

Supplementary Methods

Metabolite Profiling. Ammonium acetate, ammonium hydroxide, isotope-labeled choline-d₃, and LC-MS grade solvents were purchased from Sigma-Aldrich (St. Louis, MO). Isotope-labeled kynurenic acid-d₅, citrulline-d₇, and creatinine-d₃ were purchased from CDN Isotopes (Quebec, Canada) and isotope-labeled inosine-¹⁵N₄ was purchased from Cambridge Isotopes (Andover, MA). MultiQuant software (Version 1.1; AB SCIEX; Foster City, CA) was used for automated peak integration and all metabolite peaks were manually reviewed for quality of integration and compared against a known commercial standard to confirm identity. All plasma was collected in EDTA.

For the measurement of organic acids, sugars, bile acids and other negatively charged polar metabolites, 30 µL of plasma were extracted with the addition of four volumes of 80:20 vol/vol methanol/water containing isotope-labeled inosine-¹⁵N₄. After centrifugation, supernatants underwent chromatography on a 150 x 2.0 mm Luna NH₂ column (Phenomenex; Torrance, CA); mobile phase A: 20 mM ammonium acetate, 20mM ammonium hydroxide; mobile phase B: 10mM ammonium hydroxide in 25:75 vol/vol methanol/acetonitrile. The column was eluted isocratically with 10% mobile phase A for 1 minute followed by a linear gradient to 100% mobile phase A over 9 minutes. MS data were acquired using a 5500 QTRAP triple quadrupole mass spectrometer (AB SCIEX; Foster City, CA) using ESI and MRM in the negative ion mode. A pooled plasma sample was run every 20 experimental samples, and peak areas in experimental samples were normalized to metabolite peak areas in the nearest pooled plasma. The ion spray voltage was -4.5 kV and the source temperature was 500 °C.

Supplementary Table 1. Metabolite associations with incident CKD in FHS

Profiling Method	Metabolite	Geometric mean ratio in FHS (95% confidence interval)	P-value
Polar, positively charged	adenosine	1.50 (1.27-1.77)	1.99E-06
	trimethylamine-N-oxide	1.33 (1.18-1.49)	1.64E-06
	kynurenic acid	1.25 (1.14-1.38)	1.36E-06
	β -aminoisobutyric acid	1.22 (1.13-1.34)	1.05E-06
	glycerol	1.21 (1.09-1.35)	4.69E-04
	xanthosine	1.19 (1.13-1.27)	5.23E-09
	allantoin	1.13 (1.05-1.21)	5.63E-04
	citrulline	1.13 (1.08-1.18)	2.01E-08
	dimethylglycine	1.12 (1.04-1.20)	1.59E-03
	choline	1.08 (1.05-1.12)	3.74E-07
	symmetric dimethylarginine	1.07 (1.03-1.12)	8.33E-04
	S-adenosylhomocysteine	1.07 (0.95-1.21)	2.47E-01
	ureidopropionic acid	1.07 (0.99-1.16)	8.29E-02
	gamma-aminoisobutyric acid	1.07 (0.99-1.15)	7.22E-02
	NG-monomethyl-arginine	1.07 (1.02-1.11)	2.99E-03
	creatine	1.07 (0.97-1.17)	1.67E-01
	isoleucine	1.06 (1.01-1.10)	1.29E-02
	ornithine	1.05 (1.00-1.11)	4.83E-02
	anthranilic acid	1.05 (0.93-1.19)	3.92E-01
	creatinine	1.05 (1.02-1.09)	1.12E-03
	leucine	1.05 (1.01-1.09)	6.04E-03
	phenylalanine	1.05 (1.02-1.09)	4.36E-03
	argininosuccinate	1.05 (0.97-1.14)	2.54E-01
	hydroxyproline	1.05 (0.98-1.12)	1.58E-01
	thyroxine	1.04 (0.99-1.08)	1.20E-01
	asymmetric dimethylarginine	1.03 (0.99-1.09)	1.56E-01
	tyrosine	1.03 (0.99-1.08)	1.57E-01
	proline	1.03 (0.99-1.07)	1.69E-01
	valine	1.03 (0.99-1.06)	1.21E-01
	carnitine	1.02 (0.99-1.05)	1.79E-01
	triiodothyronine	1.02 (0.96-1.08)	5.39E-01
	lysine	1.02 (0.98-1.06)	4.09E-01
	taurine	1.01 (0.97-1.06)	5.15E-01
	alanine	1.01 (0.97-1.05)	6.94E-01
	aspartate	1.01 (0.92-1.10)	8.71E-01
	betaine	1.00 (0.96-1.04)	8.79E-01
	methionine	1.00 (0.96-1.04)	8.59E-01
	glycine	0.99 (0.93-1.06)	8.14E-01
	asparagine	0.99 (0.92-1.07)	7.87E-01
	thiamine	0.99 (0.83-1.17)	8.97E-01
threonine	0.99 (0.95-1.03)	6.03E-01	
arginine	0.98 (0.91-1.04)	4.88E-01	

