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Background/Aims: Ulcerative colitis (UC), a type of inflammatory bowel disease, is characterised by colonic inflammation and ulceration. Orally-administered Emu Oil (EO), extracted from Emu fat, accelerated the intestinal repair process in a pre-clinical model of *acute* UC. We hypothesized that EO would reduce the severity of dextran sulphate sodium (DSS)-induced *chronic* UC in mice.
Methods: Female *C57BL/6* mice ($n = 10$/group) were gavaged with water or EO (80 μL or 160 μL) thrice weekly. Mice were subjected to two cycles each consisting of *ad libitum* access to water or DSS (2% w/v) for one week and two weeks water recovery. Followed by one week water or DSS and mice culled two days later. Bodyweight, blood profile, organ data and myeloperoxidase activity were assessed. $p < 0.05$ was considered significant.
Results: DSS decreased bodyweight (days 6-19 and 26-30; maximum of 24%), compared to normal controls ($p < 0.001$). In DSS-treated mice, high dose EO significantly increased bodyweight (days 6-12), compared to controls ($p < 0.05$). DSS decreased red blood cell count, compared to normal controls ($p < 0.05$); an effect not improved by EO. Compared to normal controls, DSS increased liver (16%), spleen (45%), lung (19%) and small intestine (20%) weights ($p < 0.05$), although EO had no significant effect ($p > 0.05$). DSS increased colon myeloperoxidase activity compared to normal controls ($p < 0.05$), however, EO was unable to significantly reduce these levels.
Conclusions: EO prevented bodyweight loss in this mouse model of chronic colitis, however, was unable to improve other preliminary parameters. Analyses currently underway include chronic inflammatory markers, histological morphometry and cell kinetics.
Funding source(s): N/A.

DIETARY ADVANCED GLYCATION END PRODUCTS (AGES) INDUCE CHRONIC KIDNEY DISEASE (CKD) AND CHANGES IN GUT HOMEOSTASIS

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Background/Aims: Over-consumption of dietary AGEs, which are formed by heat-treatment of foodstuffs, is thought to lead to CKD. Research suggests that AGEs may modulate gut microbiota. The aim of this study was to characterise the effects of dietary AGEs on gut homeostasis and CKD.
Methods: Male *C57BL/6* mice 6-8 weeks old were fed (*ad libitum*) a low AGE diet (unbaked rodent chow, LAGE) (n = 10-20) or a high AGE diet (baked rodent chow, 160 degrees C for 1h, 5-fold higher AGE content, HAGE) (n = 10-16) for 24 weeks. Urine albumin was measured by ELISA. Expression of the tight junction protein occludin was determined in jejunum by qPCR. Plasma endotoxin was measured using the Limulus Amebocyte Lysate assay. 16S rRNA sequencing of caecal extracts was used to profile the gut microbiome.
Results: Chronic consumption of dietary AGEs led to increased caecal bacterial diversity (LAGE *vs.* HAGE, mean ± SEM, 0.86 ± 0.02 *vs.* 0.95 ± 0, Simpson diversity index, $p = 0.0002$) and decreased occludin expression in the jejunum (1.17 ± 0.23 *vs.* 0.43 ± 0.08 fold change, $p = 0.003$). Plasma endotoxin was increased after high AGE feeding (1.45 ± 0.12 *vs.* 1.91 ± 0.14 EU/mL, $p = 0.028$). The HAGE diet increased urinary albumin excretion (36.04 ± 3.55 *vs.* 59.61 ± 4.05 μg/24 hours, $p = 0.0003$).
Conclusions: These data indicate that excess consumption of AGEs leads to albuminuria, which is associated with increased intestinal permeability and alterations in gut microbiome. This association remains to be fully defined. Further studies in this area are warranted.
Funding source(s): N/A.

REPRODUCIBILITY OF LACTULOSE AND FRUCTOSE BREATH HYDROGEN TESTING AND IMPACT ON CLINICAL UTILITY

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Background/Aims: Breath hydrogen testing is useful to assess colonic fermentation of malabsorbed carbohydrates and their role in symptom genesis. Specifically, lactulose and fructose breath responses can guide dietary restriction of FODMAPs (fermentable carbohydrates) in patients with irritable bowel syndrome (IBS). However, data regarding their reproducibility is limited. The aim was to investigate the reproducibility of lactulose and fructose breath tests.
Methods: A retrospective audit was conducted in 27 IBS patients completing a 15 g lactulose breath test and in 32 patients ingesting 35 g fructose. A repeat test was performed 6-8 weeks later for lactulose and ≥ 6 weeks for fructose. Changes in responses between test and retest were analysed qualitatively [positive response: 2 × ≥ 10 ppm hydrogen rise) and quantitatively as area-under-curve (AUC)] and oro-caecal transit time (OCTT). The effect of duration between testing and variability was also assessed.
Results: A positive lactulose response was maintained in 96% subjects, but 31% ($p = 0.0006$) lost a positive fructose response upon retest. Initial hydrogen AUC to lactulose and fructose were poorly correlated with hydrogen AUC values on repeat testing (lactulose: $r^2 = 0.08$, $p = 0.16$; fructose: $r^2 = 0.07$, $p = 0.18$; regression analysis). Such variations in fructose responses was independent of the duration between test and retest ($r^2 = 0.003$, $p = 0.82$. Lactulose OCTT ($r = 0.29$; $p = 0.15$; Spearman's correlation) or fructose ($r = 0.29$; $p = 0.31$) were not correlated between test-retest.
Conclusions: Poor reproducibility of lactulose and fructose breath testing was demonstrated. Making clinical decisions (e.g. malabsorptive diagnosis or to guide dietary fructose restriction) on the results of a single test cannot be justified.
Funding source(s): Fonterra™ & Yakult Australia.

