Superficial mycoses

Introduction

fungal infections, depending on the tissues that are initially colonized, can be classified into three major groups as follows: **Superficial** mycoses: These are surface infections of the skin, affecting the outermost layers of skin, hair, and mucosa.

Introduction

Cutaneous mycoses: These are infections of the skin involving the epidermis and its integuments, the hair, and nails.

Subcutaneous mycoses: These are infections of the dermis, subcutaneous tissue, muscle, and fascia.

Superficial Mycoses

Superficial mycosis caused by different fungi is restricted to the outermost layers of the skin and hair. The condition usually causes cosmetic problem, which can be easily diagnosed and treated. It includes four important conditions: (a) **Pityriasis** versicolor, (b) Tinea **Nigra**, (c) **Black** piedra, and (d) **White** piedra.

FUNGAL GROWTH				
FUNGUS	**IN LESION**	**IN CULTURE (25°C)**	**INFECTION SITE**	**DISEASE**
Dermatophytes				
Microsporum canis	Septate hyphae	Mold	Hair,[a] skin	Ringworm
Microsporum audouini	Septate hyphae	Mold	Hair[a]	Ringworm
Microsporum gypseum	Septate hyphae	Mold	Hair, skin	Ringworm
Trichophyton tonsurans	Septate hyphae	Mold	Hair, skin, nails	Ringworm
Trichophyton rubrum	Septate hyphae	Mold	Hair, skin, nails	Ringworm
Trichophyton mentagrophytes	Septate hyphae	Mold	Hair, skin	Ringworm
Trichophyton violaceum	Septate hyphae	Mold	Hair, skin, nails	Ringworm
Epidermophyton floccosum	Septate hyphae	Mold	Skin	Ringworm
Other superficial fungi				
Malassezia furfur[b]	Yeast (mycelia)[c]	Yeast	Skin (pink to brown)[d]	Pityriasis (tinea) versicolor
Hortaea werneckii[e]	Septate hyphae, ellipsoidal cells	Yeast (mold)	Skin (brown–black)[d]	Tinea nigra
Trichosporon cutaneum	Septate hyphae	Mold	Hair (white)[b]	White piedra
Piedraia hortae	Septate hyphae	Mold, ascospores	Hair (black)[b]	Black piedra
Subcutaneous fungi				
Sporothrix schenckii	Cigar-shaped yeast (rare)	Mold	Subcutaneous, lymphatic spread	Sporotrichosis
Fonsecaea pedrosoi	Muriform body[f]	Mold	Wart-like foot lesions	Chromoblastomycosis
Phialophora verrucosa	Muriform body[f]	Mold	Wart-like foot lesions	Chromoblastomycosis
Cladophialophora	Muriform body[f]	Mold	Wart-like foot lesions	Chromoblastomycosis

Pityriasis Versicolor

Pityriasis versicolor or tinea versicolor is a superficial infection of the skin caused by **Malassezia furfur.** **M. furfur** requires fatty acids for growth, hence is cultured on the Sabouraud's dextrose agar (**SDA**) overlayed with a layer of olive oil. On incubation at **37°C**, the fungus produces creamy colonies within 5–7 days.

Pityriasis Versicolor

The fungus is found in parts of the body **rich** in **sebaceous** glands. The lesions of pityriasis versicolor are found most commonly on the upper tissue, arms, and abdomen. Laboratory diagnosis of the condition is usually made by demonstration of both budding yeast cell and hyphae in **KOH** preparation of skin scrapings.

Tinea Nigra

Tinea nigra is an infection of **keratinized layer** of skin caused by **Exophiala werneckii or Cladosporium** werneckii. C. werneckii is a dimorphic fungus that produces melanin. The fungus on the SDA grows as yeast with many cells in various stages of cell division producing typical two-celled oval structure, on primary isolation from clinical specimen.

Tinea Nigra

A well-demarcated brown-black macular lesion, which appears as brownish spot of the skin, is typical manifestation of the condition. These brownish to black lesions are most commonly seen on palms and soles.

Tinea Nigra

Laboratory diagnosis of tinea nigra is made by microscopy of the KOH preparation of skin scrapings collected from the affected part. Culture of the skin scraping on the SDA confirms the diagnosis.

Black Piedra

Black piedra is a superficial infection of the hair caused by **Piedraia hortae, a dematiaceous fungus**. The fungus occurs in the perfect state when it colonizes the shaft of hairs. Culture of specimens on SDA shows slow-growing brown to reddish black mycelium, which is considered asexual or anamorphic stage of the fungus.

