



Full wwPDB EM Validation Report ⓘ

Mar 31, 2024 – 01:15 AM JST

PDB ID : 8J9P
EMDB ID : EMD-36114
Title : SPARTA dimer bound with guide-target
Authors : Li, Z.X.; Guo, L.J.; Huang, P.P.; Xiao, Y.B.; Chen, M.R.
Deposited on : 2023-05-04
Resolution : 3.40 Å (reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

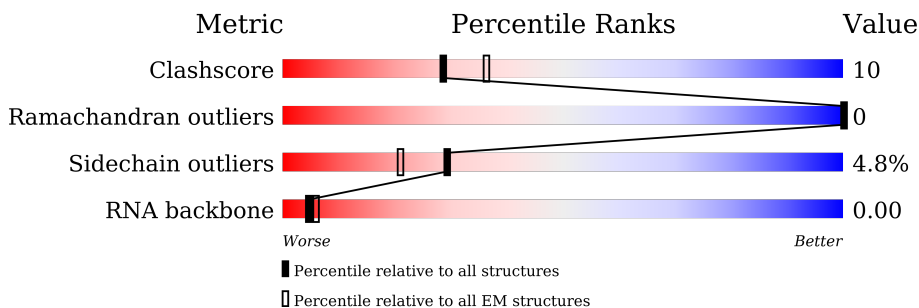
EMDB validation analysis : **FAILED**
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	507	64% 23% 12%
1	C	507	65% 22% 11%
2	B	450	70% 23% 6%
2	D	450	65% 28% 6%
3	E	21	52% 43% 5%
3	G	21	57% 38% 5%
4	F	25	36% 48% 16%
4	H	25	48% 32% 20%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 16013 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Piwi domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	448	Total	C	N	O	S	0	0
			3618	2348	603	656	11		
1	C	451	Total	C	N	O	S	0	0
			3646	2365	607	663	11		

- Molecule 2 is a protein called TIR domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	422	Total	C	N	O	S	0	0
			3529	2288	595	635	11		
2	D	422	Total	C	N	O	S	0	0
			3531	2290	595	635	11		

- Molecule 3 is a RNA chain called RNA (5'-R(P*UP*GP*AP*CP*GP*GP*CP*UP*CP*UP*AP*AP*UP*CP*UP*AP*UP*UP*AP*GP*U)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	E	21	Total	C	N	O	P	0	0
			422	198	73	130	21		
3	G	21	Total	C	N	O	P	0	0
			422	198	73	130	21		

- Molecule 4 is a DNA chain called DNA (25-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	F	21	Total	C	N	O	P	3	0
			432	206	82	123	21		
4	H	20	Total	C	N	O	P	3	0
			411	196	77	118	20		

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

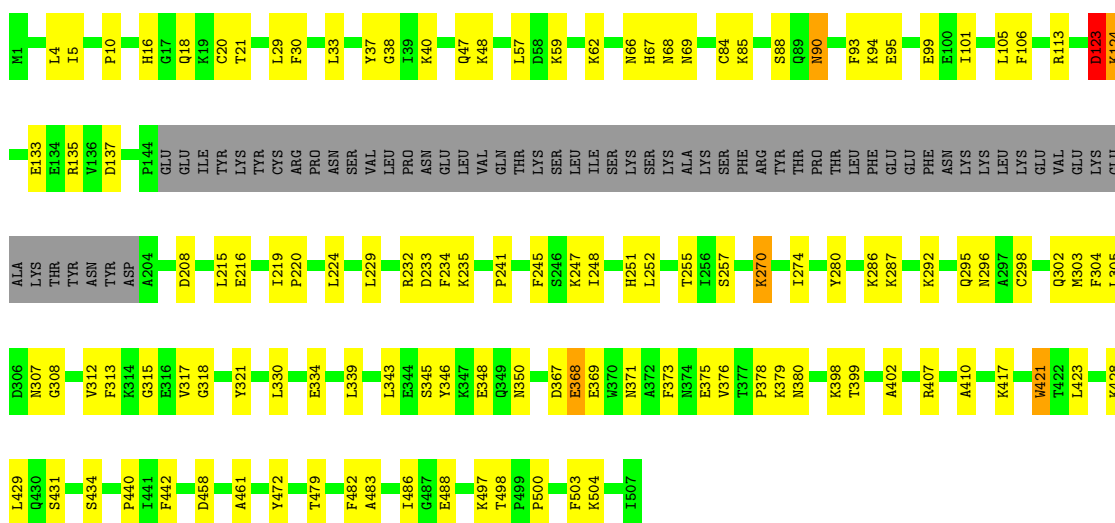
Mol	Chain	Residues	Atoms		AltConf
5	A	1	Total 1	Mg 1	0
5	G	1	Total 1	Mg 1	0

3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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.

