

Paediatric User Handbook

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2. Introduction

Dear Colleagues,

In this handbook you will find basic information concerning the Immunology department, including location and telephone numbers. Details of commonly requested tests and other services are given, together with the turnaround time for some tests. Please contact laboratory on 01709 424250 if any further information or guidance on unusual tests is required.

Although laboratory turnaround times are shown, experience has indicated that unexpected delays can occur with either instrument failure and/or in the transmission of results.

Further information that is applicable for all pathology disciplines can be found on the website below. Including, instructions for patient collected samples, consent, personal information protection and the laboratory's complaints procedure
<http://www.therotherhamft.nhs.uk/Pathology/Pathology/>

3. Laboratory Opening Times

Normal Service: Monday - Friday 09.00 hrs – 17.00 hrs

On call services in Biochemistry, Haematology / Blood Bank and Microbiology outside these hours but there is **no** out of hours services in Immunology.

4. Location of the Laboratory

The Laboratory is situated on 'A' level (top floor). Following the signs for Pathology, at the T junction near the central lifts, go down the corridor opposite the lifts and the Pathology department is first on the left double wooden doors. Pathology Reception is straight ahead.

5. Laboratory Advice/General Enquiries

Immunology Manager/Immunology Senior:

Direct Line: 01709 424250
Internal: 4250

Extensions can be obtained via the Hospital Switchboard 01709 820000.

For urgent requests: 01709 424250 (internal 4250)

6. Clinical Advice/Interpretation

Dr Shrimpton currently works on Mondays, Wednesdays and Fridays. Dr Shrimpton is at Rotherham Immunology laboratory one Monday per month (usually the third or fourth Monday of the month) and is in the office at NGH on the other Mondays.

a. For Urgent Advice

- If urgent advice is required on Monday when Dr Shrimpton is not in Rotherham, ring Dr. Shrimpton at the Northern General Hospital on 0114 2715727.
- If urgent advice is required on a Wednesday or a Friday, contact Dr. Shrimpton's secretary on 0114 2269020 or email anna.shrimpton@sth.nhs.uk
- On Tuesdays or Thursdays or if Dr Shrimpton not available, contact Graeme Wild or Kirsty Swallow (clinical scientists at STH) on 0114 2715394

b. For Non-Urgent Advice

Email anna.shrimpton@sth.nhs.uk or contact the Laboratory on x4250.

7. Request for Immunology Analyses

Samples for Mediatech and ICE requests should be received in the appropriate green bags and general request forms must be accompanied by the appropriate samples. Remove the brown self-adhesive tape to reveal the glued area, and then fold along the perforations so the glued area attaches to the plastic and securely seals the specimen bag. Remove the second brown self-adhesive tape and attach the specimen bag to the top section of the request form.

a. How Much Blood is Needed?

The yield of plasma/serum from whole blood can vary greatly and will be affected by haematocrit etc. The whole blood requirements listed below are therefore estimates of minimum volumes required. In general SERUM tubes should be used. As more plasma than serum can be harvested from whole blood however, for neonates plasma (lithium heparin tubes) may be used instead. Please note, however, that **for some assays it is not possible to use plasma samples**. Please check the following list for sample requirements before venepuncture. Please always send a separate bottle for Immunology tests as samples are no longer shared with Biochemistry.

For neonates and small children the recommended tubes are Sarsted Microtubes. For older children or if larger volumes of blood are required the monovette sarstedt tubes may be useful. Unless the sample taken is of sufficient quantity to perform all assays requested, in house assays will be performed first and any remaining serum/plasma will subsequently be sent for assays performed elsewhere.

Sarsted Microtubes (hold approximately 1.3 mL blood).

SERUM is obtained from the PLAIN/CLEAR cap tube

PLASMA is obtained from the ORANGE cap tube (which contains lithium heparin as anticoagulant).

Sarstedt Monovette Tubes (hold approximately 5 mL blood).

SERUM is obtained from the BROWN cap tube

PLASMA is obtained from the ORANGE cap tube (which contains lithium heparin as anticoagulant).

