Demataceous fungi

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- In contrast to the hyaline group of fungi, a second large group of rapidly growing saprophytic molds produce a melanin like pigment resulting in darkly pigmented hyphae, visually recognized as dark gray or black colonies ,both on the surface and on the reverse side .

- The term phaeohyphomyces has been applied to this dematiaceous group of fungi. The concept of(Phaeohyphomyces) was first proposed Ajello etal.in 1986 to cover all infections of cutaneous ,subcutaneous and systemic nature caused by dematiaceous fungi that develop in the host tissues in the form of dark–walled

- dematiaceous septate mycelia elements are characteristically accompanied by granulomatous inflammatory reactions when observed in tissue sections. Thus as originally described , Phaeohyphomyces was a term used describe a histopathologic entity rather than representing any particular clinical disease or fungal species as identified in laboratory culture.

- Nonetheless, the term Phaeohyphomyces currently applies to several clinical entities :sinusitis ,keratitis ,endocarditis and pneumonia, among others. yet many Mycologists now recommend that the generic term be replaced with reports such as "keratomycosis"caused by Bipolaris species or Mycetoma caused by phialophorarichardsiae".

The species of medical importance

- Alternaria species: The formation of short chains of large ,smooth-walled, multicelled, macroconidia separated by both cross and longitudinal septa(muriform)are characteristic of Alternaria sp..The macroconidia are shaped like drumsticks, with the elongated beak of one conidium butting against the rounded ,blunt end of the next.

- Ulocladium species: Also produce muriform macroconidia,however they are more spherical than those of Alternaria sp., do not arrange in chains and are borne from short, twisted "bent-knee" or geniculate,conidiophores.

- C-Stemphylium species: Muriform macroconidia that appear similar to those of Ulocladium are produced ,however they are borne singly at the apex of a short ,straight non-geniculate conidiophore.

- D-Epicoccum species: The hyphae typically form focal repeated branching and rebranching of certain threads,forming masses known as sporodochia. Short conidiophores arise from these masses bearing multicelled,muriform ,spherical to slightly club shaped macroconidia.

Chromomycosis and Mycetoma

- Chromomycosis is the term originally used to describe a cutaneous and subcutaneous infection characterized by the formation of elevated ,roughened multicoloured verrucous vegetations,most commonly spreading over the dorsal surfaces of the feet and lower leg ,caused by a group of slow-growing ,dematiaceous fungi belonging to the genera Cladophialophora, Phialophora, Cladosporium and Fonseceae.

- The term Mycetoma refers to a condition in which the infection is located primarily in the subcutaneous tissue ,forming an abscess or granulomatous mass with the formation of sinus tracts that reach the surface of the skin .

- Purulent material containing grains or granules of fungal elements are often discharged from these sinus tracts and are also observed in histologic sections of the mass.
- These agents gain entrance to the skin through traumatic wounds and penetrating injuries. Microabscesses granulomatous nodules ,extreme acanthosis, and pseudoepitheliomatous hyperplasia with varying degrees of fibrosis and scarring are the common histologic changes.

- -Cladophialophora (Cladosporium) carrionii
- Freely branching hyphae give rise to long chains of dark-staining ,elliptical conidia .The conidia often show scars or dysjunctors at the sites of attachment. Cladophialophora bantiana is a closely related species that also produces spores of a cladosporium type .
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- Cladophialophora bantiana differ from Cladophialophora (Cladosporium) carrionii in two essential characteristics they are:
- — A-Produce very long chains of conidia.
- — B-Grows at 43°C and doesn’t liquefy gelatin.
- — Flask shaped or urn-shaped phialides, ranging from 4 to 7 µm in length .Spherical to oval-shaped ,yellow pigmented conidia are produced from within each phialide, and aggregate in ball-like clusters at the terminal opening.

- Chromomycosis and Mycetoma
- Is a common agent recovered from phaeohyphomycotic cysts. Spherical to elliptical, hyaline conidia are borne in tight clusters at the tips of these phialides, held together by mucinous material

Fonsecaea pedrosoi

- Conidia arise from short denticles attached laterally to the sides of conidiogenous cells. which periodically swell, turn sympodially, and produce additional conidia that arrange in short chains at points of septations .

