

Figure S1. The GPC spectrum of NDH0 (The peak at about 37 min was the absorption of NaNO_3).

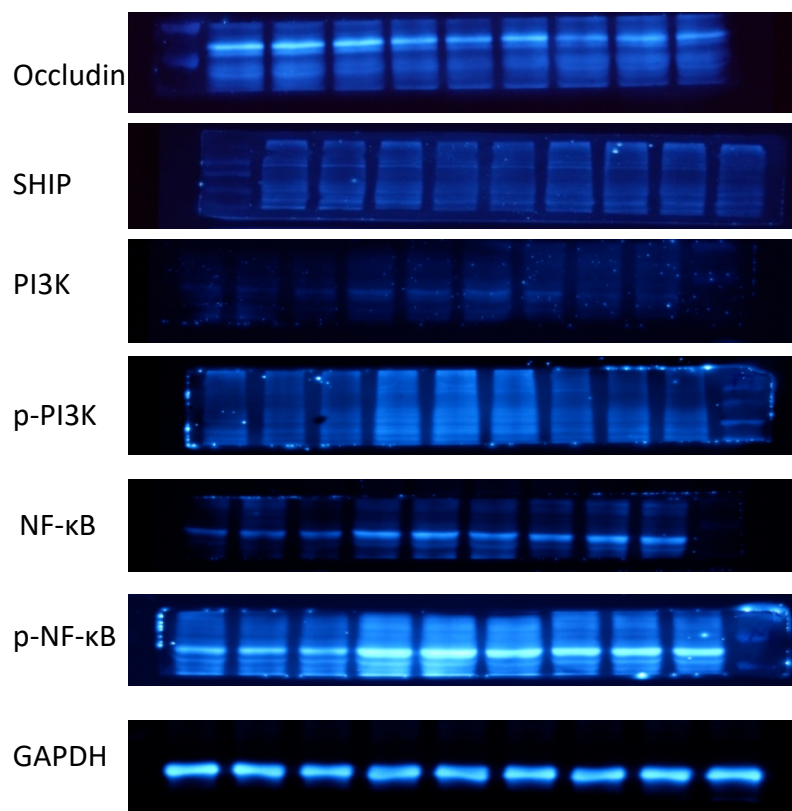


Figure S2. Raw images of data from Western blot.

Table S1. Kits used in biology tests.

Chemicals or kit	Cat log #
Clindamycin	MB1345-1
Ampicillin	MB1507-1
Ceftriaxone sodium	MB1333-1
Vancomycin	MB1260-1
Stool DNA kit	D4015-02
Q Sepharose Fast Flow	17-0709-01
Trifluoroacetic acid	76-05-1
Isoflurane	26675-46-7
Total RNA extract kit	DP419
SYBR Green	DRR820A

Table S2. The composition of mice food.

Diet composition	Percentage %
Crude ash	≤ 8 %
Crude protein	≥ 21 %
Crude fat	≥ 4.5 %
Crude fiber	≤ 5 %
Lysine	≥ 1.32 %
Methionine	≥ 0.4 %
Ca	1.0–1.8 %
P	0.6–1.2 %
NaCl	≤ 1.0 %
Moisture	≤ 10 %

Table S3. The primers used in the experiment.

Primer name	Forward (5'-3')	Reverse (5'-3')
GAPDH	GCATCCACTGGTGCTGCC	TCATCATACTTGGCAGGTTTC
SHIP1	GAGACTGTTTCAGCGTCTAC	CGTCTTCAAAAAGTCGGAATCCA
SHIP2	CGTCTTCAAAAAGTCGGAATCCA	CAGAGTCGTCCCGTGTCTTTC
IL-6	CAGAGTCGTCCCGTGTCTTTC	TCCACGATTCCCAGAGA
IL-1 β	TTGAAGAAGAGCCCATCCTC	CAGCTCATATGGGTCCGAC

Table S4. The antibody used in the experiment.

