WORLDWIDE PDB

PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 8, 2025 – 12:06 pm GMT

PDB ID	:	8S8Q
Title	:	Structure of the Interfilum paradoxum LFY DNA-binding domain bound to DNA
Authors	:	Verhage, L.; Zubieta, C.; Nanao, M.H.
Deposited on	:	2024-03-07
Resolution	:	2.95 Å(reported)

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

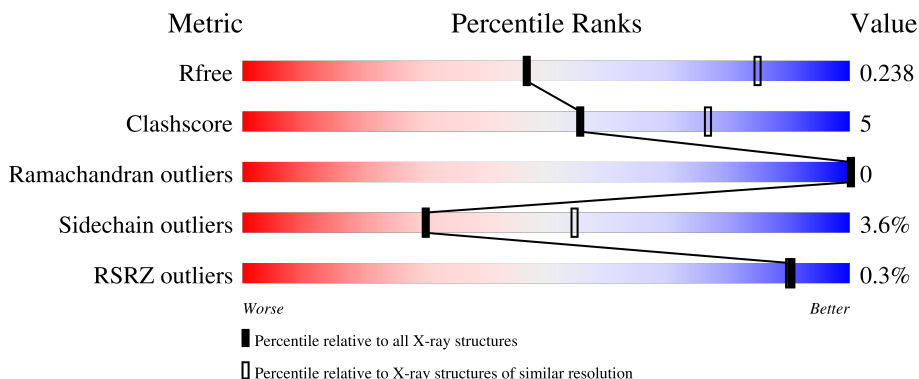|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41

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 2.95 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	Percentile Ranks	Value
Rfree		0.238
Clashscore		5
Ramachandran outliers		0
Sidechain outliers		3.6%
RSRZ outliers		0.3%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1044 (2.98-2.94)
Clashscore	180529	1097 (2.98-2.94)
Ramachandran outliers	177936	1049 (2.98-2.94)
Sidechain outliers	177891	1049 (2.98-2.94)
RSRZ outliers	164620	1044 (2.98-2.94)

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 <=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	162	85% 13% ··
1	B	162	.% 85% 14% ·
2	D	24	54% 42% ·
3	C	24	54% 29% 17%

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2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 3614 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 Floricaula/leafy-like transcription factor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	160	Total	C	N	O	S	0	0	0
			1291	811	236	233	11			
1	B	162	Total	C	N	O	S	0	0	0
			1308	822	238	237	11			

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	215	GLN	GLU	conflict	UNP A0A1Y1IRK2
A	218	GLU	GLY	conflict	UNP A0A1Y1IRK2
A	232	THR	LYS	conflict	UNP A0A1Y1IRK2
A	234	LYS	THR	conflict	UNP A0A1Y1IRK2
A	240	PRO	ALA	conflict	UNP A0A1Y1IRK2
A	286	ALA	THR	conflict	UNP A0A1Y1IRK2
A	290	LYS	ARG	conflict	UNP A0A1Y1IRK2
A	291	SER	LYS	conflict	UNP A0A1Y1IRK2
A	322	GLN	LEU	conflict	UNP A0A1Y1IRK2
A	325	HIS	GLN	conflict	UNP A0A1Y1IRK2
A	338	MET	LEU	conflict	UNP A0A1Y1IRK2
A	348	GLN	-	insertion	UNP A0A1Y1IRK2
A	350	LEU	-	expression tag	UNP A0A1Y1IRK2
B	215	GLN	GLU	conflict	UNP A0A1Y1IRK2
B	218	GLU	GLY	conflict	UNP A0A1Y1IRK2
B	232	THR	LYS	conflict	UNP A0A1Y1IRK2
B	234	LYS	THR	conflict	UNP A0A1Y1IRK2
B	240	PRO	ALA	conflict	UNP A0A1Y1IRK2
B	286	ALA	THR	conflict	UNP A0A1Y1IRK2
B	290	LYS	ARG	conflict	UNP A0A1Y1IRK2
B	291	SER	LYS	conflict	UNP A0A1Y1IRK2
B	322	GLN	LEU	conflict	UNP A0A1Y1IRK2
B	325	HIS	GLN	conflict	UNP A0A1Y1IRK2
B	338	MET	LEU	conflict	UNP A0A1Y1IRK2
B	348	GLN	-	insertion	UNP A0A1Y1IRK2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	350	LEU	-	expression tag	UNP A0A1Y1IRK2

- Molecule 2 is a DNA chain called DNA (5'-D(P*GP*GP*TP*GP*CP*AP*GP*CP*GP*A P*CP*CP*GP*GP*TP*AP*GP*CP*AP*AP*CP*GP*CP*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	D	24	497	233	100	140	24	0	0	0

- Molecule 3 is a DNA chain called DNA (5'-D(P*TP*GP*CP*GP*TP*TP*GP*CP*TP*AP *CP*CP*GP*GP*TP*CP*GP*CP*TP*GP*CP*AP*CP*T)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	C	24	488	232	83	149	24	0	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	8	Total 8	O 8	0	0
4	D	9	Total 9	O 9	0	0
4	B	7	Total 7	O 7	0	0
4	C	6	Total 6	O 6	0	0

