



النادي  
MC  
الطبي

Done By :  
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لا تنسونا من دعائكم بالتوفيق

Which statement regarding fungi is correct? 17

- (A) All fungi are able to grow as yeasts and molds.
  - (B) Although fungi are eukaryotes, they lack mitochondria.
  - (C) Dimorphic fungi produce hyphae in the host and yeasts at 25°C.
  - (D) The major components of fungal cell walls are chitin & glucans.
  - (E) Fungi have single chromosome.
- D

33

A girl who pricked her finger while pruning some rose bushes, develops 18  
a local pustule that progresses to an ulcer. Several nodules then develop  
along her forearm. The most likely agent is:

- A) *Aspergillus fumigatus*.
  - B) *Sporothrix schenckii*.
  - C) *Madurella mycetomatis*.
  - D) *Candida albicans*.
  - E) *Histoplasma capsulatum*.
- B

28

A 10-year-old child complains of a burning sensation in his mouth and pain on swallowing. He has a history of two weeks antibiotic treatment for previous chest infection. On examination, whitish lesions are seen on his tongue, palate and pharynx. Gram stain of a swab from the lesions demonstrates budding yeast. The most likely diagnosis is: 17

- A) Infection with *Herpes simplex* virus.
  - B) Infection with *Candida albicans*.
  - C) Infection with *Cryptococcus neoformans*.
  - D) Infection with *Histoplasma capsulatum*.
  - E) Infection with *Microsporum canis*.
- B

34

A 50-year-old woman receiving chemotherapy via a subclavian catheter 18  
for acute leukemia. She presented with fever and stiffness in the neck with  
clinical suspicion of meningitis. CSF culture grew budding yeasts that  
formed germ tubes. The organism most likely causing this infection is:

- A) *Cryptococcus neoformans*.
  - B) *Candida albicans*.
  - C) *Candida krusei*.
  - D) *Histoplasma capsulatum*.
  - E) *Candida tropicalis*.
- B

29

An 8-year-old girl has an itching rash on her chest. The lesion is round 17  
with an inflamed raised border and central clearing. What do you expect  
to see in KOH preparation of skin scrapings from his lesion?

- A) Pseudo-hyphae.
  - B) Septate hyphae and chlamydo spores.
  - C) Budding cells.
  - D) Septate hyphae and arthrospores.
  - E) Aseptate hyphae and arthrospores.
- D

35

*Aspergillus fumigatus* can be involved in a variety of clinical conditions. 18  
Which one of the following is LEAST likely to occur?

- A) Tissue invasion in immunocompromised host.
  - B) Allergy following inhalation of airborne particles of the fungus.
  - C) Colonization of tuberculous cavities in the lung.
  - D) Thrush.
  - E) Pneumonia and hemoptysis.
- D

30

Dermatophytes are fungi that: 17

- A) Infect the superficial keratinized areas of the body.
  - B) Cause inapparent systemic infections.
  - C) Invariably invade the subcutaneous tissues.
  - D) Produce morphologically identical spores by all genera.
  - E) Best grow at 37°C.
- A

36

A 30-year-old woman has a painless ulcer on her tongue. She is HIV 18  
patient. Biopsy of the lesion revealed yeasts within macrophages.  
What is the most likely diagnosis?

- A) Candidiasis.
  - B) Cryptococcosis.
  - C) Sporotrichosis.
  - D) Histoplasmosis.
  - E) Aspergillosis.
- D

31

Mycotoxins are toxins produced by fungi. 18

Which of the following statements best describes aflatoxin?

- A) It is readily treated with antifungal drugs.
  - B) It is transmissible between persons.
  - C) It causes chronic damage and neoplasm in liver.
  - D) It is produced by poisonous mushrooms.
  - E) It is produced by *Aspergillus fumigatus*.
- C

32

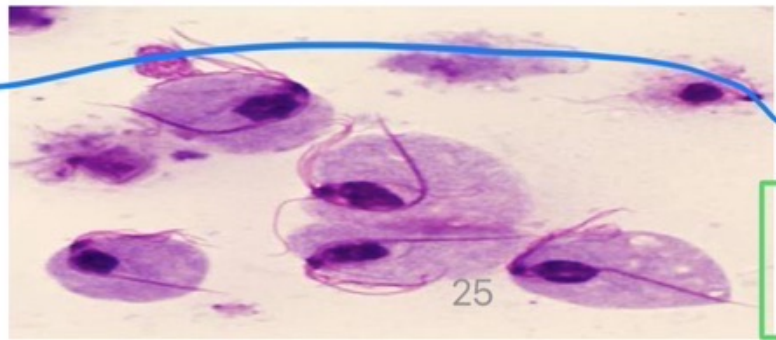
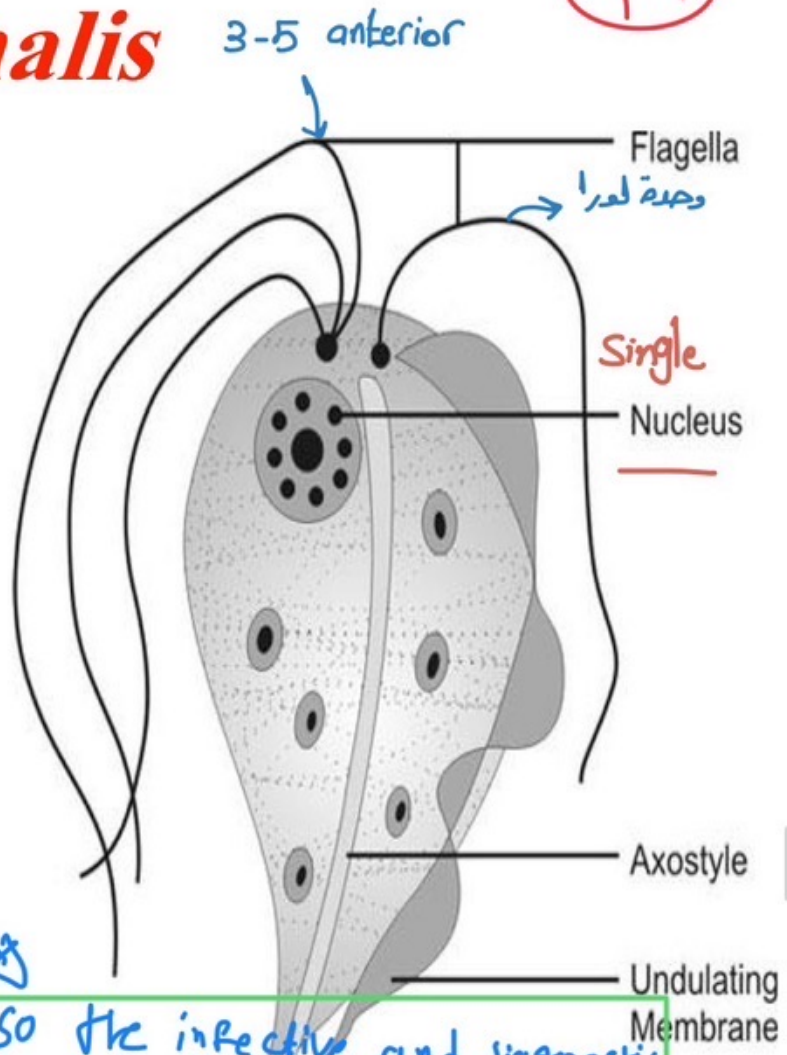
الذكرة قالت أنه واحد  
منه وول الة حلة رح يجي  
بالامتحان هي ابصوا

Urogenital Flagellates: <sup>مثل</sup> → *Trichomonas vaginalis*

**Morphology**

1) Trophozoites <sup>بشكل</sup> are pear shaped, and have single nucleus, **3-5 anterior flagella**, and <sup>متعرج</sup> undulating membrane bordered by flagellum.

