



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 04:57 PM UTC

PDB ID : 2G18 / pdb_00002g18
Title : Crystal Structure of Nostoc sp. 7120 phycocyanobilin:ferredoxin oxidoreduc-
tase (PcyA) Apoprotein
Authors : Tu, S.-L.; Lagarias, J.C.; Fisher, A.J.
Deposited on : 2006-02-13
Resolution : 2.50 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

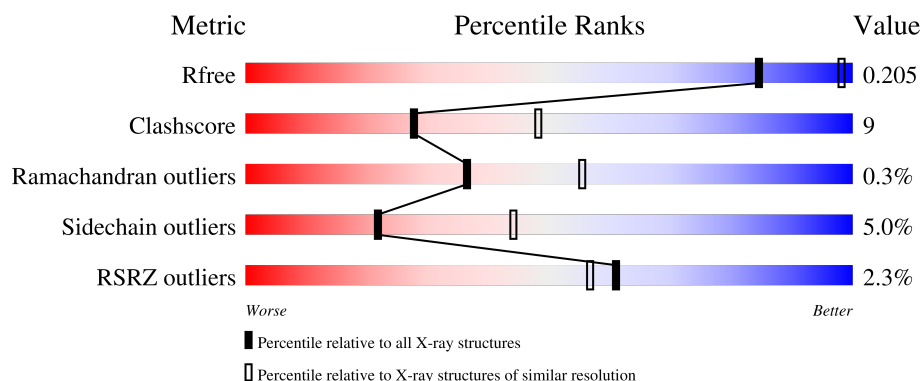
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



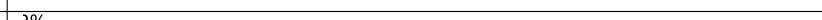
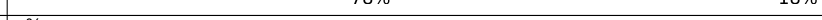
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	253	
1	B	253	
1	C	253	
1	D	253	
1	E	253	

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Mol	Chain	Length	Quality of chain	
1	F	253		78% 18% ..
1	G	253		78% 18% ..
1	H	253		79% 17% ..
1	I	253		71% 22% • 6%
1	J	253		74% 18% • 6%
1	K	253		72% 20% • 6%
1	L	253		79% 12% .. 6%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 23613 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Phycocyanobilin:ferredoxin oxidoreductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	245	Total	C	N	O	S	0	0	0
			1964	1242	341	368	13			
1	B	245	Total	C	N	O	S	0	0	0
			1964	1242	341	368	13			
1	C	245	Total	C	N	O	S	0	0	0
			1964	1242	341	368	13			
1	D	248	Total	C	N	O	S	0	0	0
			1991	1261	344	373	13			
1	E	245	Total	C	N	O	S	0	0	0
			1964	1242	341	368	13			
1	F	245	Total	C	N	O	S	0	0	0
			1964	1242	341	368	13			
1	G	248	Total	C	N	O	S	0	0	0
			1991	1261	344	373	13			
1	H	245	Total	C	N	O	S	0	0	0
			1964	1242	341	368	13			
1	I	238	Total	C	N	O	S	0	0	0
			1914	1209	334	358	13			
1	J	238	Total	C	N	O	S	0	0	0
			1914	1209	334	358	13			
1	K	238	Total	C	N	O	S	0	0	0
			1914	1209	334	358	13			
1	L	238	Total	C	N	O	S	0	0	0
			1914	1209	334	358	13			

There are 108 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	GLY	-	cloning artifact	UNP Q93TN0
A	-6	PRO	-	cloning artifact	UNP Q93TN0
A	-5	LEU	-	cloning artifact	UNP Q93TN0
A	-4	GLY	-	cloning artifact	UNP Q93TN0
A	-3	SER	-	cloning artifact	UNP Q93TN0

