Full wwPDB X-ray Structure Validation Report (i)

Nov 12, 2024 – 07:06 PM EST

PDB ID	:	3V8U
Title	:	The crystal structure of transferrin binding protein B (TbpB) from Neisseria meningitidis serogroup B
Authors	:	Noinaj, N.; Easley, N.; Buchanan, S.K.
Deposited on	:	2011-12-23
Resolution	:	2.40 Å(reported)

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

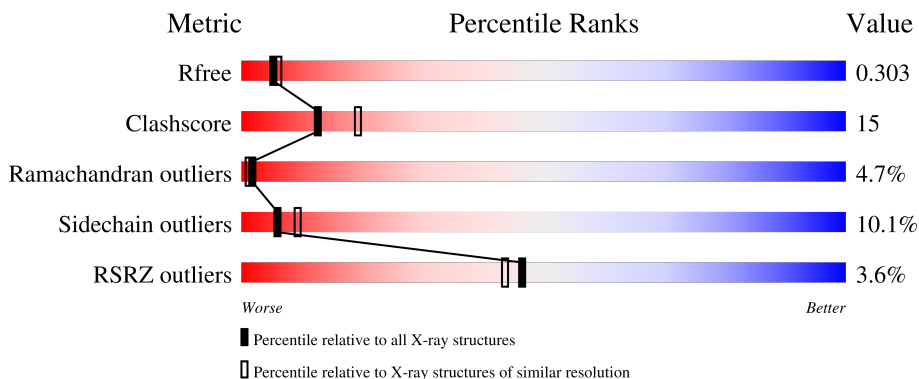|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.40 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		0.303
Clashscore		15
Ramachandran outliers		4.7%
Sidechain outliers		10.1%
RSRZ outliers		3.6%

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	4642 (2.40-2.40)
Clashscore	180529	5218 (2.40-2.40)
Ramachandran outliers	177936	5158 (2.40-2.40)
Sidechain outliers	177891	5159 (2.40-2.40)
RSRZ outliers	164620	4642 (2.40-2.40)

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	717	2% / 44% 25% · · 26%
1	B	717	3% / 45% 25% · · 26%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 8366 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 Transferrin binding-protein B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	532	Total 4113	C 2586	N 707	O 814	S 6	0	0	0
1	B	532	Total 4106	C 2581	N 708	O 811	S 6	0	0	0

There are 52 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-25	MET	-	expression tag	UNP Q9JPI9
A	-24	SER	-	expression tag	UNP Q9JPI9
A	-23	TYR	-	expression tag	UNP Q9JPI9
A	-22	TYR	-	expression tag	UNP Q9JPI9
A	-21	HIS	-	expression tag	UNP Q9JPI9
A	-20	HIS	-	expression tag	UNP Q9JPI9
A	-19	HIS	-	expression tag	UNP Q9JPI9
A	-18	HIS	-	expression tag	UNP Q9JPI9
A	-17	HIS	-	expression tag	UNP Q9JPI9
A	-16	HIS	-	expression tag	UNP Q9JPI9
A	-15	ASP	-	expression tag	UNP Q9JPI9
A	-14	TYR	-	expression tag	UNP Q9JPI9
A	-13	ASP	-	expression tag	UNP Q9JPI9
A	-12	ILE	-	expression tag	UNP Q9JPI9
A	-11	PRO	-	expression tag	UNP Q9JPI9
A	-10	THR	-	expression tag	UNP Q9JPI9
A	-9	THR	-	expression tag	UNP Q9JPI9
A	-8	GLU	-	expression tag	UNP Q9JPI9
A	-7	ASN	-	expression tag	UNP Q9JPI9
A	-6	LEU	-	expression tag	UNP Q9JPI9
A	-5	TYR	-	expression tag	UNP Q9JPI9
A	-4	PHE	-	expression tag	UNP Q9JPI9
A	-3	GLN	-	expression tag	UNP Q9JPI9
A	-2	GLY	-	expression tag	UNP Q9JPI9
A	-1	ALA	-	expression tag	UNP Q9JPI9

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Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	expression tag	UNP Q9JPI9
B	-25	MET	-	expression tag	UNP Q9JPI9
B	-24	SER	-	expression tag	UNP Q9JPI9
B	-23	TYR	-	expression tag	UNP Q9JPI9
B	-22	TYR	-	expression tag	UNP Q9JPI9
B	-21	HIS	-	expression tag	UNP Q9JPI9
B	-20	HIS	-	expression tag	UNP Q9JPI9
B	-19	HIS	-	expression tag	UNP Q9JPI9
B	-18	HIS	-	expression tag	UNP Q9JPI9
B	-17	HIS	-	expression tag	UNP Q9JPI9
B	-16	HIS	-	expression tag	UNP Q9JPI9
B	-15	ASP	-	expression tag	UNP Q9JPI9
B	-14	TYR	-	expression tag	UNP Q9JPI9
B	-13	ASP	-	expression tag	UNP Q9JPI9
B	-12	ILE	-	expression tag	UNP Q9JPI9
B	-11	PRO	-	expression tag	UNP Q9JPI9
B	-10	THR	-	expression tag	UNP Q9JPI9
B	-9	THR	-	expression tag	UNP Q9JPI9
B	-8	GLU	-	expression tag	UNP Q9JPI9
B	-7	ASN	-	expression tag	UNP Q9JPI9
B	-6	LEU	-	expression tag	UNP Q9JPI9
B	-5	TYR	-	expression tag	UNP Q9JPI9
B	-4	PHE	-	expression tag	UNP Q9JPI9
B	-3	GLN	-	expression tag	UNP Q9JPI9
B	-2	GLY	-	expression tag	UNP Q9JPI9
B	-1	ALA	-	expression tag	UNP Q9JPI9
B	0	MET	-	expression tag	UNP Q9JPI9

