وزارة التعليم العالي والبحث العلمي
الجامعة التقنية الشمالية
المعهد التقني الدور

الحقيبة التعليمية

القسم العلمي: المختبرات الطبية

اسم المقرر فطريات طبية

المرحلة / المستوى: الثاني

الفصل الدراسي: الثاني

السنة الدراسية: ٢٠٢٥ / ٢٠٢٦

و

ا

قسم

اسم المقرر:	فطريات طبية						
القسم:	المختبرات الطبية						
الكلية:	معهد التقني الدور						
المرحلة / المستوى	الثاني / الثاني						
الفصل الدراسي:	٢٠٢٤/٢٠٢٥						
عدد الساعات الاسبوعية:	نظري	١	عملي	٢			
عدد الوحدات الدراسية:	٣						
الرمز:	MLT٢١٢						
نوع المادة	نظري	نضري	عملي		كلهما	نعم	
هل يتوفر نظير للمقرر في الاقسام الاخرى							
اسم المقرر النظير	كلا						
القسم	كلا						

معلومات تدريسي المادة

اسم مدرس (مدرسي) المقرر:	ضبية داخل عواد
اللقب العلمي:	مدرس مساعد
سنة الحصول على اللقب	٢٠٢٣
الشهادة :	ماجستير

سنة الحصول على الشهادة	**٢٠٢٣**
عدد سنوات الخبرة (تدريس)	**١٠**

الوصف العام للمقرر

"دراسة الفطريات الطبية والتعرف على اهم المركبات الطبية التي تحتويها ومعرفة استخداماتها المتعدد من الناحية الغذائية .واستخلاص بعض المكملات الغذائية منها supplement.

الاهداف العامة

- **سيتمكن الطلاب من الحصول على المعرفة وفهم الفطريات الطبية.**
- **سيتعلم الطلاب من فهم ومعرفة الية استخلاص المركبات الطبية .**
- **سيتمكن الطلاب من فهم التجارب العملية المختبرية .**
-

الأهداف الخاصة

- تعريف الطلبة بأهمية الفطريات الطبية على الجانب الصناعي والمختبري .
- تزويد الطلبة بأساس واسع ومتوازن من المعرفة والمهارات في الفطريات الطبية.
- تطوير المهارات لدى الطلبة ذات القيمة في مجال اختصاصهم .
- تعريف الطالب على اهم الاجهزة والمعدات المستخدمة في المختبر لمادة الفطريات الطبية.
- تمكين الطالب من اجراء التجارب لإيجاد تراكيز المواد التي توجد داخل الفطريات الطبية .

تنمية المعرفة لدى الطلبة بوسائل التشخيص .

الأهداف السلوكية او نواتج التعلم

بعد الانتهاء من المقرر الدراسي سيتمكن الطلاب من :ـ

- معرفة المركبات الطبية للفطريات.
- اليه استخلاص supplement وكيفية استخدامها وما هي الانواع المرضية منها.
- تطبيق معارفهم ومهاراتهم في حل المشكلات النظرية والعملية في التعرف على الانواع

الضارة والسامة منها.

- معرفة اهم الامراض وانواعها التي تسببها الفطريات المرضية وطرق الوقاية منها .
- الية الوقاية وطرق العلاج مع المركبات الخطرة للفطريات.

استراتيجيات التعليم والتعلم

- المحاضرة واستخدام السبورة التفاعلية .
- الشرح والتوضيح .
- تزويد الطلبة بالأساسيات والمواضيع الاضافية المتعلقة بمخرجات التفكير والتحليل الكيميائي للفطريات .
- تكوين مجموعات نقاشية خلال المحاضرات لمناقشة مواضيع الفطريات الطبية التي تتطلب التفكير والتحليل .

واجبات للطلبة بيتية تتطلب تفسيرات ذاتية بطرق سببية .

الاسبوع	الساعات	الموضوع	طريقة التعلم	اشكال الحضور	طريقة التقييم
الاول	٣	Introduction of medical fungi	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الثاني	٣	Structure , reproduction and classification	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية

الثالث	٣	Cultural characteristics , type of mycosis	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الرابع	٣	General principle in treatment	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الخامس	٣	Actinomyces , Nocardia , Mycetoma	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
السادس	٣	Actinomyces , Nocardia , Mycetoma	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
السابع	٣	Actinomyces , Nocardia , Mycetoma	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الثامن	٣	Dermatophytes	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
التاسع	٣	Candidiasis	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
العاشر	٣	Cytococcsis	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الحادي عشر	٣	Cryptococcusis	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية

الثاني عشر	٣	Histoplasmosis , sporotrichosis	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الثالث عشر	٣	Micellanaus fungi , Aspergillosis mucor	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الرابع عشر	٣	Rhizopus & penicillium	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية
الخامس عشر	٣	Anti fungal agents , antibiotic produced by fungi	شرح المحاضرة بوجود وسائل ايضاح والتطبيق العملي	قاعة دراسية ومختبر	الامتحانات والواجبات الأسبوعية

تقييم المقرر

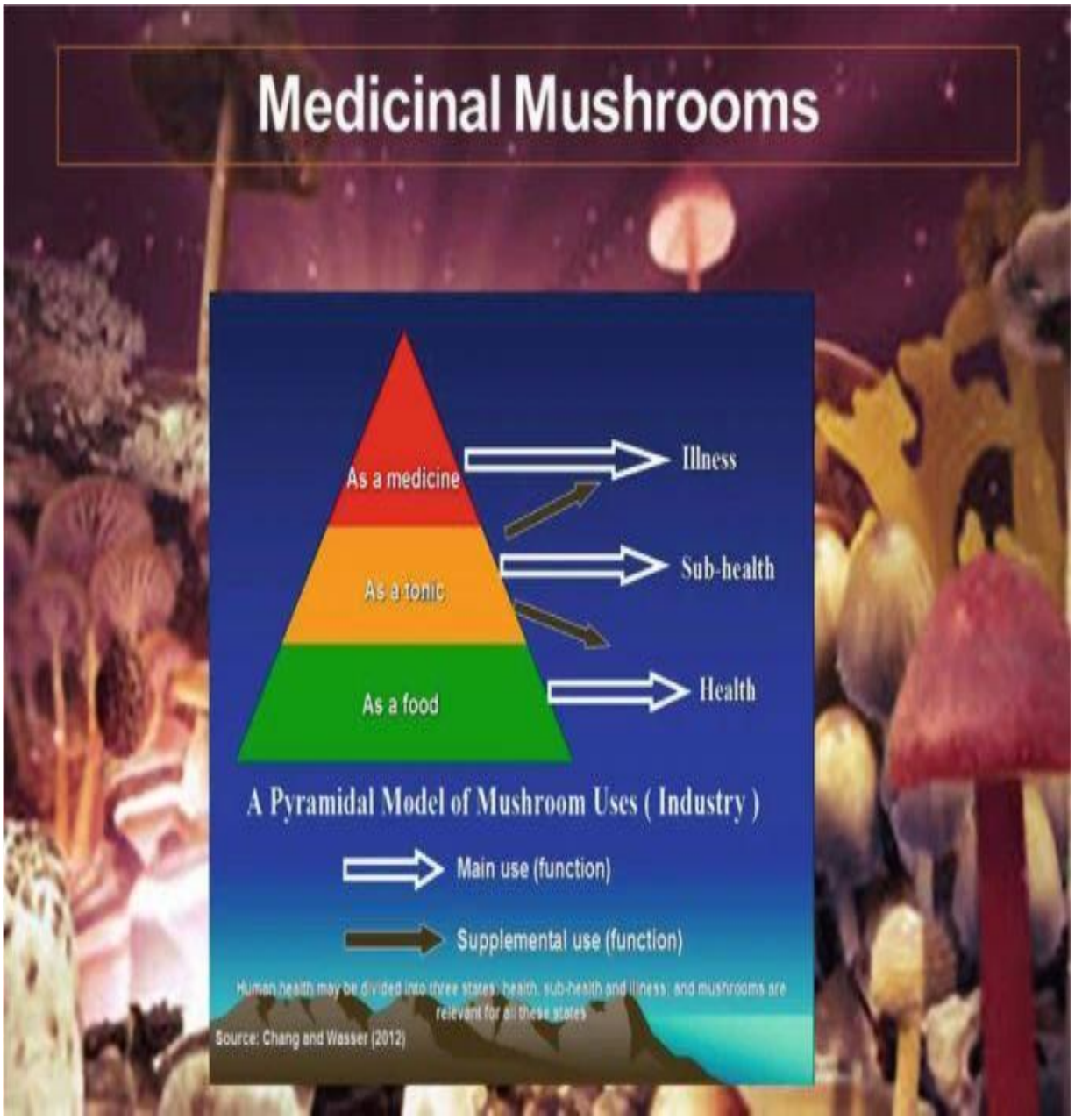
١- الاختبارات النظرية .
٢- الاختبارات العملية .
٣- التقارير والدراسات .
٤- اختبارات اسبوعية
٥- درجات محددة بواجبات بيتية .

