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CHANGES IN BLOOD LIPID LEVELS INDUCED BY DIFFERENT DIETARY FAT TYPES ARE NOT INFLUENCED BY PRE-SUPPLEMENTATION WITH FISH OIL

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Background/Aims: Although, the health benefits of long chain n-3PUFA are well known, the effects of n-3PUFA status on blood lipid modulation by background dietary fats is not well understood. Therefore, this study aimed to determine the effects of diets high in either saturated fatty acids (SFA) or n-6PUFA following pre-supplementation with n-3PUFA.

Methods: This was a randomised, controlled, parallel, dietary intervention trial involving 22 healthy adults aged 18 to 65 years. Participants consumed 2.4 g n-3PUFA daily for 4 weeks and then were randomized to one of 2 diets, enriched either with SFA or n-6PUFA combined with 2.4 g n-3PUFA daily for at least 10 days. Blood samples and anthropometric measurements were collected after an overnight fast, at baseline, after 4 weeks and post-intervention. Blood samples were assessed for lipid [total, low density lipoprotein (LDL) and high density lipoprotein (HDL)] cholesterol and triglyceride levels.

Results: Pre-supplementation with n-3PUFA decreased plasma triglycerides (p < 0.006) and increased HDL cholesterol (p = 0.032) and body mass index (BMI; p < 0.001) significantly. After the SFA and n-6PUFA diets no further change was observed in plasma triglycerides, HDL cholesterol or BMI. The SFA diet caused an increase in total and LDL cholesterol (p = 0.008 and p = 0.013, respectively), while the n-6PUFA diet caused a decrease in total and LDL cholesterol (p = 0.003, both).

Conclusions: Pre-supplementation with n-3PUFA does not influence changes in blood lipid levels induced by type of background dietary fat.

Funding source(s): Hunter Medical Research Institute (HMRI) and Coordenacao Nacional de Desenvolvimento Cientifico e Tecnologico (CNPq, Brazil).

IS COGNITIVE IMPAIRMENT IN POSTMENOPAUSAL WOMEN ATTRIBUTABLE TO POOR CEREBRAL PERFUSION? BASELINE RESULTS OF THE RESEM STUDY

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Background/Aims: Postmenopausal women suffer disproportionately from dementia, which we hypothesise may be partly attributable to loss of cerebrovascular benefits of oestrogen. We are currently testing whether a 14 week supple-mentation with resveratrol (a phytoestrogen) can improve cerebral perfusion and cognition in postmenopausal women. Herein, we present baseline evaluation of these parameters.

Methods: Eighty postmenopausal women aged 45-85 years underwent cognitive testing; domains of executive function, semantic, verbal and visuospatial working memory were scored individually and as a composite. Transcranial Doppler ultrasound was used to record basal blood flow velocity in the middle cerebral artery (MCA) and a pulsatility index (PI), reflecting stiffness of the vessel, was calculated. Cerebrovascular responsiveness (CVR) to the cognitive testing, which reflects the ability of a brain region to vasodilate in response to demands, was expressed as the percentage change in mean blood flow velocity from the basal level recorded for 30 sec before tests to the peak velocity attained during testing.

Results: Using Pearson’s correlation, we found that the composite cognitive score correlated with PI (r = -0.291, p = 0.017), the basal mean blood flow velocity (r = 0.34, p = 0.005) and CVR to the test battery (r = 0.301, p = 0.017) in the MCA.

Conclusions: Our baseline assessment of post-menopausal women shows that cognitive performance is linked to cerebrovascular function, at rest and during activation. Therefore, optimising cerebral perfusion may help to attenuate cognitive decline in this at-risk population.

Funding source(s): Hunter Medical Research Institute 3D Healing Project Grant.

FEASIBILITY OF A RANDOMISED CONTROLLED TRIAL OF FISH OIL SUPPLEMENTATION IN PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Background/Aims: To determine the feasibility of undertaking a dietary supplementation trial to evaluate fish oil as an adjunct therapy for chronic obstructive pulmonary disease (COPD).

Methods: A double-blind, randomised controlled parallel trial was undertaken to compare the effects of fish oil versus corn oil placebo (six 1 g capsules/day orally for 16 weeks) on respiratory function, dyspnoea, functional exercise capacity and well-being. The following a priori feasibility criteria were evaluated: ability to recruit 40 participants within 52 weeks, 80% participant retention rate, and a moderate sized effect in at least three outcome measures.

