



Postdoctoral Research Position in Biochemistry and Physiology of Cyanobacteria

MESSC team, Institute for Integrative Biology of the Cell
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Context and aim of the project

The research for this position is to explore the genesis of oxygenic photosynthesis from an older form of photosynthesis that was non-oxygenic and based on sulfur oxidation. Some cyanobacteria are able to express simultaneously a variant of the oxygen-evolving enzyme Photosystem II (PSII) and proteins involved in the sulfur metabolism. Among these proteins, we have identified the flavoprotein sulfide-quinone oxidoreductase (SQR) and a cytochrome-c (cyt-c) with a rare heme-axial ligation that appears to be involved in catalytic sulfur chemistry [1,2]. When the PSII variant, the SQR and the cyt-c are expressed, cells outgrow the wt in presence of sulfide suggesting that these cells have a set of characteristics that confer them a selective advantage in reducing conditions.

The candidate will focus on the physiological and biochemical characterization of this intermediate state of evolution of photosynthesis where a variant of the oxygen-evolving enzyme PSII and proteins involved in the sulfur metabolism are expressed together. Our aim is to identify the network of proteins that allowed organisms to evolve oxygenic photosynthesis.

The candidate will interact with leading authorities in photosynthesis and have access to state-of-the-art technical facilities.

Candidate profile

We are seeking a motivated candidate with training in biochemistry and physiology of cyanobacteria ideally with experience in the following area: cyanobacteria cells culture, protein biochemical techniques such as protein purification and protein interaction methods. Experience in molecular biology of cyanobacteria is a plus.

Position details

The position is for a postdoctoral researcher for two years to start as soon as possible. The salary and benefits are competitive. The laboratory is located at the Institute for Integrative Biology of the Cell at the CEA Saclay 30 min from Paris, a world cultural center.

Application

Please send your CV, a cover letter outlining your background motivation and interests, and contact details for at least one reference to Tania Tibiletti (tania.tibiletti@cea.fr).

[1] Motomura T, Suga M, Hienerwadel R, Nakagawa A, Lai TL, Nitschke W, Kuma T, Sugiura M, Boussac A, Shen JR. Crystal structure and redox properties of a novel cyanobacterial heme protein with a His/Cys heme axial ligation and a Per-Arnt-Sim (PAS)-like domain. *J. Biol. Chem.* (2017) 292: 9599-9612.

[2] Deshpande M, Xing J, Gumerov VM, Crane BR, Zhulin IB. A bacterial NO-binding sensor domain evolved through acquisition of a cytochrome-derived c-type heme-binding motif. <https://doi.org/10.64898/2026.02.01.703092> doi:bioRxiv preprint