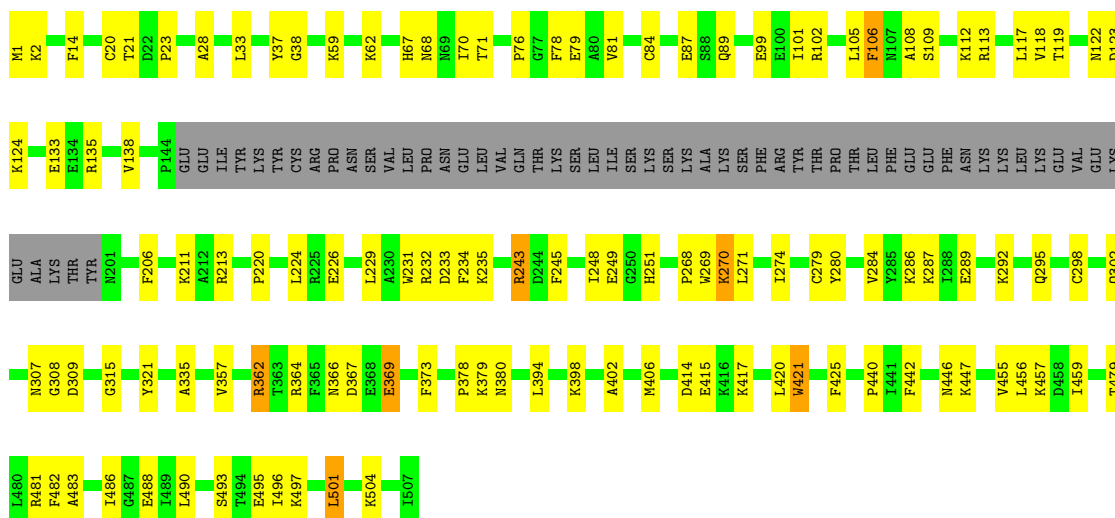
- Molecule 1: Piwi domain-containing protein

Chain A: 

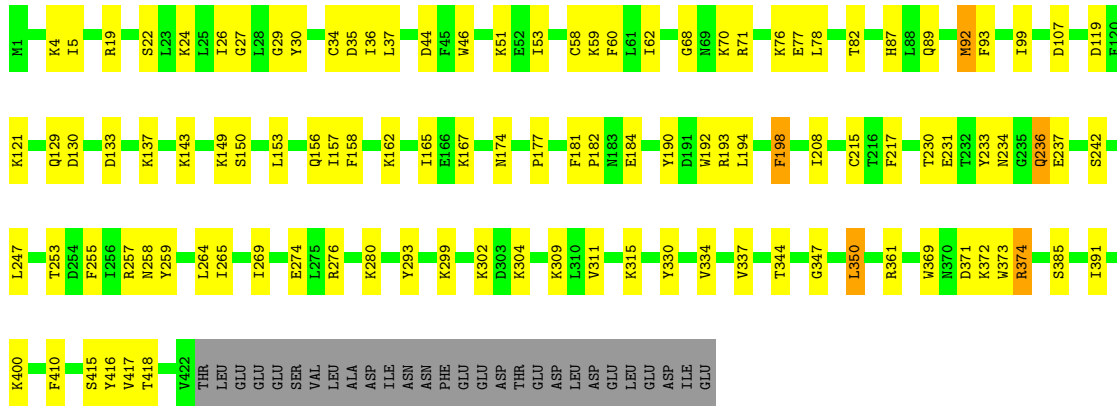


- Molecule 1: Piwi domain-containing protein

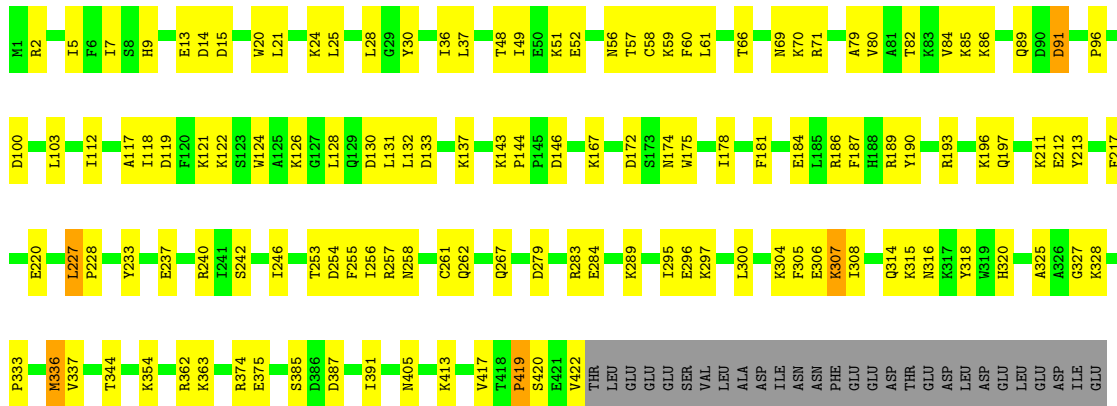
Chain C: 



- Molecule 2: TIR domain-containing protein



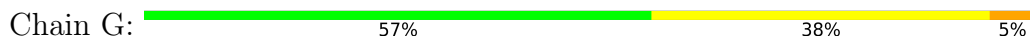
- Molecule 2: TIR domain-containing protein




- Molecule 3: RNA (5'-R(P*UP*GP*AP*CP*GP*GP*CP*UP*CP*UP*AP*AP*UP*CP*UP*A P*UP*UP*AP*GP*U)-3')



- Molecule 3: RNA (5'-R(P*UP*GP*AP*CP*GP*GP*CP*UP*CP*UP*AP*AP*UP*CP*UP*A P*UP*UP*AP*GP*U)-3')



- Molecule 4: DNA (25-MER)

Chain F:  36% 48% 16%



● Molecule 4: DNA (25-MER)