- Molecule 2 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	78	Total 78	O 78	0	0
2	B	69	Total 69	O 69	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: Transferrin binding-protein B

Chain A:
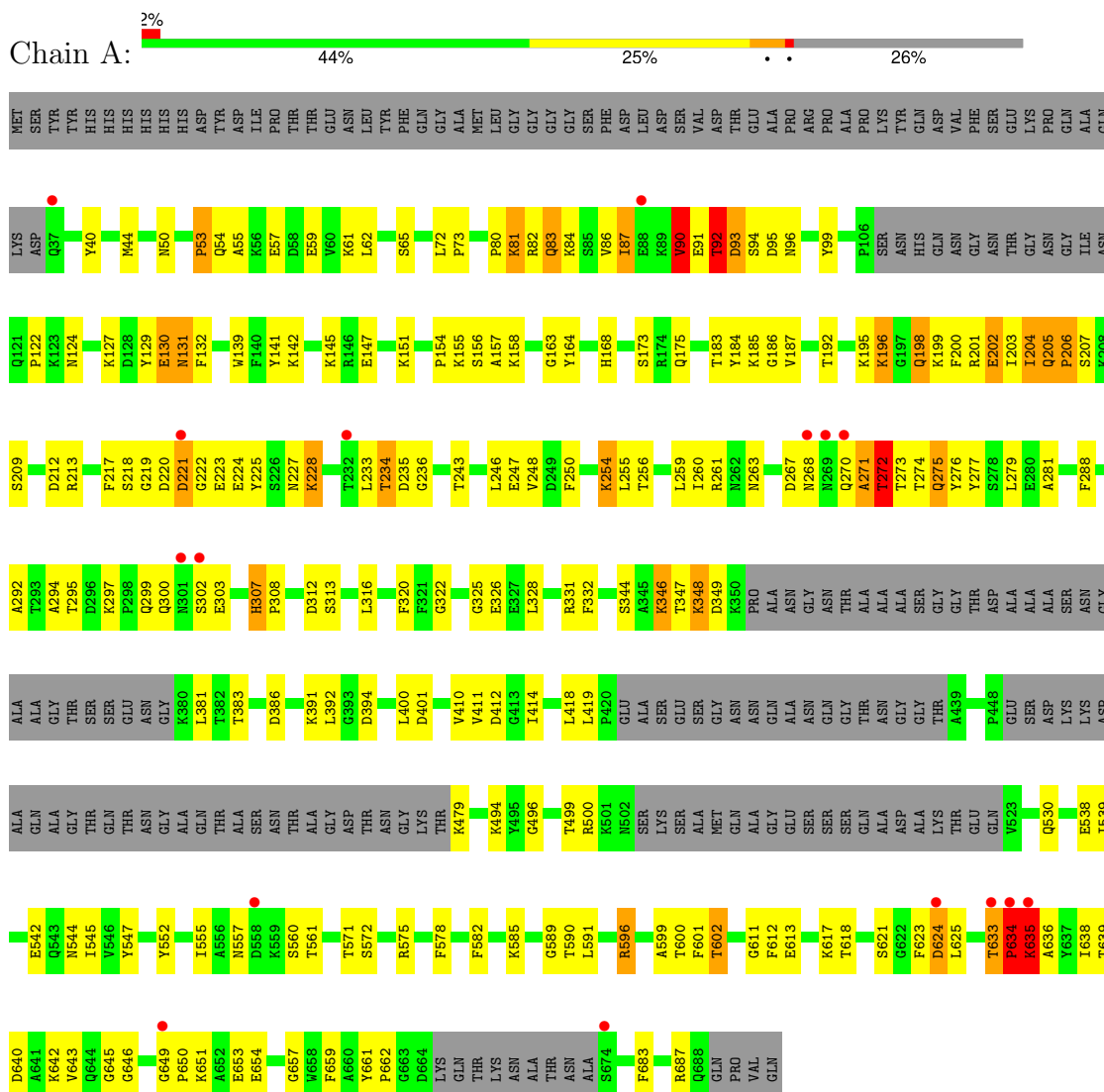
- Molecule 1: Transferrin binding-protein B