Results: Of 267 potential participants, 101 declined to participate and 91 were unable to be contacted. Of those willing to participate 62 were excluded at the telephone screening, the most common reasons being participants were taking fish oil (n = 20), did not have COPD (n = 10), were participating in another study (n = 7) or, at visit 1, had a significant bronchodilator response (n = 13). Only13 were enrolled (7 in the initial 52 weeks), 9 of whom completed the 16 week intervention. Participants withdrew from the study due to illness (n = 2), injury unrelated to the study (n = 1) or an adverse event (n = 1). There was one moderate sized change (impulse oscillometry, effect size -0.56).

Conclusions: This preliminary trial did not meet the pre-determined key feasibility criteria, which raises doubts as to whether we can ascertain the efficacy of omega-3 supplementation in COPD using this approach.

Funding source(s): None.

DOES CAFFEINE CONSUMPTION DURING 50 H OF SLEEP DEPRIVATION ALTER GLUCOSE METABOLISM, HUNGER AND SATIETY RATINGS?

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Background/Aims: Sustained operations are common in military and emergency services. In these operations it is not always possible to obtain sleep, resulting in sleep deprivation. Caffeine is a widely used fatigue countermeasure. However, the impact of caffeine on glucose metabolism, hunger, and satiety during sleep deprivation is largely unknown.

Methods: In this double-blinded laboratory based study, participants were assigned to either a caffeine (n = 12, 4F, 22.5 ± 3.3 y, 21.7 ± 1.5 kg/m²) or placebo condition (n = 12, 5F, 22.5 ± 2.5 y, 22.3 ± 2.1 kg/m²). The protocol included one baseline sleep (22:00h–08:00h), 50h sleep deprivation and a daytime recovery sleep (10:00h–19:00h). Caffeine (200 mg) or placebo gum was chewed for 5min at 01:00h, 03:00h, 05:00h and 07:00h during each night of sleep deprivation. Meal timing and composition were unable to be contacted. Of those willing to participate 62 were excluded at the telephone screening, the most common reasons being participants were taking fish oil (n = 20).
0.743) on glucose levels. Hunger increased (p = 0.001) while satiety decreased (p = 0.014) after 26h sleep deprivation. Caffeine did not moderate this effect (hunger p = 1.000, satiety p = 0.484).

**Conclusions:** Results suggest that sleep deprivation impairs glucose metabolism, increases hunger and reduces satiety. Chewing caffeine gum did not influence this effect.

**Funding source(s):** Defence Science and Technology Organisation, Australian Government, Department of Defence.

### ADEQUACY OF AND FACTORS ASSOCIATED WITH DIETARY ZINC INTAKES IN AUSTRALIAN ADULTS

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**Background/Aims:** To examine adequacy of and factors associated with dietary zinc intakes in Australian adults.

**Methods:** Dietary data were collected via two 24-hour recalls during the 2011-13 Australian National Nutrition and Physical Activity Survey (n = 4282 men and n = 4833 non-pregnant, non-lactating women, aged ≥ 19 years). Data were analysed using the Estimated Average Requirement cut-point method in PC-SIDE to calculate the prevalence of inadequate dietary zinc intakes. Linear regression was used to identify factors associated with dietary zinc intakes accounting for the complex survey design.

**Results:** In men, the prevalence (SE) of inadequate zinc intakes increased with age, ranging from 39.5% (4.2%) in 19-30 year olds to 72.0% (5.1%) in ≥ 71 year olds. In women, the prevalence of inadequate zinc intakes was similar across all age groups and was 12.8% (1.3%) for all women. For both men and women, higher zinc intakes were associated with: higher household income [mean difference between lowest vs. highest decile for men (95% CI): 2.4 (1.3, 3.5) mg/d; women: 1.4 (0.5, 2.2) mg/d], higher area-level socio-economic status [mean difference between lowest vs. highest quintile for men: 1.1 (0.3, 1.8) mg/d; women: 0.8 (0.4, 1.2) mg/d], and dietary supplement use [mean difference for men: 1.1 (0.6, 1.6) mg/d; women: 0.9 (0.6, 1.2) mg/d]. Food-insecure women had lower zinc intakes compared with those who were food secure [mean difference: 1.3 (0.7, 1.9) mg/d].

**Conclusions:** In Australia, men, individuals from low-income households and socio-economically disadvantaged areas, and food-insecure women are vulnerable to poor dietary zinc intakes.

