



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 6, 2023 – 11:21 am BST

PDB ID : 8AY2
Title : Crystal structure of the C-terminal part of rat Sec8
Authors : Dong, G.; Lesigang, J.
Deposited on : 2022-09-01
Resolution : 2.50 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.35
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) : 2.35

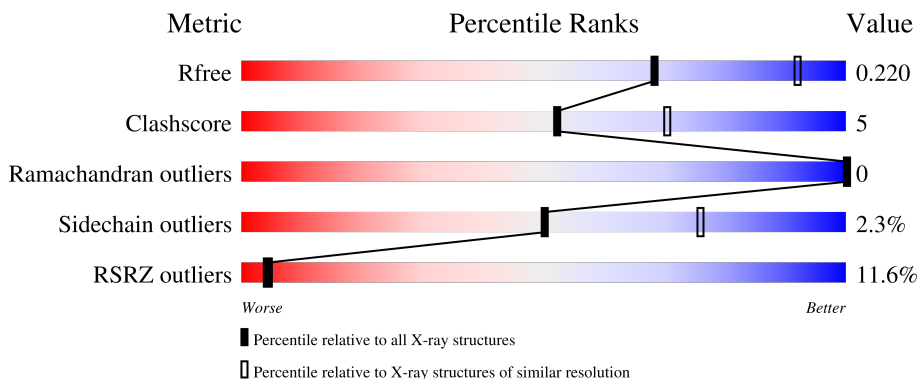
1 Overall quality at a glance

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}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (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	424	 8% 80% 14% 6%
1	B	424	 13% 75% 11% 13%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6184 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 Exocyst complex component 4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	400	3167	1999	538	607	23	0	0	0
1	B	367	2927	1855	497	554	21	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	552	HIS	-	expression tag	UNP Q62824
A	553	MET	-	expression tag	UNP Q62824
B	552	HIS	-	expression tag	UNP Q62824
B	553	MET	-	expression tag	UNP Q62824

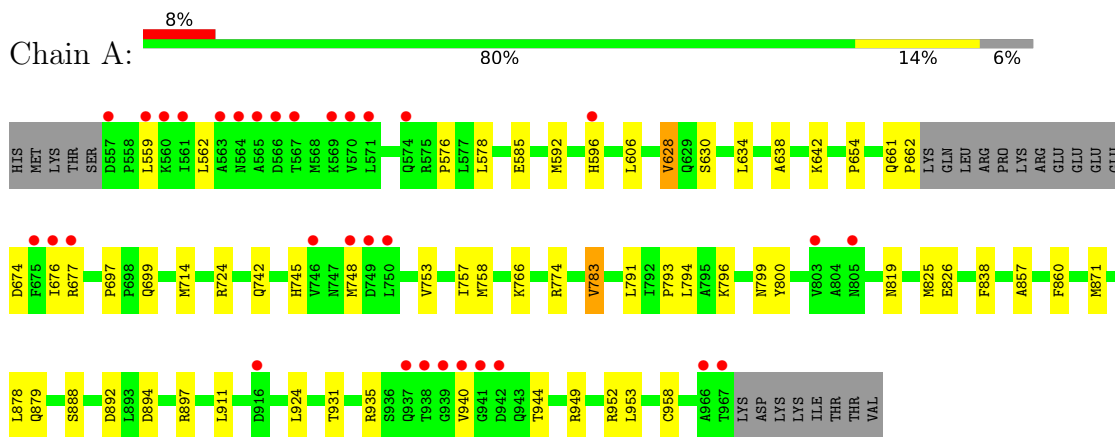
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	55	Total	O	0	0
			55	55		
2	B	35	Total	O	0	0
			35	35		

