Full wwPDB EM Validation Report ⓘ

Jul 16, 2025 – 02:48 AM JST

PDB ID	:	9JM0 / pdb_00009jm0
EMDB ID	:	EMD-61595
Title	:	retron Ec86-effector fiber
Authors	:	Wang, Y.J.; Guan, Z.Y.; Wang, C.; Zou, T.T.
Deposited on	:	2024-09-20
Resolution	:	2.70 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:

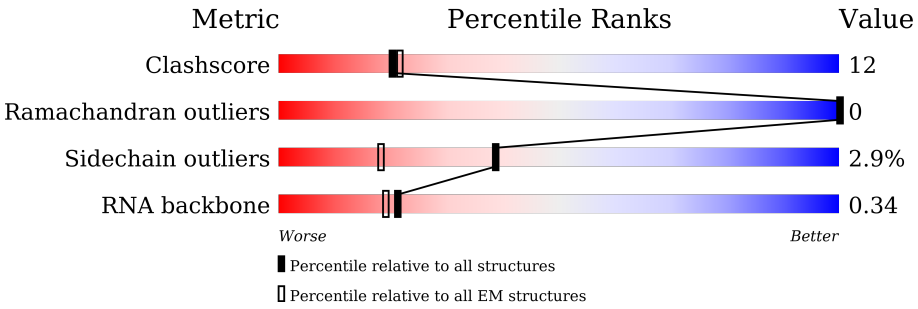
EMDB validation analysis	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance

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

The reported resolution of this entry is 2.70 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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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 <=5%

Mol	Chain	Length	Quality of chain
1	A	330	68% 25% • 5%
1	B	330	71% 24% • 5%
1	K	330	61% 33% • 5%
1	P	330	71% 24% • 5%
2	C	307	30% 12% • 57%
2	J	307	76% 23% •
2	L	307	33% 10% 57%
2	T	307	79% 20% •

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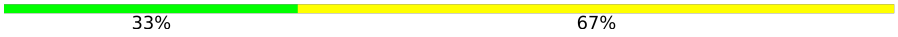
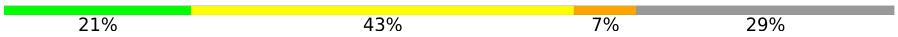
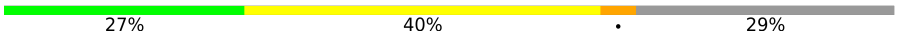
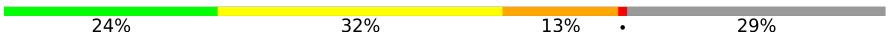
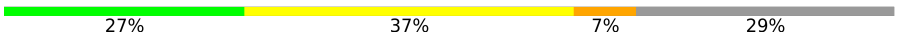
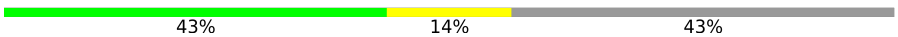
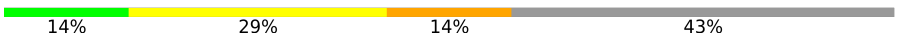
Mol	Chain	Length	Quality of chain
3	D	85	
3	G	85	
3	M	85	
3	Q	85	
4	E	82	
4	H	82	
4	N	82	
4	R	82	
5	F	14	
5	I	14	
5	O	14	
5	S	14	

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 28012 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 Retron Ec86 reverse transcriptase.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	314	Total	C	N	O	S	0	0
			2518	1613	450	446	9		
1	B	314	Total	C	N	O	S	0	0
			2518	1613	450	446	9		
1	K	314	Total	C	N	O	S	0	0
			2518	1613	450	446	9		
1	P	314	Total	C	N	O	S	0	0
			2518	1613	450	446	9		

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	321	LEU	-	expression tag	UNP P23070
A	322	GLU	-	expression tag	UNP P23070
A	323	HIS	-	expression tag	UNP P23070
A	324	HIS	-	expression tag	UNP P23070
A	325	HIS	-	expression tag	UNP P23070
A	326	HIS	-	expression tag	UNP P23070
A	327	HIS	-	expression tag	UNP P23070
A	328	HIS	-	expression tag	UNP P23070
A	329	HIS	-	expression tag	UNP P23070
A	330	HIS	-	expression tag	UNP P23070
B	321	LEU	-	expression tag	UNP P23070
B	322	GLU	-	expression tag	UNP P23070
B	323	HIS	-	expression tag	UNP P23070
B	324	HIS	-	expression tag	UNP P23070
B	325	HIS	-	expression tag	UNP P23070
B	326	HIS	-	expression tag	UNP P23070
B	327	HIS	-	expression tag	UNP P23070
B	328	HIS	-	expression tag	UNP P23070
B	329	HIS	-	expression tag	UNP P23070
B	330	HIS	-	expression tag	UNP P23070
K	321	LEU	-	expression tag	UNP P23070
K	322	GLU	-	expression tag	UNP P23070

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Chain	Residue	Modelled	Actual	Comment	Reference
K	323	HIS	-	expression tag	UNP P23070
K	324	HIS	-	expression tag	UNP P23070
K	325	HIS	-	expression tag	UNP P23070
K	326	HIS	-	expression tag	UNP P23070
K	327	HIS	-	expression tag	UNP P23070
K	328	HIS	-	expression tag	UNP P23070
K	329	HIS	-	expression tag	UNP P23070
K	330	HIS	-	expression tag	UNP P23070
P	321	LEU	-	expression tag	UNP P23070
P	322	GLU	-	expression tag	UNP P23070
P	323	HIS	-	expression tag	UNP P23070
P	324	HIS	-	expression tag	UNP P23070
P	325	HIS	-	expression tag	UNP P23070
P	326	HIS	-	expression tag	UNP P23070
P	327	HIS	-	expression tag	UNP P23070
P	328	HIS	-	expression tag	UNP P23070
P	329	HIS	-	expression tag	UNP P23070
P	330	HIS	-	expression tag	UNP P23070

- Molecule 2 is a protein called Retron Ec86 putative ribosyltransferase/DNA-binding protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	C	132	Total	C	N	O	S	0	0
			1096	704	195	192	5		
2	J	306	Total	C	N	O	S	0	0
			2490	1589	441	449	11		
2	L	132	Total	C	N	O	S	0	0
			1096	704	195	192	5		
2	T	306	Total	C	N	O	S	0	0
			2490	1589	441	449	11		

- Molecule 3 is a DNA chain called DNA (85-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	85	Total	C	N	O	P	0	0
			1752	830	337	500	85		
3	G	39	Total	C	N	O	P	0	0
			808	383	163	223	39		
3	M	85	Total	C	N	O	P	0	0
			1752	830	337	500	85		
3	Q	39	Total	C	N	O	P	0	0
			808	383	163	223	39		

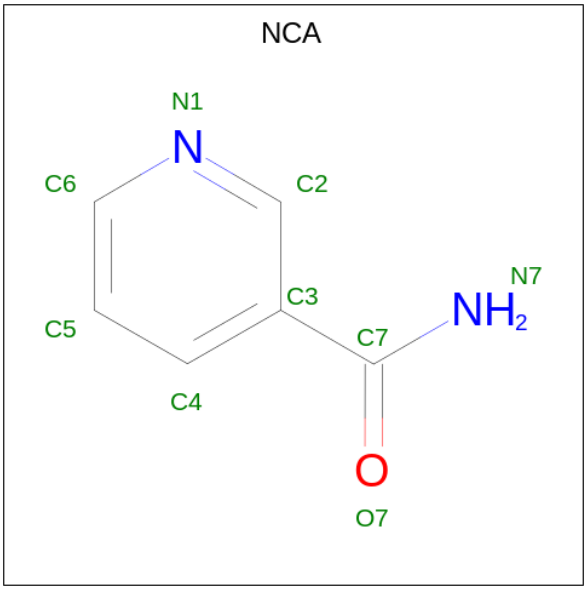
- Molecule 4 is a RNA chain called RNA (82-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
4	E	58	Total	C	N	O	P	0	0
			1225	547	205	415	58		
4	H	58	Total	C	N	O	P	0	0
			1225	547	205	415	58		
4	N	58	Total	C	N	O	P	0	0
			1225	547	205	415	58		
4	R	58	Total	C	N	O	P	0	0
			1225	547	205	415	58		

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

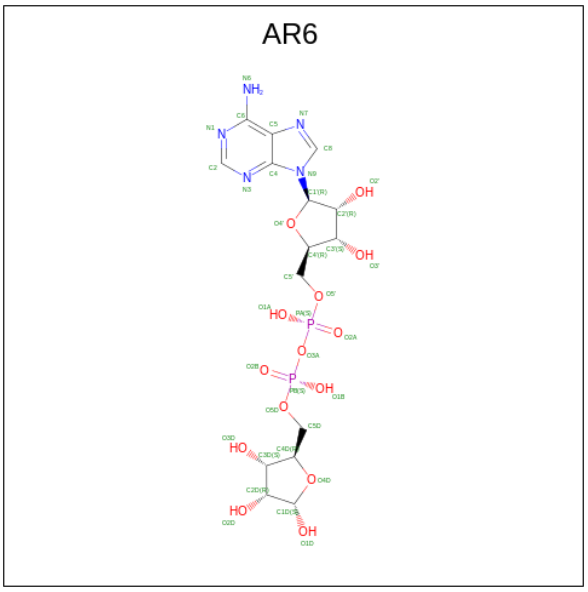
Mol	Chain	Residues	Atoms					AltConf	Trace
5	F	8	Total	C	N	O	P	0	0
			176	78	35	55	8		
5	I	8	Total	C	N	O	P	0	0
			176	78	35	55	8		
5	O	8	Total	C	N	O	P	0	0
			176	78	35	55	8		
5	S	8	Total	C	N	O	P	0	0
			176	78	35	55	8		

- Molecule 6 is NICOTINAMIDE (CCD ID: NCA) (formula: $C_6H_6N_2O$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
6	J	1	Total	C	N	O	0
			9	6	2	1	

- Molecule 7 is [(2R,3S,4R,5R)-5-(6-AMINOPURIN-9-YL)-3,4-DIHYDROXY-OXOLAN-2-YL]METHYL[HYDROXY-[[(2R,3S,4R,5S)-3,4,5-TRIHYDROXYOXOLAN-2-YL]METHOXY]PHOSPHORYL] HYDROGEN PHOSPHATE (CCD ID: AR6) (formula: $C_{15}H_{23}N_5O_{14}P_2$) (labeled as "Ligand of Interest" by depositor).



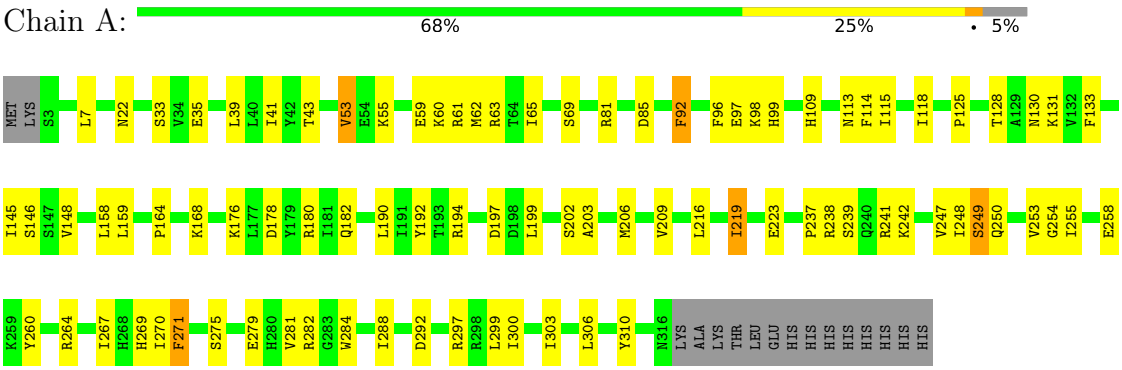
Mol	Chain	Residues	Atoms					AltConf
7	J	1	Total	C	N	O	P	0
			35	15	5	13	2	

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. 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.