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	PRO	-	cloning artifact	UNP Q93TN0
A	-1	GLU	-	cloning artifact	UNP Q93TN0
A	0	PHE	-	cloning artifact	UNP Q93TN0
A	1	ILE	-	cloning artifact	UNP Q93TN0
B	-7	GLY	-	cloning artifact	UNP Q93TN0
B	-6	PRO	-	cloning artifact	UNP Q93TN0
B	-5	LEU	-	cloning artifact	UNP Q93TN0
B	-4	GLY	-	cloning artifact	UNP Q93TN0
B	-3	SER	-	cloning artifact	UNP Q93TN0
B	-2	PRO	-	cloning artifact	UNP Q93TN0
B	-1	GLU	-	cloning artifact	UNP Q93TN0
B	0	PHE	-	cloning artifact	UNP Q93TN0
B	1	ILE	-	cloning artifact	UNP Q93TN0
C	-7	GLY	-	cloning artifact	UNP Q93TN0
C	-6	PRO	-	cloning artifact	UNP Q93TN0
C	-5	LEU	-	cloning artifact	UNP Q93TN0
C	-4	GLY	-	cloning artifact	UNP Q93TN0
C	-3	SER	-	cloning artifact	UNP Q93TN0
C	-2	PRO	-	cloning artifact	UNP Q93TN0
C	-1	GLU	-	cloning artifact	UNP Q93TN0
C	0	PHE	-	cloning artifact	UNP Q93TN0
C	1	ILE	-	cloning artifact	UNP Q93TN0
D	-7	GLY	-	cloning artifact	UNP Q93TN0
D	-6	PRO	-	cloning artifact	UNP Q93TN0
D	-5	LEU	-	cloning artifact	UNP Q93TN0
D	-4	GLY	-	cloning artifact	UNP Q93TN0
D	-3	SER	-	cloning artifact	UNP Q93TN0
D	-2	PRO	-	cloning artifact	UNP Q93TN0
D	-1	GLU	-	cloning artifact	UNP Q93TN0
D	0	PHE	-	cloning artifact	UNP Q93TN0
D	1	ILE	-	cloning artifact	UNP Q93TN0
E	-7	GLY	-	cloning artifact	UNP Q93TN0
E	-6	PRO	-	cloning artifact	UNP Q93TN0
E	-5	LEU	-	cloning artifact	UNP Q93TN0
E	-4	GLY	-	cloning artifact	UNP Q93TN0
E	-3	SER	-	cloning artifact	UNP Q93TN0
E	-2	PRO	-	cloning artifact	UNP Q93TN0
E	-1	GLU	-	cloning artifact	UNP Q93TN0
E	0	PHE	-	cloning artifact	UNP Q93TN0
E	1	ILE	-	cloning artifact	UNP Q93TN0
F	-7	GLY	-	cloning artifact	UNP Q93TN0
F	-6	PRO	-	cloning artifact	UNP Q93TN0

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Chain	Residue	Modelled	Actual	Comment	Reference
F	-5	LEU	-	cloning artifact	UNP Q93TN0
F	-4	GLY	-	cloning artifact	UNP Q93TN0
F	-3	SER	-	cloning artifact	UNP Q93TN0
F	-2	PRO	-	cloning artifact	UNP Q93TN0
F	-1	GLU	-	cloning artifact	UNP Q93TN0
F	0	PHE	-	cloning artifact	UNP Q93TN0
F	1	ILE	-	cloning artifact	UNP Q93TN0
G	-7	GLY	-	cloning artifact	UNP Q93TN0
G	-6	PRO	-	cloning artifact	UNP Q93TN0
G	-5	LEU	-	cloning artifact	UNP Q93TN0
G	-4	GLY	-	cloning artifact	UNP Q93TN0
G	-3	SER	-	cloning artifact	UNP Q93TN0
G	-2	PRO	-	cloning artifact	UNP Q93TN0
G	-1	GLU	-	cloning artifact	UNP Q93TN0
G	0	PHE	-	cloning artifact	UNP Q93TN0
G	1	ILE	-	cloning artifact	UNP Q93TN0
H	-7	GLY	-	cloning artifact	UNP Q93TN0
H	-6	PRO	-	cloning artifact	UNP Q93TN0
H	-5	LEU	-	cloning artifact	UNP Q93TN0
H	-4	GLY	-	cloning artifact	UNP Q93TN0
H	-3	SER	-	cloning artifact	UNP Q93TN0
H	-2	PRO	-	cloning artifact	UNP Q93TN0
H	-1	GLU	-	cloning artifact	UNP Q93TN0
H	0	PHE	-	cloning artifact	UNP Q93TN0
H	1	ILE	-	cloning artifact	UNP Q93TN0
I	-7	GLY	-	cloning artifact	UNP Q93TN0
I	-6	PRO	-	cloning artifact	UNP Q93TN0
I	-5	LEU	-	cloning artifact	UNP Q93TN0
I	-4	GLY	-	cloning artifact	UNP Q93TN0
I	-3	SER	-	cloning artifact	UNP Q93TN0
I	-2	PRO	-	cloning artifact	UNP Q93TN0
I	-1	GLU	-	cloning artifact	UNP Q93TN0
I	0	PHE	-	cloning artifact	UNP Q93TN0
I	1	ILE	-	cloning artifact	UNP Q93TN0
J	-7	GLY	-	cloning artifact	UNP Q93TN0
J	-6	PRO	-	cloning artifact	UNP Q93TN0
J	-5	LEU	-	cloning artifact	UNP Q93TN0
J	-4	GLY	-	cloning artifact	UNP Q93TN0
J	-3	SER	-	cloning artifact	UNP Q93TN0
J	-2	PRO	-	cloning artifact	UNP Q93TN0
J	-1	GLU	-	cloning artifact	UNP Q93TN0
J	0	PHE	-	cloning artifact	UNP Q93TN0

