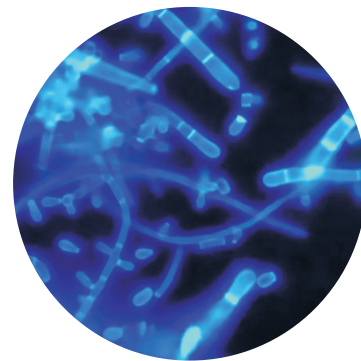
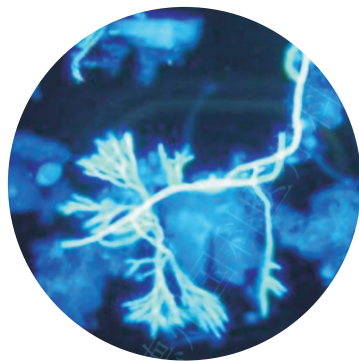
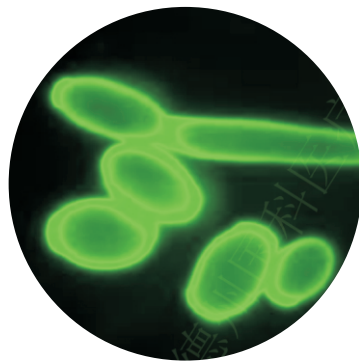
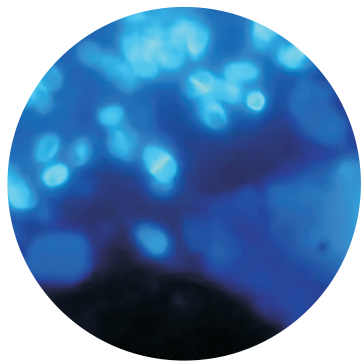


Common Fungal Atlas in Clinical Mycology

This content is for reference only.



Company Profile

Dezhou Guoke Medical Technology Co., Ltd. is an innovative technology company integrating R&D, production, sales, service, and application. Located in the Beijing-Tianjin-Hebei-Shandong National Demonstration Zone for New and Old Kinetic Energy Conversion in Dezhou City, Shandong Province, the company enjoys a superior geographical location and convenient transportation. The company's main R&D products include laboratory testing instruments and related reagents, fungal fluorescence detection reagents, and other series of products.

The company strictly adheres to the ISO9001-2000 and ISO13485-2016 quality management system standards, establishing a complete process from product R&D, design, production, sales, and service.

Our research team members possess many years of technical background in the medical industry, rich academic and R&D experience, and senior qualifications. Our team consists of a group of members who share responsibility and are willing to strive for common entrepreneurial goals.

The company focuses on overall development strategy, combining short-term and long-term goals, continuously expanding its scale, capturing market share, becoming a benchmark enterprise in IVD testing and analysis, and striving to become a flagship of innovative medical services worldwide. Braving the winds and waves, growing resiliently, striving to be a pioneering enterprise, and creating a national brand, Dezhou Guoke Medical Technology Co., Ltd. is willing to walk hand in hand with those who have dreams.

The company promises: survival through quality, customer first, honesty and trustworthiness, and win-win innovation.

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Fungal Knowledge Points

I. Classification of Fungi by Morphology:

1. Unicellular Individuals (Spores)

Yeasts: *Cryptococcus neoformans*, for example, reproduces by budding and usually does not form hyphae; in very rare cases, it may form pseudohyphae.

Yeast-like Fungi: such as *Candida*, form germ tubes through budding, resulting in pseudohyphae.

2. Multicellular Fungi

Composed of hyphae and spores.

Examples: *Aspergillus*, *Mucor*, *Penicillium*, dermatophytes, etc. The different morphologies of hyphae and spores in various fungi are important indicators for fungal identification.

3. Points to Note: Fungal hyphae are parallel on both sides and of uniform thickness; pseudohyphae are a series of spores connected to form hyphae, with indentations at the junctions (like lotus root nodes).

II. Other knowledge points:

1. Clinically, fungal infections are divided into two main categories: superficial fungal infections and deep fungal infections.

Tinea capitis	Main pathogenic fungi: <i>Trichophyton violaceum</i> , <i>Trichophyton tonsurans</i> , <i>Microsporum</i> spp., <i>Trichophyton schoenleinii</i> , <i>Microsporum ferrugineum</i>
Tinea corporis and tinea cruris	Main pathogenic fungi: <i>Trichophyton rubrum</i> , <i>Trichophyton mentagrophytes</i> , <i>Microsporum</i> , <i>Trichophyton violaceum</i>
Tinea pedis	Main pathogenic fungi: <i>Trichophyton rubrum</i> , <i>Trichophyton mentagrophytes</i> ,
Onion fungi	<i>Microsporum</i> , <i>Trichophyton violaceum</i>

Deep fungal diseases: These include subcutaneous fungal diseases and systemic fungal diseases. They cause infections of the skin, subcutaneous tissues, and internal organs. Common examples include candidiasis, spore fungal diseases, chromogenic fungal diseases, and cryptococcosis. While less common, these diseases can cause significant harm to the human body, even endangering life.

2. Fungal Fluorescence Staining

Fungal vesicles: These exhibit diverse morphologies, including round, oval, pear-shaped, sickle-shaped, spindle-shaped, and club-shaped spores. They are budding, scattered, or clustered. After fluorescence staining, the outer wall of the spore fluoresces brightly with a blue-white fluorescence, while the fluorescence intensity inside the spore varies.

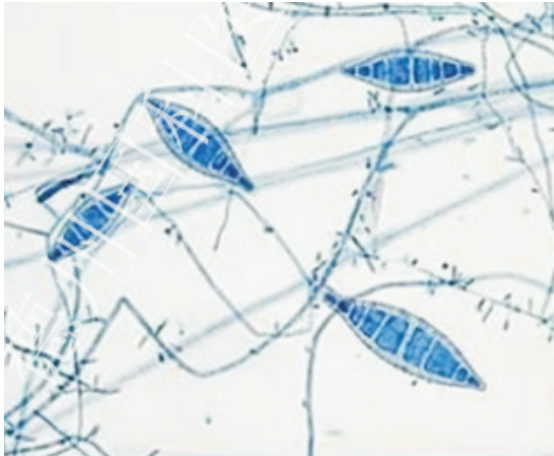
Fungal hyphae: These are small tubular structures, with or without septa, and branched or unbranched. Hyphae are divided into fungal hyphae and pseudohyphae. Fungal hyphae are parallel on both sides and uniform in thickness; pseudohyphae are a series of spores connected to form hyphae, with indentations at the junctions. After fluorescent staining, the outer wall and septa of the hyphae fluoresce brightly blue-white, while the fluorescence intensity varies within the hyphae.

Fiber impurities: These appear as broad bands or fine filaments, planar in structure, and amorphous, resembling fungal hyphae, but several times larger in size than typical hyphae. They lack tubular structures and septa, and emit a uniform, strong glow throughout.

Common Clinical Fungi - Superficial Fungi

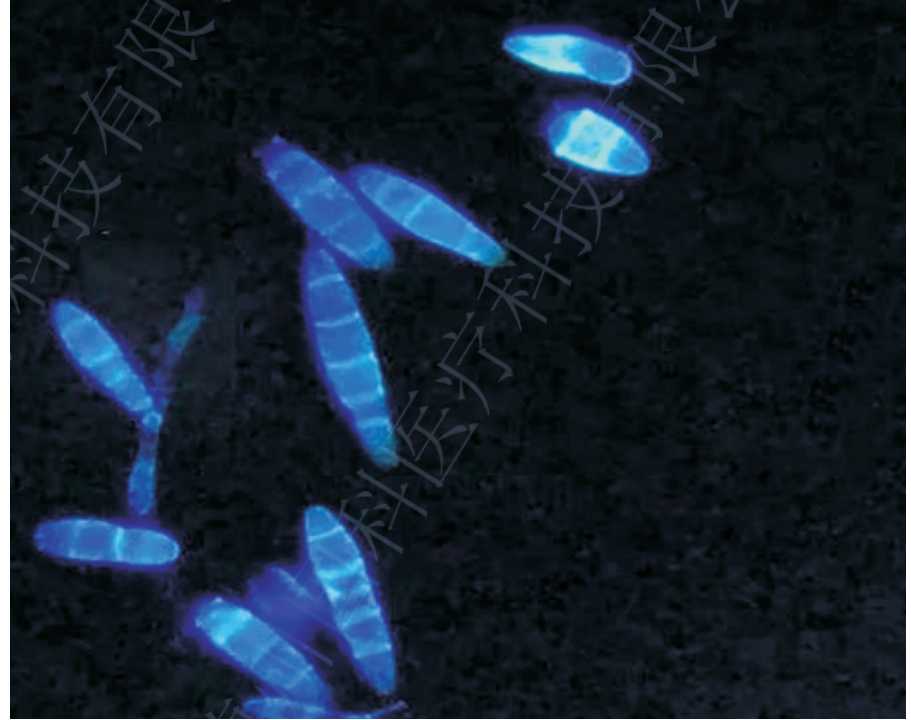
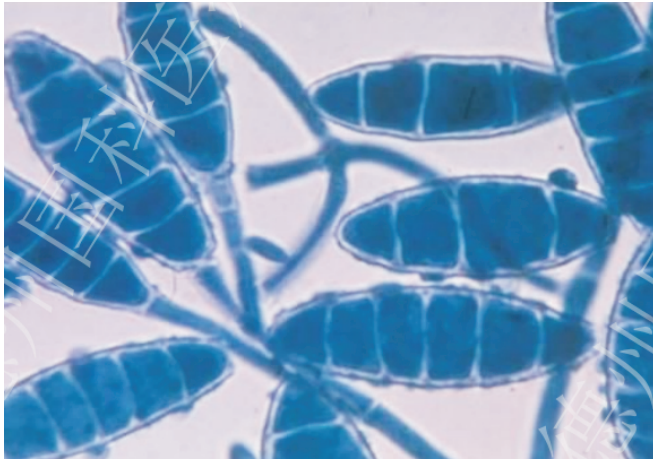
1. *Microsporum canis*

Microscopic examination: Numerous large conidia are visible, spindle-shaped, with thick, rough, and spiny walls, six or more septa, and pointed tips resembling canine teeth.