Antibody	Company	Dilute ratio
PI3 Kinase p110 α (C73F8) Rabbit mAb #4249	Cell Signaling Technology	1:1000
Phospho-PI3 Kinase p85 (Tyr458)/p55 (Tyr199) (E3U1H) Rabbit mAb #17366	Cell Signaling Technology	1:1000
Occludin (E6B4R) Rabbit mAb #91131	Cell Signaling Technology	1:1000
SHIP1 (C15C9) Rabbit mAb #2725	Cell Signaling Technology	1:1000
NF- κ B p65 (D14E12) XP [®] Rabbit mAb #8242	Cell Signaling Technology	1:1000
Phospho-NF- κ B p65 (Ser536) (93H1) Rabbit mAb #3033	Cell Signaling Technology	1:1000
GAPDH (D16H11) XP [®] Rabbit mAb #5174	Cell Signaling Technology	1:1000
Anti-rabbit IgG, HRP-linked Antibody #7074	Cell Signaling Technology	1:5000
Anti-mouse IgG, HRP-linked Antibody #7076	Cell Signaling Technology	1:5000

Table S5. Effect of NDH0 on body weight (up) and Effect of NDH0 on cecum index (down).Control (control group): mice were treated with saline from day 1 to day 14 by gavage; Model (model group): mice were treated with mixture of antibiotics (500 ug/ mL) from day 0 to day 6 for free drinks and saline from day 1 to day 14 by gavage; NDH0 (NDH0 group): mice were treated with mixture of antibiotics (500 ug/ mL) from day 0 to day 6 and NDH0 polysaccharides (30 mg/kg/d) from day 1 to day 14 by gavage.

D	Control (g)				Model(g)				NDH0 (g)								
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0	19.16	19.05	19.28	19.28	18.88	20.06	21.00	20.63	20.53	18.84	19.16	19.05	19.28	19.28	18.88	20.53	18.84
1	22.32	21.04	19.92	19.05	19.52	17.67	17.77	17.06	16.79	16.68	16.09	16.15	17.64	18.25	18.42	17.42	16.03
3	21.65	20.00	21.94	19.44	19.83	15.03	16.12	15.76	16.16	15.15	16.16	17.08	16.79	15.08	16.76	16.02	16.16
5	20.22	20.64	22.04	22.18	20.86	15.02	14.06	14.09	13.15.2	17.05	18.69	19.05	18.42	18.67	17.77	17.06	17.06
7	22.83	21.03	21.79	21.96	22.96	14.01	15.01	15.07	15.06	14.665	19.84	19.27	18.08	19.05	19.28	19.28	19.28
9	21.83	22.03	22.79	22.56	22.96	16.01	16.01	15.08	15.04	17.236	19.06	20.81	19.33	20.92	19.05	19.05	19.52
11	24.05	22.05	22.08	23.04	24.628	18.28	18.88	17.53	19.04	17.82	22.02	22.21	21.22	22.22	22.01	22.05	20.05
14	23.09	25.03	24.02	25.02	23.36	21.06	19.06	17.08	18.02	19.56	22.04	22.01	22.04	23.04	22.06	22.07	21.02

Control (mg/g)	Model (mg/g)	NDH0 (mg/g)
5.879828	9.494382	6.792453
5.983263	9.450549	6.696833
6.157025	8.974359	6.919643
5.992064	9.081633	6.99115
6.007905	8.37963	7.035398
		7.092511
		6.923077

Table S6. Relative abundance of gut microbiota at the phylum level in each group.

