



Candida albicans

Candida species are dimorphic fungus growing as yeast or filamentous cells and appearing on Gram stain as large Gram-positive ovoid cells. There are over 150 species, however only nine are considered frequent human pathogens and up to 90% of cases of infection are caused by *C. albicans*.

Infections:

The organism *C. albicans* is ubiquitous and can be detected in soils, hospital environments and as a commensal on human skin, within the GI tract and in female genital tract. Despite this, *C. albicans* causes a range of diseases, typically of endogenous origin and normally considered opportunist in nature (See below).

In healthy individuals, it can cause relatively mild infections such as in the nails. If the normal balance of commensals is disrupted however, *C. albicans* can thrive in numbers and cause infection such as oral and/or genital thrush. This can be due to taking antibiotics, poor oral hygiene, chemotherapy, pregnancy, dryness, smoking, and poor control of diabetes among other reasons. People with weakened immune systems are particularly vulnerable, as are those with diabetes. Thrush is treatable in otherwise normally healthy individuals though recurrence is common, but in the immunocompromised systemic infection may occur entering the bloodstream (Candidaemia) and can disseminate to other organs. *Candida albicans* is also one of the leading nosocomial infections due in part to the increase in medical interventions such as the use of antibiotics and invasive devices which can change the body's normal flora defences and provide a route of entry respectively. Increased use of steroids and immunosuppressants may also be associated by the rise in disease.

Summary of the types of infection caused by Candida albicans:

- Localised skin infections e.g.
 - Onychomycosis
 - Balanitis
 - Mastitis
 - Erosio interdigitalis blastomycetica (EIB) between fingers and toes
 - Nappy rash
 - Intertrigo

- Cutaneous or mucocutaneous candidiasis
- Oral Thrush
- Vulvovaginitis
- Eye infections
- UTIs
- Candida oesophagitis
- Bone, joints infection
- Endocarditis
- Candidaemia
- CNS candidiasis

Diagnosis:

In the majority of cases *C. albicans* will be diagnosed using laboratory methods including culture. Culture of these strict aerobes is relatively easy from specimens such as swabs or biopsies using media ranging from non-selective to commercial indicator preparations used to speciate. Unfortunately, blood cultures are known to flag positive in ~60% of known candidaemia cases therefore culture may be less reliable from this specimen type. Fungal antigen detection eg. 1-3 beta-*D*-glucan may also be useful, particularly for the negative predictive value, however the ubiquity of the antigen detected means the positive predicative value is often not as useful.

Therefore, in blood cultures and other sterile sites PCR may be a useful tool for increased sensitivity of detection. PCR may also be useful when the presence of *C. albicans* is suspected but speciation cannot be achieved by other means.

Our assay:

At Micropathology Ltd we use a qualitative single-round traditional PCR assay which targets the multiple copy secreted Aspartyl protease (*sap*) gene for the detection of *C. albicans*. UKAS accredited specimen types for this assay are whole blood, CSF and vitreous biopsy fluid. Eye swabs and corneal scrapes have been validated to UKAS standards but are currently awaiting accreditation.

Turnaround times are stated in the user manual (<http://www.micropathology.com/customer-downloads-handbook.php>) with results usually available in practice much sooner than the given time frame. Where there is a delay, we are usually confirming a result and addressing clinical data given with the specimen