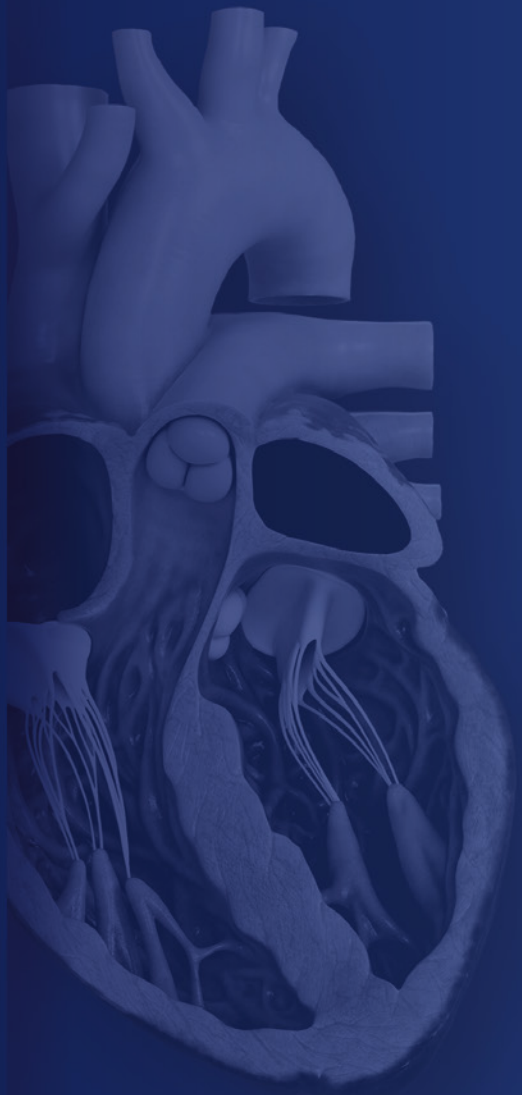
RANDOX
BIOSCIENCES

CARDIOVASCULAR & METABOLIC



Research
Molecular
Life Sciences
Pharma

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Overview

Randox Biosciences is part of Randox Laboratories; a global IVD company dedicated to improving laboratory based testing with over 35 years' experience in biomarker assay development.

Randox Biosciences provides an extensive range of molecular and immunoassay based solutions. Our long history in IVD development has resulted in the production of assays to highest quality standards. In addition to an extensive off-the-shelf menu, we provide tailored assay solutions to meet the individual needs of our research and clinical customers.

We offer a comprehensive range of testing technologies and assay solutions to make cardiovascular and metabolic-focused research more efficient, cost effective and accurate.

Central to our biomarker testing solutions, Randox's award winning Biochip Array Technology (BAT) is a first-in-class multiplex platform with applications for protein and nucleic acid target detection. In addition, our wide range of 'Rx Series' clinical chemistry analysers, coupled with the broadest chemistry reagent portfolio in the market, position Randox Biosciences to exceed your immunoassay, biochemistry and molecular assay needs.

Randox manufacture the majority of assay raw materials in-house and can therefore take a more tailored approach, by adapting assays to the detection needs of your research project. Therefore, whether your studies focus on early biomarker identification, late stage clinical trial testing and anything in between, Randox Biosciences can provide you with a full range of biochip arrays, biomarker assays and analysers that will best fit your individual requirements.

Randox Biosciences is your trusted partner for supply and support of market leading assay solutions to the research, clinical, life science, pharmaceutical and biopharma industries.

BIOCHIP ARRAY TECHNOLOGY

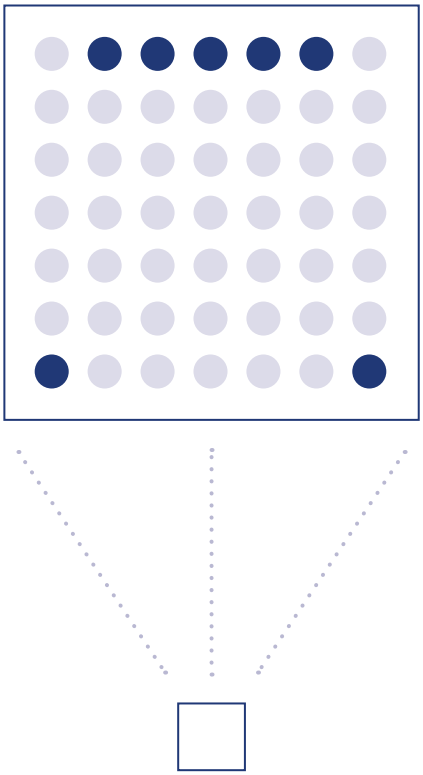
One Biochip, Multiple Results

Biochip Array Technology is a multi-analyte testing platform allowing the simultaneous detection of a wide-range of analytes from a single sample. It provides a unique platform for assessment of biological samples in a rapid, accurate and easy to use format.

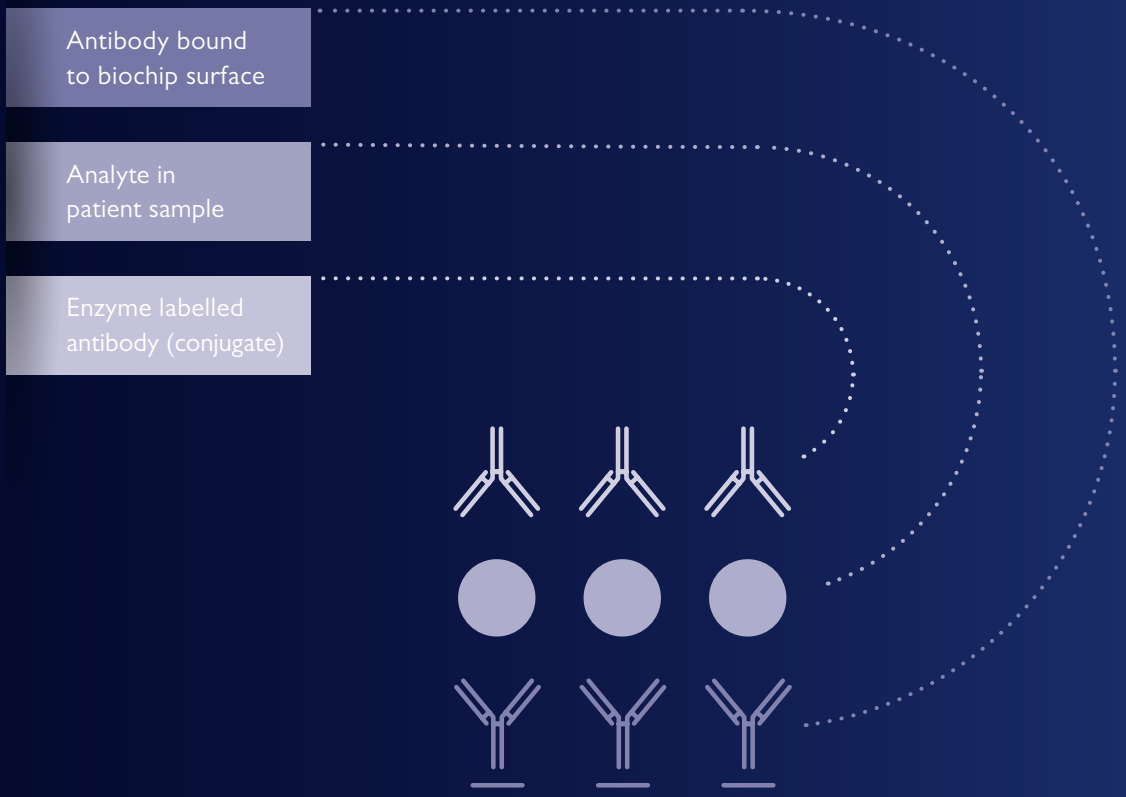
A chemically functionalised 9x9mm ceramic biochip acts as the solid phase reaction surface, replacing multiple traditional ELISA plate wells.

Biochips are pre-fabricated with an array of Discrete Test Regions (DTRs); a different antibody/oligonucleotide is immobilised at each spatially distinct DTR.

Up to 49 individual DTRs can be arrayed onto a single biochip. One single biochip is used per sample to produce multiple results simultaneously.



Sandwich Immunoassay



ASSAY FORMATS

Sandwich immunoassay

In a sandwich assay (illustrated above), the more analyte present in a sample, the more conjugate will bind to form a 'sandwich' complex. Therefore, sample concentration is directly proportional to the concentration of each particular analyte in that sample.

Competitive immunoassay

In a competitive assay, the more analyte present in a sample, the less labelled conjugate that will bind to the immunoreaction site.

Therefore, sample concentration is indirectly proportional to the concentration of each particular analyte in that sample.