Common Clinical Fungi - Superficial Fungi

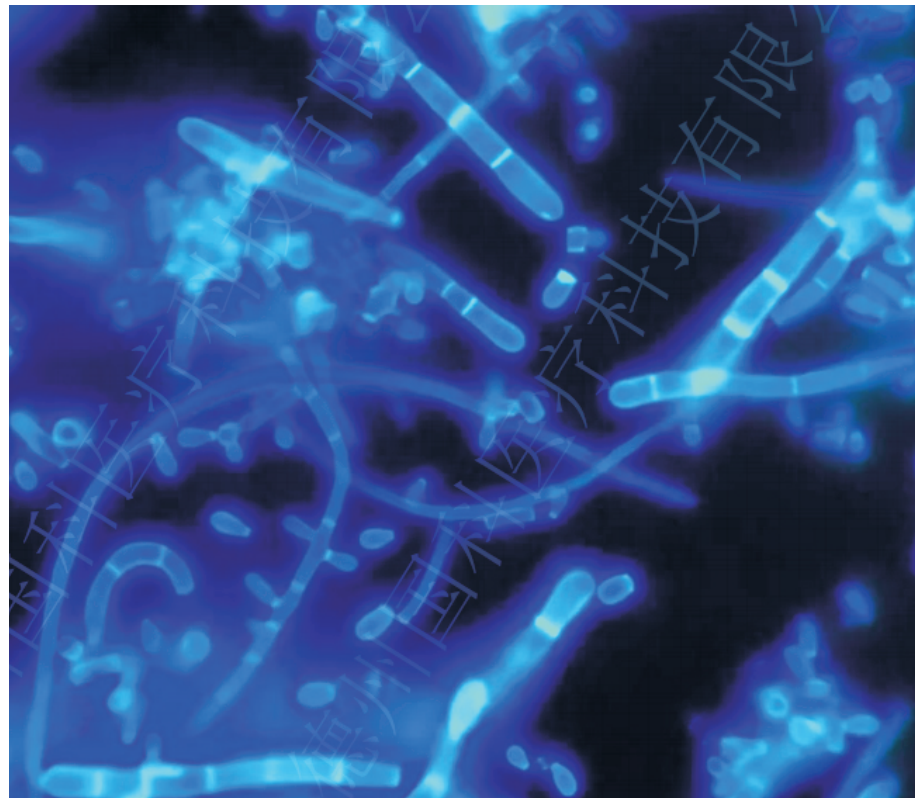
2. *Microsporum gypseum* : Microscopic examination reveals numerous large spindle-shaped conidia with 2-6 septa, thin and smooth walls or spiny ones, and rounded tips.



Common Clinical Fungi - Superficial Fungi

3. *Trichophyton mentagrophytes*

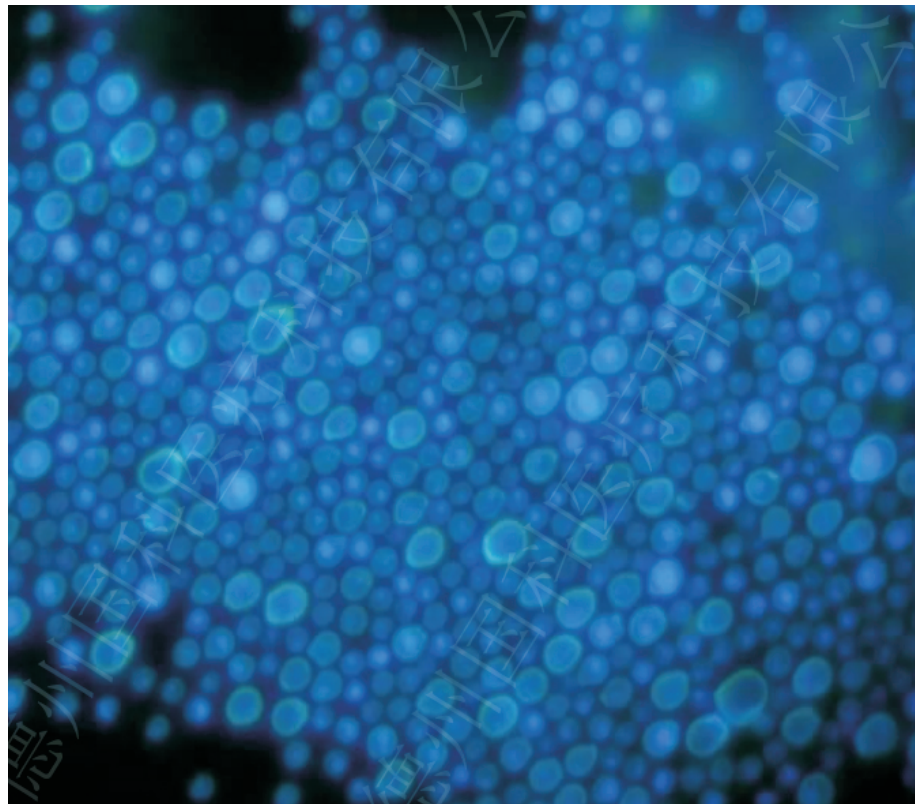
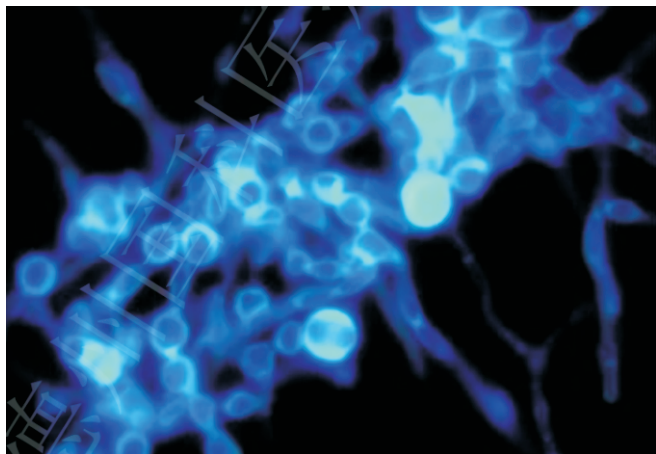
Microscopic Examination: Most macroconidia are clavate or sausage-shaped, with thin walls and 2-8 septa. The constriction is often observed at the septal positions. Microconidia are abundant, round or elliptical in shape. Spiral hyphae or pectinate hyphae are commonly seen.



Common Clinical Fungi - Superficial Fungi

4. *Trichophyton rubrum*

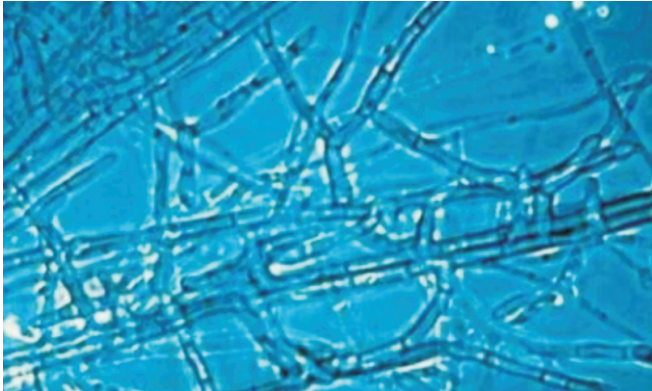
Microscopic examination: Microconidia are teardrop-shaped, appearing isolated or clustered along the hyphae, with nodular or racket-shaped hyphae visible. Macroconidia resemble pencils or cigarettes, with 3-10 septa; macroconidia are usually absent.



