

Resistant starch attenuates colonic DNA damage induced by a high protein diet in rats

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Background - Diet has a major influence on the development of degenerative diseases of the large bowel and non-digestible carbohydrates appear to protect against colorectal cancer whereas energy, fat and protein are risk factors. Recently, low carbohydrate, high protein diets have become popular as a means of weight loss. However, the long term effects of such diets on the large bowel remain to be established.

Objective - To determine if a high protein diet increases colonic DNA damage in rats and whether dietary resistant starch can protect against such damage.

Design – Male Sprague Dawley rats (~300 g) were fed a diet containing 15% or 25% casein, each with or without 48% high amylose starch (HiMaize), and after four weeks rats were anaesthetised and tissues and gut contents were collected for mucus thickness, DNA damage (comet assay) and short chain fatty acid measurements.

Outcomes - Rats on the high protein diet had greater damage to colonic DNA than those consuming a low protein diet in the absence of resistant starch (comet tail moments (mean \pm SEM): 1008 ± 107 v 464 ± 35) and this was associated with a thinning of the mucus barrier (135 ± 5 v 245 ± 9 μ m). Feeding a high resistant starch diet attenuated DNA damage and thinning of the colonic mucus layer. DNA damage and mucus thickness were inversely related.

Conclusions- Resistant starch may ameliorate colonic DNA damage induced by high dietary protein.