
MYCOLOGICAL ANSWERS - 1

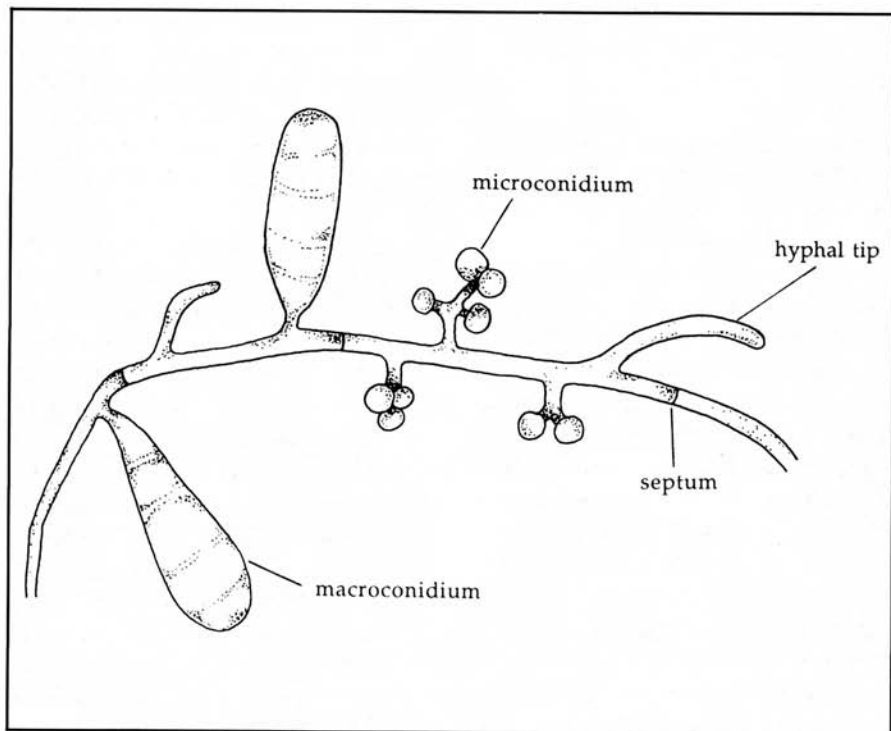
Foot rot of people or Why does "athlete's foot" itch?

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Part of the price civilised humans must pay for tucking their feet into warm fluffy socks inside cosy shoes or slippers is a tendency to develop "athlete's foot", a condition described by doctors as *tinea pedis*. The warm, moist environment between the toes, particularly under the little one, is a perfect position for the growth of some specialised fungi (known as dermatophytes) that live

on layers of dead skin. These species have the unusual ability to digest a highly resistant protein, known as keratin, which is an important component of skin and hair. The invading fungi are microscopic and grow on tiny skin flakes which are relatively undisturbed, between the toes (*Trichophyton interdigitale*) or at the sides of nails (*Epidermophyton floccosum*).



Trichophyton can be grown in laboratory culture and produces two types of spores (conidia), as shown in the diagram.

“Athlete’s foot” is an irritating infection. The skin of the foot is stimulated, by the presence of the fungus, to produce more cells at the surface than usual. These then slough-off as little flakes and scales, creating itchy patches and raw areas often with sore cracks. These dead skin flakes provide lots of extra food materials for the fungus. The fungi pour out enzymes (proteases, peptidases) as they grow, digesting keratin and other complex proteins in the skin flakes and taking in the nutrients they need for further growth. These enzymes and other compounds given out by the fungi act as irritants to the skin, and it is these that cause the itching and great discomfort associated with the condition.

Apart from the itchiness this infection is also irritating because it is not always easy to treat and may be quite persistent, reoccurring regularly. Part of the problem is that the fungus attaches itself to the small flakes and layers of dead skin on the foot. No matter how well the feet are scrubbed and towelled dry small fragments of fungus may easily remain, tucked inside dead layers, to cause further irritation some time later.

It is interesting that some people are much less susceptible to infection by these fungi than others and may never develop *tinea pedis*. It is possible that these people have higher levels of antifungal materials in their skin. Others, however, may suffer recurrent infection, particularly at times when they are a little run-down or unwell in some way.

The fungus may be carried from one person to another on small skin flakes which have been shed from an infection. Communal changing rooms, swimming pools etc., are obvious sites for such exchanges. However, in general it is sufficient to keep feet as dry as possible, and with a good airing from time to time, most of us are rarely bothered by these fungi.

These days the local chemist sells really helpful antiseptic powders that can be lightly dusted on to the infected areas changing the environment around toes sufficiently to be a useful treatment for most infections.

More pronounced infections may need medical attention and can now be treated by administering an antifungal antibiotic (usually griseofulvin) by mouth to the patient. As it is taken orally this antibiotic gradually accumulates in skin layers and prevents new growth of the fungus.

This is particularly useful for treatment of nail infections since it is not possible to apply creams or lotions to the infected regions. Treatment must continue until all infected flakes of skin have been lost from the patient so that no fungal fragments remain for possible reinfection.

Fortunately there are relatively few species of dermatophytic fungi and only some of them ever infect man (about 20 worldwide). In addition the healthy human body is very resistant to fungal infection and happily most of us never experience an invasion of the dermatophytes.