



MICROBIOLOGY

SAEF DAWWAS

Eukaryotic Microorganisms and Parasites

Lecture# 4

Pharmaceutical Microbiology

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The Importance of Fungi

- fungi are used in the production of important foods (e.g., bread, cheese, wine, and beer).
- Fungi are also responsible for the spoilage of certain foods. مرات هاد التعفن هو مفضل لانه مفيد ومرات ما بكون بدى ياه
- Because molds can grow in a drier, more acidic, and higher osmotic pressure environment than bacteria, they tend to be involved in the spoilage of fruits, grains, vegetables, and jams.

مش كلها pathogenic

انو مش كلها مسؤول انو عملي المرض عادي ممكن تستفيد منها
بالزراعة والصناعة

ال fungi بتحمل ظروف الى بحتاجها بالصناعة مش زي البكتيريا
من هون بتكون مفضله اكثر انو تستخدم في الصناعة

The Importance of Fungi

- Important in **health sciences**, as **facultative parasites** -they can obtain **nutrients from nonliving organic matter or from living organisms**
- Are never obligate parasites because all fungi can obtain nutrients from dead organisms. انو مش ضروري تعيش عل living organisim عشان تتغذى في منهم بتغذوا
- Some fungi produce antibiotics that inhibit the growth of or kill على الميتين bacteria

fungi

لعبت دور كبير كبير في اكتشافات antibiotic لما وجد العالم
الكسندر فليمنغ انو وجود ال Penicillium ولما نمت جنب
البكتيريا وسببها ال kill لأنو افرز ماده معينه

PATHOGENESIS

لما احكي pathogenic
يعني انو هاذ organism
بسبب مرض

- Parasitic fungi can be destructive when they invade other organisms. These fungi have three requirements for invasion:
 - (1) proximity to the host.
 - (2) the ability to penetrate the host
 - (3) the ability to digest and absorb nutrients from host cells.
- Human fungal diseases are called **mycoses which are often caused by more than one organism**

Examples of pathogenic fungi:

Candida, Aspergillus, Cryptococcus and Histoplasma

عمل ال fungi بما انه parasit

أولا : attachet to the host

ثانيا : endoparasites (اذا كان داخل ال host) او على ال surface

ثالثا : هون بيلش يتغذى على ال host cell و بيلش يشتغل as parasite و يكون قادر انو يعمل distruction to host tissue

* مش شرط نوع واحد يسبب ال fungal infection

ANTIFUNGAL THERAPY

- The drugs used to treat bacterial diseases have no effect on fungal diseases. For example, penicillins inhibit the growth of many bacteria but do not affect the growth of fungi.
- This difference is explained by the presence of certain structures in bacteria
- E.g : **Amphotericin B** disrupts fungal cell membranes at the site of ergosterol and **azole drugs** inhibit the synthesis of ergosterol, which is an essential component of fungal membranes.

الدوا الي بعالج امراض البكتيريا ما بتعالج الفطريات لانو في اختلافات بين بينهم في جدار الخلية , فأختلافات ال structure هي الي عملت ال specificity

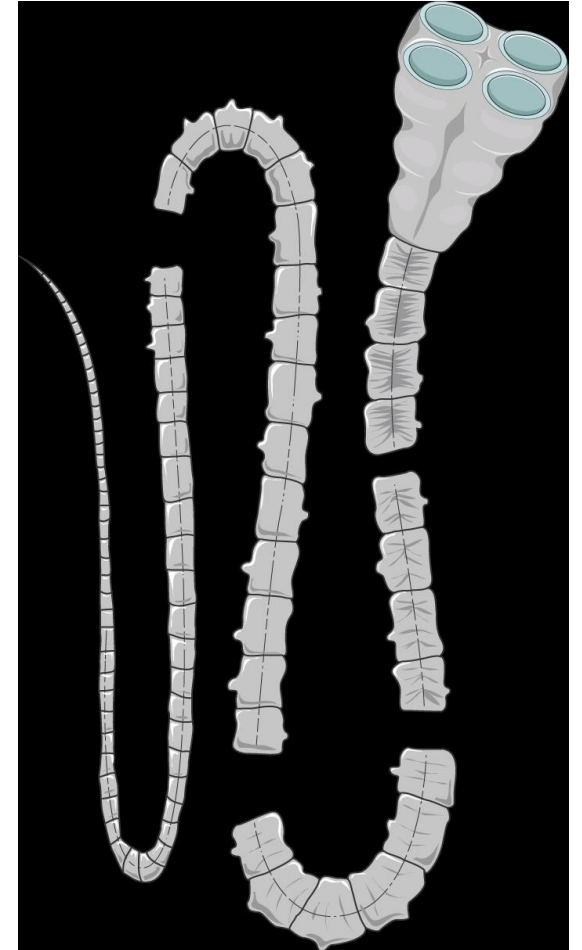
Some terms

- mycology
 - study of fungi
- mycologists
 - scientists who study fungi
- mycotoxicology
 - study of fungal toxins and their effects
- mycoses
 - diseases caused by fungi

