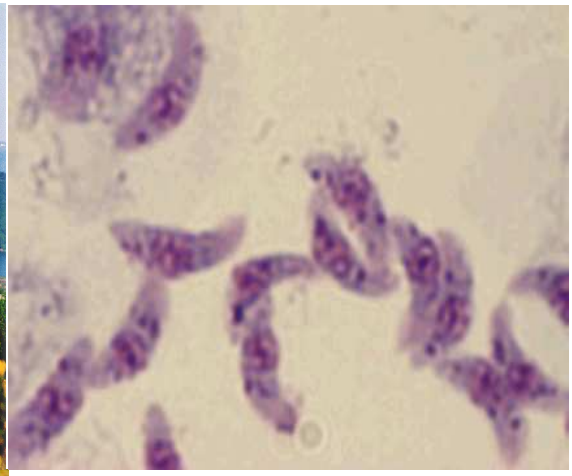
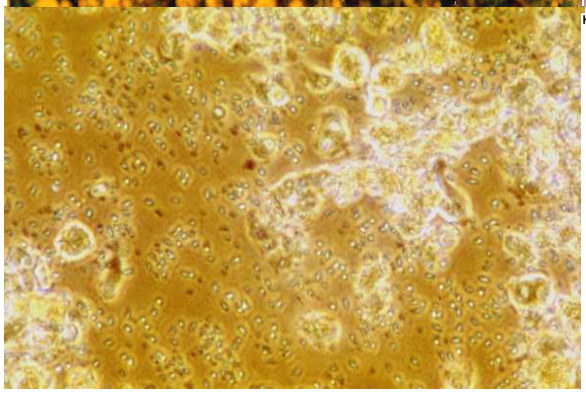
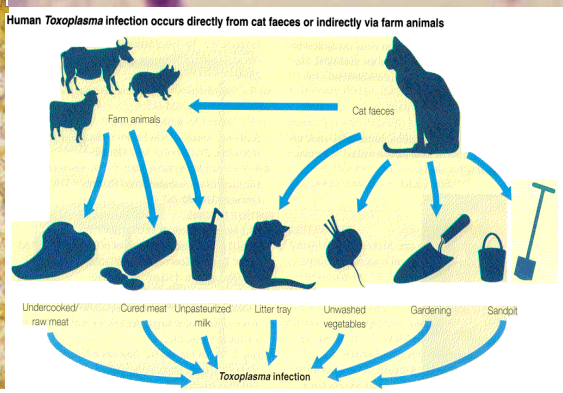
# SCOTTISH TOXOPLASMA REFERENCE LABORATORY

# USER MANUAL







## Contents

## 1.0 Introduction

The Scottish Toxoplasma Reference Laboratory (STRL) is located within the Microbiology Department, Raigmore Hospital, Inverness and is funded by National Services Scotland (NSS), Scottish Government Health Directorates. The laboratory provides specialist diagnostic testing service, advice on the management of infection and clinical management of individual patients. It also supplies epidemiological information for health protection purposes.

The STRL is unique in the UK in its use of toxoplasma tachyzoites grown in cell culture for its in-house dye test.

*The NHS Highland Microbiology Department is accredited by the United Kingdom Accreditation Service (UKAS). UKAS Medical accreditation number 9612 (accredited to ISO 15189:2012). A full list of tests in scope is available on the laboratory homepage. Our schedule of accreditation may also be found on the UKAS website:*

https://www.ukas.com/wp-content/uploads/schedule_uploads/00007/9612%20Medical%20Single.pdf

## 2.0 Contact details and key personnel

### 2.1 Address:

| **Postal address:** | **DX address** |
|---|---|
| Scottish Toxoplasma Reference Laboratory<br>Microbiology Department<br>Zone 3, Raigmore Hospital<br>Old Perth Road<br>Inverness<br>IV2 3UJ | DX6180102 - 90IV |

### 2.2 Telephone/ Fax/ email:

| | |
|---|---|
| General enquiries (09:00 - 17:00 Monday to Friday)<br>email | 01463 704206 / 704207 (direct)<br><br>high-uhb.smirl@nhs.net |

### 2.3 Key personnel:

The staff may be contacted at any time for advice and support.
Complaints should be directed to Director/Clinical Lead.

| **Designation** | **Name** | **Telephone** |
|---|---|---|
| Clinical Lead | Dr Chin Lim | 01463 704206 |
| Director/ Consultant Clinical Scientist | Dr Roger Evans | 01463 704206 |

| | | |
|---|---|---|
| Deputy director/ Clinical Scientist | Dr Sally Mavin | 01463 704206 |
| Microbiology Service Manager | Dr David Ashburn | 01463 704108 |