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Chain	Residue	Modelled	Actual	Comment	Reference
J	1	ILE	-	cloning artifact	UNP Q93TN0
K	-7	GLY	-	cloning artifact	UNP Q93TN0
K	-6	PRO	-	cloning artifact	UNP Q93TN0
K	-5	LEU	-	cloning artifact	UNP Q93TN0
K	-4	GLY	-	cloning artifact	UNP Q93TN0
K	-3	SER	-	cloning artifact	UNP Q93TN0
K	-2	PRO	-	cloning artifact	UNP Q93TN0
K	-1	GLU	-	cloning artifact	UNP Q93TN0
K	0	PHE	-	cloning artifact	UNP Q93TN0
K	1	ILE	-	cloning artifact	UNP Q93TN0
L	-7	GLY	-	cloning artifact	UNP Q93TN0
L	-6	PRO	-	cloning artifact	UNP Q93TN0
L	-5	LEU	-	cloning artifact	UNP Q93TN0
L	-4	GLY	-	cloning artifact	UNP Q93TN0
L	-3	SER	-	cloning artifact	UNP Q93TN0
L	-2	PRO	-	cloning artifact	UNP Q93TN0
L	-1	GLU	-	cloning artifact	UNP Q93TN0
L	0	PHE	-	cloning artifact	UNP Q93TN0
L	1	ILE	-	cloning artifact	UNP Q93TN0

- Molecule 2 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	E	1	Total Ca 1 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	19	Total O 19 19	0	0
3	B	7	Total O 7 7	0	0
3	C	16	Total O 16 16	0	0
3	D	31	Total O 31 31	0	0
3	E	18	Total O 18 18	0	0
3	F	17	Total O 17 17	0	0
3	G	18	Total O 18 18	0	0

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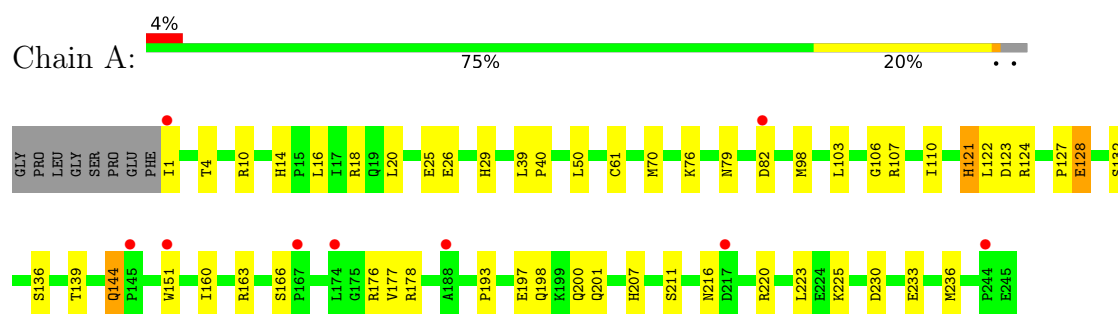
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	H	25	Total 25	O 25	0	0
3	I	14	Total 14	O 14	0	0
3	J	11	Total 11	O 11	0	0
3	K	13	Total 13	O 13	0	0
3	L	1	Total 1	O 1	0	0

