SUPPLEMENTARY MATERIAL

Early-life gut microbiome composition is associated with milk allergy resolution

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Supplementary Table 1: Baseline characteristics of the participants stratified by age at time of stool collection

Characteristics	All subjects with milk allergy included in the analysis	Age 3-6 months	Age 7-12 months	Age 13-16 months	P-value*
Subjects	226	29 (12.8%)	144 (63.7%)	53 (23.4%)	
Age at last followup (months) – median(IQR)	80.0 (18.0)	72.4 (18.8)	79.4 (22.5)	83.6 (10.8)	
Sex					0.23
Female	77	14 (18.2%)	46 (59.7%)	17 (22.1%)	
Male	149	15 (10.1%)	98 (65.8%)	36 (24.2%)	
Race					0.02
White	174	16 (9.2%)	112 (64.4%)	46 (26.4%)	
Black/African-American	30	8 (26.7%)	16 (53.3%)	6 (20%)	
Asian	19	5 (26.3%)	13 (68.4%)	1 (5.3%)	
Other	3	0 (0.0%)	3 (100.0%)	0 (0.0%)	
Baseline milk IgE level					0.17
<2	91	18 (19.8%)	52 (57.1%)	21 (23.1%)	
≥ 2-10	68	6 (8.8%)	46 (67.6%)	16 (23.5%)	
≥10	67	5 (7.5%)	46 (68.7%)	16 (23.9%)	
Baseline milk SPT response (wheal in mm)					0.0005
<5	63	18 (28.6%)	29 (46.0%)	16 (25.4%)	
5-10	82	7 (8.5%)	56 (68.3%)	19 (23.2%)	
>10	81	4 (4.9%)	59 (72.8%)	18 (22.2%)	
Baseline AD severity					0.01
None	29	4 (13.8%)	15 (51.7%)	10 (34.5%)	
Mild	32	0 (0.0%)	24 (75.0%)	8 (25.0%)	

Moderate	126	14 (11.1%)	83 (65.9%)	29 (23.0%)	
Severe	39	11 (28.2%)	22 (56.4%)	6 (15.4%)	
Breast-feeding at entry					0.15
Never	36	6 (16.7%)	22 (61.1%)	8 (22.2%)	
Yes, currently	115	14 (12.2%)	67 (58.3%)	34 (29.6%)	
Yes, but no longer	75	9 (12.0%)	55 (73.3%)	11 (14.7%)	
Mode of delivery**					0.04
Vaginal	140	23 (16.4%)	90 (64.3%)	27 (19.3%)	
C-section	85	6 (7.1%)	53 (62.4%)	26 (30.6%)	
Solid food intake					2.8x10-7
Yes	219	22 (10.0%)	144 (65.8%)	53 (24.2%)	
No	7	7 (100.0%)	0 (0.0%)	0 (0.0%)	
Antibiotics – lifetime prior to sampling					0.01
Yes	142	11 (7.7%)	95 (66.9%)	36 (25.4%)	
No	84	18 (21.4%)	49 (58.3%)	17 (20.2%)	

**Data N/A for 1 subject

*Fisher's Exact test

Supplementary Table 2: Association between early life exposures and main outcomes of interest

	Milk allergy resolution by age 8 years OR (95% CI)	Sensitization to milk at baseline OR (95% CI)
Mode of delivery	1.08 (0.61-1.94)	1.50 (0.72-3.27)
Breastfeeding status		
Never	reference	Reference
Yes, currently	0.92 (0.42-1.97)	0.72 (0.25-1.83)
Yes, no longer	0.65 (0.29-1.46)	0.74 (0.24-2.00)
Solid food intake	0.51 (0.05-3.20)	10.38 (1.63-112.62)
Antibiotic use	1.05 (0.58-1.87)	1.48 (0.73-2.99)

Supplementary Table 3. Results for tests of association between bacterial functional pathways and milk allergy resolution using STAMP. Subjects were stratified by age (3-6 months, 7-12 months, 13-16 months). PICRUSt-predicted KEGG metabolic pathways were utilized as input for STAMP analysis. ANOVA with Tukey-Kramer post-hoc test and Benjamini-Hochberg FDR correction for multiple testing were utilized to test for associations between each pathway and resolution or persistence. Effect size was measured as η^2. Pathways are represented using standard KEGG conventions, e.g. “Metabolism” at the top level, “Lipid Metabolism” as the second level, and “Fatty acid metabolism” at the lowest level. Degenerate cases where the test statistic could not be calculated are indicated. See file Bacterial_functional_pathways_milk_resolution_STAMP.xlsx.

Supplementary Figure 1. Linear discriminant analysis shows distinct gut microbiome composition associated with milk allergy resolution regardless of covariates. After accounting for specific covariates known to play a role in shaping infant microbiome composition, taxa within *Clostridia* and *Firmicutes* were still enriched in children sampled at age 3-6 months with milk allergy resolution vs. milk allergy persistence by age 8 years, while taxa within *Bacteroidetes* were underrepresented. Linear Discriminant Analysis scores as calculated by LEfSe are presented for antibiotics, breastfeeding, mode of delivery, race, and solid food intake. All taxa were significantly associated with either resolution or persistence of milk allergy ($P < 0.05$). Only taxa with LDA scores >2 are presented.

Level_1	Level_2	Level_3	p-values	p-values (corrected)	Effect size	Note	No: mean rel. freq. (%)	No: std. dev. (%)	Yes: mean rel. freq. (%)	Yes: std. dev. (%)
Metabolism	Lipid Metabolism	Fatty acid metabolism	0.00010408	0.0341384	0.433196106		0.352531247	0.064075578	0.267186047	0.033255287
Metabolism	Metabolism of Terpenoids and Polyketides	Tetracycline biosynthesis	0.000781902	0.256463818	0.346518429		0.108713919	0.037671817	0.155088573	0.025905791
Metabolism	Xenobiotics Biodegradation and Metabolism	Drug metabolism - cytochrome P450	0.000928566	0.304569507	0.338619769		0.077008333	0.024343373	0.043192381	0.022023576
Metabolism	Xenobiotics Biodegradation and Metabolism	Metabolism of xenobiotics by cytochrome P450	0.001011995	0.331934317	0.334636432		0.072917622	0.025072607	0.041036874	0.019554501
Metabolism	Energy Metabolism	Methane metabolism	0.001997867	0.655300523	0.302439633		1.057670271	0.115056711	1.234263678	0.138537884
Metabolism	Metabolism of Other Amino Acids	Glutathione metabolism	0.002558446	0.839170222	0.290423605		0.298051334	0.064280601	0.22262497	0.052414604
Metabolism	Amino Acid Metabolism	Tyrosine metabolism	0.003110073	1.020104108	0.280823111		0.400851081	0.032489936	0.355101247	0.037257176
Metabolism	Carbohydrate metabolism	Carbohydrate metabolism_Unclassified	0.003373399	1.106474794	0.276797299		0.227426041	0.034073375	0.193400116	0.020926002
Metabolism	Metabolism of Terpenoids and Polyketides	Geraniol degradation	0.003685055	1.208698073	0.272400806		0.105449431	0.054397867	0.05250474	0.032119727
Metabolism	Lipid Metabolism	Fatty acid biosynthesis	0.005081966	1.666884847	0.256240573		0.399805721	0.066544031	0.459086832	0.034103543
Metabolism	Xenobiotics Biodegradation and Metabolism	Caprolactam degradation	0.005180599	1.699236541	0.255265821		0.084606112	0.044400567	0.043487685	0.025812013
Metabolism	Metabolism of Cofactors and Vitamins	Retinol metabolism	0.005792037	1.899788028	0.249590477		0.05194853	0.016616976	0.031489558	0.017567098
Metabolism	Amino Acid Metabolism	Tryptophan metabolism	0.007573126	2.483985381	0.235826818		0.234064028	0.084182668	0.166085442	0.036729884
Metabolism	Lipid Metabolism	Glycerolipid metabolism	0.008458715	2.774458586	0.230100058		0.36163871	0.043144258	0.412917569	0.046901097
Metabolism	Metabolism of Cofactors and Vitamins	Ubiquinone and other terpenoid-quinone biosynthesis	0.008882677	2.913518013	0.227558552		0.294170623	0.087287398	0.193064464	0.09222745
Metabolism	Amino Acid Metabolism	Valine, leucine and isoleucine degradation	0.00891621	2.924516719	0.227362514		0.268559502	0.060050905	0.212585246	0.042835049
Metabolism	Carbohydrate Metabolism	Fructose and mannose metabolism	0.009152974	3.002175574	0.225998079		0.944858712	0.143520617	1.173267517	0.234915685
Metabolism	Amino Acid Metabolism	Lysine degradation	0.010273914	3.369843901	0.219964997		0.204600837	0.073778912	0.146185803	0.035544831
Metabolism	Xenobiotics Biodegradation and Metabolism	Toluene degradation	0.01248897	4.096382153	0.209703049		0.142947242	0.038359465	0.098794035	0.043446228
Metabolism	Metabolism of Cofactors and Vitamins	Vitamin B6 metabolism	0.013035819	4.275748498	0.207439728		0.204623142	0.025936796	0.177180306	0.026082901
Metabolism	Amino Acid Metabolism	Phenylalanine metabolism	0.013976945	4.58443802	0.203750137		0.2209566	0.056662407	0.178907346	0.025669505
Metabolism	Nucleotide metabolism	Nucleotide metabolism_Unclassified	0.016974501	5.567636381	0.193415127		0.106427797	0.045476763	0.073313081	0.021696252
Metabolism	Carbohydrate Metabolism	Butanoate metabolism	0.017148577	5.624733335	0.19287044		0.700222464	0.088338463	0.638100676	0.036835371
Metabolism	Glycan Biosynthesis and Metabolism	Peptidoglycan biosynthesis	0.017207509	5.644062913	0.192687251		0.697815343	0.103263214	0.775579163	0.055622682
Metabolism	Lipid Metabolism	alpha-Linolenic acid metabolism	0.020498795	6.723604629	0.183313469		0.02340777	0.0174047	0.011412062	0.007618964
Metabolism	Lipid Metabolism	Biosynthesis of unsaturated fatty acids	0.020952092	6.872286311	0.182138282		0.200665275	0.058705073	0.147209551	0.05254466
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of siderophore group nonribosomal peptides	0.021164898	6.942086465	0.181595051		0.074187167	0.051419704	0.040339372	0.018512514
Metabolism	Enzyme Families	Protein kinases	0.021614478	7.089548772	0.180464599		0.398115647	0.078318249	0.342712546	0.039229507
Metabolism	Biosynthesis and biodegradation of secondary metabolites	Biosynthesis and biodegradation of secondary metabolites_Unclassified	0.02302028	7.550651969	0.177071416		0.115652114	0.059848092	0.074994424	0.026928687
Metabolism	Amino Acid Metabolism	Glycine, serine and threonine metabolism	0.023529358	7.717629371	0.175892077		0.859762967	0.0533977	0.811003909	0.049826595
Metabolism	Glycan Biosynthesis and Metabolism	Lipopolysaccharide biosynthesis proteins	0.024203305	7.938684138	0.174368361		0.47291436	0.184417874	0.296533881	0.187325205
Metabolism	Xenobiotics Biodegradation and Metabolism	Polycyclic aromatic hydrocarbon degradation	0.025487901	8.360031431	0.171574969		0.077402656	0.031275146	0.098819289	0.015565473
Metabolism	Biosynthesis of Other Secondary Metabolites	Flavone and flavonol biosynthesis	0.026240854	8.6070002	0.170000662		0.005904394	0.005249198	0.002595821	0.001853026
Metabolism	Biosynthesis of Other Secondary Metabolites	Isoquinoline alkaloid biosynthesis	0.026254952	8.611624147	0.169971607		0.057503783	0.007253432	0.048903022	0.010240526
Metabolism	Carbohydrate Metabolism	Inositol phosphate metabolism	0.026606604	8.726966109	0.169251742		0.124673929	0.04820587	0.092938169	0.021331084
Metabolism	Metabolism of Cofactors and Vitamins	Porphyrin and chlorophyll metabolism	0.028003488	9.185144017	0.1664809		0.612303391	0.18800453	0.813107455	0.234468594
Metabolism	Metabolism of Terpenoids and Polyketides	Limonene and pinene degradation	0.029603719	9.710019714	0.163467769		0.124683859	0.033948944	0.097676553	0.026673858
Metabolism	Carbohydrate Metabolism	Amino sugar and nucleotide sugar metabolism	0.03267837	10.71850531	0.158100481		1.419899174	0.161495162	1.559001762	0.152135427
Metabolism	Glycan Biosynthesis and Metabolism	Lipopolysaccharide biosynthesis	0.033132593	10.86749044	0.157349772		0.300722074	0.15209546	0.168820764	0.145615129
Metabolism	Xenobiotics Biodegradation and Metabolism	Fluorobenzoate degradation	0.034662766	11.36938726	0.154893001		0.020624766	0.017597738	0.008543837	0.010620659
Metabolism	Metabolism of Terpenoids and Polyketides	Terpenoid backbone biosynthesis	0.034911489	11.45096829	0.154503742		0.463153848	0.09248323	0.520975294	0.041386585
Metabolism	Lipid Metabolism	Linoleic acid metabolism	0.037198106	12.20097887	0.151047553		0.043072532	0.022256342	0.06067593	0.01891872
Metabolism	Glycan biosynthesis and metabolism	Glycan biosynthesis and metabolism_Unclassified	0.03728368	12.22904692	0.150922299		0.06523242	0.044132882	0.037102966	0.022322006
Metabolism	Metabolism of Other Amino Acids	D-Arginine and D-ornithine metabolism	0.037622731	12.34025589	0.150428791		0.002016502	0.001150775	0.004686436	0.003802842
Metabolism	Energy Metabolism	Oxidative phosphorylation	0.041627269	13.65374422	0.144910021		0.980616437	0.127607236	1.067274888	0.082809688
Metabolism	Energy Metabolism	Photosynthesis	0.047929229	15.72078705	0.137206381		0.301253879	0.073964516	0.355336459	0.060277165
Metabolism	Xenobiotics Biodegradation and Metabolism	Bisphenol degradation	0.050078547	16.42576336	0.134807028		0.05513984	0.029131404	0.076080819	0.02342946
Metabolism	Amino Acid Metabolism	Lysine biosynthesis	0.05142667	16.86794766	0.13335372		0.732086794	0.137900777	0.824696541	0.097573917
Metabolism	Energy Metabolism	Photosynthesis proteins	0.053069043	17.40664601	0.131633551		0.309442114	0.069081245	0.359960988	0.058904877
Metabolism	Nucleotide Metabolism	Pyrimidine metabolism	0.053136329	17.42871582	0.131564213		1.542766285	0.234145663	1.680372988	0.117926876
Metabolism	Metabolism of Cofactors and Vitamins	Lipoic acid metabolism	0.053154815	17.43477938	0.131545178		0.056284927	0.011644072	0.041237458	0.022003569
Metabolism	Xenobiotics Biodegradation and Metabolism	Drug metabolism - other enzymes	0.054850403	17.99093213	0.129826731		0.257088429	0.026820016	0.278642355	0.027230979
Metabolism	Carbohydrate Metabolism	Pentose phosphate pathway	0.057756726	18.94420625	0.127000883		0.890240523	0.044315884	0.935933088	0.065142332
Metabolism	Biosynthesis of Other Secondary Metabolites	Tropane, piperidine and pyridine alkaloid biosynthesis	0.062972842	20.65509213	0.122268432		0.111846017	0.005429096	0.104096719	0.012062583
Metabolism	Carbohydrate Metabolism	Ascorbate and aldarate metabolism	0.066288089	21.74249335	0.119460762		0.226019573	0.0818637	0.180558336	0.041022491
Metabolism	Enzyme Families	Peptidases	0.069441896	22.77694196	0.116917922		1.734080353	0.127779291	1.813153541	0.089080045
Metabolism	Lipid Metabolism	Arachidonic acid metabolism	0.075742923	24.8436786	0.112169098		0.032664887	0.015941007	0.023098848	0.010929014
Metabolism	Amino Acid Metabolism	Histidine metabolism	0.083988899	27.54835896	0.106526129		0.520407571	0.098210978	0.572117485	0.051111904
Metabolism	Glycan Biosynthesis and Metabolism	Glycosyltransferases	0.086586887	28.4004988	0.104864607		0.370360018	0.091117519	0.314966447	0.069723968
Metabolism	Metabolism of cofactors and vitamins	Metabolism of cofactors and vitamins_Unclassified	0.090601101	29.71716128	0.102394953		0.155918826	0.053407335	0.126543827	0.03355707
Metabolism	Metabolism of Other Amino Acids	beta-Alanine metabolism	0.101024074	33.13589631	0.096472629		0.219494384	0.070847315	0.184741992	0.03497226
Metabolism	Carbohydrate Metabolism	Citrate cycle (TCA cycle)	0.10645824	34.91830258	0.093630244		0.617629878	0.100867634	0.542244197	0.121034968
Metabolism	Metabolism of Cofactors and Vitamins	One carbon pool by folate	0.110401392	36.21165657	0.091660358		0.500867555	0.071128381	0.536689786	0.041614746
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - lacto and neolacto series	0.11364229	37.27467116	0.090095315		0.000159648	0.000241162	4.21E-05	0.000131988
Metabolism	Energy Metabolism	Nitrogen metabolism	0.115037815	37.73240325	0.089435684		0.729500126	0.062747423	0.689752536	0.060787508
Metabolism	Metabolism of Terpenoids and Polyketides	Polyketide sugar unit biosynthesis	0.118506122	38.87000812	0.087831833		0.152002769	0.048133263	0.17595763	0.029063265
Metabolism	Carbohydrate Metabolism	Pyruvate metabolism	0.140426563	46.05991261	0.078714566		1.014115274	0.09697406	1.055141598	0.041539275

