Interpretation of Mycology Results

Mycology Sample Collection

It is important that sufficient amounts of good quality samples are sent to the laboratory otherwise results may be misleading and repeat specimens indicated.

| processing of specimens | microscopy & culture are carried out on arrival  
excess specimen is retained for use, should a repeat culture be required |
|-------------------------|-------------------------------------------------------------------------------------------------------|
| microscopy              | results available for GPs by e-mail or by post, within 1 working day  
in this laboratory the microscopy result reflects culture outcome in 66% of cases  
microscopy detects mycelium and arthrospores and other fungal elements, however the causal fungus cannot usually be identified  
microscopy is diagnostic for pityriasis versicolor, therefore culture is not performed  
characteristic *Scopulariopsis* spores may be seen  
other conditions which may be diagnosed by microscopy include erythrasma, causative organism *Corynebacterium minutissimum*, seborrhoeic dermatitis, caused by *Malassezia furfur* and superficial *Candida* infections |
| culture of specimens    | results usually available in 7-14 days, however repeating cultures or complex identifications means final results may take longer  
if the amount of specimen received permits, culture will be repeated on microscopy positive specimens whose initial culture shows no growth of dermatophyte after 7 days incubation |
| repeat specimens        | indicated where insufficient specimen was received  
or where microscopy was positive but culture failed to grow any dermatophyte or only a saprophyte was cultured to check clinical progress after long term treatment |
<table>
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<tr>
<th>Interpretation of Results</th>
<th>Positive microscopy of mycelium seen or fungal elements seen is an indication for treatment, however it does not guarantee that the infecting organism will be cultured.</th>
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<tbody>
<tr>
<td>Negative microscopy result followed by a positive culture result</td>
<td>Indicates modest amounts of fungus in the specimen provided, e.g. sampling healthy tissue along with the affected area. Treatment is indicated.</td>
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<tr>
<td>Failed to grow ie positive microscopy but culture negative,</td>
<td>May be due to sampling the distal area of nail or centre of a lesion, where the fungus is no longer viable or due to previous antifungal treatment. The causative fungus will fail to grow in approximately 33% of nail samples.</td>
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<tr>
<th>Significance of Results</th>
<th>In most cases only the dermatophyte is significant.</th>
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<tr>
<td>Saprophytic organisms</td>
<td>Such as <em>Scopulariopsis brevicaulis</em> and <em>Fusarium</em> sp. are usually secondary to a dermatophyte or trauma. However, if <em>Fusarium</em>, <em>Aspergillus</em> or <em>Acremonium</em> spp. is isolated from toenail material where mycelium is seen on microscopy we suggest a repeat specimen.</td>
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<tr>
<th>Current Isolation Rates</th>
<th>30% of specimens yield the following causative organisms:-</th>
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<tbody>
<tr>
<td><em>Trichophyton rubrum</em> 69.6 %</td>
<td><em>T. mentagrophytes</em> 16.7 %</td>
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<tr>
<td><em>T. tonsurans</em> 2.0 %</td>
<td><em>Microsporum canis</em> 1.7 %</td>
</tr>
<tr>
<td><em>Epidermophyton floccosum</em> 0.5%</td>
<td>Others 10%</td>
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</table>

| Treatment & Further Reading | See “Fungal Infections of the Nail” 2nd edition, 1998 by Roberts, Evans & Allen |

**Mycology Sample Collection**

**Superficial specimens**
It is important that good quality samples are sent to the laboratory otherwise results may be misleading and repeat specimens indicated.

**Suitable containers**

**Skin and Nail Specimens** should be collected into a Dermapak or similar black card packet. If these are not available then a sterile, plain, plastic universal may be used. Please do not use ad-hoc packets or sellotape as culture may fail due to overgrowth of contaminating saprophytic fungi. Microscopy will be impeded by specimen affixed to sellotape. Please do not use toothbrushes to sample scalp skin as this prevents microscopic examination. A scalp skin scraping or hair pluck is preferable. **Swabs from mucous membranes**: These should be in plain transport medium, as yeasts die rapidly in dry swabs and charcoal interferes with microscopic examination.

**Sample collection**
Clean lesions with surgical spirit or 70% alcohol before collecting samples. This minimises contamination and is an aid to microscopy if greasy ointments or powders...
have been applied
Be sure to include as much material as possible so that full laboratory investigations
 can be carried out. It is always useful to have enough skin or nail to repeat the
culture if necessary

- **Skin**: Collect material by scraping outwards from the edges of the lesions,
either with a blunt scalpel blade or with the edge of a glass microscope slide.