Chain B:
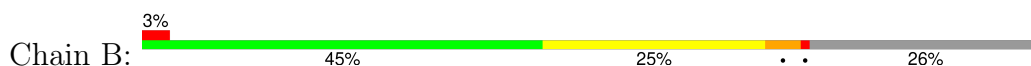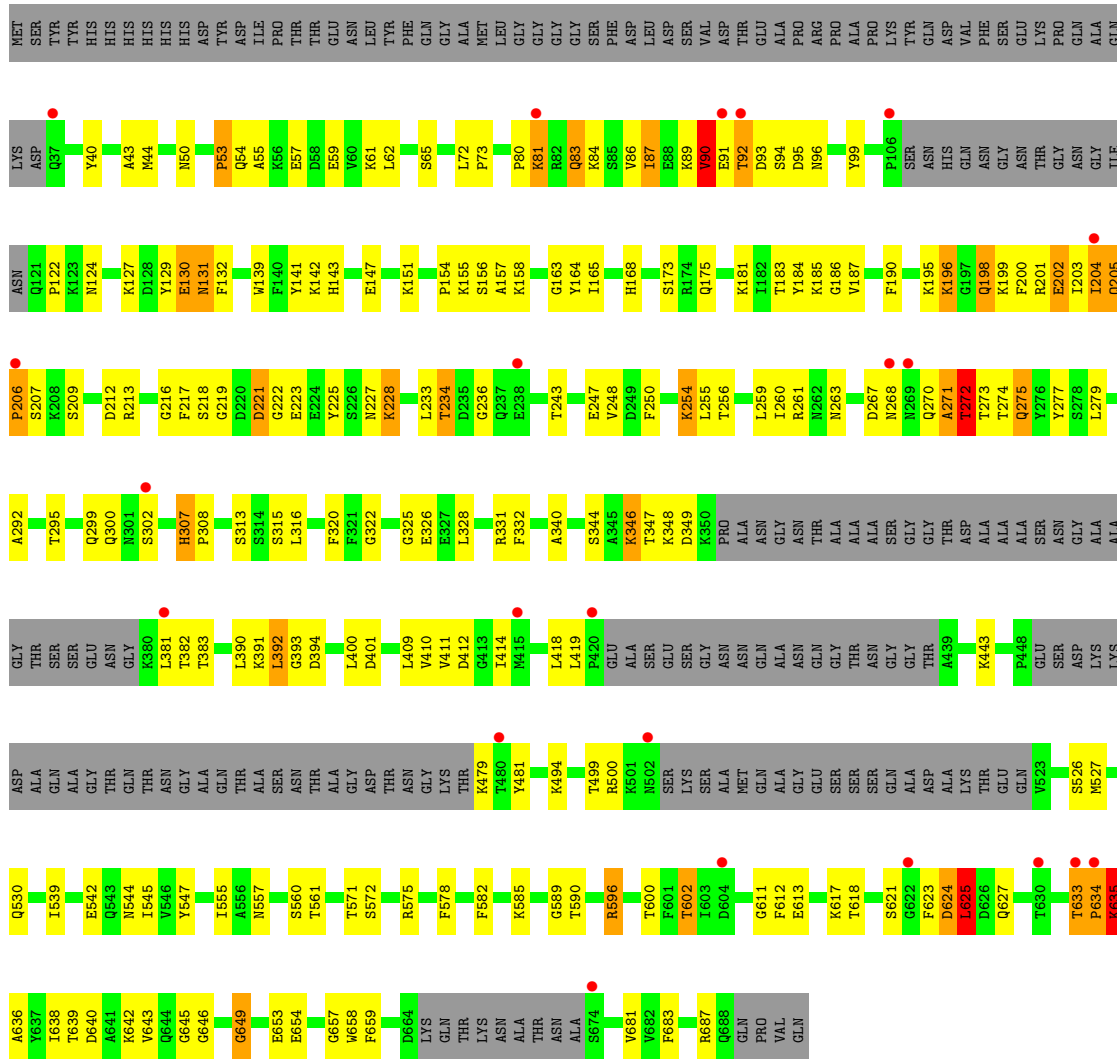
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	75.03Å 82.13Å 111.31Å 90.00° 106.07° 90.00°	Depositor
Resolution (Å)	29.50 – 2.40 29.50 – 2.40	Depositor EDS
% Data completeness (in resolution range)	95.1 (29.50-2.40) 95.2 (29.50-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$< I/\sigma(I) >$ [1]	1.99 (at 2.39Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.3_928)	Depositor
R, R_{free}	0.253 , 0.308 0.247 , 0.303	Depositor DCC
R_{free} test set	1965 reflections (4.04%)	wwPDB-VP
Wilson B-factor (Å^2)	35.6	Xtriage
Anisotropy	0.679	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 49.8	EDS
L-test for twinning[2]	$< |L| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	8366	wwPDB-VP
Average B, all atoms (Å^2)	65.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 28.49 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.8259e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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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	0.50	0/4200	0.70	0/5667
1	B	0.50	0/4192	0.70	1/5655 (0.0%)
All	All	0.50	0/8392	0.70	1/11322 (0.0%)

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	6
1	B	0	6
All	All	0	12

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	625	LEU	N-CA-C	-7.55	90.61	111.00

There are no chirality outliers.

All (12) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	624	ASP	Peptide
1	A	633	THR	Peptide
1	A	634	PRO	Peptide
1	A	649	GLY	Peptide
1	A	90	VAL	Peptide
1	A	92	THR	Peptide
1	B	624	ASP	Peptide
1	B	633	THR	Peptide

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Mol	Chain	Res	Type	Group
1	B	634	PRO	Peptide
1	B	649	GLY	Peptide
1	B	90	VAL	Peptide
1	B	92	THR	Peptide

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	4113	0	3871	122	0
1	B	4106	0	3871	117	0
2	A	78	0	0	4	0
2	B	69	0	0	4	0
All	All	8366	0	7742	239	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 15.