Detection

The biochip detection is based on a chemiluminescent signal. This is the emission of light, without heat, as a result of a chemical reaction. An enzyme is used to catalyse the chemical reaction on the biochip which generates the chemiluminescent signal. The light emitted from the chemiluminescent reaction that takes place in each DTR is simultaneously detected and quantified using a CCD camera.

This CCD camera simultaneously records the light emission from all the discrete test sites on each biochip on the biochip carrier.

KEY BENEFITS

Quality Results

Intra-assay and Inter-assay CV's typically less than 10%

Assays standardised to reference material where appropriate

Excellent sensitivity, sub-pg/mL in many instances

Assays validated to a clinical diagnostic standard

Minimal batch variation, ideal for longitudinal research studies

No Hidden Costs

Full analyser package includes biochip imaging module, PC and imaging software, thermoshaker, biochip carrier handling tray and barcode scanner

Protein arrays: all inclusive kits including reagents, biochips, buffer and multi-analyte calibrators

Reduced Sample Volume

Analyse a complete profile of biomarkers from as little as 25µl of sample

Ideal when conservation of sample is critical

Consolidation

Consolidation of immunoassay and molecular diagnostics onto a single platform

The Evidence Investigator Running Procedure

EVIDENCE INVESTIGATOR

Versatile, efficient & comprehensive testing

The Evidence Investigator Package

The bench-top, semi-automated Evidence Investigator offers complete patient profiling whilst boasting the most comprehensive test menu on the market. The Evidence Investigator consolidates immunoassay and molecular diagnostics on a single platform with protein and DNA biochips. A full reagent package is available with no hidden costs or extra consumables needed.

- Thermoshaker
- Computer
- Barcode Scanner
- Handling Tray

Dimensions	75 (H) x 48 (D) x 42 (W) cm
Weight	24kg, 52.9lbs
Throughput	Up to 2376 test per hour

EVIDENCE INVESTIGATOR
Reagents Package

Each Evidence Investigator reagent kit comes complete with all materials required to perform the analysis. To enhance the quality of your research, complementary tri-level controls are available for all protein arrays.

For further information contact: info@randoxbiosciences.com

6 Biochip Carriers
(54 Biochips in Total)

9 Level Multi-analyte
Calibrators

Pre-configured & Labelled
Secondary Conjugate Solution

Assay
Diluent

Chemiluminescent
Signal Reagent

Concentrated
Wash Buffer

MULTIPLEX PROTEIN ARRAYS

Adhesion Molecule	Inv	Evo
E-Selectin	●	●
Intercellular Adhesion Molecule-1	●	●
L-Selectin	●	●
P-Selectin	●	●
Vascular Cell Adhesion Molecule-1	●	●

Alzheimer's	Inv	Evo
Apolipoprotein E4	●	●
Pan Apolipoprotein E	●	●

Cardiac	Inv	Evo
Cardiac Troponin-I	●	●
Creatine Kinase MB	●	●
Heart-Type Fatty Acid Binding Protein	●	●
Myoglobin	●	●

Cerebral Array I	Inv	Evo
Brain-Derived Neurotrophic Factor	●	
Glial Fibrillary Acidic Protein	●	
Heart-Type Fatty Acid Binding Protein	●	
Interleukin-6	●	

Cerebral Array II	Inv	Evo
C-Reactive Protein	●	
D - Dimer	●	
Neuron Specific Enolase	●	
Soluble Tumour Necrosis Factor Receptor I	●	
Neutrophil Gelatinase Associated Lipocalin	●	

Chronic Kidney Disease I	Inv	Evo
Fatty Acid Binding Protein-1	●	●
Soluble Tumour Necrosis Factor Receptor-1	●	●

Chronic Kidney Disease I (cont.)	Inv	Evo
Soluble Tumour Necrosis Factor Receptor 2	●	●
Macrophage Inflammatory Protein-1a	●	●
Interleukin-8	●	
Epidermal Growth Factor	●	
D-DIMER	●	

Chronic Kidney Disease II	Inv	Evo
Adiponectin		●
Complement C3a des Arginine	●	●
C-Reactive Protein	●	●
Neutrophil Gelatinase Associated Lipocalin	●	●
Cystatin C	●	●

Cytokine Array I	Inv	Evo
Interleukin-1 α	●	●
Interleukin-1 β	●	●
Interleukin-2	●	●
Interleukin-4	●	●
Interleukin-6	●	●
Interleukin-8	●	●
Interleukin-10	●	●
Vascular Endothelial Growth Factor	●	●
Epidermal Growth Factor	●	●
Tumour Necrosis Factor-α	●	●
Interferon-γ	●	●
Monocyte Chemotactic Protein-1	●	●

Cytokine Array III	Inv	Evo
Interleukin-5	●	
Interleukin-15	●	
Granulocyte Macrophage Colony Stimulating Factor	●	
Macrophage Inflammatory Protein-1α	●	

Cytokine Array IV	Inv	Evo
Matrix Metalloproteinase 9	●	
Soluble IL-2 Receptor α	●	
Soluble IL-6 Receptor	●	
Soluble Tumour Necrosis Factor Receptor-1	●	
Soluble Tumour Necrosis Factor Receptor-2	●	

Cytokine Array V	Inv	Evo
Interleukin-3	●	
Interleukin-7	●	
Interleukin-13	●	
Interleukin-12p70	●	
Interleukin-23	●	

Gastro	Inv	Evo
Gastrin-17	●	●
Pepsinogen-I	●	●
Pepsinogen-II	●	●

Helicobacter Pylori	Inv	Evo
Helicobacter pylori	●	●

Metabolic Syndrome I	Inv	Evo
Adiponectin	●	●
Ferritin	●	●
Insulin	●	●
Leptin	●	●
Plasminogen Activator Inhibitor-1	●	●
Resistin	●	●
Interleukin-6	●	
Tumour Necrosis Factor-α	●	

Metabolic Syndrome II	Inv	Evo
Andiponectin	●	
C-Reactive Protein - CRP	●	
Cystatin C	●	

Stroke	Inv	Evo
D Dimer		●
Glial Fibrillary Acidic Protein		●
Glutathione S – Transferase Pi		●
Heart-Type Fatty Acidic Binding Protein		●
Interleukin-6		●
Nucleoside Diphosphate Kinase		●
Parkinson Protein 7		●
Soluble Tumour Necrosis Factor Receptor 1		●

Thyroid Auto Antibody	Inv	Evo
Anti-Thyroid Peroxidase		●
Anti-Thyroglobulin		●

Thyroid Free	Inv	Evo
Free Thyroxine	●	●
Free Tri-iodothyronine	●	●
Thyroid Stimulating Hormone	●	●

Thyroid TGB	Inv	Evo
Thyroxine Binding Globulin		●

Thyroid Total	Inv	Evo
Thyroid Stimulating Hormone		●
Total Tri-iodothyronine		●
Total Thyroxine		●

Key

● Evidence Investigator (Inv)

● Evidence Evolution (Evo)

TESTIMONIALS

Using biochip array technology

"Viapath have been using custom cytokine arrays on the Randox Evidence Investigator for a number of years due to the many requests we receive for bespoke biomarker panels. By creating a custom biochip array of commonly requested biomarkers, we are able to offer a cost effective solution to our clients over the traditional single-plex ELISA methods and we are able to maximise scientist time in the laboratory. A recent internal validation of our custom cytokine array kit showed excellent sensitivity, specificity and reproducibility, delivering consistently high quality assurance."

Tracey Mare, Clinical Research and Development Manager, Contract R&D Department, Viapath

"Using the Randox Evidence investigator with the METS arrays allowed me to analyse up to 10 different markers related to Cardiometabolic health in a very quick time period. With 60 samples to be analysed in duplicate, being able to test for multiple markers at once allowed data to be generated much quicker than with standard ELISA assays. The training provided by Randox was very thorough which made the process of using the equipment very straightforward."

Deaglan McCullough, PhD student, Faculty of Education, Health and Community, School of Sport Studies, Leisure and Nutrition, Liverpool John Moores University

"The Diabetes Exercise group at De Montfort University have several PhD projects looking at the effects of a combined resistance and cardio exercise program for volunteers who have type 1, type 2 diabetes as well as those at risk of diabetes. We have utilised the Evidence Investigator extensively for all of these projects using the metabolic arrays (MET 1 and 2) available. We have found this to be an invaluable tool in analysing blood samples to measure both acute and chronic changes in biomarkers such as IL6, insulin, TNF-alpha, adiponectin as well as several others. The technique is simple, cost effective and most importantly not time consuming especially when compared to conventional ELISA's and would recommend this product for similar research work."

