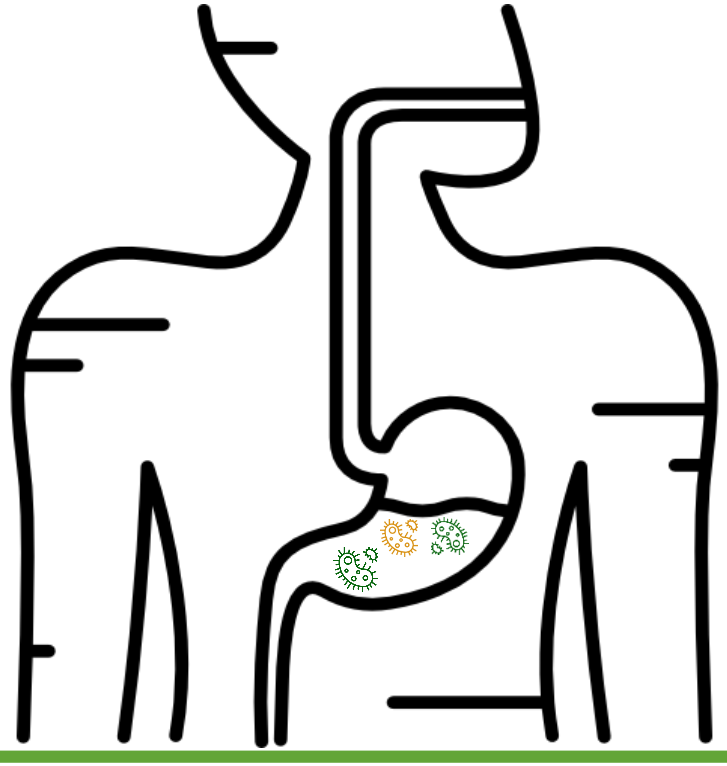
MEDICINE
KING SAUD UNIVERSITY

MICROBIOLOGY436



تمت المراجعة
شوق الأحمري & عبدالعزيز العنقري

LECTURE: Viral hepatitis A , E

Editing File

- Important
- Doctor's notes
- Extra explanation
- **Only F** or **only M**

"لا حول ولا قوة إلا بالله العلي العظيم" وتقال هذه الجملة إذا داهم الإنسان أمر عظيم لا يستطيعه ، أو يصعب عليه القيام به .

OBJECTIVES:

- Know the classification of viruses causing hepatitis.
- Viruses causing entericaly transmitted hepatitis:HAV,HEV.
- Viruses that are causing hepatitis during their course of infection: Cytomegalovirus (CMV) ,Epstein-Barr
- virus (EBV),Arbovirus (yellow fever virus)

Hepatitis:

- Hepatitis: is inflammation of the liver.
- Etiology:

A) Primary infection:	B) As part of generalized infection:
- Hepatitis A virus (HAV) - Hepatitis B virus (HBV). - Hepatitis C virus (HCV), was known as non-A non-B hepatitis. - Hepatitis D virus (HDV) or delta virus. - Hepatitis E virus (HEV). - Hepatitis F virus (HFV) Hepatitis F has been reported in the literature but not confirmed. - Hepatitis G virus (HGV).	(CMV, EBV, Yellow fever virus)

- Viral hepatitis is divided into two large groups, based on **the mode of transmission:**

1– Enterically transmitted hepatitis or water-borne hepatitis	2– Parenterally transmitted hepatitis or blood-borne hepatitis
This group includes hepatitis A and E viruses	This group includes hepatitis B, C, D & G viruses

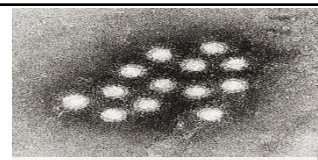
HAV and HEV belong to different families

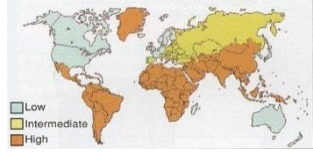
Hepatitis A Virus

Characteristics:	○ Family of Picornaviridae. ○ Genus: Hepatovirus. ○ Virion non-enveloped and consist of: 1. Icosahedral capsid. 2. Positive sense ss-RNA.

