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Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS	<u>Molecular genetic examinations for the purpose of clinical diagnosis</u>	In-house documented methods incorporating manufacturer's instructions where relevant
Whole blood Amniotic Fluid CVS Wax-embedded tissue Bone marrow DNA RNA Tissue Mouthwash/saliva Buccal scrape Guthrie bloodspots	Molecular Genetics: for Detection of common and rare genetic conditions.	Sample preparation and DNA and RNA extraction Documented methods for DNA and RNA extraction using one or a combination of the techniques below by in-house procedures, using commercial kits and manual extraction. SOP 0058 – wax embedded tissue extraction (Qiacube) SOP 059 – manual extraction of prenatal samples (CVS and amniotic fluid) SOP 032077 - IGENatal DNA extraction for prenatal array SOP 0443 (Chemagen) – whole blood SOP 061 (EZ1) – whole blood, tissue and bone marrow SOP 060 – manual extraction of tissue, mouthbrush and buccal scrapes SOPS 031970, 0011 and 0302088 - RNA extraction and processing SOP0384 Guthrie bloodspots (Qiacube) SOP 0018 DNA Extraction Hub-DNA Measurement NANODROP

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	<u>Molecular genetic examinations for the purpose of clinical diagnosis</u> (cont'd)	In-house documented methods incorporating manufacturer's instructions where relevant
Genomic DNA extracted in-house from the sample types listed below or received as primary sample type from an external source Whole blood Wax-embedded tissue DNA Mouthwash/Saliva Bone marrow Tissue (fresh)	Molecular Genetics: for Detection of common and rare genetic conditions. For two distinct applications: (i) screening for unknown mutations in multi-gene panels including but not limited to, breast cancer, Marfan syndrome and Neurofibromatosis. (ii) genotyping of specific mutations and genomic regions for both constitutional and acquired conditions, including but not limited to genes *HFE* and *JAK2*	(i) Next-generation sequencing using Illumina Nextera technology and analysed on an Illumina MiSeq. Screening for unknown mutations in multi-gene panels (SOPs 032107 and 032100); analysis of NGS data using in-house validated bioinformatics pipeline (SOP 032576) followed by either Cartagenia BENCH (SOP 032492) or in-house excel macro (SOP032107) (ii)Genotyping of specific mutations and genomic intervals (SOPs 032031 and 032101) using Reverse Complement RPCR (RC-PCR) and analysed using in-house bioinformatics pipeline (SOP 032576)
RNA or genomic DNA extracted in-house from the sample types listed below or received as primary sample type from an external source Whole blood Amniotic Fluid CVS Wax-embedded tissue Bone marrow Tissue Mouthwash Buccal scrape	Molecular Genetics: Detection of abnormal sequences for common and rare genetic conditions For confirmation of mutations identified as part of whole gene screens or identified in a non-accredited laboratory, screens for unknown mutations in part or all of a gene and family follow-up of specific mutations.	Sanger sequencing using ABI 3130XL sequencing reagents (SOPs 0012, 0344, 0456, 031652) analysed using ABI 3130XL (SOP 0481) and Mutation Surveyor software.

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	<u>Molecular genetic examinations for the purpose of clinical diagnosis</u> (cont'd)	In-house documented methods incorporating manufacturer's instructions where relevant
Genomic DNA extracted in-house from the sample types listed below or received as primary sample type from an external source Whole blood Amniotic Fluid CVS Wax-embedded tissue Bone marrow Tissue Mouthwash Buccal scrape	Molecular Genetics: Detection of common and rare genetic conditions For the detection of repeat disorders including, but not limited to, Fragile X, Myotonic dystrophy, OPMD, Huntington's disease. Microsatellite marker analysis to include, but not limited to: microsatellite instability in Lynch syndrome, UPD, linkage analysis. RP-PCR analysis including but not limited to Huntington disease, c9orf72, myotonic dystrophy Sizing analysis including but not limited to FLT3 internal tandem duplication	Fragment size analysis using fluorescent PCR amplification (SOP0008) and analysed using ABI 3130XL (SOP 0481) and Gene Marker software (SOP 031683) Non-fluorescent PCR products analysed by agarose gel electrophoresis (SOP 0169).
Genomic DNA extracted in-house from the sample types listed below or received as primary sample type from an external source Whole blood Amniotic Fluid CVS Tissue Mouthwash Buccal scrape	Molecular Genetics: Detection of whole exon deletions/duplications and specific microdeletions for common and rare genetic conditions. Detection of whole exon deletions/duplications and specific microdeletion syndromes	Multiplex Ligation Probe Analysis (MLPA) for the detection of whole exon deletions/duplications and specific microdeletion syndromes (SOP031686). MLPA is used either as a stand-alone test or as part of a whole gene screen, and for index cases and family follow up.

