

## Supplementary Materials for

Unhealthy diets induce distinct and regional effects on intestinal inflammatory signalling pathways and long-lasting metabolic dysfunction in rats

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**Includes:** Tables 1 to 3; Figs 1 to 3

Table S1. Statistics of energy and nutrient intake in rats fed with chow (CD), high-sugar (HSD) and Western (WD) diets.

Daily intake	CD		HSD		WD		<i>p</i> -value		
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	CD vs HSD	CD vs WD	HSD vs WD
Energy intake (Kcal)	63.86	3.71	54.45	1.34	120.29	30.74	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$
Protein energy intake (%)	25.95	0.19	13.62	0.48	3.90	0.42	$3.53 \times 10^{-4}$	$3.53 \times 10^{-4}$	$3.74 \times 10^{-4}$
Total carbohydrate energy intake (%)	64.58	0.26	81.42	0.65	22.96	3.22	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$
Carbohydrate intake (Kcal)	37.95	2.3	17.09	0.79	12.12	3.00	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$	$1.36 \times 10^{-3}$
Simple sugar intake (Kcal)	3.30	0.18	27.24	1.04	15.14	3.48	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$
Total fat energy intake (%)	9.47	0.07	4.96	0.17	73.14	3.58	$3.36 \times 10^{-4}$	$3.36 \times 10^{-4}$	$3.74 \times 10^{-4}$

Unsaturated fat intake (Kcal)	5.03	0.28	2.25	0.10	29.27	7.86	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$
Saturated fat intake (Kcal)	1.01	0.06	0.45	0.02	59.16	17.44	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$	$3.74 \times 10^{-4}$

Note:  $p$ -value of Mann-Whitney U test.  $n = 9$  per group.

Table S2. Pearson's partial correlations analysis between adiposity index and nutrient intake.

Parameter	Daily intake	Pearson's r	<i>p</i> -value	Significant correlations, one-tailed
Adiposity index	Simple sugar intake (g)	0.56**	$1.57 \times 10^{-3}$	** $p < 0.01$
	Total fat energy intake (%)	0.64***	$2.08 \times 10^{-4}$	*** $p < 0.001$
	Unsaturated fat intake (g)	0.57**	$1.18 \times 10^{-3}$	** $p < 0.01$
	Saturated fat intake (g)	0.62***	$3.80 \times 10^{-4}$	*** $p < 0.001$
	Energy intake (Kcal)	0.48**	$6.20 \times 10^{-3}$	** $p < 0.01$
	Protein energy intake (%)	-0.85***	$1.53 \times 10^{-8}$	*** $p < 0.001$
	Total carbohydrate energy intake (%)	-0.49**	$5.40 \times 10^{-3}$	** $p < 0.01$
	Carbohydrate intake (g)	-0.86***	$1.11 \times 10^{-8}$	*** $p < 0.001$
	Dietary fibre intake (g)	-0.86***	$6.21 \times 10^{-9}$	*** $p < 0.001$

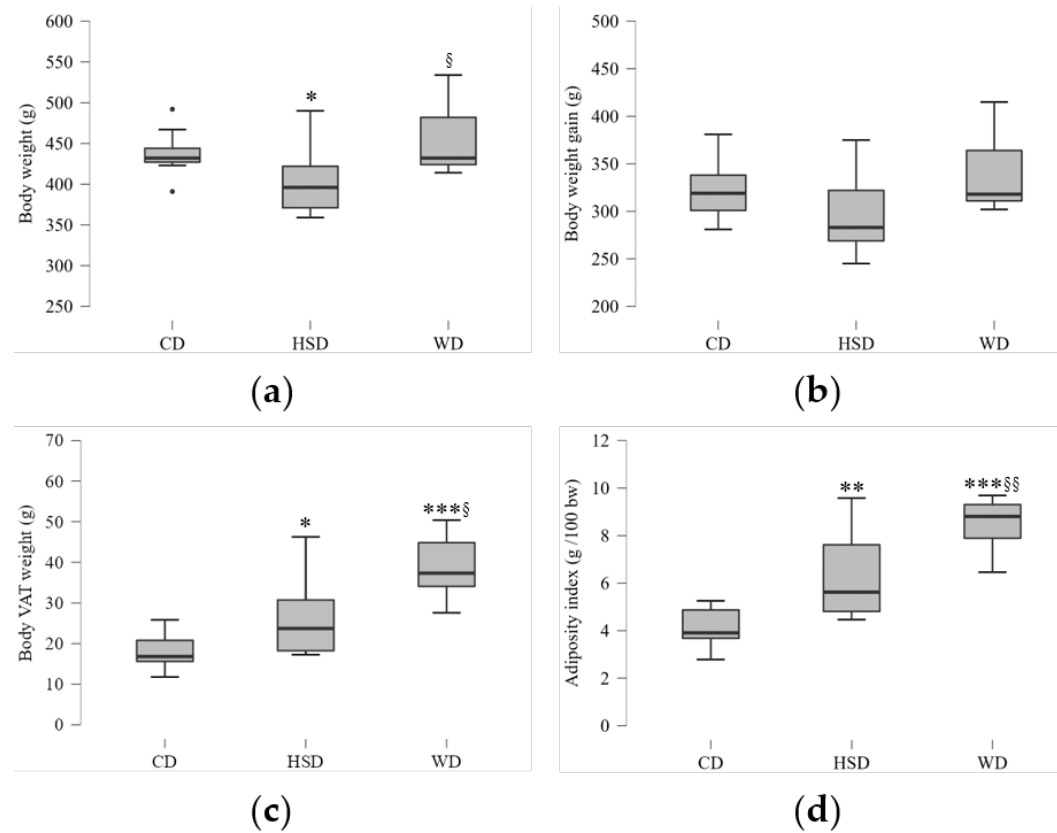
Note: Conditioned on variables: Body weight gain. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , one-tailed