Metabolism	Metabolism of Other Amino Acids	D-Alanine metabolism	0.148246616	48.62489007	0.075823028	0.095298926	0.014562896	0.103776102	0.014235034
Metabolism	Carbohydrate Metabolism	Propanoate metabolism	0.161821447	53.07743469	0.071172245	0.540659546	0.053393577	0.51547635	0.037378574
Metabolism	Biosynthesis of Other Secondary Metabolites	beta-Lactam resistance	0.162652305	53.34995599	0.070901403	0.020672685	0.013067934	0.026761639	0.008940008
Metabolism	Carbohydrate Metabolism	Galactose metabolism	0.168107814	55.13936301	0.069159516	0.778378449	0.136398602	0.838706778	0.084918618
Metabolism	Xenobiotics Biodegradation and Metabolism	Atrazine degradation	0.171132036	56.13130784	0.068220223	0.039363317	0.031622319	0.023771716	0.025462581
Metabolism	Metabolism of Cofactors and Vitamins	Pantothenate and CoA biosynthesis	0.173032282	56.75458837	0.067639249	0.567985734	0.054849179	0.597958946	0.053467688
Metabolism	Biosynthesis of Other Secondary Metabolites	Betalain biosynthesis	0.180093266	59.07059136	0.065540083	2.96E-05	8.76E-05	1.89E-07	7.79E-07
Metabolism	Metabolism of Other Amino Acids	Phosphonate and phosphinate metabolism	0.18345631	60.17366972	0.064571861	0.068681569	0.01546238	0.060547624	0.014745931
Metabolism	Biosynthesis of Other Secondary Metabolites	Phenylpropanoid biosynthesis	0.184713199	60.58592939	0.064215016	0.189783793	0.059616505	0.16561547	0.032507374
Metabolism	Lipid Metabolism	Synthesis and degradation of ketone bodies	0.185178942	60.73869308	0.064083467	0.027549185	0.010356431	0.032580124	0.008640974
Metabolism	Energy Metabolism	Carbon fixation in photosynthetic organisms	0.19922892	65.34708565	0.06027897	0.594634723	0.042954754	0.615308672	0.037414388
Metabolism	Glycan Biosynthesis and Metabolism	N-Glycan biosynthesis	0.200991357	65.92516502	0.059822937	0.021193537	0.016019923	0.014084654	0.012017661
Metabolism	Metabolism of Cofactors and Vitamins	Folate biosynthesis	0.214482385	70.35022233	0.056474515	0.393613453	0.053279044	0.362959839	0.064961188
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of type II polyketide products	0.22017008	72.21578621	0.055133604	2.82E-05	8.91E-05	8.47E-07	1.86E-06
Metabolism	Amino Acid Metabolism	Arginine and proline metabolism	0.225291651	73.89566149	0.053959525	1.130345621	0.109597128	1.174892906	0.076529266
Metabolism	Metabolism of Terpenoids and Polyketides	Carotenoid biosynthesis	0.229469258	75.26591669	0.053024259	0.007389111	0.007009363	0.015315038	0.019888028
Metabolism	Xenobiotics Biodegradation and Metabolism	Nitrotoluene degradation	0.229578658	75.30179986	0.053000031	0.07104891	0.027565768	0.085233666	0.029988555
Metabolism	Lipid Metabolism	Glycerophospholipid metabolism	0.235943304	77.38940356	0.051612931	0.535908424	0.062258449	0.56341578	0.053898171
Metabolism	Xenobiotics Biodegradation and Metabolism	Benzoate degradation	0.24599525	80.686442	0.049508248	0.238397617	0.076058102	0.214171037	0.027184053
Metabolism	Xenobiotics Biodegradation and Metabolism	Chlorocyclohexane and chlorobenzene degradation	0.254412733	83.44737626	0.04782165	0.025296193	0.01323348	0.019518007	0.012047254
Metabolism	Energy Metabolism	Sulfur metabolism	0.262957725	86.25013392	0.046175479	0.312780668	0.057377337	0.287866078	0.053401692
Metabolism	Biosynthesis of Other Secondary Metabolites	Indole alkaloid biosynthesis	0.263300198	86.36246487	0.046110829	1.81E-06	5.73E-06	1.89E-07	7.79E-07
Metabolism	Metabolism of Cofactors and Vitamins	Nicotinate and nicotinamide metabolism	0.265813166	87.18671856	0.045639487	0.438623279	0.10345025	0.405157154	0.0484074
Metabolism	Lipid Metabolism	Ether lipid metabolism	0.279448943	91.65925333	0.043171658	0.001294184	0.001214587	0.000833363	0.000940059
Metabolism	Amino Acid Metabolism	Amino acid related enzymes	0.29146805	95.60152038	0.041114177	1.323149506	0.180361226	1.379833152	0.092436322
Metabolism	Xenobiotics Biodegradation and Metabolism	Dioxin degradation	0.298769885	97.99652229	0.039914241	0.08535501	0.029107899	0.076198914	0.015719775
Metabolism	Metabolism of Cofactors and Vitamins	Thiamine metabolism	0.299222491	98.14497708	0.039841055	0.454040106	0.072563414	0.480266104	0.055404195
Metabolism	Lipid Metabolism	Steroid hormone biosynthesis	0.318123965	104.3446606	0.036902179	0.034867928	0.037701351	0.021809642	0.028625548
Metabolism	Xenobiotics Biodegradation and Metabolism	Styrene degradation	0.32256921	105.8027009	0.03624277	0.031297212	0.025076235	0.024004581	0.012334833
Metabolism	Metabolism of Terpenoids and Polyketides	Zeatin biosynthesis	0.331616675	108.7702695	0.034935683	0.039835786	0.009757989	0.042809885	0.005873023
Metabolism	Metabolism of Other Amino Acids	Taurine and hypotaurine metabolism	0.351561704	115.3122389	0.032209966	0.113956577	0.016432898	0.108572662	0.012858121
Metabolism	Amino Acid Metabolism	Phenylalanine, tyrosine and tryptophan biosynthesis	0.353043731	115.7983438	0.032015514	0.759401462	0.13123642	0.799316153	0.088011819
Metabolism	Metabolism of Other Amino Acids	Selenocompound metabolism	0.367717997	120.6115031	0.030146745	0.404389179	0.04038185	0.394094904	0.017222761
Metabolism	Metabolism of Cofactors and Vitamins	Riboflavin metabolism	0.369394938	121.1615397	0.029939534	0.221832474	0.0445812	0.209362075	0.026393945
Metabolism	Xenobiotics Biodegradation and Metabolism	1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane (DDT) degradation	0.377414346	123.7919056	0.028965892	1.60E-05	3.79E-05	0.000136287	0.000427893
Metabolism	Xenobiotics Biodegradation and Metabolism	Aminobenzoate degradation	0.397244289	130.2961269	0.026675276	0.131835597	0.049529199	0.117213237	0.038211074
Metabolism	Metabolism of Other Amino Acids	D-Glutamine and D-glutamate metabolism	0.406142645	133.2147877	0.025698478	0.127905716	0.017560439	0.132417578	0.010212699
Metabolism	Nucleotide Metabolism	Purine metabolism	0.412896767	135.4301396	0.024977059	2.093166187	0.241366094	2.147211085	0.087448807
Metabolism	Carbohydrate Metabolism	Glyoxylate and dicarboxylate metabolism	0.433989143	142.3484389	0.022829452	0.557087828	0.087271356	0.53490101	0.057772629
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of ansamycins	0.45479125	149.17153	0.020857354	0.10256389	0.027386408	0.109644836	0.020844128
Metabolism	Carbohydrate Metabolism	Starch and sucrose metabolism	0.46407429	152.216367	0.020020934	1.097139007	0.153188765	1.062479757	0.089231679
Metabolism	Amino Acid Metabolism	Cysteine and methionine metabolism	0.493652526	161.9180287	0.017522365	0.967231586	0.096835243	0.94752076	0.050324009
Metabolism	Glycan Biosynthesis and Metabolism	Glycosaminoglycan degradation	0.499954788	163.9851703	0.017020995	0.08748571	0.08948113	0.06632098	0.070138476
Metabolism	Amino Acid Metabolism	Alanine, aspartate and glutamate metabolism	0.50138699	164.4549328	0.016908511	0.958158145	0.166778248	0.991725291	0.08860664
Metabolism	Lipid Metabolism	Steroid biosynthesis	0.519912135	170.5311802	0.01550064	0.010267216	0.020870437	0.005655936	0.01568727
Metabolism	Amino Acid Metabolism	Valine, leucine and isoleucine biosynthesis	0.520432396	170.7018257	0.015462335	0.731552579	0.128804007	0.756909844	0.073422427
Metabolism	Biosynthesis of Other Secondary Metabolites	Caffeine metabolism	0.520909076	170.8581769	0.015427296	0.003416279	0.006959776	0.001882447	0.005229776
Metabolism	Lipid Metabolism	Fatty acid elongation in mitochondria	0.521085386	170.9160068	0.01541435	0.00341531	0.006960248	0.001882059	0.00522991
Metabolism	Carbohydrate Metabolism	C5-Branched dibasic acid metabolism	0.538582292	176.6549919	0.014166543	0.340465658	0.0515082	0.330539229	0.031297686
Metabolism	Lipid Metabolism	Sphingolipid metabolism	0.551308016	180.8290294	0.01330349	0.213265334	0.099372751	0.19289357	0.075104351
Metabolism	Xenobiotics Biodegradation and Metabolism	Chloroalkane and chloroalkene degradation	0.556646	182.5798881	0.01295223	0.1891645	0.03689792	0.197796086	0.036354108
Metabolism	Energy metabolism	Energy metabolism_Unclassified	0.568142637	186.3507848	0.012216685	0.785980314	0.144795024	0.810897191	0.078922182
Metabolism	Xenobiotics Biodegradation and Metabolism	Naphthalene degradation	0.572345857	187.729441	0.011954777	0.156143856	0.027733836	0.149290042	0.031663665
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of vancomycin group antibiotics	0.576697368	189.1567366	0.01168751	0.051687909	0.017149153	0.054504745	0.00864741
Metabolism	Metabolism of Cofactors and Vitamins	Biotin metabolism	0.60569811	198.6689799	0.010003792	0.127811982	0.031199278	0.134368773	0.031920752
Metabolism	Glycan Biosynthesis and Metabolism	Various types of N-glycan biosynthesis	0.608288516	199.5186332	0.009861391	1.81E-06	5.73E-06	5.67E-06	2.34E-05
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - ganglio series	0.609344203	199.8648987	0.009803722	0.047145459	0.04536191	0.037711942	0.046388253
Metabolism	Biosynthesis of Other Secondary Metabolites	Flavonoid biosynthesis	0.648586074	212.7362323	0.00780515	0.006079166	0.008050815	0.004786389	0.006401251
Metabolism	Carbohydrate Metabolism	Glycolysis / Gluconeogenesis	0.650741037	213.4430602	0.007703316	1.195055981	0.110321017	1.216480061	0.12242918
Metabolism	Glycan Biosynthesis and Metabolism	Other glycan degradation	0.654816285	214.7797414	0.007512914	0.273544333	0.135049441	0.250254646	0.126624059
Metabolism	Energy Metabolism	Photosynthesis - antenna proteins	0.670414282	219.8958845	0.006810055	3.58E-06	8.39E-06	2.31E-06	6.79E-06
Metabolism	Carbohydrate Metabolism	Pentose and glucuronate interconversions	0.672022355	220.4233326	0.006739895	0.569167443	0.095761753	0.556580566	0.057026117
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - globo series	0.734724173	240.9895287	0.004322586	0.104844402	0.053428387	0.098035386	0.048024004
Metabolism	Biosynthesis of Other Secondary Metabolites	Novobiocin biosynthesis	0.741608385	243.2475502	0.00409341	0.126059361	0.014814924	0.127840845	0.012599739
Metabolism	Energy Metabolism	Carbon fixation pathways in prokaryotes	0.747138404	245.0613965	0.00391429	0.901635872	0.072905006	0.890784772	0.090096002
Metabolism	Others	Others_Unclassified	0.762155111	249.9868763	0.003449938	1.082356164	0.086127924	1.097438413	0.142795633
Metabolism	Metabolism of Other Amino Acids	Cyanoamino acid metabolism	0.824306976	270.3726881	0.001857858	0.277873365	0.052995488	0.27401903	0.036209221
Metabolism	Biosynthesis of Other Secondary Metabolites	Penicillin and cephalosporin biosynthesis	0.834197199	273.6166812	0.001651752	0.024683766	0.022064713	0.02319745	0.014455109

