

## Concurrent Session 11: Trace Elements I

### Selenised casein increases expression of glutathione peroxidase in the colon of azoxymethane treated Sprague Dawley rat

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**Background** – While Se intakes of Australian and New Zealand consumers are sufficient to ensure no overt signs of deficiency, the relatively low intakes may contribute the risk for some cancers. However, Se supplementation is problematic, as high Se intake can be toxic, particularly if the source is inorganic. Protein-bound Se is more bioactive and less toxic than inorganic forms of Se and there is interest in delivering Se in organic forms in food products.

**Objectives** – To use real time RT-PCR to determine the colonic gene expression of important selenoproteins and genes involved in development of some colon cancers in rats fed Se-enriched casein or yeast.

**Design** – 51 male Sprague Dawley rats were fed diets containing either control casein (0.035 ppm Se), Se-enriched casein (1 ppm Se) from cows fed Sel-Plex® (HseC) or control casein plus Se-enriched yeast (1 ppm, as Sel-Plex®) (HseY). Rats were fed diets for 5 wk prior to initial s.c. azoxymethane (AOM) injection (15 mg/kg) in the lower abdomen. A 2<sup>nd</sup> dose of AOM was given one wk later and after 9 wks rats were euthanised and colon removed.

**Outcomes** – There was no significant effect of dietary Se on colonic GPx expression (+840 and +164% for HSeC and HSeY respectively, P=0.19). When the HSeC was compared to the other diets there was an increase in GPx expression (+623%, P=0.078). While there was no significant effect of dietary Se on K-ras expression (-61% and -90%, P=0.15), when both high Se diets were compared to the control diet the expression of K-ras was decreased by supplemental Se (-79%, P=0.10). There was no effect of dietary Se on expression of SelP (+31 and -50%, P=0.59).

**Conclusion** – These data suggest that dietary Se can influence the expression of key biomarkers of Se status and colon cancer formation, but the form of the Se may be important. Increased dietary Se either as yeast or casein reduced the expression of K-ras whereas only casein bound Se increased the expression of colonic GPx.

### Effect of a selenium and iodine intervention on thyroid status of older New Zealanders

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**Background** – Suboptimal status of selenium and iodine has been reported in New Zealand adults. This is likely to be exacerbated in older adults who are particularly prone to inappropriate dietary intakes and inadequate nutrient status. Both selenium and iodine are essential for optimal thyroid hormone metabolism. To our knowledge, no studies have investigated the effect of a combined selenium and iodine intervention on thyroid status in both a low selenium and iodine region.

**Objectives** – To assess the efficacy of a selenium, iodine and combined selenium and iodine supplementation in older adults on thyroid hormone status, in comparison to a placebo.

**Design** – A randomized, double blind intervention trial was conducted in August and November 2005. Participants aged 60 to 80 years (n=102) consumed 100µg selenium as selenomethionine, 80µg iodine, 100µg selenium and 80µg iodine or placebo supplements daily for 12 weeks. Fasting, morning blood samples were taken at baseline, weeks 2, 4, 8 and 12 for measurement of thyroid hormone status (plasma TSH, free T<sub>3</sub> and T<sub>4</sub>, and thyroglobulin) and selenium status (plasma selenium and whole blood glutathione peroxidase (GPx) activity). Median Urinary Iodine Concentration (MUIC) was determined at baseline and week 12 from casual urine samples.

**Outcomes and Conclusions** – Participants had a mean (SD) age of 73 (4.8) years and an average BMI of 27.4 (4.3). The MUIC was 48µg/L (IQR 31, 79), a level indicative of moderate iodine deficiency. Mean plasma selenium was 94.5 (25.7) µg/L and the correlation between plasma selenium and whole blood GPx was 0.329 (P=0.001). Selenium supplementation had no significant effect on plasma thyroid hormone concentrations. These results suggest the selenium intake of many of these older adults is still insufficient for optimal GPx activity, yet adequate for thyroid hormone status.