WORLD WIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Nov 15, 2023 – 06:20 PM JST

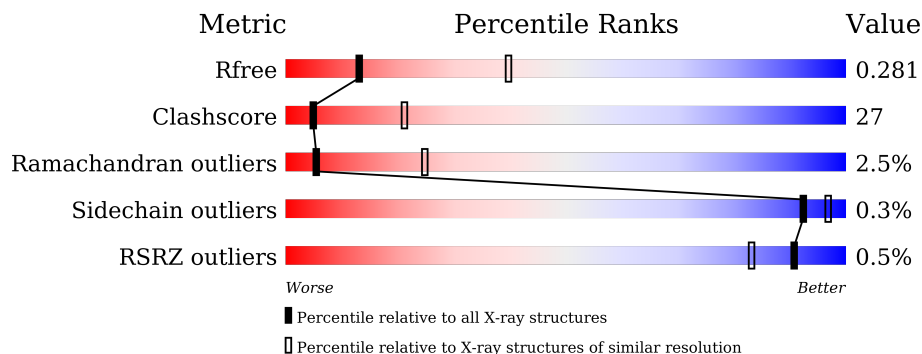|		
PDB ID	:	6JPI
Title	:	Crystal structure of PA4674 in complex with its operator DNA (28bp) from Pseudomonas aeruginosa
Authors	:	Liu, Y.; Gao, Z.; Zhang, H.; Dong, Y.
Deposited on	:	2019-03-27
Resolution	:	3.14 Å(reported)

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 3.14 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		0.281
Clashscore		27
Ramachandran outliers		2.5%
Sidechain outliers		0.3%
RSRZ outliers		0.5%

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}	130704	1626 (3.18-3.10)
Clashscore	141614	1735 (3.18-3.10)
Ramachandran outliers	138981	1677 (3.18-3.10)
Sidechain outliers	138945	1677 (3.18-3.10)
RSRZ outliers	127900	1588 (3.18-3.10)

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	109	60% 24% • 16%
1	B	109	% 47% 38% • 15%
1	C	109	49% 34% • 17%
1	D	109	% 51% 32% • 15%
2	E	28	18% 68% 14%
3	F	28	32% 57% 11%

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 4073 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 HTH cro/C1-type domain-containing protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	92	Total	C	N	O	S	0	0	0
			730	462	127	137	4			
1	B	93	Total	C	N	O	S	0	0	0
			738	468	128	138	4			
1	C	91	Total	C	N	O	S	0	0	0
			722	457	126	136	3			
1	D	93	Total	C	N	O	S	0	0	0
			735	467	128	136	4			

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	102	GLY	-	expression tag	UNP Q9HVC1
A	103	SER	-	expression tag	UNP Q9HVC1
A	104	HIS	-	expression tag	UNP Q9HVC1
A	105	HIS	-	expression tag	UNP Q9HVC1
A	106	HIS	-	expression tag	UNP Q9HVC1
A	107	HIS	-	expression tag	UNP Q9HVC1
A	108	HIS	-	expression tag	UNP Q9HVC1
A	109	HIS	-	expression tag	UNP Q9HVC1
B	102	GLY	-	expression tag	UNP Q9HVC1
B	103	SER	-	expression tag	UNP Q9HVC1
B	104	HIS	-	expression tag	UNP Q9HVC1
B	105	HIS	-	expression tag	UNP Q9HVC1
B	106	HIS	-	expression tag	UNP Q9HVC1
B	107	HIS	-	expression tag	UNP Q9HVC1
B	108	HIS	-	expression tag	UNP Q9HVC1
B	109	HIS	-	expression tag	UNP Q9HVC1
C	102	GLY	-	expression tag	UNP Q9HVC1
C	103	SER	-	expression tag	UNP Q9HVC1
C	104	HIS	-	expression tag	UNP Q9HVC1
C	105	HIS	-	expression tag	UNP Q9HVC1
C	106	HIS	-	expression tag	UNP Q9HVC1