Metabolism	Lipid metabolism	Lipid metabolism_Unclassified	0.843860869	276.7863649	0.001462523	0.146009196	0.054308209	0.149148573	0.027385534
Metabolism	Biosynthesis of Other Secondary Metabolites	Stilbenoid, diarylheptanoid and gingerol biosynthesis	0.876071468	287.3514416	0.00091718	0.001757368	0.004243124	0.002009992	0.003919988
Metabolism	Metabolism of Terpenoids and Polyketides	Prenyltransferases	0.897233102	294.2924575	0.000629185	0.287896653	0.068070199	0.290573069	0.038523696
Metabolism	Lipid Metabolism	Lipid biosynthesis proteins	0.923254833	302.8275852	0.000350078	0.527921102	0.049050206	0.526067061	0.047464845
Metabolism	Biosynthesis of Other Secondary Metabolites	Streptomycin biosynthesis	0.935087267	306.7086237	0.000250243	0.276899212	0.079469545	0.27882474	0.041941986
Metabolism	Biosynthesis of Other Secondary Metabolites	Butirosin and neomycin biosynthesis	0.937216743	307.4070917	0.000234062	0.056446665	0.023119498	0.056992273	0.01247638
Metabolism	Amino acid metabolism	Amino acid metabolism_Unclassified	0.93995026	308.3036853	0.000214089	0.219963849	0.067246139	0.221536632	0.040227637
Metabolism	Lipid Metabolism	Secondary bile acid biosynthesis	0.954781921	313.16847	0.0001213	0.033027318	0.022249225	0.033374427	0.008613916
Metabolism	Biosynthesis of Other Secondary Metabolites	Isoflavonoid biosynthesis	0.979875552	321.3991811	2.40E-05	3.31E-07	1.05E-06	3.44E-07	1.42E-06
Metabolism	Xenobiotics Biodegradation and Metabolism	Xylene degradation	0.980292846	321.5360534	2.30E-05	0.067656022	0.022473245	0.067478882	0.014434701
Metabolism	Xenobiotics Biodegradation and Metabolism	Ethylbenzene degradation	0.981598092	321.9641742	2.01E-05	0.039260169	0.012778844	0.039123785	0.015865002
Metabolism	Lipid Metabolism	Primary bile acid biosynthesis	0.989429314	324.5328149	6.62E-06	0.033665751	0.021984565	0.033745806	0.008467424
Metabolism	Biosynthesis of Other Secondary Metabolites	Clavulanic acid biosynthesis	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Enzyme Families	Cytochrome P450	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Glycosaminoglycan biosynthesis - chondroitin sulfate	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Glycosylphosphatidylinositol(GPI)-anchor biosynthesis	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Other types of O-glycan biosynthesis	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of 12-, 14- and 16-membered macrolides	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of type II polyketide backbone	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Sesquiterpenoid biosynthesis	1	328	-1 degenerate case: failed to calculate p-value	0	0	0	0

