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**Effect of dairy based replacement meals on food intake and appetite in lean and obese subjects**

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**Background** – The incidence of obesity is increasing and products that suppress appetite and subsequently food intake may be important in controlling body weight. Murray Goulburn Nutritional has produced a dairy based supplement that has been shown to stimulate cholecystokinin (CCK), a potent satiating hormone, release in vitro. This product may potentially influence appetite leading to a reduced food intake.

**Objective** – To determine if a dairy based meal replacement product can stimulate the release of CCK to increase satiety and decrease food intake in obese and lean volunteers.

**Design** – Double-blind, randomised, placebo-controlled, cross-over study with 15 lean (age 27.3 ± 5.7 yr; BMI 22.0 ± 1.3 kgm⁻²) and 15 obese (age 38.2 ± 9.5 yr; BMI 35.3 ± 4.6 kgm⁻²) men. On separate days, volunteers consumed 250 mL dairy fraction (test) and placebo beverages following an overnight fast. Plasma CCK concentrations and visual analogue scale assessments of appetite were measured. Subsequent food intake was assessed at a buffet meal.

**Outcomes** – Food intake (kilojoules) was lower in both lean and obese volunteers after the placebo supplement (Lean 7.98% less, Obese 7.39% less) with no difference between groups (P = 0.99). Obese volunteers rated themselves as less hungry and more full after the test supplement, whereas lean volunteers rated themselves less hungry and more full after the placebo; however these were not significant. CCK concentrations increased following both the test and placebo supplement (P < 0.001) but there was no difference in the CCK response between lean and obese volunteers (P = 0.13).

**Conclusions** – Although the test product proved inactive, this approach could be used to evaluate other nutrients which have the potential to suppress appetite. Further investigation of possible alterations in appetite and food intake response to novel dairy based supplements in lean and obese volunteers is warranted.

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**Effects of dietary fibre and fish oil on gut contractility**

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**Background** – Experimental and epidemiological data suggest that dietary fibre and resistant starch (RS) promote bowel function through faecal bulking and short-chain fatty acid (SCFA) production. Our data has recently shown that dietary n-3 polyunsaturated fatty acids (PUFA) from fish oil (FO) also have important actions on the gut (1).

**Objective** – To feed normotensive and the spontaneously hypertensive rat (SHR) diets supplemented with FO and RS and examine indices of gut health including effects on in vitro contractility.

**Design** – In experiment 1, young Sprague Dawley (SD) rats wed fed 4 diets that contained 100 g/kg fat as sunflower oil or FO and with 10% fibre supplied as α-cellulose or high amylase maize starch rich in RS. In experiment 2, older SHR and WKY control rats were fed 3 diets with 50 g/kg fat as lard, canola oil, or FO. We measured gut tissue fatty acid composition, muscarinic receptor binding properties, the SCFA pool and agonist-induced gut contraction. In experiment 3, we measured the effect of canola oil, α-linolenic acid (ALA), and fish oil (FO) on gut tissue n-3 PUFA content and agonist-induced gut contractions. In experiment 4, we measured the effect of canola oil, ALA, and FO on gut tissue n-3 PUFA content and agonist-induced gut contractions.

**Outcomes** – FO supplementation lead to increased n-3 PUFA content of gut tissue while RS resulted in increased caecal content of SCFA, especially as butyrate, and lowered pH. There were no changes in total mucus binding in gut tissue of older SHR. However, in young SD rats FO supplementation altered the sensitivity of the M₁ receptor subtype compared to the other diets. In SD ileum, FO feeding also led to higher 8-iso-PGE₂ (83%) PGE₂ (259%) and PGE₂-induced (203%) maximal contractility with a RS effect noted for carbachol (105%). Lower prostaglandin effects in young SD rats and older SHR were also enhanced by FO. It was noted for SHR, FO supplementation also resulted in the first observation of increased maximal contraction of the colon. While a 5% canola oil diet rich in α-linolenic acid lead to a marginal increase in total tissue n-3 PUFA in SHR ileum, there were no effects on contractility.

**Conclusion** – Although little interactive effects were noted for FO and RS, the data suggests developmental changes in ileal receptor systems with independent effects of RS and FO on some bowel properties of juvenile rats. In older SHR, FO supplementation increased contractility of ileum and colon and restored depressed prostaglandin contractility in ileum with docosahexaenoic acid (DHA) indicated as the active agent. FO and RS produce positive outcomes for bowel health, likely by independent mechanisms which may be of interest to the food industry.

**Reference**