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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	Molecular Genetics Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Fresh, frozen or fixed human tissue or cells		Manual and automated DNA extraction and quantification using: DNA SOP 2005-0159, 2006-0083, 2011 38, 2011 40, 2011 62, 2015 330, 2017 440 CYTO SOP 376, 460, 456 And Tecan Evo-HSM Robot, Promega Maxwell RSC, Grade 2 extraction cabinet, Nanodrop, Glomax Multi+ Fluorometer
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of specific mutations for: • Rare confirmation / investigation of specific mutations • Mitochondrial DNA analysis, e.g. m.8993T>C/G	Non-fluorescent PCR amplification followed by Restriction enzyme digest and electrophoresis using: DNA SOP 2011 49, 2006-0107, 2005-0064, 2005-0090, 2006-0002, And Biomek NX-S8 G-Storm and Dyad PCR Machines
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of large-scale deletions (mitochondrial DNA) Rare confirmation / investigation of specific mutations Sex determination	Non-fluorescent PCR amplification followed by agarose gel electrophoresis using: DNA SOP 2011 49, 2005-0062, 2005-0090, 2006-0002, 2005-0184, 2005-0154 and G-Storm and Dyad PCR Machines Gel tanks and power packs

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular Genetics (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of expansions including triplet repeats or microsatellite marker analysis Fragment size analysis in the investigation of • HD • ALS • FMR1 • SBMA • DM • GREM1 • CFTR gene Microsatellite marker analysis for: • sex determination • zygosity • linked markers • Ascertainment of Uni-parental Disomy (UPD) • Microsatellite Instability (MSI) • RAPID prenatal aneuploidy test • Quantitation of mitochondrial DNA copy number	Fluorescent PCR amplification (including real-time PCR, Triplet primed PCR, Devyser and ARMS) using fluorescently tagged primers prior to detection and/or sizing of the PCR product using commercially available kits or in-house designed assays using: DNA SOP 2008 4, 2008 14 2006-0051, 2005-0079, 2005-0081, 2005-0082, 2005-0121, 2005-0129, 2005-0184, 2006-0013, 2006-0014, 2006-0027, 2006-0043, 2010 34, 2012 126, 2005-0090, 2006-0002, 2005-0154, 2010 34, 2014 225 CYTO SOP 376, and G-storm and Dyad PCR machines ABI 3730 & ABI 7500 with analysis using Gene Mapper
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Mitochondrial DNA analysis, e.g. m.3243A>G	Fluorescent PCR amplification followed by Restriction enzyme digest using fluorescently tagged primers prior to detection and/or sizing of the PCR product. DNA SOP 2011 49, 2006-0002, G-storm and Dyad PCR machines ABI 3730 with analysis using Gene Mapper

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular Genetics (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of large gene re-arrangements and large triplet repeat expansions: • FMR1 • Mitochondrial DNA re-arrangements • ALS/FTD • DM	Southern blot using: DNA SOP 2005-0121, 2005-0079 2006-0002, 2014 225 (ALS/FTD) and G-Storm and Dyad PCR machines Gel tanks, Hybridisation ovens Shakers Gel Doc Developer
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection and quantification of specific variants • Mitochondrial disorders (POLG, LHON) • other specific mitochondrial mutations • BRAF analysis • HCM –associated mito variant, m.4300	Pyrosequencing using: DNA SOP 2009 26, 2006-0002, 2005-0101, 2010 34 and Qiagen PyroMark ID System
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Whole gene screen analysis for genetic variants causing diseases and disorders, family testing (including prenatal and predictive testing), and confirmation of variants detected by alternative methods: Analysis of: • Familial cardiomyopathy • Lynch syndrome • BRCA1 / BRCA2 • Familial Arrhythmias	Sanger sequencing using: DNA SOP 2009 23, 2005-0156, 2012 140 and Robots: Biomek NX-S8 and Biomek NX-MC(96) ABI 3730 with analysis using 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)	Molecular Genetics (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Endocrine disorders, including endocrine tumour predisposition Hyperparathyroidism Hypoparathroidism Disorders of calcium metabolism • Familial Cancers • Craniosynostosis • Pheochromocytoma/paragangli oma • Skeletal dysplasia • Congenital Myasthenic syndrome • Disorders of the retina • Inherited Ataxias • Mitochondrial disorders • Disorders of mitochondrial maintenance and repair	Sanger sequencing (cont'd)