Level_1	Level_2	Level_3	p-values	p-values (corrected)	Effect size	Note	No: mean rel. freq. (%)	No: std. dev. (%)	Yes: mean rel. freq. (%)	Yes: std. dev. (%)
Metabolism	Energy Metabolism	Carbon fixation in photosynthetic organisms	0.020097803	6.592079447	0.037465873		0.640588925	0.042979518	0.624248645	0.039455664
Metabolism	Biosynthesis of Other Secondary Metabolites	Stilbenoid, diarylheptanoid and gingerol biosynthesis	0.021828447	7.15973069	0.036486057		0.002131345	0.003152493	0.001206961	0.001483657
Metabolism	Xenobiotics Biodegradation and Metabolism	Bisphenol degradation	0.063317439	20.76811991	0.024074647		0.083789733	0.027110903	0.0762791	0.020707974
Metabolism	Metabolism of Other Amino Acids	Selenocompound metabolism	0.073208915	24.01252426	0.022426844		0.383922263	0.042270892	0.395826632	0.036174917
Metabolism	Carbohydrate Metabolism	Pentose phosphate pathway	0.073268072	24.03192746	0.022417714		0.959183453	0.071815414	0.939354842	0.05901264
Metabolism	Amino acid metabolism	Amino acid metabolism_Unclassified	0.083760815	27.47354743	0.020911383		0.196151656	0.03489651	0.20698284	0.038002508
Metabolism	Energy Metabolism	Methane metabolism	0.09192441	30.15120659	0.019872755		1.29575796	0.161593982	1.252007665	0.144575603
Metabolism	Lipid Metabolism	Linoleic acid metabolism	0.09413307	30.8756469	0.019608732		0.069218509	0.021698151	0.063831162	0.016395258
Metabolism	Carbohydrate Metabolism	Pentose and glucuronate interconversions	0.10289275	33.74882203	0.018623634		0.568980445	0.073487815	0.549257205	0.068866413
Metabolism	Carbohydrate Metabolism	Fructose and mannose metabolism	0.122903457	40.31233399	0.016678418		1.108177686	0.248976358	1.052295611	0.180003366
Metabolism	Carbohydrate metabolism	Carbohydrate metabolism_Unclassified	0.13654035	44.78523476	0.015542249		0.207361107	0.025643881	0.201177759	0.023355618
Metabolism	Carbohydrate Metabolism	Glycolysis / Gluconeogenesis	0.164195664	53.85617763	0.01358277		1.211599716	0.088333589	1.191100157	0.085089119
Metabolism	Amino Acid Metabolism	Arginine and proline metabolism	0.176491285	57.88914157	0.012828006		1.211180477	0.077697703	1.191884828	0.088157234
Metabolism	Biosynthesis of Other Secondary Metabolites	Betalain biosynthesis	0.214421686	70.33031307	0.010833496		1.15E-07	5.62E-07	9.02E-07	4.91E-06
Metabolism	Metabolism of Other Amino Acids	Taurine and hypotaurine metabolism	0.226960385	74.44300631	0.010263548		0.105253182	0.01289516	0.107723912	0.01130167
Metabolism	Lipid Metabolism	Synthesis and degradation of ketone bodies	0.233353196	76.53984839	0.009987193		0.026170108	0.009466412	0.027988657	0.008566941
Metabolism	Lipid Metabolism	Arachidonic acid metabolism	0.240326078	78.82695347	0.009695923		0.016879671	0.010496893	0.018965363	0.010391678
Metabolism	Amino Acid Metabolism	Phenylalanine metabolism	0.24724646	81.09683874	0.00941675		0.176877043	0.028621116	0.171215073	0.028854588
Metabolism	Lipid metabolism	Lipid metabolism_Unclassified	0.250839875	82.27547893	0.0092755		0.13773078	0.040060749	0.130353237	0.035911129
Metabolism	Energy Metabolism	Photosynthesis - antenna proteins	0.255668814	83.85937086	0.009089517		0.002107675	0.016348368	3.26E-05	0.000179465
Metabolism	Carbohydrate Metabolism	Starch and sucrose metabolism	0.264739236	86.83446932	0.008751535		1.136773179	0.130401579	1.11307529	0.120540587
Metabolism	Amino Acid Metabolism	Cysteine and methionine metabolism	0.27529515	90.29680915	0.008375752		0.972270655	0.076101149	0.987027679	0.08198683
Metabolism	Xenobiotics Biodegradation and Metabolism	Chloroalkane and chloroalkene degradation	0.276497154	90.69106662	0.008334099		0.208192909	0.03082414	0.20260846	0.029653262
Metabolism	Carbohydrate Metabolism	Inositol phosphate metabolism	0.27815758	91.23568637	0.00827693		0.098174102	0.019934958	0.094544612	0.019470654
Metabolism	Metabolism of Cofactors and Vitamins	One carbon pool by folate	0.279958385	91.82635032	0.008215409		0.558929743	0.04819773	0.567512798	0.045527009
Metabolism	Nucleotide metabolism	Nucleotide metabolism_Unclassified	0.286841229	94.08392314	0.007984761		0.062490885	0.031040474	0.068154306	0.031419738
Metabolism	Metabolism of Terpenoids and Polyketides	Carotenoid biosynthesis	0.294727588	96.67064897	0.007728916		0.006668243	0.011081759	0.005038854	0.007341755
Metabolism	Metabolism of Terpenoids and Polyketides	Terpenoid backbone biosynthesis	0.305272357	100.1293332	0.007400122		0.539860805	0.063870802	0.550701226	0.060845599
Metabolism	Biosynthesis of Other Secondary Metabolites	Isoflavonoid biosynthesis	0.320925468	105.2635534	0.006938102		7.62E-08	5.95E-07	1.75E-06	1.31E-05
Metabolism	Metabolism of Cofactors and Vitamins	Retinol metabolism	0.3325036	109.0611809	0.006614879		0.031878539	0.016344596	0.029177087	0.016427985
Metabolism	Nucleotide Metabolism	Purine metabolism	0.332548314	109.0758471	0.006613659		2.18443303	0.170618713	2.212926464	0.174624652
Metabolism	Xenobiotics Biodegradation and Metabolism	Chlorocyclohexane and chlorobenzene degradation	0.33522281	109.9530816	0.006541117		0.015177762	0.009883672	0.016756719	0.009442946
Metabolism	Biosynthesis of Other Secondary Metabolites	Butirosin and neomycin biosynthesis	0.340788086	111.7784923	0.006392604		0.067128068	0.014012443	0.064812175	0.014507442
Metabolism	Lipid Metabolism	Fatty acid biosynthesis	0.359834465	118.0257044	0.005908021		0.457055476	0.05595081	0.447955882	0.060264013
Metabolism	Metabolism of Other Amino Acids	Phosphonate and phosphinate metabolism	0.374330147	122.7802883	0.005562095		0.060402302	0.01377266	0.0586575	0.009535538
Metabolism	Enzyme Families	Cytochrome P450	0.38642645	126.7478755	0.005287396		0	0	4.72E-08	4.25E-07
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of vancomycin group antibiotics	0.393091415	128.9339841	0.005141171		0.05683527	0.013257229	0.058785021	0.013558796
Metabolism	Carbohydrate Metabolism	Pyruvate metabolism	0.400614887	131.4016828	0.004980309		1.039905965	0.062539485	1.03128101	0.058667287
Metabolism	Energy Metabolism	Sulfur metabolism	0.408788639	134.0826737	0.004810412		0.272868474	0.042210206	0.278739734	0.04151391
Metabolism	Metabolism of Cofactors and Vitamins	Folate biosynthesis	0.408919349	134.1255466	0.004807736		0.379336462	0.051410923	0.3725746	0.045569483
Metabolism	Biosynthesis of Other Secondary Metabolites	Indole alkaloid biosynthesis	0.419734395	137.6728815	0.004590518		3.72E-08	2.90E-07	1.38E-07	9.39E-07
Metabolism	Metabolism of Cofactors and Vitamins	Biotin metabolism	0.430919068	141.3414544	0.004374436		0.135746115	0.02217808	0.132477735	0.025979056
Metabolism	Xenobiotics Biodegradation and Metabolism	Fluorobenzoate degradation	0.447486774	146.7756619	0.004069475		0.005466862	0.008614562	0.006625467	0.00923772
Metabolism	Biosynthesis of Other Secondary Metabolites	Tropane, piperidine and pyridine alkaloid biosynthesis	0.453071635	148.6074962	0.003970555		0.109568638	0.008129223	0.108556825	0.007785061
Metabolism	Amino Acid Metabolism	Glycine, serine and threonine metabolism	0.457389419	150.0237294	0.003895371		0.83844611	0.046028906	0.832442665	0.048643812
Metabolism	Amino Acid Metabolism	Phenylalanine, tyrosine and tryptophan biosynthesis	0.462560948	151.7199911	0.003806776		0.863045494	0.091377582	0.851958316	0.086815516
Metabolism	Lipid Metabolism	Ether lipid metabolism	0.470410847	154.2947578	0.003675257		0.001252734	0.001527373	0.001480958	0.002077393
Metabolism	Carbohydrate Metabolism	Propanoate metabolism	0.479916361	157.4125665	0.003520641		0.502415074	0.036382718	0.506680497	0.034875872
Metabolism	Glycan Biosynthesis and Metabolism	Various types of N-glycan biosynthesis	0.483688569	158.6498506	0.003460654		1.07E-06	5.90E-06	2.23E-06	1.18E-05
Metabolism	Lipid Metabolism	Fatty acid elongation in mitochondria	0.485455794	159.2295005	0.003432814		0.001112243	0.003467326	0.001565439	0.004072074
Metabolism	Metabolism of Terpenoids and Polyketides	Prenyltransferases	0.493380854	161.82892	0.003309997		0.292313329	0.044054457	0.297288057	0.041725973
Metabolism	Xenobiotics Biodegradation and Metabolism	Nitrotoluene degradation	0.494220019	162.1041663	0.003297184		0.089377609	0.034091902	0.085804581	0.027978783
Metabolism	Biosynthesis of Other Secondary Metabolites	Phenylpropanoid biosynthesis	0.50167523	164.5494756	0.003184935		0.185912684	0.061027454	0.179515784	0.051944443
Metabolism	Energy Metabolism	Nitrogen metabolism	0.505252723	165.7228931	0.003132067		0.684932215	0.039622523	0.689921195	0.047157106
Metabolism	Xenobiotics Biodegradation and Metabolism	Toluene degradation	0.51616678	169.3027039	0.002974667		0.084647977	0.036844603	0.088634683	0.035598031
Metabolism	Metabolism of Other Amino Acids	Glutathione metabolism	0.520894476	170.853388	0.002908264		0.20465643	0.069046671	0.211691454	0.060836214
Metabolism	Metabolism of Terpenoids and Polyketides	Tetracycline biosynthesis	0.52241447	171.3519461	0.002887139		0.149802274	0.04039583	0.145488758	0.039152571
Metabolism	Xenobiotics Biodegradation and Metabolism	Metabolism of xenobiotics by cytochrome P450	0.530550362	174.0205189	0.002775889		0.037428655	0.025242072	0.034820278	0.023887112
Metabolism	Biosynthesis of Other Secondary Metabolites	beta-Lactam resistance	0.53098094	174.1617484	0.002770086		0.028059757	0.013342969	0.026789275	0.010750687
Metabolism	Metabolism of Other Amino Acids	Cyanoamino acid metabolism	0.538312577	176.5665252	0.00267256		0.292549613	0.066969301	0.286096773	0.057438842
Metabolism	Metabolism of Other Amino Acids	D-Alanine metabolism	0.547191636	179.4788566	0.002557641		0.100908925	0.00910396	0.102081239	0.012965171
Metabolism	Xenobiotics Biodegradation and Metabolism	1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane (DDT) degradation	0.559195885	183.4162503	0.00240767		5.11E-05	0.000207426	7.26E-05	0.00022225
Metabolism	Biosynthesis of Other Secondary Metabolites	Caffeine metabolism	0.563979111	184.9851484	0.002349595		0.001179383	0.003770417	0.001566025	0.004071953
Metabolism	Lipid Metabolism	Steroid biosynthesis	0.566854118	185.9281506	0.002315142		0.003593124	0.010497594	0.00471245	0.012212442
Metabolism	Metabolism of Other Amino Acids	D-Glutamine and D-glutamate metabolism	0.567783343	186.2329364	0.002304078		0.138408141	0.015695607	0.139846203	0.014116933
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of type II polyketide products	0.584036144	191.5638551	0.002116152		6.69E-05	0.000521413	3.08E-05	0.0002423
Metabolism	Metabolism of Cofactors and Vitamins	Porphyrin and chlorophyll metabolism	0.59359312	194.6985433	0.002010456		0.879003658	0.233585502	0.857227655	0.245140948

