Full wwPDB X-ray Structure Validation Report (i)

Nov 21, 2023 – 01:01 AM JST

PDB ID	:	7E7X
Title	:	SARS-CoV-2 Spike Protein N terminal domain in Complex with N11 Fab
Authors	:	Zhang, Z.; Shuo, D.; Xiao, J.
Deposited on	:	2021-02-28
Resolution	:	2.78 Å(reported)

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

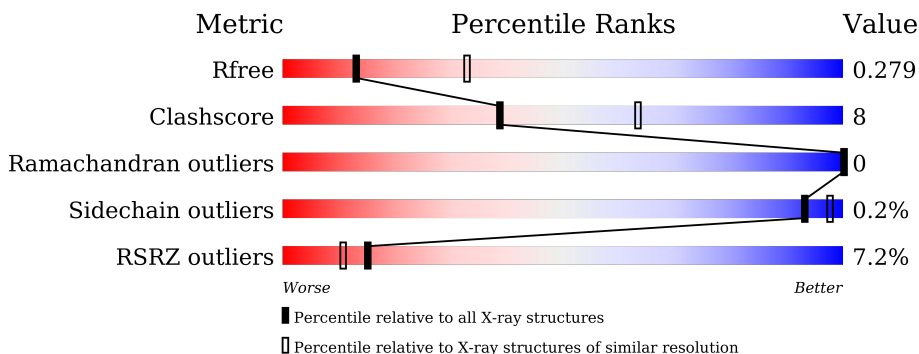|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation 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 2.78 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		0.279
Clashscore		8
Ramachandran outliers		0
Sidechain outliers		0.2%
RSRZ outliers		7.2%

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}	130704	4107 (2.80-2.76)
Clashscore	141614	4575 (2.80-2.76)
Ramachandran outliers	138981	4487 (2.80-2.76)
Sidechain outliers	138945	4489 (2.80-2.76)
RSRZ outliers	127900	4027 (2.80-2.76)

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	297	11% 60% 17% 23%
1	B	297	19% 52% 17% • 31%
2	H	234	80% 10% 10%
2	M	234	76% 14% 10%
3	L	216	88% 10% •
3	N	216	89% 8% •

2   Entity composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 9767 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 Spike protein S1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	230	Total	C	N	O	S	0	0	0
			1862	1212	301	344	5			
1	B	206	Total	C	N	O	S	0	0	0
			1675	1090	271	309	5			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	304	HIS	-	expression tag	UNP P0DTC2
A	305	HIS	-	expression tag	UNP P0DTC2
A	306	HIS	-	expression tag	UNP P0DTC2
A	307	HIS	-	expression tag	UNP P0DTC2
A	308	HIS	-	expression tag	UNP P0DTC2
A	309	HIS	-	expression tag	UNP P0DTC2
B	304	HIS	-	expression tag	UNP P0DTC2
B	305	HIS	-	expression tag	UNP P0DTC2
B	306	HIS	-	expression tag	UNP P0DTC2
B	307	HIS	-	expression tag	UNP P0DTC2
B	308	HIS	-	expression tag	UNP P0DTC2
B	309	HIS	-	expression tag	UNP P0DTC2

- Molecule 2 is a protein called N11 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	211	Total	C	N	O	S	0	0	0
			1561	990	253	311	7			
2	M	211	Total	C	N	O	S	0	0	0
			1561	990	253	311	7			

- Molecule 3 is a protein called N11 Fab Light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	211	Total	C	N	O	S	0	0	0
			1554	975	254	320	5			
3	N	211	Total	C	N	O	S	0	0	0
			1554	975	254	320	5			

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: Spike protein S1

Chain A:

• Molecule 1: Spike protein S1

Chain B:

• Molecule 2: N11 Fab heavy chain

Chain H:

GLN VAL GLN VAL VAL GLN SER **G8** A16 Y27 I30 E31 I32 S33 I34 H35 G50 F51 L86 E89 D90 T91 A97 T107 V119 T120 S137 SER LYS SER THR SER GLY G144 L169 V179 L180 Q181 V191 V192 T193 V194 Y204 N214

V217 K224 SER CYS ASP LYS HIS HIS HIS HIS HIS HIS

• Molecule 2: N11 Fab heavy chain

Chain M:

76% 14% 10%

GLN VAL GLN VAL VAL GLN SER G8 A9 E10 V11 K12 **K23** Y27 T28 L29 I32 S33 I34 H35 W36 V37 M48 G49 G50 F51 D52 A55 Q62 E72 T91 Y95 C96 A97 T120 P129 S137 SER LYS SER THR SER GLY G144 Y155 V160

L169 V179 V191 V192 T193 V194 Y204 H210 V217 K220 K224 SER CYS ASP LYS HIS HIS HIS HIS HIS HIS

• Molecule 3: N11 Fab Light chain

Chain L:

88% 10% •

GLN SER A3 I18 T19 I20 K44 I50 Y51 D52 R56 D62 K68 S69 Y88 L107 L136 L139 E164 K170 Q171 S172 Y176 L182 T185 Q188 Q198 E207 T213 GLU CYS SER

• Molecule 3: N11 Fab Light chain

Chain N:

89% 8% •

GLN SER A3 I18 T19 I20 D28 V53 T54 I77 Y88 T94 L107 L136 L139 V148 E164 S172 L182 Q198 H201 E207 K208 T213 GLU CYS SER

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	91.42Å 113.28Å 210.91Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.47 – 2.78 19.47 – 2.78	Depositor EDS
% Data completeness (in resolution range)	98.9 (19.47-2.78) 98.9 (19.47-2.78)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.24 (at 2.79Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.248 , 0.279 0.248 , 0.279	Depositor DCC
R_{free} test set	1988 reflections (3.60%)	wwPDB-VP
Wilson B-factor (Å^2)	53.3	Xtriage
Anisotropy	0.698	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 36.9	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	0.92	EDS
Total number of atoms	9767	wwPDB-VP
Average B, all atoms (Å^2)	59.0	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 48.34 % 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 8.7294e-05. 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	0.53	3/1914 (0.2%)	0.63	3/2602 (0.1%)
1	B	0.35	0/1719	0.66	4/2334 (0.2%)
2	H	0.32	0/1599	0.59	2/2184 (0.1%)
2	M	0.46	2/1599 (0.1%)	0.64	3/2184 (0.1%)
3	L	0.32	0/1594	0.53	1/2180 (0.0%)
3	N	0.30	0/1594	0.51	1/2180 (0.0%)
All	All	0.40	5/10019 (0.0%)	0.60	14/13664 (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
2	H	0	1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	M	23	LYS	CE-NZ	12.32	1.79	1.49
1	A	150	LYS	CD-CE	11.97	1.81	1.51
1	A	150	LYS	CE-NZ	10.23	1.74	1.49
1	A	156	GLU	CD-OE2	6.89	1.33	1.25
2	M	62	GLN	CG-CD	5.58	1.63	1.51

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	195	LYS	CD-CE-NZ	-10.07	88.54	111.70
2	M	23	LYS	CD-CE-NZ	-9.26	90.41	111.70
1	B	90	VAL	CG1-CB-CG2	7.96	123.63	110.90
2	H	181	GLN	CA-CB-CG	7.85	130.66	113.40
1	B	242	LEU	CB-CG-CD1	-7.69	97.92	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	150	LYS	CD-CE-NZ	-7.43	94.60	111.70
2	M	62	GLN	CA-CB-CG	6.78	128.32	113.40
1	A	150	LYS	CA-CB-CG	6.33	127.32	113.40
1	B	90	VAL	CA-CB-CG1	5.79	119.59	110.90
3	N	107	LEU	CB-CG-CD1	-5.68	101.34	111.00
2	H	181	GLN	CG-CD-OE1	-5.35	110.90	121.60
2	M	62	GLN	CB-CA-C	-5.18	100.04	110.40
1	A	150	LYS	CG-CD-CE	-5.05	96.75	111.90
3	L	44	LYS	CB-CA-C	5.02	120.45	110.40

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	H	181	GLN	Sidechain

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	1862	0	1782	39	0
1	B	1675	0	1603	41	1
2	H	1561	0	1518	16	0
2	M	1561	0	1518	25	0
3	L	1554	0	1484	17	0
3	N	1554	0	1484	15	0
All	All	9767	0	9389	144	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 8.

