Full wwPDB X-ray Structure Validation Report ⓘ

Jan 3, 2024 – 10:13 am GMT

PDB ID	:	5FW1
Title	:	Crystal structure of SpyCas9 variant VQR bound to sgRNA and TGAG PAM target DNA
Authors	:	Anders, C.; Bargsten, K.; Jinek, M.
Deposited on	:	2016-02-11
Resolution	:	2.50 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

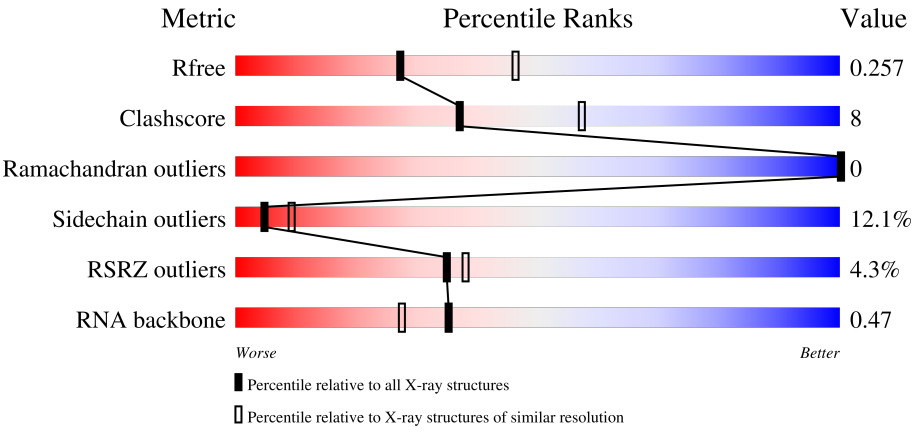
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation 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 2.50 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)
RNA backbone	3102	1008 (2.84-2.16)

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	83	6% 41% 35% 20%
2	B	1372	4% 72% 21% 5%
3	C	28	68% 32%
4	D	12	17% 50% 42% 8%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	K	B	3373	-	-	-	X

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 25684 atoms, of which 12170 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 RNA chain called SGRNA.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P			
1	A	81	2600	778	868	318	555	81	0	0	0

- Molecule 2 is a protein called CRISPR-ASSOCIATED ENDONUCLEASE CAS9/CSN1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
2	B	1304	21525	6809	10853	1852	1989	22	0	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-3	GLY	-	expression tag	UNP Q99ZW2
B	-2	ALA	-	expression tag	UNP Q99ZW2
B	-1	ALA	-	expression tag	UNP Q99ZW2
B	0	SER	-	expression tag	UNP Q99ZW2
B	10	ALA	ASP	engineered mutation	UNP Q99ZW2
B	840	ALA	HIS	engineered mutation	UNP Q99ZW2
B	1135	VAL	ASP	engineered mutation	UNP Q99ZW2
B	1335	GLN	ARG	engineered mutation	UNP Q99ZW2
B	1337	ARG	THR	engineered mutation	UNP Q99ZW2

- Molecule 3 is a DNA chain called TARGET DNA STRAND.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P			
3	C	28	889	276	323	93	170	27	0	0	0

- Molecule 4 is a DNA chain called NON-TARGET DNA STRAND.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
4	D	11	Total	C	H	N	O	P	0	0	0
			354	110	126	46	62	10			

- Molecule 5 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	2	Total	K	0	0
			2	2		
5	B	10	Total	K	0	0
			10	10		
5	D	1	Total	K	0	0
			1	1		

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	Mg	0	0
			2	2		

- Molecule 7 is water.

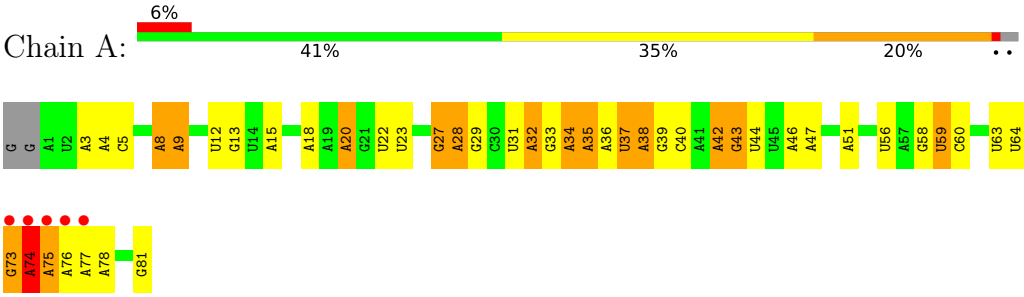
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	100	Total	O	0	0
			100	100		
7	B	187	Total	O	0	0
			187	187		
7	C	10	Total	O	0	0
			10	10		
7	D	4	Total	O	0	0
			4	4		

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.

