



# Nightingale Blood Biomarker Analysis Service

Boost your research with comprehensive blood metabolite insights.



## Powerful platform enabled by NMR

### Unique combination of biomarkers

Biomarkers include clinically validated routine markers, emerging biomarkers with strong medical relevance and promising, new biomarkers.

### Robust and highly reproducible results

Our fully automated analysis process is constantly monitored under a certified quality management system. And the NMR technology allows high reproducibility which ensures consistent and reliable results across all sample sets.

### Fast, cost-efficient and scalable technology

We use a high-throughput NMR technology which ensures efficient analysis for sample sets of all sizes without batch effects.

### Accurate and fully quantified metabolic data

Not only our analysis, but even our quantification process of the NMR spectral data is fully automated, which provides precise and accurate metabolite results in absolute concentration units.

### Comprehensive overview of an individual's health

Biomarkers in our panel provide a physiologically meaningful picture of the overall health making it possible to explore novel connections between metabolites and an individual's health status.

### Certified quality management system

Nightingale Health operates under a certified quality management system in accordance with EN ISO 13485:2016 and SFS-EN ISO/IEC 17025.

TECH SPECIFICATIONS	
<b>Technology</b>	<sup>1</sup> H NMR Spectroscopy, Nightingale Health's proprietary analysis
<b>Specimen type</b>	Serum and Plasma
<b>Sample volume</b>	100 µL and 350 µL
<b>Number of biomarkers</b>	250
<b>Result units</b>	Absolute biomarker quantification (mmol/l or g/l)
<b>Sample storage</b>	Long-term storage -70°C or below

## CLINICALLY VALIDATED BIOMARKERS (39)

### Cholesterol

Total cholesterol	mmol/l
VLDL cholesterol	mmol/l
Clinical LDL cholesterol	mmol/l
HDL cholesterol	mmol/l

### Triglycerides

Total triglycerides	mmol/l
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### Fatty acids

Total fatty acids	mmol/l
Omega-3 fatty acids	mmol/l
Omega-6 fatty acids	mmol/l
Polyunsaturated fatty acids	mmol/l
Monounsaturated fatty acids	mmol/l
Saturated fatty acids	mmol/l
Docosahexaenoic acid	mmol/l
Linoleic acid	mmol/l

### Fatty acid ratios

Ratio of omega-3 fatty acids to total fatty acids	%
Ratio of omega-6 fatty acids to total fatty acids	%

Ratio of polyunsaturated fatty acids to total fatty acids	%
Ratio of monounsaturated fatty acids to total fatty acids	%
Ratio of saturated fatty acids to total fatty acids	%
Ratio of docosahexaenoic acid to total fatty acids	%
Ratio of polyunsaturated fatty acids to monounsaturated fatty acids	%
Ratio of omega-6 fatty acids to omega-3 fatty acids	%
Ratio of linoleic acid to total fatty acids	%

### Apolipoproteins

Apolipoprotein B	g/l
Apolipoprotein A1	g/l
Ratio of apolipoprotein B to apolipoprotein A1	ratio

### Amino acids

Alanine	mmol/l
Glycine	mmol/l
Histidine	mmol/l

### Branched-chain amino acids

Total concentration of branched-chain amino acids (leucine + isoleucine + valine)	mmol/l
Isoleucine	mmol/l
Leucine	mmol/l
Valine	mmol/l

### Aromatic amino acids

Phenylalanine	mmol/l
Tyrosine	mmol/l

### Glycolysis related metabolites

Glucose	mmol/l
Lactate	mmol/l

### Fluid balance

Creatinine	mmol/l
Albumin	g/l

### Inflammation

Glycoprotein acetyls	mmol/l
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# List of all biomarkers

