Full wwPDB X-ray Structure Validation Report ⓘ

Oct 12, 2021 – 03:30 PM EDT

PDB ID	:	1XTF
Title	:	neurotoxin BoNT/A E224Q Y366F mutant
Authors	:	Breidenbach, M.A.; Brunger, A.T.
Deposited on	:	2004-10-21
Resolution	:	2.20 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 following versions of software and data (see references ⓘ) were used in the production of this report:

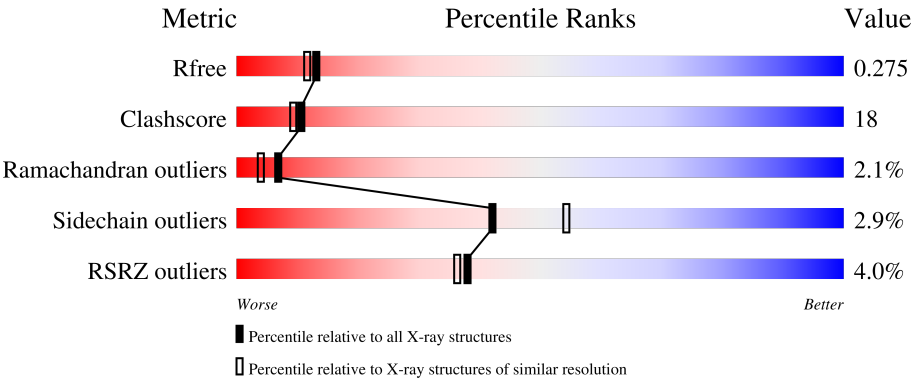
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.23.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.2

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	427	4% 70% 27%
1	B	427	4% 71% 26%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 7239 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 neurotoxin BoNT/A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	427	Total	C	N	O	S	101	0	0
			3462	2230	576	648	8			
1	B	427	Total	C	N	O	S	101	0	0
			3462	2230	576	648	8			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	224	GLN	GLU	engineered mutation	GB 33321098
A	366	PHE	TYR	engineered mutation	GB 33321098
A	421	PRO	-	cloning artifact	GB 33321098
A	422	GLY	-	cloning artifact	GB 33321098
A	423	HIS	-	expression tag	GB 33321098
A	424	HIS	-	expression tag	GB 33321098
A	425	HIS	-	expression tag	GB 33321098
A	426	HIS	-	expression tag	GB 33321098
A	427	HIS	-	expression tag	GB 33321098
A	428	HIS	-	expression tag	GB 33321098
B	652	GLN	GLU	engineered mutation	GB 33321098
B	794	PHE	TYR	engineered mutation	GB 33321098
B	849	PRO	-	cloning artifact	GB 33321098
B	850	GLY	-	cloning artifact	GB 33321098
B	851	HIS	-	expression tag	GB 33321098
B	852	HIS	-	expression tag	GB 33321098
B	853	HIS	-	expression tag	GB 33321098
B	854	HIS	-	expression tag	GB 33321098
B	855	HIS	-	expression tag	GB 33321098
B	856	HIS	-	expression tag	GB 33321098

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Zn 1 1	0	0
2	B	1	Total Zn 1 1	0	0

- Molecule 3 is water.

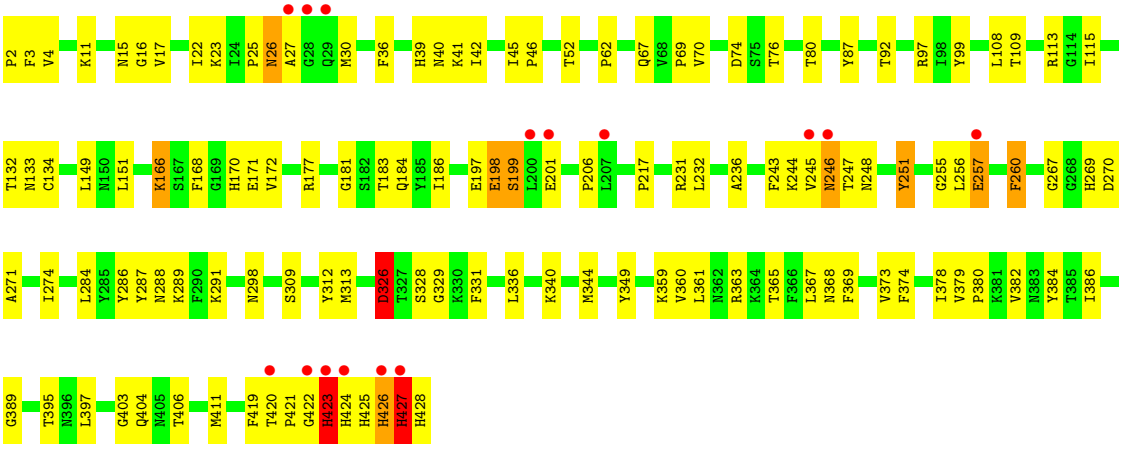
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	146	Total O 146 146	0	0
3	B	167	Total O 167 167	0	0

