



PhD-scholarships

6 PhD-scholarships are now available at the
PhD-school in Molecular and Structural Biology
University of Tromsø, Norway.

Application dead line: April 7th 2005

At University of Tromsø are now 6 PhD scholarships available at the “**PhD-school in Molecular and Structural Biology**” (the MSB PhD-school) an interfaculty initiative between the Faculty of Medicine and the Faculty of Science, University of Tromsø, Norway. The joint effort of research groups in molecular cell biology, RNA-biology, and structural and computational biology will provide unique training environments and facilities in functional genomics and modern molecular and structural biology techniques.

The PhD-school associates research groups at the University of Tromsø that focus on wide range of topics in molecular and structural biology, including basic problems targeting protein-protein and protein-ligand interaction, protein stability, enzyme catalysis and design, molecular mechanisms of drug action, research targeting the structural and biological basis for tolerance regulation and autoimmune inflammation, cell signaling, transcription factors and gene regulation, and structural and functional studies of RNA.

Six PhD-scholarships are now available for the research projects listed below.

- (1) “**Structural and molecular bases for nephritis in Systemic lupus erythematosus**”.
- (2) “**Studies on the biological role of MAP kinase MK5/PRAK**”
- (3) “**The binding epitope of SMPI for thermolysin inhibition**”.
- (4) “**Protein interaction network of the multifunctional nuclear protein SPBP**”
- (5) “**Biophysical and biochemical analyses of of uracil-DNA N-glycosylase (UNG) from Atlantic cod**”
- (6) “**Identification and characterization of unique proteinases**”

For more details about the projects and procedures for applications, see

<http://uit.no/169/5919/>

Description of PhD-scholarships (6) available at the “*PhD-school in Molecular and Structural Biology*”, University of Tromsø, Norway.

Application dead line: April 7th 2005

Application has to be marked with: Ref. 05/614

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(1) "Structural and molecular bases for nephritis in Systemic lupus erythematosus". The PhD-scholarship is in the Molecular Immunology Research Group, headed by professor, MD, PhD, Ole Petter Rekvig. The group is characterizing the molecular and cellular origin of autoimmunity to DNA and nucleosomes, and how this highly specific autoimmunity initiate potentially fatal glomerulonephritis in SLE. The focus covers studies of tolerance regulation for both B cells and T cells in SLE, and how and why anti-dsDNA antibodies induce glomerulonephritis in SLE at a molecular and cellular level. These studies imply cell biology, experiments in tetracycline-regulated transgenic mice, morphological and gene-expression studies. Experimentally and in vitro generated results and information will be tested in human SLE patients. This will allow a direct comparison of the experimental systems and observations with those obtained in human SLE. Practical aims of these studies is to describe in detail the nephritis process, and to generate more specific diagnostic assays relevant to distinguish SLE form less serious disorders that may mimic SLE. One main aim of our work is to provide arguments for a strategy to re-classify SLE in context of recent and contemporary insight into established disease mechanisms.

Since scientific work in a clinical context will be the main focus for the announced PhD student, formal education as MD is preferred, preferentially with a specialty in Internal Medicine or in Rheumatology. It is an advantage having some experience from scientific evaluation of clinical parameters and from research. The PhD student will be trained in all necessary techniques involving cell biology, molecular immunology, morphology (confocal and immune/transmission electronmicroscopy, and gene- and biotechnology. For more details of the project and the position, contact Professor **Ole Petter Rekvig** (olepr@fagmed.uit.no) or tel +47 77646203).