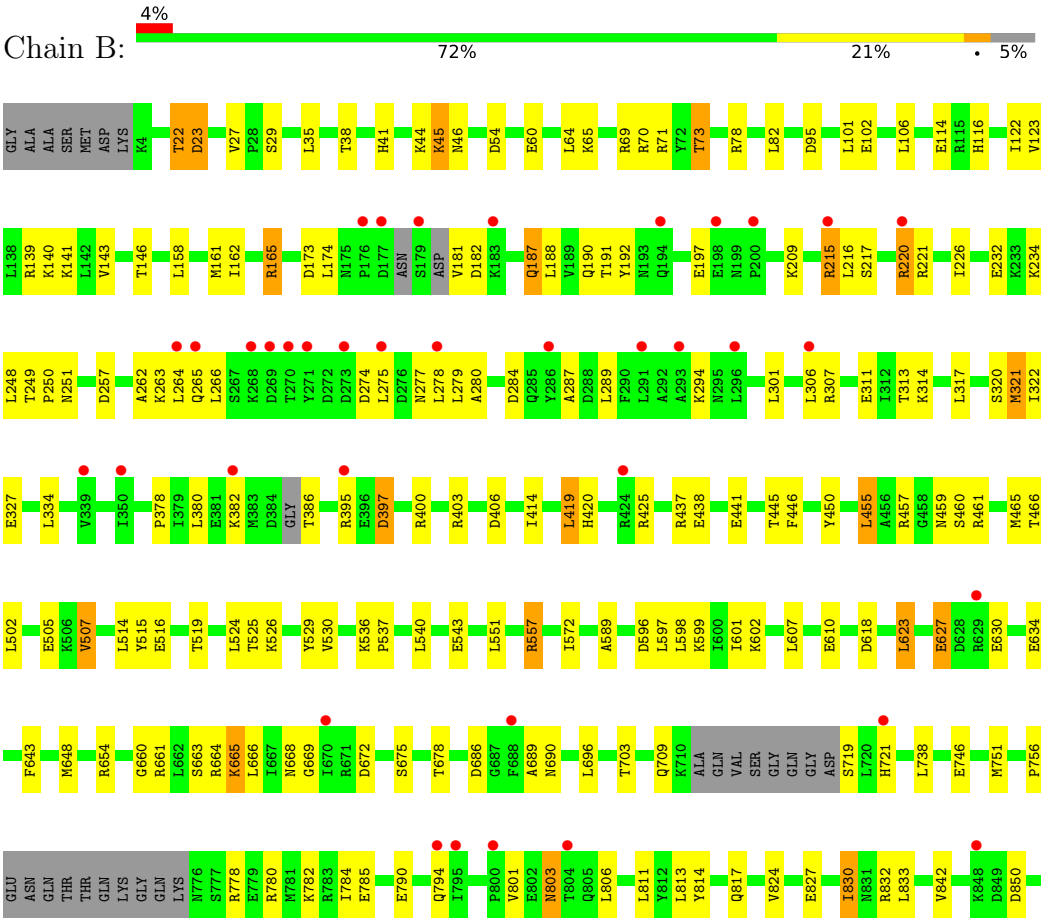
• Molecule 1: SGRNA

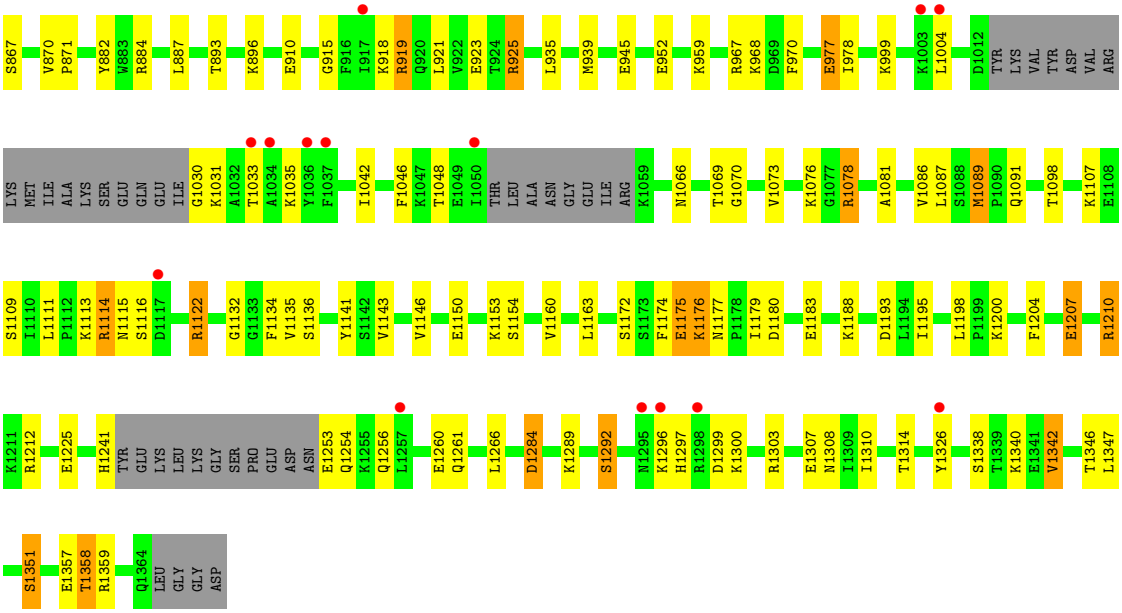
Chain A:



