



# Nightingale Blood Biomarker Analysis Service

## Features

- ▶ Comprehensive biomarker panel
- ▶ Absolute biomarker quantification
- ▶ High-throughput
- ▶ Fast results delivery
- ▶ Affordable service

## Metabolic biomarker analysis of blood

Metabolic biomarker analysis of blood samples in cohorts, biobanks and clinical research allows for numerous epidemiological study applications, including discovery of biomarkers for disease onset and molecular effects of lifestyle exposures. This provides novel opportunities to use blood biomarkers to clarify the pathophysiological mechanisms of cardiovascular disease, diabetes, inflammation and non-alcoholic fatty liver disease, as well as improve the risk prediction for other common chronic diseases.

Nightingale's high-throughput blood biomarker analysis service offers a cost-effective solution, accommodating cohorts and trials of any size, and providing quantitative and repeatable results. Metabolic biomarker analysis of large blood sample collections can be used to investigate genetics, drug interventions, dietary effects and other environmental exposures in numerous epidemiological study settings. Nightingale Blood Biomarker Analysis Service provides results measured in absolute concentration units.

## Quality

*Nightingale Health is dedicated to delivering high quality results that guarantee the validity of scientific findings and allow for effective clinical translation. As proof of our commitment, Nightingale Health's quality management system has been certified according to EN ISO 13485 standard. The blood biomarker analysis service is part of the certified quality management system. All our biomarker analysis services provide highly repeatable metabolite measures that are delivered in absolute concentrations and free of batch effects.*

## Applications

- Molecular epidemiology
- Risk and prognostics for cardiovascular disease, Type 2 diabetes and other common chronic diseases
- Biomarker reflections of diet and other lifestyle exposures
- Genetic regulation of blood metabolism
- Molecular understanding of common chronic diseases and novel biomarker discovery

## Tech specifications

<b>Technology/ method</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>	220
<b>Result report format</b>	Spreadsheet and graphical reports
<b>Result units</b>	Absolute biomarker quantification (mmol/l or g/l)
<b>Sample container requirements</b>	Outer diameter of vial less than 13mm or in 96-well plate format
<b>Sample storage</b>	Long-term storage -70°C or below
<b>Sample shipping</b>	In dry ice