Black Piedra

Infection of shaft of hairs of beard and scalp is the major clinical feature of black piedra. Laboratory diagnosis of the condition is made by demonstration of nodules containing asci with spindle-shaped ascospores in 10% KOH mount of the hair.

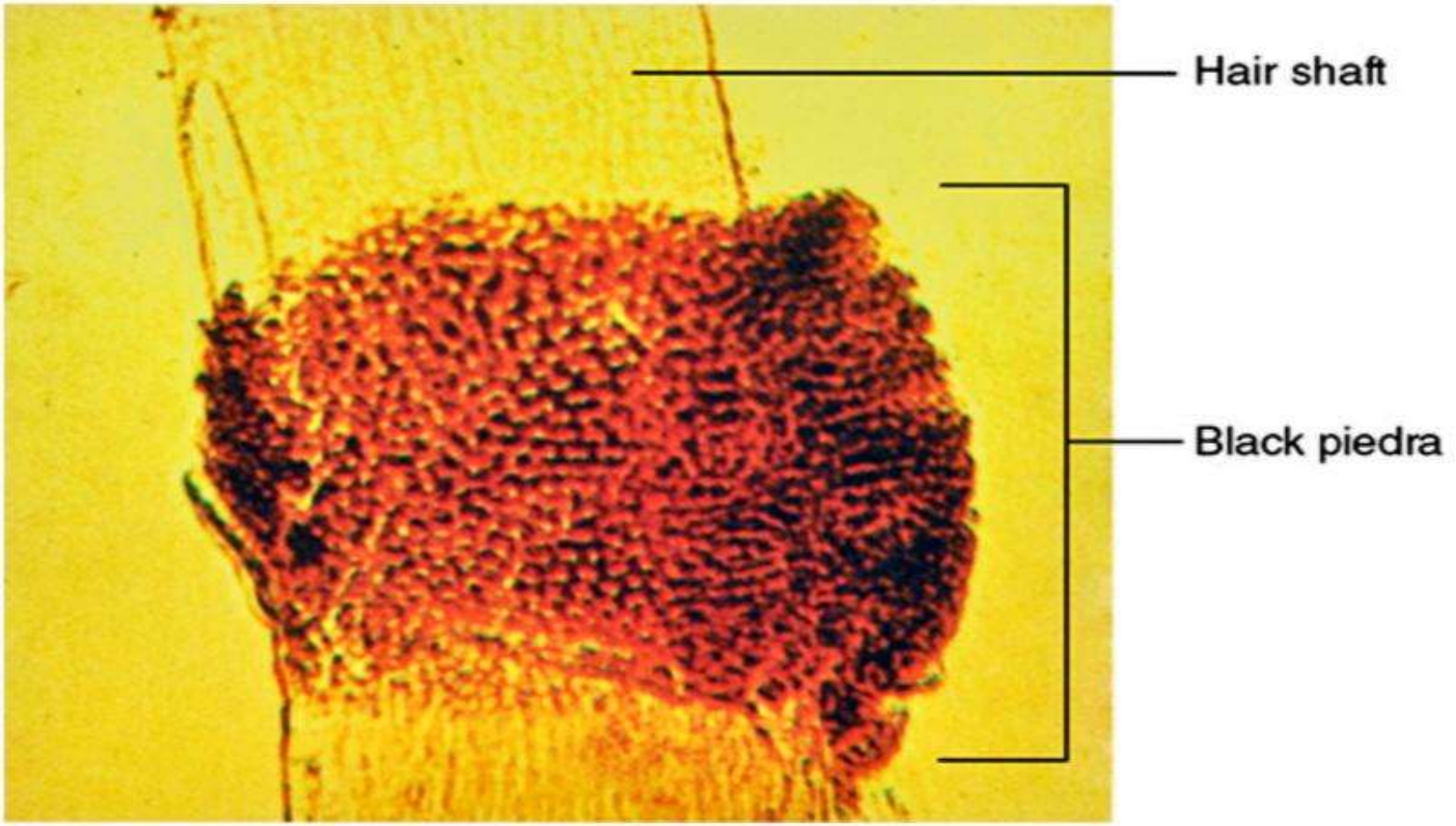


FIGURE 45–2. Black piedra. Note invasion by *Piedraia hortae* both within (endothrix) and outside (ectothrix) the hair shaft. Dermatophyte invasion would be similar. (Reproduced with permission from Willey JM: *Prescott, Harley, & Klein's Microbiology*, 7th ed. New York, NY: McGraw Hill; 2008.)