Dr Tarsem Sahota, Post Doctoral Fellow, Faculty of Health and Life Sciences, Leicester School of Pharmacy, De Montfort University

CUSTOM ARRAYS

How the process works

With over 100 cardiovascular and metabolic markers available, Randox provides an extensive and diverse test menu. Should your needs exceed those provided by one of our standard arrays, or you are researching a particular set of analytes, we would encourage you to approach a Randox representative with your specific requirements. Randox's expertise, state-of-the-art manufacturing facilities and highly specialised scientists enable us to provide a product and service tailored to a specific R&D or clinical trial requirement.

Customised Biochip Array Planning

Randox will endeavour to work with you to ensure your needs are constantly met and provide a smooth process from the time of your first order until final delivery.

For further information contact: info@randoxbiosciences.com

Submission of custom array requirements (completion of Biochip Questionnaire Form)

R&D carry out feasibility assessment

If feasible, a quote will be forwarded to customer

Confirmation of order and biochip capabilities

BIOMARKERS FOR METABOLIC & CARDIOVASCULAR RESEARCH

Analyte	
70 kilodalton heat shock proteins	HSP70
A Disintegrin & Metalloproteinase with Thrombospondin Motifs 1	ADAMTS-1
Adiponectin	GBP-28
Adrenocorticotropic Hormone	ACTH
Adrenomedullin	ADM
Agouti	AgRP
Alpha-2 Macroglobulin	α-2M
Apolipoprotein A1	APOA1
Serum Amyloid A	SAA
Angiotensin II	
Atrial Natriuretic Peptide	ANP
Brain Natriuretic Peptide	BNP
Brain-Derived Neurotrophic Factor	BDNF
Carbonic Anhydrase III	Ca III
Cardiac Troponin I	cTnI
Chemokine (C-X-C motif) Ligand 16	CXCL16
Clusterin (Apolopoprotein J)	ApoJ
C-Peptide	CPEP
C-Reactive Protein	CRP
Creatine Kinase	CST3
Cystatin C	CKMB
D-Dimer	DD
Dickkopf related protein 1	DKK-1
Erythropoietin	EPO
E-selectin	ESEL
Fatty-Acid Binding Protein	FABP
Ferritin	FTN
Fibrinogen	Fib
Fribroblast Growth Factor 19	FGF-19
Fribroblast Growth Factor 21	FGF-21
Fribroblast Growth Factor 23	FGF-23

Analyte	
Follicle-stimulating hormone	FSH
Follistatin	FST
Gastric Inhibitory Polypeptide	GIP
Ghrelin	GHRL
Glial Fibrillary Acidic Protein	GFAP
Glucagon	GCG
Glucagon-like Peptide-1	GLP-1
Glycogen Phosphorylase Isoenzyme BB	GPBB
Growth Differentiation Factor 15	GDF-15
Haptoglobin	HP
Heat Shock Protein 70	HSP-70
Heme Oxygenase-1	HO-1
Hemopexin	HPX
Insulin	INS
Insulin Growth Factor 1	IGF1
Insulin Growth Factor 2	IGF2
Insulin-like Growth Factor 1	IGF-1
Insulin-like Growth Factor 1 Receptor	IGF1R
Insulin-like Growth Factor 2 Receptor	IGF2R
Insulin-like Growth Factor Binding Protein 2	IGFBP2
Insulin-like Growth Factor Binding Protein 3	IGFBP3
Intercellular Adhesion Molecule 1	ICAM-1
Interleukin 1 beta	IL-1β
Interleukin 10	IL-10
Interleukin 6	IL-6
Interleukin 8	IL-8
Leptin	LEPT
LIGHT	TNFSF14
Lipopolysaccharide Binding Protein	LBP
Lipoprotein-associated Phospholipase A2	Lp-PLA2
L-Selectin	LSEL
Luteinizing Hormone	LH

Analyte	
Matrix Metalloproteinase 1	MMP-1
Matrix Metalloproteinase 2	MMP-2
Matrix Metalloproteinase 3	MMP-3
Matrix Metalloproteinase 7	MMP-7
Matrix Metalloproteinase 8	MMP-8
Matrix Metalloproteinase 9	MMP-9
Matrix Metalloproteinase 13	MMP-13
Monocyte Chemotactic Protein-1	MCP-1
Myeloperoxidase	MPO
Myoglobin1	MYO
Nerve Growth Factor	NGF
Neuregulin 1	NRG-1
Neutrophil Gelatinase-Associated Lipocalin	NGAL
N-Terminal Pro b-Type Natriuretic Peptide	NT-proBNP
Orexin A	OA
Osteoactivin	
Osteocalcin	PGLAP
Osteopontin	OPN
Osteoprotegerin	TNFSF11B/OPG
Oxidised low-density-lipoproteins	ox-LDL
Pentraxin-Related Protein	PTX 3
Pepsinogen 1	PG1
Peptide YY (Tyrosine Tyrosine)	PYY
Placental Growth Factor	PGF
Plasminogen Activator Inhibitor-1	PAI-1
Pro Insulin	INS
Prolactin	PRL
Proprotein Convertase Subtilisin/Kexin Type 9	PCSK9
P-selectin	PSEL
Renin	REN
Resistin	ADSF
Retinol Binding Protein 4	RBP-4

Analyte	
S100A8/A9	
Sclerostin	SOST
Thrombomodulin	TM
Thyroid-stimulating hormone	TSH
Tissue Inhibitor of Metalloproteinase 1	TIMP-1
Tissue Inhibitor of Metalloproteinase 2	TIMP-2
Tissue Inhibitor of Metalloproteinase 3	TIMP-3
Tissue Inhibitor of Metalloproteinase 4	TIMP-4
Tumour Necrosis Factor alpha	TNF-α
Vascular Cell Adhesion Protein 1	VCAM-1
Vascular Endothelial Growth Factor	VEGF

Cardiovascular And Metabolic

Cardiovascular disease comprises a spectrum of diseases, mainly coronary heart disease and cerebrovascular disease. There are numerous risk factors for cardiovascular disease including high blood pressure, elevated cholesterol, diabetes, smoking, obesity and a family history of CVD. Certain risk factors cannot be altered, however, other risk factors can be reduced.

Randox Biosciences offers a comprehensive range of multi-analyte tests directed towards cardiovascular research; consisting of multiplex cytokine arrays, an adhesion molecules array, two cerebral arrays, two metabolic syndrome arrays, as well as a range of clinical chemistry reagents.

Randox Biosciences is the best choice to help accelerate your project to completion due to our advanced arrays coupled with our wide variety of technologies and solutions available to universities globally. Whether it is biomarker identification studies right through to clinical trials, we can provide you with a full range of arrays, biomarkers and analysers that will best suit your individual project requirements.

SUP-
ERIOR
MULTI-
PLEXING

CARDIOVASCULAR DISEASE
And cytokine research

Cytokine and inflammatory mechanisms have major implications for the vascular system and can lead to cardiovascular disease, in particular atherosclerosis; a condition involving endothelial damage and the buildup of plaque-forming lipoproteins and pro-inflammatory cytokines within the artery wall.

To determine multiple cytokines in a single sample at a single time point, Randox offer a comprehensive menu of 26 cytokines, cytokine receptors and growth factors over four multi-analyte arrays. Each cytokine assay is performed on a 9 x 9mm activated biochip with spatially discrete test regions containing antibodies specific to each of the analytes.

The combination of highly specific antibodies and advanced chemistries enables cytokines, cytokine receptors and growth factors to be detected simultaneously in a single sample, providing valuable information relating to each cytokine under test and possible associations between cytokines in each sample.

CYTOKINE ARRAY I

12 biomarkers - 1 sample

Analyte	Intra-Assay Precision (n=20)			Inter-Assay Precision (n=20)		
	Level 1 %CV	Level 2 %CV	Level 3 %CV	Level 1 %CV	Level 2 %CV	Level 3 %CV
EGF	4.6	5.8	7.6	7.4	4.0	7.2
IFNγ	12.7	6.2	3.8	13.4	9.8	9.1
IL-1α	9.7	7.7	6.8	10.7	5.9	7.3
IL-1β	8.2	6.3	6.7	13.1	7.3	7.0
IL-2	9.6	5.0	6.3	10.0	7.2	7.6
IL-4	10.7	9.4	4.6	10.0	6.4	7.8
IL-6	12.9	6.1	8.7	15.4	10.4	8.7
IL-8	10.1	7.5	7.9	10.1	8.7	9.9
IL-10	6.3	5.5	6.7	9.4	6.3	6.1
MCP-1	6.8	5.1	4.7	14.7	6.0	5.6
TNFα	10.2	6.0	7.8	13.0	8.1	11.6
VEGF	7.3	4.6	4.3	13.4	7.6	6.0

Analyte	Calibration Range pg/ml	Sensitivity pg/ml
EGF	0 - 900	2.9
IFNγ	0 - 1500	3.5
IL-1α	0 - 500	0.8
IL-1β	0 - 250	1.6
IL-2	0 - 3000	4.8
IL-4	0 - 900	6.6
IL-6	0 - 900	1.2
IL-8	0 - 3000	4.9
IL-10	0 - 1000	1.8
MCP-1	0 - 1500	13.2
TNFα	0 - 1500	4.4
VEGF	0 - 3000	14.6

Intra-assay precision was determined by assaying 20 replicates of each of three levels of sample.

