Department of Translational Medicine
Scholarship administrator

Dnr V 2020/2342

Announcement of post-doc scholarship at the Department of Translational Medicine within Joakim Esbjörnsson's research group focused on neutralising antibodies against SARS-CoV-2 at the atomic level.

Background and project description
Coronaviruses (CoVs) are a family of viruses infecting birds and mammals, and six CoV species infecting humans have been described to date (HCoV-OC43, HCoV-HKU1, HCoV-229E, HCoV-NL63, MERS-CoV, SARS-CoV [including the SARS-CoV and SARS-CoV-2 strains]. The “classical” HCoVs generally result in relatively mild symptoms (normally denoted as “common cold symptoms”). In contrast, the respiratory syndrome (RS) CoVs can result in much more severe and sometimes lethal disease. The currently ongoing SARS-CoV-2 pandemic has thus far (2021-12-18) caused 75 million confirmed infections worldwide with over 1.6 million confirmed deaths.

CoVs are single stranded RNA viruses, and the size of the virus genome ranges from 27,000-34,000 bp and encodes approximately 23 proteins. This include the spike (S) protein, a surface glycoprotein that is crucial for viral attachment and entry into the host cell. Recent reports have indicated that differences in virulence might be associated with genetic variance in the S protein, and that antibodies are typically raised against this protein. One of the most important components in developing drugs and vaccines against pathogens is in-depth understanding of the structural basis of the pathogen’s key proteins and how these structures are shaped by the pathogen’s inherent ability to diversify and adapt to new environments. The most recent developments in cryogenic electron microscopy (cryo-EM) and synchrotron particle acceleration makes it possible to determine the three-dimensional structure of proteins and protein complexes, and their chemical properties at atomic resolution. This provides unprecedented opportunities to understand and inform the design of new drugs and vaccines against pathogens.

The objective of this postdoctoral fellowship is to disentangle key protein structures of the most common CoVs, with a particular focus on the S protein of SARS-CoV-2 and how this protein interacts with different types of antibodies developed from combinatorial antibody libraries, or human B cells. The main task of the appointed fellow will be to set up and run a cell based assay to study protein mutations and antibody interactions. Here, the functionality and associated pathogenicity/neutralisation sensitivity of identified key protein structures will be assessed by ex vivo infections of cell lines using chimeric virus particles. Additionally the project will in a collaborative effort with staff from Lund Protein Production Platform (LP3) and MAX IV laboratory express and purify targeted proteins in order to resolve their three-dimensional structures using cryo-EM and X-ray crystallography. The fellow is also expected to link these project parts together. This fellowship is therefore a unique opportunity for someone who is interested in a collaborative environment and interacting with investigators with diverse experiences and expertise.
Primary Location
The primary affiliation of the appointed fellow will be with the Systems Virology Team, led by Associate Professor Joakim Esbjörnsson, located at the Biomedical Centre (https://www.med.lu.se/english/contact/biomedical_centre_bmc), Lund University, Sweden. However, due to the translational and collaborative character of the project, the appointed fellow will work closely with a broad network of scientists – ranging from experts in molecular virology and immunotechnologists to experts in protein chemistry and structural biology.

Lund University was founded in 1666, is consistently ranked among the world’s top 100 universities, and has produced four Nobel laureates. The University has 40,000 students and 8,160 staff based in Lund, Helsingborg and Malmö, Sweden. Lund is the most popular study location in Sweden. The University offers one of the broadest ranges of programmes and courses in Scandinavia, based on cross-disciplinary and cutting-edge research. The University has a distinct international profile, with partner universities in 67 countries. For more information, please visit: https://www.lunduniversity.lu.se/about/about-lund-university. In addition, Lund University is hosting the MAX IV laboratory which is considered the facility that provides the highest quality of X-rays available to scientists in the world (https://www.maxiv.lu.se/). Moreover, the world’s most powerful neutron source – The European Spallation Source (ESS) – is under construction on the outskirts of Lund and will be operational during 2023 (https://europeanspallationsource.se/).

The group’s homepage: https://www.virology.lu.se

Qualifications
Only candidates with a PhD degree obtained during or after 2019 should apply. The successful candidate must be highly motivated and independent, possess good verbal and written communications skills in English, and have a good track record of scientific accomplishments (including publications in peer-reviewed journals). The candidate must have a strong background in molecular and cell biology, as well as a track record in mammalian cell culturing and cell based assays. Additionally, a strong aptitude for biostatistics and bioinformatics, as well as an ability to work in multifaceted collaborative networks is desirable. Fluency in both written and spoken English is mandatory.

Scholarship period: 24 months.

Scholarship amount: 75000 SEK per quarter (three months)
Preliminary (flexible) start date: February 2022
Supervisor/contact person: Associate Professor and head of research group Joakim Esbjörnsson (joakim.esbjornsson@med.lu.se)

Written application, including reference number, is to be sent via e-mail to joakim.esbjornsson@med.lu.se and must include the following:

1. A Curriculum Vitae in English (max. 2 pages), containing:
   a) Personal details (name, address, email, date of birth, nationality, language skills etc)
   b) Education, subjects of Master and PhD theses and degrees
   c) Work experience
   d) Additional skills relevant for the fellowship
   e) Other relevant information

2. Copy of PhD certificate
3. Publication list
Only publications published in international peer-reviewed scientific journal should be listed. The two most important publications should be highlighted with an asterisk and followed by a short description of why it is important for the applicant.

4. Motivation letter (max. 2 pages)

5. Supporting letters from at least two references (if available)

Application deadline: Dec 14, 2021

Information regarding scholarships at Lund University
- The scholarship sum is paid quarterly and in advance
- The scholarship is a grant and therefore not subjected to tax deduction
- A scholarship can be awarded for 24 months but will be reviewed after 6 months
- The scholarship is intended for the recipient’s own education and does not constitute compensation for work carried out for the University.
- The scholarship does not constitute a pensionable income.
- The scholarship does not include financial compensation for parental leave.
- The scholarship does not entitle the recipient to unemployment benefits after the scholarship period.
- The scholarship follows the regulations established by the Vice-Chancellor of Lund University (June 27th 2013; Reg. No PE 2013/356).