



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 22, 2024 – 01:54 PM EDT

PDB ID : 5N99
Title : CRYSTAL STRUCTURE OF STREPTAVIDIN with cyclic peptide NQpWQ
Authors : Lyamichev, V.; Goodrich, L.; Sullivan, E.; Bannen, R.; Benz, J.; Albert, T.;
Patel, J.
Deposited on : 2017-02-24
Resolution : 1.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.37.1
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) : 2.37.1

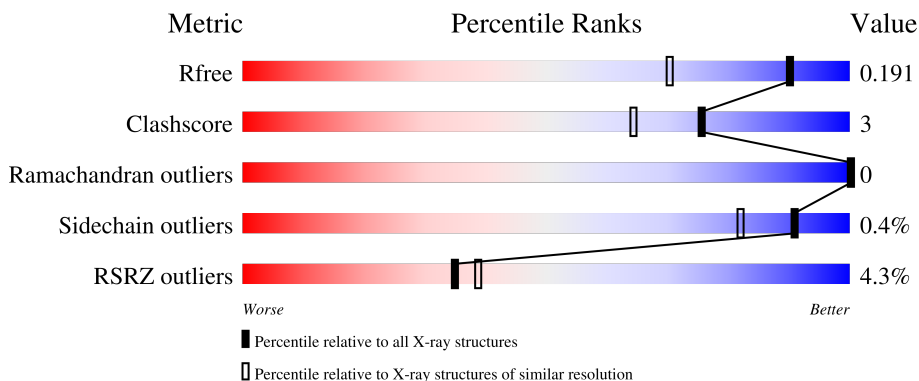
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2936 (1.50-1.50)
Clashscore	141614	3144 (1.50-1.50)
Ramachandran outliers	138981	3066 (1.50-1.50)
Sidechain outliers	138945	3064 (1.50-1.50)
RSRZ outliers	127900	2884 (1.50-1.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	183	 2% 62% 5% 33%
1	B	183	 3% 63% 5% 33%
1	D	183	 0% 62% 5% 33%
1	G	183	 2% 61% 5% 34%
1	I	183	 2% 61% 5% 34%

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Mol	Chain	Length	Quality of chain
1	K	183	 4% 63% 5% 34%
1	M	183	 5% 61% 5% 34%
1	O	183	 7% 62% 5% 34%
1	Q	183	 2% 62% 5% 34%
1	S	183	 % 62% 5% 34%
1	U	183	 4% 63% 5% 33%
1	Y	183	 2% 61% 5% 34%
2	C	5	 100%
2	E	5	 80% 20%
2	F	5	 100%
2	H	5	 100%
2	J	5	 100%
2	L	5	 100%
2	N	5	 20% 100%
2	P	5	 100%
2	R	5	 100%
2	T	5	 80% 20%
2	V	5	 100%
2	X	5	 100%

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 13995 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 Streptavidin.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
1	A	122	Total 954	C 605	N 158	O 191	0	10	0
1	B	123	Total 966	C 610	N 160	O 196	0	11	0
1	D	122	Total 949	C 600	N 158	O 191	0	10	0
1	G	121	Total 945	C 596	N 157	O 192	0	9	0
1	I	120	Total 939	C 595	N 156	O 188	0	9	0
1	K	120	Total 930	C 587	N 156	O 187	0	8	0
1	M	120	Total 941	C 597	N 156	O 188	0	9	0
1	O	120	Total 930	C 587	N 156	O 187	0	8	0
1	Q	120	Total 936	C 592	N 156	O 188	0	9	0
1	S	121	Total 937	C 592	N 157	O 188	0	8	0
1	U	122	Total 960	C 608	N 158	O 194	0	11	0
1	Y	120	Total 940	C 595	N 156	O 189	0	10	0