	niacinamide	0.98 (0.90-1.06)	5.63E-01
	tryptophan	0.97 (0.93-1.01)	8.94E-02
	glutamine	0.96 (0.84-1.11)	5.39E-01
	serine	0.96 (0.91-1.00)	6.01E-02
	histidine	0.96 (0.93-0.99)	3.62E-03
	serotonin	0.95 (0.83-1.09)	4.87E-01
	glutamate	0.93 (0.83-1.04)	2.08E-01
	alpha-glycerophosphocholine	0.88 (0.76-1.03)	1.12E-01
	cotinine	0.85 (0.60-1.19)	3.46E-01
	carosine	0.83 (0.58-1.20)	3.31E-01
	3-hydroxyanthranilic acid	0.79 (0.62-0.99)	4.15E-02
	5-hydroxyindoleacetic acid	0.73 (0.64-0.83)	3.25E-06
Polar, negatively charged	sucrose	1.39 (1.19-1.63)	4.70E-05
	salicylurate	1.32 (0.99-1.77)	5.71E-02
	glucuronate	1.30 (1.11-1.52)	9.72E-04
	uridine diphosphate	1.27 (1.04-1.56)	2.21E-02
	orotic acid	1.26 (1.07-1.48)	6.22E-03
	oxalate	1.25 (1.05-1.48)	1.32E-02
	xanthurenate	1.25 (1.06-1.47)	8.87E-03
	indole-3-propionate	1.24 (1.05-1.48)	1.26E-02
	pyruvate	1.24 (0.98-1.57)	6.96E-02
	hippuric acid	1.22 (1.04-1.44)	1.50E-02
	lactose	1.20 (1.08-1.34)	1.11E-03
	inositol	1.19 (1.09-1.30)	1.22E-04
	quinolinic acid	1.19 (1.10-1.28)	5.14E-06
	beta-hydroxybutyric acid	1.18 (1.01-1.37)	3.41E-02
	propionic acid	1.17 (1.03-1.33)	1.36E-02
	taurocholate	1.17 (0.95-1.44)	1.40E-01
	suberic acid	1.16 (1.06-1.27)	1.01E-03
	cystathionine	1.16 (1.06-1.27)	1.91E-03
	isocitrate	1.14 (1.09-1.20)	9.11E-08
	sorbitol	1.14 (1.05-1.24)	2.35E-03
	hyodeoxycholate; ursodeoxycholate; chenodeoxycholate; deoxycholate	1.14 (1.00-1.30)	4.54E-02
	inosine	1.14 (0.98-1.32)	1.02E-01
	aconitate	1.13 (1.08-1.19)	9.39E-08
	kynurenine	1.13 (1.08-1.19)	4.05E-07
	hypoxanthine	1.13 (0.94-1.35)	1.88E-01
	aminoadipic acid	1.12 (1.06-1.20)	2.78E-04
	fumarate; maleate; alpha-ketoisovalerate	1.10 (1.03-1.18)	3.36E-03
	indoxyl sulfate	1.09 (0.95-1.25)	2.05E-01
	3-hydroxyphenylacetic acid	1.09 (1.01-1.18)	2.39E-02
	glycocholate	1.09 (0.97-1.22)	1.46E-01
	uridine diphosphate glucose; uridine diphosphate galactose	1.08 (0.96-1.23)	2.12E-01
	pantothenic acid	1.08 (0.99-1.19)	9.38E-02
	glycodeoxycholate; glycochenodeoxycholate	1.08 (0.94-1.25)	2.88E-01

	adenosine monophosphate	1.08 (0.95-1.24)	2.53E-01
	alpha-hydroxybutyric acid	1.07 (0.99-1.15)	7.36E-02
	guanosine monophosphate	1.06 (0.91-1.23)	4.46E-01
	phosphoenolpyruvic acid	1.06 (0.90-1.24)	4.84E-01
	citrate	1.05 (1.02-1.09)	6.93E-04
	glycerol-3-phosphate	1.05 (0.96-1.15)	2.79E-01
	3-methyladipic acid; pimelic acid	1.05 (0.99-1.10)	1.01E-01
	cyclic adenosine monophosphate	1.04 (0.94-1.15)	4.07E-01
	adipic acid	1.04 (0.98-1.09)	1.84E-01
	uric acid	1.04 (1.01-1.06)	1.35E-02
	pyridoxate	1.03 (0.91-1.18)	6.22E-01
	fructose; glucose; galactose	1.03 (1.01-1.05)	1.22E-03
	gentisic acid	1.03 (0.86-1.22)	7.53E-01
	malate	1.03 (0.98-1.07)	2.11E-01
	2-hydroxyglutaric acid	1.02 (0.95-1.10)	6.37E-01
	lactate	1.02 (0.97-1.06)	5.34E-01
	ribose-5-phosphate; ribulose-5-phosphate	1.00 (0.91-1.10)	9.84E-01
	fructose-1-phosphate; fructose-6-phosphate; glucose-1-phosphate; glucose-6-phosphate	1.00 (0.95-1.06)	9.75E-01
	alpha_ketoglutarate	0.99 (0.89-1.09)	7.82E-01
	taurodeoxycholate; taurochenodeoxycholate	0.98 (0.83-1.17)	8.48E-01
	uridine	0.98 (0.94-1.02)	3.60E-01
	xanthine	0.97 (0.86-1.09)	5.79E-01
	phosphocreatine	0.96 (0.91-1.03)	2.38E-01
	adenosine diphosphate	0.96 (0.83-1.12)	5.97E-01
	3-phosphoglyceric acid	0.96 (0.89-1.03)	2.83E-01
	guanosine diphosphate	0.95 (0.84-1.07)	3.99E-01
Lipids	TAG 58:12	1.20 (1.06-1.37)	5.66E-03
	DAG 36:2	1.12 (1.03-1.23)	9.31E-03
	TAG 56:8	1.12 (1.04-1.22)	4.90E-03
	CE 22:6	1.12 (1.00-1.26)	5.43E-02
	TAG 56:7	1.12 (1.03-1.20)	5.56E-03
	TAG 50:5	1.10 (1.00-1.21)	4.11E-02
	DAG 34:2	1.10 (1.00-1.21)	5.13E-02
	TAG 56:2	1.10 (0.97-1.24)	1.21E-01
	TAG 56:4	1.10 (1.03-1.17)	2.74E-03
	TAG 58:8	1.10 (1.01-1.20)	2.90E-02
	DAG 36:1	1.10 (0.99-1.21)	6.72E-02
	TAG 54:1	1.09 (0.94-1.26)	2.47E-01
	TAG 56:6	1.09 (1.03-1.15)	4.01E-03
	TAG 54:7	1.09 (1.00-1.19)	6.41E-02
	TAG 56:5	1.08 (1.02-1.14)	5.18E-03
	TAG 54:6	1.08 (0.99-1.17)	6.61E-02
	TAG 50:1	1.08 (0.99-1.17)	8.95E-02
	DAG 34:1	1.07 (0.97-1.18)	1.50E-01
	TAG 54:8	1.07 (0.98-1.17)	1.28E-01
	TAG 54:5	1.07 (1.01-1.13)	2.22E-02

