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# An ambient Temperature crystal structure of bacterial CyaY Determined at Turkish Light Source

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## Abstract

The iron-sulfur (Fe-S) cluster assembly is an essential mechanism for sufficing cellular needs for the Iron sulfur clusters, the ancient small protein cofactors, found in various organisms. The iron-sulfur cluster assembly machinery is known to be correlated with diverse cellular functions including electron transfer, gene expression, regulation, nitrogen fixation, RNA modification, DNA repair and replication. Iron sulfur cluster assembly is accomplished by highly conserved systems existing both in prokaryotes and eukaryotes. In prokaryotes the most general system is ISC, encoded by isc operon (IscR, IscS, IscU, HscB, HscA, , IscA, ferredoxin and CyaY) that have eukaryotic homologs. CyaY, bacterial ortholog of eukaryotic mitochondrial frataxin, thought to have a role in iron sulfur cluster assembly as an iron supplier. In addition, mutation in Frataxin, a mitochondrial iron-binding protein, caused Friedreich's ataxia a progressive neurodegenerative disorder, therefore CyaY has attracted attention due to its essential role. Here we present the first ambient temperature crystal structure of CyaY protein from Escherichia coli obtained using the home source Rigaku Oxford Diffraction XtaLAB Synergy-S diffractometer. This study provides valuable insights to better understand the dynamic characteristics of the protein in near-physiological conditions which may not have been noticed in previous cryogenic studies.

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