Antiobesity Effect of Recombinant Caseinomacropeptide in Sprague-Dawley Rats

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Background: Caseinomacropeptide(CMP) represents a 106-169 fragment produced by specific cleavage of the Phe_{105}-Met_{106} bond of milk-casein during digestion[(1)]. CMP has been reported to cause weight loss and to decrease food intake[(1)(2)]. The purpose of this study was to determine the effect of recombinant CMP on antiobesity in Sprague-Dawley rats.

Methods: The recombinant CMP was obtained from a recombinant yeast *Saccharomyces cerevisiae*. Thirty male Sprague-Dawley rats, weighing approximately 250g, were housed individually in polycarbonate cages at 22±1℃under 12:12 light/dark cycle. The rats were classified into 5 groups and fed with experimental diet for four weeks as follows: Normal diet(ND), ND+CMP 1%, high fat diet(HFD), HFD+CMP 0.5%, and HFD+CMP 1%. Food intakes and body weights were recorded daily and weekly, respectively.

Results: CMP had no effects on the rats fed with normal diet in terms of food intake and weight gain. However, in the rats fed with high fat diet, final weight, weight gain, and food efficiency ratio decreased when CMP was fed (Table. 1). At autopsy, liver, spleen, kidney and adipose tissues were found to be affected (Table. 2).

Conclusion: These results show that recombinant CMP is a potential therapeutic tool for the treatment of obesity.

Table. 1. Change in body weight, food intake and food efficiency ratio(FER) of rats fed the experimental diets

	ND	ND + CMP 1.0%	HFD	HFD +CMP 0.5%	HFD +CMP 1.0%
Body weight(g)					
Initial weight	249.8±8.09^{ns}	250.0±9.00	249.2±10.82	249.4±10.49	249.5±10.13
Final weight	361.4±13.73^{c}	364.2±6.17^{c}	400.0±3.67^{a}	391.5±13.68^{ab}	376.5±3.35^{bc}
weight gain(g/day)	3.83±0.25^{c}	4.04±0.29^{cb}	4.77±0.18^{a}	4.37±0.27^{ab}	3.86±0.21^{c}
Food intake & FER					
Food intake(g/day)	21.70±1.34^{ns}	22.25±0.89	19.50±0.29	20.35±0.48	20.09±0.54
Food efficiency ratio	0.19±0.01^{a}	0.19±0.01^{a}	0.24±0.01^{b}	0.23±0.01^{b}	0.20±0.01^{a}

ns : not significant

$^{a-c}$Means with the different letters in the same row are significantly differently($p<0.05$) by Duncan's multiple range test.

Table. 2. The weight ratio(g/100g Body weight) of lever, kidney and adipose tissues in rats fed with experimental diets

Organ weight (g)	ND	ND + CMP 1.0%	HFD	HFD +CMP 0.5%	HFD +CMP 1.0%
Liver	3.98±0.23	3.97±0.40	4.15±0.11	3.90±0.23	3.78±0.24
Kidney	0.87±0.03	0.90±0.05	0.96±0.06	0.90±0.05	0.87±0.03
Perinenal fat pad	1.06±0.07	0.93±0.10	1.26±0.10	1.06±0.18	0.95±0.15
Epididymal fat pad	1.30±0.02	1.28±0.06	1.45±0.06	1.31±0.20	1.19±0.28

Reference

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