3 Residue-property plots (i)

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.
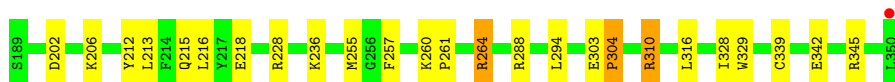
• Molecule 1: Floricaula/leafy-like transcription factor

Chain A:

• Molecule 1: Floricaula/leafy-like transcription factor
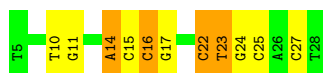
Chain B:

• Molecule 2: DNA (5'-D(P*GP*GP*TP*GP*CP*AP*GP*CP*GP*AP*CP*CP*GP*GP*TP*A P*GP*CP*AP*AP*CP*GP*CP*A)-3')

Chain D:

• Molecule 3: DNA (5'-D(P*TP*GP*CP*GP*TP*TP*GP*CP*TP*AP*CP*CP*GP*GP*TP*C P*GP*CP*TP*GP*CP*AP*CP*T)-3')

Chain C:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 61	Depositor
Cell constants a, b, c, α, β, γ	144.89Å 144.89Å 69.84Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	47.43 – 2.95 47.43 – 2.95	Depositor EDS
% Data completeness (in resolution range)	99.9 (47.43-2.95) 99.8 (47.43-2.95)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.07 (at 2.73Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.194 , 0.237 0.198 , 0.238	Depositor DCC
R_{free} test set	891 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	82.5	Xtriage
Anisotropy	0.351	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 34.4	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.038 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	3614	wwPDB-VP
Average B, all atoms (Å^2)	87.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.76% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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 ⓘ

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	0.40	0/1318	0.94	5/1769 (0.3%)
1	B	0.38	0/1335	0.84	0/1792
2	D	0.67	0/559	1.43	7/861 (0.8%)
3	C	0.68	0/544	1.40	8/837 (1.0%)
All	All	0.49	0/3756	1.09	20/5259 (0.4%)

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	A	0	2
1	B	0	3
All	All	0	5

There are no bond length outliers.

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	345	ARG	NE-CZ-NH1	10.34	125.47	120.30
2	D	15	DC	O5'-P-OP2	-9.95	96.75	105.70
3	C	14	DA	O4'-C1'-N9	8.70	114.09	108.00
1	A	345	ARG	CD-NE-CZ	7.99	134.79	123.60
3	C	15	DC	O5'-P-OP2	-7.85	98.63	105.70

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	248	ARG	Sidechain
1	A	345	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	B	264	ARG	Sidechain
1	B	288	ARG	Sidechain
1	B	310	ARG	Sidechain

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	1291	0	1288	9	3
1	B	1308	0	1305	11	3
2	D	497	0	267	5	0
3	C	488	0	272	8	0
4	A	8	0	0	0	0
4	B	7	0	0	0	0
4	C	6	0	0	2	0
4	D	9	0	0	1	0
All	All	3614	0	3132	31	3

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 5.

The worst 5 of 31 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)
3:C:22:DC:H2"	3:C:23:DT:H5"	1.67	0.75
2:D:6:DG:N2	4:D:101:HOH:O	2.33	0.61
2:D:16:DC:H2'	2:D:17:DG:C8	2.36	0.61
3:C:16:DC:H2'	3:C:17:DG:C8	2.38	0.59
3:C:23:DT:H2"	3:C:24:DG:C8	2.38	0.59

All (3) 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:A:345:ARG:CD	1:B:310:ARG:NH2[3_664]	1.96	0.24

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:345:ARG:CD	1:B:310:ARG:NE[3_664]	2.01	0.19
1:A:345:ARG:NH1	1:B:310:ARG:NH2[3_664]	2.12	0.08

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	158/162 (98%)	157 (99%)	1 (1%)	0	100	100
1	B	160/162 (99%)	150 (94%)	10 (6%)	0	100	100
All	All	318/324 (98%)	307 (96%)	11 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	136/138 (99%)	133 (98%)	3 (2%)	47	69
1	B	138/138 (100%)	131 (95%)	7 (5%)	20	43
All	All	274/276 (99%)	264 (96%)	10 (4%)	30	55

5 of 10 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	304	PRO

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Mol	Chain	Res	Type
1	B	342	GLU
1	B	345	ARG
1	B	202	ASP
1	B	228	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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   ⓘ

There are no oligosaccharides in this entry.

5.6   Ligand geometry   ⓘ

There are no ligands in this entry.

5.7   Other polymers   ⓘ

There are no such residues in this entry.

5.8   Polymer linkage issues   ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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	160/162 (98%)	-0.51	0 100	100	53, 77, 111, 166	0
1	B	162/162 (100%)	-0.34	1 (0%) 85	85	57, 79, 124, 175	0
2	D	24/24 (100%)	-0.92	0 100	100	58, 83, 155, 182	0
3	C	24/24 (100%)	-0.86	0 100	100	61, 83, 170, 188	0
All	All	370/372 (99%)	-0.49	1 (0%) 90	90	53, 79, 133, 188	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	350	LEU	2.4

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.