Common Clinical Fungi - Superficial Fungi

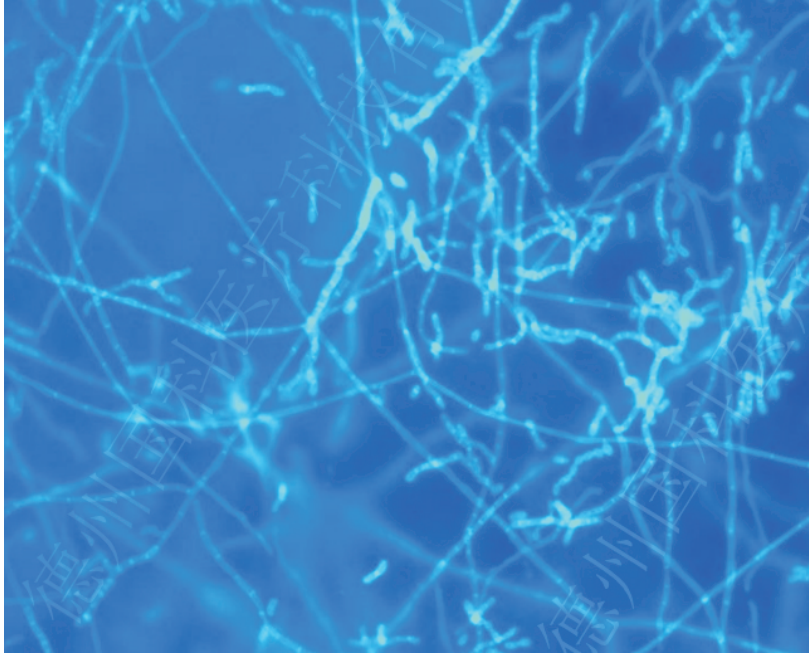
5. *Microsporum ferrugineum*

Microscopic examination: The hyphae are relatively thick and irregular, deformed or straight, with important bamboo-like septa. The mycelium is relatively thick, mostly at a 45-degree angle, with 3-4 branches growing from a single point. It has racket-shaped hyphae and comb-like structures. Over time, it can produce a large number of thick-walled spores, lacking typical microconidia and macroconidia.

