

M.V.SC. (VETERINARY MICROBIOLOGY), FIRST YEAR, MONSOON SEMESTER

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VMC 603 (VETERINARY MYCOLOGY), UNIT I

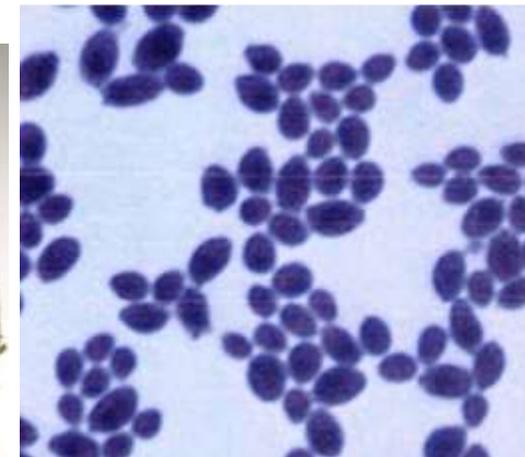
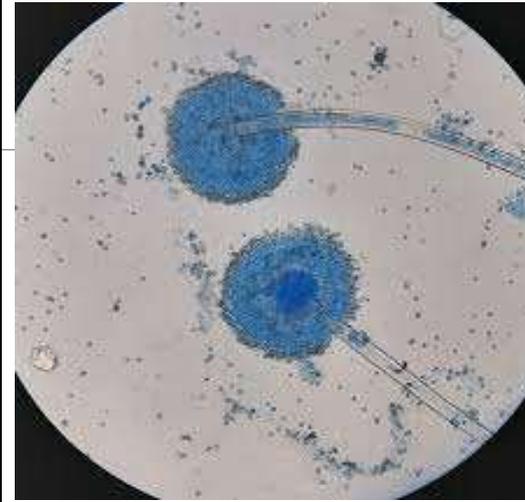
TOPIC: GENERAL CHARACTERISTICS OF FUNGI

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INTRODUCTION

- ❖ English word fungus - directly adopted from Latin “fungus” (mushroom)
- ❖ Fungi are divided into two major groups called yeasts and molds
- ❖ Fungi are usually slow growers, non-fastidious
- ❖ Prevalent in our everyday world



(Image source-google)

Terms:

Mycology - branch of biology, concerned with the study of fungi

Mycotoxicology- The study of fungal toxins

Mycoses- The diseases caused by fungi in animals. (s., mycosis)

Phaeohyphomycosis- Infection caused by pigmented (dematiaceous) fungi

Mycetoma- Tumour-like granulomatous lesions caused by saprophytic fungi

Pseudomycetoma- Tumour-like granulomatous lesions, associated with dermatophytes invasion

Mycotoxicoses- Diseases resulting from ingestion of fungal toxins

HISTORY

- ❖ Mycology was one of the first microbiological sciences, beginning around 1835, when Bassi discovered that some fungi are pathogenic
- ❖ In 1900, Darling characterized the pathogenic fungus, *Histoplasma capsulatum*
- ❖ Majority of techniques- developed in the early 1900's by a scientist named Sabouraud
- ❖ Raymond Sabouraud - major contributions in mycology
- ❖ He invented a method to select fungi with a medium of low pH and a rather high concentration of sugar, media called as Sabouraud agar

General characteristics:

1.5 million species in the kingdom Fungi

Approx. 400 fungal species - pathogenic for humans and animals

Widely distributed in the environment

Eukaryotic

Non-photosynthetic heterotrophs

Produce exoenzymes and obtain nutrients by absorption

- ❖ Cell walls contain **chitin** and other polysaccharides
- ❖ The two main morphological fungal forms are moulds and yeasts
- ❖ Reproduce both sexually and asexually with the production of spores
- ❖ Grow aerobically at 25°C; some moulds are strict aerobes
- ❖ Tolerate high osmotic pressures and low pH values
- ❖ Grow on Sabouraud dextrose agar, pH 5.5
- ❖ Non- motile, few (e.g. Chytrids) have a motile phase
- ❖ Fungal cell membranes have a unique sterol, **ergosterol**, which replaces cholesterol found in mammalian cell membranes

Resistant to antimicrobial drugs which are effective against bacteria

Fungal species may be saprophytic, parasitic or mutualistic

Majority are saprophytes; some cause opportunistic infections

Mutualistic fungi:

Have obligatory associations with other microorganisms

Non-pathogenic

Saprophytic fungi-

widespread in the environment

involved in the decomposition of organic matter, cause sporadic opportunistic infections in animals

Parasitic fungi:

Pathogenic

Dermatophytes are pathogens that cause ringworm in animals and humans

Overgrowth of yeasts, which are often commensals on skin and mucous membranes, may cause localized lesions

Morphology of fungi

The two main morphological fungal forms- moulds and yeasts

Moulds multicellular, threadlike fungus, grow as branching filaments called hyphae (2 to 10 μm in diameter)

Unicellular yeasts - oval or spherical appearance (3 to 5 μm in diameter)

Dimorphic fungi occur in both mould and yeast forms

Environmental factors usually determine the form of dimorphic fungus

Candida albicans, produce forms additional to the two major forms- polymorphic

MYCOSES

Diseases caused by fungi – mycoses

Four general categories on the basis of the primary tissue affinity of the pathogen

- a. **Superficial mycoses**- infections limited to the hair and dead layers of the skin (stratum corneum)
- b. **Cutaneous mycoses** (dermatophytoses or ringworm)- affect only the skin, hair, and nails
- c. **Subcutaneous mycoses**- affect the subcutaneous tissue below the skin, and occasionally, the bone
- d. **Systemic mycoses**- infect the internal organs and may spread throughout the host, most serious of the mycoses