Advanced medial mycology

# SUPERFICIAL MYCOSIS

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# SUPERFICIAL MYCOSES

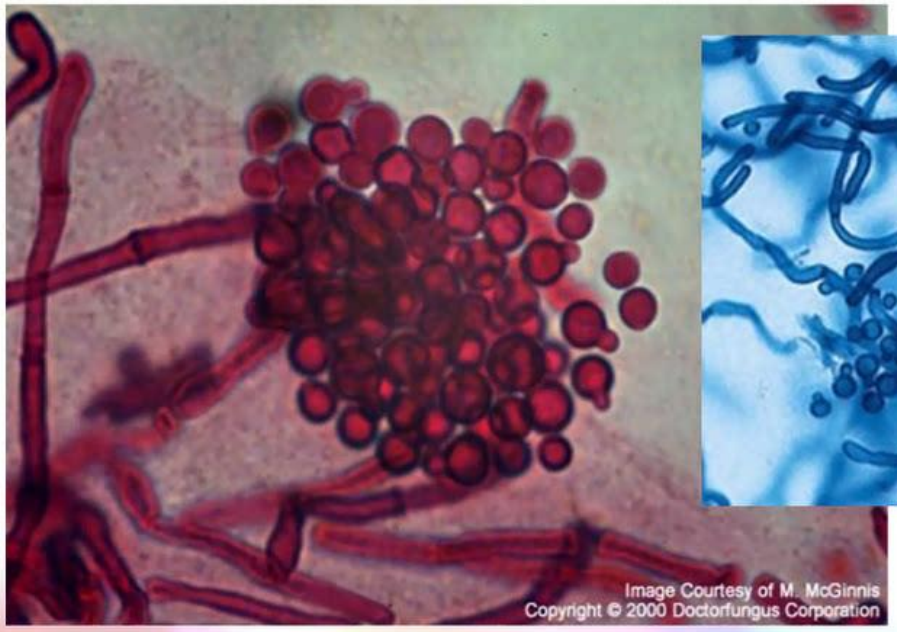
- Characterized by invasion restricted to the stratum corneum .
- Usually not associated with a remarkable inflammatory response of the host.

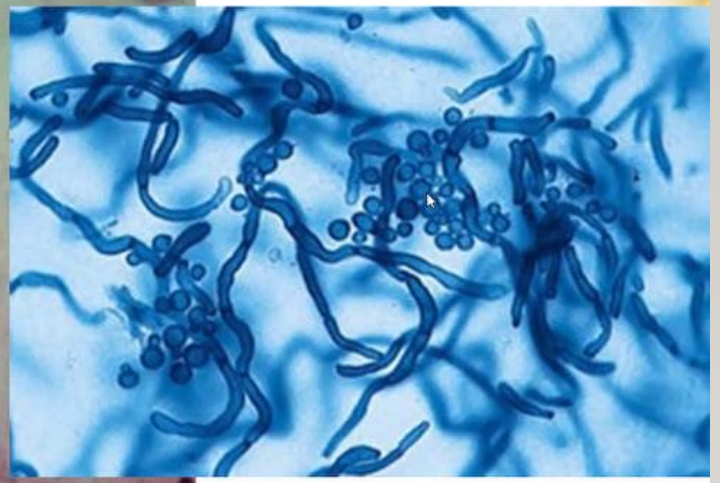
## 1- Pityriasis versicolor

- This cosmetically disturbing condition.
- First described in 1846.
- Caused by the lipophilic yeast *Malassezia furfur.*
- Physiological saprophytes of the human skin from where they may be cultured in up to 100% of the cases.
- Certain predisposing factors (humidity, heat, oily skin, hyperhidrosis as well as hereditary disposition and immunodeficiency) lead to the distinct clinical lesions presenting as asymptomatic, rarely itching macules of hypopigmentation (in summer affected areas fail to tan) and hyperpigmentation (winter) on the upper trunk, neck and shoulders, slightly scaling when scraped.
- The disease is uncommon in childhood.
- Recently reported entities are systemic disease by Malassezia –fungemia described mostly in neonates receiving parenteral lipids through central catheters as well as a form of onychomycosis in AIDS patients.

