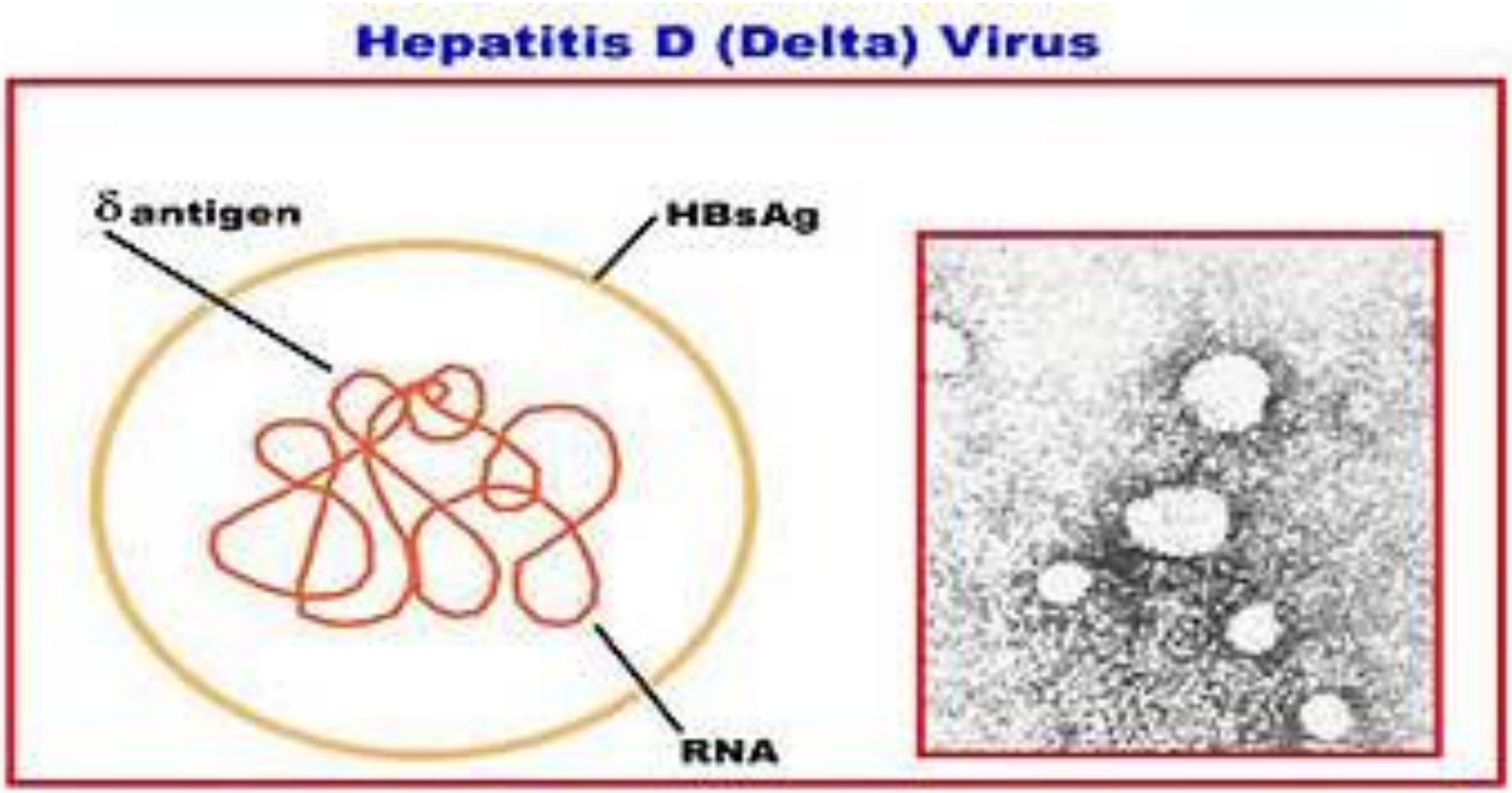
HEPATITIS D VIRUS

- The delta agent is a defective virus.
- The agent consists of a particle 35 nm in diameter consisting of the delta antigen surrounded by an outer coat of HBsAg.
- The genome of the virus is very small and consists of a single-stranded RNA.

HEPATITIS D - PREVENTION

- Pre or postexposure prophylaxis to prevent HBV infection reduces the HBV-HDV Coinfection .
- Education to reduce risk behaviors among persons with chronic HBV infection.

HEPATITIS D VIRUS



HEPATITIS D - CLINICAL FEATURES

- Co-infection
- Severe acute disease.
- Low risk of chronic infection.

Hepatitis E Virus

HEPATITIS E VIRUS

- Calicivirus-like viruses
- unenveloped RNA virus, 32-34 nm in diameter
- +ve stranded RNA genome, 7.6 kb in size.
- very labile and sensitive

PREVENTION OF HEV

- Avoid drinking water and beverages of unknown purity, uncooked shellfish, and unwashed fruit/vegetables.
- IG prepared from donors in Western countries does not prevent infection.
- Unknown efficacy of IG prepared from donors in endemic areas.


THANK YOU