



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 12, 2020 – 11:03 AM EDT

PDB ID : 5WNR  
Title : Crystal Structure of 30S ribosomal subunit from *Thermus thermophilus*  
Authors : DeMirci, H.  
Deposited on : 2017-08-01  
Resolution : 3.50 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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.14.6  
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) : 2.14.6

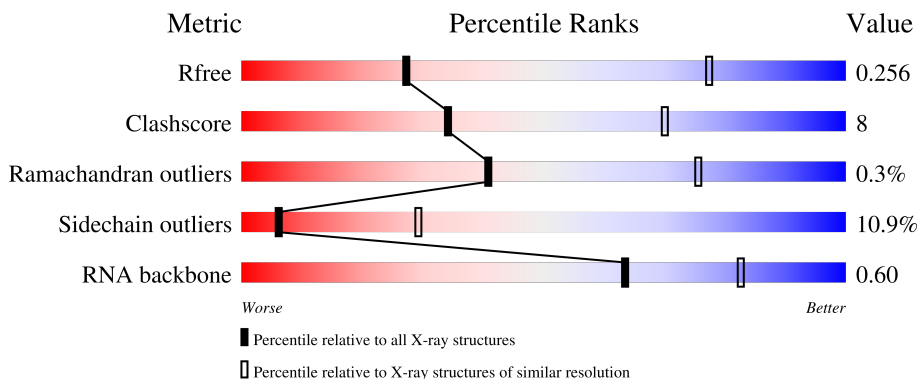
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.50 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	1659 (3.60-3.40)
Clashscore	141614	1036 (3.58-3.42)
Ramachandran outliers	138981	1005 (3.58-3.42)
Sidechain outliers	138945	1006 (3.58-3.42)
RNA backbone	3102	1002 (4.00-3.00)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	1522	57% (green), 33% (yellow), 9% (orange), 1% (red), 1% (grey)
2	B	234	65% (green), 30% (yellow), 5% (orange), 0% (red), 0% (grey)
3	C	206	62% (green), 34% (yellow), 2% (orange), 0% (red), 0% (grey)
4	D	208	68% (green), 29% (yellow), 3% (orange), 0% (red), 0% (grey)
5	E	150	76% (green), 23% (yellow), 1% (orange), 0% (red), 0% (grey)
6	F	101	74% (green), 24% (yellow), 2% (orange), 0% (red), 0% (grey)

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Mol	Chain	Length	Quality of chain
7	G	155	 80% 17% .
8	H	138	 73% 24% .
9	I	127	 61% 33% 6%
10	J	98	 62% 31% 6% .
11	K	116	 66% 30% .
12	L	124	 68% 28% .
13	M	118	 59% 35% 6%
14	N	60	 60% 35% 5%
15	O	87	 72% 22% 6%
16	P	83	 78% 18% .
17	Q	99	 79% 21%
18	R	70	 81% 16% .
19	S	80	 70% 30%
20	T	99	 68% 25% 5% .
21	U	24	 63% 38%

## 2 Entry composition [i](#)

There are 24 unique types of molecules in this entry. The entry contains 52227 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a RNA chain called 16S Ribosomal RNA rRNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	A	1512	32644	14540	6039	10547	1518	0	6	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1534	C	A	conflict	GB 55771382
A	1535	A	C	conflict	GB 55771382

- Molecule 2 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	234	1900	1213	341	341	5	0	0	0

- Molecule 3 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	206	1612	1016	314	281	1	0	0	0

- Molecule 4 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	208	1703	1066	339	291	7	0	0	0

- Molecule 5 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	E	150	1146	724	217	201	4	0	0	0

- Molecule 6 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	F	101	843	531	155	154	3	0	0	0

- Molecule 7 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
7	G	155	1257	781	252	218	6	0	0	0

- Molecule 8 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
8	H	138	1116	705	215	193	3	0	0	0

- Molecule 9 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
9	I	127	1010	639	197	174	0	0	0

- Molecule 10 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
10	J	98	792	498	156	137	1	0	0	0

- Molecule 11 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
11	K	116	864	537	164	160	3	0	0	0

- Molecule 12 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
12	L	124	972	612	195	163	2	0	0	0

- Molecule 13 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
13	M	118	937	579	193	163	2	0	0	0

- Molecule 14 is a protein called 30S ribosomal protein S14 type Z.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
14	N	60	492	312	104	72	4	0	0	0

- Molecule 15 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
15	O	87	729	457	146	124	2	0	0	0

- Molecule 16 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
16	P	83	700	443	139	117	1	0	0	0

- Molecule 17 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
17	Q	99	823	528	152	141	2	0	0	0

- Molecule 18 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
18	R	70	574	367	112	95	0	0	0

- Molecule 19 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
19	S	80	647	414	119	112	2	0	0	0

- Molecule 20 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
20	T	99	763	470	162	129	2	0	0	0

- Molecule 21 is a protein called 30S ribosomal protein Thx.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
21	U	24	208	128	50	30	0	0	0

- Molecule 22 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
22	P	2	Total 2	Mg 2	0	0
22	Q	2	Total 2	Mg 2	0	0
22	D	4	Total 4	Mg 4	0	0
22	E	1	Total 1	Mg 1	0	0
22	B	3	Total 3	Mg 3	0	0
22	I	1	Total 1	Mg 1	0	0
22	C	3	Total 3	Mg 3	0	0
22	A	234	Total 234	Mg 234	0	0
22	U	1	Total 1	Mg 1	0	0
22	S	2	Total 2	Mg 2	0	0
22	F	1	Total 1	Mg 1	0	0

- Molecule 23 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
23	D	1	Total 1	Zn 1	0	0
23	N	1	Total 1	Zn 1	0	0

- Molecule 24 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
24	A	225	Total O 225 225	0	0
24	D	2	Total O 2 2	0	0
24	E	5	Total O 5 5	0	0
24	L	2	Total O 2 2	0	0
24	N	1	Total O 1 1	0	0
24	Q	2	Total O 2 2	0	0
24	T	2	Total O 2 2	0	0

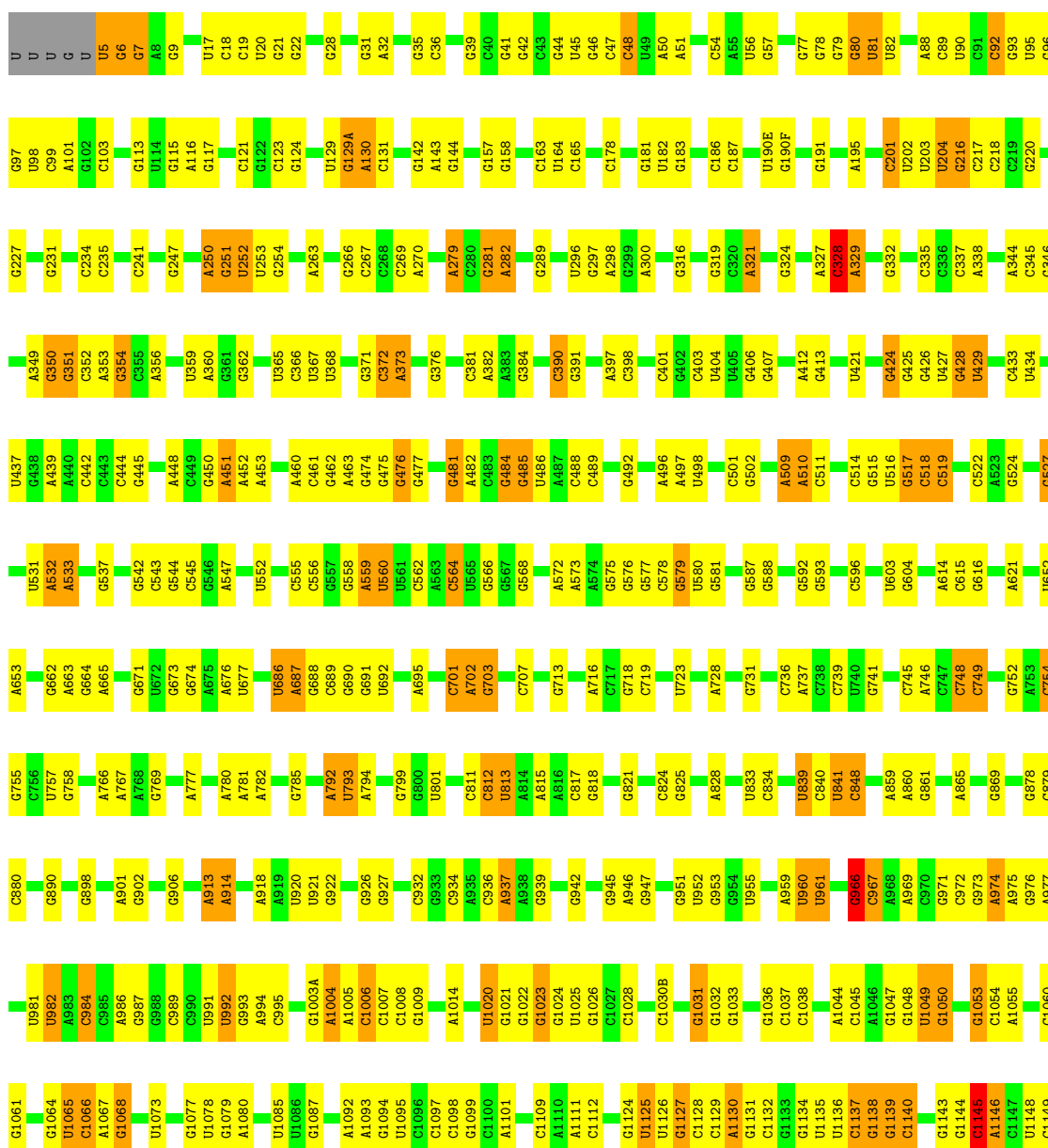


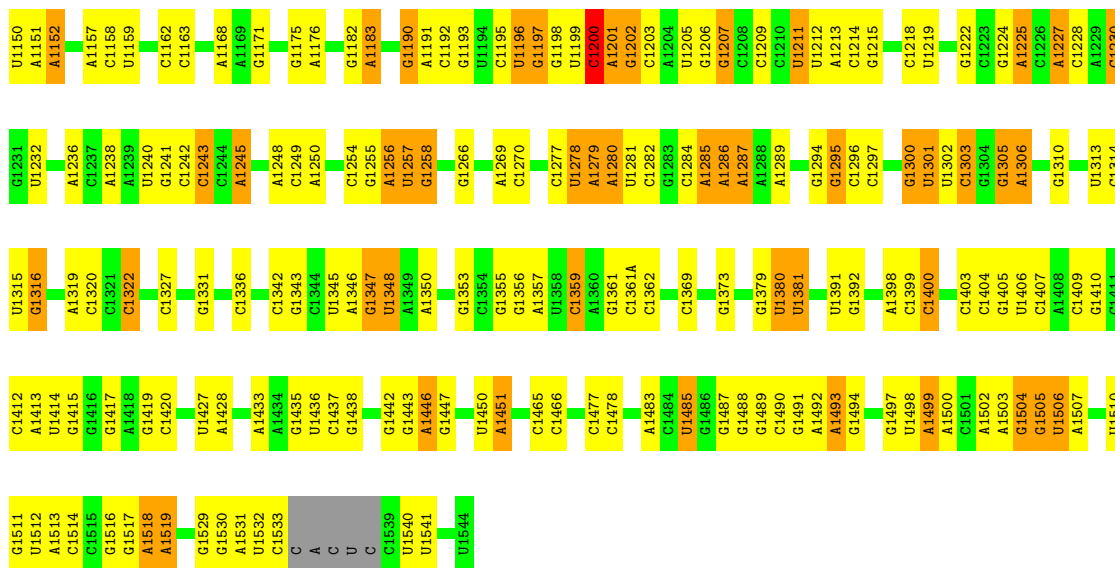
### 3 Residue-property plots [i](#)

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.

