

Module Number 4c	Title: Non-Mammalian Model Systems of Neurodegenerative Diseases		
Module type: compulsory elective	Language: English	Group Size: 6 students	
Study semester: 1	Availability: summer semester	Duration: 1 semester	
Workload: 240 hrs	Credits: 8 CP	Contact time: 89 hrs	Independent Study: 151 hrs
1	Courses a) Lectures: 2 PPW b) Practical Course: 5 PPW c) Seminars: 1 PPW		
2	Intended Learning Outcomes The students are capable to describe the development of the nervous system in non-mammalian animal models such as <i>Caenorhabditis elegans</i> and <i>Drosophila</i> . They are able to delineate model systems for neurodegenerative diseases in nematodes and flies and evaluate their contribution to the elucidation of respective pathomechanisms in humans. The students are able to cultivate <i>Drosophila</i> and <i>C. elegans</i> and to devise experimental strategies to analyse their nervous system by means of state-of-the-art genetic and imaging methods. The students are able to describe basic principles of high throughput methods and quantification of image data by pattern recognition.		
3	Content The molecular mechanisms of neurodegenerative diseases are largely unknown. The development of non-mammalian animal models allows for genetic high throughput approaches to elucidate biological interaction networks of neurodegeneration. The module 'Model systems for neurodegenerative diseases' aims to make students familiar with non-mammalian animal models and motivate them to take up this innovative research. Practical course/laboratory: During the practical course the students will perform the methods listed, respective experiments and data analyses in wild type or reporter invertebrates. Fruit fly, <i>Drosophila</i>: - Basic methods of <i>Drosophila</i> cultivation and genetics - Basic methods of imaging the fly's nervous system - Analyses of the synapse at single synapse resolution - Analyses of synaptic growth and degeneration - Analysis of early neurogenesis in the fly <i>C. elegans</i>: - Basic methods of <i>C. elegans</i> cultivation (solid and liquid culture) - Basic methods of imaging the nematode's nervous system at single cell resolution - Quantification of image data by pattern recognition - Analyses of amyloid protein fibrillation by imaging or biochemistry (immunoblotting, filter retardation assays) - Observation of behavioural, biochemical and morphological phenotypes in aging, adult nematodes		
4	Teaching methods Lecture, practical course/laboratory work, written protocols		
5	Prerequisites Formal: Successful completion of module 1. Proficiency in English level B2 of Common European Framework of Reference for Languages (CEFR). With regards to content: None		
6	Examination types Written exam		

7	Requirements for award of credit points Participation in the practical course, delivery of a written protocol, and passed final examination
8	Module applicability (in other study courses) Master Biology Compatibility with other curricula Master Biochemistry
9	Assessment The mark given will contribute to the final grade in proper relation to its credits.
10	Module convenor and main lecturers Prof. Hermann Aberle, Prof. Thomas Klein, <u>Prof. Dr. Anna von Mikecz</u>
11	Further information The attendance at the lectures is strongly recommended. The content of the lectures is prerequisite for the practicals and seminars.