<b>Cholesterol</b>		<b>Other lipids</b>		<b>Glycolysis related metabolites</b>		<b>Medium VLDL (average diameter 44.5 nm)</b>	
Total cholesterol	mmol/l	Phosphoglycerides	mmol/l	Glucose	mmol/l	Concentration of medium VLDL particles	mmol/l
Total cholesterol minus HDL-C	mmol/l	Ratio of triglycerides to phosphoglycerides	ratio	Lactate	mmol/l	Total lipids in medium VLDL	mmol/l
Remnant cholesterol		Total cholinols	mmol/l	Pyruvate	mmol/l	Phospholipids in medium VLDL	mmol/l
(non-HDL, non-LDL -cholesterol)	mmol/l	Phosphatidylcholines	mmol/l	Citrate **	mmol/l	Cholesterol in medium VLDL	mmol/l
VLDL cholesterol	mmol/l	Sphingomyelins	mmol/l	Glycerol *	mmol/l	Cholesteryl esters in medium VLDL	mmol/l
Clinical LDL cholesterol	mmol/l					Free cholesterol in medium VLDL	mmol/l
LDL cholesterol	mmol/l	<b>Apolipoproteins</b>		<b>Ketone bodies</b>		Triglycerides in medium VLDL	mmol/l
HDL cholesterol	mmol/l	Apolipoprotein B	g/l	3-Hydroxybutyrate	mmol/l		
		Apolipoprotein A1	g/l	Acetate	mmol/l	<b>Small VLDL (average diameter 36.8 nm)</b>	
		Ratio of apolipoprotein B to apolipoprotein A1	ratio	Acetoacetate	mmol/l	Concentration of small VLDL particles	mmol/l
<b>Triglycerides</b>		<b>Fatty acids</b>		Acetone	mmol/l	Total lipids in small VLDL	mmol/l
Total triglycerides	mmol/l	Total fatty acids	mmol/l			Phospholipids in small VLDL	mmol/l
Triglycerides in VLDL	mmol/l	Degree of unsaturation	degree	<b>Fluid balance</b>		Cholesterol in small VLDL	mmol/l
Triglycerides in LDL	mmol/l	Omega-3 fatty acids	mmol/l	Creatinine	mmol/l	Cholesteryl esters in small VLDL	mmol/l
Triglycerides in HDL	mmol/l	Omega-6 fatty acids	mmol/l	Albumin	g/l	Free cholesterol in small VLDL	mmol/l
		Polyunsaturated fatty acids	mmol/l			Triglycerides in small VLDL	mmol/l
<b>Phospholipids</b>		Monounsaturated fatty acids	mmol/l	<b>Inflammation</b>			
Total phospholipids in lipoprotein particles	mmol/l	Saturated fatty acids	mmol/l	Glycoprotein acetyls	mmol/l	<b>Very small VLDL (average diameter 31.3 nm)</b>	
Phospholipids in VLDL	mmol/l	Linoleic acid	mmol/l			Concentration of very small VLDL particles	mmol/l
Phospholipids in LDL	mmol/l	Docosahexaenoic acid	mmol/l	<b>Lipoprotein subclasses</b>		Total lipids in very small VLDL	mmol/l
Phospholipids in HDL	mmol/l			<b>Chylomicrons and extremely large VLDL (particle diameters from 75 nm upwards)</b>		Phospholipids in very small VLDL	mmol/l
		<b>Fatty acid ratios</b>		Concentration of chylomicrons and extremely large VLDL particles	mmol/l	Cholesterol in very small VLDL	mmol/l
<b>Cholesteryl esters</b>		Ratio of omega-3 fatty acids to total fatty acids	%	Total lipids in chylomicrons and extremely large VLDL	mmol/l	Cholesteryl esters in very small VLDL	mmol/l
Total esterified cholesterol	mmol/l	Ratio of omega-6 fatty acids to total fatty acids	%	Phospholipids in chylomicrons and extremely large VLDL	mmol/l	Free cholesterol in very small VLDL	mmol/l
Cholesterol esters in VLDL	mmol/l	Ratio of polyunsaturated fatty acids to total fatty acids	%	Cholesterol in chylomicrons and extremely large VLDL	mmol/l	Triglycerides in very small VLDL	mmol/l
Cholesterol esters in LDL	mmol/l	Ratio of monounsaturated fatty acids to total fatty acids	%	Cholesteryl esters in chylomicrons and extremely large VLDL	mmol/l		