All (144) 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:150:LYS:CD	1:A:150:LYS:CE	1.81	1.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:150:LYS:CE	1:A:150:LYS:NZ	1.74	1.48
2:M:23:LYS:CE	2:M:23:LYS:NZ	1.79	1.41
1:A:150:LYS:CE	1:A:150:LYS:CG	2.44	0.95
2:M:23:LYS:NZ	2:M:23:LYS:CD	2.33	0.90
3:L:198:GLN:HG2	3:L:207:GLU:HG3	1.61	0.80
1:B:81:ASN:OD1	1:B:242:LEU:HD11	1.82	0.80
1:B:115:GLN:HG2	1:B:130:VAL:HG22	1.66	0.77
3:L:56:ARG:NH1	3:L:62:ASP:HA	2.01	0.74
1:A:57:PRO:HB2	1:A:60:SER:HB2	1.69	0.74
1:B:45:SER:HB2	1:B:279:TYR:CD2	2.23	0.74
1:A:150:LYS:CE	1:A:150:LYS:HG2	2.19	0.73
1:A:277:LEU:HD12	1:A:284:THR:HG21	1.70	0.71
1:B:128:ILE:HD12	1:B:170:TYR:HD2	1.54	0.71
1:B:48:LEU:HD12	1:B:278:LYS:HG2	1.73	0.70
2:M:27:TYR:HB2	2:M:32:ILE:HD11	1.72	0.70
3:L:136:LEU:HD12	3:L:182:LEU:HD23	1.74	0.68
3:N:136:LEU:HD12	3:N:182:LEU:HD23	1.75	0.68
1:B:90:VAL:HG23	1:B:194:PHE:HB2	1.76	0.67
1:B:86:PHE:CE1	1:B:90:VAL:HG22	2.29	0.66
3:N:20:ILE:HD11	3:N:107:LEU:HD12	1.77	0.66
2:H:27:TYR:HB2	2:H:32:ILE:HD11	1.78	0.65
3:L:20:ILE:HD11	3:L:107:LEU:HD12	1.78	0.65
1:B:130:VAL:HG12	1:B:168:PHE:HB3	1.77	0.65
1:A:150:LYS:CD	1:A:150:LYS:NZ	2.61	0.64
1:A:100:ILE:HD13	1:A:263:ALA:HB2	1.81	0.63
1:A:157:PHE:O	1:A:158:ARG:HB2	1.97	0.63
3:L:56:ARG:HH12	3:L:62:ASP:HB3	1.64	0.62
1:B:141:LEU:HD21	1:B:154:GLU:HG2	1.80	0.62
3:N:28:ASP:HB3	3:N:94:THR:HG22	1.82	0.62
1:A:286:THR:HG22	1:A:287:ASP:H	1.65	0.61
1:B:242:LEU:HD12	1:B:242:LEU:N	2.16	0.60
1:B:66:HIS:HB3	1:B:264:ALA:HA	1.83	0.60
2:M:191:VAL:HG21	3:N:139:LEU:HD13	1.84	0.60
1:A:106:PHE:HB2	1:A:117:LEU:HB3	1.86	0.58
2:M:23:LYS:NZ	2:M:23:LYS:CG	2.66	0.58
3:L:56:ARG:HH12	3:L:62:ASP:CB	2.17	0.58
1:B:286:THR:HG22	1:B:287:ASP:H	1.69	0.56
1:B:130:VAL:CG1	1:B:168:PHE:HB3	2.34	0.56
1:A:28:TYR:HB2	1:A:64:TRP:HD1	1.70	0.55
2:H:191:VAL:HG21	3:L:139:LEU:HD13	1.89	0.55
1:B:47:VAL:HG22	1:B:48:LEU:H	1.71	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:179:VAL:HG21	3:L:164:GLU:HB3	1.88	0.55
1:B:271:GLN:HB3	1:B:273:ARG:HG3	1.89	0.55
3:L:50:ILE:HD13	3:L:56:ARG:HG2	1.90	0.54
1:A:47:VAL:HG22	1:A:48:LEU:H	1.72	0.54
