

# Fungal skin infections



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# Skin infection

- Bacterial

- **Fungal**

- Viral

# Fungi imperfecti

- Dermatophytes
- Yeasts /candida, cryptococcus/
- Dimorphic fungi (deep fungal inf.)
- Opportunistic fungi (aspergillus aj.)

# Fungi - mycetes

- 100 thousand of species, ubiquitous
- Aerobic organisms
- Do not manufacture chlorophyll

classes: Zygomycetes

Ascomycetes

Basidiomycetes

Deuteromycetes (fungi imperfecti)

(pathogenic for human)

# nomenclature

- Mycosis = any fungal infection,  
incl. Yeast, deep mycosis

>

- Tinea = dermatophytoses

>

- Trichofytia, epidermophytia, microsporia

# I. Dermatophytoses

- Antropophilic: *T. rubrum*, *T. interdigitale*

fungi            *T. tonsurans*, *T. schoenleinii*

*Microsporon audouinii*

*Epidermphyton floccosum*

- Zoophilic :    *T. verrucosum*, mentagrophytes, equinum

*Microsporon canis*, *persicolor*, *nanum*

- Geophilic:     *T. ajelloi*, *terrestre*

*Microsporon gypseum*

# Tinea pedis

- C. agens: *Trichophyton rubrum*

- clinical variants : interdigital

hyperkeratotic

dyshidrotic

# interdigital tinea





# hyperkeratotic tinea



# Tinea unguium-onychomycosis

- C.agens:

T. rubrum

T. interdigitale

Epidermophyton

floccosum



# Tinea unguium-onychomycosis





# Tinea unguium-onychomycosis



# Tinea unguium-onychomycosis





# Tinea unguium-onychomycosis



# Tinea inguinalis

- C. agens: *E. floccosum*, *T. rubrum*, *T. interdigitale*





# Tinea inguinalis





# Tinea manum

- etiol: T. rubrum

T. interdigitale

E. floccosum



T. verrucosum

- forms: hyperkeratotic

dyshidrotic

erythemosquamous

# Tinea manum-dyshidrotic form



# Tinea manum erythemosquamous form



# Tinea corporis

- *T. verrucosum*
- *T. mentagrophytes*
- *M. canis*

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- *T. rubrum*
- *E. floccosum*





# Tinea corporis -superficial



## Tinea corporis - erythemosquamous





# Tinea corporis erythemosvesiculous



# Tinea corporis - deep

- *T. verrucosum*
- *T. mentagrophytes*





# Tinea faciei

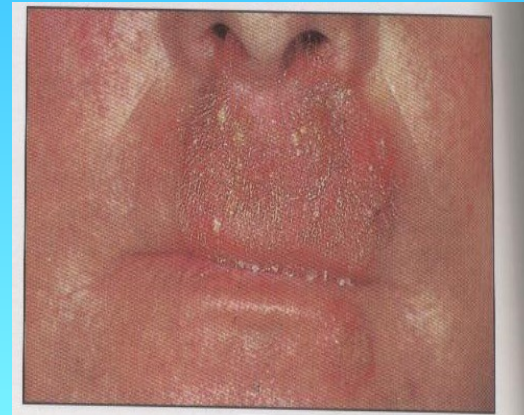
- M. canis
- T. verrucosum
- T. mentagrophytes

Ddg: atop. dermatitis

seborrhoic

dermatitis

CDE



# Tinea capitis

- C.agens: Trichophyton (ecto/endothrix )

growth along the hair

**Microsporon** (ectothrix)

invasion of the hair

- clinical variants: superficial

(non-inflammatory)