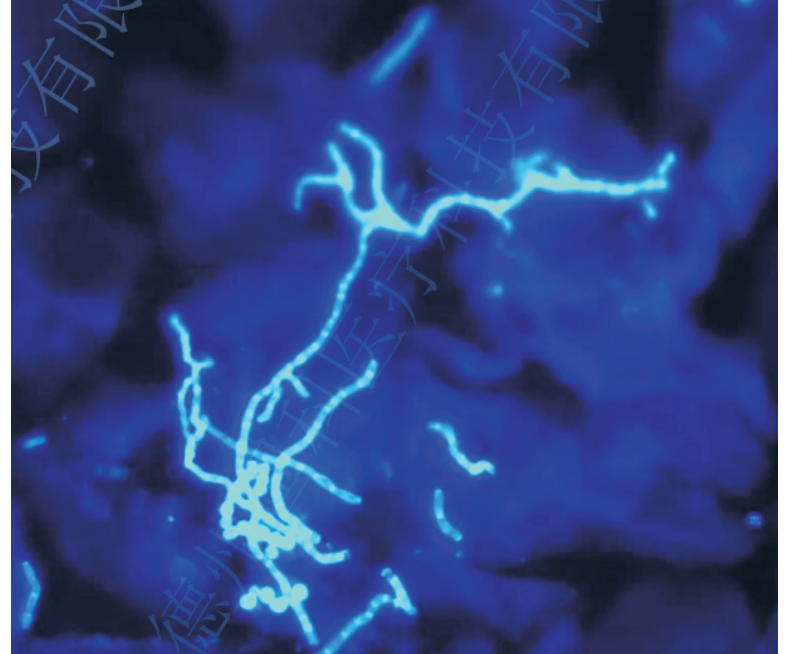


Common Clinical Fungi - Superficial Fungi

6. Other dermatophytes

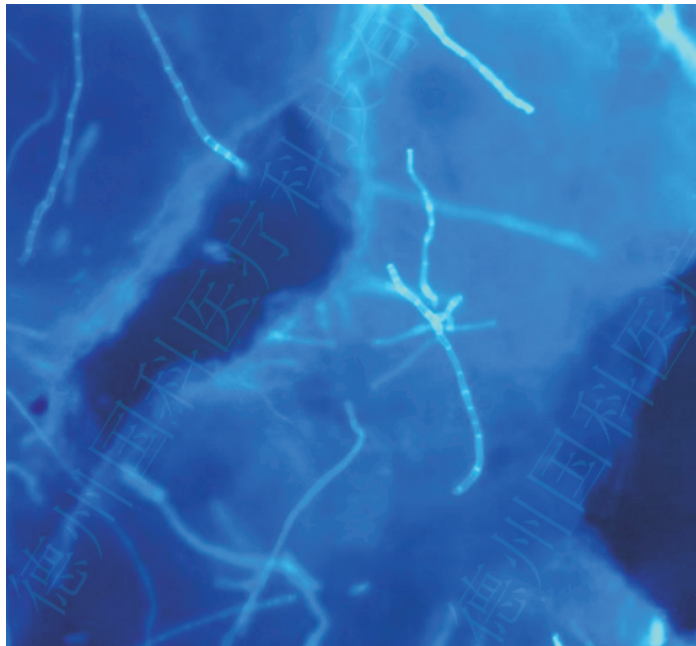


Tinea cruris

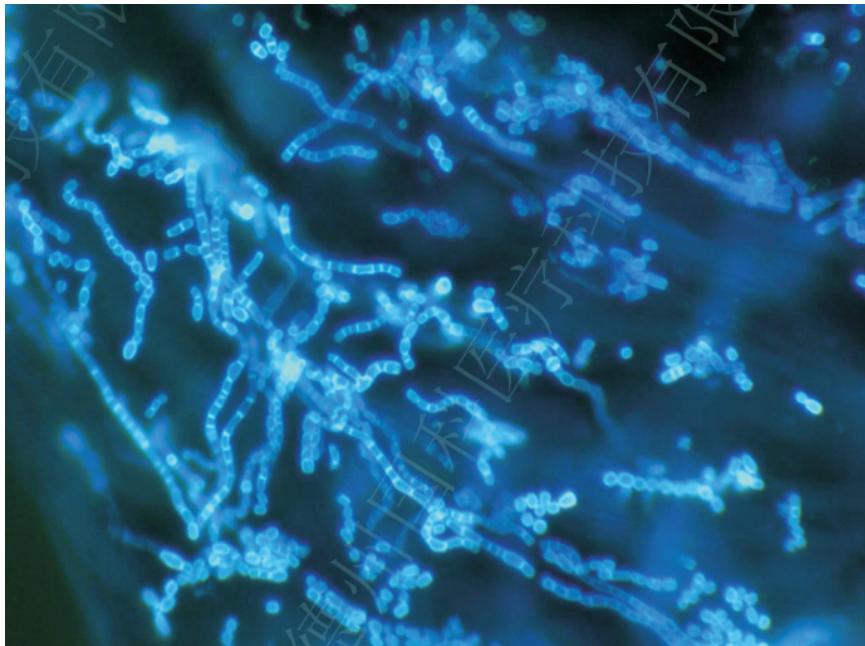


Onychomycosis

Common Clinical Fungi - Superficial Fungi



Tinea pedis



Body moss

Common Clinical Fungi - Superficial Fungi

7. Microorganisms



Sarcoptes scabiei



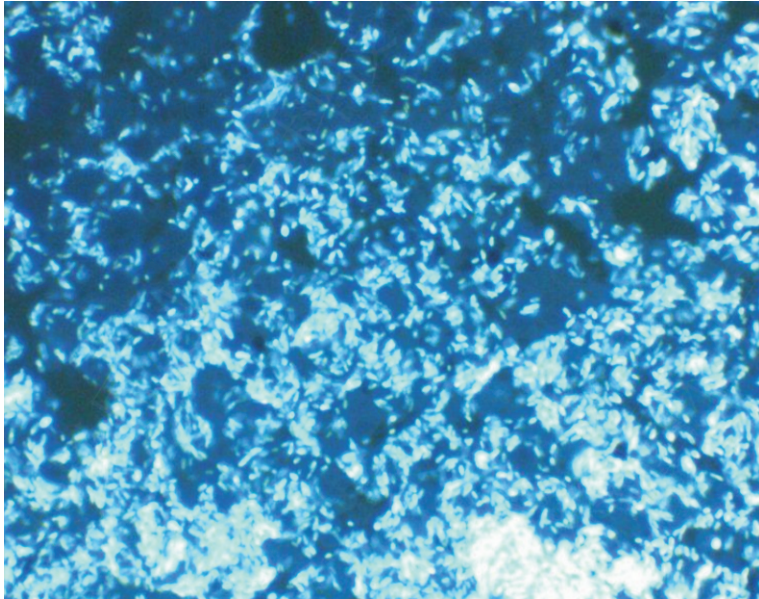
Demodex Folliculorum

Commonly seen fungi in clinical practice

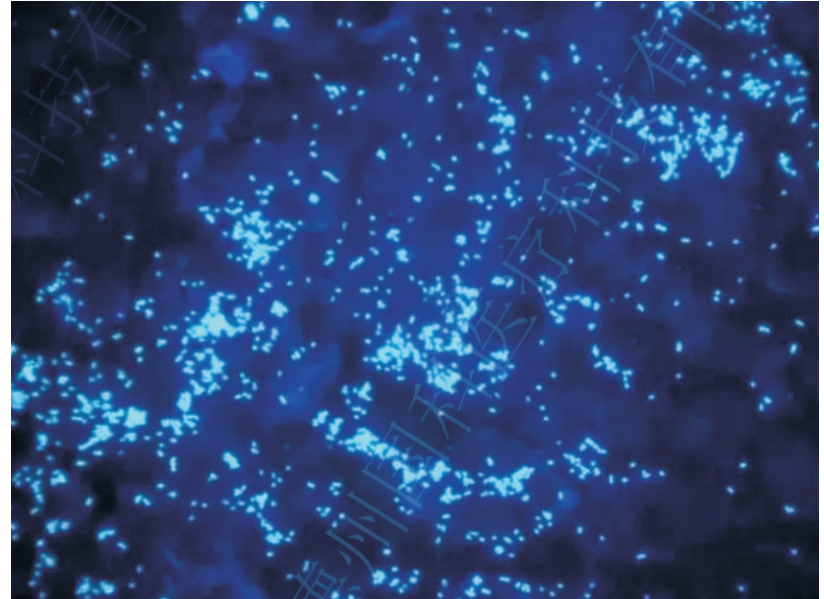
-superficial fungi: yeasts and yeast-like fungi

8. *Malassezia*-01

Microscopic examination: In cases of pityriasis versicolor caused by *Malassezia* infection, the hyphae of *Malassezia* are short and thick. Under the microscope, racket-shaped, grenade-shaped, or peanut-shaped *Malassezia* spores and banana-shaped or short club-shaped hyphae can be seen.



Malassezia furfur



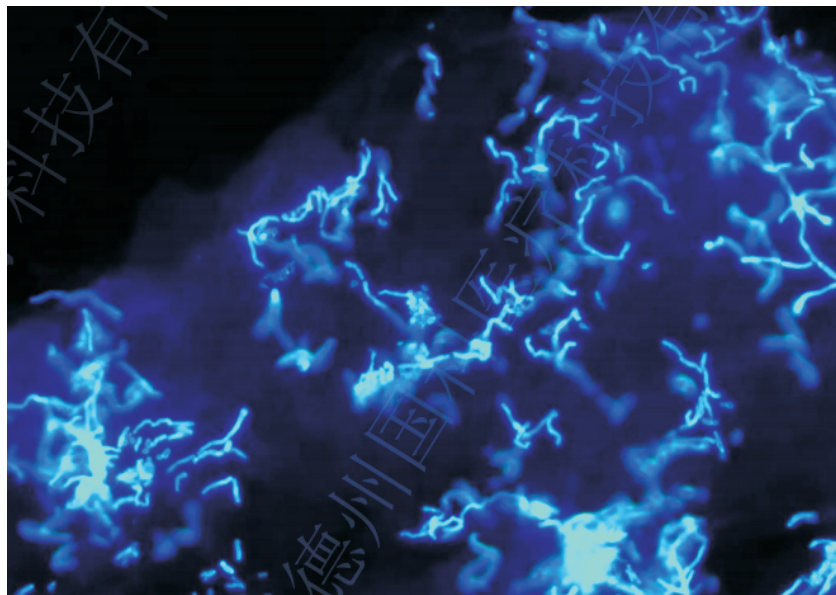
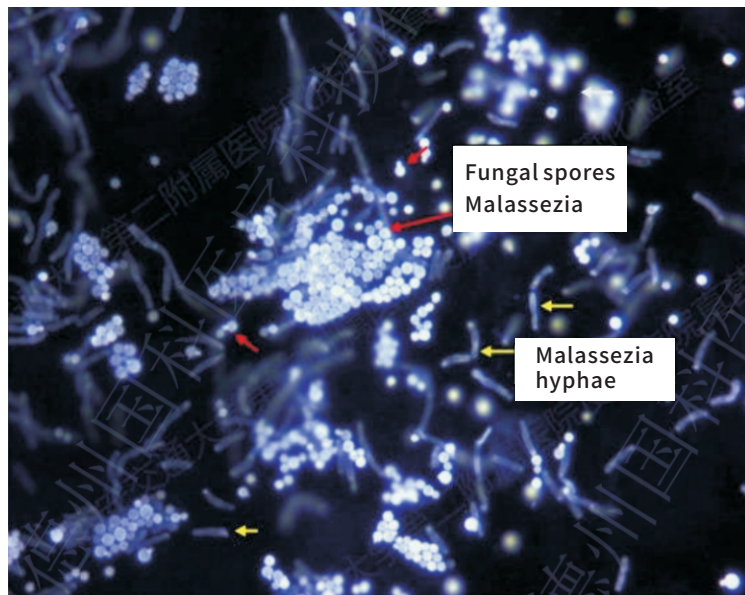
Malassezia furfur

Commonly seen fungi in clinical practice

- superficial fungi: yeasts and yeast-like fungi

9. Malassezia-02

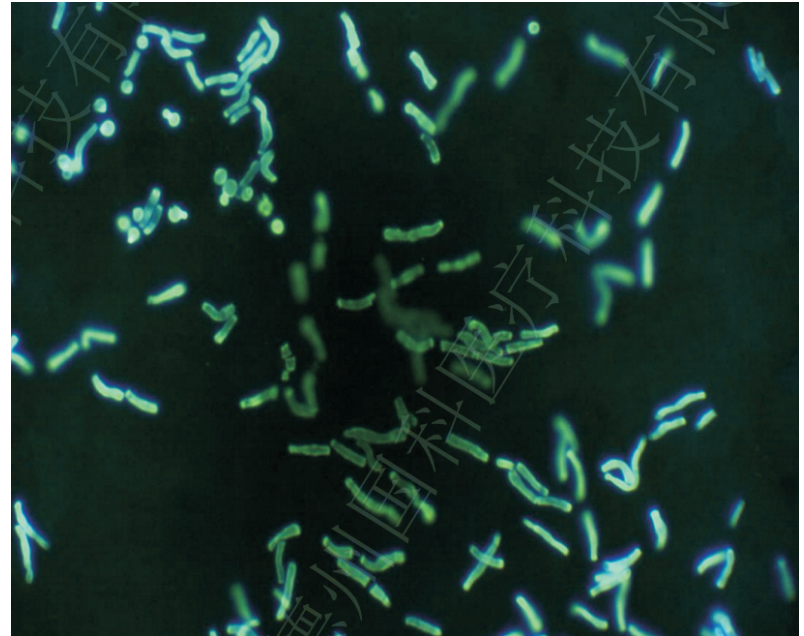
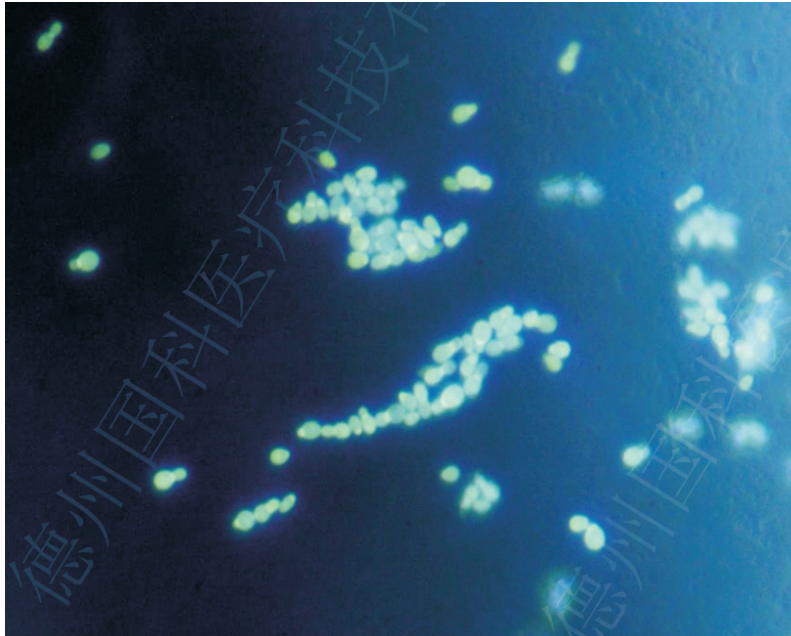
Microscopic examination: In cases of pityriasis versicolor caused by Malassezia infection, the hyphae of Malassezia are short and thick. Under the microscope, racket-shaped, grenade-shaped, or peanut-shaped Malassezia spores and banana-shaped or short club-shaped hyphae can be seen.