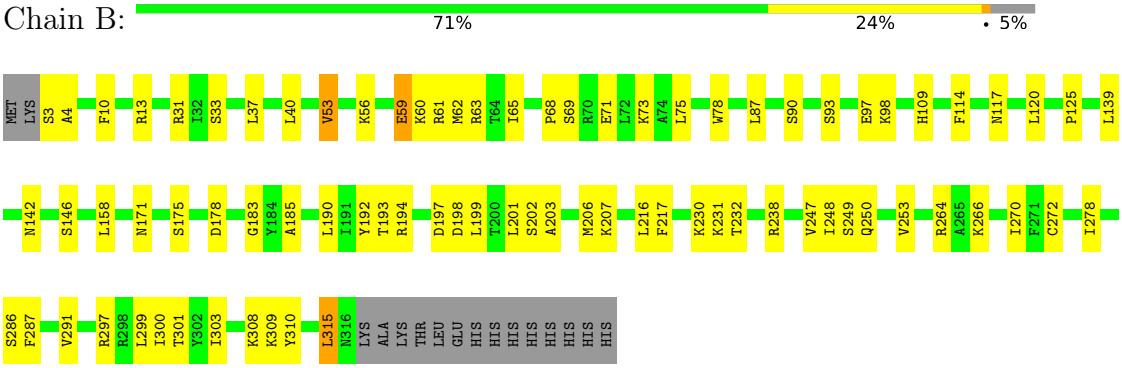
• Molecule 1: Retron Ec86 reverse transcriptase

Chain A:



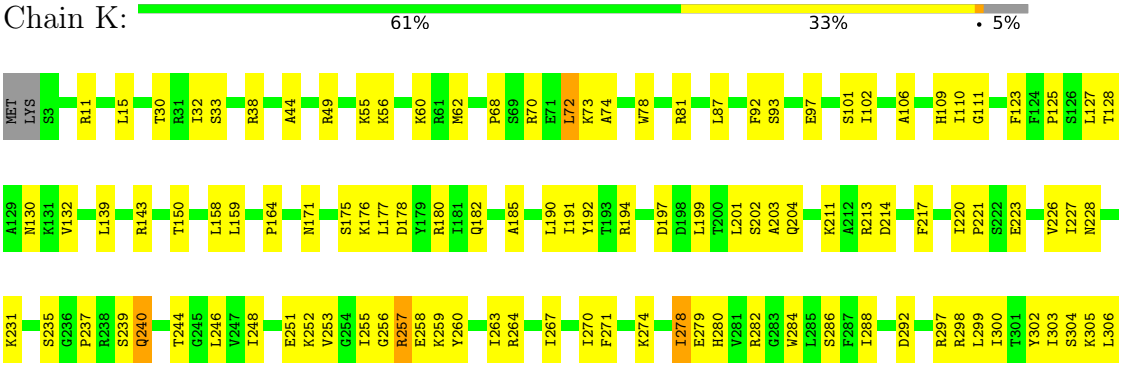
• Molecule 1: Retron Ec86 reverse transcriptase

Chain B:



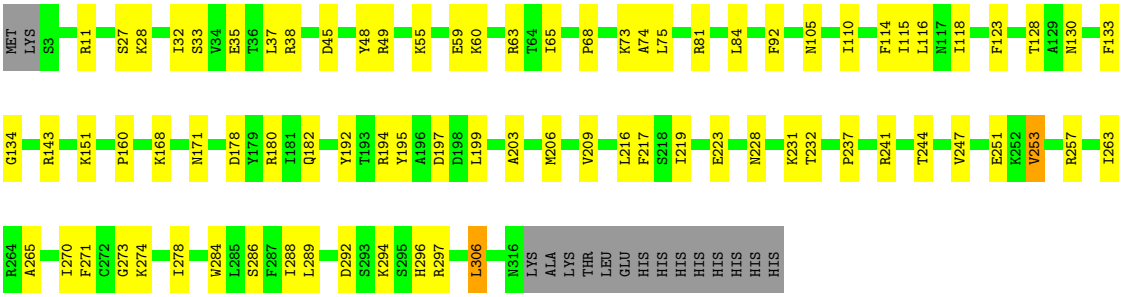
• Molecule 1: Retron Ec86 reverse transcriptase

Chain K:



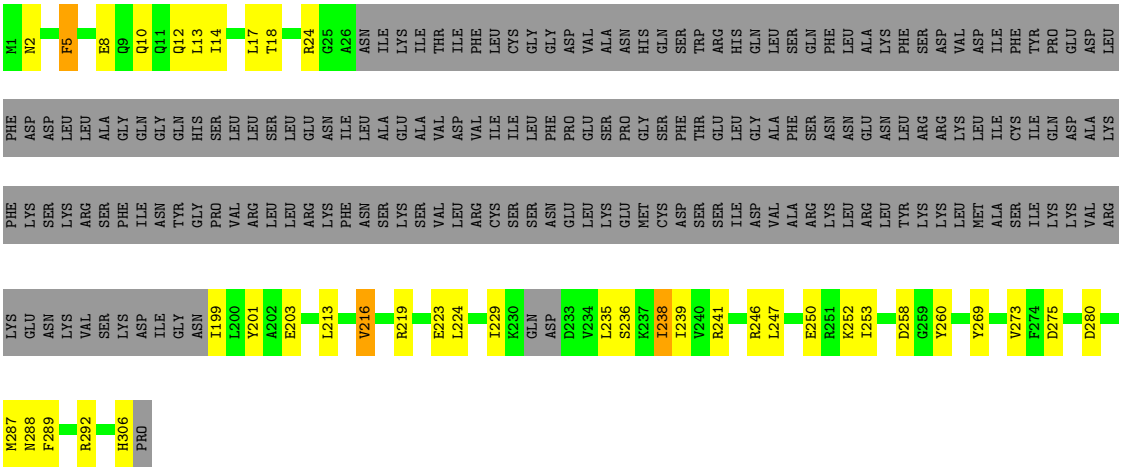
• Molecule 1: Retron Ec86 reverse transcriptase

Chain P:



• Molecule 2: Retron Ec86 putative ribosyltransferase/DNA-binding protein

Chain C:

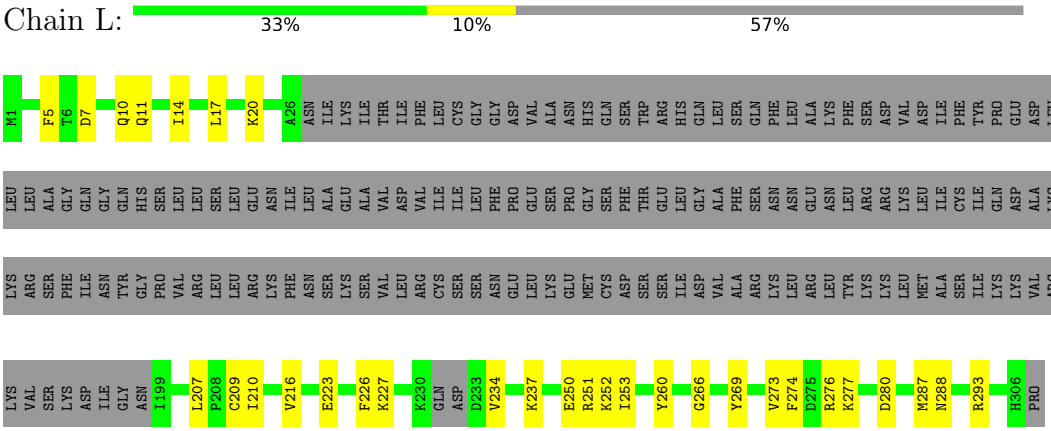


• Molecule 2: Retron Ec86 putative ribosyltransferase/DNA-binding protein

Chain J:

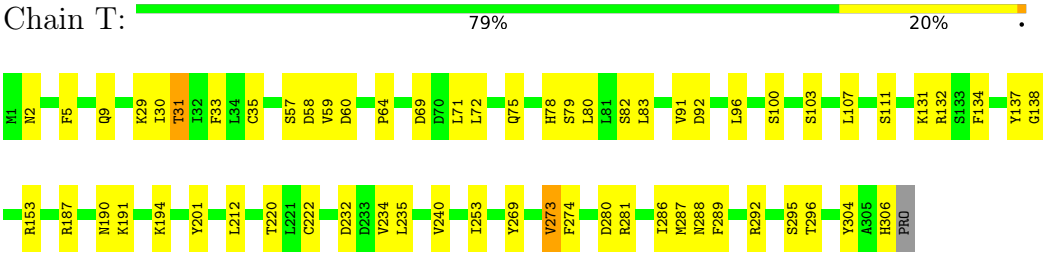
• Molecule 2: Retron Ec86 putative ribosyltransferase/DNA-binding protein

Chain L:



• Molecule 2: Retron Ec86 putative ribosyltransferase/DNA-binding protein

Chain T:

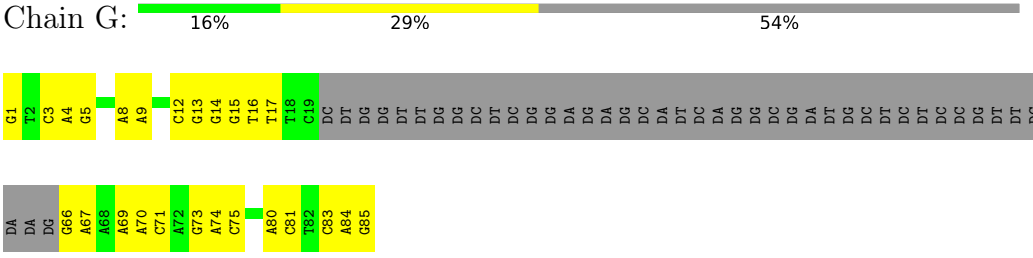


• Molecule 3: DNA (85-MER)

Chain D:

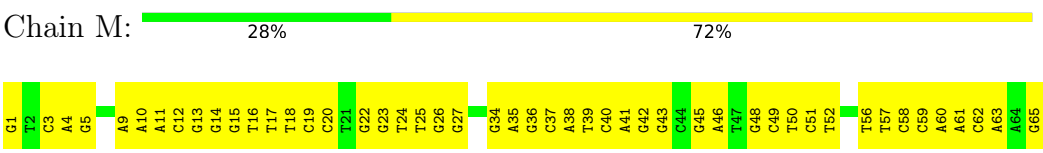
• Molecule 3: DNA (85-MER)

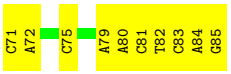
Chain G:



• Molecule 3: DNA (85-MER)

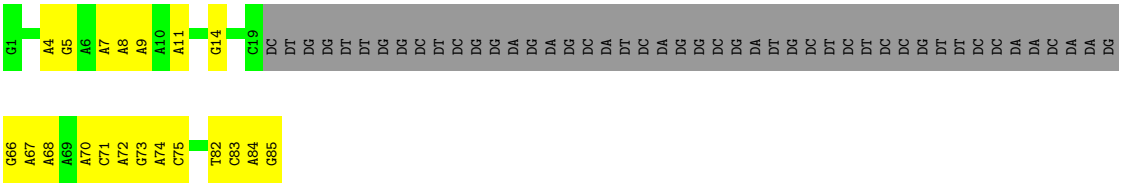
Chain M:





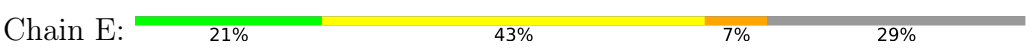
• Molecule 3: DNA (85-MER)

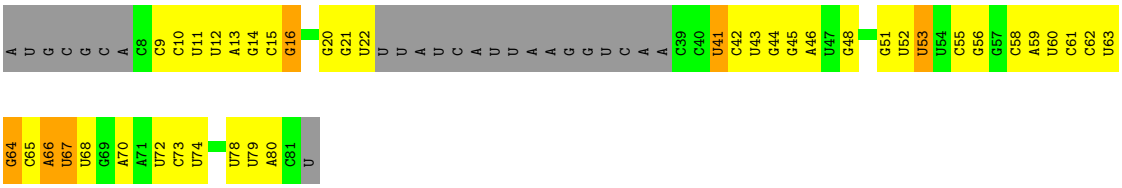
Chain Q:



• Molecule 4: RNA (82-MER)

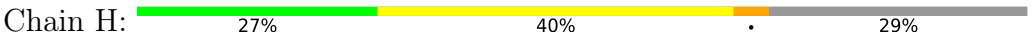
Chain E:

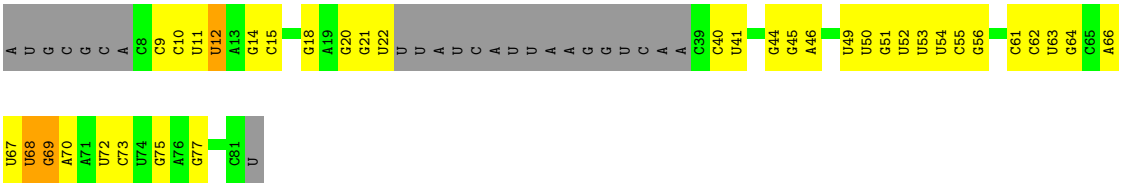




• Molecule 4: RNA (82-MER)

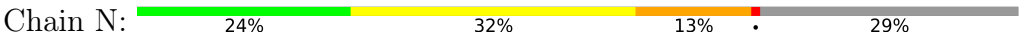
Chain H:

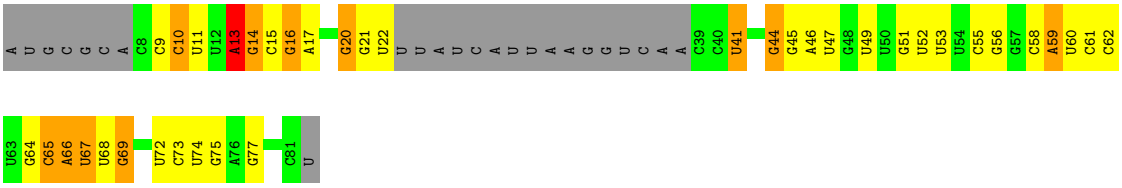




• Molecule 4: RNA (82-MER)

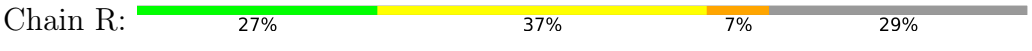
Chain N:

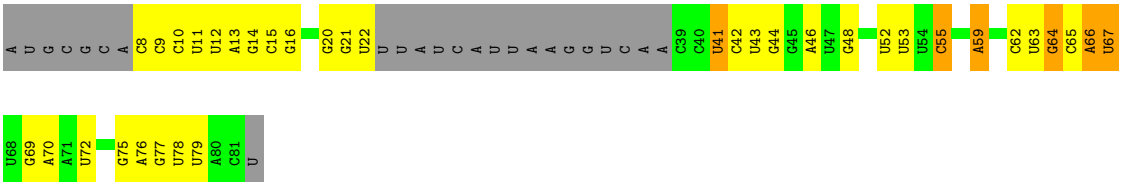




• Molecule 4: RNA (82-MER)

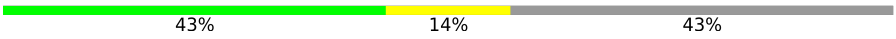
Chain R:

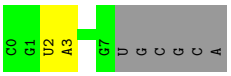




• Molecule 5: RNA (5'-R(P*CP*GP*UP*AP*AP*GP*GP*GP*UP*GP*CP*GP*CP*A)-3')

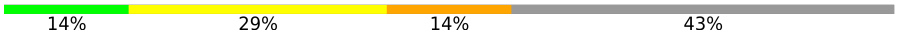
Chain F:





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

Chain I:



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

Chain O:

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

Chain S:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	270375	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TECNAI SPIRIT	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: AR6, NCA

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	0.17	0/2568	0.29	0/3456
1	B	0.17	0/2568	0.28	0/3456
1	K	0.15	0/2568	0.32	0/3456
1	P	0.13	0/2568	0.26	0/3456
2	C	0.13	0/1112	0.30	0/1489
2	J	0.16	0/2531	0.30	0/3396
2	L	0.16	0/1112	0.39	0/1489
2	T	0.15	0/2531	0.30	0/3396
3	D	0.21	0/1970	0.41	0/3039
3	G	0.21	0/910	0.37	0/1400
3	M	0.19	0/1970	0.39	0/3039
3	Q	0.25	0/910	0.41	0/1400
4	E	0.13	0/1364	0.31	0/2119
4	H	0.15	0/1364	0.31	0/2119
4	N	0.19	0/1364	0.44	2/2119 (0.1%)
4	R	0.15	0/1364	0.36	0/2119
5	F	0.08	0/197	0.16	0/306
5	I	0.12	0/197	0.24	0/306
5	O	0.44	0/197	0.65	0/306
5	S	0.39	0/197	0.76	0/306
All	All	0.17	0/29562	0.34	2/42172 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	N	13	A	C4-N9-C1'	5.41	142.54	126.30
4	N	13	A	C8-N9-C1'	-5.11	112.37	127.70

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	2518	0	2621	66	0
1	B	2518	0	2621	59	0
1	K	2518	0	2621	99	0
1	P	2518	0	2621	59	0
2	C	1096	0	1139	27	0
2	J	2490	0	2567	48	0
2	L	1096	0	1139	19	0
2	T	2490	0	2567	44	0
3	D	1752	0	952	62	0
3	G	808	0	437	22	0
3	M	1752	0	952	49	0
3	Q	808	0	437	19	0
4	E	1225	0	621	32	0
4	H	1225	0	621	19	0
4	N	1225	0	621	29	0
4	R	1225	0	621	17	0
5	F	176	0	88	2	0
5	I	176	0	88	2	0
5	O	176	0	88	14	0
5	S	176	0	88	10	0
6	J	9	0	6	1	0
7	J	35	0	18	4	0
All	All	28012	0	23534	610	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 12.

