



P3.007: Dietary Inflammatory Index and Lung Cancer Risk: Multi-Cohort Evidence and Plasma Proteomic Profiles

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INTRODUCTION

Increasing evidence links dietary inflammatory potential to cancer development; however, its association with lung cancer remains unclear. This study aimed to investigate the relationship between the Dietary Inflammatory Index (DII) and lung cancer risk, while exploring the underlying molecular mechanisms.

METHODS

DII scores were calculated based on 24-hour dietary recalls. The associations between DII scores and lung cancer incidence were evaluated using multivariable Cox proportional hazards models and subgroup analyses within the UK Biobank cohort, with external validation conducted in NHANES. Mediation analyses were performed to assess the role of plasma proteins and inflammatory biomarkers as intermediaries. Functional enrichment analysis, protein-protein interaction networks, and Spearman correlation analyses were utilized to characterize candidate and mediated proteins. Spatial expression patterns across tissues and cell types were examined using the Human Protein Atlas. Two-sample Mendelian randomization was employed to evaluate potential causal effects of individual dietary components.

RESULTS

- During a median follow-up of 11.8 years, 1,024 lung cancer cases were documented among 198,735 participants. Higher DII scores were associated with an increased risk of lung cancer in a nonlinear manner (continuous HR 1.08, 95% CI 1.04-1.12; Q4 vs Q1 HR 1.30, 95% CI 1.08-1.56).
- Proteomic screening identified 133 candidate proteins enriched in immune regulation and pro-survival signaling pathways, with IL-6 identified as a hub protein. Mediation analysis revealed 13 proteins that fully mediated the association between DII and lung cancer, with HGF and PRSS8 accounting for over 25% of the total mediation effect.
- Among these mediators, HGF, TNFSF13B, and LGMN were further identified as potentially druggable targets based on curated drug-gene interaction databases.

