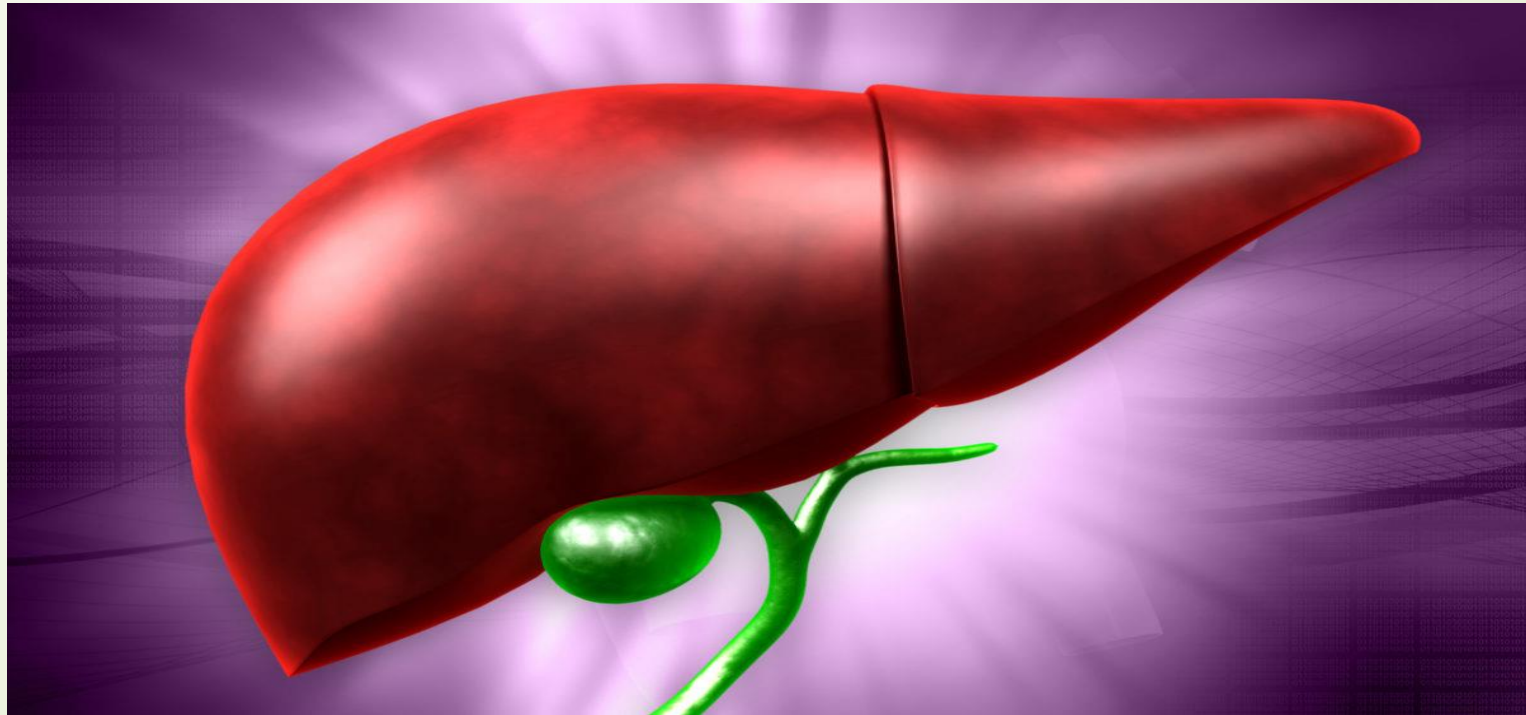




*AZERBAIJAN  
MEDICAL UNIVERSITY*

# *ETIOPATHOGENESIS AND MODERN LABORATORY DIAGNOSTICS OF LIVER DISEASES*

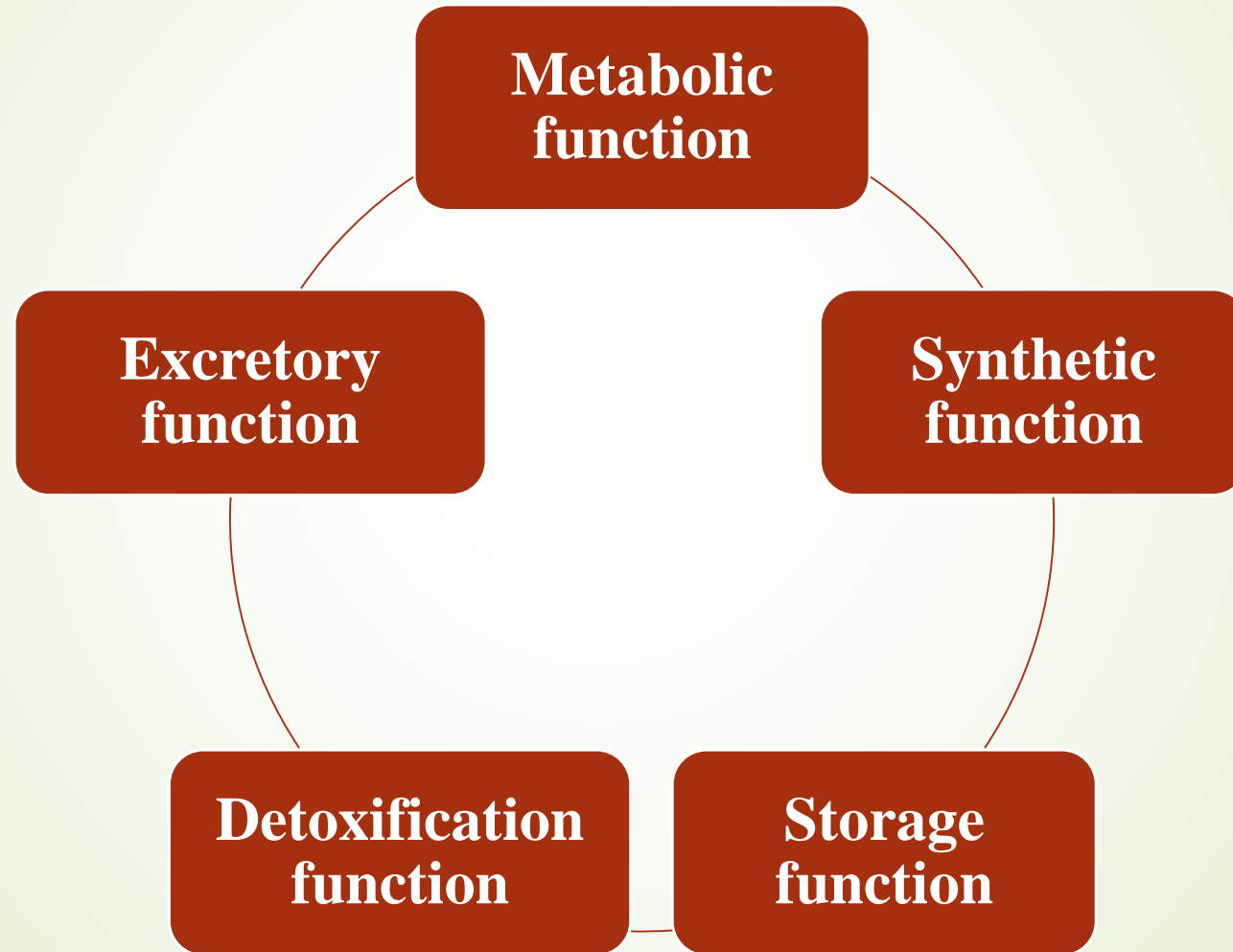




# *Plan*

- 1. Functional tests of the liver*
- 2. Etiology of acute hepatitis*
- 3. Viral hepatitis*
  - ❖ Hepatitis A*
  - ❖ Hepatitis B*
  - ❖ Hepatitis C*
  - ❖ Hepatitis D*
  - ❖ Hepatitis E*
- 4. Alcoholic hepatitis*
- 5. Autoimmune hepatitis*

# *MAIN FUNCTIONS OF THE LIVER*



## ***LIVER FUNCTION TESTS ‘DAMAGE’***

<b>Enzymes</b>	<b>Location</b>	<b>Reason</b>
<b>ALT</b>	Liver	Liver damage
<b>AST</b>	Liver Muscle	Liver damage Muscle damage Myocardial infarction
<b>ALP</b>	Biliary system Bone Placenta	Cholestasis Bone breakdown Pregnancy
<b>GGT</b>	Biliary system	Cholestasis

## Tests measuring the synthesis function of the liver

### Albumin

- ✓ The duration of stay in the serum is long (20 days)
- ✓ It is normal in acute injury, it decreases in chronic pathology
- ✓ It is a prognostic indicator in chronic damage

### PT/INR

- ✓ The duration of stay in the serum is short (hours)
- ✓ Both acute and chronic prolonged in injuries
- ✓ In acute injuries is the test with the highest prognostic value
- ✓ It is also a prognostic indicator in chronic injury