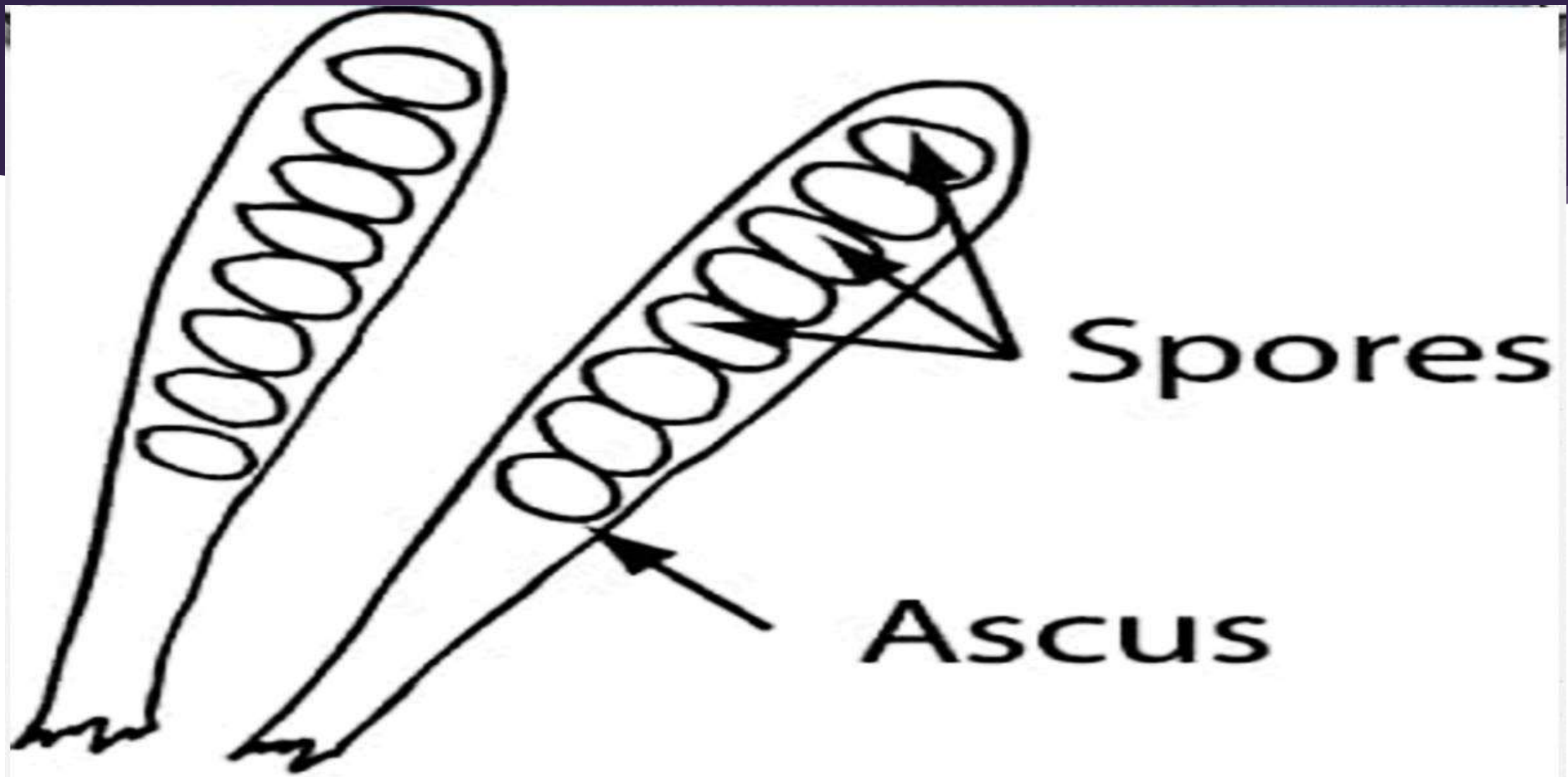


Fig. 1H Asci

White Piedra

White piedra is an infection of the hair caused by **yeast**-like organism **Trichosporon beigelli**. The fungus can be grown on SDA and other media containing cycloheximide. On SDA, it forms green-colored colonies, which subsequently become yellowish gray and wrinkled..

White Piedra

Microscopic examination of the colony shows septate hyphae that break rapidly to form arthroconidia. The latter subsequently become round and develop to blastoconidia.

White Piedra

The hair of scalp, moustache, and beard are commonly affected in white piedra. The development of a soft, pasty, cream-colored growth along infected hair shaft characterizes the condition.