## 3.0 Opening hours

**3.1** Core Hours are Monday – Friday 9.00am to 5.00pm.
**3.2** The STRL does not operate an out-of-hours service.

## 4.0 Service provided

### 4.1 Samples and turnaround times



| Patient group | Required sample | Minimum volume | Turnaround time | Laboratory test | Comment |
|---|---|---|---|---|---|
| *Immunocompetent:* | | | | | |
| Current Infection | Clotted blood | 5ml | 7 days | Dye test, EIA M, IgG avidity, IgG | Clotted blood/serum |
| | Serum | 500µl | | avidity immunoblot | sample preferred as plasma can give occasional unreliable results |
| Chronic infection | Clotted blood | 5ml | 7 days | Dye test, EIA M, IgG avidity, IgG avidity | |
| | Serum | 500µl | | immunoblot | |
| | Whole blood (EDTA)* | 5ml | 7 days | PCR | *Please send whole blood for PCR as buffy coat is examined |
| Pregnancy | Clotted blood | 5ml | | Dye test, EIA M IgG avidity, IgG | Clotted blood/serum |
| | Serum | 500µl | | Avidity immunoblot | sample preferred as plasma can give occasional unreliable results |
| | Amniotic fluid | >200µl | | PCR | |
| Congenital | *Baby:* | | | | (Maternal blood |
| | Clotted blood | 1ml | | Dye test, EIA M, ISAGA IgM, | MUST be taken on the same day as |
| | Serum | 200µl | | IgG Western blot | baby's blood) |
| | *Maternal:* | | | | |
| | Clotted blood | 5ml | | Dye test, EIA M, IgG Western blot | Clotted blood/serum |
| | Serum | 500µl | | | sample preferred as plasma can give occasional |
| | Placenta | | | PCR | unreliable results |
| | Foetal tissues | | | PCR | |
| Ocular | Clotted blood | 5ml | | Dye test, EIA M, ISAGA IgM | Aqueous/vitreous fluid is difficult to obtain and may require many tests. Any volume is acceptable but |
| | Serum | 500µl | | | |
| | Aqueous/vitreous fluid | 100µl | | PCR | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 100µl is preferred minimum volume |
| Immunocompromise | Clotted blood<br><br>Serum<br><br>Whole blood (EDTA)*<br><br>CSF (if CNS involvement) | 5ml<br><br>500µl<br><br>5ml<br><br>200µl | | Dye test, EIA M, ISAGA IgM<br><br><br>PCR<br><br>PCR | <br><br><br>*Please send whole blood for PCR as buffy coat is examined |
| Difficult cases | Discuss with laboratory prior to sending samples | Variable | 7 days | As appropriate | |



### 4.2 Clinical Information

Toxoplasmosis is caused by the protozoan parasite *Toxoplasma gondii* and can present in different patient groups with a range of clinical symptoms. Clinical information and date of onset allows interpretation of serological results thereby helping us to provide a better reference service. Please do not hesitate to contact the laboratory to discuss any queries or unusual cases.

- **Primary acquired**

The STRL provides confirmatory testing and determination of timing of infection. In immunocompetent adults the symptoms and signs of toxoplasma-like illness are fever, lymphadenopathy, malaise, myalgia, flu-like symptoms, hepatitis and other organ involvement. It must be remembered many infected people are asymptomatic.

- **Pregnancy**

In pregnancy the STRL provides further testing for women who have a screen positive test at any stage in pregnancy, a history of exposure or foetal abnormalities detected at ultra sound.

Initially a current specimen of serum and, if available, sera from earlier in the pregnancy or prenatal bloods are required.

If appropriate, amniotic fluid can be tested by PCR.

Testing at delivery will be directed by the STRL as required.

- **Congenital**

The STRL will test any babies that present with symptoms or signs of toxoplasma infection e.g. fever, lymphadenopathy, hepatitis, retinochoroiditis, hydrocephalus, encephalitis, intracranial calcifications.

If there is a suspicion of congenital infection, a serum sample from both mother and baby at the time of birth should be sent for parallel testing by IgG Western blot. Unique bands or a greater intensity of bands in the neonatal sample compared to the maternal sample is indicative of congenital toxoplasmosis. It is essential that the mother and baby's bloods are taken on the same day otherwise the test becomes invalid.

Tissues from a stillbirth can be tested by PCR. A maternal clotted blood sample is useful in these cases, even the antenatal sample.

Late presentation: diagnosis is difficult in infants older than 1 year. A range of tests is used to determine whether infection is due to infection after birth or congenital infection.

- **Ocular**

Ocular toxoplasmosis presents usually as retinochoroiditis and less commonly as panuveitis, papillitis producing optic atrophy and conjunctivitis.

The majority of ocular cases are thought to be reactivation of a congenital infection. A sensitive and specific test (e.g., dye test) is important as a negative result (<2iu/ml) can exclude disease. As >80% of the general population do not have antibody, any positive dye test result supports the clinical diagnosis.

All suspected ocular cases should be referred as many screening tests do not detect the low levels of antibody that can occur with congenital infection.

Ocular disease may also result from primary acquired infection.

PCR can be performed on aqueous/vitreous fluid for both congenital and acquired disease.

- **Immunocompromise**

**Reactivation**
Immunocompromised patients (HIV, malignancy, bone marrow transplants, patients on corticosteroids, anti-cancer therapy and treatment for connective tissue disease) can be at risk of reactivated toxoplasma infection. Symptoms are similar to primary acquired infection plus encephalitis, pneumonia, chorioretinitis or multi-organ failure.

