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EXCESS CONSUMPTION OF DIETARY ADVANCED GLYCATION END-PRODUCTS INDUCES CHANGES IN GUT MICROBIOTA WHICH IS ASSOCIATED WITH INFLAMMATION

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A diet high in advanced glycation end-products (AGEs) may activate pathways involved in chronic disease progression thereby exacerbating pre-existing pathology. The majority of diet-derived AGEs escape digestion and reach the colon, and previous studies suggest that dietary AGEs can modulate the gut microbiota, although a comprehensive metagenomic profiling of the gut microbiota has not been previously performed. C57BL6/J mice (n = 10/group) were randomised to receive a low AGE diet (unbaked rodent chow, AIN93G) or a high AGE diet (baked AIN93G rodent chow, 160°C for 1 h, resulting in a 5-fold higher AGE content) for 24 weeks. 16S rRNA sequencing was used to profile the gut microbiome and showed that mice receiving a high AGE diet had an increase in cecal bacterial diversity compared to the low AGE diet. Analysis of the operational taxonomic unit (OTU) at the family level showed an increase in *Bacteroidaceae* and *Heliobacteraceae* and a decrease in *Lachnospiraceae* and *Saccharibacteria*. There was also a decrease in *Akkermansia muciniphila* species and genus *Ruminococcus*. Plasma monocyte chemoattractant protein (MCP)-1, a marker of inflammation, and plasma lipopolysaccharide (LPS), a marker of bacterial translocation measured by Limulus Amebocyte Lysate assay, were both increased after high AGE feeding. Gene expression of the tight junction proteins ZO-1 and occludin was assessed by qPCR and found to be downregulated in ileum and jejunum respectively. These novel data indicate that excessive dietary intake of AGEs alters the gut microbiome, induces intestinal permeability and bacterial translocation to the circulation, supporting the notion that diet-derived AGEs can promote inflammation.

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IODINE INTAKE AND STATUS IN AUSTRALIAN PREGNANT WOMEN

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Mandatory iodine fortification of bread was introduced in 2009 in response to the re-emergence of iodine deficiency in Australia. Following this, in 2010 NHMRC has recommended all pregnant women to take iodine supplements daily. Since the mandatory fortification, little is known about iodine intake and status in Australian pregnant women. The aim of this study was to assess iodine intake, iodine status, and the correlation between intake and status during pregnancy. We conducted a large prospective cohort study in 783 pregnant women and measured iodine intake from food, using a validated iodine food frequency questionnaire (I-FFQ), and supplements as well as urinary iodine concentration (UIC) at study entry (<20 weeks) and at 28 weeks gestation. The association between iodine intake and UIC was adjusted for potential confounders. Mean total iodine intake at study entry and 28 weeks gestation was 307 ± 128 μg/day and 300 ± 127 μg/day, respectively. Overall, 74.9% (579/773) of women met the recommended dietary intake (RDI; ≥220 μg/day) for iodine in pregnancy but only 85/773 (11.0%) met the RDI from food alone. The average dose of iodine supplement use over pregnancy was 154 ± 126 μg/day. The main sources of iodine from food in pregnancy were dairy (50%) and iodine fortified bread (23%). The median UIC at study entry and 28 weeks gestation was 189 (112–308) μg/L and 172 (103–281) μg/L, respectively. Iodine intake in pregnancy was positively associated with UIC. In conclusion, the iodine status of pregnant and lactating women in South Australia is sufficient post mandatory iodine fortification.

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OPTIMISING EARLY NUTRITION; WHERE DO WE 'TRIP' UP?

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Preterm birth has been described as 'a nutritional emergency' with these infants often born with suboptimal nutritional stores. Failure to provide adequate early nutrition jeopardises growth and development. While internationally recognised guidelines exist regarding optimal nutrition for preterm <1500 g, audits have identified shortfalls in their adherence; an evidence-practice gap. The aim of this work was to identify the barriers to the delivery of early optimal nutrition in a tertiary level neonatal critical care unit to inform a translating research into practice (TRIP) project. Semi-structured interviews were used for data collection, and analysed using qualitative content analysis. Nineteen staff (medical and nursing) were interviewed. Barriers identified were categorised into Domains from the Theoretical Domains Framework (TDF) and potential interventions were identified using translational research methodology. Four main themes with associated subthemes emerged including: (1) roles and responsibilities, (2) decision making, (3) disconnect between beliefs and the application of evidence and (4) monitoring and awareness. Eight TDF barrier 'domains' were identified – Knowledge; Memory, Attention and Decision Processes; Skills; Professional/Social Role and Identity; Beliefs about Capabilities; Beliefs about Consequences; Environmental Context and Resources; and Social Influences. Effective change interventions were mapped to the above domains and will include a consensus agreement, nutrition bundle, redesign of work processes, use of local opinion leaders/clinical champions, and information sharing and education (orientation and ongoing communication). Potential outcomes of modified practices will be improved quality and timeliness of the delivery of appropriate nutrition. These will be monitored in a planned re-audit.

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