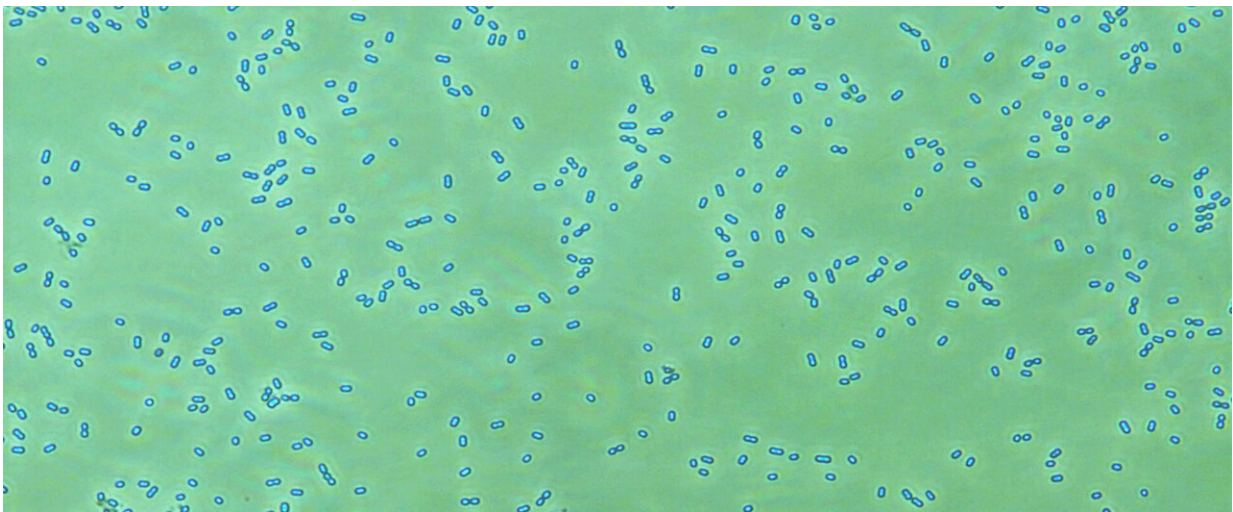


Researchers identify structure and function of first deacylase enzyme CddA in cyanobacteria

September 17 2020, by Liu Jia



Cyanobacteria. Credit: IHB

In a study published online in *Plant Physiology*, the research group led by Prof. Ge Feng from Institute of Hydrobiology (IHB) of the Chinese Academy of Sciences identified the first deacylase enzyme CddA that has both deacetylase and depropionylase activities in cyanobacteria.

The researchers found that the loss of the gene *cddA* lead to slower growth and impaired linear and cyclic [photosynthetic](#) electron transfer.

They determined its [crystal structure](#) at a resolution of 2.1 Å and established that it has a unique and characteristically folded α/β structure and a tube-like pocket likely playing a role in substrate binding.

By detecting an acyl binding site within CddA via site-directed mutagenesis, the researchers demonstrated that this site is essential for the depropionylase activity of this enzyme.

Resorting to a proteomic approach, they next characterized in vivo protein acetylation and propionylation in *Synechococcus* 7002 and found that these modified proteins were highly enriched for photosynthetic and metabolic functionality. In addition, they demonstrated that CddA was capable of catalyzing in vivo and in vitro lysine depropionylation and deacetylation of fructose-1,6-bisphosphatase (F/SBPase), thereby regulating its enzymatic activity.

Multiple complex regulatory mechanisms govern the photosynthetic and metabolic pathways within [cyanobacteria](#). While these mechanisms remain incompletely understood, there is increasing evidence indicating that a wide range of post-translational modification (PTMs) in both cyanobacteria and plants can regulate these processes, making the study of the enzymes regulating these processes of great interest.

Two [enzyme](#) families are responsible for regulating lysine acylation, lysine acyltransferases and deacylases. However, they are still not present in cyanobacteria. This study provides insight into the mechanisms globally regulating photosynthesis and carbon metabolism in cyanobacteria and potentially in other photosynthetic organisms as well.

More information: Xin Liu et al. Structural and functional insights into a lysine deacylase in the cyanobacterium *Synechococcus* sp. PCC 7002, *Plant Physiology* (2020). [DOI: 10.1104/pp.20.00583](https://doi.org/10.1104/pp.20.00583)

Provided by Chinese Academy of Sciences

Citation: Researchers identify structure and function of first deacylase enzyme CddA in cyanobacteria (2020, September 17) retrieved 24 June 2024 from <https://phys.org/news/2020-09-function-deacylase-enzyme-cdda-cyanobacteria.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.