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Effect of diet on the human gut microbiota

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Abstract

The gut microbiota plays an important role for humans in both health and disease. It is therefore important to understand how and to what extent choice of diet may influence the microbial community and the effects this has on the host. The variation in the normal human gut microbiota may however impede the discovery of correlations between dietary changes and compositional shifts in the microbiota by masking such effects. Although specific functional food ingredients, such as prebiotics, are known to have measurable effects on e.g. abundance of bifidobacteria, it is nevertheless clear that induced shifts in gut microbiota show large inter-individual variations. It thus seems plausible that knowing the microbiota composition could facilitate predictions as to how the community will react to dietary interventions thus moving towards some degree of personalised dietary recommendations. During a 6-month randomised, controlled dietary intervention following either the New Nordic Diet recommendations or Average Danish Diet (n=62) almost no significant differences in the gut microbiota composition caused by the different diets were observed using qPCR analysis of 33 selected bacterial groups. By stratifying subjects into two enterotypes, distinguished simply by the *Prevotella/Bacteroides* ratio (*P/B*), we were however able to detect several significant changes in the gut microbiota composition resulting from the intervention. The enterotypes were found to be stable during this 6 month study and furthermore we have observed in another study, that the fecal microbiota seems to group by *P/B* ratio during the first 3 years of life. The use of *P/B* to distinguish enterotypes appears to be a simple approach to stratify individuals, which may be useful to assess the effect of diets and other treatments on the gut microbiota.