TAG 52:5	1.07 (0.98-1.16)	1.33E-01
TAG 60:12	1.07 (0.97-1.17)	1.68E-01
TAG 58:9	1.06 (0.96-1.18)	2.23E-01
TAG 52:6	1.06 (0.97-1.17)	2.15E-01
TAG 58:6	1.06 (0.96-1.17)	2.39E-01
TAG 56:9	1.06 (1.00-1.12)	7.17E-02
TAG 52:4	1.05 (1.01-1.11)	1.14E-02
TAG 52:3	1.05 (1.02-1.08)	2.76E-04
TAG 56:3	1.05 (0.97-1.14)	2.38E-01
TAG 54:4	1.05 (1.00-1.09)	5.19E-02
TAG 54:3	1.04 (0.99-1.10)	1.27E-01
TAG 48:4	1.04 (0.96-1.13)	3.02E-01
TAG 54:2	1.04 (0.96-1.13)	3.42E-01
TAG 52:1	1.04 (0.93-1.16)	4.93E-01
TAG 56:10	1.03 (0.95-1.12)	4.61E-01
TAG 50:2	1.03 (0.97-1.10)	3.40E-01
TAG 48:0	1.03 (0.85-1.24)	7.62E-01
TAG 58:7	1.03 (0.95-1.12)	4.96E-01
TAG 52:2	1.03 (0.98-1.07)	2.59E-01
CE 20:5	1.03 (0.92-1.15)	6.52E-01
TAG 50:4	1.02 (0.94-1.14)	4.79E-01
TAG 50:3	1.02 (0.95-1.12)	4.54E-01
TAG 46:1	1.02 (0.83-1.25)	8.70E-01
TAG 48:2	1.01 (0.88-1.16)	8.47E-01
PC 38:6	1.01 (0.97-1.05)	6.22E-01
TAG 48:1	1.01 (0.88-1.15)	8.81E-01
SM 18:1	1.01 (0.97-1.06)	6.74E-01
TAG 48:3	1.01 (0.89-1.13)	9.16E-01
PC 40:6	1.01 (0.95-1.06)	8.46E-01
TAG 58:11	1.00 (0.91-1.10)	9.85E-01
TAG 54:9	1.00 (0.88-1.14)	9.94E-01
TAG 46:2	1.00 (0.85-1.17)	9.99E-01
PC 38:2	1.00 (0.96-1.03)	8.80E-01
TAG 58:10	1.00 (0.92-1.08)	9.29E-01
CE 18:2	0.99 (0.94-1.04)	6.92E-01
PC 34:2	0.99 (0.98-1.00)	1.57E-01
TAG 44:1	0.99 (0.80-1.22)	8.97E-01
SM 18:0	0.99 (0.94-1.03)	5.17E-01
PC 32:0	0.98 (0.95-1.03)	4.45E-01
PC 36:4	0.98 (0.96-1.01)	1.34E-01
SM 16:1	0.98 (0.94-1.01)	2.49E-01
SM 24:1	0.98 (0.94-1.02)	3.48E-01
SM 16:0	0.98 (0.96-1.00)	2.98E-02
PC 36:2	0.98 (0.96-1.00)	3.25E-02
SM 22:1	0.98 (0.95-1.01)	1.41E-01
LPC 20:5	0.97 (0.89-1.07)	5.71E-01

PC 38:4	0.97 (0.94-1.00)	8.01E-02
PC 38:5	0.97 (0.94-1.01)	1.06E-01
PC 34:1	0.97 (0.94-1.00)	2.32E-02
CE 20:4	0.97 (0.90-1.04)	3.99E-01
PC 36:3	0.97 (0.95-0.99)	4.14E-03
PC 38:3	0.97 (0.92-1.01)	1.27E-01
CE 16:0	0.97 (0.92-1.01)	1.40E-01
CE 20:3	0.97 (0.90-1.04)	3.33E-01
SM 24:0	0.96 (0.91-1.03)	2.63E-01
TAG 46:0	0.96 (0.85-1.09)	5.38E-01
LPC 22:6	0.96 (0.90-1.03)	2.27E-01
LPC 16:0	0.96 (0.93-0.98)	2.14E-03
CE 18:1	0.96 (0.92-1.00)	5.55E-02
SM 22:0	0.95 (0.92-0.99)	6.30E-03
LPE 16:0	0.95 (0.89-1.03)	1.99E-01
PC 34:3	0.94 (0.90-0.99)	1.39E-02
PC 36:1	0.94 (0.90-0.98)	6.63E-03
PC 32:1	0.94 (0.86-1.02)	1.23E-01
CE 18:0	0.93 (0.89-0.98)	9.08E-03
CE 18:3	0.93 (0.86-1.00)	5.60E-02
PC 36:5	0.93 (0.88-0.98)	6.33E-03
LPC 18:0	0.93 (0.89-0.97)	5.01E-04
SM 14:0	0.92 (0.88-0.96)	3.58E-04
PC 32:2	0.92 (0.86-0.98)	1.56E-02
LPE 18:1	0.91 (0.85-0.98)	8.06E-03
LPC 20:4	0.91 (0.86-0.96)	8.91E-04
PC 34:4	0.91 (0.85-0.97)	4.83E-03
LPC 14:0	0.91 (0.84-0.98)	8.74E-03
CE 14:0	0.91 (0.83-0.99)	2.55E-02
LPC 18:1	0.91 (0.86-0.95)	1.03E-04
LPE 22:6	0.91 (0.86-0.96)	3.91E-04
CE 16:1	0.90 (0.83-0.98)	1.11E-02
LPE 18:2	0.90 (0.84-0.97)	3.33E-03
LPC 16:1	0.90 (0.85-0.96)	9.99E-04
LPE 20:4	0.90 (0.85-0.96)	5.56E-04
LPC 18:2	0.90 (0.85-0.94)	1.93E-05
LPE 18:0	0.89 (0.83-0.96)	1.24E-03
LPC 20:3	0.89 (0.83-0.95)	9.58E-04

TAG: triacylglycerol. DAG: diacylglycerol. CE: cholesterol ester. PC: phosphatidylcholine.
SM: sphingomyelin. LPC: lysophosphatidylcholine. LPE: lysophosphatidylethanolamine.