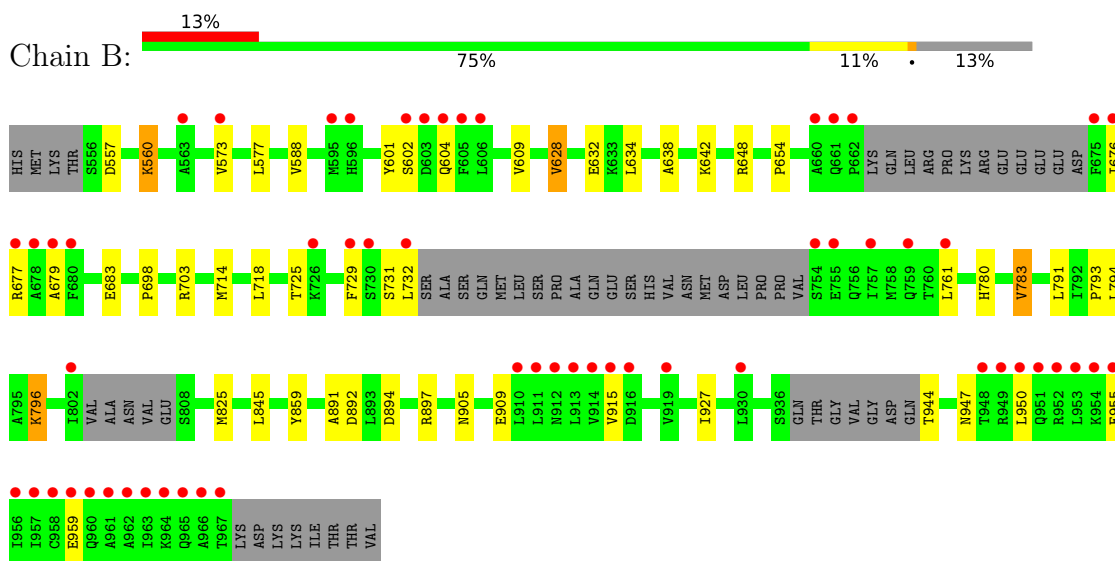
3 Residue-property plots [i](#)

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: Exocyst complex component 4



- Molecule 1: Exocyst complex component 4



4 Data and refinement statistics i

Property	Value	Source
Space group	I 4 2 2	Depositor
Cell constants a, b, c, α , β , γ	190.00Å 190.00Å 175.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.99 – 2.50 47.50 – 2.50	Depositor EDS
% Data completeness (in resolution range)	89.6 (19.99-2.50) 89.4 (47.50-2.50)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.72 (at 2.51Å)	Xtrriage
Refinement program	PHENIX 1.20.1_4487, PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.189 , 0.215 0.194 , 0.220	Depositor DCC
R_{free} test set	1999 reflections (4.04%)	wwPDB-VP
Wilson B-factor (Å ²)	50.8	Xtrriage
Anisotropy	0.022	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 47.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6184	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.28% 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](#)

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	0.28	0/3216	0.48	0/4347
1	B	0.27	0/2969	0.51	0/4003
All	All	0.27	0/6185	0.49	0/8350

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 [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	3167	0	3190	39	0
1	B	2927	0	2963	31	0
2	A	55	0	0	2	0
2	B	35	0	0	3	0
All	All	6184	0	6153	67	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 5.

All (67) 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:793:PRO:HG3	1:B:796:LYS:HE3	1.54	0.89