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.

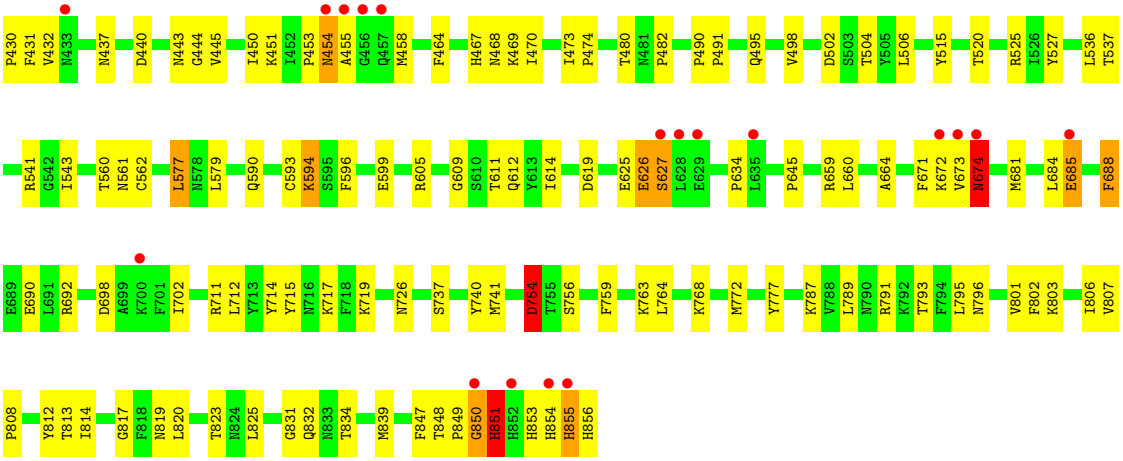
• Molecule 1: neurotoxin BoNT/A

Chain A:



• Molecule 1: neurotoxin BoNT/A

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	57.90Å 40.49Å 195.89Å 90.00° 90.25° 90.00°	Depositor
Resolution (Å)	50.00 – 2.20 49.94 – 2.20	Depositor EDS
% Data completeness (in resolution range)	(Not available) (50.00-2.20) 93.2 (49.94-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.18 (at 2.20Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.220 , 0.273 0.221 , 0.275	Depositor DCC
R_{free} test set	2262 reflections (5.11%)	wwPDB-VP
Wilson B-factor (Å^2)	34.1	Xtriage
Anisotropy	0.949	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 43.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.460 for h,-k,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7239	wwPDB-VP
Average B, all atoms (Å^2)	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.13% of the height of the origin peak. No significant pseudotranslation is detected.*

[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

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

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	0.55	0/3550	0.77	3/4807 (0.1%)
1	B	0.55	1/3550 (0.0%)	0.79	7/4807 (0.1%)
All	All	0.55	1/7100 (0.0%)	0.78	10/9614 (0.1%)

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	1
1	B	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	593	CYS	CB-SG	-5.31	1.73	1.81

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	427	HIS	CA-CB-CG	-8.20	99.66	113.60
1	B	634	PRO	CA-N-CD	-7.82	100.55	111.50
1	B	674	ASN	CA-C-N	-7.41	100.89	117.20
1	B	851	HIS	N-CA-C	6.29	127.99	111.00
1	B	851	HIS	CA-C-N	-6.04	103.92	117.20
1	B	851	HIS	CA-CB-CG	-5.78	103.78	113.60
1	A	426	HIS	N-CA-C	-5.73	95.52	111.00
1	B	674	ASN	O-C-N	5.52	131.53	122.70

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	246	ASN	C-N-CA	5.34	135.06	121.70
1	B	674	ASN	C-N-CA	5.20	134.69	121.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	286	TYR	Sidechain
1	B	714	TYR	Sidechain

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	3462	0	3393	128	0
1	B	3462	0	3393	119	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	146	0	0	8	0
3	B	167	0	0	8	0
All	All	7239	0	6786	246	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 18.

