The aim of this PhD thesis is to investigate the relationship between reduction in appetite and body weight management. This relationship is explored through a systematic review and meta-analysis of the current literature along with original research completed within the European Commission project Satiety Innovation (SATIN). The SATIN project consisted of seven work packages aiming to develop food products that control appetite by enhancing satiety and/or reducing hunger through the modification of food structure by novel food processing. Data from a long-term multicentre study aiming to demonstrate the relationship between final food products designed to reduce appetite and weight loss maintenance is included in this PhD thesis. The clinical data collection at the Danish study site was carried out at Department of Nutrition, Exercise and Sports (NEXS), Faculty of Science, University of Copenhagen, January – November 2016. I managed the data collection at the Danish study site along with coordination between the three study sites.

Furthermore, effects on appetite from macronutrient manipulations and from a novel food-derived bioactive component were explored through original research in the STABLE and the SLIM8 studies. The clinical data collection was carried out at NEXS September – November 2015 for the STABLE study and September – December 2017 for the SLIM8 study. I designed and conducted the STABLE study and contributed to the designing of the SLIM8 study as well as monitored the study during the data collection.

The SATIN study was a part of the 7th Framework Programme funded by the European Commission. The STABLE study was funded by Fromageries Bel S.A. The SLIM8 study was funded by Diet4Life. Additionally, my employment was funded by the StrucSat project (a research project funded by the Danish Council for Strategic Research, DuPont Nutrition Biosciences Aps and Arla Foods Ingredients Group R&D aiming to investigate how food structure affects appetite) (two years) and NEXS (one year). Additional studies conducted during the PhD period (explained in the following) were funded by the StrucSat project and Biocare Copenhagen A/S/DSM.
This PhD thesis is based on the following five scientific papers:


**Paper V:** Jiehui Zhou, Randi Jessen, Johan Palmfeldt, Thea Toft Hansen, Christel Johanneson Bertolt, Anders Sjödin, Arne Astrup, Karsten Kristiansen, Erik T Hansen and Jan Stagsted. *Identification of a food-derived peptide that induces neurotensin receptor-mediated signaling in intestinal cells and reduces energy intake in mice and humans.* (Original paper)
I have contributed to the preparation and presentation of the following papers and abstracts during my PhD. Additionally, the master and bachelor projects I have supervised, related teaching and specialisation courses as well as additional studies conducted are presented.

**Papers**


Adrianna Mira Talaga, *Thea Toft Hansen*, Christian Ritz, Anders Sjödin, Susanne Bügel. The effect of low energy diet on folate (vitamin B9) and cobalamin (vitamin B12) levels as well as inflammation markers in adults with overweight and obesity. (Original paper, in preparation)


Contributions at conferences

Thea Toft Hansen, Mads Fiil Hjorth, Karoline Sandby, Sarah Vold Andersen, Arne Astrup, Christian Ritz, Mònica Bulló, Maria Lucia Camacho-Barcia, Jesús Francisco García-Gavilán, Jordi Salas-Salvadó, Joanne A. Harrold, Jason C.G. Halford, Anders Sjödin. Predictors of successful weight loss with relative maintenance of fat-free mass in individuals with overweight and obesity on an 8-week low energy diet. (Abstract for the 2019 European Congress on obesity [ECO], accepted for poster presentation [presented by Karoline Sandby and Sarah Vold Andersen])

Christopher Papandreou, Maria Lucia Camacho-Barcia, Jesús Francisco García-Gavilán, Thea Toft Hansen, Mads Fiil Hjorth, Jason C.G. Halford, Jordi Salas-Salvadó, Anders Sjödin, Mónica Bulló. Circulating metabolites associated with objectively-measured sleep duration and sleep variability in overweight/obese participants: a metabolomics approach within the SATIN study. (Abstract for the 2019 European Congress on obesity [ECO], accepted for poster presentation [presented by Christopher Papandreou])

Thea Toft Hansen, Sarah Vold Andersen, Arne Astrup, John Blundell, Anders Sjödin. Is increased satiety beneficial for body weight management in the context of overweight and obesity? (Abstract for the 2018 Obesity Week, accepted for poster presentation)

Thea Toft Hansen, Anders Sjödin, Christian Ritz, Sanne Kellebjerg Korndal. Macronutrient manipulations of cheese resulted in lower energy content without compromising its satiating capacity. (Abstract for the 2018 European Congress on obesity [ECO], accepted for poster presentation)

Thea Toft Hansen, Tine Anette Jakobsen, Mette Søndergaard Nielsen, Anders Sjödin, Carel le Roux, Julie Berg Schmidt. Hedonic changes in food choices following Roux-en-Y Gastric Bypass. (Abstract for the 2016 Danish Diabetes Academy Symposium, accepted for poster presentation)

Master and bachelor projects I have co-supervised

Related teaching

- Co-responsible for coordination of the master course Nutrition related disease: 2016 – ongoing.
- Supervision of 14 interns (bachelor, master and PhD students).

Specialisation courses

- **European Nutrition Leadership Platform (ENLP), Essentials Programme April 2019.**
  The course focused on: Understanding the qualities and skills of leaders; developing team and communication skills; create a network with leaders within nutrition research. The theme was to assist the development of future European leaders in nutrition.
- **League of European Research Universities’ (LERU) Doctoral Summer School July 2018.**
  The course focused on: Self-confidence and strengthened leadership skills; personality, discipline and cultural backgrounds; novel collaboration methods and social entrepreneurship; intercultural communication. The theme was interdisciplinary collaborations between participants with a wide variety of academic backgrounds to tackle major challenges in today’s global society.
- Good Clinical Practice, Biostatics, Medical writing, Metabolism, Research management and leadership.

Additional studies conducted during the PhD period

These studies served as pilot/phase 1 studies and are not presented in the PhD thesis as further investigations are ongoing.

- **February 2017 – ongoing:** Animal studies in mice examining satiety enhancing effects of different particularisations of whey protein, a food structure approach developed within the StrucSat project. The study was divided into two parts; one part investigating the location of the whey protein in the gastrointestinal tract depend on the particularisation and one part investigating *ad libitum* feed intake after gavage with the different particularisations. I was included in the designing of the studies to align with the clinical studies, which I am currently involved in designing. I also attended one day of pilot testing including gavage and dissection of mice with separation of stomach, duodenum, jejunum and ileum.
- **September 2016 – August 2017:** A double-blinded randomised clinical crossover study with five arms, including four experimental conditions and a control condition. The study investigated if coated encapsulated nutrients (selected on their ability to stimulate release of glucagon-like peptide-1 and polypeptide YY and ability to reduce appetite), expected to be released in the distal part of the small intestine, could reduce energy intake and self-reported appetite evaluations compared with capsules containing a nutrient that was not expected to have this effect.
- **September 2017 – April 2018:** A second double-blinded randomised clinical crossover study. Based on the results from the study described above, three experimental conditions were continued to be examined compared with the control condition. The study aimed to investigate objectives comparable to the first study but with an improved study design based on the results from the first study.
- **February – April 2018:** *In vitro* digestion models investigating the time of release of the content from coated compared with non-coated capsules. Furthermore, it was investigated whether the content was released immediately or gradually as well as different factors affecting the time of release.