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Expression of NPY in the Hypothalamus by high fat diet is Controlled by Treatment of Levan from *Zymomonas mobilis*

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We studied the effect of dietary levan on adiposity, adipocyte size and NPY expression in obese rats fed high fat diet. Levan, or high molecular-mass β-2,6-linked fructose polylmer is found in microorganism and plants. Microbial levans are produced extracellularly from sucrose-based substrates by levansucrase. Neuropeptide Y (NPY) stimulates food intake by anabolic effect of CNS pathway. Sprague Dawley male rats of weanling rats were given AIN-76A diet until 4 weeks of age, and fed high fat diet (beef tallow, 40% of calories as fat) for 6 weeks until 10 weeks of age. After induced obesity by dietary high fat, both normal and high fat diet groups were fed 0% (control group), 1%, 5% and 10% levan containing diet for 4 wk. Weight gain was reduced in 5% and 10% levan groups compared to control and the food efficiency ratio (FER) of high fat fed rats was reduced by levan diet, dose-dependently. White adipose tissue, i.e., epididymal, visceral and peritoneal fat masses were reduced by dietary levan, while the brown adipose tissue mass was increased by dietary levan in high fat diet groups. Body fat mass of high fat diet groups was reduced by 5% levan diet to the level of normal diet group, and reduced by 43-56% of control group by 10% levan diet. 1% levan diet reduced the body fat mass of high fat diet groups, and epididymal and peritoneal fat masses of normal diet fed rats were reduced by levan diet. Adipocyte size reflected the body fat mass and FER, thus, reduced by levan diet, dose-dependently in high fat diet groups. 10% levan diet reduced the hypothalamic expression of NPY in rats fed high fat diet. In conclusions, dietary levan reduced weight gain, body fat accumulation, adipocyte size and NPY expression in obese rats fed high fat diet. Futhermore, the effect was shown in normal diet fed rat by 10% levan diet, also. This study suggest that the food intake controlling effect of dietary levan would an interesting tool in the control of obesity.