• Molecule 2: CRISPR-ASSOCIATED ENDONUCLEASE CAS9/CSN1

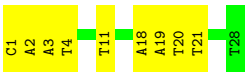
Chain B:





• Molecule 3: TARGET DNA STRAND

Chain C:



• Molecule 4: NON-TARGET DNA STRAND

Chain D:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	176.64Å 66.98Å 187.23Å 90.00° 111.12° 90.00°	Depositor
Resolution (Å)	47.62 – 2.50 47.62 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.5 (47.62-2.50) 99.8 (47.62-2.50)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.80 (at 2.51Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.218 , 0.254 0.220 , 0.257	Depositor DCC
R_{free} test set	3559 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	48.2	Xtriage
Anisotropy	0.334	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 35.9	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	0.93	EDS
Total number of atoms	25684	wwPDB-VP
Average B, all atoms (Å^2)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.10% 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: K, MG

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	0.40	0/1942	0.98	2/3023 (0.1%)
2	B	0.28	0/10857	0.52	0/14581
3	C	0.64	0/632	1.09	0/973
4	D	0.66	0/257	1.08	1/396 (0.3%)
All	All	0.34	0/13688	0.67	3/18973 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	74	A	C6-N1-C2	5.84	122.10	118.60
1	A	32	A	N9-C4-C5	-5.71	103.52	105.80
4	D	7	DA	O4'-C1'-N9	5.51	111.86	108.00

