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## 膳食辣椒素预防高脂饮食诱导的小鼠胰岛素抵抗

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Title: Dietary capsaicin prevents insulin resistance in high fat diet-induced mice

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关键词: 辣椒素; TRPV1; 胰岛素抵抗; 胰岛素敏感性; 葡萄糖转运子4

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摘要: 目的 探讨膳食辣椒素对高脂饮食诱导的小鼠胰岛素抵抗的预防作用。方法 雄性C57BL/6J小鼠30只,按随机数字表法分成3组,每组10只,分别给予普通饮食(normal diet, ND),高脂饮食(high fat diet, HD)和高脂+辣椒素饮食(high fat + capsaicin, HC)。辣椒素的添加浓度为0.01%(质量百分比)。小鼠自8周龄开始给予上述饮食干预,干预时间为20周。每周测空腹血糖、体质量,干预后测葡萄糖耐量、胰岛素耐量,干预结束后取血浆测血脂水平(总胆固醇、甘油三酯、低密度脂蛋白胆固醇和高密度脂蛋白胆固醇)、胰岛素水平。取内脏脂肪(肠系膜脂肪、肾周脂肪及睾旁脂肪)检测各组小鼠内脏脂肪质量,Western blot检测脂肪组织中瞬时受体电位通道1(transient

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receptor potential vanilloid 1, TRPV1) 和葡萄糖转运子4 (glucose transporter type 4, GLUT4) 的表达水平。 结果 经20周的高脂饮食干预成功复制出小鼠胰岛素抵抗模型, 而膳食辣椒素可显著预防高脂饮食导致的小鼠体质量和空腹血糖的升高、葡萄糖耐量异常、血浆胰岛素水平的升高和胰岛素敏感性的下降等胰岛素抵抗的表现; 与高脂饮食组小鼠比较, 高脂+辣椒素饮食组小鼠的腹内脂肪质量显著低于高脂饮食组小鼠 ( $P<0.01$ )。Western blot检测提示膳食辣椒素可显著增加小鼠脂肪组织TRPV1和GLUT4的表达水平 ( $P<0.01$ )。 结论 膳食辣椒素可能通过上调脂肪组织TRPV1和GLUT4的表达, 从而预防高脂饮食诱导的小鼠胰岛素抵抗。

Abstract: Objective To investigate whether dietary capsaicin can prevent insulin resistance induced by high fat diet in mice. Methods Thirty male C57BL/6J mice at 8 weeks old were divided into 3 groups randomly, with 10 in each group, and then fed with normal diet (ND), high fat diet (HD), and high fat diet plus capsaicin (HC, 0.01% capsaicin inside) respectively, for 20 weeks. Their fasting blood glucose and body weight were measured every week. Glucose tolerance and insulin tolerance test were tested at the end of the 20th week, and then the mice were sacrifice after anesthesia. Plasma levels of insulin, lipids (total cholesterol, triglycerides, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol) were detected. Weights of visceral fats (mesenteric fat, perirenal fat and supraepididymal fat) was measured. Western blotting was used to detect the expression of transient receptor potential vanilloid 1 (TRPV1) and glucose transporter type 4 (GLUT4) in above fat tissues. Results Twenty weeks of high fat diet successfully induced insulin resistance model in mice. High fat diet plus capsaicin prevented high fat diet induced elevation of mice body weight, increase of