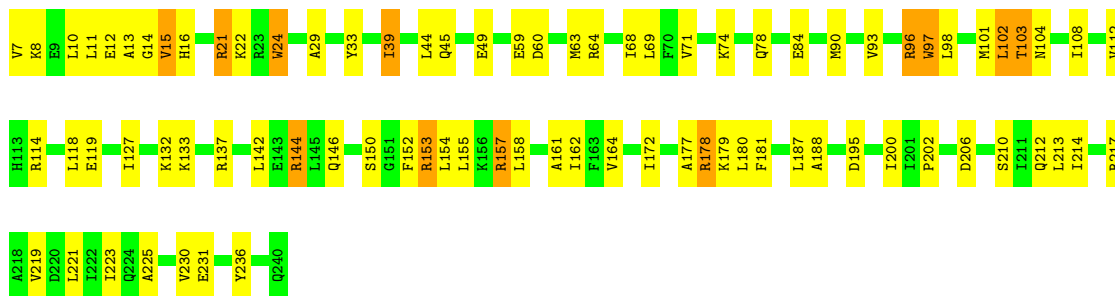
- Molecule 1: 16S Ribosomal RNA rRNA

Chain A: 





• Molecule 2: 30S ribosomal protein S2



• Molecule 3: 30S ribosomal protein S3



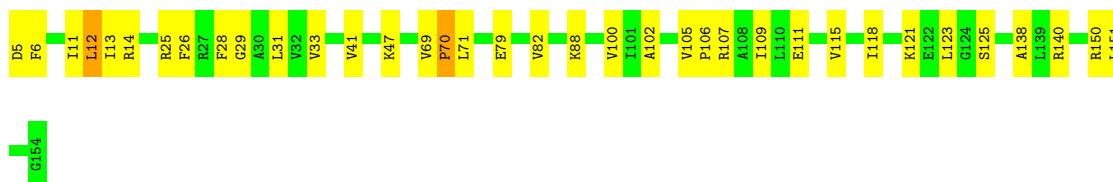
• Molecule 4: 30S ribosomal protein S4





- Molecule 5: 30S ribosomal protein S5

Chain E: 76% 23%



- Molecule 6: 30S ribosomal protein S6

Chain F: 74% 24%



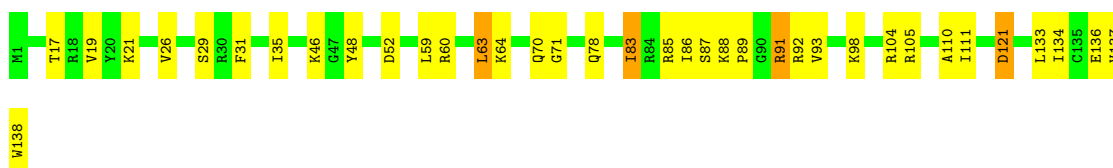
- Molecule 7: 30S ribosomal protein S7

Chain G: 80% 17%



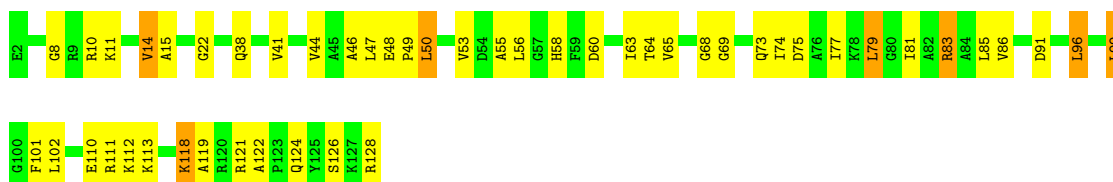
- Molecule 8: 30S ribosomal protein S8

Chain H: 73% 24%




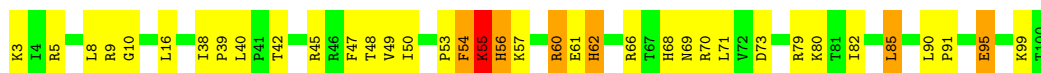
- Molecule 9: 30S ribosomal protein S9

Chain I: 61% 33% 6%



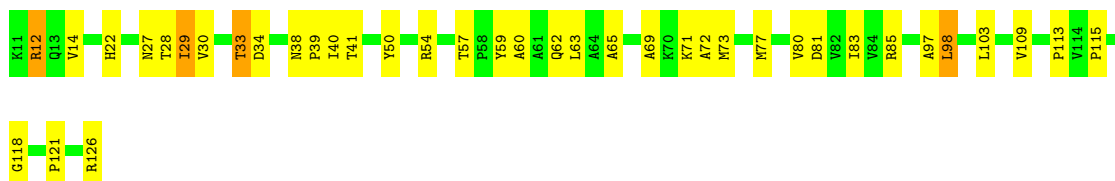
- Molecule 10: 30S ribosomal protein S10

Chain J:  62% 31% 6%



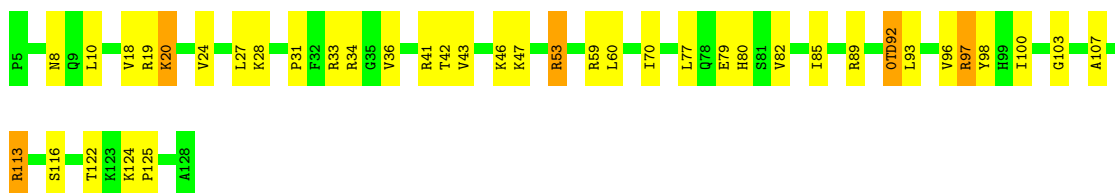
• Molecule 11: 30S ribosomal protein S11

Chain K:  66% 30%



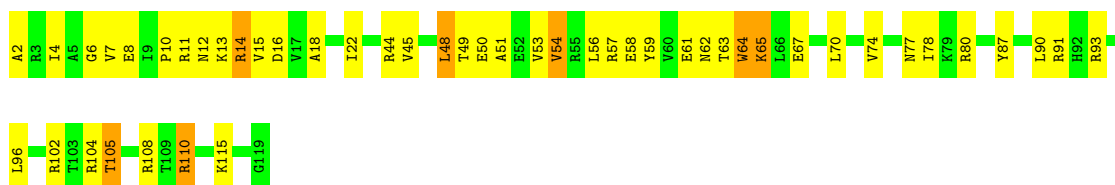
• Molecule 12: 30S ribosomal protein S12

Chain L:  68% 28%



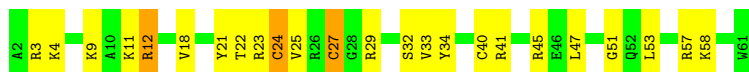
• Molecule 13: 30S ribosomal protein S13

Chain M:  59% 35% 6%



• Molecule 14: 30S ribosomal protein S14 type Z

Chain N:  60% 35% 5%

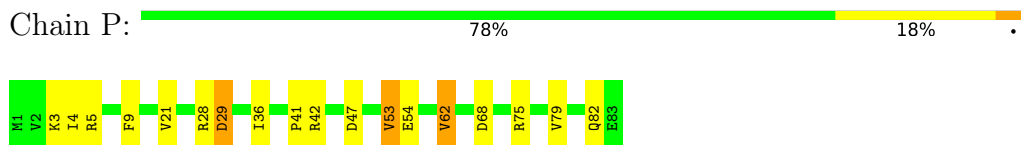


• Molecule 15: 30S ribosomal protein S15

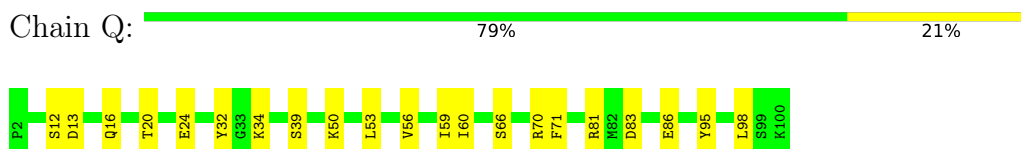
Chain O:  72% 22% 6%



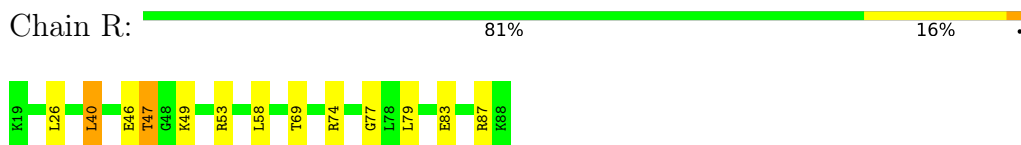
- Molecule 16: 30S ribosomal protein S16



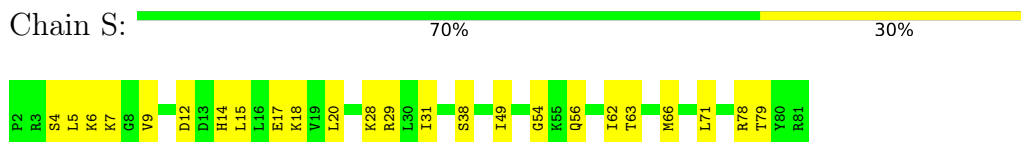
- Molecule 17: 30S ribosomal protein S17



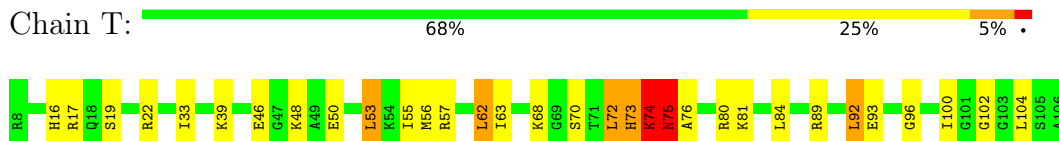
- Molecule 18: 30S ribosomal protein S18



- Molecule 19: 30S ribosomal protein S19



- Molecule 20: 30S ribosomal protein S20



- Molecule 21: 30S ribosomal protein Thx



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	400.00Å 400.00Å 173.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.98 – 3.50 39.78 – 2.92	Depositor EDS
% Data completeness (in resolution range)	91.5 (29.98-3.50) 71.0 (39.78-2.92)	Depositor EDS
$R_{merge}$	1.18	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.46 (at 2.90Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, $R_{free}$	0.214 , 0.256 0.217 , 0.256	Depositor DCC
$R_{free}$ test set	2000 reflections (0.67%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	58.0	Xtrriage
Anisotropy	0.303	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.07 , -10.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	52227	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	232.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.56% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

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

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, MA6, 0TD, MG, 2MG, 5MC, UR3, 4OC, M2G, 7MG, PSU

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	0.19	0/36139	0.80	22/56396 (0.0%)
2	B	0.25	0/1935	0.43	0/2609
3	C	0.25	0/1636	0.47	0/2205
4	D	0.24	0/1733	0.40	0/2318
5	E	0.25	0/1162	0.45	0/1564
6	F	0.23	0/856	0.43	0/1154
7	G	0.24	0/1276	0.40	0/1709
8	H	0.24	0/1136	0.46	0/1527
9	I	0.26	0/1029	0.45	0/1379
10	J	0.25	0/805	0.52	0/1082
11	K	0.26	0/879	0.47	0/1187
12	L	0.25	0/977	0.51	0/1306
13	M	0.23	0/947	0.45	0/1270
14	N	0.25	0/501	0.46	0/664
15	O	0.24	0/740	0.39	0/987
16	P	0.24	0/716	0.44	0/963
17	Q	0.24	0/836	0.46	0/1117
18	R	0.24	0/579	0.44	0/768
19	S	0.24	0/661	0.51	0/890
20	T	0.25	0/765	0.43	0/1007
21	U	0.22	0/212	0.42	0/277
All	All	0.21	0/55520	0.71	22/82379 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	1
3	C	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
10	J	0	2
13	M	0	1
14	N	0	1
20	T	0	1
All	All	0	7

There are no bond length outliers.

