PATHOGENIC MICROORGANISMS

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Lecture 4

Mycology

Definition and General Information

- Mycology is the branch of biology concerned with the study of fungi and their unique relationships with other organisms and the environment. It deals with the genetic and biochemical properties, their taxonomy, and their use to humans as a source for medicinal and other applications. It encompasses the study of all fungal organisms, including yeasts, molds, and mushrooms.

- A fungus is any member of the group of eukaryotic organisms that includes microorganisms such as yeasts and molds, found in all temperate and tropical regions of the world where there is sufficient moisture to enable them to grow.

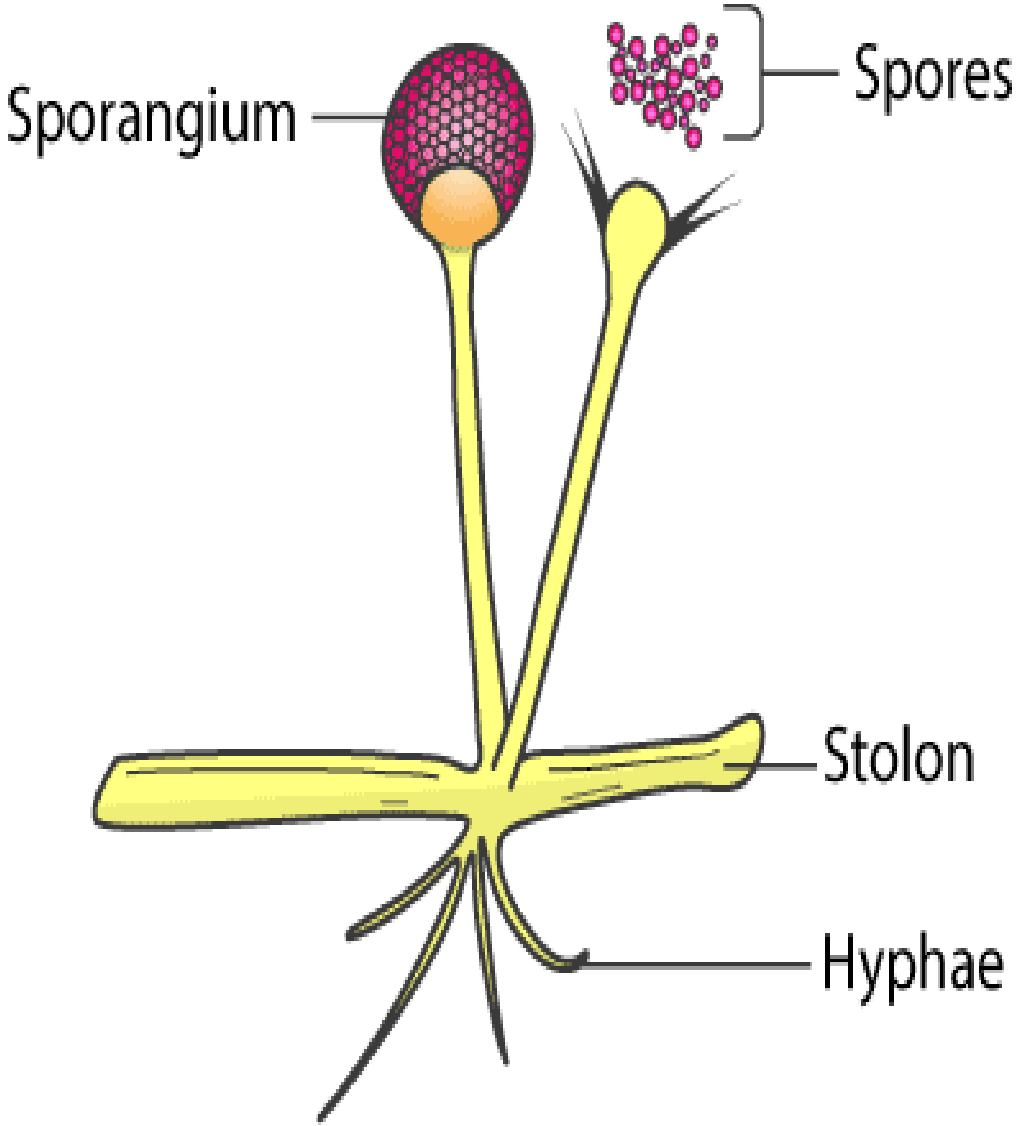
Structure of Fungi

- Except for yeasts, which grow as single cells, most fungi grow as thread-like filaments, which called **hyphae**. Each hypha consists of one or more cells surrounded by a tubular cell wall. A mass of hyphae make up the body of a fungus, which is called a **mycelium**

The anatomy of fungi is separated into two different parts; the vegetative structures and the reproductive structures.

- **The vegetative structures** are the mycelium, which existing as a mass of branched, tubular threads known as hyphae
- **The reproductive structure** of fungi is the spore-producing structure.

STRUCTURE OF KINGDOM FUNGI



Types of Fungi

- **Yeasts:** Single-celled fungi that can reproduce asexually by budding or fission.
- **Molds:** Multicellular fungi that form visible mycelium. They can reproduce both sexually and asexually.
- **Mushrooms:** A type of mold with complex fruiting bodies. They have well-developed structures for spore dispersal.

Reproduction of Fungi

- Fungi can reproduce by many mechanisms, both sexually and asexually, with the particular mechanisms employed dependant on species.
- Asexual reproduction usually occurs in fungal mycelium by mycelial fragmentation, allowing large clonal populations adapted to a specific role to rapidly disperse.