White Piedra

- Laboratory diagnosis of the condition is made by demonstration of fragmented hyphae that develop into arthroconidia or produce blastoconidia in 10% KOH mount of hair. Culture of the fungus from clinical specimen confirms the diagnosis.

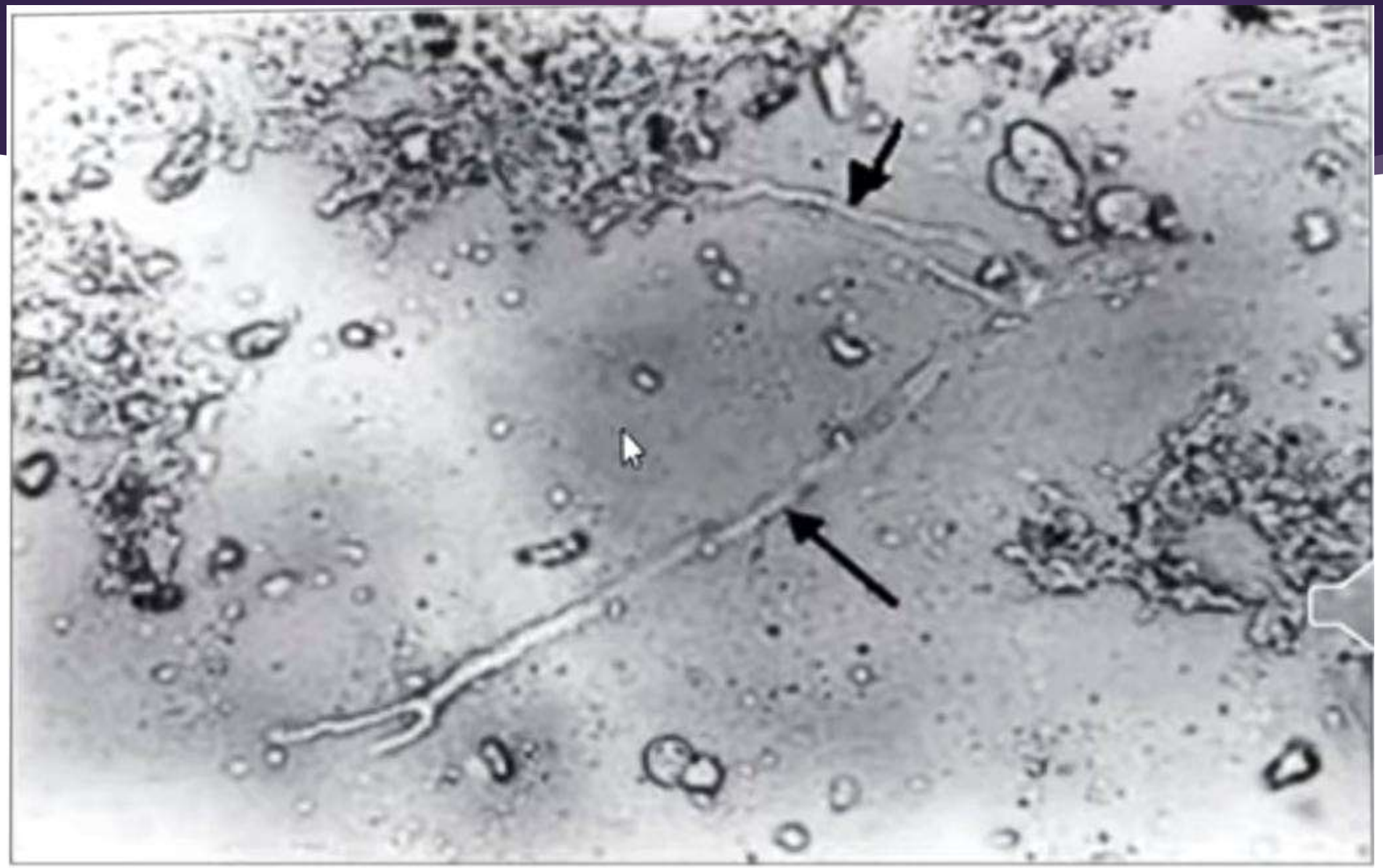
LABORATORY DIAGNOSIS (main points)

❑ Specimens:

- Skin scrapings, nail clippings, hairs
- Scrapings from mucous membrane
- Scrapings, crusts, aspirated pus, tissue biopsy.
- Blood, CSF etc in systemic mycoses.

❑ Microscopy:

- **KOH mount** - **KOH dissolves keratin and cellular material but does not affect fungi.** Specimen is placed on a slide, a drop of 10-20% KOH is added and covered with a coverslip, left for 20 min in incubator at 37°C to digest keratin. Then examined microscopically.