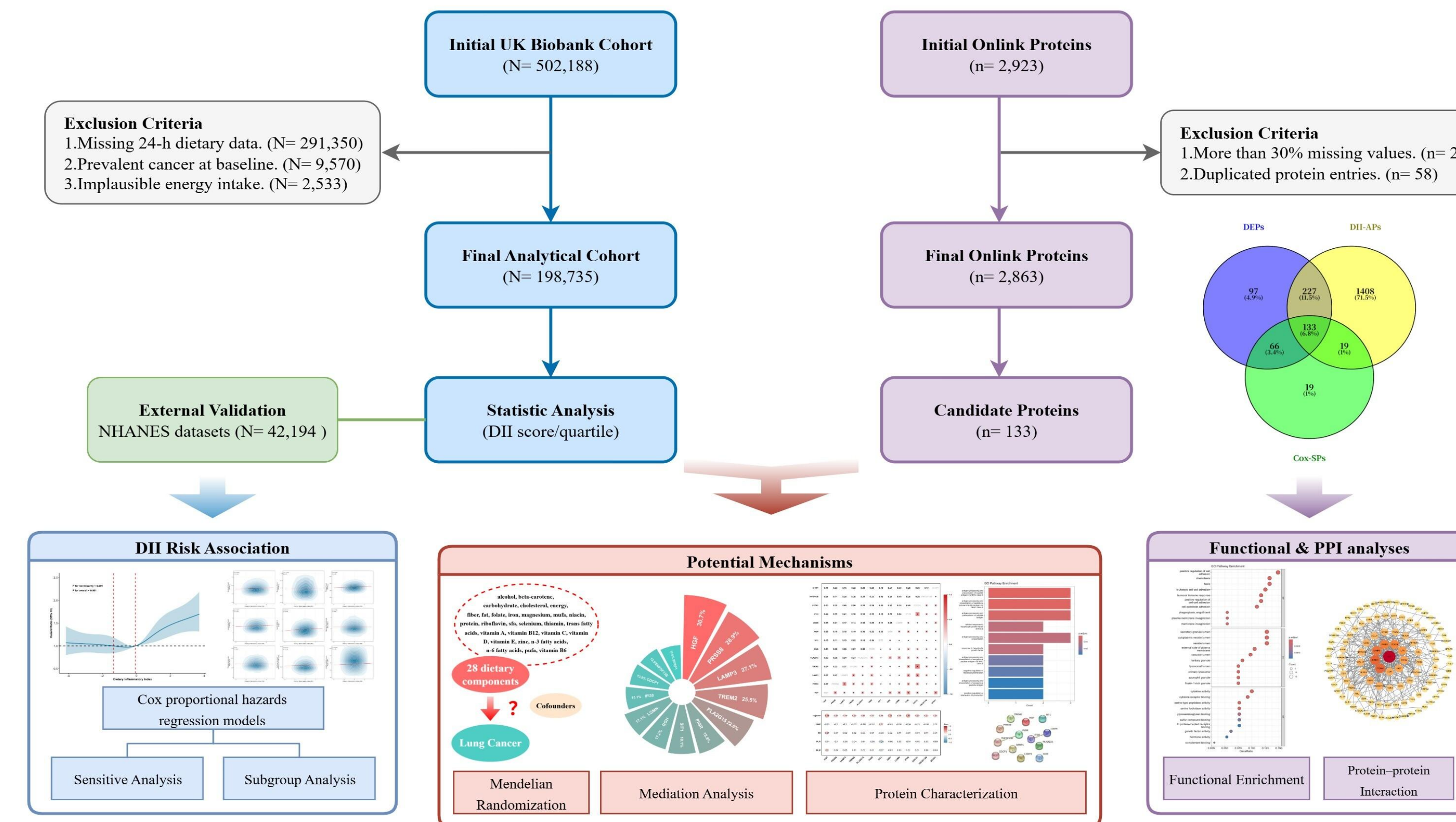


Figure 1. Overview of the study design

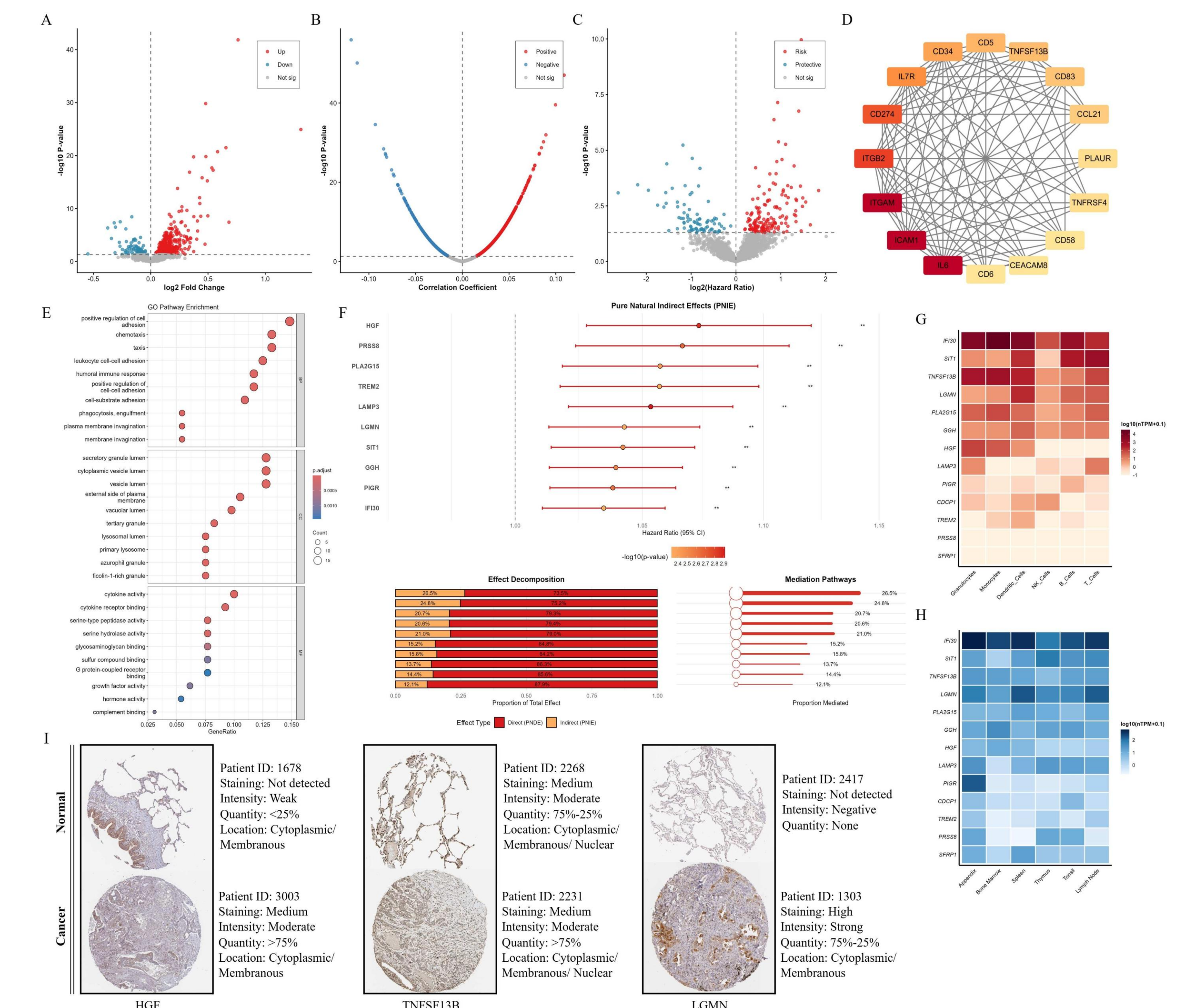


Figure 2. Key findings (A-E) Candidate protein screening & functional annotation. (F) Plasma proteins mediate DII-lung cancer association. (G-H) Immune tissue/cell transcript profiles of mediating genes. (I) Drug-targetable protein expression in tumor vs normal lung tissue.

DISCUSSION AND CONCLUSION

Pro-inflammatory diets have been associated with an increased risk of lung cancer through alterations in circulating protein profiles, providing molecular insights into the role of dietary inflammation in carcinogenesis and underscoring the preventive potential of anti-inflammatory dietary patterns.

REFERENCES & ACKNOWLEDGEMENTS

Key References

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Artificial Intelligence (AI) Use Disclaimer

ChatGPT (OpenAI) was used for language editing; Gemini (Google) was used to assist with literature retrieval. AI was not used to generate scientific data, analyses, or conclusions. All AI-assisted content was reviewed and verified by the authors, who take full responsibility for the accuracy and integrity of the final material.