The effects of diet on gut microbiome of healthy adults from a food-level perspective: A systematic literature review

Hiu Chak Lam

Supervisors:
Wendy Stuart-Smith, BSc DipEd MNutDiet APD ¹,²
Carling Chan, BSc (Hons) MNutDiet APD ²
Anne Swain, DipNut & Diet, PhD, APD
Chief Dietitian, Allergy Unit, RPAH ²
Robert Loblay, MBBS, FRACP, PhD
Director, Allergy Unit, RPAH ²,¹

¹Nutrition and Dietetics Group, School of Life and Environmental Science, Charles Perkins Centre, The University of Sydney, Sydney, NSW, Australia

²Allergy Unit, Department of Clinical Immunology Royal Prince Alfred Hospital, Sydney

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Abstract

There is a rapidly growing interest in the diet-gut microbiome relationship as diet has been revealed as a potential modulator of gut microbiome, which influences human health. Consequently, a vast number of primary studies regarding this topic has been conducted in the past decade. The aim of this systematic review was to summarize available research findings from studies investigating associations between whole foods and the gut microbiome, and evaluate the overall quality of the evidence. A literature search was conducted in MEDLINE, EMBASE, CENTRAL, CINAHL and PreMedline using search terms relating to ‘diet’ and ‘gut microbiome’. Primary studies targeting healthy adults (over 18 years old) with single food as dietary intervention and gut microbiota composition as measured outcome were selected. Quality assessments were conducted using RoB 2.0, ROBINS-I and GRADE. A total of 18 studies were included. Of these, no significant change in $\alpha$-diversity was found. Inconsistencies were observed regarding the effects of food intervention on $\beta$-diversity and relative gut bacterial abundance at different taxonomic levels when compared between or within food groups. High risk of bias were found in most studies, mainly due to unadjusted confounders and selective reporting. The overall quality of the evidence was rated ‘very low’. No clear conclusions can be drawn from current evidence due to inconsistencies in the reported findings and study designs. Further research with an improved study design is warranted to better understand the effect of whole foods on modulation of gut microbiota and promotion of human health.

**Keywords:** Diet, Food, Gastrointestinal microbiome, Microbiota