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	328	C	C2-N1-C1'	7.91	127.50	118.80
1	A	1139	G	P-O3'-C3'	7.69	128.93	119.70
1	A	1127	G	N1-C6-O6	-7.66	115.30	119.90
1	A	328	C	N1-C2-O2	7.39	123.33	118.90
1	A	1127	G	C5-C6-O6	7.22	132.93	128.60
1	A	1243	C	C2-N3-C4	-6.96	116.42	119.90
1	A	839	U	C2-N1-C1'	6.82	125.89	117.70
1	A	1243	C	N1-C2-N3	6.38	123.67	119.20
1	A	839	U	N1-C2-O2	6.19	127.13	122.80
1	A	1295	G	N3-C4-N9	-6.15	122.31	126.00
1	A	476	G	C5-C6-O6	6.00	132.20	128.60
1	A	839	U	N3-C2-O2	-5.92	118.06	122.20
1	A	1145	C	N3-C4-N4	-5.86	113.90	118.00
1	A	328	C	N3-C2-O2	-5.67	117.93	121.90
1	A	328	C	C6-N1-C1'	-5.61	114.06	120.80
1	A	1158	C	C2-N1-C1'	5.45	124.79	118.80
1	A	1243	C	N3-C2-O2	-5.42	118.10	121.90
1	A	754	C	C2-N1-C1'	5.28	124.61	118.80
1	A	476	G	N1-C6-O6	-5.10	116.84	119.90
1	A	1200	C	N1-C2-O2	5.09	121.96	118.90
1	A	1158	C	N1-C2-O2	5.09	121.95	118.90
1	A	1200	C	C2-N1-C1'	5.03	124.34	118.80

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	15	VAL	Peptide
3	C	166	GLU	Peptide
10	J	54	PHE	Peptide
10	J	55	LYS	Peptide

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Mol	Chain	Res	Type	Group
13	M	6	GLY	Peptide
14	N	11	LYS	Peptide
20	T	74	LYS	Peptide

## 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	32644	0	16507	384	2
2	B	1900	0	1951	43	0
3	C	1612	0	1677	49	0
4	D	1703	0	1763	43	0
5	E	1146	0	1207	19	0
6	F	843	0	857	13	0
7	G	1257	0	1296	18	0
8	H	1116	0	1177	21	0
9	I	1010	0	1037	32	0
10	J	792	0	835	24	0
11	K	864	0	881	25	0
12	L	972	0	1058	23	0
13	M	937	0	995	31	0
14	N	492	0	529	23	0
15	O	729	0	768	10	0
16	P	700	0	720	12	0
17	Q	823	0	893	11	0
18	R	574	0	644	9	0
19	S	647	0	673	14	0
20	T	763	0	861	19	0
21	U	208	0	221	10	0
22	A	234	0	0	0	0
22	B	3	0	0	0	0
22	C	3	0	0	0	0
22	D	4	0	0	0	0
22	E	1	0	0	0	0
22	F	1	0	0	0	0
22	I	1	0	0	0	0
22	P	2	0	0	0	0
22	Q	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
22	S	2	0	0	0	0
22	U	1	0	0	0	0
23	D	1	0	0	0	0
23	N	1	0	0	0	0
24	A	225	0	0	1	0
24	D	2	0	0	0	0
24	E	5	0	0	0	0
24	L	2	0	0	1	0
24	N	1	0	0	0	0
24	Q	2	0	0	0	0
24	T	2	0	0	0	0
All	All	52227	0	36550	722	2