## *Tests showing the transport and elimination function of the liver*

Free bilirubin (N  
0,3-0,7 mg/dl)

- Hemolytic anemias
- Gilbert syndrome
- Crigler-Najjar syndrome

Conjugated bilirubin  
(N 0,1-0,3 mg/dl)

- Obstruction of the bile ducts
- Dubin-Johnson syndrome
- Rotor syndrome

Total bilirubin  
(N 0,2-1,0 mg/dl)

- All hepatitises
- Long-term obstruction of the bile ducts

# *Classification of acute hepatitis*

<b>According to its etiology</b>	<b>According to the clinical form</b>	<b>According to clinical course</b>	<b>By severity according to</b>	<b>Due to complications</b>
<b>drug, alcohol, bacterial, toxic, traumatic, radiation, viral (A, B, C, D, E, F, G, cytomegalovirus, herpes virus, infectious mononucleosis, etc.).</b>	<b>asymptomatic subclinical, icteric, cholestatic, anicteric.</b>	<b>acute, chronic</b>	<b>mild, medium, severe form</b>	<b>early late</b>

# ACUTE VIRAL HEPATITIS

Hepatitis  
A

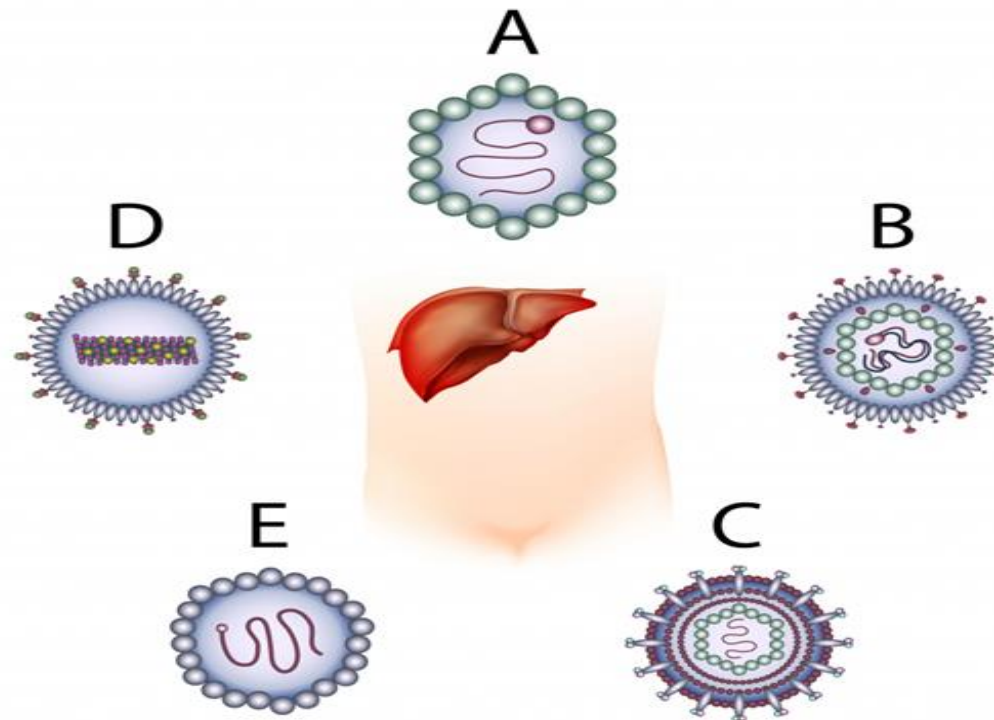
Hepatitis  
B

Hepatitis  
C

Hepatitis  
D

Hepatitis  
E

## HEPATITIS VIRUSES





A close-up photograph of a doctor wearing a white lab coat and a blue stethoscope. The doctor's hands are visible, holding a small, round object. The background is a plain, light color.