2:H:89:GLU:OE1	2:H:89:GLU:N	2.37	0.53
2:M:29:LEU:HD23	2:M:72:GLU:HG2	1.89	0.53
1:A:126:VAL:HB	1:A:174:PRO:HA	1.92	0.52
1:A:41:LYS:HD3	1:A:43:PHE:HE1	1.75	0.52
2:M:179:VAL:HG21	3:N:164:GLU:HB3	1.91	0.52
1:A:146:HIS:CE1	2:H:30:ILE:HD11	2.45	0.52
1:A:195:LYS:HE2	1:A:197:ILE:HD13	1.92	0.52
1:B:52:GLN:OE1	1:B:274:THR:OG1	2.18	0.51
1:B:202:LYS:HA	1:B:228:ASP:HB3	1.93	0.51
1:A:37:TYR:OH	1:A:54:LEU:O	2.17	0.51
1:B:52:GLN:NE2	1:B:272:PRO:O	2.43	0.51
1:B:126:VAL:HB	1:B:174:PRO:HA	1.94	0.50
3:N:88:TYR:CE1	3:N:107:LEU:HD13	2.46	0.50
3:N:18:ILE:CD1	3:N:107:LEU:HD11	2.42	0.50
3:N:148:VAL:HG12	3:N:201:HIS:HB2	1.94	0.49
1:B:231:ILE:HG22	1:B:233:ILE:HG22	1.95	0.49
1:B:86:PHE:CE1	1:B:90:VAL:CG2	2.96	0.49
1:B:228:ASP:N	1:B:228:ASP:OD1	2.46	0.48
3:N:53:VAL:HG12	3:N:54:THR:HG23	1.94	0.48
2:M:91:THR:HG23	2:M:120:THR:HA	1.94	0.48
1:A:94:SER:OG	1:A:96:GLU:HG2	2.14	0.48
1:A:278:LYS:HD2	1:A:286:THR:HB	1.96	0.48
1:A:96:GLU:HA	1:A:96:GLU:OE1	2.13	0.47
1:B:127:VAL:HG22	1:B:171:VAL:HG22	1.95	0.47
1:B:115:GLN:HG2	1:B:130:VAL:CG2	2.42	0.47
3:L:170:LYS:HG3	3:L:176:TYR:CZ	2.50	0.47
1:B:132:GLU:HG3	1:B:165:ASN:HB2	1.96	0.47
1:B:279:TYR:CD1	1:B:279:TYR:N	2.83	0.47
2:M:23:LYS:CD	2:M:23:LYS:HZ2	2.20	0.47
1:A:41:LYS:HD3	1:A:43:PHE:CE1	2.49	0.47
3:L:185:THR:OG1	3:L:188:GLN:HG3	2.15	0.47
1:B:104:TRP:HB2	1:B:106:PHE:CE1	2.49	0.47
1:A:36:VAL:HG21	1:A:287:ASP:OD2	2.14	0.47
2:H:33:SER:OG	2:H:51:PHE:HB3	2.15	0.46
2:H:107:THR:HG22	3:L:52:ASP:OD1	2.15	0.46
1:B:105:ILE:HG22	1:B:118:LEU:HD13	1.97	0.46
1:A:132:GLU:HG3	1:A:165:ASN:HB2	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:L:56:ARG:NH1	3:L:62:ASP:CA	2.75	0.46
1:A:129:LYS:HD3	1:A:169:GLU:OE2	2.15	0.46
1:A:40:ASP:OD1	1:A:204:TYR:OH	2.28	0.46
2:M:129:PRO:HB3	2:M:155:TYR:HB3	1.97	0.45
2:M:169:LEU:HD21	2:M:192:VAL:HG21	1.97	0.45
1:A:96:GLU:OE2	1:A:264:ALA:N	2.47	0.45
2:M:35:HIS:HB2	2:M:97:ALA:HB3	1.99	0.45
1:B:116:SER:O	1:B:130:VAL:HA	2.16	0.45
1:A:175:PHE:CD1	1:A:226:LEU:HD21	2.51	0.45
1:B:87:ASN:OD1	1:B:269:TYR:CG	2.70	0.45
1:B:242:LEU:HD12	1:B:242:LEU:H	1.81	0.45
3:L:18:ILE:HD11	3:L:107:LEU:HD11	1.97	0.45
