NHS Highland

Scottish Toxoplasma Reference Laboratory User Manual

User manual

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1. 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**.

1.1 Contact details

Scottish Toxoplasma Reference Laboratory
Microbiology Department
Zone 3, Raigmore Hospital
Old Perth Road
Inverness
IV2 3UJ

Telephone (Monday to Friday, 9am to 5pm): 01463 704206 (direct)
Email: nhsh.smirl@nhs.scot
DX address: DX6180102 - 90IV

1.2 Key personnel

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

Principal Clinical Scientist (Director):	Dr Sally Mavin
Clinical lead:	Dr Mairi Cullen & Dr Alex Cochrane
Microbiology Service Manager:	Dr Joanne Smullen

2. Opening hours

Core Hours are Monday to Friday, 9am to 5pm.
STRL does not operate an out-of-hours service

3. Service provided

3.1 Samples and turnaround times

Test	Specimen required	Volume	Turnaround time	Comment
Serology Dye test followed by IgM CLIA &/or ELISA, IgG avidity (CLIA &/or Immunoblot) as required	Clotted blood	5ml (1ml baby)	7 days	Clotted blood/serum sample preferred as plasma can give occasional unreliable results
	Serum	500µl		
PCR *T. gondii*	Whole blood EDTA (unspun)*	5ml	7 days	Samples for PCR **must** be accompanied by serum sample. *Please send whole blood for PCR as buffy coat is examined **Aqueous/vitreous fluid is difficult to obtain and may require many tests. Any volume is acceptable but 100µl is preferred minimum volume ***Formalin fixed/parafilm embedded can inhibit reaction. Tissue can be sent in saline.
	CSF	200µl		
	Aqueous/vitreous fluid**	100µl		
	Amniotic fluid	200µl		
	Tissue (fresh)***	25mg		
	Broncheolar lavage (BAL)	200µl		

4. Clinical Information and testing

Toxoplasmosis is caused by the protozoan parasite *Toxoplasma gondii* and can present in different patient groups with a range of clinical symptoms. Provision of 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.

4.1 Primary acquired infection (Immunocompetent)

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 that many infected people are asymptomatic.

Samples required:

- Clotted blood/serum for serology

4.2 Infection in pregnancy

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

Samples required:

- Clotted blood/serum for serology. Current specimen and, if available, sera from earlier in the pregnancy (i.e. booking or prenatal bloods) are required.
- Amniotic fluid for PCR, if appropriate.
- Testing at delivery will be directed by the STRL as required (see samples required for congenital infection below).

4.3 Congenital infection

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. Additionally, babies born from mothers infected during pregnancy will be tested.

Samples required:

- Clotted blood/ serum from both mother and baby at the time of delivery should be sent for parallel testing by IgG and IgM Western blot. Unique 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.
- Clotted blood/serum from seropositive neonates should be taken for serology at regular intervals to monitor for infection/declining maternal antibodies.
- CSF for PCR from seropositive neonates (CNS involvement).
- Placenta tissue for PCR, if appropriate
- Tissues from a stillbirth can be tested by PCR. A maternal clotted blood sample is useful in these cases, even the antenatal sample.

4.4 Ocular disease

Ocular toxoplasmosis presents usually as retinochoroiditis and less commonly as panuveitis, papillitis producing optic atrophy and conjunctivitis. It can result from primary acquired infection or 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.

Samples required:

- Clotted blood/serum for serology
- Aqueous/vitreous fluid for PCR (both congenital and acquired disease), if appropriate.

4.5 Infection in immunocompromised patients

4.5.1 Reactivation

Immunocompromised patients (HIV, malignancy, solid organ and bone marrow transplants, patients on corticosteroids, anti-cancer therapy and treatment for connective tissue disease) can be at risk of reactivated toxoplasma infection if known to be seropositive. 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 and regularly monitor post transplant by both PCR and serology.

4.5.2 Primary

Patients in this group may be susceptible to a primary acquired infection obtained via the usual routes of transmission. However, those most at risk from acquiring primary infection are seronegative transplant recipients receiving an organ from a seropositive donor, particularly heart & lungs or liver, usually within 1 to 2 months of transplantation. Serology pre transplant is required so that mis-matches may be avoided. Symptoms are similar to primary acquired infection plus encephalitis, pneumonia, chorioretinitis or multi-organ failure.

Samples required:

- Clotted blood/serum for serology
    - Baseline: Newly diagnosed HIV, pre immunosuppressive therapy, pre solid organ transplant (donor and recipient) and pre stem cell transplant.
    - All symptomatic patients
- EDTA whole blood for PCR (particularly for monitoring of seropositive haemopoietic stem cell transplant patients) in addition to serology.
- CSF for PCR (CNS involvement)
- BAL for PCR (respiratory involvement)

5. Specimen and request form labelling

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).

Specimens may be submitted either using the STRL request form (see Section 8.) or a referring laboratory's own request form. However both the request form 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)

[1]Or accepted coded identifier (e.g. soundex code, NaSH number)
[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 information

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

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. Specimen transportation

- Samples must be appropriately packaged and transported in accordance with current regulations.
- If unsure of the current regulations please contact STRL for advice.
- Please ensure that packages contain sufficient absorbent material to contain all liquid.
- Please ensure request forms are placed between the plastic container and cardboard outer and not with the sample inside the plastic container.
- Samples should be sent to the laboratory via Royal Mail or DX courier to the address shown in section 2.1.
- 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. 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. Results

Results are emailed 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. STRL request form

- A copy is available on the **NHS Highland website**.

10. References

- **NHS Highland website**
- **NHS Highland intranet (available to NHS Highland only)**
- **UpToDate factsheet – Toxoplasmosis: Acute systemic disease**

11. Algorithm for referral of serum samples to STRL

*Laboratories that screen may choose not to 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.