Inter-assay precision was determined by assaying 2 replicates of each of three levels of sample in 10 separate assays.

Assay range may vary with batch of calibrators.

CYTOKINE
High sensitivity array

Analyte	Intra-Assay Precision (n=20)			Inter-Assay Precision (n=20)		
	Level 1 %CV	Level 2 %CV	Level 3 %CV	Level 1 %CV	Level 2 %CV	Level 3 %CV
EGF	9.2	9.5	9.6	11.7	8.5	9.6
IFNγ	10.1	7.4	7.7	11.4	6.4	7.6
IL-1α	10.9	9.7	11.4	15.5	8.9	13.1
IL-1β	9.3	8.7	7.4	9.9	11.8	8.7
IL-2	7.8	5.8	6.9	7.9	6.5	8.2
IL-4	8.1	9.5	8.4	11.8	8.6	8.8
IL-6	11.9	9.8	7.8	8.4	7.4	8.4
IL-8	9.4	9.4	7.0	11.1	9.9	9.2
IL-10	6.8	5.6	6.1	6.7	6.5	7.5
MCP-1	12.2	8.9	5.8	12.8	10.4	7.2
TNFα	7.1	7.2	12.7	8.6	6.7	7.0
VEGF	10.4	10.8	7.3	12.0	7.2	10.7

Analyte	Calibration Range pg/ml	Sensitivity pg/ml
EGF	0 - 450	1.04
IFNγ	0 - 600	0.44
IL-1α	0 - 225	0.19
IL-1β	0 - 112.5	0.26
IL-2	0 - 1,200	2.97
IL-4	0 - 450	2.12
IL-6	0 - 400	0.12
IL-8	0 - 1,450	0.36
IL-10	0 - 450	0.37
MCP-1	0 - 500	3.53
TNFα	0 - 600	0.59
VEGF	0 - 1,000	3.24

Intra-assay precision was determined by assaying 20 replicates of each of three levels of sample.

Inter-assay precision was determined by assaying 2 replicates of each of three levels of sample in 10 separate assays.

Assay range may vary with batch of calibrators.

OTHER RELATED
Cytokine arrays:

Cytokine Array III

- Granulocyte Macrophage Colony Stimulating Factor (GM-CSF)
- Interleukin-5 (IL-5)
- Interleukin-15 (IL-15)
- Macrophage Inflammatory Protein - 1α (MIP-1α)

Cytokine Array IV

- Matrix Metalloproteinase-9 (MMP-9)
- Soluble IL-2 Receptor α (sIL-2Rα)
- Soluble IL-6 Receptor (sIL-6R)
- Soluble Tumour Necrosis Factor Receptor I (sTNFR1)
- Soluble Tumour Necrosis Factor Receptor II (sTNFRII)

Cytokine Array V

- Interleukin-3 (IL-3)
- Interleukin-7 (IL-7)
- Interleukin-13 (IL-13)
- Interleukin-12p70 (IL-12p70)
- Interleukin-23 (IL-23)

CARDIAC ARRAY

For cardiac research

The Cardiac Array simultaneously detects up to four cardiac markers from a single patient sample, providing highly accurate quantitative results. Suitable for use within both clinical and research settings, the Cardiac Array has a wide range of applications.

- Comprehensive range of both routine and novel assays provide an excellent tool for research into cardiovascular disease
- Central laboratory and research analysers available – suitable for all sizes of laboratory
- 98% rule out for MI within 3-6 hours post pain onset – accurate results you can rely on
- Improved risk stratification of patients with suspected ACS – allows better management of patients and can also be used to further research into this area of expertise

Cardiac Array meets ACC/ESC guidelines

The Randox Troponin, CK-MB and H-FABP assays all meet the ACC/ESC guidelines of <10% CV at the 99th percentile of normal range

CK-MB	**Late marker**	Raised 4-6 hours after event Can remain elevated for 3-4 days Highly specific but lacks sensitivity during early time points
H-FABP	**Early marker**	Raised 30 minutes after event Peaks at 6-8 hours Cleared to normal levels within 20-24 hours Highly sensitive
Troponin I	**Late marker**	Raised 4-6 hours after event Can remain elevated for 10-14 days Highly specific but lacks sensitivity during early time points
Myoglobin	**Early marker**	Raised after 2-4 hours after event Peaks at 6-12 hours

CEREBRAL ARRAY I

For cerebrovascular research

Randox's two complimentary Cerebral Arrays are designed for the simultaneous measurement of analytes associated with nervous system dysfunctions such as cerebrovascular disease.

Brain-Derived Neurotrophic Factor (BDNF)

A neurotrophin; widely distributed throughout the central nervous system. It limits neurodegenerative damage after brain injury and is a good marker for stroke detection.

Glial Fibrillary Acidic Protein (GFAP)

Specific marker for astrocyte damage. It is significantly elevated following stroke onset. The release pattern of GFAP is dependent on the subtype & pathophysiology of stroke.

Heart Type Fatty Acid Binding Protein (H-FABP)

Involved in lipid transport and released rapidly from damaged cells. It is an early marker of cardiac injury but also shows elevated levels following stroke.

Interleukin-6 (IL-6)

IL-6 has long been implicated in chronic inflammation related to both all-cause and cardiovascular risk mortality. Circulating IL-6 levels are a contributing factor in cardiomyopathy, myocarditis and left ventricular dysfunction.

Analyte	Intra-Assay Precision (n=20)			Inter-Assay Precision (n=20)		
	Level 1 %CV	Level 2 %CV	Level 3 %CV	Level 1 %CV	Level 2 %CV	Level 3 %CV
BDNF	11.5	12.6	7.7	9.5	14.2	12.8
GFAP	8.0	13.5	6.4	8.1	7.5	7.4
H-FABP	8.5	14.5	6.4	8.4	10.8	9.4
IL-6	6.7	12.9	7.8	10.2	9.1	9.7

Analyte	Calibration Range pg/ml	Sensitivity pg/ml
BDNF	0-7500	0.59
GFAP	0-120,000	180
H-FABP	0-100,000	290
IL-6	0-550	0.64

Intra-assay precision was determined by assaying 20 replicates of each of three levels of sample.

Inter-assay precision was determined by assaying 2 replicates of each of three levels of sample in 10 separate assays.

Assay range may vary with batch of calibrators.

CEREBRAL ARRAY II

For cerebrovascular research

C-Reactive Protein (CRP)

Fastest acting acute phase protein. While high levels indicate infection/ inflammation, mildly increased levels are associated with cardiovascular disease.

D-Dimer

Mediates both clot formation and fibrinolysis. Elevated levels are dependent on the type of stroke and correlate with the degree of damage and neurological outcome.

Neuron Specific Enolase (NSE)

A glycolytic enzyme which is readily released into CSF and blood after tissue damage. Blood levels are elevated in stroke and seem to correlate with the extent of infarcted tissue.

Neutrophil Gelatinase-Associated Lipocalin (NGAL)

Secreted from specific granules of human neutrophils upon cell activation; prolonged elevation in serum and plasma after stroke.

Soluble Tumour Necrosis Factor Receptor I (sTNFRI)

A soluble receptor shed from the cell surface; elevated levels are found in acute ischemic stroke. It could be a significant predictor of mortality after ischemic stroke.

	Intra-Assay Precision (n=20)			Inter-Assay Precision (n=20)		
Analyte	Level 1 %CV	Level 2 %CV	Level 3 %CV	Level 1 %CV	Level 2 %CV	Level 3 %CV
CRP	3.3	3.8	2.9	11.3	3.9	6.2
D-DIMER	8.7	5.8	8.3	8.1	7.1	7.4
NSE	9.5	5.3	6.2	10.7	10.3	10.4
NGAL	11.3	9.1	7.9	11.1	10.1	6.5
sTNFRI	9.7	7.2	7.4	10.0	7.5	8.7

Analyte	Calibration Range pg/ml	Sensitivity pg/ml
CRP	0 - 12*	0.67*
D-DIMER	0-2000	2.1
NSE	0- 200	0.26
NGAL	0- 2000	17.8
sTNFRI	0-50	0.24

*Results measured in mg/L

Intra-assay precision was determined by assaying 20 replicates of each of three levels of sample.

Inter-assay precision was determined by assaying 2 replicates of each of three levels of sample in 10 separate assays.

Assay range may vary with batch of calibrators.

CKD ARRAYS I & II

Early damage detection

The current approach used in the estimation of chronic kidney disease (CKD), eGFR calculation, has repeatedly been shown to be unreliable and unable to distinguish between early and later stage renal disease.