- Molecule 2 is a protein called ASN-GLN-DPR-TRP-GLN.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	C	5	Total 47	C 30	N 9	O 8	0	0	0
2	E	5	Total 47	C 30	N 9	O 8	0	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	F	5	Total 47	C 30	N 9	O 8	0	0	0
2	H	5	Total 47	C 30	N 9	O 8	0	0	0
2	J	5	Total 47	C 30	N 9	O 8	0	0	0
2	L	5	Total 47	C 30	N 9	O 8	0	0	0
2	N	5	Total 47	C 30	N 9	O 8	0	0	0
2	P	5	Total 47	C 30	N 9	O 8	0	0	0
2	R	5	Total 47	C 30	N 9	O 8	0	0	0
2	T	5	Total 53	C 34	N 10	O 9	0	1	0
2	V	5	Total 47	C 30	N 9	O 8	0	0	0
2	X	5	Total 47	C 30	N 9	O 8	0	0	0

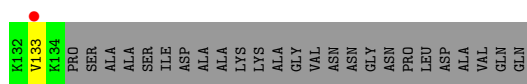
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	181	Total 183	O 183	0	2
3	B	170	Total 171	O 171	0	1
3	C	11	Total 11	O 11	0	0
3	D	186	Total 188	O 188	0	2
3	E	6	Total 6	O 6	0	0
3	F	8	Total 8	O 8	0	0
3	G	176	Total 178	O 178	0	2
3	H	4	Total 4	O 4	0	0
3	I	178	Total 179	O 179	0	1

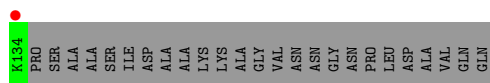
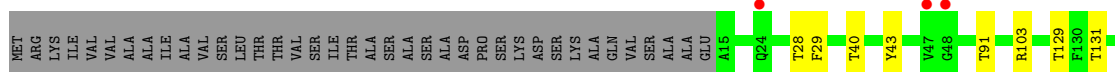
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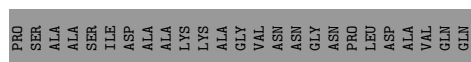
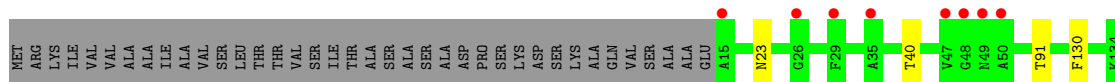
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	J	9	Total O 9 9	0	0
3	K	162	Total O 163 163	0	1
3	L	7	Total O 7 7	0	0
3	M	154	Total O 154 154	0	0
3	N	4	Total O 4 4	0	0
3	O	121	Total O 121 121	0	0
3	P	6	Total O 6 6	0	0
3	Q	174	Total O 175 175	0	1
3	R	10	Total O 10 10	0	0
3	S	180	Total O 184 184	0	4
3	T	8	Total O 8 8	0	0
3	U	149	Total O 151 151	0	2
3	V	8	Total O 8 8	0	0
3	X	6	Total O 6 6	0	0
3	Y	162	Total O 164 164	0	2



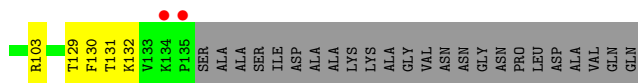
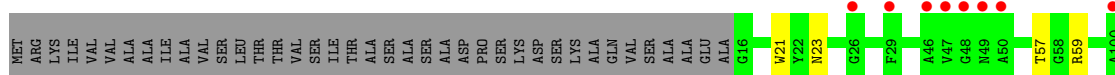
- Molecule 1: Streptavidin



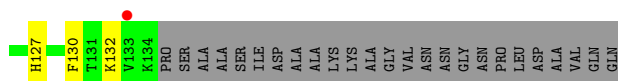
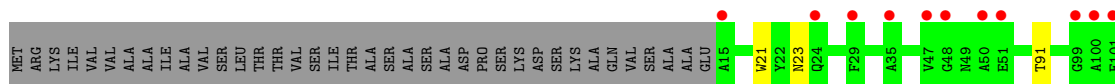
- Molecule 1: Streptavidin



- Molecule 1: Streptavidin



- Molecule 1: Streptavidin



- Molecule 1: Streptavidin



Chain F:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain H:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain J:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain L:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain N:  20% 100%



- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain P:  100%


There are no outlier residues recorded for this chain.

- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain R:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain T:  80% 20%



- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain V:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: ASN-GLN-DPR-TRP-GLN

Chain X:  100%

There are no outlier residues recorded for this chain.