مصادر التعلم والتدريس

١-الكتب المنهجية
٢-المراجع الرئيسية
٣-البحوث العلمية
٤-المصادر العلمية ضمن الشبكة العنكبوتية

أساليب التدريس (حدد مجموعة متنوعة من أساليب التدريس لتناسب احتياجات الطلاب ومحتوى المقرر)

الاسلوب او الطريقة	مبررات الاختيار
١. السبورة	للتوضيح
٢. DATA SHOW	لتقديم بيئة رسومية لتسهيل وصول الفكرة العلمية
٣.المناقشة الختامية للمحاضرة	لتقييم الفهم النهائي للطلبة
٤.شاشة بلازمة	للتقديم فيديوهات تعليمية


Medicinal Mushrooms
As a medicine
As a tonic
As a food
Illness
Sub-health
Health
A Pyramidal Model of Mushroom Uses (Industry)
Main use (function)
Supplemental use (function)
Human health may be divided into three states: health, sub-health and illness, and mushrooms are relevant for all these states
Source: Chang and Wasser (2012)

الفصل الثاني						
عنوان الفصل	الوقت					
التوزيع الزمني	النظري	العملي	العنوان الرئيسي	العنوان الفرعي	طريقة التدريس	التقنيات	طرق القياس
الاسبوع الاول	١ ساعة	٢ ساعة	مقدمة في الفطريات الطبية	استخدامات الفطريات الطبية واستخلاص المكملات الغذائية	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الثاني	١ ساعة	٢ ساعة	تراكيب الفطريات الطبية وتصنيفها	أنواع الفطريات الفوائد العامة تصنيف الممرضة منها تلوث التربة التصنيف	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الثالث	١ ساعة	٢ ساعة	زراعة الفطريات وانواعها	زراعة الفطريات التي تستخدم للغذاء واستخلاص العقاقير الطبية	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الرابع	١ ساعة	٢ ساعة	مبدأ العمل والعلاج	استخلاص مادة البنسليوم التي ينتج منها عقار البنسلين	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الخامس	١ ساعة	٢ ساعة	Actinomyces , Nocardia ,	دراسة الانواع المذكورة	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة

الفصل الثاني						
عنوان الفصل	الوقت					
			Mycetoma	والتعرف على خصائها		وملاحظة مستوى الطلبة
الأسبوع السادس والسابع	١ ساعة	٢ ساعة	الفطريات الجلدية	سعفة الرأس عدوى الخميرة سعفة الجسم القدم الرياضي فطريات الأظافر	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الثامن والتاسع والعاشر والحادي عشر	١ ساعة	٢ ساعة	الفطر الاسود	امراض الكانديدا فطر المبيضة البيضاء الاماكن الاكثر انتشارا الحارة والرطبة	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الثاني عشر	١ ساعة	٢ ساعة	المكورات الخلوية	المجموعة A المجموعة B البكتريا العقدية البكتريا السالبة والموجبة لصبغة كرام	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الثالث عشر	١ ساعة	٢ ساعة	الرشاشيات المخاطية	داء الرشاشيات القصبي الرئوي التحسسي فطر الاسبرجلس	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة
الأسبوع الرابع عشر	١ ساعة	٢ ساعة	فطر المايسيليوم	فطر المشروم	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة

الفصل الثاني						
عنوان الفصل	الوقت					
						وملاحظة مستوى الطلبة
الأسبوع الخامس عشر	١ ساعة	٢ ساعة	عوامل مضادة للفطريات	المضاد الحيوي تنتجه الفطريات	محاضرة نظري + عملي	عرض تقديمي، شرح، أسئلة وأجوبة, مناقشة	عرض الأمثلة والمناقشة وملاحظة مستوى الطلبة

المحتوى العلمي

خارطة القياس المعتمدة

المحتوى التعليمي	عناوين الفصول	الأهمية النسبية	الأهداف السلوكية					عدد الفقرات
			المعرفة	الفهم	التطبيق	التحليل	التقييم	
			النسبة					
الفصل الثاني /المستوى الثاني	مقدمة عن الفطريات الطبية	٪١٠٠	٪٣٥	٪١٠	٪٢٥	٪١٠	٪٢٠	٥

الاسبوع الاول

أ-الفئة المستهدفة: Target Population

طلبة المرحلة الثانية قسم المختبرات الطبية

ب-المحتوى :

Medicinal Mushrooms

Medicinal mushrooms have important health

The pharmacological activities of a medicinal fungus

الاختبار القبلي

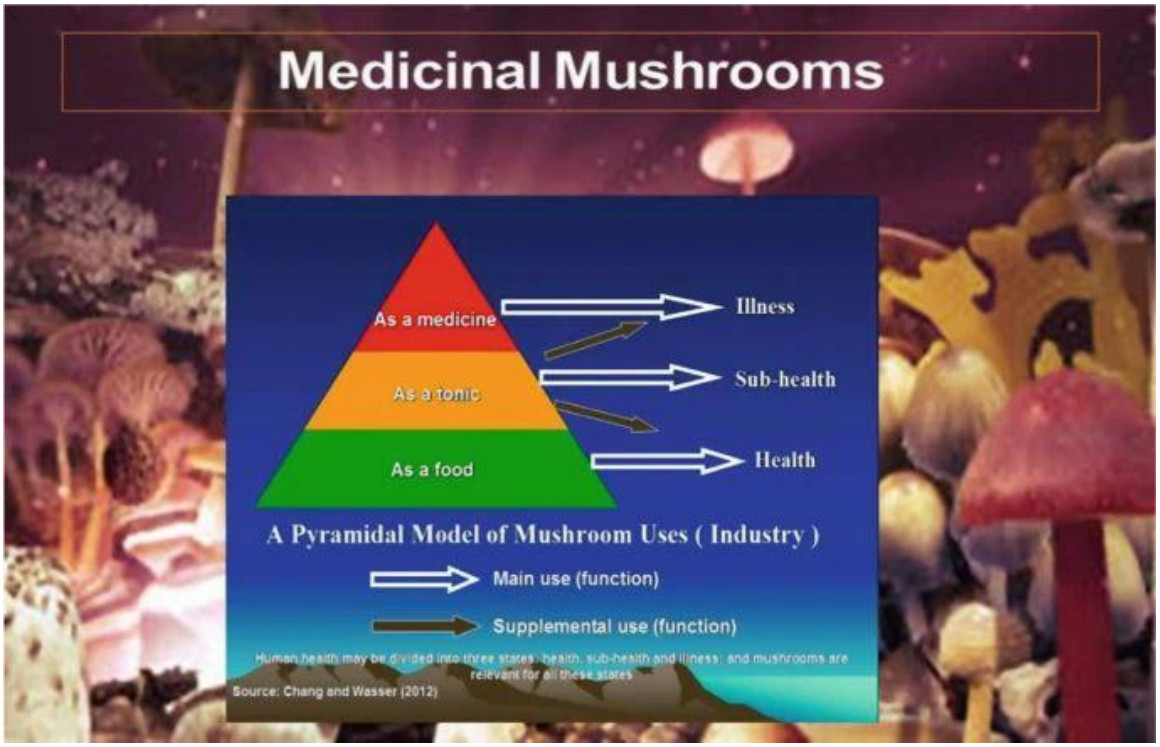
Q١ /What is the medicinal mushroom ?

Q٢/What are the types of medical mushroom ?