2:M:33:SER:OG	2:M:51:PHE:HB3	2.16	0.45
2:M:37:VAL:HG22	2:M:95:TYR:HB2	1.99	0.45
1:B:86:PHE:HE1	1:B:90:VAL:CG2	2.30	0.44
2:H:169:LEU:HD21	2:H:192:VAL:HG21	1.99	0.44
2:M:35:HIS:ND1	2:M:50:GLY:HA3	2.33	0.44
2:M:52:ASP:HB3	2:M:55:ALA:HB3	2.01	0.43
1:A:14:GLN:HB3	1:A:158:ARG:HD2	1.99	0.43
1:B:194:PHE:CD1	1:B:203:ILE:HG12	2.54	0.43
1:A:108:THR:HG22	1:A:236:THR:HG23	2.00	0.43
1:B:279:TYR:N	1:B:279:TYR:HD1	2.16	0.43
3:L:68:LYS:HG2	3:L:69:SER:N	2.32	0.43
2:M:160:VAL:HG12	2:M:210:HIS:CD2	2.53	0.43
3:N:136:LEU:HB2	3:N:182:LEU:HB3	2.01	0.43
1:A:41:LYS:HB3	1:A:43:PHE:CD1	2.53	0.43
2:M:10:GLU:HB3	2:M:12:LYS:HE2	2.01	0.43
3:N:198:GLN:HE21	3:N:207:GLU:HG3	1.84	0.43
1:A:43:PHE:HZ	1:A:49:HIS:ND1	2.16	0.42
2:H:35:HIS:HB2	2:H:97:ALA:HB3	2.01	0.42
2:H:91:THR:HG23	2:H:120:THR:HA	2.01	0.42
3:N:18:ILE:HD12	3:N:107:LEU:HD11	2.00	0.42
3:L:56:ARG:NH1	3:L:62:ASP:CB	2.82	0.42
2:M:192:VAL:HG22	2:M:194:VAL:HG13	2.02	0.42
1:B:66:HIS:HB3	1:B:264:ALA:CA	2.46	0.42
1:A:64:TRP:CE3	1:A:266:TYR:CE1	3.07	0.42
1:B:277:LEU:HB3	1:B:279:TYR:HE1	1.83	0.42
1:A:41:LYS:HB3	1:A:43:PHE:HD1	1.84	0.42
1:B:128:ILE:O	1:B:169:GLU:HA	2.20	0.42
2:H:16:ALA:O	2:H:86:LEU:HG	2.19	0.41
1:B:41:LYS:HB3	1:B:43:PHE:CD1	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:194:VAL:HG11	2:M:204:TYR:CE1	2.56	0.41
2:H:35:HIS:ND1	2:H:50:GLY:HA3	2.34	0.41
2:H:214:ASN:HB2	2:M:220:LYS:HB3	2.02	0.41
3:L:88:TYR:CE1	3:L:107:LEU:HD13	2.54	0.41
3:N:18:ILE:HD11	3:N:77:ILE:HD12	2.01	0.41
3:N:208:LYS:HD3	3:N:208:LYS:HA	1.96	0.41
1:A:130:VAL:HG21	1:A:231:ILE:HD12	2.02	0.41
2:H:217:VAL:HG22	2:M:217:VAL:HG22	2.01	0.41
1:B:64:TRP:CE3	1:B:266:TYR:CE2	3.08	0.41
1:A:175:PHE:O	1:A:190:ARG:NH2	2.46	0.41
1:B:278:LYS:HD2	1:B:286:THR:HB	2.03	0.41
1:A:64:TRP:NE1	1:A:66:HIS:CE1	2.90	0.40
2:H:194:VAL:HG11	2:H:204:TYR:CE1	2.56	0.40
2:M:36:TRP:HB3	2:M:48:MET:HE3	2.03	0.40
1:A:233:ILE:HD12	1:A:233:ILE:HA	1.92	0.40
1:B:196:ASN:HA	1:B:200:TYR:O	2.21	0.40
1:A:250:THR:OG1	1:A:253:ASP:OD1	2.40	0.40
2:H:91:THR:HA	2:H:119:VAL:O	2.22	0.40
2:M:27:TYR:HB2	2:M:32:ILE:CD1	2.49	0.40
2:M:191:VAL:CG2	3:N:139:LEU:HD13	2.51	0.40

