Concurrent Session 11: Trace Elements I

**Selenium intake of Northern Tasmanian adults**

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**Background** – Selenium is an essential trace element with well established antioxidant and redox related biological roles. There is increasing evidence relating to its importance in the prevention of chronic disease such as cancer.

**Objectives** – The aims of this study were to estimate the dietary selenium intake of a sample of northern Tasmanian adults; to determine dietary differences between genders and establish the major contributing food groups.

**Design** – A sample of 69 adults aged 23 -74 yrs, largely from an electoral roll sample, was selected from the northern Tasmanian region, an area hypothesised to be at risk of inadequate selenium intakes due to low soil content. Responses from the 121 item semi-quantitative FFQ, standard serving size data and food content data (ANZFA where possible or USDA) were used to produce dietary selenium intake estimates.

**Outcomes** – Selenium intakes were not significantly different between genders; men (n=30) consumed 85.9 ± 24.6 µg/day (mean ± SD) while women (n=39) consumed 79.1 ± 26.4 µg/day. Sixty three percent of men and 38% of women had estimated selenium intakes below the Australian RDI (85 µg/day and 70 µg/day respectively). These mean values are higher than countries with established low selenium status such as New Zealand, but are much lower than selenium intakes that have been associated with chemopreventive effects in recent studies. The major contributing food groups for male and female subjects respectively were meat/fish (38% and 41%), cereal based foods (both 24%) and vegetables (9% and 10%).

**Conclusion** – While the estimated selenium intakes of this sample are sufficient to avoid symptoms of overt deficiency, a large proportion consume less than the Australian RDI and most appear to receive significantly less than what may be considered as an optimum intake. Further investigation on selenium intake of the Tasmanian population is warranted to identify groups that may be most at risk.

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**Enrichment of selenium in milk protein linearly increases blood selenium and improves immune function**

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**Background** – Selenium (Se), an essential micronutrient, is incorporated into cells and proteins of the immune system, boosting immune function. Incorporation of micronutrients into biological materials (fortification), is proposed to improve micronutrient absorption. Recently technologies have been developed to increase the incorporation of micronutrients into cow’s milk.

**Objective** – To determine the dose-response relationship between 25, 73 and 121 µg Se /100g diet and blood selenium concentrations and immune function in healthy 3 month old mice.

**Design** – Three month-old mice were housed 3-per box and fed non-fortified milk protein (MP, 18 µg Se /100g total diet) and 3 Se-fortified MP diets (25, 73 and 121 µg Se /100g total diet), combined with normal mouse chow. The fortification was achieved by feeding Se enriched diets, allowing greater incorporation of Se into the cow’s milk proteins. All mice were vaccinated against Mem71 strain influenza virus at 21 d, and euthanised at 49 d, peripheral blood was then collected via cardiac puncture and the spleen removed. In blood, Se concentrations and the immune enzyme glutathione peroxidase (GPx) were measured. In the spleen, non specific proliferative capacity and Mem71 virus-specific proliferation were measured.

**Outcomes** – Blood Se concentrations increased linearly with increasing dietary Se concentration (P<0.001). This corresponded with increasing red blood cell GPx activity. Splenocyte proliferative capacity increased with 73 and 121 µg Se /100g diet compared to non-supplemented control, but the virus specific proliferation was highest when supplemented to 121 µg Se /100g diet.

**Conclusion** – Increasing Se fortification of cow’s milk linearly increased peripheral selenium concentrations, with corresponding improvement in immune function in healthy mice.