Initial evaluation of the Randox CKD arrays showed that a multi-marker approach improved upon current methods and was able to more effectively distinguish between early and late stage disease. The improved areas under the ROC could potentially be used to diagnose renal disease earlier as well as more accurately differentiate subjects for enrolment in clinical trials.

The CKD Array I comprises 7 biomarkers (EGF, FABP1, IL-8, sTNFR1, D-Dimer, MIP-1 alpha and sTNFR2) and the CKD Array II comprises 4 biomarkers (C3a des Arg, CRP, NGAL and Cystatin C).

MOLECULAR DIAGNOSTIC ARRAYS

For cardiovascular & cerebrovascular research

Randox offers a number of cardiovascular focused molecular arrays allowing SNP genotyping & mutation detection; the arrays are optimised for use on the Randox Evidence Investigator Analyser.

Cardiac Risk Prediction Array

- For enhanced CHD Risk assessment, 20 SNPs genotyped in one day
- Genetic information is combined with known risk factors to more accurately assess CVD Risk
- Two chip assay containing 10 SNPs and corresponding 10 wild types in each biochip
- Contains SNP to identify patients pre-disposed to statin induced myopathy

Familial Hypercholesterolemia (FH) Array I & II

- FH is a genetic disorder characterised by high levels of LDL-C
- Array screens for 40 FH-causing mutations within the ApoB and PCSK9 genes which are commonly implicated in FH

Polygenic Familial Hypercholesterolemia (FH) Array

- Despite a clinical diagnosis of possible FH, no common mutations are found in around 60% of patients, this is likely due to an accumulation of common small-effect LDL-C raising alleles. High levels of LDL-C alleles leaves patients at higher risk of polygenic hypercholesterolemia. This could identify patients potentially affected with polygenic hypercholesterolemia and negate the need for further genetic and cascade screening
  - Polygenic FH Array detects 6 SNP's associated with polygenic FH and these targets are applicable to all ethnic groups

MDX Array Protocol

Extraction
Genomic DNA extracted from blood/saliva

Amplification
Multiplex PCR reaction

Hybridisation
Amplicon hybridisation/ conjugation to biochip array

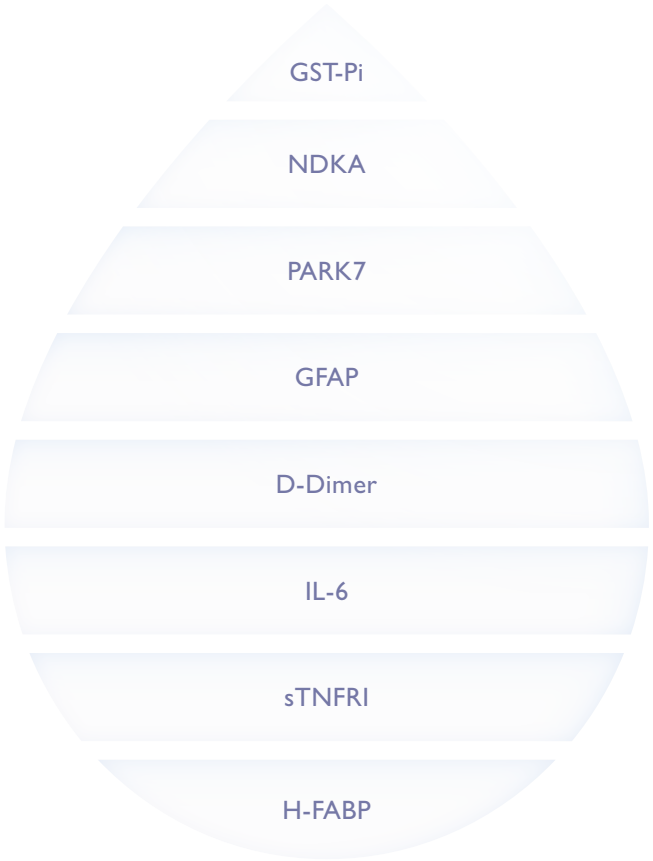
Detection
Results Processed by Evidence Investigator

STROKE ARRAY

8 biomarkers – 1 sample

Stroke is the second leading cause of death globally (WHO). Acute ischaemic stroke, which accounts for 87% of all stroke cases, can be treated by thrombolysis and early administration (within 3-4 hours of symptoms onset) can help limit stroke damage and disability.

However, inappropriate administration of thrombolytic therapy can cause serious adverse effects, including intracranial haemorrhage. Hence, there is an unmet clinical need for a rapid and highly sensitive test that will complement existing CT scanning approaches and facilitate the definitive identification of ischaemic stroke patients. Previous studies have reported Glutathione S-Transferase-Pi (GST-Pi), Nucleoside Diphosphate Kinase A (NDKA), Parkinson Protein 7 (PARK7), Glial Fibrillary Acidic Protein (GFAP), D-Dimer, Interleukin 6 (IL-6) and Heart Fatty Acid Binding Protein (H-FABP) as plasma markers for early diagnosis of stroke and for differentiation between ischaemic and haemorrhagic stroke.



A Single
Blood Sample

ADHESION MOLECULES ARRAY

For cardiovascular & cerebrovascular research

Adhesion Molecules Facts

- Altered levels of adhesion molecules are involved in conditions and diseases such as cardiovascular disease, stroke, cancer, diabetes and more
- Increased knowledge of the changes in these levels would help progress the understanding of their physiological role and pathological significance
- Suitable for human serum and plasma samples
- Small sample volume required, just 2.5µl of neat sample
- 5-plex biochip array

E-Selectin

E-Selectin is a member of the selectin family. E-Selectin is only expressed on endothelial cells and only after activation by inflammatory cytokines or endotoxins. Its expression is transitory and reaches a maximum two to six hours after cell activation. It is then shed into the circulation where it may activate neutrophils and act as a pro-inflammatory agent.

L-Selectin

Unlike the other members of the selectin family, L-Selectin is not expressed on endothelial cells but has only been found on leukocytes. A number of different ligands for L-Selectin on endothelial cells have been identified.

P-Selectin

P-Selectin is a member of the selectin family. P-Selectin is associated with the 2-granules in resting platelets and is also found in a preformed state in the Weibel -Palade bodies of endothelial cells. Upon activation or stimulation it is rapidly moved to the cell surface.

ICAM-1

ICAM-1 is a member of the Immunoglobulin (Ig) like superfamily of adhesion molecules. It is expressed in endothelial cells as well as other cell types such as lymphocytes and monocytes. ICAM-1 plays an important role in inflammatory processes and in the T-cell mediated host defence system.

VCAM-1

VCAM-1 is also a member of the Immunoglobulin (Ig) like superfamily of adhesion molecules. As well as being expressed on endothelial cells, VCAM-1 is expressed on smooth muscle cells, fibroblasts, dendritic cells and macrophages.

a. Calibration range may vary slightly with batch of calibrators

b. Sensitivity defined as the concentration two standard deviations from zero (multiplied by 10 to account for sample dilution)

	Intra-Assay Precision (n=20)			Inter-Assay Precision (n=20)		
Analyte	Level 1 %CV	Level 2 %CV	Level 3 %CV	Level 1 %CV	Level 2 %CV	Level 3 %CV
E-Selectin	7.0	7.4	5.2	7.5	8.0	8.6
L-Selectin	6.2	6.1	9.1	8.7	7.7	13.4
P-Selectin	6.5	6.1	9.6	5.7	4.8	7.2
ICAM-I	6.4	8.4	9.4	3.5	7.9	8.3
VCAM-I	7.7	8.1	9.2	5.9	9.6	7.5

Analyte	Calibration Range[a] ng/ml	Sensitivity[b] ng/ml
E-Selectin	0-25	0.1
L-Selectin	0-350	3.2
P-Selectin	0-120	1.9
ICAM-I	0-100	1.7
VCAM-I	0-330	4.1

Intra-assay precision was determined by assaying 20 replicates of each of three levels of sample.

Inter-assay precision was determined by assaying 2 replicates of each of three levels of sample in 10 separate assays.

Assay range may vary with batch of calibrators.

METABOLIC SYNDROME
Research arrays

What is Metabolic Syndrome?

Metabolic syndrome (MetS) is a group of cardiovascular risk factors. It is highly prevalent, with approximately 20-25% of adults affected. It is estimated that having metabolic syndrome results in a person being three times more likely to have a stroke or heart attack, and five times more likely to develop diabetes.

Underlying risk factors for MetS include: abdominal obesity, insulin resistance, physical inactivity, aging and hormonal imbalance.