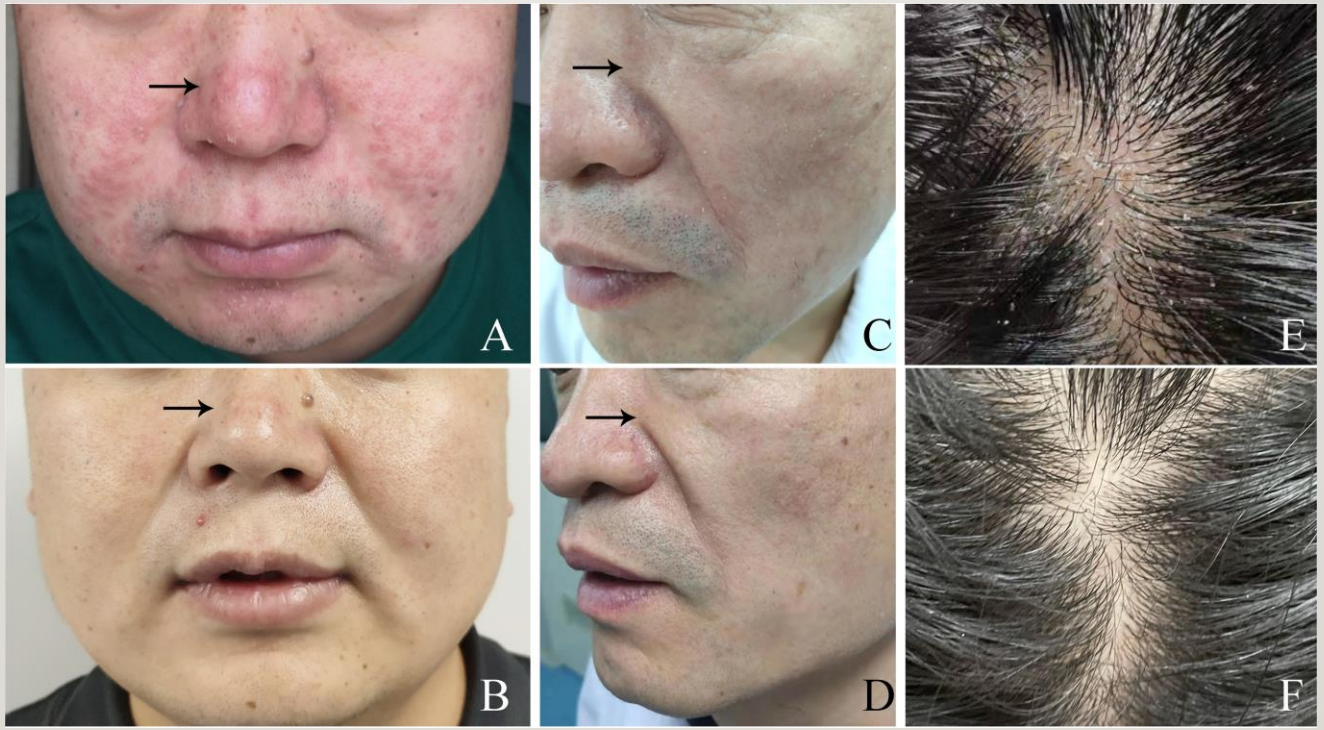
# *Malassezia spp. – Direct Microscopic Exam*

*"spaghetti and meatballs"*



- The clinical picture in combination with the detection of short curved hyphae and ovoid budding yeast cells (the so-called ‘spaghetti and meat balls’) by light microscopy is sufficient for diagnosis.
- Often inspection under Wood’s light (a lamp emitting UV light at a wavelength of above 365 nm) may demonstrate weak yellow fluorescence, which however disappears after bathing.
- Occasionally, however, it may be necessary to culture the fungi on agar with sterile olive oil.
- In most cases, topical treatment with selenium sulfide or a number of other agents including imidazoles and terbinafine extended also to areas not yet visually affected will be successful, repigmentation taking up to several months.
- Malassezia (Pityrosporum )folliculitis, a distinct clinical picture, is characterized by scattered itching acneiform, small follicular papules, sometimes pustules, on the back and shoulders of young patients.
- Malassezia yeasts take part in the pathogenesis of seborrheic dermatitis and have also been associated with certain facial eczemas in young atopic women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# WHITE PIEDRA