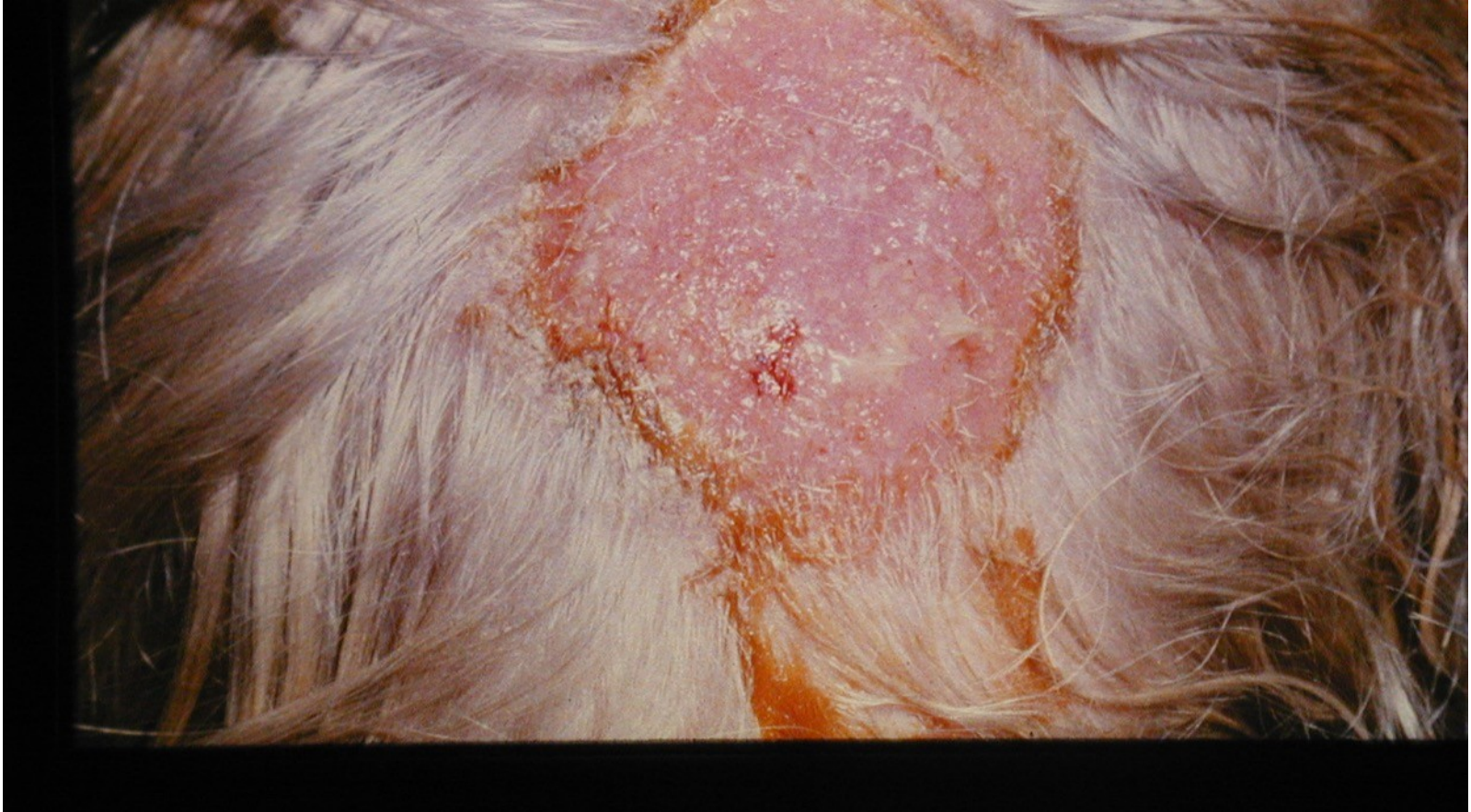
**deep** (inflammatory) - Kerion Celsi

**favus**

# Tinea capitis - superficial



# Tinea capitis - deep





# Tinea capitis - deep



# Tinea capitis - favus

- C.agens: Trichophyton Schoenleinii
- Most often in children, very rare in W. and C. Europe
- Occurrence in Middle East region
- Scutulum (little shield) – yellowish dish-like crusts
- mixture of hyfi and spores, smells like a mouse urine
- Rarely trunk and nails affected

# Tinea capitis - favus





# Tinea barbae (sycosis barbae parasitaria)

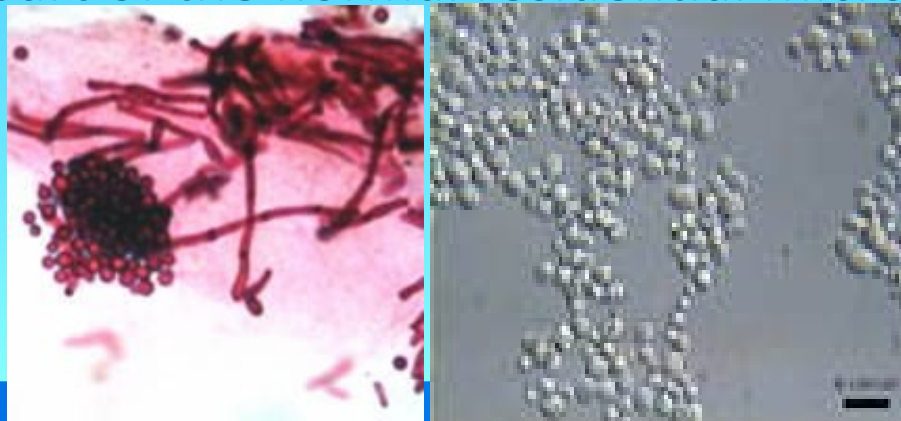
- C.agens:
  - T. verrucosum
  - M. canis
- Clinical picture:
  - folliculitis,
  - infiltrates, nodules
- Ddg: sycosis barbae
  - nonparasitaria
  - (staphylogenes)





# Pityriasis versicolor

- Causative agents – *Malassezia furfur*
- dimorphism of malassezia yeasts: able form both hyfi and round/oval yeasts
- Lipophilic, utilize human lipids
- Component part of the normal residential microflora of the skin



# Pityriasis versicolor



# Pityriasis versicolor



## II. Yeast infections

yeasts: reproduce by budding

Candidosis:

- Candida albicans
- C.non albicans: glabrata

krusei

kefyr

parapsilosis

tropicalis

Cryptococcosis

# 1) oral candidosis – soor





## 2) intertriginous candidosis





# Candidosis interdigitalis erosiva





3) vaginal candidosis (MOP VI)

4) *candidal balanitis*



## 5) paronychia, onychomycosis



# Deep fungal infections

- Blastomycosis: *blastomyces dermatitidis*  
skin, pulmonary, and disseminated
- Histoplasmosis: *H. capsulatum*  
*H.duboisii* (South America)  
osteoarticular, lymphadenitis  
skin: nodules, abscesses
- Lobomycosis: *Loboa Loboii*  
tumoriform nodules



# Deep fungal infections

- Coccidiomycosis
- Paracoccidiomycosis
- Aspergillosis Sporotrichosis
- Chromomycosis
- Geotrichosis
- Maduramycosis



