

Supplementary materials

Table S1. The composition of basal diet of Suckling piglets

	Dry matter feed
Ingredients	
Expanded corn	30.00%
Corn	26.30%
Full-fat soybean	12.50%
Whey powder	12.00%
Fermented soybean meal	5.00%
Plasma protein powder	4.00%
Fish meal	5.00%
Soybean oil	2.00%
Monocalcium phosphhate	0.40%
Calcium carbonate	0.60%
Acidifiers	0.40%
Sodium butyrate	0.25%
Zinc oxide	0.35%
Premix	1.00%
Nutrients	
Digestible energy	3500Kcal·kg ⁻¹
Crude protein	18.00%
Calcium	0.65%
phosphorus	0.45%
Lys	1.40%
Met	0.45%
Thr	0.91%
Try	0.24%

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Table S2. The composition of basal diet of lactating sows

	Dry matter feed
Ingredients	
Corn	60.4%
Wheat bran	10.4%
Cottonseed meal	6.8%
Fish meal	5.1%
Soybean Meal	1.8%
bone meal	1.2%
salt	0.5%
Peanut cake	12.6%
Sweet Potato Vine	1.2%
Nutrients	
Digestible energy	2.61Kcal·kg ⁻¹
Crude protein	13.8%
Lys	0.68%
phosphorus	0.67%

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Table S3. The PCR reaction system

	Amount
Sterilized ultra pure water	8.75 μ l
Q5 Reaction Buffer (5 \times)	5.0 μ l
Q5 GC high Enhancer (5 \times)	5.0 μ l
dNTP (2.5mM)	2.00 μ l
Template (20ng/ μ l)	2.00 μ l
Primer F (10 μ M)	1.00 μ l
Primer R (10 μ M)	1.00 μ l
Q5 Polymerase(5U/ μ l)	0.25 μ l
Total amount	25.00 μ l

9 **Table S4. Richness and diversity estimation based on pyrosequencing analysis**

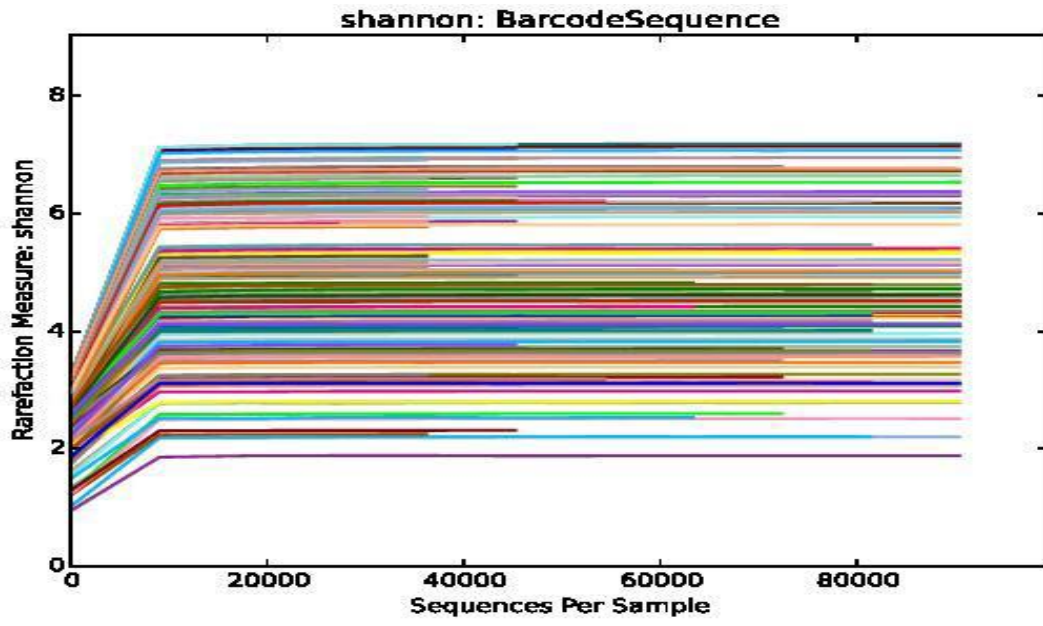
Groups	High-qualitysequences	OTUs	Chao1	Shannon	
3 days	CG	692555	1625	2079.99	21.60 ^{bB}
	EGI	727690	1646	2064.45	24.12 ^{acA}
	EG II	636069	1602	1971.14	15.61 ^c
6 days	EG III	557795	1551	2105.15	23.53 ^{acA}
	CG	343687	1859	2411.94 ^a	27.65 ^{aB}
	EGI	409748	1546	1992.30 ^b	21.33 ^b
9 days	EG II	529999	1590	2085.02 ^{ab}	20.23 ^{bA}
	EG III	483993	1646	1980.76 ^b	22.16 ^b
	CG	570239	2166	2732.54 ^{bc}	24.42
14 days	EGI	619916	2421	3114.85 ^{ac}	26.27
	EG II	584274	2609	2807.35 ^a	22.96
	EG III	586370	2365	3022.67 ^{ac}	23.40
28 days	CG	553015	2573	4164.07 ^{aB}	26.40
	EGI	584749	2609	3302.43 ^{aA}	24.58
	EG II	538471	3130	4115.29 ^{aB}	25.17
32 days	EG III	568852	2819	3770.35 ^a	28.50
	CG	636746	3865	4758.73 ^a	33.05 ^b
	EGI	711061	4414	5097.15 ^{ab}	35.69 ^{ab}
35 days	EG II	579160	4278	5126.55 ^{ab}	35.42 ^{ab}
	EG III	782082	4531	5249.87 ^b	38.80 ^a
	CG	252219	3711	4483.68 ^{bc}	36.39 ^{ab}
35 days	EGI	758698	4818	5524.10 ^{aB}	39.77 ^a
	EG II	327423	4011	4837.60 ^b	37.48 ^{ab}
	EG III	239480	3539	4274.08 ^{bA}	33.47 ^b
35 days	CG	277118	4046	4751.88	39.54 ^{ab}
	EGI	270805	3660	4522.73	36.76 ^b
	EG II	278024	3844	4625.55	37.34 ^{ab}
	EG III	283502	4056	4795.13	39.94 ^a