2) No cyst stage, <sup>للموت</sup> so infection occurs by trophozoites.



So the infective and diagnostic stage is: Trophozoites



# Giardiasis ← *Giardia lamblia* (Pear shaped,)

ببعض مرض

(Pear shaped,)

- Trophozoite attaches to the gut wall (not invade the mucosa /bloodstream)  
 of small intestine  
 duodenal mucosa في Superficial inflammation تبطل
- > inflammation of the duodenal mucosa —> malabsorption of protein and fat.  
 and diarrhea
- Most cases are asymptomatic.  
 بتصيب الاطفال اكثر
- Symptoms range from mild diarrhea, flatulence, cramp-like abdominal pains  
 غازات  
 فحش شديد  
 to steatorrhea (fatty diarrhea). →  
 فاني blood
- The stool is foul smelling, greasy in appearance and devoid of blood.  
 خالية

20

# Life cycle

جزء بالحشرة وجزء بالانسان عنا tsetse fly (infected) فيها trypomastigote بتيجي بتقرص الشخص السليم وبتنقلوا اياها (بتصل بالدم ما يتدخل الخلايا) بتصل تتكاثر هناك ويتروح ل tissue معينة ، بعدين بتيجي حشرة ثانية سليمة بتقرص هذا الشخص ويتوخذ ال trypomastigote وبتتحول ل epimastigote

**Definitive host:** Man.

**Habitat:** All tissues specially REC (Reticuloendothelial cells) and CNS.

**Vector:** *Glossina* (tsetse fly). *اسم ال Vector ملهم*

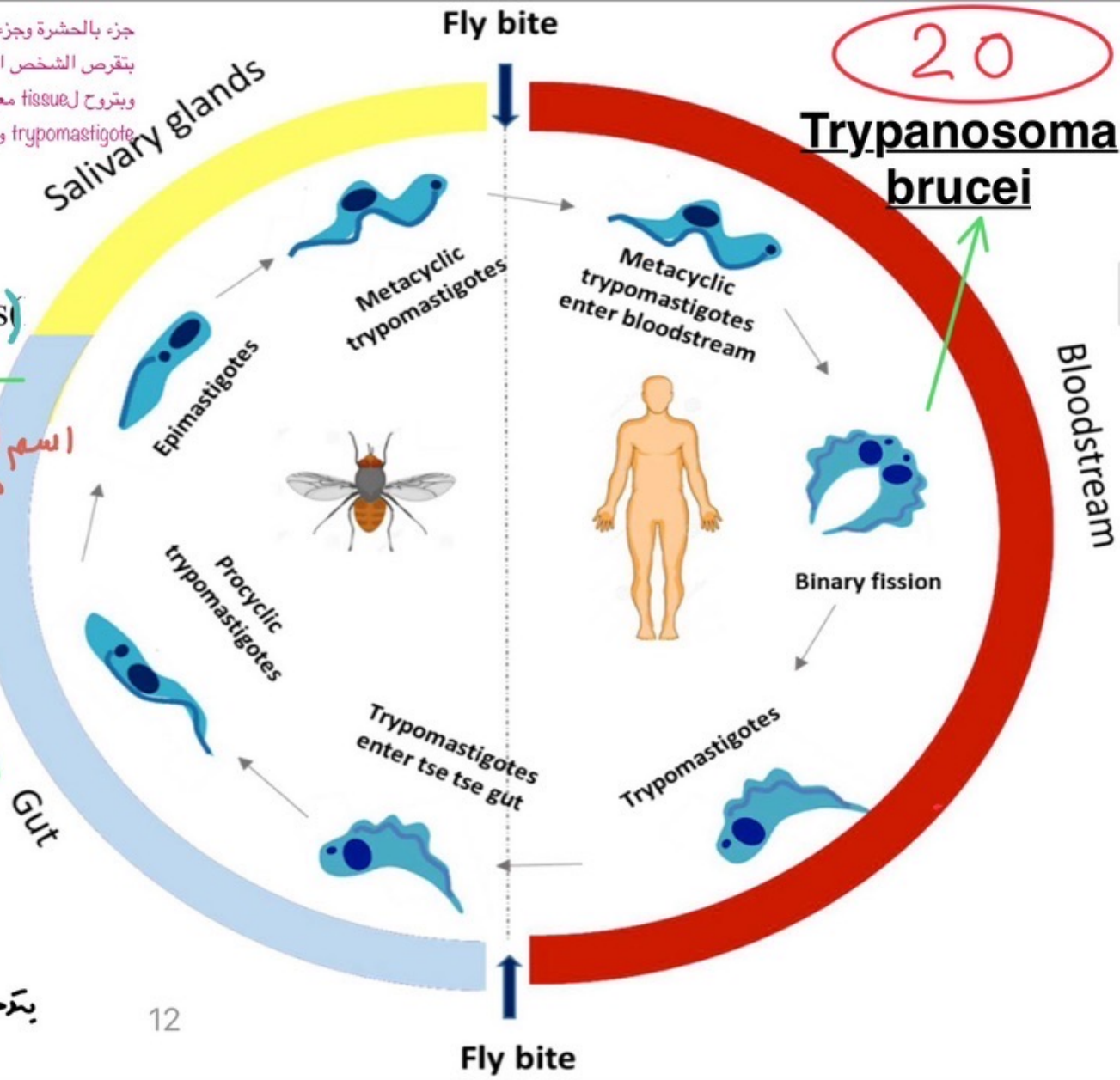
**Infective stage:** Trypomastigote.

**Mode of infection:**

- 1) Bite of tsetse fly.
- 2) Congenital infection (rare).
- 3) Blood transfusion.

**Diagnostic stage:** Trypomastigote.

*بتحدر الجسم وبتطلع به وانه متحول*





# Leishmania

بتعلق  
مرضها

# Leishmaniasis

الدكتورة ركنة مهنون  
مرضها كلمة Kala-Azar

20

Results from the invasion of RES by amastigotes which multiply enormously in the macrophages. This leads to a marked destruction and proliferation of reticuloendothelial tissue. It may be:

حشوية

## 1 Visceral leishmaniasis (kala-azar) (black fever): حمى سوداء

- Persistent fever (Azar) and hyperpigmentation of skin (Kala).
- Hepatomegaly, splenomegaly and generalized lymphadenopathy.
- Pancytopenia (Anaemia, repeated infections, intestinal hemorrhage).