- *Trichosporon asakii, Trichosporon inkin, and Trichosporon mucoides* are regularly isolated from clinical specimens.
- In addition, *Trichosporon ovoides (Trichosporon beigelii)* was isolated as causative agent of capital white piedra.
- These inhabitants of soil, lakes and plants in subtropical and temperate climates including Europe, North America and Japan produce small and soft white to cream-colored nodules on hair shafts of a usually restricted area which may be easily stripped off.
- Not contagious.
- Cultures should be grown without the use of cycloheximide.
- Treatment includes shaving of all affected hair and/or topical clotrimazole, oral ketoconazole being an alternative possibility.
- In immunocompromised patients *T. asakii* may lead to a serious systemic infection called trichosporonosis.


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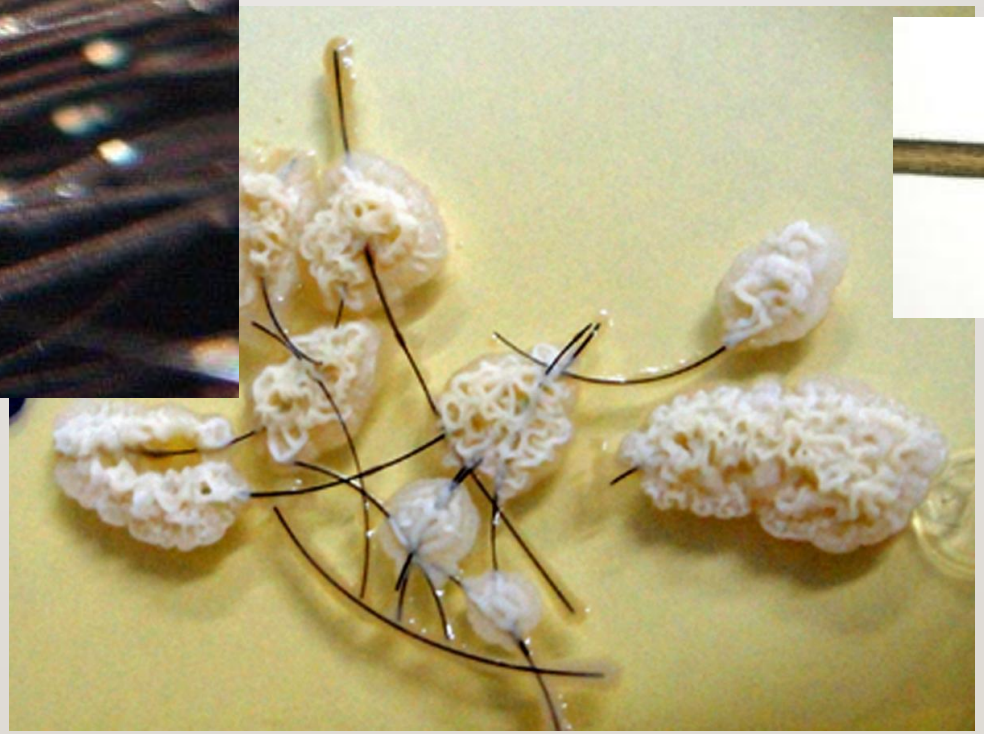


# BLACK PIEDRA

- This infection by *Piedraia hortai* presents with tightly adherent dark nodules on hair shafts causing breakage.
- Light microscopy and culture consolidate the diagnosis.
- Shaving is the treatment of choice; oral terbinafine 250 mg daily for several weeks may be an alternative


# TINEA NIGRA

- This harmless condition, caused by *Hortaea (Phaeoannelomyces) werneckii*,
- Acquired by direct inoculation from various sources via minor trauma

and most commonly involves one hand.

