

MyNewGut's implications for public health policy and dietary guidelines and perspectives for health claims

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Stoffer Loman, PhD

“Microbiome influence on Energy Balance and Brain Development-Function put into action to tackle diet-related Diseases and Behavior”

Work package leader WP 11:

- Guidance for health claims pertaining to probiotics and dietary fiber induced health benefits through modulation of the microbiome
- Recommendations for Public Health

Gut microbiota in health and disease

- Gut microbiota plays a pivotal role in host metabolism and health, which revealed the possibility of a **plethora of associations** between gut bacteria/composition and human diseases.
- The intestinal microbiota, **as a whole**, provides additional metabolic functions and regulates the host's gene expression, improving the ability to extract and store energy from the diet and contributing to body-weight gain.

“Normal Microbiome”

- Huge interindividual variability in microbiome composition – esp. across continents (diet related)
- Huge interindividual variability in microbial diversity – potentially also largely diet related
- → healthy microbiome not defined

“Fiber gap”

Consuming a modern diet low in fiber contributes to the loss of taxa over generations and may be responsible for the lower diversity microbiota observed in the industrialized world compared to present-day hunter-gatherers and rural agrarians.

(Sonnenburg et al., Nature. 2016 January 14; 529(7585): 212–215).

Dietary fiber & diversity gut microbiota

- Microbiota-accessible carbohydrates (MACs), which are abundant in dietary fiber, serve as the primary source of carbon and energy for the distal gut microbiota
- One possible explanation for the greater microbiota diversity seen in hunter-gatherers and agrarians is the large quantity of dietary fiber they consume relative to Westerners.

(Sonnenburg et al., Nature. 2016 January 14; 529(7585): 212–215).

Diversity gut microbiota

- Loss of diversity of gut microbiota plays a pivotal role in host metabolism and health, which suggests the possibility of a **plethora of associations** between gut bacteria and human diseases
- Possible that **rewilding** the modern microbiota with extinct species may be necessary to restore evolutionarily important functionality to our gut.

(Sonnenburg et al., Nature. 2016 January 14; 529(7585): 212–215).

- Recommendation intake of dietary fiber > 50g/d

(O'Keefe et al. Nat Commun. 2015 Apr 28;6:6342).