8. Specimen Handling

Manual request forms must have clear legible labelling on the form and specimens for Mediatech, ICE and manual requests must be legible.

A fully completed request form must include:-

- Patient's full name
- Date of birth
- Rotherham Hospital number and / or NHS No
- Ward
- Initials of the patient's Consultant

Patient Details on Samples must include:-

- Patient's full name, DOB plus either Rotherham hospital No or NHS number.
- Date and time sample taken

Current laboratory criteria for accepting/rejecting samples are that all forms and samples should have a minimum of the full name (forename and surname), DOB and either the patient hospital or NHS number. A&E only can either use a hospital or A&E number. Additionally, all forms require the requesting Clinician and requesting location. Samples will be rejected if they fall outside of this minimum criteria.

Ensure the lid of all specimen bottles is secured before the bottle is placed into the plastic pockets. All specimen bottles must be placed in the correct plastic pocket. Samples for Mediatech and ICE requests should be received in the appropriate green bags and general request forms must be accompanied by the appropriate samples. Remove the brown self-adhesive tape to reveal the glued area, and then fold along the perforations so the glued area attaches to the plastic and securely seals the specimen bag. Remove the second brown self-adhesive tape and attach the specimen bag to the top section of the ICE order comms (may be hand written or order comms) request form.

Hard copies of all reports issued by the laboratory include the relevant age and sex related reference ranges.

9. Transportation of Specimens to the Laboratory

GP samples are usually transported using Courier Logistics (a private provider). Hospital samples are delivered either via the air tube system or by hand to the Laboratory Specimen Reception Department.

10. Specimen Reception

All samples arrive at the laboratory via the centralised specimen reception area. The specimen reception area also deals with initial result enquiries for all departments with the exception of Histopathology and Cytology. Specimen Reception contact numbers are as follows:

Results enquiries 01709 427553 (internal 7553)

Any queries regarding Specimen Reception should be directed to the Specimen Reception Manager on any of the above numbers.

11. Additional Tests

Separated blood samples are retained in a refrigerated or frozen state. If additional tests are required to be added to samples already in the department then this may be arranged. Any additional requests must be made within 5 days of the sample being taken using either the 'Biochemistry Additional Requesting Form' available on inSite or a Pathology Request Form. ALL patient/ clinician details must be included as detailed above.

If additional tests are required after 5 days please telephone the department with any such requests. Some tests may be affected by a delay in analysis after the sample is taken from the patient, laboratory staff may be able provide the additional testing subject to test stability and storage.

12. Turnaround Times

These are based on the average expected turnaround time from receipt of sample to time of report. We aim to get 90% of results available in this stated time but there may be exceptions with samples processed over extended bank holiday periods and tests performed at specialist referral laboratories.

It is important to note that results are often available on ICE before the times quoted and in addition any urgent results that may affect the clinical management of the patient are telephoned by Biomedical Scientific staff as soon as available.

Should reporting the result from a sample be significantly delayed and thus compromise patient care, for example through equipment failure, supply problems or contamination issues, the user will be contacted, informed of the reasons and advised of a proposed date for resolution of the problem. An internal incident/internal investigation by CAPA and Datix reporting will be performed if appropriate.

13. Measurement of Uncertainty

The laboratory makes regular estimates of measurement uncertainty for all analytes. Please contact the laboratory if further information is required.

14. Referred Work

The department holds a list of test repertoire and accreditation status of all laboratories to which work is routinely referred. This list is available on request. Referral work is primarily sent to NGH:

Immunology Department
Northern General Hospital
Herries Road
Sheffield S5 7AU
Tel: 0114 271 5552

As part of the South Yorkshire and Bassetlaw Transformation project, some routine Immunology testing has now been transferred to NGH (as of March 2024). This includes the following tests:

- Anti-nuclear antibody testing
- Liver kidney stomach tissue multiblock
- ANCA testing

- Tissue transglutaminase and associated confirmatory testing for coeliac disease*
- ENA screen and ENAT typings
- DNA and DNA by crithidia
- Intrinsic Factor Ab
- Gliadin antibodies
- Glomerular basement membrane Ab

***TTG Analysis**

A serological test for coeliac disease is only accurate if a gluten-containing diet has been followed for at least 6 weeks prior to the test.

