

## Online Supporting Material

**Supplemental Table 2.** Plasma metabolites that differed ( $P \leq 0.10$ ) between C and U mice at d 16 of age<sup>1</sup>

Metabolite	Method	FC	P	Q	Pathway
Urobilinogen	LC/MS neg	4.51	0.0004	0.0052	Hemoglobin and porphyrin metabolism
Galactose	GC/MS	3.90	0.0003	0.0045	Fructose, mannose, galactose, starch, sucrose metabolism
Phenyllactate (PLA)	LC/MS neg	3.19	0.0005	0.0058	Phenylalanine & tyrosine metabolism
2-hydroxyisobutyrate	GC/MS	3.16	$2.19 \times 10^{-1}$	$4.10 \times 10^{-9}$	Chemical
$\alpha$ -hydroxyisovalerate	GC/MS	2.39	$1.75 \times 10^{-7}$	$1.64 \times 10^{-5}$	Valine, leucine and isoleucine metabolism
$\gamma$ -glutamylalanine	LC/MS pos	2.13	0.0005	0.0058	$\gamma$ -glutamyl
3-methylglutaryl carnitine (C6)	LC/MS pos	2.12	$4.41 \times 10^{-5}$	0.0012	Valine, leucine and isoleucine metabolism
$\alpha$ -hydroxyisocaproate	LC/MS neg	2.01	$6.89 \times 10^{-5}$	0.0015	Valine, leucine and isoleucine metabolism
Homoserine	GC/MS	2.01	0.0009	0.0075	Glycine, serine and threonine metabolism
4-guanidinobutanoate	LC/MS pos	1.88	$2.23 \times 10^{-5}$	0.001	Guanidino and acetamido metabolism
Stearoyl sphingomyelin	GC/MS	1.86	0.0017	0.012	Sphingolipid
Pyroglutamine	LC/MS pos	1.84	0.0033	0.0175	Glutamate metabolism
2-palmitoylglycerol (2-monopalmitin)	LC/MS neg	1.83	0.0068	0.0272	Monoacylglycerol
Sarcosine (N-Methylglycine)	GC/MS	1.82	0.0053	0.0233	Glycine, serine and threonine metabolism
2-linoleoylglycerol (2-monolinolein)	LC/MS neg	1.8	0.0057	0.0244	Monoacylglycerol
1-linoleoylglycerophosphoethanolamine	LC/MS neg	1.75	0.0019	0.013	Lysolipid
4-vinylphenol sulfate	LC/MS neg	1.73	0.077	0.1367	Benzoate metabolism
2-aminobutyrate	GC/MS	1.72	0.0085	0.0322	Butanoate metabolism
Dimethylglycine	GC/MS	1.70	$5.56 \times 10^{-6}$	0.0003	Glycine, serine and threonine metabolism
Phenol sulfate	LC/MS neg	1.70	0.0069	0.0272	Phenylalanine & tyrosine metabolism
1-linoleoylglycerol (1-monolinolein)	LC/MS neg	1.68	0.0144	0.0449	Monoacylglycerol
1-palmitoylglycerol (1-monopalmitin)	LC/MS neg	1.67	0.007	0.0272	Monoacylglycerol
Betaine	LC/MS pos	1.65	$4.08 \times 10^{-5}$	0.0012	Glycine, serine and threonine metabolism
2-hydroxybutyrate (AHB)	GC/MS	1.64	$2.76 \times 10^{-5}$	0.001	Cysteine, methionine, SAM, taurine metabolism
2-linoleoylglycerophosphoethanolamine	LC/MS neg	1.63	0.0104	0.0361	Lysolipid
$\gamma$ -glutamyltyrosine	LC/MS pos	1.61	$7.00 \times 10^{-5}$	0.0015	$\gamma$ -glutamyl
$\gamma$ -glutamylglycine	GC/MS	1.60	0.0091	0.0322	$\gamma$ -glutamyl
$\gamma$ -glutamylmethionine	LC/MS pos	1.59	0.0234	0.0626	$\gamma$ -glutamyl
Glutaryl carnitine (C5)	LC/MS pos	1.57	0.0021	0.0136	Lysine metabolism
Gulono-1,4-lactone	GC/MS	1.57	0.0025	0.0148	Ascorbate and aldarate metabolism
Alanine	LC/MS pos	1.56	0.0007	0.0075	Alanine and aspartate metabolism
Ophthalmate	LC/MS pos	1.55	0.0188	0.0541	Glutathione metabolism
Serine	GC/MS	1.55	0.0243	0.0636	Glycine, serine and threonine metabolism
Proline	LC/MS pos	1.50	0.0001	0.002	Urea cycle; arginine-, proline-, metabolism
2-hydroxy-3-methylvalerate	LC/MS neg	1.47	0.0067	0.0272	Valine, leucine and isoleucine metabolism
Indolelactate	GC/MS	1.45	0.0004	0.0052	Tryptophan metabolism
3-(4-hydroxyphenyl)lactate	LC/MS neg	1.45	0.0014	0.0102	Phenylalanine & tyrosine metabolism
N-acetylneuraminic acid	GC/MS	1.45	0.0087	0.0322	Aminosugars metabolism
1-myristoylglycerol (1-monomyristin)	LC/MS neg	1.45	0.0936	0.1569	Monoacylglycerol
$\gamma$ -glutamyltryptophan	LC/MS pos	1.44	0.0031	0.0175	$\gamma$ -glutamyl
$\gamma$ -glutamylphenylalanine	LC/MS pos	1.43	0.0007	0.0075	$\gamma$ -glutamyl
Asparagine	GC/MS	1.43	0.0381	0.0884	Alanine and aspartate metabolism
Tyrosine	LC/MS pos	1.42	0.0002	0.0042	Phenylalanine & tyrosine metabolism
N-acetylserine	GC/MS	1.39	0.0009	0.0075	Glycine, serine and threonine metabolism
Palmitoyl sphingomyelin	GC/MS	1.39	0.0023	0.0139	Sphingolipid
Glycerate	GC/MS	1.38	0.0044	0.0211	Glycolysis, gluconeogenesis, pyruvate metabolism
Deoxycarnitine	LC/MS pos	1.37	0.0316	0.0776	Carnitine metabolism
Threonine	LC/MS pos	1.35	0.019	0.0541	Glycine, serine and threonine metabolism
Pantothenate	LC/MS pos	1.34	0.0135	0.0436	Pantothenate and CoA metabolism
Adenosine	LC/MS pos	1.34	0.0137	0.0436	Purine metabolism, adenine containing
2-ethylhexanoate	GC/MS	1.33	0.0651	0.1294	Chemical
Tauro( $\alpha + \beta$ )muricholate	LC/MS neg	1.32	0.009	0.0322	Bile acid metabolism

