Supporting Information

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Table S1. Bacterial families and genera in each treatment that are significantly different in at least one life stage pairing

Treatment	Phylum	Family	Genus	Species	Third instar–sixth instar	Third instar–pupa	Third instar–adult	Sixth instar–pupa	Sixth instar–adult	Pupa–adult
Control	Acidobacteria	Bryobacteraceae	*Bryobacter*		*	*	*			
	Acidobacteria	Corynebacteriaceae	*Corynebacterium*	sp. 1, 2	*	*	*			
	Bacteroidetes	Chitinophagaceae	*Sediminibacterium*	sp. 1	*	*	*			
	Firmicutes	Peptoniphilaceae	*Finegoldia*		*	*	*			
	Proteobacteria	Bradyrhizobiaceae	*Bradyrhizobium*	sp. 1, 2	*	*	*			
	Proteobacteria	Burkholderiaceae	*Burkholderia*		*	*				
	Proteobacteria	Caulobacteraceae	*Caulobacter*		*	*	*			
	Proteobacteria	Hyphomicrobiaceae	*Hyphomicrobium*		*	*	*			
	Proteobacteria	Methylobacteriaceae	*Methylobacterium*		*					
	Proteobacteria	Pseudomonadaceae	*Pseudomonas*	sp. 1	*	*	*			
	Proteobacteria	Rhodospirillaceae	*Reyranella*		*	*	*			
	Proteobacteria	Sinobacteraceae	*Nevskia*		*	*	*			
	Proteobacteria	Sinobacteraceae	*Steroidobacter*	sp. 1, 2	*	*	*			
Acetaminophen	Proteobacteria	Alcaligenaceae	*Achromobacter*		*					
	Proteobacteria	Enterobacteriaceae	*Erwinia*		*					
	Proteobacteria	Pseudomonadaceae	*Pseudomonas*	sp. 2, 3	*					
	Proteobacteria	Xanthomonadaceae	*Stenotrophomonas*		*					
Caffeine	Firmicutes	Enterococcaceae	*Enterococcus*		*	*				
	Fusobacteria	Leptotrichiaceae	*Leptotrichia*		*	*				
	Proteobacteria	Enterobacteriaceae	*Erwinia*	sp. 1, 2	*	*				
	Proteobacteria	Enterobacteriaceae	*Klebsiellia*		*	*				
Antibiotics	Firmicutes	Enterococcaceae	*Enterococcus*				*			*
	Firmicutes	Lactobacillaceae	*Lactobacillus*						*	*
	Proteobacteria	Acetobacteraceae	*Commensalibacter*	sp. 1					*	
	Proteobacteria	Acetobacteraceae	*Commensalibacter*	sp. 2					*	
	Proteobacteria	Alcaligenaceae	*Achromobacter*				*		*	*
	Proteobacteria	Comamonadaceae	*Pelomonas*				*		*	*
	Proteobacteria	Enterobacteriaceae	*Erwinia*	sp. 1			*		*	*
	Proteobacteria	Enterobacteriaceae	*Erwinia*	sp. 2					*	
	Proteobacteria	Enterobacteriaceae	*Klebsiella*						*	
	Proteobacteria	Enterobacteriaceae	*Salmonella*						*	
	Proteobacteria		*Methylobacterium*				*		*	*
	Proteobacteria		*Pseudomonas*	sp. 2, 4			*		*	*
	Proteobacteria		*Stenotrophomonas*				*		*	
Hormones	Proteobacteria	Comamonadaceae	*Pelomonas*				*			
	Proteobacteria	Comamonadaceae	*Variovorax*				*			
Mixture	Bacteroidetes	Chitinophagaceae	*Ferruginibacter*	sp. 2			*		*	*
	Bacteroidetes	Chitinophagaceae	*Sediminibacterium*	sp. 1			*		*	*
	Proteobacteria	Bradyrhizobiaceae	*Bradyrhizobium*				*		*	*
	Proteobacteria	Caulobacteraceae	*Calobacter*				*			
	Proteobacteria	Ectothiorhodospiraceae	*Ectothiorhodospira*							*
	Proteobacteria	Geobacteraceae	*Geobacter*				*		*	*
	Proteobacteria	Methylobacteriaceae	*Methylobacterium*				*			
	Proteobacteria	Sinobacteraceae	*Steroidobacter*				*			

*Adjusted *P* value of <0.05 for that life stage grouping in the genera treatment pairing.