A gluten-containing diet = some gluten consumed in more than one meal every day.

Ref: [Coeliac disease: recognition, assessment and management](#) (2015) NICE guideline NG20

Cryoglobulin Analysis

As of December 2024, full analysis of cryoglobulin screens has now also been transferred to Immunology at NGH, however samples are still handled by the Immunology department at TRFT.

Please note the special requirements for this test:

Sample type: 5 ml Serum brown top plus 4ml EDTA (Serum and Plasma).

Samples need to be collected and kept at 37°C until separation. Collect at 37°C and take to laboratory as soon as possible in thermos flask, which is available from the lab. Contact the lab to arrange. OPD and GP patients taken at RDGH phlebotomy preferably.

For information on turnaround times, sample requirements and factors known to significantly impact the performance of the examination or interpretation of results for these tests or any that are not listed in the table below, please visit the PRU website: <https://pru-sheffield.org.uk/>

Complement Components

Please send the following tests to the lab immediately after venesection (in <60 minutes):

- Classical Pathway Haemolytic Complement Assay / CH50
- Alternative Pathway Haemolytic Complement / AP50
- Other complement components (excluding C3 and C4)

Special note on mast cell tryptase if suspected anaphylaxis:

Take a sample as soon as possible after emergency treatment has started and another 1-2 hours after symptoms start (no later than 4 hours). These need to be compared to a baseline level that can be taken 24 hours later or at clinic follow up visit if the patient has been discharged. If mastocytosis baseline level check, no restrictions on timing of sample. TAT 2 weeks.

Please ensure time and date of sample are on both form and sample with some indication of time elapsed post anaphylactic event if possible.

The following table lists tests performed at Immunology Department, STH, which are available to request. For information on turnaround times, sample requirements and factors known to significantly impact the performance of the examination or interpretation of results for these tests, please visit the PRU website: <https://pru-sheffield.org.uk/>. For any other Immunology tests that are required, and which do not appear in this table but are available on the PRU website, please contact

the laboratory (Immunology Department, TRFT on ex.4250) beforehand to discuss. Please ensure this is done prior to bloods being taken.

Tests Performed at Immunology Department, NGH
Acetylcholine Receptor Antibodies, AchR, ACR
Acid Glycoprotein (Orosomucoid) / AGP
Adalimumab Antibodies, Anti Drug Antibodies, ADA
Adalimumab Drug Level, Trough Adalimumab, Humira, Anti TNF Alpha
Adrenal Antibodies (see endocrine autoantibodies)
AFP Allotype – Lectin Binding Index, Fucosylation Index, Yolk Sac AFP
ALEX Allergy Chip (Allergy Explorer)
Allergen Specific IgG Bee/Wasp Venom
Alpha 1 Antitrypsin PCR Genotype (Anti-Trypsin)
Alpha 1 Antitrypsin Phenotype, PI Typing (Anti-Trypsin)
Alpha 1 Microglobulin, Alpha - 1MG, Protein HC
Alpha 2 Macroglobulin, Alpha-2MG
Alternative Pathway Haemolytic Complement / AP50
Amyloid A Protein, SAA
ANCA, IIF Screen Anti-Neutrophil Cytoplasmic Antibodies
Anti-Nuclear Antibody (ANA HEP2), ANF.
Apolipoprotein A-I and B
Autoimmune Encephalitis Screen (NMDAR, CASPR2, LGI1, AMPAR1/2, DPPX and GABA Receptor Antibodies)
Basal Ganglia Antibodies
Beta 2 Glycoprotein 1 Antibodies IgG and IgM. B2GP.
Beta 2 Interferon Neutralising Antibody
Beta 2 Microglobulin. B2M Urine and Serum.
C1 Esterase Inhibitor (Quantitation and Functional Level)
C1Q
C1Q Antibodies
C2
C3 Nephritic Factor, C3NEF
C3d Levels, C3 Breakdown Product
C4 Genotype
C5–C9 (C5, C6, C7, C8, C9), Membrane Attack Complex (MAC)
Candida Precipitins
Carbohydrate Deficient Transferrin, CDT.
Cardiac Muscle Antibodies
Cardiolipin Antibodies, ACA IgG and IgM
Cerebellum (Purkinje) Cell Antibody IIF Screen (Hu, Ri, Yo, Tr, CV2, Ma/Ta), Neuronal Antibody.
Cholinesterase Phenotype
Classical Pathway Haemolytic Complement Assay / CH50
Complement - Factor H/Factor I
Cryoglobulin
CSF Tau Protein (Beta 2 Transferrin) for Rhinorrhoea

