





Job offer –Post-doctorate in Integrative biochemical studies of yeast spliceosome assembly and activation (For non-French scientists only)

Research Project Short Title as Submitted to CEFIPRA: "Integrative biochemical studies of elusive splicing factors involved in spliceosome assembly and activation" **Principal Investigator contact (Name and email id):** Clément Charenton, I.G.B.M.C. - Institut de génétique et de biologie moléculaire et cellulaire, University of Strasbourg, <u>charentc@igbmc.fr</u> **Reference Number of the Job Offer:** IFI_CEF_25_11

Project description

- Keywords : Splicing, Spliceosome, ribonucleoprotein, biochemistry, genetics, structure
- **Context :** Most eukaryotic mRNAs are initially transcribed as mosaics of coding (exons) and non-coding (introns) sequences. Pre-mRNA splicing, an essential step in mRNA processing, involves the removal of introns and ligation of exons through a two-step transesterification reaction. The boundaries of each intron are characterized by short conserved sequences called splice sites (SS). During the first step of splicing, called "branching", the 5' splice site (5'SS) is attacked by the "Branch A" adenosine present within the intron, producing the 5' exon cleaved and the intron-lariat/3'exon intermediate. During the second step, the 3' end of the 5' exon attacks the 3'SS, thereby ligating the exons together and releasing the intron-lariat. Importantly, this crucial step in gene expression is highly regulated since most pre-mRNAs are spliced differently depending on the cellular state or external stimuli1. This alternative splicing phenomenon remodels the genetic information contained in a given pre-mRNA to yield several mRNAs encoding distinct protein isoforms, displaying specific properties. This mechanism allows complex organisms to significantly expand and diversify their protein repertoires while maintaining a reduced number of genes.
- Abstract of the Research Project : Our comprehension of RNA splicing mechanisms has been largely informed by extensive investigations in the fields of biochemistry and genetics since the 1980's. More recently, significant advancements have been made through the acquisition of detailed structural snapshots of yeast and human spliceosome by cryo-electron microscopy (cryo-EM). These works have provided a rational framework for understanding functional data gathered over more than three decades. Nevertheless, it has also sparked new questions and hypotheses, driving further exploration and inquiry in the field. This new era in spliceosome biology requires tight collaboration between geneticists, biochemists and structural biologists to develop integrative biology approaches needed to uncover the most complex questions in the field.
- Scientific Objectives of the Project : Determine the role of yeast splicing factors involved in spliceosome assembly and activation using a combination of biochemistry, biophysics, cryo-EM and yeast genetics.
- Methodology and Timeline of the Project : For this, the researcher will use a combination of biochemical and structural biology methods: ribonucleoprotein complexes reconstitution from cell extracts and/or recombinant sources, cryo-EM, X-ray crystallography, mass spectrometry... The IGBMC has an exceptional scientific environment particularly well suited for this ambitious project. In particular, the institute hosts several cutting-edge technological platforms (electron microscopy equipped with two Titan Krios and a Glacios; cell culture; protein production; molecular biology; mass spectrometry, etc.) that guarantee this project good chances of success.







Candidate profile

- Candidates can be all nationalities except French. In case of double nationality (French and another one), the candidate is not eligible. In the context of CEFIPRA, Indian candidates are preferred
- Applicants for post-doctorate must have a PhD degree (or be in the process of obtaining one);
- No competences in French language is required
- Candidate competences: training in biochemistry / structural biology (ideally cryo-EM), experience in recombinant protein expression (E. coli, mammalian systems) and purification (including use of FPLC systems), good computer skills (familiarity with UNIX).
- Candidate know-how: strong organizational, interpersonal, and communication skills, advanced analytical reasoning, autonomy, rigor, responsiveness, versatility, and a collaborative team spirit.
- Expected starting date: 01-07-2025
- Expected duration: 18 months

How to candidate ?

Documents to be provided :

- i. A cover letter (reasons for the candidature, professional project ...) max 2 pages
- ii. A copy of the master's degree or a proof of the program followed (and expected date of end) OR A copy of the PhD degree or a proof of the PhD program followed (and expected date of defense) max 1 page
- iii. A copy of results for previous scholarship (max 3 pages)
- iv. International curriculum vitae (max 2 pages)
- v. Two letters of recommendation: one from any Indian institution and one from the French institution planned to host the candidate –mandatory- (max 2 pages)
- vi. All should be submitted within 1 pdf file of no more than 10 pages.

Applications should be submitted to the following email address: <u>msi@ifindia.in</u> mentioning the reference number of the Job offer clearly.







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Candidates are requested to contact the French scientific principal investigator of the project before submission. A recommendation letter from the scientific principal investigator is mandatory.

Benefits:

- Monthly allowance of 2400 euros for Post-Doc
- Travel allowance
- University fee
- Carte de séjour fee
- Campus France management fee
- Registration to the French social security scheme

Selection process:

Selection is made by a dedicated selection committee of at least 4 persons. Decisions will be transmitted by the Embassy of France to CEFIPRA. <u>No consideration will be given for candidates with no recommendation letter from the French institution.</u>

Criteria for applicants' selection:

Academic excellence

• Excellence of the Academic background, Academic records, Honors, Letters of support, Participation to international research projects, exchange programmes and conferences.

Motivation and qualities

Academic maturity: appropriation of the thesis project (stakes and contexts) • Quality of the presentation (oral expression, skills for synthesis, English level) • Maturity of the professional project: capacity to project her/himself within five years in terms of career development.

About CEFIPRA:

Indo-French Center for the Promotion of Advanced Research (CEFIPRA/IFCPAR) is an Indian body which promotes scientific cooperation between France and India in advanced fields of Science and Technology. It is supported by the Department of Science and Technology, Government of India and the Ministry of Europe and Foreign Affairs of the French government