

Supplementary information

Figure S1. PCA trajectory plot derived from NMR spectra of fecal extracts showing the metabolic changes associated with different antibiotics treatments. The axes represent average scores for all samples collected from the same group and time points. The bars are the standard deviation of respective scores. Key: black diamond: control group; red diamond: low dose of sulfate gentamicin-treated group; blue diamond: high dose of sulfate gentamicin-treated group; purple diamond: ceftriaxone sodium-treated; orange diamond: antibiotic combination-treated mice.

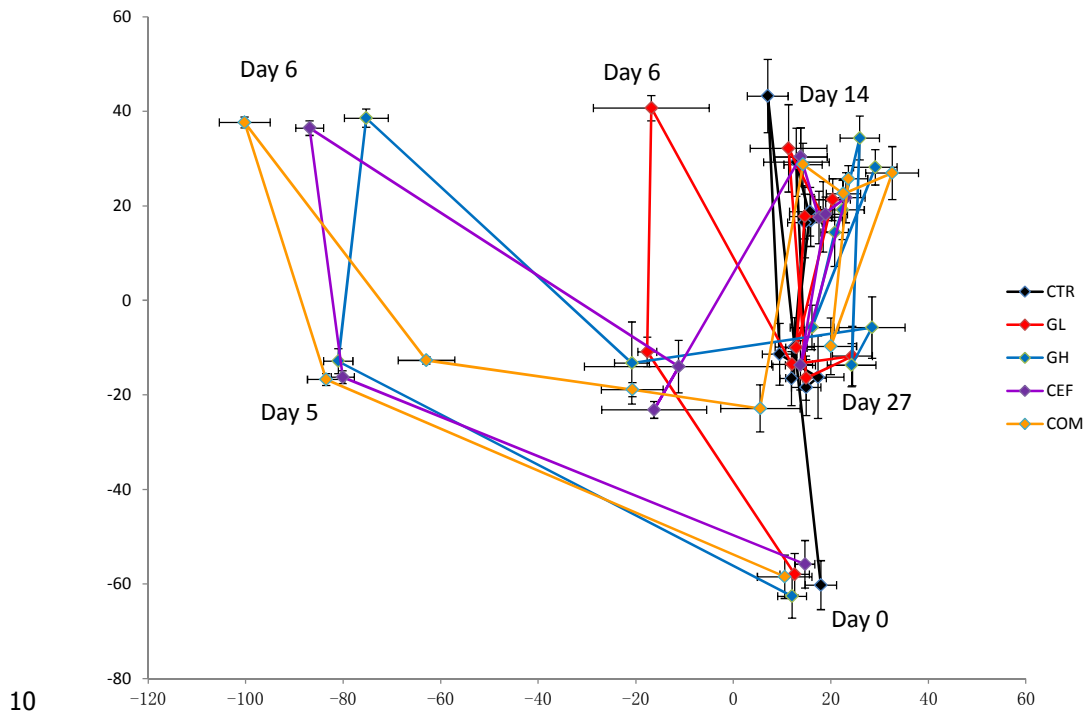


Figure S2. Time dependence of changes of relative concentration of metabolite in the fecal extracts after antibiotic treatment. $(C_t - C_c)/C_c$, where C_t is the NMR intensity representing concentration of metabolites in antibiotic-treated groups while C_c is the NMR intensity in the control group.

