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DEEPPDIVE SUMMARIES

- ◇ Genetic Preference for Morning and Dietary Intake: What Drives What?
- ◇ Associations Between Intuitive Eating and Glycaemic Control in Type-2 Diabetes
- ◇ Does the Effect of Whey Protein on Blood Glucose Levels Depend on Insulin?
- ◇ Soy Isoflavones and Postmenopausal Bone Health: Are All Supplements Created Equal?

Genetic Preference for Morning and Dietary Intake: What Drives What?

Dashti HS, Chen A, Daghlas I, Saxena R. Morning diurnal preference and food intake: a Mendelian randomization study. *American Journal of Clinical Nutrition*. 2020;112(5):1348-1357.

Background

- While an individual's chronotype is strongly influenced by genetics, time-of-day preferences for morning are also influenced by behavioural traits.
- A preference for "morningness" is also associated with certain positive dietary habits, such as regular breakfast consumption and overall diet quality.
- To what extent could genetic preference for morning relate to dietary intake?

The Study

- The investigators conducted a Mendelian randomisation study of genes associated with a preference for "morningness" from the 23andMe genetic database, and analysed how those genes were associated with dietary intake of 61 foods from the UK Biobank genetic database.

Findings, Strengths & Limitations

- A morning preference was associated with more fruit, cereals, bran cereal, and consumption of alcohol with meals. It was also associated with less full cream milk, processed meats, and less variation in diet.
- The strengths of the study are the use of two vast datasets, genes that are robustly associated with "morningness", and a well-validated dietary assessment in the UK Biobank.
- The limitations include a sample of only participants of European ancestry, a limited number of food items analysed and, ultimately, only 11 significant findings, of which the magnitude of effect was small.

Context

- It is important to bear in mind that food intake is only weakly influenced by genetic factors, and more strongly influenced by situational factors like behaviours and the environment.
- Other behavioural traits are also strongly correlated with both "morningness" and related dietary behaviours.
- For example, morning diurnal preference is consistently associated with higher levels of the 'Big Five' personality dimensions of Conscientiousness and Agreeableness, and lower levels of Openness.
- The study leaves us with genetic associations between a morning diurnal preference and certain health-promoting dietary characteristics, not causal relationships between being a morning person and eating fruit.

Application

- The magnitude of effect was relatively miniscule. For example, a genetic predisposition to a morning diurnal preference may lead to you eating an extra half-apple a day and two-thirds a bowl of cereal a week.
- Even if these were causal genetic outcomes, they would easily be overcome with an emphasis on behaviours.
- Genetics may be the reason you like to wake earlier in the morning, but they are not the reason you

Associations Between Intuitive Eating and Glycaemic Control in Type-2 Diabetes

Soares FLP, Ramos MH, Gramelisch M, et al. Intuitive eating is associated with glycemic control in type 2 diabetes. *Eating & Weight Disorders*. 2021;26(2):599-608.

Background

- In prospective cohorts, higher intuitive eating scores are associated with better emotional wellbeing, lower levels of binge eating, and less unhealthy weight control behaviours.
- Other intervention trials have found improvements in objective cardio-metabolic risk factors, including LDL-cholesterol and blood pressure.
- What are the associations between eating intuitively and blood glucose regulation?

The Study

- The investigators conducted across-sectional observational study in Brazil, in adults with type-2 diabetes diagnosed for over 1yr. Data on the participant's HbA1c was taken, and the participants completed the validated Intuitive Eating Scale 2. The analysis looked at total IES-2 scores, and each of the 4 dimensions of the composite scale.

Findings, Strengths & Limitations

- Higher total IES-2 scores, and body-food congruence dimension scores, were associated with 89% and 66%, respectively, lower odds of HbA1c >7%.
- Participants taking only oral antidiabetic drugs had 90% lower odds of HbA1c >7% .
- The strengths of the study are the analysis of all dimensions of intuitive eating, the diverse population relative to wider weight-neutral research, and the use of medical records for HbA1c and the validated IES-2.
- The limitations include the cross-sectional design [i.e., a 'snapshot in time'], the lack of inclusion of important variables into the statistical analysis, and lack of dietary analysis.

Context

- Remember: odds ratios are not relative risk. The seemingly huge effect sizes are different in risk terms: the 89% lower odds with high IES-2 would be around a 10% lower risk.
- The body-food congruence dimension finding is interesting because it is associated with the selecting of foods to eat based on body needs, e.g., energy levels or activity.
- For example, other research has shown eating for physical rather than emotional reasons to be associated with lower HbA1c levels.
- The evidence to date is limited to a pool of case-control, cross-sectional, qualitative, and pilot study research on intuitive eating and glycaemic control.

Application

- The overall, albeit limited, body of research – which includes qualitative research – suggests that emotional eating and related stigma may be associated with worsened glycaemic control.
- For eating behaviour, which is driven by both external environmental factors and internal neurobiological factors, dichotomising the psychological and physiological is short-sighted.
- An emphasis on eating according to internal cues, and with an emphasis on eating for physical rather than emotional reasons [i.e., body-food congruence], may be a useful adjuvant strategy for the management of metabolic disease, but more prospective and intervention trials are needed.