CYFRA 21-1
Diphtheria Antibodies, Functional Antibodies
DNA Antibodies, Double-Stranded IgG Crithidia Assay
DNA Antibodies, Double-Stranded, IgG dsDNA
ECP, Eosinophil Cationic Protein
ENA Antibodies Screen
Endocrine Antibodies (Adrenal, Ovarian, Testes)
Endomysial Antibodies (IgA)
Endothelial Cell Antibodies
Factor B
Free Light Chains (Serum)
Ganglioside Antibodies GD1a, GD1b, GT1b (IgG or IgM)
Ganglioside Antibodies GM1 IgG or IgM
Ganglioside Antibodies GQ1b IgG or IgM
Gastric Parietal Cell Antibody (see autoantibodies - Liver)
Gliadin Antibodies (IgG and IgA)
Glomerular Basement Membrane Antibodies, GBM Screen
Glutamic Acid Decarboxylase Antibodies (GAD, GAD65)
Glycine Receptor Antibodies
Haemopexin
Haemophilus Influenzae B (HiB Antibodies, Functional Antibodies).
HEP 2 Antigen Blot (SS-A, SS-B, Sm, RNP, SCL-70, JO-1, PM-SCL, CENT B, CENT C, AMA-M2, RIB-P, RO52).
High Sensitivity CRP, Ultrasensitive CRP
Histone Antibodies
HLA B27
IA2 Antibodies, Anti Tyrosine Phosphatase Antibodies.
IgA Tissue Transglutaminase 6 Antibodies (TTG6, TG6)
IgG Subclasses
IgG Tissue Transglutaminase 6 Antibodies (TTG6, TG6)
Immunoglobulin D, IgD
Infliximab Antibodies, Anti-Drug Antibodies, ADA
Infliximab Drug Level, Trough Infliximab, Anti-TNF Alpha
Insulin Antibodies IgG
Interleukin 6, IL-6
Intrinsic Factor Antibody. IFA.
ISAC (Immuno Solid-Phase Allergen Chip)
Islet Cell Antibody, ICA
LGI1 and CASPR2 Antibodies (Limbic Encephalitis screen), (Leucine-rich glioma-inactivated protein 1, Contactin-associated protein 2)
Liver and Gastric Parietal Cell Antibodies, LKS Substrate (ANA, AMA, SMA, LKM, GPC)
Liver Blot (AMA-M2, M2-E3, Sp100, PML Ag, gp210, LKM-1, LC-1,SLA/LP, RO52)
Mannose Binding Lectin, MBL, MBP
Mitochondrial Antibody, PBC Screen, AMA.
Muscle Specific Kinase Antibodies
Myelin Associated Glycoprotein Antibodies (Anti-MAG)