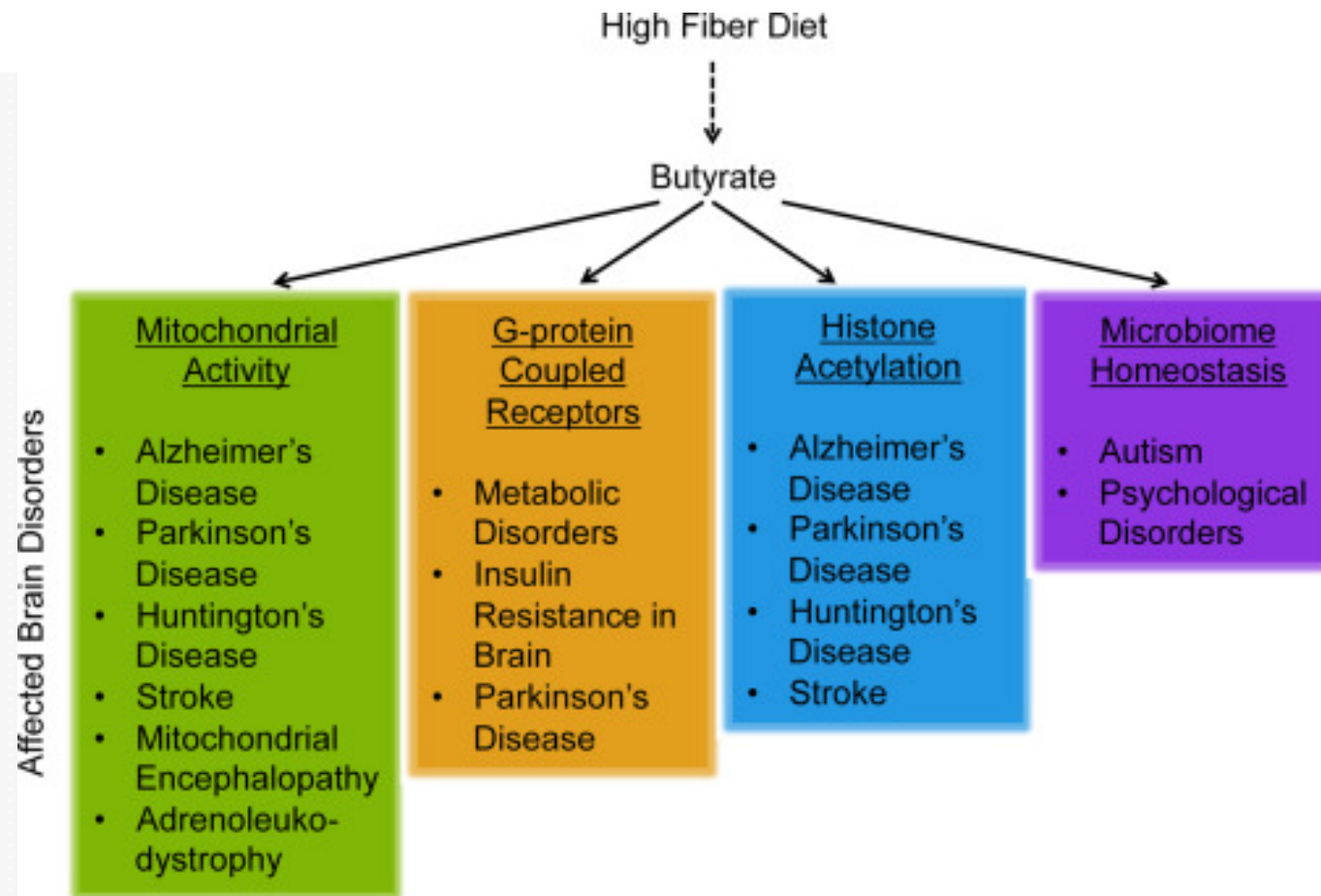
Dietary fiber in the development of Insulin Resistance & Obesity

The effects of dietary fiber on IR/Obesity has been linked to:

- local changes of the gut environment and microbiota
- stimulation of production of SCFA, esp. butyric acid in the colon.

(Tian et al., Food Funct. 2016, 7, 3789–3797)

Plethora of effects of dietary fiber



Schematic view of postulated dietary fiber mechanisms of action in brain disorders

Nutrition & Microbiome Public Health perspective

- The diet-microbiome interactions may be moderators of human metabolism.
- Does this mean that with the ingestion of a capsule with the mix of relevant bacterial strains we can colonize our gut with beneficial organisms that prevent us from obesity, cancer, cardiovascular or metabolic diseases as obesity, type 2 diabetes, etc.?

Public Health

- Utilizing the preventive – and even possible therapeutic – power of modifications of the gut microbiome has to find its place as well.
- Communication of health benefits through health claims

Health claims Dietary fiber & modulation of the Microbiome

- Cause and effect relationship established between food (ingredient) and health benefit
- Food sufficiently defined
- Claimed effect beneficial to human health
- Mechanism of action

Health Claim Substantiation pertaining to the microbiome

- Key to health claim substantiation is cause-and-effect relationship established in randomized, controlled clinical trials/nutrition intervention trials
- Targeted study design!
 - Primary endpoint
 - Statistics/power calculation
 - NO cross-over design → carry-over effects!
 - Properly validated techniques/questionnaires
 - Proper controls!
- Proper data analysis
- Significant result ($p < 0.05$) – biological relevance?

Microbiome in health claim substantiation

- Modulation of microbiome → plethora of effects, mechanisms, etc.....
- No magic bullet
- MoA black box
- As long as health benefit is evident, circumstantial evidence suggestive of microbiome-related mechanisms of action would suffice for EFSA to conclude on cause-and-effect relationship

Taken together

- Utilizing the preventative – and even possible therapeutic – power of modifications of the gut microbiome has to find its place in public health.
- Health Claims pertaining health effects due to modulation of the microbiome by dietary fiber are already within scope.



Thank you!

stoffer.loman@nutriclaim.com