ال RBC بتناثر

ال WBC بتناثر

## 2 Cutaneous leishmaniasis:

- Single or multiple papules that ulcerate.
- The ulcers healed leaving scars or secondary infected.



## 3 Mucocutaneous leishmaniasis:- Rare, affect nasopharynx.

➤ Malarial paroxysmal attacks recur at the following intervals:

مهم

20

a) *P. vivax* and *P. ovale* attack occurs every 48 hs (<sup>اليوم الثالث</sup> tertian malaria).

b) *P. malariae* attack occurs every 72 hs (<sup>اليوم الرابع</sup> quartan malaria).

c) *P. falciparum* attack occurs from 24 - 48 hs (<sup>الاخطر</sup> Subtertian or irregular malaria).

ممكّن ما تكون نالها  
مؤعد وحدود

الدكتورة ركزت عليهم كثير  
وقالت الثالثة (C) هي

ممكّن يكونه وقتها مشي

محدد باختصار  $a = 48$  h

$c = 24 = 48$

$b = 72$

(أي وقتهاي مثلا (يوم ريفه , 8 ساعات...)+



# Sporozoa 2 *Toxoplasma gondii*

- Tissue sorozoa:

## Morphology

Toxoplasmosis : داء القطط

20

- **Tachyzoite:** It is crescent-shaped, rapidly multiplying  
سريرة. طفيلية الشكل

parasite stage . موجودة داخل خلايا الدم بال (circulation)



- **Bradyzoite (tissue cyst):** This is accumulation of slowly  
بطيئة

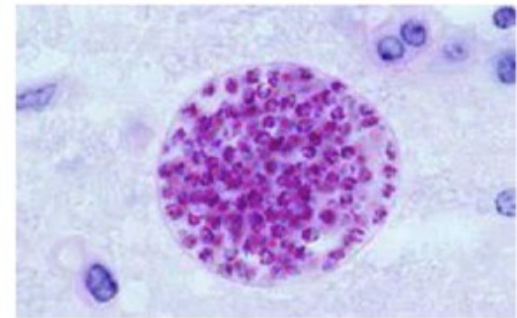
multiplying parasite stage.



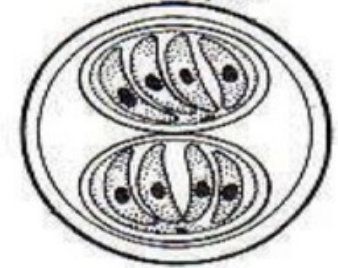
لا تكوّن إلا بال (cats) sexual reproduction + Q

- **Oocyst:** It is oval, 2 sporocysts each contain 4  
بويضات (sexual reproduction)

sporozoites. It is formed only in **cats (definitive host)**.



Sporulated oocyst





## General characteristic morphology of Trematodes:

### A) Adult form:

- Flat (NO body cavity), leaf-shaped **unsegmented**.  
*زي درقـ الشجر ( غير مقسمات )*
- **Organ of fixation:** They all live in lumens and so they possess **suckers** (oral and ventral suckers), except *H. heterophyes* which has extra genital sucker.  
*اعضاء بتساعدھا تثبت بال lumen*
- All are **hermaphroditic** (The adult worm contains male and female genital organs) **except schistosomes have separate sexes**.  
*في نفس ال worm*

B) The eggs are usually oval and **operculated** **except** for schistosomes, which are spined.

*شوكية*

*ركزوا على موضوع ال (except)*

# Life cycle

# Schistosoma

## Habitat:

*Schistosoma mansoni*

*S. haematobium*

Mesenteric or vesical venous plexus

Definitive host: Man.

Intermediate host:

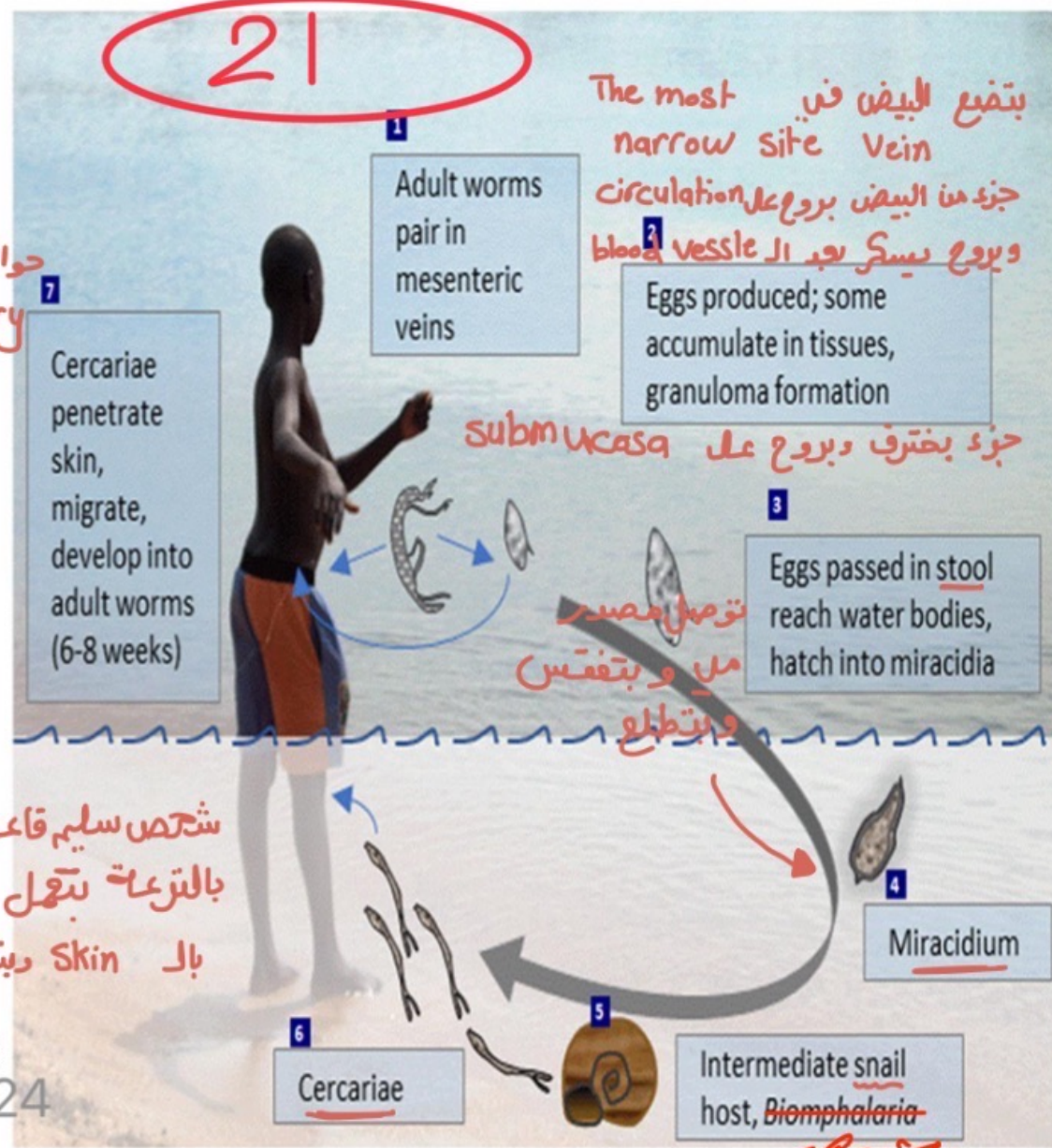
~~*Biomphalaria alexandrina*~~ snail

Infective stage: Forked tailed Cercaria.