All (239) 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:261:ARG:NH1	1:A:263:ASN:OD1	2.11	0.84
1:B:611:GLY:HA2	1:B:646:GLY:HA2	1.58	0.83
1:B:202:GLU:HB3	1:B:261:ARG:HH21	1.44	0.83
1:A:611:GLY:HA2	1:A:646:GLY:HA2	1.60	0.82
1:A:87:ILE:HD11	1:A:163:GLY:HA2	1.62	0.81
1:A:202:GLU:HB3	1:A:261:ARG:HH21	1.46	0.81
1:B:205:GLN:O	1:B:207:SER:N	2.13	0.80
1:A:205:GLN:O	1:A:207:SER:N	2.14	0.80
1:B:87:ILE:HD11	1:B:163:GLY:HA2	1.63	0.80
1:B:261:ARG:NH1	1:B:263:ASN:OD1	2.19	0.76
1:B:412:ASP:OD2	1:B:500:ARG:NH2	2.19	0.76
1:A:53:PRO:O	1:A:55:ALA:N	2.19	0.75
1:A:412:ASP:OD2	1:A:500:ARG:NH2	2.19	0.75
1:A:44:MET:HE2	1:A:62:LEU:HD22	1.69	0.75
1:A:613:GLU:OE2	1:A:642:LYS:NZ	2.21	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:613:GLU:OE2	1:B:642:LYS:NZ	2.21	0.74
1:B:44:MET:HE2	1:B:62:LEU:HD22	1.70	0.73
1:A:209:SER:HB3	1:A:212:ASP:HB3	1.71	0.73
1:B:53:PRO:O	1:B:55:ALA:N	2.22	0.72
1:B:209:SER:HB3	1:B:212:ASP:HB3	1.73	0.71
1:B:91:GLU:N	1:B:92:THR:HA	2.10	0.67
1:B:81:LYS:H	1:B:81:LYS:HD2	1.60	0.66
1:B:481:TYR:N	2:B:719:HOH:O	2.28	0.66
1:A:621:SER:O	1:A:635:LYS:NZ	2.29	0.65
1:A:173:SER:OG	1:A:322:GLY:O	2.12	0.65
1:B:596:ARG:HH11	1:B:596:ARG:HG3	1.61	0.65
1:B:203:ILE:HD13	1:B:223:GLU:HB2	1.79	0.64
1:B:202:GLU:O	1:B:223:GLU:HG2	1.96	0.64
1:A:346:LYS:NZ	1:A:347:THR:O	2.28	0.64
1:A:596:ARG:HG3	1:A:596:ARG:HH11	1.62	0.64
1:B:173:SER:OG	1:B:322:GLY:O	2.16	0.63
1:A:203:ILE:HD13	1:A:223:GLU:HB2	1.79	0.63
1:A:82:ARG:NH1	2:A:774:HOH:O	2.31	0.62
1:B:236:GLY:HA3	1:B:272:THR:HG21	1.79	0.62
1:A:201:ARG:HH11	1:A:307:HIS:HD2	1.46	0.62
1:A:202:GLU:O	1:A:223:GLU:HG2	1.98	0.62
1:A:236:GLY:HA3	1:A:272:THR:HG21	1.81	0.62
1:A:81:LYS:H	1:A:81:LYS:HD2	1.63	0.62
1:A:83:GLN:HA	1:A:86:VAL:HG23	1.83	0.60
1:B:83:GLN:HA	1:B:86:VAL:HG23	1.84	0.60
1:B:201:ARG:HH11	1:B:307:HIS:HD2	1.48	0.60
1:A:596:ARG:HH11	1:A:596:ARG:CG	2.15	0.59
1:B:596:ARG:HH11	1:B:596:ARG:CG	2.15	0.58
1:A:557:ASN:HB3	1:A:560:SER:HB3	1.87	0.57
1:B:346:LYS:NZ	1:B:347:THR:O	2.33	0.57
1:A:560:SER:OG	1:A:561:THR:N	2.37	0.57
1:A:294:ALA:N	1:A:312:ASP:OD1	2.27	0.56
1:A:204:ILE:HG12	1:A:224:GLU:HG2	1.88	0.55
1:B:129:TYR:CA	1:B:130:GLU:HB2	2.36	0.55
1:B:129:TYR:HA	1:B:130:GLU:HB2	1.89	0.55
1:A:129:TYR:HA	1:A:130:GLU:HB2	1.89	0.55
1:A:401:ASP:O	1:A:410:VAL:HB	2.07	0.55
1:B:623:PHE:HB3	1:B:636:ALA:HB3	1.89	0.55
1:B:139:TRP:NE1	2:B:764:HOH:O	2.32	0.54
1:A:129:TYR:CA	1:A:130:GLU:HB2	2.37	0.54
1:A:199:LYS:HB3	1:A:307:HIS:HA	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:557:ASN:HB3	1:B:560:SER:HB3	1.90	0.54
1:A:93:ASP:O	1:A:95:ASP:N	2.41	0.53
1:B:199:LYS:HB3	1:B:307:HIS:HA	1.90	0.53
1:B:183:THR:HG22	1:B:247:GLU:OE1	2.09	0.53
1:A:184:TYR:CD1	1:A:328:LEU:HD23	2.43	0.53
1:B:202:GLU:HA	1:B:225:TYR:HD2	1.74	0.53
1:A:186:GLY:HA3	1:A:344:SER:O	2.09	0.53
1:B:202:GLU:OE2	1:B:308:PRO:HD3	2.09	0.53
1:B:401:ASP:O	1:B:410:VAL:HB	2.09	0.53
1:A:73:PRO:HA	1:A:81:LYS:HE3	1.91	0.52
1:A:80:PRO:HB2	1:A:83:GLN:HG2	1.92	0.52
1:B:80:PRO:HB2	1:B:83:GLN:HG2	1.91	0.52
1:B:271:ALA:O	1:B:272:THR:HB	2.08	0.52
1:A:634:PRO:HB2	1:A:635:LYS:HA	1.91	0.52
1:B:186:GLY:HA3	1:B:344:SER:O	2.08	0.52
1:B:248:VAL:HG22	1:B:255:LEU:HD13	1.91	0.52
1:A:545:ILE:HD12	1:A:582:PHE:HE2	1.75	0.51
1:A:256:THR:HA	1:A:279:LEU:O	2.10	0.51
1:B:93:ASP:O	1:B:95:ASP:N	2.43	0.51
1:A:202:GLU:HA	1:A:225:TYR:HD2	1.75	0.51
1:A:93:ASP:H	1:A:145:LYS:HB2	1.76	0.51
1:B:95:ASP:OD1	1:B:96:ASN:N	2.44	0.51
1:A:623:PHE:HB3	1:A:636:ALA:HB3	1.93	0.51
1:B:542:GLU:HG3	1:B:545:ILE:HD11	1.93	0.51