All (246) 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:674:ASN:C	1:B:674:ASN:HD22	1.39	1.13
1:A:421:PRO:HB2	1:A:423:HIS:NE2	1.67	1.10
1:A:365:THR:HG22	1:A:367:LEU:H	1.27	0.98
1:A:425:HIS:ND1	1:A:427:HIS:HD2	1.61	0.98
1:B:726:ASN:HD21	1:B:759:PHE:H	1.05	0.98
1:A:421:PRO:HB2	1:A:423:HIS:HE2	1.23	0.97
1:A:298:ASN:HD21	1:A:331:PHE:H	1.05	0.97

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:793:THR:HG22	1:B:795:LEU:H	1.30	0.96
1:B:674:ASN:C	1:B:674:ASN:ND2	2.14	0.95
1:B:854:HIS:O	1:B:855:HIS:HB2	1.64	0.93
1:A:423:HIS:N	1:A:423:HIS:ND1	2.12	0.91
1:A:41:LYS:HE2	1:A:115:ILE:HD12	1.52	0.91
1:B:850:GLY:O	1:B:851:HIS:CB	2.17	0.91
1:B:789:LEU:H	1:B:832:GLN:HE22	1.19	0.89
1:B:850:GLY:O	1:B:851:HIS:CG	2.25	0.89
1:B:698:ASP:OD1	1:B:793:THR:HG23	1.73	0.88
1:A:11:LYS:HG2	3:A:969:HOH:O	1.73	0.88
1:A:270:ASP:OD1	1:A:365:THR:HG23	1.75	0.87
1:A:361:LEU:H	1:A:404:GLN:HE22	1.23	0.84
1:B:469:LYS:HE2	1:B:543:ILE:HD12	1.60	0.83
1:B:490:PRO:HG2	1:B:495:GLN:HG2	1.59	0.83
1:B:848:THR:HB	1:B:849:PRO:HD3	1.60	0.83
1:A:62:PRO:HG2	1:A:67:GLN:HG2	1.60	0.82
1:B:453:PRO:HG3	1:B:562:CYS:O	1.81	0.81
1:A:41:LYS:HE2	1:A:115:ILE:CD1	2.12	0.79
1:B:850:GLY:O	1:B:851:HIS:HB2	1.81	0.79
1:A:244:LYS:NZ	1:A:256:LEU:H	1.80	0.79
1:A:25:PRO:HG3	1:A:134:CYS:O	1.84	0.78
1:A:361:LEU:H	1:A:404:GLN:NE2	1.82	0.78
1:A:70:VAL:HG11	1:A:426:HIS:HB2	1.65	0.77
1:A:69:PRO:HG2	1:A:424:HIS:HE1	1.49	0.77
1:A:374:PHE:CZ	1:A:406:THR:HG21	2.20	0.76
1:A:420:THR:HB	1:A:421:PRO:HD3	1.67	0.76
1:A:2:PRO:HD2	1:A:39:HIS:CG	2.21	0.76
1:B:672:LYS:NZ	1:B:684:LEU:H	1.84	0.75
1:B:802:PHE:CZ	1:B:834:THR:HG21	2.22	0.75
1:A:426:HIS:O	1:A:427:HIS:CD2	2.40	0.74
1:A:425:HIS:ND1	1:A:427:HIS:CD2	2.52	0.74
1:A:244:LYS:HD3	1:A:256:LEU:O	1.88	0.74
1:B:430:PRO:HD2	1:B:467:HIS:CG	2.23	0.74
1:A:426:HIS:O	1:A:427:HIS:CG	2.42	0.73
1:B:726:ASN:ND2	1:B:759:PHE:H	1.85	0.72
1:A:298:ASN:ND2	1:A:331:PHE:H	1.85	0.72
1:B:791:ARG:HB2	1:B:796:ASN:HD22	1.56	0.71
1:A:363:ARG:HB2	1:A:368:ASN:HD22	1.56	0.71
1:A:217:PRO:HG2	1:A:378:ILE:HD11	1.74	0.69
1:A:26:ASN:OD1	1:A:27:ALA:N	2.25	0.69
1:A:2:PRO:HD3	1:A:42:ILE:HD12	1.75	0.69