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:677:ARG:NH2	2:B:1003:HOH:O	2.19	0.74
1:B:894:ASP:OD1	1:B:897:ARG:NH2	2.22	0.73
1:B:944:THR:OG1	1:B:947:ASN:OD1	2.11	0.68
1:B:677:ARG:HH12	1:B:891:ALA:HB3	1.58	0.67
1:B:796:LYS:HD2	1:B:859:TYR:O	1.97	0.65
1:A:888:SER:OG	2:A:1001:HOH:O	2.15	0.64
1:A:642:LYS:HA	1:A:774:ARG:HH12	1.64	0.62
1:B:892:ASP:OD2	2:B:1002:HOH:O	2.16	0.61
1:A:911:LEU:HD22	1:A:953:LEU:HD13	1.81	0.60
1:A:860:PHE:O	1:A:935:ARG:NH2	2.33	0.59
1:B:905:ASN:HB3	1:B:909:GLU:HB2	1.83	0.59
1:A:677:ARG:NH1	1:A:892:ASP:OD2	2.36	0.58
1:A:628:VAL:HG22	1:A:638:ALA:HB2	1.87	0.56
1:A:606:LEU:HB3	1:A:757:ILE:HG21	1.88	0.55
1:A:766:LYS:NZ	2:A:1004:HOH:O	2.38	0.55
1:A:783:VAL:HG22	1:A:825:MET:SD	2.47	0.53
1:B:588:VAL:HG22	1:B:609:VAL:HG13	1.89	0.53
1:A:940:VAL:CG2	1:A:949:ARG:HH12	2.22	0.52
1:B:676:ILE:HD12	1:B:679:ALA:HB3	1.91	0.52
1:B:601:TYR:HD1	1:B:604:GLN:OE1	1.94	0.51
1:A:799:ASN:C	1:A:800:TYR:HD1	2.14	0.50
1:B:642:LYS:NZ	2:B:1001:HOH:O	2.16	0.50
1:A:742:GLN:HA	1:A:745:HIS:ND1	2.27	0.49
1:A:753:VAL:HG11	1:A:758:MET:CE	2.42	0.49
1:B:729:PHE:CE2	1:B:761:LEU:HG	2.48	0.49
1:B:783:VAL:HG13	1:B:825:MET:SD	2.53	0.49
1:A:931:THR:HG22	1:A:935:ARG:NH1	2.28	0.48
1:B:698:PRO:O	1:B:703:ARG:NH1	2.46	0.48
1:B:791:LEU:O	1:B:794:LEU:HB2	2.12	0.48
1:B:628:VAL:HG13	1:B:634:LEU:HD22	1.94	0.48
1:B:955:GLU:O	1:B:959:GLU:N	2.31	0.48
1:A:642:LYS:HA	1:A:774:ARG:NH1	2.28	0.48
1:B:714:MET:O	1:B:718:LEU:HD13	2.13	0.48
1:A:606:LEU:HA	1:A:606:LEU:HD23	1.74	0.48
1:B:628:VAL:HG22	1:B:638:ALA:HB2	1.95	0.47
1:A:894:ASP:OD1	1:A:897:ARG:NH1	2.46	0.47
1:A:753:VAL:HG11	1:A:758:MET:HE3	1.96	0.47
1:A:796:LYS:HE2	1:B:793:PRO:CG	2.45	0.46
1:B:955:GLU:OE1	1:B:955:GLU:N	2.46	0.46
1:A:562:LEU:HD13	1:A:576:PRO:HB3	1.97	0.46
1:A:791:LEU:O	1:A:794:LEU:HB2	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:677:ARG:NH1	1:B:891:ALA:HB3	2.28	0.45
1:A:857:ALA:HA	1:A:860:PHE:HD2	1.80	0.45
1:B:683:GLU:OE2	1:B:780:HIS:NE2	2.37	0.45
1:A:674:ASP:HB2	1:A:677:ARG:HB3	1.99	0.45
1:A:628:VAL:HG13	1:A:634:LEU:HD22	1.99	0.44
1:B:654:PRO:HD2	1:B:679:ALA:HB1	1.99	0.44
1:B:573:VAL:HG11	1:B:577:LEU:HD11	2.00	0.44
1:A:800:TYR:HE2	1:A:871:MET:HE1	1.82	0.44
1:A:826:GLU:HG2	1:A:838:PHE:HZ	1.82	0.44
1:A:819:ASN:OD1	1:A:878:LEU:HD23	2.18	0.44
1:A:562:LEU:HD23	1:A:578:LEU:HD23	2.00	0.43
1:B:725:THR:HB	1:B:729:PHE:CE2	2.53	0.43
1:A:911:LEU:HD12	1:A:952:ARG:NH2	2.33	0.43
1:A:559:LEU:HD21	1:A:714:MET:SD	2.59	0.42
1:B:731:SER:OG	1:B:732:LEU:HD22	2.19	0.42
1:A:654:PRO:HB2	1:A:676:ILE:HG12	2.02	0.42
1:A:826:GLU:HG2	1:A:838:PHE:CZ	2.55	0.42
1:A:585:GLU:OE2	1:A:724:ARG:NH1	2.53	0.41
1:A:697:PRO:HB2	1:A:699:GLN:OE1	2.19	0.41
1:B:927:ILE:HG23	1:B:950:LEU:HD11	2.01	0.41
1:A:796:LYS:HE2	1:B:793:PRO:HG3	2.03	0.41
1:A:661:GLN:HA	1:A:662:PRO:HD3	1.89	0.41
1:A:924:LEU:HD23	1:A:924:LEU:HA	1.87	0.41
1:A:592:MET:O	1:A:596:HIS:ND1	2.53	0.40
1:B:557:ASP:HB3	1:B:560:LYS:HB2	2.02	0.40

There are no symmetry-related clashes.