Other names for hepatitis a virus:

- ○ Short incubation hepatitis (Hepatitis E virus is longer)
- ○ Infectious hepatitis
- ○ Epidemic hepatitis





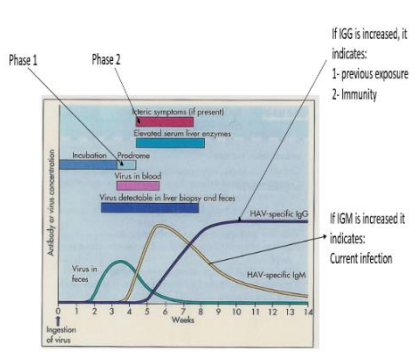
Epidemiology	
Distribution:	Worldwide, endemic in tropical countries Due to poor hygiene
Transmission:	• Fecal-oral route [major route] :Contaminated food &water Like eating infected shellfish harvested in the fecal contaminated order or uncooked food like salad • Sexual contact (homosexual men) • Blood transfusion (very rarely)
Age:	• In developing countries; children The most affected group of age due to poor hygiene • In developed countries; young adults
Manifestations	Acute infection Hepatitis: • Asymptomatic & anicteric infection is common • Symptomatic illness increases with age • Incubation period=2-6 Weeks • Two Phases: 1- Pre-icteric phase: fever, fatigue ,nausea, vomiting, & RUQP (right upper quadrant pain) 2- Icteric phase: dark urine, pale stool, jaundice

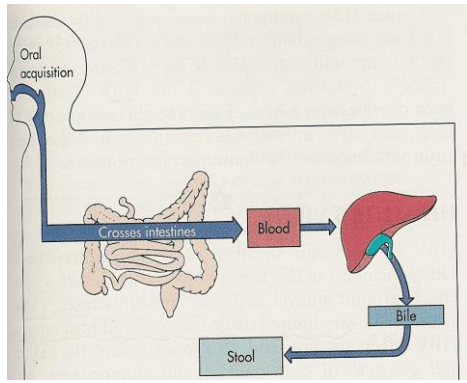
Virus is found in stool during incubation period + prodrome period before symptoms start to appear, and when symptoms appear the concentration of virus decline in the stool

Icteric means jaundice

Hepatitis A Virus

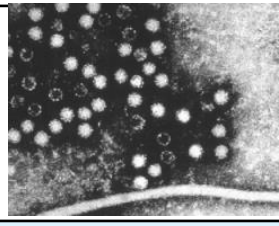
Pathogenesis:	The virus enters the body by ingestion of contaminated food. It replicates in the intestine (epithelium), and then spread to the liver where it multiplies in hepatocytes. Cell mediated immunity → Damage of virus-infected hepatocytes → increase ALT, AST & Bilirubin
Managment	
Treatment:	Supportive therapy
Prevention:	Sanitation & hygiene measures
	HIG (human immunoglobulin): Given before or within 2 Weeks of exposure (shorter immunity) -Indication: travellers, unvaccinated, exposed patients.
	Vaccine: inactivated (longer immunity), Given IM in two doses ->1 Y of age -Indication: Patients at high risk of infection and severe disease
Lab Diagnosis	Serology: • Detection of anti-HAV IgM →Current infection • Detection of Anti-HAV IgG → Previous infection OR Immunity
Prognosis	• Self-limited disease* • Fulminant hepatitis → rare Severe necrotic infection of Lever lead to liver failure • Mortality rate ~ 0.1 - 0.3% • No chronicity or malignancy changes



