

Macrophage Galactose Lectin binding to *S. aureus* cell surface WTA/LTA by integrated structural biology.

PhD in structural biology of Host-pathogen interactions, (M/W)

AUREUS Marie-Curie Doctoral Network

Identification du poste :

Fonctions	Doctorant / PhD
Catégorie	A
Corps	Chercheur
Quotité	100 %

- Assignment (place of work): Institute of Structural Biology (IBS - UMR 5075) - Grenoble, France

- Contract dates: from 1/10/2025 to 30/9/2028 (36 months)

Context and working environment

Description de la structure

Located on the Grenoble Scientific Polygon (ESRF/ILL/EMBL/IBS), the Institute of Structural Biology (IBS) is a national and international player in the field of integrated structural biology. At the same time a research centre, a technical platform, a reception and scientific training site, the IBS aims to develop research in structural biology, a field of research that is crucial for the understanding of fundamental biological mechanisms. It is based on 12 state-of-the-art platforms. As a joint research unit (CEA-CNRS-UGA) the IBS is composed of 19 research groups, each of these groups offering a multidisciplinary approach, at the frontiers of biology, physics and chemistry, in coherence with 3 research axes. Nearly 300 people work there, researchers, doctoral students, engineers and technicians in a multicultural and international environment. The recruited person will join the membrane and pathogens group.

Job duties and main activities :

Precise project name : MGL binding to *S. aureus* cell surface WTA/LTA by integrated structural biology

This position is one of 15 doctoral positions in a European doctoral network, called Aureus, whose members are spread across 9 European countries, and which will be operational from 2022 to 2029. The groups involved range from synthetic chemistry and immunology to structural, computational and cellular biology.

The study aims to understand how Macrophage Galactose Lectin (MGL) recognizes teichoic acids (TA) on *S. aureus* surfaces. Recognition depends on TA arrangement and the dynamics of MGL's carbohydrate recognition domain (CRD). Researchers will use microscopy, SPR, NMR, and X-ray scattering to investigate these interactions. Co-crystallization and X-ray crystallography of MGL with TA ligands may also be considered. This integrated approach seeks detailed insights into MGL-TA recognition mechanisms.

Main activities : The PhD candidate will produce and purify MGL lectin. He/She will investigate the interaction of the protein with the surface of *S. aureus* through an integrated structural biology approach, from cells to molecular details at atomic resolution. The candidate will employ fluorescently labelled MGL to probe the interaction at the surface of *S. aureus*, by confocal and super-resolution microscopy. Interaction between MGL and cell-surface polysaccharides will be characterised by Surface Plasmon Resonance, NMR and small-angle X-ray scattering. Co-crystallization of MGL with ligands could be also envisioned if required.

The doctoral candidate will work in collaboration with Università degli Studi di Napoli Federico II (UNINA), Italy; National Institute for Bioprocessing Research and Training Limited (NIBRT), Ireland and Imperial College of Science Technology and Medicine (ICL), United Kingdom.

Job-related restrictions or constraints : To be eligible to apply for this position under the European AUREUS project, applicants must meet the following criteria. - You have not yet obtained (or successfully defended) a PhD. - You have not resided or carried out your main activity (work, studies, etc.) in France for more than 12 months during the 36 months immediately preceding your date of entry into service. Compulsory national service, short-term stays such as holidays and time spent in a procedure for obtaining refugee status are not taken into account. - The research will be done in French or English, however it is expected that the non-French-speaking candidate will strive to learn the basics of French in order to facilitate communication and integration into the laboratory. The PhD candidate will have to perform secondments in other laboratories of the AUREUS Doctoral network for a duration of 3 to 4 months.

Profile required

Priority skills expected :

- **Professional skills/know-how**

Biochemistry- Microbiology - Structural biology - Nuclear magnetic resonance (NMR) - Purification and characterization of proteins. - English (written/oral) level C1 spoken and written.

- **Personal skills**

Organizational skills, fluency in English, ability to work independently and as a team player in a multidisciplinary environment. Good communication skills (in the context of a multi-partner project on a European scale).

Supervisory role (hierarchical or functional) : ☐ Yes ☒ No

Desired professional experience : ☒ beginner ☐ 2 to 5 years

Training, diploma, experience required : Master degree in Biochemistry, Structural Biology, Chemical-Biology or Pharmacy

Gross salary : 2700 Euros + 600 euros of mobility Allowance

General information

Contacts for questions :

- related to functions :

Dr Cedric Laguri, CNRS Researcher cedric.laguri@ibs.fr

Pr Franck Fieschi, Professor UGA franck.fieschi@ibs.fr

- about the position :

Valérie LANARI, HR Manager valerie.lanari@ibs.fr

Application to the position :

Please follow this link :

<https://emploi.univ-grenoble-alpes.fr/job-offers/phd-in-structural-biology-of-host-pathogen-interactions-aureus-marie-curie-doctoral-network--1568763.kjsp?RH=1135797159702996>