Table S3. Pearson's partial correlation analysis between serum biochemical levels and nutrient intake.

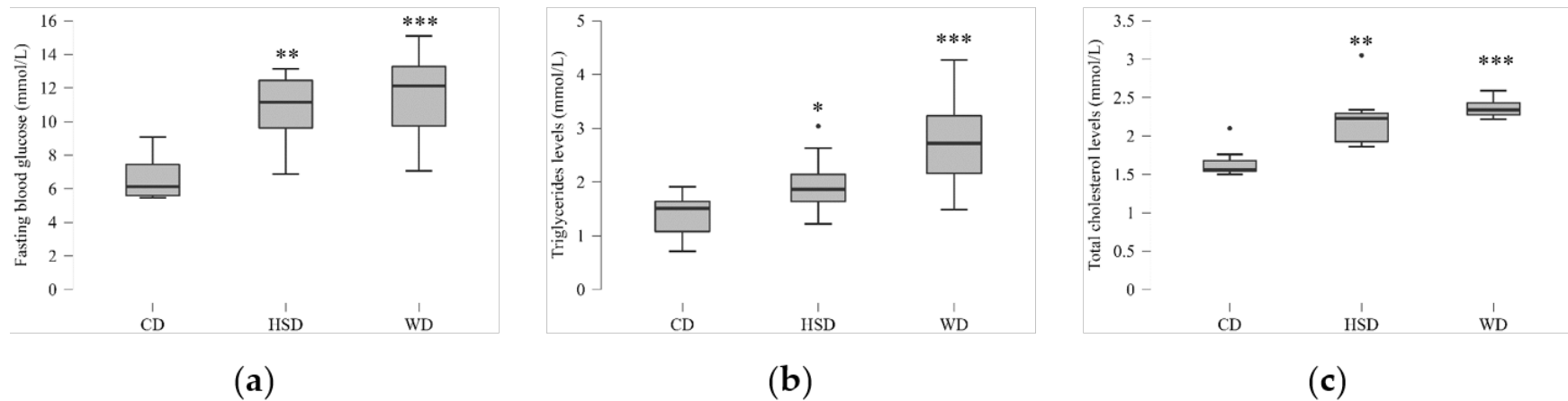
Serum parameter	Daily intake	Pearson's r	<i>p</i> -value	Significant correlations, one-tailed
Fasting blood glucose (mmol/L)	Simple sugar intake (g)	0.49**	$7.16 \times 10^{-3}$	** $p < 0.01$
	Total fat energy intake (%)	0.20	0.17	Ns
	Unsaturated fat intake (g)	0.24	0.13	Ns
	Saturated fat intake (g)	0.31	0.07	Ns
	Energy intake (Kcal)	0.24	0.87	Ns
	Protein energy intake (%)	-0.63***	$4.63 \times 10^{-4}$	*** $p < 0.001$
	Total carbohydrate energy intake (%)	-0.05	0.40	Ns
	Carbohydrate intake (g)	-0.63***	$4.30 \times 10^{-4}$	*** $p < 0.001$
	Dietary fibre intake (g)	-0.64***	$3.54 \times 10^{-4}$	*** $p < 0.001$
Triglyceride serum levels (mmol/L)	Simple sugar intake (g)	0.18	0.20	Ns
	Total fat energy intake (%)	0.34*	0.05	* $p < 0.05$
	Unsaturated fat intake (g)	0.34	0.05	Ns
	Saturated fat intake (g)	0.38*	0.04	* $p < 0.05$
	Energy intake (Kcal)	0.32	0.06	Ns
	Total carbohydrate energy intake (%)	-0.25	0.12	Ns
	Protein energy intake (%)	-0.49**	$7.24 \times 10^{-3}$	** $p < 0.01$
	Carbohydrate intake (g)	-0.35*	0.04	* $p < 0.05$
	Dietary fibre intake (g)	-0.43*	0.02	* $p < 0.05$

Total cholesterol levels (mmol/L)	Simple sugar intake (g)	0.21	0.34	Ns
	Total fat energy intake (%)	0.03	0.88	Ns
	Unsaturated fat intake (g)	-0.11	0.62	Ns
	Saturated fat intake (g)	-0.06	0.77	Ns
	Energy intake (Kcal)	-0.17	0.22	Ns
	Total carbohydrate energy intake (%)	0.04	0.43	Ns
	Protein energy intake (%)	-0.28	0.10	Ns
	Carbohydrate intake (g)	-0.38*	0.04	* $p < 0.05$
	Dietary fibre intake (g)	-0.33	0.06	Ns