# *Hepatitis A*

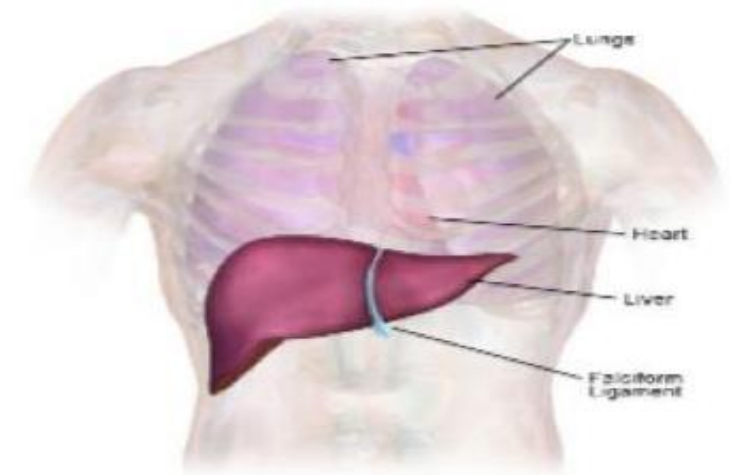
# HEPATITIS A

## Clinical manifestations

A rise in temperature ( $38^{\circ}\text{C}$  and more very) with dyspeptic disorders (nausea, vomiting, etc. ) occurs, starts acute.

By the end of the first week, jaundice is being observed.

The disease lasts 2-3 weeks and results in recovery.

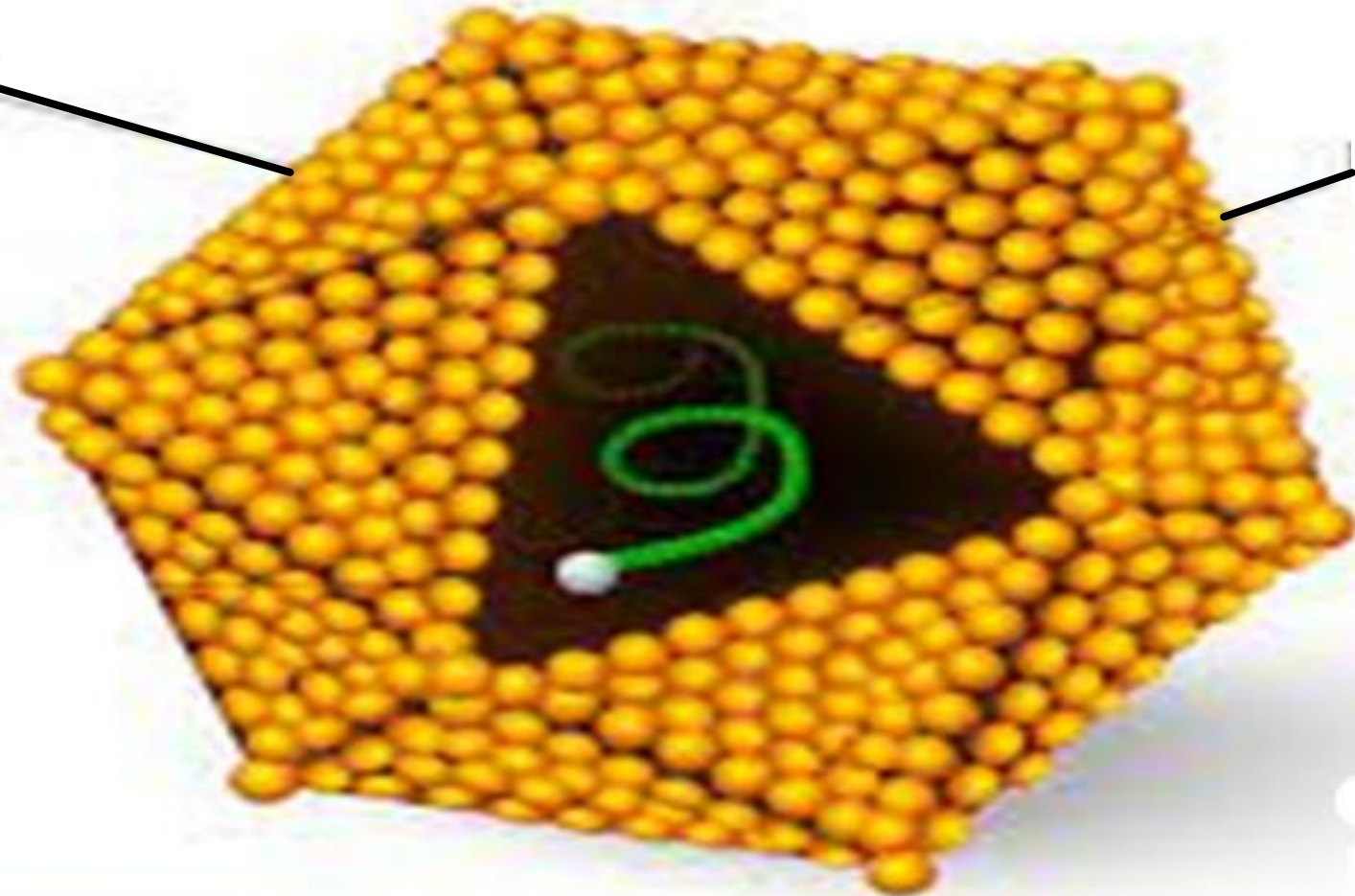


Liver Location

# HEPATITIS A VIRUS

Capsid

RNA




# HAV serological tests used in the clinic

<b>Anti-HAV IgM positive</b>	<b>There is an acute infection</b>
<b>Anti – HAV IgM neqative</b>	<b>No acute infection</b>
<b>Anti-HAV IgG positive</b>	<b>Transmitted hepatitis A</b>