All (610) 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)
7:J:402:AR6:O4'	7:J:402:AR6:C1'	1.64	1.15
1:B:109:HIS:HE2	1:B:193:THR:HG1	1.25	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:S:0:C:HO2'	5:S:2:U:H3	0.85	0.81
5:O:2:U:N3	5:O:6:G:N7	2.28	0.80
4:N:13:A:N6	5:O:6:G:C4	2.51	0.77
1:K:11:ARG:HH21	1:P:11:ARG:HG2	1.49	0.76
2:L:276:ARG:NH2	1:P:35:GLU:OE1	2.16	0.76
1:K:299:LEU:O	1:K:303:ILE:HD12	1.86	0.75
4:N:13:A:N6	5:O:6:G:C5	2.53	0.75
2:C:8:GLU:OE2	2:C:8:GLU:N	2.18	0.75
1:A:109:HIS:HD1	1:A:202:SER:HB3	1.52	0.74
2:T:75:GLN:HE21	2:T:80:LEU:HD13	1.51	0.74
2:T:75:GLN:HE22	2:T:78:HIS:H	1.35	0.73
5:S:0:C:O2'	5:S:2:U:N3	1.99	0.73
3:D:66:DG:H2'	3:D:67:DA:C8	2.22	0.73
3:D:37:DC:H42	3:D:48:DG:H1	1.37	0.73
1:P:228:ASN:HD22	1:P:231:LYS:HB2	1.53	0.73
2:J:2:ASN:ND2	2:J:295:SER:O	2.22	0.72
1:B:40:LEU:HD21	1:B:71:GLU:HB3	1.72	0.72
1:P:257:ARG:NH1	4:R:48:G:O6	2.23	0.71
1:A:255:ILE:HD12	1:A:255:ILE:H	1.55	0.71
5:O:2:U:O4	5:O:6:G:C5	2.44	0.71
5:O:7:G:N2	5:O:7:G:OP2	2.21	0.71
2:T:2:ASN:ND2	2:T:295:SER:O	2.24	0.71
3:D:38:DA:H2'	3:D:39:DT:H71	1.73	0.71
1:P:151:LYS:NZ	3:Q:9:DA:N7	2.40	0.69
3:M:67:DA:H2"	3:M:68:DA:H5"	1.72	0.69
4:E:14:G:N2	4:E:14:G:OP2	2.25	0.69
3:D:38:DA:H2"	3:D:39:DT:H5'	1.74	0.69
1:K:257:ARG:HD2	1:K:258:GLU:N	2.08	0.69
1:K:211:LYS:NZ	3:M:1:DG:OP2	2.26	0.68
3:M:65:DG:H2'	3:M:66:DG:C8	2.29	0.68
1:P:180:ARG:NH1	1:P:223:GLU:OE1	2.27	0.68
2:J:64:PRO:HG2	7:J:402:AR6:H2D	1.76	0.68
1:K:263:ILE:O	1:K:267:ILE:HG13	1.93	0.68
1:A:55:LYS:HD2	1:A:60:LYS:HE3	1.74	0.67
1:A:284:TRP:O	1:A:288:ILE:HG12	1.95	0.67
4:E:58:C:H2'	4:E:59:A:H8	1.59	0.67
2:L:280:ASP:OD2	1:P:33:SER:OG	2.12	0.67
2:C:288:ASN:OD1	2:C:292:ARG:NH1	2.27	0.66
4:R:43:U:HO2'	4:R:65:C:HO2'	1.41	0.66
1:P:84:LEU:HB3	1:P:168:LYS:HG2	1.77	0.66
2:J:83:LEU:HB3	6:J:401:NCA:H6	1.76	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:257:ARG:NH1	4:N:46:A:OP2	2.27	0.66
1:K:11:ARG:NH2	1:P:11:ARG:HG2	2.11	0.66
1:K:298:ARG:NH1	4:N:49:U:OP2	2.29	0.66
3:M:61:DA:H2"	3:M:62:DC:H5"	1.78	0.65
1:P:55:LYS:HD3	1:P:60:LYS:HG3	1.77	0.65
1:K:70:ARG:O	2:T:288:ASN:ND2	2.26	0.65
3:M:9:DA:H2"	3:M:10:DA:H5"	1.79	0.65
1:B:231:LYS:NZ	4:H:69:G:OP1	2.30	0.64
1:A:33:SER:OG	2:J:280:ASP:OD2	2.15	0.64
3:D:29:DT:H3	3:D:56:DT:H3	1.43	0.64
1:P:294:LYS:HD2	1:P:297:ARG:HH22	1.64	0.63
1:P:128:THR:OG1	1:P:130:ASN:OD1	2.16	0.63
3:Q:14:DG:N2	3:Q:72:DA:N1	2.46	0.63
3:D:54:DC:H1'	3:D:55:DG:C8	2.33	0.63
2:T:9:GLN:HE21	2:T:296:THR:HG23	1.63	0.63
1:A:194:ARG:HG3	1:A:199:LEU:HG	1.81	0.62
3:D:28:DC:H42	3:D:57:DT:H3	1.47	0.62
1:K:284:TRP:O	1:K:288:ILE:HG12	2.00	0.62
3:D:24:DT:H2"	3:D:25:DT:C5	2.34	0.62
2:J:102:GLY:O	2:J:106:GLU:HB2	2.00	0.62
2:T:31:THR:HG23	2:T:92:ASP:H	1.65	0.62
2:J:165:SER:HB3	2:J:169:VAL:HG13	1.82	0.62
2:J:30:ILE:HD11	2:J:187:ARG:HD3	1.81	0.61
1:A:118:ILE:HD12	1:A:216:LEU:HD23	1.80	0.61
1:K:257:ARG:HH21	4:N:47:U:P	2.23	0.61
3:M:83:DC:H2'	3:M:84:DA:H8	1.66	0.61
3:G:3:DC:H2'	3:G:4:DA:C8	2.36	0.61
1:K:257:ARG:HD2	1:K:258:GLU:H	1.65	0.61
1:B:286:SER:HB2	4:H:77:G:H21	1.66	0.61
1:A:180:ARG:NH1	1:A:223:GLU:OE2	2.31	0.61
2:C:292:ARG:NH2	4:H:73:C:OP1	2.29	0.61
1:K:49:ARG:HB2	3:M:75:DC:H2"	1.83	0.61
2:L:7:ASP:OD1	2:L:227:LYS:NZ	2.26	0.61
3:D:18:DT:H2'	3:D:19:DC:C6	2.36	0.61
2:T:132:ARG:NH1	2:T:137:TYR:OH	2.33	0.61
2:C:235:LEU:HD12	2:C:238:ILE:HD13	1.83	0.60
2:J:134:PHE:HB2	2:J:140:VAL:HG21	1.83	0.60
3:Q:83:DC:H2'	3:Q:84:DA:H8	1.66	0.60
1:K:111:GLY:O	1:K:204:GLN:NE2	2.27	0.60
3:M:18:DT:H2'	3:M:19:DC:C6	2.37	0.60
1:K:62:MET:SD	1:K:62:MET:N	2.67	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:71:LEU:HD22	2:J:235:LEU:HD22	1.83	0.60
1:K:125:PRO:HA	1:K:158:LEU:HB2	1.84	0.60
1:A:269:HIS:NE2	4:E:53:U:O2'	2.35	0.60
2:L:273:VAL:HG23	2:L:274:PHE:HD1	1.67	0.59
3:G:4:DA:H2"	3:G:5:DG:C8	2.37	0.59
3:M:60:DA:H2"	3:M:61:DA:C8	2.38	0.59
1:K:32:ILE:HD11	2:T:287:MET:HE1	1.84	0.59
1:B:247:VAL:HG11	4:H:46:A:H5"	1.84	0.59
1:A:264:ARG:NH1	4:E:51:G:O6	2.35	0.58
1:K:33:SER:OG	2:T:280:ASP:OD2	2.14	0.58
3:D:65:DG:H2'	3:D:66:DG:C8	2.38	0.58
1:B:87:LEU:HD11	1:B:139:LEU:HD21	1.85	0.58
1:K:191:ILE:HG12	2:L:251:ARG:HE	1.68	0.58
1:A:53:VAL:HG12	1:A:63:ARG:HB3	1.86	0.58
2:T:288:ASN:OD1	2:T:292:ARG:NH1	2.35	0.58
2:C:219:ARG:O	2:C:223:GLU:HG3	2.04	0.58
3:Q:8:DA:H2"	3:Q:9:DA:C2	2.38	0.58
2:T:78:HIS:O	2:T:78:HIS:ND1	2.36	0.58
3:M:15:DG:OP1	2:T:281:ARG:NH2	2.37	0.58
3:M:62:DC:H2"	3:M:63:DA:H5'	1.86	0.58
3:Q:83:DC:H2'	3:Q:84:DA:C8	2.39	0.58
2:J:96:LEU:HD12	2:J:120:LEU:HD11	1.85	0.58
2:C:2:ASN:ND2	2:C:289:PHE:O	2.34	0.57
1:P:49:ARG:HB2	3:Q:75:DC:H2"	1.84	0.57
2:C:14:ILE:O	2:C:18:THR:OG1	2.23	0.57
1:K:251:GLU:OE2	1:K:252:LYS:HG3	2.04	0.57
1:K:185:ALA:HB1	1:K:190:LEU:HB2	1.85	0.57
5:S:3:A:O2'	5:S:5:G:O6	2.19	0.57
3:D:3:DC:H2'	3:D:4:DA:C8	2.39	0.57
3:M:4:DA:H2"	3:M:5:DG:C8	2.40	0.57
4:H:14:G:OP2	4:H:14:G:N2	2.31	0.57
2:J:288:ASN:OD1	2:J:292:ARG:NH1	2.33	0.57
3:D:17:DT:H2"	3:D:18:DT:H5"	1.87	0.57
1:P:38:ARG:NH2	3:Q:11:DA:OP1	2.37	0.57
1:B:194:ARG:HG3	1:B:199:LEU:HG	1.86	0.56
1:K:93:SER:OG	1:K:194:ARG:NH1	2.38	0.56
3:M:83:DC:H2'	3:M:84:DA:C8	2.41	0.56
5:O:6:G:N2	5:O:7:G:H5'	2.20	0.56
2:C:10:GLN:O	2:C:14:ILE:HG13	2.05	0.56
3:M:40:DC:H2"	3:M:41:DA:C8	2.40	0.56
1:B:125:PRO:HA	1:B:158:LEU:HB2	1.85	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:260:TYR:HE2	1:K:298:ARG:HH12	1.54	0.56
3:M:71:DC:H2"	3:M:72:DA:C8	2.40	0.56
1:B:60:LYS:HA	1:B:62:MET:HE3	1.88	0.56
1:B:69:SER:HB2	3:G:75:DC:H5"	1.87	0.56
1:K:309:LYS:HD3	1:K:310:TYR:HD1	1.71	0.55
1:P:247:VAL:HG11	4:R:46:A:H5"	1.87	0.55
5:S:4:A:H4'	5:S:5:G:N7	2.21	0.55
1:P:110:ILE:HG12	1:P:253:VAL:HG13	1.89	0.55
2:C:236:SER:HA	2:C:239:ILE:HD12	1.88	0.55
1:K:110:ILE:HD11	1:K:253:VAL:HG23	1.89	0.55
1:K:177:LEU:HD13	1:K:223:GLU:HG3	1.88	0.55
1:P:105:ASN:ND2	1:P:244:THR:OG1	2.39	0.55
1:A:197:ASP:OD1	1:A:197:ASP:N	2.35	0.55
1:K:231:LYS:HE2	4:N:68:U:H4'	1.89	0.55
5:S:1:G:O3'	5:S:3:A:C2	2.60	0.55
3:D:4:DA:H2"	3:D:5:DG:C8	2.41	0.54
3:Q:4:DA:H2"	3:Q:5:DG:C8	2.42	0.54
3:D:28:DC:N4	3:D:57:DT:H3	2.05	0.54
2:J:47:HIS:O	2:J:51:GLN:HG2	2.08	0.54
3:D:12:DC:H2'	3:D:13:DG:C8	2.43	0.54
1:K:176:LYS:HZ2	1:K:180:ARG:HD2	1.72	0.54
3:Q:73:DG:H4'	3:Q:74:DA:OP1	2.06	0.54
3:M:17:DT:H2'	3:M:18:DT:C6	2.43	0.54
2:T:33:PHE:HB2	2:T:91:VAL:HG11	1.88	0.54
1:P:178:ASP:OD1	1:P:192:TYR:OH	2.18	0.54
1:B:171:ASN:OD1	1:B:194:ARG:NH2	2.41	0.54
1:K:177:LEU:HD11	1:K:220:ILE:HD13	1.88	0.54
5:O:2:U:O4	5:O:6:G:C4	2.60	0.54
2:T:232:ASP:OD1	2:T:235:LEU:HB2	2.07	0.54
1:A:270:ILE:HG12	1:A:281:VAL:HG21	1.89	0.54
1:P:194:ARG:HG3	1:P:199:LEU:HG	1.89	0.54
1:A:269:HIS:O	1:A:275:SER:OG	2.24	0.53
2:C:258:ASP:N	2:C:258:ASP:OD1	2.39	0.53
3:D:40:DC:H2"	3:D:41:DA:C8	2.44	0.53
3:M:84:DA:H2'	3:M:85:DG:C8	2.43	0.53
1:P:171:ASN:HA	1:P:194:ARG:HH22	1.73	0.53
2:T:71:LEU:HD22	2:T:235:LEU:HG	1.90	0.53
1:P:178:ASP:OD2	1:P:194:ARG:NH1	2.41	0.53
1:P:237:PRO:HB2	4:R:62:C:O2'	2.08	0.53
2:J:134:PHE:HD1	2:J:140:VAL:HG11	1.73	0.53
3:M:12:DC:H2"	3:M:13:DG:C8	2.42	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:N:13:A:N1	5:O:6:G:N7	2.55	0.53
1:P:81:ARG:NH2	4:R:75:G:OP1	2.36	0.53
2:C:280:ASP:OD2	1:B:33:SER:OG	2.22	0.53
1:K:271:PHE:HZ	1:K:303:ILE:HG23	1.74	0.53
1:K:246:LEU:HB3	1:K:253:VAL:HG13	1.90	0.53
1:B:264:ARG:NH2	4:H:51:G:N7	2.52	0.52
5:O:2:U:C4	5:O:6:G:N7	2.77	0.52
4:E:58:C:H2'	4:E:59:A:C8	2.43	0.52
1:B:40:LEU:HD23	1:B:75:LEU:HD12	1.92	0.52
2:L:287:MET:HE1	1:P:32:ILE:HD11	1.91	0.52
2:L:293:ARG:NH2	4:R:76:A:OP2	2.34	0.52
2:T:191:LYS:HA	2:T:191:LYS:HE2	1.91	0.52
2:T:232:ASP:OD1	2:T:232:ASP:N	2.42	0.52
2:J:98:PRO:HA	2:J:103:SER:HB2	1.90	0.52
5:S:5:G:H2'	5:S:6:G:C2	2.45	0.52
4:N:73:C:OP1	2:T:292:ARG:NH2	2.42	0.52
2:C:199:ILE:HG23	2:C:201:TYR:H	1.75	0.52
5:F:2:U:H2'	5:F:3:A:H8	1.74	0.52
2:J:72:LEU:O	2:T:141:ARG:NH2	2.43	0.52
4:N:20:G:N2	4:N:41:U:O2	2.38	0.52
1:A:39:LEU:O	1:A:43:THR:OG1	2.25	0.52
1:K:221:PRO:HD3	1:K:227:ILE:HD11	1.92	0.52
1:B:309:LYS:HG2	1:B:310:TYR:CD1	2.44	0.52
3:M:80:DA:H2'	3:M:81:DC:C6	2.44	0.52
1:B:266:LYS:O	1:B:270:ILE:HG23	2.10	0.52
3:M:26:DG:H2"	3:M:27:DG:C8	2.44	0.52
3:Q:67:DA:H2"	3:Q:68:DA:H5'	1.92	0.52
2:T:212:LEU:HB3	2:T:286:ILE:HD12	1.92	0.52
3:D:3:DC:H2"	3:D:4:DA:O5'	2.10	0.52
1:P:92:PHE:CZ	1:P:182:GLN:HG2	2.45	0.52
1:A:41:ILE:HD13	1:A:148:VAL:HG13	1.91	0.52
1:A:238:ARG:HD2	4:E:63:U:O2'	2.10	0.52
3:D:67:DA:H2"	3:D:68:DA:C8	2.45	0.52
3:D:83:DC:H2'	3:D:84:DA:H8	1.75	0.52
3:D:54:DC:H4'	3:D:55:DG:H5'	1.92	0.51
3:M:80:DA:H2'	3:M:81:DC:H6	1.73	0.51
1:A:190:LEU:HG	1:A:203:ALA:HB2	1.91	0.51
3:M:3:DC:H4'	3:M:4:DA:OP1	2.10	0.51
4:E:10:C:H2'	4:E:11:U:C6	2.46	0.51
1:K:68:PRO:HG2	1:K:73:LYS:HG3	1.92	0.51
1:B:59:GLU:HB3	1:B:61:ARG:HH22	1.75	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:310:TYR:HB3	1:K:312:LYS:HZ3	1.76	0.51