- This dematiaceous fungus is endemic in maritime regions of tropical and subtropical climates and occasionally affects travelers on vacation, producing mostly asymptomatic, sometimes itchy, slowly extending brown to black macules after incubation periods of supposedly weeks to decades.
- After consolidation of diagnosis by light microscopy and culture, treatment with topical keratolytic agents, 10% thiabendazole or topical imidazoles has been effective

# DERMATOPHYTOSIS (RINGWORM,TINEA)

- The dermatophytes, a group of filamentous fungi invading the epidermal stratum corneum and keratinized skin appendages as hair and nails in up to 20% of the population.
- May be divided according to their natural habitats:

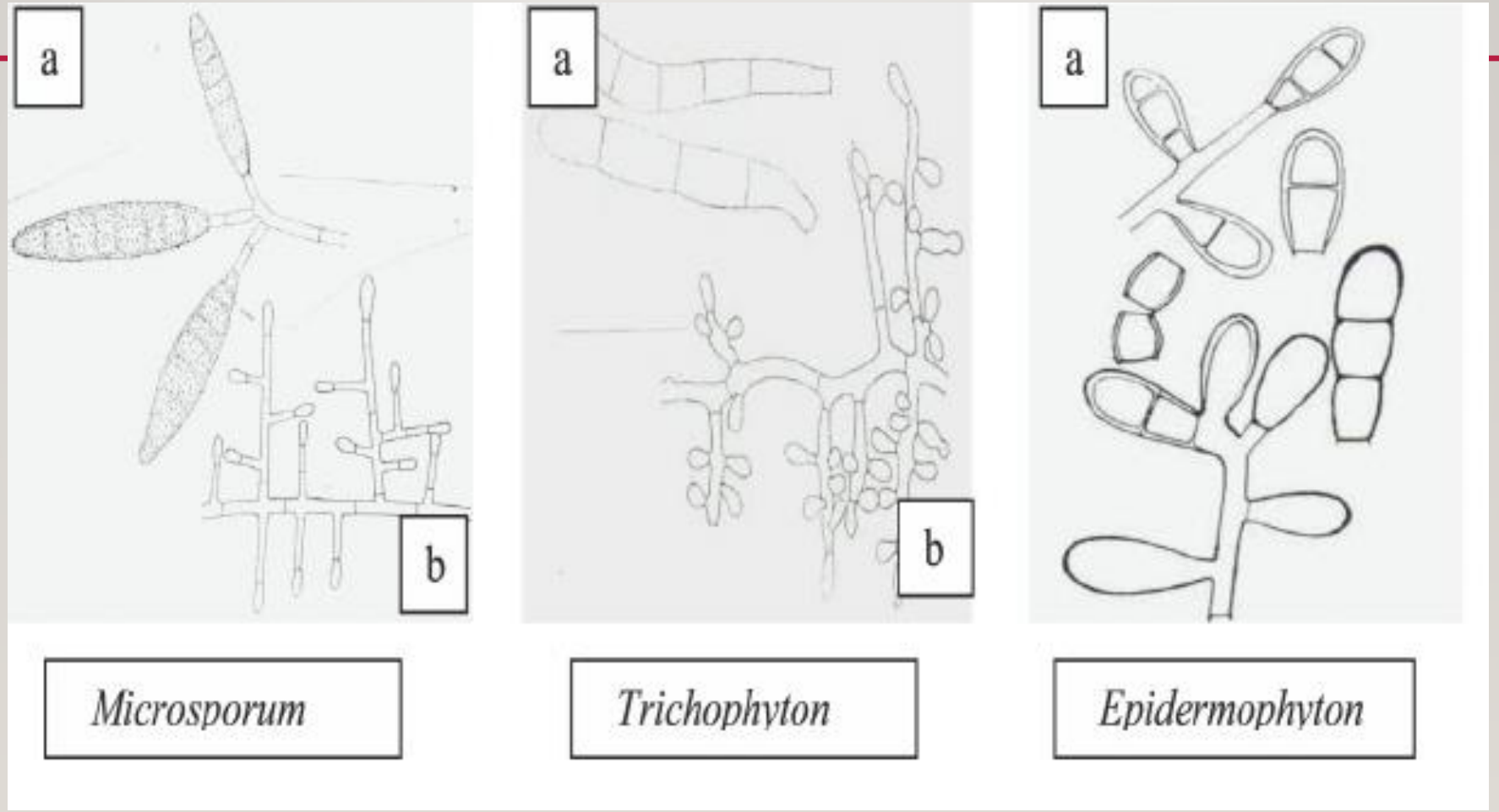
1- Anthropophilic species are spread from human to human.