Medicinal Mushrooms

Medicinal mushrooms have important health benefits and exhibit a broad spectrum of pharmacological activities, including antiallergic, antibacterial, antifungal, anti-inflammatory, antioxidative, antiviral, cytotoxic, immunomodulating, antidepressive, antihyperlipidemic, antidiabetic, digestive, hepatoprotective, neuroprotective, nephroprotective, osteoprotective, and hypotensive activities. The growing interest in mycotherapy requires a strong

commitment from the scientific community to expand clinical trials and to propose supplements of safe origin and genetic purity. Bioactive compounds of selected medicinal mushrooms and their effects and mechanisms in in vitro and in vivo clinical studies are reported in this review. Besides, we analyzed the therapeutic use and pharmacological activities of mushroom



Medicinal Mushrooms

Medicinal mushrooms have important health benefits and exhibit a broad spectrum of pharmacological activities, including antiallergic, antibacterial, antifungal, anti-inflammatory, antioxidative, antiviral, cytotoxic, immunomodulating, antidepressive, antihyperlipidemic, antidiabetic, digestive, hepatoprotective, neuroprotective, nephroprotective, osteoprotective, and hypotensive activities. The growing interest in mycotherapy requires a strong commitment from the scientific community to expand clinical trials and to propose supplements of safe origin and genetic purity. Bioactive compounds of selected medicinal mushrooms and their effects and mechanisms in in vitro and in vivo clinical studies are reported in this review. Besides, we analyzed the therapeutic use and pharmacological activities of mushrooms.

Mushrooms, which have always been appreciated for their culinary and nutritional value, are now increasingly valued for their many important medicinal properties, so much so that they are used not only as dietary food (functional foods) but also in the form of dietary supplements, nutraceuticals, and mycotherapy products .Their use for promoting and maintaining a good state of health and the treatment of diseases has been around since ancient times in Asian regions, while in the West, this approach is considerably more recent. Medicinal mushrooms (MMs) are reported to have numerous pharmacological actions such as antimicrobial, anti-inflammatory, immunomodulatory, antidiabetic, cytotoxic, antioxidant, hepatoprotective, anticancer, antioxidant, antiallergic, antihyperlipidemic, and prebiotic properties, among others. These activities are attributable to many bioactive metabolites present in the mycelium but above all in the fruiting body, whose biological effect varies according to the chemical nature and whose distribution varies according to the fungal species. A great deal of research has been carried out and is increasingly being undertaken to identify and characterize mycochemicals and to define their actions and mechanisms, due to the growing interest in the use of natural products, including as adjuvants in traditional therapies. The bulk of research carried out has focused on a few genera or species, for example, those of the oldest and most traditional use among Asian populations, while for those remaining, current scientific support is still lacking. Several studies have so far investigated the various activities of MMs, highlighting their enormous potential for use in the medical sector, but a particular effort has been put into studying their antitumor and immunomodulatory properties, as cancer remains one of the most difficult challenges to date.

The pharmacological activities of a medicinal fungus are detected primarily by in vitro assays, generally accompanied or followed by in vivo studies in animal models, which together reveal the great potential of a mushroom, fungal extract, or chemical compound. On the other hand, a small number of clinical studies carried out on humans and published in the peer-reviewed literature are available. Clinical studies are necessary to assess the efficacy of medicinal mushrooms within the complex human body system but also to assess their safety.

This review aims to provide a discussion of some of the best-known and most studied bioactive metabolites of medicinal mushrooms. In particular, we highlight the mechanisms of action by in vitro and preclinical scientific studies.

Post-Test (الاختبار البعدي)

- **Q/What are** of pharmacological activities**?**
- **Q/Enumerate** Medicinal mushrooms have important health **?**

الاسبوع الثاني والثالث :

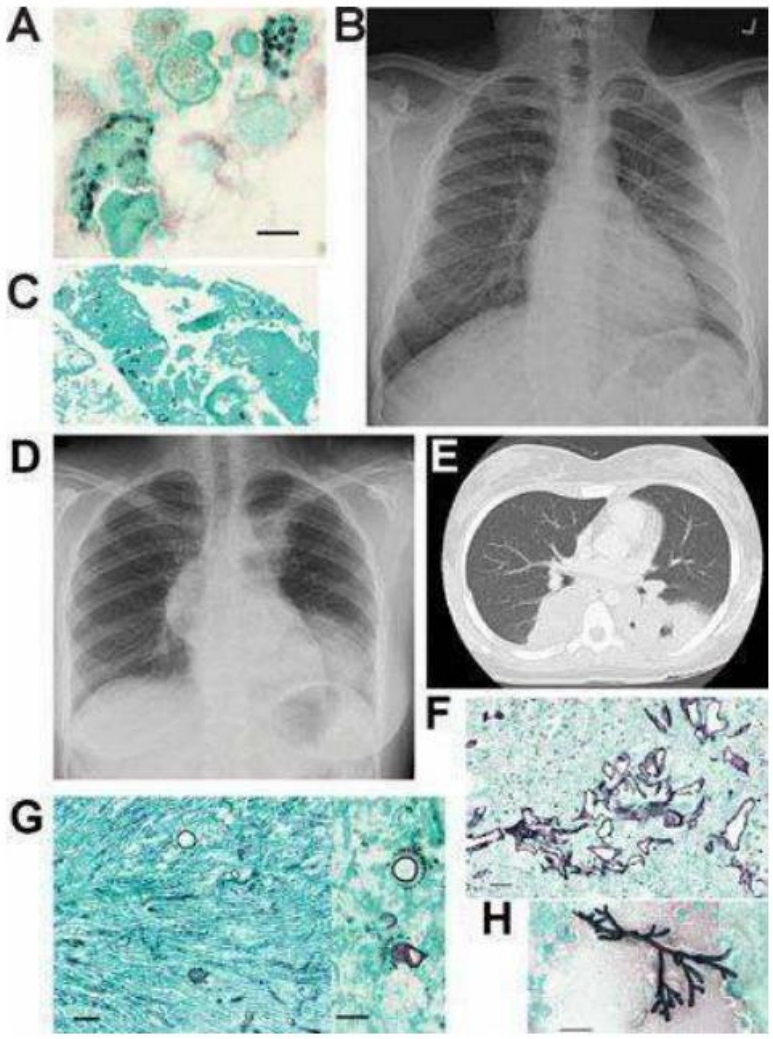
-الاختبار القبلي (pre-test)

Q/ What is the fungi that infect Human?

Q/ What is fungi must to infect humans ?

Fungi that Infect Humans

Fungi must meet four criteria to infect humans: growth at human body temperatures, circumvention or penetration of surface barriers, lysis and absorption of tissue, and resistance to immune defenses, including elevated body temperatures. Morphogenesis between small round, detachable cells and long, connected cells is the mechanism by which fungi solve problems of locomotion around or through host barriers. Secretion of lytic enzymes, and uptake systems for the released nutrients, are necessary if a fungus is to nutritionally utilize human tissue. Last, the potent human immune system evolved in the interaction with potential fungal pathogens, so few fungi meet all four conditions for a healthy human host. Paradoxically, the advances of modern medicine have made millions of people newly susceptible to fungal infections by disrupting immune defenses.



FUNGI CAPABLE OF INFECTING HEALTHY HUMANS

Most of the fungi capable of infecting healthy humans evolved to infect other hosts such as amoebae, insects, or small mammals. This is in contrast to bacteria such as Streptococcus pyogenes or Mycobacterium tuberculosis, whose virulence attributes directly target humans as their primary host. The ability to utilize healthy human hosts arose independently multiple times among three major fungal phyla: the Entomophthoromycota (107), the Ascomycota, and the Basidiomycota.