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	67.74Å 115.31Å 210.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.72 – 1.50 48.72 – 1.50	Depositor EDS
% Data completeness (in resolution range)	99.5 (48.72-1.50) 99.7 (48.72-1.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.47 (at 1.50Å)	Xtrriage
Refinement program	BUSTER 2.11.6	Depositor
R, R_{free}	0.167 , 0.192 0.168 , 0.191	Depositor DCC
R_{free} test set	12917 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å ²)	16.5	Xtrriage
Anisotropy	0.319	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 43.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	13995	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.23% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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

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	0.56	0/1006	0.72	0/1379
1	B	0.53	0/1023	0.71	0/1402
1	D	0.52	0/1000	0.69	0/1371
1	G	0.54	0/992	0.71	0/1358
1	I	0.54	0/987	0.69	0/1352
1	K	0.53	0/974	0.71	0/1334
1	M	0.50	0/990	0.70	0/1357
1	O	0.46	0/974	0.67	0/1334
1	Q	0.49	0/984	0.67	0/1349
1	S	0.51	0/982	0.69	0/1346
1	U	0.49	0/1014	0.68	0/1389
1	Y	0.50	0/991	0.66	0/1359
2	C	0.55	0/40	0.68	0/52
2	E	0.54	0/40	0.70	0/52
2	F	0.47	0/40	0.66	0/52
2	H	0.52	0/40	0.63	0/52
2	J	0.56	0/40	0.66	0/52
2	L	0.43	0/40	0.60	0/52
2	N	0.43	0/40	0.63	0/52
2	P	0.44	0/40	0.65	0/52
2	R	0.57	0/40	0.77	0/52
2	T	0.44	0/48	0.91	0/61
2	V	0.42	0/40	0.67	0/52
2	X	0.49	0/40	0.76	0/52
All	All	0.51	0/12405	0.69	0/16963