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	396/424 (93%)	389 (98%)	7 (2%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	357/424 (84%)	349 (98%)	8 (2%)	0	100	100
All	All	753/848 (89%)	738 (98%)	15 (2%)	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	355/379 (94%)	348 (98%)	7 (2%)	55	79
1	B	327/379 (86%)	318 (97%)	9 (3%)	43	70
All	All	682/758 (90%)	666 (98%)	16 (2%)	50	76

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	628	VAL
1	A	630	SER
1	A	748	MET
1	A	783	VAL
1	A	879	GLN
1	A	944	THR
1	A	958	CYS
1	B	560	LYS
1	B	602	SER
1	B	628	VAL
1	B	632	GLU
1	B	648	ARG
1	B	783	VAL
1	B	796	LYS
1	B	845	LEU
1	B	915	VAL

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

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](#)

There are no ligands in this entry.

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	400/424 (94%)	0.60	32 (8%) 12 12	36, 61, 117, 159	0
1	B	367/424 (86%)	0.87	57 (15%) 2 1	42, 69, 125, 159	0
All	All	767/848 (90%)	0.73	89 (11%) 4 4	36, 64, 121, 159	0

All (89) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	966	ALA	12.7
1	B	965	GLN	8.9
1	B	967	THR	8.7
1	B	911	LEU	7.9
1	B	675	PHE	7.5
1	A	557	ASP	7.3
1	B	962	ALA	6.8
1	A	939	GLY	6.7
1	A	938	THR	6.6
1	B	732	LEU	6.2
1	A	675	PHE	6.0
1	B	662	PRO	6.0
1	A	940	VAL	5.9
1	B	950	LEU	5.6
1	B	729	PHE	5.6
1	B	676	ILE	5.6
1	B	957	ILE	5.5
1	A	941	GLY	5.3
1	B	960	GLN	5.2
1	A	570	VAL	5.0
1	B	953	LEU	5.0
1	B	959	GLU	4.9
1	B	964	LYS	4.8
1	A	676	ILE	4.8

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Mol	Chain	Res	Type	RSRZ
1	B	761	LEU	4.7
1	B	915	VAL	4.6
1	B	963	ILE	4.4
1	B	956	ILE	4.3
1	B	606	LEU	4.3
1	B	951	GLN	4.3
1	B	757	ILE	4.2
1	B	955	GLU	4.2
1	A	805	ASN	4.1
1	A	966	ALA	4.1
1	B	596	HIS	4.0
1	A	560	LYS	4.0
1	A	750	LEU	3.8
1	B	952	ARG	3.8
1	A	803	VAL	3.7
1	B	912	ASN	3.7
1	A	565	ALA	3.5
1	A	942	ASP	3.4
1	B	958	CYS	3.3
1	B	802	ILE	3.3
1	B	730	SER	3.3
1	A	677	ARG	3.2
1	A	749	ASP	3.2
1	B	679	ALA	3.2
1	B	961	ALA	3.2
1	B	602	SER	3.0
1	B	754	SER	3.0
1	A	746	VAL	2.9
1	A	567	THR	2.9
1	A	967	THR	2.9
1	B	660	ALA	2.9
1	B	919	VAL	2.9
1	B	916	ASP	2.9
1	B	661	GLN	2.9
1	B	914	VAL	2.8
1	A	937	GLN	2.8
1	A	571	LEU	2.7
1	B	677	ARG	2.7
1	A	569	LYS	2.7
1	B	563	ALA	2.6
1	A	566	ASP	2.6
1	A	748	MET	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	574	GLN	2.5
1	B	603	ASP	2.5
1	B	755	GLU	2.5
1	B	910	LEU	2.4
1	B	949	ARG	2.4
1	A	563	ALA	2.4
1	A	559	LEU	2.4
1	B	726	LYS	2.4
1	B	680	PHE	2.4
1	B	948	THR	2.3
1	A	596	HIS	2.3
1	B	595	MET	2.3
1	B	930	LEU	2.3
1	B	573	VAL	2.2
1	A	564	ASN	2.2
1	B	604	GLN	2.2
1	B	678	ALA	2.2
1	B	913	LEU	2.2
1	B	759	GLN	2.1
1	B	605	PHE	2.1
1	A	916	ASP	2.1
1	A	561	ILE	2.1
1	B	954	LYS	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 monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.