# List of Biomarkers

Metabolite	Unit	Metabolite	Unit	Metabolite	Unit	Metabolite	Unit
<b>Cholesterol</b>		<b>Branched-chain amino acids</b>		<b>Large VLDL (average diameter 53.6 nm)</b>		<b>Medium LDL (average diameter 23 nm)</b>	
Total cholesterol	mmol/l	Isoleucine	mmol/l	Concentration of large VLDL particles	mol/l	Concentration of medium LDL particles	mol/l
VLDL cholesterol	mmol/l	Leucine	mmol/l	Total lipids in large VLDL	mmol/l	Total lipids in medium LDL	mmol/l
Remnant cholesterol	mmol/l	Valine	mmol/l	Phospholipids in large VLDL	mmol/l	Phospholipids in medium LDL	mmol/l
(non-HDL, non-LDL-cholesterol)				Cholesterol in large VLDL	mmol/l	Cholesterol in medium LDL	mmol/l
LDL cholesterol	mmol/l	<b>Aromatic amino acids</b>		Cholesteryl esters in large VLDL	mmol/l	Cholesteryl esters in medium LDL	mmol/l
HDL cholesterol	mmol/l	Phenylalanine	mmol/l	Free cholesterol in large VLDL	mmol/l	Free cholesterol in medium LDL	mmol/l
HDL2 cholesterol	mmol/l	Tyrosine	mmol/l	Triglycerides in large VLDL	mmol/l	Triglycerides in medium LDL	mmol/l
HDL3 cholesterol	mmol/l						Unit
Total esterified cholesterol	mmol/l	<b>Glycolysis related metabolites</b>		<b>Medium VLDL (average diameter 44.5 nm)</b>		<b>Small LDL (average diameter 18.7 nm)</b>	
Total free cholesterol	mmol/l	Glucose	mmol/l	Concentration of medium VLDL particles	mol/l	Concentration of small LDL particles	mol/l
		Lactate	mmol/l	Total lipids in medium VLDL	mmol/l	Total lipids in small LDL	mmol/l
<b>Glycerides and phospholipids</b>		Pyruvate *	mmol/l	Phospholipids in medium VLDL	mmol/l	Phospholipids in small LDL	mmol/l
Total triglycerides	mmol/l	Citrate **	mmol/l	Cholesterol in medium VLDL	mmol/l	Cholesterol in small LDL	mmol/l
Triglycerides in VLDL	mmol/l	Glycerol *	mmol/l	Cholesteryl esters in medium VLDL	mmol/l	Cholesteryl esters in small LDL	mmol/l
Triglycerides in LDL	mmol/l			Free cholesterol in medium VLDL	mmol/l	Free cholesterol in small LDL	mmol/l
Triglycerides in HDL	mmol/l	<b>Ketone bodies</b>		Triglycerides in medium VLDL	mmol/l	Triglycerides in small LDL	mmol/l
Phosphoglycerides	mmol/l	Acetate	mmol/l				
Ratio of triglycerides to phosphoglycerides	ratio	Acetoacetate	mmol/l	<b>Small VLDL (average diameter 36.8 nm)</b>		<b>Very large HDL (average diameter 14.3 nm)</b>	
Total cholines	mmol/l	Beta-hydroxybutyrate	mmol/l	Concentration of small VLDL particles	mol/l	Concentration of very large HDL particles	mol/l
Phosphatidylcholines	mmol/l			Total lipids in small VLDL	mmol/l	Total lipids in very large HDL	mmol/l
Sphingomyelins	mmol/l	<b>Fluid balance</b>		Phospholipids in small VLDL	mmol/l	Phospholipids in very large HDL	mmol/l
		Creatinine	mmol/l	Cholesterol in small VLDL	mmol/l	Cholesterol in very large HDL	mmol/l
<b>Apolipoproteins</b>		Albumin	signal area	Cholesteryl esters in small VLDL	mmol/l	Cholesteryl esters in very large HDL	mmol/l
Apolipoprotein B	g/l			Free cholesterol in small VLDL	mmol/l	Free cholesterol in very large HDL	mmol/l
Apolipoprotein A1	g/l	<b>Inflammation</b>		Triglycerides in small VLDL	mmol/l	Triglycerides in very large HDL	mmol/l
Ratio of apolipoprotein B to apolipoprotein A1	ratio	Glycoprotein acetyls	mmol/l				
				<b>Very small VLDL (average diameter 31.3 nm)</b>		<b>Large HDL (average diameter 12.1 nm)</b>	