3:M:19:DC:H2'	3:M:20:DC:C6	2.46	0.51
3:D:14:DG:H2"	3:D:15:DG:C8	2.46	0.51
1:A:96:PHE:HZ	3:D:85:DG:H1'	1.75	0.51
1:A:249:SER:OG	1:A:250:GLN:N	2.42	0.51
3:D:51:DC:H2'	3:D:52:DT:H72	1.91	0.51
3:D:67:DA:H2"	3:D:68:DA:H8	1.76	0.51
4:H:45:G:H2'	4:H:46:A:H8	1.74	0.51
1:K:257:ARG:NH2	4:N:47:U:OP2	2.42	0.51
3:M:81:DC:H3'	3:M:82:DT:H71	1.91	0.51
1:K:297:ARG:HG3	1:K:297:ARG:HH11	1.76	0.51
1:P:114:PHE:CE2	1:P:237:PRO:HD3	2.45	0.51
2:T:80:LEU:HG	2:T:83:LEU:HG	1.93	0.51
2:J:5:PHE:HB3	2:J:10:GLN:HG3	1.93	0.50
1:K:255:ILE:HD12	1:K:259:LYS:HB3	1.93	0.50
4:E:60:U:H2'	4:E:61:C:C6	2.46	0.50
3:G:15:DG:H2'	3:G:16:DT:H71	1.93	0.50
2:L:277:LYS:NZ	3:Q:14:DG:OP1	2.31	0.50
4:N:66:A:H4'	4:N:67:U:O5'	2.11	0.50
1:K:297:ARG:HA	1:K:300:ILE:HG12	1.93	0.50
4:R:78:U:H2'	4:R:79:U:H6	1.77	0.50
2:T:79:SER:O	2:T:79:SER:OG	2.27	0.50
3:M:48:DG:H2"	3:M:49:DC:H5'	1.93	0.50
1:A:128:THR:OG1	1:A:130:ASN:OD1	2.16	0.50
4:E:73:C:OP1	2:J:292:ARG:NH2	2.42	0.50
3:M:3:DC:H2"	3:M:4:DA:O5'	2.12	0.50
5:S:0:C:O2'	5:S:2:U:C2	2.59	0.50
1:A:203:ALA:HB3	1:A:209:VAL:HG13	1.94	0.50
3:D:67:DA:H2"	3:D:68:DA:H5"	1.94	0.50
3:M:79:DA:H2'	3:M:80:DA:H8	1.77	0.50
1:A:131:LYS:HG2	3:D:7:DA:C5	2.47	0.50
3:D:57:DT:H2"	3:D:58:DC:C5	2.47	0.50
1:B:120:LEU:HB2	1:B:197:ASP:HB2	1.93	0.50
1:K:264:ARG:NH2	4:N:51:G:N7	2.60	0.50
2:T:30:ILE:HG22	2:T:187:ARG:HD3	1.93	0.50
1:A:180:ARG:HH21	1:A:219:ILE:HG13	1.76	0.49
1:B:178:ASP:OD1	1:B:192:TYR:OH	2.26	0.49
1:B:272:CYS:HG	1:B:310:TYR:HH	1.60	0.49
3:G:1:DG:OP1	4:H:14:G:O2'	2.24	0.49
5:F:2:U:H2'	5:F:3:A:C8	2.47	0.49
2:J:168:ASP:O	2:J:172:LYS:NZ	2.46	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:M:13:DG:H1'	3:M:14:DG:H5'	1.94	0.49
2:T:57:SER:OG	2:T:58:ASP:N	2.45	0.49
1:A:125:PRO:HA	1:A:158:LEU:HB2	1.94	0.49
4:N:60:U:H2'	4:N:61:C:C6	2.47	0.49
2:C:203:GLU:OE2	2:C:246:ARG:NH2	2.45	0.49
2:L:207:LEU:HD13	2:L:269:TYR:HE1	1.77	0.49
3:M:50:DT:H2"	3:M:51:DC:C6	2.47	0.49
1:B:68:PRO:HG2	1:B:73:LYS:HG3	1.94	0.49
1:A:258:GLU:OE2	1:A:258:GLU:N	2.28	0.49
2:C:287:MET:HE2	1:B:78:TRP:CD1	2.48	0.49
3:D:15:DG:OP1	2:J:281:ARG:NH2	2.43	0.49
2:J:124:GLN:HB2	2:J:134:PHE:CZ	2.46	0.49
2:T:79:SER:O	2:T:82:SER:OG	2.29	0.49
1:A:92:PHE:CZ	1:A:182:GLN:HG2	2.48	0.49
2:C:247:LEU:HB3	2:C:253:ILE:HG12	1.95	0.49
1:K:213:ARG:NH1	1:K:214:ASP:OD1	2.43	0.49
2:C:13:LEU:HG	2:C:17:LEU:HD22	1.95	0.49
1:B:142:ASN:O	1:B:146:SER:OG	2.26	0.48
1:K:55:LYS:HB3	1:K:60:LYS:HB3	1.94	0.48
3:M:51:DC:H2"	3:M:52:DT:H71	1.95	0.48
2:J:155:SER:HB2	2:J:158:GLU:HG3	1.94	0.48
2:L:223:GLU:O	2:L:227:LYS:HG3	2.14	0.48
3:Q:66:DG:H2"	3:Q:67:DA:C8	2.48	0.48
1:A:238:ARG:NE	4:E:66:A:N1	2.62	0.48
3:D:42:DG:H1'	3:D:43:DG:H5'	1.95	0.48
3:Q:70:DA:H2"	3:Q:71:DC:H5'	1.95	0.48
4:E:78:U:H2'	4:E:79:U:H6	1.78	0.48
4:H:45:G:H2'	4:H:46:A:C8	2.48	0.48
3:Q:84:DA:H2'	3:Q:85:DG:C8	2.48	0.48
3:D:37:DC:H2"	3:D:38:DA:H8	1.78	0.48
1:B:93:SER:OG	1:B:194:ARG:NH1	2.46	0.48
2:J:57:SER:OG	2:J:58:ASP:N	2.46	0.48
3:D:62:DC:H2'	3:D:63:DA:C5	2.48	0.48
1:B:53:VAL:HG12	1:B:63:ARG:HB3	1.95	0.48
1:K:274:LYS:HB3	1:K:274:LYS:HE3	1.53	0.48
2:T:29:LYS:HG2	2:T:58:ASP:HB2	1.94	0.48
3:G:83:DC:H2'	3:G:84:DA:C8	2.49	0.48
1:K:178:ASP:OD1	1:K:192:TYR:OH	2.23	0.48
1:K:101:SER:OG	1:K:102:ILE:N	2.45	0.48
2:L:288:ASN:HB2	1:P:74:ALA:HB2	1.96	0.48
3:M:23:DG:C8	3:M:24:DT:H72	2.49	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:T:194:LYS:HG3	2:T:201:TYR:CE2	2.49	0.48
1:A:279:GLU:OE2	1:A:282:ARG:NH2	2.39	0.48
3:D:23:DG:H2"	3:D:24:DT:H5'	1.95	0.48
1:B:278:ILE:HG23	1:B:315:LEU:HD23	1.96	0.48
1:B:272:CYS:SG	1:B:310:TYR:OH	2.68	0.48
3:G:3:DC:H2"	3:G:4:DA:O5'	2.14	0.48
2:J:75:GLN:NE2	2:J:78:HIS:O	2.47	0.48
1:K:255:ILE:HD13	1:K:288:ILE:HD12	1.96	0.48
3:M:45:DG:H2"	3:M:46:DA:OP2	2.12	0.48
2:T:222:CYS:HA	2:T:240:VAL:HG21	1.96	0.48
1:A:98:LYS:HB3	1:A:99:HIS:ND1	2.28	0.47
1:K:288:ILE:O	1:K:292:ASP:N	2.44	0.47
3:M:18:DT:H2'	3:M:19:DC:H6	1.77	0.47
1:B:65:ILE:HD12	4:H:70:A:C2	2.49	0.47
1:B:299:LEU:O	1:B:303:ILE:HG13	2.14	0.47
1:K:267:ILE:HA	1:K:270:ILE:HG22	1.95	0.47
3:M:37:DC:H2"	3:M:38:DA:H8	1.79	0.47
3:D:37:DC:H2"	3:D:38:DA:C8	2.48	0.47
1:B:31:ARG:HG3	1:B:31:ARG:HH11	1.80	0.47
2:J:31:THR:HG23	2:J:92:ASP:H	1.80	0.47
1:K:178:ASP:OD2	1:K:194:ARG:NH1	2.47	0.47
1:K:278:ILE:HD12	1:K:279:GLU:H	1.79	0.47
1:A:114:PHE:CD2	1:A:206:MET:HE2	2.50	0.47
4:H:10:C:H2'	4:H:11:U:C6	2.49	0.47
1:K:305:LYS:NZ	4:N:51:G:OP1	2.46	0.47
5:O:2:U:N3	5:O:6:G:C8	2.82	0.47
1:A:164:PRO:HA	4:E:74:U:H5'	1.97	0.47
1:K:237:PRO:HB2	4:N:62:C:O2'	2.15	0.47
1:K:278:ILE:O	1:K:282:ARG:HD3	2.15	0.47
3:M:15:DG:H2"	3:M:16:DT:H5'	1.96	0.47
4:E:12:U:H2'	4:E:13:A:C8	2.49	0.47
4:E:48:G:O6	4:E:59:A:N6	2.48	0.47
3:G:70:DA:H1'	3:G:71:DC:H5'	1.97	0.47
1:A:59:GLU:HG3	1:A:61:ARG:HD2	1.97	0.47
3:D:3:DC:H4'	3:D:4:DA:OP1	2.15	0.47
3:D:83:DC:H2'	3:D:84:DA:C8	2.50	0.47
4:E:11:U:H2'	4:E:12:U:C6	2.49	0.47
4:E:66:A:H4'	4:E:67:U:O5'	2.14	0.47
1:B:109:HIS:CE1	1:B:193:THR:HG1	2.32	0.47
1:K:106:ALA:HB1	1:K:248:ILE:HD11	1.96	0.47
2:T:144:ARG:HE	2:T:153:ARG:HH22	1.60	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:14:DG:H2”	3:G:15:DG:C8	2.50	0.46
4:N:13:A:H4’	4:N:14:G:OP1	2.15	0.46
2:T:273:VAL:HG12	2:T:274:PHE:CD2	2.51	0.46
1:B:266:LYS:HG2	4:H:54:U:C4	2.50	0.46
2:J:173:LEU:O	2:J:177:LYS:HG3	2.15	0.46
1:P:273:GLY:O	1:P:274:LYS:HG2	2.15	0.46
1:A:255:ILE:HD12	1:A:255:ILE:N	2.25	0.46
3:D:59:DC:H2”	3:D:60:DA:C8	2.51	0.46
1:P:265:ALA:HB2	4:R:55:C:N4	2.31	0.46
2:C:224:LEU:HD23	2:C:224:LEU:HA	1.74	0.46
3:D:25:DT:H1’	3:D:26:DG:C8	2.50	0.46
1:B:117:ASN:ND2	1:B:198:ASP:OD1	2.43	0.46
3:G:12:DC:H2’	3:G:13:DG:C8	2.50	0.46
3:Q:73:DG:H2”	3:Q:74:DA:O5’	2.15	0.46
3:G:3:DC:H4’	3:G:4:DA:OP1	2.16	0.46
2:J:157:ASN:O	2:J:161:GLU:HG2	2.15	0.46
4:N:44:G:C4	4:N:45:G:C8	3.04	0.46
1:P:63:ARG:HG2	1:P:65:ILE:HD11	1.97	0.46
1:B:31:ARG:HG3	1:B:31:ARG:NH1	2.30	0.46
4:R:8:C:O2’	4:R:9:C:H5’	2.16	0.46
4:R:64:G:H5’	4:R:65:C:C6	2.51	0.46
1:B:171:ASN:HA	1:B:194:ARG:HH22	1.80	0.46
2:J:88:ALA:O	2:J:119:LYS:NZ	2.43	0.46
1:K:271:PHE:CZ	1:K:303:ILE:HG23	2.51	0.46
3:M:35:DA:H2”	3:M:36:DG:C8	2.51	0.46
1:P:171:ASN:OD1	1:P:194:ARG:NH2	2.48	0.46
1:A:267:ILE:HG21	1:A:303:ILE:HG22	1.97	0.45
3:D:19:DC:H2’	3:D:20:DC:C6	2.50	0.45
1:B:308:LYS:HE2	1:B:308:LYS:HB3	1.76	0.45
1:P:65:ILE:HD12	4:R:70:A:C2	2.50	0.45
1:A:297:ARG:O	1:A:300:ILE:HG13	2.15	0.45
4:H:61:C:H2’	4:H:62:C:C6	2.51	0.45
3:M:41:DA:H2”	3:M:42:DG:H8	1.81	0.45
1:P:59:GLU:OE2	1:P:60:LYS:N	2.50	0.45
2:J:241:ARG:NH2	2:J:260:TYR:OH	2.48	0.45
1:K:278:ILE:HD12	1:K:279:GLU:HG2	1.98	0.45
4:N:10:C:HO2’	4:N:11:U:H5	1.64	0.45
1:A:61:ARG:O	1:A:61:ARG:HG2	2.16	0.45
4:E:41:U:H2’	4:E:42:C:C6	2.52	0.45
2:J:5:PHE:CE1	2:J:213:LEU:HD21	2.52	0.45
2:J:34:LEU:HD12	2:J:46:ARG:HG3	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:81:ARG:NH2	4:N:75:G:OP1	2.33	0.45
3:M:25:DT:H2"	3:M:26:DG:C8	2.51	0.45
3:D:58:DC:H1'	3:D:59:DC:H5'	1.97	0.45
2:T:30:ILE:HD11	2:T:59:VAL:HG22	1.99	0.45
3:D:34:DG:H2"	3:D:35:DA:C8	2.52	0.45
2:J:113:ASN:HB3	2:J:116:LEU:HB2	1.97	0.45
1:K:11:ARG:NH1	1:K:15:LEU:HD11	2.32	0.45
1:K:171:ASN:HA	1:K:194:ARG:HH22	1.82	0.45
1:K:278:ILE:HD12	1:K:279:GLU:N	2.32	0.45
3:M:17:DT:H3'	3:M:18:DT:H71	1.98	0.45
1:A:242:LYS:HB2	1:A:242:LYS:HE3	1.81	0.44
1:B:114:PHE:CE2	1:B:206:MET:HE2	2.53	0.44
4:H:49:U:H2'	4:H:50:U:C6	2.53	0.44
3:M:56:DT:H2'	3:M:57:DT:H71	1.98	0.44
1:A:258:GLU:OE1	4:E:45:G:H5'	2.17	0.44
1:A:299:LEU:O	1:A:303:ILE:HG23	2.18	0.44
2:J:36:GLY:O	7:J:402:AR6:O3D	2.35	0.44
2:J:56:PHE:HZ	2:J:176:TYR:HE2	1.64	0.44
1:K:228:ASN:HD22	1:K:231:LYS:HD2	1.82	0.44
3:D:21:DT:H4'	3:D:22:DG:H5'	1.99	0.44
3:D:60:DA:H1'	3:D:61:DA:C4	2.53	0.44
4:E:16:G:N1	4:E:64:G:O4'	2.50	0.44
5:I:2:U:H2'	5:I:3:A:C8	2.52	0.44
2:J:72:LEU:HD13	2:J:83:LEU:HD12	1.99	0.44
2:J:269:TYR:O	2:J:273:VAL:HG22	2.18	0.44
1:K:213:ARG:O	1:K:217:PHE:HD1	2.00	0.44
1:P:68:PRO:HG2	1:P:73:LYS:HG3	1.98	0.44
1:A:65:ILE:HD12	4:E:70:A:C2	2.52	0.44
1:A:248:ILE:HG12	1:A:253:VAL:HG12	1.99	0.44
3:D:33:DA:H2"	3:D:34:DG:C8	2.53	0.44
1:K:38:ARG:NH2	3:M:11:DA:OP1	2.42	0.44
1:P:116:LEU:HB2	1:P:209:VAL:HG13	1.99	0.44
1:P:270:ILE:HD12	1:P:278:ILE:HD12	2.00	0.44
4:E:48:G:C6	4:E:59:A:N6	2.85	0.44
3:G:8:DA:H2"	3:G:9:DA:C2	2.52	0.44
3:G:73:DG:H2"	3:G:74:DA:C8	2.53	0.44
1:K:127:LEU:HD12	1:K:159:LEU:HD12	2.00	0.44
1:P:105:ASN:OD1	1:P:195:TYR:HB2	2.17	0.44
2:J:8:GLU:O	2:J:12:GLN:HG3	2.17	0.44
1:K:197:ASP:OD1	1:K:197:ASP:N	2.42	0.44
3:D:21:DT:H1'	3:D:22:DG:C8	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:56:LYS:HB3	4:H:69:G:C2	2.52	0.44
1:B:178:ASP:OD2	1:B:194:ARG:NH1	2.51	0.44
3:G:84:DA:H2'	3:G:85:DG:C8	2.53	0.44
1:K:255:ILE:HG13	1:K:256:GLY:N	2.33	0.44
2:L:237:LYS:HA	2:L:237:LYS:HD3	1.72	0.44
1:P:133:PHE:HZ	1:P:143:ARG:HD2	1.83	0.44
4:R:63:U:H5'	4:R:64:G:OP1	2.18	0.44