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	1732	868	869	44	0
2	B	10672	10853	10852	154	1
3	C	566	323	323	9	0
4	D	228	126	126	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	2	0	0	0	0
5	B	10	0	0	0	0
5	D	1	0	0	0	0
6	A	2	0	0	0	0
7	A	100	0	0	12	0
7	B	187	0	0	29	0
7	C	10	0	0	0	0
7	D	4	0	0	2	0
All	All	13514	12170	12170	198	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 (198) 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)
2:B:140:LYS:NZ	7:B:3036:HOH:O	1.90	1.01
2:B:60:GLU:OE1	7:B:3020:HOH:O	1.89	0.90
2:B:1212:ARG:NH1	7:B:3164:HOH:O	2.03	0.90
2:B:557:ARG:NH2	2:B:596:ASP:OD1	2.08	0.85
1:A:12:U:OP1	7:A:3014:HOH:O	1.93	0.85
2:B:516:GLU:OE1	7:B:3071:HOH:O	1.95	0.84
7:A:3082:HOH:O	2:B:69:ARG:NH2	2.10	0.83
2:B:1132:GLY:O	7:B:3146:HOH:O	1.97	0.81
2:B:1089:MET:O	7:B:3137:HOH:O	1.99	0.80
2:B:1109:SER:O	7:B:3142:HOH:O	2.01	0.79
2:B:978:ILE:O	7:B:3129:HOH:O	2.03	0.76
1:A:5:C:OP1	2:B:515:TYR:OH	2.04	0.75
2:B:1177:ASN:ND2	2:B:1180:ASP:OD2	2.20	0.75
1:A:43:G:OP1	7:A:3041:HOH:O	2.05	0.74
2:B:1225:GLU:OE1	7:B:3169:HOH:O	2.05	0.74
1:A:76:A:C5	1:A:77:A:H1'	2.23	0.74
2:B:1253:GLU:N	7:B:3171:HOH:O	2.20	0.73
2:B:38:THR:OG1	7:B:3011:HOH:O	2.07	0.73
1:A:77:A:OP1	2:B:721:HIS:NE2	2.24	0.70
7:A:3095:HOH:O	2:B:1098:THR:O	2.10	0.69
2:B:248:LEU:O	7:B:3045:HOH:O	2.11	0.68
2:B:1256:GLN:NE2	2:B:1260:GLU:OE2	2.27	0.68
2:B:78:ARG:NH1	2:B:162:ILE:O	2.27	0.68
2:B:307:ARG:NH2	2:B:397:ASP:OD2	2.27	0.66
1:A:77:A:OP1	7:A:3089:HOH:O	2.14	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:42:A:O2'	1:A:43:G:OP1	2.12	0.66
2:B:1114:ARG:NH2	4:D:9:DA:OP1	2.29	0.65
2:B:1113:LYS:O	7:B:3144:HOH:O	2.15	0.65
2:B:762:GLU:OE1	7:B:3111:HOH:O	2.15	0.64
2:B:187:GLN:NE2	7:B:3042:HOH:O	2.29	0.64
2:B:54:ASP:OD2	7:B:3016:HOH:O	2.13	0.64
1:A:13:G:N3	7:A:3015:HOH:O	2.29	0.64
7:A:3042:HOH:O	2:B:325:TYR:OH	2.15	0.63
1:A:59:U:OP1	2:B:467:ARG:NH2	2.32	0.62
2:B:1176:LYS:NZ	7:B:3158:HOH:O	2.20	0.61
1:A:60:C:H5'	2:B:455:LEU:O	1.99	0.61
2:B:1066:ASN:ND2	7:B:3132:HOH:O	2.34	0.61
2:B:526:LYS:NZ	2:B:690:ASN:O	2.28	0.60
2:B:817:GLN:O	2:B:882:TYR:OH	2.19	0.59
4:D:12:DG:OP2	7:D:3004:HOH:O	2.17	0.59
2:B:1086:VAL:O	7:B:3130:HOH:O	2.15	0.59
1:A:20:A:OP2	2:B:403:ARG:NH1	2.36	0.58
2:B:1338:SER:O	7:B:3185:HOH:O	2.17	0.58
3:C:1:DC:H2'	3:C:2:DA:C8	2.39	0.58
2:B:516:GLU:HA	2:B:519:THR:HG22	1.85	0.57
1:A:73:G:H3'	1:A:74:A:C5'	2.34	0.57
2:B:1141:TYR:OH	2:B:1175:GLU:OE1	2.21	0.57
2:B:525:THR:HG22	2:B:690:ASN:HB3	1.87	0.57
2:B:437:ARG:NH1	7:B:3056:HOH:O	2.37	0.56
2:B:1030:GLY:O	2:B:1033:THR:OG1	2.22	0.56
2:B:665:LYS:HA	2:B:669:GLY:HA3	1.88	0.55
2:B:165:ARG:NH2	2:B:446:PHE:O	2.39	0.55
2:B:116:HIS:CE1	2:B:122:ILE:HG12	2.40	0.55
3:C:20:DT:H2'	3:C:21:DT:H71	1.89	0.55
1:A:73:G:C3'	1:A:74:A:H5"	2.36	0.54
2:B:378:PRO:O	2:B:382:LYS:HG2	2.08	0.54
2:B:450:TYR:OH	2:B:627:GLU:HG2	2.06	0.54
2:B:216:LEU:O	2:B:221:ARG:NH1	2.40	0.54
2:B:1150:GLU:OE2	2:B:1188:LYS:NZ	2.41	0.54
1:A:69:A:H1'	2:B:1358:THR:HG21	1.90	0.54
