

Effects of water extract of garlic on cholesterol transporter in the intestine of obese mice

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Garlic is one of the famous herbal plants which have showed beneficial properties on atherosclerosis risk factors. Some components of garlic suppress cholesterol and triglyceride biosynthesis and its absorptin, resulting in lowering of serum cholesterol and triglycerides and increase in HDL level. However, the mechanism of these specific properties is not fully understood. In the small intestine, ATP-binding cassette transporters G5, G8 and A1 (ABCG5, ABCG8 and ABCA1), as well as Niemann-Pick C1 like 1 (NPC1L1) protein has important roles in cholesterol metabolism. In this study, we evaluated the beneficial effect of aqueous extract of garlic on lipid profile and also expression of npc1l1, abca1, abcg5 and abcg8 genes in the intestine of N-Marry mice fed a high cholesterol diet as a possible mechanism of garlic effect. Mice were randomly divided into three groups (n=8): Group 1: high cholesterol diet (HCD, or obese) (received chow + 2% cholesterol + 0.5% cholic acid); Group 2: garlic (received chow + 4% (w/w) garlic extract + 2% cholesterol + 0.5% cholic acid); and Group 3: received chow only. After 30 days, mice were anesthetized and blood was collected. The small intestine of mouse was removed, washed and enterocytes were scraped and used for the experiments. Blood factors were measured enzymatically and expression of mRNA levels for the above-mentioned proteins was determined by RT-PCR. Water extract of garlic markedly declined blood lipids ($p<0.05$), compared with the obese group. Expression of the intestinal npc1l1 was significantly decreased ($p<0.01$) in the garlic group, compared with the chow group, while abcg5 ($p<0.01$), abcg8 ($p<0.01$) and abca1 ($p<0.05$) expressions were significantly increased. In conclusion, this experiment showed a possible mechanism for the beneficial effects of the garlic in declining blood lipids by decreasing the intestinal lipid absorption and increasing excretion of cholesterol back into the intestinal lumen.

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Obesity is a state of positive energy balance which has become a global problem of major current concern. Obesity occurs when calorie intake exceeds energy requirement. Until recently, it was thought confined to the economically advanced western nations. Recent reports indicate that it is an emerging disorder in the resource poor countries as well. It is almost unanimously accepted that this upsurge in the developing countries is as a result of the shift from traditional diet to western diet. Though many strategies are currently employed to control the disorder, the need to return to indigenous diet has only received measured attention. This condition became paralleled affluence; increases with rising economic progress. Obesity is important because of the serious health consequences; mainly metabolic syndrome which may progress to type 2 diabetes mellitus, cardiovascular disease, arthritis, skin disease and cancer. One of the ways of reversing metabolic events that culminate initially in overweight (BMI > 25Kg/m²) and obesity (BMI > 30kg/m²) is a diet based essentially on plant-based foods; fruit and vegetables. This is the original indigenous diet in most developing or resource poor countries. The diseases associated with obesity are very expensive to treat; though abundant in the affluent western nations, they have adequate resources to manage the non-communicable diseases (NCDs) whereas the resource poor countries cannot cope because they have lean and fragile economies. It is therefore expedient to admonish these resource poor countries to return to their indigenous largely plant based diet to avoid the burden of the expense to treat NCDs. The return to this traditional diet may also serve as a template for the global community to manage this spreading pandemic.

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