



wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 3EZ9
Title : Partition Protein
Authors : Schumacher, M.A.
Deposited on : 2008-10-22
Resolution : 2.80 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

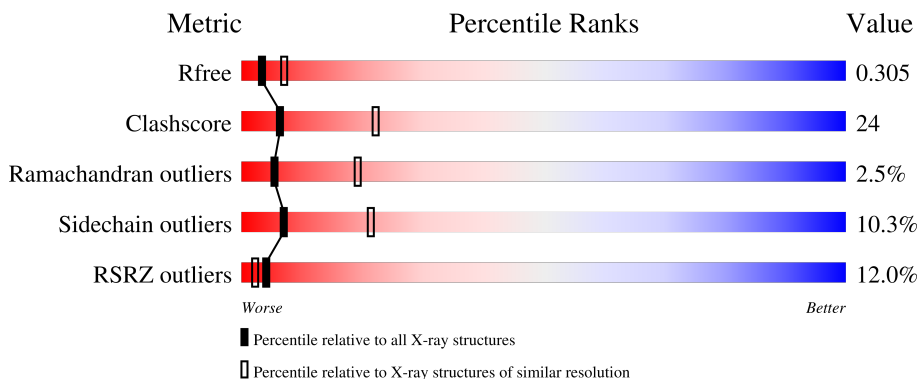
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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}	130704	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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	403	
1	B	403	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	MG	A	402	-	-	-	X

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 5670 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 ParA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	349	2802	1772	491	532	7	0	0	0
1	B	350	2792	1763	491	531	7	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	expression tag	UNP B4ABW6
A	0	MET	-	expression tag	UNP B4ABW6
A	21	ALA	SER	conflict	UNP B4ABW6
A	28	ASP	GLU	conflict	UNP B4ABW6
A	35	GLN	LEU	conflict	UNP B4ABW6
A	59	ASP	GLU	conflict	UNP B4ABW6
A	67	GLU	ASP	conflict	UNP B4ABW6
A	68	ASP	GLY	conflict	UNP B4ABW6
A	71	GLN	GLU	conflict	UNP B4ABW6
A	182	ASN	ASP	conflict	UNP B4ABW6
A	198	VAL	ILE	conflict	UNP B4ABW6
A	218	ARG	GLU	conflict	UNP B4ABW6
A	219	GLU	ASP	conflict	UNP B4ABW6
A	222	GLU	LYS	conflict	UNP B4ABW6
A	228	GLN	MET	conflict	UNP B4ABW6
A	229	ASN	LYS	conflict	UNP B4ABW6
A	230	GLN	PRO	conflict	UNP B4ABW6
A	231	TYR	SER	conflict	UNP B4ABW6
A	233	ILE	VAL	conflict	UNP B4ABW6
A	236	ARG	LYS	conflict	UNP B4ABW6
A	237	ASN	LYS	conflict	UNP B4ABW6
A	240	ASP	GLU	conflict	UNP B4ABW6
A	360	VAL	ILE	conflict	UNP B4ABW6
A	380	THR	ASN	conflict	UNP B4ABW6
B	-1	MET	-	expression tag	UNP B4ABW6

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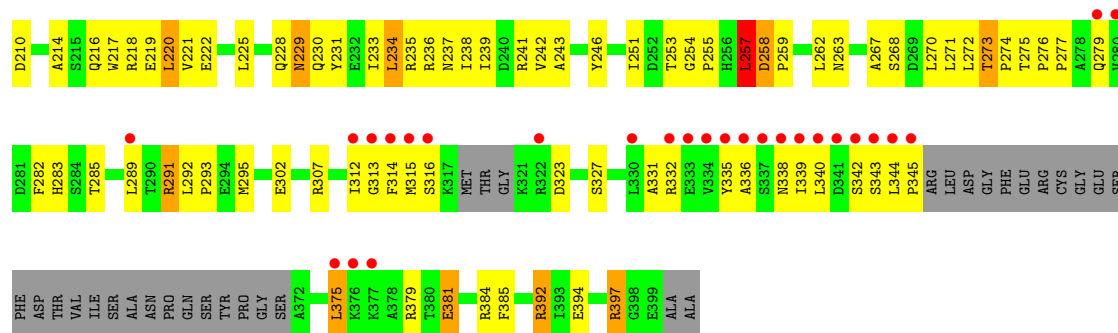
Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	expression tag	UNP B4ABW6
B	21	ALA	SER	conflict	UNP B4ABW6
B	28	ASP	GLU	conflict	UNP B4ABW6
B	35	GLN	LEU	conflict	UNP B4ABW6
B	59	ASP	GLU	conflict	UNP B4ABW6
B	67	GLU	ASP	conflict	UNP B4ABW6
B	68	ASP	GLY	conflict	UNP B4ABW6
B	71	GLN	GLU	conflict	UNP B4ABW6
B	182	ASN	ASP	conflict	UNP B4ABW6
B	198	VAL	ILE	conflict	UNP B4ABW6
B	218	ARG	GLU	conflict	UNP B4ABW6
B	219	GLU	ASP	conflict	UNP B4ABW6
B	222	GLU	LYS	conflict	UNP B4ABW6
B	228	GLN	MET	conflict	UNP B4ABW6
B	229	ASN	LYS	conflict	UNP B4ABW6
B	230	GLN	PRO	conflict	UNP B4ABW6
B	231	TYR	SER	conflict	UNP B4ABW6
B	233	ILE	VAL	conflict	UNP B4ABW6
B	236	ARG	LYS	conflict	UNP B4ABW6
B	237	ASN	LYS	conflict	UNP B4ABW6
B	240	ASP	GLU	conflict	UNP B4ABW6
B	360	VAL	ILE	conflict	UNP B4ABW6
B	380	THR	ASN	conflict	UNP B4ABW6