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:427:HIS:O	1:A:428:HIS:C	2.32	0.68
1:A:246:ASN:C	1:A:246:ASN:ND2	2.44	0.68
1:B:692:ARG:NH1	3:B:866:HOH:O	2.13	0.68
1:B:430:PRO:HG3	1:B:536:LEU:HB3	1.76	0.68
1:B:645:PRO:HG2	1:B:806:ILE:HD11	1.75	0.68
1:A:2:PRO:HG3	1:A:108:LEU:HB3	1.76	0.67
1:B:454:ASN:OD1	1:B:455:ALA:N	2.27	0.67
1:A:423:HIS:NE2	1:A:424:HIS:CE1	2.63	0.67
1:B:482:PRO:HA	3:B:1094:HOH:O	1.95	0.66
1:B:430:PRO:HA	1:B:536:LEU:HD13	1.77	0.66
1:B:672:LYS:HD3	1:B:684:LEU:O	1.96	0.66
1:B:498:VAL:HG11	1:B:854:HIS:HB2	1.79	0.65
1:A:2:PRO:HA	1:A:108:LEU:HD13	1.79	0.64
1:B:789:LEU:H	1:B:832:GLN:NE2	1.90	0.64
1:B:850:GLY:O	1:B:851:HIS:CD2	2.51	0.64
1:B:741:MET:HE2	1:B:741:MET:HA	1.80	0.64
1:A:244:LYS:HZ2	1:A:256:LEU:H	1.44	0.64
1:B:430:PRO:HD3	1:B:470:ILE:HD12	1.80	0.63
1:A:423:HIS:CG	1:A:424:HIS:H	2.16	0.63
1:A:52:THR:HG21	1:A:166:LYS:HE3	1.81	0.63
1:A:378:ILE:HG23	1:A:384:TYR:CD1	2.33	0.62
1:B:806:ILE:HG23	1:B:812:TYR:CD1	2.33	0.62
1:B:469:LYS:HE2	1:B:543:ILE:CD1	2.28	0.62
1:A:420:THR:HG23	1:B:672:LYS:O	1.99	0.62
1:A:361:LEU:N	1:A:404:GLN:HE22	1.96	0.61
1:B:626:GLU:O	1:B:627:SER:HB2	1.98	0.61
1:A:269:HIS:HB3	3:A:1073:HOH:O	1.99	0.61
1:A:198:GLU:O	1:A:199:SER:HB2	1.99	0.60
1:A:52:THR:CG2	1:A:166:LYS:HE3	2.31	0.60
1:B:480:THR:HG21	1:B:594:LYS:HE3	1.83	0.60
1:A:217:PRO:HG2	1:A:378:ILE:CD1	2.32	0.59
1:A:177:ARG:HG2	1:A:236:ALA:O	2.02	0.58
1:A:15:ASN:O	1:A:17:VAL:HG23	2.04	0.58
1:A:113:ARG:NH1	3:A:860:HOH:O	2.37	0.58
1:B:480:THR:CG2	1:B:594:LYS:HE3	2.33	0.58
1:A:26:ASN:CG	1:A:27:ALA:N	2.57	0.58
1:B:454:ASN:CG	1:B:455:ALA:N	2.57	0.57
1:B:605:ARG:HG2	1:B:664:ALA:O	2.04	0.57
1:B:443:ASN:O	1:B:445:VAL:HG23	2.05	0.57
1:B:645:PRO:HG2	1:B:806:ILE:CD1	2.35	0.56
1:B:672:LYS:HZ2	1:B:684:LEU:H	1.50	0.56