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular genetic examinations for the purpose of clinical diagnosis (cont'd)	In-house documented methods incorporating manufacturer's instructions where relevant
Genomic DNA extracted in-house from the sample types listed below or received as primary sample type from an external source Whole blood Amniotic Fluid CVS	Molecular Genetics: Detection of repeat expansions too large to be amplified by PCR for Fragile X and Myotonic dystrophy type 1 (DM1).	Southern blot hybridization analysis using labelled probes. Southern blotting of restriction enzyme-digested genomic DNA followed by hybridization using labelled probes for the detection of repeat expansions too large to be amplified by PCR (SOP0001).
Whole blood Amniotic Fluid CVS Guthrie bloodspots	Molecular Genetics: Detection of abnormal sequences for common and rare genetic conditions. Detection of 50 specific mutations in the *CFTR* gene for the diagnosis and carrier testing of cystic fibrosis and the screening of four common mutations from neonatal bloodspots	Fluorescent ARMS (Amplification Refractory Mutation System) allele-specific amplification technology Using the Elucigene CF-50 (CF-EU2v1) kit (SOP0007) and SOP 0384 for screening from neonatal bloodspots
Genomic DNA extracted in-house from the sample types listed below or received as primary sample type from an external source Whole blood Amniotic Fluid CVS Tissue Mouthwash/saliva Buccal scrape	Molecular Genetics: Analysis of imprinting disorders for common and rare genetic conditions. Disorders include, but are not limited to, Prader-Willi and Angelman syndromes, Russell-Silver syndrome, and Beckwith-Wiedemann syndrome.	MS-PCR and MS-MLPA using ABI 3130XL (SOP 0481) and Gene Marker software (SOP 031683). Prader-Willi and Angelman syndromes - SOP 0241; Russell-Silver syndrome -SOP 265; Beckwith-Wiedemann syndrome - SOP 247.
RNA extracted in-house from the sample types listed below or Genomic RNA or cDNA received as primary sample type from an external source Whole blood RNA cDNA	Molecular Genetics: Assessment of the impact of previously - reported sequence variants on splicing	RNA analysis using reverse transcription for detection of abnormal sequences for common and rare genetic conditions. RNA analysis using cDNA (SOP 032088) and specific oligonucleotide primers (SOP 031721). Analysis using Sanger sequencing and/or gel electrophoresis sizing.

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular genetic examinations for the purpose of clinical diagnosis (cont'd)	In-house documented methods incorporating manufacturer's instructions where relevant
RNA and genomic DNA extracted in-house from the sample types listed below or received as primary sample type from an external source Whole blood Amniotic Fluid CVS DNA tissue	Determination of the X inactivation pattern in females to aid the interpretation of X-linked copy number variants or single nucleotide variants or where X-linked inheritance is suspected.	Using enzyme digestion and fragment sizing on an ABI 3130XL analyser (SOP 0267).
Whole blood, Amniotic Fluid and CVS DNA	Fragment size analysis	using the Amplidex FMR1 PCR kit (SOP 0044) and analysed using ABI 3130XL and GeneMarker software
Whole blood and Bone marrow DNA	Digital droplet PCR	using the BioRad QX200 Droplet Digital PCR System for the qualitative detection of the KIT D816V mutation
Whole blood and Bone marrow DNA	Illumina TruSight Myeloid Panel	sequenced on an Illumina MiSeq for the detections of mutations in myeloid disorders, analysed using the Alissa Interpret (Agilent) NGS Software

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	<u>Cytogenetics examinations for the purpose of clinical diagnosis</u>	In-house documented methods incorporating manufacturer's instructions where relevant
Whole blood Amniotic Fluid CVS Solid tissues Products of conception Skin Bone marrow Solid tumours	Detection of chromosome rearrangements in comparison with considered normal pattern (ISCN). Detection of chromosome abnormalities associated with: Prenatal diagnosis Reproductive disorders Developmental disorders Haemato-oncology disorders - including but not limited to AML, ALL, CML, CLL, MPNs, MDS Confirmation of genomic rearrangements detected using alternative technologies	Conventional Karyotyping Examination of G-banded metaphase chromosomes. Cell culture by in-house procedures using commercial media and reagents. Standard cell harvesting and slide making procedure; Giemsa/Wright's chromosome staining Setting up samples- SOPs: amniocentesis (amnio), 032094, Chorionic villus sampling (CVS) 032095, solid tissues 031875, 031878, oncology 0363, blood 0167. Cell harvesting by in-house methods -SOPs manual harvesting: oncology 0369, blood 0064, SOP perinatal samples using Multiprep Robotic Harvester SOP 0398 Chromosome preparation SOPs: perinatals 0037, oncology 0370, bloods, 0114, FISH 0023. Chromosome banding SOPs: Bloods and perinatal 0038, oncology 0371 Automated cell scan, capture and analysis - Cytovision GLS 120 automated karyotyper SOP 018, Cytovision 061, oncology 0372, analysis guidelines 032102.