Factors predisposing to high frequency of yeast infections include:

- — Increase in chemotherapy and in bone marrow and other organ transplantations.
- — Prolonged stays in hospitals.
- — Vascular catheterizations.
- — Prolonged administration of broad –spectrum antimicrobial agents.
- — Extensive use of prophylactic antifungal drugs.
- — In a review of patients with nosocomial candidiasis ,cite burns, artificial respiratory assistance, colonization with Candida species and repeated transfusions a additional risk factors. Patients with cancer particularly those with leukemia and lympho proliferative disorders.

Factors affecting the pathogenesis of the fungal infections :-

- 1-Hydrolysis enzymes
- — virulence factors of molds and dermatophytes, allowing the
- — hydrolisis of structural components of the epidermal
- — tissue and the invasive character of these pathogens.

Factors affecting the pathogenesis of the fungal infections :-

- Among the wide variety of enzymes secreted by dermatophytes,
- — proteolytic enzymes are the most studied,and the importance of keratinolytic proteases to the pathogenicity is well established.
- — Keratin is a fibrous protein molecule of high molecular weight, rich in cysteine, whose disulfide bridges and acetamide bonds guarantee its stability.
- — This protein is produced by humans and other animals and is the

Factors affecting the pathogenesis of the fungal infections :-

- main component of skin, nails , having the function to protect and cover.
- — The keratinases secreted by dermatophytes catalyse the degradation of the keratin present in the host tissue into oligopeptides or amino acids that may be then assimilated by the fungus.
- — It is thought that proteolytic enzymes degrade the protein components of the skin, aiding in the process of penetration in the stratum corneum.
- — Some authors suggest that the proteases secreted by dermatophytes facilitate and are even necessary for an efficient adhesion of these pathogens to the host tissue

2-pH of the tissue

- — pH signaling and monitoring pathways could be considered fungal and dermatophyte virulence factor, allowing the development and maintenance of the infection. Regulated by the pacC gene, interfering with the secretion of proteases with optimal activity in alkaline pH.
- — They proposed a model of regulation of proteolytic enzymes by neutral pH during the infectious process of dermatophytoses. In the early stages of the infection and in response to the acidic pH of human skin,

2-pH of the tissue

- the pathogen unsuppressed the synthesis of non-specific keratinases and proteases that have optimal activity in acidic pH. They act in substrates, keratinous or not, producing peptides that are hydrolyzed to amino acids, which are used by the fungus as a source of carbon, nitrogen and sulphur. The metabolization of some amino acids promotes the alkalinization of the host's microenvironment, making it suitable to the action of keratinases with optimal activity in alkaline pH, which allows the maintenance of the infection.

2-pH of the tissue

- It was shown that *T. rubrum* rapidly responds to changes in neutral pH by modulating its gene expression profile. This metabolic machinery allows dermatophytes to use proteins as a source of nutrients in a wide pH spectrum. This makes the complete installation, development and permanence of the dermatophyte

2-pH of the tissue

- in the host tissue possible. For example , *T. rubrum* modifies a protein homologous to the transcriptional regulator pacC
- — (*Aspergillus nidulans*)/Rim101p (*Candida albicans*),which is part of the signaling pathway of neutral pH. In candidiasis one should be avoid the breads, cheese, mushrooms ,vinegar which give arise to decrease pH of the stomach and small intestine that will enhance the growth of Candida species. Milk and milk products as well as avoided because of their high levels of milk sugar as yeast grows freely in a high-sugar environment.

3-Lipid content of the tissue

- — Other important components found in the host tissue are lipids, which are also the target of fungal extracellular enzymes in the pathogenesis of fungal and dermatophyts species. Studies have demonstrated that *Aspergillus* species grows widely in corn and weigh , peanuts due to their content of lipid and consider a major contaminants of the food stuff which will cause digestive tract problems in human.

3-Lipid content of the tissue

- The dermatophytes *Epidermophyton floccosum*, *Microsporum canis*, *Trichophyton mentagrophytes* and *Trichophyton rubrum* show lipolytic activity when cultured in different lipid agar sources.
- — Yeast also prefer the lipid environment and seborrhiec skin e.g. pityriasis versicolor , tinea piedra and tinea nigra they widely distributed in highly lipid area of the body and cause brown color infection which is consider a cosmetic problem e.g.(chest , upper back,abdomen,arms).

4-Drugs

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- The medication affect the growth of yeast e.g.Candidiasis, including antibiotics, cortisone ,hormones (birth control pills),ulcer drugs(zantac).
- — They reversely enhance the growth of the yeast and fungal species by killing the bacterial species so the area will be suitable for fungal growth, in addition the cortisone and hormones make the area of low pH (acidic) which consider a good factor in activating yeast and fungal species.