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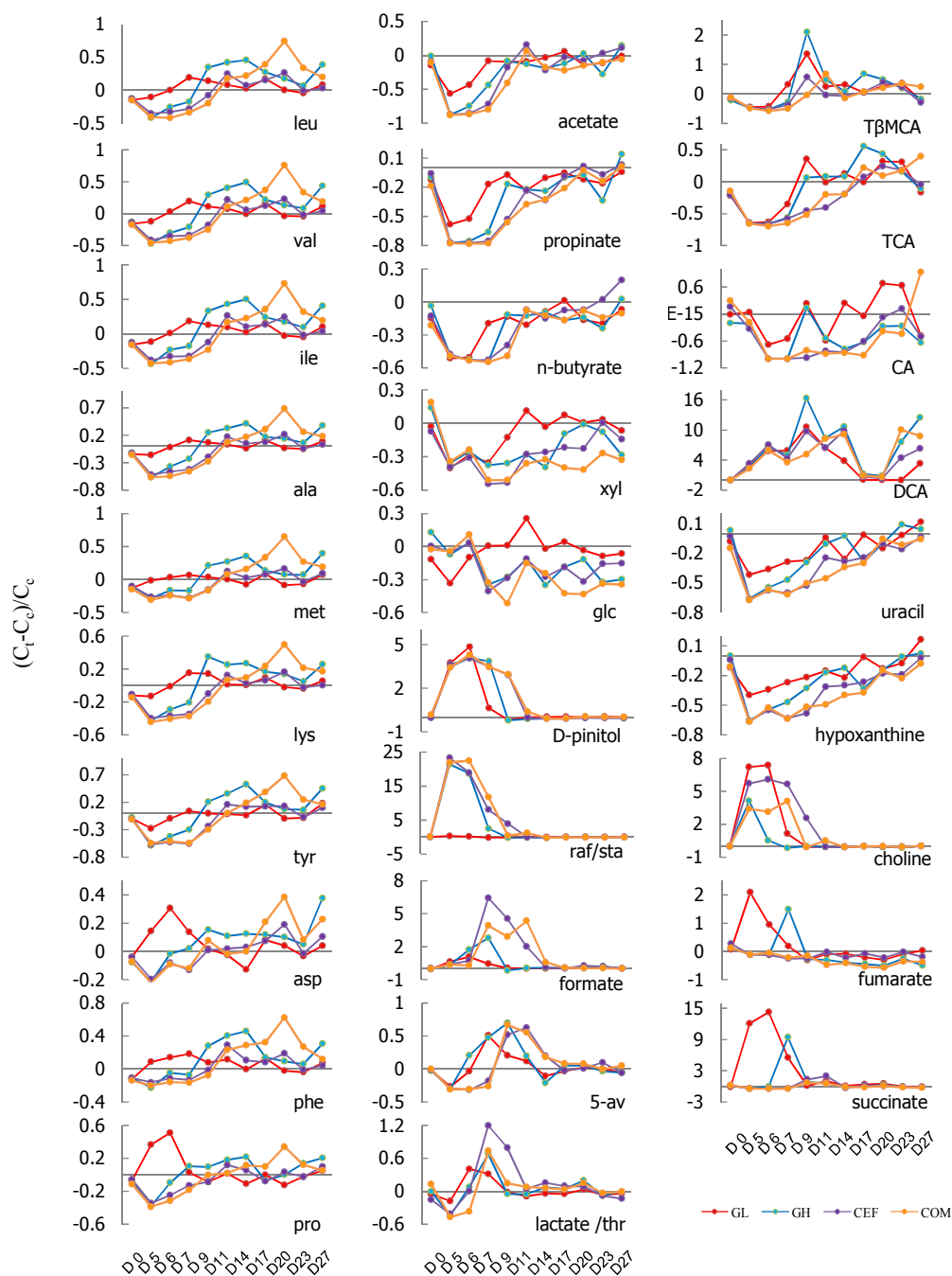


Figure S3. Denaturing Gradient Gel Electrophoresis (DGGE) fingerprinting of V3 region of 16S rRNA gene from fecal samples on day 14 with four compare groups (left) and their OPLS-DA coefficient plots (right) from the DGGE band indicating discrimination between the control groups to low dose of sulfate gentamicin-treated mice (a), high dose of sulfate gentamicin-treated mice (b), ceftriaxone sodium-treated mice (c) and the antibiotic combination-treated mice (d) separately.