<b>Fatty acids</b>		<b>Lipoprotein subclasses</b>		Concentration of very small VLDL particles	mol/l	Concentration of large HDL particles	mol/l
Total fatty acids	mmol/l			Total lipids in very small VLDL	mmol/l	Total lipids in large HDL	mmol/l
Degree of unsaturation	degree	<b>Chylomicrons and extremely large VLDL (particle diameters from 75 nm upwards)</b>		Phospholipids in very small VLDL	mmol/l	Phospholipids in large HDL	mmol/l
Omega-3 fatty acids	mmol/l	Concentration of chylomicrons and extremely large VLDL particles	mol/l	Cholesterol in very small VLDL	mmol/l	Cholesterol in large HDL	mmol/l
Omega-6 fatty acids	mmol/l	Total lipids in chylomicrons and extremely large VLDL	mmol/l	Cholesteryl esters in very small VLDL	mmol/l	Cholesteryl esters in large HDL	mmol/l
Polyunsaturated fatty acids	mmol/l	Phospholipids in chylomicrons VLDL and extremely large	mmol/l	Free cholesterol in very small VLDL	mmol/l	Free cholesterol in large HDL	mmol/l
Monounsaturated fatty acids	mmol/l	Cholesterol in chylomicrons and extremely large VLDL	mmol/l	Triglycerides in very small VLDL	mmol/l	Triglycerides in large HDL	mmol/l
Saturated fatty acids	mmol/l	Cholesteryl esters in chylomicrons and extremely large VLDL	mmol/l				
Docosahexaenoic acid	mmol/l	Free cholesterol in chylomicrons and extremely large VLDL	mmol/l	<b>IDL (average diameter 28.6 nm)</b>		<b>Medium HDL (average diameter 10.9 nm)</b>	
Linoleic acid	mmol/l	Triglycerides in chylomicrons and extremely large VLDL	mmol/l	Concentration of IDL particles	mol/l	Concentration of medium HDL particles	mol/l
				Total lipids in IDL	mmol/l	Total lipids in medium HDL	mmol/l
<b>Fatty acid ratios</b>		<b>Very large VLDL (average diameter 64 nm)</b>		Phospholipids in IDL	mmol/l	Phospholipids in medium HDL	mmol/l
Ratio of omega-3 fatty acids to total fatty acids	%	Concentration of very large VLDL particles	mol/l	Cholesterol in IDL	mmol/l	Cholesterol in medium HDL	mmol/l
Ratio of omega-6 fatty acids to total fatty acids	%	Total lipids in very large VLDL	mmol/l	Cholesteryl esters in IDL	mmol/l	Cholesteryl esters in medium HDL	mmol/l
Ratio of polyunsaturated fatty acids to total fatty acids	%	Phospholipids in very large VLDL	mmol/l	Free cholesterol in IDL	mmol/l	Free cholesterol in medium HDL	mmol/l
Ratio of monounsaturated fatty acids to total fatty acids	%	Cholesterol in very large VLDL	mmol/l	Triglycerides in IDL	mmol/l	Triglycerides in medium HDL	mmol/l
Ratio of saturated fatty acids to total fatty acids	%	Cholesteryl esters in very large VLDL	mmol/l				
Ratio of docosahexaenoic acid to total fatty acids	%	Free cholesterol in very large VLDL	mmol/l	<b>Large LDL (average diameter 25.5 nm)</b>			
Ratio of linoleic acid to total fatty acids	%	Triglycerides in very large VLDL	mmol/l	Concentration of large LDL particles	mol/l		
				Total lipids in large LDL	mmol/l		
<b>Amino acids</b>				Phospholipids in large LDL	mmol/l		
Alanine	mmol/l			Cholesterol in large LDL	mmol/l		
Glutamine	mmol/l			Cholesteryl esters in large LDL	mmol/l		
Glycine *	mmol/l			Free cholesterol in large LDL	mmol/l		
Histidine	mmol/l			Triglycerides in large 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 Biomarkers