# Diagnosis of fungal infections

1) Obtaining specimens – disinfection of the lesion with 70%

ethanol

scraping the scales from the border,

or hyperkeratotic material from

beneath the nail's free end

2) Microscopic investigation:

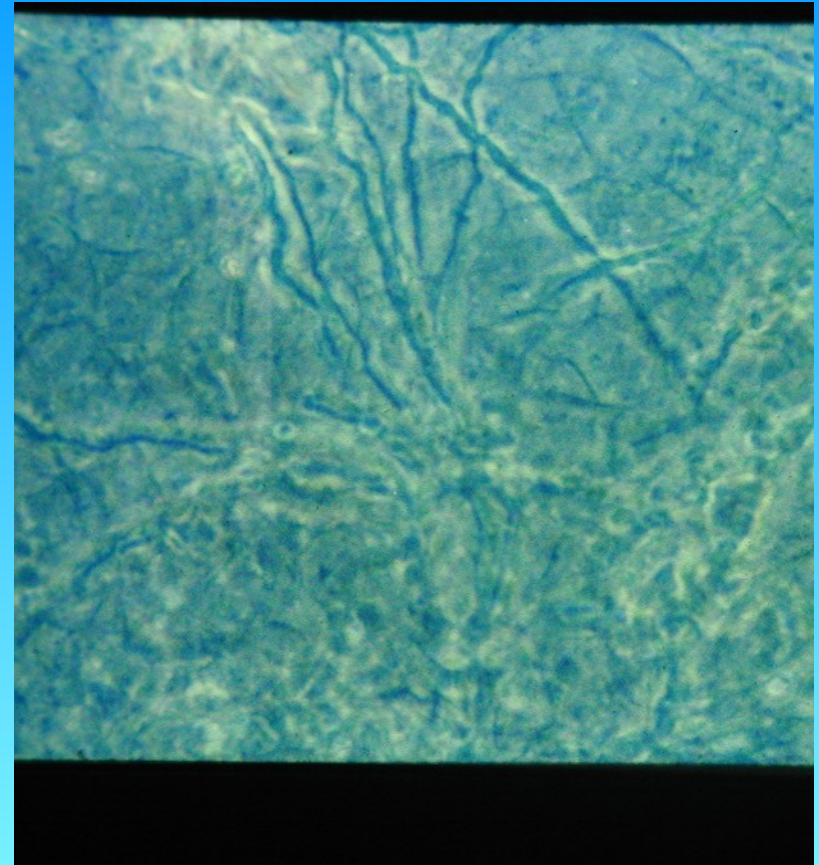
- native preparation

(10-30% KOH, 30min.-3h)

- possible to stain with

Parker's ink

Branched septed fibres (hyphae)



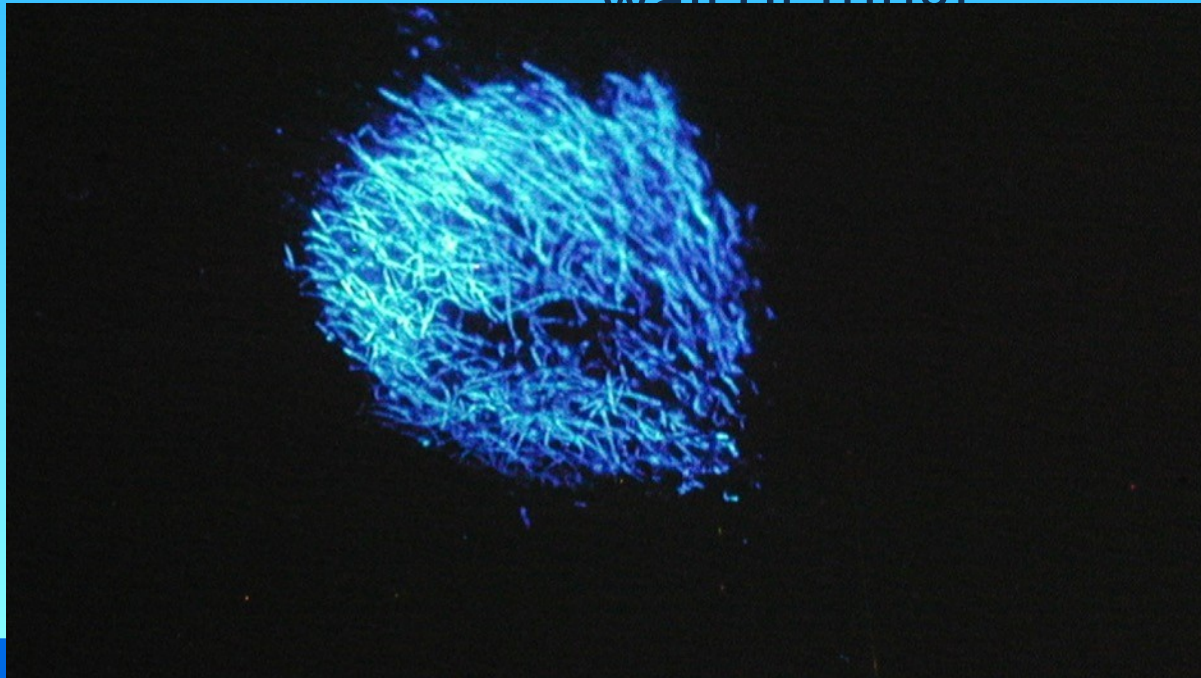


# Diagnosis of fungal infections

## 3) fluorescent microscopy

with blankophore – binds to chitin of the cell

wall of fungi



# Diagnosis of fungal infections

4) Wood's lamp (high pressure flash light lamp emittingd UV A 320-400 nm)

