



April 2007  
Basic Mycology

**0704 *Trichophyton tonsurans***

**HISTORY** This sample was sent as a toe scraping isolate. It was sent to compensate for sample 0609-2 that was contaminated with *A. flavus*.

**CMPT QA:** Pure growth of *T. tonsurans*, viable for 32 days.

**Reference Laboratory:** Growth of *T. tonsurans* confirmed.

All laboratories correctly reported the genus; media are shown in Table 1. See Table 2 for descriptions of all fungi reported.

Table 1. 0704 reports received and media noted by Basic Mycology participants.		
Report received	No.	Media reported
<i>T. tonsurans</i>	1	Fungus selection agar, Potato Dextrose agar, Dermatophyte test media, 25°C
<i>T. mentagrophytes</i>	2	Fungus selection agar/RT
<i>Trichophyton rubrum</i>	1	SAB/RT
<i>Trichophyton georgiae</i> See Table 2.	1	Fungus selection agar, Potato Dextrose agar/25°C
no report	1	n/a
Total	6	

**IDENTIFICATION (as per 0609-2)** *Trichophyton* differs from *Microsporum* and *Epidermophyton* by having cylindrical, clavate to cigar-shaped, thin-walled or thick-walled, smooth macroconidia. However, *Trichophyton* species usually have more microconidia present than macroconidia. A combination of characters (macroscopic and/or microscopic) 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 or pear-shaped, tear drop, club shaped or balloon shaped; intercalary and terminal chlamydospores are found in older culture; macroconidia are rare, those found are smooth walled and distorted, small pencil or club-shaped. Spiral hyphae may be present. A variant all-macroconidial form of *T. tonsurans* was described in 1994<sup>1</sup>. 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** *Trichophyton tonsurans* is considered moderately slow growing as colonies mature in about 12 days on Sabouraud's dextrose agar. Colonies vary 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 white to pale-buff to yellow, the so called sulfureum form which resembles *Epidermophyton floccosum*, to dark-brown. The reverse colour is rarely pale and 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 microco-

nidia 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.

**CLINICAL SIGNIFICANCE** 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. *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, which is a fungal infection well known in wrestlers and widespread among wrestling teams worldwide. 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. Recently, cases in judo teams at a university in Japan in 2004 and a judo school in France in 2005 were reported. In the French study, where there were 49 cases, the investigators found that the lesions mimic 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 frequently underestimated by the individual.

**TREATMENT** 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. 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.

(Continued on page 2)

**REFERENCES** (see CMPT Mycology Plus 0609-2 *T. tonsurans* [http://www.cmpt.ca/pdf\\_mycology/0609\\_2\\_tri\\_ton.pdf](http://www.cmpt.ca/pdf_mycology/0609_2_tri_ton.pdf) )

1. Summerbell RC, Weitzman I, Padhye AA. 2007. p. 1874-1897. *Trichophyton*, *Microsporum*, *Epidermophyton*, and agents of superficial mycoses. In PR Murray et al. (eds.) *Manual of Clinical Microbiology*. 9th ed. Vol. 2. Ch. 124. ASM Press. Washington, DC.
2. <http://www.doctorfungus.org/Thefungi/trichophyton.htm>
3. <http://www2.provlab.ab.ca/bugs/webbug/mycology/ttons.htm>
4. Kraiden S. 1997. Dermatophytes: Epidemiology and Clinical Features. pp. 22-23. In J Kane, ed. *Laboratory Handbook of Dermatophytes*. Star Publishing Company. Belmont, Ca.
5. [http://www.mycology.adelaide.edu.au/Fungal\\_Descriptions/Dermatophytes/Trichophyton/tonsurans.html](http://www.mycology.adelaide.edu.au/Fungal_Descriptions/Dermatophytes/Trichophyton/tonsurans.html)
6. Larone DH. 2002. p. 244. *Medically important fungi. A Guide to Identification*. 4th ed. ASM Press, Washington, D.C.
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>

<b>Fungus</b>	<b>Colonial Morphology</b>	<b>Microscopic Morphology Phase Contrast</b>
<i>Trichophyton tonsurans</i> <a href="http://www.provlab.ab.ca/mycol/tutorials/derm/ttons.htm">http://www.provlab.ab.ca/mycol/tutorials/derm/ttons.htm</a>	Growth rate: moderately fast Texture: suede like with radial folds, granular to woolly sometimes powdery or velvety often with abundant mycelium in the medium Thallus color: white to creamy yellow, rose Reverse: lemon yellow to mahogany brown, may have dark diffusing pigment	<b>Microconidia are numerous</b> characteristic 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. Microconidia are occasionally on match stick-like conidiophores; growth enhanced by thiamine. <b>Macroconidia are rare</b> or very occasional smooth, thin-walled, irregular, clavate may be present on some cultures. Numerous swollen giant forms of microconidia and chlamydoconidia are produced in older cultures. <b>Hyphae</b> are relatively broad, irregular, much branched with numerous septa that may be spiral shape.
<i>T. mentagrophytes</i> <a href="http://www.provlab.ab.ca/mycol/tutorials/derm/tment.htm">http://www.provlab.ab.ca/mycol/tutorials/derm/tment.htm</a> for Photo	<b>Granular form:</b> Growth rate: moderate; Texture: granular, flat; Thallus color: buff to tan Reverse: pale yellow, tan, or reddish brown <b>Velvety form:</b> Growth rate: moderate Texture: velvety, flat, thin, with fine powder Thallus color: white to sandy to butter yellow Reverse: white to tan, rarely reddish brown <b>Downy form:</b> Growth rate: moderate Texture: deep, cottony; Thallus color: white Reverse: pale yellow to tan	<b>Velvety and granular forms:</b> round microconidia in grape-like clusters spiral hyphae +/- cigar shaped, thin walled macroconidia, narrowly attached to hyphae  <b>Downy form:</b> pyriform microconidia indistinguishable from <i>T. rubrum</i>
<i>Trichophyton rubrum</i> <a href="http://www.provlab.ab.ca/mycol/tutorials/derm/trub.htm">http://www.provlab.ab.ca/mycol/tutorials/derm/trub.htm</a>	Growth rate: slow to moderately rapid Texture: downy to cottony Thallus color: white to pale pink Reverse: blood red (PDA) to reddish brown (SDA, Mycosel) Variants: yellow, may produce red pigment on PDA coffee brown soluble pigment unpigmented deeply red, heaped up, folded yellow orange reverse	<b>few</b> pyriform, lateral microconidia pencil shaped macroconidia uncommon microconidia form on macroconidia arthroconidia produced from hyphae and macroconidia
<i>Chrysosporium georgiae</i> (Varsavsky & Ajello) Studies in Mycology 20: 31 (1980), formerly called <i>Trichophyton georgiae</i>	Moderately rapid, matures in 6 days. Some <i>C. georgiae</i> isolates, but not all, grow slowly at 37°C. Spreading or compact cottony or powdery ; flat or raised; usually white, yellow, or tan but may be pink or slightly orange. <b>NOTE:</b> <i>Chrysosporium</i> species are not dermatophytes; however, some species will grow on dermatophyte test medium and turn it red.	1 to 2- septate microconidia may rarely occur; no macroconidia  <b>NOTE:</b> Conidia of <i>Chrysosporium</i> sp. and <i>T. rubrum</i> are morphologically similar and can also be mistaken for <i>Blastomyces dermatitidis</i> .