Mode of infection:

skin penetration by cercariae.

Diagnostic stage: Eggs in stool or urine



# Schistosomiasis (Bilharziasis)

ركزوا على اسم المرض



# General life cycle of Cestodes:



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All medically important cestodes require:

a. **Definitive host** (vertebrate).

عليهم سوء ال

b. **Intermediate host:** Beef in *T. saginata*.

بتختلف حسب نوع الدودة

- Pork in *T. solium*.

**الاهم** - Cyclops and fish (two intermediate hosts) in *D. latum*.

**Mode of infection:** By ingestion of infective stage in contaminated undercooked beef, pork or fish.

# Diphelobothriasis

تحتوي ع groove

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مرهم  
جدا  
وعليه  
سؤال  
بالإضافة

- Caused by *D. latum*.
- GIT disturbances: nausea, vomiting and diarrhea.
- Hunger pain, loss of weight as the adult worm absorbs large quantities of nutrients.
- Intestinal obstruction may occur related to large number of long worms.
- **Macrocytic hyperchromic anemia** as the adult worm absorbs large quantities of **vitamin B12**.

طويلة وشريهة كثييير ف بتوكل اكل كثير من غذاء الشهص الي موجودة فيه ، المريض عطول  
جوعان وبيوكل كثير ومع ذلك بخسر وزن

بتسکر الامعاء

الاهم : بتحب كثير الفيتامين B12 بتسبب نقص فيه ويتسبب انيميا من هاي النوع

*Ancylostoma duodenale*. Cause **Microcytic hypochromic anaemia**

Nematodes (Round worms)

فرقه بين الياثنين لانه سؤال  
الامتحان فيه الخيارين



أكثر معلومة عارضا الدكتور بمحاضراته

# Distinguishing characteristics of viruses

Obligate intracellular parasites

لازم يدخل على الخلية

• Extreme genetic simplicity

genome + DNA or RNA  
← مش كبير

• Contain DNA or RNA

• Replication involves disassembly and reassembly

• Replicate by "one-step growth"

الفيروس اول ما يدخل على الخلية يهمل  
disassembly  
بتفكك الى مركباته الاوليه

بعد الreplication وهناعه بروتينات بصير  
reassembly

? Enzymes	DNA None or few	virus
? Multiplication by binary fission (most cells)	RNA No	

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في انواع فيها وانواع لك  
 Replication ← RNA  
 بدير حاله بال ← DNA  
 بعضه الانزيمات عن ال host cell  
 Few  
 Non

عنا نوعين للفيروسات  
 Structural ( Capsid و Glycoprotein )  
 اليبخلوا بتكوين الفيروس وال الفيروس بضمعه  
 Non structural  
 انزيمات ما بتعمل الفيروسات بدونهم

All DNA viruses are icosahedral except pox virus is complex

\* كل ال DNA virus بتتضاعف (تتقسم) جوا الخلية واعدا  
 (replicated)

Pox virus  $\xrightarrow{\text{عمل فرغ}}$  small box

بتقسم جوا السيتوبلازم لئلا حجم كبير  
 فعارج يقدر يخترق النواة.

\* كل ال RNA virus بنفسه بالسيتوبلازم واعدا HIV و influenza

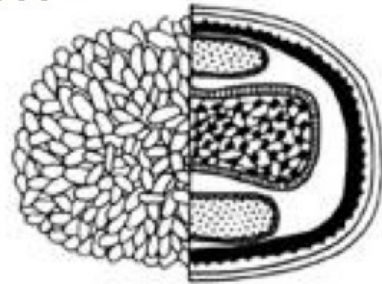


Virus particle = virion

All DNA viruses replicate in the nucleus EXCEPT Pox virus

15

DNA Virus  
largest  
replicate in cytoplasm



Poxviridae



Herpesviridae envelop

22

Naked

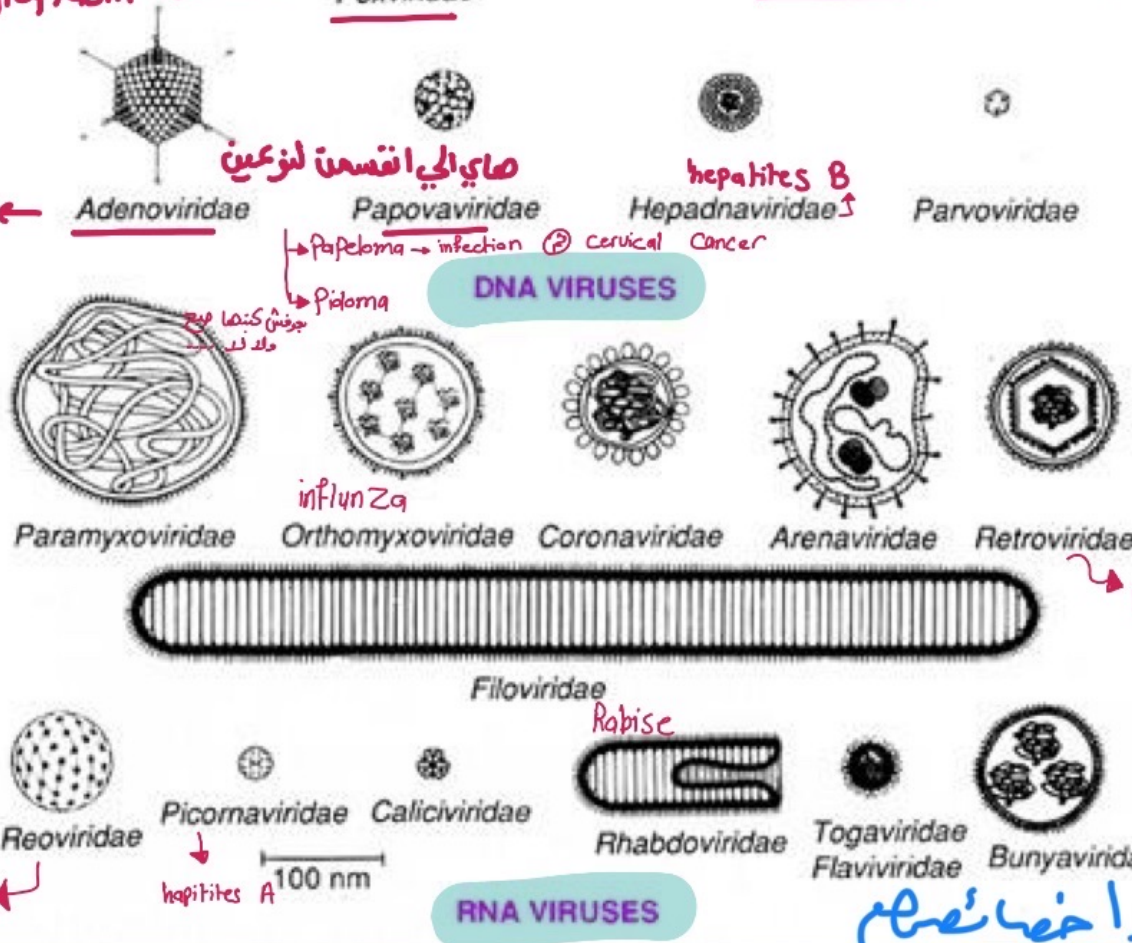
قاعدة عادية:

اذا كان Naked



Icosahedral

Rota Virus



صاي الي اقسام لتزعين

hepatites B

Hepadnaviridae

Parvoviridae

DNA VIRUSES

Papeloma -> infection @ cervical cancer

Piloma

جوش كنهها هوج ولد ليه

influnza

HIV

Rabise

hepatites A

RNA VIRUSES

كثير منهم

تكونوا عارفين

له دور عشانه تعرفوا حضانهم

لما يبتدئ

اسمهم

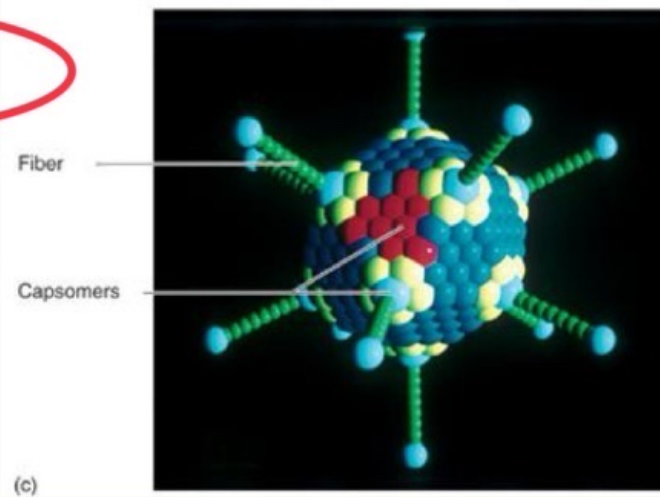
بالاستعانة

All RNA viruses replicate in the cytoplasm except: infl... / HIV

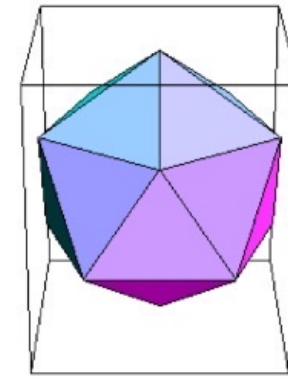
All hepatitis viruses are RNA viruses except hepatitis (B)

22

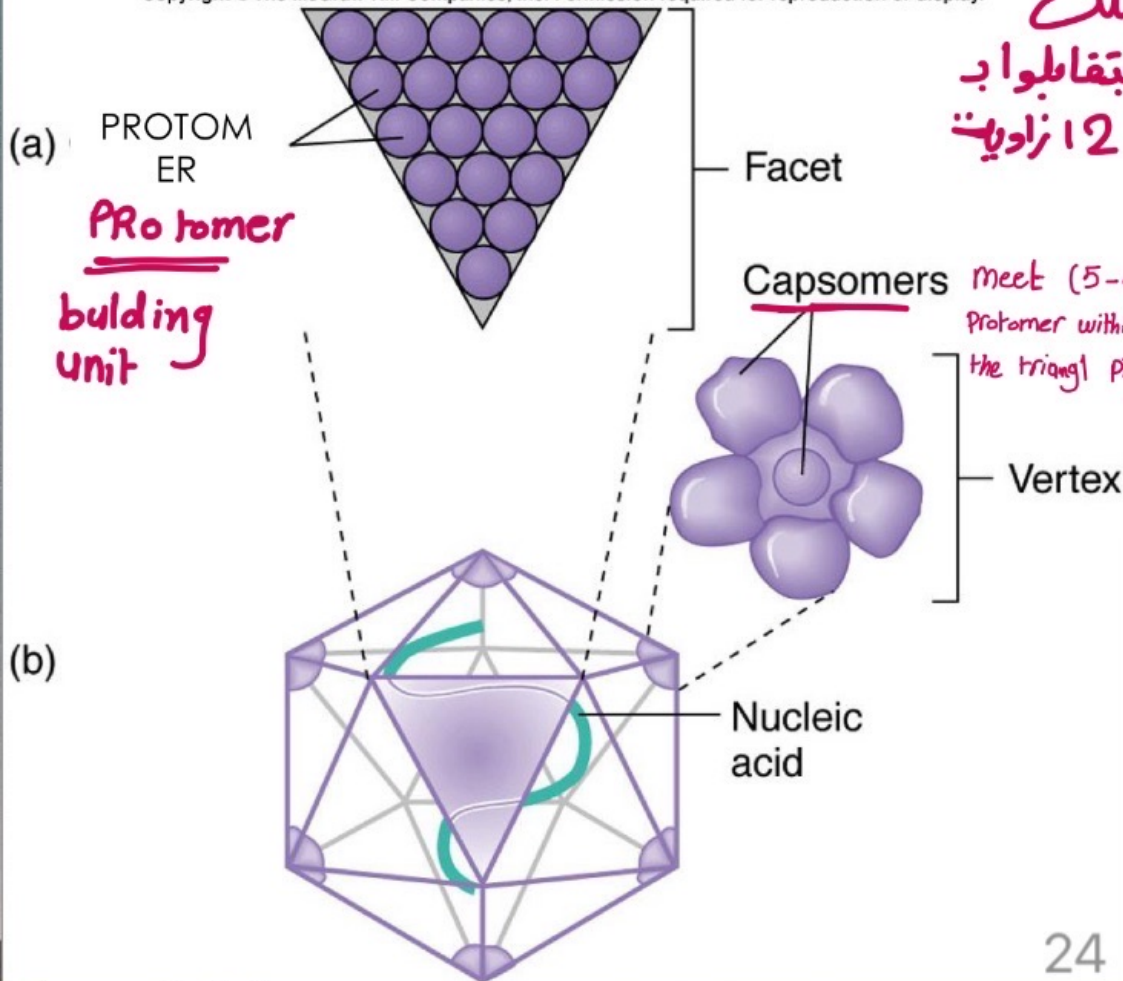
# Icosahedral



## Morphological types



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20 وجهه مثلث  
20-سided with 12  
corners  
بمقابلها 12 زاوية

20-sided with 12 corners

Vary in the number of capsomers

Each capsomer may be made of 1 or several proteins

Some are enveloped



In the GI tract the virus prefer to be naked, because the envelope is a lipid bilayer which will be destroyed by gastric acidity and after the loss of the envelope the virus will become uninfecous because the spiko proteins embedded on the envelope is responsible for the attachment of the virus to the target cell

also naked viruses are more resistance to the enviromental conditions

like heat, enveloped viruses is going to be uninfecous in high

temperature, also in terms of disinfective - naked virus can tolerate

more concentration of <sup>تركيز المطهر</sup> disinfectant than enveloped viruses

naked virus more resistance than enveloped  
naked virus tolerat more concentration of disinfectant