- Sexual reproduction Involves the fusion of specialized reproductive structures and the formation of sexual spores. The specifics vary among fungal groups.

Fungal Infections

- **Superficial**: Affect skin, hair, and nails (e.g., athlete's foot, ringworm).
- **Cutaneous**: Involve deeper skin layers (e.g., candidiasis).
- **Subcutaneous**: Affect deeper tissues (e.g., sporotrichosis).
- **Systemic**: Affect internal organs and can be life-threatening (e.g., histoplasmosis, cryptococcosis).

Mode of transmission

- Infections are spread by:-
- direct skin contact (with humans or animals).
- indirectly from contaminated objects.

There are common ways to get fungal infections such as :-

- From damp public spaces, like showers and locker rooms.
- Through injury in a skin.
- From breathing fungus in from the environment (like soil or dust).
- Infections with dermatophytes from direct contact with an infected person or animal.

Fungal infections, or mycosis, are diseases caused by a fungus (yeast or mold). These infection acquired in weakened immune system or take antibiotics.

Fungal infections are most common on your skin or nails, but fungi can also cause infections in mouth, throat, lungs, urinary tract and many other parts of human body.

Incubation period

Time between becoming infected person and developing symptoms (infected person can infect others).

Uses of Fungi

- Following are some of the important uses of fungi:
- **Recycling:** – They play a major role in recycling the dead and decayed matter.
- **Food:** – The mushrooms species which are cultured are edible and are used as food by humans.

- **Medicines: –** There are many fungi that are used to produce antibiotics and to control diseases in humans and animals. Penicillin antibiotic is derived from a common fungus called *Penicillium*.

- **Bio control Agents:** – Fungi are involved in exploiting insects, other small worms and help in controlling pests. Spores of fungi are used as a spray on crops.
- **Food spoilage:** – Fungi play a major role in recycling organic material and are also responsible for major spoilage and economic losses of stored food.

