

**Results:** There were positive relationships between fasting plasma 2-AG ( $r=0.4$ ,  $P=0.009$ ) and AEA ( $r=0.3$ ,  $P=0.018$ ), but not OEA, with BMI. ID lipid had no effect on plasma concentrations of 2-AG or AEA, but there was a group  $\times$  time interaction for OEA ( $P=0.026$ ). OEA increased in response to lipid in the obese, but not the lean or overweight groups (post-hoc  $P=NS$ ). There was a relationship between plasma OEA at  $t=120$  min with energy ( $r=0.35$ ,  $P=0.022$ ), but not fat, intake at the buffet meal. 30-min of ID fat infusion significantly increased duodenal OEA ( $P=0.046$ ), but had no effect on 2-AG or AEA concentrations.

**Conclusions:** Fasting endocannabinoid tone, and lipid-induced OEA secretion appear altered in human obesity. Duodenal mobilisation of OEA may play an important role in the regulation of food intake.

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57

### Weight loss and tissue remodelling following 8-week calorie restriction or intermittent fasting in females who are overweight and obese



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Tissue remodelling and changes in macrophage polarisation occur in adipose tissue (AT) and skeletal muscle (SM) in response to nutrient availability in animals [1–4]. This study aimed to compare the effects of daily calorie restriction (CR) versus intermittent fasting (IF) on markers of AT and SM remodelling in women.

Women ( $N=75$ ,  $50.3 \pm 1.0$  y, BMI  $32.4 \pm 0.5$  kg/m<sup>2</sup>) were randomised to 1 of 3 groups for 8 weeks, and provided with foods at 70% (IF70 and CR70), or 100% (IF100) of energy requirements. CR70 participants consumed food daily, whereas IF participants ate breakfast, prior to initiating a 24-h fast, for 3 non-consecutive days/week. Fasting bloods, subcutaneous abdominal AT and quadriceps muscle biopsies were obtained at baseline, and 8 weeks, after a 12-h overnight fast (all groups), and 24-h fast (IF groups). Markers of macrophages

and extracellular matrix (ECM) were examined by qPCR.

We observed significant weight loss after 8 weeks, with greater weight loss in IF70 vs. CR70 and IF100 ( $P<0.05$ ). Insulin sensitivity, assessed by HOMA-IR, was improved in IF70 and CR70 following a 12-h fast and in all groups following a 24-h fast, with greatest improvement in IF70 ( $P<0.05$ ). Reductions in NEFAs were greater in IF70 vs. CR70 after a 12-h fast, whereas NEFAs increased after a 24-h fast in IF groups ( $P<0.05$ ). In AT, CD40 expression (M1-macrophage marker) was increased following a 24-h fast in IF70 and MMP2 (involved in breakdown of ECM), was increased in CR70 and IF70 ( $P<0.05$ ). In SM, CD163 (M2-macrophage) expression was increased after 12- and 24-h fasts in fasting groups ( $P<0.05$ ).

Weight loss stimulated markers of ECM remodelling in AT. IF increased pro-inflammatory M1 macrophages in AT and anti-inflammatory M2 macrophages in muscle. We speculate this increase in macrophages may be an appropriate response to buffer increased lipolysis in response to severe energy deprivation.

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58

### The influence of meals containing differing fatty acid compositions on appetite parameters in overweight and obese individuals



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**Introduction:** It has been proposed that differing dietary fats are capable of modulating appetite signalling, possibly altering the amount of food consumed at subsequent meals, and in the long term, body weight.

**Methods:** Eight normoglycaemic overweight or obese individuals (BMI  $32 \pm 1.2$  kg/m<sup>2</sup>) randomly completed three single-blinded, fasting breakfast

challenges separated by one week. Meals provided 30% of EER and consisted of toasted bread, jam and varying oils, resulting in an isoenergetic control, oleic acid (OA) and linoleic acid (LA) meals. The two high fat meals had equal lipid contents and matched levels of the specifically elevated fat. Blood samples were collected via an intravenous cannula at baseline (1 ¼ h pre-consumption), and 1 and 2 h post -consumption. Appetite parameters were assessed immediately before consumption and 2 h postprandially with visual analogue scale questionnaires. Serum adiponectin, ghrelin, leptin, adipsin, CRP, GIP, GLP-1, glucagon, insulin, PAI-1, resistin and visfatin were quantified using a Bioplex multiplex suspension array system.

**Results:** The LA meal resulted in a net increase in ghrelin AUC over the sampling period compared to the control meal, accompanied by no change to postprandial prospective food intake perception. The LA meal resulted in a net increase in adiponectin AUC and absolute increase over the sampling period compared to the control and high oleic acid meals. No other measurements were affected by meal type consumed.

**Discussion:** The increase in ghrelin and lack of change in post prandial prospective food intake in response to the high linoleic acid meal may show a dysregulation in satiety signalling and appetite control. The reason for the acute increase in adiponectin following the consumption of the linoleic acid meal is unclear and requires further investigation.

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59

### Cognitive performance in normal weight and obese young women and its association with omega-3 PUFA



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**Background and significance:** Low body status of omega-3 polyunsaturated fatty acids (n3PUFA) has been linked with cognitive decline in older adults. Evidence also indicates that obesity and its comorbidities may be associated with cognitive decline, however it is as yet unknown as to how these factors affect cognition in younger adults. Since n3PUFA status and obesity are both modifiable risk factors for reduced cognitive function, we sought to understand their relationship with cognition at an age and stage when they may indeed be effectively treated/modified.

**Methods:** Non-smoking, healthy, young (18–35 y) normal weight (BMI 18.5–24.9 kg/m<sup>2</sup>, NW) and obese weight (BMI > 30 kg/m<sup>2</sup>, OB) women were recruited. Participants completed anthropometric and cognitive assessments (using a validated computerised cognition testing platform, IntegNeuro™), and provided a fasting blood sample. Performance on five cognitive domains (impulsivity, attention, information processing, memory, executive function) was reported as z-scores (normal range ±1 z-score). Omega-3 Index (O3I) was calculated as the erythrocyte membrane content of eicosapentaenoic acid plus docosahexaenoic acid as a percentage of total membrane fatty