



- **PATHOGENS WITH INTERMEDIATE VIRULENCE**

Dermatophytes

- Dermatophytes are fungi that require keratin for growth. These fungi can cause superficial infections of the skin, hair, and nails. Dermatophytes are spread by direct contact from other people (anthropophilic organisms), animals (zoophilic organisms), and soil (geophilic organisms),
- or indirect contact with infected exfoliated skin or hair in combs, hair brushes, clothing, furniture, theatre seats, caps, bed linens, towels, hotel rugs, and locker room floors

- These infections are known as **ringworm**
or **tinea**

Dermatophytes usually do not invade living tissues, but colonize the outer layer of the skin.



- Three different types of fungi can cause this infection: trichophyton, microsporum, and epidermophyton. It is possible that these fungi may live for an extended period of time as spores in soil



- At the National Centre for Mycology -
- about 58% of the dermatophyte species isolated are
Trichophyton rubrum
- 27% are T. mentagrophytes
- 7% are T. verrucosum
- 3% are T. tonsurans
- Infrequently isolated (less than 1%) are
Epidermophyton floccosum, Microsporum audouinii,
M. canis, M. equinum, M. nanum.



Trichophyton



Microsporum



Epidermophyton



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(b)

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(c)

coc

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Epidermophyton produces only macroconidia, no microconidia and consists of 2 species, one of which is a pathogen.

Microsporum - Both microconidia and rough-walled macroconidia characterize *Microsporum* species. There are 19 described species but only 9 are involved in human or animal infections.

Trichophyton -the macroconidia of *Trichophyton* species are smooth-walled. There are 22 species, most causing infections in humans or animals.

TYPES OF DERMATOPHYTE INFECTIONS

- Dermatophytoses are referred to as “tinea” infections. They are also named for the body site involved
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Scalp - tinea capitis.

Feet - tinea pedis.

Hands - tinea manuum.

Nail - tinea unguium (or onychomycosis).

Beard area - tinea barbae.

Groin - tinea cruris.

Body including trunk and arms - tinea corporis



symptoms

- Itching, rash and nail discolouration are the most common symptoms of tinea infection.
- Hair loss occurs with tinea capitis (mainly a disease of children)
- . patches that may be more red on the outside edges or resemble a ring
- patches with edges that are defined
- It is common in people who play contact sports.
- It occurs in immunocompromised patients



Epidemiology and Pathology of Dermatophytes

- Ringworm of scalp (**tinea capitis**) affects scalp and hair-bearing regions of head; hair may be lost →
It can cause hair loss with broken hairs at the surface
- Ringworm of beard (**tinea barbae**) affects the chin and beard of adult males; contracted mainly from animals
- Ringworm of body (**tinea corporis**) occurs as →
inflamed, red ring lesions anywhere on smooth skin



- Ringworm of groin (**tinea cruris**) “jock itch” affects groin and scrotal regions
- Ringworm of foot and hand (**tinea pedis** and **tinea manuum**) is spread by exposure to public surfaces; occurs between digits and on soles
- Ringworm of nails (**tinea unguium**) is a persistent colonization of the nails of the hands and feet that distorts the nail bed

Figure 22.18 Ringworm of the extremities

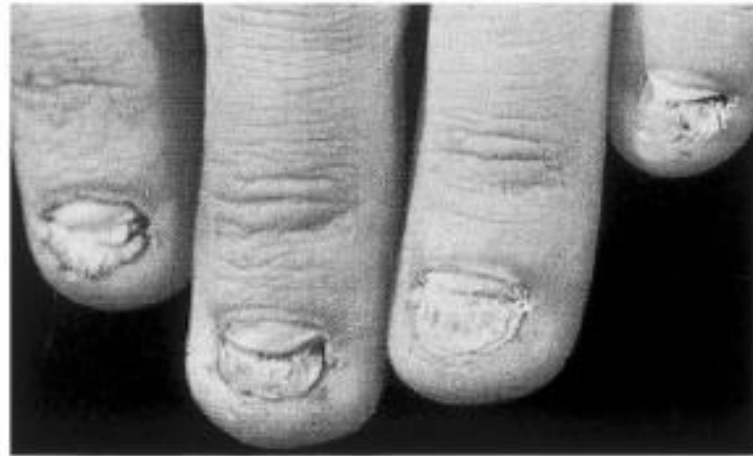


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(a) **Tinea pedis**



(b) **Tinea unguium**



DIAGNOSING RINGWORM (DERMATOPHYTOSIS)

- **skin biopsy**—the doctor will take a sample of your skin or discharge from a blister and will send it to a lab to test it for the presence of fungus
- **KOH exam**—the doctor will scrape off a small area of infected skin and place it in potassium hydroxide (KOH). The KOH destroys normal cells and leaves the fungal cells untouched, so they are easy to see under a microscope



- **Microscopy of skin and nail** specimens may reveal hyphae and spores.
- **Fungal culture** can identify the species but is not always reliable and it can take six weeks to get results.
- **Ultraviolet light** (Wood's light) is useful for tinea capitis especially. Fluorescence is produced by the fungus. Fluorescence is not seen with tinea corporis or tinea cruris.
- Rarely, a biopsy may be needed if the case is atypical or not responding to treatment

