

**0704-1 *Candida parapsilosis***

**HISTORY** This sample was sent as a central line tip isolate.

**CMPT QA:** Pure growth of 4+ *Candida parapsilosis* viable for 22 days.

**Reference Laboratory:** Growth of *Candida parapsilosis* confirmed.

Participants performed very well in this challenge as noted in Table 1. This isolate was previously sent in October 2002 in Mycology Plus 0209-1 as a blood isolate when 8 participants identified *C. parapsilosis*, and 2 reported '*Candida* species, not *albicans*, refer'.

**ISOLATION & IDENTIFICATION** 1 - 3

**Colony morphology** *Candida parapsilosis* grows at 35-37°C and matures within 3 days on Sabouraud's dextrose agar (SAB). There is no growth on media containing cyclohexamide. *C. parapsilosis* colonies on SAB appear white to cream colored, smooth, glabrous, although sometimes lacy in appearance.

**Microscopic morphology** On routine primary media, yeast cells are oval shaped, 3-4 x 5-8µm in size. *C. parapsilosis* may be differentiated from other *Candida* species by fermentation and assimilation tests <sup>1</sup>.

**Cornmeal and Tween 80 Agar morphology** Outstanding characteristics are the crooked or slightly curved appearance of relatively short pseudohyphae and occasional giant pseudohyphae that is produced <sup>2</sup>. The pseudohyphae may spread in all directions giving a spider shape appearance <sup>3</sup>.

Identification to the species level is accomplished by physiological, assimilation and fermentation tests. Commercial ID kits/methods may be used as reported by several participants and noted in Table 1.

**Physiological Tests:** Germ Tube test: negative.; Hydrolysis of Urea: negative; No growth on Cycloheximide medium; Growth at 37°C: positive; India Ink Preparation: negative - no capsules present.

**Assimilation tests** <sup>4</sup>:

**Positive:** Glucose; Galactose; Maltose; Trehalose; D-Xylose; Glycerol; L-Arabinose; Ribitol (delayed); D-Mannitol; Sucrose; D-Glucitol

**Variable:** D-Ribose; L-Sorbose; Succinic, Citric, and DL-Lactic acid

**Negative:** Potassium nitrate; Cellobiose; Lactose; Raffinose; Melibiose; Galactitol; Erythritol; Inositol; Soluble Starch; L-Rhamnose; Salicin; Melezitose; D-Arabinose

**Fermentation Reactions:** Where fermentation means the production of gas and is independent of pH changes. Positive: Glucose; Variable: Galactose; Negative: Lactose; Sucrose (some positive); Maltose (some positive); Trehalose (some positive).

**CLINICAL SIGNIFICANCE** *Candida parapsilosis* is an opportunistic human pathogen which is increasingly responsible for hospital outbreaks <sup>5</sup>. *C. parapsilosis* particularly affects critically ill neonates and surgical intensive care unit (ICU) patients, likely because of its association with parenteral nutrition and central lines. The hands of healthcare workers may be the predominant environmental source <sup>5</sup>. It is the most prevalent pathogen of fungal peritonitis in peritoneal dialysis (PD) <sup>6</sup> and is second only to *C. albicans* as a cause of systemic candidiasis in very low birth weight neonates <sup>7</sup>. In a study from Spain, *C. parapsilosis* was responsible for 23% of all candidemias; however, the mortality rate was lower than that associated with *C. albicans* fungemia <sup>8</sup>.

Characteristics of *C. parapsilosis* that may relate to its increasing occurrence in nosocomial settings include frequent colonization of the skin, particularly the subungual space, and an ability to proliferate in glucose-containing solutions, with a resultant increase in adherence to synthetic materials <sup>9</sup>. Its affinity for foreign material is shown by infections related to peritoneal dialysis catheters and prosthetic heart valves. It is suggested that biofilm production plays a role in *C. parapsilosis* outbreaks <sup>5</sup>.

**TREATMENT** Susceptibility testing should be performed either in-house or by forwarding the isolate to a reference laboratory. One study recommends that *C. parapsilosis* peritonitis in PD patients should be treated more aggressively than other *Candida* species <sup>6</sup>.

In 2006, Barchiesi, et al. <sup>10</sup> reported caspofungin (CAS) MICs obtained by broth dilution and Etest methods clearly showed a rank order of susceptibility to the echinocandin compound with *C. albicans* > *C. parapsilosis* > *C. guilliermondii*. Similarly, time-kill assays performed on selected isolates showed that CAS was fungistatic against *C. albicans* and *C. parapsilosis*, while it did not exert any activity against *C. guilliermondii*. The overall CFU reduction for *C. guilliermondii* and *C.*

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Identification	No. Labs	Media and Methods
<i>Candida parapsilosis</i>	10	SAB, BAP, 30°C; Cornmeal agar, GT, Vitek2, API 20C Aux; FSA, SAB, Cornmeal Agar, PDA, 25C; SAB, BHI + chlor & gent, 30C, Candiselect 4, 37°C; IMA, BHIA, 28C, Aux-acolour; BAP,35°C, Mycosel, PDA, 30 C; Tween 80, Littman oxgall, Caffeic acid agar, GT, urea, Auxacolor2; IMA, 30C, API 20C Aux, chromagar, tobacco agar, cornmeal agar; SAB 37°C, SAB, BHI w/ chloramphenicol, cyclohexime, gentamicin, GT, urea, Auxacolor2; SABHI, Littman oxgall, Mycosel, 25°C; IMA, Mycobiotic agar, SAB, 25°C; IMA, BHI w/ chloramphenicol, gentamicin, cycloheximide; BHI w/ chloramphenicol, gentamicin & 10% sheep blood, 29°C
Total	10	/

*parapsilosis* was approximately 100-fold less than that for *C. albicans*. Their study showed that CAS was active in experimental systemic candidiasis due to *C. guilliermondii* and *C. parapsilosis*, but this activity required relatively high drug dosages.

Echinocandins are approved for the treatment of candidal infections. In vitro they have been shown to be less potent against strains of *Candida parapsilosis* than against other *Candida* spp. A case report describing the development of a secondary multidrug (echinocandin-azole)-resistant *Candida* strain during therapy was recently described <sup>11</sup>.

## REFERENCES

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## Internet Resources:

Flow Chart Yeast Identification [http://microbiology.mtsinai.on.ca/mig/charts/FC10\\_yeast.pdf](http://microbiology.mtsinai.on.ca/mig/charts/FC10_yeast.pdf)

Image Gallery Resource <http://microbiology.mtsinai.on.ca/mig/index.shtml>

Mycology Manual Mt Sinai <http://microbiology.mtsinai.on.ca/manual/myc/index.shtml>