

Supplementary Information

Table S1. Composition of the buffer solution for in vitro fermentation.

Trace element solution		Carbonate-Phosphate Buffer	
FeSO₄·7H₂O	3680mg/L	NaHCO₃	9.24g/L
MNSO₄·H₂O	1159mg/L	Na₂HPO₄·12H₂O(anhydrous)	2.824g/L
ZnSO₄·7H₂O	440mg/L	NaCl	0.47g/L
CoCl₂·6H₂O	120mg/L	KCl	0.45g/L
NiCl₂·6 H₂O	182mg/L	Urea	0.40g/L
CuSO₄·5H₂O	98mg/L	Na₂SO₄(anhydrous)	0.10g/L
Mo₇(NH₄)₆O₂₄·4H₂O	17mg/L	MgCl₂·6H₂O	0.10g/L
		CaCl₂·2H₂O	0.0728g/L
		Trace element solution	10ml/L
		Resazurin(1mg/mL)	1ml/L
		cysteine. HCL	0.50g/L

Note: Add the buffer components in reverse order listed (minor components first).

Table S2. Composition of the Experimental Diets for C57/BL Mouse.

		NC	HF	HF-WGLSF	HF-PMGS
Carbohydrate		71.2			
(% of energy)	Maltodextrin		11.2	10.6	10.6
	Sucrose		10	0	0
	WGLSF		0	10.6	0
	corn starch		0	0	9.7
	β -glucan		0	0	0.9
protein (% of energy)		18.8	18.8	18.8	18.8
fat (% of energy)		10	60	60	60
energy (kcal/kg)		3800	5500	5500	5500

Note: NC: normal control; HF: high fat; HF-WGLSF: whole-grain-like structural form incorporated high-fat; HF-PMGS: physical mixture of β -glucan and starch incorporated high-fat; WGLSF: whole-grain-like structural form starch. All the other ingredients (vitamin and mineral) are the same for all the diets.

Table S3. The primer sequences of genes.

Genes	Forward	Reward
β -actin	5'-GGGTCAGAAGGACTCCTATG-3'	5'-GTAACAATGCCATGTTCAAT-3'
NPY	5'-GACTGACCCTCGCTCTAT-3'	5'-GGTGATGAGATTGATGTAGTG-3'
POMC	5'-GTTACGGTGGCTTCATGACCTC-3'	5'-CGCGTTCTTGATGATGGCGTTC-3'
G-6-Pase	5'-GACCTGAGGAACGCCTTCTATG-3'	5'-AGTCGGTGTCCAGGACCCACCAA-3'
GK	5'-GAAGACCTGAAGAAGGTGATGAGC- 3'	5'-GTCTATGTCTTCGTGCCTTACAGG-3'
PPAR α	5'-ACTACGGAGTTCACGCATGTG-3'	5'-TTGTCGTACACCAGCTTCAGC-3'
SREBP-1c	5'-TCGACTACATCCGCTTCTTG-3'	5'-TTCGTAGGGTCAGGTTCTCC-3'

