

Venous blood analysis

CoreMetabolomics biomarker list

Biomarkers

Cholesterol		Total lipids		Fatty acids	
Total cholesterol	mmol/L	Total lipids in lipoprotein particles	mmol/L	Total fatty acids	mmol/L
Total cholesterol minus HDL-C	mmol/L	Total lipids in VLDL	mmol/L	Degree of unsaturation	degree
Remnant cholesterol (non-HDL, non-LDL -cholesterol)	mmol/L	Total lipids in LDL	mmol/L	Omega-3 fatty acids	mmol/L
VLDL cholesterol	mmol/L	Total lipids in HDL	mmol/L	Omega-6 fatty acids	mmol/L
Clinical LDL cholesterol	mmol/L	Lipoprotein particle concentrations		Polyunsaturated fatty acids	mmol/L
LDL cholesterol	mmol/L			Monounsaturated fatty acids	mmol/L
HDL cholesterol	mmol/L			Saturated fatty acids	mmol/L
Triglycerides		Concentration of VLDL particles		Linoleic acid	mmol/L
		Concentration of LDL particles	mmol/L	Docosahexaenoic acid	mmol/L
		Concentration of HDL particles	mmol/L	Fatty acid ratios	
		Lipoprotein particle sizes			
Total triglycerides	mmol/L				
Triglycerides in VLDL	mmol/L				
Triglycerides in LDL	mmol/L	Average diameter for VLDL particles	nm	Ratio of omega-3 fatty acids to total fatty acids	%
Triglycerides in HDL	mmol/L	Average diameter for LDL particles	nm	Ratio of omega-6 fatty acids to total fatty acids	%
Phospholipids		Average diameter for HDL particles	nm	Ratio of polyunsaturated fatty acids to total fatty acids	%
		Other lipids		Ratio of monounsaturated fatty acids to total fatty acids	%
				Ratio of saturated fatty acids to total fatty acids	%
				Ratio of linoleic acid to total fatty acids	%
Total phospholipids in lipoprotein particles	mmol/L	Phosphoglycerides	mmol/L	Ratio of docosahexaenoic acid to total fatty acids	%
Phospholipids in VLDL	mmol/L	Ratio of triglycerides to phosphoglycerides	ratio	Ratio of polyunsaturated fatty acids to monounsaturated fatty acids	ratio
Phospholipids in LDL	mmol/L	Total cholines	mmol/L		
Phospholipids in HDL	mmol/L	Phosphatidylcholines	mmol/L		
Cholesteryl esters		Sphingomyelins	mmol/L	Amino acids	
Total esterified cholesterol	mmol/L	Apolipoproteins			
Cholesteryl esters in VLDL	mmol/L				
Cholesteryl esters in LDL	mmol/L				
Cholesteryl esters in HDL	mmol/L	Apolipoprotein B	g/L	Alanine	mmol/L
Free cholesterol		Apolipoprotein A1	g/L	Glutamine	mmol/L
		Ratio of apolipoprotein B to apolipoprotein A1	ratio	Glycine	mmol/L
				Histidine	mmol/L
Total free cholesterol	mmol/L				
Free cholesterol in VLDL	mmol/L				
Free cholesterol in LDL	mmol/L				
Free cholesterol in HDL	mmol/L				