Commonly seen fungi in clinical practice - superficial fungi: yeasts and yeast-like fungi

10. *Malassezia*-03

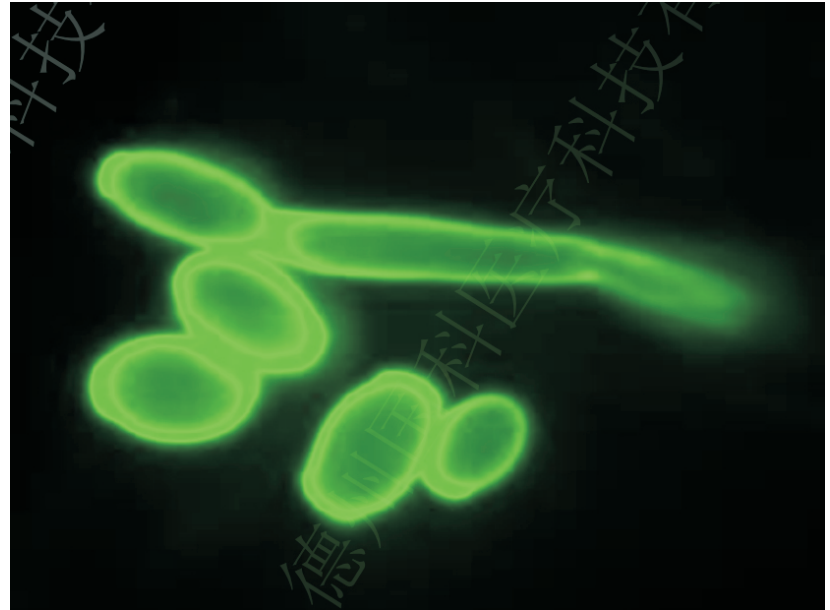
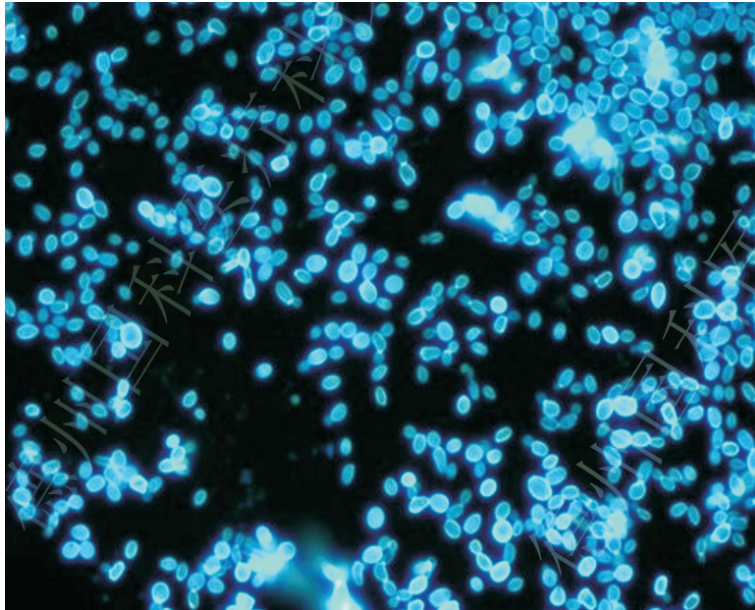
Microscopic examination: In cases of pityriasis versicolor caused by *Malassezia* infection, the hyphae of *Malassezia* are short and thick. Under the microscope, racket-shaped, grenade-shaped, or peanut-shaped *Malassezia* spores and banana-shaped or short club-shaped hyphae can be seen.



Commonly seen fungi in clinical practice - superficial fungi: yeasts and yeast-like fungi

11. *Candida albicans*

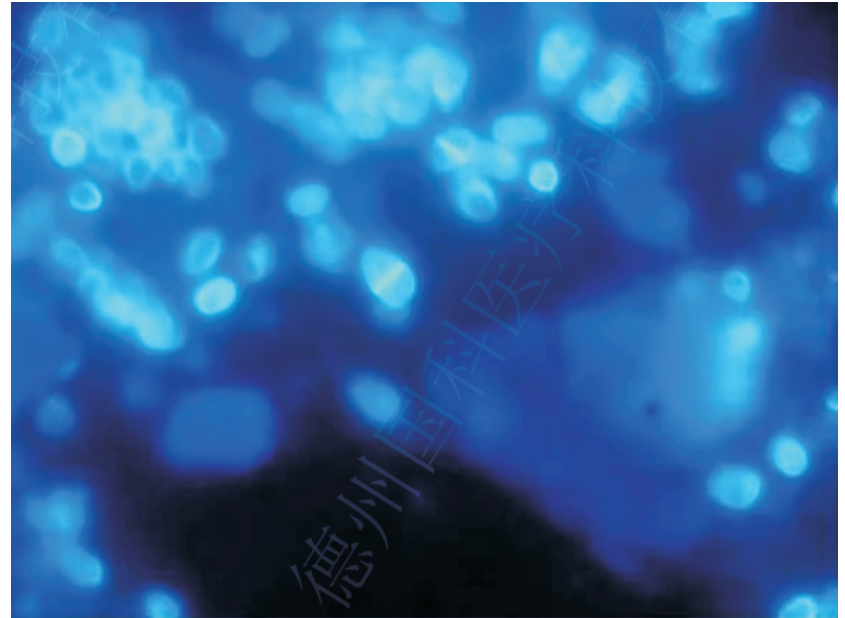
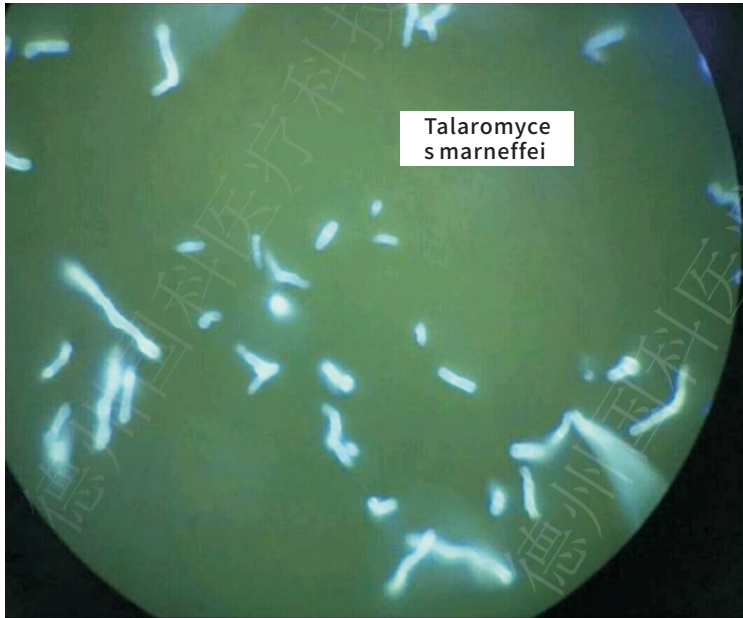
Microscopic examination: Under a microscope, it appears as a string of small spherical spores threaded through a tin wire, resembling beads. *Candida albicans* normally appears round or oval, with indistinct pseudohyphae and dentate tubes.



Commonly found fungi in clinical practice - Dimorphic fungi (deep-seated fungi)

12. Dimorphic Bacterium - *Talaromyces marneffe*

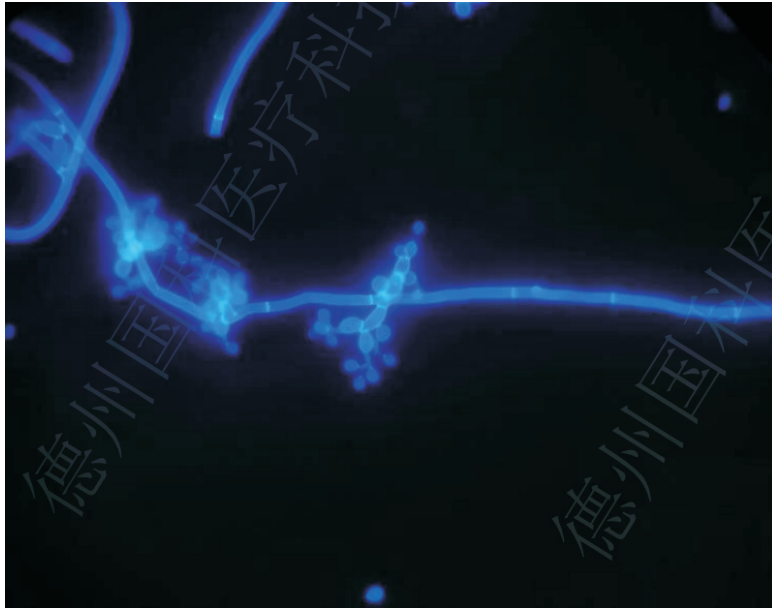
Microscopic Examination: *Bluelea marneffe* spores are oval, non-spore-forming, approximately 2.5–5 μm in diameter, and septate. It primarily infects the liver, spleen, lymph nodes, and lung tissue. The sausage-shaped spores with transverse septa are a key distinguishing feature. **Histoplasma capsulatum** lacks both the sausage-shaped spores and transverse septa, which can be used to differentiate the two.