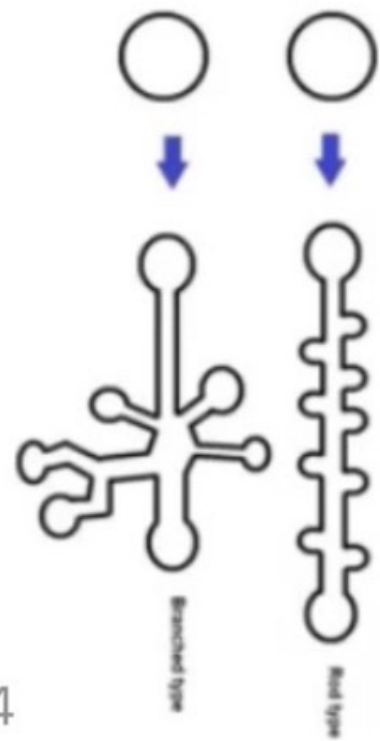
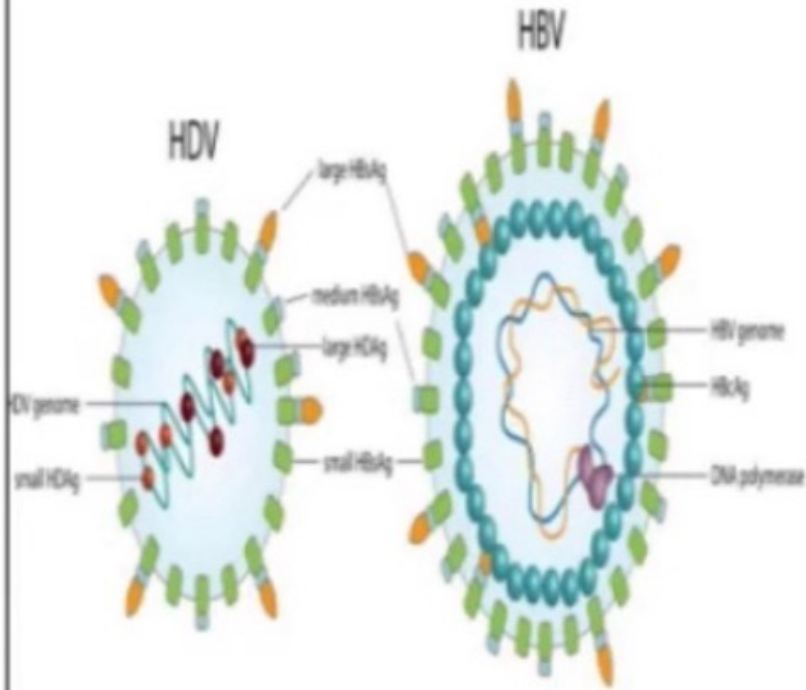
23

23

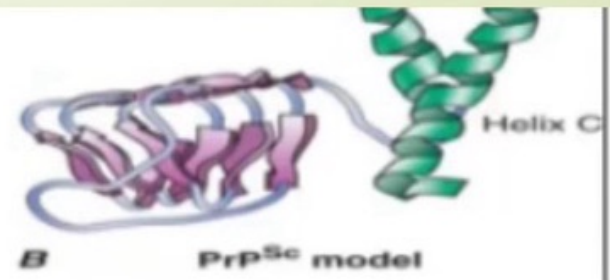
All of DNA viruses are ds DNA  
Except "Barbo virus" that is ss DNA




	satellites	viroids	Prions
Structure	*Contain nucleic acid May be encapsidated → satellite virus If nucleic acid only = virusoid	– Unencapsidated, small circular ssRNA molecules that replicate autonomously	– No nucleic acid – Infectious protein e.g. BSE – Highly heat resistant
For replication	Depend on co-infection with a helper virus or super infection (can't infected alone)	Depend on host cell pol II for replication, no protein or mRNA *obligate intracellular parasites	23
Example	– Mostly in plants, can be human e.g. hepatitis delta virus need hepatitis B	Only in plants, e.g. potato spindle tuber viroid -smallest known pathogens	– Animal disease that affects nervous tissue – Affects nervous tissue and results in • Bovine spongiform encephalitis (BSE) "mad cow disease", • scrapie in sheep • kuru & Creutzfeld-Jakob Disease (CJD) in humans



كيف يصير ال replication  
When PrP<sup>Sc</sup> comes in contact with PrP<sup>c</sup>, it converts the PrP<sup>c</sup> into more of itself. These molecules bind to each other forming aggregates.



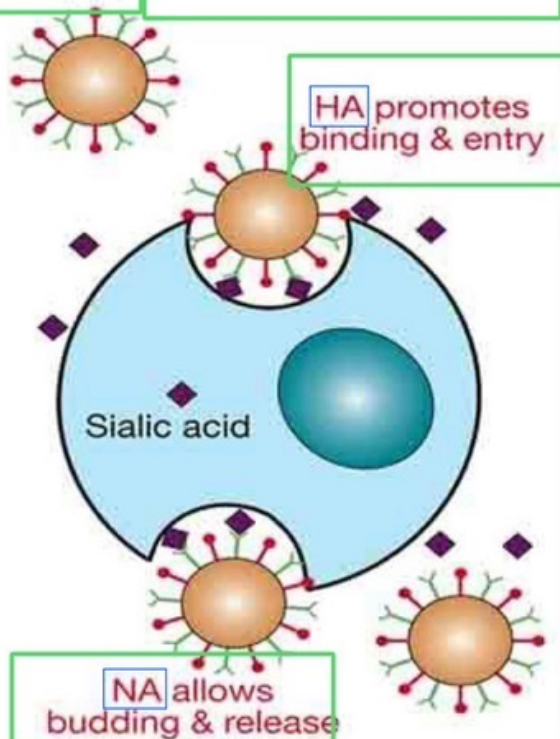
<p><b>Kuru</b> → illness from the past            لطبخوا اللحم وشدوا شوريه</p>	<p><sup>exogenous</sup>  <b>Human Transmissible</b></p> <p>another name of          Prion protein transmissible spongiforms → <b>encephalitis</b></p>	<p>Kuru prion</p>	<p>HuPrP<sup>Sc</sup></p>
<p><b>Creutzfeldt-Jakob disease (CJD)</b> two type ⇒ classic + variant</p>	<p>Human  <b>Sporadic</b></p>	<p>CJD prion</p>	<p>HuPrP<sup>Sc</sup></p>
<p><b>Gerstmann-Straussler-Scheinker syndrome (GSS)</b></p>	<p>Human  <b>Familial</b> (<u>inherited</u>)</p>	<p>GSS prion</p>	<p>HuPrP<sup>Sc</sup></p>
<p><b>Fatal familial insomnia (FFI)</b></p>	<p>Human  <b>Familial</b> (<u>inherited</u>)</p>	<p>FFI prion</p>	<p>HuPrP<sup>Sc</sup></p>

Handwritten notes: A red circle is drawn around the word "Familial" in the GSS row. A red oval is drawn around the "GSS prion" and "HuPrP<sup>Sc</sup>" cells in the GSS row, with the numbers "23" written inside. A red "X" is drawn over the "inherited" text in the GSS row. A bracket on the left side of the table groups the GSS and FFI rows.