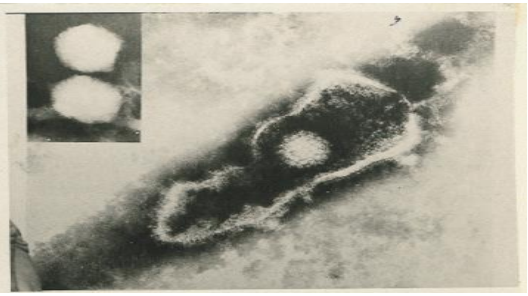


* Usually patient recovers within few weeks, however The majority of the infection are asymptomatic

Hepatitis E virus

Characteristics:	• Family of Hepeviridae. • Genus: Hepevirus. • Virion non-enveloped and consist of: •Icosahedral capsid. •Positive sense ss-RNA. 
Epidemiology	
Distribution:	Outbreak of water-borne & sporadic cases of viral hepatitis
Transmission:	1. Water-borne The main route 2. Zoonotic (from animals) food borne. (from pork) 3. Blood-borne Rare 4. Perinatal From pregnant mother to her baby
Age:	• Age; young adults
Clinical features:	
Similar to HAV infection with exceptions: • Longer incubation period =4-8 weeks • Acute and Chronic hepatitis, cirrhosis, but **not** hepatocellular carcinoma (HCC)	• Fulminant disease • Mortality rate ~10 times > HAV / ~ 1-3% / [20% in pregnancy]
Lab diagnosis:	ELISA → Anti-HE IgM
Treatment:	• Not specific In immunocompetent
Prevention:	• Sanitation & hygiene measures • No Immunoglobulin • No vaccine

Herpesviridae:



dsDNA , Icosahedral & Enveloped Virus	
1-Herpes simplex virus type-1	HSV-1
2-Herpes simplex virus type-2	HSV-2
3-Varicella –Zoster virus	VZV
4-Epstein-Barr virus	EBV
5-Cytomegalovirus	CMV
6-Human herpes virus type-6	HHV-6
7-Human herpes virus type-7	HHV-7
8-Human herpes virus type-8	HHV-8

They cause hepatitis

Type 1-6 are mild self-limited in immunocompetent but severe in immunocompromised patients

Epstein–Barr Virus (EBV): *Infect lymphocytes mainly B lymphocyte

Characteristics:	• It is lymphotropic*. • It has oncogenic properties; (Burkitt's lymphoma, Nasopharyngeal carcinoma)	
Epidemiology		
Distribution:	worldwide	
Transmission:	1-slaiva (kissing disease) 2-blood(rare)	
Age:	• socio-economic state(SE): 1-Low SE : early childhood (developing countries) 2-High SE : adolsence (developed countries)	
Clinical features:		
1-immunocompetive host: • Asymptomatic Usually • Infectious mononucleosis [or glandular fever] • Mainly in teenagers & young adults • IP = 4-7 weeks • Fever, pharyngitis, malaise, hepatosplenomegaly & abnormal LFT, hepatitis. • Complications: (acute air way obstruction, splenic rupture, CNS inf) Rare		2-immunocompremised host: (HIV) • Lymphoproliferative disease (LD) • Oral hairy leukoplakia (OHL)
Lab diagnosis:	**Hematology:** • increased WBC • Lymphocytosis (atypical lymphocytes)	**Serology:** 1- Non-specific AB test : -Heterophile Abs +ve -Paul-Bunnell or -monospot test 2- EBV-specific AB test: IgM Abs to EBV capsid antigen
Treatment:	Antiviral drug is not effective in IMN	
Prevention:	no vaccine	

Cytomegalovirus (CMV)

Special features:	-Its replication cycle is longer. -Infected cell enlarged with multinucleated.[cyto=cell, megalo=big](change in cell) -Resistant to acyclovir. -Latent in monocyte, lymphocyte & other
Distribution:	worldwide
Transmission:	• Early in life: Transplacental From pregnant mother to her baby causing a congenital infection- Birth canal - Breast milk • Young children: saliva • Later in life: sexual contact, Blood transfusion & organ transplant.