2- Zoophilic species parasitize animals.

3- Geophilic species live on soil as saprophytes.

- Spread of zoophilic and geophilic species from human to human is uncommon.
- Zoophilic species usually cause a more severe clinical variant producing suppurative lesions.

| Features | Trichophyton | Microsporum | Epidermophyton |
|---|---|---|---|
| 1. Site of infection | Hair, nail and skin | Hair and skin only | Skin and nail only |
| 2. Colony | Powderly pigmented | Cotton like pigmented | Powderly greenish yellow |
| 3. Spores<br>a. Microconidia | Abundant | Relatively scanty | Absent |
| b. Macroconidia | Pencil or cylindrical shaped | Spindle shaped | Club or pear shaped |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b
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Microsporum
Trichophyton
Epidermophyton

# Clinical findings

- Dermatophytosis is classified according to site of involvement :

1. Tinea capitis : infection in scalp and hair.
2. Tinea barbae : infection in beard area.
3. Tinea corporis : infection in the trunk.
4. Tinea cruris (jock itch): infection in groin/ inguinal region.
5. Tinea manum : infection in hand.
6. Tinea unguium (onychomycosis): infection in nail.
7. Tinea pedis (athlete's foot) : infection in foot.

# TINEA CORPORIS

- This dermatophyte infection confined to the trunk and extremities takes a subacute to chronic course (weeks to years) and produces the typical and rather well-known lesion called ringworm, a usually round, often irregular scaly lesion with a significantly more inflamed, raised border containing a majority of 'active' fungi (and often producing prominent hair follicles.
- Multiple lesions are not uncommon. Facial involvement is characterized by possible flares in sunlight.
- terbinafine usually giving the best results in dermatophytosis.

# TINEA CAPITIS

- This dermatophyte infection of the scalp and hair.
- This sporadic infection sometimes causes epidemics in schools.
- Its clinical appearance varies from mildly scaling lesions over alopecia (patchy hair loss) to highly inflamed, suppurative (kerion) variants, the latter usually caused by zoophilic species as the leading pathogen in a bacterial skin disease (brick red) and pityriasis versicolor (yellow) if observed in a darkened room.
- Dermatophytes regularly inducing fluorescence are *M. canis* and *M. canis var. distortum, M. audouinii, M. ferrugineum* and *T. schoenleinii*, whereas *Microsporum nanum* and *Microsporum gypseum* do so only occasionally.
- Griseofulvin as the gold standard of treatment

# TINEA PEDIS ('ATHLETE'S FOOT')

- Up to 70% of the 'western' population is reported to suffer from this harmless, but stubborn infection.
- Transmission usually occurs by walking barefoot on contaminated floors where the fungi are able to survive in skin scales for many months.
- The infection commonly starts with scaling in the third or fourth interdigital space (interdigital form).
- The clinical picture may be mild with erythematosquamous lesions sometimes covering the whole sole and extending upwards (squamous form, 'moccasin-type') almost always caused by *T. rubrum* or a more severe blistering disease (vesicobullous form) generally attributable to *T. mentagrophytes var. interdigitale*.


- Especially in chronic courses with interdigital maceration ('dermatophytosis simplex') concomitant bacterial infection (e.g. *Pseudomonas aeruginosa* leading to greenish discoloration, *Proteus, Staphylococcus aureus*) is very common ('dermatophytosis complex'), most bacteria being resistant to penicillin and its derivates.
- In mild disease sensitivity of cultures has been reported to reach about 85%.
- The more symptoms, bacterial superinfection and inflammation, the more difficult it is to isolate the pathogenic fungus in cultures,.