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:244:LYS:HZ3	1:A:256:LEU:H	1.53	0.56
1:B:740:TYR:CD2	1:B:741:MET:CE	2.89	0.56
1:B:541:ARG:NH1	3:B:1051:HOH:O	2.39	0.56
1:B:590:GLN:HG2	3:B:1121:HOH:O	2.05	0.55
1:A:184:GLN:OE1	1:A:231:ARG:HD3	2.07	0.55
1:A:423:HIS:CG	1:A:424:HIS:N	2.75	0.54
1:A:69:PRO:CG	1:A:424:HIS:HE1	2.20	0.54
1:B:793:THR:H	1:B:796:ASN:ND2	2.05	0.53
1:B:789:LEU:N	1:B:832:GLN:HE22	1.97	0.53
1:A:312:TYR:CD2	1:A:313:MET:HE2	2.44	0.53
1:A:373:VAL:HG22	1:A:419:PHE:HZ	1.74	0.53
1:A:373:VAL:CG2	1:A:419:PHE:CZ	2.92	0.52
1:B:625:GLU:O	1:B:626:GLU:HB2	2.07	0.52
1:A:26:ASN:HB2	1:A:168:PHE:CE1	2.45	0.52
1:A:365:THR:H	1:A:368:ASN:ND2	2.07	0.52
1:B:671:PHE:O	1:B:685:GLU:HA	2.10	0.52
1:A:36:PHE:CD1	1:A:36:PHE:N	2.77	0.52
1:B:726:ASN:HD21	1:B:759:PHE:N	1.89	0.52
1:A:3:PHE:HB2	1:A:99:TYR:CE2	2.45	0.51
1:B:431:PHE:HB2	1:B:527:TYR:CE2	2.45	0.51
1:A:298:ASN:HD21	1:A:331:PHE:N	1.89	0.51
1:A:422:GLY:C	1:A:423:HIS:CG	2.82	0.51
1:A:369:PHE:CD1	1:A:424:HIS:O	2.63	0.51
1:A:425:HIS:CG	1:A:426:HIS:H	2.29	0.51
1:A:421:PRO:CB	1:A:423:HIS:NE2	2.57	0.51
1:A:22:ILE:HD11	1:A:45:ILE:HD11	1.92	0.51
1:A:426:HIS:CG	1:A:427:HIS:H	2.29	0.51
1:A:197:GLU:O	1:A:198:GLU:HB2	2.10	0.50
1:A:329:GLY:HA2	3:A:998:HOH:O	2.10	0.50
1:A:419:PHE:O	3:A:1071:HOH:O	2.19	0.50
1:B:430:PRO:HD3	1:B:470:ILE:CD1	2.41	0.50
1:A:243:PHE:O	1:A:257:GLU:HA	2.12	0.50
1:B:432:VAL:HG21	1:B:520:THR:HG23	1.92	0.50
1:B:825:LEU:HG	1:B:831:GLY:HA2	1.92	0.50
1:A:133:ASN:ND2	1:A:183:THR:H	2.10	0.50
1:B:454:ASN:HB2	1:B:596:PHE:CE1	2.47	0.50
1:B:672:LYS:HZ3	1:B:684:LEU:H	1.55	0.50
1:A:423:HIS:CE1	1:A:424:HIS:CE1	2.99	0.49
1:B:464:PHE:N	1:B:464:PHE:CD1	2.80	0.49
1:B:740:TYR:CD2	1:B:741:MET:HE3	2.48	0.49
1:A:397:LEU:HG	1:A:403:GLY:HA2	1.94	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:612:GLN:OE1	1:B:659:ARG:HD3	2.13	0.49
1:B:854:HIS:O	1:B:855:HIS:CB	2.48	0.49
1:B:430:PRO:HB2	1:B:467:HIS:CD2	2.47	0.49
1:B:823:THR:OG1	1:B:825:LEU:HB2	2.13	0.49
1:B:847:PHE:O	3:B:1062:HOH:O	2.19	0.49
1:A:2:PRO:HB2	1:A:39:HIS:CD2	2.48	0.48
1:B:812:TYR:HA	1:B:817:GLY:O	2.14	0.48
1:B:848:THR:HB	1:B:849:PRO:CD	2.40	0.48
1:A:171:GLU:CD	1:A:171:GLU:H	2.16	0.48
1:B:819:ASN:O	3:B:1129:HOH:O	2.20	0.48
1:A:395:THR:OG1	1:A:397:LEU:HB2	2.14	0.48
1:B:561:ASN:ND2	1:B:611:THR:H	2.12	0.48
1:B:801:VAL:CG2	1:B:847:PHE:CZ	2.96	0.48