Branched-chain amino acids		Very large VLDL (average diameter 64 nm)		IDL (average diameter 28.6 nm)	
Total concentration of branched-chain amino acids (leucine + isoleucine + valine)	mmol/L	Concentration of very large VLDL particles	mmol/L	Concentration of IDL particles	mmol/L
Isoleucine	mmol/L	Total lipids in very large VLDL	mmol/L	Total lipids in IDL	mmol/L
Leucine	mmol/L	Phospholipids in very large VLDL	mmol/L	Phospholipids in IDL	mmol/L
Valine	mmol/L	Cholesterol in very large VLDL	mmol/L	Cholesterol in IDL	mmol/L
		Cholesteryl esters in very large VLDL	mmol/L	Cholesteryl esters in IDL	mmol/L
		Free cholesterol in very large VLDL	mmol/L	Free cholesterol in IDL	mmol/L
		Triglycerides in very large VLDL	mmol/L	Triglycerides in IDL	mmol/L
Aromatic amino acids		Large VLDL (average diameter 53.6 nm)		Large LDL (average diameter 25.5 nm)	
Phenylalanine	mmol/L	Concentration of large VLDL particles	mmol/L	Concentration of large LDL particles	mmol/L
Tyrosine	mmol/L	Total lipids in large VLDL	mmol/L	Total lipids in large LDL	mmol/L
		Phospholipids in large VLDL	mmol/L	Phospholipids in large LDL	mmol/L
		Cholesterol in large VLDL	mmol/L	Cholesterol in large LDL	mmol/L
		Cholesteryl esters in large VLDL	mmol/L	Cholesteryl esters in large LDL	mmol/L
		Free cholesterol in large VLDL	mmol/L	Free cholesterol in large LDL	mmol/L
		Triglycerides in large VLDL	mmol/L	Triglycerides in large LDL	mmol/L
Glycolysis-related metabolites		Medium VLDL (average diameter 44.5 nm)		Medium LDL (average diameter 23 nm)	
Glucose	mmol/L	Concentration of medium VLDL particles	mmol/L	Concentration of medium LDL particles	mmol/L
Lactate	mmol/L	Total lipids in medium VLDL	mmol/L	Total lipids in medium LDL	mmol/L
Pyruvate	mmol/L	Phospholipids in medium VLDL	mmol/L	Phospholipids in medium LDL	mmol/L
Citrate **	mmol/L	Cholesterol in medium VLDL	mmol/L	Cholesterol in medium LDL	mmol/L
Glycerol *	mmol/L	Cholesteryl esters in medium VLDL	mmol/L	Cholesteryl esters in medium LDL	mmol/L
		Free cholesterol in medium VLDL	mmol/L	Free cholesterol in medium LDL	mmol/L
		Triglycerides in medium VLDL	mmol/L	Triglycerides in medium LDL	mmol/L
Ketone bodies		Small VLDL (average diameter 36.8 nm)		Small LDL (average diameter 18.7 nm)	
3-Hydroxybutyrate	mmol/L	Concentration of small VLDL particles	mmol/L	Concentration of small LDL particles	mmol/L
Acetate	mmol/L	Total lipids in small VLDL	mmol/L	Total lipids in small LDL	mmol/L
Acetoacetate	mmol/L	Phospholipids in small VLDL	mmol/L	Phospholipids in small LDL	mmol/L
Acetone	mmol/L	Cholesterol in small VLDL	mmol/L	Cholesterol in small LDL	mmol/L
		Cholesteryl esters in small VLDL	mmol/L	Cholesteryl esters in small LDL	mmol/L
		Free cholesterol in small VLDL	mmol/L	Free cholesterol in small LDL	mmol/L
		Triglycerides in small VLDL	mmol/L	Triglycerides in small LDL	mmol/L
Fluid balance		Very small VLDL (average diameter 31.3 nm)		Very large HDL (average diameter 14.3 nm)	
Creatinine	μmol/L	Concentration of very small VLDL particles	mmol/L	Concentration of very large HDL particles	mmol/L
Albumin	g/L	Total lipids in very small VLDL	mmol/L	Total lipids in very large HDL	mmol/L
		Phospholipids in very small VLDL	mmol/L	Phospholipids in very large HDL	mmol/L
		Cholesterol in very small VLDL	mmol/L	Cholesterol in very large HDL	mmol/L
		Cholesteryl esters in very small VLDL	mmol/L	Cholesteryl esters in very large HDL	mmol/L
		Free cholesterol in very small VLDL	mmol/L	Free cholesterol in very large HDL	mmol/L
		Triglycerides in very small VLDL	mmol/L	Triglycerides in very large HDL	mmol/L
Inflammation					
Glycoprotein acetyls	mmol/L				
Lipoprotein subclasses					
Chylomicrons and extremely large VLDL (particle diameters from 75 nm upwards)					
Concentration of chylomicrons and extremely large VLDL particles	mmol/L				
Total lipids in chylomicrons and extremely large VLDL	mmol/L				
Phospholipids in chylomicrons and extremely large VLDL	mmol/L				
Cholesterol in chylomicrons and extremely large VLDL	mmol/L				
Cholesteryl esters in chylomicrons and extremely large VLDL	mmol/L				
Free cholesterol in chylomicrons and extremely large VLDL	mmol/L				
Triglycerides in chylomicrons and extremely large VLDL	mmol/L				