# HEPATITIS B



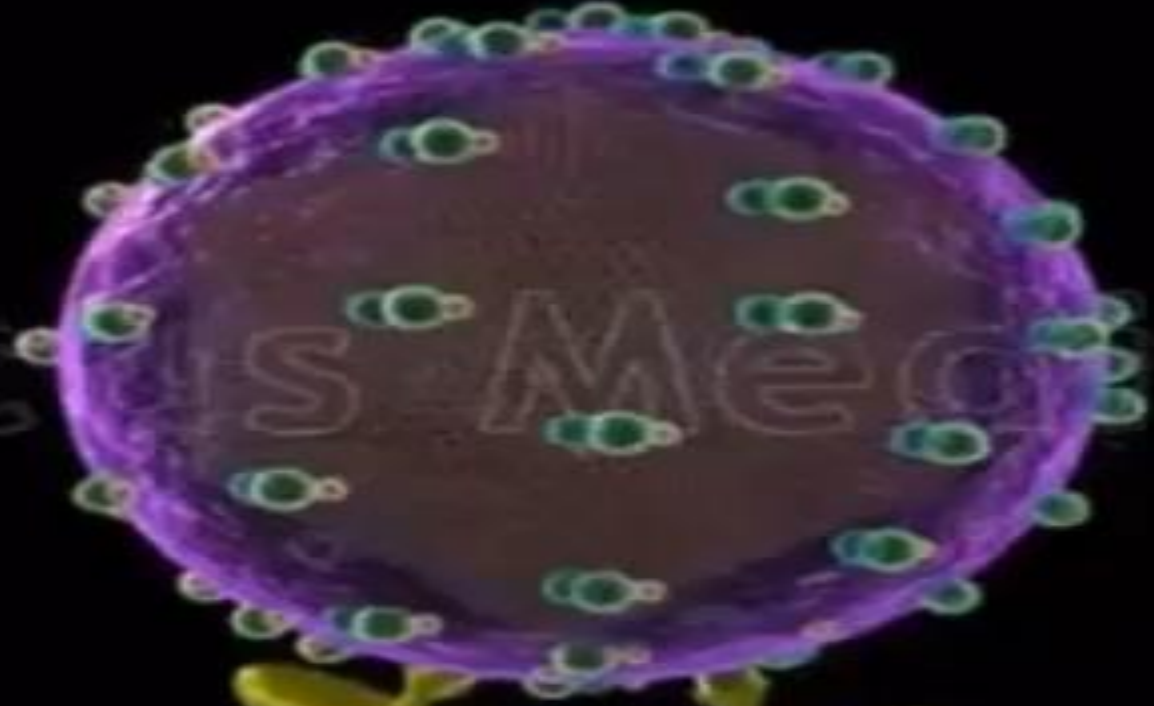
- 
- MCH class introduces HBV's intracellular antigenic markers to CD+T cells (CTL) on the hepatocyte surface, CTLs are stimulated
  - MHC Class II presents antigenic markers of HBV such as HBCAg and HBeAg in plasma to CD4+T cells (Thelper) on macrophages and sensitizes them
  - CD4+T lymphocytes-II,2,4,6,10, TNF-alpha and IFN-gamma are released



The virus is eliminated

- In this way, both CTLs are stimulated and B cells are stimulated to provide an antibody response (Th 1 response).

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# HBV serology used in the clinic tests

**HBsAg of infection is indicative (casein, chronically active or carrier)**

**Anti-HBs: immunity**

**Anti- HBc IgM: acute infection**

**Anti-HBc IgG: earlier virus infection**

**HBeAg, HBV DNA: replication**

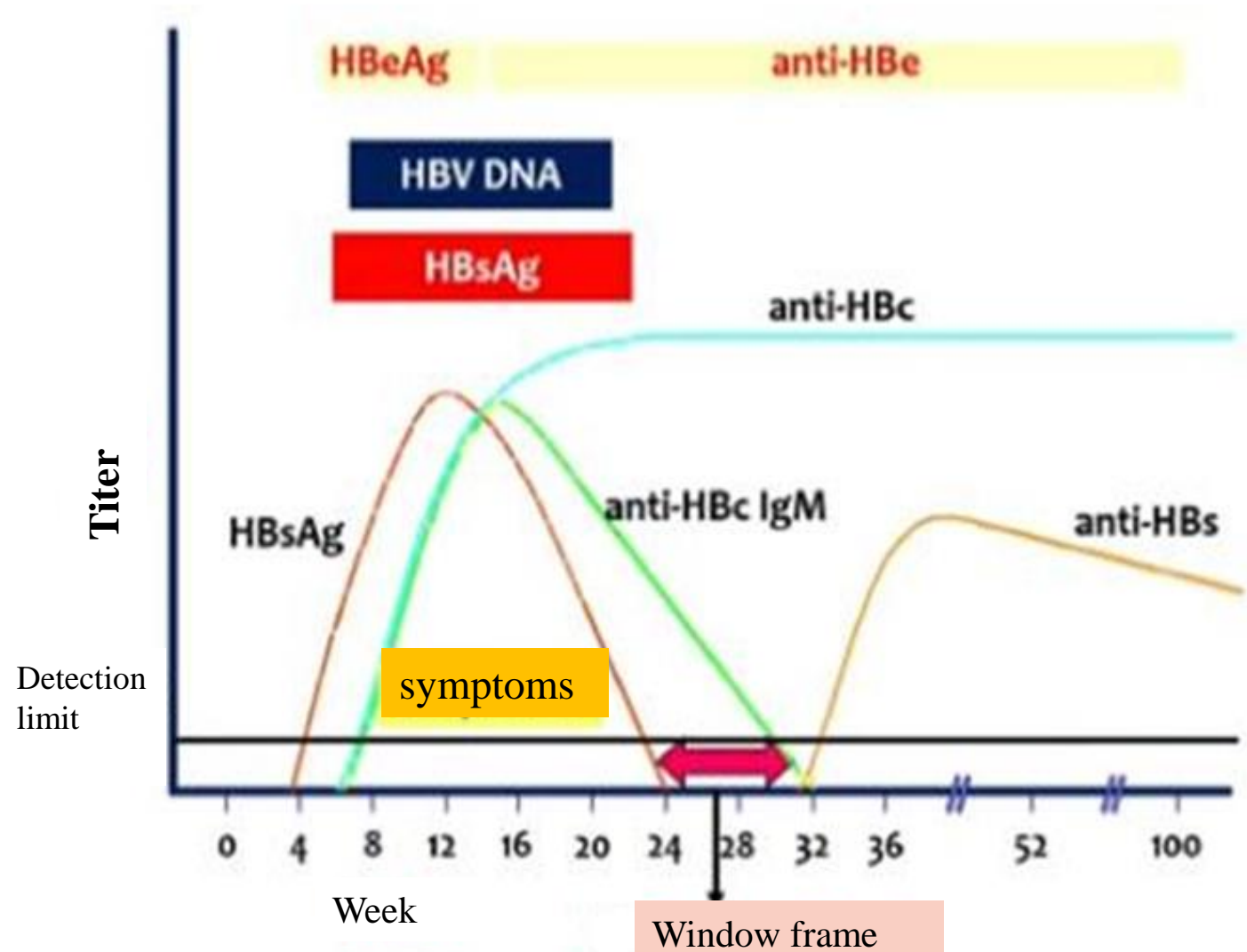
**Anti HBe: reduced replication**





# HBV Markers

1. HBsAg
2. HBeAg
3. Anti-HBc
4. Anti-HBe
5. Anti-HBs



In the serological examination of the 44-year-old patient, HbsAg(+), but HBV DNA and HbeAg were negative. In the biochemical examination, AST and ALT are within normal limits. Which of the following is the most correct answer for pathology?

- A) immune tolerant phase
- B) immune active phase
- C) **inactive carrier**
- D) Chronic acute hepatitis
- E) Natural immunity

Serological examination of a 50-year-old patient is as follows.

HbsAg (negative)  
Anti Hbs (positive)  
Anti HbcIgM (negative)  
Anti HbcIgG (negative)  
HbeAg (negative)  
HBV DNA (negative)

What is the most accurate diagnosis for this patient?