Arya. Some species such as Mucor circillenoides are dimorphic and form yeast in the host, contributing to dissemination. Spread to distant sites is rare in the monomorphic species because fragments of the coenocytic hyphae, small enough to travel in the

bloodstream, are likely to leak cytoplasm and become inviable, but when it occurs, the brain is a common target organ in a usually terminal stage of the infection. Thermotolerance has experimentally been shown to be correlated with virulence among Rhizopus species (360) (Fig. 1E). Thermotolerant Rhizopus microsporum produces a secreted toxin, rhizoxin, in collaboration with a bacterial endosymbiont, Burkholderia rhizoxinica (361). Rhizoxin inhibits mitotic spindle formation in eukaryotes and is known to kill, for example, rice seedlings which then provide nutrients for the fungus as well as for the bacterium. Recent work shows that a Burkholderia type 2 secretion system extrudes chitinase to gradually melt the fungal cell wall at sites of bacterial attachment, enabling the Burkholderia to gently enter Rhizopus hyphae and move to the growing hyphal tip, where they induce spore formation so that each vegetative fungal progeny (sporangiospore) is guaranteed its own bacterial endosymbiont. In a meticulous study using murine and Drosophila models, a contribution of rhizoxin to Rhizopus spp. pathogenesis in animal infection was not found. This study suggests that pathogenicity for a human is likely to be an unexpected accident for Rhizopus landing in a human alveolus, for which this fungus is evolutionarily

Mechanisms of fungal dissemination

Fungal infections are an increasing threat to global public health. There are more than six million fungal species worldwide, but less than 1% are known to infect humans. Most of these fungal infections are superficial, affecting the hair, skin and nails, but some species are capable of causing life-threatening diseases. The most common of these include Cryptococcus neoformans, Aspergillus fumigatus and Candida albicans. These fungi are typically innocuous and even constitute a part of the human microbiome, but if these pathogens disseminate throughout the body, they can cause fatal infections which account for more than one million deaths worldwide each year. Thus, systemic dissemination of fungi is a critical step in the development of these deadly infections. In this review, we discuss our current understanding of how fungi disseminate from the initial infection sites to the bloodstream, how immune cells eliminate fungi from circulation and how fungi leave the blood and enter distant organs, highlighting some recent advances and offering some perspectives on future directions.

-الاسبوع الرابع والخامس

الاختبار القبلي (pre-test)

- What are found blastomycosis?
- What is blastomycosis is found?

Medical mycology

Blastomycosis

Blastomycosis, also known as **Gilchrist's disease,** is a fungal infuction, typically of the lungs, which can spread to brain stomach, intestine and skin, where it appears as crusting purplish warty plaques with a roundish bumpy edge and central depression. Only about half of people with the disease have symptoms, which can include fever, cough, night sweat, muscle pains, weight loss, chest pain, and feel tired.

Blastomyces dermatitidis is found in the soil and decaying organic matter like wood or leaves. Outdoor activities like hunting or camping in wooded areas increase the risk of developing blastomycosis. There is no vaccine, but the risk of the disease can be reduced by not disturbing the soil. Treatment is typically with an azole drug such as itraconzole for mild or moderate disease In severe cases, patients are treated with amphotericin B before azole treatment

Blastomycosis is an infection caused by a fungus called Blastomyces. People can get blastomycosis after breathing in the microscopic fungal spores from the air. Although most people who breathe in the spores don't get sick, some people will develop symptoms like fever and cough, and the infection can sometimes become serious if it is not treated.

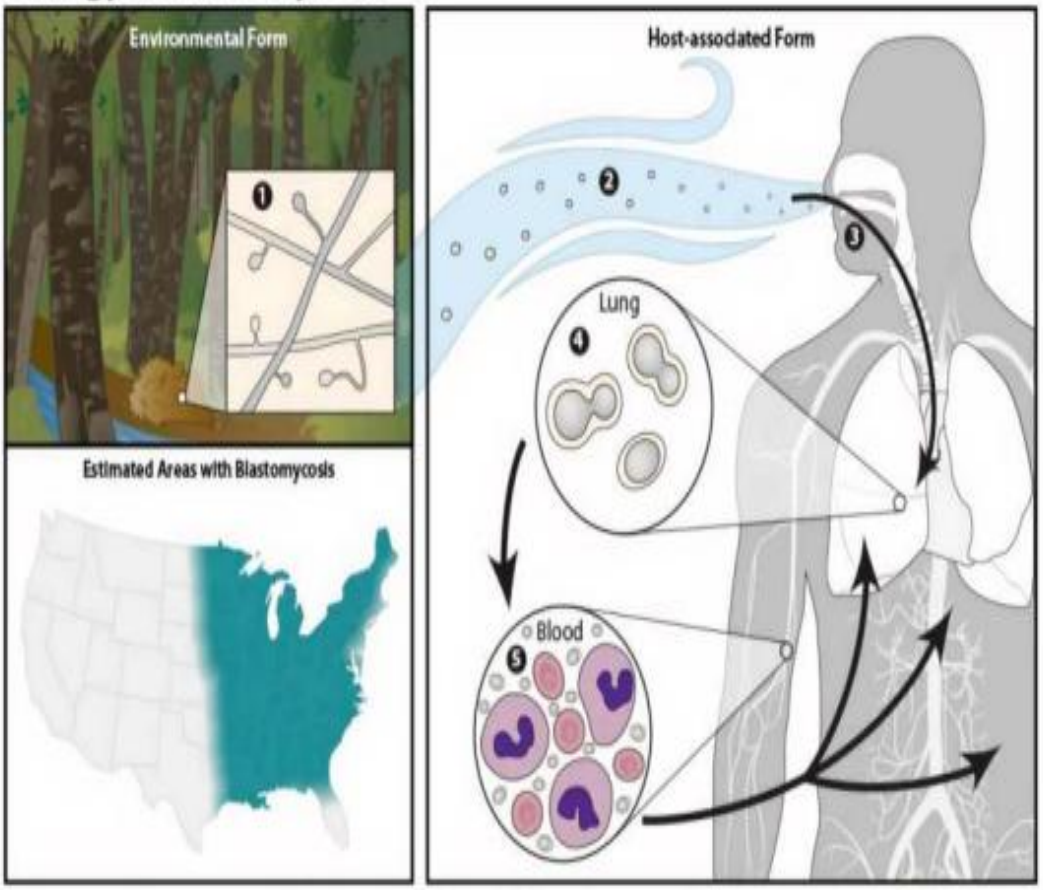
Signs and symptoms

The symptoms of blastomycosis cover a wide range, overlapping with more common conditions; for this reason, blastomycosis has often been called "the great pretender". Many cases are asymptomatic or subclinical. Lung symptoms are common, because the lungs are infected in 79% of blastomycosis cases. However, in 25-40% of cases the disease also disseminates to other organs, including the skin.

The extent and severity of symptoms depends in part on a person's immune status; less than 50% of healthy people with blastomycosis have symptoms, while immunocompromised patients are especially likely to have the disease spread beyond the lungs to other organs like the skin and bones.

Blastomycosis manifests as a primary lung infection in about 79% of cases. The onset is relatively slow and symptoms are suggestive of bacterial pneumonia, often leading to initial treatment with antibacterials. Because the symptoms are variable and nonspecific, blastomycosis is often not even considered in differential diagnosis until antibacterial treatment has failed, unless there are known risk factors or skin lesions. The disease may be misdiagnosed as a carcinoma, leading in some cases to surgical removal of the affected tissue. Upper lung lobes are involved somewhat more frequently than lower lobes. If untreated, many cases progress over a period of months to years to become disseminated blastomycosis.

Biology of Blastomycosis



In the environment, *Blastomyces* exists as mold (1) with septate aerial hyphae. The hyphae produce spores (2). These spores are either inhaled, or inoculated into the skin (3) of a susceptible host. The warmer temperature inside the host signals a transformation (4) into a broad-based budding yeast. The yeast may continue to colonize the lungs or disseminate in the bloodstream (5) to other parts of the body, such as the skin, bones and joints, organs, and central nervous system.

313841-A https://www.cdc.gov/fungal/diseases/blastomycosis/causes.html

Symptoms of blastomycosis

Approximately half of people who are infected with the fungus *Blastomyces* will show symptoms. The symptoms of blastomycosis blastomycosis are often similar to the symptoms of other lung infections, and can include:

- Fever
- Cough
- Night sweats
- Muscle aches or joint pain
- Weight loss
- Chest pain
- Fatigue (extreme tiredness)

(Post-Test) **الاختبار البعدي**

Q/ What the symptoms of blastomycosis?
Q/ What is Characteristics of blastomycosis?

الاسبوع السادس والسابع والثامن :

-الاختبار القبلي :(pre-test)

Q١/What are the different between fungi and bacteria

Q٢/ Enumerate types of tinea

Q٣/Dermatophytes cause infections

Dermatophyte

Dermatophytes cause infections of the skin, hair and nails, obtaining nutrients from keratinized material, and do not living tissue. Colonies of dermatophytes are usually restricted to the nonliving cornified layer of the epidermis because of their inability to penetrate viable tissue of an immunocompetent host.