(2) **“Studies on the biological role of MAP kinase MK5/PRAK”**. PhD-scholarship will be with the cellular signalling and gene regulation research group. The research interests of this group are gene regulation and signal transduction in mammalian cells. Central in the current studies are the transcription factor CREB (cAMP response element-binding protein) and the mitogen-activated protein kinase (MAPK) signal transduction pathways. The transcription factor CREB exerts a pivotal role in the expression of genes involved in important biological processes such as immune responses, gluconeogenesis, neural processes, cardiac functions, and apoptosis. The MAPK pathways participate in multiple cellular processes, including metabolism, gene expression, cell proliferation, differentiation, apoptosis, and motility. Aberrant activities of both CREB and MAP kinases can lead to cellular transformation and have been associated with human tumours. The PhD student will work on a project involving the MAPK-activated protein kinase MK5/PRAK. The biological role of MK5/PRAK remains elusive, but MK5 deficiency causes embryonic lethality in mice. The PhD student will work with different aspect to elucidate the biological role of MK5/PRAK. Experience with cell cultures, molecular biological and immunological techniques is an advantage. For more details of the project and the position, contact Professor **Ugo Moens** (ugom@fagmed.uit.no or tel +47 77644622).

(3) **“The binding epitope of SMPI for thermolysin inhibition”** Stepomyces metalloproteinase inhibitor (SMPI) is a proteinaceous inhibitor of the thermolysins. The stronger (several hundred folds) experimentally derived binding affinity of SMPI compared with other available inhibitors indicates a huge potential for inhibitor design mimicking the thermolysin binding interactions of SMPI. In the present project the functional binding epitope of SMPI for thermolysin inhibition will be studied by a combination of experimental and theoretical techniques. The project studies involve cloning and recombinant expression, structural studies by x-ray crystallographic methods, and characterization of the binding pattern using theoretical calculations in combination with SPR and calorimetric methods. For more details of the project and the position, contact Professor **Ingebrigt Sylte** (Ingebrigt.Sylte@fagmed.uit.no) tlf +47 77644705 (<http://uit.no/medbiologi/farmakologi/2>)

(4) **Protein interaction network of the multifunctional nuclear protein SPBP** Stromelysin-1 PDGF-responsive element Binding Protein (SPBP) is a large (220 kDa) nuclear protein. We have cloned and published cDNAs for the human and murine proteins. The human SPBP cDNA is alternatively spliced resulting in three isoforms differing in the extreme C-terminus of the protein. The murine gene is located on chromosome 15, while the human gene is found on chromosome 22. SPBP is expressed in most tissues. Functional mapping has revealed that SPBP is a multidomain protein. It contains three nuclear localisation signals, a novel type of DNA-binding protein with a single AT-hook, a transactivation domain at the N-terminal end, and an evolutionarily conserved ePHD zinc finger domain at the very C-terminal end. This ePHD zinc finger is also found in the trithorax family of chromatin-based transcriptional regulator proteins. Interestingly, SPBP has the ability to enhance the transcriptional activity of various transcription factors, suggesting that SPBP has a role as a transcriptional coactivator. We have used the yeast two-hybrid system to identify a number of nuclear proteins that interact with the ePHD domain of SPBP. Our results so far point to the possibility that SPBP is a multifunctional protein that in addition to be involved in transcriptional regulation also may be involved in

DNA repair and DNA replication. The person that is employed in the current PhD scholarship position will be working on functional characterization of these interactions in order to try to reveal more about the function of SPBP in the regulation of transcription, DNA repair and DNA replication. Experience in molecular biology techniques including work with recombinant DNA techniques is an advantage. For more details of the project and the position, contact Professor **Terje Johansen** (terjej@fagmed.uit.no or tel +47 77644720)

(5) “Biophysical and biochemical analyses of of uracil-DNA N-glycosylase (UNG) from Atlantic cod”. The project focuses on biophysical and biochemical properties of UNG, especially structural features that affect dynamic and catalytic properties. It is well known that the dynamics of the enzyme structure is important for the catalytic efficiency, but so far little is known about the relation between stability and dynamics, and thereby the catalytic ability. An increased knowledge about relations between structural features and stability will allow a more efficient design of proteins with modified properties. In this project we will use different experimental methods in order to study the biophysical and biochemical properties of proteins. The cold-adapted uracil-DNA N-glycosylase (UNG) from Atlantic cod will be used as model system. Marine enzymes adapted to cold environments are found to be more catalytically efficient than the mammalian counterparts, but also more thermolabile and therefore constitute ideal models in such studies. Native cod UNG and a large number of mutants of this enzyme will be studied and compared in order to pinpoint structural features of importance in this regard.