Table S2. Bacterial families and genera in each treatment that are significantly different in at least one treatment pairing

Stage	Phylum	Family	Genus	Species	Den	Control	Acetaminophen	Caffeine	Antibiotics	Hormones
Third instar	Acidobacteria	Bryobacteraceae	Bryobacter		38	AC, CA, AN, H, M				
	Acidobacteria	Corynebacteriaceae	*Corynebacterium*	sp. 1	41	AC, CA, AN, H, M				
	Acidobacteria	Corynebacteriaceae	*Corynebacterium*	sp. 2	42	AN, M				
	Bacteroidetes	Chitinophagaceae	Sediminibacterium	sp. 1	4	AC, CA, AN, H, M				
	Firmicutes	Enterococcaceae	*Enterococcus*		20	AN, H	AN, H, M	AN, H		
	Firmicutes	Lactobacillaceae	*Lactobacillus*	sp. 1	0	AN	AN, M	AN		
	Firmicutes	Lactobacillaceae	*Lactobacillus*	sp. 2	2	AN, H, M	AN, H, M	AN, H, M		
	Firmicutes	Peptoniphilaceae	Finegoldia		50	AC, CA, AN, M				
	Fusobacteria	Leptotrichiaceae	Leptotrichia		107	CA		AN		
	Proteobacteria	Alcaligenaceae	Achromobacter		3	AN	AN	AN		
	Proteobacteria	Bradyrhizobiaceae	Bradyrhizobium	sp. 1	31	AC, CA, AN, H, M				
	Proteobacteria	Bradyrhizobiaceae	Bradyrhizobium	sp. 2	72	AC, AN, H, M				
	Proteobacteria	Burkholderiaceae	Burkholderia		23	AC, CA, AN, H, M				
	Proteobacteria	Caulobacteraceae	Caulobacter		14	AC, CA, AN, H, M				
	Proteobacteria	Enterobacteriaceae	*Erwinia*	sp. 1	13	AC, AN, H	AN, H, M	AN, H		
	Proteobacteria	Enterobacteriaceae	*Erwinia*	sp. 2	29		AN, H, M	AN		
	Proteobacteria	Enterobacteriaceae	Klebsiellia		17	AN, H	AN, H	AN, H		
	Proteobacteria	Hyphomicrobiaceae	Hyphomicrobium		25	AC, CA, AN, H, M				
	Proteobacteria	Methylobacteriaceae	Methylobacterium		11	AN, M				
	Proteobacteria	Moraxellaceae	*Acinetobacter*		43	AC	H			
	Proteobacteria	Pseudomonadaceae	*Pseudomonas*	sp. 1	1		AN	AN		
	Proteobacteria	Pseudomonadaceae	*Pseudomonas*	sp. 2	52		AN, H, M			
	Proteobacteria	Pseudomonadaceae	*Pseudomonas*	sp. 4	181	AC, AN, H, M				
	Proteobacteria	Rhodospirillaceae	Reyranella		22	AC, CA, AN, H, M				
	Proteobacteria	Sinobacteraceae	Nevskia		8	AC, CA, AN, H, M				
	Proteobacteria	Sinobacteraceae	Steroidobacter	sp. 1, 2	12	AC, CA, AN, H, M				
	Proteobacteria	Xanthomonadaceae	Stenotrophomonas		5		AN			
Sixth instar										
Pupa	Actinobacteria	Bifidobacteriaceae	Bifidobacterium	sp. 1	61		AN	AN	H, M	
	Bacteroidetes	Chitinophagaceae	Sediminibacterium	sp. 1	4				M	
	Firmicutes	Enterococcaceae	*Enterococcus*		20				H, M	
	Firmicutes	Lactobacillaceae	*Lactobacillus*	sp. 2	193		AN	AN	H, M	
	Proteobacteria	Acetobacteraceae	Commensalibacter	sp. 1, 2, 3	18		AN	AN	H, M	
	Proteobacteria	Burkholderiaceae	Burkholderia		23				M	
	Proteobacteria	Caulobacteraceae	Caulobacter		14				M	
	Proteobacteria	Comamonadaceae	Pelomonas		9				M	
	Proteobacteria	Enterobacteriaceae	*Salmonella*		68		AN	AN	H, M	
	Proteobacteria	Methylobacteriaceae	Methylobacterium		11				M	
	Proteobacteria	Rhodospirillaceae	Reyranella		22				M	
	Proteobacteria	Sinobacteraceae	Nevskia		8	M	M	M	M	M
Adult	Bacteroidetes	Chitinophagaceae	Flavihumibacter		54	M	M	M	M	M
	Bacteroidetes	Chitinophagaceae	Sediminibacterium	sp. 1	4	M	M	M	M	M
	Proteobacteria	Bradyrhizobiaceae	Bradyrhizobium	sp. 1	31	M	M	M	M	M
	Proteobacteria	Burkholderiaceae	Burkholderia		23		M	M	M	M
	Proteobacteria	Caulobacteraceae	Caulobacter		14	M	M	M	M	M
	Proteobacteria	Comamonadaceae	Variovorax		48			M		M
	Proteobacteria	Geobacteraceae	Geoalkalibacter		69	M	M	M	M	M
	Proteobacteria	Oxalobacteraceae	Massilia		44	AC, CA, AN, H, M				
	Proteobacteria	Rhodospirillaceae	Reyranella		22	M	M	M	M	M
	Proteobacteria	Sinobacteraceae	Nevskia		8	M	M	M	M	M
	Proteobacteria	Sinobacteraceae	Steroidobacter	sp. 2	34	M	M	M		M