Some of these skin infections are known as ringworm or tinea. Toenail and fingernail infections are referred to as onychomycosis. Dermatophytes usually do not invade living tissue, but colonize the outer layer of the skin. Occasionally the organisms do invade subcutaneous tissue.

Type of infections

Infections by dermatophytes affect the superficial skin, hair and nails and are named using "tinea" followed by the latin term for the area that is affected. Dermatophytoses tend to occur in moist areas and skin folds. The degree of infection depends on the specific site of infection, the fungal species, and the host inflammatory response.

Some types of tinea

I-**Tinea corporis**:- small lesions occurring anywhere on the body.

2-**Tinea pedis**:- "athlete's foot ". Infection of toe webs and soles of feet.

3-**Tinea cappitis:-** Fungus infection of the hair, frequently found in children.

4-**Tinea cruris:-** "jock itch". Infection of the groin, perineum or area.

5-**Tinea brbae**:- ringworm of the bearded areas of the face and neck.

Pathogenesis

In other for dermatophytoses to occur, the fungus must directly contact the skin. The fungi use various proteinases to establish infection in the keratinized stratum corneum. The course of infection varies between each case, and may be determined by several factors including: the anatomic location, the degree of skin moisture, the dynamics of skin growth and desquamation, the speed and extent of the inflammatory response and the infecting species.

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Diagnosis and identification

Usually, dermatophyte infections can be diagnosed by their appearance. However, a confirmatory rapid in-office test can also be conducted,

1- which entails using a scalpel to scrape oft a lesion sample from the nail, skin or scalp and transferring it to a slide.

Potassium hydroxide (KOH) is add to the slide and the sample is examined with a microscope to determine presence of hyphae.

1- A wood's lamp examination (ultraviolet light) may be used to diagnose specific dermatphytes.

2- Fungal culture medium can be used for positive identification of the species. The fungi tend to grow well at 25 degrees Celsius on Sabouraud's agar within a few days to a few weeks.

Classification

Dermatophytes are classified as anthropophilic (humans), zoophilic (animals), or geophilic (soil) according to their normal habitat.

Table 1 Some Differences between Fungi and Bacteria.

NO	Properties	Fungi	Bacteria
1	Nucleus	Eukaryotic; nuclear membrane; more than one chromosome; mitosis	Prokaryotic; no membrane; nucleoid; only one chromosome
2	Cytoplasm	Mitochondria; endoplasmic reticulum; 80S ribosomes	No mitochondria; no endoplasmic reticulum; 70S ribosomes
3	Cytoplasmic memberane	Sterols	No sterols
4	Cell wall	Glucans, mannans, chitin, chitosan.	Murein, teichoic acid (Gram-positive).
5	Metabolism	Heterotrophic; mostly aerobes; no photosynthesis	Heterotrophic; obligate aerobes and anaerobes, facultative anaerobes
6	Size, mean diameter	Yeast cells: 3-5-10µm. Molds: indefinable.	1-5µm
7	Dimorphism	In some species	None

الاختبار البعدي:(Post-Test)

-Define The following: Cytoplasm ,membrane ,

-Classification dermatophytes

الاسبوع التاسع والعاشر والحادي عشر :

الاختبار القبلي : (Post-Test)

Define mucormycosis?

What the cause of black fungus ?

Black fungus

Black fungus disease, also known as mucormycosis, is a fungal infection that affects the sinuses, brain, or lungs, and occurs in some people with weakened immune systems.

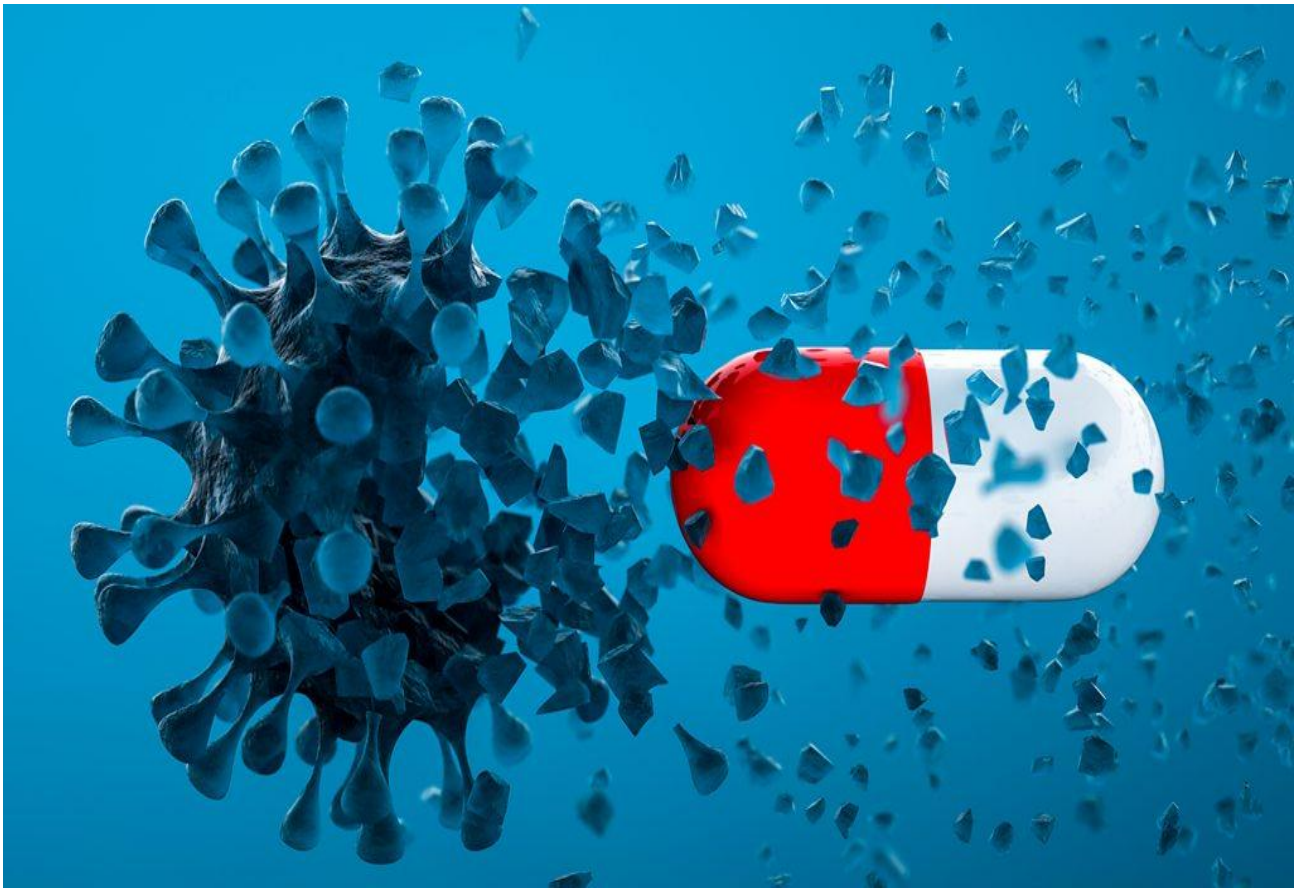
The reasons

Black fungus is caused by different types of fungi that are often found in decaying organic matter. These include rotten bread, fruits and vegetables, as well as soil and compost heaps. Most people come into contact with these fungi at some time. However, people with a weakened immune system are more susceptible to infection with black fungus, and these include people who suffer from one of the following conditions:

- Acquired Immunodeficiency Syndrome (AIDS)
- Burns
- Diabetes (when blood sugar is not under control)
- For leukemia and lymphoma
- Long-term use of steroids
- Metabolic acidosis
- Malnutrition
- USE of certain medications

Black fungus may include:

1- An infection in the sinuses and the brain is called a rhinocerebral infection, and it may start with an infection in the sinuses, then lead to swelling of the nerves that exit the brain, and it may also cause blood clots that block the blood vessels to the brain.
2- Lung infection, called pulmonary mucormycosis. Pneumonia gets worse quickly and may spread to the chest cavity, heart and brain.
3- Other parts of the body, such as mycosis of the gastrointestinal tract mucosa, skin and kidneys.