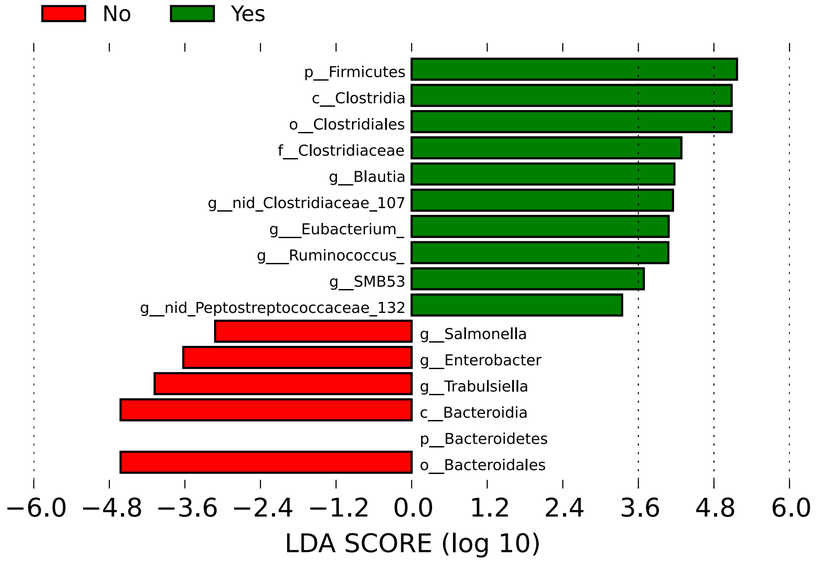
Metabolism	Metabolism of cofactors and vitamins	Metabolism of cofactors and vitamins_Unclassified	0.594557575	195.0148845	0.001999982	0.107148125	0.03793703	0.110441136	0.035236595
Metabolism	Metabolism of Terpenoids and Polyketides	Limonene and pinene degradation	0.602403306	197.5882843	0.001916074	0.085068293	0.035010108	0.082137838	0.031610705
Metabolism	Biosynthesis of Other Secondary Metabolites	Flavonoid biosynthesis	0.604970393	198.4302891	0.001889114	0.004734623	0.006044971	0.004252588	0.00502279
Metabolism	Metabolism of Other Amino Acids	D-Arginine and D-ornithine metabolism	0.606380382	198.8927652	0.001874409	0.003086529	0.002859962	0.00284241	0.002734737
Metabolism	Metabolism of Other Amino Acids	beta-Alanine metabolism	0.609024954	199.760185	0.001847023	0.178862473	0.050278214	0.174614254	0.04783171
Metabolism	Lipid Metabolism	Fatty acid metabolism	0.615086849	201.7484865	0.001785203	0.261347213	0.068841002	0.26723625	0.069037457
Metabolism	Carbohydrate Metabolism	Glyoxylate and dicarboxylate metabolism	0.625936494	205.3071699	0.001677813	0.522840852	0.052564735	0.517960521	0.063345239
Metabolism	Carbohydrate Metabolism	Citrate cycle (TCA cycle)	0.630911149	206.9388567	0.001629947	0.524552436	0.078110148	0.517880777	0.084412481
Metabolism	Lipid Metabolism	Biosynthesis of unsaturated fatty acids	0.634836426	208.2263478	0.001592777	0.137665427	0.046160262	0.141377215	0.045904949
Metabolism	Xenobiotics Biodegradation and Metabolism	Drug metabolism - cytochrome P450	0.636676675	208.8299495	0.001575531	0.038732482	0.02577047	0.036710891	0.024757568
Metabolism	Metabolism of Cofactors and Vitamins	Riboflavin metabolism	0.637241615	209.0152498	0.00157026	0.20486677	0.031855374	0.202332476	0.031480542
Metabolism	Xenobiotics Biodegradation and Metabolism	Xylene degradation	0.644484627	211.3909578	0.001503627	0.069049303	0.01594492	0.070392642	0.017992187
Metabolism	Amino Acid Metabolism	Alanine, aspartate and glutamate metabolism	0.646951154	212.1999786	0.001481335	1.063574223	0.115320763	1.054982947	0.106612085
Metabolism	Biosynthesis of Other Secondary Metabolites	Isoquinoline alkaloid biosynthesis	0.649650232	213.0852762	0.001457171	0.0522333	0.009416138	0.051625903	0.006466229
Metabolism	Xenobiotics Biodegradation and Metabolism	Drug metabolism - other enzymes	0.651399932	213.6591778	0.001441634	0.293277468	0.028276709	0.295487834	0.029197622
Metabolism	Metabolism of Terpenoids and Polyketides	Polyketide sugar unit biosynthesis	0.655457709	214.9901284	0.001405986	0.186464467	0.037653317	0.189230635	0.035607714
Metabolism	Metabolism of Cofactors and Vitamins	Nicotinate and nicotinamide metabolism	0.659359383	216.2698778	0.001372213	0.435808215	0.075926339	0.441744079	0.08174048
Metabolism	Xenobiotics Biodegradation and Metabolism	Naphthalene degradation	0.669921837	219.7343627	0.001283221	0.142774557	0.027025823	0.140896376	0.025096313
Metabolism	Energy metabolism	Energy metabolism_Unclassified	0.675231619	221.4759709	0.001239811	0.786637383	0.105136385	0.778723506	0.115607279
Metabolism	Glycan Biosynthesis and Metabolism	N-Glycan biosynthesis	0.678561617	222.5682105	0.001213033	0.015329472	0.0086925	0.015974312	0.009501671
Metabolism	Xenobiotics Biodegradation and Metabolism	Atrazine degradation	0.682145573	223.7437481	0.001184595	0.020037237	0.020701876	0.021503682	0.021369294
Metabolism	Xenobiotics Biodegradation and Metabolism	Ethylbenzene degradation	0.69502912	227.9695512	0.001085586	0.032646082	0.013667884	0.0318368	0.010873173
Metabolism	Lipid Metabolism	Lipid biosynthesis proteins	0.697982551	228.9382767	0.00106359	0.536013563	0.039001711	0.533506106	0.037314459
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of siderophore group nonribosomal peptides	0.701239405	230.0065247	0.001039634	0.027668943	0.027709253	0.025929956	0.025895139
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - lacto and neolacto series	0.715796702	234.7813182	0.000936345	0.000159756	0.000441508	0.000204485	0.000878475
Metabolism	Metabolism of Cofactors and Vitamins	Vitamin B6 metabolism	0.721983137	236.8104691	0.000894297	0.187503996	0.030135535	0.189289721	0.029107014
Metabolism	Carbohydrate Metabolism	C5-Branched dibasic acid metabolism	0.72768027	238.6791286	0.000856534	0.353203864	0.037665632	0.355501183	0.039723954
Metabolism	Nucleotide Metabolism	Pyrimidine metabolism	0.728712299	239.0176341	0.000849791	1.751074225	0.156977171	1.760475394	0.161585891
Metabolism	Lipid Metabolism	Glycerophospholipid metabolism	0.733196311	240.4883899	0.000820838	0.551417037	0.05994412	0.548148023	0.053701943
Metabolism	Lipid Metabolism	Glycerolipid metabolism	0.735050789	241.0966587	0.000809027	0.400499449	0.058751701	0.403584154	0.049497765
Metabolism	Xenobiotics Biodegradation and Metabolism	Dioxin degradation	0.750580164	246.1902939	0.000713834	0.075323975	0.01606868	0.076271247	0.018590797
Metabolism	Glycan Biosynthesis and Metabolism	Lipopolysaccharide biosynthesis proteins	0.752911047	246.9548235	0.000700111	0.251810902	0.1496602	0.25996516	0.154685063
Metabolism	Lipid Metabolism	Sphingolipid metabolism	0.753504373	247.1494343	0.000696642	0.224905949	0.090650978	0.229412191	0.079549312
Metabolism	Glycan Biosynthesis and Metabolism	Peptidoglycan biosynthesis	0.755503463	247.8051358	0.000685021	0.802169859	0.072741894	0.798296038	0.073652923
Metabolism	Carbohydrate Metabolism	Ascorbate and aldarate metabolism	0.761176869	249.6660131	0.000652623	0.156401179	0.05067773	0.158965567	0.048926284
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - ganglio series	0.77240893	253.350129	0.000590997	0.037684072	0.035356556	0.035952654	0.035178101
Metabolism	Glycan Biosynthesis and Metabolism	Lipopolysaccharide biosynthesis	0.772892704	253.5088069	0.000588417	0.14048981	0.119516495	0.146541269	0.126410567
Metabolism	Amino Acid Metabolism	Valine, leucine and isoleucine degradation	0.774710548	254.1050597	0.000578777	0.198647357	0.044129654	0.200820073	0.045136163
Metabolism	Glycan Biosynthesis and Metabolism	Glycosaminoglycan degradation	0.775340219	254.3115918	0.000575458	0.066476797	0.054772019	0.063778001	0.056374422
Metabolism	Lipid Metabolism	Primary bile acid biosynthesis	0.776098301	254.5602426	0.000571476	0.04197581	0.015057518	0.041261968	0.014569379
Metabolism	Xenobiotics Biodegradation and Metabolism	Aminobenzoate degradation	0.777750963	255.1023159	0.000562846	0.098554706	0.029783481	0.100009007	0.030761598
Metabolism	Lipid Metabolism	Secondary bile acid biosynthesis	0.786319364	257.9127515	0.000519236	0.041264132	0.015106634	0.040579354	0.014699742
Metabolism	Metabolism of Cofactors and Vitamins	Lipoic acid metabolism	0.788650478	258.6773567	0.000507698	0.035011264	0.018783048	0.035822517	0.017061513
Metabolism	Glycan Biosynthesis and Metabolism	Other glycan degradation	0.790064463	259.1411438	0.000500767	0.293543809	0.132595708	0.288055376	0.112218676
Metabolism	Amino Acid Metabolism	Lysine biosynthesis	0.793630701	260.31087	0.000483512	0.874609802	0.098013207	0.870322975	0.095355798
Metabolism	Energy Metabolism	Oxidative phosphorylation	0.796765626	261.3391253	0.000468611	1.050074997	0.095489861	1.045533949	0.109741925
Metabolism	Xenobiotics Biodegradation and Metabolism	Benzoate degradation	0.798257021	261.8283028	0.000461609	0.209919535	0.025758077	0.211100596	0.02826326
Metabolism	Amino Acid Metabolism	Tyrosine metabolism	0.798976413	262.0642635	0.000458251	0.349196091	0.037071577	0.34754206	0.039117593
Metabolism	Metabolism of Cofactors and Vitamins	Thiamine metabolism	0.810714872	265.914478	0.000405301	0.518229197	0.056584832	0.515992865	0.053756329
Metabolism	Energy Metabolism	Carbon fixation pathways in prokaryotes	0.817633076	268.1836491	0.0003757	0.908680314	0.063105645	0.906183448	0.064272065
Metabolism	Amino Acid Metabolism	Tryptophan metabolism	0.818051476	268.320884	0.000373948	0.142222889	0.059548895	0.144441343	0.054619231
Metabolism	Enzyme Families	Protein kinases	0.830939074	272.5480162	0.000322074	0.328993202	0.056114583	0.331004841	0.055019335
Metabolism	Xenobiotics Biodegradation and Metabolism	Caprolactam degradation	0.832727648	273.1346687	0.000315195	0.031573666	0.037910177	0.032866829	0.034596954
Metabolism	Enzyme Families	Peptidases	0.834852346	273.8315695	0.000307123	1.840908992	0.089282243	1.844257296	0.098412141
Metabolism	Lipid Metabolism	Steroid hormone biosynthesis	0.835296489	273.9772485	0.00030545	0.018921811	0.023457984	0.019802583	0.02602105
Metabolism	Energy Metabolism	Photosynthesis	0.84595691	277.4738665	0.000266709	0.386930447	0.089339859	0.389314321	0.05600597
Metabolism	Amino Acid Metabolism	Lysine degradation	0.847334885	277.9258422	0.0002619	0.129617921	0.06243457	0.127679864	0.056797083
Metabolism	Metabolism of Cofactors and Vitamins	Pantothenate and CoA biosynthesis	0.863917043	283.36479	0.000207571	0.619691371	0.046685103	0.618412992	0.041728126
Metabolism	Glycan Biosynthesis and Metabolism	Glycosyltransferases	0.875418042	287.1371178	0.000173694	0.294557985	0.062904815	0.296269506	0.065330187
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - globo series	0.881116657	289.0062637	0.000158053	0.101599567	0.043785367	0.102697253	0.042804978
Metabolism	Xenobiotics Biodegradation and Metabolism	Styrene degradation	0.882212775	289.3657902	0.00015513	0.019241527	0.009782259	0.019499722	0.010613296
Metabolism	Carbohydrate Metabolism	Butanoate metabolism	0.883113414	289.6611999	0.00015275	0.622856461	0.06566973	0.621286233	0.060729529
Metabolism	Others	Others_Unclassified	0.885013076	290.2842888	0.000147791	1.011917647	0.076520821	1.013940238	0.086537698
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of ansamycins	0.885557785	290.4629535	0.000146385	0.11574434	0.02376197	0.11518655	0.022092182
Metabolism	Biosynthesis of Other Secondary Metabolites	Streptomycin biosynthesis	0.890824258	292.1903567	0.00013314	0.304385559	0.056674886	0.305687315	0.055232685
Metabolism	Biosynthesis of Other Secondary Metabolites	Penicillin and cephalosporin biosynthesis	0.913363959	299.5833787	8.36E-05	0.020701811	0.014569327	0.020436006	0.014252855
Metabolism	Carbohydrate Metabolism	Galactose metabolism	0.920736615	302.0016097	7.00E-05	0.860820973	0.124327593	0.858901461	0.104800074
Metabolism	Metabolism of Terpenoids and Polyketides	Zeatin biosynthesis	0.922986063	302.7394287	6.60E-05	0.045931654	0.007411572	0.046046268	0.006640717