most of them are
parasits

Helminths (Worms) الديدان

- has a head and tail end, and its tissues are differentiated into three distinct tissue layers
- The worms that parasitize humans include
 1. **Flatworms** بتلف حالها بال intestine
 - no more than 1 mm thick, but some, such as large tapeworms, can be as long as 10 m
 - Have **suckers or hooks to attach to their hosts** خطاف
to attachment to the parasit زي لزقة
 - Examples: **tapeworm (*Taenia saginata*)**
Permament in the parasit body



Helminths (Worms)

2. Roundworms, or nematodes

- Have ^{اسطواناني} cylindrical bodies and they vary in length from 1mm to 1m
- Example: *Ascaris lumbricoides*

في ادوية لعلاج الديدان مش
شرط عملية



نهاية الشابتر

هاي آخر سلايد بمادة
الفيرست

بداية الشابتر الجديد

Host-Microbe Relationships

Lecture# 5

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Host-Microbe Relationships

- **Pathogen** is a parasite capable of causing disease in a host.
- **Host:** is an organism that harbors another organism inside or near their body
- **تكافل** **Symbiosis** is an association between two (or more) species.
Meaning “living together,” the term *symbiosis* compasses a spectrum of relationships. These include *mutualism, commensalism, and parasitism*

mutualism: تبادلية both membrs getting benefits

commensalism تعايش بتستفيد مني وما بتضرني

parasitism تطفل geting benefits from diesesing the host
harmful effect

Host-Microbe Relationships

- **Mutualism** : in **which both members of the association living together benefit from the relationship**
- E.g: large numbers of *Escherichia coli* live in the large intestine of humans. These bacteria release vitamin K, in turn, get a favorable environment in which to live and obtain nutrients.

انتا بتحميها جوا الجسم وهيه بتفرز
فيتامين k عشان
prevent blood homosstesis



Many of the bacteria on human skin are mutualistic.

Host-Microbe Relationships

- parasitism, in which one organism, the parasite, benefits from the relationship, whereas the other organism, the host, is harmed by it.
- bacteria, viruses, protozoa, fungi, and helminths are parasites.
- Parasites exert harmful effects on **human host ranging from slight harm to death**



الأمراض الي بتسببها الميكروبات
بتتراوح من modern ل sever
وبعض منها بكون reversable
ومنها لاء

Host-Microbe Relationships

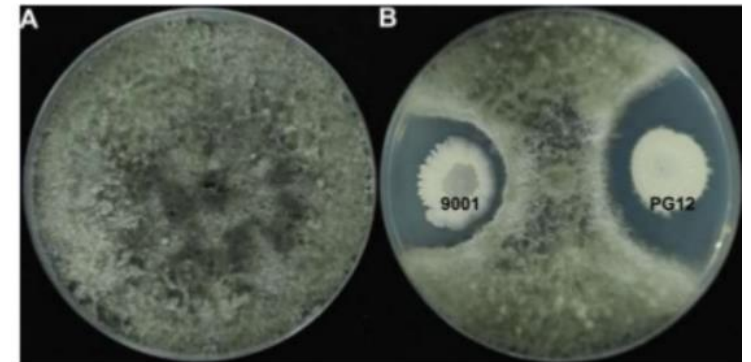
- **Commensalism: one benefits from the relationship, the other neither benefited nor harmed.**
- For example, many microorganisms live on our skin surfaces and utilize metabolic products secreted from skin without causing any harm.