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Chain	Residue	Modelled	Actual	Comment	Reference
C	107	HIS	-	expression tag	UNP Q9HVC1
C	108	HIS	-	expression tag	UNP Q9HVC1
C	109	HIS	-	expression tag	UNP Q9HVC1
D	102	GLY	-	expression tag	UNP Q9HVC1
D	103	SER	-	expression tag	UNP Q9HVC1
D	104	HIS	-	expression tag	UNP Q9HVC1
D	105	HIS	-	expression tag	UNP Q9HVC1
D	106	HIS	-	expression tag	UNP Q9HVC1
D	107	HIS	-	expression tag	UNP Q9HVC1
D	108	HIS	-	expression tag	UNP Q9HVC1
D	109	HIS	-	expression tag	UNP Q9HVC1

- Molecule 2 is a DNA chain called DNA (28-MER).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	E	28	568	273	99	168	28	0	0	0

- Molecule 3 is a DNA chain called DNA (28-MER).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	F	28	580	277	107	168	28	0	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.
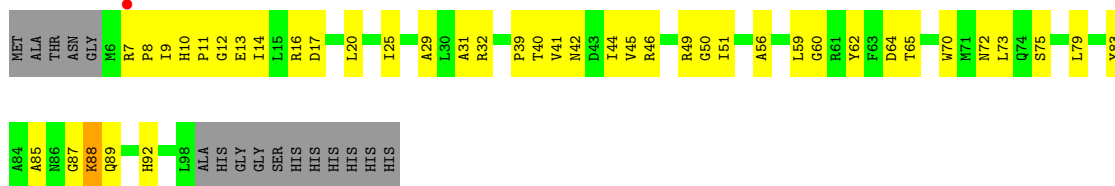
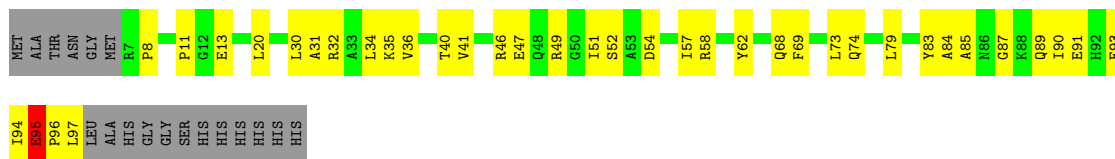- Molecule 1: HTH cro/C1-type domain-containing protein

Chain A:
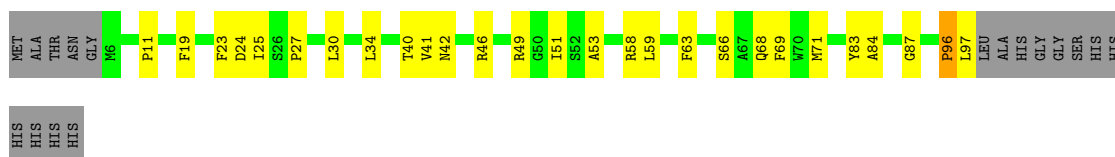
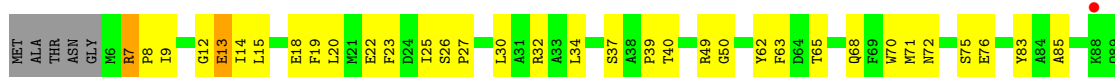- Molecule 1: HTH cro/C1-type domain-containing protein

Chain B:

- Molecule 1: HTH cro/C1-type domain-containing protein

Chain C:

- Molecule 1: HTH cro/C1-type domain-containing protein

Chain D:

I90 E93 L97 L98 ALA HIS GLY GLY SER HIS HIS HIS HIS HIS HIS

• Molecule 2: DNA (28-MER)

Chain E: 18%   68%   14%

C1 A2 T3 T4 A5 A6 C7 C8 C9 T10 T11 A12 A13 C14 G15 T16 T17 A18 A19 G20 C21 G22 A26 C27 T28

• Molecule 3: DNA (28-MER)