# Influenza Viruses

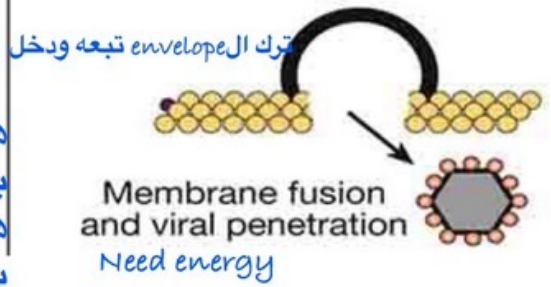
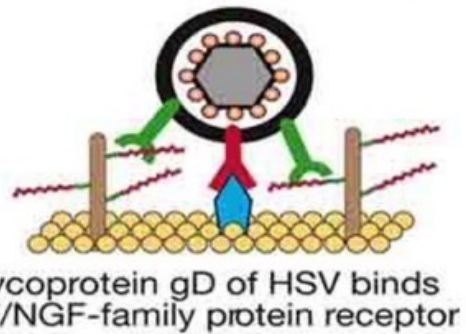
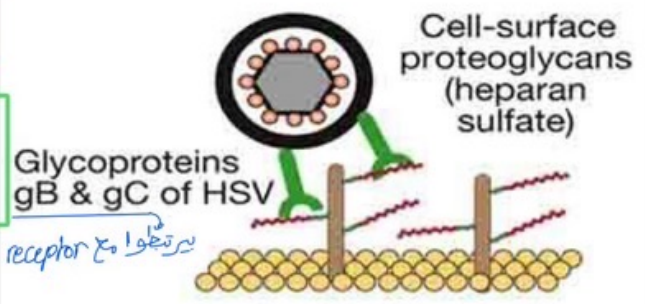
- tetramer Neuraminidase (NA)
- trimer Hemagglutinin (HA)



هل هو بحاجة النوعين من GP ويرتبطوا بال receptor لحتى يدخل الفيروس؟ هو يحتاجهم لكن مش بنفس الوقت واحد بيحتاجه ليدخل واحد بيحتاجه ليخرج

until cleavage occurs

# Herpes Simplex Virus



أول شيء بيمسكوا بالسطح وبيبدأوا يعملوا شق فيه وشوي بيكبر وبيعطي فتحة كبيرة يقدر ال nucleocapsid تدخل الخلية

24

How does an animal virus infect its host?

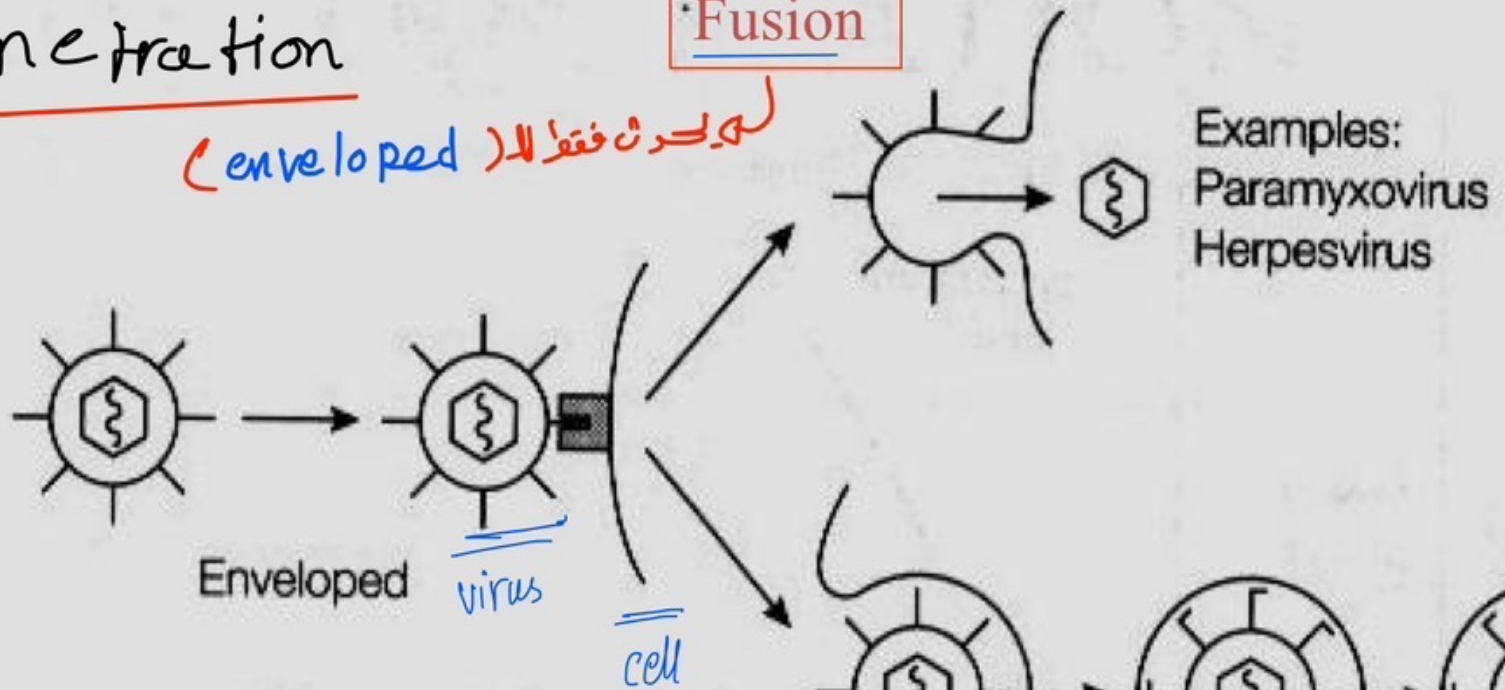
## Examples of Animal Virus Entry

- حمار ( HIV )
- لكونه ادر ( glycoprotein )
- ال بظليه يرتبط بال ( T-cell )
- اسمه ( GP-120 )