1:A:248:VAL:HG22	1:A:255:LEU:HD13	1.92	0.50
1:B:545:ILE:HD12	1:B:582:PHE:HE2	1.76	0.50
1:B:578:PHE:CD1	1:B:589:GLY:HA3	2.45	0.50
1:A:72:LEU:HD12	1:A:73:PRO:HD2	1.93	0.50
1:A:271:ALA:O	1:A:272:THR:HB	2.11	0.50
1:A:599:ALA:N	2:A:764:HOH:O	2.37	0.50
1:A:303:GLU:HB2	2:A:771:HOH:O	2.11	0.49
1:A:542:GLU:HG3	1:A:545:ILE:HD11	1.95	0.49
1:B:560:SER:OG	1:B:561:THR:N	2.44	0.49
1:B:643:VAL:HA	1:B:659:PHE:HB3	1.94	0.49
1:B:204:ILE:O	1:B:205:GLN:C	2.50	0.49
1:B:73:PRO:HA	1:B:81:LYS:HE3	1.93	0.49
1:A:275:GLN:HG2	1:A:295:THR:HG21	1.94	0.49
1:B:653:GLU:HG3	1:B:654:GLU:HG3	1.95	0.49
1:A:391:LYS:O	1:A:394:ASP:N	2.42	0.48
1:A:618:THR:HG23	1:A:638:ILE:HB	1.96	0.48
1:A:204:ILE:O	1:A:205:GLN:C	2.51	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:391:LYS:O	1:B:394:ASP:N	2.42	0.48
1:A:95:ASP:OD1	1:A:96:ASN:N	2.47	0.48
1:A:122:PRO:HB3	1:A:228:LYS:HG3	1.95	0.48
1:A:259:LEU:HB2	1:A:277:TYR:HB2	1.96	0.48
1:B:621:SER:O	1:B:635:LYS:NZ	2.30	0.48
1:B:623:PHE:CG	1:B:624:ASP:N	2.82	0.48
1:A:50:ASN:OD1	1:A:157:ALA:N	2.41	0.48
1:A:320:PHE:HB3	1:A:325:GLY:CA	2.44	0.48
1:A:572:SER:O	1:A:575:ARG:NH1	2.47	0.48
1:A:643:VAL:HA	1:A:659:PHE:HB3	1.94	0.48
1:A:653:GLU:HG3	1:A:654:GLU:HG3	1.96	0.48
1:B:217:PHE:O	1:B:219:GLY:N	2.46	0.48
1:A:651:LYS:N	2:A:742:HOH:O	2.28	0.48
1:B:547:TYR:CE1	1:B:687:ARG:HB2	2.49	0.47
1:B:572:SER:O	1:B:575:ARG:NH1	2.47	0.47
1:A:233:LEU:O	1:A:235:ASP:N	2.46	0.47
1:B:130:GLU:HB3	1:B:131:ASN:H	1.27	0.47
1:B:596:ARG:HH12	1:B:623:PHE:HZ	1.63	0.47
1:B:612:PHE:CZ	1:B:645:GLY:HA3	2.50	0.47
1:A:40:TYR:CE1	1:A:72:LEU:HD13	2.49	0.47
1:A:217:PHE:O	1:A:219:GLY:N	2.48	0.47
1:A:254:LYS:HA	1:A:254:LYS:HD3	1.61	0.47
1:A:400:LEU:HD22	1:A:411:VAL:HG12	1.97	0.47
1:B:122:PRO:HB3	1:B:228:LYS:HG3	1.95	0.47
1:B:187:VAL:HA	1:B:243:THR:HA	1.95	0.47
1:B:275:GLN:HG2	1:B:295:THR:HG21	1.95	0.47
1:A:183:THR:HG22	1:A:247:GLU:OE1	2.15	0.47
1:A:600:THR:HG23	1:A:623:PHE:CD1	2.50	0.47
1:A:292:ALA:HB3	1:A:313:SER:HB3	1.97	0.47
1:B:400:LEU:HD22	1:B:411:VAL:HG12	1.97	0.47
1:B:270:GLN:CB	1:B:271:ALA:HB2	2.46	0.46
1:A:612:PHE:CZ	1:A:645:GLY:HA3	2.51	0.46
1:B:147:GLU:HB3	1:B:158:LYS:HB2	1.96	0.46
1:A:657:GLY:HA3	1:A:683:PHE:CZ	2.50	0.46
1:B:195:LYS:O	1:B:196:LYS:HD2	2.16	0.46
1:B:320:PHE:HB3	1:B:325:GLY:CA	2.45	0.46
1:B:602:THR:HG22	1:B:617:LYS:HG2	1.98	0.46
1:A:151:LYS:HB3	1:A:151:LYS:HE2	1.70	0.46
1:A:175:GLN:HG3	1:A:381:LEU:HD23	1.97	0.45
1:A:578:PHE:CD1	1:A:589:GLY:HA3	2.50	0.45
1:A:596:ARG:HH12	1:A:623:PHE:HZ	1.64	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:618:THR:HG23	1:B:638:ILE:HB	1.98	0.45
1:A:263:ASN:HD21	1:A:274:THR:HG22	1.80	0.45
1:B:50:ASN:OD1	1:B:157:ALA:N	2.42	0.45
1:B:72:LEU:HD12	1:B:73:PRO:HD2	1.97	0.45
1:B:151:LYS:HB3	1:B:151:LYS:HE2	1.70	0.45
1:A:414:ILE:HD12	1:A:414:ILE:HA	1.79	0.45
1:B:315:SER:HB3	2:B:724:HOH:O	2.16	0.45
1:A:129:TYR:CG	1:A:185:LYS:HB2	2.51	0.45
1:A:187:VAL:HA	1:A:243:THR:HA	1.98	0.45
1:A:233:LEU:HA	1:A:233:LEU:HD12	1.56	0.45
1:B:175:GLN:HG3	1:B:381:LEU:HD23	1.98	0.45
1:B:139:TRP:HA	1:B:164:TYR:O	2.16	0.45
1:A:209:SER:HB2	1:A:213:ARG:HD2	1.97	0.45
1:A:57:GLU:O	1:A:59:GLU:N	2.49	0.44
1:A:602:THR:HG22	1:A:617:LYS:HG2	1.98	0.44
1:B:40:TYR:CE1	1:B:72:LEU:HD13	2.53	0.44
1:A:202:GLU:OE2	1:A:308:PRO:HD3	2.17	0.44
1:A:221:ASP:N	1:A:222:GLY:HA3	2.33	0.44
1:A:591:LEU:HB2	1:A:601:PHE:HB2	1.98	0.44
1:B:316:LEU:HA	1:B:332:PHE:HB3	2.00	0.44
1:B:596:ARG:HE	1:B:627:GLN:HG3	1.82	0.44
1:B:414:ILE:HD12	1:B:414:ILE:HA	1.80	0.44
1:A:195:LYS:O	1:A:196:LYS:HD2	2.18	0.44
1:A:227:ASN:ND2	1:A:234:THR:HG23	2.32	0.44