Metabolism	Metabolism of Cofactors and Vitamins	Ubiquinone and other terpenoid-quinone biosynthesis	0.927171539	304.1122649	5.90E-05		0.155495786	0.088443053	0.156838781	0.085074815
Metabolism	Biosynthesis of Other Secondary Metabolites	Clavulanic acid biosynthesis	0.928191245	304.4467284	5.74E-05		3.81E-08	2.98E-07	4.35E-08	3.92E-07
Metabolism	Lipid Metabolism	alpha-Linolenic acid metabolism	0.931610292	305.5681757	5.20E-05		0.007491134	0.012577925	0.007316072	0.01157112
Metabolism	Carbohydrate Metabolism	Amino sugar and nucleotide sugar metabolism	0.939045387	308.0068868	4.13E-05		1.525691638	0.152603198	1.523874396	0.1296052
Metabolism	Biosynthesis and biodegradation of secondary metabolites	Biosynthesis and biodegradation of secondary metabolites_Unclassified	0.943409872	309.438438	3.56E-05		0.068022687	0.036682305	0.067604827	0.033071328
Metabolism	Xenobiotics Biodegradation and Metabolism	Polycyclic aromatic hydrocarbon degradation	0.956840584	313.8437115	2.07E-05		0.099518043	0.022695343	0.099320652	0.020519053
Metabolism	Biosynthesis of Other Secondary Metabolites	Novobiocin biosynthesis	0.959421363	314.6902072	1.83E-05		0.135456232	0.012427849	0.135351882	0.011810023
Metabolism	Amino Acid Metabolism	Amino acid related enzymes	0.969044566	317.8466177	1.06E-05		1.445095238	0.115708433	1.445854257	0.114820108
Metabolism	Amino Acid Metabolism	Valine, leucine and isoleucine biosynthesis	0.971387912	318.615235	9.09E-06		0.798994124	0.081837924	0.799505127	0.085451796
Metabolism	Biosynthesis of Other Secondary Metabolites	Flavone and flavonol biosynthesis	0.976208377	320.1963476	6.29E-06		0.005054524	0.005178453	0.005080003	0.004918558
Metabolism	Metabolism of Terpenoids and Polyketides	Geraniol degradation	0.976411912	320.2631072	6.18E-06		0.040314828	0.04608646	0.040090605	0.043562593
Metabolism	Glycan biosynthesis and metabolism	Glycan biosynthesis and metabolism_Unclassified	0.980023833	321.4478174	4.43E-06		0.027993974	0.031267095	0.028119965	0.028343259
Metabolism	Energy Metabolism	Photosynthesis proteins	0.99315022	325.7532722	5.21E-07		0.39252015	0.099267099	0.392408706	0.053065188
Metabolism	Amino Acid Metabolism	Histidine metabolism	0.999621254	327.8757714	1.59E-09		0.60178324	0.059634292	0.60178832	0.065495458
Metabolism	Glycan Biosynthesis and Metabolism	Glycosaminoglycan biosynthesis - chondroitin sulfate	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Glycosylphosphatidylinositol(GPI)-anchor biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Other types of O-glycan biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of 12-, 14- and 16-membered macrolides	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of type II polyketide backbone	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Sesquiterpenoid biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0

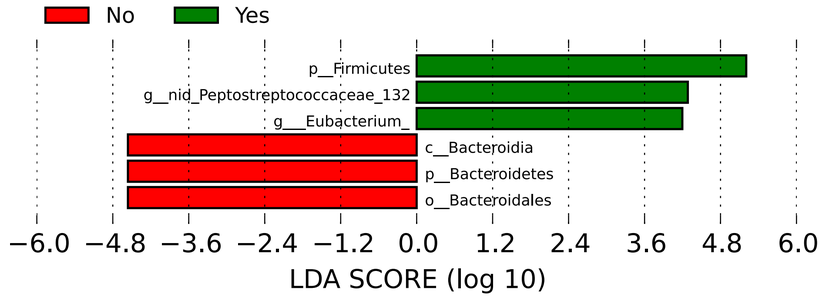
Level_1	Level_2	Level_3	p-values	p-values (corrected)	Effect size	Note	No: mean rel. freq. (%)	No: std. dev. (%)	Yes: mean rel. freq. (%)	Yes: std. dev. (%)
Metabolism	Biosynthesis of Other Secondary Metabolites	Stilbenoid, diarylheptanoid and gingerol biosynthesis	0.09016166	29.57302439	0.05526955		0.001132619	0.000959163	0.000712307	0.000777891
Metabolism	Carbohydrate Metabolism	Amino sugar and nucleotide sugar metabolism	0.134371693	44.07391542	0.043407254		1.501198148	0.077992741	1.543501841	0.11158551
Metabolism	Metabolism of Cofactors and Vitamins	Pantothenate and CoA biosynthesis	0.156176495	51.22589024	0.03903357		0.630913216	0.034968531	0.64480113	0.033513159
Metabolism	Glycan Biosynthesis and Metabolism	Various types of N-glycan biosynthesis	0.189631089	62.19899724	0.033492589		9.98E-07	4.03E-06	0	0
Metabolism	Energy Metabolism	Carbon fixation in photosynthetic organisms	0.2141884	70.25379535	0.030088042		0.633138278	0.039168836	0.64620301	0.034807261
Metabolism	Amino Acid Metabolism	Histidine metabolism	0.228657149	74.99954491	0.02828706		0.60841376	0.055535809	0.624722165	0.040003268
Metabolism	Xenobiotics Biodegradation and Metabolism	Polycyclic aromatic hydrocarbon degradation	0.229821233	75.38136445	0.02814799		0.103746105	0.018296286	0.108701542	0.010549321
Metabolism	Metabolism of Terpenoids and Polyketides	Polyketide sugar unit biosynthesis	0.23075599	75.68796487	0.028036915		0.201182675	0.028565079	0.210724899	0.027281326
Metabolism	Xenobiotics Biodegradation and Metabolism	Caprolactam degradation	0.248040494	81.35728188	0.026074088		0.024646156	0.025205933	0.017853974	0.016146522
Metabolism	Nucleotide metabolism	Nucleotide metabolism_Unclassified	0.252101352	82.68924358	0.025636524		0.053733995	0.02630664	0.046948002	0.015131387
Metabolism	Carbohydrate Metabolism	Pentose phosphate pathway	0.255473252	83.79522678	0.025279579		0.944267688	0.052250729	0.959625101	0.043049599
Metabolism	Xenobiotics Biodegradation and Metabolism	Drug metabolism - other enzymes	0.256452824	84.11652637	0.025176945		0.301778128	0.021910175	0.308761505	0.021245604
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of type II polyketide products	0.25734756	84.40999954	0.025083612		1.57E-07	7.37E-07	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Limonene and pinene degradation	0.288075391	94.48872818	0.022099051		0.075489339	0.025913034	0.068761307	0.018826944
Metabolism	Energy Metabolism	Photosynthesis	0.290179346	95.17882545	0.021909179		0.395089191	0.054580378	0.411515647	0.054254692
Metabolism	Xenobiotics Biodegradation and Metabolism	Toluene degradation	0.294886532	96.72278253	0.021490534		0.0860043	0.040146739	0.076552648	0.023010468
Metabolism	Glycan biosynthesis and metabolism	Glycan biosynthesis and metabolism_Unclassified	0.304224886	99.78576275	0.020684322		0.020724085	0.020815996	0.016023631	0.011034227
Metabolism	Biosynthesis of Other Secondary Metabolites	Streptomycin biosynthesis	0.30809756	101.0559998	0.020359106		0.322399635	0.045391896	0.333409096	0.030843841
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of vancomycin group antibiotics	0.309932003	101.6576971	0.020206863		0.061555583	0.011583799	0.064370149	0.007988467
Metabolism	Energy Metabolism	Photosynthesis proteins	0.31051557	101.849107	0.020158673		0.397340493	0.052981632	0.412818877	0.053865398
Metabolism	Amino Acid Metabolism	Arginine and proline metabolism	0.351507456	115.2944456	0.017040328		1.221088319	0.07565742	1.240253014	0.069323566
Metabolism	Enzyme Families	Protein kinases	0.379661331	124.5289167	0.015166012		0.317868188	0.048619742	0.308937038	0.020868546
Metabolism	Lipid Metabolism	alpha-Linolenic acid metabolism	0.385430706	126.4212714	0.014805395		0.003580456	0.008099355	0.002158457	0.002845853
Metabolism	Amino Acid Metabolism	Tryptophan metabolism	0.385527214	126.4529263	0.014799427		0.125907887	0.039891316	0.117628286	0.027574976
Metabolism	Enzyme Families	Cytochrome P450	0.386431763	126.7496184	0.01474359		0	0	3.87E-07	2.08E-06
Metabolism	Xenobiotics Biodegradation and Metabolism	1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane (DDT) degradation	0.387310211	127.0377492	0.014689539		0.0002548	0.000691508	0.000135676	0.000215538
Metabolism	Metabolism of Cofactors and Vitamins	Ubiquinone and other terpenoid-quinone biosynthesis	0.40137493	131.650977	0.013847011		0.140878065	0.072490993	0.125150649	0.060131628
Metabolism	Carbohydrate Metabolism	Ascorbate and aldarate metabolism	0.401944985	131.837955	0.013813749		0.140404103	0.040492493	0.131781136	0.032350757
Metabolism	Carbohydrate Metabolism	Fructose and mannose metabolism	0.409822284	134.4217092	0.013360937		1.04804666	0.172881334	1.087583874	0.164863193
Metabolism	Metabolism of Cofactors and Vitamins	Thiamine metabolism	0.423084139	138.7715976	0.012626427		0.524790277	0.047062182	0.534510191	0.038833675
Metabolism	Carbohydrate Metabolism	Galactose metabolism	0.4308604	141.3222111	0.012211293		0.877967797	0.092576696	0.897923742	0.08607591
Metabolism	Carbohydrate Metabolism	Butanoate metabolism	0.438479771	143.8213649	0.011815235		0.6191586	0.046749733	0.60973105	0.039373605
Metabolism	Amino Acid Metabolism	Cysteine and methionine metabolism	0.442171784	145.032345	0.011627031		0.985928502	0.068540881	0.97255127	0.054769702
Metabolism	Xenobiotics Biodegradation and Metabolism	Naphthalene degradation	0.44345499	145.4532368	0.011562175		0.145180347	0.025656439	0.139798114	0.02387547
Metabolism	Lipid Metabolism	Biosynthesis of unsaturated fatty acids	0.447904026	146.9125205	0.01133951		0.134437181	0.040288933	0.12676886	0.031311687
Metabolism	Biosynthesis of Other Secondary Metabolites	beta-Lactam resistance	0.465424766	152.6593234	0.010494772		0.028158666	0.011711432	0.030446125	0.010437403
Metabolism	Energy Metabolism	Methane metabolism	0.466931877	153.1536558	0.010424431		1.284267226	0.122016547	1.309963889	0.125649964
Metabolism	Lipid Metabolism	Arachidonic acid metabolism	0.476621856	156.3319688	0.009980629		0.018883392	0.009390899	0.016767838	0.011182396
Metabolism	Metabolism of Terpenoids and Polyketides	Geraniol degradation	0.477589554	156.6493737	0.009937101		0.030061476	0.0315264	0.024930664	0.019396441
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of siderophore group nonribosomal peptides	0.486044674	159.4226531	0.009562752		0.018128113	0.018168013	0.015390645	0.009151947
Metabolism	Xenobiotics Biodegradation and Metabolism	Drug metabolism - cytochrome P450	0.490418826	160.8573748	0.009373225		0.032903339	0.020180365	0.029390121	0.015933113
Metabolism	Amino Acid Metabolism	Alanine, aspartate and glutamate metabolism	0.490875086	161.0070283	0.009353616		1.08781206	0.102438355	1.105258808	0.077103634
Metabolism	Xenobiotics Biodegradation and Metabolism	Fluorobenzoate degradation	0.498093022	163.3745111	0.009047363		0.005426059	0.008050918	0.003960896	0.007234848
Metabolism	Lipid Metabolism	Linoleic acid metabolism	0.500231252	164.0758507	0.008958054		0.06758758	0.017221526	0.070780134	0.01618508
Metabolism	Carbohydrate Metabolism	Inositol phosphate metabolism	0.50291293	164.9554411	0.008846947		0.0944389	0.016461282	0.097523201	0.01596103
Metabolism	Metabolism of Terpenoids and Polyketides	Zeatin biosynthesis	0.512217302	168.007275	0.008469097		0.047841699	0.006529399	0.048966897	0.005624905
Metabolism	Amino Acid Metabolism	Lysine degradation	0.513527185	168.4369168	0.008416841		0.112005162	0.046459475	0.105259671	0.025911919
Metabolism	Carbohydrate Metabolism	Pentose and glucuronate interconversions	0.5138831	168.5536568	0.008402682		0.572737305	0.071028505	0.585696392	0.068793306
Metabolism	Biosynthesis of Other Secondary Metabolites	Flavonoid biosynthesis	0.514574736	168.7805135	0.008375216		0.005257022	0.004671221	0.004480866	0.003771471
Metabolism	Lipid Metabolism	Fatty acid metabolism	0.519277925	170.3231592	0.008190119		0.246817757	0.060283066	0.23765344	0.040341909
Metabolism	Metabolism of Other Amino Acids	Cyanoamino acid metabolism	0.521470211	171.042229	0.008104832		0.303215857	0.079860281	0.315023315	0.05014779
Metabolism	Others	Others_Unclassified	0.52395571	171.857473	0.008008891		0.997622782	0.063320083	0.984800308	0.075918598
Metabolism	Xenobiotics Biodegradation and Metabolism	Xylene degradation	0.525674141	172.4211182	0.007943025		0.071651717	0.017660666	0.068638698	0.015903585
Metabolism	Xenobiotics Biodegradation and Metabolism	Metabolism of xenobiotics by cytochrome P450	0.555283836	182.1330981	0.006865767		0.030612081	0.019342103	0.027779475	0.014725619
Metabolism	Carbohydrate Metabolism	Pyruvate metabolism	0.566337307	185.7586368	0.006490364		1.045563463	0.074975612	1.055787029	0.051317693
Metabolism	Metabolism of Terpenoids and Polyketides	Terpenoid backbone biosynthesis	0.567545832	186.155033	0.006450165		0.560684755	0.048743763	0.566730978	0.02494164
Metabolism	Metabolism of Terpenoids and Polyketides	Tetracycline biosynthesis	0.57095761	187.274096	0.006337564		0.151684712	0.041482485	0.157522111	0.031610489
Metabolism	Xenobiotics Biodegradation and Metabolism	Dioxin degradation	0.573468119	188.097543	0.006255538		0.075532365	0.018571174	0.072595743	0.018168493
Metabolism	Amino Acid Metabolism	Phenylalanine, tyrosine and tryptophan biosynthesis	0.584446016	191.6982933	0.005904987		0.869249273	0.069201447	0.880491283	0.074576697
Metabolism	Metabolism of Cofactors and Vitamins	Folate biosynthesis	0.586997271	192.5351049	0.005825386		0.376184943	0.03933824	0.381903345	0.035148135
Metabolism	Metabolism of cofactors and vitamins	Metabolism of cofactors and vitamins_Unclassified	0.58871111	193.0972442	0.005772303		0.104708311	0.027369566	0.101100543	0.019964723
Metabolism	Amino Acid Metabolism	Valine, leucine and isoleucine biosynthesis	0.595650019	195.3732061	0.005560555		0.812815237	0.074201505	0.823280432	0.065411023
Metabolism	Metabolism of Other Amino Acids	Glutathione metabolism	0.607494427	199.258172	0.005210647		0.194830727	0.048223023	0.188508393	0.039100021
Metabolism	Lipid Metabolism	Primary bile acid biosynthesis	0.610558193	200.2630873	0.005122461		0.04245125	0.011994803	0.043946591	0.008840681
Metabolism	Lipid Metabolism	Fatty acid biosynthesis	0.631929681	207.2729355	0.004533079		0.466453599	0.068844537	0.474137917	0.044649509
Metabolism	Metabolism of Cofactors and Vitamins	Porphyrin and chlorophyll metabolism	0.633173543	207.6809221	0.004500135		0.880348156	0.212784792	0.908205207	0.199459757
Metabolism	Nucleotide Metabolism	Pyrimidine metabolism	0.633632824	207.8315661	0.004488008		1.788860086	0.128178269	1.804263507	0.101207862

