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The toxicity of reduced sulphur compounds in the human large intestine: A novel approach to management of ulcerative colitis by dietary intervention

In the human large intestine, there are many bacteria, including some that will reduce dietary sulphur compounds to sulphide. Sulphide is a very toxic substance. Hydrogen sulphide gas is extremely pungent at low levels (the smell of rotten eggs) and as poisonous as cyanide. We have shown sulphide to be present in the contents of the large intestine and recent evidence has identified sulphide as damaging to the cells that line the intestine, hence implicating sulphur in the inflammation of ulcerative colitis. Sulphide levels in the gut are significantly higher in untreated ulcerative colitis patients than healthy controls and 5-amino salicylate, one of the best drugs for the treatment of ulcerative colitis, inhibits sulphide production by bacteria.

The levels of sulphide in the large intestine are determined mainly by the amount of sulphur compounds in the diet although we believe that the nature of the microflora and the amount of carbohydrate available for fermentation are also important. In previous studies in healthy subjects, we have shown that sulphide levels increase with meat (containing the sulphur amino acids cysteine and methionine) and in both healthy and ulcerative colitis patients, inorganic sulphur intake also increases faecal sulphide levels. The main sources of inorganic sulphur in the diet are the widely used sulphur containing food additives sulphur dioxide and sulphite.

We therefore propose to undertake a dietary trial in ulcerative colitis patients designed to lower intestinal sulphide levels and prevent initiation of disease episodes or continuation of symptoms.