UV investigation → fluorescence

Pityriasis versicolor: yellow/orange

Mikrosporium: green

Favus: white/grey

# Diagnosis of fungal infections

5) culture – on Sabouraud agar

evaluation: after 3-5 days - yeasts (at 37 st C)

2w rapidly growing f. - *E. floccosum*

3w *T. rubrum*

4w slowly growing - *T. verucosum*

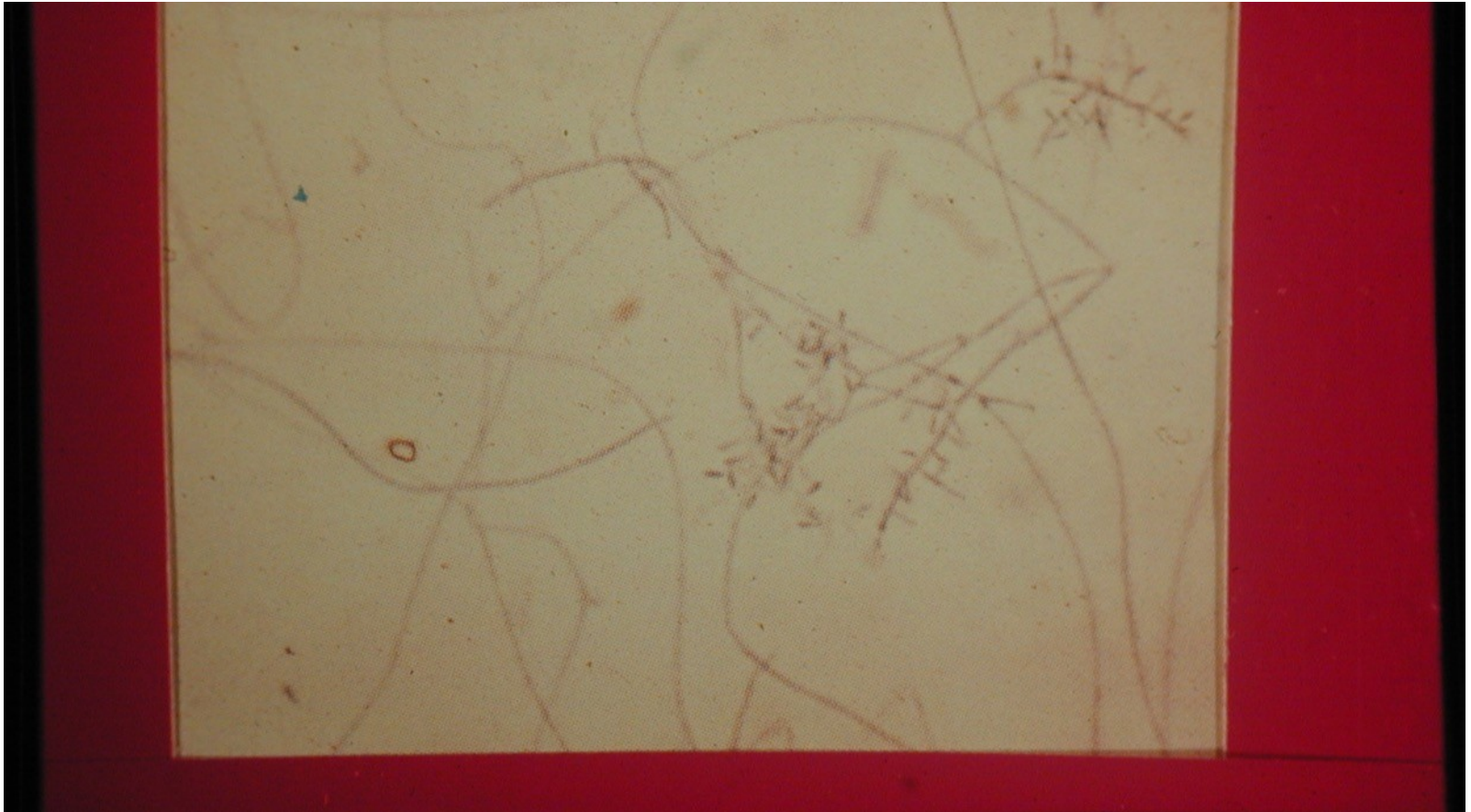
Only after 6 weeks if nt appears, the culture can be concluded as negative

# Diagnosis of fungal infections

- Evaluation of the macromorphology of the colonies
- Manufacturing of the microculture
- Physiologic tests
  - ureaze test ...
  - zymograms, auxanograms..