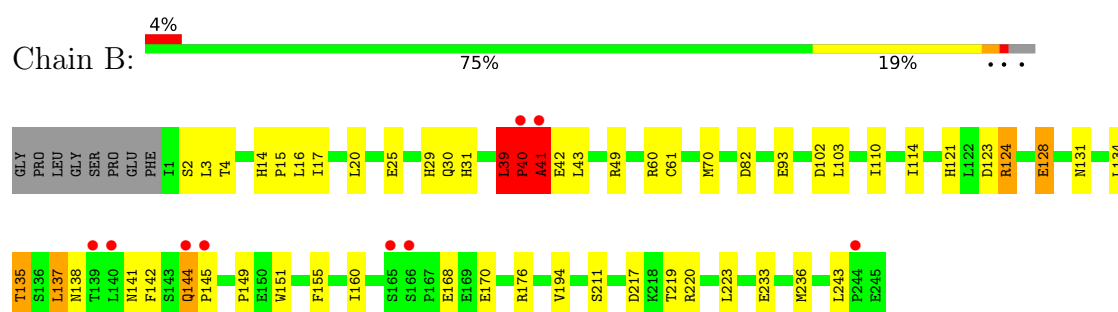
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

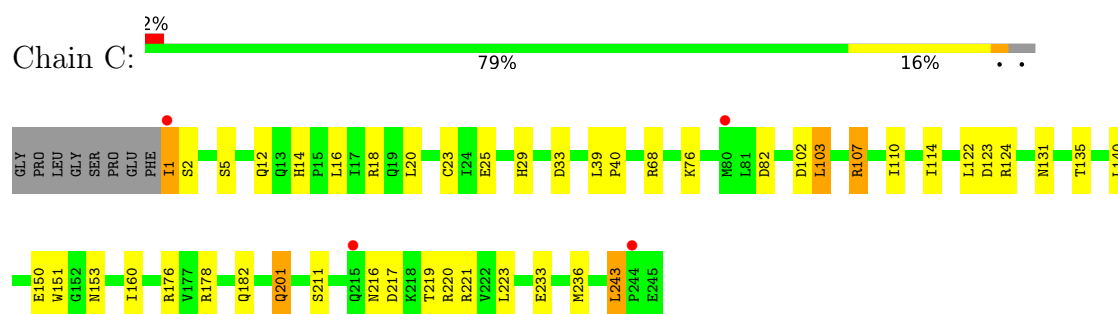
- Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



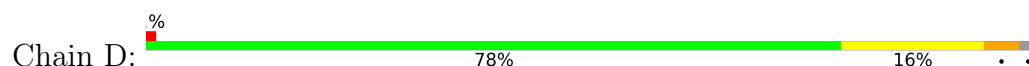
- Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase

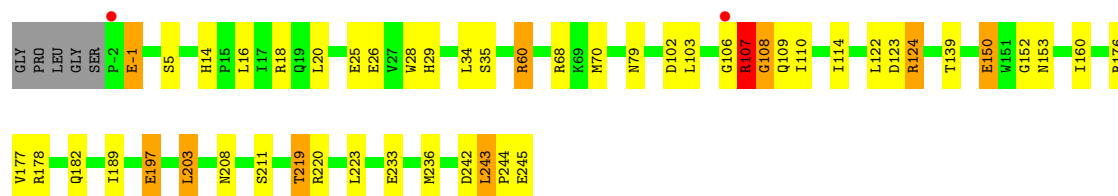


- Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase

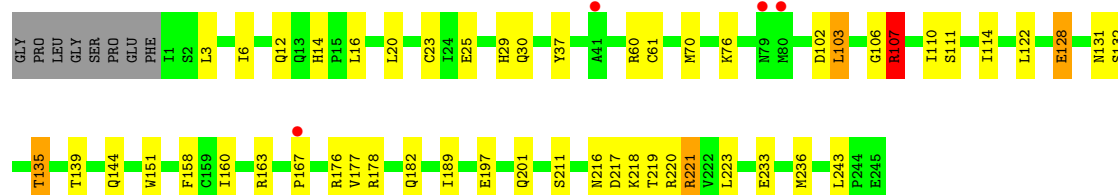
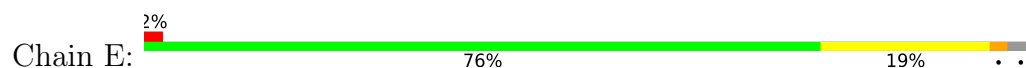


- Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase

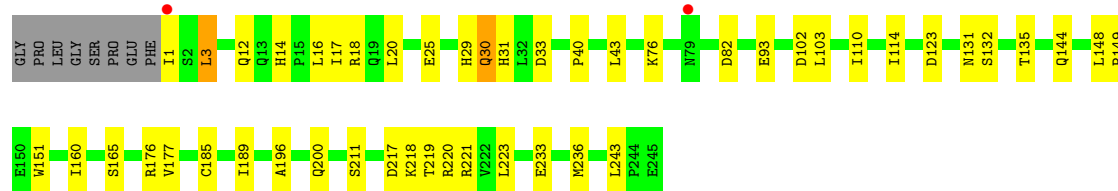
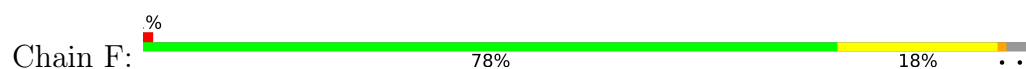




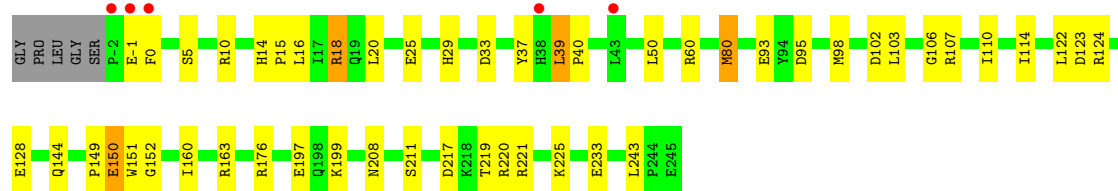
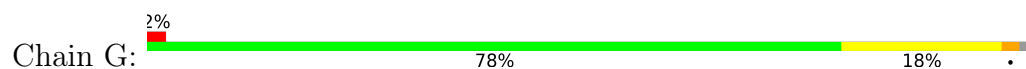
• Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



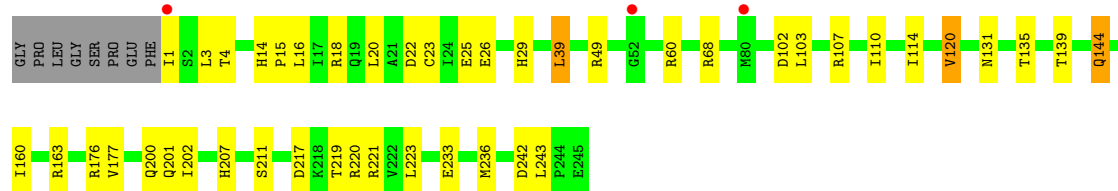
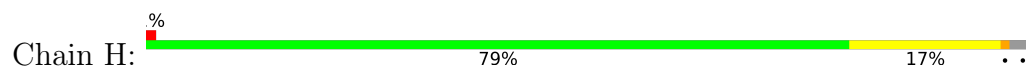
• Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



