



CLINICAL GENETIC SERVICE

Laboratory User Guides

December 2009

(Website version)



**DEPARTMENT OF HEALTH
GOVERNMENT OF HONG KONG SAR**

The Clinical Genetic Service of the Department of Health in Hong Kong is a government-funded, tertiary referral centre that provides clinical, laboratory, counseling services related to genetic disorders. The function of the Genetic Laboratory is to back up Genetic Counseling Clinic within this Service. Presently the Laboratory accepts specimens only via the Genetic Counseling Clinic of the Clinical Genetic Service.

Specimen Submission Information

1. Clinical Specimens

Cytogenetic testing: 3 ml **heparin** blood
1 to 2 ml more for additional FISH study

Molecular testing: 3 ml **EDTA** blood

Patients need be identified positively and not be fasted. The container of specimen shall be labeled with patient's name (in capital letters) and the ID number (2 unique identifiers).

Each specimen must be accompanied with a requisition form. Please fill patient name again in capital letters and the ID number on the requisition form, which **SHALL** also include the followings:

- Date of birth and sex
- Date of specimen taken
- Date of request
- Type of specimen
- Name and signature of physician requesting test
- Name and institution of referring doctor
- Type of test requested
- Pedigree (if needed)

Remarks:

Clotted blood is not acceptable because of a high chance of culture failure

2. Delivering Specimens

After blood taken, specimen should be delivered with a manner safe to the carrier

- **on the same day of blood taking (before 5 PM) or store at 4°C if unable to deliver at the same day;**
- **in a plastic bag separately with the Requisition Form;**
- **at room temperature to**

2/F, Laboratory, Cheung Sha Wan Jockey Club Clinic
2 Kwong Lee Road, Sham Shui Po
Kowloon, Hong Kong
Tel: 2708 7112 (attention: Mr. Lai)

For operational need, it is advice to take blood and send on Monday or Tuesday or Friday for cytogenetic testing. For DEB fragility testing, it is advice to take blood and send on Monday or Tuesday with the control sample. Where possible, the control should be appropriately matched with the test sample, such as sex, age, cigarette smoking and undercurrent illness.

Further re-arrangement is necessary for the blood taken and delivery during or before public holidays.

3. Turnaround Time (TAT)

For routine service cases: Cytogenetic testing: 30 calendar days
FISH: 2 months
Molecular testing: 3 months

For urgent cases: Cytogenetic testing: 8 calendar days
Molecular testing: 7 calendar days for prenatal (mutation(s) must has been identified)
14 calendar days for mutational screening testing (amplicons < 10)
28 calendar days for Southern based testing

4. Enquire Telephone : 2725 3773

5. Website: <http://www.cgs.dh.gov.hk>

Cytogenetic Service

A. Conventional Cytogenetic Investigations for Blood

TAT: 30 calendar days

1. G banding
2. DEB fragility study
3. C staining

B. Molecular Cytogenetics (FISH) Investigations

TAT: 2 months

Microdeletion Diseases Detected by FISH Probes for Specific Chromosome Locations

4. Wolf-Hirschhorn syndrome	4p16.3
5. Cri du Chat syndrome	5p15.2-15.3
6. Williams syndrome	7q11.23
7. Prader Willi syndrome	15q11-13
8. Angelman syndrome	15q11-13
9. DiGeorge syndrome	22q11.2
10. Miller Dieker syndrome	17p13.3
11. Smith Magenis syndrome	17p11.2
12. Steroid sulphatase deficiency	Xp22.3
13. Kallmann syndrome	Xp22.3
14. Retinoblastoma (Rb)	13q14

Multiple Congenital Anomalies / Mental Retardation and Marker Chromosomes

15. α Satellite probes for autosomes	1 to 22
16. α Satellite probes for sex chromosomes	X and Y
17. Whole chromosome painting probes for autosomes	1 to 22
18. Whole chromosome painting probes for sex chromosomes	X and Y