- A) Acute hepatitis
- B) Chronic acute hepatitis
- C) Natural immunity
- D) **Immunity by vaccination**

A doctor wearing a white lab coat, a blue stethoscope, and blue gloves is holding a white rectangular sign. The sign has the text "HEPATITIS C" written in red, serif, all-caps font. The background is a solid light blue color.

**HEPATITIS C**

# HEPATITIS C VIRUS



## Symptoms of hepatitis C virus

- General weakness, drowsiness and loss of appetite
- Nausea and vomiting
- Muscle and joint pains

Tension in the Liver area

Other in the case of deeper damage of the liver complaints also appear:

- Continuous or occasional yellowing of the skin and hides
- Itching of the skin
- Temperature rise



# Course of HCV Infection

Acute hepatitis C

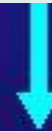
Healing (10-15%)

Chronic hepatitis (85-95%)

Fulminant hepatitis (4%)

Cirrhosis (20-30%)

Cancer (10%, risk: 1-4%/year)



# Serological examination of hepatitis C virus

Anti HCV	HCV RNA	ALT	Pathology
-	+	Elevated enough to be noticed	Acute hepatitis C (early period)
+	+	Noticeably so elevated	Acute hepatitis C
+	+	Weak-moderately degree elevated	Chronic hepatitis C
+	-	Normal	Transmitted hepatitis, chronic inactive hepatitis



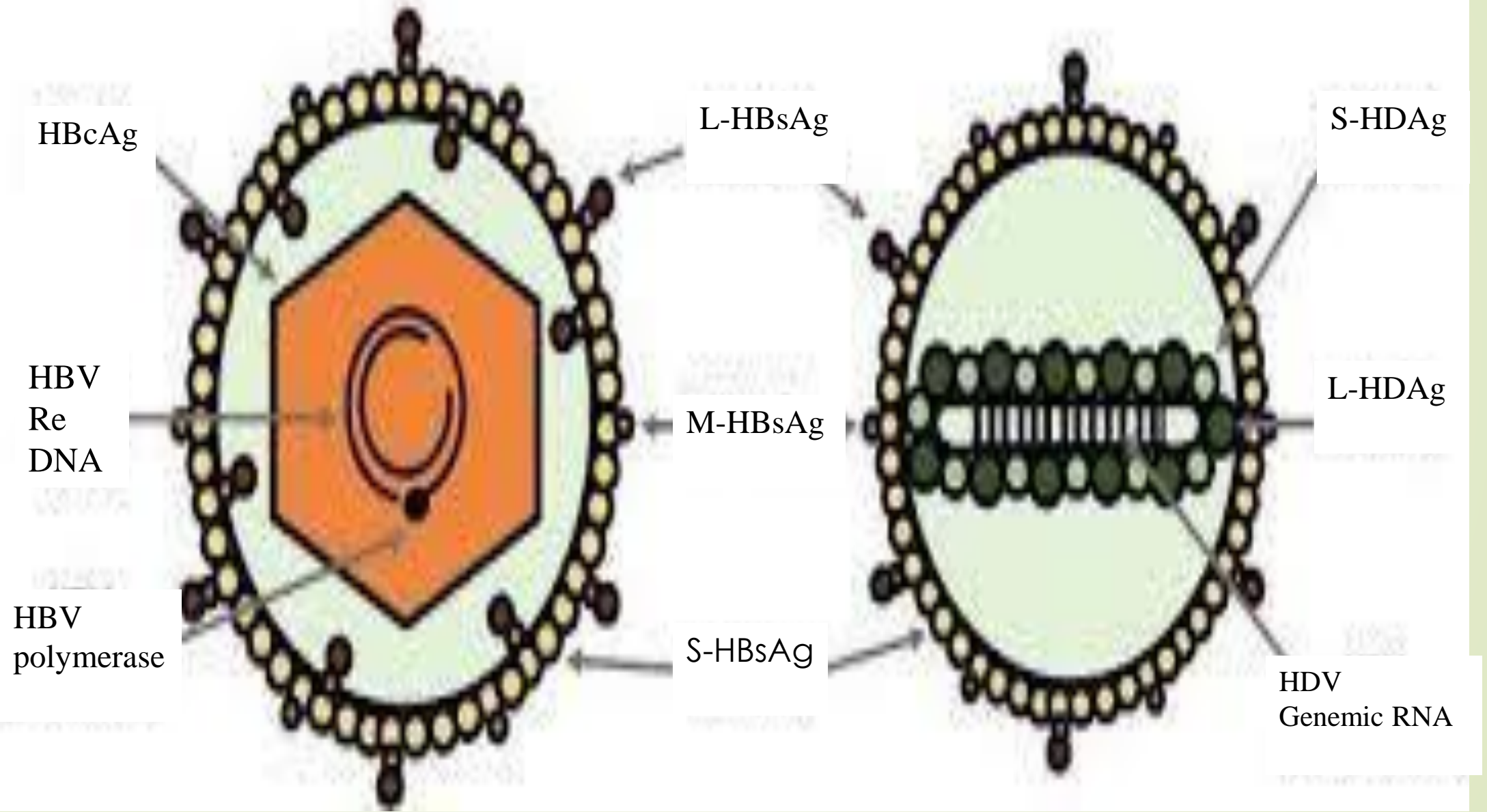
A top-down view of a white surface, possibly a notebook page, covered with a variety of pills and capsules. The pills are scattered across the page, with some overlapping. The colors include yellow, orange, pink, white, and light blue. The pills vary in shape, including round tablets, oval tablets, and capsules. In the center of the page, the words "Hepatitis D" are written in a blue, cursive font. The left edge of the image shows the spiral binding of a notebook.