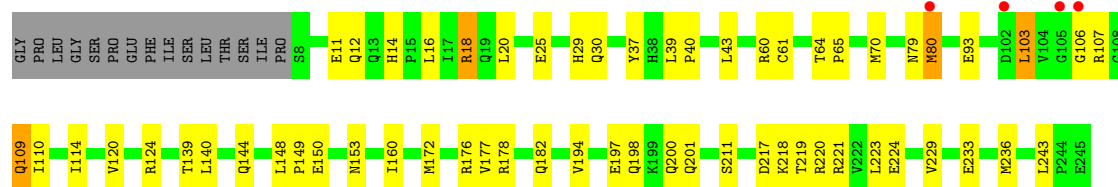
• Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



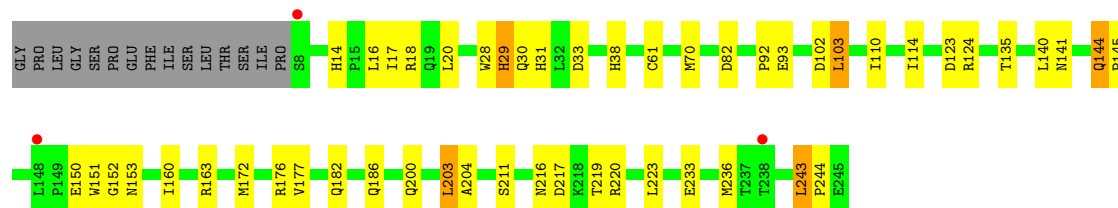
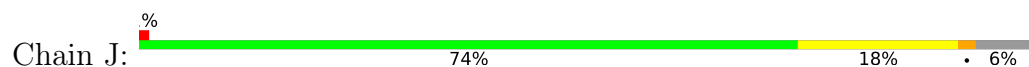
• Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



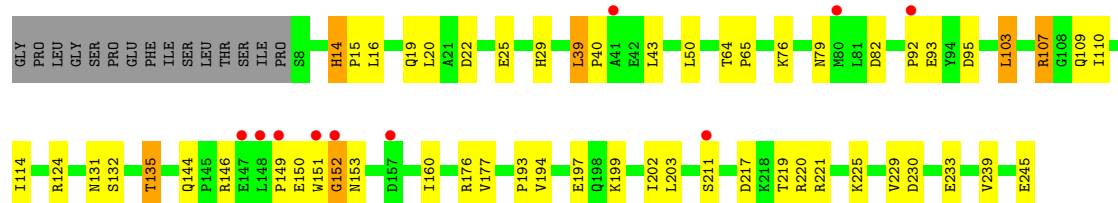
• Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



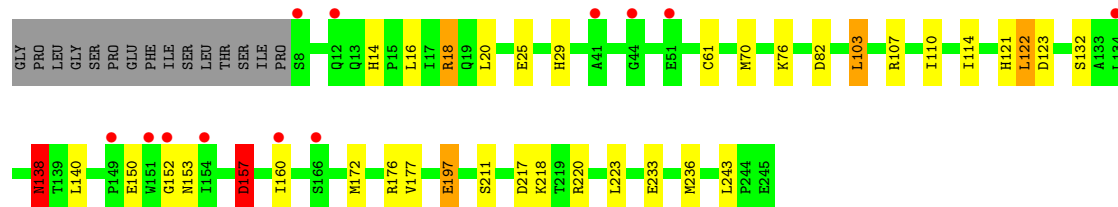
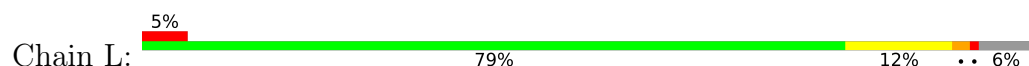
- Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



- Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



- Molecule 1: Phycocyanobilin:ferredoxin oxidoreductase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	78.50Å 141.33Å 121.84Å 90.00° 91.29° 90.00°	Depositor
Resolution (Å)	43.94 – 2.50 43.94 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.7 (43.94-2.50) 99.7 (43.94-2.50)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.27 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.211 , 0.257 0.206 , 0.205	Depositor DCC
R_{free} test set	4582 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	44.4	Xtriage
Anisotropy	0.050	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 51.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.018 for h,-k,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	23613	wwPDB-VP
Average B, all atoms (Å ²)	53.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 27.33 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.2431e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	A	1.05	4/2012 (0.2%)	1.05	3/2729 (0.1%)
1	B	0.82	0/2012	0.97	4/2729 (0.1%)
1	C	0.91	1/2012 (0.0%)	1.03	5/2729 (0.2%)
1	D	1.00	1/2041 (0.0%)	1.06	4/2768 (0.1%)
1	E	0.98	0/2012	0.99	3/2729 (0.1%)
1	F	0.93	0/2012	1.02	4/2729 (0.1%)
1	G	0.85	0/2041	0.97	4/2768 (0.1%)
1	H	0.98	0/2012	1.06	4/2729 (0.1%)
1	I	0.88	1/1961 (0.1%)	0.97	3/2658 (0.1%)
1	J	0.91	0/1961	1.00	4/2658 (0.2%)
1	K	0.88	1/1961 (0.1%)	0.94	1/2658 (0.0%)
1	L	0.97	4/1961 (0.2%)	0.91	4/2658 (0.2%)
All	All	0.93	12/23998 (0.1%)	1.00	43/32542 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	3

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	L	197	GLU	CD-OE1	21.56	1.66	1.25
1	A	178	ARG	NE-CZ	18.20	1.53	1.33
1	L	157	ASP	CB-CG	14.74	1.89	1.52
1	L	197	GLU	CD-OE2	13.71	1.51	1.25
1	A	178	ARG	CZ-NH1	-12.75	1.15	1.32

The worst 5 of 43 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	178	ARG	NE-CZ-NH2	18.87	136.18	119.20
1	C	178	ARG	NE-CZ-NH2	-13.67	106.89	119.20
1	D	219	THR	OG1-CB-CG2	-10.09	89.13	109.30
1	G	243	LEU	CA-C-N	9.40	129.62	119.28
1	G	243	LEU	C-N-CA	9.40	129.62	119.28

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	39	LEU	Peptide
1	B	40	PRO	Peptide
1	B	41	ALA	Peptide

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1964	0	1916	32	0
1	B	1964	0	1916	39	1
1	C	1964	0	1916	34	0
1	D	1991	0	1938	53	0
1	E	1964	0	1916	39	0
1	F	1964	0	1916	29	2
1	G	1991	0	1938	33	0
1	H	1964	0	1916	26	0
1	I	1914	0	1856	40	1
1	J	1914	0	1856	56	0
1	K	1914	0	1856	48	0
1	L	1914	0	1856	32	0
2	E	1	0	0	0	0
3	A	19	0	0	2	0
3	B	7	0	0	1	0
3	C	16	0	0	4	0
3	D	31	0	0	6	0
3	E	18	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	F	17	0	0	0	0
3	G	18	0	0	1	0
3	H	25	0	0	3	0
3	I	14	0	0	2	0
3	J	11	0	0	0	0
3	K	13	0	0	0	0
3	L	1	0	0	0	0
All	All	23613	0	22796	418	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

The worst 5 of 418 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:157:ASP:CG	1:L:157:ASP:CB	1.88	1.44
1:L:197:GLU:OE1	1:L:197:GLU:CD	1.66	1.34
1:K:124:ARG:NH2	1:K:153:ASN:HB2	1.66	1.08
1:D:35:SER:CB	1:J:186:GLN:NE2	2.21	1.04
1:D:35:SER:CB	1:J:186:GLN:HE22	1.69	1.04

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:60:ARG:NH2	1:F:3:LEU:O[2_456]	2.16	0.04
1:F:218:LYS:NZ	1:I:197:GLU:OE1[2_446]	2.19	0.01