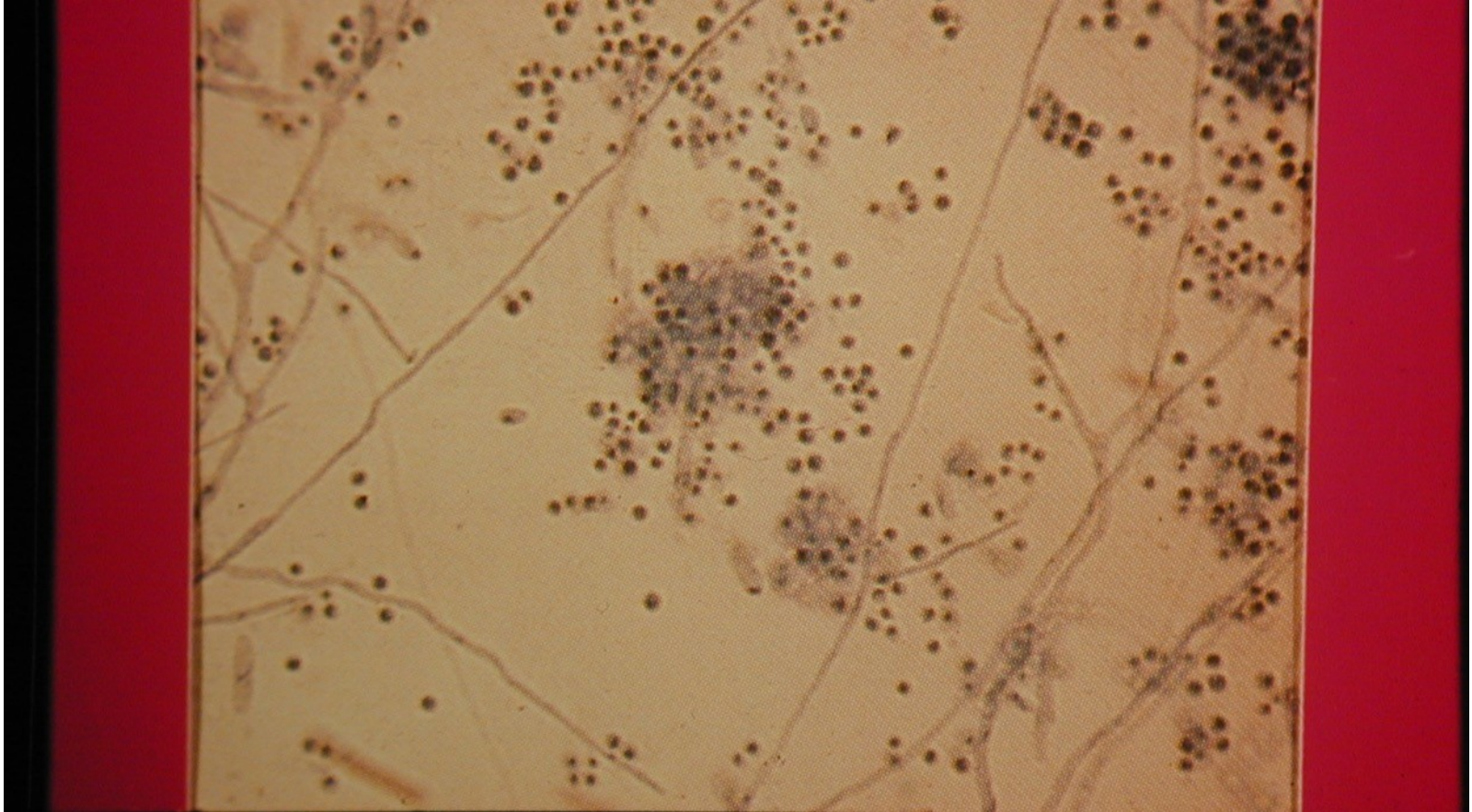


T.rubrum

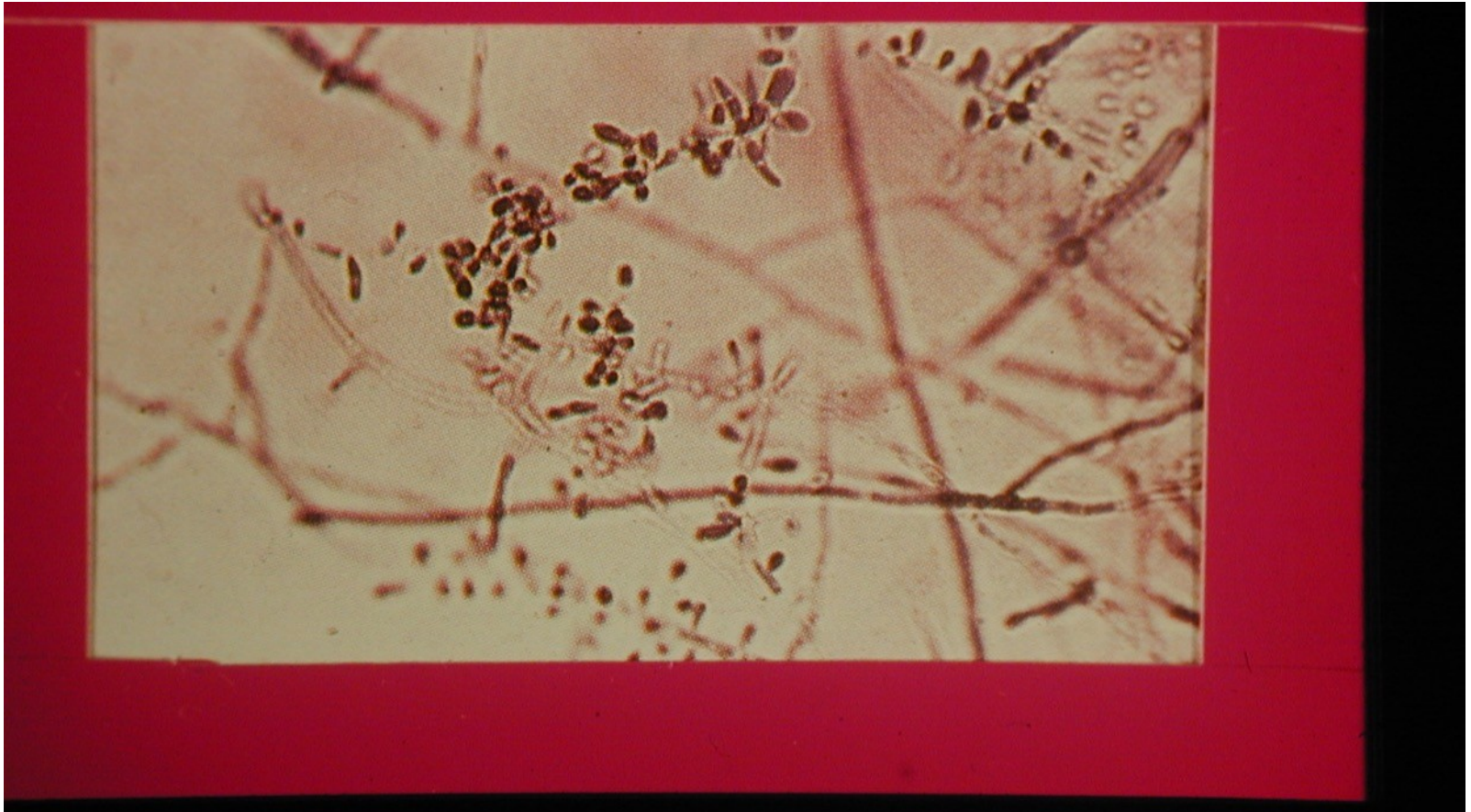




# T.mentagrophytes

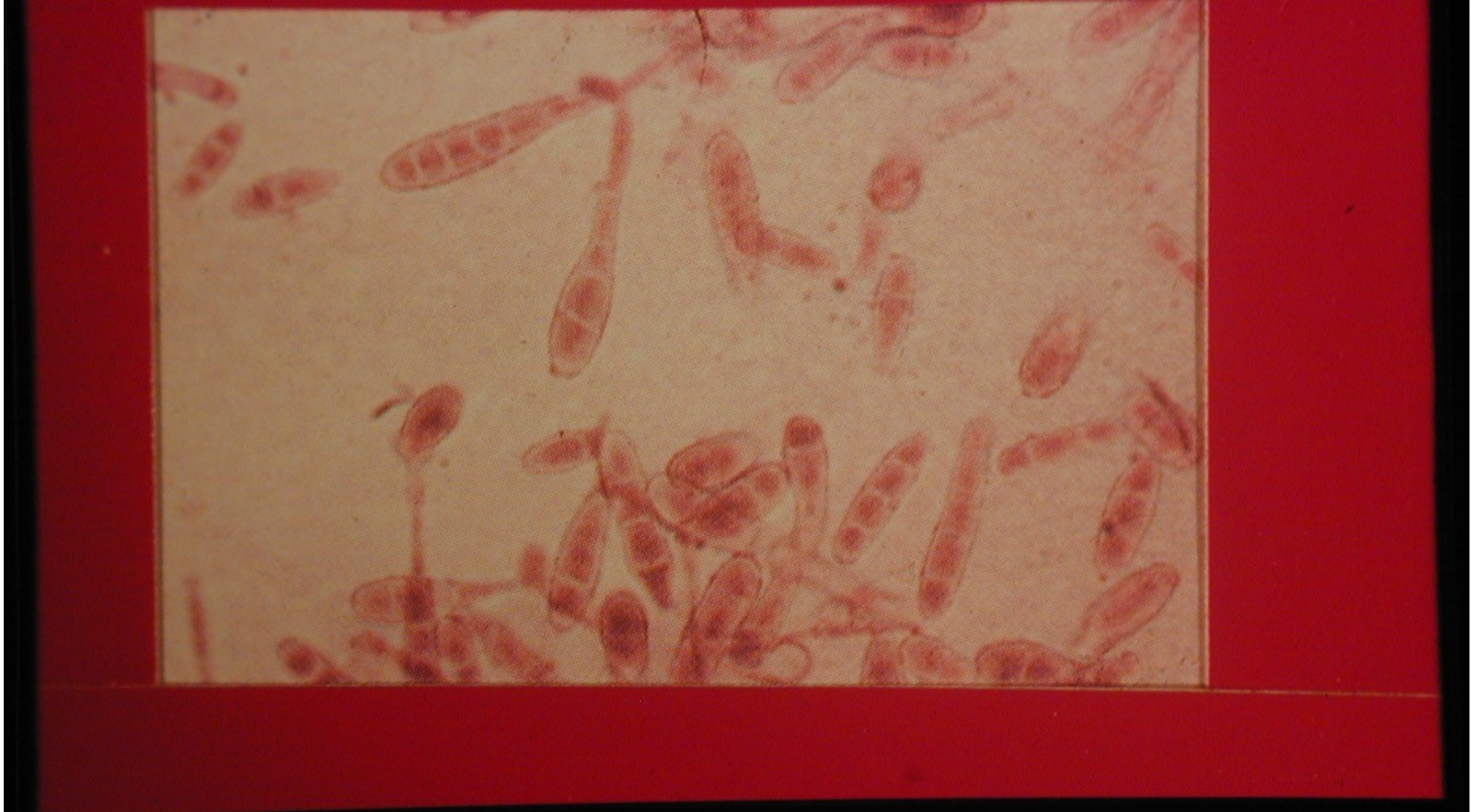


# T. tonsurans

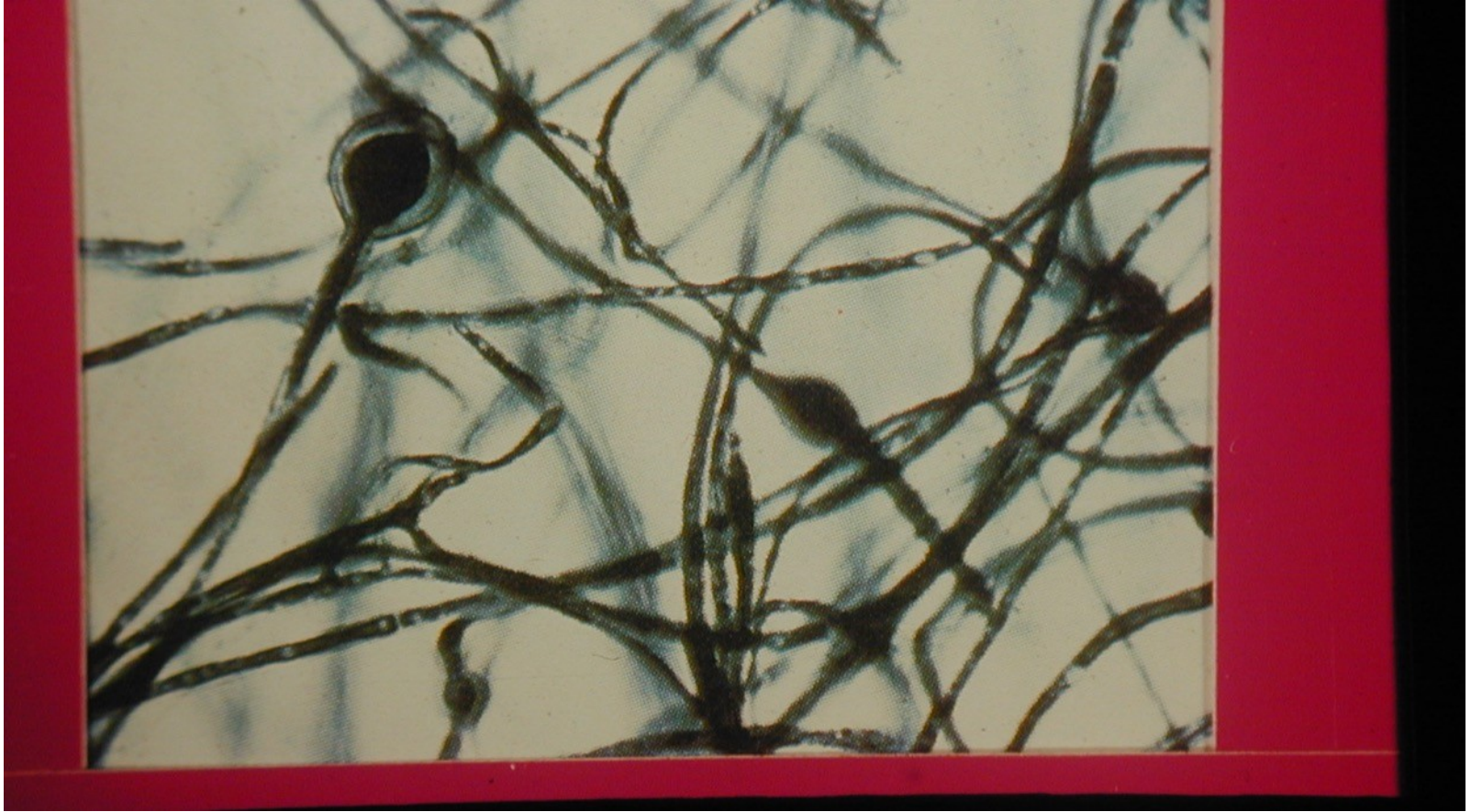




# Epidermophyton floccosum



# M.audouinii



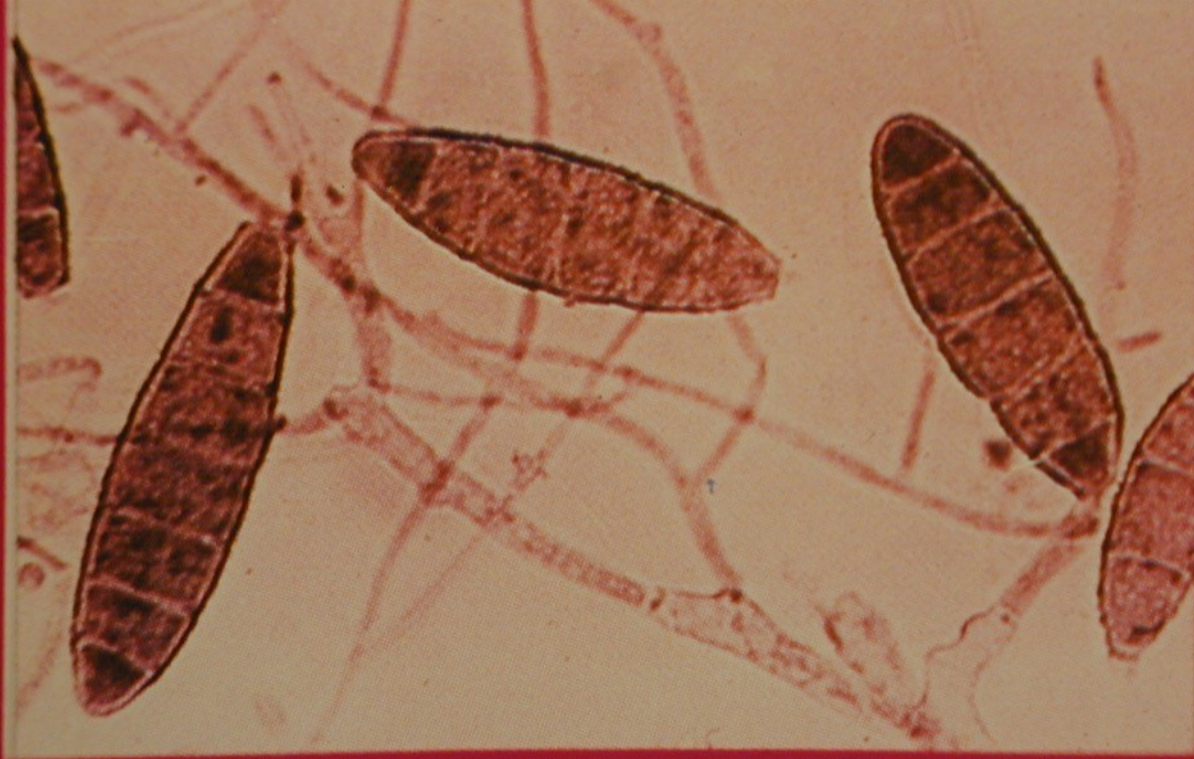


# Microsporon canis



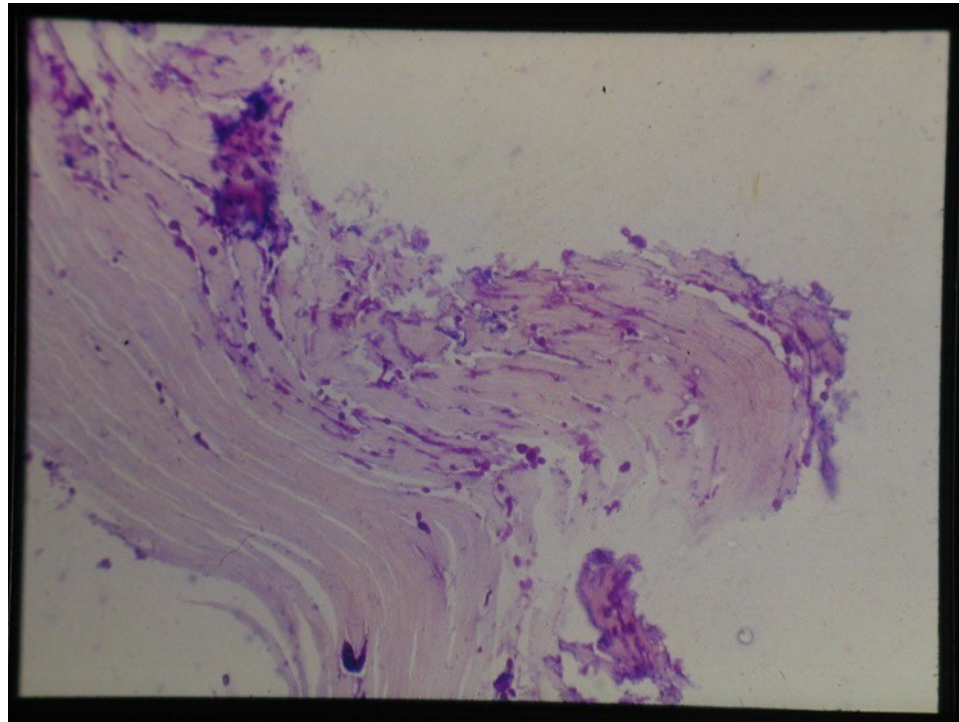