Chain H:  48% 32% 20%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	147489	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.25	0/3710	0.48	1/5023 (0.0%)
1	C	0.25	0/3739	0.47	0/5063
2	B	0.25	0/3618	0.50	0/4876
2	D	0.25	0/3620	0.51	0/4879
3	E	0.65	1/472 (0.2%)	0.92	2/721 (0.3%)
3	G	0.63	1/472 (0.2%)	0.87	1/721 (0.1%)
4	F	0.56	0/485	0.90	0/746
4	H	0.56	0/461	0.89	0/709
All	All	0.31	2/16577 (0.0%)	0.56	4/22738 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	1	U	OP3-P	-10.71	1.48	1.61
3	G	1	U	OP3-P	-10.68	1.48	1.61

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	17	U	O4'-C1'-N1	7.97	114.57	108.20
3	E	17	U	O4'-C1'-N1	5.33	112.47	108.20
1	A	123	ASP	CB-CG-OD1	5.26	123.04	118.30
3	E	8	U	O4'-C1'-N1	5.22	112.38	108.20

There are no chirality outliers.

There are no planarity outliers.

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	3618	0	3642	79	0
1	C	3646	0	3661	75	0
2	B	3529	0	3537	69	0
2	D	3531	0	3544	94	0
3	E	422	0	224	6	0
3	G	422	0	224	7	0
4	F	432	0	223	14	0
4	H	411	0	212	6	0
5	A	1	0	0	0	0
5	G	1	0	0	0	0
All	All	16013	0	15267	324	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 10.