Cholesterol esters in HDL	mmol/l	Ratio of saturated fatty acids to total fatty acids	%	Free cholesterol in chylomicrons and extremely large VLDL	mmol/l	<b>IDL (average diameter 28.6 nm)</b>	
		Ratio of linoleic acid to total fatty acids	%	Triglycerides in chylomicrons and extremely large VLDL	mmol/l	Concentration of IDL particles	mmol/l
<b>Free cholesterol</b>		Ratio of docosahexaenoic acid to total fatty acids	%			Total lipids in IDL	mmol/l
Total free cholesterol	mmol/l	Ratio of polyunsaturated fatty acids to monounsaturated fatty acids	ratio	<b>Very large VLDL (average diameter 64 nm)</b>		Phospholipids in IDL	mmol/l
Free cholesterol in VLDL	mmol/l	Ratio of omega-6 fatty acids to omega-3 fatty acids	ratio	Concentration of very large VLDL particles	mmol/l	Cholesterol in IDL	mmol/l
Free cholesterol in LDL	mmol/l			Total lipids in very large VLDL	mmol/l	Cholesteryl esters in IDL	mmol/l
Free cholesterol in HDL	mmol/l	<b>Amino acids</b>		Phospholipids in very large VLDL	mmol/l	Free cholesterol in IDL	mmol/l
		Alanine	mmol/l	Cholesterol in very large VLDL	mmol/l	Triglycerides in IDL	mmol/l
<b>Total lipids</b>		Glutamine	mmol/l	Cholesteryl esters in very large VLDL	mmol/l		
Total lipids in lipoprotein particles	mmol/l	Glycine	mmol/l	Free cholesterol in chylomicrons and extremely large VLDL	mmol/l	<b>Large LDL (average diameter 25.5 nm)</b>	
Total lipids in VLDL	mmol/l	Histidine	mmol/l	Triglycerides in chylomicrons and extremely large VLDL	mmol/l	Concentration of large LDL particles	mmol/l
Total lipids in LDL	mmol/l					Total lipids in large LDL	mmol/l
Total lipids in HDL	mmol/l	<b>Branched-chain amino acids</b>		<b>Very large VLDL (average diameter 64 nm)</b>		Phospholipids in large LDL	mmol/l
		Total concentration of branched -chain amino acids (leucine + isoleucine + valine)	mmol/l	Concentration of very large VLDL particles	mmol/l	Cholesterol in large LDL	mmol/l
<b>Lipoprotein particle concentrations</b>		Isoleucine	mmol/l	Total lipids in very large VLDL	mmol/l	Cholesteryl esters in large LDL	mmol/l
Total concentration of lipoprotein particles	mmol/l	Leucine	mmol/l	Phospholipids in very large VLDL	mmol/l	Free cholesterol in large LDL	mmol/l
Concentration of VLDL particles	mmol/l	Valine	mmol/l	Cholesterol in very large VLDL	mmol/l	Triglycerides in large LDL	mmol/l
Concentration of LDL particles	mmol/l			Triglycerides in very large VLDL	mmol/l		
Concentration of HDL particles	mmol/l	<b>Aromatic amino acids</b>		<b>Large VLDL (average diameter 53.6 nm)</b>		<b>Medium LDL (average diameter 23 nm)</b>	
		Phenylalanine	mmol/l	Concentration of large VLDL particles	mmol/l	Concentration of medium LDL particles	mmol/l
<b>Lipoprotein particle sizes</b>		Tyrosine	mmol/l	Total lipids in large VLDL	mmol/l	Total lipids in medium LDL	mmol/l
Average diameter for VLDL particles	nm			Phospholipids in large VLDL	mmol/l	Phospholipids in medium LDL	mmol/l
Average diameter for LDL particles	nm			Cholesterol in large VLDL	mmol/l	Cholesterol in medium LDL	mmol/l
Average diameter for HDL particles	nm			Cholesteryl esters in large VLDL	mmol/l	Cholesteryl esters in medium LDL	mmol/l
				Free cholesterol in large VLDL	mmol/l	Free cholesterol in medium LDL	mmol/l
				Triglycerides in large VLDL	mmol/l	Triglycerides in medium LDL	mmol/l