# Microsporon Gypseum



# Diagnosis of fungal infections

- 5) histologic examination with PAS staining (periodic acid Schiff)



# Antifungal therapy

- Antifungals:
  - 1) polyenic
  - 2) azoles
  - 3) alylamines
  - 4) other

# Antifungal therapy

systemic treatment - indications

- Deep fungal infections
- Deep tinea capitis
- Extensive onychomycosis
- Recalcitrant superficial tinea



# Antifungal therapy

Parenteral application:

1) Amphotericin B

systemic and deep fungal infections

intravenous appl., serious AE

2) Voriconazole (VFEND)

3) Posakonazole (Nofaxil, Posatex)

4) Kaspofungine (Candidas)

# Antifungal therapy

Oral application:

1) fluconazole vaginal candidosis

2) ketokonazole yeast infection, dermatopytoses,  
malassezia

3) itrakonazole yeast infection, dermatophytoses,  
malassezia

onychomycosis: 3m/5m

4) terbinafine

onychomycosis: 6t/3m

# Antifungal therapy

topical therapy:

ekonazole - Pevaryl crm, pst

ketokonazole - Nizoral crm

clotrimazole - Canesten crm

oxikonazole – Myfungar crm.

terbinafin - Lamisil crm

cyklopiroxolamine – Batrafen crm, sol.