



## 0609-2 *Trichophyton tonsurans* – Contaminated sample

**HISTORY** This sample was sent as a nail culture isolate.

**CMPT QA:** *Trichophyton tonsurans*. Unfortunately this sample became contaminated with *Aspergillus flavus*.

**Reference Laboratory:** Growth of *Trichophyton tonsurans* confirmed; however, contaminated w/ *Aspergillus* sp. / *A. flavus*.

Only 2 laboratories reported *Trichophyton tonsurans*. One of these laboratories noted using Mycosel, PDA, Trichophyton agar, Bromcresol purple agar, incubated at 30°C; the other noted using IMA and Mycosel agar incubated at 30°C. The remaining participants reported *Aspergillus*.

**SPECIMEN COLLECTION AND LABORATORY PROCESSING**  
Please refer to CMPT critique 0509-2 and reference 1.

**IDENTIFICATION** <sup>1-5</sup> *Trichophyton* differs from *Microsporum* and *Epidermophyton* by having cylindrical, clavate to cigar-shaped, thin-walled or thick-walled, smooth macroconidia. A combination of macroscopic and/or microscopic characteristics from each medium is required for identification and no one single test is infallible.

**Microscopic morphology** *Trichophyton tonsurans* has numerous microconidia of various shapes and sizes such as pyriform, tear drop, club shaped or balloon shaped; intercalary and terminal chlamydoconidia are found in older culture; macroconidia are rare, those found are smooth walled and distorted. Spiral hyphae may be present. Invaded hairs show an endothrix infection. Hair infected by *M. canis* fluoresces under **Wood's light**; hair infected by *T. tonsurans* does not.

**Colony morphology** <sup>2,3</sup> Matures in about 12 days with colonies on Sabouraud's dextrose agar showing considerable variation in texture and colour. They may be suede-like to woolly to powdery, flat with a raised centre or folded, often with radial grooves. The colour may vary from pale-buff to yellow, the so called sulfureum form which resembles *Epidermophyton floccosum*, to dark-brown. The reverse colour varies from lemon yellow-brown to reddish-brown to deep mahogany; a dark diffusing pigment may be present.

Hyphae are relatively broad, irregular, much branched with numerous septa. Numerous characteristic microconidia varying in size and shape from long clavate to broad pyriform, are borne at right angles to the hyphae, which often remain unstained by lactophenol cotton blue. Very occasional smooth, thin-walled, irregular, clavate macroconidia may be present on some cultures. Numerous swollen giant forms of microconidia and chlamydoconidia are produced in older cultures.

**Tests** <sup>2,3</sup> Alkalinization of BCP-milk (bromcresol purple agar); urea hydrolysis (urease is positive), hair perforation is usually negative, and thiamine enhances growth. *T. mentagrophytes* is also urease positive.

**CLINICAL SIGNIFICANCE** <sup>6</sup> Members of the genus *Trichophyton* possess several virulence factors including acid proteinases, elastase, keratinases, and other proteinases that allow them to invade the keratinous tissues of humans and animals <sup>1,2</sup>. *Trichophyton tonsurans* is an anthropophilic fungus with a world wide distribution which causes inflammatory or chronic non-inflammatory finely scaling lesions of skin, nails, and scalp. *T. tonsurans* is highly contagious and temporary exclusion from school until appropriate treatment has commenced has long been considered a part of treatment. The etiological organisms of tinea capitis depend on the geographic area. In North America, they are *Trichophyton tonsurans* and *Microsporum canis*.

*T. tonsurans* is the causative agent of tinea corporis gladiatorum, a fungal infection of wrestlers and spread among wrestling teams worldwide <sup>7</sup>. This fungal infection is transmitted through close skin-to-skin contact. In the United States, Kohl et al. found that 84% of wrestling teams had at least one case of tinea corporis gladiatorum during the 1998-1999 season. Cases in judo teams at a university in Japan (2004) and a judo school in France (2005) were recently reported. In the 49 cases reported in the French study, the investigators found that the lesions mimicked mat-burns or skin grazes, were frequent in team members above the protuberances of bones on wrists or elbows, and the number of lesions were often underestimated by the individual.

**TREATMENT** <sup>1-6</sup> Ketoconazole, clotrimazole, itraconazole, terbinafine, naftifine, and amorolfine are in general active in vitro against *Trichophyton*. Terbinafine and itraconazole are now commonly used in treatment of infections due to *Trichophyton* spp. and other dermatophytes. For treatment of tinea capitis and onychomycosis, oral therapy is usually preferred <sup>2</sup>. Terbinafine usually appears to be the most effective agent. Griseofulvin, once the drug of choice for treatment of dermatophytosis, is now less commonly used due to the availability of more effective and less toxic drugs.

As the French investigators noted, self-medication with topical treatments failed as many of the skin lesions were considered to be benign problems (e.g., mat burns), therefore not all lesions received the treatment. Oral treatment (Terbinafine) was therefore indicated and worked well in this study <sup>7</sup>.

## REFERENCES

1. Summerbell RC. 2003. pp. 1798-1819. *Trichophyton*, *Microsporum*, *Epidermophyton*, and agents of superficial mycoses. In PR Murray PR et al. (eds.) *Manual of Clinical Microbiology*. 8th ed. Vol. 2. Ch. 119. ASM Press, Washington, DC.
2. <http://www.doctorfungus.org/Thefungi/trichophyton.htm>

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3. <http://www2.provlab.ab.ca/bugs/webbug/mycology/ttons.htm>
4. [http://www.mycology.adelaide.edu.au/Fungal\\_Descriptions/Dermatophytes/Trichophyton/tonsurans.html](http://www.mycology.adelaide.edu.au/Fungal_Descriptions/Dermatophytes/Trichophyton/tonsurans.html)
5. Larone DH. 2002. p. 244. *Medically important fungi A Guide to Identification*. 4th ed. ASM Press, Washington, D.C.
6. Krajden S. 1997. Dermatophytes: Epidemiology and Clinical Features. pp. 22-23. In J Kane, ed. *Laboratory Handbook of Dermatophytes*. Star Publishing Company. Belmont, Ca.
7. Poisson DM, D Rousseau D, Defo D, Estève E 2005. Outbreak of tinea corporis gladiatorum, a fungal skin infection due to *Trichophyton tonsurans*, in a French high level judo team. *Euro Surveill*.10(9):187-190. <http://www.eurosurveillance.org/em/v10n09/1009-224.asp>

CMPT Critiques:

0509-2 (simulated skin scraping): *M. gypseum*

[http://www.interchg.ubc.ca/cmpt/pdf\\_mycology/0509\\_2\\_mgyp.pdf](http://www.interchg.ubc.ca/cmpt/pdf_mycology/0509_2_mgyp.pdf)

0504-1 *T. rubrum*

0601-2 *T. rubrum*

0409-2 *T. mentagrophytes*

**Internet Resource Photographs**

<http://microbiology.mtsinai.on.ca/mig/dsma/dsmafig037.shtml>