For more details of the project, contact Prof. Nils Peder Willassen

(nilspw@fagmed.uit.no or tel +47 77644652)

(<http://cold.imb.fm.uit.no/ProteinGroup/> or <http://uit.no/norstruct/home/>)

(6) Identification and characterization of unique proteinases: The PhD-scholar will work with identification and characterization of new proteinases from *Vibrio* and *Serratia* species. The project aims at exploring extremeophilic proteinases with unique specificity, activity and stability features. The molecular basis of the unique properties will be investigated by structure – function relation studies, and the gained information will be further used for redesign of enzyme properties by directed mutagenesis. The project studies involve bioinformatics identification and comparative genomics studies, cloning and recombinant expression, biochemical and biophysical characterization, and structural studies by crystallographic methods. Specificity and binding patterns will be explored by SPR and calorimetric methods in combination with theoretical binding interaction calculations. For more details of the project, contact Professor Arne O. Smalås (Arne.Smalas@chem.uit.no or tel +47 77644070) (<http://uit.no/norstruct/home/>)

Preferences for one or more of the positions must be clearly indicated in the application (prioritized order).

Common to all positions:

To be qualified for Ph.D. studies, a master degree or equivalent in molecular biology, chemistry, medicine, pharmacy or biotechnology is required. For some of the projects, additional and more specific requirements are required. Good knowledge of English is required.

The scholarship should lead to a Ph.D. degree in molecular and structural biology in accordance with the rules and regulations for Ph.D. studies at the University of Tromsø. Within 3 months after accession the Ph.D. student should present a plan for the qualifying work and for the Ph.D. project, including a plan of progress. The project and progress plan will be a part of the appointment contract, together with names of the advisors at the PhD-school.

Scholarship recipients are expected to contribute to the development of the Department's and the PhD-school's research activities. In addition to research, 25% of the scholarship working period is reserved for teaching obligations as directed by the relevant faculty.

The fellowship is for a period of four year, including 25% teaching duties per year. Previous employment as PhD fellowship will be included, in such a way that the total research period will be 3 years.

To be qualified for Ph.D. studies, a master degree or equivalent in molecular biology, chemistry, medicine, pharmacy or biotechnology is required. For some of the projects, additional and more specific requirements are given above. Good knowledge of English is required. A committee of professors will judge the qualifications of the applicants. The committee's main emphasis will be on the applicants' potential for research in the project's fields. The evaluation will be based on the master thesis, publications and other scientific work, which is included by the applicants in their application for the stipend. In addition, the committee will take into consideration working experience and pedagogical qualifications, and recommendations from individuals who have worked with the applicant. Information and material to be considered must be submitted within the application deadline. Material presented after the deadline will not be considered. Names of references may be given. The expert committee has the opportunity to invite applicants to visit the PhD-school in order to present their work and for an interview.

The University of Tromsø wishes to recruit women for research positions. If the qualifications of a group of applicants are found equal, female applicants will be ranked before male applicants. The positions adhere to the Norwegian Government's policy of balanced ethnicity, age and gender. Persons with immigrant background are encouraged to apply.

A Ph.D. stipend pays according to the state salary scale, code 1017, alternative code 1378, presently gross salary NOK 290.000 per annum. Two per cent of the salary will be deducted at source as an obligatory premium to the Norwegian State Pension Fund.

The applicants must send in a list in 5 copies of all his/her scientific papers, indicating where each has been published.

The application, including curriculum vitae, testimonials, certificates and the list of publications should be sent in 5 copies, within the application deadline, to:

**University of Tromsø
N-9037 TROMSØ
NORWAY**

Tel.: + 47 776 44975 or +47 776 44977, Fax.: + 47 776 45970

Scientific work, published or unpublished, which the applicant wants to be included in the evaluation, must be submitted in 3 copies arranged in 3 complete sets. The scientific work to be considered should be sent in within the application deadline to:

**Institute of Medical biology
University of Tromsø
N-9037 TROMSØ
NORWAY**

Mark the application with the reference number: Ref. 05/614

Complete regulations for faculty positions at the University of Tromsø are available in Norwegian only.