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	954	0	913	8	0
1	B	966	0	929	10	0
1	D	949	0	911	4	0
1	G	945	0	902	8	0
1	I	939	0	899	8	0
1	K	930	0	890	3	0
1	M	941	0	901	8	0
1	O	930	0	890	4	0
1	Q	936	0	899	6	0
1	S	937	0	897	7	0
1	U	960	0	922	4	0
1	Y	940	0	906	7	0
2	C	47	0	39	0	0
2	E	47	0	39	1	0
2	F	47	0	39	0	0
2	H	47	0	39	0	0
2	J	47	0	39	0	0
2	L	47	0	39	0	0
2	N	47	0	39	0	0
2	P	47	0	39	0	0
2	R	47	0	39	0	0
2	T	53	0	47	1	0
2	V	47	0	39	0	0
2	X	47	0	39	0	0
3	A	183	0	0	4	0
3	B	171	0	0	1	0
3	C	11	0	0	0	0
3	D	188	0	0	2	0
3	E	6	0	0	0	0
3	F	8	0	0	0	0
3	G	178	0	0	2	0
3	H	4	0	0	0	0
3	I	179	0	0	3	0
3	J	9	0	0	0	0
3	K	163	0	0	2	0
3	L	7	0	0	0	0
3	M	154	0	0	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	N	4	0	0	0	0
3	O	121	0	0	1	0
3	P	6	0	0	0	0
3	Q	175	0	0	2	0
3	R	10	0	0	0	0
3	S	184	0	0	1	0
3	T	8	0	0	0	0
3	U	151	0	0	0	0
3	V	8	0	0	0	0
3	X	6	0	0	0	0
3	Y	164	0	0	4	0
All	All	13995	0	11335	71	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (71) 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:103:ARG:HH21	1:B:129[B]:THR:CG2	1.85	0.88
3:K:282:HOH:O	1:Q:57[B]:THR:HG21	1.85	0.76
1:A:57[B]:THR:HG21	3:M:268:HOH:O	1.86	0.76
1:B:103:ARG:HH21	1:B:129[B]:THR:HG22	1.50	0.74
1:B:57[B]:THR:HG21	3:D:315:HOH:O	1.91	0.70
1:B:103:ARG:HH21	1:B:129[B]:THR:HG21	1.55	0.70
1:G:103:ARG:HE	1:G:105:ASN:HD21	1.38	0.69
1:M:103:ARG:HH21	1:M:129[B]:THR:CG2	2.10	0.65
1:Y:42[A]:THR:HG22	3:Y:336:HOH:O	1.98	0.63
1:S:103:ARG:HG2	1:S:131[A]:THR:HG22	1.82	0.60
1:Q:40[A]:THR:HG22	3:Q:220:HOH:O	2.02	0.59
1:S:103:ARG:HE	1:S:129[B]:THR:CG2	2.15	0.58
1:A:103:ARG:HG2	1:A:131:THR:HG22	1.85	0.58
1:I:103:ARG:HH21	1:I:129[B]:THR:CG2	2.16	0.58
1:I:103:ARG:HG2	1:I:131:THR:HG22	1.84	0.58
1:B:103:ARG:NH2	1:B:129[B]:THR:CG2	2.64	0.57
1:Y:131[B]:THR:HG22	1:Y:133:VAL:H	1.70	0.57
1:Q:57[B]:THR:HG22	3:Q:328:HOH:O	2.05	0.56
1:B:103:ARG:NH2	1:B:129[B]:THR:HG21	2.21	0.56
1:G:40[B]:THR:HG23	3:G:222:HOH:O	2.06	0.56
1:U:103:ARG:CD	1:U:131[A]:THR:HG22	2.37	0.54
1:S:103:ARG:HE	1:S:129[B]:THR:HG21	1.73	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:103:ARG:HH21	1:M:129[B]:THR:HG22	1.72	0.53
1:M:103:ARG:HG2	1:M:131:THR:HG22	1.90	0.52
1:A:57[B]:THR:HG22	3:A:258:HOH:O	2.10	0.52
1:I:40[B]:THR:HG23	3:I:223:HOH:O	2.09	0.52
1:G:131:THR:OG1	1:G:133:VAL:HG22	2.10	0.51
1:Y:131[B]:THR:HG21	3:Y:309:HOH:O	2.10	0.51
1:M:21:TRP:CZ2	1:M:132:LYS:HE3	2.45	0.51
1:B:40[B]:THR:HG23	3:B:236:HOH:O	2.11	0.50
1:S:40[B]:THR:HG23	3:S:287:HOH:O	2.11	0.50
1:Y:127:HIS:HD2	3:Y:324:HOH:O	1.94	0.50
1:B:105:ASN:OD1	1:B:129[B]:THR:HG23	2.12	0.49
1:K:40[A]:THR:HG22	3:K:218[A]:HOH:O	2.12	0.49
1:D:103:ARG:HG2	1:D:131[A]:THR:HG22	1.94	0.48
1:B:103:ARG:NH2	1:B:129[B]:THR:HG22	2.24	0.48
1:D:40[B]:THR:HG23	3:D:266:HOH:O	2.12	0.48
1:M:103:ARG:HH21	1:M:129[B]:THR:HG21	1.79	0.47
1:A:21:TRP:CZ2	1:A:132:LYS:HE3	2.50	0.47
1:G:57[A]:THR:HG21	3:I:304:HOH:O	2.15	0.47
1:I:103:ARG:HH21	1:I:129[B]:THR:HG21	1.78	0.46
1:G:103:ARG:NE	1:G:105:ASN:HD21	2.10	0.46
1:K:91:THR:HB	1:Q:91:THR:HB	1.97	0.46
1:O:91:THR:HB	1:Y:91:THR:HB	1.99	0.45
1:U:29:PHE:HB3	1:U:43[A]:TYR:CD1	2.51	0.45
1:A:40[B]:THR:HG23	3:A:258:HOH:O	2.16	0.45
1:I:103:ARG:HH21	1:I:129[B]:THR:HG22	1.80	0.45
