



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 06:30 AM UTC

PDB ID : 4OIY / pdb_00004oiy
Title : Crystal structure of Sec7p catalytic domain
Authors : Qiu, B.; Zhang, K.; Sun, F.
Deposited on : 2014-01-20
Resolution : 1.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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

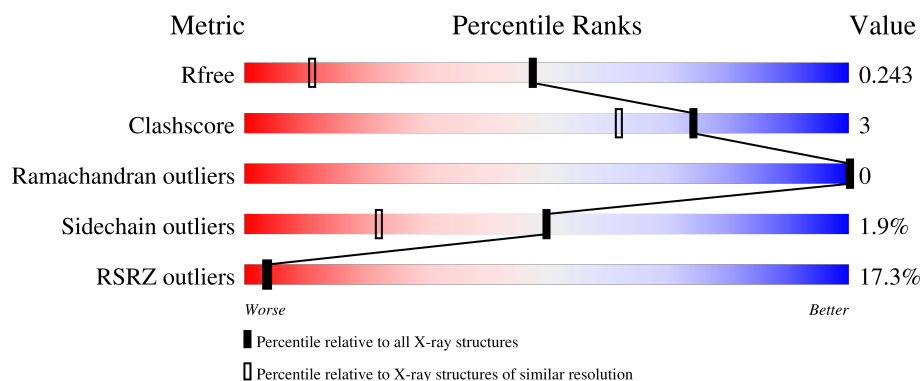
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.50 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	4037 (1.50-1.50)
Clashscore	190562	4235 (1.50-1.50)
Ramachandran outliers	187476	4153 (1.50-1.50)
Sidechain outliers	187428	4150 (1.50-1.50)
RSRZ outliers	180081	4039 (1.50-1.50)

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	191	11% 92% 7% •
1	B	191	23% 88% 5% • 5%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 3152 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 Protein transport protein SEC7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	189	Total	C	N	O	S	0	1	0
			1497	956	247	287	7			
1	B	181	Total	C	N	O	S	0	0	0
			1436	917	237	275	7			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	820	GLY	-	expression tag	UNP P11075
A	821	PRO	-	expression tag	UNP P11075
A	822	GLY	-	expression tag	UNP P11075
A	823	SER	-	expression tag	UNP P11075
B	820	GLY	-	expression tag	UNP P11075
B	821	PRO	-	expression tag	UNP P11075
B	822	GLY	-	expression tag	UNP P11075
B	823	SER	-	expression tag	UNP P11075

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	138	Total	O	0	0
			138	138		
3	B	80	Total	O	0	0
			80	80		

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.

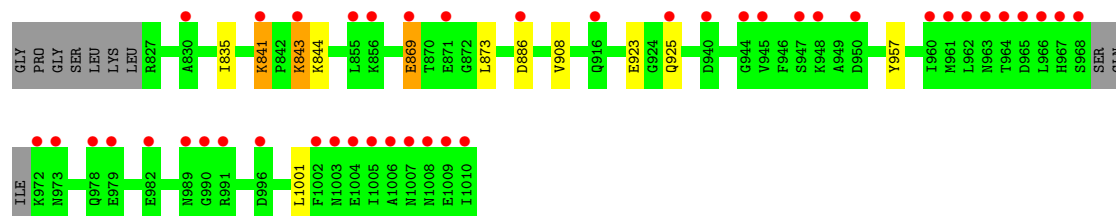
• Molecule 1: Protein transport protein SEC7

Chain A: 



• Molecule 1: Protein transport protein SEC7

Chain B: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	48.65Å 68.96Å 59.60Å 90.00° 106.74° 90.00°	Depositor
Resolution (Å)	36.27 – 1.50 36.27 – 1.50	Depositor EDS
% Data completeness (in resolution range)	90.5 (36.27-1.50) 90.5 (36.27-1.50)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.61 (at 1.50Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.211 , 0.237 0.219 , 0.243	Depositor DCC
R_{free} test set	2747 reflections (4.55%)	wwPDB-VP
Wilson B-factor (Å ²)	13.9	Xtriage
Anisotropy	0.075	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 31.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	3152	wwPDB-VP
Average B, all atoms (Å ²)	18.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.86% 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

5.1 Standard geometry

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	0.43	0/1526	0.66	0/2050
1	B	0.42	0/1461	0.70	0/1962
All	All	0.42	0/2987	0.68	0/4012

There are no bond length outliers.

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	1497	0	1496	12	0
1	B	1436	0	1423	10	0
2	B	1	0	0	0	0
3	A	138	0	0	4	0
3	B	80	0	0	0	0
All	All	3152	0	2919	18	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 3.