Hepatitis D

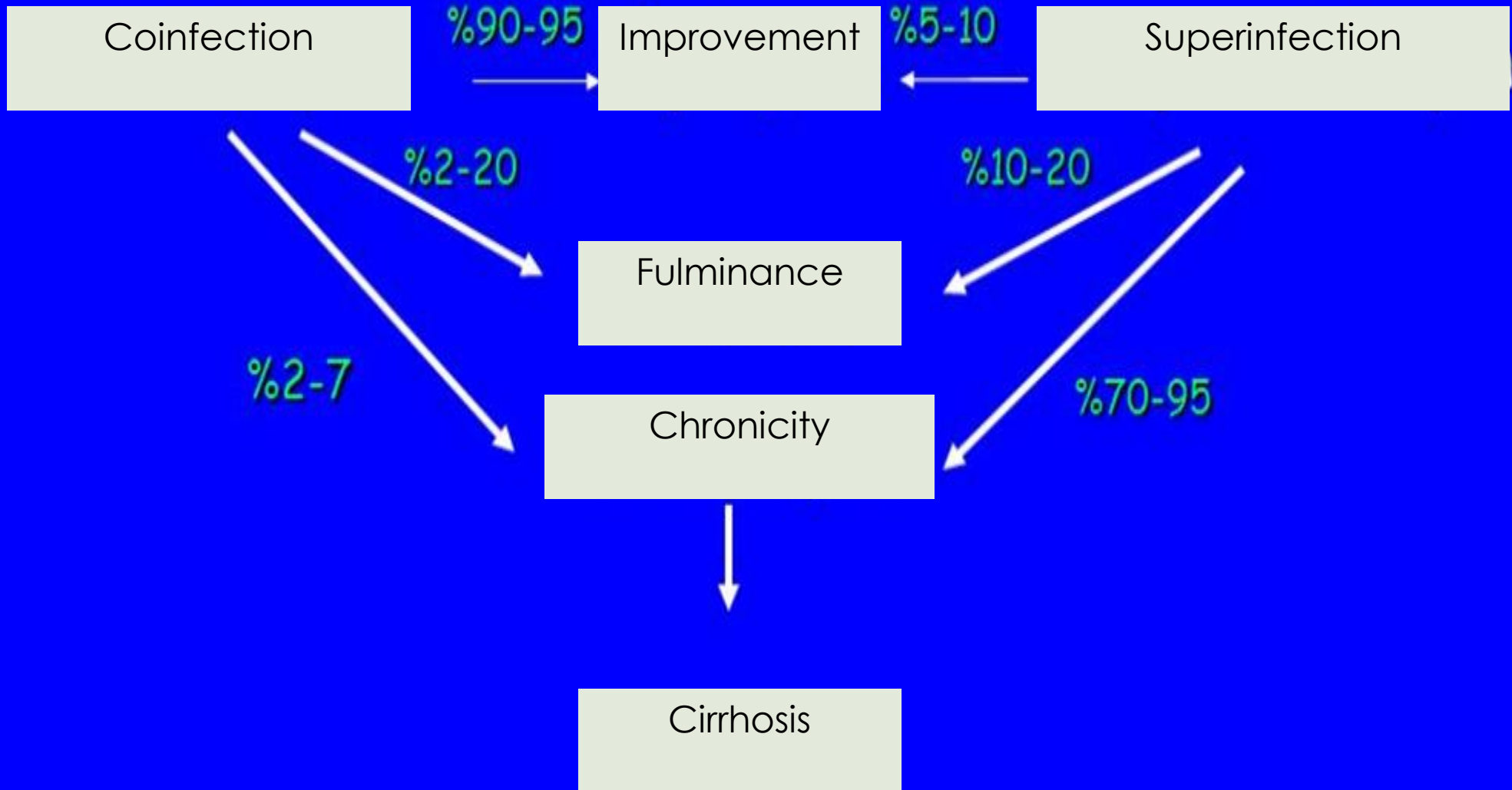


HBV

HDV



# COURSE OF HDV INFECTION

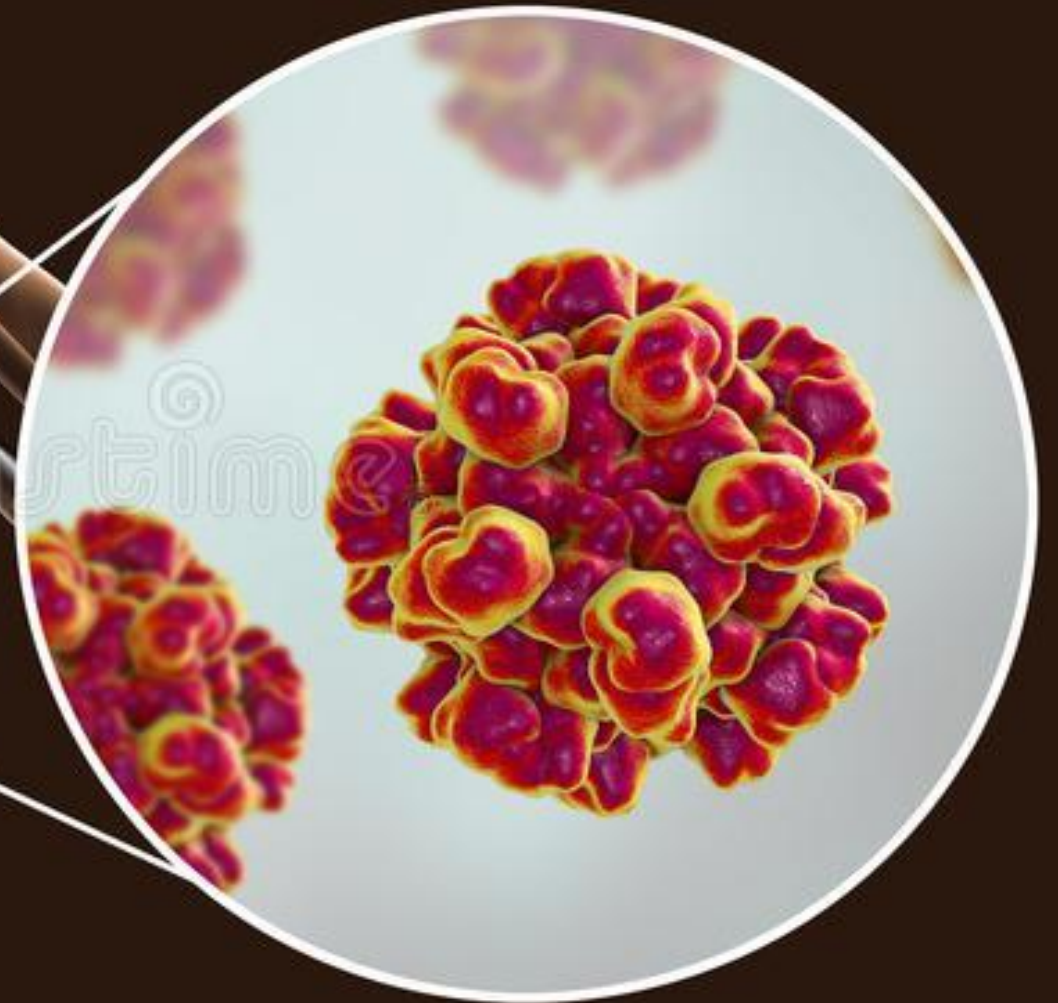


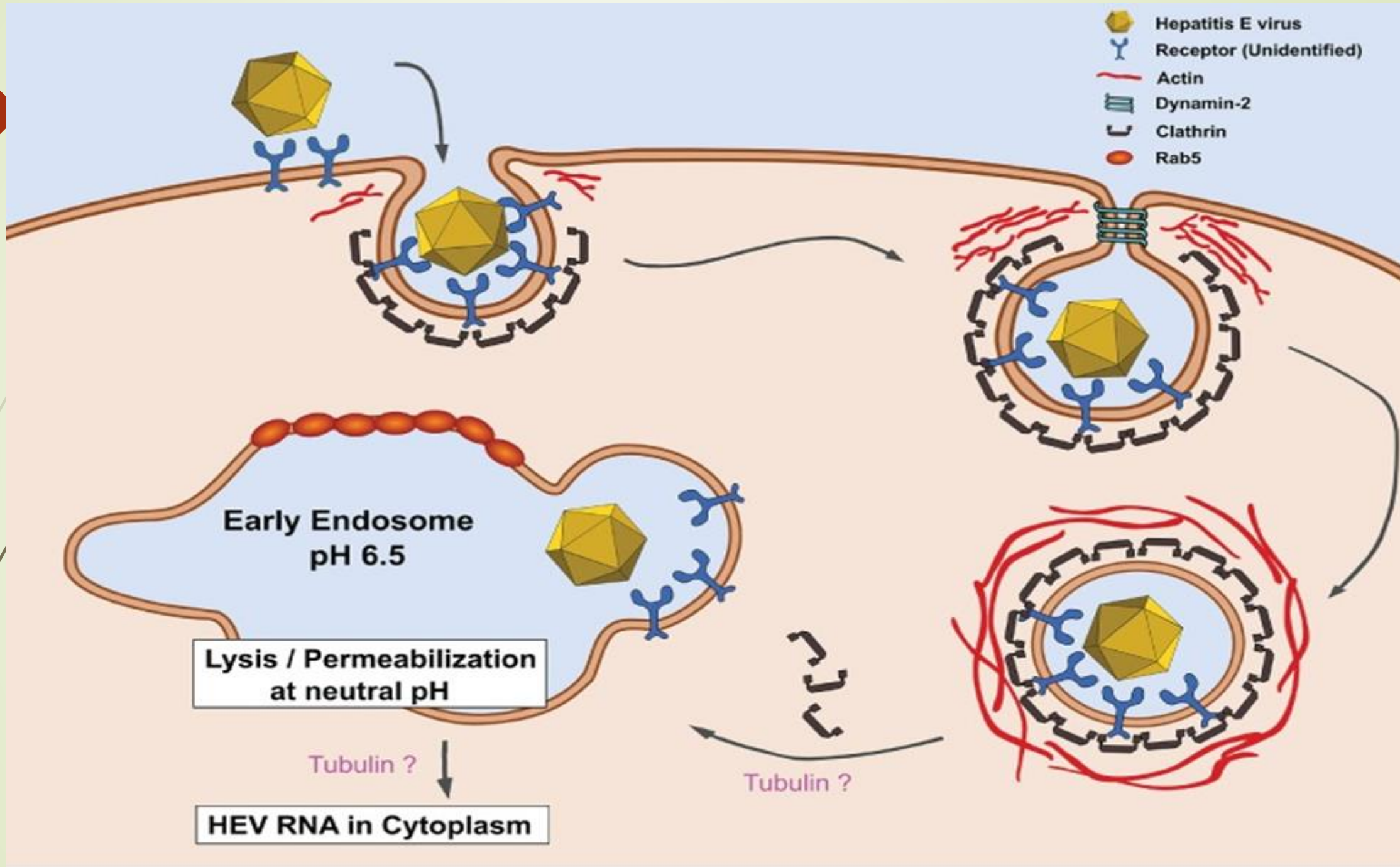
# Serological examination of hepatitis D virus

HbsAg	Anti-HBs	Anti-HBc-IgM	Anti-HDV IgM	
+	-	+	+	B+D co-infection
+	-	-	+	B+D Superinfection