1:K:194:ARG:HG3	1:K:199:LEU:HG	2.00	0.44
1:K:240:GLN:HB2	4:N:46:A:OP1	2.18	0.44
3:M:38:DA:H1'	3:M:39:DT:H5'	2.00	0.44
1:P:151:LYS:HZ1	3:Q:9:DA:H62	1.66	0.44
2:T:2:ASN:HB3	2:T:289:PHE:CE1	2.53	0.44
2:T:30:ILE:HG23	2:T:187:ARG:HH11	1.83	0.44
2:C:253:ILE:HD12	2:C:260:TYR:HB3	2.00	0.43
3:D:35:DA:H2"	3:D:36:DG:C8	2.53	0.43
3:D:59:DC:H2"	3:D:60:DA:OP2	2.17	0.43
1:P:206:MET:HE2	1:P:206:MET:HB2	1.88	0.43
1:A:69:SER:HB3	3:D:75:DC:H5'	1.98	0.43
1:A:178:ASP:OD1	1:A:192:TYR:OH	2.29	0.43
2:C:213:LEU:HB2	2:C:216:VAL:HG22	2.00	0.43
3:G:66:DG:H1'	3:G:67:DA:C5	2.52	0.43
4:N:58:C:H2'	4:N:59:A:H8	1.83	0.43
3:D:33:DA:H2"	3:D:34:DG:H8	1.83	0.43
2:T:35:CYS:HB2	2:T:96:LEU:HG	2.00	0.43
1:K:128:THR:OG1	1:K:130:ASN:OD1	2.18	0.43
1:K:260:TYR:HE2	1:K:298:ARG:NH1	2.15	0.43
4:R:48:G:C6	4:R:59:A:N6	2.85	0.43
2:T:304:TYR:CE2	2:T:306:HIS:HB3	2.53	0.43
1:A:260:TYR:O	1:A:260:TYR:HD1	2.00	0.43
2:C:250:GLU:HG2	2:C:252:LYS:HE2	2.00	0.43
4:E:43:U:O2'	4:E:65:C:O2'	2.32	0.43
5:O:2:U:C4	5:O:6:G:C8	3.07	0.43
4:R:66:A:H4'	4:R:67:U:O5'	2.18	0.43
1:K:211:LYS:HA	1:K:211:LYS:HD2	1.85	0.43
1:K:286:SER:HB2	4:N:77:G:H21	1.84	0.43
2:L:252:LYS:HG2	2:L:266:GLY:HA2	2.01	0.43
5:S:5:G:O2'	5:S:6:G:OP1	2.32	0.43
1:A:178:ASP:OD2	1:A:194:ARG:NH1	2.52	0.43
1:K:244:THR:HB	3:M:84:DA:H4'	1.99	0.43
1:K:304:SER:O	1:K:307:GLU:HG3	2.19	0.43
2:C:229:ILE:C	2:C:229:ILE:HD12	2.44	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:36:DG:H2"	3:D:37:DC:C6	2.54	0.43
1:K:190:LEU:HB3	1:K:201:LEU:HD22	2.00	0.43
1:P:217:PHE:CZ	1:P:232:THR:HG21	2.54	0.43
2:T:64:PRO:O	2:T:69:ASP:HB2	2.18	0.43
3:D:23:DG:H2"	3:D:24:DT:H2'	2.01	0.43
1:K:109:HIS:HD1	1:K:202:SER:HG	1.62	0.43
5:S:5:G:C8	5:S:5:G:H3'	2.54	0.43
3:D:60:DA:H2"	3:D:61:DA:C8	2.53	0.43
4:E:64:G:H5'	4:E:65:C:C5	2.54	0.43
3:G:69:DA:H2"	3:G:70:DA:N7	2.33	0.43
2:J:258:ASP:N	2:J:258:ASP:OD1	2.51	0.43
1:K:164:PRO:HA	4:N:74:U:H5'	2.00	0.43
1:K:308:LYS:HB3	1:K:308:LYS:HE3	1.73	0.43
2:L:209:CYS:SG	2:L:210:ILE:N	2.92	0.43
1:P:203:ALA:HB3	1:P:209:VAL:HG23	2.01	0.43
1:A:115:ILE:HD12	1:A:241:ARG:HB3	2.00	0.42
4:E:61:C:H2'	4:E:62:C:C6	2.54	0.42
1:B:217:PHE:CZ	1:B:232:THR:HG21	2.54	0.42
5:I:5:G:H2'	5:I:6:G:C5	2.54	0.42
2:L:20:LYS:HB2	2:L:20:LYS:HE2	1.76	0.42
3:M:58:DC:H2"	3:M:59:DC:C5	2.54	0.42
5:O:7:G:H21	5:O:7:G:P	2.38	0.42
1:P:289:LEU:HB2	1:P:296:HIS:CG	2.54	0.42
2:C:269:TYR:O	2:C:273:VAL:HG22	2.19	0.42
3:D:50:DT:H2"	3:D:51:DC:C6	2.54	0.42
1:B:98:LYS:HE2	4:H:75:G:H5"	1.99	0.42
1:P:123:PHE:CG	1:P:197:ASP:HB3	2.54	0.42
1:A:260:TYR:HD1	1:A:260:TYR:C	2.28	0.42
1:A:113:ASN:HB2	1:A:114:PHE:CD1	2.55	0.42
1:A:176:LYS:HG3	1:B:10:PHE:HZ	1.84	0.42
1:P:263:ILE:HG13	1:P:288:ILE:HD11	2.01	0.42
1:P:286:SER:HB2	4:R:77:G:H21	1.85	0.42
1:A:306:LEU:O	1:A:310:TYR:HB2	2.19	0.42
1:B:238:ARG:HB2	4:H:63:U:O2'	2.20	0.42
3:G:16:DT:H2"	3:G:17:DT:H5"	2.02	0.42
3:G:83:DC:H2'	3:G:84:DA:H8	1.83	0.42
1:K:92:PHE:CZ	1:K:182:GLN:HG2	2.54	0.42
1:K:190:LEU:HD23	1:K:203:ALA:HB2	2.01	0.42
1:K:248:ILE:HD12	1:K:253:VAL:HG22	1.99	0.42
1:K:256:GLY:O	1:K:260:TYR:N	2.40	0.42
2:L:253:ILE:HD11	2:L:260:TYR:HB3	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:M:34:DG:H2”	3:M:35:DA:C8	2.53	0.42
1:A:239:SER:HA	4:E:66:A:N6	2.35	0.42
1:A:247:VAL:N	1:A:254:GLY:O	2.51	0.42
1:A:288:ILE:O	1:A:292:ASP:N	2.52	0.42
2:C:8:GLU:O	2:C:12:GLN:HG3	2.20	0.42
4:H:11:U:H2’	4:H:12:U:C6	2.55	0.42
2:L:250:GLU:O	2:L:251:ARG:HB2	2.19	0.42
3:M:42:DG:H1’	3:M:43:DG:H5’	2.00	0.42
1:P:271:PHE:CD2	1:P:306:LEU:HB3	2.54	0.42
3:D:47:DT:H1’	3:D:48:DG:H5’	2.02	0.42
4:E:64:G:H5’	4:E:65:C:C4	2.54	0.42
3:G:15:DG:H8	3:G:15:DG:H5”	1.85	0.42
2:J:30:ILE:CD1	2:J:187:ARG:HD3	2.48	0.42
1:K:264:ARG:HG3	1:K:302:TYR:CE2	2.55	0.42
1:K:302:TYR:CE1	1:K:306:LEU:HD22	2.55	0.42
3:D:84:DA:H2’	3:D:85:DG:C8	2.54	0.42
1:K:44:ALA:HB1	1:K:72:LEU:HD21	2.01	0.42
4:N:58:C:H2’	4:N:59:A:C8	2.55	0.42
4:R:78:U:H2’	4:R:79:U:C6	2.55	0.42
2:C:24:ARG:HD3	2:C:275:ASP:HB2	2.01	0.42
2:C:238:ILE:O	2:C:241:ARG:HB2	2.20	0.42
3:D:24:DT:H1’	3:D:25:DT:C2	2.55	0.42
1:P:244:THR:HG22	3:Q:84:DA:H4’	2.02	0.42
2:T:107:LEU:O	2:T:111:SER:OG	2.31	0.42
1:A:159:LEU:HD23	1:A:159:LEU:HA	1.85	0.42
1:A:239:SER:OG	4:E:65:C:O5’	2.38	0.42
1:A:300:ILE:O	1:A:303:ILE:HG13	2.20	0.42
2:C:306:HIS:ND1	2:C:306:HIS:C	2.77	0.42
1:B:309:LYS:HE3	1:B:309:LYS:HB2	1.77	0.42
2:J:68:PHE:HA	2:J:71:LEU:HB2	2.01	0.42
1:P:284:TRP:CD1	3:Q:82:DT:H4’	2.55	0.42
1:B:287:PHE:O	1:B:291:VAL:HG22	2.20	0.41
2:J:129:LYS:HA	2:J:129:LYS:HD2	1.76	0.41
1:K:299:LEU:O	1:K:302:TYR:HB3	2.20	0.41
2:L:11:GLN:OE1	2:L:11:GLN:HA	2.19	0.41
3:M:84:DA:H2’	3:M:85:DG:H8	1.85	0.41
1:P:75:LEU:HD12	1:P:75:LEU:HA	1.87	0.41
1:A:130:ASN:HD22	3:D:7:DA:H2”	1.85	0.41
1:A:133:PHE:CE2	1:A:146:SER:HB2	2.55	0.41
1:B:183:GLY:HA3	3:G:4:DA:OP1	2.20	0.41
2:J:3:LYS:HE3	2:J:3:LYS:HB3	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:171:ARG:H	2:J:171:ARG:HD2	1.85	0.41
5:O:0:C:H3'	5:O:1:G:H8	1.84	0.41
1:P:48:TYR:OH	1:P:160:PRO:HG2	2.20	0.41
1:P:118:ILE:HD12	1:P:216:LEU:HD12	2.01	0.41
2:T:75:GLN:HB3	2:T:80:LEU:HD22	2.02	0.41
1:A:260:TYR:C	1:A:260:TYR:CD1	2.97	0.41
3:D:62:DC:H2'	3:D:63:DA:C4	2.56	0.41
2:J:15:GLY:O	2:J:19:LYS:HE2	2.20	0.41
1:K:280:HIS:CD2	1:K:284:TRP:HD1	2.38	0.41
2:T:100:SER:H	2:T:103:SER:HG	1.65	0.41
1:A:270:ILE:HD12	1:A:271:PHE:HD1	1.84	0.41
1:B:230:LYS:NZ	4:H:68:U:O3'	2.53	0.41
2:J:138:GLY:HA2	2:T:72:LEU:HD13	2.02	0.41
1:K:74:ALA:HB2	2:T:288:ASN:ND2	2.35	0.41
1:P:288:ILE:O	1:P:292:ASP:N	2.50	0.41
4:E:45:G:H2'	4:E:46:A:H8	1.86	0.41
1:B:217:PHE:HZ	1:B:232:THR:HG21	1.85	0.41
3:M:22:DG:H2"	3:M:23:DG:N7	2.35	0.41
1:A:237:PRO:HB2	4:E:62:C:O2'	2.20	0.41
1:B:37:LEU:HD23	1:B:37:LEU:HA	1.91	0.41
1:B:249:SER:OG	1:B:250:GLN:N	2.53	0.41
1:K:270:ILE:HG23	1:K:271:PHE:HD1	1.85	0.41
4:N:13:A:N6	5:O:6:G:C8	2.80	0.41
1:P:37:LEU:HD23	1:P:37:LEU:HA	1.91	0.41
1:A:81:ARG:NH1	1:A:85:ASP:OD2	2.50	0.41
3:D:5:DG:OP1	1:B:13:ARG:NH2	2.39	0.41
3:D:30:DC:H2"	3:D:31:DG:OP2	2.19	0.41
4:E:59:A:H2'	4:E:60:U:C6	2.56	0.41
1:B:185:ALA:HB1	1:B:190:LEU:HB2	2.03	0.41
1:K:56:LYS:HG3	4:N:69:G:H21	1.85	0.41
4:R:41:U:H2'	4:R:42:C:C6	2.56	0.41
1:B:190:LEU:HD23	1:B:203:ALA:HB2	2.03	0.41
1:B:248:ILE:HD13	1:B:253:VAL:HG12	2.02	0.41
1:P:27:SER:HB2	1:P:32:ILE:O	2.21	0.41
1:P:28:LYS:HE3	1:P:28:LYS:HB3	1.87	0.41
1:P:134:GLY:HA3	3:Q:7:DA:H1'	2.03	0.41
1:A:145:ILE:HD13	1:A:145:ILE:HA	1.87	0.41
3:D:51:DC:H2'	3:D:52:DT:C7	2.51	0.41
1:B:3:SER:OG	1:B:4:ALA:N	2.52	0.41
1:B:202:SER:OG	2:J:251:ARG:NH2	2.54	0.41
1:B:297:ARG:O	1:B:301:THR:HG23	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:J:402:AR6:O2'	2:T:131:LYS:HD2	2.21	0.41
1:K:72:LEU:HD12	1:K:72:LEU:HA	1.88	0.41
1:K:297:ARG:O	1:K:300:ILE:HG12	2.21	0.41
2:C:5:PHE:HD1	2:C:5:PHE:HA	1.65	0.41
1:K:255:ILE:HG13	1:K:256:GLY:H	1.86	0.41
1:K:259:LYS:O	1:K:263:ILE:HD12	2.21	0.41
4:N:16:G:H2'	4:N:17:A:H8	1.86	0.41
3:D:32:DG:H2"	3:D:33:DA:OP2	2.20	0.40
2:T:269:TYR:CD1	2:T:269:TYR:C	2.99	0.40
1:A:109:HIS:ND1	1:A:202:SER:HB3	2.29	0.40
2:J:134:PHE:CD1	2:J:140:VAL:HG11	2.54	0.40
1:K:123:PHE:CG	1:K:197:ASP:HB3	2.56	0.40
1:K:132:VAL:HB	1:K:150:THR:HG23	2.03	0.40
3:M:60:DA:H2"	3:M:61:DA:N7	2.36	0.40
2:J:196:ILE:HD12	2:J:196:ILE:HA	1.90	0.40
1:K:30:THR:HG22	1:K:78:TRP:CE2	2.56	0.40
1:K:87:LEU:HD11	1:K:139:LEU:HD11	2.03	0.40
1:K:309:LYS:HD3	1:K:310:TYR:CD1	2.52	0.40
4:N:44:G:O2'	4:N:45:G:H8	2.04	0.40
1:P:115:ILE:HD12	1:P:241:ARG:HB3	2.04	0.40
4:E:79:U:C2	4:E:80:A:C8	3.10	0.40
2:J:31:THR:HG22	2:J:194:LYS:HE3	2.04	0.40
1:P:118:ILE:HG12	1:P:232:THR:HG23	2.03	0.40
1:A:288:ILE:HG12	1:A:288:ILE:H	1.77	0.40
3:D:60:DA:H2"	3:D:61:DA:N7	2.37	0.40
4:E:41:U:H2'	4:E:42:C:H6	1.87	0.40
1:B:201:LEU:HD13	1:B:216:LEU:HD11	2.02	0.40
1:B:207:LYS:HB3	1:B:207:LYS:HE3	1.87	0.40
3:G:66:DG:H1'	3:G:67:DA:C4	2.56	0.40
3:G:80:DA:H2'	3:G:81:DC:H6	1.86	0.40
1:K:239:SER:HB2	4:N:65:C:H5'	2.02	0.40
2:L:10:GLN:O	2:L:14:ILE:HG23	2.21	0.40
5:S:5:G:H3'	5:S:5:G:H8	1.87	0.40
2:T:134:PHE:O	2:T:138:GLY:N	2.54	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	312/330 (94%)	301 (96%)	11 (4%)	0	100	100
1	B	312/330 (94%)	302 (97%)	10 (3%)	0	100	100
1	K	312/330 (94%)	298 (96%)	14 (4%)	0	100	100
1	P	312/330 (94%)	302 (97%)	10 (3%)	0	100	100
2	C	126/307 (41%)	123 (98%)	3 (2%)	0	100	100
2	J	304/307 (99%)	285 (94%)	19 (6%)	0	100	100
2	L	126/307 (41%)	125 (99%)	1 (1%)	0	100	100
2	T	304/307 (99%)	291 (96%)	13 (4%)	0	100	100
All	All	2108/2548 (83%)	2027 (96%)	81 (4%)	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	281/296 (95%)	270 (96%)	11 (4%)	27	56
1	B	281/296 (95%)	274 (98%)	7 (2%)	42	72
1	K	281/296 (95%)	272 (97%)	9 (3%)	34	63
1	P	281/296 (95%)	276 (98%)	5 (2%)	54	80
2	C	120/278 (43%)	117 (98%)	3 (2%)	42	72
2	J	277/278 (100%)	270 (98%)	7 (2%)	42	72