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 (722) 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:664:G:H22	1:A:741:G:H1	1.23	0.86
20:T:100:ILE:HG22	20:T:102:GLY:H	1.41	0.86
1:A:1443:G:H5''	1:A:1446:A:H5'	1.57	0.85
1:A:1125:U:OP2	1:A:1145:C:N4	2.11	0.81
1:A:1347:G:O6	9:I:10:ARG:NH2	2.12	0.81
1:A:1193:G:OP1	3:C:167:TRP:NE1	2.16	0.79
1:A:1417:G:O2'	1:A:1483:A:N6	2.17	0.78
1:A:686:U:HO2'	1:A:687:A:H8	1.34	0.76
4:D:11:LEU:HD13	4:D:66:ARG:HD2	1.68	0.75
1:A:1134:G:H1	1:A:1140:C:H42	1.33	0.74
1:A:481:G:HO2'	1:A:482:A:H8	1.33	0.74
1:A:1049:U:O2'	14:N:3:ARG:NH1	2.19	0.74
2:B:21:ARG:HA	2:B:39:ILE:HA	1.71	0.73
9:I:50:LEU:HB3	9:I:55:ALA:HB3	1.71	0.73
13:M:10:PRO:HB2	13:M:18:ALA:HB1	1.70	0.73
1:A:1111:A:H61	3:C:177:THR:HB	1.53	0.72
1:A:1373:G:H5''	7:G:36:LYS:HE3	1.72	0.71
16:P:4:ILE:HG12	16:P:21:VAL:HG22	1.73	0.70
20:T:74:LYS:O	20:T:76:ALA:N	2.24	0.70
3:C:33:LEU:HD21	14:N:53:LEU:HD22	1.72	0.70
1:A:1128:C:O2'	1:A:1130:A:N7	2.25	0.70
6:F:10:LEU:HD12	6:F:59:TYR:HB3	1.74	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:974:A:OP2	14:N:29:ARG:NH2	2.25	0.69
17:Q:66:SER:O	17:Q:70:ARG:NH1	2.25	0.69
20:T:75:ASN:OD1	20:T:75:ASN:N	2.25	0.69
1:A:1195:C:H3'	1:A:1196:U:H5''	1.75	0.69
3:C:41:GLY:O	3:C:45:LYS:HG2	1.93	0.69
1:A:1098:C:OP2	2:B:144:ARG:NH2	2.25	0.68
1:A:1073:U:O2	2:B:104:ASN:ND2	2.27	0.68
1:A:1516[B]:G:N2	1:A:1519[B]:MA6:OP2	2.25	0.68
1:A:1028:C:H42	1:A:1033:G:H1	1.42	0.68
3:C:52:LEU:HD12	3:C:68:VAL:HG13	1.75	0.67
11:K:85:ARG:HD3	11:K:113:PRO:HD3	1.76	0.67
5:E:71:LEU:HD21	5:E:115:VAL:HG22	1.77	0.67
10:J:82:ILE:HA	10:J:85:LEU:HB2	1.77	0.67
12:L:41:ARG:HE	12:L:43:VAL:HG22	1.58	0.67
9:I:10:ARG:HG2	9:I:75:ASP:HB2	1.77	0.66
1:A:404:U:OP2	4:D:118:ARG:NH1	2.29	0.66
1:A:372:C:H4'	1:A:373:A:O5'	1.94	0.66
12:L:53:ARG:NH1	12:L:92:0TD:OD2	2.27	0.66
1:A:671:G:H5'	6:F:77:ARG:HH21	1.61	0.65
1:A:1399:C:H4'	1:A:1400:5MC:H5''	1.77	0.65
1:A:1004:A:N7	1:A:1036:G:O6	2.30	0.65
1:A:427:U:OP1	4:D:13:ARG:NH2	2.30	0.65
2:B:63:MET:HB3	2:B:225:ALA:HB1	1.79	0.65
1:A:1347:G:H1'	1:A:1348:U:H5	1.61	0.64
1:A:811:C:O2'	1:A:901:A:N1	2.29	0.64
15:O:39:LEU:HD13	15:O:56:LEU:HB2	1.79	0.64
10:J:61:GLU:OE1	14:N:45:ARG:NH1	2.29	0.64
1:A:982:U:OP2	14:N:23:ARG:NH2	2.30	0.64
16:P:28:ARG:NH1	16:P:29:ASP:OD2	2.29	0.64
4:D:107:ARG:HH12	4:D:114:ARG:HH21	1.45	0.64
20:T:46:GLU:OE1	20:T:48:LYS:NZ	2.30	0.64
1:A:462:G:H21	16:P:82:GLN:HE21	1.44	0.64
1:A:297:G:N2	1:A:300:A:OP2	2.26	0.63
13:M:8:GLU:HG3	13:M:22:ILE:HG23	1.81	0.63
1:A:1266:G:N2	1:A:1269:A:OP2	2.23	0.63
1:A:95:U:H2'	1:A:96:G:H8	1.63	0.63
17:Q:12:SER:HB3	17:Q:20:THR:HB	1.80	0.63
1:A:564:C:O2'	8:H:91:ARG:NH2	2.32	0.63
1:A:1242:C:OP1	21:U:10:ARG:NH1	2.21	0.63
3:C:26:LYS:O	3:C:30:ARG:NH1	2.32	0.63
1:A:1243:C:O2	1:A:1295:G:N2	2.32	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1222:G:OP2	1:A:1322:C:N4	2.29	0.62
1:A:1505:G:O2'	1:A:1506:U:OP2	2.14	0.62
12:L:60:LEU:HD11	12:L:85:ILE:HD12	1.81	0.62
4:D:15:GLU:HB3	4:D:63:LYS:HD3	1.80	0.62
15:O:33:THR:OG1	15:O:63:ARG:NH1	2.32	0.62
1:A:103:C:OP1	20:T:17:ARG:NH1	2.33	0.62
1:A:1009:G:H1	1:A:1020:U:H3	1.48	0.62
1:A:1518[B]:MA6:H102	1:A:1519[B]:MA6:H103	1.81	0.62
13:M:57:ARG:O	13:M:61:GLU:HB2	1.99	0.62
1:A:376:G:H5''	16:P:5:ARG:HB2	1.82	0.62
1:A:1310:G:H5'	13:M:77:ASN:HD21	1.65	0.62
10:J:61:GLU:OE2	14:N:58:LYS:NZ	2.32	0.62
4:D:194:LEU:HB3	4:D:196:LEU:HG	1.81	0.62
10:J:49:VAL:HG13	14:N:41:ARG:HB2	1.82	0.62
1:A:1406:U:O2'	1:A:1517[B]:G:N2	2.32	0.61
4:D:107:ARG:HH21	4:D:194:LEU:HD12	1.66	0.61
3:C:156:ARG:H	3:C:163:ALA:HA	1.65	0.61
8:H:111:ILE:HG22	8:H:134:ILE:HD12	1.81	0.61
21:U:9:ARG:HE	21:U:22:ARG:HG3	1.66	0.60
1:A:1150:U:O4	1:A:1151:A:N6	2.34	0.60
4:D:57:ARG:HB3	4:D:206:PHE:HB2	1.83	0.60
11:K:80:VAL:HG21	11:K:103:LEU:HD13	1.82	0.60
1:A:426:G:OP1	4:D:38:TYR:OH	2.18	0.60
5:E:102:ALA:O	5:E:107:ARG:NH1	2.34	0.60
1:A:321:A:N6	1:A:329:A:OP2	2.34	0.60
13:M:49:THR:HG22	13:M:51:ALA:H	1.67	0.60
1:A:946:A:H2'	1:A:947:G:C8	2.36	0.60
9:I:86:VAL:HG21	9:I:102:LEU:HD11	1.82	0.60
1:A:1245:A:OP2	21:U:9:ARG:NH1	2.34	0.60
11:K:57:THR:HG23	11:K:60:ALA:H	1.66	0.60
1:A:1006:C:H42	1:A:1022:G:H22	1.50	0.59
1:A:1064:G:N2	1:A:1190:G:O2'	2.35	0.59
1:A:1498:UR3:H6	1:A:1498:UR3:O5'	2.02	0.59
1:A:953:G:N7	13:M:104:ARG:NH2	2.49	0.59
1:A:522:C:H41	12:L:53:ARG:HH22	1.48	0.59
13:M:96:LEU:O	13:M:110:ARG:NH1	2.34	0.59
1:A:992:U:H3	1:A:1044:A:H62	1.50	0.59
12:L:46:LYS:HB3	12:L:92:OTD:H8	1.84	0.59
1:A:1144:G:H21	1:A:1146:A:H62	1.50	0.59
1:A:981:U:H5'	14:N:21:TYR:CZ	2.38	0.59
1:A:1314:C:C5	19:S:6:LYS:HD3	2.38	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:792:A:H4'	1:A:793:U:O5'	2.03	0.59
1:A:951:G:OP2	13:M:102:ARG:NH2	2.36	0.59
20:T:33:ILE:HD13	20:T:62:LEU:HB3	1.85	0.59
2:B:84:GLU:HB3	2:B:219:VAL:HG21	1.85	0.58
16:P:53:VAL:HG12	16:P:79:VAL:HG22	1.85	0.58
1:A:45:U:H2'	1:A:46:G:C8	2.38	0.58
1:A:677:U:H3	1:A:713:G:H22	1.49	0.58
7:G:69:VAL:HG21	7:G:104:LEU:HD21	1.85	0.58
1:A:403:C:OP2	4:D:3:ARG:NH2	2.36	0.58
1:A:279:A:OP2	17:Q:95:TYR:OH	2.20	0.58
1:A:1532:U:H2'	1:A:1533:C:H3'	1.86	0.57
4:D:62:GLN:OE1	4:D:65:ARG:NH1	2.37	0.57
4:D:57:ARG:HG3	4:D:202:LEU:HD13	1.84	0.57
9:I:46:ALA:HB2	9:I:74:ILE:HG23	1.85	0.57
1:A:1405:G:O2'	1:A:1518[A]:MA6:O2'	2.18	0.57
19:S:18:LYS:HD3	19:S:31:ILE:HD11	1.87	0.57
1:A:401:C:O2'	1:A:621:A:N3	2.34	0.57
1:A:1305:G:N2	1:A:1331:G:H1'	2.19	0.57
3:C:150:LYS:HB2	3:C:173:VAL:HG21	1.85	0.57
1:A:407:G:OP1	4:D:115:ARG:NH1	2.38	0.57
1:A:1414:U:H2'	1:A:1415:G:C8	2.40	0.57
3:C:156:ARG:NH1	3:C:193:TYR:O	2.38	0.56
11:K:40:ILE:HG22	11:K:41:THR:HG23	1.87	0.56
1:A:1145:C:O2'	1:A:1146:A:O5'	2.24	0.56
2:B:59:GLU:HB2	2:B:221:LEU:HD11	1.88	0.56
3:C:131:ARG:HA	3:C:134:ILE:HD12	1.87	0.56
10:J:79:ARG:HH12	10:J:82:ILE:HD12	1.70	0.56
1:A:1053:G:HO2'	1:A:1199:U:H5	1.52	0.56
1:A:898:G:N2	1:A:901:A:OP2	2.33	0.56
3:C:14:ILE:HG22	3:C:15:THR:HG23	1.87	0.56
8:H:83:ILE:HG12	8:H:137:VAL:HG22	1.87	0.56
12:L:41:ARG:HH21	12:L:43:VAL:HG13	1.69	0.56
1:A:1342:C:H2'	1:A:1343:G:C8	2.41	0.56
1:A:17:U:H2'	1:A:18:C:C6	2.40	0.56
6:F:22:GLU:OE1	6:F:82:ARG:NH1	2.39	0.56
2:B:101:MET:HA	2:B:108:ILE:HG13	1.87	0.56
4:D:18:LYS:HE2	4:D:20:TYR:HE2	1.70	0.56
12:L:24:VAL:HG13	12:L:98:TYR:HE2	1.71	0.56
1:A:21:G:H2'	1:A:22:G:C8	2.41	0.56
1:A:250:A:H4'	1:A:251:G:O5'	2.05	0.56
1:A:880:C:OP1	12:L:8:ASN:ND2	2.35	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:21:ARG:HG3	2:B:22:LYS:H	1.71	0.56
12:L:70:ILE:HG12	12:L:100:ILE:HD12	1.87	0.56
1:A:129(A):G:N2	1:A:190(F):G:OP2	2.34	0.56
3:C:91:LEU:HD21	3:C:99:VAL:HG22	1.88	0.56
20:T:39:LYS:HG2	20:T:55:ILE:HD13	1.88	0.56
1:A:1202:G:O2'	14:N:27:CYS:SG	2.65	0.55
1:A:1313:U:O4	19:S:4:SER:OG	2.17	0.55
3:C:137:ALA:HA	3:C:140:ARG:HD2	1.87	0.55
1:A:1491:G:N2	1:A:1492:A:H62	2.03	0.55
9:I:79:LEU:O	9:I:83:ARG:HG2	2.06	0.55
1:A:1391:U:H2'	1:A:1392:G:C8	2.42	0.55
2:B:103:THR:HG23	2:B:180:LEU:HD21	1.88	0.55
1:A:718:G:O6	18:R:74:ARG:NH1	2.40	0.55
1:A:95:U:H2'	1:A:96:G:C8	2.42	0.55
8:H:48:TYR:HA	8:H:60:ARG:O	2.06	0.55
1:A:955:U:H1'	1:A:1227:A:H61	1.72	0.55
1:A:451:A:N6	1:A:481:G:C4	2.75	0.55
1:A:959:A:O2'	1:A:984:C:O2'	2.23	0.55
2:B:162:ILE:HD12	2:B:177:ALA:HB2	1.87	0.55
1:A:1415:G:H1	1:A:1485:U:H3	1.54	0.55
1:A:1192:C:O2	5:E:25:ARG:NH2	2.40	0.55
6:F:39:LYS:HG2	6:F:64:GLN:HB3	1.90	0.54
1:A:1437:C:H2'	1:A:1438:G:H8	1.73	0.54
3:C:68:VAL:HG12	3:C:70:VAL:HG22	1.90	0.54
20:T:50:GLU:HA	20:T:100:ILE:HG13	1.89	0.54
11:K:69:ALA:O	11:K:73:MET:HG2	2.07	0.54
1:A:1048:G:H1	1:A:1209:C:H42	1.56	0.54
1:A:1510:U:H2'	1:A:1511:G:C8	2.42	0.54
1:A:558:G:OP2	1:A:559:A:O2'	2.24	0.54
1:A:191:G:O2'	20:T:102:GLY:O	2.16	0.54
5:E:102:ALA:HB1	5:E:106:PRO:HB2	1.90	0.54
1:A:1077:G:N2	1:A:1080:A:OP2	2.41	0.54
1:A:1049:U:H4'	1:A:1050:G:O5'	2.08	0.54
1:A:7:G:H5'	1:A:298:A:O4'	2.08	0.54
1:A:501:C:H2'	1:A:502:G:C8	2.43	0.54
3:C:155:GLY:HA2	3:C:164:ARG:H	1.73	0.54
10:J:53:PRO:HA	14:N:41:ARG:NH2	2.23	0.54
11:K:65:ALA:HB1	11:K:98:LEU:HD23	1.89	0.53
1:A:1060:C:OP1	14:N:45:ARG:NH2	2.41	0.53
1:A:1379:G:O6	7:G:2:ALA:N	2.42	0.53
3:C:134:ILE:HG23	3:C:151:VAL:HB	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:140:VAL:HG11	4:D:146:ILE:HD11	1.91	0.53
12:L:34:ARG:NH2	24:L:201:HOH:O	2.40	0.53
1:A:144:G:H1	1:A:178:C:H42	1.56	0.53
7:G:111:ARG:NH1	7:G:113:GLU:OE2	2.42	0.53
12:L:24:VAL:HG13	12:L:98:TYR:CE2	2.42	0.53
1:A:56:U:H2'	1:A:57:G:H8	1.74	0.53
1:A:1488:G:H2'	1:A:1489:G:C8	2.43	0.53
1:A:19:C:OP1	5:E:125:SER:OG	2.21	0.53
1:A:88:A:H2'	1:A:89:C:O4'	2.09	0.53
20:T:16:HIS:O	20:T:19:SER:HB3	2.09	0.53
1:A:448:A:P	1:A:485:G:H22	2.31	0.53
8:H:86:ILE:HD12	8:H:133:LEU:HD22	1.89	0.53
4:D:99:SER:HB3	4:D:139:ARG:HG3	1.89	0.53
9:I:112:LYS:HA	9:I:119:ALA:HB2	1.90	0.53
1:A:501:C:H2'	1:A:502:G:H8	1.74	0.53
1:A:1162:C:H2'	1:A:1163:C:C6	2.44	0.52
1:A:216:G:H2'	1:A:217:C:C6	2.44	0.52
15:O:56:LEU:HA	15:O:59:MET:HE2	1.90	0.52
18:R:47:THR:HA	18:R:83:GLU:HB2	1.91	0.52
4:D:61:LYS:NZ	4:D:62:GLN:OE1	2.38	0.52
1:A:1195:C:H3'	1:A:1196:U:C5'	2.39	0.52
1:A:1310:G:H5'	13:M:77:ASN:ND2	2.25	0.52
1:A:1498:UR3:O4'	1:A:1519[A]:MA6:H2	2.09	0.52
1:A:77:G:H2'	1:A:78:G:C8	2.44	0.52
1:A:269:C:H2'	1:A:270:A:C8	2.45	0.52
1:A:362:G:N2	1:A:365:U:OP2	2.39	0.52
1:A:1240:U:OP1	7:G:119:ARG:NH2	2.34	0.52
1:A:913:A:H4'	1:A:914:A:O5'	2.09	0.52
3:C:81:GLY:O	3:C:84:ILE:HG22	2.09	0.52
10:J:50:ILE:HA	10:J:60:ARG:HB3	1.91	0.52
10:J:5:ARG:HB2	10:J:99:LYS:O	2.09	0.52
1:A:390:C:O3'	16:P:28:ARG:NH2	2.43	0.52
1:A:1230:C:N4	13:M:105:THR:HG21	2.25	0.52
1:A:937:A:N6	1:A:1345:U:O4	2.42	0.52
1:A:518:C:H4'	1:A:519:C:O5'	2.09	0.52
1:A:56:U:H2'	1:A:57:G:C8	2.44	0.52
14:N:47:LEU:HB3	14:N:53:LEU:HD21	1.92	0.52
1:A:1008:C:N4	1:A:1021:G:H1	2.08	0.52
3:C:150:LYS:HB3	3:C:201:TYR:HB2	1.92	0.52
1:A:544:G:OP1	4:D:59:ARG:NH1	2.43	0.51
1:A:92:C:H2'	1:A:93:G:C8	2.44	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:173:TRP:CD2	4:D:189:PRO:HB3	2.45	0.51
1:A:1198:G:H2'	1:A:1199:U:C6	2.46	0.51
1:A:1254:C:H2'	1:A:1255:G:C8	2.45	0.51
9:I:99:LEU:HB3	9:I:101:PHE:HD1	1.76	0.51
1:A:974:A:OP2	14:N:41:ARG:NH1	2.43	0.51
1:A:1031:G:H2'	1:A:1032:G:C8	2.46	0.51
1:A:41:G:H2'	1:A:42:G:C8	2.45	0.51
20:T:92:LEU:O	20:T:96:GLY:HA2	2.10	0.51
1:A:509:A:N3	1:A:543:C:O2'	2.40	0.51
1:A:1314:C:H2'	1:A:1315:U:C6	2.46	0.51
1:A:579:G:H5'	1:A:728:A:H1'	1.91	0.51