Myelin Oligodendrocyte Glycoprotein Antibodies (MOG Antibodies)
Myelin Sheath / Myelin Associated Glycoprotein by IIF
Myeloperoxidase (MPO) Antibodies
Myositis Screen (Mi-2alpha, Mi-2beta, TIF1-gamma, MDA5, NXP2, SAE1, Ku, PM-Scl100, PM-Scl75, Jo-1, SRP, PL-7, PL-12, EJ, OJ, Ro-52)
Neuronal Blot (Amphiphysin, CV2.1, PNMA2 [Ma2/Ta], RI, YO, HU)
N-Methyl-D-Aspartate Receptor Antibodies / NMDAR
NSE (Neurone Specific Enolase), Gamma-Enolase
Oligoclonal Bands, CSF IgG Oligoclonal Bands and IgG/Alb Ratio.
Ovarian Antibodies
Pemphigoid and Pemphigus Antibodies. Skin Antibodies.
Phospholipase A2 Antibody, PLA2R, Antiphospholipase A2 Antibody, MPLA2R.
Pneumococcal Antibodies (Functional Antibodies)
Pneumococcal Serotypes
Precipitins, Avian (Budgie, Pigeon)
Precipitins, Farmers Lung/ Micropolysporum faenii/Laceyella sacchari
Procollagen Type III Peptide, P3NP
Proteinase 3 (PR3) Antibodies
Retinol Binding Protein
RNA Polymerase III Antibodies (RNA Polymerase 3)
Salivary Duct Antibody and Salivary Gland Antibody
Skeletal Muscle Antibodies
Skin Antibodies: BP180, BP230, Desmoglein 1 (DSG1) and Desmoglein 3 (DSG3)
Soluble CD25, Soluble Interleukin 2 Receptor (sCD25, sTL2R).
Split Skin Antibodies
Systemic Sclerosis blot (Antibodies to: Scl-70, CENP-A, CENP-B, RPII, RP155, Fibrillarin (U3 RNP), NOR90, Th/To, PM-Scl75, Ku, PDGFR (platelet derived growth factor receptor), Ro52).
Tetanus Antibodies (Functional Antibodies).
Thrombospondin Type-1 Domain Containing 7A (THSD7A).
Thyroglobulin
Thyroglobulin Antibodies
Thyroid Receptor Antibodies (TSH Receptor Antibodies), TRAb.
Tissue Transglutaminase Antibody (IgG and IgA), TTG
Transthyretin, Pre Albumin
Tryptase, Serum or Plasma
Urine Gluten Immunogenic Peptides
Voltage-Gated Calcium Channel Antibodies
Voltage-Gated Potassium Channel Antibodies - This test has now been superseded by the LGI1 and CASPR2 tests.
ZnT8 Antibodies

All referred work sent to Immunology Department, NGH, with the exception of the following:

Immunodeficiency vaccine response testing:

Manchester Medical microbiology partnership
Manchester Royal Infirmary
Central Manchester hospitals trust
Oxford Road
Manchester
M139WL
Tel: 0161 276 6757

Specialised Neurology Testing:

Immunology Department
Churchill Hospital
Old Road
Headington
Oxford
OX3 7LJ
Tel: 01865 225995

15. Immunology Tests Performed In-House

If no age specific reference range is quoted, it is presumed to be the same as the adult range.

Age related reference ranges are quoted on all reports.

Analyte	Reference Ranges (and source)	Estimated whole blood volume required	Turnaround Times/Comments	Patient preparation Factors affecting test &/or interpretation of results Clinical decision values Special precautions
A1AT (Alpha 1 antitrypsin)*	Birth 0.9 – 2.2 g/L To 6 months 0.8 - 1.8 g/L To 1 year 1.1 – 2.0 g/L To 5 years 1.1 – 2.2 g/L To 10 years 1.4 – 2.3 g/L To 15 years 1.2 – 2.0 g/L Adult 1.1 – 2.1 g/L PRU (Protein Reference Units) Handbook of Clinical Immunochemistry, Ninth Edition 2007	250 µL for quantitation, 500 µL if phenotyping also required	2 days plus further 3 weeks for phenotype	
B2M (Beta 2 microglobulin)*	Serum 1.2 – 2.4 mg/L PRU (Protein Reference Units) Handbook of Clinical Immunochemistry, Ninth Edition 2007	250 µL	1 week	

Analyte	Reference Ranges (and source)	Estimated whole blood volume required	Turnaround Times/Comments	Patient preparation Factors affecting test &/or interpretation of results Clinical decision values Special precautions
Ceruloplasmin*	0.20 – 0.60 g/L PRU (Protein Reference Units) Handbook of Clinical Immunochemistry, Ninth Edition 2007	250 µL	2 days	
Complement C3, C4 levels*	C3 0.75-1.65 g/L C4 0.14-0.54 g/L PRU (Protein Reference Units) Handbook of Clinical Immunochemistry, Ninth Edition 2007	250 µL	2 days	