Symptoms

Symptoms of nasolacrimal black fungus include:

- Swelling and protrusion of the eyes
- Dark scales in the nasal cavities
- Fever
- Headache
- Altered mental state
- Redness of the skin over the sinuses
- Sinus pain or congestion

Symptoms of pulmonary black fungus include:

- cough
- Sometimes coughing up blood
- Fever
- shortness of breath

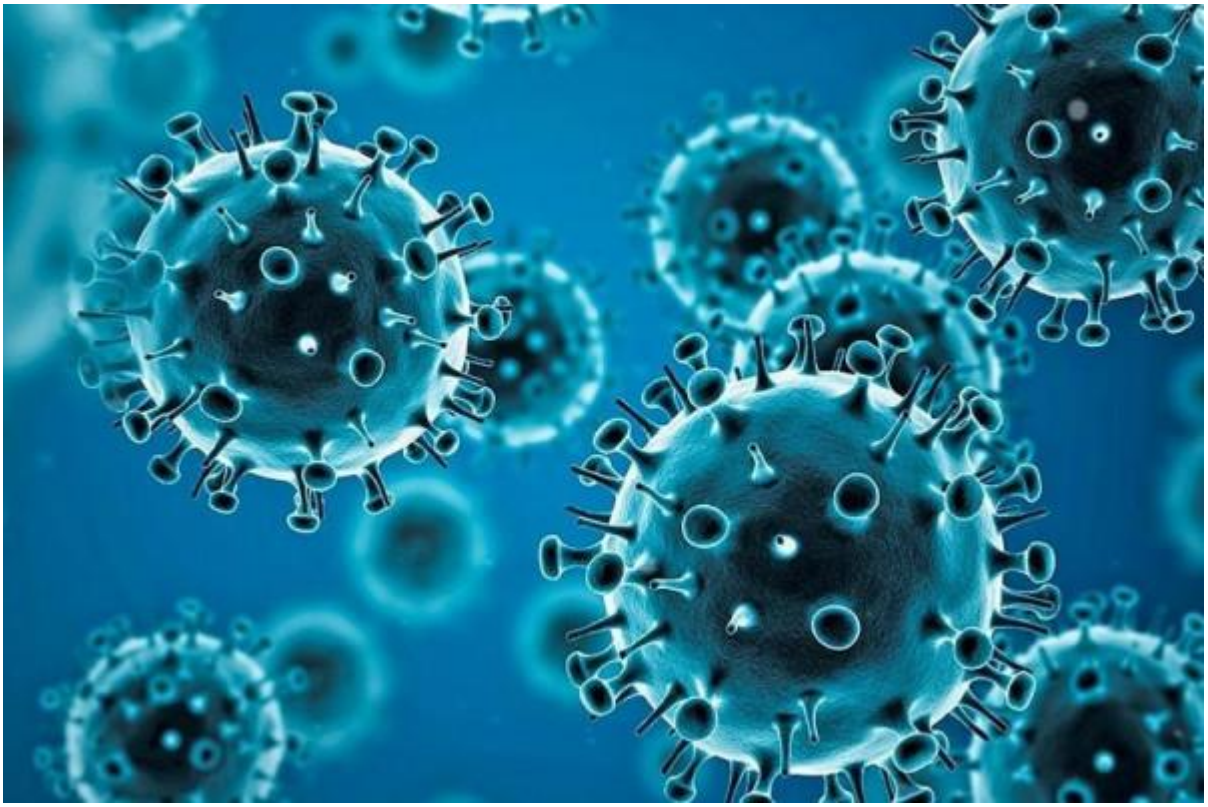
Symptoms of gastrointestinal black fungus include:

- Stomach ache
- blood in the stool
- Diarrhea
- vomiting blood

Symptoms of black fungus in the kidney (renal) include:

- Fever
- Pain in the upper abdomen or back

Symptoms of the black fungus of the skin include one area, sometimes painful, and it is stiff, and its center may be black in color.



Cryptococcus

neoformans is a lethal fungus disguised in a polysaccharide coat. It can remain dormant in the host for decades prior to reactivation, causing systemic cryptococcosis in humans and other mammals. Cryptococcus deploys a multitude of traits to adapt to and survive within the host, including immunosuppression, an ability to replicate intra- and extra-cellularly in phagocytes, changes in morphology and ploidy, a predilection to infect the CNS, and the capacity to utilize neurotransmitters and unique carbon sources available in the brain. These pathogenic strategies displayed by this fungus might have evolved through its interactions with microbial predators in the environment.

Taxonomy

Domain Eukaryota, kingdom Fungi; phylum Basidiomycota; class Tremellomycetes; order Tremellales; family Cryptococcaceae; genus Cryptococcus; species Cryptococcus neoformans and Cryptococcus gattii. The ‘Cryptococcus neoformans’ and ‘Cryptococcus gattii’ species complexes (collectively pathogenic Cryptococcus species) encompass at least seven

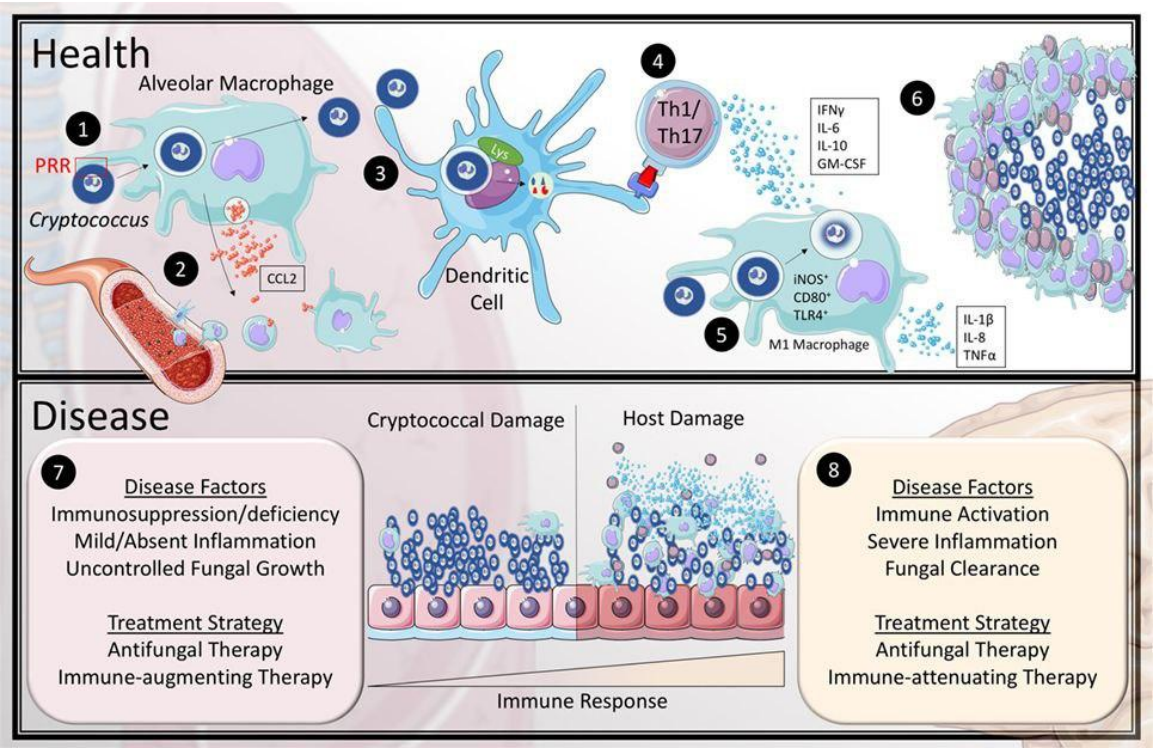
distinct biological and phylogenetic species, with potentially additional cryptic species to be defined.

Properties

Cryptococcus species are aerobic mesophilic fungi phylogenetically more closely related to mushrooms than to the baker's yeast. Cryptococcus species are found on trees or in soil contaminated with bird guano. They grow as budding yeast cells (~٥ µm in diameter) under nutrient rich conditions. A characteristic feature of Cryptococcus is the polysaccharide capsule, whose production is stimulated by conditions that mimic human physiology, including high CO^{2}, low iron, neutral/alkaline pH and serum. The ability to utilize various phenolic substrates, including the neurotransmitter dopamine, to produce melanin enhances its survival in the host and distinguishes it from other pathogenic yeasts

. Capsule

enhances Cryptococcus evasion of host detection, inhibits phagocytosis and suppresses host immune functions. The cryptococcal cell wall is enriched with chitosan, the deacetylated form of the universal fungal component chitin. Chitosan also contributes to cryptococcal host evasion. Melanin anchored in the chitin layer of the cell wall protects the fungus from biotic and abiotic assaults, including radiation and reactive oxygen species. Cryptococcus synthesizes melanin from varying phenolic substrates, including the neurotransmitter dopamine. These features collectively contribute to Cryptococcus as a stealth pathogen.