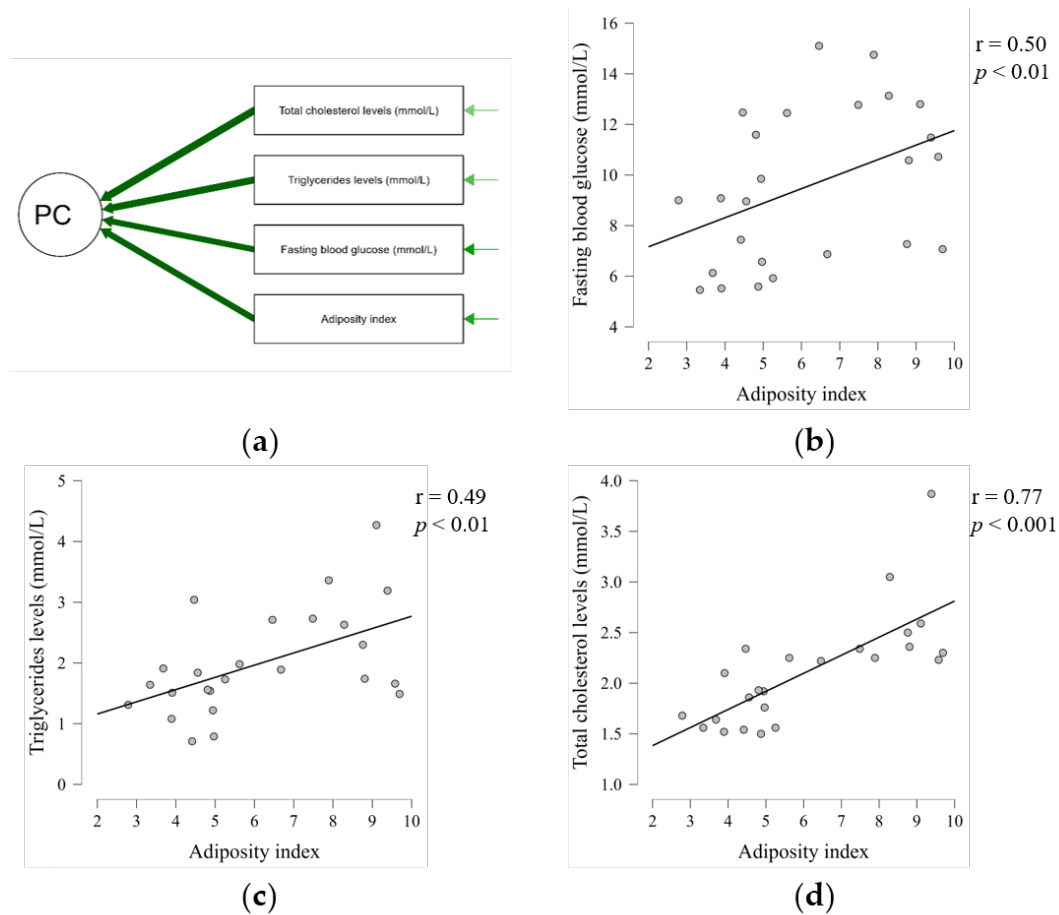
*Note:* Conditioned on variables: Adiposity index. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , one-tailed



**Figure S1.** Effects of dietary intervention on body weight, adipose tissue weight and adiposity. **(a)** Body weight after 14 weeks of feeding. **(b)** Total body weight gain. **(c)** Total visceral adipose tissue (VAT) weight. **(d)** Adiposity index determined as total VAT per 100 g of body weight (bw). Mean values  $\pm$  SD are plotted. Symbols indicate significant differences (one-way ANOVA) compared to CD-fed group: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  and HSD-fed group: §  $p < 0.05$ , §§  $p < 0.01$  ( $n = 9$  rats per group).  $p$ -values reported for Welch statistic and using Dunn's test for multiple comparisons within each variable. CD, chow diet; HSD, high-sugar diet; WD, western diet.



**Figure S2.** Effects of dietary intervention on serum metabolic parameters of rats fed with chow (CD), high-sugar (HSD) and Western (WD) diets. Serum levels of fasting blood glucose (a), triglycerides (b) and total cholesterol (c) were significantly higher in both HSD and WD-fed rats. Mean values  $\pm$  SD are plotted. Symbol indicate significant differences (one-way ANOVA) compared to CD-fed group: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , ( $n = 9$  rats per group).  $p$ -values reported for Welch statistic and using Dunn's test for multiple comparisons within each variable.



**Figure S3.** Correlation between serum metabolic parameters and adiposity index. (a) Path diagram of principal component (PC) used in Pearson correlation analysis. (b) Fasting blood glucose, (c) triglycerides and (d) total cholesterol levels correlated positively with adiposity.