

THE DIFFERENCE IN GUT MICROBIOME COMPOSITION OF MELANOMA PATIENTS REGARDING THEIR DIETARY FIBER INTAKE

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INTRODUCTION

The gut microbiome has been recently put in focus for its implications in the pathogenesis and treatment of melanoma, and together with diet may have an influence on the effectiveness of treatment. Dietary fiber (DF) intake impacts gut microbiome composition and metabolic function, but greatly varies across individuals whose response to fibers depends on their baseline gut microbiome. This study aimed to determine microbiome differences among melanoma progression-free survival patients regarding their DF intake.

RESULTS

HFG had significantly higher intake and energy proportion of mono-unsaturated fatty acids ($p=0.007$) and omega-3 fatty acids ($p=0.049$), and lower alcohol intake ($p=0.046$) than LFG patients. HFG patients showed increase in proportion of *Phocaeicola dorei*, *Bacteroides cellulosilyticus* and *Holdemania massiliensis* on LEfSE analysis, while LFG exhibited higher abundance of *Ruminococcus*, *Blautia wexlerae*, *Anaerobutyricum hellii*, and *Ruthenibacterium edouardi*.

CONCLUSION

DF and omega-3 fatty acids have proven to be associated with promoting intestinal integrity, enhancing short-chain fatty acid production, and altering gut inflammatory state. We demonstrated differences in gut microbiome composition between HFG and LFG metastatic melanoma patients with complete and sustained response to immunotherapy; which further exhibits a potential for health and intestinal homeostasis. The presented difference could be explained by the causal variance in intestinal microbial community ecology that is possibly affected by various environmental involvements, such as diet.

FUNDING

Financing of the DNA extraction and analysis was funded by the Croatian Society for Medical Oncology, the researchers funded the rest of the study.

METHODS

Croatian metastatic melanoma patients with a complete and sustained response to immunotherapy (N = 15, male 80%, average age 61.0 ± 12.2 years) were prospectively profiled for gut (fecal) microbiota signatures and dietary intake (four 24-hour recalls three weeks before the stool sample). Patients were grouped regarding the average DF intake of ≥ 25 g/day (high fiber group HFG, N=8) and < 25 g/day (low fiber group LFG, N=7).

Table 1. Selected dietary variables intake differences in Croatian melanoma patients (N=15) regarding their average dietary fiber intake

Variables	LFG DF intake < 25g/day	HFG DF intake \geq 25g/day	p-value
Body mass index (kg/m ²)	29.44 \pm 3.81	29.80 \pm 7.40	0.440
Energy intake (MJ/day)	8.01 \pm 0.95	10.54 \pm 0.86	0.049*
Proteins (g/day)	85.24 \pm 18.63	97.93 \pm 19.42	0.220
Proteins (% MJ of EI)	19.68 \pm 0.92	18.76 \pm 2.12	0.292
Total fats (g/day)	76.66 \pm 11.06	94.12 \pm 12.59	0.013*
Total fats (% MJ of EI)	36.02 \pm 3.46	39.27 \pm 4.43	0.135
Saturated fatty acids (g/day)	31.29 \pm 10.57	35.86 \pm 7.98	0.370
Monounsaturated fatty acids (g/day)	28.23 \pm 5.21	36.83 \pm 6.36	0.007*
Polyunsaturated fatty acids (g/day)	12.70 \pm 2.78	17.09 \pm 8.98	0.224
Omega-3 fatty acids (g/day)	0.32 \pm 0.18	0.97 \pm 0.78	0.049*
Carbohydrates (g/day)	198.59 \pm 30.95	228.37 \pm 35.38	0.106
Carbohydrates (% MJ of EI)	41.91 \pm 5.45	42.38 \pm 4.69	0.863
Dietary fibers (g/day)	18.53 \pm 5.49	29.80 \pm 7.20	0.004*
Alcohol (g/day)	4.55 \pm 4.48	0.27 \pm 0.52	0.045*

* $p < 0.05$ tested with t-test

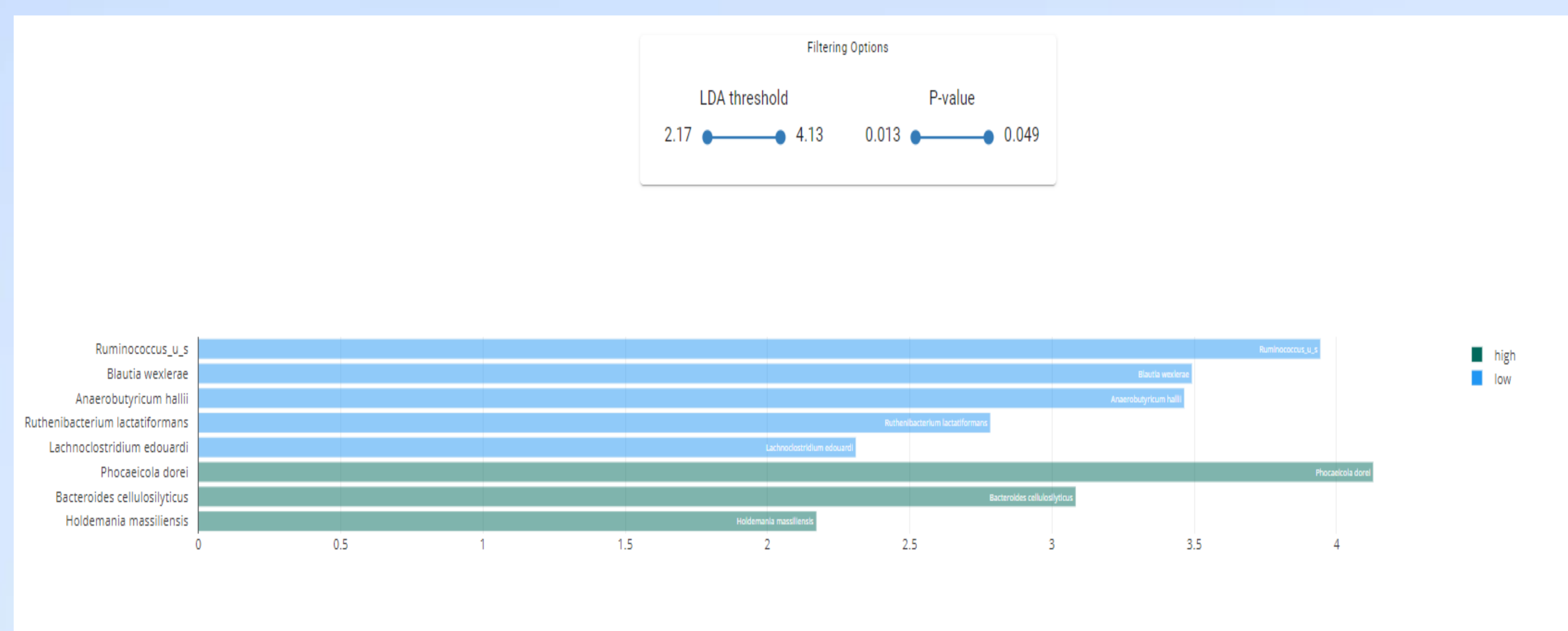


Figure 1. A linear discriminant analysis (LDA) effect size (LEfSE) plot showing the bacterial strains with the difference in relative abundance in metastatic melanoma patients regarding their average dietary fiber intake. Green = HFG (≥ 25 g/day), blue = LFG (< 25 g/day)

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