Telomere Studies

19. Telomeric region probes for 22 autosomes	1 to 22
20. Telomeric region probes for sex chromosomes	X and Y

Molecular Diagnostic Service

TAT: 3 months

Diseases/Syndromes	Gene Involved	Investigation
1. Charcot-Marrie-Tooth, 1A	<i>PMP22</i>	Gene duplication
2. Fragile X syndrome (PCR) Fragile X syndrome (Southern)	<i>FMRI</i>	CGG expansion
3. Friedreich ataxia	<i>FXN</i>	GAA expansion
4. Huntington's disease	<i>HTT</i>	CAG expansion
5. Spinocerebellar ataxias panel:		
SCA1	<i>ATXN1</i>	CAG expansion
SCA2	<i>ATXN2</i>	CAG expansion
SCA3	<i>ATXN3</i>	CAG expansion
SCA6	<i>CACNA1A</i>	CAG expansion
SCA7	<i>ATXN7</i>	CAG expansion
SCA8	<i>SCA8</i>	CTG expansion
SCA12	<i>PPP2R2B</i>	CAG expansion
Dentatorubral-pallidoluysian atrophy	<i>DRPLA</i>	CAG expansion
6. Duchenne muscular dystrophy	<i>DMD</i>	Exon(s) deletion/ duplication
7. Myotonic dystrophy (PCR) Myotonic dystrophy (Southern)	<i>DMPK</i>	CTG expansion
8. Spinal muscular atrophy	<i>SMN1</i>	Exon deletion
9. Prader Willi syndrome	PWS critical region at Chromosome 15	Methylation status at this region
Angelman syndrome	AS critical region at Chromosome 15	Methylation status at this region
10. Mitochondrial disorder panel	<i>Mitochondrion</i>	Point mutation
MELAS (m.3243A>G)		
MERRF (m.8344A>G)		
NARP (m.8993 T>G)		
LHON (m.3460G>A m.11778G>A m.14484T>C)		

Molecular Investigation Studies

TAT: 4 to 6 months.

Diseases/Syndromes	Gene Involved	Investigation
1. Chromosomal Abnormalities		
Subtelomeric deletion/duplication	Telomeres	Deletion / duplication
MR related microdeletion syndromes	multiple loci causing MR syndromes	Deletion
Trisomies	chr 13, 18, 21	Trisomy 13, 18, 21
2. Craniosynostotic Syndromes		
Antley-Bixler syndrome	<i>POR</i>	Point mutation
Crouzon Syndrome	<i>FGFR2</i>	Point mutation
Apert syndrome	<i>FGFR2</i>	Point mutation
Pfeiffer syndrome	<i>FGFR2</i>	Point mutation
Saethre-Chotzen syndrome	<i>Twist</i>	Deletion
3. Eye Diseases		
Cone -Rod dystrophy	<i>CRX</i>	Point mutation
Corneal dystrophy (lattice type)	<i>BIGH3</i>	Point mutation
4. Hearing Loss		
Non-syndromic deafness	<i>GJB2</i>	Point mutation
Non-syndromic deafness	mtDNA 1555A/G	Point mutation
Waardenburg syndrome type 1	<i>PAX3</i>	Point mutation / deletion
5. Hematology		
α -Thalassemia	<i>HBA</i>	SEA/R/L deletion point mutation
Hemophilia A	<i>Factor VIII</i>	Linkage analysis* Introns 1 & 22 inversion
6. Inborn Errors of Metabolism		
Pyruvate dehydrogenase deficiency	<i>PDHA1</i>	Point mutation
Wilson disease	<i>ATP7B</i>	Point mutation
Mowat-Wilson syndrome	<i>ZFX1B</i>	Point mutation