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	243/253 (96%)	235 (97%)	8 (3%)	0	100	100
1	B	243/253 (96%)	236 (97%)	4 (2%)	3 (1%)	10	20
1	C	243/253 (96%)	238 (98%)	4 (2%)	1 (0%)	30	49
1	D	246/253 (97%)	238 (97%)	6 (2%)	2 (1%)	16	31
1	E	243/253 (96%)	237 (98%)	5 (2%)	1 (0%)	30	49
1	F	243/253 (96%)	238 (98%)	5 (2%)	0	100	100
1	G	246/253 (97%)	240 (98%)	6 (2%)	0	100	100
1	H	243/253 (96%)	236 (97%)	7 (3%)	0	100	100
1	I	236/253 (93%)	231 (98%)	5 (2%)	0	100	100
1	J	236/253 (93%)	231 (98%)	5 (2%)	0	100	100
1	K	236/253 (93%)	228 (97%)	7 (3%)	1 (0%)	30	49
1	L	236/253 (93%)	228 (97%)	7 (3%)	1 (0%)	30	49
All	All	2894/3036 (95%)	2816 (97%)	69 (2%)	9 (0%)	36	55

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	40	PRO
1	D	108	GLY
1	D	107	ARG
1	K	152	GLY
1	B	41	ALA

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	217/223 (97%)	204 (94%)	13 (6%)	17	36
1	B	217/223 (97%)	205 (94%)	12 (6%)	19	40
1	C	217/223 (97%)	207 (95%)	10 (5%)	24	48
1	D	220/223 (99%)	207 (94%)	13 (6%)	18	37

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	217/223 (97%)	204 (94%)	13 (6%)	17	36
1	F	217/223 (97%)	210 (97%)	7 (3%)	34	62
1	G	220/223 (99%)	208 (94%)	12 (6%)	19	40
1	H	217/223 (97%)	206 (95%)	11 (5%)	21	43
1	I	210/223 (94%)	199 (95%)	11 (5%)	21	42
1	J	210/223 (94%)	205 (98%)	5 (2%)	43	70
1	K	210/223 (94%)	197 (94%)	13 (6%)	16	34
1	L	210/223 (94%)	201 (96%)	9 (4%)	26	51
All	All	2582/2676 (96%)	2453 (95%)	129 (5%)	22	44

5 of 129 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	197	GLU
1	K	245	GLU
1	E	6	ILE
1	D	245	GLU
1	L	103	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 55 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	29	HIS
1	I	12	GLN
1	L	144	GLN
1	K	38	HIS
1	G	30	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	245/253 (96%)	0.53	9 (3%) 45 40	39, 51, 68, 83	0
1	B	245/253 (96%)	0.44	9 (3%) 45 40	40, 52, 73, 78	0
1	C	245/253 (96%)	0.29	4 (1%) 70 67	40, 52, 69, 79	0
1	D	248/253 (98%)	0.26	2 (0%) 82 80	40, 51, 68, 76	0
1	E	245/253 (96%)	0.29	4 (1%) 70 67	38, 52, 69, 82	0
1	F	245/253 (96%)	0.27	2 (0%) 82 80	40, 52, 66, 73	0
1	G	248/253 (98%)	0.35	5 (2%) 65 61	38, 52, 70, 77	0
1	H	245/253 (96%)	0.28	3 (1%) 76 73	39, 53, 66, 76	0
1	I	238/253 (94%)	0.34	4 (1%) 69 65	39, 52, 68, 77	0
1	J	238/253 (94%)	0.27	3 (1%) 75 71	40, 51, 66, 84	0
1	K	238/253 (94%)	0.51	10 (4%) 40 36	39, 52, 72, 90	0
1	L	238/253 (94%)	0.78	12 (5%) 34 30	39, 53, 67, 74	0
All	All	2918/3036 (96%)	0.38	67 (2%) 61 57	38, 52, 69, 90	0

The worst 5 of 67 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	244	PRO	4.5
1	H	1	ILE	4.0
1	K	151	TRP	3.8
1	L	152	GLY	3.4
1	G	-1	GLU	3.3

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	CA	E	246	1/1	0.89	0.20	23,23,23,23	1

6.5 Other polymers [i](#)

There are no such residues in this entry.