Metabolism	Glycan Biosynthesis and Metabolism	Peptidoglycan biosynthesis	0.637803247	209.1994652	0.004378801	0.816843478	0.075224778	0.825722152	0.058651119
Metabolism	Lipid Metabolism	Secondary bile acid biosynthesis	0.651500173	213.6920566	0.004031522	0.042001542	0.012099506	0.043336228	0.008873611
Metabolism	Lipid Metabolism	Ether lipid metabolism	0.652534722	214.0313889	0.00400599	0.001680794	0.002809553	0.002037933	0.00277669
Metabolism	Biosynthesis of Other Secondary Metabolites	Penicillin and cephalosporin biosynthesis	0.65410444	214.5462562	0.003967436	0.022324049	0.015125501	0.024084525	0.012738074
Metabolism	Metabolism of Other Amino Acids	Taurine and hypotaurine metabolism	0.657313258	215.5987486	0.003889317	0.10691528	0.013329587	0.108546	0.01262299
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - globo series	0.66276703	217.3875859	0.003758659	0.114038428	0.043671644	0.119257192	0.040871817
Metabolism	Lipid Metabolism	Synthesis and degradation of ketone bodies	0.667770597	219.0287558	0.003641106	0.02616169	0.008081861	0.027153341	0.008166975
Metabolism	Lipid Metabolism	Fatty acid elongation in mitochondria	0.669630001	219.6386404	0.003597982	0.001928215	0.003664351	0.001504035	0.003365891
Metabolism	Lipid Metabolism	Steroid biosynthesis	0.669893777	219.7251589	0.003591889	0.00578908	0.010991497	0.004517687	0.010097971
Metabolism	Biosynthesis of Other Secondary Metabolites	Caffeine metabolism	0.670033812	219.7710905	0.003588657	0.001928432	0.003664238	0.001504802	0.003366012
Metabolism	Carbohydrate Metabolism	C5-Branched dibasic acid metabolism	0.674167333	221.1268852	0.003494017	0.353263914	0.039225552	0.357879577	0.038172751
Metabolism	Metabolism of Other Amino Acids	Selenocompound metabolism	0.678428012	222.5243881	0.003398013	0.389532413	0.028404478	0.386251908	0.027407249
Metabolism	Glycan Biosynthesis and Metabolism	N-Glycan biosynthesis	0.679630021	222.9186468	0.003371211	0.017752006	0.009384525	0.018727152	0.007380673
Metabolism	Metabolism of Cofactors and Vitamins	One carbon pool by folate	0.687785106	225.5935148	0.003192621	0.580420587	0.039274741	0.584584064	0.034148444
Metabolism	Amino Acid Metabolism	Amino acid related enzymes	0.688414778	225.8000471	0.003179065	1.47003639	0.101292117	1.479766858	0.070834508
Metabolism	Metabolism of Terpenoids and Polyketides	Carotenoid biosynthesis	0.689209341	226.060664	0.003162008	0.005126104	0.005402304	0.00454895	0.004816308
Metabolism	Metabolism of Cofactors and Vitamins	Biotin metabolism	0.689410959	226.1267946	0.003157688	0.135676067	0.02596027	0.138549717	0.024791421
Metabolism	Metabolism of Cofactors and Vitamins	Lipoic acid metabolism	0.696842745	228.5644204	0.003000823	0.033254937	0.015925373	0.031559959	0.014825081
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - lacto and neolacto series	0.69848189	229.1020599	0.002966842	0.000150571	0.000343584	0.000204656	0.000579741
Metabolism	Metabolism of Cofactors and Vitamins	Vitamin B6 metabolism	0.714513624	234.3604686	0.002646067	0.190657328	0.027471197	0.187934543	0.025180324
Metabolism	Lipid Metabolism	Sphingolipid metabolism	0.714604749	234.3903576	0.002644303	0.249084953	0.073387507	0.256626249	0.071968828
Metabolism	Carbohydrate Metabolism	Glyoxylate and dicarboxylate metabolism	0.716700269	235.0776883	0.002603922	0.517547777	0.056909565	0.52259611	0.041872507
Metabolism	Xenobiotics Biodegradation and Metabolism	Benzoate degradation	0.721402208	236.6199243	0.002514589	0.207103493	0.024000391	0.209599747	0.025120959
Metabolism	Amino Acid Metabolism	Glycine, serine and threonine metabolism	0.722818428	237.0844444	0.002488025	0.831378739	0.039550803	0.835264837	0.037791943
Metabolism	Biosynthesis of Other Secondary Metabolites	Phenylpropanoid biosynthesis	0.725794604	238.0606301	0.002432716	0.19055524	0.08747728	0.197589923	0.054217364
Metabolism	Metabolism of Cofactors and Vitamins	Retinol metabolism	0.727313793	238.5589241	0.002404751	0.030134332	0.017490626	0.028604432	0.013668518
Metabolism	Metabolism of Other Amino Acids	D-Arginine and D-ornithine metabolism	0.737116603	241.7742457	0.00222863	0.002172472	0.00147666	0.002373144	0.002480329
Metabolism	Xenobiotics Biodegradation and Metabolism	Atrazine degradation	0.740584564	242.911737	0.002168101	0.022538737	0.019012871	0.02088267	0.016450308
Metabolism	Amino Acid Metabolism	Phenylalanine metabolism	0.742012741	243.3801789	0.002143442	0.171838756	0.032875745	0.168851969	0.031203092
Metabolism	Glycan Biosynthesis and Metabolism	Lipopolysaccharide biosynthesis	0.748610457	245.5442299	0.002031541	0.133568588	0.124815313	0.123017025	0.108584175
Metabolism	Carbohydrate Metabolism	Starch and sucrose metabolism	0.75779138	248.5555725	0.001881295	1.153586044	0.18302626	1.16664324	0.116495099
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of ansamycins	0.758327876	248.7315433	0.001872711	0.11717345	0.019835204	0.118711965	0.015679564
Metabolism	Glycan Biosynthesis and Metabolism	Other glycan degradation	0.765119631	250.9592389	0.001765881	0.312026765	0.116395367	0.322452717	0.127589502
Metabolism	Amino Acid Metabolism	Lysine biosynthesis	0.776753015	254.7749889	0.001590777	0.891526126	0.075457278	0.897124194	0.064577268
Metabolism	Glycan Biosynthesis and Metabolism	Lipopolysaccharide biosynthesis proteins	0.795589698	260.9534209	0.001327993	0.234669664	0.145101978	0.224729428	0.126901138
Metabolism	Amino Acid Metabolism	Tyrosine metabolism	0.797157529	261.4676695	0.00130726	0.343959248	0.040005234	0.341145127	0.037396297
Metabolism	Carbohydrate Metabolism	Citrate cycle (TCA cycle)	0.800658904	262.6161205	0.001261585	0.530668485	0.101007757	0.524092422	0.083872675
Metabolism	Lipid Metabolism	Glycerophospholipid metabolism	0.804179593	263.7709065	0.001216526	0.552027578	0.054085552	0.54861795	0.043581726
Metabolism	Biosynthesis and biodegradation of secondary metabolites	Biosynthesis and biodegradation of secondary metabolites_Unclassified	0.805893321	264.3330092	0.001194907	0.059369363	0.02776042	0.057912985	0.013362858
Metabolism	Glycan Biosynthesis and Metabolism	Glycosphingolipid biosynthesis - ganglio series	0.810991758	266.0052968	0.001131801	0.039162691	0.040766807	0.041945537	0.041131876
Metabolism	Biosynthesis of Other Secondary Metabolites	Tropane, piperidine and pyridine alkaloid biosynthesis	0.812142174	266.3826329	0.001117812	0.107358854	0.010265448	0.108063189	0.010563494
Metabolism	Metabolism of Terpenoids and Polyketides	Prenyltransferases	0.812304384	266.435838	0.001115847	0.29793249	0.035316106	0.300005319	0.026700549
Metabolism	Xenobiotics Biodegradation and Metabolism	Bisphenol degradation	0.81521093	267.3891849	0.001080943	0.080840569	0.021877107	0.082204242	0.019463515
Metabolism	Carbohydrate metabolism	Carbohydrate metabolism_Unclassified	0.818049613	268.3202731	0.001047418	0.206766647	0.027213882	0.205214968	0.020705513
Metabolism	Biosynthesis of Other Secondary Metabolites	Isoquinoline alkaloid biosynthesis	0.827475843	271.4120765	0.000940063	0.051043208	0.008478246	0.050446028	0.010457814
Metabolism	Metabolism of Other Amino Acids	D-Glutamine and D-glutamate metabolism	0.829618307	272.1148048	0.000916509	0.142406589	0.012256203	0.143109403	0.01088589
Metabolism	Biosynthesis of Other Secondary Metabolites	Butirosin and neomycin biosynthesis	0.840663267	275.7375514	0.000800019	0.069976512	0.013859488	0.07066291	0.010396957
Metabolism	Carbohydrate Metabolism	Glycolysis / Gluconeogenesis	0.84834622	278.2575601	0.000723831	1.186458321	0.051390638	1.182871108	0.075395825
Metabolism	Energy Metabolism	Nitrogen metabolism	0.853576395	279.9730575	0.000674221	0.681306913	0.049899543	0.678573431	0.05382457
Metabolism	Metabolism of Other Amino Acids	D-Alanine metabolism	0.867793303	284.6362034	0.000548528	0.103069601	0.009902178	0.103625977	0.013022758
Metabolism	Metabolism of Cofactors and Vitamins	Riboflavin metabolism	0.868900649	284.9994129	0.000539297	0.201200056	0.03184369	0.202680721	0.031397344
Metabolism	Amino Acid Metabolism	Valine, leucine and isoleucine degradation	0.87110749	285.7232568	0.000521139	0.185543194	0.038933531	0.187302222	0.037591377
Metabolism	Lipid metabolism	Lipid metabolism_Unclassified	0.871361907	285.8067054	0.000519066	0.132982843	0.032613708	0.131711568	0.02312996
Metabolism	Metabolism of Other Amino Acids	beta-Alanine metabolism	0.872950464	286.3277521	0.000506219	0.167801522	0.031686272	0.166508185	0.025758167
Metabolism	Nucleotide Metabolism	Purine metabolism	0.873447448	286.4907629	0.000502234	2.223376518	0.157131072	2.229809952	0.129675361
Metabolism	Xenobiotics Biodegradation and Metabolism	Ethylbenzene degradation	0.879302407	288.4111895	0.000456497	0.031908098	0.012767489	0.031414612	0.010316377
Metabolism	Xenobiotics Biodegradation and Metabolism	Aminobenzoate degradation	0.880248923	288.7216467	0.000449313	0.100570316	0.028258127	0.101619354	0.021218011
Metabolism	Glycan Biosynthesis and Metabolism	Glycosaminoglycan degradation	0.88731254	291.038513	0.000397535	0.069786819	0.05861964	0.072136112	0.058207062
Metabolism	Xenobiotics Biodegradation and Metabolism	Styrene degradation	0.8914758	292.4040623	0.000368529	0.019462518	0.008324008	0.019766784	0.007473524
Metabolism	Xenobiotics Biodegradation and Metabolism	Nitrotoluene degradation	0.898051863	294.561011	0.000324989	0.086896849	0.027440727	0.085896451	0.027543499
Metabolism	Metabolism of Cofactors and Vitamins	Nicotinate and nicotinamide metabolism	0.898840384	294.8196461	0.000319955	0.431157184	0.068430613	0.428963572	0.054169554
Metabolism	Xenobiotics Biodegradation and Metabolism	Chloroalkane and chloroalkene degradation	0.900473662	295.3553612	0.000309655	0.203261314	0.028197812	0.204247181	0.027424352
Metabolism	Carbohydrate Metabolism	Propanoate metabolism	0.909597891	298.3481081	0.000255255	0.494864388	0.031979078	0.495803307	0.026727301
Metabolism	Lipid Metabolism	Glycerolipid metabolism	0.921665256	302.3062041	0.000191458	0.417832663	0.05660839	0.416457155	0.042788861
Metabolism	Xenobiotics Biodegradation and Metabolism	Chlorocyclohexane and chlorobenzene degradation	0.923721119	302.9805269	0.000181511	0.015713221	0.008097931	0.015929649	0.007854523
Metabolism	Enzyme Families	Peptidases	0.92572829	303.6388792	0.000172058	1.86548181	0.084981991	1.867345776	0.056786407
Metabolism	Energy Metabolism	Oxidative phosphorylation	0.92720826	304.1243093	0.000165251	1.068971532	0.12610309	1.065910195	0.11142493
Metabolism	Glycan Biosynthesis and Metabolism	Glycosyltransferases	0.933312859	306.1266178	0.000138635	0.300375202	0.057696191	0.29913162	0.047834174