Supplementary Table 2. Renal arterio-venous metabolite gradients in nine individuals

Metabolite		Mean V/A	P-value	Subject								
				1	2	3	4	5	6	7	8	9
V/A <1 for all 9 individuals	hippuric acid	0.38	2.7E-05	0.35	0.26	0.24	0.46	0.48	0.45	0.31	0.22	0.63
	malate	0.41	1.4E-04	0.35	0.39	0.18	0.43	0.47	0.70	0.36	0.23	0.61
	xanthosine	0.45	6.7E-05	0.37	0.35	0.27	0.51	0.56	0.70	0.31	0.32	0.62
	β-aminoisobutyric acid	0.50	4.0E-06	0.56	0.39	0.40	0.57	0.47	0.69	0.44	0.42	0.55
	putrescine	0.51	3.4E-04	0.55	0.31	0.34	0.65	0.36	0.86	0.64	0.33	0.56
	succinate	0.58	1.5E-05	0.56	0.58	0.43	0.48	0.59	0.76	0.55	0.51	0.73
	choline	0.58	1.4E-04	0.46	0.46	0.44	0.75	0.75	0.75	0.43	0.47	0.67
	kynurenic acid	0.59	7.0E-05	0.61	0.39	0.82	0.49	0.69	0.53	0.55	0.55	0.69
	4-pyridoxate	0.62	5.5E-05	0.78	0.50	0.59	0.58	0.69	0.64	0.45	0.80	0.58
	citrulline	0.65	9.0E-06	0.55	0.66	0.63	0.58	0.74	0.75	0.52	0.74	0.68
	fumarate; maleate; alpha-ketoisovalerate	0.69	1.4E-04	0.66	0.70	0.63	0.52	0.87	0.82	0.61	0.60	0.79
	aconitate	0.70	9.9E-05	0.67	0.60	0.60	0.55	0.78	0.85	0.69	0.85	0.71
	kynurenine	0.70	3.1E-05	0.82	0.56	0.72	0.63	0.71	0.85	0.65	0.65	0.73
	adipic acid	0.72	4.2E-04	0.66	0.69	0.81	0.63	0.73	0.82	0.78	0.51	0.90
	3-methyladipic acid; pimelic acid	0.75	9.0E-05	0.63	0.76	0.66	0.69	0.80	0.91	0.74	0.66	0.85
	gentisic acid	0.77	4.3E-04	0.82	0.60	0.79	0.86	0.93	0.74	0.69	0.68	0.84
	lactose	0.77	3.4E-04	0.74	0.60	0.86	0.72	0.79	0.67	0.81	0.84	0.92
	butyrobetaine	0.79	2.4E-05	0.79	0.78	0.85	0.76	0.88	0.86	0.69	0.78	0.72
	indoxylsulfate	0.81	2.5E-04	0.93	0.69	0.85	0.75	0.84	0.68	0.83	0.81	0.89
	isocitrate	0.81	4.0E-05	0.85	0.77	0.74	0.79	0.91	0.87	0.78	0.73	0.86
	ureidopropionic acid	0.81	5.4E-05	0.77	0.82	0.81	0.78	0.95	0.84	0.71	0.78	0.84
	fructose-1-phosphate; fructose-6-phosphate; glucose-1-phosphate; glucose-6-phosphate	0.83	2.5E-05	0.72	0.84	0.85	0.87	0.91	0.79	0.80	0.86	0.79
	allantoin	0.83	5.8E-05	0.88	0.82	0.76	0.75	0.92	0.84	0.78	0.85	0.89
	beta-hydroxybutyric acid	0.83	5.1E-05	0.85	0.82	0.87	0.85	0.84	0.76	0.76	0.78	0.95
	sorbitol	0.83	2.7E-04	0.79	0.75	0.80	0.79	0.87	0.76	0.83	0.93	0.98
	creatinine	0.84	7.6E-06	0.85	0.78	0.83	0.81	0.89	0.92	0.81	0.82	0.84

	alpha-hydroxybutyric acid	0.91	3.9E-04	0.85	0.96	0.90	0.90	0.93	0.85	0.88	0.95	0.97
V/A >1 for all 9 individuals	threonine	1.11	3.1E-04	1.12	1.07	1.09	1.25	1.08	1.06	1.14	1.07	1.11
	alanine	1.16	1.4E-04	1.23	1.03	1.09	1.23	1.11	1.16	1.24	1.16	1.23
	niacinamide	1.17	2.9E-03	1.07	1.24	1.16	1.44	1.27	1.15	1.00	1.14	1.07
	arginine	1.20	9.6E-04	1.11	1.15	1.53	1.25	1.17	1.22	1.14	1.19	1.06
	alpha-glycerophosphocholine	1.24	6.5E-03	1.05	1.16	1.57	1.24	1.64	1.08	1.10	1.22	1.07
	serine	1.53	4.6E-04	1.26	1.49	1.48	2.04	1.48	1.07	1.99	1.26	1.73
Variable V/A	1-methylnicotinamide	0.45	1.1E-03	0.41	0.41	0.13	0.58	0.60	0.76	0.25	0.28	0.61
	2-hydroxyglutaric acid	0.54	5.1E-04	0.35	1.01	0.38	0.42	0.53	0.65	0.59	0.32	0.60
	salicylurate	0.62	8.9E-04	0.65	0.42	0.76	0.51	0.84	0.77	0.63	0.35	0.69
	cotinine	0.63	2.6E-02	0.77	0.15	0.84	0.23	1.21	0.22	0.47	1.01	0.74
	acetylglycine	0.66	3.4E-03	0.66	0.35	0.75	0.51	0.84	0.41	0.72	0.87	0.86
	5-hydroxyindoleacetic acid	0.71	9.3E-04	0.98	0.63	0.82	0.73	0.62	0.85	0.48	0.65	0.67
	adenosine	0.73	2.8E-02	0.77	0.49	0.43	0.42	1.00	0.40	0.70	1.70	0.67
	phosphocreatine	0.74	8.4E-03	0.67	0.66	0.48	0.50	0.79	1.36	0.71	0.76	0.72
	anthranilic acid	0.76	6.7E-03	0.75	0.64	0.96	0.43	0.78	0.90	0.91	0.74	0.76
	homogentistic acid	0.78	4.4E-04	0.71	0.76	0.70	0.74	1.07	0.78	0.68	0.73	0.83
	glucuronate	0.80	1.2E-03	0.71	0.63	0.68	0.87	0.93	0.72	0.91	0.78	0.91
	4-hydroxymandelic acid	0.80	1.8E-03	0.72	0.70	0.69	0.84	0.96	0.80	0.73	0.68	1.05
	thiamine	0.80	5.6E-03	0.75	0.75	0.97	0.61	0.68	0.74	0.91		0.97
	uracil	0.80	1.3E-02	0.73	0.62	0.80	0.63	0.92	0.54	0.89	1.01	1.05
	uridine	0.80	1.4E-02	0.75	0.60	0.81	0.66	0.89	0.54	0.86	1.03	1.07
	aminoadipic acid	0.80	2.0E-03	0.98	0.68	0.97	0.67	0.75	0.89	0.83	0.79	0.66
	glucose	0.82	2.7E-02	0.88	0.58	0.86	0.72	0.85	0.49	0.95	1.09	0.94
	inositol	0.83	4.5E-03	0.76	0.70	0.75	0.69	0.94	0.81	0.81	0.84	1.13
	dimethylglycine	0.83	9.7E-04	0.76	0.86	1.02	0.77	0.80	0.77	0.70	0.91	0.87
	inosine	0.84	2.5E-02	1.15	0.92	0.61	0.86	0.93	0.83	0.81	0.56	0.86
	hypoxanthine	0.84	7.9E-03	0.70	0.74	0.86	0.64	0.96	1.02	0.80	0.82	1.00
	trimethylamine-N-oxide	0.85	4.9E-03	0.87	0.84	0.92	0.90	0.95	0.79	0.63	0.96	0.82
	pantothenate	0.86	1.5E-02	0.88	0.71	0.81	0.93	0.96	0.68	0.71	0.95	1.07
	glycerol	0.86	1.3E-01	0.75	0.78	0.45	1.02	1.13	1.42	0.69	0.55	1.00
	quinolinic acid	0.86	3.1E-03	0.84	0.86	0.97	0.83	1.08	0.79	0.84	0.76	0.83
	TAG 56:10	0.87	1.1E-03	0.96	0.83	0.92	0.81	0.77	0.88	0.80	0.99	0.83
thymidine	0.88	2.9E-02	0.82	0.80	0.83	1.07	0.81	1.03	0.99	0.64	0.91	