CONCURRENT SESSION 18: ANTIOXIDANTS.
ANTI-INFLAMMATORY EFFECTS OF POLYPHENOL-RICH PROPOLIS EXTRACTS BY MODULATING UBIQUITINATION OF TRAF6 DURING NF-κB ACTIVATION

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Background/Aims: Propolis is a resinous product collected by honeybees from polyphenol-rich plants. It has documented antioxidant and anti-inflammatory properties although its mechanisms of action are understood poorly. In this study, the anti-inflammatory effects of polyphenol-rich propolis extracts (PPE) from China (CPPE) and Brazil (BPPE) were examined.
Methods: Folin–Ciocalteu's method and chromatographic analysis were used to compare their chemical compositions and *in vitro* antioxidant activities were measured using several different indices. The anti-inflammatory effects of PPE from China and Brazil were examined in murine endotoxin-induced inflammatory lung injury as well several cellular inflammation models.
Results: CPPE and BPPE showed differences in their polyphenolic composition and *in vitro* free radical scavenging activities. Oral administration of PPE to lipopolysaccharide (LPS)-challenged mice decreased serum proinflammatory cytokine concentrations and inhibited pulmonary nuclear factor (NF)-κB activation. Both PPE types modulated LPS-induced key inflammatory mediators and cytokine gene expression in RAW 264.7 macrophages. Reactive oxygen species (ROS) production and several inflammatory mediators were suppressed by both PPE types in a time and dose-dependent manner. In HeLa-T6RZC stable cells where NF-κB signalling is initiated at the level of TNF receptor-associated factor 6 (TRAF6), we found PPE suppressed NF-κB activation by delaying the ubiquitination of TRAF6. In an *in vitro* kinase assay system, both PPE types directly disrupted polyubiquitin synthesis by TRAF6.

Conclusions: Analysis showed substantial compositional differences between CPPE and BPPE, nevertheless they both displayed similar anti-inflammatory properties which may be useful as an alternative/additive therapeutic strategy against inflammation diseases like ulcerative colitis.
Funding source(s): National Science Foundation of China.

ASSOCIATIONS BETWEEN DIETARY FLAVONOID INTAKE AND GUT MICROBIOTA IN A GROUP OF ADULTS WITH CYSTIC FIBROSIS (CF)

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Background/Aims: Intakes of certain flavonoids influence gut microbiota and immune functions. Aberrations in CF gut microbiota have been reported and may link to CF airway microbiota and respiratory complications. Relationships between flavonoid intakes and gut microbiota in adults with CF were therefore investigated.
Methods: Flavonoid intakes of 16 free-living adults with CF were estimated using a validated flavonoid-specific food frequency questionnaire. Extracted faecal sample DNA was sequenced using 454 pyrosequencing targeting the bacterial 16-small subunit ribosomal DNA V1-V3 regions. Sequences were assembled and taxonomy assigned using the Quantitative Insights Into Microbial Ecology pipeline, and unweighted and weighted UniFrac distances between samples calculated. Associations between the gut microbiota variations based on these distances and standardised dietary flavonoid intakes were analysed using adonis test. Flavonoids significant at a false discovery rate (FDR)=0.3 were subjected to Spearman correlation tests with standardised relative abundances of bacterial taxa (FDR = 0.3).
Results: Gallocatechin intakes ($p = 0.047$, $q = 0.285$) correlated with overall gut microbiota variations using unweighted UniFrac distances, and apigenin ($p = 0.028$, $q = 0.227$) and kaempferol ($p = 0.029$, $q = 0.227$) intakes and %flavones ($p = 0.013$, $q = 0.227$) and % flavonols ($p = 0.016$, $q = 0.227$), both excluding tea, correlated with weighted UniFrac distances. Gallocatechin intakes correlated positively with genus *Actinomyces* and family *Actinomycetaceae* (*Actinobacteria*), and negatively with class *Coriobacteriia* (*Actinobacteria*).
Conclusions: Intakes of certain flavonoids may be associated with gut microbiota variations, presenting implications for metabolism, immune function and inflammation which affect CF co-morbidity management.
Funding source(s): NHMRC, Australian Cystic Fibrosis Research Trust.