All (324) 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:302:GLN:NE2	1:A:479:THR:O	2.15	0.80
3:E:21:U:O4	4:F:3:DA:N7	2.15	0.79
1:A:307:ASN:OD1	1:A:308:GLY:N	2.16	0.78
2:B:92:MET:SD	2:B:92:MET:N	2.58	0.77
1:A:62:LYS:HE3	1:A:62:LYS:HA	1.68	0.75
1:A:330:LEU:HB3	1:A:369:GLU:HG3	1.71	0.72
2:D:308:ILE:HD11	2:D:375:GLU:HB3	1.71	0.71
2:D:284:GLU:N	2:D:284:GLU:OE1	2.24	0.70
1:C:307:ASN:OD1	1:C:308:GLY:N	2.23	0.70
1:A:20:CYS:SG	1:A:21:THR:N	2.64	0.70
1:C:402:ALA:O	4:H:23:DA:N6	2.24	0.70
2:D:58:CYS:HB3	2:D:59:LYS:HD3	1.72	0.69
1:A:399:THR:O	2:B:374:ARG:NH1	2.25	0.68
1:A:343:LEU:HD21	1:A:378:PRO:HG3	1.76	0.67
2:D:258:ASN:ND2	2:D:262:GLN:OE1	2.27	0.67
4:H:10[A]:DG:H2'	4:H:11:DA:C8	2.30	0.66
1:C:295:GLN:HE22	1:C:321:TYR:HB3	1.62	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:27:GLY:O	2:B:149:LYS:NZ	2.30	0.65
1:C:108:ALA:O	1:C:112:LYS:NZ	2.29	0.65
2:D:193:ARG:HH21	2:D:227:LEU:HD22	1.62	0.65
1:C:20:CYS:SG	1:C:21:THR:N	2.70	0.64
1:A:16:HIS:O	1:A:18:GLN:NE2	2.29	0.64
2:B:60:PHE:HZ	2:B:77:GLU:HG3	1.62	0.64
1:A:302:GLN:HE22	1:A:483:ALA:HB2	1.62	0.64
2:D:253:THR:O	2:D:257:ARG:NH1	2.31	0.63
1:A:40:LYS:HG3	1:A:135:ARG:HH21	1.64	0.63
1:A:123:ASP:OD1	1:A:124:LYS:N	2.32	0.63
1:A:472:TYR:OH	2:B:162:LYS:NZ	2.30	0.62
2:D:193:ARG:C	2:D:193:ARG:HD2	2.20	0.62
2:D:193:ARG:NH1	2:D:228:PRO:O	2.33	0.62
1:C:279:CYS:SG	1:C:280:TYR:N	2.74	0.61
1:A:504:LYS:NZ	1:C:133:GLU:O	2.33	0.61
4:F:3:DA:N3	4:F:3:DA:H2'	2.15	0.61
2:D:57:THR:HG21	2:D:60:PHE:HE1	1.65	0.61
2:B:194:LEU:HB2	2:B:198:PHE:HE1	1.67	0.60
2:D:96:PRO:HB3	2:D:112:ILE:HD11	1.83	0.60
2:B:153:LEU:O	2:B:156:GLN:NE2	2.34	0.60
2:D:91:ASP:OD1	2:D:91:ASP:N	2.34	0.60
1:A:305:LEU:HB2	1:A:312:VAL:HB	1.82	0.60
1:C:79:GLU:N	1:C:79:GLU:OE1	2.35	0.60
1:C:302:GLN:HE22	1:C:483:ALA:HB2	1.67	0.60
1:A:37:TYR:HE1	1:C:38:GLY:HA2	1.67	0.59
1:A:235:LYS:HE3	1:A:241:PRO:HB3	1.84	0.59
4:F:4:DC:C4	4:F:5:DT:H72	2.37	0.59
1:A:402:ALA:O	4:F:23:DA:N6	2.35	0.59
1:C:406:MET:HA	1:C:425:PHE:H	1.69	0.58
1:C:106:PHE:HD2	1:C:112:LYS:HZ3	1.50	0.58
2:D:57:THR:HG21	2:D:60:PHE:CE1	2.38	0.58
1:A:105:LEU:HB3	1:A:113:ARG:HB2	1.86	0.58
1:C:287:LYS:HD2	1:C:289:GLU:HG2	1.86	0.57
2:B:30:TYR:HA	2:B:143:LYS:HG3	1.87	0.57
2:D:187:PHE:CG	2:D:213:TYR:HB3	2.39	0.57
1:C:224:LEU:HD23	1:C:229:LEU:HD11	1.85	0.57
3:E:4:C:H2'	3:E:5:G:C8	2.39	0.57
1:A:106:PHE:HA	1:A:113:ARG:HD2	1.86	0.57
2:D:315:LYS:HD3	2:D:316:ASN:N	2.19	0.57
2:B:129:GLN:HG2	2:B:157:ILE:HD12	1.87	0.57
1:C:33:LEU:HD11	1:C:270:LYS:HG2	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:481:ARG:NH1	3:G:4:C:OP1	2.37	0.57
2:B:184:GLU:HG3	2:B:242:SER:HA	1.87	0.56
2:D:130:ASP:OD1	2:D:131:LEU:N	2.38	0.56
2:D:175:TRP:NE1	2:D:336:MET:SD	2.78	0.56
1:A:302:GLN:HA	1:A:315:GLY:HA2	1.87	0.56
2:B:253:THR:O	2:B:257:ARG:NH1	2.38	0.56
2:B:276:ARG:O	2:B:276:ARG:HD3	2.06	0.56
1:C:59:LYS:NZ	1:C:249:GLU:OE2	2.30	0.56
1:A:224:LEU:HD23	1:A:229:LEU:HD11	1.87	0.56
2:B:415:SER:OG	2:B:416:TYR:N	2.39	0.56
2:D:178:ILE:HD12	2:D:333:PRO:HB2	1.88	0.56
2:D:385:SER:OG	2:D:387:ASP:O	2.24	0.56
2:B:150:SER:HA	2:B:153:LEU:HB3	1.87	0.55
1:C:1:MET:HE3	1:C:2:LYS:HG3	1.87	0.55
1:C:302:GLN:NE2	1:C:479:THR:O	2.39	0.55
2:B:62:ILE:HG21	2:B:78:LEU:HD21	1.87	0.55
2:B:174:ASN:ND2	2:B:337:VAL:O	2.39	0.55
1:C:235:LYS:NZ	1:C:243:ARG:O	2.31	0.55
2:B:5:ILE:HG23	2:B:59:LYS:HB2	1.89	0.55
2:D:86:LYS:O	2:D:89:GLN:NE2	2.39	0.55
1:A:66:ASN:O	1:A:69:ASN:ND2	2.39	0.55
1:A:133:GLU:O	1:C:504:LYS:NZ	2.36	0.55
2:D:52:GLU:HA	2:D:56:ASN:HB2	1.88	0.55
2:D:246:ILE:HD11	2:D:261:CYS:HB3	1.89	0.55
2:D:300:LEU:HD11	2:D:305:PHE:HB2	1.89	0.55
2:B:234:ASN:HD21	2:B:236:GLN:HB3	1.72	0.55
2:B:34:CYS:SG	2:B:35:ASP:N	2.80	0.54
1:C:67:HIS:CE1	1:C:68:ASN:HB2	2.42	0.54
2:D:314:GLN:O	2:D:316:ASN:N	2.40	0.54
2:D:119:ASP:O	2:D:126:LYS:NZ	2.36	0.54
1:A:47:GLN:NE2	1:A:95:GLU:OE2	2.41	0.54
2:B:53:ILE:HD12	2:B:77:GLU:OE1	2.07	0.54
2:D:14:ASP:N	2:D:14:ASP:OD1	2.41	0.53
2:B:156:GLN:OE1	2:B:156:GLN:N	2.42	0.53
1:C:335:ALA:HB1	1:C:373:PHE:CE1	2.44	0.53
1:A:84:CYS:SG	1:A:85:LYS:N	2.82	0.53
1:A:417:LYS:NZ	2:B:330:TYR:OH	2.40	0.53
2:B:302:LYS:HG3	2:B:304:LYS:HG2	1.90	0.53
4:F:16:DA:H2'	4:F:17:DG:C8	2.44	0.53
1:C:117:LEU:HB3	1:C:206:PHE:HE1	1.74	0.53
2:B:78:LEU:O	2:B:82:THR:HG23	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:302:LYS:O	2:B:304:LYS:NZ	2.41	0.53
1:A:334:GLU:OE1	1:A:334:GLU:N	2.40	0.53
2:D:190:TYR:HB3	2:D:193:ARG:HB3	1.91	0.53
1:A:367:ASP:O	1:A:371:ASN:N	2.40	0.52
1:A:504:LYS:NZ	1:C:133:GLU:OE1	2.42	0.52
3:E:7:C:H2'	3:E:8:U:C6	2.43	0.52
1:A:274:ILE:HD11	1:A:280:TYR:HE2	1.74	0.52
1:C:119:THR:OG1	1:C:213:ARG:NH2	2.43	0.52
2:D:417:VAL:HG12	2:D:419:PRO:HD2	1.92	0.52