3-phosphoglyceric acid	0.88	4.1E-02	0.73	0.86	0.86	0.84	1.13	0.72	0.70	1.00	1.07
hydroxyphenylacetic acid	0.88	5.7E-02	0.79	1.36	0.84	0.98	0.77	0.78	0.73	0.74	0.93
citrate	0.88	1.5E-03	0.93	0.86	0.78	0.83	0.92	1.03	0.89	0.88	0.81
indole-3-propionate	0.89	2.1E-01	0.94		0.78	0.67	0.89		0.71		1.34
CE 14:0	0.89	2.1E-02	0.92	0.99	0.94	0.72	1.00	0.86	0.98	0.88	0.70
glutamate	0.89	5.1E-02	1.01	0.96	1.10	0.83	0.94	0.65	0.76	0.98	0.80
pyroglutamic acid	0.90	9.5E-02	1.05	0.60	0.87	0.74	1.03	1.02	0.93	1.04	0.82
hydroxyproline	0.90	1.4E-02	0.74	0.92	0.99	1.07	0.86	0.89	0.90	0.90	0.87
cystathionine	0.92	3.1E-01	0.92	1.00	1.18	0.33	0.87	0.96	0.98	0.93	1.08
asymmetric dimethylarginine	0.92	1.2E-01	0.75	0.81	1.30	0.98	0.92	0.96	0.89	0.84	0.88
erythrose-4-phosphate	0.93	3.0E-01	0.72	0.64	1.12	0.87	1.12	0.50	0.68	1.25	1.42
TAG 46:1	0.93	2.3E-02	0.89	0.88	0.93	0.86	1.04	0.87	1.02	1.02	0.83
LPE 18:0	0.93	3.6E-02	0.88	0.96	0.85	0.80	0.89	0.89	1.07	1.06	0.94
methylmalonate	0.93	1.5E-02	0.88	0.93	1.10	0.94	0.89	0.85	0.95	0.89	0.92
spermidine	0.94	1.9E-01	0.79	0.93	1.13	0.95	0.78	0.94	1.14	0.77	1.03
LPE 16:0	0.94	9.4E-02	1.01	1.01	0.99	0.75	0.98	0.85	1.01	0.88	1.00
TAG 56:2	0.94	1.3E-01	0.82	0.90	0.88	0.95	1.16	0.83	0.87	0.97	1.10
hyodeoxycholate; ursodeoxycholate; chenodeoxycholate; deoxycholate	0.94	1.1E-01	0.87	0.93	0.91	0.92	0.81	0.87	1.03	0.97	1.17
symmetric dimethylarginine	0.94	6.8E-03	0.92	0.89	0.98	0.88	0.94	0.93	1.02	0.93	1.00
glycine	0.95	1.2E-02	0.99	0.92	1.00	0.97	0.98	0.84	0.91	0.94	0.95
malondialdehyde	0.95	7.3E-02	0.93	0.91	0.97	0.86	0.95	0.84	0.96	1.01	1.10
LPE 22:6	0.95	2.9E-01	1.06	0.82	1.04	0.90	1.08	0.64	0.94	1.04	1.01
TAG 48:3	0.95	8.0E-02	0.84	1.02	0.97	1.07	0.97	0.90	0.96	0.98	0.85
oxalate	0.95	1.2E-01	0.86	1.00	0.99	0.86	1.14	0.99	0.92	0.90	0.92
urate	0.95	5.4E-02	1.02	0.90	1.01	0.94	0.97	0.84	0.98	0.94	1.01
fructose; glucose; galactose	0.96	2.3E-02	0.96	0.89	0.96	0.94	0.98	0.89	1.00	1.00	1.00
glycocholate	0.96	1.9E-01	0.96	0.91	0.96	0.87	0.89	0.88	1.08	0.91	1.16
TAG 56:4	0.96	3.1E-01	0.74	1.10	1.01	1.04	0.79	1.04	0.98	0.96	0.99
taurocholate	0.96	4.2E-01	0.98	0.84	0.69	1.06	0.65	0.83	0.97	0.90	1.72
LPC 22:6	0.96	6.7E-02	0.96	1.00	0.99	1.01	0.98	0.92	0.98	0.98	0.83
LPE 20:4	0.96	2.9E-01	0.98	1.00	1.09	1.03	0.97	0.70	0.99	0.95	0.94
PC 32:2	0.96	1.0E-01	0.96	0.94	1.03	0.83	0.94	0.99	0.98	1.04	0.96
glutamine	0.96	1.2E-01	0.93	1.05	1.01	0.95	0.94	0.98	0.95	1.02	0.84