# TINEA UNGUIUM

- Onychomycosis infection of nails by any pathogens.
- Tinea unguium nail infection by dermatophytes species.
- Very common disease with an incidence of approximately 5:1,000.
- The most common pathogens are *T. rubrum* followed by *T. mentagrophytes var. interdigitale*.
- Invading the nail from the distal and lateral ends leading to onycholysis (i.e. separation of the nail from the nailbed), discoloration, thickening and dystrophy.
- Isolation of the pathogen by culture may prove difficult even in samples positive on light microscopy.

- Onychomycosis caused by other filamentous fungi:
- *Scytalidium* spp.
- *Scopulariopsis brevicaulis*,
- *Aspergillus* spp.,
- *Fusarium* spp.,
- *Acremonium* spp.

# SUPERFICIAL CANDIDIASIS

- The first step in the genesis of this common infection of mucous membranes (of the mouth, gastrointestinal tract and vagina where they live as physiological commensals) and the skin seems to be a change in host resistance, the origin of which is detectable in most cases.
- Predisposing factors include age (very young and very old), moisture, reduced general conditions (e.g. malignancies), hormonal influences (diabetes and other endocrine disorders, pregnancy), immunosuppression (e.g. steroids, whole-body irradiation, immunosuppressive drugs), destruction of the physiological bacterial flora by prolonged use of antibiotics and mechanical factors.
- *Candida albicans*, is by far the most important pathogen; other pathogens include *Candida krusei, Candida glabrata, Candida tropicalis*.
- The typical sign of the invasive phase of *Candida* is the production of hyphae.

# ORAL CANDIDIASIS (ORAL THRUSH)

- Pseudomembranous Candidiasis: This condition is characterized by white to gray patches which are easily removed leaving inflamed epithelium, often accompanied by angular cheilitis (perlèche).
- In patients without known predisposing factors, this disease, especially its chronic form, is highly suspicious of HIV infection, often extending to the pharyngeal and esophageal areas, usually causing retrosternal pain on swallowing.
- Erythematous (Atrophic) Candidiasis. (No pseudomembranes);:the mucosal surface is inflamed, often associated with local discomfort.
- In its chronic variant, bacteria probably play a pathogenic role too, so the use of antiseptics in addition to antifungal treatment is essential.
- Candida Leukoplakia (Chronic Plaque-Like or Hyperplastic Candidiasis). Here the plaques, most commonly on the cheeks and on the tongue, are not easily removable and may clear with prolonged antimycotic therapy.
- This condition is difficult to differentiate from other types of leukoplakia.

# GENITAL CANDIDIASIS

- Candida Balanitis: This infection preferably occurs in the uncircumcised population.
- In its mild variant, papules develop to pustules or vesicles with minimal inflammation and discomfort; in its severe form, these symptoms aggravate and become persistent, often extending to the prepuce.
- Vaginal Candidiasis: This condition, usually accompanied by itch and discharge, may appear in its acute form or take a chronic relapsing course presenting a burden for both patient and doctor.
- No satisfying explanation has been found for chronic recurrent vaginal candidiasis.

# CANDIDA PARONYCHIA AND ONYCHOMYCOSIS

- Interdigital candidiasis and candida paronychia are connected with frequent immersion of the hands in water leading to painful swelling of the nail folds.
- Discharge of pus is often associated with bacterial coinfection.
- The invasion may also spread to the nails causing onycholysis, even if this seems to be a rare occurrence in temperate climates.
- Other causes of candida onychomycosis are Cushing's disease and Raynaud's disease; it also appears in connection with chronic mucocutaneous candidiasis.

# CONGENITAL CANDIDIASIS

- Generalized cutaneous candidiasis of newborns, mostly of mothers who suffered from vaginal candidiasis prior to delivery, often is associated with prematurity or intrauterine contraceptive devices.
- It usually starts on the face and chest and becomes generalized over the next days.
- Sometimes pulmonary involvement has to be differentiated from Candida sepsis, which seldom involves the skin.

# The end