1:A:81:LYS:H	1:A:81:LYS:CD	2.30	0.44
1:B:227:ASN:ND2	1:B:234:THR:HG23	2.32	0.44
1:A:288:PHE:HZ	1:A:328:LEU:HD13	1.81	0.44
1:B:539:ILE:HG13	1:B:539:ILE:O	2.18	0.44
1:B:600:THR:HG23	1:B:623:PHE:CD1	2.53	0.44
1:B:221:ASP:N	1:B:222:GLY:HA3	2.33	0.44
1:B:254:LYS:HA	1:B:254:LYS:HD3	1.63	0.44
1:A:255:LEU:N	1:A:281:ALA:O	2.38	0.44
1:B:205:GLN:HA	1:B:206:PRO:HD2	1.76	0.44
1:B:346:LYS:HB3	1:B:347:THR:H	1.60	0.44
1:A:147:GLU:HB3	1:A:158:LYS:HB2	1.99	0.43
1:A:539:ILE:HG13	1:A:539:ILE:O	2.18	0.43
1:B:236:GLY:HA3	1:B:272:THR:CG2	2.47	0.43
1:B:392:LEU:HA	1:B:393:GLY:HA2	1.68	0.43
1:A:91:GLU:N	1:A:92:THR:HA	2.33	0.43
1:B:184:TYR:CD1	1:B:328:LEU:HD23	2.52	0.43
1:A:547:TYR:CE1	1:A:687:ARG:HB2	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:129:TYR:HB3	1:A:185:LYS:O	2.18	0.43
1:A:347:THR:HG22	1:A:348:LYS:H	1.83	0.43
1:A:99:TYR:HB2	1:A:141:TYR:CE2	2.54	0.43
1:B:256:THR:HA	1:B:279:LEU:O	2.18	0.43
1:B:263:ASN:HD21	1:B:274:THR:HG22	1.82	0.43
1:A:316:LEU:HA	1:A:332:PHE:HB3	2.00	0.43
1:B:233:LEU:HD12	1:B:233:LEU:HA	1.56	0.43
1:B:99:TYR:HB2	1:B:141:TYR:CE2	2.54	0.43
1:B:292:ALA:HB3	1:B:313:SER:HB3	2.01	0.43
1:A:139:TRP:HA	1:A:164:TYR:O	2.18	0.43
1:B:43:ALA:HA	1:B:165:ILE:O	2.19	0.43
1:B:83:GLN:HB2	1:B:164:TYR:CE2	2.54	0.43
1:B:625:LEU:HD13	1:B:625:LEU:HA	1.92	0.43
1:A:130:GLU:HB3	1:A:131:ASN:H	1.26	0.43
1:A:132:PHE:CD1	1:A:346:LYS:HG3	2.54	0.43
1:B:129:TYR:CG	1:B:185:LYS:HB2	2.54	0.42
1:B:129:TYR:HB3	1:B:185:LYS:O	2.18	0.42
1:B:57:GLU:O	1:B:59:GLU:N	2.51	0.42
1:B:81:LYS:H	1:B:81:LYS:CD	2.25	0.42
1:A:634:PRO:HB2	1:A:635:LYS:CA	2.49	0.42
1:B:50:ASN:HA	1:B:157:ALA:O	2.19	0.42
1:B:198:GLN:HB2	1:B:206:PRO:HG3	2.01	0.42
1:B:209:SER:HB2	1:B:213:ARG:HD2	2.01	0.42
1:B:443:LYS:NZ	2:B:765:HOH:O	2.52	0.42
1:A:538:GLU:HG3	1:A:651:LYS:HG3	2.01	0.42
1:B:657:GLY:HA3	1:B:683:PHE:CZ	2.54	0.42
1:A:248:VAL:HG11	1:A:250:PHE:CZ	2.54	0.42
1:B:181:LYS:HA	1:B:248:VAL:O	2.20	0.42
1:A:246:LEU:HD21	1:A:279:LEU:HD12	2.01	0.42
1:B:259:LEU:HB2	1:B:277:TYR:HB2	2.02	0.42
1:A:270:GLN:CB	1:A:271:ALA:HB2	2.50	0.41
1:B:184:TYR:OH	1:B:325:GLY:O	2.23	0.41
1:A:386:ASP:O	1:A:530:GLN:HA	2.20	0.41
1:A:418:LEU:O	1:A:419:LEU:HD13	2.19	0.41
1:B:658:TRP:HA	1:B:681:VAL:O	2.20	0.41
1:A:220:ASP:OD1	1:A:222:GLY:HA3	2.21	0.41
1:A:661:TYR:HA	1:A:662:PRO:HA	1.81	0.41
1:A:623:PHE:CG	1:A:624:ASP:N	2.88	0.41
1:A:236:GLY:HA3	1:A:272:THR:CG2	2.48	0.41
1:A:276:TYR:HE1	1:A:307:HIS:CD2	2.39	0.41
1:B:390:LEU:O	1:B:526:SER:HB2	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:50:ASN:OD1	1:A:156:SER:HA	2.21	0.41
1:A:90:VAL:HG12	1:A:142:LYS:HD2	2.03	0.41
1:B:141:TYR:HE1	1:B:143:HIS:CE1	2.39	0.41
1:B:527:MET:HE2	1:B:527:MET:HB2	1.87	0.41
1:A:496:GLY:HA2	1:A:552:TYR:CE2	2.56	0.41
1:B:418:LEU:O	1:B:419:LEU:HD13	2.21	0.41
1:A:184:TYR:OH	1:A:325:GLY:O	2.25	0.41
1:B:190:PHE:HA	1:B:340:ALA:O	2.21	0.41
1:B:300:GLN:C	1:B:302:SER:H	2.24	0.41
1:A:198:GLN:HB2	1:A:206:PRO:HG3	2.02	0.40
1:A:255:LEU:HD23	1:A:281:ALA:HB3	2.03	0.40
1:B:90:VAL:HG12	1:B:142:LYS:HD2	2.03	0.40
1:A:300:GLN:C	1:A:302:SER:H	2.24	0.40
1:B:409:LEU:HA	1:B:530:GLN:HE22	1.86	0.40
1:B:50:ASN:OD1	1:B:156:SER:HA	2.21	0.40
1:B:132:PHE:CD1	1:B:346:LYS:HG3	2.56	0.40
1:A:72:LEU:HD12	1:A:73:PRO:CD	2.51	0.40
1:A:294:ALA:O	1:A:297:LYS:HG3	2.22	0.40
1:B:248:VAL:HG11	1:B:250:PHE:CZ	2.56	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	518/717 (72%)	446 (86%)	47 (9%)	25 (5%)	2	1
1	B	518/717 (72%)	449 (87%)	45 (9%)	24 (5%)	2	1
All	All	1036/1434 (72%)	895 (86%)	92 (9%)	49 (5%)	2	1