2:B:1253:GLU:CD	7:B:3173:HOH:O	2.45	0.54
1:A:74:A:H8	1:A:74:A:P	2.30	0.54
2:B:814:TYR:CZ	2:B:830:ILE:HG23	2.43	0.54
2:B:778:ARG:NH2	3:C:11:DT:OP1	2.41	0.53
2:B:910:GLU:HG2	2:B:1033:THR:HG23	1.89	0.53
3:C:2:DA:H2"	3:C:3:DA:C8	2.43	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:35:LEU:HB2	2:B:1358:THR:HB	1.91	0.53
1:A:76:A:C6	1:A:77:A:H1'	2.44	0.53
2:B:915:GLY:O	2:B:919:ARG:NH1	2.43	0.52
2:B:249:THR:OG1	2:B:265:GLN:OE1	2.26	0.52
1:A:22:U:H2'	1:A:23:U:C6	2.45	0.51
1:A:18:A:OP1	2:B:165:ARG:HD3	2.10	0.51
2:B:1066:ASN:O	2:B:1070:GLY:N	2.41	0.51
2:B:1303:ARG:O	2:B:1307:GLU:HG3	2.11	0.51
2:B:46:ASN:OD1	7:B:3006:HOH:O	2.19	0.51
2:B:672:ASP:HA	2:B:703:THR:HG22	1.92	0.51
2:B:551:LEU:HD22	2:B:572:ILE:HD11	1.91	0.50
1:A:73:G:H3'	1:A:74:A:H5"	1.91	0.50
1:A:8:A:H2'	1:A:9:A:C8	2.46	0.50
1:A:33:G:O2'	1:A:35:A:N6	2.34	0.49
2:B:870:VAL:HG13	2:B:871:PRO:HD2	1.94	0.49
2:B:923:GLU:OE2	2:B:925:ARG:NH1	2.44	0.49
2:B:306:LEU:O	2:B:320:SER:HB3	2.12	0.49
2:B:507:VAL:HG11	2:B:660:GLY:O	2.12	0.49
2:B:999:LYS:HB3	2:B:1073:VAL:HG12	1.95	0.49
2:B:1292:SER:O	2:B:1296:LYS:HG3	2.12	0.49
2:B:1357:GLU:OE1	2:B:1359:ARG:NH1	2.44	0.49
2:B:597:LEU:O	2:B:601:ILE:HG13	2.14	0.48
2:B:232:GLU:HG3	7:B:3044:HOH:O	2.13	0.48
2:B:967:ARG:NH2	7:B:3127:HOH:O	2.45	0.48
1:A:3:A:H2'	1:A:4:A:C8	2.49	0.48
2:B:400:ARG:NH2	2:B:406:ASP:OD2	2.37	0.48
3:C:19:DA:H5"	3:C:19:DA:H8	1.78	0.48
7:A:3089:HOH:O	2:B:721:HIS:CD2	2.66	0.48
2:B:1143:VAL:HG13	2:B:1195:ILE:HG23	1.96	0.48
2:B:274:ASP:O	2:B:277:ASN:OD1	2.31	0.48
2:B:668:ASN:O	2:B:678:THR:HG21	2.14	0.48
2:B:1308:ASN:OD1	2:B:1326:TYR:O	2.32	0.48
2:B:317:LEU:HD22	2:B:414:ILE:CD1	2.43	0.47
1:A:77:A:N3	1:A:78:A:C8	2.82	0.47
2:B:1114:ARG:HG2	2:B:1115:ASN:N	2.29	0.47
1:A:68:A:C4	1:A:69:A:C8	3.03	0.47
1:A:27:G:H4'	1:A:28:A:OP2	2.14	0.47
2:B:192:TYR:CA	2:B:289:LEU:HD11	2.45	0.47
2:B:756:PRO:HD2	2:B:939:MET:HE2	1.97	0.47
2:B:1284:ASP:N	2:B:1284:ASP:OD1	2.48	0.46
1:A:34:A:N6	1:A:35:A:C2	2.84	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:780:ARG:NH1	2:B:806:LEU:O	2.38	0.46
3:C:3:DA:H2"	3:C:4:DT:H5'	1.97	0.46
2:B:460:SER:N	7:B:3062:HOH:O	2.37	0.46
2:B:380:LEU:O	2:B:386:THR:HG21	2.14	0.46
2:B:977:GLU:HG3	2:B:1310:ILE:CG2	2.45	0.46
2:B:215:ARG:CZ	2:B:395:ARG:O	2.64	0.46
7:A:3073:HOH:O	2:B:457:ARG:HB3	2.15	0.46
2:B:1297:HIS:O	2:B:1300:LYS:HG2	2.15	0.46
2:B:1163:LEU:HD11	2:B:1198:LEU:HD12	1.98	0.45
1:A:75:A:C2	1:A:76:A:C4	3.05	0.45
2:B:244:LEU:HD22	2:B:266:LEU:HG	1.99	0.45
2:B:497:ASN:HD21	3:C:19:DA:P	2.40	0.45
1:A:27:G:N2	1:A:44:U:OP2	2.49	0.45
1:A:75:A:H2'	1:A:76:A:O4'	2.17	0.45
1:A:81:G:N1	7:A:3097:HOH:O	2.09	0.45
2:B:623:LEU:HG	2:B:654:ARG:O	2.16	0.45
2:B:663:SER:OG	2:B:664:ARG:N	2.50	0.45
1:A:37:U:H2'	1:A:38:A:H5"	1.99	0.45
2:B:505:GLU:CD	2:B:665:LYS:HD2	2.37	0.45
2:B:275:LEU:O	2:B:279:LEU:HG	2.17	0.45
2:B:746:GLU:OE2	2:B:1351:SER:HB3	2.17	0.45
2:B:952:GLU:OE2	7:B:3124:HOH:O	2.21	0.45
1:A:75:A:C6	1:A:76:A:C5	3.05	0.44
