The etiology and pathology of neurodegenerative diseases is vastly unknown. Neuroinflammation is known to be involved and have been suggested to be a major driving force in the progression of neurodegenerative diseases such as Alzheimer's disease, amyotrophic lateral sclerosis, Parkinson's disease and multiple sclerosis (MS). In MS treatment options are mainly immunomodulators targeting either T- or B-cells, which slows down disease progression, but no cure has been discovered. MS stands out from the prior mentioned diseases, as it has been suggested an autoimmune disease, because chronic inflammation plays a central role in the disease progression. Though autoimmunity is the most accepted hypothesis for disease introduction, new hypothesis also suggested primary oligodendrocyte dysfunction and malfunctional metabolisms as possible disease triggers.

In this thesis, we focus on using proteome analysis to elucidate relation between protein expression patterns and disease development as well as mechanisms central for neurological health. Using the animal models; experimental autoimmune encephalomyelitis and cuprizone, we investigate the central mechanisms; autoinflammation, demyelination and remyelination. We also discuss, which multiple sclerosis related mechanisms is reflected in these models.

Using etomoxir, we also explored the effect of altering lipid metabolism on disease progression in the experimental autoimmune encephalomyelitis model.

This thesis also focuses on, how post translational modification of proteins is an essential process in cell signaling and how modifications can be associated with autoimmune development as well as a possible connection between dysfunctional metabolism and the development of autoimmunity. Using state of the art mass spectrometry setups, we show that discovery-based protein post translational modification analysis is possible and allows for a deeper proteome analysis. We also demonstrate how this can be used to monitor potential antigenic modification on proteins during disease and disease progression.
To fulfill the requirements for the PhD degree, Kenneth Kastaniegaard has submitted the thesis: Biochemical model for the development of neurodegenerative diseases – The role of posttranslational modifications of proteins, extracellular vesicles and autoimmune development, to the Faculty Council of Medicine at Aalborg University.

The Faculty Council has appointed the following adjudication committee to evaluate the thesis and the associated lecture:

**Professor Blagoy Blagoev**  
University Southern Denmark  
Denmark

**Associate professor Thomas Deierborg**  
Lund University  
Sweden

**Chairman:**  
Associate Professor Louiza Bohn Thomsen  
Aalborg University  
Denmark

**Moderator:**  
Associate Professor Allan Stensballe  
Aalborg University  
Denmark

The PhD lecture is public and will take place on:

**Friday 05 April 2019 at 13:00**  
Aalborg University – Room D2-106  
Fredrik Bajers Vej 7 D2  
9220 Aalborg East

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**Program for PhD lecture on**

**Friday 05 April 2019**

**by**

**Kenneth Kastaniegaard**

Biochemical model for the development of neurodegenerative diseases – The role of posttranslational modifications of proteins, extracellular vesicles and autoimmune development.

Chairman: Associate Professor Louiza Bohn Thomsen  
Moderator: Associate Professor Allan Stensballe

13.00 Opening by the Moderator

13.05 PhD lecture by Kenneth Kastaniegaard

13.50 Break

14.00 Questions and comments from the Committee  
Questions and comments from the audience at the Moderator’s discretion

16.00 Conclusion of the session by the Moderator

After the session a reception will be arranged