Post-doctoral position in Fe-S cluster biogenesis

Contract type: Post-Doc 24 months
Salary Range: 30,000 - 35,000 € annual gross salary
Start date: 01 october 2017

Employer: Redox Biology team, Dr; **Benoit D'Autréaux**, Institute for Integrative Biology of the Cell (I2BC), UMR 9198 CNRS-CEA-Paris-Saclay University, 1 av. de la terrasse, 91190 Gif-Sur-Yvette. http://www.i2bc.paris-saclay.fr/spip.php?article108

Main place of work will be CEA Saclay, DRF/Joliot/SBIGEM/LSOC/Redox Biology Team, bat142, F91191 Gif-Sur-Yvette. http://ibitecs.cea.fr/drf/ibitecs/Pages/services/sbigem/lsoc/biologie_redox.aspx

Project: the post-doctoral fellow will be in charge of on-going project on the mechanism of iron-sulfur (Fe-S) cluster bio-synthesis. Fe-S clusters are essential prosthetic groups of a multitude of proteins. They are synthesized by multi-protein complexes through multi-step processes but the mechanisms of their biosynthesis are still poorly understood. Our team is particularly interested in the molecular function of Frataxin which controls the whole process. Defective expression of this protein leads to a severe neurodegenerative and cardiac disease named Friedreich's ataxia (FRDA). Thereby, the elucidation of Frataxin's molecular function will help design therapeutic strategies based on the replacement of Frataxin.

The specific aim of the project is to disentangle the primary steps of the assembly process, step by step, using an in vitro reconstituted machinery. Then to assess the effect of Frataxin on each of these steps. Based on novel data from our lab, the post-doctoral fellow will carried out the reconstitution of the Fe-S cluster assembly machinery in vitro using purified proteins and specific mutants to attempt isolate intermediates of the assembly process. The effect of Frataxin on these intermediates will be assessed by an array of biophysical methods (native mass spectrometry, X-ray absorption, EPR, CD, Mossbauer…).

Collaborations: the project will be conducted in collaboration with Synchrotron SOLEIL (Saclay), ICSN (Gif-Sur-Yvette), College de France (Paris) and IPHC (Strasbourg) as well as other national and international groups. This environment should as well provide opportunities for exchanges with other researchers.

Environment: Our team is a leading group in the redox biology field (oxidative stress defense, redox signaling, Fe-S cluster assembly) and their links with human pathologies such as ageing, neurodegeneration and cancer (1-6). Our team is hosted by the I2BC (Institute for Integrative Biology of the Cell), a recently created institute in the South-Paris area and is supported by CEA, CNRS and Paris-Saclay University. I2BC gathers cell biologists, biochemists and biophysicists investigating cellular biological processes from the biochemical to the whole cell aspects. The main place of work is CEA Saclay, the French Alternative Energies and Atomic Energy Commission (Commissariat à l'énergie atomique et aux énergies alternatives). It is a public institution with four main research areas: defense and security, information technologies, low-carbon energies and human health.

Candidate profile: The successful candidate will have a PhD in biochemistry, biophysics or chemistry with a solid background in biophysical methods and expertise in protein purification as well as redox biology. Specific skills in metallo-proteins, metallo-cofactor biogenesis, X-ray absorption or basic programming for data mining and fitting will be appreciated. We are seeking for highly motivated candidates interested in the elucidation of a long standing questions on how Fe-S cluster are assembled and how Frataxin is controlling this process. The candidate must show enthusiasm, autonomy and the will to collaborate with other team members.

How to apply: Send Email to Dr. **Benoit D'Autréaux**, benoit.dautreaux@i2bc.paris-saclay.fr

Please send a Curriculum Vitae, including academic records, past research experience as well as a letter detailing the motivation and the interest in our work. Applicants should also provide the names and contact details of two or more referees (supervisors, collaborators).

Relevant references:

1 Parent A, Elduque X, Cornu D, Belot L, Le Caer JP, Grandas A, Toledano MB, D'Autreaux B. (2015). **Nat Commun.** 6, 5686.
2 Kumar C, Igbaria A, D'Autreaux B, Planson AG, Junot C, Godat E, Bachhawat AK, Delaunay-Moisan A, Toledano MB. (2011). **EMBO J**. 30, 2044-2056.
3 Bersweiler A, D'Autreaux B, Mazon H, Belli G, Delaunay-Moisan A, Toledano MB, Rahuel-Clermont S. (2017). **Nat Chem Biol.**
4 D'Autreaux B, Toledano MB. (2007). **Nat Rev Mol Cell Biol.** 8, 813-824.
5 D'Autreaux B, Tucker NP, Dixon R, Spiro S. (2005). **Nature.** 437, 769-772.
6 Hanzen S, Vielfort K, Yang J, Roger F, Andersson V, Zamarbide-Fores S, Andersson R, Malm L, Palais G, Biteau B, Liu B, Toledano MB, Molin M, Nystrom T. (2016). **Cell.** 166, 140-151.