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	L	120/278 (43%)	115 (96%)	5 (4%)	25 53
2	T	277/278 (100%)	269 (97%)	8 (3%)	37 67
All	All	1918/2296 (84%)	1863 (97%)	55 (3%)	39 67

All (55) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	LEU
1	A	22	ASN
1	A	35	GLU
1	A	53	VAL
1	A	62	MET
1	A	92	PHE
1	A	97	GLU
1	A	168	LYS
1	A	219	ILE
1	A	249	SER
1	A	271	PHE
2	C	5	PHE
2	C	216	VAL
2	C	238	ILE
1	B	53	VAL
1	B	59	GLU
1	B	90	SER
1	B	97	GLU
1	B	175	SER
1	B	300	ILE
1	B	315	LEU
2	J	28	ILE
2	J	96	LEU
2	J	173	LEU
2	J	174	ARG
2	J	191	LYS
2	J	216	VAL
2	J	262	VAL
1	K	72	LEU
1	K	97	GLU
1	K	143	ARG
1	K	175	SER
1	K	226	VAL
1	K	235	SER

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Mol	Chain	Res	Type
1	K	240	GLN
1	K	257	ARG
1	K	278	ILE
2	L	5	PHE
2	L	17	LEU
2	L	216	VAL
2	L	226	PHE
2	L	234	VAL
1	P	45	ASP
1	P	219	ILE
1	P	251	GLU
1	P	253	VAL
1	P	306	LEU
2	T	5	PHE
2	T	31	THR
2	T	60	ASP
2	T	190	ASN
2	T	220	THR
2	T	234	VAL
2	T	253	ILE
2	T	273	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	113	ASN
1	A	296	HIS
2	C	249	ASN
1	B	82	ASN
1	B	100	GLN
1	B	113	ASN
1	B	137	HIS
2	J	112	ASN
2	J	113	ASN
2	J	115	ASN
1	K	82	ASN
1	K	137	HIS
1	K	228	ASN
1	K	240	GLN
1	P	22	ASN
1	P	105	ASN
2	T	75	GLN

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Mol	Chain	Res	Type
2	T	115	ASN
2	T	217	ASN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
4	E	56/82 (68%)	17 (30%)	1 (1%)
4	H	56/82 (68%)	20 (35%)	0
4	N	56/82 (68%)	22 (39%)	1 (1%)
4	R	56/82 (68%)	21 (37%)	1 (1%)
5	F	7/14 (50%)	0	0
5	I	7/14 (50%)	4 (57%)	0
5	O	7/14 (50%)	6 (85%)	0
5	S	7/14 (50%)	6 (85%)	1 (14%)
All	All	252/384 (65%)	96 (38%)	4 (1%)