زي الميكروبات الي على الجلد الي بتحميه من المؤثرات
الخارجية وبتساهم بأفراز العرق



- **Antagonism: both species harm each other without either benefiting** Like competition

For example, normal flora interfere with the growth of some pathogens by competing for nutrients that the pathogen needs, or they produce substances in which the pathogen cannot grow



بتكون تنافس على البقاء يعني الحرب على (التغذية)

Contamination, Infection & Disease

- Contamination means that the microorganisms are present.
- Infection : multiplication of any parasitic organism within or on the host's body. (Sometimes the term infestation is used to refer to the presence of larger parasites, such as worms or in the body.)
- Disease is a disturbance in the state of health wherein the body cannot carry out all its normal functions.
بتفعل جهاز المناعة لانو الجسم بصير فيه
لوظائفها disfunction

When an infection causes disease, the effects of the disease range from mild to severe , either reversible or irreversible

Contamination ملوث

انو مثلاً زي الكزاز لما تنجرح من مسمار مصدي الفيروس الي يكون فيه بتنتقل لجسمك

Infection عدوى

increasing in micro organism number

Disease مرض

الفرق بين ال infection وال infestation
انو infestation بتكون لل parasit الكبيرة

Pathogenicity & Virulence

- **Pathogenicity is the capacity to produce disease**

An organism's pathogenicity depends on:

1. Its ability to invade a host
2. Number of infectious organisms that enter the body.
3. multiply in the host.
4. avoid being destroyed by host defence mechanisms.

إذا زادوا بتزيد ال
pathogenicity

بتتخبي من جهاز المناعة
(بتحمي حالها بغشاء بأماكن جوا الجسم)

قوة المرض وخطورتها

- **Virulence refers to the intensity of the disease produced by pathogens, and it varies among different microbial species** depends in host immune system
- For example *Bacillus cereus* causes mild gastroenteritis, whereas the rabies virus causes neurological damage that is nearly always fatal

Pathogenicity & Virulence

- The virulence of a pathogen can be decreased by قدرتوا بتقل على انتاج المرض

Attenuation: the weakening of the disease-producing ability of the pathogen.

- Attenuation can be achieved by:

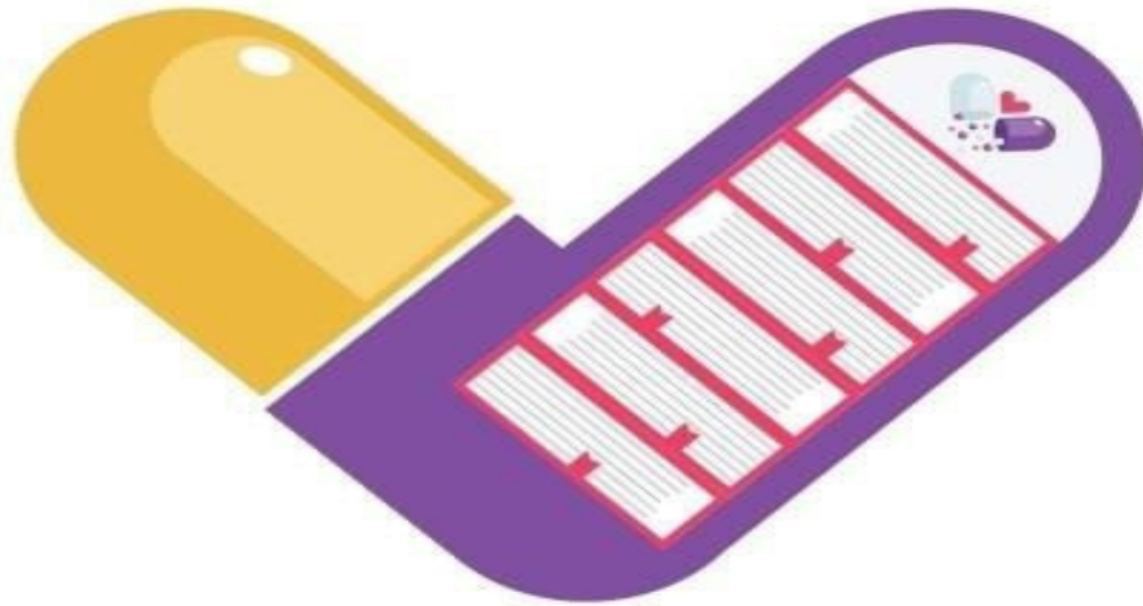
1.Repeated **subculturing**

2.Transposal of virulence: transferring the pathogen from its normal host to new different species, then repeat the passage through many individuals of the new host, the pathogen will adapt to the new host & will lose its virulence to its original host. (used to prepare mumps & measles vaccines)

ينتقل ل species ل host غير الأصلي فتغيير الحمض النووي لألها بتغير
صفاتها بتقل قدرتها على انتاج المرض بسبب ضعف ال intensity

آخر سلايد بالمحاضرة
بالتوفيق للجميع

بالتوفيق والنجاح
والعلامات العالية
فالكم الفل



Artery Academy