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1-methylimidazoleacetate	LC/MS pos	1.32	0.0151	0.0457	Histidine metabolism
$\gamma$ -glutamylleucine	LC/MS pos	1.32	0.0244	0.0636	$\gamma$ -glutamyl
Nicotinamide adenine dinucleotide (NAD <sup>+</sup> )	LC/MS neg	1.31	0.0178	0.0529	Nicotinate and nicotinamide metabolism
Docosapentaenoate (n6 DPA; 22:5n6)	LC/MS neg	1.29	0.0047	0.0215	Essential fatty acid
Campesterol	GC/MS	1.29	0.0738	0.1355	Sterol/Steroid
Methionine	LC/MS pos	1.28	0.0008	0.0075	Cysteine, methionine, SAM, taurine metabolism
$\gamma$ -glutamylvaline	LC/MS pos	1.28	0.0032	0.0175	$\gamma$ -glutamyl
Erythronate	GC/MS	1.28	0.0036	0.0182	Aminosugars metabolism
Ribitol	GC/MS	1.28	0.0463	0.1023	Nucleotide sugars, pentose metabolism
N-acetylglycine	GC/MS	1.26	0.0603	0.1217	Glycine, serine and threonine metabolism
N-acetylalanine	LC/MS neg	1.26	0.0655	0.1294	Alanine and aspartate metabolism
Arabinose	GC/MS	1.25	0.0864	0.1461	Nucleotide sugars, pentose metabolism
Caprate (10:0)	LC/MS neg	1.24	0.0751	0.1355	Medium chain fatty acid
1-stearoylglycerophosphoethanolamine	LC/MS neg	1.23	0.074	0.1355	Lysolipid
Glycine	GC/MS	1.22	0.3075	0.3225	Glycine, serine and threonine metabolism
N4-acetylcytidine	LC/MS pos	1.22	0.0034	0.0178	Pyrimidine metabolism, cytidine containing
Hexanoylcarnitine	LC/MS pos	1.22	0.0566	0.117	Carnitine metabolism
Tauroursodeoxycholate	LC/MS neg	1.22	0.0829	0.1414	Bile acid metabolism
Histidine	LC/MS neg	1.21	0.0011	0.0087	Histidine metabolism
$\gamma$ -glutamylisoleucine	LC/MS pos	1.21	0.0479	0.1045	$\gamma$ -glutamyl
Glutamine	LC/MS pos	1.20	0.0306	0.0776	Glutamate metabolism
Taurocholate	LC/MS neg	1.20	0.0694	0.1327	Bile acid metabolism
Cholesterol	GC/MS	1.19	0.0208	0.0583	Sterol/Steroid
Valine	LC/MS pos	1.16	0.0377	0.0884	Valine, leucine and isoleucine metabolism
Octanoylcarnitine	LC/MS pos	1.16	0.07	0.1327	Carnitine metabolism
Isoleucine	LC/MS pos	1.15	0.0501	0.1081	Valine, leucine and isoleucine metabolism
Stearoylcarnitine	LC/MS pos	1.15	0.0808	0.1405	Carnitine metabolism
N1-methylguanosine	LC/MS pos	1.15	0.0818	0.1408	Purine metabolism, guanine containing
Citrate	GC/MS	1.13	0.0411	0.093	Krebs cycle
13-methylmyristic acid	LC/MS neg	1.12	0.022	0.0607	Fatty acid, branched
Undecanoate (11:0)	LC/MS neg	1.10	0.067	0.1295	Medium chain fatty acid
Carnitine	LC/MS pos	0.87	0.0121	0.04	Carnitine metabolism
Arachidonate (20:4n6)	LC/MS neg	0.87	0.095	0.1579	Long chain fatty acid
2-hydroxypalmitate	LC/MS neg	0.86	0.0441	0.0985	Fatty acid, monohydroxy