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular Genetics (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Gene screening of gene panels for genetic variants causing diseases and disorders including: • Familial Cardiomyopathy • Inherited eye conditions • Ataxia • Joubert & Ciliopathies • Familial arrhythmia • Familial cancers • Mitochondrial • Painful channelopathies • Epilepsy • Familial Hypercholesterolaemia • Non-malignant haematology	Next generation sequencing with target enrichment using TWIST Biosciences generated probes. DNA SOP 2014-227, 2019-603. Veriti PCR Machines, GloMax®-Multi+' Fluorometer, Agilent 2200 Tape Station Illumina NGS Platforms (either in house or located within the Wellcome Trust Centre for Human Genetics. Analysis Analysis of DNA sequence data generated either internally or externally using in-house validated bioinformatics pipeline DNA SOP 2016-402, 2019-602, 2019-604, 2019-605, 2019-606, 2020-620, 2020-621, 2020-622, 2020-628, 2020, 629. 2020-630.
DNA sequence data	Diseases and disorders listed for Next generation sequencing above	Analysis of DNA sequence data generated externally by Next generation sequencing using in-house validated bioinformatics pipeline as above

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular Genetics (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Whole mitochondrial DNA screening (includes all 37 mtDNA genes) for genetic variants causing mitochondrial disease	Next generation sequencing DNA SOP 2006-0002, 2014 227, 2015 327, 2017 421, 2019 593 and 2019 592. Dyad PCR Machines Glomax Multi+ Fluorometer Illumina MiSeq Agilent 2200 Tape Station with library preparation using Illumina NexteraXT Analysis Using in-house validated bioinformatics pipeline
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	BRCA1/BRCA2 analysis	Next generation sequencing using SOPHiA Genetics capture based target enrichment methodology, custom panel (based on Hereditary Cancer solutions kit methodology; DNA SOP 2018 460, DNA SOP 2015 316, DNA SOP 2014 227 Veriti (Applied Biosystems) PCR Machines 'GloMax®-Multi+' Fluorometer Illumina MiSeq Agilent 2200 Tape Station Analysis Using the Sophia Genetics bioinformatics DDM pipeline using: DNA SOP 2018 528, DNA SOP 2015 327.

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular Genetics (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of whole or partial gene deletions and duplications and probe specific mutations of the following genes/disease areas: • DMD/BMD • SMA • Familial Breast/Ovarian cancer • LQT syndrome • Lynch syndrome • Hereditary cancer predisposition • MEN1 • AIP • Hereditary paraganglioma/ pheochromocytoma • VHL • APC • TP53 • PTEN • Juvenile polyposis • Hereditary Cardiomyopathy including arrhythmias • Recessive ataxia • Hyperparathyroidism/multiple endocrine neoplasia	Multiplex Ligation-dependant Probe Amplification (MLPA) using: DNA SOP 2011 50 (MLPA) DNA SOP 2012 128 (MS-MLPA) DNA SOP 2013 204 (Coffalyser) and G-storm and Dyad PCR machines ABI 3730 with analysis using coffalyser software