TEA AND FLAVONOID INTAKE IN RELATION TO OSTEOPOROTIC FRACTURE RISK IN ELDERLY AUSTRALIAN WOMEN

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Background/Aims: Observational studies have linked tea drinking, a major source of dietary flavonoids, with higher bone density. The objective of this study was to examine the associations of black tea drinking and flavonoid intake with fracture risk in a prospective cohort of women aged over 75 years.
Methods: A total of 1,188 women were assessed for habitual dietary intake with a food frequency and beverage questionnaire. Incidence of osteoporotic fracture requiring hospitalization was determined through the Western Australian Hospital Morbidity Data system. Multivariable adjusted Cox regression was used to examine the hazard ratios (HR) for incident fracture.
Results: Over 10 years of follow up, osteoporotic fractures were identified in 288 (24.2%) women, of which 129 (10.9%) were a hip fracture. Compared to the lowest tea intake category ($\leq$ 1 cup/week), consumption of $\geq$ 3 cups/day was associated with a 30% decrease in the risk of any osteoporotic fracture (HR: 0.70; 95%CI: 0.50, 0.96). Compared to women in the lowest tertile of total flavonoid intake women in the highest tertile had a lower risk of any osteoporotic fracture (HR: 0.65; 95%CI: 0.47, 0.88) or hip fracture (HR: 0.58; 95%CI: 0.36, 0.95). For specific classes of flavonoids, reductions in fracture risk were observed for higher intake of flavonols with any osteoporotic fracture, and flavones with hip fracture ($p < 0.05$).
Conclusions: Higher intake of black tea and particular classes of flavonoids were associated with lower risk of fracture-related hospitalizations in elderly women at high risk of fracture.
Funding source(s): Healthway; NHMRC.

RIPE FOR THE PICKING: ANTHOCYANIN CONTENT OF WASTE FRUIT VERSUS FIRST GRADE FRUIT IN AUSTRALIAN SWEET CHERRIES

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Background/Aims: Approximately 16000 tonnes of sweet cherries are produced annually in Australia, however growers estimate that 20 to 50% of each season's crop is unfit for market. As cherries are known to be rich in bioactive compounds, the recovery and conversion of this waste fruit into value-added products is attractive for both economic and environmental reasons. The aim of this research was to compare the anthocyanin content and profile of third grade (waste) *Prunus avium* 'Lapins' cherries with that from first grade fruit.
Methods: Anthocyanins were extracted from first and third grade 'Lapins' cherries and analysed via UPLC. Differences in anthocyanin profile and total anthocyanin content (TAC) were identified. In addition, the effect of storage on the TAC of the waste fruit was determined.
Results: No differences in the anthocyanin profiles of the two grades of fruit were identified. The TAC of waste 'Lapins' cherries was 385 mg/100 g fresh weight (FW), 43% higher than that of first grade cherries (269 mg/100 g fresh weight). Whilst storage at -80°C for 3 months resulted in a significant decrease in the TAC of waste cherries ($p = 0.002$), it remained higher than that of fresh first grade cherries.
Conclusions: Third grade 'Lapins' cherries contain a significantly higher concentration of anthocyanins than first grade fruit, with a TAC exceeding those previously reported for sweet cherries. As such, there is much scope as to the application of current waste cherry fruit and their potential as a rich source of anthocyanins.
Funding source(s): Researcher in Business Grant.

FOLLOWING A MEDITERRANEAN DIET FOR 6 MONTHS REDUCES OXIDATIVE STRESS IN OLDER AUSTRALIANS: RESULTS FROM THE MEDLEY STUDY

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Background/Aims: The MedLey trial is a 6 month dietary intervention study comparing the effects of a traditional Mediterranean diet (MedDiet) with habitual diet on cardiovascular risk factors and cognitive performance in Australians aged 65 years and over. We aim to present the effect of a MedDiet versus a habitual diet (HabDiet) on an oxidative stress biomarker (F_2-isoprostane; PGF_{2a}).
Methods: One hundred and fifty-two volunteers (mean age 71 ± 5 years) were randomly assigned to follow either a MedDiet ($n = 80$) or continue their habitual diet (HabDiet; $n = 72$) (control) for 6 months. Plasma PGF_{2a} was measured by GC-MS at baseline and 3 and 6 months. Data were analysed using a linear mixed effects model with age and gender as covariates.
Results: One hundred and thirty-seven volunteers completed the trial ($n =$ 70 MedDiet, $n = 67$ HabDiet). Mean plasma PGF_{2a} values for the MedDiet group were 808.5 ± 27.5, 729.3 ± 26.7, 730.4 ± 50.0 pmol/L, at baseline, 3 and 6 months, respectively. Mean plasma PGF_{2a} values for the HabDiet group were 787.8 ± 34.8, 805.9 ± 32.9, 776.4 ± 33.5 pmol/L, at baseline, 3 and 6 months, respectively. There was a significant change over time within the MedDiet group ($p < 0.0001$, 95% CI 34.8, 109.3) however, there