4:H:15:DG:H2''	4:H:16:DA:H5'	1.91	0.52
1:A:38:GLY:HA2	1:C:37:TYR:HE1	1.75	0.52
1:C:28:ALA:HA	1:C:81:VAL:HG12	1.90	0.52
2:D:96:PRO:HD2	2:D:117:ALA:HB2	1.91	0.52
2:D:174:ASN:ND2	2:D:337:VAL:O	2.41	0.51
2:D:362:ARG:HH22	3:G:6:G:H2''	1.76	0.51
1:A:317:VAL:HG22	1:A:318:GLY:H	1.75	0.51
1:A:33:LEU:HD11	1:A:270:LYS:HG2	1.91	0.51
1:A:379:LYS:HE3	1:A:380:ASN:HB2	1.91	0.51
1:A:423:LEU:HD12	1:A:434:SER:HB3	1.91	0.51
2:B:234:ASN:ND2	2:B:236:GLN:OE1	2.43	0.51
1:C:274:ILE:HD11	1:C:280:TYR:HE2	1.76	0.51
2:D:246:ILE:CD1	2:D:261:CYS:HB3	2.40	0.51
1:A:497:LYS:HG3	1:A:498:THR:HG23	1.92	0.51
1:C:226:GLU:OE1	1:C:226:GLU:N	2.41	0.51
2:D:130:ASP:HA	2:D:133:ASP:OD2	2.10	0.51
3:G:13:U:H2'	3:G:14:C:C6	2.45	0.51
2:B:22:SER:O	2:B:26:ILE:HG22	2.10	0.50
4:F:15:DG:H2'	4:F:16:DA:H8	1.76	0.50
1:C:102:ARG:HD2	1:C:102:ARG:N	2.26	0.50
1:A:88:SER:O	1:A:88:SER:OG	2.30	0.50
1:A:339:LEU:HD23	1:A:376:VAL:HB	1.93	0.50
4:F:16:DA:H2'	4:F:17:DG:H8	1.77	0.50
2:D:80:VAL:O	2:D:84:VAL:HG22	2.11	0.50
1:C:231:TRP:CE2	1:C:245:PHE:HB2	2.46	0.50
1:A:235:LYS:HD2	1:A:241:PRO:HA	1.94	0.50
2:B:36:ILE:HG13	2:B:37:LEU:HD22	1.93	0.49
1:A:302:GLN:HG3	1:A:503:PHE:HZ	1.78	0.49
2:B:190:TYR:HE2	2:B:192:TRP:HE3	1.60	0.49
1:C:496:ILE:O	1:C:497:LYS:HD3	2.13	0.49
2:D:184:GLU:OE2	2:D:186:ARG:NH2	2.46	0.49
3:G:7:C:H2'	3:G:8:U:C6	2.46	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:5:ILE:HG22	2:D:61:LEU:HD11	1.93	0.49
2:D:385:SER:HA	2:D:391:ILE:HG12	1.93	0.49
2:D:193:ARG:HB2	2:D:233:TYR:CZ	2.46	0.49
2:D:283:ARG:NH1	2:D:296:GLU:OE1	2.46	0.49
1:A:287:LYS:HE2	1:A:296:ASN:HD22	1.76	0.49
2:D:255:PHE:HD2	2:D:256:ILE:HG23	1.78	0.48
1:A:248:ILE:O	1:A:251:HIS:N	2.46	0.48
1:C:89:GLN:N	1:C:89:GLN:OE1	2.46	0.48
2:D:193:ARG:HH22	2:D:227:LEU:HB2	1.78	0.48
2:D:254:ASP:OD1	2:D:254:ASP:N	2.44	0.48
1:C:279:CYS:HB3	1:C:357:VAL:HG22	1.95	0.48
2:D:48:THR:OG1	2:D:49:ILE:N	2.47	0.48
1:A:379:LYS:O	1:A:380:ASN:ND2	2.47	0.48
1:A:421:TRP:CZ2	1:A:440:PRO:HG3	2.49	0.48
1:C:482:PHE:O	1:C:486:ILE:HG23	2.14	0.48
2:B:68:GLY:HA2	2:B:71:ARG:HG3	1.96	0.47
4:F:15:DG:H2'	4:F:16:DA:C8	2.49	0.47
1:A:286:LYS:HB2	1:A:298:CYS:HB2	1.95	0.47
2:B:165:ILE:HG13	2:B:167:LYS:H	1.79	0.47
3:G:14:C:H2'	3:G:15:U:C6	2.49	0.47
1:A:245:PHE:HD2	1:A:252:LEU:HD22	1.80	0.47
1:C:138:VAL:HG12	1:C:220:PRO:HB2	1.95	0.47
1:C:379:LYS:HE3	1:C:380:ASN:HB2	1.97	0.47
2:D:197:GLN:N	2:D:197:GLN:OE1	2.48	0.47
2:D:318:TYR:HB2	2:D:344:THR:HG23	1.96	0.47
2:B:371:ASP:OD1	2:B:372:LYS:N	2.46	0.47
1:A:99:GLU:HG2	1:A:101:ILE:HG23	1.96	0.47
3:E:5:G:H2'	3:E:6:G:C8	2.49	0.47
1:A:245:PHE:CD2	1:A:252:LEU:HD22	2.50	0.47
1:C:420:LEU:HD22	1:C:456:LEU:HD22	1.97	0.47
2:D:7:ILE:HB	2:D:61:LEU:HD13	1.97	0.47
2:D:237:GLU:OE1	2:D:237:GLU:N	2.43	0.47
2:B:29:GLY:O	2:B:143:LYS:NZ	2.38	0.47
2:D:66:THR:HA	2:D:103:LEU:HD11	1.97	0.47
4:H:16:DA:H2''	4:H:17:DG:O5'	2.13	0.47
1:C:367:ASP:OD1	1:C:367:ASP:N	2.46	0.46
1:A:5:ILE:HG22	1:A:410:ALA:HB3	1.95	0.46
1:C:105:LEU:HA	1:C:113:ARG:HD3	1.97	0.46
1:A:59:LYS:HE2	1:A:59:LYS:HA	1.98	0.46
1:A:94:LYS:HD3	1:A:124:LYS:HG2	1.97	0.46
2:D:100:ASP:O	2:D:121:LYS:NZ	2.47	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:182:PRO:HG2	2:B:217:PHE:HE1	1.80	0.46
1:C:364:ARG:HH12	4:H:13[A]:DT:P	2.38	0.46
2:D:279:ASP:OD1	2:D:279:ASP:N	2.48	0.46
1:C:417:LYS:HB3	1:C:442:PHE:CZ	2.49	0.46
2:D:128:LEU:O	2:D:132:LEU:HD23	2.16	0.46
1:A:488:GLU:OE1	1:A:488:GLU:N	2.32	0.46
2:B:208:ILE:HD11	2:B:264:LEU:HG	1.98	0.46
1:C:421:TRP:CZ2	1:C:440:PRO:HG3	2.51	0.46
2:B:24:LYS:HD2	2:B:24:LYS:HA	1.68	0.45
1:C:231:TRP:CE2	1:C:232:ARG:HD2	2.51	0.45
1:C:379:LYS:O	1:C:380:ASN:ND2	2.49	0.45
1:C:109:SER:HB3	1:C:112:LYS:NZ	2.31	0.45
1:C:394:LEU:HD13	2:D:175:TRP:CZ2	2.52	0.45
2:B:274:GLU:OE2	2:B:293:TYR:OH	2.31	0.45
2:D:24:LYS:HD3	2:D:128:LEU:HD11	1.98	0.45
2:B:237:GLU:OE1	2:B:237:GLU:N	2.42	0.45
1:C:493:SER:OG	1:C:495:GLU:OE1	2.29	0.45
1:A:4:LEU:HD11	2:B:410:PHE:HB3	1.98	0.45
1:A:215:LEU:HG	1:A:500:PRO:HD2	1.99	0.45
1:A:232:ARG:O	1:A:235:LYS:NZ	2.45	0.45
1:A:345:SER:O	1:A:348:GLU:HG3	2.17	0.45
1:A:367:ASP:OD1	1:A:368:GLU:N	2.49	0.45
1:C:366:ASN:ND2	1:C:369:GLU:OE1	2.49	0.45
3:E:4:C:H2'	3:E:5:G:H8	1.81	0.45
1:A:428:LYS:HG2	2:B:162:LYS:HE3	1.98	0.45
2:B:60:PHE:N	2:B:93:PHE:O	2.46	0.45
2:D:186:ARG:HE	2:D:240:ARG:HE	1.64	0.45
2:B:70:LYS:HB2	2:B:70:LYS:HE2	1.67	0.44
2:B:258:ASN:OD1	2:B:259:TYR:N	2.50	0.44
1:C:233:ASP:OD1	1:C:233:ASP:N	2.48	0.44
1:A:233:ASP:OD1	1:A:233:ASP:N	2.49	0.44
4:F:19:DC:H2'	4:F:20:DG:C8	2.52	0.44
2:D:20:TRP:O	2:D:24:LYS:HG2	2.16	0.44
2:D:48:THR:O	2:D:52:GLU:HG2	2.17	0.44
2:D:220:GLU:N	2:D:220:GLU:OE1	2.51	0.44
1:A:247:LYS:HD2	1:A:247:LYS:N	2.33	0.44
2:B:276:ARG:HD3	2:B:276:ARG:C	2.38	0.44