1:I:28:THR:HG22	3:I:255:HOH:O	2.17	0.45
3:A:299:HOH:O	1:M:57[B]:THR:HG21	2.15	0.45
1:M:23:ASN:HB3	1:M:130:PHE:CE2	2.51	0.45
1:S:91:THR:HB	1:U:91:THR:HB	2.00	0.44
1:A:116:GLU:HG2	3:M:328:HOH:O	2.16	0.44
1:A:127:HIS:HD2	3:A:340:HOH:O	2.00	0.44
1:O:127:HIS:HD2	3:O:293:HOH:O	2.01	0.43
1:D:35:ALA:HB1	1:S:35:ALA:HB1	2.00	0.43
1:G:23:ASN:HB3	1:G:130:PHE:CE2	2.54	0.43
1:A:57[B]:THR:HG23	1:M:59:ARG:HD3	2.00	0.43
1:D:21:TRP:CZ2	1:D:132:LYS:HE3	2.54	0.43
1:Q:21:TRP:CZ2	1:Q:132:LYS:HE3	2.54	0.42
1:O:23:ASN:HB3	1:O:130:PHE:CE2	2.54	0.42
1:Q:26:GLY:O	1:Q:47:VAL:HG23	2.20	0.42
1:U:23:ASN:HB3	1:U:130:PHE:CE2	2.55	0.42
1:O:21:TRP:CZ2	1:O:132:LYS:HE3	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:91:THR:HB	1:I:91:THR:HB	2.02	0.42
1:I:29:PHE:HB3	1:I:43[A]:TYR:CD1	2.54	0.42
1:K:23:ASN:HB3	1:K:130:PHE:CE2	2.55	0.41
1:Y:103:ARG:HG2	1:Y:131[A]:THR:HG22	2.02	0.41
1:B:46:ALA:HB2	2:E:3:DPR:HG2	2.03	0.40
1:S:25:LEU:HD13	2:T:2[B]:GLN:HE21	1.85	0.40
1:Y:40[B]:THR:HG23	3:Y:221:HOH:O	2.21	0.40
1:G:127:HIS:HD2	3:G:323:HOH:O	2.04	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	129/183 (70%)	128 (99%)	1 (1%)	0	100	100
1	B	132/183 (72%)	130 (98%)	2 (2%)	0	100	100
1	D	129/183 (70%)	127 (98%)	2 (2%)	0	100	100
1	G	127/183 (69%)	127 (100%)	0	0	100	100
1	I	126/183 (69%)	125 (99%)	1 (1%)	0	100	100
1	K	125/183 (68%)	122 (98%)	3 (2%)	0	100	100
1	M	126/183 (69%)	125 (99%)	1 (1%)	0	100	100
1	O	125/183 (68%)	123 (98%)	2 (2%)	0	100	100
1	Q	126/183 (69%)	123 (98%)	3 (2%)	0	100	100
1	S	126/183 (69%)	126 (100%)	0	0	100	100
1	U	130/183 (71%)	128 (98%)	2 (2%)	0	100	100
1	Y	127/183 (69%)	124 (98%)	3 (2%)	0	100	100
2	C	2/5 (40%)	2 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	E	2/5 (40%)	2 (100%)	0	0	100	100
2	F	2/5 (40%)	2 (100%)	0	0	100	100
2	H	2/5 (40%)	2 (100%)	0	0	100	100
2	J	2/5 (40%)	2 (100%)	0	0	100	100
2	L	2/5 (40%)	2 (100%)	0	0	100	100
2	N	2/5 (40%)	2 (100%)	0	0	100	100
2	P	2/5 (40%)	2 (100%)	0	0	100	100
2	R	2/5 (40%)	2 (100%)	0	0	100	100
2	T	3/5 (60%)	3 (100%)	0	0	100	100
2	V	2/5 (40%)	2 (100%)	0	0	100	100
2	X	2/5 (40%)	2 (100%)	0	0	100	100
All	All	1553/2256 (69%)	1533 (99%)	20 (1%)	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	98/134 (73%)	98 (100%)	0	100	100
1	B	101/134 (75%)	100 (99%)	1 (1%)	76	57
1	D	98/134 (73%)	96 (98%)	2 (2%)	55	25
1	G	97/134 (72%)	97 (100%)	0	100	100
1	I	96/134 (72%)	96 (100%)	0	100	100
1	K	95/134 (71%)	95 (100%)	0	100	100
1	M	97/134 (72%)	97 (100%)	0	100	100
1	O	95/134 (71%)	95 (100%)	0	100	100
1	Q	97/134 (72%)	97 (100%)	0	100	100
1	S	96/134 (72%)	96 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	U	99/134 (74%)	99 (100%)	0	100	100
1	Y	98/134 (73%)	97 (99%)	1 (1%)	76	57
2	C	4/4 (100%)	4 (100%)	0	100	100
2	E	4/4 (100%)	4 (100%)	0	100	100
2	F	4/4 (100%)	4 (100%)	0	100	100
2	H	4/4 (100%)	4 (100%)	0	100	100
2	J	4/4 (100%)	4 (100%)	0	100	100
2	L	4/4 (100%)	4 (100%)	0	100	100
2	N	4/4 (100%)	4 (100%)	0	100	100
2	P	4/4 (100%)	4 (100%)	0	100	100
2	R	4/4 (100%)	4 (100%)	0	100	100
2	T	5/4 (125%)	5 (100%)	0	100	100
2	V	4/4 (100%)	4 (100%)	0	100	100
2	X	4/4 (100%)	4 (100%)	0	100	100
All	All	1216/1656 (73%)	1212 (100%)	4 (0%)	91	85

