

The interaction between inflammatory properties of diet and genetic variation in body weight regulation

Citation for published version (APA):

Freitag, H. (2021). *The interaction between inflammatory properties of diet and genetic variation in body weight regulation*. [Doctoral Thesis, Maastricht University]. Penerbit Andi.
<https://doi.org/10.26481/dis.20211209hm>

Document status and date:

Published: 01/01/2021

DOI:

[10.26481/dis.20211209hm](https://doi.org/10.26481/dis.20211209hm)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

SUMMARY

Inflammation might play a part in body weight regulation. Previous studies showed that circulating inflammatory markers, inflammatory properties of the diet, and genetic variation in inflammatory markers are associated with obesity. To date, it is not known whether the interaction between inflammation and obesity could also be evaluated in the context of weight change during and after a weight loss program and whether diet might influence this association.

The general objective of this thesis was to evaluate the influence of diet and inflammatory gene variations on inflammation and body weight changes in obesity. The objective was specified into 4 aims: 1) To evaluate the association of the inflammatory properties of the diet with weight regain after a weight loss program as well as with the risk for obesity in a population-based study; 2) To develop a new low calorie dietary regime with low inflammatory property (LCID) for weight loss and evaluate the association between the inflammatory properties of the diet and weight regain; 3) To examine the influence of inflammatory gene variations on the association between obesity and inflammation; 4) To evaluate the interaction between inflammatory gene variations and diet composition and its effect on weight regain after weight loss.

We showed that the inflammatory property of the diet is associated with adipose tissue inflammation, marked by leptin concentration. In a weight loss program, we reported that the inflammatory property of the diet partially explains the variation in weight regain following weight loss. The modification of a standard low-calorie diet (LCD) for weight loss to lower its inflammatory properties (LCID), reduces hs-CRP compared to the LCD, but does not influence changes TNF-alpha, IL-6, or weight. However, the LCID had a positive impact on improving genomic health by elongation of relative telomere length. We showed that variations in the genes for inflammation markers such as *CRP*, *TNFA*, and *IL6* influenced the correlation between obesity and inflammation. Variations in these genes also influenced the correlation between diet composition and weight regain following weight loss. All in all, these data support the hypothesis that inflammation plays a role in the regulation of body weight. This effect is either direct or indirect through interaction with dietary intake.