3:C:88:ARG:HH21	3:C:100:ALA:HB1	1.75	0.51
1:A:227:G:N2	16:P:62:VAL:O	2.38	0.51
1:A:537:G:OP1	12:L:113:ARG:NH2	2.44	0.51
1:A:932:C:H5'	7:G:4:ARG:HG3	1.91	0.51
1:A:973:G:H3'	1:A:974:A:H5''	1.93	0.51
3:C:108:ASN:HB3	3:C:111:LEU:HB2	1.93	0.51
3:C:180:ALA:HB1	3:C:205:GLY:O	2.11	0.51
4:D:78:LEU:HD21	4:D:96:LEU:HB3	1.93	0.51
8:H:63:LEU:H	8:H:63:LEU:HD22	1.76	0.51
1:A:281:G:H4'	1:A:282:A:O5'	2.11	0.51
1:A:5:U:H4'	1:A:6:G:O5'	2.11	0.51
1:A:736:C:H2'	1:A:737:A:C8	2.46	0.51
1:A:662:G:H2'	1:A:663:A:C8	2.46	0.50
1:A:686:U:O2'	1:A:687:A:H8	1.93	0.50
1:A:1305:G:O2'	1:A:1306:A:P	2.70	0.50
3:C:70:VAL:HG12	3:C:72:LYS:H	1.75	0.50
1:A:1148:U:H2'	1:A:1149:C:O4'	2.11	0.50
1:A:1435:G:H2'	1:A:1436:U:C6	2.46	0.50
1:A:1392:G:N2	1:A:1502:A:H8	2.09	0.50
4:D:23:GLY:HA3	4:D:112:VAL:HG12	1.92	0.50
5:E:11:ILE:HG22	5:E:12:LEU:HD12	1.93	0.50
11:K:12:ARG:HB3	11:K:14:VAL:HG13	1.93	0.50
12:L:113:ARG:HH11	12:L:116:SER:H	1.60	0.50
1:A:1257:U:O2'	1:A:1258:G:OP2	2.24	0.50
1:A:157:G:H2'	1:A:158:G:H8	1.77	0.50
1:A:514:C:H2'	1:A:515:G:H8	1.76	0.50
1:A:780:A:N6	1:A:801:U:OP2	2.43	0.50
1:A:1143:G:H2'	1:A:1144:G:C8	2.46	0.50
1:A:1498:UR3:H1'	1:A:1499:A:OP2	2.12	0.50
1:A:89:C:H2'	1:A:90:U:O4'	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:45:GLN:O	2:B:49:GLU:HG3	2.12	0.50
1:A:1112:C:O2	3:C:179:ARG:HB2	2.12	0.50
1:A:1504:G:OP1	1:A:1507:A:H4'	2.11	0.50
2:B:119:GLU:OE1	2:B:153:ARG:NH2	2.45	0.50
14:N:9:LYS:HD2	14:N:23:ARG:HB2	1.94	0.49
20:T:70:SER:HA	20:T:73:HIS:CD2	2.47	0.49
1:A:31:G:N2	1:A:48:C:OP1	2.42	0.49
3:C:138:VAL:HG13	3:C:149:ALA:HB3	1.93	0.49
1:A:1301:U:O2'	1:A:1303:C:OP2	2.31	0.49
1:A:1513:A:H2'	1:A:1514:C:C6	2.47	0.49
17:Q:59:ILE:HG23	17:Q:71:PHE:HB3	1.94	0.49
1:A:1427:U:H2'	1:A:1428:A:C8	2.47	0.49
1:A:1055:A:O2'	3:C:161:GLU:O	2.28	0.49
8:H:26:VAL:HG13	8:H:59:LEU:HB2	1.94	0.49
9:I:22:GLY:HA3	9:I:60:ASP:HB2	1.94	0.49
1:A:1137:C:H4'	1:A:1138:G:C2	2.48	0.49
1:A:739:C:HO2'	15:O:42:HIS:HD1	1.58	0.49
5:E:13:ILE:HA	5:E:29:GLY:O	2.12	0.49
7:G:22:LEU:HG	7:G:62:PHE:HE2	1.78	0.49
1:A:1348:U:OP1	9:I:110:GLU:HB3	2.13	0.49
13:M:48:LEU:HB3	13:M:53:VAL:HG23	1.94	0.49
13:M:90:LEU:HD23	13:M:93:ARG:HD2	1.95	0.49
3:C:134:ILE:HG21	3:C:167:TRP:O	2.13	0.49
4:D:81:GLU:O	4:D:85:LYS:HG3	2.13	0.49
8:H:31:PHE:O	8:H:35:ILE:HG12	2.13	0.49
1:A:1355:G:H2'	1:A:1356:G:C8	2.48	0.49
3:C:130:VAL:HG21	3:C:153:VAL:HG11	1.94	0.49
1:A:450:G:H4'	16:P:41:PRO:HB2	1.94	0.49
1:A:328:C:H4'	1:A:329:A:O5'	2.13	0.49
13:M:63:THR:HG23	13:M:64:TRP:CD2	2.48	0.49
6:F:70:ASP:N	6:F:70:ASP:OD1	2.38	0.48
11:K:121:PRO:HD2	11:K:126:ARG:HD2	1.93	0.48
12:L:27:LEU:HG	12:L:28:LYS:H	1.78	0.48
1:A:1136:U:H5''	1:A:1137:C:OP2	2.13	0.48
1:A:1497:G:H2'	1:A:1498:UR3:H5'	1.95	0.48
12:L:103:GLY:N	12:L:107:ALA:O	2.31	0.48
1:A:1008:C:H42	1:A:1021:G:H1	1.61	0.48
1:A:1151:A:HO2'	1:A:1152:A:H8	1.62	0.48
1:A:1256:A:H4'	1:A:1257:U:O5'	2.13	0.48
1:A:442:C:H42	1:A:492:G:H1	1.61	0.48
2:B:98:LEU:O	2:B:101:MET:HG3	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1343:G:H4'	9:I:122:ALA:HB3	1.95	0.48
1:A:235:C:N4	24:A:1904:HOH:O	2.45	0.48
1:A:474:G:H2'	1:A:475:G:C8	2.48	0.48
1:A:859:A:OP2	1:A:869:G:N1	2.30	0.48
4:D:93:PHE:CE1	4:D:97:LEU:HD11	2.48	0.48
8:H:110:ALA:N	8:H:121:ASP:OD1	2.47	0.48
1:A:1092:A:N3	1:A:1183:A:N6	2.60	0.48
1:A:1196:U:OP1	1:A:1197:G:H5'	2.13	0.48
1:A:1294:G:H2'	1:A:1295:G:C8	2.49	0.48
1:A:701:C:H4'	1:A:702:A:O5'	2.12	0.48
4:D:19:LEU:HB3	4:D:67:ILE:HG12	1.95	0.48
6:F:77:ARG:O	6:F:81:ILE:HG13	2.13	0.48
11:K:83:ILE:HD13	11:K:109:VAL:HB	1.94	0.48
11:K:59:TYR:CE2	11:K:63:LEU:HD11	2.49	0.48
3:C:12:LEU:HD11	14:N:51:GLY:HA2	1.95	0.48
18:R:40:LEU:HB3	18:R:79:LEU:HD11	1.94	0.48
19:S:62:ILE:HD12	19:S:66:MET:HG3	1.95	0.48
1:A:481:G:O2'	1:A:482:A:H8	1.93	0.48
3:C:16:ARG:NH1	3:C:183:ASP:OD2	2.47	0.48
1:A:517:G:N1	1:A:533:A:OP2	2.46	0.48
5:E:100:VAL:O	5:E:107:ARG:NH2	2.46	0.48
10:J:48:THR:HA	10:J:62:HIS:HB3	1.96	0.48
1:A:1131:G:H2'	1:A:1132:C:C6	2.49	0.48
1:A:1286:A:H2'	1:A:1287:A:H4'	1.94	0.48
1:A:1300:G:H4'	1:A:1301:U:O5'	2.13	0.48
1:A:337:C:H2'	1:A:338:A:C8	2.49	0.48
1:A:652:U:O4	1:A:752:G:O2'	2.26	0.48
1:A:701:C:H5''	1:A:703:G:H5'	1.96	0.48
2:B:68:ILE:O	2:B:90:MET:HB3	2.14	0.48
1:A:474:G:H2'	1:A:475:G:H8	1.79	0.47
1:A:324:G:N1	1:A:327:A:OP2	2.45	0.47
9:I:63:ILE:HG21	9:I:77:ILE:HG12	1.96	0.47
1:A:757:U:H2'	1:A:758:G:O4'	2.13	0.47
5:E:105:VAL:HB	5:E:106:PRO:HD3	1.96	0.47
1:A:1068:G:H8	1:A:1068:G:OP2	1.96	0.47
7:G:26:PHE:O	7:G:30:ILE:HG13	2.14	0.47
11:K:33:THR:OG1	11:K:34:ASP:N	2.47	0.47
11:K:50:TYR:CD2	11:K:54:ARG:HB3	2.49	0.47
1:A:673:G:H2'	1:A:674:G:C8	2.49	0.47
5:E:33:VAL:HG11	5:E:109:ILE:HA	1.96	0.47
1:A:241:C:O3'	12:L:19:ARG:NH2	2.47	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:579:G:H4'	15:O:54:ARG:HH21	1.79	0.47
1:A:1305:G:H5''	21:U:4:GLY:HA3	1.96	0.47
1:A:186:C:H2'	1:A:187:C:C6	2.50	0.47
4:D:57:ARG:NH2	5:E:111:GLU:OE2	2.48	0.47
1:A:707:C:OP1	11:K:85:ARG:NH1	2.48	0.47
19:S:12:ASP:H	19:S:38:SER:HB3	1.80	0.47
1:A:324:G:OP1	20:T:22:ARG:NH1	2.47	0.47
1:A:316:G:OP2	1:A:351:G:O2'	2.32	0.47
1:A:437:U:H5'	4:D:155:LEU:HD21	1.96	0.47
1:A:920:U:H2'	1:A:921:U:C6	2.50	0.47
1:A:974:A:H8	1:A:974:A:OP1	1.97	0.47
10:J:9:ARG:HG3	10:J:95:GLU:HB3	1.96	0.47
18:R:46:GLU:CD	18:R:46:GLU:H	2.17	0.47
1:A:555:C:H2'	1:A:556:C:C6	2.50	0.47
17:Q:50:LYS:HE2	17:Q:50:LYS:HB3	1.79	0.47
1:A:1301:U:OP2	1:A:1303:C:N4	2.48	0.47
1:A:1319:A:OP1	19:S:5:LEU:HD22	2.15	0.47
1:A:514:C:H2'	1:A:515:G:C8	2.50	0.47
3:C:13:GLY:HA3	14:N:57:ARG:HH21	1.79	0.47
3:C:17:ASP:O	3:C:54:ARG:NH2	2.48	0.47
1:A:1254:C:H2'	1:A:1255:G:H8	1.80	0.47
1:A:390:C:H2'	1:A:391:G:C8	2.50	0.47
13:M:74:VAL:O	13:M:78:ILE:HG12	2.15	0.47
14:N:24:CYS:H	14:N:33:VAL:HG21	1.80	0.47
1:A:1359:C:H1'	1:A:1361(A):C:H41	1.79	0.46
1:A:1412:C:H2'	1:A:1413:A:C8	2.50	0.46
4:D:177:ASP:OD1	4:D:179:GLU:HG2	2.14	0.46
9:I:96:LEU:HD23	9:I:102:LEU:HG	1.97	0.46
9:I:48:GLU:N	9:I:49:PRO:HD2	2.30	0.46
9:I:15:ALA:HB2	9:I:65:VAL:HG23	1.98	0.46
1:A:1327:C:P	21:U:12:LYS:HZ1	2.39	0.46
1:A:1257:U:H4'	1:A:1258:G:O5'	2.15	0.46
1:A:1280:A:H5'	10:J:40:LEU:HD22	1.97	0.46
1:A:41:G:H2'	1:A:42:G:H8	1.81	0.46
1:A:476:G:H2'	1:A:477:G:H8	1.79	0.46
1:A:532:A:H2'	1:A:533:A:H5''	1.97	0.46
1:A:945:G:O6	1:A:1236:A:N1	2.48	0.46
2:B:142:LEU:HD23	2:B:142:LEU:HA	1.81	0.46
8:H:46:LYS:HG3	8:H:64:LYS:HB3	1.97	0.46
10:J:10:GLY:HA3	10:J:16:LEU:HD21	1.96	0.46
13:M:48:LEU:HA	13:M:48:LEU:HD22	1.79	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
20:T:63:ILE:HG21	20:T:81:LYS:HG3	1.97	0.46
1:A:1232:U:H5''	9:I:124:GLN:O	2.14	0.46
2:B:24:TRP:HZ3	2:B:29:ALA:HB2	1.80	0.46
10:J:42:THR:HG21	10:J:66:ARG:HB2	1.97	0.46
1:A:335:C:O2'	1:A:1433:A:N3	2.43	0.46
1:A:1502:A:H2	1:A:1505:G:H1	1.61	0.46
11:K:72:ALA:HB1	11:K:77:MET:HG3	1.97	0.46
13:M:15:VAL:HG21	13:M:48:LEU:HD21	1.97	0.46
1:A:1020:U:H2'	1:A:1021:G:H8	1.79	0.46
1:A:1225:A:N3	1:A:1225:A:H2'	2.30	0.46
1:A:130:A:H1'	1:A:263:A:O2'	2.16	0.46
15:O:26:GLU:HA	15:O:81:LEU:HD11	1.97	0.46
1:A:1201:A:H4'	1:A:1202:G:O5'	2.15	0.46
1:A:1305:G:O2'	1:A:1306:A:H8	1.98	0.46
1:A:1409:C:H2'	1:A:1410:G:C8	2.51	0.46
1:A:542:G:OP1	4:D:10:ARG:NH2	2.45	0.46
2:B:71:VAL:HB	2:B:164:VAL:HG12	1.96	0.46
3:C:6:HIS:CE1	3:C:8:ILE:HB	2.51	0.46
4:D:187:ARG:NH2	4:D:188:LEU:HB2	2.31	0.46
1:A:1305:G:O2'	1:A:1306:A:O5'	2.27	0.46
1:A:1518[A]:MA6:O5'	1:A:1518[A]:MA6:H8	2.16	0.46
4:D:28:SER:O	4:D:30:LYS:N	2.47	0.46
1:A:812:C:H4'	1:A:813:U:O5'	2.14	0.46
1:A:1369:C:OP1	9:I:111:ARG:HB2	2.16	0.46
16:P:68:ASP:OD1	16:P:68:ASP:N	2.49	0.46
1:A:254:G:O2'	17:Q:16:GLN:O	2.33	0.46
1:A:707:C:O2	11:K:39:PRO:HD3	2.16	0.46
1:A:1218:C:H2'	1:A:1219:U:C6	2.50	0.46
1:A:19:C:H2'	1:A:20:U:C6	2.50	0.46
1:A:201:C:H42	1:A:216:G:H1	1.63	0.46
1:A:1157:A:H5'	2:B:132:LYS:HE3	1.97	0.46
2:B:96:ARG:HG3	2:B:97:TRP:N	2.31	0.46
1:A:113:G:H1'	1:A:354:G:H5'	1.98	0.45
1:A:356:A:N3	1:A:368:U:O2'	2.33	0.45
5:E:82:VAL:HG21	5:E:138:ALA:HA	1.97	0.45
10:J:8:LEU:O	10:J:69:ASN:HA	2.16	0.45
19:S:5:LEU:HD12	19:S:9:VAL:HG22	1.98	0.45
1:A:129:U:O3'	1:A:129(A):G:H3'	2.15	0.45
1:A:1305:G:O2'	1:A:1306:A:C8	2.70	0.45
1:A:19:C:H2'	1:A:20:U:H6	1.81	0.45
1:A:766:A:H2'	1:A:767:A:O4'	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:60:ASP:CG	2:B:64:ARG:HH12	2.20	0.45
8:H:19:VAL:HG23	8:H:21:LYS:HG3	1.97	0.45
15:O:29:VAL:HG11	15:O:67:LEU:HD21	1.98	0.45
15:O:75:PRO:O	15:O:79:ARG:HG3	2.16	0.45
17:Q:24:GLU:HG2	17:Q:39:SER:HB3	1.97	0.45
1:A:1200:C:H5'	1:A:1201:A:OP1	2.17	0.45
1:A:1316:G:N2	1:A:1319:A:OP2	2.50	0.45
1:A:463:A:OP1	16:P:75:ARG:NH1	2.39	0.45
3:C:180:ALA:HB3	3:C:203:PHE:HE1	1.81	0.45
1:A:1049:U:H5'	1:A:1201:A:OP2	2.16	0.45
1:A:1277:C:O2'	1:A:1279:A:H1'	2.16	0.45
1:A:1356:G:H2'	1:A:1357:A:C8	2.52	0.45
1:A:142:G:H2'	1:A:143:A:C8	2.52	0.45
1:A:689:C:H2'	1:A:690:G:O4'	2.17	0.45
3:C:159:GLY:HA2	3:C:193:TYR:CG	2.52	0.45
1:A:1347:G:O2'	1:A:1348:U:P	2.75	0.45
1:A:1355:G:H2'	1:A:1356:G:H8	1.82	0.45
1:A:560:U:H5'	1:A:566:G:N2	2.30	0.45
1:A:972:C:H4'	10:J:57:LYS:HD3	1.97	0.45
2:B:179:LYS:HB2	2:B:179:LYS:HE3	1.72	0.45
9:I:111:ARG:NH1	9:I:112:LYS:O	2.49	0.45
1:A:1343:G:H1'	9:I:121:ARG:HH12	1.81	0.45
10:J:57:LYS:O	10:J:60:ARG:NH1	2.50	0.45
16:P:21:VAL:HG23	16:P:36:ILE:HG12	1.98	0.45
1:A:1202:G:H2'	1:A:1203:C:O4'	2.17	0.45
1:A:1511:G:H2'	1:A:1512:U:O4'	2.17	0.45
20:T:73:HIS:HB3	20:T:74:LYS:H	1.56	0.45
1:A:1098:C:H2'	1:A:1099:G:O4'	2.17	0.45
5:E:88:LYS:HD2	5:E:123:LEU:HD12	1.99	0.45
1:A:966:M2G:HM22	1:A:967:5MC:C2	2.52	0.45
4:D:35:ARG:N	4:D:35:ARG:HD2	2.32	0.45
7:G:84:ASN:OD1	7:G:84:ASN:N	2.29	0.45
14:N:29:ARG:HB3	14:N:33:VAL:HG22	1.99	0.45
1:A:1065:U:H1'	1:A:1066:C:OP2	2.16	0.44
1:A:1380:U:H1'	1:A:1381:U:OP2	2.16	0.44
1:A:1450:U:HO2'	1:A:1451:A:H8	1.63	0.44
1:A:157:G:H2'	1:A:158:G:C8	2.51	0.44
1:A:35:G:H2'	1:A:36:C:C6	2.52	0.44
3:C:34:LEU:O	3:C:38:ARG:HG2	2.17	0.44
4:D:177:ASP:OD1	4:D:180:GLY:N	2.38	0.44
1:A:381:C:H2'	1:A:382:A:O4'	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:452:A:O2'	1:A:453:A:O4'	2.30	0.44
1:A:890:G:O2'	1:A:906:G:O6	2.32	0.44
2:B:146:GLN:O	2:B:150:SER:HB3	2.16	0.44
4:D:184:LYS:HB2	4:D:184:LYS:HE3	1.80	0.44
4:D:61:LYS:HE3	4:D:61:LYS:HB3	1.87	0.44
1:A:1232:U:OP1	9:I:126:SER:HB3	2.16	0.44
20:T:50:GLU:HG3	20:T:100:ILE:HD11	2.00	0.44
1:A:1007:C:H2'	1:A:1008:C:C6	2.53	0.44
1:A:676:A:H1'	11:K:115:PRO:HB3	1.99	0.44