1:A:360:VAL:HB	1:A:404:GLN:HE22	1.79	0.48
1:B:599:GLU:H	1:B:599:GLU:CD	2.17	0.47
1:A:109:THR:HG22	1:A:113:ARG:HD2	1.95	0.47
1:A:244:LYS:HA	1:A:256:LEU:O	2.15	0.47
1:A:373:VAL:HG22	1:A:419:PHE:CZ	2.49	0.47
1:B:537:THR:HG22	1:B:541:ARG:HD2	1.96	0.47
1:B:609:GLY:HA3	1:B:660:LEU:O	2.15	0.47
1:A:423:HIS:CE1	1:A:424:HIS:NE2	2.82	0.47
1:B:801:VAL:HG22	1:B:847:PHE:HZ	1.80	0.47
1:A:426:HIS:O	1:A:427:HIS:CB	2.62	0.46
1:A:23:LYS:HE3	1:A:30:MET:O	2.15	0.46
1:B:579:LEU:HD11	1:B:614:ILE:HD12	1.97	0.46
1:B:853:HIS:CG	1:B:854:HIS:H	2.31	0.46
1:A:181:GLY:HA3	1:A:232:LEU:O	2.16	0.46
1:A:312:TYR:CD2	1:A:313:MET:CE	2.99	0.46
1:B:468:ASN:ND2	3:B:942:HOH:O	2.48	0.46
1:B:451:LYS:HE3	1:B:458:MET:O	2.15	0.46
1:B:609:GLY:HA2	1:B:659:ARG:O	2.15	0.46
1:B:740:TYR:CE2	1:B:741:MET:CE	2.99	0.46
1:B:450:ILE:HD11	1:B:473:ILE:HD11	1.98	0.45
1:A:40:ASN:ND2	3:A:988:HOH:O	2.49	0.45
1:B:834:THR:O	1:B:834:THR:HG22	2.16	0.45
1:B:717:LYS:HE2	3:B:1003:HOH:O	2.15	0.45
1:B:577:LEU:HD23	1:B:577:LEU:N	2.31	0.45
1:A:199:SER:O	1:A:201:GLU:HG2	2.16	0.45
1:A:260:PHE:CE1	1:A:274:ILE:HD13	2.52	0.45
1:B:768:LYS:HE3	1:B:768:LYS:HB2	1.77	0.45
1:B:834:THR:O	1:B:834:THR:CG2	2.64	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:688:PHE:CE1	1:B:702:ILE:HD13	2.51	0.45
1:A:181:GLY:HA2	1:A:231:ARG:O	2.17	0.45
1:B:793:THR:C	1:B:795:LEU:N	2.70	0.45
1:A:287:TYR:CE2	1:A:291:LYS:HD2	2.52	0.44
1:A:365:THR:C	1:A:367:LEU:N	2.70	0.44
1:B:741:MET:HA	1:B:741:MET:CE	2.47	0.44
1:B:684:LEU:HD23	1:B:684:LEU:HA	1.80	0.44
1:B:715:TYR:CE2	1:B:719:LYS:HD2	2.53	0.44
1:B:740:TYR:HD2	1:B:741:MET:HE3	1.81	0.44
1:A:373:VAL:HG23	1:A:419:PHE:CE1	2.51	0.44
1:A:384:TYR:HA	1:A:389:GLY:O	2.18	0.44
1:A:246:ASN:C	1:A:246:ASN:HD22	2.18	0.44
1:B:855:HIS:O	1:B:856:HIS:HB2	2.18	0.44
1:A:151:LEU:HD11	1:A:186:ILE:HD12	2.00	0.43
1:A:340:LYS:HB2	1:A:340:LYS:HE3	1.79	0.43
1:A:80:THR:HB	3:A:1004:HOH:O	2.18	0.43
1:A:245:VAL:CG2	1:A:256:LEU:HB3	2.48	0.43
1:A:2:PRO:HD2	1:A:39:HIS:CB	2.48	0.43
1:A:406:THR:O	1:A:406:THR:HG22	2.17	0.43
1:B:839:MET:HA	1:B:839:MET:HE2	2.00	0.43
1:B:807:VAL:HB	1:B:808:PRO:HD3	1.99	0.43
1:A:422:GLY:C	1:A:423:HIS:ND1	2.72	0.43
1:B:740:TYR:CD2	1:B:741:MET:HE2	2.53	0.43
1:A:4:VAL:HG21	1:A:92:THR:HG23	2.00	0.43
1:A:344:MET:HG3	1:A:349:TYR:CZ	2.53	0.43
1:A:373:VAL:HG23	1:A:419:PHE:CZ	2.53	0.43