TDTEKGEFLSEGGV	LC/MS neg	0.86	0.0569	0.117	Fibrinogen cleavage peptide
1-arachidonoylglycerophosphocholine	LC/MS pos	0.84	0.0091	0.0322	Lysolipid
Riboflavin (Vitamin B2)	LC/MS pos	0.84	0.0232	0.0626	Riboflavin metabolism
Mannose	GC/MS	0.81	0.0792	0.139	Fructose, mannose, galactose, starch, sucrose metabolism
2-arachidonoylglycerophosphocholine	LC/MS pos	0.80	0.0554	0.1168	Lysolipid
Uridine	LC/MS neg	0.80	0.099	0.163	Pyrimidine metabolism, uracil containing
1-myristoylglycerophosphocholine	LC/MS pos	0.77	0.0051	0.0229	Lysolipid
Azelate (nonanedioate)	LC/MS neg	0.77	0.0322	0.0776	Fatty acid, dicarboxylate
Heme	LC/MS pos	0.77	0.0772	0.1367	Hemoglobin and porphyrin metabolism
Flavin adenine dinucleotide (FAD)	LC/MS neg	0.76	0.0018	0.0127	Riboflavin metabolism
Serotonin (5HT)	LC/MS pos	0.75	0.0108	0.0362	Tryptophan metabolism
Glycerophosphorylcholine (GPC)	LC/MS pos	0.75	0.0734	0.1355	Glycerolipid metabolism
N-acetylhistidine	LC/MS neg	0.75	0.0747	0.1355	Histidine metabolism
11-dehydrocorticosterone	LC/MS neg	0.74	0.0322	0.0776	Sterol/Steroid
Hexanoylglycine	LC/MS neg	0.72	0.0257	0.0661	Fatty acid metabolism
Guanosine	LC/MS neg	0.72	0.0534	0.1139	Purine metabolism, guanine containing
7- $\alpha$ -hydroxy-3-oxo-4-cholestenoate (7-Hoca)	LC/MS neg	0.68	0.0047	0.0215	Sterol/Steroid
Phenylacetylglycine	LC/MS neg	0.68	0.0397	0.0908	Phenylalanine & tyrosine metabolism
N-acetylphenylalanine	LC/MS neg	0.67	0.0148	0.0456	Phenylalanine & tyrosine metabolism
Caproate (6:0)	LC/MS neg	0.65	0.0011	0.0087	Medium chain fatty acid
Catechol sulfate	LC/MS neg	0.65	0.0107	0.0362	Benzoate metabolism
Phosphoenolpyruvate (PEP)	GC/MS	0.65	0.0662	0.1294	Glycolysis, gluconeogenesis, pyruvate metabolism
Corticosterone	LC/MS pos	0.61	0.0008	0.0075	Sterol/Steroid

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Palmitoleate (16:1n7)	LC/MS neg	0.60	0.0358	0.085	Long chain fatty acid
Quinate	GC/MS	0.57	0.0573	0.117	Food component/Plant
12-HETE	LC/MS neg	0.51	0.0318	0.0776	Eicosanoid
$\beta$ -muricholate	LC/MS neg	0.38	0.0039	0.0195	Bile acid metabolism
Deoxycholate	LC/MS neg	0.36	0.0023	0.0139	Bile acid metabolism
Taurodeoxycholate	LC/MS neg	0.21	0.018	0.0529	Bile acid metabolism

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<sup>1</sup>C, control mice; FC, fold-change for concentration of metabolites derived from U mice in relation to C; GC, gas chromatography; LC, liquid chromatography; MS, mass spectrometry; *P*, *P* value; *Q*, *Q* value; U, undernourished mice.