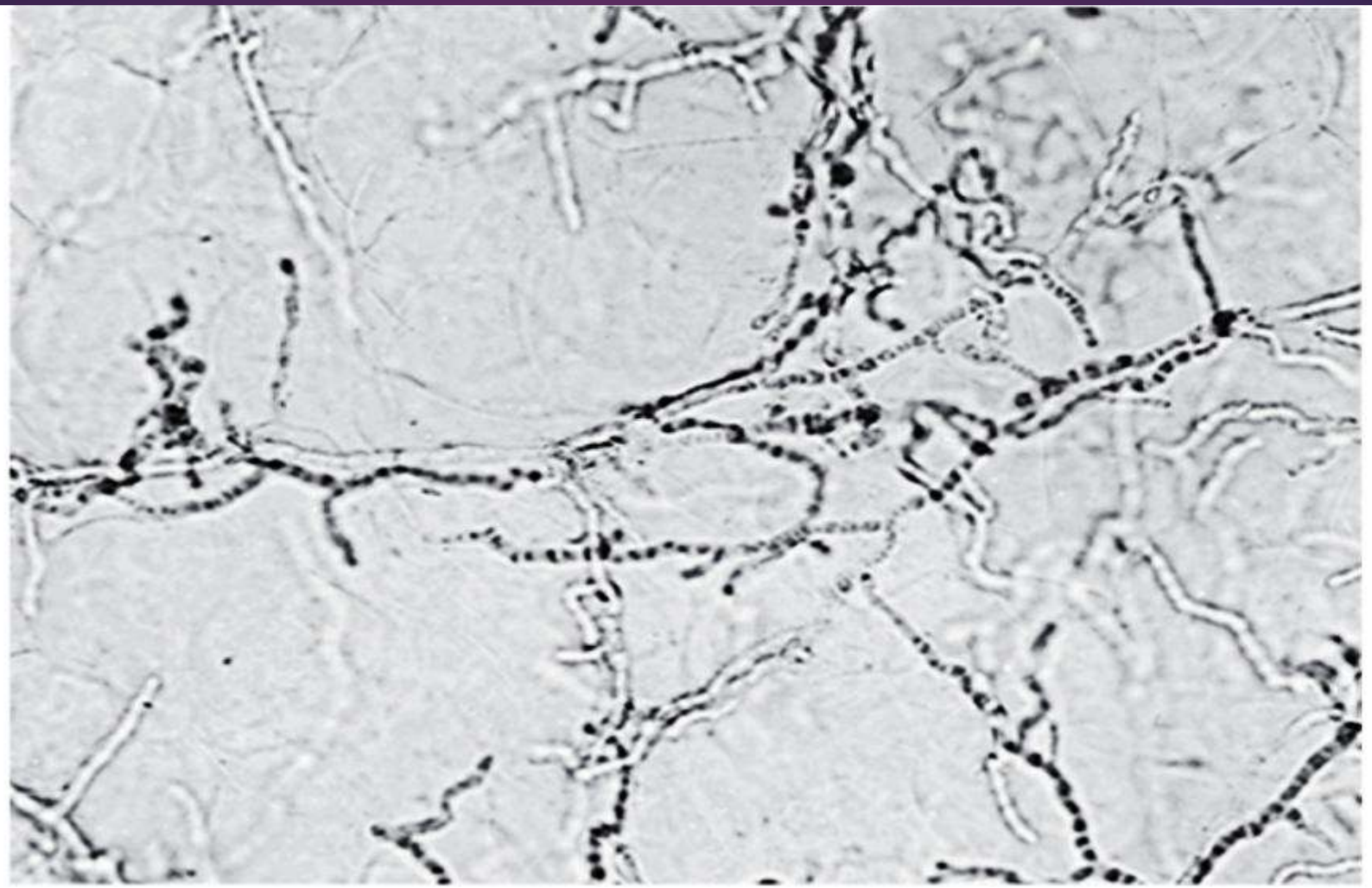


FIGURE 43–3. KOH (potassium hydroxide) preparation. Scalp scrapings from a suspected ringworm lesion have been mixed with 10% KOH and viewed under low power. The skin has been dissolved, revealing tubular branching hyphae.

LACTOPHENOL COTTON BLUE (LPCB)

- **is the most widely used method of staining and observing fungi and is simple to prepare.** The preparation has three components: **phenol**, which will kill any live organisms; **lactic acid** which preserves fungal structures, and **cotton blue** which stains the chitin in the fungal cell walls.