**Funding source(s):** NHF of Australia.

### BLOOD LIPIDS – SOLUBLE DIETARY FIBRES: STUDY OF BILE SALTS DIFFUSION ACROSS INTESTINAL MUCOSA USING THE USSING CHAMBER SYSTEM

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**Background/Aims:** The aim of this study was to investigate the effect of oat β-glucan ([βG]) on bile salts (BS) diffusion across the intestinal mucosa.

**Methods:** Pigs used as a human model were fed a control diet (n = 6) or a diet containing 10% oat βG (n = 6) for 28 d. Sections from the proximal, mid jejunum and terminal ileum were mounted into Ussing chambers. Glycocholate (GDC) with or without addition of oat βG to the mucosal side of the chambers, was sampled from the serosal side every 20 min for 80 min. Fresh tissue samples and tissues after diffusion experiments were fixed for microscopic comparison.

**Results:** (1) GDC diffuses slower across the terminal ileum from pigs fed the βG diet; (2) added βG to the mucosal side reduces the diffusion of GDC across terminal ileal tissue from pigs fed the control diet but has no significant effect for tissues from the βG diet.

**Conclusions:** Oat βG reduces BS diffusion across porcine terminal ileal tissue, consistent with a potential mechanism underlying plasma cholesterol reduction.

**Funding source(s):** ARC Centre of Excellence in Plant Cell Walls.

### IS ANIMAL FLESH CONSUMPTION ASSOCIATED WITH BETTER IRON STATUS AMONG ADULTS IN DEVELOPED COUNTRIES: A SYSTEMATIC REVIEW

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**Background/Aims:** Iron deficiency (ID) is the most prevalent nutrient deficiency within the developed world. One in five Australian women (25-50 yrs) is affected and this is concerning as ID has been shown to affect immunity, thermo-regulation, work performance and cognition. Animal flesh foods provide the richest and most bioavailable source of dietary (haem) iron, however it is unclear if a low animal flesh diet contributes to ID. The aim of this systematic review was to investigate whether a higher consumption of animal flesh foods is associated with better iron status in adults.

**Methods:** CINAHL, Cochrane, EMBASE and MEDLINE were searched for published studies that included adults (≥ 18 years) from developed countries and measured flesh intakes in relation to iron status indices. Included studies were assessed for methodological quality by two reviewers and results were described in narrative format.

**Results:** Eight experimental and 39 observational studies met the inclusion criteria. Overall, included studies varied in population and study designs and results were conflicting. Five of the seven studies that rated positively for methodological quality suggested a positive association between animal flesh intake and iron status. It remains unclear if there is an optimum quantity or frequency of flesh intake required to maintain or achieve a healthy iron status.

**Conclusions:** Evidence from this review shows promising results for an effect between animal flesh intake and iron status, however additional longitudinal and experimental studies are required to confirm this effect and determine optimal intakes to reduce the likelihood of ID.

**Funding source(s):** N/A.

### POSTPRANDIAL CHYLOMICRON METABOLISM AND SIZE DISTRIBUTION IS AFFECTED BY MEAL OIL TYPE

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**Background/Aims:** To investigate the effect of consumption of different edible oils on postprandial chylomicron size distribution and metabolism in healthy normolipidemic subjects.

**Methods:** Volunteers received in random order an isocaloric mixed meal containing 40 g of either: palm oil (PO), coconut oil (CO), or rice bran oil (RBO) on 3 occasions. Apolipoprotein (apo) B-48 concentration, a measure of chylomicron particle number, was measured at 0, 4 and 8 hours postprandially in lipoprotein fractions with Svedberg flotation rates (Sf) > 400, Sf 20-400 and Sf < 20. The trial was registered ACTRN 12614000352606.

**Results:** Preliminary data indicate that ~80% of the fasting and postprandial concentrations of apo B-48 is found in the Sf < 20 fraction following all test meals. Following consumption of the CO meal a greater proportion of the postprandial apo B-48 response (corrected for baseline levels, incremental area under the curve (IAUC)) were observed in the Sf < 20 fractions compared to other oils. However following consumption of the RBO meal a greater postprandial apo B-48 response was observed in all lipoprotein fractions compared with the CO and PO meals.

**Conclusions:** We observed that following consumption of all oils the majority of the chylomicrons particles were present in the small dense lipoprotein fraction (Sf < 20), however differences exist in the postprandial response following consumption of different edible oils.

**Funding source(s):** Curtin University.