All (49) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	54	GLN
1	A	93	ASP
1	A	94	SER
1	A	130	GLU
1	A	155	LYS
1	A	206	PRO
1	A	218	SER
1	A	234	THR
1	A	348	LYS
1	A	634	PRO
1	A	635	LYS
1	A	650	PRO
1	B	54	GLN
1	B	94	SER
1	B	130	GLU
1	B	155	LYS
1	B	206	PRO
1	B	218	SER
1	B	348	LYS
1	B	634	PRO
1	B	635	LYS
1	A	272	THR
1	A	633	THR
1	A	639	THR
1	B	234	THR
1	B	271	ALA
1	B	272	THR
1	B	633	THR
1	B	639	THR
1	B	649	GLY
1	A	53	PRO
1	A	92	THR
1	A	267	ASP
1	A	271	ALA
1	B	53	PRO
1	B	267	ASP
1	B	544	ASN
1	A	268	ASN
1	A	349	ASP
1	B	127	LYS
1	B	268	ASN
1	B	349	ASP
1	A	205	GLN

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Mol	Chain	Res	Type
1	B	205	GLN
1	A	127	LYS
1	A	544	ASN
1	B	216	GLY
1	B	154	PRO
1	A	154	PRO

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	423/586 (72%)	381 (90%)	42 (10%)	6	10
1	B	422/586 (72%)	379 (90%)	43 (10%)	6	9
All	All	845/1172 (72%)	760 (90%)	85 (10%)	6	9