1:A:824:C:H2'	1:A:825:G:C8	2.53	0.44
1:A:952:U:H2'	1:A:953:G:H8	1.83	0.44
1:A:1196:U:H3	3:C:162:GLN:HE22	1.65	0.44
8:H:86:ILE:HD11	8:H:136:GLU:HG3	1.99	0.44
14:N:29:ARG:HH22	14:N:41:ARG:HH12	1.65	0.44
1:A:1047:G:H5''	14:N:4:LYS:HD2	1.99	0.44
18:R:53:ARG:NH1	18:R:58:LEU:O	2.45	0.44
1:A:1278:U:H5'	1:A:1279:A:O4'	2.17	0.44
1:A:164:U:H2'	1:A:165:C:C6	2.52	0.44
2:B:188:ALA:O	2:B:202:PRO:HA	2.17	0.44
3:C:150:LYS:HG3	3:C:169:ALA:HB2	1.99	0.44
8:H:104:ARG:HG3	8:H:138:TRP:CD2	2.52	0.44
1:A:1230:C:H41	13:M:105:THR:HG21	1.81	0.44
2:B:187:LEU:HD23	2:B:214:ILE:HG21	1.99	0.44
4:D:133:VAL:HG12	4:D:135:LEU:H	1.82	0.44
1:A:1148:U:H4'	9:I:14:VAL:HG11	2.00	0.44
11:K:14:VAL:HG21	11:K:40:ILE:HD13	2.00	0.44
21:U:13:ILE:HG22	21:U:22:ARG:CZ	2.47	0.44
21:U:5:ASP:O	21:U:11:GLY:HA3	2.17	0.44
1:A:615:C:H2'	1:A:616:G:O4'	2.18	0.44
1:A:719:C:O2'	18:R:49:LYS:HB3	2.17	0.44
1:A:824:C:H2'	1:A:825:G:H8	1.81	0.44
1:A:986:A:H2'	1:A:987:G:C8	2.53	0.44
1:A:98:U:H2'	1:A:99:C:C6	2.53	0.44
2:B:133:LYS:O	2:B:137:ARG:HG3	2.17	0.44
13:M:16:ASP:OD1	13:M:16:ASP:N	2.50	0.44
1:A:79:G:H2'	1:A:79:G:N3	2.33	0.44
3:C:137:ALA:O	3:C:141:VAL:HG23	2.17	0.44
13:M:54:VAL:O	13:M:58:GLU:HG2	2.17	0.44
10:J:9:ARG:HA	10:J:68:HIS:O	2.18	0.44
1:A:1391:U:H2'	1:A:1392:G:H8	1.82	0.44
1:A:1443:G:C5'	1:A:1446:A:H5'	2.40	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1399:C:C2	1:A:1502:A:N6	2.86	0.44
4:D:11:LEU:HD22	4:D:66:ARG:NH1	2.33	0.44
8:H:110:ALA:HB3	8:H:121:ASP:HB3	2.00	0.44
16:P:3:LYS:HE2	16:P:3:LYS:HB3	1.86	0.44
1:A:143:A:O3'	1:A:144:G:H8	2.01	0.43
2:B:102:LEU:HB3	2:B:180:LEU:HD12	2.00	0.43
2:B:16:HIS:CE1	2:B:210:SER:HB2	2.52	0.43
2:B:230:VAL:HG12	2:B:231:GLU:O	2.17	0.43
3:C:134:ILE:O	3:C:138:VAL:HG23	2.18	0.43
13:M:51:ALA:O	13:M:54:VAL:HG12	2.17	0.43
12:L:10:LEU:HB3	17:Q:32:TYR:CE1	2.52	0.43
1:A:986:A:H1'	19:S:54:GLY:O	2.17	0.43
1:A:488:C:H2'	1:A:489:C:C6	2.53	0.43
1:A:580:U:H2'	1:A:581:G:O4'	2.17	0.43
1:A:1112:C:H1'	3:C:179:ARG:HH21	1.83	0.43
6:F:26:ILE:HG23	6:F:79:LEU:HD21	2.00	0.43
9:I:50:LEU:HD11	9:I:81:ILE:HD13	2.00	0.43
1:A:578:C:O2'	1:A:728:A:N3	2.45	0.43
2:B:68:ILE:HG12	2:B:161:ALA:HB3	1.99	0.43
11:K:62:GLN:HG3	11:K:97:ALA:HB2	1.99	0.43
4:D:36:ARG:HG2	4:D:38:TYR:CZ	2.54	0.43
1:A:7:G:H21	5:E:121:LYS:HG2	1.84	0.43
11:K:27:ASN:OD1	11:K:28:THR:N	2.52	0.43
17:Q:83:ASP:N	17:Q:83:ASP:OD1	2.50	0.43
1:A:1211:U:H1'	1:A:1213:A:N3	2.33	0.43
1:A:1437:C:H2'	1:A:1438:G:C8	2.52	0.43
1:A:337:C:H2'	1:A:338:A:H8	1.83	0.43
1:A:371:G:O2'	1:A:372:C:H5'	2.17	0.43
1:A:769:G:H4'	1:A:1513:A:H4'	2.01	0.43
1:A:77:G:H2'	1:A:78:G:H8	1.82	0.43
1:A:80:G:H2'	1:A:81:U:H5'	1.99	0.43
3:C:6:HIS:HE1	3:C:8:ILE:HB	1.83	0.43
5:E:11:ILE:HB	5:E:31:LEU:HB3	2.00	0.43
6:F:50:TYR:CE1	18:R:77:GLY:HA2	2.54	0.43
1:A:28:G:O2'	1:A:296:U:OP1	2.33	0.43
1:A:671:G:H5'	6:F:77:ARG:NH2	2.32	0.43
1:A:1205:U:OP1	3:C:190:ARG:NH2	2.52	0.43
4:D:150:GLU:HA	4:D:153:ARG:HG3	2.00	0.43
11:K:22:HIS:HB3	11:K:29:ILE:HD13	1.99	0.43
11:K:29:ILE:HG12	11:K:30:VAL:N	2.33	0.43
12:L:124:LYS:HD2	12:L:125:PRO:HD2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
20:T:72:LEU:HD11	20:T:80:ARG:HD2	2.00	0.43
20:T:89:ARG:NH2	20:T:104:LEU:HB3	2.33	0.43
1:A:1037:C:H2'	1:A:1038:C:C6	2.53	0.43
1:A:587:G:N2	1:A:754:C:OP2	2.50	0.43
3:C:110:ASN:O	3:C:141:VAL:HG22	2.19	0.43
1:A:130:A:OP2	1:A:190(E):U:O2'	2.26	0.43
10:J:50:ILE:H	10:J:50:ILE:HD12	1.84	0.43
12:L:20:LYS:HG3	12:L:20:LYS:H	1.53	0.43
1:A:1316:G:N1	1:A:1319:A:OP2	2.51	0.43
1:A:1111:A:N6	3:C:177:THR:HB	2.29	0.43
1:A:1477:C:H2'	1:A:1478:C:C6	2.54	0.43
1:A:1493:A:H2'	1:A:1494:G:H8	1.83	0.43
1:A:234:C:H2'	1:A:235:C:C6	2.53	0.43
1:A:428:G:H1'	1:A:429:U:OP2	2.19	0.43
3:C:12:LEU:HD23	3:C:12:LEU:HA	1.90	0.43
1:A:1061:G:N7	3:C:2:GLY:HA3	2.34	0.43
5:E:28:PHE:O	5:E:47:LYS:HA	2.19	0.43
2:B:223:ILE:HD13	2:B:230:VAL:HG21	2.01	0.42
7:G:26:PHE:CE2	7:G:30:ILE:HD11	2.54	0.42
9:I:8:GLY:H	9:I:83:ARG:HD2	1.83	0.42
10:J:90:LEU:N	10:J:91:PRO:HD2	2.34	0.42
15:O:18:PHE:CZ	15:O:21:ASP:HB2	2.53	0.42
1:A:1403:C:H1'	1:A:1500:A:N1	2.34	0.42
1:A:463:A:H2'	1:A:474:G:O4'	2.19	0.42
6:F:8:ILE:HB	6:F:61:LEU:HB2	2.01	0.42
8:H:87:SER:HB2	8:H:93:VAL:HB	2.02	0.42
13:M:54:VAL:HG23	13:M:57:ARG:NH1	2.35	0.42
1:A:433:C:H2'	1:A:434:U:C6	2.54	0.42
2:B:178:ARG:O	8:H:71:GLY:HA2	2.19	0.42
19:S:17:GLU:HA	19:S:20:LEU:HG	2.00	0.42
1:A:1516[A]:G:H2'	1:A:1518[A]:MA6:OP2	2.19	0.42
2:B:213:LEU:O	2:B:217:ARG:HG2	2.19	0.42
9:I:53:VAL:HG21	9:I:85:LEU:HD21	2.00	0.42
12:L:53:ARG:HG2	12:L:93:LEU:HD11	2.01	0.42
1:A:279:A:C6	17:Q:98:LEU:HD13	2.54	0.42
19:S:7:LYS:HE3	19:S:7:LYS:HB3	1.90	0.42
1:A:1022:G:N2	1:A:1023:G:N7	2.66	0.42
1:A:1213:A:N6	1:A:1215:G:N3	2.67	0.42
1:A:745:C:H2'	1:A:746:A:C8	2.55	0.42
1:A:967:5MC:H4'	9:I:128:ARG:HG3	2.01	0.42
13:M:2:ALA:O	13:M:10:PRO:HD2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:359:U:H2'	1:A:360:A:C8	2.54	0.42
1:A:716:A:N3	11:K:118:GLY:HA2	2.35	0.42
1:A:860:A:H2'	1:A:861:G:O4'	2.18	0.42
1:A:878:G:H5''	8:H:89:PRO:O	2.20	0.42
4:D:121:VAL:O	4:D:134:ASP:HA	2.19	0.42
7:G:87:VAL:HG11	7:G:154:TYR:O	2.18	0.42
1:A:1255:G:C6	1:A:1279:A:N7	2.88	0.42
2:B:152:PHE:CE1	2:B:155:LEU:HD12	2.54	0.42
4:D:72:GLU:OE1	4:D:207:TYR:OH	2.33	0.42
1:A:1343:G:H1'	9:I:121:ARG:NH1	2.35	0.42
20:T:53:LEU:HD22	20:T:53:LEU:HA	1.91	0.42
1:A:1145:C:HO2'	1:A:1146:A:P	2.41	0.42
1:A:1419:G:H2'	1:A:1420:C:C6	2.55	0.42
1:A:373:A:H1'	1:A:481:G:H1'	2.01	0.42
1:A:46:G:H2'	1:A:366:C:C5	2.55	0.42
1:A:691:G:H2'	1:A:692:U:C6	2.54	0.42
6:F:55:ASP:HB3	6:F:86:ARG:HH12	1.85	0.42
12:L:77:LEU:HD23	12:L:77:LEU:HA	1.91	0.42
19:S:28:LYS:HG2	19:S:29:ARG:H	1.85	0.42
21:U:10:ARG:HA	21:U:13:ILE:HG12	2.01	0.42
21:U:12:LYS:HB3	21:U:22:ARG:HD2	2.01	0.42
2:B:74:LYS:O	2:B:78:GLN:HG3	2.20	0.42
2:B:71:VAL:HG22	2:B:93:VAL:HB	2.01	0.42
14:N:32:SER:O	14:N:40:CYS:HB2	2.20	0.42
1:A:484:G:H1'	1:A:485:G:OP2	2.20	0.42
6:F:76:ALA:O	6:F:80:ARG:HG3	2.20	0.42
10:J:39:PRO:HA	10:J:70:ARG:HD3	2.02	0.42
1:A:1093:A:N3	1:A:1109:C:O2'	2.47	0.41
3:C:136:GLN:O	3:C:140:ARG:HG3	2.20	0.41
3:C:27:LYS:HA	3:C:30:ARG:HH12	1.85	0.41
7:G:116:ALA:O	7:G:120:ILE:HG12	2.20	0.41
7:G:74:GLU:O	7:G:88:PRO:HA	2.20	0.41
8:H:104:ARG:HD3	8:H:104:ARG:HA	1.87	0.41
10:J:71:LEU:HA	10:J:71:LEU:HD12	1.83	0.41
1:A:1248:A:H2'	1:A:1249:C:C6	2.56	0.41
1:A:217:C:H2'	1:A:218:C:C6	2.55	0.41
9:I:99:LEU:HB3	9:I:101:PHE:CD1	2.54	0.41
19:S:5:LEU:C	19:S:6:LYS:HG3	2.40	0.41
1:A:1079:G:O3'	5:E:14:ARG:NH2	2.53	0.41
1:A:96:G:H2'	1:A:97:G:C8	2.55	0.41
2:B:132:LYS:HG3	2:B:132:LYS:H	1.69	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:13:ALA:O	2:B:15:VAL:N	2.53	0.41
11:K:34:ASP:OD2	11:K:38:ASN:HB2	2.20	0.41
15:O:36:ILE:HD13	15:O:59:MET:HE3	2.03	0.41
1:A:1097:C:H2'	1:A:1098:C:C6	2.56	0.41
1:A:349:A:H2'	1:A:350:G:O4'	2.20	0.41
1:A:841:U:H5'	1:A:848:C:C6	2.55	0.41
13:M:62:ASN:N	13:M:62:ASN:OD1	2.52	0.41
18:R:26:LEU:HA	18:R:26:LEU:HD12	1.79	0.41
1:A:1014:A:H4'	19:S:14:HIS:CD2	2.56	0.41
1:A:1065:U:H4'	1:A:1066:C:O5'	2.20	0.41
1:A:328:C:H1'	1:A:329:A:OP2	2.20	0.41
1:A:865:A:H2	1:A:918:A:H4'	1.85	0.41
2:B:155:LEU:HA	2:B:155:LEU:HD23	1.79	0.41
10:J:47:PHE:HB3	14:N:34:TYR:HE2	1.83	0.41
21:U:12:LYS:HG2	21:U:22:ARG:HB3	2.03	0.41
1:A:1205:U:H2'	1:A:1206:G:H8	1.84	0.41
1:A:252:U:H2'	1:A:253:U:C6	2.55	0.41
1:A:532:A:N6	3:C:159:GLY:O	2.53	0.41
1:A:936:C:H2'	1:A:937:A:O4'	2.20	0.41
13:M:13:LYS:O	13:M:45:VAL:HG23	2.20	0.41
13:M:4:ILE:O	13:M:57:ARG:HG3	2.21	0.41
13:M:65:LYS:H	13:M:65:LYS:HG2	1.51	0.41
13:M:87:TYR:CE1	13:M:91:ARG:HD3	2.56	0.41
14:N:12:ARG:H	14:N:12:ARG:HG2	1.61	0.41
17:Q:56:VAL:HG21	17:Q:81:ARG:HD3	2.02	0.41
1:A:1087:G:N2	1:A:1099:G:H1'	2.36	0.41
1:A:1465:C:H2'	1:A:1466:C:O4'	2.21	0.41
5:E:69:VAL:HA	5:E:70:PRO:HD3	1.94	0.41
9:I:10:ARG:HG2	9:I:75:ASP:CB	2.48	0.41
1:A:424:G:H2'	1:A:425:G:H8	1.85	0.41
1:A:757:U:O2'	1:A:879:C:O2	2.37	0.41
1:A:960:U:H4'	1:A:961:U:C5'	2.51	0.41
2:B:158:LEU:H	2:B:158:LEU:HD12	1.84	0.41
2:B:157:ARG:HG2	2:B:158:LEU:N	2.36	0.41
1:A:1296:C:H5'	13:M:14:ARG:HD2	2.02	0.41
13:M:57:ARG:HG2	13:M:61:GLU:HG3	2.01	0.41
1:A:1006:C:H2'	1:A:1007:C:C6	2.56	0.41
1:A:96:G:H2'	1:A:97:G:H8	1.85	0.41
2:B:108:ILE:O	2:B:112:VAL:HG23	2.21	0.41
4:D:26:CYS:HA	4:D:31:CYS:HB2	2.02	0.41
1:A:552:U:O2	12:L:31:PRO:HB3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
18:R:47:THR:HG22	18:R:83:GLU:H	1.85	0.41
1:A:123:C:H2'	1:A:124:G:H8	1.85	0.41
8:H:17:THR:O	8:H:78:GLN:NE2	2.42	0.41
1:A:1250:A:H4'	9:I:68:GLY:H	1.86	0.41
1:A:833:U:H2'	1:A:834:C:C6	2.55	0.41
4:D:187:ARG:HD2	4:D:187:ARG:HA	1.85	0.41
5:E:11:ILE:HG23	5:E:105:VAL:HG22	2.03	0.41
7:G:44:TYR:O	7:G:48:LYS:HG3	2.21	0.41
8:H:105:ARG:HA	8:H:105:ARG:HD3	1.83	0.41
9:I:69:GLY:O	9:I:73:GLN:HG3	2.21	0.41
12:L:89:ARG:HG2	12:L:97:ARG:HA	2.03	0.41
1:A:1359:C:O2'	1:A:1361:G:N7	2.53	0.40
1:A:614:A:H2'	1:A:615:C:C6	2.56	0.40
1:A:748:C:H1'	1:A:749:C:OP2	2.22	0.40
2:B:114:ARG:HH11	2:B:118:LEU:HD21	1.85	0.40
2:B:181:PHE:HD2	8:H:70:GLN:HB3	1.86	0.40
10:J:42:THR:CG2	10:J:66:ARG:HB2	2.51	0.40
1:A:1004:A:H5''	1:A:1025:U:C4	2.56	0.40
1:A:1284:C:H3'	1:A:1285:A:H8	1.86	0.40
1:A:1350:A:OP2	9:I:118:LYS:NZ	2.51	0.40
1:A:1488:G:H2'	1:A:1489:G:H8	1.86	0.40
1:A:603:U:H2'	1:A:604:G:H8	1.86	0.40
1:A:939:G:H5''	7:G:102:ARG:CZ	2.52	0.40
7:G:44:TYR:CD1	9:I:41:VAL:HG11	2.56	0.40
11:K:41:THR:HG21	11:K:71:LYS:HB3	2.02	0.40
13:M:11:ARG:HA	13:M:45:VAL:HG11	2.03	0.40
13:M:56:LEU:HD23	13:M:56:LEU:HA	1.90	0.40
1:A:1175:G:H2'	1:A:1176:A:C8	2.56	0.40
1:A:1279:A:H8	1:A:1282:C:N3	2.18	0.40
1:A:204:U:H4'	1:A:216:G:O4'	2.22	0.40
6:F:9:VAL:HB	6:F:87:ARG:HB2	2.03	0.40
19:S:31:ILE:HG22	19:S:49:ILE:HA	2.03	0.40
1:A:1003(A):G:C5	1:A:1004:A:H1'	2.56	0.40
1:A:1211:U:H1'	1:A:1213:A:C2	2.56	0.40
1:A:1277:C:H1'	1:A:1282:C:H1'	2.02	0.40
4:D:162:LEU:HA	4:D:165:MET:HB2	2.04	0.40
7:G:70:LYS:HE2	7:G:97:GLN:HA	2.03	0.40
11:K:33:THR:HG1	11:K:38:ASN:C	2.23	0.40
1:A:444:C:H2'	1:A:445:G:C8	2.56	0.40
1:A:44:G:H2'	1:A:45:U:O4'	2.22	0.40
1:A:509:A:HO2'	1:A:510:A:P	2.44	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:592:G:H2'	1:A:593:G:H8	1.86	0.40
7:G:47:CYS:HA	7:G:50:ILE:HG22	2.04	0.40
10:J:55:LYS:O	10:J:56:HIS:CG	2.75	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:82:U:O2	1:A:1400:5MC:C2[3_545]	1.99	0.21
1:A:82:U:O2	1:A:1400:5MC:C4[3_545]	2.11	0.09