All (18) 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:A:847:PRO:O	3:A:1237:HOH:O	1.62	1.13
1:A:841:LYS:NZ	1:B:923:GLU:OE2	2.15	0.79
1:A:847:PRO:C	3:A:1237:HOH:O	2.21	0.74
1:B:841:LYS:HD2	1:B:844:LYS:HG2	1.74	0.69
1:A:850:ILE:N	3:A:1237:HOH:O	2.36	0.58
1:A:841:LYS:HE2	1:B:925:GLN:CD	2.28	0.57
1:A:846:ILE:HB	1:A:847:PRO:HD3	1.88	0.56
1:B:841:LYS:HE3	1:B:843:LYS:HG2	1.92	0.51
1:A:967:HIS:HE1	1:A:1005:ILE:O	1.97	0.48
1:A:925:GLN:CD	1:B:841:LYS:HG2	2.39	0.47
1:B:908:VAL:HG23	1:B:1001:LEU:HD22	1.96	0.46
1:B:841:LYS:C	1:B:841:LYS:HD3	2.42	0.45
1:B:869:GLU:O	1:B:869:GLU:HG3	2.16	0.44
1:A:848:VAL:C	3:A:1237:HOH:O	2.61	0.43
1:B:835:ILE:HG23	1:B:873:LEU:HD23	2.01	0.43
1:A:926:LYS:HG2	1:A:929:ARG:NH1	2.36	0.41
1:A:822:GLY:HA3	1:A:823:SER:HA	1.85	0.40
1:A:841:LYS:HE2	1:B:925:GLN:OE1	2.22	0.40

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	188/191 (98%)	187 (100%)	1 (0%)	0	100	100
1	B	177/191 (93%)	177 (100%)	0	0	100	100
All	All	365/382 (96%)	364 (100%)	1 (0%)	0	100	100

There are no Ramachandran outliers to report.

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	164/164 (100%)	163 (99%)	1 (1%)	78	62
1	B	156/164 (95%)	151 (97%)	5 (3%)	34	8
All	All	320/328 (98%)	314 (98%)	6 (2%)	50	22

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	869	GLU
1	B	841	LYS
1	B	843	LYS
1	B	869	GLU
1	B	886	ASP
1	B	957	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	889	ASN
1	A	967	HIS
1	B	978	GLN
1	B	1007	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 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

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	189/191 (98%)	0.63	21 (11%)	10 10	6, 14, 27, 32	1 (0%)
1	B	181/191 (94%)	1.19	43 (23%)	2 2	9, 17, 37, 44	0
All	All	370/382 (96%)	0.90	64 (17%)	4 3	6, 15, 31, 44	1 (0%)

All (64) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	968	SER	6.1
1	A	822	GLY	5.6
1	B	947	SER	5.3
1	B	1006	ALA	5.3
1	A	824	LEU	5.0
1	B	964	THR	4.6
1	B	966	LEU	4.6
1	B	1005	ILE	4.5
1	B	967	HIS	4.4
1	B	950	ASP	4.0
1	B	1008	ASN	4.0
1	B	886	ASP	3.9
1	B	978	GLN	3.7
1	B	869	GLU	3.6
1	B	960	ILE	3.6
1	A	944	GLY	3.5
1	B	961	MET	3.4
1	B	962	LEU	3.4
1	A	823	SER	3.3
1	A	968	SER	3.2
1	B	871	GLU	3.1
1	B	1010	ILE	3.1
1	A	991	ARG	3.1
1	A	825	LYS	3.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	990	GLY	2.9
1	A	855	LEU	2.9
1	B	843	LYS	2.8
1	B	991	ARG	2.8
1	A	853	GLY	2.8
1	B	1007	ASN	2.8
1	A	971	ILE	2.7
1	B	965	ASP	2.7
1	B	973	ASN	2.7
1	A	869	GLU	2.7
1	A	970	GLN	2.7
1	B	916	GLN	2.7
1	A	845	ALA	2.6
1	B	1002	PHE	2.6
1	B	989	ASN	2.5
1	B	856	LYS	2.5
1	B	1009	GLU	2.4
1	B	855	LEU	2.4
1	B	963	ASN	2.4
1	A	854	PHE	2.4
1	A	885	GLY	2.4
1	B	1003	ASN	2.4
1	A	996	ASP	2.4
1	B	972	LYS	2.3
1	B	925	GLN	2.3
1	A	832	SER	2.3
1	A	844	LYS	2.2
1	B	948	LYS	2.2
1	B	1004	GLU	2.2
1	B	996	ASP	2.2
1	A	1008	ASN	2.2
1	B	979	GLU	2.1
1	B	982	GLU	2.1
1	A	851	LYS	2.1
1	B	944	GLY	2.1
1	B	830	ALA	2.1
1	B	841	LYS	2.1
1	A	850	ILE	2.1
1	B	945	VAL	2.0
1	B	940	ASP	2.0

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	MG	B	1101	1/1	0.97	0.13	18,18,18,18	0

6.5 Other polymers [i](#)

There are no such residues in this entry.