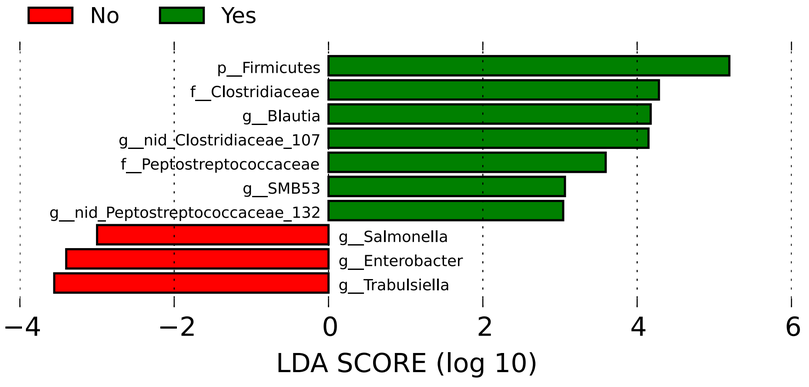
Metabolism	Lipid Metabolism	Lipid biosynthesis proteins	0.934867523	306.6365477	0.000132233		0.54893116	0.051213294	0.549974231	0.039488007
Metabolism	Biosynthesis of Other Secondary Metabolites	Novobiocin biosynthesis	0.947498573	310.7795321	8.59E-05		0.13426206	0.00986359	0.134438097	0.009057363
Metabolism	Energy Metabolism	Sulfur metabolism	0.947562563	310.8005208	8.56E-05		0.278881941	0.035179283	0.278278586	0.029926875
Metabolism	Amino acid metabolism	Amino acid metabolism_Unclassified	0.949302819	311.3713247	8.00E-05		0.201792901	0.045628984	0.201025879	0.03991316
Metabolism	Biosynthesis of Other Secondary Metabolites	Flavone and flavonol biosynthesis	0.955522814	313.4114829	6.16E-05		0.006963852	0.008258799	0.007084349	0.007071328
Metabolism	Metabolism of Other Amino Acids	Phosphonate and phosphinate metabolism	0.959918581	314.8532947	5.00E-05		0.06005206	0.010363232	0.059891407	0.011900241
Metabolism	Energy Metabolism	Photosynthesis - antenna proteins	0.976254636	320.2115208	1.75E-05		3.09E-05	6.62E-05	3.03E-05	8.63E-05
Metabolism	Energy Metabolism	Carbon fixation pathways in prokaryotes	0.976744082	320.372059	1.68E-05		0.924870865	0.091899017	0.925571139	0.078563156
Metabolism	Energy metabolism	Energy metabolism_Unclassified	0.982314928	322.1992965	9.73E-06		0.778388217	0.116936608	0.779094115	0.108358105
Metabolism	Lipid Metabolism	Steroid hormone biosynthesis	0.983417245	322.5608563	8.55E-06		0.020566688	0.022671196	0.020433963	0.02235168
Metabolism	Biosynthesis of Other Secondary Metabolites	Betalain biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Biosynthesis of Other Secondary Metabolites	Clavulanic acid biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Biosynthesis of Other Secondary Metabolites	Indole alkaloid biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Biosynthesis of Other Secondary Metabolites	Isoflavonoid biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Glycosaminoglycan biosynthesis - chondroitin sulfate	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Glycosylphosphatidylinositol(GPI)-anchor biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Glycan Biosynthesis and Metabolism	Other types of O-glycan biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of 12-, 14- and 16-membered macrolides	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Biosynthesis of type II polyketide backbone	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0
Metabolism	Metabolism of Terpenoids and Polyketides	Sesquiterpenoid biosynthesis	1	328	-1	degenerate case: failed to calculate p-value	0	0	0	0



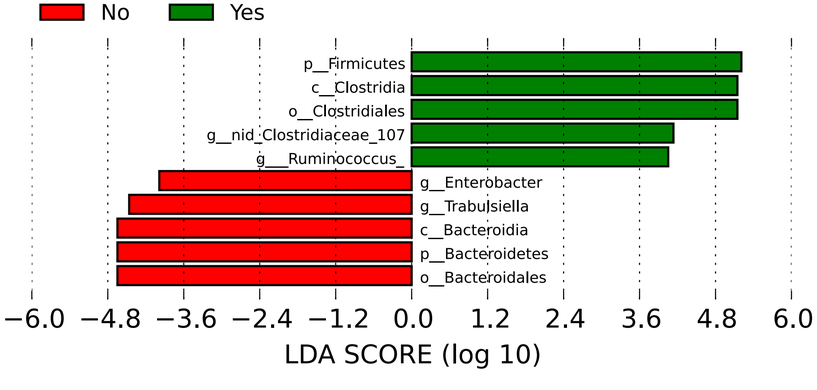
Antibiotics



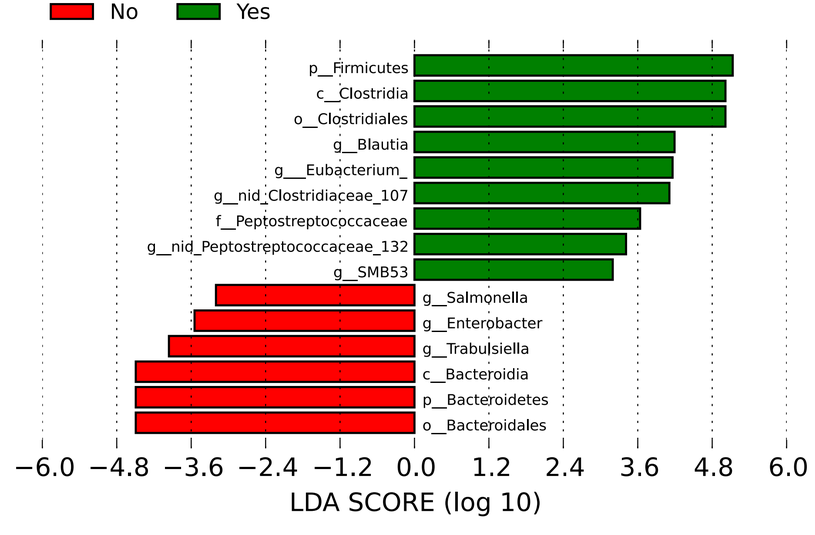
Breastfeeding



C-section



Race



Solid food