- **Nail**: If possible, collect the subungual debris in addition to nail clippings.
  Sample the discoloured, dystrophic or brittle parts of the nail only, digging as
  far back as possible from the distal part of the nail.

- **Hair**: Pluck hairs from the affected area with forceps (infected hairs come
  out easily) and scrape the scalp with a blunt scalpel. Preferably, the sample
  should include hair stubs, the contents of plugged follicles and skin scales.
  Hair cut with a scissors is unsatisfactory as the focus of infection is usually
  below or near the surface of the scalp.

- **Samples from mucous membranes**: Use swabs to collect material from
  *Candida* infections of the mouth or vagina.

**Request forms**
The request forms for Mycology have purple borders and an integral specimen bag.
The address for the return report should be clearly indicated. Details of previous
 treatment should be included on the request form where possible as they may affect
 both the appearance of the fungus and also the likelihood of a positive culture result.

**Storage of specimens**
Skin and nail specimens should be stored at room temperature, as dermatophyte
fungi may be killed at 4 - 6 C. Swabs from mucous membranes should be stored in
the refrigerator prior to despatch.

**Supply of Dermapaks and forms**
- **GP's dealing with LGI and Wharfedale** - further forms and Dermapaks will
  be issued with the hard copy report of the microscopy results. GP's dealing
  with Bradford - order on consumables request slips.
- **Dermatology clinics/ wards** - order Dermapaks from manufacturer and
  forms from Saxton Gardens
- **Irregular Ward users** - please contact the laboratory for us to issue you
  with a few forms and Dermapaks
- **Other customers** - please contact the laboratory

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**Microscopy and Culture of Clinical specimens**

*Use(s):* Isolation and identification of all relevant fungi from the following sample
types: skin, hair and nail specimens; oral and vaginal swabs; urine; peritoneal
dialysis fluid; CSF; respiratory samples (e.g. sputum, broncho-alveolar lavage fluid).

*Description*: Microscopy for yeasts, mycelium, arthrospores and other fungal
 elements; culture of any viable fungi present and identification of any clinically
 significant species. Antifungal susceptibility testing is undertaken or arranged where
 appropriate.

*Specimens*: Skin, nail and hair should be sent in Dermapaks or similar paper packs
designed for the purpose. Preferably wet specimens are processed for culture in local
laboratories and the fungi isolated sent for identification. Specimens from GPs in
Leeds can be sent to the laboratory via the GP shuttle.

*Results*: Microscopy is reported as Negative or Positive for yeasts, Candida-type
mycelium, mycelium, fungal elements (arthrospores); culture: identity of any
significant fungi isolated, estimation of amount of fungal growth (+, ++, ++++) where relevant.

**Mean Turnaround Time:** 4 days (90% within 6 days) (microscopy reported within 2-3 days, positive cultures will take longer to report than negatives).

### Identification of Fungi

**Use(s):** Identification of fungi for optimisation of patient management and epidemiological purposes.

**Description:** Identification, usually to species level. Yeasts are identified by a combination of morphological and nutritional/ enzymatic tests. Moulds are usually identified on the basis of macroscopic and microscopic morphology.

**Specimens:** Cultures of fungi, ideally on a Sabouraud slope in a bijou or universal.

**Results:** Identity of the fungus, usually to species level.

**Mean Turnaround Time:** 4 days (90% within 7 days) (approx. 1-3 days for yeasts, exact figures not calculated). **Note:** Fungi not considered to be of clinical significance may not be identified fully unless specifically requested.

### Antifungal sensitivity testing

**Use(s):** Determination of the in vitro sensitivity of yeast isolates.

**Description:** Testing by disc diffusion (fluconazole) or microbroth dilution (fluconazole, itraconazole, voriconazole, amphotericin B, flucytosine and ketoconazole). Specific antifungal(s) tested depend on the identity and source of the isolate and the clinical details supplied. Microbroth dilution testing against is undertaken where indicated by isolate identity, disk diffusion results, or where requested specifically. The identity of the yeast isolate is always confirmed or carried out on isolates sent for sensitivity testing.

**Specimen:** Yeast isolates, ideally on a Sabouraud agar slope in a bijou or universal tube.

**Results:** Sensitive, Intermediate/Sensitive-dose dependent, Resistant. If microbroth dilution testing is carried out, a Minimum Inhibitory Concentration (MIC) can be reported.

**Mean Turnaround Time:** 4 days (90% within 9 days).

**Notes:** Infections with C. krusei should not be treated with fluconazole, as this organism is intrinsically resistant; sensitivity testing for moulds is indicated only rarely - please contact the laboratory if advice on this is required; because of limitations in the microbroth method used, a small number of isolates are referred to another laboratory for testing.