Electronic Supplementary Material (ESI) for Food & Function.

Supporting information

Supplemental Tables

Table S1 The compositions of the experimental diets (g/100g)

Ingredient	CON[1]	D+CON[2]	D+MR[3]
Soy protein[4]	7.59	7.59	7.59
L-Arginine	0.66	0.66	0.66
L-Histidine	0.18	0.18	0.18
L-Isoleucine	0.51	0.51	0.51
L-Leucine	0.64	0.64	0.64
L-Lysine	0.11	0.11	0.11
L-Methionine	0.69	0.69	0.00
L-Phenylalanine	0.85	0.85	0.85
L-Threonine	0.65	0.65	0.65
L-Tryptophan	0.10	0.10	0.10
L-Valine	0.57	0.57	0.57
L-Glutamic acid	1.37	1.37	2.06
L-Glycine	2.08	2.08	2.08
Corn starch	64.09	64.09	64.09
maltodextrin	5.00	5.00	5.00
Sucrose	0.10	0.10	0.10
Soybean oil	2.00	2.00	2.00
Pork Lard	2.20	2.20	2.20

Cellulose	5.00	5.00	5.00
Mineral mixture-AIN-76A	3.50	3.50	3.50
Mineral vitamin-AIN-76A	1.00	1.00	1.00
Choline chloride	0.11	0.11	0.11
CMC	1.00	1.00	1.00
Total	100.00	100.00	100.00

[1]CON, control diet, was mainly based upon the AIN-76A formulation.

[2]D+CON, control diet, was mainly based upon the AIN-76A formulation.

[3]D+MR, control diet in which methionine was restricted from 0.86% to 0.17%. The glutamic acid was increased to compensate for the reduced methionine content and to create equal amounts of total amino acids.

[4]Amino acid composition of soy protein was as follows: 6.19% leucine, 4.11% isoleucine, 5.49% valine, 1.18% methionine, 1.66% cysteine, 4.09% phenylalanine, 2.57% tyrosine, 4.83% lysine, 2.21% threonine, 1.07% tryptophan, 1.99% histidine, 6.11% arginine, 3.30% serine, 3.25% alanine, 5.56% proline, 3.27% glycine, 17.49% glutamic acid 9.44% aspartic acid. 1 g cysteine is equal to 0.64 g methionine.[1]

Table S2 Sequence of primers in quantitative real-time reverse transcription polymerase chain reaction

Genes	Forward (5′–3′)	Reverse (5′–3′)
Nrf2	TCTTGGAGTAAGTCGAGAAGTGT	GTTGAAACTGAGCGAAAAAGGC
HO-1	GGAAATCATCCCTTGCACGC	TGTTTGAACTTGGTGGGGCT
NQO-1	AGGATGGGAGGTACTCGAATC	AGGCGTCCTTCCTTATATGCTA

Nr1	AGAGCCCGACCCTAAAAAGAA	CCCTCCTCCCTCTCAATAGC
Nr2a	ACGTGACAGAACGCGAACTT	TCAGTGCGGTTCATCAATAACG
Nr2b	GGCTCCGAGACTTCTACCTG	GCTTATCGCCTGTTCCGT
CAMK2A	AAACACTCAACAAAATCAAACGAC	GCCACAGAGAGACCAAAAGCA
CAMK2B	GAGAACCTGAGATACTGGACGGATA	ATTTCATCAAACACTTGTATGGACC
CAMK2D	CATCTTGACAACTATGCTGGCTACG	TTGATGATCTCCTGTTTTCGTGCT
NF-κB	ATGGCAGACGATGATCCCTAC	TGTTGACAGTGGTATTTCTGGTG
BDNF	TCATACTTCGGTTGCATGAAGG	TCATACTTCGGTTGCATGAAGG
TrkB	CTGGGGCTTATGCCTGCTG	GTACACCAAATCCTAGCGGAAC
RC3	TCCAAGCCAGACGACGATATT	CACACTCTCCGCTCTTTATCTTC
Gap-43	TGGTGTCAAGCCGGAAGATAA	GCTGGTGCATCACCCTTCT
PSD-95	TCTGTGCGAGAGGTAGCAGA	AAGCACTCCGTGAACTCCTG
SYNAPO	CCTGCCCGTAACTTCCGTG	GAGCGGCGGTAGGGAAAAG
β-actin	GGCTGTATTCCCTCCATCG	CCAGTTGGTAACAATGCCATG