2:B:1204:PHE:CE1	2:B:1342:VAL:HG13	2.52	0.44
2:B:1004:LEU:HD11	2:B:1042:ILE:HD11	1.99	0.44
2:B:45:LYS:NZ	2:B:1357:GLU:OE2	2.50	0.44
3:C:2:DA:H2"	3:C:3:DA:H8	1.81	0.44
2:B:420:HIS:CE1	2:B:441:GLU:OE2	2.70	0.44
1:A:18:A:OP2	2:B:71:ARG:NH1	2.49	0.44
2:B:1179:ILE:O	2:B:1183:GLU:HG3	2.18	0.44
2:B:686:ASP:HB3	2:B:689:ALA:O	2.18	0.44
2:B:22:THR:HG22	2:B:23:ASP:H	1.82	0.44
1:A:46:A:H2'	1:A:47:A:C8	2.52	0.44
1:A:69:A:H2'	1:A:70:C:H6	1.83	0.44
2:B:158:LEU:HA	2:B:161:MET:HE2	2.00	0.43
2:B:217:SER:OG	2:B:220:ARG:NH1	2.51	0.43
2:B:1200:LYS:NZ	4:D:6:DG:OP1	2.39	0.43
7:A:3098:HOH:O	2:B:1358:THR:HG21	2.18	0.43
2:B:182:ASP:H	2:B:209:LYS:HE2	1.83	0.43
2:B:251:ASN:HA	2:B:262:ALA:O	2.18	0.43
2:B:516:GLU:O	2:B:519:THR:HG22	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:275:LEU:HG	2:B:279:LEU:HD11	2.00	0.43
2:B:323:LYS:O	2:B:327:GLU:HG3	2.19	0.43
2:B:1207:GLU:OE2	2:B:1210:ARG:NH1	2.51	0.43
1:A:3:A:H2'	1:A:4:A:H8	1.82	0.43
2:B:192:TYR:HA	2:B:289:LEU:HD11	2.00	0.43
2:B:813:LEU:O	2:B:817:GLN:HG3	2.19	0.43
1:A:35:A:H2'	1:A:36:A:N9	2.34	0.43
2:B:1107:LYS:HD2	2:B:1136:SER:HB2	2.01	0.43
1:A:15:A:OP1	2:B:70:ARG:NH2	2.44	0.43
2:B:970:PHE:CZ	2:B:1046:PHE:HB3	2.53	0.43
2:B:1308:ASN:HB3	2:B:1326:TYR:O	2.19	0.43
2:B:262:ALA:HB1	2:B:278:LEU:HD13	2.01	0.43
2:B:137:HIS:HA	2:B:322:ILE:HD11	1.99	0.42
2:B:326:ASP:OD2	7:B:3050:HOH:O	2.21	0.42
2:B:161:MET:HE3	2:B:419:LEU:HD12	2.01	0.42
2:B:1307:GLU:O	2:B:1310:ILE:HB	2.19	0.42
7:A:3076:HOH:O	2:B:459:ASN:HB2	2.19	0.42
2:B:850:ASP:OD1	2:B:850:ASP:N	2.43	0.42
2:B:1078:ARG:O	2:B:1081:ALA:HB3	2.20	0.42
2:B:1114:ARG:CZ	4:D:9:DA:OP1	2.68	0.42
1:A:76:A:N6	1:A:77:A:N3	2.67	0.41
2:B:250:PRO:HD2	2:B:264:LEU:O	2.20	0.41
1:A:36:A:H2'	1:A:37:U:C5'	2.50	0.41
2:B:450:TYR:OH	2:B:627:GLU:CG	2.68	0.41
2:B:824:VAL:HG12	2:B:824:VAL:O	2.20	0.41
1:A:73:G:H5"	1:A:74:A:OP2	2.19	0.41
2:B:803:ASN:N	2:B:803:ASN:OD1	2.50	0.41
2:B:287:ALA:HB3	7:B:3046:HOH:O	2.20	0.41
2:B:636:LEU:O	2:B:648:MET:HE1	2.21	0.41
2:B:244:LEU:CD2	2:B:266:LEU:HG	2.51	0.41
2:B:1122:ARG:HG3	2:B:1134:PHE:CZ	2.55	0.41
2:B:262:ALA:CB	2:B:278:LEU:HD13	2.50	0.41
1:A:42:A:O2'	1:A:43:G:P	2.79	0.41
4:D:2:DA:C5'	7:D:3001:HOH:O	2.68	0.41
2:B:519:THR:HG23	2:B:589:ALA:HB1	2.03	0.41
2:B:601:ILE:HD11	2:B:607:LEU:HG	2.02	0.41
2:B:893:THR:HG23	2:B:896:LYS:H	1.86	0.41
1:A:63:U:H4'	1:A:64:U:OP2	2.21	0.41
2:B:277:ASN:O	2:B:280:ALA:HB3	2.21	0.41
2:B:1143:VAL:HG21	2:B:1174:PHE:CZ	2.56	0.41
3:C:18:DA:C2'	3:C:19:DA:H5"	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:75:A:C6	1:A:76:A:C6	3.09	0.40
2:B:784:ILE:HD12	2:B:806:LEU:HD13	2.03	0.40
2:B:69:ARG:O	2:B:73:THR:HG23	2.21	0.40
2:B:1204:PHE:CE1	2:B:1347:LEU:HB2	2.56	0.40
2:B:529:TYR:O	2:B:537:PRO:HA	2.21	0.40
2:B:250:PRO:O	2:B:263:LYS:HA	2.22	0.40
2:B:321:MET:HE1	2:B:324:ARG:CZ	2.51	0.40
2:B:122:ILE:O	2:B:126:VAL:HG23	2.22	0.40
2:B:143:VAL:CG1	2:B:314:LYS:HB2	2.52	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)
2:B:618:ASP:OD1	2:B:832:ARG:NH2[1_565]	2.07	0.13