1-Acquired Infection:

a)Immunocompetent host: Asymptomatic - Self-limited illness – Hepatitis - Infectious mononucleosis like syndrome [Heterophile AB is –ve]

b)Immunocompromised host : Encephalitis , Retinitis , Pneumonia - Hepatitis, Esophagitis, Colitis.

2- Congenital Infections

The difference between infectious mononucleosis and infectious mononucleosis like syndrome is:

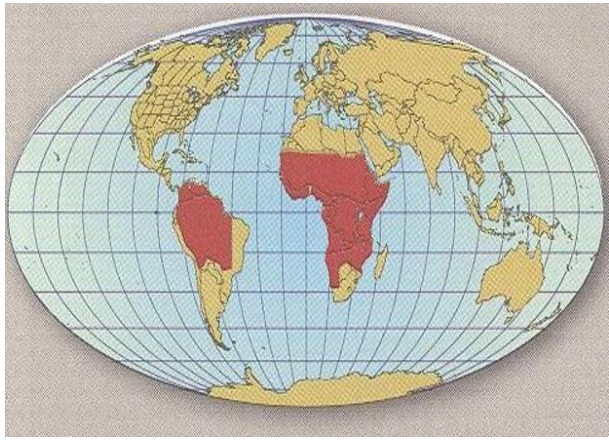
- the first one is caused by Epstein herpesvirus + pharyngitis + positive heterophile
- the second by cytomegalovirus + rare pharyngitis + negative heterophile

Cytomegalovirus (CMV)

Lab diagnosis:	Histology: Intranuclear inclusion bodies [Owl's – eye]	Culture: • In human fibroblast 1-4 wks → CPE (very slow growing disease) • Shell Vial Assay → 1-3 days	Serology : 1-AB : → IgM: current infection → IgG: previous exposure 2-Ag: → CMV pp65 Ag by IFA	PCR
Treatment:	• Ganciclovir : is effective in the treatment of severe CMV inf. • Foscarnet: the 2nd drug of choice			

Prevention:	• **Screening**
	  • Organ donors
	  • Organ recipient
	  • Blood donors
	• Leukocyte-depleted blood.
	• Prophylaxis: Ganciclovir, CMVIG.
	• No vaccine.			

Arthropod –borne Viruses (Arboviruses)
Yellow Fever virus (because of jaundice)

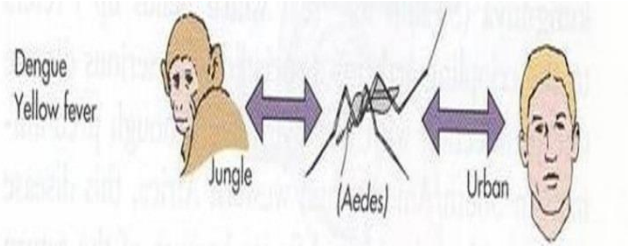


- Family: *Flaviviridae*
- Asymptomatic to Jaundice + Fever ± hemorrhage ± renal failure
- Epidemiology

  Tropical Africa & South America:

  1-Jungle Yellow Fever

  2-Urban Yellow Fever



Jungle Yellow Fever

- Vector: mosquito
- Reservoir: monkeys
- Accidental host: humans
- It is a disease of monkeys

Urban Yellow Fever

- Vector: mosquito
- Reservoir: human
- It is a disease of humans

Arthropod –borne Viruses (Arboviruses)
Yellow Fever virus (because of jaundice)

Diagnosis
-Reference Lab -Lab Methods: A- Isolation (Gold standard) B -IgM-Ab - ELISA, IF: (most used) C - Arbovirus RNA by RT-PCR

Prevention
1-Vector Control: • Elimination of vector breading sites • Using insecticides • Avoidance contact with vectors 2-Vaccines: • Yellow Fever vaccine (LAV, one dose /10 yrs) • is recommended for travelers

THANK YOU FOR CHECKING OUR WORK, BEST OF LUCK!

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Doctors slides