The International Diabetes Foundation (IDF) has proposed the following definition for MetS:

A person must have

Central Obesity	Increased waist circumference* (ethnicity specific)

*If BMI is >30kg/m^2, central obesity can be assumed and waist circumference does not have to be measured

Plus at least two of the following four factors

Raised Triglycerides	≥ 150mg/dL (1.7 nmol/L) or specific treatment for this abnormality
Reduced HDL Cholesterol	< 40 mg/dL (1.03 nmol/L) for men < 50 mg/dL (1.29 nmol/L) for women or specific treatment for this abnormality
Raised Blood Pressure	Systolic BP ≥ 130 or diastolic BP ≥ 85 mm Hg or treatment of previously diagnosed hypertension
Raised Fasting Plasma Glucose	Fasting plasma glucose ≥ 100 mg/dL (5.6 mmol/L) or previously diagnosed type 2 diabetes If above 5.6 mmol/L or 100 mg/dL, an Oral Glucose Tolerance Test (OGTT) is strongly recommended, but not necessary, to define presence of the syndrome

METABOLIC SYNDROME

Array Benefits

- Can be used in the investigation of insulin resistance, pro-thrombotic state, abnormal body fat distribution, pro-inflammatory state and atherogenic dyslipidaemia
- Biochip Array Technology allows multiplexing from one sample
- Validated for both serum and plasma samples – suitable for clinical research studies
- Small sample volume – 100 µl to measure all analytes on each array
- Highly efficient use of valuable patient sample banks
- Biochips are ready to use, thus saving time, labour and resources
- Short time for results to be collated
- Multi-analyte controls and calibrators
- Excellent assay performance
- Zero non-specific aggregation, which is associated with multi-analyte bead assays
- Applicable to the semi-automated Evidence Investigator analyser and the fully automated Evidence and Evolution analysers

METABOLIC SYNDROME ARRAY I

7 biomarkers - 1 sample

Ferritin

The concentration within the blood reflects the amount of iron stored within the body.

Insulin

Helps to evaluate insulin production; can help determine insulin resistance.

Interleukin-6 (IL-6)

A pleiotropic adipokine with pro-inflammatory action in MetS; inhibits insulin signalling through inhibitory phosphorylation of IRS1.

Leptin

Helps to regulate energy intake and energy expenditure; obese persons generally exhibit an unusually high concentration and are said to be resistant to the effects of leptin.

Plasminogen Activator Inhibitor-I (PAI-I)

Linked to the increase of thrombosis in patients with obesity or metabolic syndrome; plays a role in the maintenance of an inflammatory state; increases cardiovascular risk by favouring clot stability.

Resistin

An inflammatory marker of atherosclerosis; increases the production of LDL in liver cells and degrades LDL receptors in the liver; impacts the effects of statins.

Tumour Necrosis Factor α (TNFα)

An inflammatory adipokine, which can induce apoptotic cell death.

Analyte	Intra-Assay Precision (n=20)			Inter-Assay Precision (n=20)		
	Level 1 %CV	Level 2 %CV	Level 3 %CV	Level 1 %CV	Level 2 %CV	Level 3 %CV
FERR	5.7	8.2	7.2	10.0	5.7	8.2
INS	9.4	7.8	7.5	10.3	9.0	14.0
IL-6	6.4	6.1	6.3	4.9	6.3	8.4
LEPT	7.7	4.6	5.3	10.3	10.5	10.3
PAI-1	10.5	10.9	10.7	14.0	13.1	14.3
RETN	12.1	10.1	11.8	5.2	7.1	8.6
TNFα	6.1	6.3	5.5	9.2	7.4	7.9

Analyte	Calibration Range[a] pg/ml	Sensitivity[b] pg/ml
FERR	0 - 500,000	3,270
INS	0 -300*	2.32*
IL-6	0 - 140	0.73
LEPT	0 - 100,000	1,100
PAI-1	0 - 200,000	2,340
RETN	0 - 75,000	1,060
TNFα	0 - 75	0.66

*Results measured in µIU/ml

a. Calibration range may vary slightly with batch of calibrators

b. Sensitivity defined as the concentration two standard deviations from zero (multiplied by 10 to account for sample dilution)

Intra-assay precision was determined by assaying 20 replicates of each of three levels of sample.

Inter-assay precision was determined by assaying 2 replicates of each of three levels of sample in 10 separate assays.

Assay range may vary with batch of calibrators.

METABOLIC SYNDROME ARRAY II

3 biomarkers - 1 sample

Adiponectin

A hormone produced by adipose tissue; a key regulator of insulin sensitivity and tissue inflammation; low levels are associated with insulin resistance and type 2 diabetes.

C-Reactive Protein (CRP)

Identifies inflammation; helps to assess risk for heart disease.

Cystatin C

A biomarker of kidney function; dysfunction increases the risk of cardiovascular disease.

IDF Supported MetS Parameters	Implicated Analytes
Abnormal body fat distribution	Adiponectin*, Leptin*
Insulin resistance	Adiponectin*, C-peptide, Insulin*
Pro-inflammatory state	Adiponectin*, C-reactive protein*, E-selectin, hsCRP, IL-6*, IL-1α, TNFα*
Pro-thrombotic state	PAI-1*, P-selectin, VCAM-1
Vascular dysregulation	Cortisol
Atherogenic dyslipidaemia	E-selectin, Microalbuminuria
Dysglycaemia	ApoA-1, ApoB, LDL Cholesterol, Lp(a), Resistin*, Cystatin C*, D-3 Hydroxybutyrate (Ranbut), HbA1c, Fructosamine, NEFA

*Included on Metabolic Syndrome Arrays I & II

	Intra-Assay Precision (n=20)			Inter-Assay Precision (n=20)		
Analyte	Level 1 %CV	Level 2 %CV	Level 3 %CV	Level 1 %CV	Level 2 %CV	Level 3 %CV
ADPN	8.7	8.2	9.6	10.8	9.7	12.4
CRP	5.3	4.5	5.0	5.4	4.9	5.5
CYSC	8.2	5.6	5.6	7.3	5.6	5.8

Analyte	Calibration Range pg/ml	Sensitivity pg/ml
ADPN	0 - 40,000	164
CRP	0 - 60,000	690
CYSC	0 - 5,000	60

Intra-assay precision was determined by assaying 20 replicates of each of three levels of sample.

Inter-assay precision was determined by assaying 2 replicates of each of three levels of sample in 10 separate assays.

Assay range may vary with batch of calibrators.

series

Randox Clinical Chemistry Analysers

RX SERIES

Randox clinical chemistry analysers

Diagnostic Reagents for Routine & Esoteric Clinical Chemistry Testing

Historically, research scientists have relied on a narrow selection of biomarkers to monitor safety, efficacy or mechanism of action. Randox offers over 130 enzymatic, substrate and immunoturbidimetric assays on its RX series of clinical chemistry analysers.

The RX Series of clinical analysers offer the highest quality testing on various compact, easy-to-use machines. They provide outstanding flexibility, coupled with optimum reliability; whilst boasting straight forward and intuitive software to promote ease of use for the end user. This, coupled with Randox's extensive test menu and quality control sera, ensures that you receive results of the highest quality in addition to saving on time, cost and labour.

Instrument Specific Reagents Offering Unrivalled Value & Choice

In addition to protocols for our own excellent range of clinical chemistry analysers Randox provide instrument specific applications for numerous clinical analysers; including models from manufacturers such as Roche, Siemens, Abbott, Beckman, I-Lab and Horiba, enabling the end user to utilise Randox's extensive range of routine and research oriented lipid tests.

misano

The RX misano has been developed with the user in mind by incorporating a responsive touch-screen display. The sleek ergonomic design boasts intuitive user-friendly software allowing test menu personalisation for ease of use. The RX misano provides exciting opportunities for consolidation of routine & specialised testing and is perfectly suited to a variety of laboratory types as a primary or a backup analyser.

monaco

Capable of carrying out 170 tests per hour, the RX monaco guarantees unrivalled performance, providing cost-effective, high quality testing for small to mid-volume laboratories. This fully automated analyser can be easily integrated into any laboratory setting with the option of a floor standing unit if bench-top space is limited.

daytona+

The RX daytona+ is a fully automated, random access, bench-top clinical chemistry analyser capable of performing routine and specialised testing as well as emergency STAT sampling. With a throughput of 450 tests per hour including ISE, the RX daytona+ offers a high performance, fully automated solution to mid-volume clinical chemistry testing. With intuitive icon-based software, the RX daytona+ is the only analyser in its class with a sample clot detection sensor ensuring efficiency, precision and accuracy.

imola

The RX imola combines superior quality, intuitive software and minimal maintenance for increased productivity and reduced downtime for rapid comprehensive testing. This compact, fully automated bench-top analyser is capable of handling the workload of a medium to high throughput laboratory, with a throughput of 560 tests per hour including ISE.

modena

Capable of running up to 1,200 tests per hour, with unique HbA1c testing abilities, the RX modena consolidates all your assay requirements onto one intuitive platform. This high throughput analyser has a continuous loading hatch allowing emergency samples to be analysed quickly and easily mid-run. The RX modena boasts icon based, interactive touch -screen technology adding a modern flair to your laboratory.

