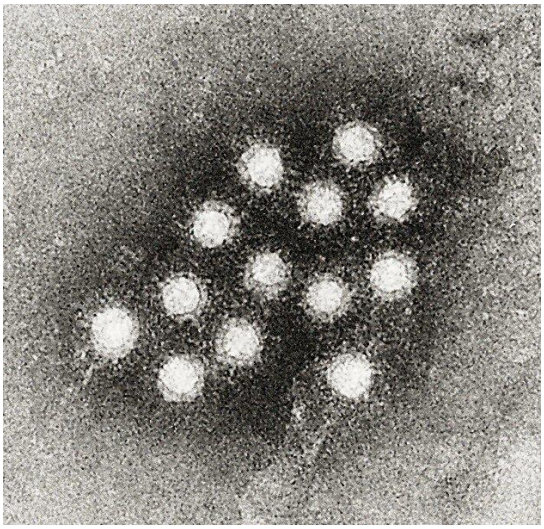
Hepatitis

Viral hepatitis is caused mainly by infection with one of the five hepatitis viruses, which use the liver as their primary site of replication. These viruses belong to different virus families, have unique morphology, genomic organization and replication strategy.

Type of Hepatitis

Hepatitis A virus



Family: Picornaviridae;

Genus: Hepatovirus

Virion morphology and size:

1. Non enveloped,

2.icosahedral nucleocapsid symmetry,

3.spherical,

5. Nucleic acid: Linear, positive-sense, single-stranded RNA

HAV retains most of its infectivity when subjected to pH 1.0 for 2 hours at room temperature and is still infectious at 5 hours. It is resistant to 20% ether and chloroform. Autoclaving at 121°C is effective. HAV is inactivated within minutes at 98-100°C. The virus persists for days to months in experimentally contaminated fresh water, seawater, wastewater, soils, marine sediment, live oysters, and cream-filled cookies. HAV is inactivated by UV radiation, formalin, iodine, or chlorine or chlorine containing compounds

Common Human Exposure Routes:

• Ingestion of virus from material contaminated with feces containing HAV leading to person-to-person transmission (fecal-oral route) ,

Incubation Period (10-50)days with a mode of ~1 month from exposure to symptoms regardless of the route of infection. Higher doses of virus lead to a shorter incubation period

Primary Disease Symptoms:

• Anicteric or icteric hepatitis

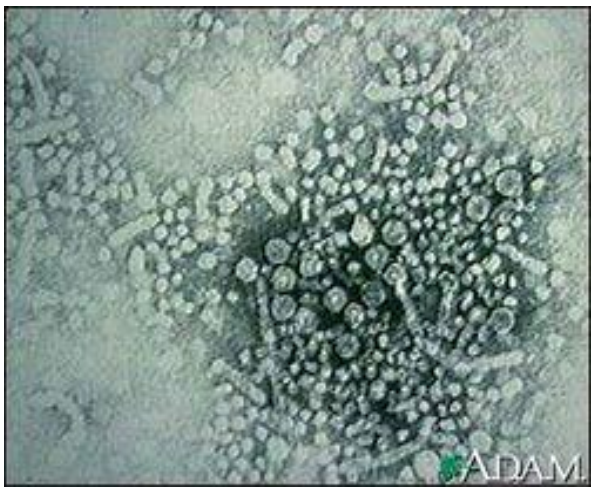
• Prodrome of anorexia, fever (usually <39.5°C), fatigue, malaise, myalgia, nausea, and vomiting; relatively abrupt transition from well-being to acutely ill (within 24 h) in more that 60% of the cases; weight loss with disorder of taste and smell; right upper quadrant abdominal pain followed by an icteric phase within 10 days of the initial symptom

Treatment Available/Efficacious:

• Liver transplant for acute fulminate hepatitis

Hepatitis B virus

Disease Agent Characteristics:



• Family: Hepadnaviridae;

Genus: Hepadnavirus

• Virion morphology and size:

Enveloped,

icosahedral nucleocapsid symmetry,

spherical particles,

• Nucleic acid: Relaxed circular, partially duble DNA,

Incubation Period:

• Exposure to detection of HBV DNA: 2-5 weeks

• Exposure to symptoms: 6-8 weeks

Primary Disease Symptoms:

with anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgia and rash, often progressing to jaundice. Following acute HBV infection, the risk of developing chronic infection varies inversely with age

Transmission HBV has been found in virtually all body secretions and excretions. However, only blood, body fluids containing visible blood, semen and vaginal secretions

represent a risk of transmission. HBV is transmitted by percutaneous and mucosal exposure to infective blood or body fluids. Major modes of HBV transmission include sexual or close household contact with an infected person, perinatal mother to infant transmission, injecting drug use and nosocomial exposure.1 Percutaneous exposures that have resulted in HBV transmission include transfusion of unscreened blood or blood products, sharing un-sterilized injection needles for IV drug use, haemodialysis, acupuncture, tattooing and injuries from contaminated sharp instruments sustained by hospital personnel

