Selenium Enriched Pork May Reduce Colon Carcinogenesis

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Extensive experimental evidence indicates that selenium (Se) supplementation reduces the incidence of cancer in animals (Hu et al., 2008). However, the delivery of Se is challenging due to its toxicity, especially when consumed in an inorganic form. The consumption of Se enriched pork where the Se is bound in an organic protein matrix could provide a means of delivering direct health benefits for humans (Biesalski, 2002). This study investigated the effectiveness of Se enriched pork in the suppression of aberrant crypt foci (ACF) formation, the putative precursors of colon cancer (Bird and Good, 2000), using a rodent azoxymethane (AOM) induced colon cancer model.

Ninety-six male Sprague Dawley rats (28 d old) were offered ad libitum access to one of four experimental diets (n=24): 1) Control, American Institute of Nutrition (AIN, Reeves et al., 1993) 93G diet (Se 0.2 ppm); 2) AIN 93G diet + non-Se enriched pork (Se 0.2 ppm); 3) AIN 93G diet + Se enriched pork (Se 0.7 ppm); and 4) AIN 93G diet + selenised yeast (Diamond V, Cedar Rapids, Iowa, USA; Se 0.7 ppm). After four weeks of feeding the respective diets, the rats were injected once a week for 2 weeks with AOM (15 mg/kg) to induce DNA damage (Hu et al., 2008). The dietary treatments continued for the following 15 weeks to allow for ACF formation without allowing carcinogenesis to progress to the adenoma or tumour stage. At the end of the study rats were euthanased, colons were collected, fixed in formalin and stained with methylene blue for histologic examinations for the presence ACF. Data were analyzed using analysis of variance.

![Figure 1. Aberrant crypt foci (ACF) in the distal colon of AOM induced Sprague Dawley rats fed AIN 93G diet (1), AIN 93G diet with pork (2), AIN 93G diet with selenium enriched pork (3) and the AIN 93G diet with selenised yeast (4).](image)

Means with different superscripts differ significantly (P<0.05)

Feeding rats a diet containing Se enriched pork reduced (P=0.05) the number of ACF in AOM-induced rats compared to those fed the other experimental diets. Selenised yeast did not reduce the incidence of ACF in rats, despite the same concentration of Se being present as in the Se-enriched pork diet. This suggests that the Se-enriched pork appears to have a protective effect against early stage of colon carcinogenesis in the rodent model.


Supported in part by the Pork CRC Ltd.