Table S1. The composition of the treatment diets.

Ingredient	LF	HF	HFGF	HFEX
Oat bran	0	0	260.0	0
β-glucan	0	0	0	45.4*
Casein	140.0	183.6	134.2	183.6
starch	465.7	171.6	68.5	171.6
maltodextrin	155.0	59.5	59.5	59.5
Sucrose	100.0	261.8	261.8	261.8
Soybean oil	40.0	29.7	0.2	29.7
Anhydrous cream	0	174.2	174.2	174.2
Cellulose	50.0	59.5	0	54.1
vitamins+minerals mix	45.0	53.5	53.5	53.5
L-Cystine	3.0	3.6	3.6	3.6
Choline chloride	2.5	3.0	3.0	3.0
Total	1000	1000	1018.5	1040
Energy，Kcal/g	3.8	4.5	4.4	4.3

Note:

HFBF: the content of starch, lipids and protein from prepared oat flour(260g) are 103.0 g, 29.2g，50.5g, respectively. *: the amount is converted from the purity of extracted β-glucan. Energy ratio for LF diet: carbohydrate 75.0%，fat 10.3%，protein 15.0%；

Energy ratio for high-fat diet: carbohydrate 44.0%，fat 41.0%，protein 15.0%。

Table S2. The insulin resistance (HOMA-IR) and sensitivity (ISI).

Treatment	FINS	ISI	HOMA-IR
LF	1.849±0.021[a]	1.083±0.021[a]	0.339±0.014[a]
HF	2.424±0.009[b]	0.670±0.038[b]	0.512±0.021[b]
HFEF8	1.810±0.014[a]	1.156±0.031[c]	0.315±0.039[a]

*Note: HFEF8: HFEF with addition of 8% extracted β-glucan. Different letters represent statistical significant differences at $p < 0.05$.
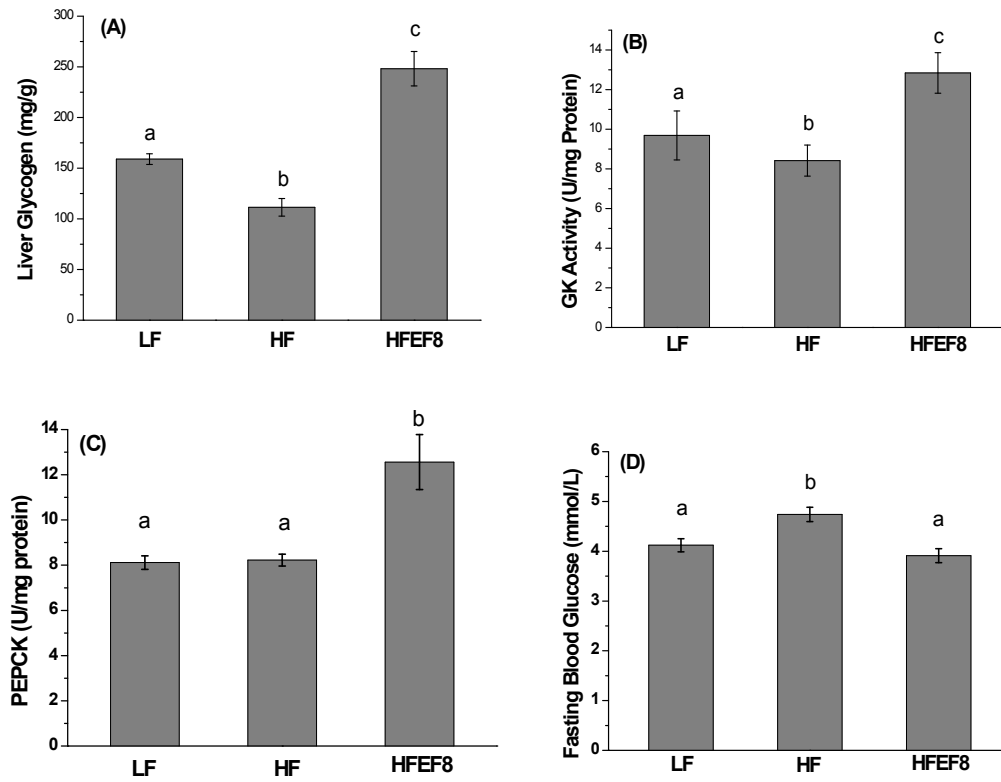
Figure S1. The changes of liver glycogen, hepatic GK activity, intestinal PEPCK activity and fasting blood glucose in mice fed on HFEF diet containing 8% extracted β-glucan. Different letters represent statistic significant difference at p<0.05.