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Mg 1 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	44	Total O 44 44	0	0
3	B	31	Total O 31 31	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	55.95Å 267.41Å 154.69Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	66.85 – 2.80 66.85 – 2.67	Depositor EDS
% Data completeness (in resolution range)	99.3 (66.85-2.80) 99.3 (66.85-2.67)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.51 (at 2.65Å)	Xtrriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.254 , 0.294 0.267 , 0.305	Depositor DCC
R_{free} test set	2015 reflections (6.04%)	wwPDB-VP
Wilson B-factor (Å ²)	72.3	Xtrriage
Anisotropy	0.401	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 70.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	5670	wwPDB-VP
Average B, all atoms (Å ²)	87.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.99% of the height of the origin peak. No significant pseudotranslation is detected.*

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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.62	2/2850 (0.1%)	0.94	11/3853 (0.3%)
1	B	0.47	1/2838 (0.0%)	0.82	4/3837 (0.1%)
All	All	0.55	3/5688 (0.1%)	0.88	15/7690 (0.2%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	29	GLN	CB-CG	-12.98	1.17	1.52
1	B	1	MET	N-CA	6.89	1.60	1.46
1	A	109	PRO	N-CA	6.31	1.57	1.47

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	109	PRO	CA-N-CD	-24.64	77.00	111.50
1	A	109	PRO	CA-N-CD	-23.71	78.30	111.50
1	A	108	SER	C-N-CD	-8.96	100.89	120.60
1	A	109	PRO	N-CA-CB	8.45	113.44	103.30
1	A	1	MET	N-CA-C	8.09	132.84	111.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	2802	0	2798	131	1
1	B	2792	0	2791	139	0
2	A	1	0	0	0	0
3	A	44	0	0	1	0
3	B	31	0	0	3	0
All	All	5670	0	5589	270	1

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 24.

The worst 5 of 270 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:B:279:GLN:HA	1:B:282:PHE:HB3	1.46	0.97
1:B:182:ASN:OD1	1:B:241:ARG:NH2	1.99	0.95
1:B:335:TYR:HB2	1:B:339:ILE:HG12	1.52	0.92
1:A:47:VAL:HG21	1:A:85:LEU:HD12	1.53	0.90
1:A:236:ARG:HE	1:A:237:ASN:HD21	1.19	0.89

All (1) 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:60:GLN:CG	1:A:399:GLU:OE2[8_565]	1.69	0.51

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	339/403 (84%)	303 (89%)	30 (9%)	6 (2%)	8 28
1	B	338/403 (84%)	293 (87%)	34 (10%)	11 (3%)	4 13

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	677/806 (84%)	596 (88%)	64 (10%)	17 (2%)	5 19

5 of 17 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	109	PRO
1	B	109	PRO
1	B	161	PHE
1	A	342	SER
1	A	376	LYS

5.3.2 Protein sidechains [i](#)

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	305/350 (87%)	272 (89%)	33 (11%)	6 19
1	B	304/350 (87%)	274 (90%)	30 (10%)	8 23
All	All	609/700 (87%)	546 (90%)	63 (10%)	7 21

5 of 63 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	305	GLU
1	B	283	HIS
1	B	25	ASP
1	B	273	THR
1	B	381	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 20 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	138	GLN
1	B	229	ASN
1	B	298	GLN

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Mol	Chain	Res	Type
1	B	230	GLN
1	A	229	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides 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	349/403 (86%)	0.28	22 (6%) 20 12	33, 65, 148, 167	0
1	B	350/403 (86%)	0.84	62 (17%) 1 1	45, 89, 163, 179	0
All	All	699/806 (86%)	0.56	84 (12%) 4 2	33, 76, 159, 179	0

The worst 5 of 84 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	3	ARG	9.6
1	B	343	SER	9.5
1	B	342	SER	9.3
1	B	334	VAL	8.8
1	B	315	MET	8.5

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 monosaccharides 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(\AA^2)	Q<0.9
2	MG	A	402	1/1	0.71	0.53	33,33,33,33	1

6.5 Other polymers [i](#)

There are no such residues in this entry.