All (85) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	61	LYS
1	A	65	SER
1	A	81	LYS
1	A	83	GLN
1	A	84	LYS
1	A	87	ILE
1	A	90	VAL
1	A	124	ASN
1	A	131	ASN
1	A	168	HIS
1	A	192	THR
1	A	196	LYS
1	A	198	GLN
1	A	200	PHE
1	A	202	GLU
1	A	204	ILE
1	A	221	ASP

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Mol	Chain	Res	Type
1	A	228	LYS
1	A	254	LYS
1	A	260	ILE
1	A	272	THR
1	A	273	THR
1	A	275	GLN
1	A	299	GLN
1	A	307	HIS
1	A	326	GLU
1	A	331	ARG
1	A	346	LYS
1	A	383	THR
1	A	392	LEU
1	A	479	LYS
1	A	494	LYS
1	A	499	THR
1	A	555	ILE
1	A	571	THR
1	A	585	LYS
1	A	590	THR
1	A	596	ARG
1	A	602	THR
1	A	625	LEU
1	A	635	LYS
1	A	640	ASP
1	B	61	LYS
1	B	65	SER
1	B	81	LYS
1	B	83	GLN
1	B	84	LYS
1	B	87	ILE
1	B	89	LYS
1	B	90	VAL
1	B	124	ASN
1	B	131	ASN
1	B	168	HIS
1	B	196	LYS
1	B	198	GLN
1	B	200	PHE
1	B	202	GLU
1	B	204	ILE
1	B	221	ASP

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Mol	Chain	Res	Type
1	B	228	LYS
1	B	254	LYS
1	B	260	ILE
1	B	272	THR
1	B	273	THR
1	B	275	GLN
1	B	299	GLN
1	B	307	HIS
1	B	326	GLU
1	B	331	ARG
1	B	346	LYS
1	B	382	THR
1	B	383	THR
1	B	392	LEU
1	B	479	LYS
1	B	494	LYS
1	B	499	THR
1	B	555	ILE
1	B	571	THR
1	B	585	LYS
1	B	590	THR
1	B	596	ARG
1	B	602	THR
1	B	625	LEU
1	B	635	LYS
1	B	640	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	307	HIS
1	B	124	ASN
1	B	307	HIS

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	532/717 (74%)	0.45	16 (3%)	52	49	28, 62, 101, 140	0
1	B	532/717 (74%)	0.44	22 (4%)	42	39	30, 61, 101, 141	0
All	All	1064/1434 (74%)	0.44	38 (3%)	46	43	28, 62, 101, 141	0

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	269	ASN	4.7
1	B	269	ASN	4.2
1	B	302	SER	3.6
1	B	268	ASN	3.4
1	A	634	PRO	3.4
1	B	238	GLU	3.3
1	A	88	GLU	3.2
1	A	221	ASP	3.0
1	B	106	PRO	3.0
1	A	268	ASN	3.0
1	B	204	ILE	2.9
1	B	622	GLY	2.9
1	B	420	PRO	2.8
1	A	302	SER	2.6
1	A	624	ASP	2.6
1	B	92	THR	2.6
1	A	232	THR	2.5
1	B	634	PRO	2.5
1	B	502	ASN	2.4
1	B	37	GLN	2.4
1	B	630	THR	2.4
1	A	633	THR	2.3
1	B	633	THR	2.3
1	A	635	LYS	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	270	GLN	2.3
1	A	649	GLY	2.3
1	B	674	SER	2.3
1	B	91	GLU	2.2
1	B	381	LEU	2.2
1	B	81	LYS	2.1
1	B	480	THR	2.1
1	B	206	PRO	2.1
1	A	558	ASP	2.1
1	A	37	GLN	2.0
1	A	301	ASN	2.0
1	B	604	ASP	2.0
1	A	674	SER	2.0
1	B	415	MET	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.