Diseases/Syndromes	Gene Involved	Investigation
7. Neurology		
Charcot-Marrie-Tooth, 1B	<i>MPZ</i>	Point mutation
Charcot-Marrie-Tooth, X-linked, 1	<i>GJB1</i>	Point mutation
Congenital central hypoventilation syndrome	<i>CCHS</i>	Point mutation / polyalanine expansion
Fragile X syndrome, type E	<i>FMR2</i>	GCC expansion
Pelizaeus Merzbacher disease	<i>PLP</i>	Gene duplication
Pelizaeus-Merzbacher-like disease	<i>GJA12</i>	Point mutation
Spastic paraplegia 2, X-linked	<i>PLP</i>	Point mutation
Dystonia, type 1	<i>DYT1</i>	GAG deletion
8. Neuro-muscular Diseases		
Duchenne muscular dystrophy	<i>DMD</i>	Linkage analysis*
Kennedy's disease	<i>Androgen receptor</i>	CAG expansion
Oculopharyngeal muscular dystrophy	<i>PABP2</i>	GCG insertion
9. Renal Diseases		
Alport syndrome	<i>COL4A5</i>	Linkage analysis*
Polycystic kidney disease, adult	<i>PKD & PKD2</i>	Linkage analysis*
Polycystic kidney disease, AR type	<i>ARPKD</i>	Linkage analysis*
10. Dermatologic Disorder		
Incontinentia pigmenti	<i>NEMO</i>	Exons deletion / point mutation
11. Skeletal Dysplasia		
Achondroplasia	<i>FGFR3</i>	Point mutation
Hypochondroplasia	<i>FGFR3</i>	Point mutation
Thanatophoric Dysplasia	<i>FGFR3</i>	Point mutation
Metaphyseal chondrodysplasia (McKusick type)	<i>RMRP</i>	Point mutation
Epiphyseal dysplasia, multiple, 4	<i>DTDST</i>	Point mutation
Achondrogenesis, type Ib	<i>DTDST</i>	Point mutation
Diatrophic dysplasia	<i>DTDST</i>	Point mutation
Hypophosphatemic ricket, X-linked	<i>PHEX</i>	Point mutation
Hypophosphatemic ricket, AD type	<i>FGF23</i>	Point mutation
Leri-Weill syndrome	<i>SHOX</i>	Deletion / point mutation
Pseudoachondroplasia	<i>COMP</i>	GAC expansion
Pseudohypoparathyroidism / Albright hereditary osteodystrophy	<i>GNAS1</i>	Point mutation
Brachydactyly type B	<i>ROR2</i>	Point mutation

Diseases/Syndromes	Gene Involved	Investigation
12. Sex Disorder Sex determination	<i>SRY</i>	Deletion / point mutation
13. Syndromes/ Dysmorphology Angelman syndrome	AS critical region Chromosome 15 <i>UBE3A</i>	Microdeletion / UPD Point mutation
Blepharophimosis-Ptosis-Epicanthus- Inversus syndrome (BPES)	<i>FOXL2</i>	Point mutation / deletion
Costello syndrome	<i>HRAS</i>	Point mutation
Noonan syndrome	<i>PTPN11</i>	Point mutation
Prader Willi syndrome	PWS critical region Chromosome 15	Microdeletion / UPD
Rett syndrome	<i>MECP2</i>	Point mutation / deletion
Sotos syndrome	<i>NSD1</i>	Point mutation / deletion
LOWE syndrome	<i>OCRL1</i>	Point mutation
14. Miscellaneous X-inactivation pattern	<i>Androgen receptor</i>	Abnormal X-inactivation

* Sufficient numbers of family member, especially the index patient must present before the start of a linkage analysis, judged by the Clinical Molecular Geneticist.

In addition, several mutational screenings are provided upon request. TAT is variable.

Diseases/Syndromes	Gene Involved	Investigation
1. Connective Tissue Disorder Marfan syndrome	<i>Fibrillin</i>	Point mutation / deletion
2. Inborn Errors of Metabolism Gaucher disease Glutaric aciduria type 1 Citrullinemia disease type 2	<i>GCB</i> <i>GCDH</i> <i>SLC25A13</i>	Point mutation Point mutation Point mutation
3. Neuro-cutaneous Syndrome Neurofibromatosis type 1	<i>NF1</i>	Point mutation / deletion
4. Neuro-muscular Diseases Duchenne muscular dystrophy	<i>DMD</i>	Point mutation
5. Renal Diseases Senior-Loken syndrome 5	<i>IQCBI</i>	Point mutation
6. Skeletal Dysplasia Conradi-Humermann syndrome Spondylocostal dysostosis (Jarcho-Levin syndrome)	<i>EBP</i> <i>DLL3</i>	Point mutation Point mutation
7. Syndromes/ Dysmorphology Greig syndrome Smith-Megenis syndrome Triple A syndrome	<i>GLI 3</i> <i>RAI1</i> <i>GL003</i>	Point mutation Point mutation Point mutation

End of the Document

Next version will be available in July 2010