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	14	GLU
1	D	56	LEU
1	D	83	TYR
1	Y	101	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	24	GLN
1	A	82	ASN
1	A	127	HIS
1	B	82	ASN
2	C	5	GLN
1	D	82	ASN
2	E	5	GLN
2	F	5	GLN
1	G	82	ASN

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Mol	Chain	Res	Type
1	G	105	ASN
1	G	127	HIS
2	H	5	GLN
1	I	127	HIS
2	J	5	GLN
1	K	82	ASN
2	L	5	GLN
1	M	82	ASN
1	M	127	HIS
2	N	5	GLN
1	O	49	ASN
1	O	127	HIS
2	P	5	GLN
1	Q	82	ASN
2	R	5	GLN
1	S	82	ASN
2	T	5	GLN
1	U	82	ASN
1	U	127	HIS
2	V	5	GLN
2	X	5	GLN
1	Y	82	ASN
1	Y	127	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](#)

12 non-standard protein/DNA/RNA residues are modelled in this entry.

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.

5.5 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 i

6.1 Protein, DNA and RNA chains i

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	122/183 (66%)	-0.25	1 (0%) 86 89	11, 16, 35, 63	2 (1%)
1	B	123/183 (67%)	-0.02	6 (4%) 29 32	11, 18, 41, 61	2 (1%)
1	D	122/183 (66%)	-0.29	0 100 100	11, 16, 29, 62	2 (1%)
1	G	121/183 (66%)	-0.04	4 (3%) 46 51	11, 17, 40, 70	2 (1%)
1	I	120/183 (65%)	-0.21	4 (3%) 46 51	11, 16, 32, 80	2 (1%)
1	K	120/183 (65%)	-0.02	8 (6%) 17 19	12, 20, 48, 76	2 (1%)
1	M	120/183 (65%)	0.23	10 (8%) 11 12	13, 20, 50, 63	2 (1%)
1	O	120/183 (65%)	0.20	12 (10%) 7 7	14, 25, 58, 74	2 (1%)
1	Q	120/183 (65%)	-0.17	4 (3%) 46 51	12, 20, 40, 57	2 (1%)
1	S	121/183 (66%)	-0.36	2 (1%) 70 75	13, 18, 29, 47	2 (1%)
1	U	122/183 (66%)	0.12	8 (6%) 18 19	13, 20, 48, 86	2 (1%)
1	Y	120/183 (65%)	-0.16	4 (3%) 46 51	13, 21, 40, 57	2 (1%)
2	C	4/5 (80%)	-0.30	0 100 100	13, 14, 14, 21	0
2	E	4/5 (80%)	-0.35	0 100 100	16, 16, 23, 30	0
2	F	4/5 (80%)	-0.28	0 100 100	14, 16, 16, 23	0
2	H	4/5 (80%)	-0.18	0 100 100	16, 18, 23, 28	0
2	J	4/5 (80%)	-0.45	0 100 100	16, 17, 20, 26	0
2	L	4/5 (80%)	-0.39	0 100 100	19, 22, 28, 29	0
2	N	4/5 (80%)	0.44	1 (25%) 0 0	21, 23, 29, 34	0
2	P	4/5 (80%)	-0.02	0 100 100	24, 25, 30, 39	0
2	R	4/5 (80%)	-0.51	0 100 100	14, 14, 15, 29	0
2	T	4/5 (80%)	-0.36	0 100 100	16, 17, 21, 27	0
2	V	4/5 (80%)	0.10	0 100 100	20, 21, 28, 36	0
2	X	4/5 (80%)	-0.43	0 100 100	16, 18, 18, 30	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
All	All	1499/2256 (66%)	-0.09	64 (4%) 35 39	11, 19, 42, 86	24 (1%)