All listed biomarkers are available for Serum and Heparin plasma samples.

Biomarkers marked with \* are not available for EDTA plasma samples.

Biomarkers marked with \*\* are not available for Citrate plasma samples.

# List of all biomarkers

## Small LDL (average diameter 18.7 nm)

Concentration of small LDL particles	mmol/l
Total lipids in small LDL	mmol/l
Phospholipids in small LDL	mmol/l
Cholesterol in small LDL	mmol/l
Cholesteryl esters in small LDL	mmol/l
Free cholesterol in small LDL	mmol/l
Triglycerides in small LDL	mmol/l

## Very large HDL (average diameter 14.3 nm)

Concentration of very large HDL particles	mmol/l
Total lipids in very large HDL	mmol/l
Phospholipids in very large HDL	mmol/l
Cholesterol in very large HDL	mmol/l
Cholesteryl esters in very large HDL	mmol/l
Free cholesterol in very large HDL	mmol/l
Triglycerides in very large HDL	mmol/l

## Large HDL (average diameter 12.1 nm)

Concentration of large HDL particles	mmol/l
Total lipids in large HDL	mmol/l
Phospholipids in large HDL	mmol/l
Cholesterol in large HDL	mmol/l
Cholesteryl esters in large HDL	mmol/l
Free cholesterol in large HDL	mmol/l
Triglycerides in large HDL	mmol/l

## Medium HDL (average diameter 10.9 nm)

Concentration of medium HDL particles	mmol/l
Total lipids in medium HDL	mmol/l
Phospholipids in medium HDL	mmol/l
Cholesterol in medium HDL	mmol/l
Cholesteryl esters in medium HDL	mmol/l
Free cholesterol in medium HDL	mmol/l
Triglycerides in medium HDL	mmol/l

## Small HDL (average diameter 8.7 nm)

Concentration of small HDL particles	mmol/l
Total lipids in small HDL	mmol/l
Phospholipids in small HDL	mmol/l
Cholesterol in small HDL	mmol/l
Cholesteryl esters in small HDL	mmol/l
Free cholesterol in small HDL	mmol/l
Triglycerides in small HDL	mmol/l

## Relative lipoprotein lipid concentrations

### Chylomicrons and extremely large VLDL ratios

Phospholipids to total lipids ratio in chylomicrons and extremely large VLDL	%
Cholesterol to total lipids ratio in chylomicrons and extremely large VLDL	%
Cholesteryl esters to total lipids ratio in chylomicrons and extremely large VLDL	%
Free cholesterol to total lipids ratio in chylomicrons and extremely large VLDL	%

Triglycerides to total lipids ratio in chylomicrons and extremely large VLDL	%
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### Very large VLDL ratios

Phospholipids to total lipids ratio in very large VLDL	%
Cholesterol to total lipids ratio in very large VLDL	%
Cholesteryl esters to total lipids ratio in very large VLDL	%
Free cholesterol to total lipids ratio in very large VLDL	%
Triglycerides to total lipids ratio in very large VLDL	%

### Large VLDL ratios

Phospholipids to total lipids ratio in large VLDL	%
Cholesterol to total lipids ratio in large VLDL	%
Cholesteryl esters to total lipids ratio in large VLDL	%
Free cholesterol to total lipids ratio in large VLDL	%
Triglycerides to total lipids ratio in large VLDL	%

### Medium VLDL ratios

Phospholipids to total lipids ratio in medium VLDL	%
Cholesterol to total lipids ratio in medium VLDL	%
Cholesteryl esters to total lipids ratio in medium VLDL	%
Free cholesterol to total lipids ratio in medium VLDL	%
Triglycerides to total lipids ratio in medium VLDL	%

