

Dietary effects on cholesterol absorption and excretion Studies in ileostomy subjects

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Abstract

Cholesterol is a steroid molecule essential to man, but a high level of cholesterol in serum is a risk factor for cardiovascular disease (CVD). Most cholesterol in the body is derived from endogenous synthesis, but in affluent societies a substantial part is derived from the diet. The absorption of dietary cholesterol ranges from 30 to 80%. CVD is common in Sweden, and mean levels of serum cholesterol are high. Saturated fat and dietary cholesterol intake increase serum cholesterol levels, while unsaturated fat and plant sterols have the opposite effect. Dietary recommendations aim to prevent diet-related diseases.

We have investigated the effects of such recommendations on the absorption of cholesterol, and the excretion of cholesterol and bile acids, in 20 ileostomy subjects. Controlled diets according to recommendations were compared to standard controlled diets. We have also investigated the effects of adding dietary cholesterol, or inulin and oligofructose (two indigestible, new varieties of soluble dietary fibre). Cholesterol and bile acids in ileostomy effluents were analysed by gas liquid chromatography, and cholesterol absorption was determined by isotope labelling and liquid scintillation counting.

Cholesterol increased absolute cholesterol absorption within 6 hours, although fractional absorption decreased. Inulin and oligofructose had no detectable effects on cholesterol absorption or sterol excretion. Moderate total fat reduction (saturated fat intake cut by half) reduced cholesterol absorption by 5%, but did not significantly affect sterol excretion, compared to a standard diet. A dietary fibre intake of 30 g/day reduced cholesterol absorption by 9%, and increased small bowel cholesterol excretion, compared to standard diet. The combined dietary modifications of reduced saturated fat, and increased dietary fibre, reduced cholesterol absorption by 8-16%, and increased net sterol excretion by 11-33%. Cholesterol absorption was negatively correlated to plant sterol excretion, suggesting that plant sterols in cereals and vegetable oils might partly explain the cholesterol-lowering properties of a recommended diet.

Key words: cholesterol absorption, sterol excretion, ileostomy, dietary fibre, fat

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