RX SERIES TEST MENU

CLINICAL

Autoimmune

- Complement Component 3
- Complement Component 4
- CRP
- CRP Full Range (0.3-160mg/l)
- CRP High Sensitivity
- IgA
- IgE
- IgG
- IgM
- Rheumatoid Factor

Basic Metabolic Profile

- Calcium
- CO2 Total
- Chloride
- Creatinine (Enzymatic)
- Creatinine (Jaffe)
- Glucose
- Potassium
- Sodium
- Urea

Bone Profile

- Alkaline Phosphatase
- Calcium
- Phosphorus
- Total Protein

Cardiac

- Adiponectin
- Cholesterol
- CK-MB
- CK-NAC
- CRP
- CRP Full Range (0.3-160mg/l)
- CRP High Sensitivity
- Digoxin
- Direct HDL Cholesterol
- Direct LDL Cholesterol
- Heart-Type Fatty Acid Binding Protein (H-FABP)
- Lipoprotein (a)
- Myoglobin
- sLDL
- Triglycerides
- TxB Cardio

Comprehensive Metabolic Profile

- Adiponectin
- Albumin
- Alkaline Phosphatase
- ALT
- AST (GOT)
- Direct Bilirubin
- Calcium
- Chloride
- CO2 Total
- Creatinine (Enzymatic)
- Creatinine (Jaffe)
- Glucose
- Lactate
- Potassium
- Sodium
- Total Bilirubin
- Total Protein
- Urea

Diabetes

- Cholesterol
- Creatinine (Enzymatic)
- Creatinine (Jaffe)
- Cystatin C
- Direct HDL Cholesterol
- Direct LDL Cholesterol
- Fructosamine
- Glucose
- Glycerol
- HbA1c/Hb
- Microalbumin
- NEFA (Non-Esterified Fatty Acids)
- Ranbut (Hydroxybutyrate)
- Total Protein
- Triglycerides
- Urinary Protein

Electrolytes

- Calcium
- Chloride (Direct / Nondirect)
- CO2 Total
- Lithium
- Magnesium
- Potassium (Direct / Nondirect)
- Sodium (Direct / Nondirect)

Haemolytic Anaema

- G6P-DH
- Haptoglobin
- LDH

Hepatic Function

- Albumin
- Aldolase
- Alkaline Phosphatase
- Alpha-1 Antitrypsin
- ALT
- Ammonia
- AST (GOT)
- Cholinesterase
- Complement Component 3
- Complement Component 4
- Direct Bilirubin
- Gamma GT
- GLDH
- Glycerol
- Haptoglobin
- IgA
- IgG
- IgM
- Iron (UIBC)
- LAP
- LDH
- Total Bilirubin
- Total Protein
- Transferrin
- Transthyretin (Prealbumin)

Lipids

- Alpha-1Acid Glycoprotein
- ASO
- CRP
- Lactate
- Rheumatoid Factor

Inflammation & Infection

- Apolipoprotein A-I
- Apolipoprotein AII
- Apolipoprotein B
- Apolipoprotein CII
- Apolipoprotein CIII
- Apolipoprotein E
- Cholesterol
- Direct HDL Cholesterol
- Direct LDL Cholesterol
- Lipoprotein (a)
- sLDL
- Triglycerides

Neonatal Screening

- Alpha-1 Antitrypsin
- CRP
- CRP Full Range (0.3-160mg/l)
- CRP High Sensitivity
- IgE
- Transthyretin (Prealbumin)

Neurological Disorders (CSF)

- IgA
- IgG
- IgM

Nutritional Status

- Albumin
- Copper
- Ferritin
- Iron
- Iron (UIBC)
- Lipase
- Magnesium
- Potassium
- TIBC
- Transferrin
- Transthyretin (Prealbumin)
- Zinc

Pancreatic Function

- Amylase
- Glucose
- LDH
- Lipase
- Pancreatic Amylase

Renal Function

- Albumin
- Ammonia
- Beta-2 Microglobulin
- Calcium
- Chloride
- Creatinine (Enzymatic)
- Creatinine (Jaffe)
- Cystatin C
- Glucose
- HbA1c/Hb
- IgG
- LDH
- Magnesium
- Microalbumin
- Potassium
- Sodium
- Phosphorus (Inorganic)
- Urinary Protein
- Urea
- Uric Acid

VETERINARY

- Albumin
- Alkaline phosphatase
- ALT (GPT)
- Aldolase
- Ammonia
- Amylase
- AST (GOT)
- Bile acids
- Bilirubin
- Calcium
- Chloride
- Cholesterol
- Cholinesterase (Butyryl)
- CK-NAC
- CO2 Total
- Copper
- Creatinine
- CRP
- Fructosamine
- Gamma-GT
- GLDH
- Glucose
- Glycerol
- HDL
- Iron (UIBC)
- Lactate
- Lactate dehydrogenase
- LDL
- Lipase
- Magnesium
- NEFA (Non-esterified fatty acids)
- Phosphorus (Inorganic)
- Potassium
- Ranbut (Hydroxybutyrate)
- Ransel (Glutathione peroxidase)
- Ransod (Superoxide dismutase)
- Sodium
- Therapeutic drugs
- Total Protein
- Triglycerides
- Urea
- Uric Acid
- Urinary protein
- Zinc

TOXICOLOGY

Therapeutic Drugs

- Carbamazepine
- Digoxin
- Gentamicin
- Lithium
- Acetaminophen
- Phenobarbitol
- Phenytoin
- Salicylate
- Theophyline
- Valproic Acid

Drugs of Abuse

- Amphetamines
- Barbiturates
- Benzodiazepines
- Cannabinoids
- Cocaine metabolite
- EDDP
- Ecstasy
- Ethanol
- Methadone
- Opiates

PROTEIN

Specific Proteins

- Alpha-1 Antitrypsin
- Alpha-1 Acid Glycoprotein
- Apolipoprotein A-I
- Apolipoprotein AII
- Apolipoprotein B
- Apolipoprotein CII
- Apolipoprotein CIII
- Apolipoprotein E
- ASO
- Beta-2 Microglobulin
- Ceruloplasmin
- Complement Component 3
- Complement Component 4
- CRP
- CRP Full Range (0.3-160mg/l)
- CRP High Sensitivity
- Cystatin C
- Ferritin
- Fructosamine
- Haptoglobin
- HbA1c/Hb
- IgA
- IgE
- IgG
- IgM
- Lipoprotein (a)
- Microalbumin
- Myoglobin
- Rheumatoid Factor
- Transthyretin (Prealbumin)
- Transferrin

RESEARCH

Therapeutic Drugs

- Albumin
- Bilirubin
- Ferritin
- Glutathione Reductase
- Ransel (Glutathione Peroxidase)
- Ransod (Superoxide Dismutase)
- TIBC
- Total Antioxidant Status
- Transferrin
- Uric Acid

Bio Technology

- Glutamate
- Glutamine

Food & Wine

- Acetic Acid
- Ammonia
- Calcium
- Copper
- Glucose
- Glucose/Fructose
- Glycerol
- Iron
- L-Lactic Acid
- Malic Acid
- Potassium
- Total Antioxidant Status

Speciality

- Acid phosphatase

LIPIDS FOR METABOLIC & CARDIOVASCULAR RESEARCH

The Randox lipid profile combines conventional lipid assays with emerging biomarkers associated with cardiovascular disease, ensuring that both traditional and more novel lipid biomarkers can be detected, therefore enhancing your research project findings. Our extensive menu of cardiac biomarkers offers superior performance and are liquid ready to use and are available for use on a wide range of clinical chemistry analysers.

Adiponectin

Adiponectin is an adipokine exclusively secreted by adipocytes and has an important role in a number of metabolic processes such as glucose regulation and fatty acid oxidation. Its abundance has been linked with several pathologies including metabolic syndrome, cancer and cardiovascular disease. High plasma concentrations are associated with lower risk of MI whereas individuals with low levels of adiponectin are up to 9x as likely to develop type 2 diabetes.

Apolipoproteins

Apolipoproteins and the ratio between them are useful in the assessment of cardiovascular risk. They have particular value in monitoring lipid lowering therapies where HDL-C and LDL-C alone are less predictive of future cardiovascular events.

Apolipoprotein A-I

The main role of Apolipoprotein A-I (Apo A-I) is in the removal of excess cholesterol from extra-hepatic tissues. Like HDL Cholesterol, Apo A-I can be described as non-atherogenic showing an inverse relationship to cardiovascular disease risk. Individuals with cardiovascular disease generally have reduced levels of Apo A-I and increased levels of Apo B. The Randox Apo A-I assay is based on an immunoturbidimetric method.

