

## **Association between dietary intake, inflammation and lipopolysaccharide binding protein as a measure of gut function for older adults: A cross-sectional study**

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**Background:** Diet and the gut microbiome may be important modifiable factors in the ageing process. The gut microbiome is a diverse ecosystem vital for health, yet diversity and composition tend to decrease with age so impacting on health [1-3]. Immune and metabolic response proteins, including lipopolysaccharide binding protein (LBP), Cluster of differentiation 14 (CD14) and Fatty acid binding protein 2 (FABP2) are measurable indicators of gut health. For example, elevated levels of LBP indicate increased gut permeability [4,5] and a “leaky gut” may be an important driver of local and systemic inflammation. Previous research indicates that nutrient intake has profound effects on gut biomarkers, with high fibre and Mediterranean diets shown to increase microbial diversity and enhance overall health, particularly in ageing individuals [6].

**Aim:** To explore the relationship between nutrient intake and gut health in ageing individuals using novel biomarkers; LBP, CD14 and FABP2.

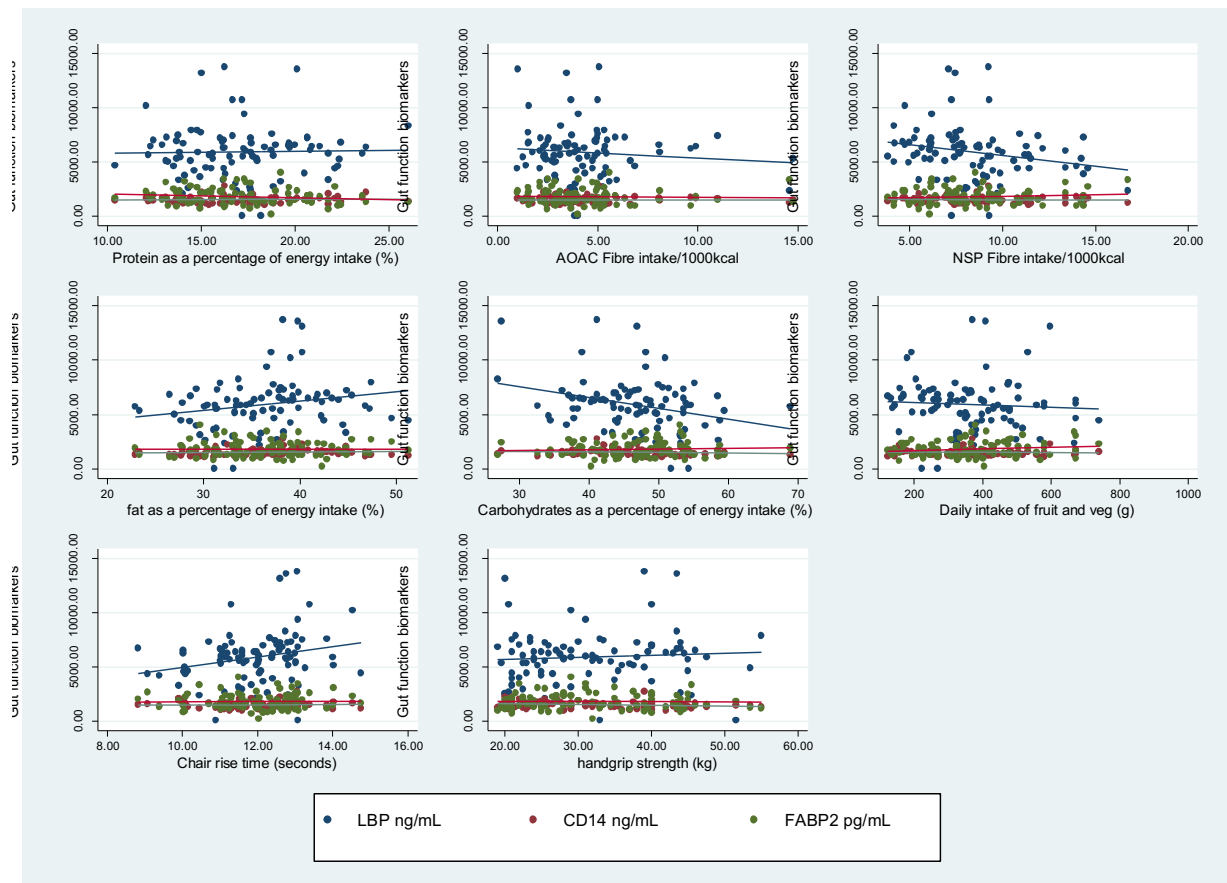
**Methods:** Using cross-sectional data collected from a previous study in healthy older individuals [7], we investigated the relationship between gut biomarkers, nutrient intake and physical function using linear regression models.

**Results:** Participants (n=94) were healthy older individuals with a mean age of 71.1 (SD 5.10) years. Scatter plots indicated nutrient and physical function associations with LBP only; (figure 1). Linear regression of the nutrient and physical measures, when adjusted for age reported that LBP changed by; -197.7ng/mL (95% CI -387.3 to -17.2) for an increase by 1 gram of fibre/1000 kilocalories; 100.7ng/mL (12.2 to 189.2) for % increase in fat as % of energy intake; -117.3ng/mL (-186.4 to -48.3) for % increase in carbohydrates as % of energy intake; and 449.6ng/mL (11.5 to 887.8) for every 1 second increase in chair rise time. When further adjustment was made for CRP (a possible mediator rather than confounder), the nutrient intake on LBP increased by an additional 4.27ng/mL for fat and decreased by an additional 2.64ng/mL for fibre, and 4.01ng/mL for carbohydrate.

**Conclusions:** Findings suggest that nutrient intake, particularly fibre, and physical function according chair rise time are associated with gut function, as indicated by LBP. This relationship appears to be enhanced when accounting for CRP. Further evidence to suggest CRP might be, as hypothesised, a potential mediator should be

explored in this context. These results highlight the importance of high fibre diets in preventing gut dysbiosis and indicates a need for further exploration into gut nutrient sensing in ageing populations.

**Figure 1:** Scatter plots of nutrient intake and physical function in association with markers of gut function



AOAC: Association of Analytical Chemists, NSP: non-starch polysaccharides, kcal: kilocalories, g: grams, LBP: lipopolysaccharide binding protein, CD14: cluster of differentiation 14, FABP2: fatty acid binding protein 2, kg: kilograms, ng/mL: nanograms per millilitre, pg/mL: picograms per millilitre

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