Hepatitis C virus

Family: *Flaviviridae*

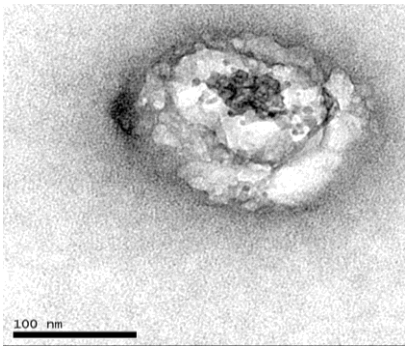
genus: *hepacivirus*

HCV genomic RNA was single-stranded with positive polarity, which was packaged by core protein and enveloped by a lipid bilayer containing two viral glycoproteins

Signs and Symptoms

60-70% of patients are asymptomatic. Symptoms may include fever, abdominal pain, anorexia, nausea, jaundice, or dark urine. Jaundice occurs in 25% of patients; liver function test results generally are less pronounced than with HBV infection. Acute disease tends to be mild and insidious in onset. Average incubation period is 6-7 weeks (range: 2 weeks to 6 months).

Transmission



• Highest infection rates (60-90%) occur in persons with large or repeated, direct percutaneous exposure to blood or blood products

• Less than 10% of cases are sexually transmitted.

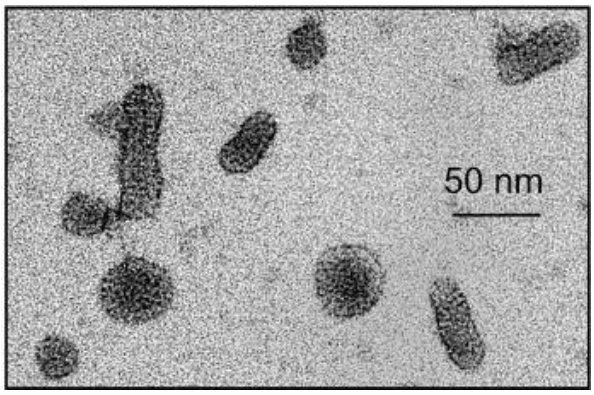
• Perinatal transmission occurs in 5% of births.

Hepatitis D virus

Hepatitis D virus (HDV) is a virus that requires hepatitis B virus (HBV) for its replication. HDV infection occurs only simultaneously or as super-infection with HBV.

Hepatitis D virus (HDV) is a defective,

single-stranded RNA virus that requires the hepatitis B virus (HBV) to replicate .



Signs and Symptoms

HDV infection causes hepatitis only in persons with acute or chronic HBV infection; the HDV cannot produce infection in the absence of HBsAg.

• Symptoms are indistinguishable from HBV infection, whether HBV-HDV co-infection (simultaneously acquired) or super infection (HDV acquired by a person with chronic HBV infection)

Hepatitis D virus (HDV) is a defective, single-stranded RNA virus that requires the helper function of the hepatitis B virus (HBV) to replicate

• The average incubation period for: Co-infection is 90 days (range 45-160 days) o Super infection is approximately 2-8 weeks.

Transmission

• Percutaneous exposure; injecting drug use

• Permucosal exposure

• Sexual transmission is less common

• Perinatal transmission is rare

• Persons at risk for HBV infection might also be at risk for infection with hepatitis C virus (HCV) or HIV

Hepatitis E Virus

Family: *Hepeviridae*;

Genus: *Hepevirus*

Virion morphology and size:

1.Nonenveloped, icosahedral

2.nucleocapsid symmetry,

3.spherical particles,

4.930-340 nm diameter

• Nucleic acid: Linear, positive-sense, single-stranded

RNA, ~7.2 kb in length

Physicochemical properties: Less stable to heat than HAV; most strains totally inactivated at 60°C stable to multiple cycles of freezing and thawing ,

Common Human Exposure Routes:

• Most epidemics water-borne, some food-borne from a focally contaminated cause

• Exposure source for sporadic cases usually unknown;

may be fecal-oral, but epidemiology different from other fecal-oral agents (e.g., HAV)

• Person-to-person spread relatively uncommon; sexual spread unproved

• Blood transmission is rare, but has been reported in endemic areas and rarely in nonendemic areas presumably resulting from an extended asymptomatic viremic period.

Incubation Period:

Usually 3-8 weeks, but longer and shorter periods have been reported.

Primary Disease Symptoms:

• Indistinguishable from other forms of hepatitis:nausea, vomiting, abdominal pain, anorexia, fatigue, jaundice

Severity of Clinical Disease:

• Usually not severe except in those with chronic liver disease or in pregnant women where fulminate hepatitis may occur

• High incidence of fetal wastage