# Hepatitis E



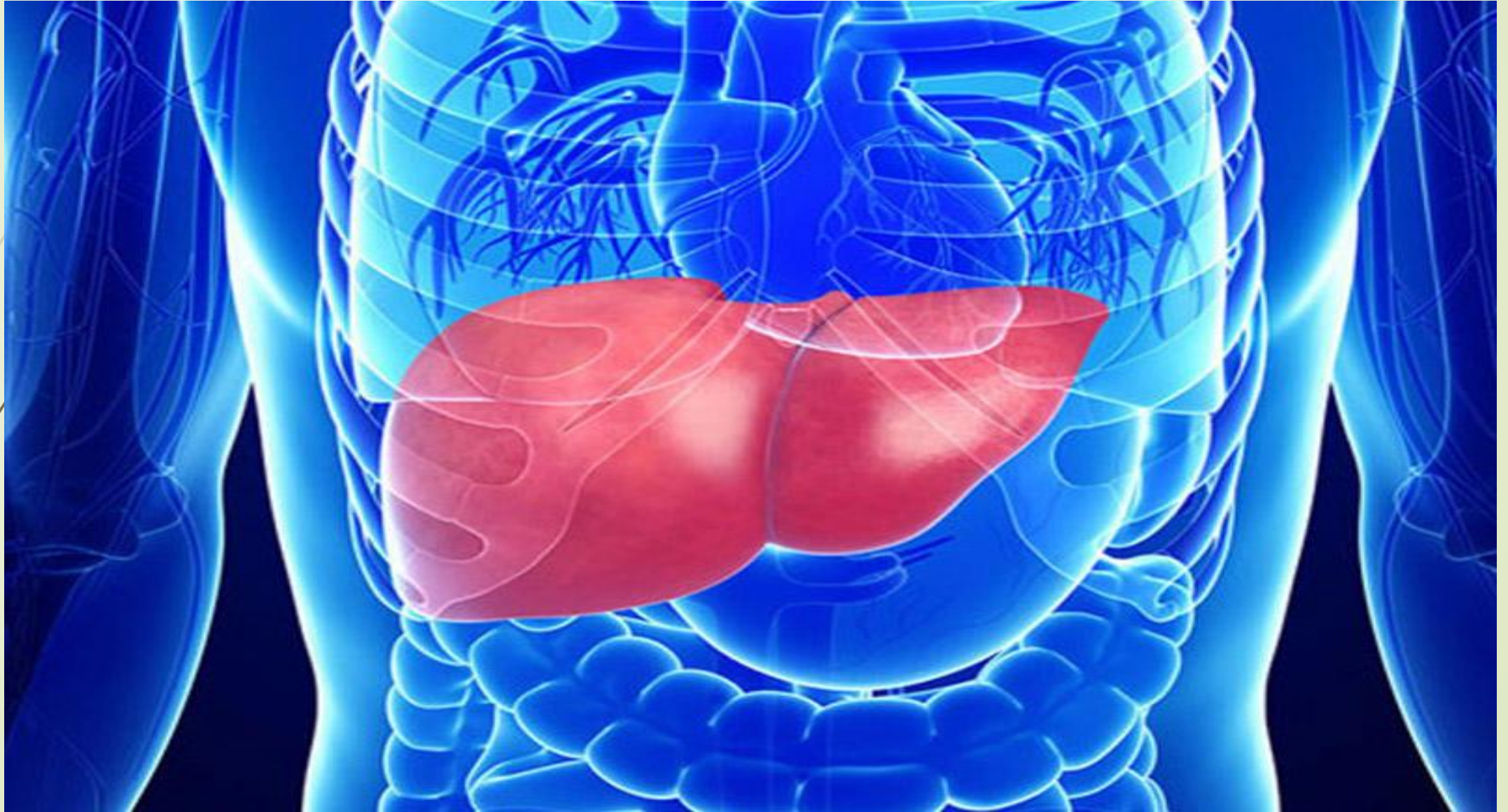


# Serological examination of hepatitis E virus

<b>Anti-HEV-IgM</b>	+	It is positive in acute infection
<b>Anti-HEV-IgG</b>	+	Indicates a transmitted infection



# AUTOIMMUNE HEPATITIS



## Types and markers of autoimmune hepatitis

Marker	Type I	Type II	Type III
ANA	+	-	-
Anti SMA (muscular antibody)	+	-	-
Anti-liver Kidney Ab* (anti LKM)	-	+	-
Anti-HCV	-	+	-
Qammaqlobulin (IgG)	increased	Norm	Norm
Anti SLA (soluble liver antigen)	-	-	+





# ALCOHOLIC HEPATITIS

## *Diagnosis of alcoholic hepatitis*

**Hematological indicators**

**Macrocytic anemia (MCV ↑)  
Leukocytosis**

**LOW/LOW-2**

**More than 3 for alcoholic hepatitis is specific**

**ALT**

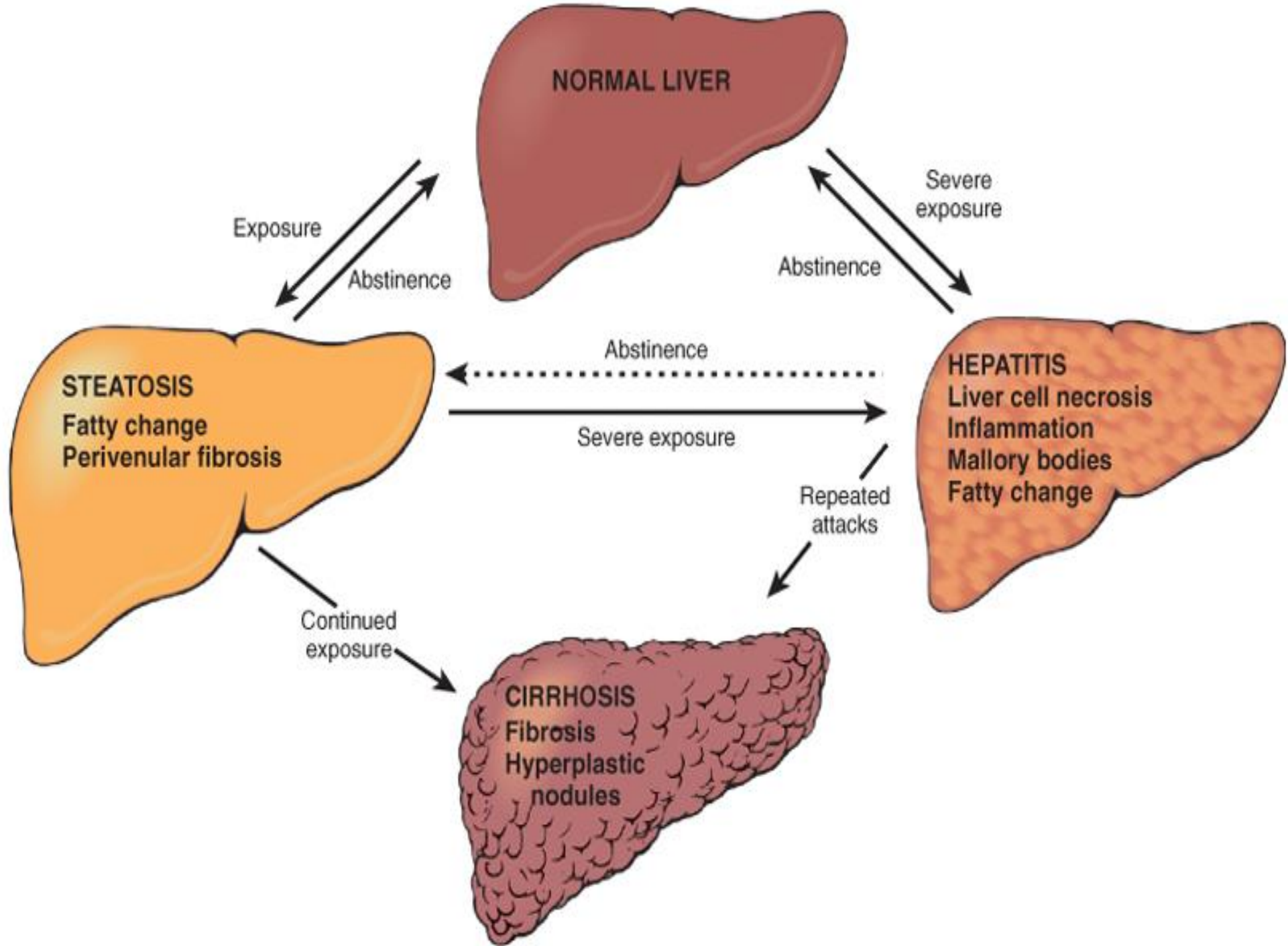
**Normal**

**GGT**

**It is high**

# Alkohol hepatiti və sirrozu fərqləndirən xüsusiyyətlər

	Alkohol hepatiti	Sirroz
Alkoholdan istifadə tarixi	Davamlı alkohol istifadəsi (qəbuldan ən azı 2 ay əvvəl)	Qəbuldan bir neçə həfə əvvəl alkoholda istifadənin dayandırılması
Sarılığın vaxtı	Sarılığın son zamanlar olması	Xronik sarılıq
Transaminazalar	AST yüksəkdir lakin < 500 AST/ALT >3	Transaminazalar əhəmiyyətli dərəcədə yüksəlməmişdir AST/ALT < 2
Bilirubin	>3 mg/dl	Daha çox artır
Qaraciyərdən kənar dəyişikliklər (məs. ginekomastiya, teleangektoziya və s.)	Görülə bilər	Daha çox görülür



***THANK YOU FOR YOUR ATTENTION***

***YOUR QUESTION ???***

***ADDITIONAL ???***