2:B:369:TRP:O	2:B:373:TRP:HD1	2.00	0.44
4:F:4:DC:H2''	4:F:5:DT:C2	2.51	0.44
2:D:9:HIS:CE1	2:D:36:ILE:H	2.36	0.44
2:D:193:ARG:HD2	2:D:193:ARG:O	2.16	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:196:LYS:HE3	2:D:196:LYS:HB3	1.75	0.44
1:A:428:LYS:HB3	2:B:162:LYS:HB2	2.00	0.44
1:C:99:GLU:O	1:C:101:ILE:N	2.51	0.44
1:C:490:LEU:HD23	1:C:490:LEU:HA	1.78	0.44
1:A:251:HIS:O	1:A:255:THR:HG22	2.18	0.44
2:B:121:LYS:HB3	2:B:121:LYS:HE3	1.76	0.44
1:C:248:ILE:O	1:C:251:HIS:N	2.45	0.44
1:C:284:VAL:HG23	1:C:362:ARG:HD2	2.00	0.44
2:D:325:ALA:HA	2:D:336:MET:O	2.17	0.44
1:A:20:CYS:HA	2:B:158:PHE:HE1	1.82	0.43
1:A:429:LEU:HD22	1:A:431:SER:HB2	2.00	0.43
2:B:165:ILE:HG21	2:B:417:VAL:HG13	2.00	0.43
2:B:193:ARG:HB3	2:B:233:TYR:HE2	1.83	0.43
3:E:12:A:H2'	3:E:13:U:C6	2.54	0.43
2:D:172:ASP:OD1	2:D:172:ASP:N	2.42	0.43
1:A:417:LYS:HB3	1:A:442:PHE:CZ	2.53	0.43
1:C:315:GLY:O	1:C:501:LEU:HB2	2.18	0.43
2:D:24:LYS:O	2:D:28:LEU:HB2	2.19	0.43
2:D:242:SER:O	2:D:246:ILE:HG22	2.18	0.43
1:A:137:ASP:OD1	1:C:135:ARG:NH1	2.50	0.43
1:C:211:LYS:NZ	3:G:1:U:OP2	2.35	0.43
2:B:247:LEU:HD23	2:B:247:LEU:HA	1.84	0.43
1:C:123:ASP:OD1	1:C:124:LYS:N	2.51	0.43
1:C:364:ARG:HG2	1:C:446:ASN:ND2	2.32	0.43
1:A:219:ILE:HD12	1:A:220:PRO:HD2	2.00	0.43
2:B:257:ARG:HA	2:B:257:ARG:HD3	1.78	0.43
1:C:495:GLU:OE1	1:C:495:GLU:N	2.50	0.43
2:D:363:LYS:HB2	2:D:363:LYS:HE2	1.84	0.43
3:G:13:U:H2'	3:G:14:C:H6	1.83	0.43
4:F:5:DT:H73	4:F:6:DA:H62	1.84	0.43
2:D:374:ARG:NE	2:D:375:GLU:OE2	2.52	0.43
1:C:268:PRO:HB2	1:C:269:TRP:CE3	2.53	0.43
2:B:350:LEU:H	2:B:350:LEU:HD23	1.83	0.42
2:B:417:VAL:HG23	2:B:418:THR:H	1.82	0.42
2:D:21:LEU:HD23	2:D:25:LEU:HD13	2.02	0.42
2:D:69:ASN:OD1	2:D:70:LYS:N	2.52	0.42
1:A:133:GLU:OE2	1:C:504:LYS:NZ	2.30	0.42
1:C:414:ASP:OD1	1:C:415:GLU:N	2.51	0.42
2:D:118:ILE:H	2:D:118:ILE:HG12	1.70	0.42
2:D:289:LYS:HA	2:D:289:LYS:HD3	1.76	0.42
1:C:76:PRO:HB2	2:D:124:TRP:HE1	1.85	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:420:SER:O	2:D:422:VAL:N	2.52	0.42
1:C:14:PHE:HZ	1:C:23:PRO:HA	1.84	0.42
4:F:16:DA:H2''	4:F:17:DG:O5'	2.18	0.42
2:B:99:ILE:HD13	2:B:99:ILE:HA	1.85	0.42
1:C:87:GLU:N	1:C:87:GLU:OE1	2.53	0.42
1:C:286:LYS:HB2	1:C:298:CYS:HB2	2.02	0.42
2:B:385:SER:HA	2:B:391:ILE:HG12	2.01	0.42
2:D:186:ARG:HE	2:D:240:ARG:NE	2.17	0.42
2:D:189:ARG:HB2	2:D:212:GLU:OE2	2.20	0.42
1:A:274:ILE:HD12	1:A:274:ILE:HA	1.83	0.42
2:B:280:LYS:HA	2:B:280:LYS:HD2	1.70	0.42
1:C:455:VAL:O	1:C:459:ILE:HG22	2.20	0.42
2:D:143:LYS:HG2	2:D:144:PRO:HD2	2.01	0.42
2:D:327:GLY:O	2:D:328:LYS:HD3	2.19	0.42
1:C:232:ARG:H	1:C:232:ARG:HG2	1.68	0.42
2:D:100:ASP:OD2	2:D:103:LEU:HD13	2.20	0.42
1:A:10:PRO:HG2	1:A:461:ALA:HA	2.01	0.41
1:A:295:GLN:NE2	1:A:321:TYR:HB3	2.35	0.41
2:D:193:ARG:NH2	2:D:227:LEU:HD13	2.35	0.41
1:A:29:LEU:HD23	1:A:30:PHE:CE2	2.55	0.41
1:A:482:PHE:O	1:A:486:ILE:HG23	2.20	0.41
2:B:265:ILE:O	2:B:269:ILE:HG22	2.20	0.41
1:A:305:LEU:HD13	1:A:346:TYR:HD2	1.85	0.41
2:B:130:ASP:HA	2:B:133:ASP:OD2	2.20	0.41
2:B:315:LYS:HE2	2:B:315:LYS:HB3	1.90	0.41
1:A:67:HIS:CE1	1:A:68:ASN:HB2	2.56	0.41
2:D:66:THR:N	2:D:100:ASP:OD1	2.52	0.41
2:D:306:GLU:O	2:D:307:LYS:HG2	2.21	0.41
2:B:46:TRP:CH2	2:B:76:LYS:HD3	2.55	0.41
2:B:309:LYS:NZ	2:B:311:VAL:O	2.50	0.41
1:C:118:VAL:HG22	1:C:122:ASN:ND2	2.36	0.41
2:D:13:GLU:HB2	2:D:71:ARG:HH22	1.86	0.41
2:D:24:LYS:HE3	2:D:24:LYS:HB3	1.79	0.41
2:D:79:ALA:O	2:D:82:THR:HG22	2.21	0.41
2:D:82:THR:HA	2:D:85:LYS:HE2	2.03	0.41
2:B:44:ASP:OD1	2:B:44:ASP:O	2.38	0.41
2:D:297:LYS:HB3	2:D:297:LYS:HE2	1.87	0.41
2:D:51:LYS:HE2	2:D:51:LYS:HB2	1.95	0.41
2:D:193:ARG:NH2	2:D:227:LEU:HD22	2.32	0.41
2:D:413:LYS:HD3	2:D:413:LYS:HA	1.89	0.41
2:B:193:ARG:HB2	2:B:230:THR:HG22	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:231:GLU:OE1	2:B:231:GLU:N	2.51	0.41
1:C:78:PHE:HE1	1:C:84:CYS:HB2	1.86	0.41
2:D:58:CYS:C	2:D:59:LYS:HD3	2.42	0.41
2:D:295:ILE:O	2:D:320:HIS:ND1	2.51	0.41
2:B:87:HIS:O	2:B:89:GLN:NE2	2.54	0.41
1:C:70:ILE:HG23	1:C:71:THR:HG23	2.03	0.41
1:A:20:CYS:HA	2:B:158:PHE:CE1	2.56	0.40
1:A:302:GLN:HE22	1:A:483:ALA:CB	2.31	0.40
1:C:124:LYS:HB2	1:C:124:LYS:HE2	1.67	0.40
1:C:62:LYS:HZ2	2:D:122:LYS:HA	1.85	0.40
1:A:57:LEU:HD12	1:A:57:LEU:HA	1.90	0.40
1:A:90:ASN:OD1	1:A:90:ASN:N	2.54	0.40
2:B:177:PRO:HA	2:B:334:VAL:HG12	2.02	0.40
2:B:344:THR:HG21	2:B:347:GLY:HA2	2.04	0.40
2:D:85:LYS:HE2	2:D:85:LYS:HB3	1.75	0.40
4:F:17:DG:H2''	4:F:18:DC:H5''	2.04	0.40
2:D:70:LYS:HD3	2:D:70:LYS:HA	1.79	0.40
2:D:227:LEU:HD12	2:D:227:LEU:O	2.21	0.40
2:D:267:GLN:OE1	4:H:9:DA:H4'	2.21	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 PDB entries followed by that with respect to all EM entries.