Commonly found fungi in clinical practice - Dimorphic fungi (deep-seated fungi)

13. Dimorphic fungus - *Sporothrix*

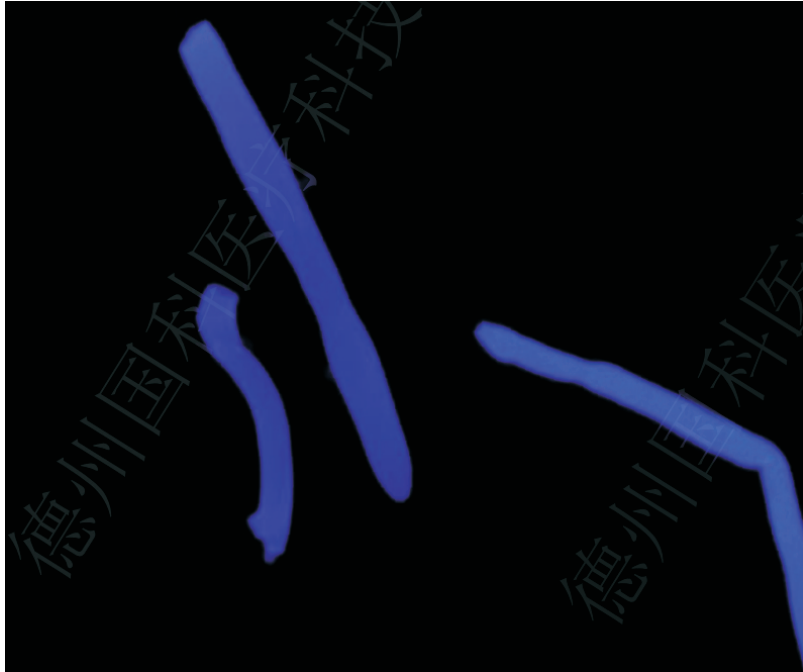
Microscopic examination: Hyphae are fine, septate, and branched; conidiophores are fine with slightly swollen tips; conidia are round or elliptical and sympodially produced.



Commonly found fungi in clinical practice - Mucor genus of deep fungi

14. Mucor

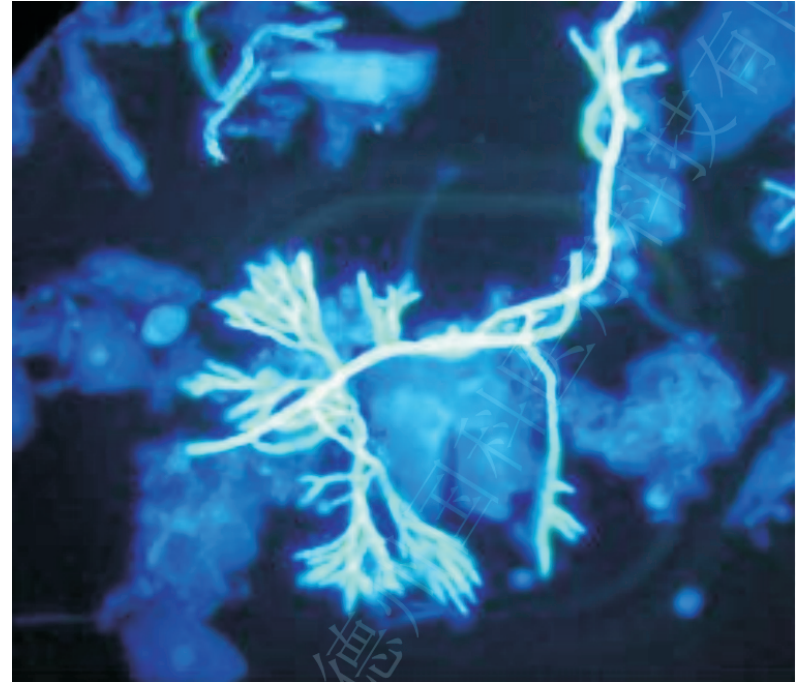
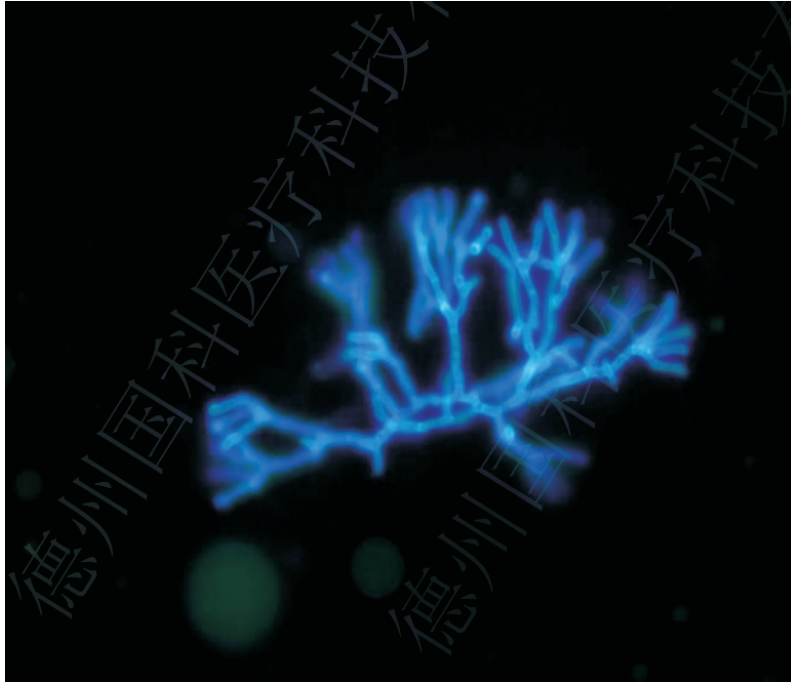
Microscopic examination: wide hyphae with non-parallel hyphal walls, transparent, thin-walled band-like hyphae with almost no septa, exhibiting characteristic twisting, collapse, and folding. The hyphae branching intervals are irregular, usually showing right-angle branching.



Commonly found fungi in clinical practice - Aspergillus genus of deep fungi

15. Aspergillus

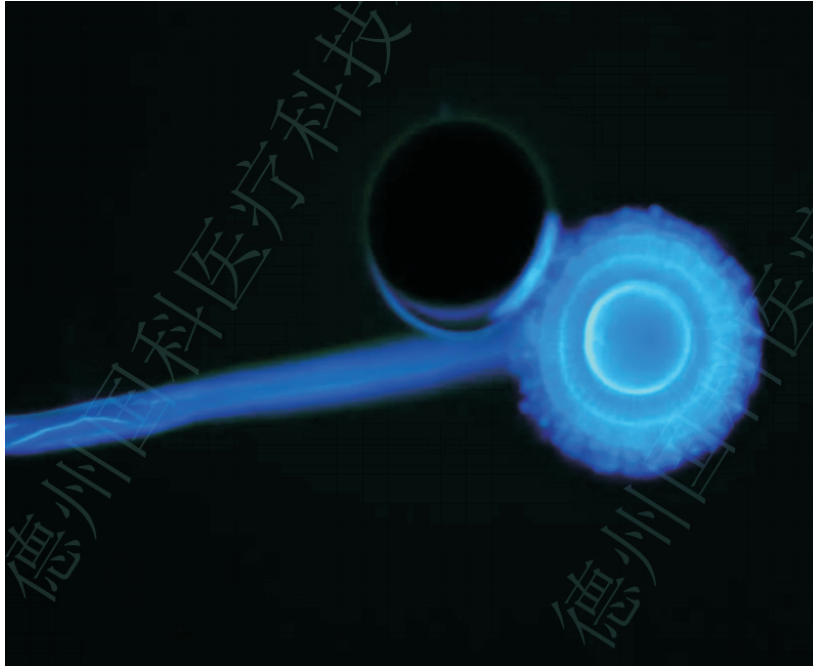
Microscopic examination: Aspergillus hyphae are septate and branch at an acute angle of 45° , which distinguishes them from the broad, ribbon-like hyphae of Mucor (which are septate and branch at right angles).