- With disease progression, patients may lose antibody. Therefore, on diagnosis of HIV or prior to commencing immunosuppressive regime, patients should be tested for specific antibody so that the potential for reactivated infection can be recognised.
- For haemopoietic stem cell transplant patients, if the recipient is seropositive the patient is at high risk of reactivated toxoplasmosis. These patients should be on prophylaxis for toxoplasmosis. Due to their severe immunosuppression these patients often revert to being seronegative post transplant hence it is

important to test prior to transplant to assess infection status. For diagnostic purposes post-transplant an EDTA whole blood must be sent for PCR.

- o If symptomatic, sera should be assessed for rising dye test result, toxoplasma specific IgM and IgG avidity.
- o CSF for PCR may be useful for CNS involvement (in addition to a serum sample) and BAL for respiratory involvement.
- o EDTA whole blood for PCR may be useful.

**Primary**

Patients in this group may be susceptible to a primary acquired infection. However, those most at risk from acquiring primary infection are seronegative transplant recipients receiving an organ from a seropositive donor, particularly heart or liver, usually within 1-2 months of transplantation. Symptoms are similar to primary acquired infection plus encephalitis, pneumonia, chorioretinitis or multi-organ failure.

Serum for toxoplasma antibody in organ transplant donors is required so that mis-matches may be avoided. If symptomatic, serum should be assessed by the dye test or for the presence of toxoplasma specific IgM and low IgG avidity.

CSF for PCR may be useful for CNS involvement (in addition to a serum sample). Whole blood EDTA blood for PCR may also be useful.

## 5.0 Specimen and request form labelling

**5.1** For the safety of patients and staff, the NHS Highland Area Laboratory Service operates a strict specimen acceptance policy (full copy is available on request).

**5.2** Specimens may be submitted either using a referring laboratory's own request form or with a letter. However both the request form (or letter) and sample must be labelled with a minimum of three pieces of information to allow **unequivocal identification** of the patient:

| **MINIMUM DATA SET** | |
|---|---|
| **Request form** | **Sample** |
| Patient's surname(1) | Patient's surname(1) |
| Patient's forename(s) | Patient's forename(s) |
| CHI number (2) | CHI number(2) |
| Date of birth (not age) | Date of birth (not age) |
| Senders laboratory sample number (if applicable) | Senders laboratory sample number (if applicable) |

(1) Or accepted coded identifier (e.g. soundex code)
(2) Where the CHI number is **not** available a third point of identification (e.g. address) **must be** provided.

In addition please ensure the request form includes:

- Name and location of sender (or details of where the final report should be sent if different)

- Specimen type
- Date and time of collection
- Associated clinical and epidemiological information. For pregnant women it is very useful to have the stage of pregnancy stated which can be entered in the additional comments box on the request form.

**5.3** Specimens that do not conform to the minimum data set will **NOT** be processed by the laboratory.

**5.4** The department will reject specimens that present a Health & Safety hazard to staff (e.g. leaking specimens, contamination of specimen containers external surfaces), inappropriate and insufficient specimens.

## 6.0 Specimen transportation

**6.1** Samples must be appropriately packaged and transported in accordance with current regulations.

**6.2** If unsure of the current regulations please contact STRL for advice.

**6.3** Please ensure that packages contain sufficient absorbent material to contain all liquid.

**6.4** Please ensure request forms are placed between the plastic container and cardboard outer and not with the sample inside the plastic container.

**6.5** Samples should be sent to the laboratory via Royal Mail or DX courier to the address shown in section 2.1.

**6.6** NHS Highland users should use appropriate transport within NHS Highland and should refer to the NHS Highland transport policy on the intranet regarding specifications for delivery.

## 7.0 Charges

STRL is funded by National Services Scotland (NSS) and testing is carried out free of charge for Scottish NHS laboratories. Samples received from other laboratories and private companies will be subject to charge; prices are reviewed annually and are available on request.

## 8.0 Results and turn around times

| | |
|---|---|
| Serology | Within 7 working days |
| PCR | Within 7 working days |
| Urgent requests | Please contact the laboratory |

Results are returned by email to the referring laboratory or can be obtained from Sci-store (NHS Highland and Health Boards with store to store access).. Significant results or those that are required urgently will be reported by telephone.

## 9.0 References

Health Protection Scotland:

https://www.hps.scot.nhs.uk/a-to-z-of-topics/public-health-microbiology/nhs-highland-reference-laboratories/

NHS Highland intranet (available to NHS Highland only): http://intranet.nhsh.scot.nhs.uk/Org/DHS/SSU/Medical_DiagnosticsDivision/Laboratories/Raigmore/Microbiology/Pages/Default.aspx

## 10.0 Toxoplasma request form

See separate pdf file

## 11.0 Algorithm for referral of serum samples to STRL

Overleaf

# Algorithm for referral of serum samples to STRL

* Laboratories that screen may not refer seronegative samples on Immunocompromise/Immunity patients but if they do so they should be aware of the level of sensitivity of their screening test.