1:B:430:PRO:HD2	1:B:467:HIS:CB	2.48	0.43
1:B:502:ASP:OD1	1:B:504:THR:HB	2.19	0.43
1:B:430:PRO:CD	1:B:470:ILE:HD12	2.49	0.43
1:B:772:MET:HG3	1:B:777:TYR:CZ	2.53	0.43
1:A:74:ASP:OD1	1:A:76:THR:HB	2.19	0.42
1:A:69:PRO:HG2	1:A:424:HIS:CE1	2.41	0.42
1:A:69:PRO:HB2	1:A:424:HIS:CE1	2.55	0.42
1:A:245:VAL:HG23	1:A:256:LEU:HB3	2.02	0.42
1:A:378:ILE:O	1:A:378:ILE:CG2	2.68	0.42
1:A:382:VAL:HG13	3:A:1014:HOH:O	2.19	0.42
1:A:267:GLY:HA2	1:A:271:ALA:HB2	2.02	0.42
1:B:690:GLU:HG3	1:B:855:HIS:NE2	2.34	0.42
1:A:406:THR:O	1:A:406:THR:CG2	2.67	0.42
1:A:289:LYS:HD3	1:A:289:LYS:HA	1.87	0.42
1:B:474:PRO:HB3	1:B:515:TYR:HD2	1.83	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:288:ASN:HD22	1:A:288:ASN:HA	1.67	0.42
1:B:673:VAL:HG23	1:B:684:LEU:HB3	2.02	0.42
1:B:740:TYR:HD2	1:B:741:MET:CE	2.32	0.42
1:A:149:LEU:HD23	1:A:149:LEU:N	2.35	0.42
1:A:326:ASP:CG	1:A:328:SER:H	2.24	0.42
1:A:423:HIS:CE1	1:A:424:HIS:CD2	3.08	0.42
1:B:737:SER:O	1:B:740:TYR:HB3	2.19	0.42
1:B:801:VAL:HG23	1:B:847:PHE:CZ	2.55	0.42
1:A:132:THR:HB	1:A:168:PHE:HB2	2.02	0.41
1:B:560:THR:HB	1:B:596:PHE:HB2	2.02	0.41
1:A:426:HIS:CG	1:A:427:HIS:N	2.87	0.41
1:A:170:HIS:HD2	1:A:172:VAL:H	1.69	0.41
1:B:506:LEU:HD21	1:B:515:TYR:HB2	2.03	0.41
1:B:577:LEU:HD23	1:B:577:LEU:H	1.85	0.41
1:B:491:PRO:O	1:B:495:GLN:HG3	2.21	0.41
1:B:754:ASP:CG	1:B:756:SER:H	2.24	0.41
1:B:801:VAL:HG23	1:B:847:PHE:CE1	2.55	0.41
1:A:69:PRO:HB3	1:A:421:PRO:HD2	2.03	0.41
1:B:525:ARG:HA	1:B:814:ILE:HG23	2.03	0.41
1:B:801:VAL:HG22	1:B:847:PHE:CZ	2.56	0.41
1:B:806:ILE:O	1:B:806:ILE:CG2	2.69	0.41
1:A:97:ARG:HA	1:A:386:ILE:HG23	2.03	0.41
1:A:22:ILE:HD11	1:A:45:ILE:CD1	2.51	0.41
1:A:46:PRO:HB3	1:A:87:TYR:HD2	1.85	0.41
1:A:379:VAL:HB	1:A:380:PRO:HD3	2.02	0.41
1:B:673:VAL:CG2	1:B:684:LEU:HB3	2.51	0.41
1:A:97:ARG:HH11	1:A:97:ARG:HG3	1.86	0.40
1:B:619:ASP:HB3	1:B:803:LYS:NZ	2.36	0.40
1:B:813:THR:HG23	1:B:820:LEU:CD2	2.52	0.40
1:B:437:ASN:HB2	1:B:440:ASP:OD1	2.22	0.40
1:B:715:TYR:OH	1:B:763:LYS:HE2	2.22	0.40
1:A:309:SER:O	1:A:312:TYR:HB3	2.21	0.40
1:A:411:MET:HA	1:A:411:MET:HE2	2.04	0.40
1:B:715:TYR:CZ	1:B:719:LYS:HD2	2.57	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	425/427 (100%)	382 (90%)	32 (8%)	11 (3%)	5 3
1	B	425/427 (100%)	387 (91%)	31 (7%)	7 (2%)	9 7
All	All	850/854 (100%)	769 (90%)	63 (7%)	18 (2%)	7 4