# Penetration

## Fusion

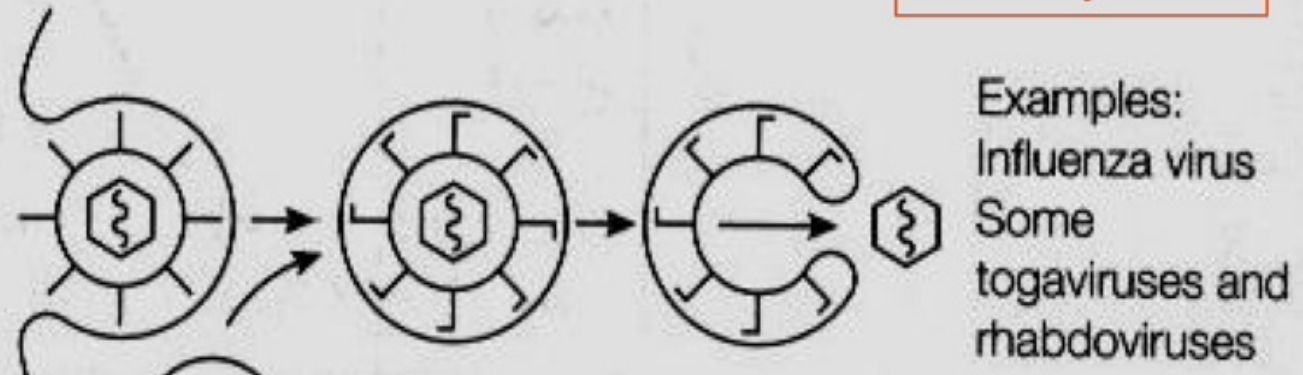
لويكون فقط لا (enveloped)



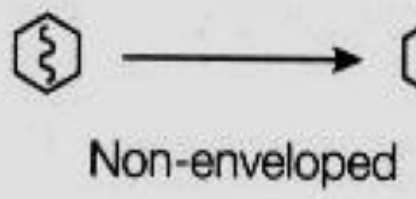
24

## Endocytosis

لويكون لا (enveloped and reached)



## Pinocytosis (Viropexis)



Examples:  
Poliovirus  
Adenovirus  
Reovirus



# Viral replication terminology

24

- (ركزوا أنه عدد الفيرومات با (Eclipse) يكون صفر
- وإنما ال (Latent) تشمل من رعدا النايردس حتى خروجه
- وكلما قل ال (MOI) مكانه أصغر

• Multiplicity of infection (MOI):  
ratio of infectious agents (e.g., phage or virus) to infection targets

Percentage of the number of viruses to the percentage of the number of target cells.

- 1 • Eclipse phase: period during which the input virus becomes uncoated; 10-12h
- 2 • Synthetic phase: time during which new virus particles are assembled; 4-6h
- 3 • Latent period: no extracellular virus can be detected
- 4 • Burst size: amount of infectious virus produced, per infected cell ; 10-10,000

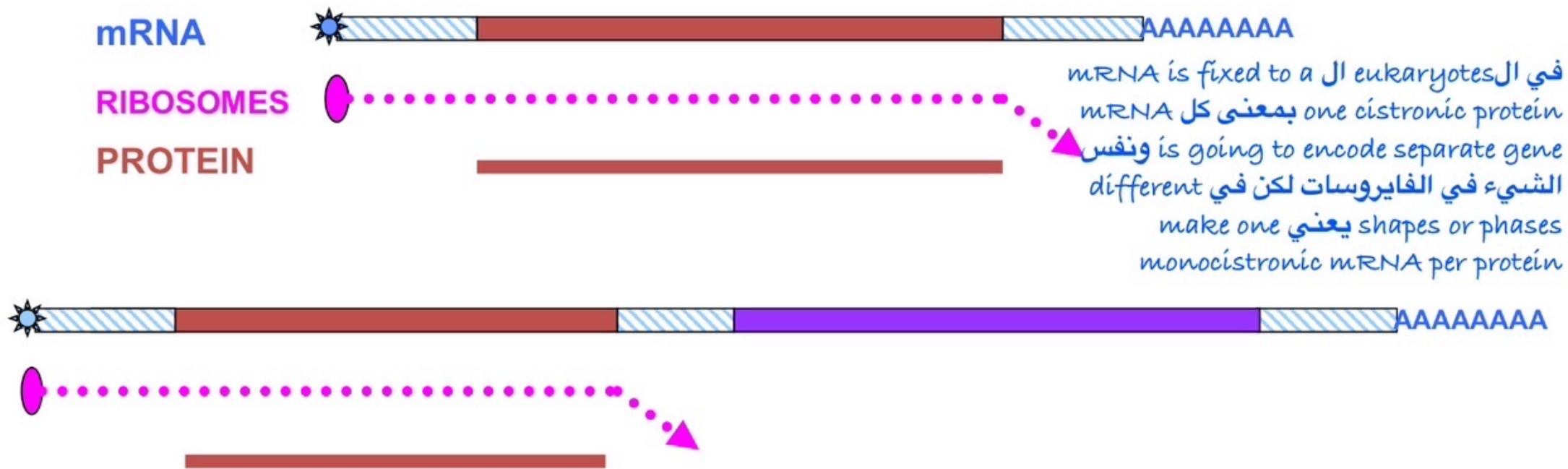
يعني لو في المختبر حطينا 1000 viruses على 10000 cells ال MOI=,1  
ولو حطينا 10000v على 1000 cells ال MOI=10

طيب شو الفائدة منها؟ ال MOI بتعطيني مؤشر عن الوضع يعني لو كان الجواب عدد صحيح مش عشري بعرف أنه عدد الفيرومات أكبر من عدد الخلايا بالتالي بعض الخلايا ممكن يدخلها أكثر من فايروس وممكن بعض الفيرومات تضل بلا host فهي inactive.

- بالعادة كل ما زاد ال input زاد output  
في MOI العكس (رح نوضحها لقدام خلوها في بالك).

# The monocistronic mRNA problem

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- Make one monocistronic mRNA per protein مثل ال segmented
- Make a primary transcript and use alternative splicing مثل positive sense
- Make a large protein and then cut it into smaller proteins
- Include special features in the mRNA which enable ribosomes to bind internally يعني في عندها signals معينة لما تيجي تعمل mRNA بتنبه على بداية الحين ونهايته (promoters and telomeres)





## الدكتور رجح أكد على واجب محاضرة 25 وحكى جاي بالامتحان

\* واجب- لدفعه وريد ما يعرف إذا حكاه الدكتور عنا:- بعض الnueclucapsid بيدخل كامل على nucleus وبعضها لا واحد العوامل الي بيعتمد عليها هو الحجم  
Which of DNA viruses uncoated in nucleus and which of DNA viruses replicate in nucleus and uncoated in the cytoplasm? the genetic material enter to nucleus

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Uncoating in the Nucleus:

Examples: Herpesviruses (e.g., Herpes Simplex Virus - HSV), Adenoviruses.

Replication in the Nucleus and Uncoating in the Cytoplasm:

Examples: Papillomaviruses, Polyomaviruses. (Papovaviridae)

Replication and Uncoating in the Nucleus (without Cytoplasmic Phase):

Example: Hepadnaviruses (e.g., Hepatitis B Virus - HBV).

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\*نحاول نتذكر شو أخذنا عن parvovirus ,

الدكتور ذكره ولخصه شو أخذنا عن هذا

(v) The smallest virus, ssDNA, replicate in the nucleus, totally dependent on the target cell and naked icosahedral virus

+ ما بقدر بحجر الخلية تدخل بال (S-phase) و يغذي نفسه فبتنامها

لحد متدخل بال (S-phase)