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Table S5. Structure modulate of the gut microbiota in genus level

Bacteria	Control group	Experimental group I	Experimental group II	Experimental group III
<i>Eubacterium</i>	0.33±0.04	0.11±0.02	0.42±0.03	0.23±0.03
<i>Prevotella</i>	1.76±0.07	1.37±0.03	0.99±0.04	0.74±0.05
<i>Bacteroides</i>	2.40±0.08	2.48±0.07	4.23±0.17	1.13±0.05
<i>Blautia</i>	0.06±0.01	0.15±0.02	0.13±0.02	0.04±0.00
<i>Coprococcus</i>	0.37±0.07	0.66±0.04	0.37±0.02	0.53±0.06
<i>Oscillospira</i>	2.15±0.08	2.56±0.06	4.72±0.46	2.53±0.09

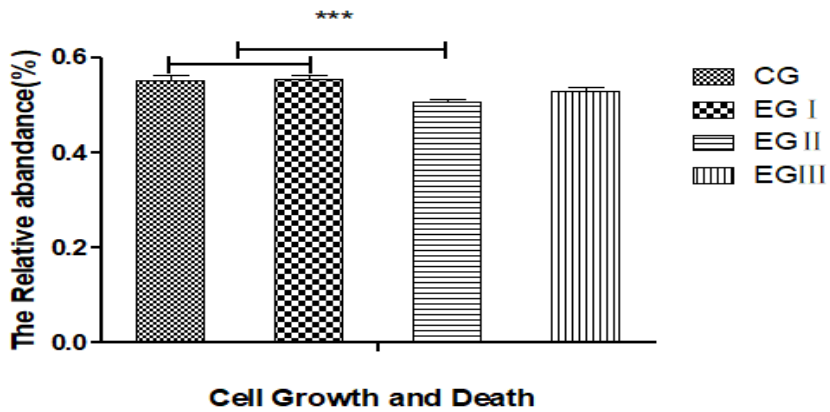
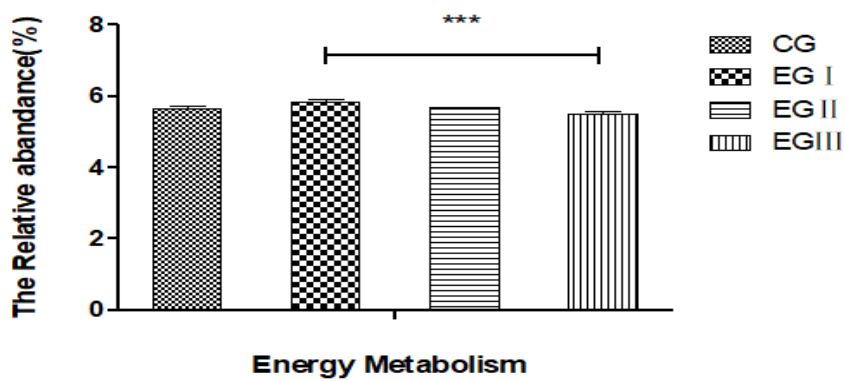
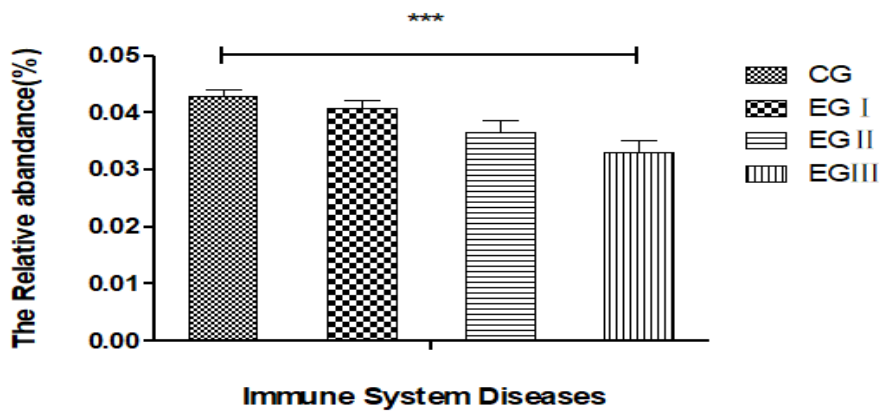


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Fig. S1. Shannon curves for the gut microbiota of suckling piglets.

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 16 **Fig. S2.** The significance of KEGG statistics for the functional genes of 32-day-old
 17 piglets. In each of the panels, the analysis result of KEGG was indicated by the label
 18 on the y-axis. ** $P < 0.01$ means the difference was extremely significant by the
 19 Multigroup comparisons (the LSD test) were carried out by analysis of variance
 20 (ANOVA) with SPSS 20.0.