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	199	SER
1	A	247	THR
1	A	248	ASN
1	A	251	TYR
1	B	627	SER
1	B	681	MET
1	B	855	HIS
1	A	255	GLY
1	A	423	HIS
1	B	850	GLY
1	A	206	PRO
1	A	326	ASP
1	A	427	HIS
1	B	626	GLU
1	B	754	ASP
1	A	198	GLU
1	B	444	GLY
1	A	16	GLY

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	382/382 (100%)	372 (97%)	10 (3%)	46	58
1	B	382/382 (100%)	370 (97%)	12 (3%)	40	51
All	All	764/764 (100%)	742 (97%)	22 (3%)	42	54

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	ASN
1	A	166	LYS
1	A	251	TYR
1	A	257	GLU
1	A	260	PHE
1	A	284	LEU
1	A	326	ASP
1	A	336	LEU
1	A	359	LYS
1	A	423	HIS
1	B	454	ASN
1	B	577	LEU
1	B	594	LYS
1	B	674	ASN
1	B	685	GLU
1	B	688	PHE
1	B	711	ARG
1	B	712	LEU
1	B	754	ASP
1	B	764	LEU
1	B	787	LYS
1	B	851	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	39	HIS
1	A	40	ASN
1	A	60	ASN
1	A	86	ASN
1	A	133	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	170	HIS
1	A	224	GLN
1	A	246	ASN
1	A	280	ASN
1	A	288	ASN
1	A	298	ASN
1	A	368	ASN
1	A	400	ASN
1	A	404	GLN
1	A	410	ASN
1	A	424	HIS
1	A	427	HIS
1	B	467	HIS
1	B	468	ASN
1	B	488	ASN
1	B	514	ASN
1	B	561	ASN
1	B	598	HIS
1	B	652	GLN
1	B	674	ASN
1	B	708	ASN
1	B	716	ASN
1	B	726	ASN
1	B	796	ASN
1	B	828	ASN
1	B	832	GLN
1	B	838	ASN
1	B	854	HIS

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

Of 2 ligands modelled in this entry, 2 are 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

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, 95^{th} 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	414/427 (96%)	-0.11	15 (3%)	42	41	23, 42, 75, 101	0
1	B	414/427 (96%)	-0.10	18 (4%)	35	33	21, 42, 75, 97	0
All	All	828/854 (96%)	-0.10	33 (3%)	38	36	21, 42, 75, 101	0

All (33) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	423	HIS	8.7
1	A	422	GLY	7.9
1	B	628	LEU	7.9
1	B	850	GLY	6.7
1	B	674	ASN	6.1
1	B	854	HIS	6.1
1	A	28	GLY	5.4
1	A	426	HIS	5.3
1	B	629	GLU	5.1
1	B	456	GLY	5.1
1	A	27	ALA	4.8
1	A	200	LEU	4.6
1	B	457	GLN	4.5
1	A	245	VAL	4.3
1	B	673	VAL	4.2
1	A	420	THR	3.8
1	A	246	ASN	3.6
1	B	455	ALA	3.5
1	A	201	GLU	3.4
1	A	424	HIS	3.3
1	B	855	HIS	3.3
1	B	685	GLU	3.3
1	B	852	HIS	3.2
1	A	29	GLN	3.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	700	LYS	2.8
1	A	427	HIS	2.8
1	B	635	LEU	2.6
1	B	672	LYS	2.4
1	A	207	LEU	2.3
1	A	257	GLU	2.2
1	B	433	ASN	2.1
1	B	454	ASN	2.0
1	B	627	SER	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)

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, 95^{th} 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(Å^2)	Q<0.9
2	ZN	A	429	1/1	0.99	0.08	30,30,30,30	0
2	ZN	B	857	1/1	0.99	0.11	31,31,31,31	0

6.5 Other polymers (i)

There are no such residues in this entry.