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	444/507 (88%)	419 (94%)	25 (6%)	0	100	100
1	C	447/507 (88%)	413 (92%)	34 (8%)	0	100	100
2	B	420/450 (93%)	393 (94%)	27 (6%)	0	100	100
2	D	420/450 (93%)	384 (91%)	36 (9%)	0	100	100
All	All	1731/1914 (90%)	1609 (93%)	122 (7%)	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 PDB entries followed by that with respect to all EM entries.

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	389/446 (87%)	367 (94%)	22 (6%)	20	50
1	C	392/446 (88%)	376 (96%)	16 (4%)	30	59
2	B	387/415 (93%)	369 (95%)	18 (5%)	26	57
2	D	388/415 (94%)	370 (95%)	18 (5%)	27	57
All	All	1556/1722 (90%)	1482 (95%)	74 (5%)	29	56

All (74) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	48	LYS
1	A	90	ASN
1	A	93	PHE
1	A	123	ASP
1	A	124	LYS
1	A	208	ASP
1	A	216	GLU
1	A	234	PHE
1	A	257	SER
1	A	270	LYS
1	A	292	LYS
1	A	303	MET
1	A	304	PHE
1	A	313	PHE
1	A	350	ASN
1	A	368	GLU
1	A	373	PHE
1	A	375	GLU
1	A	398	LYS
1	A	407	ARG
1	A	421	TRP
1	A	458	ASP