Large HDL (average diameter 12.1 nm)		Cholesteryl esters to total lipids ratio in very large VLDL		%	IDL ratios	
Concentration of large HDL particles	mmol/L	Free cholesterol to total lipids ratio in very large VLDL		%	Phospholipids to total lipids ratio in IDL	%
Total lipids in large HDL	mmol/L	Triglycerides to total lipids ratio in very large VLDL		%	Cholesterol to total lipids ratio in IDL	%
Phospholipids in large HDL	mmol/L	Large VLDL ratios		%">	Cholesteryl esters to total lipids ratio in IDL	%
Cholesterol in large HDL	mmol/L				Free cholesterol to total lipids ratio in IDL	%
Cholesteryl esters in large HDL	mmol/L				Triglycerides to total lipids ratio in IDL	%
Free cholesterol in large HDL	mmol/L	Phospholipids to total lipids ratio in large VLDL		%	Large LDL ratios	
Triglycerides in large HDL	mmol/L	Cholesterol to total lipids ratio in large VLDL		%	Phospholipids to total lipids ratio in large LDL	%
Medium HDL (average diameter 10.9 nm)		Cholesteryl esters to total lipids ratio in large VLDL		%	Cholesterol to total lipids ratio in large LDL	%
Concentration of medium HDL particles	mmol/L	Free cholesterol to total lipids ratio in large VLDL		%	Cholesteryl esters to total lipids ratio in large LDL	%
Total lipids in medium HDL	mmol/L	Triglycerides to total lipids ratio in large VLDL		%	Free cholesterol to total lipids ratio in large LDL	%
Phospholipids in medium HDL	mmol/L	Medium VLDL ratios		%">	Triglycerides to total lipids ratio in large LDL	%
Cholesterol in medium HDL	mmol/L				Medium LDL ratios	
Cholesteryl esters in medium HDL	mmol/L				Phospholipids to total lipids ratio in medium LDL	%
Free cholesterol in medium HDL	mmol/L	Phospholipids to total lipids ratio in medium VLDL		%	Cholesterol to total lipids ratio in medium LDL	%
Triglycerides in medium HDL	mmol/L	Cholesterol to total lipids ratio in medium VLDL		%	Cholesteryl esters to total lipids ratio in medium LDL	%
Small HDL (average diameter 8.7 nm)		Cholesteryl esters to total lipids ratio in medium VLDL		%	Free cholesterol to total lipids ratio in medium LDL	%
Concentration of small HDL particles	mmol/L	Free cholesterol to total lipids ratio in medium VLDL		%	Triglycerides to total lipids ratio in medium LDL	%
Total lipids in small HDL	mmol/L	Triglycerides to total lipids ratio in medium VLDL		%	Small LDL ratios	
Phospholipids in small HDL	mmol/L	Small VLDL ratios		%">	Phospholipids to total lipids ratio in small LDL	%
Cholesterol in small HDL	mmol/L				Cholesterol to total lipids ratio in small LDL	%
Cholesteryl esters in small HDL	mmol/L				Cholesteryl esters to total lipids ratio in small LDL	%
Free cholesterol in small HDL	mmol/L	Phospholipids to total lipids ratio in small VLDL		%	Free cholesterol to total lipids ratio in small LDL	%
Triglycerides in small HDL	mmol/L	Cholesterol to total lipids ratio in small VLDL		%	Triglycerides to total lipids ratio in small LDL	%
Relative lipoprotein lipid concentrations		Cholesteryl esters to total lipids ratio in small VLDL		%	Very large HDL ratios	
Chylomicrons and extremely large VLDL ratios		Free cholesterol to total lipids ratio in small VLDL		%	Phospholipids to total lipids ratio in very large HDL	%
Phospholipids to total lipids ratio in chylomicrons and extremely large VLDL	%	Triglycerides to total lipids ratio in small VLDL		%	Cholesterol to total lipids ratio in very large HDL	%
Cholesterol to total lipids ratio in chylomicrons and extremely large VLDL	%	Very small VLDL ratios		%">	Cholesteryl esters to total lipids ratio in very large HDL	%
Cholesteryl esters to total lipids ratio in chylomicrons and extremely large VLDL	%				Free cholesterol to total lipids ratio in very large HDL	%
Free cholesterol to total lipids ratio in chylomicrons and extremely large VLDL	%				Triglycerides to total lipids ratio in very large HDL	%
Triglycerides to total lipids ratio in chylomicrons and extremely large VLDL	%	Phospholipids to total lipids ratio in very small VLDL		%		
Very large VLDL ratios		Cholesterol to total lipids ratio in very small VLDL		%		
Phospholipids to total lipids ratio in very large VLDL	%	Cholesteryl esters to total lipids ratio in very small VLDL		%		
Cholesterol to total lipids ratio in very large VLDL	%	Free cholesterol to total lipids ratio in very small VLDL		%		
		Triglycerides to total lipids ratio in very small VLDL		%		

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	%