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:B:200:TYR:OH	1:B:228:ASP:OD1[2_655]	2.18	0.02

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	220/297 (74%)	204 (93%)	16 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	192/297 (65%)	177 (92%)	15 (8%)	0	100	100
2	H	207/234 (88%)	198 (96%)	9 (4%)	0	100	100
2	M	207/234 (88%)	199 (96%)	8 (4%)	0	100	100
3	L	209/216 (97%)	202 (97%)	7 (3%)	0	100	100
3	N	209/216 (97%)	201 (96%)	8 (4%)	0	100	100
All	All	1244/1494 (83%)	1181 (95%)	63 (5%)	0	100	100

There are no Ramachandran outliers to report.

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	206/267 (77%)	206 (100%)	0	100	100
1	B	186/267 (70%)	185 (100%)	1 (0%)	88	95
2	H	172/196 (88%)	172 (100%)	0	100	100
2	M	172/196 (88%)	171 (99%)	1 (1%)	86	95
3	L	173/183 (94%)	173 (100%)	0	100	100
3	N	173/183 (94%)	173 (100%)	0	100	100
All	All	1082/1292 (84%)	1080 (100%)	2 (0%)	93	98

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	279	TYR
2	M	23	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	66	HIS

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Mol	Chain	Res	Type
1	A	146	HIS
1	A	149	ASN
1	B	14	GLN
1	B	115	GLN
1	B	245	HIS
3	N	198	GLN

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 monosaccharides 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(Å²)	Q<0.9
1	A	230/297 (77%)	0.79	33 (14%)	2	1	46, 68, 96, 117	0
1	B	206/297 (69%)	1.40	56 (27%)	0	0	58, 84, 111, 126	0
2	H	211/234 (90%)	-0.10	0	100	100	35, 49, 65, 74	0
2	M	211/234 (90%)	-0.04	1 (0%)	91	90	37, 52, 70, 77	0
3	L	211/216 (97%)	-0.24	1 (0%)	91	90	31, 43, 58, 66	0
3	N	211/216 (97%)	-0.10	1 (0%)	91	90	37, 48, 60, 68	0
All	All	1280/1494 (85%)	0.29	92 (7%)	15	11	31, 54, 96, 126	0

All (92) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	28	TYR	9.5
1	B	18	LEU	6.2
1	B	280	ASN	6.1
1	B	268	GLY	5.7
1	A	98	SER	5.7
1	B	40	ASP	5.6
1	B	287	ASP	5.5
1	B	189	LEU	5.1
1	A	97	LYS	5.1
1	B	190	ARG	5.1
1	B	62	VAL	4.9
1	A	61	ASN	4.8
1	B	278	LYS	4.8
1	A	32	PHE	4.8
1	A	282	ASN	4.7
1	A	290	ASP	4.5
1	B	282	ASN	4.4
1	B	45	SER	4.3
1	B	271	GLN	4.3

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Mol	Chain	Res	Type	RSRZ
1	A	18	LEU	4.0
1	B	269	TYR	3.8
1	B	89	GLY	3.7
1	A	17	ASN	3.6
2	M	8	GLY	3.6
1	A	36	VAL	3.6
1	B	206	LYS	3.5
1	B	224	GLU	3.5
1	B	88	ASP	3.4
1	B	274	THR	3.4
1	B	285	ILE	3.3
1	B	279	TYR	3.3
1	A	150	LYS	3.3
1	B	48	LEU	3.2
1	B	198	ASP	3.2
1	B	49	HIS	3.2
1	B	290	ASP	3.1
1	B	289	VAL	3.1
1	B	262	ALA	3.1
1	B	284	THR	3.1
1	B	17	ASN	3.0
1	B	276	LEU	3.0
1	A	190	ARG	3.0
1	B	272	PRO	3.0
1	A	278	LYS	2.9
1	B	197	ILE	2.9
1	B	273	ARG	2.8
1	B	286	THR	2.8
1	B	261	GLY	2.8
1	B	266	TYR	2.8
1	B	66	HIS	2.8
1	B	253	ASP	2.7
1	B	95	THR	2.7
1	A	45	SER	2.7
1	A	35	GLY	2.7
1	B	165	ASN	2.6
1	B	252	GLY	2.6
1	B	281	GLU	2.6
1	A	40	ASP	2.6
1	A	286	THR	2.6
1	A	42	VAL	2.5
1	A	253	ASP	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	95	THR	2.5
1	B	44	ARG	2.4
1	A	276	LEU	2.4
1	B	223	LEU	2.4
1	A	59	PHE	2.4
1	A	197	ILE	2.4
1	B	52	GLN	2.4
1	A	280	ASN	2.4
1	B	63	THR	2.4
1	A	262	ALA	2.3
1	B	288	ALA	2.3
1	B	237	ARG	2.3
1	A	34	ARG	2.3
1	B	191	GLU	2.3
1	B	15	CYS	2.2
3	N	172	SER	2.2
1	B	81	ASN	2.2
1	A	271	GLN	2.2
1	B	195	LYS	2.2
1	B	13	SER	2.2
1	B	108	THR	2.2
1	B	42	VAL	2.1
1	A	279	TYR	2.1
1	B	82	PRO	2.1
1	B	43	PHE	2.1
1	A	62	VAL	2.1
1	A	266	TYR	2.1
1	A	29	THR	2.1
3	L	172	SER	2.1
1	A	198	ASP	2.0
1	A	189	LEU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.