### Small VLDL ratios

Phospholipids to total lipids ratio in small VLDL	%
Cholesterol to total lipids ratio in small VLDL	%
Cholesteryl esters to total lipids ratio in small VLDL	%
Free cholesterol to total lipids ratio in small VLDL	%
Triglycerides to total lipids ratio in small VLDL	%

### Very small VLDL ratios

Phospholipids to total lipids ratio in very small VLDL	%
Cholesterol to total lipids ratio in very small VLDL	%
Cholesteryl esters to total lipids ratio in very small VLDL	%
Free cholesterol to total lipids ratio in very small VLDL	%
Triglycerides to total lipids ratio in very small VLDL	%

### IDL ratios

Phospholipids to total lipids ratio in IDL	%
Cholesterol to total lipids ratio in IDL	%
Cholesteryl esters to total lipids ratio in IDL	%
Free cholesterol to total lipids ratio in IDL	%
Triglycerides to total lipids ratio in IDL	%

### Large LDL ratios

Phospholipids to total lipids ratio in large LDL	%
Cholesterol to total lipids ratio in large LDL	%
Cholesteryl esters to total lipids ratio in large LDL	%
Free cholesterol to total lipids ratio in large LDL	%
Triglycerides to total lipids ratio in large LDL	%

### Medium LDL ratios

Phospholipids to total lipids ratio in medium LDL	%
Cholesterol to total lipids ratio in medium LDL	%

Cholesteryl esters to total lipids ratio in medium LDL	%
Free cholesterol to total lipids ratio in medium LDL	%
Triglycerides to total lipids ratio in medium LDL	%

### Small LDL ratios

Phospholipids to total lipids ratio in small LDL	%
Cholesterol to total lipids ratio in small LDL	%
Cholesteryl esters to total lipids ratio in small LDL	%
Free cholesterol to total lipids ratio in small LDL	%
Triglycerides to total lipids ratio in small LDL	%

### Very large HDL ratios

Phospholipids to total lipids ratio in very large HDL	%
Cholesterol to total lipids ratio in very large HDL	%
Cholesteryl esters to total lipids ratio in very large HDL	%
Free cholesterol to total lipids ratio in very large HDL	%
Triglycerides to total lipids ratio in very large HDL	%

### Large HDL ratios

Phospholipids to total lipids ratio in large HDL	%
Cholesterol to total lipids ratio in large HDL	%
Cholesteryl esters to total lipids ratio in large HDL	%
Free cholesterol to total lipids ratio in large HDL	%
Triglycerides to total lipids ratio in large HDL	%

### Medium HDL ratios

Phospholipids to total lipids ratio in medium HDL	%
Cholesterol to total lipids ratio in medium HDL	%
Cholesteryl esters to total lipids ratio in medium HDL	%
Free cholesterol to total lipids ratio in medium HDL	%
Triglycerides to total lipids ratio in medium HDL	%

### Small HDL ratios

Phospholipids to total lipids ratio in small HDL	%
Cholesterol to total lipids ratio in small HDL	%
Cholesteryl esters to total lipids ratio in small HDL	%
Free cholesterol to total lipids ratio in small HDL	%
Triglycerides to total lipids ratio in small HDL	%

## ABOUT US

Nightingale Health Plc provides a NMR (Nuclear Magnetic Resonance) based metabolomics technology, supplying biomarker analysis services for human blood, urine, CSF and umbilical cord blood samples. By measuring biomarkers from multiple pathways in a single experiment, Nightingale equips public health researchers with comprehensive insights into the effects of lifestyle factors and future disease risk, accelerating future breakthroughs in precision medicine. In the long term, the company plans to fully integrate its services into clinical practice, helping to empower patients to follow-up on their own well-being and take proactive steps to stay healthy.

## SEE ALSO

- Nightingale CSF Biomarker Analysis Service
- Nightingale Urine Biomarker Analysis Service
- Nightingale Cord Blood Biomarker Analysis Service



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