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	Molecular Genetics (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of whole or partial gene deletions and duplications and probe specific mutations of the following genes/disease areas: (cont'd) • Melanoma • Craniosynostosis • Skeletal disorders • Other FGFR related conditions • Mitochondrial related disorders • Joubert	Multiplex Ligation-dependant Probe Amplification (MLPA) (cont'd)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of whole or partial gene deletions and duplications, and to determine methylation status of the following genes/disease areas: • Mismatch repair • CDKN2A • PWS/AS • RSS-BWS	Methylation specific –MLPA (MS-MLPA) using procedures and equipment as for MLPA
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of whole or partial gene deletions and duplications and probe specific mutations. Analysis of the following genes/disease areas: • Hypoparathyroidism (GATA3/GCM2)	Custom design MLPA using a kit template supplied by MRC-Holland and procedures as for MLPA

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUES AND FLUIDS (cont'd)	<u>Molecular Genetics</u> (cont'd) Detection of genetic mutations and sequence variants for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of whole or partial gene deletions and duplications and probe specific mutations. Analysis of the following genes/disease areas: • Hyperparathyroidism Jaw tumour (CDC73) • Cardiomyopathy (ACTN2, DCM) • Rapsin / Dok • Skeletal disorders • POLR1C/POLR1D/TCOF • Inherited eye conditions • Myasthenia	<u>Custom design MLPA</u> (cont'd)

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUE AND FLUIDS (cont'd)	Cytogenetics	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Fresh tissues/cells	Cytogenetic analysis for the purpose of clinical diagnosis	Culturing and processing of human tissues/cells to provide metaphase cells using: CYTO SOP 67, 84,111, 178, 185, 216, 271, 277, 278, 288
Fresh tissues/cells		Direct preparation (without culture) to provide interphase cells using: CYTO SOP 84, 111, 132, 271, 288, 419
Fresh frozen or paraffin embedded tissue (FFPE)		Processing to provide material suitable for Fluorescence in situ hybridisation (FISH) using: CYTO SOP 85, 352 and Hotplate, Fume Hood and Hybrite/Thermobrite
Fixed tissues/cells	Detection of chromosome abnormalities associated with: Prenatal diagnosis Reproductive disorders Developmental disorders Haemato-oncology disorders	Fluorescence in situ hybridisation (FISH) using: CYTO SOP 340 and UV light box, microfuge and Hybrite/Thermobrite.
Fixed tissues/cells	Detection of chromosome abnormalities associated with: Prenatal diagnosis Reproductive disorders Developmental disorders Haemato-oncology disorders	FISH analysis by use of fluorescently tagged probes and fluorescence microscopy to detect copy number and spatial location of specific regions of the genome using: CYTO SOP 353, 364, 410, 414, 438 Cytogenetics 407, 408, 409, 418 and Cytovision Image Capture System

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
HUMAN TISSUE AND FLUIDS (cont'd)	Cytogenetics (cont'd) Cytogenetic analysis for the purpose of clinical diagnosis (cont'd)	Documented in-house methods incorporating manufacturer's instructions (where relevant)
Fixed cells	Detection of chromosome abnormalities associated with: Prenatal diagnosis Reproductive disorders Developmental disorders Haemato-oncology disorders Chromosome breakage disorders	Chromosome analysis by light microscopy screening of the whole genome for copy number changes (e.g. deletions or duplications) and structural chromosome rearrangements (e.g. translocations) using: CYTO SOP 414, 419
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of chromosome abnormalities associated with: Prenatal diagnosis Reproductive disorders Developmental disorders	Manual and automated DNA extraction and quantification using methods and equipment described for Molecular Genetics, followed by: Array Comparative Genomic Hybridisation (aCGH) processing by competitive hybridisation of patient and control DNA using: CYTO SOP 452, 454, 456, and Nanodrop machine/Plate spinner/hot plate/mini spinner/PCR machine Scanning computer Hybridisation oven AGILENT Scanner and AGILENT Plate processing
Genomic DNA extracted in-house from the sample types listed above or received as primary sample type from external source	Detection of chromosome abnormalities associated with: Prenatal diagnosis Reproductive disorders Developmental disorders	aCGH screening of the whole genome for copy number changes (e.g. deletions or duplications) using: CYTO SOP 429 and Analytical computers, software and hard drive+analytical license Data processing, analysis and interpretation
END		