There are common fungi infections include:

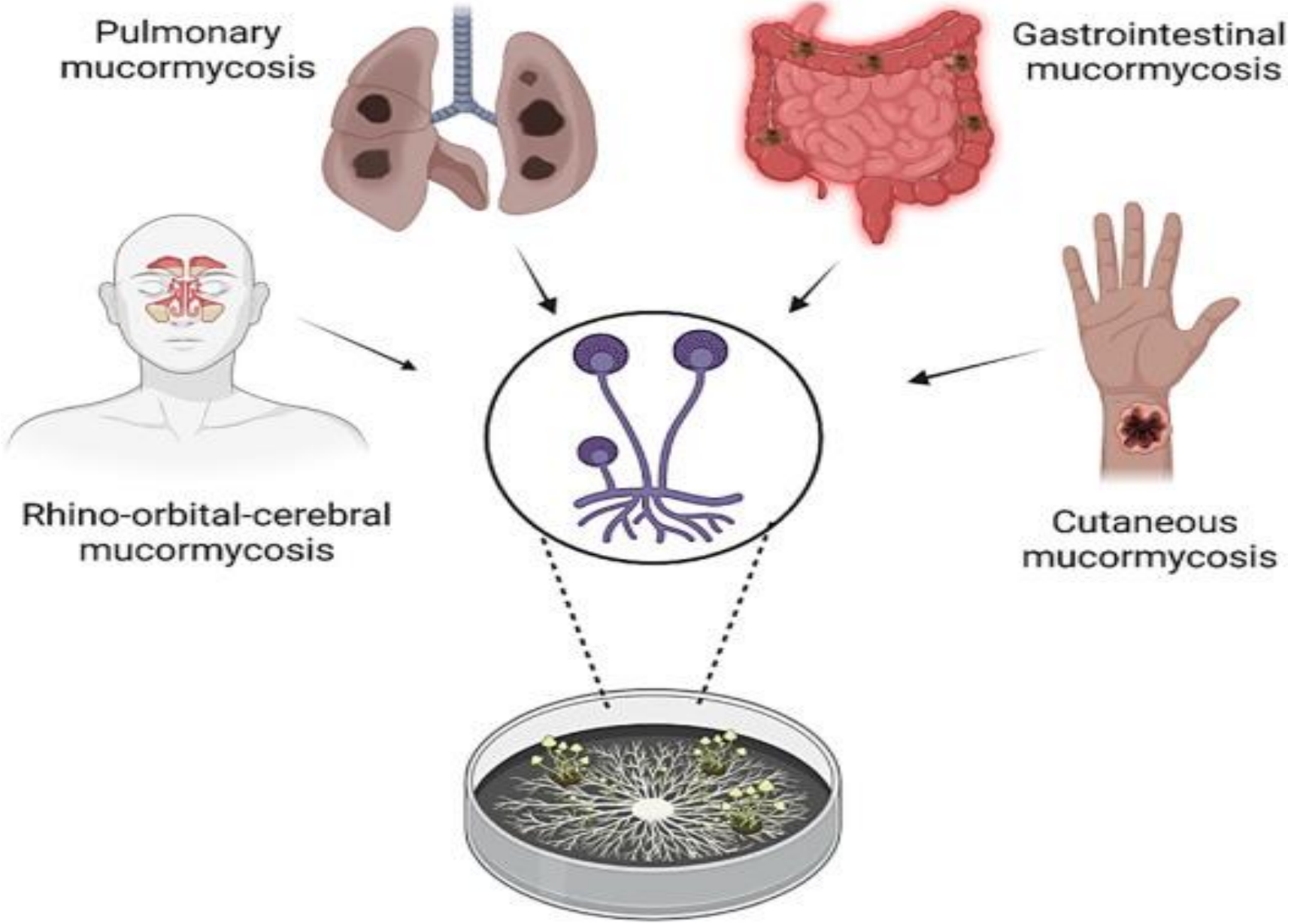
Dermatophytes:- Dermatophytes are a group of fungi that live off of keratin, a substance in your hair, your nails and the outer layer of your skin. They don’t infect living tissue.

Candida:- *Candida albicans* is a yeast that naturally lives on your body, usually without causing problems. Under certain conditions, it can grow too much and cause itching and redness. Rarely, it can cause serious infections.

Environmental fungi:- that live in soil or water

For examples

Histoplasma, *Coccidioides*, *Blastomyces* and *Aspergillus.*


Pulmonary mucormycosis
Gastrointestinal mucormycosis
Rhino-orbital-cerebral mucormycosis
Cutaneous mucormycosis


Thank you