Biomolecular Disease Processes

Programme course

6 credits

Biomolekylära sjukdomsprocesser

TFKE48

Valid from: 2017 Spring semester

Determined by
Board of Studies for Chemistry, Biology and Biotechnology

Date determined
2017-01-25

Main field of study
Chemical Biology, Chemistry

Course level
Second cycle

Advancement level
A1X

Course offered for
- Protein Science, Master's Programme
- Chemical Biology, M Sc in Engineering
- Protein Science, Master's programme

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Protein chemistry. Three years of Chemistry / Chemical biology program or equivalent program

Intended learning outcomes
The course aims to provide knowledge of biomolecular processer of common degenerative diseases (Alzheimer´s disease, type II diabetes) and rare diseases (systemic and familial amyloidoses) which collectively are caused by misfolded protein molecules.After the course the student is able to:

- explpain with deep insight of molecular processes concerning protein misfolding.
- explain with deep insight how mutations influence protein conformational changes,
- give avenues for therapeutic strategies against different diseases.

Course content

The course handles the background of a group of human diseases known as the amyloidoses or protein conformational diseases. The links between protein structure, the biophysical and chemical properties of proteins and the link from mutation to conformational change are studied in detail with a number of examples from human diseases.
Proteins studied in detail are: amyloid-beta (Alzheimer's disease); prion protein (Creutzfeldt Jakob disease); BR12 (familial brittish and danish dementia); immunoglobulin (primary systemic amyloidosis); transthyretin (familial amyloidotic polyneuropathy); high density lipo proteins, amyloid-A (secondary amyloid-A amyloidosis), apoAII; gelsolin (Finnish familial amyloidosis); lysozyme (Inhereted non-neuropathic amyloidois); fibrinogen (inherited nephropathic amyloidosis); beta-2-microglobulin (dialysis related amyloidosis), cystatin-c (heritable cystatin-c amyloid angiopathy), islet amyloid poly peptide (type II diabetes).
The laboratory course contains experimental studies of amyloid fibrils.

Teaching and working methods

The course contains a number of lectures and a seminar series with active participation of the students. A minor laboratory course is also included.

Examination

LAB1	Laboratory work	1 credits	U, G
TEN1	Written examination	5 credits	U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för fysik, kemi och biologi

Director of Studies or equivalent

Magdalena Svensson

Examiner

Peter Nilsson

Education components

Preliminary scheduled hours: 54 h
Recommended self-study hours: 106 h

Course literature

Boken: ”Amyloid Proteins. The beta-sheet conformation and disease” vol. 2.
Editor Jean D. Sipe (Whiley, VCH), samt vetenskapliga artiklar.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.