

Supplementary Table S1. The 154 metabolites analyzed in GWAS.

Metabolic Feature (m/z_Time[s])	Name	KEGG* ID	Liquid Chromatography	GWAS Inflation Factor
mz87.0087_t22.3	pyruvate	C00022	C18 negative	1.00
mz89.0244_t22.1	(s)-lactate	C01432	C18 negative	0.99
mz103.0035_t94	malonate	C00383	C18 negative	1.00
mz104.0351_t26.8	serine	C00716	C18 negative	0.99
mz105.0193_t22.9	glycerate	C00258	C18 negative	1.00
mz112.0516_t24.7	creatinine	C00791	C18 negative	1.01
mz116.0716_t21.8	5-aminopentanoate	C00431	C18 negative	1.00
mz123.045_t27.4	3-hydroxybenzyl alcohol	C03351	C18 negative	1.01
mz130.0873_t23	norleucine	C01933	C18 negative	0.99
mz131.0459_t20.7	3-ureidopropionate	C02642	C18 negative	1.00
mz135.0306_t23.2	hypoxanthine	C00262	C18 negative	1.00
mz140.0118_t36.8	ethanolamine phosphate	C00346	C18 negative	0.99
mz143.1077_t59.1	caprylic acid	C06423	C18 negative	1.00
mz145.0142_t24.5	alpha-ketoglutaric acid	C00026	C18 negative	1.00
mz145.0618_t22.9	glutamine	C00064	C18 negative	1.00
mz145.0982_t37	lysine	C16440	C18 negative	1.00
mz147.0298_t23.1	citramalate	C00815	C18 negative	0.99
mz147.045_t46.9	trans-cinnamate	C10438	C18 negative	0.99
mz147.0661_t24.1	(rs)-mevalonic acid lithium salt	C00418	C18 negative	1.01
mz148.0437_t35.7	methionine	C00073	C18 negative	0.99
mz149.0278_t28.8	2-hydroxy-4-(methylthio)butyric acid	CA1484	C18 negative	1.02
mz151.026_t22.8	xanthine	C00385	C18 negative	0.99
mz154.0621_t21.1	histidine	C00135	C18 negative	1.01
mz162.056_t60.4	3-methyl-2-oxindole	CA1325	C18 negative	1.00
mz164.0717_t22.7	phenylalanine	C00079	C18 negative	1.00
mz165.0557_t49.5	3-(2-hydroxyphenyl)propanoate	C01198	C18 negative	1.00
mz167.0211_t23.9	urate	C00366	C18 negative	1.00
mz173.0091_t25.6	trans-aconitate	C02341	C18 negative	1.00
mz173.0456_t23.2	shikimate	C00493	C18 negative	0.99
mz173.1044_t19.5	arginine	C00062	C18 negative	0.99
mz174.056_t47.1	indole-3-acetate	C00954	C18 negative	1.00
mz174.0884_t21.1	citrulline	C00327	C18 negative	1.01
mz176.0388_t26.6	formyl-l-methionyl peptide	C03145	C18 negative	1.00
mz177.0405_t19.7	d-gulonic acid gama-lactone	C01040	C18 negative	1.00
mz178.051_t30.3	hippurate	C01586	C18 negative	1.00
mz179.035_t25.5	caffeate	C01481	C18 negative	0.99
mz189.088_t31.9	ll-2,6-diaminoheptanedioate	C00666	C18 negative	0.99
mz190.0544_t27.4	n-acetyl-dl-methionine	CA1210	C18 negative	1.00
mz195.0511_t23.4	gluconic acid	C00257	C18 negative	1.00