الاختبار البعدي:(Post-Test)

-Taxonomy of cryptococcal

- Explain of cryptococcal

الاسبوع الثاني عشر والثالث عشر:

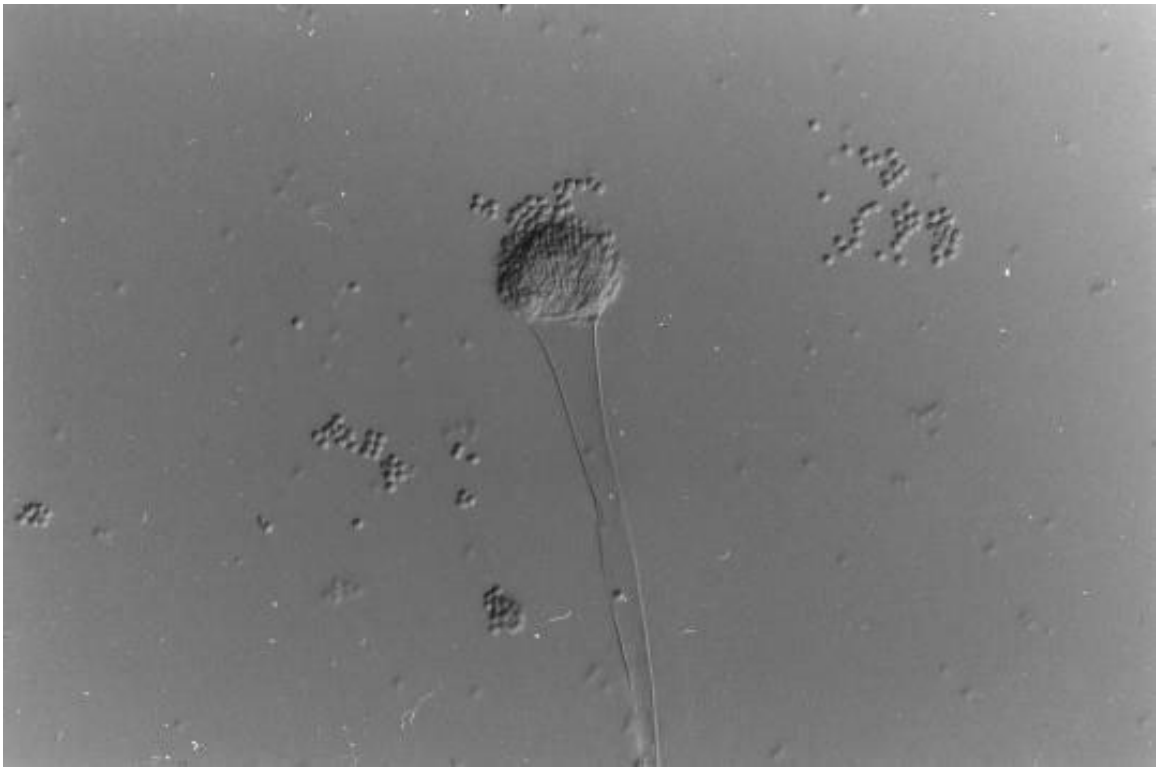
الاختبار القبلي :(Post-Test)

-Who are the people most at risk of infection with Aspergillus fungus?

Aspergillus fumigatus and aspergillosis

Aspergillus fumigatus is one of the most ubiquitous of the airborne saprophytic fungi. Humans and animals constantly inhale numerous conidia of this fungus. The conidia are normally eliminated in the immunocompetent host by innate immune mechanisms, and aspergilloma and allergic bronchopulmonary aspergillosis, uncommon clinical syndromes, are the only infections observed in such hosts. Thus, A. fumigatus was considered for years to be a weak pathogen. With increases in the number of immunosuppressed patients, however, there has been a dramatic increase in severe and usually fatal invasive aspergillosis, now the most common mold infection worldwide. In this review, the focus is on the biology of A. fumigatus and the diseases it causes. Included are discussions of genomic and molecular characterization of the organism, clinical and laboratory methods available for the diagnosis of aspergillosis in immunocompetent and immunocompromised hosts, identification of host and

fungal factors that play a role in the establishment of the fungus in vivo, and problems associated with antifungal therap.



Histoplasmosis

Epidemiology

Histoplasmosis is most commonly understood as intensely endemic in the Ohio and Mississippi River Valleys in the United States and much of Latin America (Fig. ١),٣, ٤ although it has been known for some time that other areas around the world saw cases as well.٥ The HIV pandemic and the increasing use of other immunosuppressive medications, such as calcineurin and tumor necrosis factor

inhibitors, has resulted in more cases of histoplasmosis and thus improved understanding of the distribution of

Pathogenesis

Infection with H capsulatum occurs by inhaling microconidia after disturbance of environmental sites containing the organism.[٣٢] Infection is usually asymptomatic in healthy individuals unless a large inoculum has been inhaled.[٢٥] In the absence of immunocompromising conditions, acute infection resolves with the development of cell-mediated immunity.[٣٣] As a consequence of production of T lymphocytes that recognize the organism, tumor necrosis factor α and interferon gamma are induced, activating

Acute Pulmonary Histoplasmosis

After inhalation of Histoplasma microconidia, a majority (٩٠٪) of patients develop subclinical, self-limited, and most often unrecognized disease (Table ١). Symptoms are more likely to manifest after high-inoculum exposures, in immunocompromised patients, in those at the extremes of age, and possibly with more intrinsically virulent strains.[٣٤, ٣٥] The overt acute pulmonary syndrome occurs after a median incubation period of ١٤ days and is characterized by fever, chills, dyspnea, and cough.

Pathology

Rapid identification of H capsulatum var. capsulatum is facilitated by visualization of ovoid yeast cells measuring ٢ μm to ٤ μm in greatest dimension in tissue and/or body fluid specimens. The average size of H capsulatum var. duboisii (range, approximately ٦–١٢ μm or greater), however, is often much larger than that of H capsulatum var. capsulatum, so presumptive identification should not rely solely on microscopic morphology. Budding yeast is connected at a narrow base, which helps

Treatment

Histoplasmosis resolves without treatment in most healthy individuals, in whom treatment is usually not recommended. The main exception is healthy individuals with recent exposure to a site contaminated with the organism, in whom early treatment is usually recommended to shorten the duration of illness and prevent the rare occurrence of PDH. In contrast, histoplasmosis is

progressive in most immunocompromised patients, in whom PDH is highly likely and treatment is always recommended.

الاختبار البعدي:(Post-Test)

-Where does the fungus Histoplasmosis settle?

الاسبوع الرابع عشر :

الاختبار القبلي :(Post-Test)

-Where does Penicillium grow?