Metabolite	Unit	Metabolite	Unit	Metabolite	Unit
<b>Small HDL (average diameter 8.7 nm)</b>		<b>Small VLDL ratios</b>		<b>Large HDL ratios</b>	
Concentration of small HDL particles	mol/l	Phospholipids to total lipids ratio in small VLDL	%	Phospholipids to total lipids ratio in large HDL	%
Total lipids in small HDL	mmol/l	Cholesterol to total lipids ratio in small VLDL	%	Cholesterol to total lipids ratio in large HDL	%
Phospholipids in small HDL	mmol/l	Cholesteryl esters to total lipids ratio in small VLDL	%	Cholesteryl esters to total lipids ratio in large HDL	%
Cholesterol in small HDL	mmol/l	Free cholesterol to total lipids ratio in small VLDL	%	Free cholesterol to total lipids ratio in large HDL	%
Cholesteryl esters in small HDL	mmol/l	Triglycerides to total lipids ratio in small VLDL	%	Triglycerides to total lipids ratio in large HDL	%
Free cholesterol in small HDL	mmol/l				
Triglycerides in small HDL	mmol/l				
<b>Lipoprotein particle sizes</b>		<b>Very small VLDL ratios</b>		<b>Medium HDL ratios</b>	
Average diameter for VLDL particles	nm	Phospholipids to total lipids ratio in very small VLDL	%	Phospholipids to total lipids ratio in medium HDL	%
Average diameter for LDL particles	nm	Cholesterol to total lipids ratio in very small VLDL	%	Cholesterol to total lipids ratio in medium HDL	%
Average diameter for HDL particles	nm	Cholesteryl esters to total lipids ratio in very small VLDL	%	Cholesteryl esters to total lipids ratio in medium HDL	%
		Free cholesterol to total lipids ratio in very small VLDL	%	Free cholesterol to total lipids ratio in medium HDL	%
		Triglycerides to total lipids ratio in very small VLDL	%	Triglycerides to total lipids ratio in medium HDL	%
<b>Relative lipoprotein lipid concentrations</b>		<b>IDL ratios</b>		<b>Small HDL ratios</b>	
Chylomicrons and extremely large VLDL ratios	%	Phospholipids to total lipids ratio in IDL	%	Phospholipids to total lipids ratio in small HDL	%
Phospholipids to total lipids ratio in VLDL	%	Cholesterol to total lipids ratio in IDL	%	Cholesterol to total lipids ratio in small HDL	%
chylomicrons and extremely large		Cholesteryl esters to total lipids ratio in IDL	%	Cholesteryl esters to total lipids ratio in small HDL	%
Cholesterol to total lipids ratio in	%	Free cholesterol to total lipids ratio in IDL	%	Free cholesterol to total lipids ratio in small HDL	%
chylomicrons and extremely large VLDL		Triglycerides to total lipids ratio in IDL	%	Triglycerides to total lipids ratio in small HDL	%
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					
<b>Very large VLDL ratios</b>		<b>Large LDL ratios</b>			
Phospholipids to total lipids ratio in very large VLDL	%	Phospholipids to total lipids ratio in large LDL	%		
Cholesterol to total lipids ratio in very large VLDL	%	Cholesterol to total lipids ratio in large LDL	%		
Cholesteryl esters to total lipids ratio in	%	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	%		
<b>Very large VLDL</b>		<b>Medium LDL ratios</b>			
Free cholesterol to total lipids ratio in	%	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	%		
<b>Very large VLDL</b>		<b>Small LDL ratios</b>			
Triglycerides to total lipids ratio in very large VLDL	%	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	%		
<b>Large VLDL ratios</b>		<b>Very large HDL ratios</b>			
Phospholipids to total lipids ratio in large VLDL	%	Phospholipids to total lipids ratio in very large HDL	%		
Cholesterol to total lipids ratio in large VLDL	%	Cholesterol to total lipids ratio in very large HDL	%		
Cholesteryl esters to total lipids ratio in large VLDL	%	Cholesteryl esters to total lipids ratio in very large HDL	%		
Free cholesterol to total lipids ratio in large VLDL	%	Free cholesterol to total lipids ratio in very large HDL	%		
Triglycerides to total lipids ratio in large VLDL	%	Triglycerides to total lipids ratio in very large HDL	%		
<b>Medium VLDL ratios</b>					
Phospholipids to total lipids ratio in medium VLDL	%				
Cholesterol to total lipids ratio in medium VLDL	%				
Cholesteryl esters to total lipids ratio in	%				
<b>Medium VLDL</b>					
Free cholesterol to total lipids ratio in medium VLDL	%				
Triglycerides to total lipids ratio in medium VLDL	%				



# Nightingale

Nightingale Health Ltd. 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](#)

[www.nightingale.health](http://www.nightingale.health)