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Cytogenetics examinations for the purpose of clinical diagnosis (cont'd)	In-house documented methods incorporating manufacturer's instructions where relevant
Whole Blood Amniotic Fluid CVS Solid tissues Products of conception Bone marrow Solid tumours Buccal smears Paraffin embedded tissue External cell suspensions	Detection and analysis of genomic rearrangements and imbalances. Confirmation of genomic rearrangements detected using alternative technologies. Family follow-up studies Detection of acquired chromosome rearrangements from patients with haemato-oncology disorders, including but not limited to LPD, MM, NHL (BL, DLBCL)	Fluorescence in-situ hybridisation (FISH) by microscopy. FISH in-house and commercial probe kits for constitutional and acquired abnormalities using Thermobrite Statspin hybridisation station. SOPs: probe prep 0206, BRADY TLS 2200 Thermal labelling system 0200, constitutional FISH protocol 031960, oncology FISH protocol 0373. Automated cell scan/ capture / analysis Cytovision GLS 120 SOP 032123, scanner 031962, manual capture/analysis for haematological samples- photomic fluorescence microscope 0373
Bacterial (Plasmid, Cosmid and BAC/PAC) DNA Clones	Detection of cytogenetic abnormalities for testing listed	Preparation of in-house FISH probes from the 30K clone set. Procedures for growing and labelling BAC Clones for FISH probes Methodology, - Bacterial Cell Culture, DNA Cloning, Probe Labelling. WRGL SOP 031959 FISH Constitutional –Growing up of Bacterial (Plasmid, Cosmid and BAC/PAC) Clones WRGL SOP 0445 FISH Constitutional –Quick Method for Rapid Alkaline Lysis Mini Prep Protocol for Extraction of BAC, Cosmid and PAC DNAs WRGL SOP 0200 FISH Constitutional –Digoxigenation and Biotinylation of Nucleic Acids, using the Sanger Centre Nick Translation Protocol FISH constitutional – Probe preparation of in-house Cosmids/Plasmids etc SOP 0206

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Cytogenetics examinations for the purpose of clinical diagnosis (cont'd)	In-house documented methods incorporating manufacturer's instructions where relevant
Blood Amniotic Fluid CVS Solid tissues Products of conception Tissue External DNA	Detection and analysis of genomic imbalances against a reference in patients for a number of disorders in a range of clinical settings, including but not limited to neurodevelopmental problems or multiple congenital abnormalities and confirmation of genomic imbalances detected using other technologies	Array comparative genomic hybridisation (array-CGH) Examination of the whole genome for gain or loss of genetic material in comparison with normal pooled control DNA. IGENatal DNA Extraction for prenatal array SOP 032077 EZ1 DNA extraction for tissue array SOP 031668 Chemagen DNA extraction for whole blood SOP 0443 Nanodrop spectrophotometer SOPs 031670, 074 Preparation and processing of 8x60K microarray PCR run plate 031672, prep of individual slides SOPs 032231, 032232, 03223, 032233 Operation procedure for the Biotray Ozone-free hood SOP 032473 Agilient DNA microarray scanner 031673, Array analysis OGT Cytosure software analysis 03, 035
Blood CVS Amniotic Fluid Products of conception Solid tissues	Clinical Cytogenetics: Detection of aneuploidy, maternal cell contamination and confirmation of genetic sex.	QF-PCR. Amplification of microsatellite markers using quantitative fluorescent PCR (Thermal cycler) and fragment analysis using ABI 3130XL SOPs: DNA extraction and QF-PCR set up/ABI set up 031677/89 Setting up QSTAR kit 031678, QF-PCR analysis 031682

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HUMAN TISSUES AND FLUIDS (cont'd)	Cytogenetics examinations for the purpose of clinical diagnosis (cont'd)	In-house documented methods incorporating manufacturer's instructions where relevant
Bone marrow Leukaemic blood pellets RNA cDNA	Detection of cryptic chromosome rearrangements in acute leukaemia	Molecular leukaemic analysis of fusions transcripts. RNA extraction from bone marrow/blood pellets - SOP032088. Generation of cDNA by RT-PCR followed by PCR amplification with specific primers for 29 common fusion transcripts in acute leukaemia and analysis of various breakpoints resulting from BCR-ABL1 fusions (Hemavision kits; SOP 0053). PCR products analysed by agarose gel electrophoresis (SOP 0169). Mutation screen of the BCR-ABL1 kinase domain by Sanger sequencing following PCR amplification of cDNA (SOP 0392).
Bone marrow	CD138 cell separation for Multiple Myeloma	Magnetic separation using the EasySep TM Human CD 138 Positive Selection Kit 11 and EasySep TM Magnet (SOP 031731 Oncology-Culture Hub-Myeloma Plasma Cell Purification)
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