## 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	232/234 (99%)	213 (92%)	18 (8%)	1 (0%)	34	72
3	C	204/206 (99%)	188 (92%)	16 (8%)	0	100	100
4	D	206/208 (99%)	202 (98%)	4 (2%)	0	100	100
5	E	148/150 (99%)	143 (97%)	5 (3%)	0	100	100
6	F	99/101 (98%)	98 (99%)	1 (1%)	0	100	100
7	G	153/155 (99%)	149 (97%)	4 (3%)	0	100	100
8	H	136/138 (99%)	134 (98%)	2 (2%)	0	100	100
9	I	125/127 (98%)	115 (92%)	10 (8%)	0	100	100
10	J	96/98 (98%)	80 (83%)	13 (14%)	3 (3%)	4	30
11	K	114/116 (98%)	108 (95%)	6 (5%)	0	100	100
12	L	121/124 (98%)	109 (90%)	12 (10%)	0	100	100
13	M	116/118 (98%)	105 (90%)	11 (10%)	0	100	100
14	N	58/60 (97%)	49 (84%)	9 (16%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
15	O	85/87 (98%)	83 (98%)	2 (2%)	0	100	100
16	P	81/83 (98%)	79 (98%)	2 (2%)	0	100	100
17	Q	97/99 (98%)	94 (97%)	3 (3%)	0	100	100
18	R	68/70 (97%)	68 (100%)	0	0	100	100
19	S	78/80 (98%)	72 (92%)	6 (8%)	0	100	100
20	T	97/99 (98%)	84 (87%)	10 (10%)	3 (3%)	4	30
21	U	22/24 (92%)	21 (96%)	1 (4%)	0	100	100
All	All	2336/2377 (98%)	2194 (94%)	135 (6%)	7 (0%)	41	75

