

## Soluble dietary fibre (pectin) increases satiety and decreases adiposity in fat rats on a high fat diet

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Macronutrient-induced satiety may provide a natural countermeasure to obesity and one such macronutrient is indigestible complex carbohydrate or soluble dietary fibre. We have previously demonstrated decreased voluntary food intake and decreased adiposity in conventional adult rats fed different types of soluble dietary fibre, including pectin<sup>(1)</sup>. This study tested the hypothesis that soluble dietary fibre (pectin) may also increase satiety and decrease adiposity in high fat diet-induced obese rats.

In two independently replicated experiments, adult 12-week old male outbred Sprague Dawley rats that had previously been reared on a high fat diet (standard purified 45% kcal fat diet; HF) were offered the following purified experimental diets *ad libitum* for 4 weeks (*n* 8 per experiment per group): low fat diet (AIN-93M diet, 10% kcal fat), low fat–high fibre diet (AIN-93M with 10% w/w pectin), high fat diet (HF) or high fat-high fibre diet (HF with 10% w/w pectin); all diets were supplied by Special Diet Services Ltd. (Witham, Essex, UK). Voluntary food intake was measured daily, body weight recorded twice weekly, MRI scans performed at start and end to determine body composition, and final trunk blood samples were obtained. Radioimmunoassay kits were used to determine plasma hormone concentrations (Merck Millipore, Billerica, MA, USA). Mean (and range) body weight and total body fat content at the start were 542 (420–630) g and 13 (8–24) %, respectively, and final results after 4 weeks were:

	Diet ( <i>n</i> 16 per group)							
	Low fat		Low fat + pectin		High fat		High fat + pectin	
	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM
Cumulative caloric intake (kcal)	2541.9 <sup>a</sup>	317.7	2012.0 <sup>b</sup>	188.7	2849.1 <sup>c</sup>	263.6	2337.6 <sup>a</sup>	259.1
Bodyweight gain (g)	70.24 <sup>a</sup>	6.03	20.01 <sup>b</sup>	5.74	98.02 <sup>c</sup>	4.83	20.83 <sup>b</sup>	4.83
Total fat mass change (g)	3.63 <sup>a</sup>	3.70	−26.18 <sup>b</sup>	2.78	28.46 <sup>c</sup>	1.60	−13.53 <sup>d</sup>	3.26
Final total body fat (%)	11.7 <sup>a</sup>	1.01	7.81 <sup>b</sup>	0.56	16.11 <sup>c</sup>	0.79	9.47 <sup>ab</sup>	0.61
Plasma leptin (ng/ml)	9.36 <sup>a</sup>	1.11	4.97 <sup>b</sup>	0.58	14.67 <sup>c</sup>	1.10	5.62 <sup>b</sup>	0.60
Plasma insulin (ng/ml)	1.59 <sup>a</sup>	0.14	0.96 <sup>b</sup>	0.14	1.79 <sup>a</sup>	0.16	0.78 <sup>b</sup>	0.07
Plasma PYY (pg/ml)	325.1 <sup>a</sup>	38.0	506.7 <sup>b</sup>	51.6	355.2 <sup>a</sup>	38.9	505.3 <sup>b</sup>	42.2

Within rows, mean values with different superscript letters are significantly different, *P* < 0.05 (ANOVA).

Caloric intake, bodyweight gain, final adiposity, plasma leptin and insulin were all lower, and plasma satiety hormone PYY was higher, in rats given low fat + pectin diet than low fat diet alone and in rats given high fat + pectin diet than high fat diet alone. Whereas body fat mass increased during the experiment on high fat diet, and was maintained on low fat diet, significant body fat loss occurred in both pectin-fed groups.

Therefore, even if a high fat diet is consumed, the addition of soluble fibre leads to increased satiety and decreased caloric intake, adiposity, leptinaemia and insulinaemia, indicating its potential for weight loss and improving metabolic phenotype in diet-induced obesity.

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1. Adam CL, Findlay PA, Thomson LM, Ross AW (2012) *Appetite* 59, e2.