TAG 48:0	0.96	1.4E-01	0.90	0.89	0.99	1.09	1.06	0.94	0.96	0.93	0.91
bilirubin	0.96	1.3E-01	1.10	0.97	0.92	0.94	0.99	0.88	1.04	0.93	0.92
LPC 18:0	0.96	1.6E-01	0.97	1.03	0.95	0.92	0.96	0.84	0.99	1.10	0.93
TAG 56:3	0.97	4.4E-01	0.89	0.89	0.75	1.28	1.11	0.78	0.83	1.24	0.92
TAG 50:4	0.97	8.3E-02	0.87	0.94	1.02	1.00	1.06	0.95	0.95	0.97	0.93
cytidine	0.97	3.2E-01	0.99	0.93	1.05	1.00	1.14	0.97	1.01	0.81	0.80
TAG 54:1	0.97	3.6E-01	0.79	0.92	0.94	1.09	1.15	0.82	1.08	0.92	0.98
TAG 56:9	0.97	5.3E-02	1.01	0.95	0.99	0.89	0.93	0.95	1.04	0.99	0.95
TAG 54:8	0.97	1.8E-01	0.96	1.05	1.00	0.97	1.03	0.89	1.01	0.96	0.83
PC 32:1	0.97	3.5E-02	0.99	0.98	0.99	0.94	0.95	0.91	1.00	1.02	0.93
SM 14:0	0.97	7.5E-02	0.96	1.01	0.98	0.91	0.98	0.90	1.02	1.02	0.95
TAG 52:5	0.97	2.2E-01	0.86	1.03	0.92	0.97	1.08	0.90	1.01	0.99	0.99
LPC 16:0	0.97	8.3E-02	0.96	0.99	0.97	0.96	0.99	0.87	1.02	1.02	0.96
LPC 18:1	0.97	1.9E-01	0.96	1.02	1.03	0.92	0.98	0.86	1.00	1.06	0.93
PC 34:3	0.97	1.3E-01	0.96	1.05	0.99	0.93	0.94	0.91	0.93	1.05	0.98
proline	0.97	3.2E-01	0.90	1.10	1.04	1.04	0.94	0.92	0.82	1.04	0.95
DAG 36:1	0.97	2.4E-01	0.93	0.91	0.92	1.13	0.97	1.05	0.98	0.95	0.92
taurine	0.97	2.0E-01	0.93	0.90	1.11	0.98	1.00	0.94	0.99	0.98	0.92
lactate	0.97	2.4E-01	0.89	0.98	0.97	0.90	0.95	1.03	0.93	1.05	1.06
pyridoxal-5-phosphate	0.98	4.5E-01	1.00	0.94	1.04	0.78	1.09	1.06	0.85	0.98	1.06
alpha-glycerophosphate	0.98	4.8E-01	0.87	1.05	0.96	0.79	1.00	0.99	0.98	0.92	1.23
TAG 54:6	0.98	3.3E-01	0.84	0.98	1.01	0.99	1.08	0.89	0.98	1.05	0.97
SM 18:1	0.98	1.7E-01	0.95	1.05	0.97	1.00	1.00	0.91	0.92	1.01	0.99
CE 22:6	0.98	4.4E-01	0.89	0.89	1.10	0.91	1.00	1.02	1.03	1.09	0.89
TAG 56:7	0.98	4.4E-01	0.86	1.00	1.06	0.95	1.08	0.83	1.02	0.96	1.05
PC 32:0	0.98	2.2E-01	0.93	1.02	0.93	1.01	0.93	0.94	0.99	1.07	0.98
SM 16:0	0.98	7.4E-02	0.97	1.02	1.02	0.95	0.97	0.94	0.97	1.00	0.99
PC 38:4	0.98	3.7E-01	0.96	1.09	1.01	0.90	1.06	0.87	0.98	0.98	0.96
DAG 34:2	0.98	4.1E-01	0.87	1.16	1.01	0.95	0.96	0.98	0.92	0.95	1.02
TAG 56:8	0.98	5.0E-01	0.84	0.90	1.01	0.90	1.16	0.91	1.04	1.09	0.97
TAG 58:9	0.98	5.2E-01	0.82	1.09	0.96	0.93	1.12	0.85	1.04	0.97	1.06
SM 16:1	0.98	3.4E-01	0.94	1.05	0.98	0.93	1.01	0.89	1.02	1.02	1.02
CE 16:0	0.98	3.5E-01	0.93	0.96	1.01	0.95	1.03	0.91	1.07	0.94	1.04