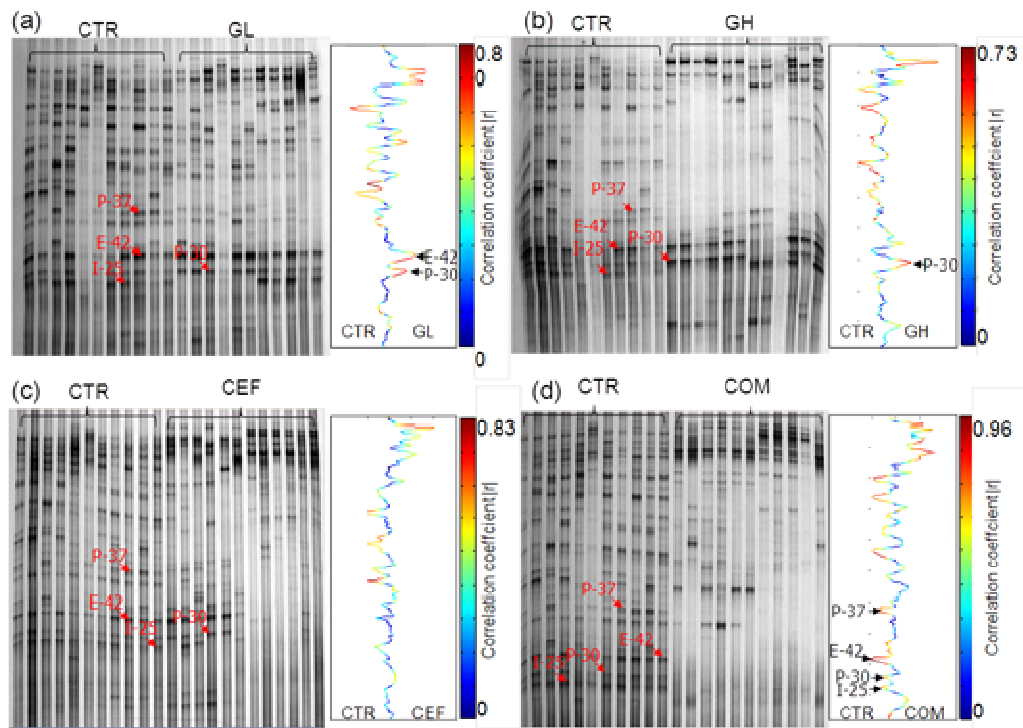


Figure S4. Dendrogram generated using an unweighted pair-group method with arithmetic means. The information of the DGGE bands can be found in table 1.

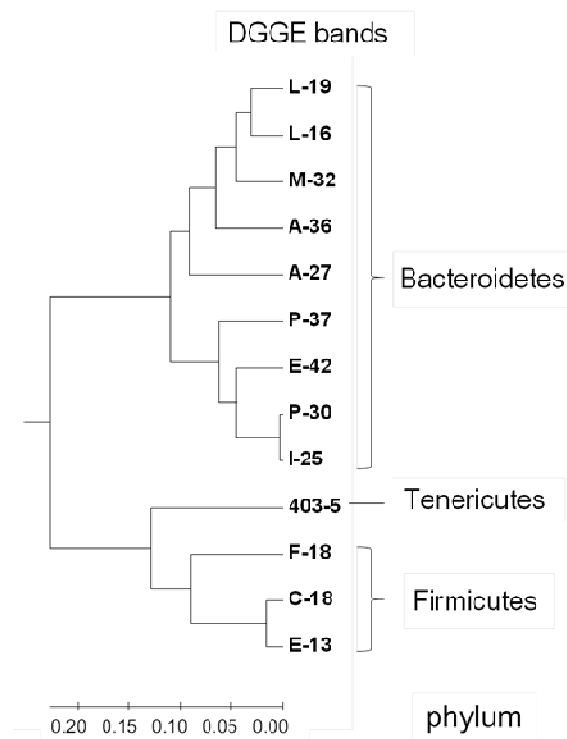


Table S1. Q^2 and R^2 values generated from models obtained from profiles of fecal extracts