Apolipoprotein A-II

Apolipoprotein A-II (APO A-II) is a major constituent of HDL cholesterol and plays an important role in reverse cholesterol transport and lipid metabolism. The distribution of Apo A-I within the HDL particle is primarily determined by the production rate of Apo A-II. Increased production of Apo A-II promotes atherosclerosis by decreasing the proportion of anti-atherogenic HDL containing Apo A-I. The Randox Apo A-II assay is based on an immunoturbidimetric method.

Apolipoprotein B

Apolipoprotein B (Apo B) is the main protein in LDL Cholesterol and is the ligand concerned with the uptake of cholesterol. Elevated levels of Apo B indicate an increased risk of cardiovascular disease even when total and LDL cholesterol levels are normal. Apo B is often tested alongside Apo A-I to determine the Apo B/Apo A-I ratio which is sometimes used as an alternative to the total cholesterol/HDL cholesterol ratio when determining cardiovascular risk.

Apolipoprotein C-II

Apolipoprotein C-II (APO C-II) acts as a co-factor for lipoprotein lipase, an enzyme that breaks down lipoproteins and hydrolyses triglycerides in chylomicrons and VLDL for absorption into tissue cells. Apo C-II deficiency has been linked with hypertriglyceridemia. The Randox Apo C-II assay is based on an immunoturbidimetric method.

Apolipoprotein C-III

Apolipoprotein C- III (Apo C-III) circulates in the plasma in association with triglyceride rich lipoproteins (chylomicrons, VLDL and LDL) and HDL. Apo C-III modulates the uptake of triglyceride-rich lipoproteins by the LDL receptor related protein through inhibition of lipoprotein lipase. Elevated levels of Apo C-III are associated with both primary and secondary hypertriglyceridemia. Genetically determined Apo C-III deficiency in humans has shown to increase the rate of triglyceride clearance from the plasma by 6 to 7-fold. Apo C-III levels have been reported higher in many pathological conditions including type 2 diabetes, hyperbilirubinemia, kidney deficiency and decreased thyroid function.

The Randox Apo C-III assay is based on an immunoturbidimetric method.

Apolipoprotein E

Apolipoprotein E (APO E) has many functions including the transport of triglycerides to the liver and distribution of cholesterol between cells. Apo E deficiency gives rise to high serum cholesterol and triglyceride levels and as a result leads to premature atherosclerosis. It has also been shown to affect the formation of atherosclerotic lesions by inhibiting platelet aggregation. The Randox Apo E assay is based on an immunoturbidimetric method.

HDL3

HDL comprises of several subclass particles which differ in their sizes, densities and components. There are two kinds of HDL2-C and three kinds of HDL3-C. These HDL subclasses are considered to play different roles in the progression and regression of arteriosclerosis. HDL3-C is a smaller and denser sub-fraction of the HDL particle. Standard tests for total cholesterol, HDL, LDL and triglyceride levels only detect approximately 20% of all coronary disease patients. The other 80% can only be identified by differentiating sub groups and carrying out more detailed lipid testing.

HDL Cholesterol

High-density lipoproteins (HDL-C) are one of the major classes of plasma lipoproteins. HDL-C is often referred to as 'good cholesterol' since it transports cholesterol from the tissues to the liver for removal from the body. High levels of HDL-C can lower an individual's risk of developing heart disease. If HDL-C accounts for 20% of an individual's total cholesterol then the risk of developing heart disease is less than average. NCEP recommends the following:

Low <1.01mmol/l
Borderline 1.01 – 1.54mmol/l
Desirable 1.54mmol/l

The Randox HDL kit utilises a direct clearance method for superior performance.

LIPIDS FOR METABOLIC & CARDIOVASCULAR RESEARCH

LDL Cholesterol

LDL-C, often referred to as 'bad cholesterol,' transports cholesterol to the tissues and is linked to the development of atherosclerotic lesions. Accurate measurement of LDL-C is therefore of vital importance in therapies which focus on lipid reduction to prevent or reduce the progress of atherosclerosis and to avoid plaque rupture. NCEP recommends the following:

Optimal <2.56mmol/l
Near Optimal 2.56 – 3.3mmol/l
Borderline High 3.3 – 4.0mmol/l
High 4.1 – 4.85mmol/l
Very High >4.85mmol/l

The Randox LDL-C kit utilises a direct clearance method for superior performance. Furthermore all reagents are liquid ready-to-use with applications available for a wide range of chemistry analysers.

Lipoprotein (a): Lp(a)

Lipoprotein (a) (Lp(a), in combination with other lipid tests, can provide clinicians with much needed additional information on an individual's risk of CVD. High levels of Lp(a) are known to occur in individuals with an otherwise normal lipid profile as such it is thought to contribute to an increased risk of CVD independent of other lipids. It is also of particular use in assessing the risk of coronary heart disease in specific populations as Lp(a) concentrations are genetically determined and vary with ethnic population.

Although not a routinely requested test, the European Atherosclerosis Society (EAS), the National Cholesterol Education Programme and the National Academy of Clinical Biochemistry recognise the usefulness of Lp(a) and recommend testing patients with a family history of premature CVD or those classified as moderate/high risk. The Randox Lp(a) assay is based on an immunoturbidimetric method. All reagents are liquid ready-to-use and suitable for use on a wide range of chemistry analysers.

Why use the Randox Lp(a) assay?

Lp(a) is an LDL-like particle with a molecule of Apo B-100 linked by a disulphide bridge to Apo(a). Apo(a) is unique in that it is extremely heterogeneous in size due to the Kringle 4 Type 2 domain which can be present in up to 40 copies. This size heterogeneity of Apo(a) affects to varying degrees the outcome of many commercially available Lp(a) kits resulting in over estimation of samples containing large Apo(a) molecules and an under estimation of samples containing small Apo(a) molecules. Research has documented and shown the Randox method to exhibit minimum size related bias.

sLDL Cholesterol

LDL cholesterol is considered the most atherogenic component of cholesterol constituting a major risk factor for cardiovascular disease (CVD). There are two main types of LDL which differ in terms of size, density and composition; large buoyant LDL and small dense LDL. Small dense LDL Cholesterol (sLDL) penetrates the arterial wall more readily, has a lower binding affinity for the LDL receptor and a longer plasma half-life making it more atherogenic than the larger LDL subtype. Research has shown individuals with a predominance of sLDL have a 3-fold increased risk of myocardial infarction.

Determination of sLDL allows the clinician to get a more comprehensive picture of lipid risk factors and tailor treatment accordingly. Measurements are useful in cases of;

Coronary or peripheral arterial disease
Hyper/Dyslipidemia
Hypertension
Diabetes

To date, ultracentrifugation and electrophoresis-based methods are used for the measurement of sLDL cholesterol; however these methods are both laborious and time-consuming. Randox provides a liquid ready-to-use direct method for the quantitative determination of sLDL cholesterol on a wide range of automated chemistry analysers.

Total Antioxidant Status (TAS)

The antioxidant defence system has many components; a deficiency in any of these components can cause a reduction in the overall antioxidant status of an individual. Reduction in total antioxidant status has been implicated in several disease states, such as cancer and heart disease. The Randox TAS kit measures the total antioxidant capacity of a sample i.e. anything that has an antioxidant effect.

Glutathione Reductase

Glutathione Reductase is required for the regeneration of reduced glutathione which is important for normal cellular metabolism. This enzyme is often discussed in association with Glutathione Peroxidase, which requires reduced glutathione for activation. Glutathione Reductase is responsible for maintaining levels of reduced glutathione which has many important functions in the cell. Glutathione plays a role in protein folding and the maintenance of reduced pools of vitamin C and E. Reduced levels of this enzyme have been described in several diseases.

Glutathione Peroxidase (Ransel)

Selenium is an essential trace element involved in the aetiology of a number of diseases. At normal concentrations, selenium has a protective effect against several disease states, however this protection is lost at lower concentrations and selenium can be toxic at high concentrations. It is therefore important to monitor selenium levels to ensure they are kept within the normal range. Ransel measures Glutathione Peroxidase which has a direct correlation with selenium levels.

Superoxide Dismutase (Ransod)

Superoxide Dismutase (SOD) catalyses the dismutation of superoxide into oxygen and hydrogen peroxide, consequently providing protection against superoxide which is one of the most common free radicals in the body. The enzyme acts by repairing and/or reducing the amount of damage done to cells. The fact that Superoxide Dismutase levels have been found to decrease with age, while the level of free radicals in the body has been found to increase, suggests this enzyme plays a major role in the ageing process. As such there is great interest in determining the potential of Superoxide Dismutase in anti-ageing treatments and cosmetics.

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drug development and diagnostics globally

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