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Mol	Chain	Res	Type
2	B	4	LYS
2	B	19	ARG
2	B	51	LYS
2	B	58	CYS
2	B	92	MET
2	B	107	ASP
2	B	119	ASP
2	B	137	LYS
2	B	181	PHE
2	B	198	PHE
2	B	215	CYS
2	B	236	GLN
2	B	255	PHE
2	B	299	LYS
2	B	350	LEU
2	B	361	ARG
2	B	374	ARG
2	B	400	LYS
1	C	106	PHE
1	C	234	PHE
1	C	243	ARG
1	C	270	LYS
1	C	271	LEU
1	C	292	LYS
1	C	309	ASP
1	C	362	ARG
1	C	369	GLU
1	C	378	PRO
1	C	398	LYS
1	C	421	TRP
1	C	447	LYS
1	C	457	LYS
1	C	488	GLU
1	C	501	LEU
2	D	2	ARG
2	D	15	ASP
2	D	30	TYR
2	D	37	LEU
2	D	91	ASP
2	D	137	LYS
2	D	146	ASP
2	D	167	LYS

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Mol	Chain	Res	Type
2	D	181	PHE
2	D	211	LYS
2	D	217	PHE
2	D	227	LEU
2	D	304	LYS
2	D	307	LYS
2	D	336	MET
2	D	354	LYS
2	D	405	ASN
2	D	419	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	295	GLN
1	A	296	ASN
1	A	302	GLN
1	A	374	ASN
1	A	380	ASN
1	C	67	HIS
1	C	111	HIS
1	C	205	GLN
1	C	295	GLN
1	C	296	ASN
1	C	380	ASN
1	C	382	ASN
2	D	258	ASN
2	D	405	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	E	0/21	-	-
3	G	0/21	-	-
All	All	0/42	-	-

There are no RNA backbone outliers to report.

There are no RNA pucker outliers to report.

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 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 [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.