Nrf2: nuclear factor erythroid-derived 2-like 2, HO-1: heme oxygenase 1, NQO-1: NADPH quinone oxidoreductase-1, Nr1: N-methyl-D-aspartate (NMDA) receptor 1, Nr2a: N-methyl-D-aspartate (NMDA) receptor 2a, Nr2b: N-methyl-D-aspartate (NMDA) receptor 2b, CAMK2A: Ca2+/calmodulin-dependent protein kinase II alpha chain, CAMK2B: Ca2+/calmodulin-dependent protein kinase II beta chain, CAMK2D: Ca2+/calmodulin-dependent protein kinase II delta chain, NF-κB: nuclear factor kappa B, BDNF: brain-derived neurotrophic factor, TrkB: tyrosine kinase receptor B, RC3: neurogranin, Gap-43: neuromodulin, PSD-95: postsynaptic density protein 95, SYNAPO:

synaptopodin.

Table S3 ^{1}H chemical shift assignment of the metabolites of short-chain fatty acid production pathways in feces

Keys	Metabolites	Moieties	$\delta^{1}H$ (ppm) and multiplicity	Annotated chemical shift (ppm)	Integral region (ppm)
1	butyrate	CH_3, βCH_2, αCH_2	0.90(t), 1.56(m), 2.15(t)	0.90(CH_3)	0.88-0.92
2	α-ketoisocaproate	2*CH_3, CH, CH_2	0.92(d), 2.06(m), 2.61(d)	2.61(CH_2)	2.60-2.62
3	propionate	CH_3, CH_2	1.07(t), 2.19(q)	1.07(CH_3)	1.06-1.08
4	α-keto-β-methyl-valerate	δCH_3, $\gamma' CH_3$, γCH, $\gamma' CH$, βCH	0.88(t), 1.10(d), 1.47(m), 1.69(m), 2.93(m)	1.10(CH_3)	1.10-1.11
5	α-ketoisovalerate	CH_3, CH	1.13(d), 3.02(m)	1.13(CH_3)	1.12-1.13
6	lactate	αCH, βCH_3	1.33(d), 4.11(q)	1.33(CH_3)	1.31-1.35
7	acetate	CH_3	1.92(s)	1.92(CH_3)	1.91-1.93
8	5-aminovalerate	2CH_2, 3CH_2, 1CH_2, 4CH_2	1.62(m), 1.65(m), 2.26(t), 3.02(t)	2.26(CH_2)	2.25-2.27
9	pyruvate	CH_3	2.37(s)	2.37(CH_3)	2.37-2.38
10	succinate	CH_2	2.41(s)	2.41(CH_2)	2.40-2.42
11	malate	βCH_2,	2.38(dd), 2.70(dd),	2.70(CH_2)	2.69-2.71

		β′CH_2, αCH	4.31(dd)		
12	malonate	CH_2	3.11(s)	3.11(CH_2)	3.10-3.12
13	fumarate	CH	6.52(s)	6.52(CH)	6.52-6.53
14	formate	CH	8.46(s)	8.46(CH)	8.46-8.47

s, singlet, d, doublet, t, triplet, q, quartet, dd, doublet of doublets, m, multiplet.

References

M. Di Buono, L. J. Wykes, R. O. Ball and P. B. Pencharz, Dietary cysteine reduces the methionine requirement in men, *Am. J. Clin. Nutr., 2001*, **74**, 761-766.