LPC 20:4	0.98	3.1E-01	0.94	0.99	1.04	0.99	1.04	0.93	1.03	0.98	0.90
PC 40:6	0.98	4.3E-01	0.90	1.03	0.90	1.02	0.99	0.91	0.97	1.03	1.09
PC 38:5	0.98	4.8E-02	1.00	1.00	0.98	0.99	0.99	0.94	0.98	1.01	0.96
PC 38:2	0.98	6.3E-01	1.07	0.94	0.92	1.23	0.92	0.71	0.92	1.12	1.04
TAG 50:0	0.98	4.5E-01	0.92	0.92	1.00	0.92	1.11	0.99	1.02	1.03	0.96
TAG 48:2	0.99	4.7E-01	0.89	1.04	0.95	0.97	1.09	0.90	1.01	0.99	1.04
TAG 52:2	0.99	4.4E-01	0.92	0.99	0.96	0.94	0.98	0.97	0.98	1.01	1.13
LPC 16:1	0.99	5.0E-01	0.97	0.99	0.99	0.94	0.99	0.85	1.07	1.08	1.00
SM 18:0	0.99	4.6E-01	0.96	1.07	0.97	0.94	0.96	0.90	1.04	1.06	0.98
PC 36:1	0.99	4.3E-01	0.95	1.08	1.01	0.94	0.99	0.91	0.98	1.03	0.99
CE 20:4	0.99	4.2E-01	0.89	1.02	1.03	0.95	1.01	0.98	0.99	1.03	0.97
LPC 20:5	0.99	6.8E-01	1.01	1.16	0.52	1.00	1.15	0.93	1.04	1.15	0.94
SM 22:0	0.99	4.5E-01	0.98	0.98	0.92	1.00	0.97	0.93	1.04	1.07	1.02
PC 36:5	0.99	6.1E-01	0.85	1.14	0.97	1.00	0.98	0.90	1.02	1.00	1.03
PC 36:3	0.99	2.5E-01	0.97	1.00	1.00	0.98	1.01	0.94	1.00	1.03	0.97
TAG 50:3	0.99	5.3E-01	0.91	1.01	0.94	1.04	1.05	0.94	0.98	1.04	1.01
TAG 54:3	0.99	5.4E-01	0.90	1.01	1.03	1.02	0.98	1.04	1.03	0.94	0.96
TAG 48:1	0.99	3.4E-01	0.99	0.96	1.01	0.98	1.04	0.94	0.99	0.98	1.01
phosphoenolpyruvic acid	0.99	6.6E-01	1.12	0.86	1.03	0.97	1.02	0.91	1.02	1.07	0.91
LPC 14:0	0.99	7.0E-01	0.92	0.86	0.84	1.08	0.97	0.92	1.08	1.11	1.14
TAG 52:1	0.99	6.0E-01	0.93	1.09	0.99	0.90	0.97	1.01	1.02	1.05	0.98
TAG 58:6	0.99	6.9E-01	0.98	1.00	1.15	0.89	1.04	0.98	1.01	0.83	1.03
thyroxine	0.99	7.1E-01	0.93	0.85	1.10	1.17	0.96	0.87	1.05	0.97	1.05
LPC 18:2	0.99	6.6E-01	1.02	0.98	1.00	1.05	1.00	0.89	1.00	1.04	0.95
TAG 52:4	0.99	6.3E-01	0.95	1.04	1.06	0.98	0.99	0.96	0.95	1.03	0.98
CE 18:2	0.99	5.8E-01	0.95	0.96	0.99	0.97	1.02	1.00	1.01	1.03	1.03
pyruvate	0.99	7.8E-01	0.84	0.98	1.07	0.85	0.93	1.08	0.91	1.19	1.09
SM 24:0	1.00	7.6E-01	0.91	1.01	1.05	0.96	1.08	0.96	0.93	1.06	1.01
PC 36:4	1.00	7.6E-01	1.10	1.01	0.99	0.97	0.99	0.97	0.98	1.01	0.94
PC 34:2	1.00	5.6E-01	0.97	1.02	1.01	0.98	1.01	0.98	1.01	1.01	0.98
TAG 54:5	1.00	8.0E-01	0.89	1.02	1.04	0.98	1.00	0.94	1.04	1.06	0.99
CE 18:3	1.00	8.0E-01	0.92	0.99	1.04	1.00	1.02	0.96	1.10	1.01	0.94
SM 22:1	1.00	8.3E-01	0.96	1.06	1.06	0.97	0.97	0.93	1.03	1.04	0.95

PC 36:2	1.00	8.3E-01	1.07	1.01	1.00	1.00	1.05	0.94	0.98	0.99	0.94
sucrose	1.00	5.5E-01	0.79	0.70	1.08	0.43	0.86	1.30	0.83	0.88	2.10
tryptophan	1.00	8.7E-01	1.02	0.98	0.99	1.05	0.96	0.96	0.98	1.13	0.92
TAG 54:7	1.00	8.9E-01	0.82	1.04	1.07	0.98	1.10	1.01	0.97	1.01	0.99
TAG 56:5	1.00	8.4E-01	1.06	1.06	1.07	0.84	1.17	1.05	0.92	0.75	1.07
CE 16:1	1.00	9.1E-01	0.97	0.92	0.97	0.96	1.09	1.06	1.03	1.05	0.94
SM 24:1	1.00	9.9E-01	1.00	1.05	0.97	0.99	0.99	0.94	1.02	1.02	1.03
DAG 36:2	1.00	9.5E-01	0.98	1.17	1.00	0.94	0.96	0.97	0.95	1.04	1.00
TAG 54:2	1.00	9.4E-01	0.96	1.20	1.00	0.99	0.93	0.92	1.01	1.03	0.96
TAG 58:8	1.00	8.6E-01	0.90	1.28	0.92	1.03	0.98	0.91	1.14	0.79	1.06
CE 18:0	1.00	9.4E-01	0.80	0.98	1.04	0.96	1.04	1.01	1.09	1.08	1.01
DAG 34:1	1.00	9.9E-01	0.94	1.16	1.02	0.96	1.00	0.95	1.02	1.02	0.95
PC 34:4	1.00	9.8E-01	1.04	1.07	1.04	0.88	1.00	1.00	0.97	1.02	0.99
TAG 54:4	1.00	9.6E-01	0.99	1.06	0.94	0.96	1.04	0.99	1.07	1.02	0.93
guanosine	1.00	7.4E-01	0.92	1.19	0.43	1.26	0.95	0.96	1.22	0.97	1.11
PC 34:1	1.00	7.5E-01	0.99	1.05	0.98	1.04	1.01	0.95	1.00	1.01	0.99
TAG 50:2	1.00	8.3E-01	1.00	0.96	1.07	1.03	1.01	1.03	1.02	0.93	1.00
TAG 50:1	1.00	7.7E-01	0.98	1.06	1.02	0.95	1.04	1.02	1.00	0.96	1.02
CE 20:5	1.00	8.6E-01	0.90	1.03	1.03	0.97	1.04	0.98	1.04	1.04	1.01
CE 18:1	1.00	7.7E-01	0.93	0.99	1.02	1.04	1.05	0.99	1.03	0.98	1.01
TAG 52:3	1.00	6.3E-01	0.96	1.00	1.04	1.00	1.04	1.01	1.00	1.01	0.98
TAG 50:5	1.00	9.8E-01	1.00	0.98	1.05	1.21	0.84	0.89	0.95	0.99	1.13
methionine sulfoxide glycodeoxycholate; glycochenodeoxycholate	1.00	9.9E-01	1.02	0.89	1.05	1.15	1.11	0.95	0.94	1.07	0.86
PC 38:6	1.01	8.9E-01	0.99	1.12	1.12	1.00	0.95	0.90	1.03	0.94	1.01
TAG 54:9	1.01	9.2E-01	1.01	0.84	1.01	1.11	1.10	0.91	1.06	1.11	0.91
TAG 56:6	1.01	9.6E-01	0.92	0.98	1.13	1.39	0.89	0.96	1.02	0.81	0.97
carnitine	1.01	8.0E-01	0.96	0.91	1.14	1.08	1.04	0.89	1.02	1.05	1.00
LPE 18:2	1.01	8.3E-01	1.05	0.92	1.01	0.92	1.08	0.96	1.00	1.23	0.92
isoleucine	1.01	9.1E-01	1.00	0.84	1.03	1.14	0.79	1.10	1.13	1.13	0.95
TAG 58:7	1.01	8.2E-01	0.97	1.02	0.87	1.03	1.02	0.96	0.91	1.10	1.24
leucine	1.02	7.7E-01	1.15	0.82	1.08	1.08	1.10	0.93	1.04	0.96	0.96
pipecolic acid	1.02	9.0E-01	0.94	1.05	1.03	1.24	0.90	0.78	1.25	1.02	0.94