Commonly found fungi in clinical practice - Aspergillus genus of deep fungi

16. *Aspergillus niger*

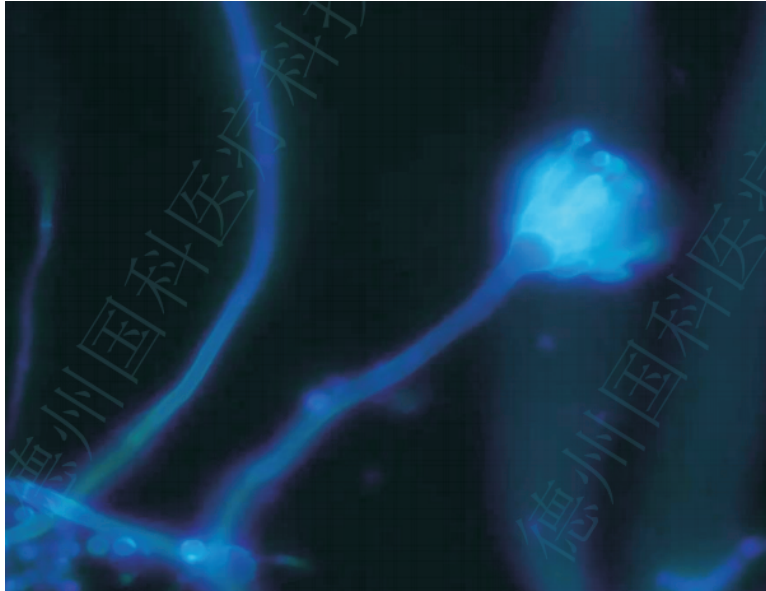
Microscopic examination: The vesicle of *Aspergillus niger* is round, with the pedicel covering the entire vesicle. Double-layered pedicels cover the vesicle, and the base of the pedicel is closely arranged with the pedicel. The base of the pedicel and the pedicel are of equal length.



Commonly found fungi in clinical practice - Aspergillus genus of deep fungi

17. *Aspergillus sulcatus*

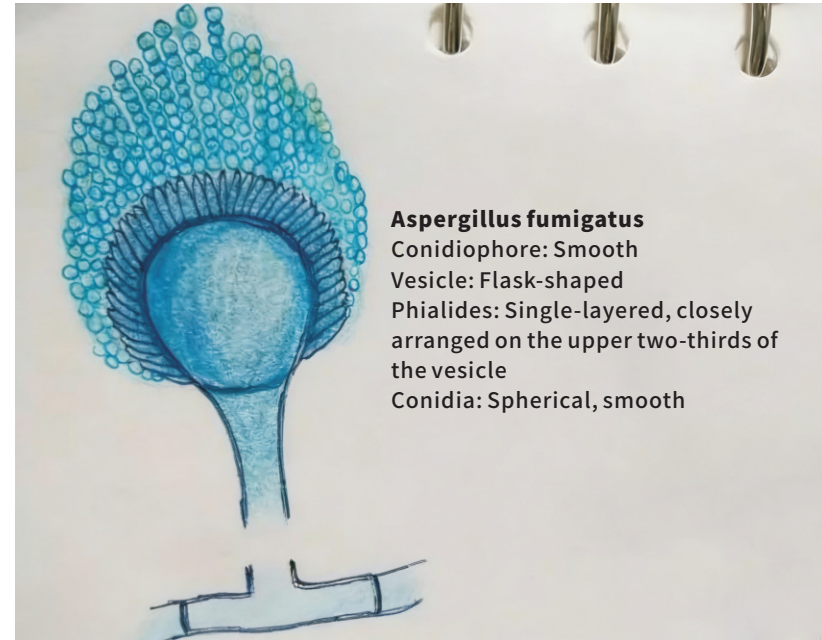
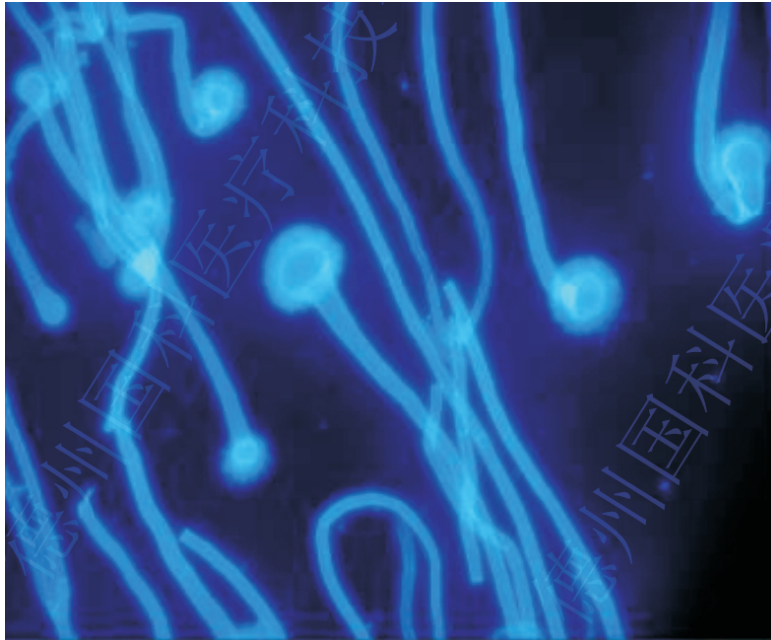
Microscopic examination: Hyphae are septate and transparent or contain granules; conidial heads are short, columnar, smooth, and curved; apical vesicles are round or semi-circular, with double-layered pedicels, short at the base, branched, and distributed radially on the apical surface (half of the surface). Conidia are spherical and have small spines.



Commonly found fungi in clinical practice - Aspergillus genus of deep fungi

18. *Aspergillus fumigatus*

Microscopic examination: Conidial heads are short columnar, with smooth stalks that swell near the apex to form an inverted flask-shaped vesicle with a single layer of small stalks.



Aspergillus fumigatus

Conidiophore: Smooth

Vesicle: Flask-shaped

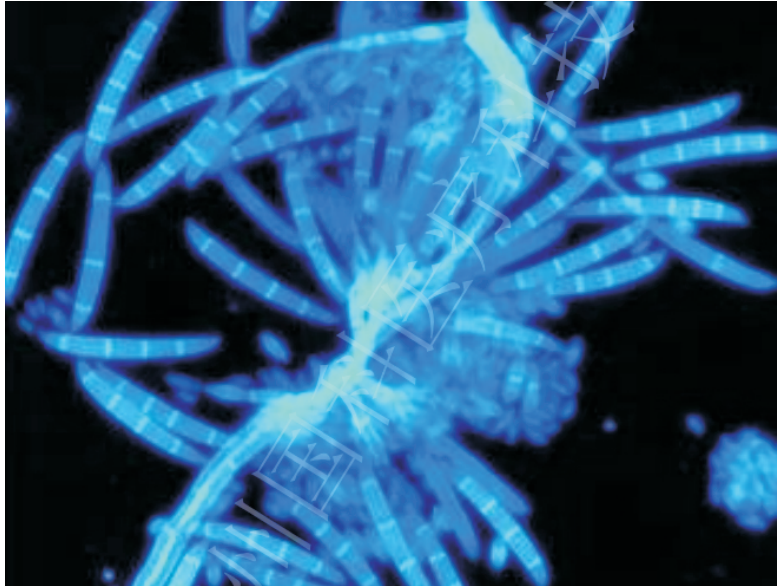
Phialides: Single-layered, closely arranged on the upper two-thirds of the vesicle

Conidia: Spherical, smooth

Commonly found fungi in clinical practice - *Fusarium* genus of deep fungi

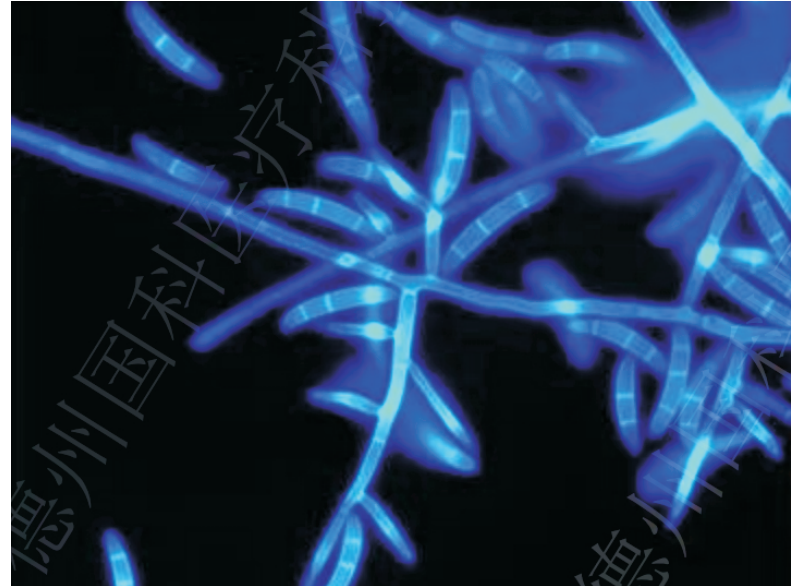
19. *Fusarium solani*

Macroconidia are sausage-shaped with 3–5 septa, and their apical cells constrict to form a beak-like structure. Microconidia are fusiform to ovoid with 0–1 septum. The hyphae are septate, and chlamydospores are produced at the apex or middle of the hyphae.