Does the Effect of Whey Protein on Blood Glucose Levels Depend on Insulin?

Smith K, Taylor GS, Allerton DM, et al. The Postprandial Glycaemic and Hormonal Responses Following the Ingestion of a Novel, Ready-to-Drink Shot Containing a Low Dose of Whey Protein in Centrally Obese and Lean Adult Males: A Randomised Controlled Trial. *Frontiers in Endocrinology (Lausanne)*. 2021;12:696977.

Background

- Glucose intolerance is a spectrum from impaired glucose tolerance to T2D, characterised by the progressive decline in the ability of the pancreas to produce and release insulin.
- Meal “preloads” with protein, fibre, and/or fat, have attracted interest as a strategy to reduce the magnitude of blood glucose responses to carbohydrates.
- However, many of these studies lack generalisability to everyday life.

The Study

- The study investigated the effects of a 16g whey protein ready-to-drink 100ml ‘shot’ preload before breakfast on blood glucose responses in 24 lean participants and participants with obesity.

Findings, Strengths & Limitations

- After the whey preload, blood glucose over 1 h after breakfast was 18.2% and 13% lower in the lean participants and participants with obesity, respectively. GLP-1 increased by 2 to 3-fold higher in all participants.
- The rate of gastric emptying was significantly slower following the whey shake, which correlated with the lower postprandial blood glucose response.
- The strengths of the study are the crossover design, the extensive experimental measures, and having different body types to compare responses.
- The limitations include the all-male sample, the method of measuring gastric emptying may have inaccuracies, and lack of detail on randomisation.

Context

- The study thought hard about external validity, specifically developing a product with the potential to apply protein pre-loads in an everyday, real-life setting.
- The slower rate of gastric emptying, based on wider research, is likely mediated by elevated GLP-1.
- The findings in this study indicates a mechanism of attenuating the rise in blood glucose that is independent of insulin, i.e., reduced gastric emptying rate.
- The findings are consistent with the wider research demonstrating that whey protein pre-loads are effective at reducing the magnitude of postprandial glucose responses.

Application

- The meal preload research, while encouraging, has issues with the ability to apply the findings in an everyday setting.
- For otherwise healthy individual, the sequence of macronutrients within meals or specific ‘preloads’ are not worth micromanaging.
- In clinical contexts, such ready-to-drink, easily consumable and non-invasive products could be of real clinical utility were they to become more widely available for dietetic practice.

Soy Isoflavones and Postmenopausal Bone Health: Are All Supplements Created Equol?

Pawlowski JW, Martin BR, McCabe GP, et al. Impact of equol-producing capacity and soy-isoflavone profiles of supplements on bone calcium retention in postmenopausal women: a randomized crossover trial. *American Journal of Clinical Nutrition*. 2015;102(3):695-703.

Background

- Soy foods contain several properties – isoflavones, protein in particular – which may explain lower rates of osteoporosis in women in South-East Asian populations.
- One factor that has been identified as potentially mediating the effects related to soy isoflavones is the capacity to convert daidzein into the metabolite, equol.
- Equol may be important for some of the bone-related effects of soy isoflavones.

The Study

- The study investigated soy isoflavone supplements on bone calcium retention in postmenopausal women in the United States, in a randomised, double-blind, crossover trial. Different levels of total isoflavones, and compositions of isoflavones, were tested.

Findings, Strengths & Limitations

- Of the different compositions, a low-dose mixed isoflavone supplement resulted in the greatest magnitude of effect, an increase of 7.6% of bone calcium retention. High-dose isolated genistein had no significant effect.
- Equol-producing status had no influence on bone calcium retention.
- The strengths of the study are the overall design, the identification of equol producers and non-producers before the interventions, and the various doses and compositions used in the supplements.
- The limitations include only 8 equol-producers, an overall small sample size, and potential lack of statistical power to detect differences between groups.

Context

- Although serum equol levels increased in equol-producers, there was no difference in bone calcium retention based on equol producing status.
- This indicates that at least some bone health effects of isoflavones are not dependant on equol producing capacity.
- There was no additional benefit to higher genistein levels, and neither to higher-dose total isoflavones. It appears that mixed isoflavones in their natural ratios yielded the best outcomes.
- Wider research on outcomes like BMD or fractures is mixed, but still indicates that equol production status may be important for these outcomes.

Application

- There are too many incomplete aspects of the evidence for soy and postmenopausal bone health to make specific recommendations.
- The greatest magnitude of effect on bone calcium retention from soy isoflavone supplementation was still half that of the drug used as control.
- It is important to not arbitrarily dichotomise “drugs vs. foods/lifestyle”, as all are important in the management of postmenopausal osteoporosis risk.
- For soy isoflavones, it appears that the natural ratios consumed through isoflavone rich foods – soy milk, tofu – may be sufficient for any benefit accruing from these compounds.