Chain F: 32%   57%   11%

A1 G2 T3 T4 A5 A6 C9 T10 T11 A12 A13 C14 G15 T16 T17 A18 A19 T23 T24 A25 A26 T27 G28
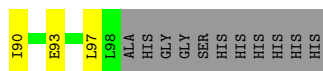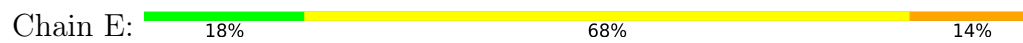
4　Data and refinement statistics　ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	77.80Å　　90.70Å　　91.70Å 90.00°　　90.00°　　90.00°	Depositor
Resolution (Å)	45.35　–　3.14 45.35　–　3.14	Depositor EDS
% Data completeness (in resolution range)	97.1 (45.35-3.14) 98.1 (45.35-3.14)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.11 (at 3.12Å)	Xtriage
Refinement program	PHENIX 1.10.1_2155	Depositor
R, R_{free}	0.215　,　0.281 0.216　,　0.281	Depositor DCC
R_{free} test set	1168 reflections (10.11%)	wwPDB-VP
Wilson B-factor (Å^2)	74.4	Xtriage
Anisotropy	0.711	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 43.9	EDS
L-test for twinning[2]	$< |L| > = 0.47, < L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	4073	wwPDB-VP
Average B, all atoms (Å^2)	91.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.39% 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	0.56	0/745	0.75	0/1008
1	B	0.53	0/753	0.77	0/1019
1	C	0.64	0/737	0.88	0/998
1	D	0.53	0/750	0.73	0/1015
2	E	1.31	7/635 (1.1%)	1.05	0/976
3	F	1.19	4/651 (0.6%)	1.04	0/1004
All	All	0.83	11/4271 (0.3%)	0.88	0/6020

The worst 5 of 11 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	14	DC	O3'-P	-7.43	1.52	1.61
3	F	11	DT	O3'-P	-6.07	1.53	1.61
3	F	12	DA	O3'-P	-5.97	1.53	1.61
2	E	2	DA	O3'-P	-5.87	1.54	1.61
2	E	18	DA	O3'-P	-5.83	1.54	1.61

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	730	0	718	29	0
1	B	738	0	729	35	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	722	0	709	35	0
1	D	735	0	727	40	0
2	E	568	0	318	56	0
3	F	580	0	318	41	0
All	All	4073	0	3519	205	0

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 27.

The worst 5 of 205 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:C:95:GLU:N	1:C:96:PRO:CD	2.09	1.14
1:C:95:GLU:H	1:C:96:PRO:CD	1.61	1.13
3:F:26:DA:H2"	3:F:27:DT:O5'	1.33	1.13
1:C:95:GLU:H	1:C:96:PRO:HD3	1.07	1.08
3:F:15:DG:H1'	3:F:16:DT:H5'	1.44	0.99

There are no symmetry-related clashes.

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	90/109 (83%)	77 (86%)	11 (12%)	2 (2%)	6	27
1	B	91/109 (84%)	82 (90%)	8 (9%)	1 (1%)	14	45
1	C	89/109 (82%)	71 (80%)	14 (16%)	4 (4%)	2	13
1	D	91/109 (84%)	81 (89%)	8 (9%)	2 (2%)	6	27
All	All	361/436 (83%)	311 (86%)	41 (11%)	9 (2%)	5	25

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	88	LYS
1	D	13	GLU
1	A	24	ASP
1	D	7	ARG
1	C	69	PHE

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	76/88 (86%)	76 (100%)	0	100	100
1	B	77/88 (88%)	77 (100%)	0	100	100
1	C	75/88 (85%)	74 (99%)	1 (1%)	69	86
1	D	76/88 (86%)	76 (100%)	0	100	100
All	All	304/352 (86%)	303 (100%)	1 (0%)	92	97

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	95	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	68	GLN
1	A	86	ASN

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 monosaccharides 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(Å²)	Q<0.9
1	A	92/109 (84%)	0.06	0	100	100	69, 90, 115, 130	0
1	B	93/109 (85%)	0.14	1 (1%)	80	66	59, 86, 132, 155	0
1	C	91/109 (83%)	-0.03	0	100	100	66, 83, 120, 159	0
1	D	93/109 (85%)	0.04	1 (1%)	80	66	73, 94, 122, 138	0
2	E	28/28 (100%)	-0.43	0	100	100	66, 82, 115, 129	0
3	F	28/28 (100%)	-0.34	0	100	100	61, 86, 121, 134	0
All	All	425/492 (86%)	-0.00	2 (0%)	91	83	59, 88, 122, 159	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	7	ARG	3.1
1	D	88	LYS	2.1

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.