		GL vs CTR			GH vs CTR			CEF vs CTR			COM vs CTR		
		PCA	PLS-DA	OPLS	PCA	PLS-DA	OPLS	PCA	PLS-DA	OPLS	PCA	PLS-DA	OPLS
day5	R^2X	0.629	0.45	0.45	0.676	0.593	0.593	0.677	0.603	0.603	0.678	0.595	0.595
	$Q^2(\text{cum})$	0.379	0.979	0.981	0.494	0.989	0.987	0.514	0.993	0.991	0.53	0.986	0.986
day6	R^2X	0.34	0.34	0.77	0.684	0.532	0.532	0.712	0.583	0.583	0.728	0.6	0.6
	$Q^2(\text{cum})$	0.921	0.937	0.592	0.432	0.967	0.969	0.487	0.982	0.982	0.492	0.979	0.978
day7	R^2X	0.6	0.276	0.276	0.685	0.396	0.396	0.697	0.489	0.489	0.714	0.511	0.511
	$Q^2(\text{cum})$	0.111	0.875	0.876	0.267	0.93	0.936	0.325	0.977	0.98	0.382	0.987	0.99
day9	R^2X	0.636	0.32	0.32	0.671	0.369	0.369	0.689	0.384	0.384	0.651	0.424	0.424
	$Q^2(\text{cum})$	0.135	0.591	0.555	0.282	0.875	0.848	0.362	0.88	0.882	0.416	0.877	0.891
day11	R^2X	0.636	0.32	0.32	0.671	0.369	0.369	0.689	0.384	0.384	0.651	0.424	0.424
	$Q^2(\text{cum})$	0.135	0.591	0.555	0.282	0.875	0.848	0.362	0.88	0.882	0.416	0.877	0.891
day14	R^2X	0.656	0.19	0.19	0.682	0.352	0.352	0.399	0.34	0.34	0.665	0.329	0.329
	$Q^2(\text{cum})$	0.32	0.21	0.358	0.286	0.705	0.676	0.15	0.632	0.581	0.302	0.784	0.782
day17	R^2X	0.581	0.306	0.306	0.686	0.324	0.324	0.589	0.233	0.233	0.652	0.343	0.343
	$Q^2(\text{cum})$	0.366	0.008	0.295	0.323	0.566	0.748	0.315	0.381	0.762	0.278	0.924	0.938
day20	R^2X	0.601	0.34	0.34	0.581	0.336	0.336	0.615	0.406	0.406	0.44	0.417	0.417
	$Q^2(\text{cum})$	0.322	0.375	0.541	0.289	0.493	0.556	0.373	0.666	0.653	0.307	0.931	0.912
day23	R^2X	0.558	0.317	0.317	0.614	0.368	0.368	0.625	0.308	0.308	0.58	0.389	0.389
	$Q^2(\text{cum})$	0.182	0.611	0.497	0.342	0.781	0.715	0.244	0.383	0.498	0.285	0.741	0.689
day 27	R^2X	0.626	0.383	0.383	0.728	0.352	0.352	0.669	0.335	0.335	0.703	0.274	0.274
	$Q^2(\text{cum})$	0.291	0.113	0.258	0.368	0.495	0.457	0.34	0.128	0.335	0.254	0.275	0.422

Table S2. Fecal extracts OPLS CV-ANOVA & PLS_DA permutation test

	GL Vs. CTR		GH Vs. CTR		CEF Vs. CTR		COM Vs. CTR	
	OPLS	PLS_DA	OPLS	PLS_DA	OPLS	PLS_DA	OPLS	PLS_DA
	CV-ANOVA	permutation	CV-ANOVA	permutation	CV-ANOVA	permutation	CV-ANOVA	permutation
	test		test		test		test	
day5	***	√	***	√	***	√	***	√
day6	***	√	***	√	***	√	***	√
day7	***	√	***	√	***	√	***	√
day9	**	√	***	√	***	√	***	√
day11	***	√	***	√	***	√	***	√
day14	NS	×	***	√	**	√	***	√
day17	NS	×	***	√	***	×	***	√
day20	**	×	**	√	***	√	***	√
day23	**	√	***	√	**	×	***	√
day27	NS	×	*	√	NS	×	*	×

* : P<0.05;

** : P<0.01;

*** : P<0.001;

5 NS: no significant difference