Fusarium oxysporum

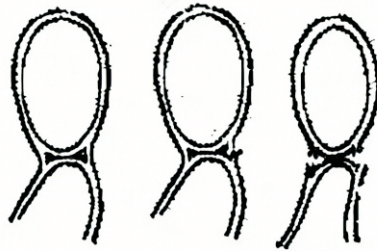
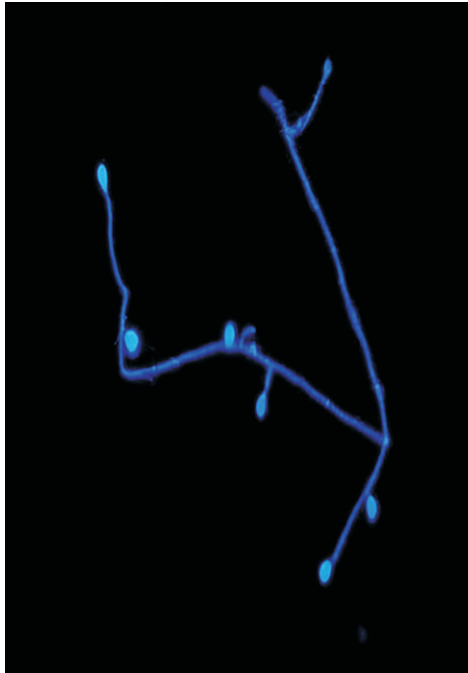
Microconidia are produced on solitary phialides, often aggregated into spherical clusters at the apex of phialides, unicellular and ovoid. Macroconidia are falcate, slightly curved, and mostly 3-septate. Chlamydospores are terminally or apically produced and spherical.



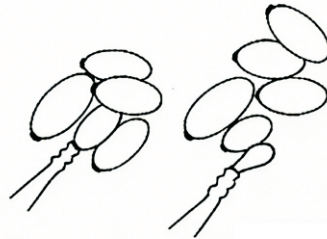
Commonly found fungi in clinical practice - *Scedosporium* genus of deep fungi

20. *Scedosporium apiospermum*

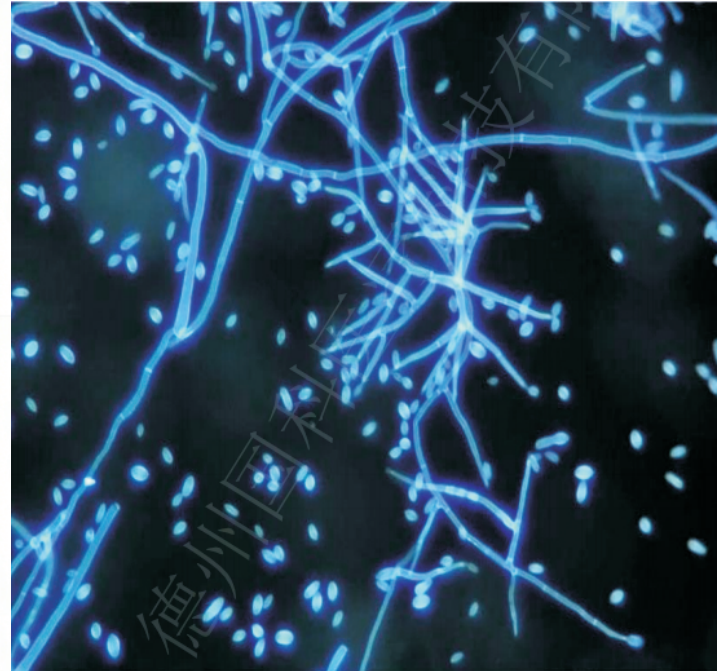
Microscopic Examination: Conidiogenesis is annellidic. Most conidia are produced singly at the apex of conidiophores, with enlarged apices and truncate bases. **Annellus Definition:** Since a single conidiogenous cell can sequentially produce several conidia at the same sporulation site, each detachment of a conidium from the parent cell leaves a ruptured hyphal cell wall remnant—this structure is called an annellus.



Conidiation by annellation



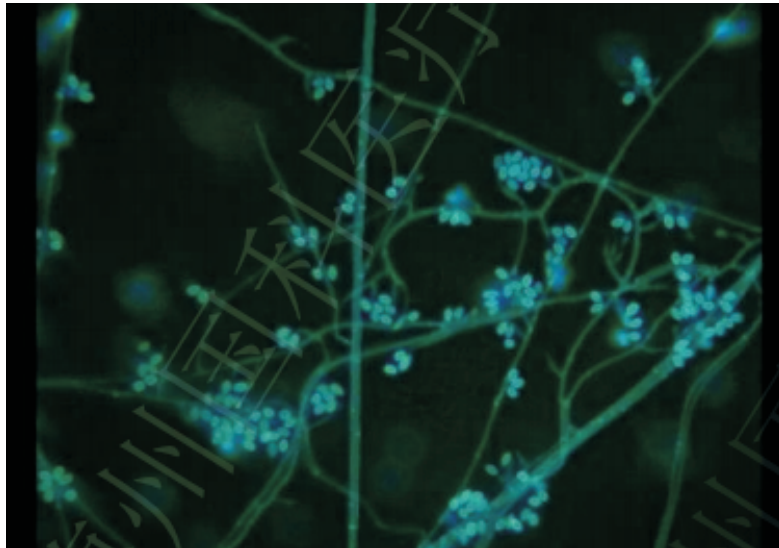
Mode diagram of single spore production by *Scedosporium apiospermum*



Commonly found fungi in clinical practice - *Scedosporium* genus of deep fungi

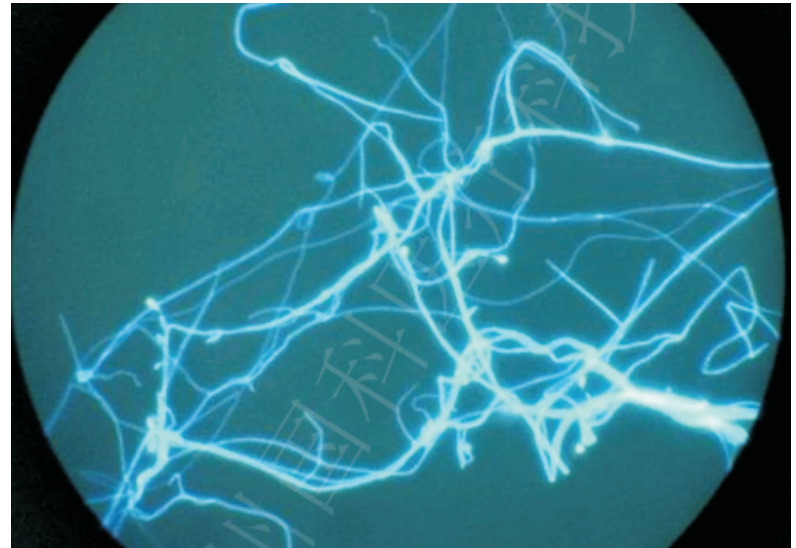
21. *Scedosporium prolificans*

Microscopic examination: Conidia are oval or pear-shaped, appearing in multiples borne at the apex of the conidiophore, sympodially producing conidia (conidia are produced successively around the hyphae). The base of the conidiophore is clearly swollen and bottle-shaped.



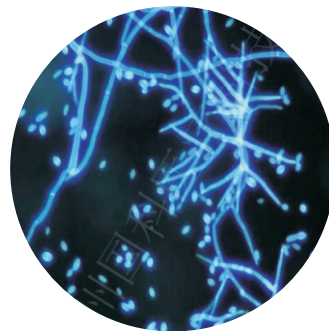
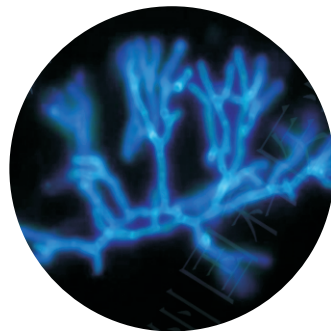
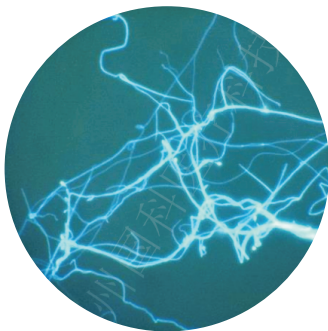
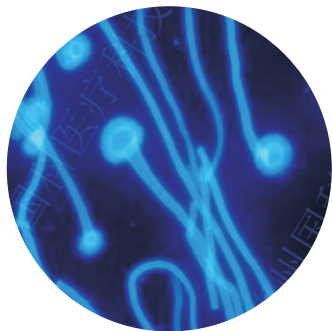
Scedosporium boydii

Microscopic examination: There are two types of conidia. One type is short, club-shaped or oval, with one end rounded and the other end truncate or tapering, borne singly on the side of the conidiophore or hyphae. The other type is smaller, club-shaped or cylindrical, with one end truncate, borne on short annular scars or long conidiophores, forming spore hyphae. After the conidia fall off, they form spore masses.



Thank you .

The content is for reference only.
Please feel free to point out any errors.



Dezhou Guoke Medical Technology Co.,Ltd