mz197.0433_t40.7	3-methoxy-4-hydroxymandelate	C05584	C18 negative	1.00
mz199.1704_t152.3	lauric acid	C02679	C18 negative	1.00
mz202.1087_t40.9	n6-(delta2-isopentenyl)-adenine	C04083	C18 negative	1.00
mz206.0825_t46.2	n-acetyl-l-phenylalanine	C03519	C18 negative	1.01
mz209.0308_t34.2	d-saccharic acid	C00818	C18 negative	1.01
mz218.1037_t23.6	d-pantothenic acid	C00864	C18 negative	1.00
mz239.017_t24.2	cystine	C01420	C18 negative	1.00
mz243.0627_t22.4	uridine	C00299	C18 negative	1.01
mz245.0935_t49	n-acetyl-d-tryptophan	C03137	C18 negative	1.01
mz253.2177_t230.4	palmitoleic acid	C08362	C18 negative	1.00
mz266.0893_t18.4	adenosine	C00212	C18 negative	1.01
mz279.2335_t237.1	linoleate	C01595	C18 negative	1.01
mz281.2493_t256.8	elaidic acid	C01712	C18 negative	1.01
mz283.265_t282.7	stearate	C01530	C18 negative	1.00
mz301.239_t252	rac-glycerol 1-myristate	CA1370	C18 negative	1.01
mz307.0316_t28.5	2'-deoxyuridine 5'-mono-phosphate	C00365	C18 negative	1.00
mz308.1_t22.3	n-acetylneuraminate	C00270	C18 negative	0.99
mz311.296_t295.2	arachidic acid	C06425	C18 negative	1.01
mz337.0532_t26.4	5-aminoimidazole-4-carboxamide-1-beta-d-ribofuranosyl 5'-monophosphate	C04677	C18 negative	1.00
mz347.0405_t30.1	inosine 5'-monophosphate	C00130	C18 negative	1.00
mz362.052_t33	guanosine 5'-monophosphate	C00144	C18 negative	1.00
mz375.2926_t209.2	3alpha-hydroxy-5beta-cholanate	C03990	C18 negative	1.00
mz90.0551_t71.3	beta-alanine	C00099	HILIC positive	1.00
mz94.0653_t45.9	aniline	C00292	HILIC positive	1.00
mz96.0445_t35.3	2-hydroxypyridine	C02502	HILIC positive	0.99
mz101.06_t20	5-valerolactone	C02240	HILIC positive	1.00
mz102.055_t78.3	1-aminocyclopropane-1-carboxylate	C01234	HILIC positive	1.00
mz103.0391_t80.3	2-oxobutanoate	C00109	HILIC positive	1.01
mz106.05_t115	serine	C00716	HILIC positive	0.99
mz110.0272_t66.7	hypotaurine	C00519	HILIC positive	1.00
mz113.0347_t39.3	uracil	C00106	HILIC positive	1.00
mz113.0597_t29.2	sorbate	CA1411	HILIC positive	1.00
mz114.0661_t40.7	creatinine	C00791	HILIC positive	1.00
mz116.0343_t85.6	maleamate	C01596	HILIC positive	1.00
mz116.0707_t58	proline	C16435	HILIC positive	0.99
mz118.0612_t73.1	guanidinoacetate	C00581	HILIC positive	1.00
mz123.0441_t56.2	3-hydroxybenzaldehyde	C03067	HILIC positive	0.99
mz123.0552_t32.2	nicotinamide	C00153	HILIC positive	1.00
mz126.022_t55.6	taurine	C00245	HILIC positive	0.99
mz127.0503_t70.4	4-imidazoleacetic acid	C02835	HILIC positive	0.98

mz130.0863_t52.9	pipecolate	C00408	HILIC positive	0.99
mz132.0765_t72.5	creatine	C00300	HILIC positive	1.00
mz133.0647_t24.9	trans-cinnamaldehyde	C00903	HILIC positive	1.00
mz134.06_t21.2	indoxyl sulfate	C08481	HILIC positive	1.00
mz136.0428_t56.3	homocysteine	C05330	HILIC positive	0.99
mz137.0457_t39.7	hypoxanthine	C00262	HILIC positive	1.00
mz138.055_t53.8	trigonelline	C01004	HILIC positive	0.99
mz138.0795_t55.7	1-methylnicotinamide	C02918	HILIC positive	1.00
mz139.0502_t64.4	urocanate	C00785	HILIC positive	1.00
mz144.0807_t46.2	1-naphthylamine	C14790	HILIC positive	1.00
mz147.0764_t81.7	glutamine	C00064	HILIC positive	1.00
mz148.0757_t44.7	3-methyl-2-oxindole	CA1325	HILIC positive	1.00
mz150.0583_t52.3	methionine	C00073	HILIC positive	1.00
mz153.0407_t42	xanthine	C00385	HILIC positive	1.00
mz153.0772_t51.3	arabitol	CA1387	HILIC positive	1.00
mz156.0767_t105	histidine	C00135	HILIC positive	1.00
mz159.0515_t42.1	allantoin	C01551	HILIC positive	1.00
mz162.1124_t80.7	carnitine	C00318	HILIC positive	1.00
mz163.1229_t40.3	(s)-nicotine	C16150	HILIC positive	1.01
mz164.0377_t43.9	n-acetyl-l-cysteine	C06809	HILIC positive	1.00
mz166.0862_t46.5	phenylalanine	C00079	HILIC positive	1.00
mz168.1019_t36	3-methoxytyramine	C05587	HILIC positive	1.00
mz169.0357_t49	urate	C00366	HILIC positive	1.00
mz169.0971_t67.2	pyridoxamine	C00534	HILIC positive	1.00
mz175.0866_t42.7	indole-3-acetamide	C02693	HILIC positive	1.01
mz176.0663_t49	n-amidino-l-aspartate	C03139	HILIC positive	1.00
mz176.1029_t90.6	citrulline	C00327	HILIC positive	1.00
mz178.0533_t51.9	formyl-l-methionyl peptide	C03145	HILIC positive	1.00
mz180.0329_t57.5	s-carboxymethyl-l-cysteine	C03727	HILIC positive	1.00
mz180.1019_t47.4	1-methyl-6,7-dihydroxy-1,2,3,4-tetrahydroisoquinoline	C09642	HILIC positive	1.00
mz182.0811_t55.8	tyrosine	C00082	HILIC positive	0.99
mz184.0603_t21	4-pyridoxate	C00847	HILIC positive	1.00
mz189.1233_t69.3	alpha-acetyl-l-lysine	C12989	HILIC positive	0.99
mz190.0496_t20	4-hydroxy-2-quinolinecarboxylic acid	C01717	HILIC positive	1.01
mz192.0655_t46.6	5-hydroxyindoleacetate	C05635	HILIC positive	1.00
mz195.0505_t48.3	d-glucuronic acid	C00191	HILIC positive	1.01
mz195.0651_t53.4	ferulate	C01494	HILIC positive	1.00
mz198.076_t50.3	3,4-dihydroxy-l-phenylalanine (l-dopa)	C00355	HILIC positive	0.99
mz204.123_t63.1	o-acetyl-l-carnitine	C02571	HILIC positive	1.00
mz205.0972_t45.9	tryptophan	C00078	HILIC positive	1.00
mz209.0921_t47.2	kynurenine	C00328	HILIC positive	1.00