ID	Con 1	Con 3	Con 2	Con 4	Con 5	Mod el1	Mod el2	Mod el3	Mod el4	Mod el5	NDH 01	NDH 02	NDH 03	NDH 04	NDH 05
Bacteroidetes	0.63 142 1	0.80 448 4	0.84 630 5	0.65 050 3	0.80 908 8	0.00 454 6	0.54 819 7	0.66 987 1	0.00 075 4	0.00 031 9	0.75 156 2	0.61 598 2	0.69 702 5	0.59 118 3	0.08 269 9
Proteobacteria	0.01 366 5	0.03 015 9	0.02 961 8	0.02 020 6	0.03 248 6	0.85 523 1	0.41 126 7	0.27 393 8	0.99 853 4	0.99 955 5	0.19 030 3	0.16 929 3	0.21 939 3	0.17 564 2	0.81 296 1
Firmicutes	0.34 914 3	0.15 499	0.12 135	0.32 300 4	0.15 000 7	0.14 003 1	0.04 041 8	0.05 522 2	0.00 017 5	0.00 01	0.03 705 6	0.13 280 9	0.07 105 5	0.11 520 9	0.05 961 8
Verrucomicrobia	0	0	0	2.34 E-05	0	0	5.55 E-05	0.00 082 8	0	0	0.01 940 8	0.07 928 7	0.01 064 5	0.11 378 8	0.00 026 7
Actinobacteria	0.00 256	0.00 917 6	0.00 134 6	0.00 336	0.00 467 3	0	4.17 E-05	4.43 E-05	0.00 049 6	1.25 E-05	0.00 073 7	0.00 118 1	0.00 089 5	0.00 350 2	0.03 051 3
Tenericutes	0.00 169 5	0.00 018	0.00 032 5	0.00 182 6	0.00 210 5	0	0	0	0	0	5.11 E-05	0	0	0	0
[Thermi]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00 608 4
TM7	0.00 097 7	0.00 038 8	0.00 040 6	0.00 039 8	0.00 110 9	0	0	0	0	0	0	0	0	0	5.33 E-05
OD1	0	0	2.32 E-05	0	2.26 E-05	0	0	0	0.00 001 4	0	0	0	0	0	0.00 271 9
Cyanobacteria	0	0	0	0	0	0	0	0	0.00 001 4	0	0	0	0	0	0.00 167 5
Others	0.00 053 9	0.00 062 3	0.00 062 7	0.00 067 9	0.00 050 9	0.00 019 2	2.08 E-05	9.61 E-05	0.00 001 4	1.25 E-05	0.00 088 3	0.00 144 9	0.00 098 7	0.00 067 7	0.00 341 2

Table S7. Different bacteria at genus levels.

Blautia

Control	Model	NDH0
0.00144	0.029537	0.004494
0.000625	0.019939	0.001309
0.000858	0.004523	0.014529
0.000669	0.011649	0.002749
0.000756	0.029537	0

Enterobacter

Control	Model	NDH0
2.91E-05	0.768095	0
7.27E-05	0.391457	7.27E-05
7.27E-05	0.313434	0
0.000175	0.20708	0
4.36E-05	0.000436	0.006108

Proteus

Control	Model	NDH0
0	0.029392	0
1.45E-05	0.005308	2.91E-05
0	0.006777	1.45E-05
0	0.020055	2.91E-05
0	0	0.000145

Enterococcus

Control	Model	NDH0
0	0.006224	0.00096
0	0.001091	0.000974
0	0.004218	0.001382
0	0.000378	0.003156
0	0.000553	0

Clostridioides

Control	Model	NDH0
0	0.104449	0
0	0.019517	0
0	0.146289	0
0	0.033217	0
0	0	0

Muribaculum

Control	Model	NDH0
0.3595934	0.000000	0.1036198
0.3738165	0.000000	0.02371984
0.4428092	5.820000e-005	0.01330696
0.4167479	0.000000	0.0363869
0.4534256	0.000000	0.018673

Ruminococca

Control	Model	NDH0
0.02082576	0.000000	0.001192536
0.01093643	0.000000	0.01995317
0.01282704	0.004261136	0.000596268
0.03065691	0.000770786	0.005831794
0.009642094	0.000218	0.0000582
0.001411	0.0000873	0.0000436

Lactobacillus

Control	Model	NDH0
0.006878899	0.000000	0.00213784
0.009613007	0.000000	0.003286747
0.01308881	0.000000	0.001105278
0.004348395	0.0000290863	0.007198848
0.01060194	0.000000	0.006559

Fecalibaculum

Control	Model	NDH0
0.004057533	0.	0.009685723
0.01006384	0.	0.0159829
0.003184945	0.	0.004639258
0.002225099	0.	0.06772734
0.008856765	0.	0.001062

Bifidobacterium

Control	Model	NDH0
0.001090735	0.	0.000639898
0.000712613	0.	0.001294338
0.005133724	0.	0.000828958
0.002457789	0.	0.003577609
0.003083143	0.	0.001789