All (96) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
4	E	9	C
4	E	15	C
4	E	16	G
4	E	20	G
4	E	21	G
4	E	22	U
4	E	41	U
4	E	44	G
4	E	52	U
4	E	53	U
4	E	55	C
4	E	56	G
4	E	64	G
4	E	66	A
4	E	67	U
4	E	68	U
4	E	72	U
4	H	9	C
4	H	12	U
4	H	15	C
4	H	18	G
4	H	20	G

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Mol	Chain	Res	Type
4	H	21	G
4	H	22	U
4	H	40	C
4	H	41	U
4	H	44	G
4	H	52	U
4	H	53	U
4	H	55	C
4	H	56	G
4	H	64	G
4	H	66	A
4	H	67	U
4	H	68	U
4	H	69	G
4	H	72	U
5	I	4	A
5	I	5	G
5	I	6	G
5	I	7	G
4	N	9	C
4	N	10	C
4	N	13	A
4	N	14	G
4	N	15	C
4	N	16	G
4	N	20	G
4	N	21	G
4	N	22	U
4	N	41	U
4	N	44	G
4	N	52	U
4	N	53	U
4	N	55	C
4	N	56	G
4	N	59	A
4	N	64	G
4	N	65	C
4	N	66	A
4	N	67	U
4	N	69	G
4	N	72	U
5	O	1	G

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Mol	Chain	Res	Type
5	O	2	U
5	O	3	A
5	O	4	A
5	O	6	G
5	O	7	G
4	R	10	C
4	R	11	U
4	R	12	U
4	R	13	A
4	R	14	G
4	R	15	C
4	R	16	G
4	R	20	G
4	R	21	G
4	R	22	U
4	R	41	U
4	R	44	G
4	R	52	U
4	R	53	U
4	R	55	C
4	R	59	A
4	R	64	G
4	R	66	A
4	R	67	U
4	R	69	G
4	R	72	U
5	S	1	G
5	S	2	U
5	S	3	A
5	S	5	G
5	S	6	G
5	S	7	G

All (4) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
4	E	66	A
4	N	66	A
4	R	66	A
5	S	5	G

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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	NCA	J	401	-	9,9,9	0.32	0	11,11,11	0.40	0
7	AR6	J	402	2	33,38,39	5.18	15 (45%)	37,58,60	2.59	8 (21%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NCA	J	401	-	-	0/4/4/4	0/1/1/1
7	AR6	J	402	2	-	10/18/51/54	0/4/4/4

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	J	402	AR6	O4'-C1'	17.09	1.64	1.41
7	J	402	AR6	C2'-C1'	-13.77	1.32	1.53
7	J	402	AR6	C2D-C3D	-10.99	1.35	1.53
7	J	402	AR6	O4D-C4D	-8.43	1.30	1.44
7	J	402	AR6	O4D-C1D	7.79	1.61	1.43
7	J	402	AR6	O4'-C4'	-6.64	1.30	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	J	402	AR6	C1D-C2D	4.17	1.58	1.51
7	J	402	AR6	O3'-C3'	-4.15	1.33	1.43
7	J	402	AR6	C3D-C4D	3.93	1.63	1.53
7	J	402	AR6	O2D-C2D	3.26	1.50	1.43
7	J	402	AR6	C6-N6	2.73	1.44	1.34
7	J	402	AR6	C5-C4	-2.33	1.34	1.40
7	J	402	AR6	C3'-C4'	2.24	1.58	1.53
7	J	402	AR6	C2-N3	2.23	1.35	1.32
7	J	402	AR6	PA-O5'	2.04	1.67	1.59

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	J	402	AR6	C5-C6-N6	10.05	135.62	120.35
7	J	402	AR6	N6-C6-N1	-6.87	104.32	118.57
7	J	402	AR6	N3-C2-N1	-5.66	119.83	128.68
7	J	402	AR6	C1D-C2D-C3D	4.13	107.93	101.63
7	J	402	AR6	PB-O3A-PA	-3.13	122.10	132.83
7	J	402	AR6	C3'-C2'-C1'	2.79	105.19	100.98
7	J	402	AR6	O4D-C4D-C3D	2.75	107.14	104.70
7	J	402	AR6	O2D-C2D-C3D	-2.20	107.09	111.27

There are no chirality outliers.

All (10) torsion outliers are listed below:

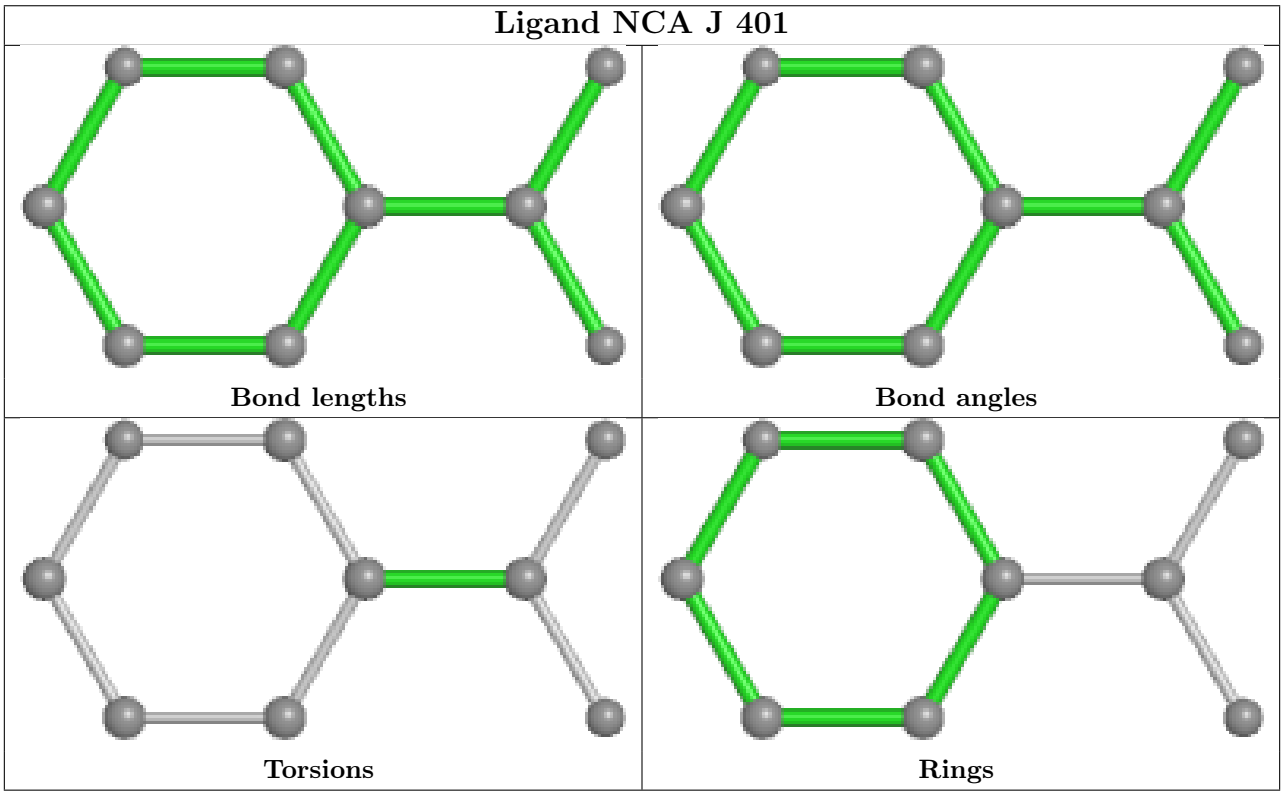
Mol	Chain	Res	Type	Atoms
7	J	402	AR6	C5'-O5'-PA-O2A
7	J	402	AR6	C5'-O5'-PA-O3A
7	J	402	AR6	C3'-C4'-C5'-O5'
7	J	402	AR6	C3D-C4D-C5D-O5D
7	J	402	AR6	O4D-C4D-C5D-O5D
7	J	402	AR6	O4'-C4'-C5'-O5'
7	J	402	AR6	PB-O3A-PA-O5'
7	J	402	AR6	C5D-O5D-PB-O3A
7	J	402	AR6	PA-O3A-PB-O1B
7	J	402	AR6	C5D-O5D-PB-O1B

There are no ring outliers.

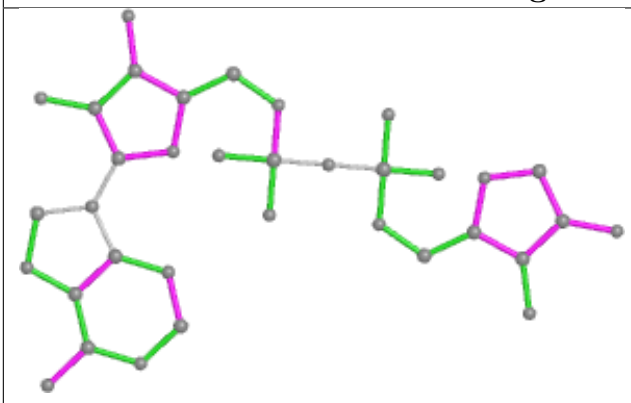
2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	J	401	NCA	1	0
7	J	402	AR6	4	0

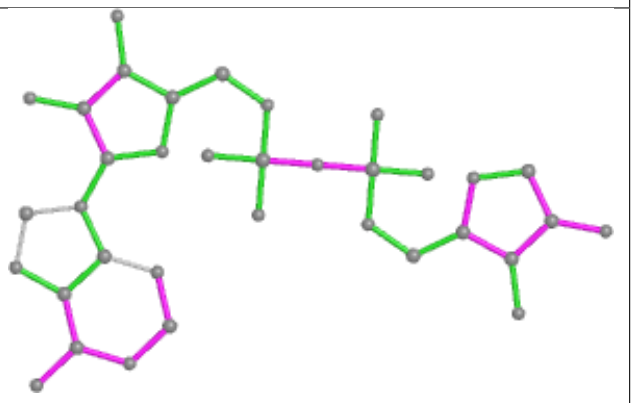
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



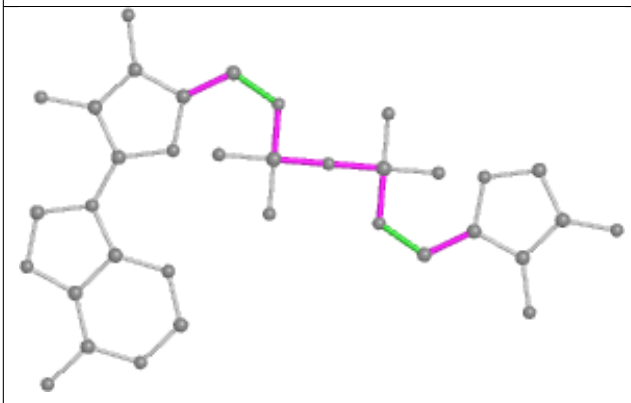
Ligand AR6 J 402



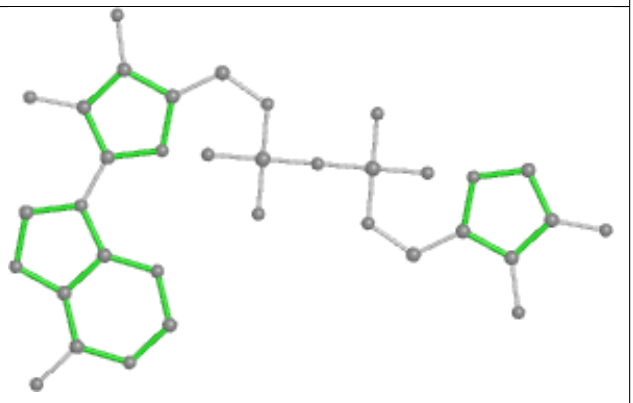
Bond lengths



Bond angles



Torsions



Rings

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.