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Effect of carrot feeding to APC^{Min} mouse on intestinal tumours

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Multiple studies show that diets containing carrot are associated with a reduced risk of a range of cancers such as bladder cancer[(1)]. Carrots contain several types of bioactive compounds with potentially beneficial effects, including polyacetylenes such as falcarinol, which for example are responsible for the cytotoxic effects of carrot juice on leukaemia cell cultures[(2)]. Mice with the APC^{Min} mutation develop multiple polyps in both the small and the large intestine by age around three months and have been used extensively as a model to investigate chemopreventive effects of different food constituents[(3)]. The aim of this study was to investigate if feeding diet containing carrot could reduce development of intestinal tumours in APC^{Min} mice.

Wild-type C57BL/6J dams were fed pellets either made from 20% blanched freeze dried carrots and 80% powdered standard RM3 diet, or standard control diet, and mated with APC^{Min} males. Pups were raised on the same diets as their mothers, genotyped at 5 weeks and APC^{Min} animals were killed at 12 weeks of age. The mice were dissected, and the tumour size and number measured. Experiments were carried out under project license PPL60/4294, granted to Newcastle University by the UK Home Office.

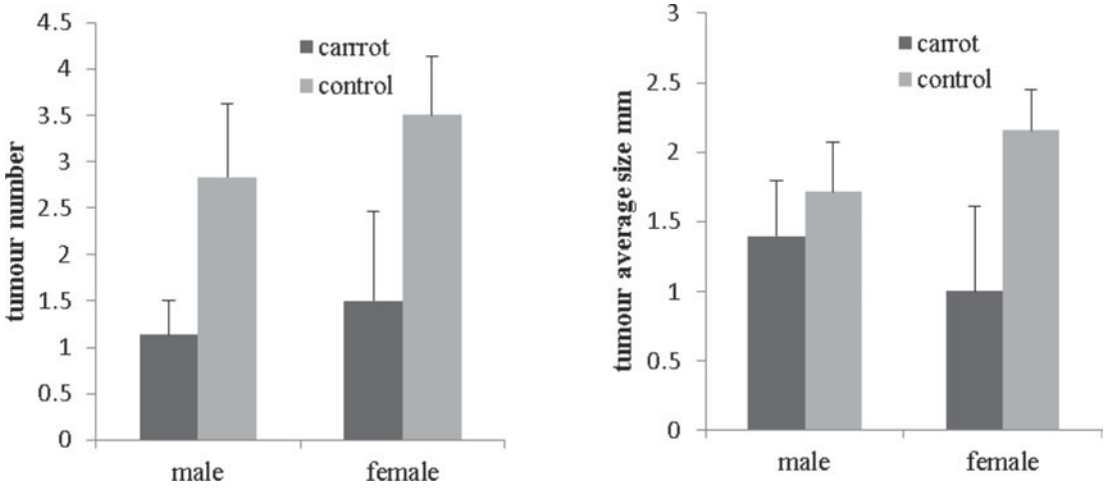

Fig. 1. Mean tumour number (left), and tumour average size (right) at 12 weeks in APCMin mice fed control diet (N = 28) or carrot-supplemented diet (N = 19). Error bars represent Standard Error of the Mean.

Carrot feeding significantly reduced the tumour number (P = 0.021) compared with control. The average tumour size showed a strong trend for a reduction compared with the control feeding, even though the differences were not significant (P = 0.057).

The results show that this mouse model responds well to the cancer-protective constituents of carrots and thus is suitable for further investigations of the mechanisms involved. The APC^{Min} mouse model will be used to determine whether the carrots primarily affect tumour initiation or tumour growth. In other studies each of the bioactive polyacetylenes found in carrots will be isolated to assess their roles in tumour reduction, and effects of carrot consumption on human volunteers will be investigated.

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