

Abstract

Plasma Proteomic Profiles of White British and British Indian Vegetarians and Non-Vegetarians in the UK Biobank [†]

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Abstract: Background and objectives: Proteins have an integral role in almost all biological processes and may be influenced by environmental factors, such as diet. We aimed to assess differences in circulating proteins between people of different habitual dietary groups, which may provide novel information in understanding biological functions and disease aetiology. Methods: The UK Biobank recruited adults aged 40 to 69 years throughout the UK in 2006–2010. The relative concentrations of 1463 plasma proteins were quantified using Olink Proximity Extension Assay on samples from ~54,000 participants. Participants were also asked to report their ethnicity and consumption of red and processed meat, poultry, fish, dairy and eggs. From this information, we identified six diet groups among the white British participants (23,116 regular meat eaters, 23,323 low meat eaters, 484 poultry eaters, 1074 fish eaters, 722 vegetarians, and 54 vegans), and two diet groups among the British Indian participants (390 meat eaters and 163 vegetarians). We used multivariable-adjusted linear regressions to assess differences in protein concentrations by diet groups. Results: We observed significant differences in many plasma proteins ($p < 0.00008$ after correction for multiple testing, 683 proteins in white British participants), with many proteins showing a gradient effect in magnitude of differences across diet groups. Of the biggest differences, compared with white British regular meat eaters, the other white British diet groups had higher concentrations of FGF21 (e.g., +0.40 units in vegetarians on a standardised scale), GUCA2A (+0.33), FOLR1 (+0.32), IGFBP2 (+0.31), FGF23 (+0.31) and DSG2 (+0.30), but lower concentrations of HAVCR1 (-0.38), CDHR2 (-0.26) and ACP5 (-0.24); concentrations of CD99L2 were lower in low meat, poultry and fish eaters (-0.16), but higher in vegetarians (+0.24). The observed differences were generally similar in direction for the white British and British Indian participants. The proteins identified are involved in a range of different biological processes, particularly in gastrointestinal tract function, as well as kidney, liver and muscle functions, and cell growth and cell adhesion, among other processes. Discussion: The substantial differences in plasma proteomic profiles between people of different diet groups indicate differences in cellular activities and may relate to differences in future disease risk.



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Informed Consent Statement: All participants gave informed consent to participate using a signature capture device at the baseline visit.

Data Availability Statement: This research has been conducted using UK Biobank Resource under application 67506. Bona fide researchers can apply to use the UK Biobank data set by registering and applying at <http://ukbiobank.ac.uk/register-apply/>.

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