Lettering (AC, CA, AN, H, M) denotes adjusted *P* value of <0.05 for that treatment group (acetaminophen, caffeine, antibiotics, hormones, and mixture, respectively) in the genera life stage pairing.

Table S3. UPLC-MS/MS chemical analysis for each chemical and their deuterated standard

Group	No.	Compound	Formula	Tr, min	Molecular ions, M + H	Cone, V	Fragment ions	CE, V	ESI
Antibiotic	1	Ciprofloxacin	$C_{17}H_{18}FN_3O_3$	2.58 (±0.2)	332.0343	48	245.0868; 231.0416	26; 32	+
	2	Ciprofloxacin-D_8	$C_{17}D_8H_{10}FN_3O_3$	2.59 (±0.2)	336.1194	44	248.0708; 235.0031	22; 44	+
	3	Lincomycin	$C_{18}H_{34}N_2O_6S$	2.14 (±0.2)	407.1243	48	126.1087; 41.8801	42; 72	+
	4	Lincomycin-^{13}C-D_4	$C_{17}{}^{13}CH_{30}D_4N_2O_6S$	6.62 (±0.2)	408.2206	20	80.9941	16	+
	5	Oxytetracycline	$C_{22}H_{24}N_2O_9$	2.61 (±0.2)	461.0329	32	426.0248; 201.0076	20; 44	+
	6	Tetracycline-$^{13}C_2$-D_6	$C_{29}{}^{13}C_2H_{18}D_6N_2O_8$	2.49 (±0.2)	451.1181	32	416.1078; 104.0699	18; 44	+

CE, collision energy.