Analyte	Reference Ranges (and source)		Estimated whole blood volume required	Turnaround Times/Comments	Patient preparation Factors affecting test &/or interpretation of results Clinical decision values Special precautions
Immunoglobulins (IgG, A, M)*	IgG	Ref Range g/L	300 µL Note serum only (Fibrinogen band appears on electrophoresis otherwise)	1 Day	
	< 2 weeks	5.0 – 17.0			
	2 to 6 weeks	3.9 – 13.0			
	6 to 12 weeks	2.1 – 7.7			
	3 to 6 months	2.4 – 8.8			
	6 to 9 months	3.0 – 9.0			
	9 to 12 months	3.0 – 10.9			
	1 to 2 years	3.1 – 13.8			
	2 to 3 years	3.7 – 15.8			
	3 to 6 years	4.9 – 16.1			
	6 to 15 years	5.4 – 16.1			
	over 15	6.0 – 16.0			
	IgA				
	< 2 weeks	0.01 – 0.08			
	2 to 6 weeks	0.02 – 0.15			
	6 to 12 weeks	0.05 – 0.4			
	3 to 6 months	0.10 – 0.5			
	6 to 9 months	0.15 – 0.7			
	9 to 12 months	0.20 – 0.7			
	1 to 2 years	0.30 – 1.2			
	2 to 3 years	0.30 – 1.3			
	3 to 6 years	0.40 – 2.0			
	6 to 9 years	0.50 – 2.4			
	9 to 12 years	0.70 – 2.5			
	12 to 15 years	0.80 – 2.8			
	15 to 45 years	0.80 – 2.8			
	> 45 years	0.80 – 4.0			

Analyte	Reference Ranges (and source)	Estimated whole blood volume required	Turnaround Times/Comments	Patient preparation Factors affecting test &/or interpretation of results Clinical decision values Special precautions
	IgM < 2 weeks 0.05 – 0.2 2 to 6 weeks 0.08 – 0.4 6 to 12 weeks 0.15 – 0.7 3 to 6 months 0.20 – 1.0 6 to 9 months 0.40 – 1.6 9 to 12 months 0.60 – 2.1 1 to 2 years 0.50 – 2.2 2 to 3 years 0.50 – 2.2 3 to 6 years 0.50 – 2.0 6 to 9 years 0.50 – 1.8 9 to 12 years 0.50 – 1.8 12 to 15 years 0.50 – 1.9 15 to 45 years 0.50 – 1.9 > 45 years 0.50 – 2.0 PRU (Protein Reference Units) Handbook of Clinical Immunochemistry, Ninth Edition 2007	300 µL Note serum only (Fibrinogen band appears on electrophoresis otherwise)	3 days	

Analyte	Reference Ranges (and source)	Estimated whole blood volume required	Turnaround Times/Comments	Patient preparation Factors affecting test &/or interpretation of results Clinical decision values Special precautions
IgG Aspergillus precipitins	< 25 mg/L Page <i>et al</i> (2018) "Receiver operating characteristic curve analysis of four Aspergillus-specific IgG assays for the diagnosis of chronic pulmonary aspergillosis". Diagnostic Microbiology and Infectious Disease.	500 µL	1 weeks	
Total and Specific IgE Specify all allergens required	Total IgE Newborn <5 kU/L 3 months <11 kU/L 1 year <29 kU/L 5 years <52 kU/L 10 years <63 kU/L 15 years <75 kU/L Adult <81 kU/L Specific IgE <0.35 kAU/L PRU (Protein Reference Units) Handbook of Clinical Immunochemistry, Ninth Edition 2007	100 µL per allergen requested (plus 200µl for instrument dead volume).	1 week	When requesting ask for total IgE and make a note on the form of all allergens required. If small volume sample specify allergens required in order of importance.

*Tests performed in Biochemistry Department