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Diet, microbes & immune responses

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Laura A. Bolte

Diet, microbes & immune responses

Dissecting the role of diet
and the gut microbiome
in intestinal inflammation
and cancer immunotherapy



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Laura A. Bolte

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university of
 groningen

Diet, microbes & immune responses

Dissecting the role of diet and the gut microbiome
in intestinal inflammation and cancer immunotherapy

3

PhD thesis

to obtain the degree of PhD at the
University of Groningen
on the authority of the
Rector Magnificus Prof. J.M.A. Scherpen
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

Wednesday 6 November 2024 at 9.00 hours

by

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Propositions

1. Diet may be leveraged to shape the gut microbiome as an immunoregulatory strategy in the context of intestinal inflammation and cancer treatment with immune checkpoint blockade (ICB). (*This thesis*)
2. Mediterranean diet is associated with microbial species and pathways known to infer mucosal protection and anti-inflammatory effects. (*This thesis*)
3. Consistency of diet-gut microbiome associations in different diseases and population controls suggests a potential for targeted diets in many contexts in which inflammation, gut microbial changes and diet form a common thread. (*This thesis*)
4. The challenge in finding reproducible microbial biomarkers for ICB response illustrates the need to view the microbiome as a dynamic ecosystem with strain-level diversity. (*This thesis*)
5. Response to ICB is associated with higher pre-treatment abundances of *Bifidobacterium pseudocatenulatum*, *Akkermansia muciniphila* and *Roseburia* spp. (*This thesis*)
6. Longitudinal profiling shows distinct gut microbiome dynamics in responders and non-responders after ICB-initiation. Therapeutic targets based solely on baseline data may lead to unexpected effects. (*This thesis*)
7. Fiber degrading taxa are persistently enriched in patients with longer progression-free survival, representing targets for dietary intervention. (*This thesis*)
8. Mediterranean diet high in whole grains, fish, nuts, fruit, and vegetables is associated with a higher probability of ICB response. (*This thesis*)
9. Nutrition holds an untapped therapeutic potential. Nutrition science must evolve to closely integrate with other omics layers and acknowledge individual variation of dietary responses. (*This thesis*)

“An ounce of prevention is worth a pound of cure.”

Benjamin Franklin

“Nothing in life is to be feared, it is only to be understood.
Now is the time to understand more, so that we may fear less.”

Marie Curie

“Diet is like football. Opinions are many, but true understanding is rare.”

Arnau Vich Vila

Recipe for a PhD: A blend of curiosity, perseverance, growth, and discovery,
infused with a dash of serendipity, and a savor for small triumphs along the way.
Add a generous portion of multidisciplinary teamwork for a richer experience.
Best enjoyed with a glass of Châteauneuf-du-Pape.

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