mz212.0433_t126.8	phosphocreatine	C02305	HILIC positive	1.00
mz220.1182_t64.5	d-pantothenic acid	C00864	HILIC positive	1.00
mz221.092_t44.8	5-hydroxy-l-tryptophan	C01017	HILIC positive	1.01
mz222.0962_t43.6	n-acetyl-d-glucosamine	C00140	HILIC positive	1.00
mz225.1484_t26.7	methyl jasmonate	C11512	HILIC positive	1.00
mz237.0362_t73.2	quinat	C00296	HILIC positive	1.00
mz241.0311_t181.3	cystine	C00491	HILIC positive	0.99
mz245.0769_t45.3	uridine	C00299	HILIC positive	0.99
mz245.0971_t55	biotin	C00120	HILIC positive	1.01
mz247.1076_t34.1	n-acetyl-d-tryptophan	C03137	HILIC positive	1.00
mz255.2318_t21.7	palmitoleic acid	C08362	HILIC positive	1.00
mz258.1102_t114.4	sn-glycero-3-phosphocholine	C00670	HILIC positive	0.99
mz266.1215_t33.8	thiamine	C00378	HILIC positive	1.00
mz269.0881_t43.1	inosine	C00294	HILIC positive	1.00
mz279.2319_t23.7	gamma-linolenic acid	C06426	HILIC positive	1.00
mz281.2476_t28.9	linoleate	C01595	HILIC positive	0.99
mz301.2167_t26.6	retinoate	C00777	HILIC positive	0.99
mz302.3054_t35.1	sphinganine	C00836	HILIC positive	1.00
mz308.0929_t55.3	glutathione	C00051	HILIC positive	0.98
mz310.1137_t48.2	n-acetylneuraminate	C00270	HILIC positive	1.00
mz319.0692_t48.2	melanin	C05606	HILIC positive	1.00
mz329.2502_t29.9	docosahexaenoic acid	C06429	HILIC positive	1.01
mz330.0603_t50	adenosine 3,5-cyclic monophosphate	C00575	HILIC positive	0.99
mz344.2795_t32.4	lauroylcarnitine	CA1406	HILIC positive	1.00
mz347.2221_t21.9	reichstein's substance s	C05488	HILIC positive	1.00
mz357.2999_t24	1-oleoyl-rac-glycerol	CA1373	HILIC positive	0.99
mz363.2163_t27.2	cortisol	C00735	HILIC positive	1.01
mz373.2371_t19.8	deoxycorticosterone acetate	C14554	HILIC positive	1.00
mz377.1455_t37.9	riboflavin	C00255	HILIC positive	0.99
mz403.3574_t23.7	25-hydroxycholesterol	C15519	HILIC positive	0.99
mz409.2936_t20.8	cholate	C00695	HILIC positive	0.99
mz583.2537_t25.4	biliverdin	C00500	HILIC positive	0.99
mz585.2707_t23.2	bilirubin	C00486	HILIC positive	0.99
mz777.6935_t33.9	thyroxine	C01829	HILIC positive	1.00

*KEGG: Kyoto Encyclopedia of Genes and Genomes database.