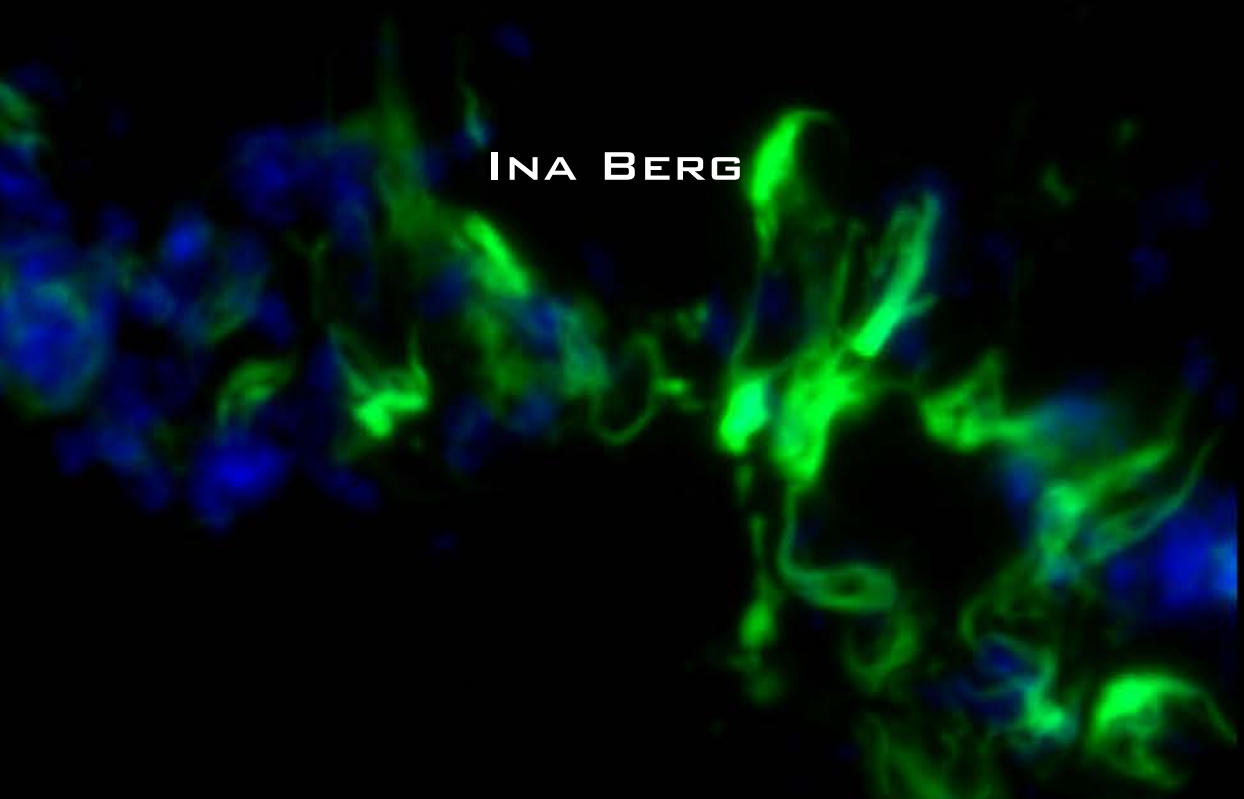
Linköping Studies in Science and Technology
Dissertation No. 1320

Modeling Amyloid Disease in Drosophila melanogaster



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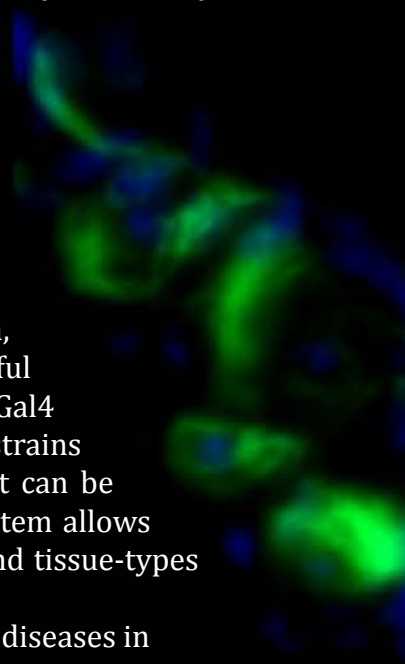
Amyloid diseases are caused by protein misfolding and aggregation. To date there are 27 known proteins causing amyloid disorders involving brain and peripheral protein deposition. The proteins involved in this mechanism do not share sequence homology, but the amyloid fibrils share biophysical properties and possibly a common pathogenic mechanism. Amyloid deposits are known to be involved in a broad range of neurodegenerative diseases, such as Alzheimer's disease and Creutzfeldt-Jakob disease, as well as in non-neuropathic diseases, such as senile systemic amyloidosis and type II diabetes. During the last decade the fruit fly, *Drosophila melanogaster (Drosophila)*, have increasingly been used as a model for neurodegenerative disease, such as Alzheimer's disease, Huntington's disease, amyotrophic lateral sclerosis, and familial amyloidotic polyneuropathy. The advantages of using the *Drosophila* model are the well-defined genetic characteristics, the quantity, short life span, simplicity in genetic manipulation and the powerful binary UAS-Gal4 transgenic system. The UAS-Gal4 system allows for rapid generation of individual strains in which expression of a specific gene of interest can be directed to different tissues or cell types. The system allows the target gene to be activated in different cell- and tissue-types by altering the activator-expressing lines.



This thesis has been focused on modeling amyloid diseases in *Drosophila*. This has been performed by:

- Creating new model systems of senile systemic amyloidosis and familial amyloidotic polyneuropathy in *Drosophila*
- Developing a new staining protocol for detection of amyloid in *Drosophila*
- Initiate a compound screen of Alzheimer's disease modeled in *Drosophila*

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