RHIZOPUS :

Mucormycosis is an invasive infection caused by opportunistic fungi. Rhizopus, Lichtheimia, Mucor and Rhizomucor are the most common isolated genera. Primary cutaneous mucormycosis is usually related to traumatic injuries, but immunocompromised cases are associated with underlying conditions such as diabetes mellitus and malignancies. The treatment of choice is surgical debridement and liposomal amphotericin B. We present a ٤٠-year-old male with fever and a painful necrotic lesion on the middle back and history of poorly

controlled diabetes mellitus. Rhizopus oryzae was isolated and identified using an internal transcribed spacer regions ITS١ and ITS٢. An initial good response to treatment was observed; however, ٧ days later a diabetic ketoacidosis due to poor adherence to treatment caused a lethal outcome

Penicillium

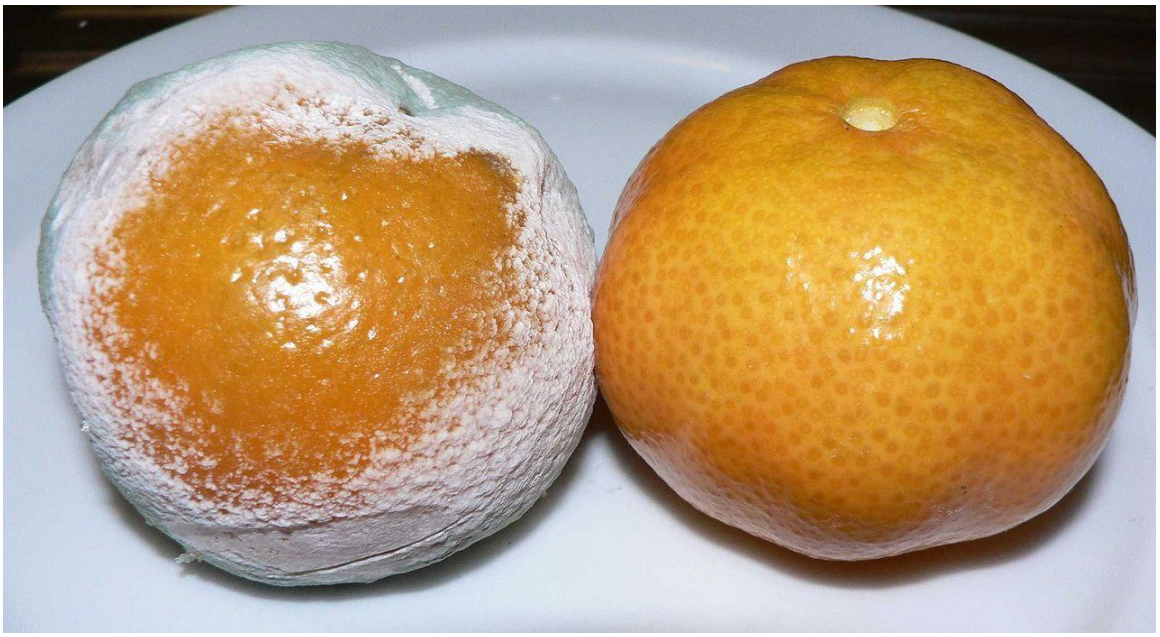
Penicillium is a genus of ascomycetous fungi that is part of the mycobiome of many species and is of major importance in the natural environment, in food spoilage, and in food and drug production. Species of Penicillium are ubiquitous soil fungi preferring cool and moderate climates, commonly present wherever organic material is available. Saprophytic species of Penicillium and Aspergillus are among the best-known representatives of the Eurotiales and live mainly on organic biodegradable substances. Commonly known in America as molds, they are among the main causes of food spoilage, especially species of subgenus Penicillium Many species produce highly toxic mycotoxins. The ability of these Penicillium species to grow on seeds and other stored foods depends on their propensity to thrive in low humidity and to colonize rapidly by aerial dispersion while the seeds are sufficiently moist Some species have a blue color, commonly growing on old bread and giving it a blue fuzzy texture.

*Some members of the genus produce penicillin, a molecule that is used as an antibiotic, which kills or stops the growth of certain kinds of bacteria. Other species are used in cheesemaking. According to the Dictionary of the Fungi (١٠th edition, ٢٠٠٨), the widespread genus contains over ٣٠٠ specie

*The genus was first described in the scientific literature by Johann Heinrich Friedrich Link in his ١٨٠٩ work Observationes in ordines plantarum naturales; he wrote, "Penicillium. Thallus e floccis caespitosis septatis simplicibus aut ramosis fertilibus erectis apice penicillatis", where penicillatis means "having tufts of fine hair Link included three species—P. candidum, P. expansum, and P. glaucum—all of which produced a brush-like conidiophore (asexual spore-producing structure). The common apple rot fungus P. expansum was later selected as the type species.

*In his ١٩٧٩ monograph, John I. Pitt divided Penicillium into four subgenera based on conidiophore morphology and branching pattern: **Aspergilloides, Biverticillium, Furcatum, and Penicillium Species** included in subgenus Biverticillium were later merged into Talaromyces

Some Penicillium species affect the fruits and bulbs of plants, including **P. expansum**, apples and pears; **P. digitatum**, citrus fruits and **P. allii**, garlic Some species are known to be pathogenic to animals; P. **corylophilum, P. fellutanum, P. implicatum, P. janthinellum, P.** viridicatum, and P. waksmanii are potential pathogens of mosquitoes



الاختبار البعدي:(Post-Test)

- Number of Penicillium genera?

الاسبوع الخامس عشر :

الاختبار القبلي (pre- -Test) :

-The number of antibiotics produced by fungi?

antibiotic produced by fungi

Many fungal secondary metabolites are of great commercial importance. Fungi naturally produce antibiotics to kill bacteria or inhibit their growth, limiting their competition in the natural environment. Important antibiotics, such as penicillin and cephalosporins, can be isolated from fungi. Valuable drugs isolated from the fungus include the immunosuppressive drug cyclosporine (which reduces the risk of rejection after organ transplantation), precursors of steroid hormones, and ergot alkaloids used to stop bleeding. Psilocybin is a compound found in fungi such as Psilocybe semilanceata and Gymnopilus junonius, which have been used for their hallucinogenic properties by various cultures for thousands of years.

At the beginning of the ٢١st century, fungi were involved in the development of more than ١٠ of the ٢٠ most profitable products in human medicine. Among the top ١٠ are two anti-cholesterol statins, the antibiotic penicillin and the immunomodulator cyclosporin A. Each of these products has sales of over $١ billion annually. As pharmaceutical breakthroughs expand, the following products have recently been accepted for human use: micafungin, an antifungal agent; Mycophenolate is used to avoid tissue rejection; Rosuvastatin is used to lower cholesterol; Cefditoren as an antibiotic.

As simple eukaryotic organisms, fungi are important model organisms for research. Many advances in modern genetics have been made using the red bread mold Neurospora crassa. In addition, several important genes originally

discovered in S. cerevisiae served as a starting point for the discovery of similar human genes. As a eukaryotic organism, the yeast cell produces and modifies proteins in a similar way to human cells, unlike the bacterium Escherichia coli, which lacks internal membrane structures and enzymes to tag proteins for export. This makes yeast a much better organism to use in recombinant DNA technology experiments. Like bacteria, yeast grow easily in culture, have a short generation, and are amenable to genetic modification.

iii)Antibiotic production by the fungus *Cephalosporium acremonium* :

- produce the antibiotics Cephalosporins

iv)Antibiotic production by Bacteria

- *Bacillus subtilis* produce the antibiotic Bacitracin.
- *Bacillus polymyxa* produce the antibiotic Polymyxin.

ii) Antibiotic production by actinomycetes (filamentous bacteria) :

- The genus *Streptomyces* produces many antibiotics.
- Streptomycin - Produced by *Streptomyces griseus* (Selman Waksman, Albert Schatz, and Elizabeth Bugie in 1943).
- Chloramphenicol - Produced by *S. venezuelae*
- Neomycin - " *S. fradiae*
- Erythromycin - " *S. erythraeus*
- Chlortetracycline - " *S. aureofaciens*
- Kanamycin - " *S. knanamyceticus*

etc.

- Penicillin is effective against many Gram positive bacteria.
- It kills the susceptible bacteria by inhibiting the synthesis of cell wall.
- Penicillins can be used for the treatment of various bacterial diseases .
- However, allergic reactions may occur in some people which may be fatal.

Antibiotics	Produced Fungi
(i). Penicillin	Penicillium notatum P. chrysogenum
(ii). Griseofulvin	Penicillium griseofulvum P. nigricans
(iii). Cephalosporin	Acremonium sp.
(iv). Citrinin	Penicillium citrinum
(v). Palutin	Penicillium palutum
(vi). Fumagillin	Aspergillus fumigatus
(vii). Fusidic acid	Fusidium coccineum
(viii). Viridin	Trichoderma viridi

(post –test) الاختبار البعدي

- **What is the importance of penicillin fungus?**

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- -
- https://my.clevelandclinic.org/health/body/٢٢٩٧١ antibodies
- -https://www.youtube.com/watch?si=RZyJETG٨٤ohAdmQr&v=T
- ١٣_JvoGyE&feature=youtu.be
- -
- https://www.hopkinsmedicine.org/health/conditions and diseases/the immune
- system
- -https://youtu.be/hIioUzwX٢٥c?si=ed٦j٠lzRc_maBpJd
- -https://youtu.be/tc ZYNSk٨٤U?si=sfqVSNIMxXptxdgu