

Postdoctoral position: Epigenetic, structural and 3D X-ray imaging studies of morphotype switching in *Candida albicans* (M/F)

- Assignment (place of work): Institut de Biologie Structurale (IBS) and Institute for Advanced Biosciences (IAB)

Context and working environment

Description of the structure

This position is part of a collaborative research project between the Institut de Biologie Structurale (IBS; <https://www.ibs.fr/>) and the Institute for Advanced Biosciences (IAB; <https://iab-grenoble.fr>) in Grenoble, France.

IBS is an internationally recognized center for integrated structural biology located on the European Photon and Neutron (EPN) Campus (<https://www.epn-campus.eu>). Jointly operated by the University of Grenoble Alpes, the CEA and the CNRS, the institute comprises 20 research groups and 10 state-of-the-art technology platforms that together advance research at the interface of biology, chemistry and physics.

IAB is a leading biomedical research center located on Grenoble's Health Campus, adjacent to Grenoble Alpes University Hospital. Jointly operated by Inserm, CNRS, and the University of Grenoble Alpes, it comprises 19 research teams and 7 technology platforms conducting research spanning fundamental biology, translational research and clinical applications.

The project also involves close interactions with EMBL and ESRF, two international research organizations located adjacent to the IBS. The position thus offers the opportunity to work within a multidisciplinary environment at the interface of structural biology, epigenetics, microbiology and advanced imaging.

The successful candidate will be primarily based at IBS in the Epigenetics and Molecular Pathways research group led by Carlo Petosa. The group currently consists of 13 members, including 7 permanent staff and 6 researchers on fixed-term contracts including students, postdocs and technicians.

The candidate will also work closely with the Translational Epigenetics team led by Jérôme Govin at IAB. This team specializes in the study of epigenetic mechanisms regulating gene expression and adaptation in pathogenic fungi.

The candidate will benefit from joint IBS–IAB supervision, as well as regular interactions with collaborators at EMBL and ESRF involved in the development of 3D X-ray imaging approaches.

Job duties and main activities :

Brief description and estimated completion date: This project aims to investigate the molecular mechanisms underlying morphotype switching in *Candida albicans*, a major fungal pathogen responsible for invasive infections associated with high mortality. A key determinant of *C. albicans* virulence is its ability to transition between distinct morphological forms, notably yeast and filamentous forms, in response to environmental signals. The project will focus in particular on the fungal BET protein Bdf1, a chromatin-associated regulator that recognizes histone acylation marks and is suggested by preliminary evidence to play a key role in morphotype switching. The project will combine complementary approaches in fungal genetics, epigenetics, biochemistry, structural biology and high-resolution 3D X-ray imaging to elucidate the molecular and cellular mechanisms that govern morphogenesis and virulence in *C. albicans*.

Estimated completion date: October 2028.

Missions / duties performed:

- Investigate the molecular mechanisms by which Bdf1 recognizes histone acyl modifications and regulates morphotype switching in *Candida albicans* using biophysical, structural, cellular and transcriptomic approaches.
- Develop and apply 3D X-ray imaging to characterize the subcellular architecture of distinct *C. albicans* morphotypes at nanometric resolution.

Main activities:

- Characterize the interactions between Bdf1 and different histone acylation marks using biochemical and biophysical approaches.
- Determine the structural basis by which Bdf1 recognizes these histone acylation marks.

- Develop and implement quantitative cell biology approaches, including microscopy and FRAP, to investigate the recognition of histone acylation modifications by Bdf1.
- Perform comparative transcriptomic analyses of wildtype and mutant *Candida albicans* strains.
- Develop and implement innovative 3D X-ray imaging approaches to characterize the subcellular organization of different *Candida albicans* morphotypes.
- Present research findings at project meetings and contribute to the preparation of scientific publications.

Event - Objective result(s) setting the end of the agent's mission: Achievement of the scientific objectives of the project, including the generation and analysis of biochemical, biophysical, structural, transcriptomic and X-ray imaging datasets, and the establishment of an X-ray imaging workflow for *Candida albicans*.

Evaluation and control of the achievement of the results: Progress toward the project objectives will be evaluated through regular meetings with the project supervisors. Assessment will be based on the successful completion of the planned experimental work, including the generation and analysis of project datasets and the establishment of a 3D X-ray imaging workflow.

Job-related restrictions or constraints:

The position involves work across the two partner laboratories located at the IBS and IAB as well as interactions with collaborators at EMBL and ESRF. Occasional travel may be required for experiments at other synchrotron facilities in France and abroad.

Profile required

Priority skills expected:

- **Professional skills/know-how**

A strong background in biochemistry, biophysics, structural biology, molecular and cellular biology, microbiology or a related discipline. Previous experience in any of the following areas would be an advantage: fungal genetics, protein expression and purification, biophysical characterization of macromolecular interactions, X-ray crystallography and/or cryo-electron microscopy, advanced cellular microscopy and image analysis, bioinformatic analysis of complex biological datasets, and basic scripting and quantitative data analysis.

- **Personal skills**

Scientific rigor, autonomy, critical thinking, organizational skills, strong oral and written communication skills, and the ability to work collaboratively in a multidisciplinary environment.

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

Desired professional experience: ☒ beginner ☐ 2 to 5 years

Training, diploma, experience required:

A PhD in Life Sciences, Biomedical Sciences or a related discipline.

Contacts for questions:

- related to functions:

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- about the position:

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