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	
2	B	1287/1372 (94%)	1264 (98%)	23 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	1171/1226 (96%)	1029 (88%)	142 (12%)	5 9

All (142) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	22	THR
2	B	23	ASP
2	B	27	VAL
2	B	29	SER
2	B	41	HIS
2	B	44	LYS
2	B	45	LYS
2	B	64	LEU
2	B	65	LYS
2	B	73	THR
2	B	82	LEU
2	B	95	ASP
2	B	101	LEU
2	B	102	GLU
2	B	106	LEU
2	B	114	GLU
2	B	123	VAL
2	B	139	ARG
2	B	141	LYS
2	B	146	THR
2	B	165	ARG
2	B	173	ASP
2	B	174	LEU
2	B	181	VAL
2	B	187	GLN
2	B	188	LEU
2	B	190	GLN
2	B	191	THR
2	B	197	GLU
2	B	215	ARG
2	B	220	ARG
2	B	226	ILE
2	B	234	LYS
2	B	244	LEU
2	B	257	ASP
2	B	284	ASP
2	B	294	LYS
2	B	301	LEU

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Mol	Chain	Res	Type
2	B	311	GLU
2	B	313	THR
2	B	321	MET
2	B	334	LEU
2	B	397	ASP
2	B	419	LEU
2	B	425	ARG
2	B	438	GLU
2	B	445	THR
2	B	455	LEU
2	B	461	ARG
2	B	465	MET
2	B	466	THR
2	B	502	LEU
2	B	507	VAL
2	B	514	LEU
2	B	524	LEU
2	B	530	VAL
2	B	536	LYS
2	B	540	LEU
2	B	543	GLU
2	B	557	ARG
2	B	598	LEU
2	B	599	LYS
2	B	602	LYS
2	B	610	GLU
2	B	623	LEU
2	B	627	GLU
2	B	630	GLU
2	B	634	GLU
2	B	635	ARG
2	B	638	THR
2	B	643	PHE
2	B	661	ARG
2	B	665	LYS
2	B	666	LEU
2	B	675	SER
2	B	696	LEU
2	B	709	GLN
2	B	719	SER
2	B	738	LEU
2	B	751	MET

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Mol	Chain	Res	Type
2	B	782	LYS
2	B	785	GLU
2	B	790	GLU
2	B	794	GLN
2	B	801	VAL
2	B	803	ASN
2	B	811	LEU
2	B	827	GLU
2	B	830	ILE
2	B	833	LEU
2	B	842	VAL
2	B	859	ARG
2	B	867	SER
2	B	884	ARG
2	B	887	LEU
2	B	918	LYS
2	B	919	ARG
2	B	921	LEU
2	B	925	ARG
2	B	935	LEU
2	B	945	GLU
2	B	959	LYS
2	B	968	LYS
2	B	977	GLU
2	B	1031	LYS
2	B	1035	LYS
2	B	1048	THR
2	B	1069	THR
2	B	1076	LYS
2	B	1078	ARG
2	B	1087	LEU
2	B	1089	MET
2	B	1091	GLN
2	B	1111	LEU
2	B	1114	ARG
2	B	1116	SER
2	B	1122	ARG
2	B	1135	VAL
2	B	1146	VAL
2	B	1153	LYS
2	B	1154	SER
2	B	1160	VAL

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Mol	Chain	Res	Type
2	B	1172	SER
2	B	1175	GLU
2	B	1176	LYS
2	B	1193	ASP
2	B	1207	GLU
2	B	1210	ARG
2	B	1241	HIS
2	B	1254	GLN
2	B	1261	GLN
2	B	1266	LEU
2	B	1284	ASP
2	B	1289	LYS
2	B	1292	SER
2	B	1299	ASP
2	B	1314	THR
2	B	1340	LYS
2	B	1342	VAL
2	B	1346	THR
2	B	1351	SER
2	B	1358	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	497	ASN
2	B	1262	HIS