CE 20:3	1.02	4.6E-01	0.99	0.94	1.06	0.99	1.13	1.01	1.07	0.95	1.02
LPE 18:1	1.02	8.9E-01	0.91	1.38	1.14	0.59	0.84	0.82	1.18	0.95	1.34
xanthine	1.02	8.8E-01	0.80	0.77	1.02	1.19	1.02	1.06	1.25	0.99	1.08
TAG 46:2	1.02	7.6E-01	0.93	0.93	1.10	1.28	1.18	0.94	0.95	1.02	0.86
NG-monomethyl-arginine	1.02	7.7E-01	0.91	0.98	1.30	1.12	0.83	1.00	0.95	1.16	0.95
LPC 20:3	1.02	4.8E-01	1.04	0.94	0.89	0.99	1.00	1.06	1.03	1.16	1.11
sarcosine	1.02	7.7E-01	0.91	1.21	1.23	1.17	1.10	0.86	0.91	0.95	0.89
PC 38:3	1.03	6.4E-01	1.07	1.12	0.97	0.99	1.08	0.77	1.18	1.11	0.96
TAG 58:11	1.03	8.6E-01	0.72	1.23	1.04	0.91	0.91	1.46	0.99	1.01	1.00
guanosine monophosphate taurodeoxycholate;	1.03	8.6E-01	0.89	1.43	0.57	1.38	1.45	1.21	0.92	0.65	0.79
taurochenodeoxycholate	1.03	7.8E-01	0.94	0.92	0.98	1.06	0.84	0.86	1.13	1.04	1.53
TAG 58:10	1.03	4.2E-01	0.89	1.21	0.98	1.00	0.94	1.06	1.15	0.97	1.11
ornithine	1.04	3.4E-01	1.03	1.03	1.24	1.09	0.86	0.95	1.13	1.08	0.97
3-hydroxyanthranilic acid	1.05	5.9E-01	1.15	1.27	1.22	0.95	0.92	0.84	0.98	0.81	1.31
vanillylmandelic acid	1.05	8.6E-01	0.91	1.35	1.40	1.03	0.80	0.54	1.05	1.24	1.17
TAG 48:4	1.06	1.6E-01	0.94	1.08	0.97	1.22	1.09	0.93	1.14	1.16	0.99
TAG 52:6	1.06	1.2E-01	0.99	1.03	0.99	1.30	1.11	0.99	1.15	0.99	1.01
histidine	1.06	4.0E-02	0.97	1.01	1.21	1.08	1.03	1.06	1.14	1.06	0.99
betaine	1.06	4.7E-02	0.96	1.05	1.11	1.12	1.15	0.94	1.06	1.16	1.00
valine	1.07	7.7E-02	1.16	0.92	1.07	1.07	1.18	0.95	1.11	1.14	1.00
fructose-1,6-diphosphate; fructose- 2,6-diphosphate; glucose-1,6- diphosphate	1.08	5.0E-01	0.70	0.91	1.09	0.99	1.41	1.42	0.97	1.19	1.03
creatine	1.08	3.4E-01	0.86	1.07	1.21	1.23	1.14	0.83	0.90	1.45	1.06
methionine	1.08	1.4E-01	0.95	0.93	1.01	1.24	0.94	1.17	1.14	1.33	1.03
lysine	1.08	9.7E-02	0.98	1.06	1.43	1.08	0.95	1.00	1.04	1.14	1.08
asparagine	1.09	3.5E-02	0.95	1.13	1.19	1.26	1.07	1.04	0.94	1.09	1.16
tyrosine	1.11	1.9E-01	1.12	0.76	1.14	1.32	1.13	0.88	1.38	1.07	1.16
TAG 60:12	1.12	1.1E-01	0.93	1.23	1.50	1.19	0.88	1.00	1.04	1.20	1.07
2-deoxycytidine	1.13	3.9E-01	1.26	1.12	0.87	1.33	1.07	1.72	1.25	0.83	0.69
adenosine diphosphate	1.24	1.6E-01	1.04	2.14	0.98	1.36	1.81	1.05	0.85	0.85	1.09
adenosine monophosphate	1.25	2.4E-01	1.41	1.36	1.08	1.36	1.94	1.58	0.67	0.60	1.23
uridine diphosphate	1.29	3.2E-01	1.30	2.20	1.09	1.26	0.72	0.67	0.74	2.36	1.29

phenylalanine	1.41	6.4E-02		1.15	1.15	2.65	0.71	1.67	1.03	1.68	1.59	1.03
guanosine diphosphate	1.42	1.4E-01		1.49	2.56	0.89	1.10	1.31	1.21	0.98	0.65	2.55

TAG: triacylglycerol. CE: cholesterol ester. LPE: lysophosphatidylethanolamine. LPC: lysophosphatidylcholine. PC: phosphatidylcholine. SM: sphingomyelin. DAG: diacylglycerol.