All (64) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	U	47	VAL	11.7
1	U	48	GLY	11.0
1	G	47	VAL	9.5
1	M	47	VAL	9.5
1	O	47	VAL	9.0
1	M	48	GLY	8.7
1	Y	100	ALA	7.6
1	G	48	GLY	7.0
1	K	47	VAL	7.0
1	Q	100	ALA	6.0
1	K	48	GLY	5.5
1	O	100	ALA	5.5
1	O	15	ALA	4.7
1	O	48	GLY	4.4
1	A	15	ALA	4.3
1	S	15	ALA	4.3
1	K	50	ALA	4.1
1	U	50	ALA	3.9
1	M	134	LYS	3.7
1	B	24	GLN	3.7
1	G	133	VAL	3.6
1	B	50	ALA	3.6
1	I	24	GLN	3.6
1	M	50	ALA	3.4
1	K	26	GLY	3.4
1	O	24	GLN	3.4
1	M	26	GLY	3.4
1	U	24	GLN	3.3
1	U	133	VAL	3.3
1	M	46	ALA	3.2
1	M	135	PRO	3.2
1	M	49	ASN	3.2
1	B	99	GLY	3.0
1	G	50	ALA	3.0
1	B	47	VAL	3.0
1	B	49	ASN	3.0
1	Y	101	GLU	2.9

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Mol	Chain	Res	Type	RSRZ
1	B	48	GLY	2.9
1	K	15	ALA	2.8
1	O	101	GLU	2.8
1	M	100	ALA	2.7
1	I	47	VAL	2.6
1	Y	48	GLY	2.6
1	O	99	GLY	2.5
1	O	51	GLU	2.4
1	Q	99	GLY	2.4
1	M	29	PHE	2.4
1	U	49	ASN	2.4
1	Y	99	GLY	2.4
1	Q	101	GLU	2.3
1	I	48	GLY	2.3
2	N	4	TRP	2.3
1	O	29	PHE	2.3
1	K	49	ASN	2.3
1	O	35	ALA	2.2
1	Q	135	PRO	2.2
1	O	50	ALA	2.2
1	O	133	VAL	2.2
1	K	29	PHE	2.1
1	U	15	ALA	2.1
1	I	134	LYS	2.1
1	K	35	ALA	2.0
1	U	35	ALA	2.0
1	S	47	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	DPR	P	3	7/8	0.86	0.17	29,30,31,34	0
2	DPR	N	3	7/8	0.93	0.16	27,28,29,33	0
2	DPR	L	3	7/8	0.93	0.11	25,27,28,32	0
2	DPR	J	3	7/8	0.95	0.09	16,18,19,23	0
2	DPR	F	3	7/8	0.96	0.07	14,16,18,21	0
2	DPR	H	3	7/8	0.96	0.17	23,24,26,31	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	DPR	T	3	7/8	0.96	0.06	18,19,20,26	0
2	DPR	X	3	7/8	0.96	0.06	17,18,20,25	0
2	DPR	R	3	7/8	0.97	0.06	15,16,18,23	0
2	DPR	C	3	7/8	0.97	0.08	13,14,16,20	0
2	DPR	V	3	7/8	0.97	0.09	26,27,29,32	0
2	DPR	E	3	7/8	0.97	0.08	19,22,23,26	0

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.