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	80/83 (96%)	23 (28%)	5 (6%)

All (23) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	9	A
1	A	20	A
1	A	28	A
1	A	29	G
1	A	31	U

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Mol	Chain	Res	Type
1	A	32	A
1	A	34	A
1	A	35	A
1	A	37	U
1	A	38	A
1	A	39	G
1	A	40	C
1	A	42	A
1	A	43	G
1	A	51	A
1	A	56	U
1	A	58	G
1	A	59	U
1	A	68	A
1	A	69	A
1	A	73	G
1	A	74	A
1	A	75	A

All (5) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	8	A
1	A	27	G
1	A	28	A
1	A	42	A
1	A	68	A

5.4 Non-standard residues in protein, DNA, RNA chains (i)

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 15 ligands modelled in this entry, 15 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	81/83 (97%)	0.25	5 (6%) 20 21	28, 43, 118, 162	0
2	B	1304/1372 (95%)	0.44	54 (4%) 37 40	24, 49, 81, 118	0
3	C	28/28 (100%)	-0.10	0 100 100	35, 43, 74, 83	0
4	D	11/12 (91%)	0.73	2 (18%) 1 1	37, 59, 97, 100	0
All	All	1424/1495 (95%)	0.42	61 (4%) 35 38	24, 49, 83, 162	0

All (61) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	269	ASP	14.6
2	B	179	SER	8.2
1	A	77	A	8.1
2	B	291	LEU	7.2
2	B	1037	PHE	5.4
1	A	76	A	5.1
2	B	215	ARG	4.3
2	B	795	ILE	4.2
4	D	12	DG	3.9
2	B	268	LYS	3.9
2	B	800	PRO	3.6
2	B	200	PRO	3.6
2	B	198	GLU	3.5
2	B	264	LEU	3.5
2	B	247	GLY	3.5
2	B	177	ASP	3.1
2	B	244	LEU	3.1
2	B	306	LEU	3.1
2	B	1326	TYR	3.0
2	B	350	ILE	3.0
2	B	275	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
2	B	273	ASP	2.9
1	A	75	A	2.9
1	A	74	A	2.8
2	B	270	THR	2.8
2	B	278	LEU	2.7
2	B	794	GLN	2.7
2	B	1296	LYS	2.7
2	B	629	ARG	2.7
2	B	293	ALA	2.7
2	B	670	ILE	2.6
2	B	1257	LEU	2.6
2	B	1004	LEU	2.5
2	B	220	ARG	2.5
2	B	1117	ASP	2.4
2	B	296	LEU	2.4
2	B	917	ILE	2.4
2	B	1298	ARG	2.4
2	B	271	TYR	2.4
1	A	73	G	2.4
2	B	395	ARG	2.4
2	B	688	PHE	2.4
2	B	194	GLN	2.3
2	B	1003	LYS	2.3
2	B	1295	ASN	2.3
2	B	339	VAL	2.3
2	B	1050	ILE	2.3
2	B	721	HIS	2.2
2	B	424	ARG	2.2
2	B	862	LYS	2.2
2	B	848	LYS	2.2
2	B	1033	THR	2.2
2	B	265	GLN	2.1
2	B	176	PRO	2.1
4	D	2	DA	2.1
2	B	183	LYS	2.1
2	B	1034	ALA	2.0
2	B	804	THR	2.0
2	B	1036	TYR	2.0
2	B	286	TYR	2.0
2	B	382	LYS	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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
5	K	B	3370	1/1	0.67	0.10	79,79,79,79	0
5	K	B	3373	1/1	0.73	0.41	92,92,92,92	0
5	K	A	2081	1/1	0.82	0.18	83,83,83,83	0
5	K	A	2082	1/1	0.83	0.20	88,88,88,88	0
5	K	D	2013	1/1	0.86	0.38	92,92,92,92	0
5	K	B	3369	1/1	0.88	0.08	72,72,72,72	0
5	K	B	3372	1/1	0.90	0.12	70,70,70,70	0
6	MG	A	2084	1/1	0.91	0.17	34,34,34,34	0
6	MG	A	2083	1/1	0.92	0.34	45,45,45,45	0
5	K	B	3371	1/1	0.92	0.08	77,77,77,77	0
5	K	B	3365	1/1	0.93	0.18	45,45,45,45	0
5	K	B	3366	1/1	0.94	0.09	51,51,51,51	0
5	K	B	3368	1/1	0.94	0.10	46,46,46,46	0
5	K	B	3374	1/1	0.97	0.11	52,52,52,52	0
5	K	B	3367	1/1	0.97	0.17	31,31,31,31	0

6.5 Other polymers (i)

There are no such residues in this entry.