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	J	55	LYS
20	T	74	LYS
20	T	75	ASN
10	J	56	HIS
20	T	73	HIS
2	B	14	GLY
10	J	54	PHE

### 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	202/202 (100%)	175 (87%)	27 (13%)	4	21
3	C	160/160 (100%)	136 (85%)	24 (15%)	3	17
4	D	180/180 (100%)	169 (94%)	11 (6%)	18	51
5	E	115/115 (100%)	104 (90%)	11 (10%)	8	34
6	F	90/90 (100%)	82 (91%)	8 (9%)	9	37
7	G	126/126 (100%)	116 (92%)	10 (8%)	12	41
8	H	119/119 (100%)	109 (92%)	10 (8%)	11	40

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	I	98/98 (100%)	82 (84%)	16 (16%)	2	13
10	J	87/88 (99%)	77 (88%)	10 (12%)	5	26
11	K	88/88 (100%)	83 (94%)	5 (6%)	20	53
12	L	103/103 (100%)	88 (85%)	15 (15%)	3	18
13	M	94/94 (100%)	77 (82%)	17 (18%)	1	9
14	N	49/49 (100%)	43 (88%)	6 (12%)	5	23
15	O	79/79 (100%)	66 (84%)	13 (16%)	2	13
16	P	72/72 (100%)	65 (90%)	7 (10%)	8	33
17	Q	94/94 (100%)	89 (95%)	5 (5%)	22	55
18	R	61/61 (100%)	57 (93%)	4 (7%)	16	49
19	S	71/71 (100%)	65 (92%)	6 (8%)	10	39
20	T	76/76 (100%)	65 (86%)	11 (14%)	3	18
21	U	19/19 (100%)	18 (95%)	1 (5%)	22	55
All	All	1983/1984 (100%)	1766 (89%)	217 (11%)	6	29

All (217) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	7	VAL
2	B	8	LYS
2	B	10	LEU
2	B	11	LEU
2	B	12	GLU
2	B	21	ARG
2	B	24	TRP
2	B	33	TYR
2	B	39	ILE
2	B	44	LEU
2	B	69	LEU
2	B	96	ARG
2	B	97	TRP
2	B	102	LEU
2	B	103	THR
2	B	127	ILE
2	B	144	ARG
2	B	153	ARG
2	B	154	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	B	157	ARG
2	B	172	ILE
2	B	178	ARG
2	B	195	ASP
2	B	200	ILE
2	B	206	ASP
2	B	212	GLN
2	B	236	TYR
3	C	3	ASN
3	C	10	PHE
3	C	11	ARG
3	C	31	HIS
3	C	34	LEU
3	C	52	LEU
3	C	90	GLU
3	C	91	LEU
3	C	94	LEU
3	C	95	THR
3	C	98	ASN
3	C	99	VAL
3	C	104	GLN
3	C	108	ASN
3	C	111	LEU
3	C	154	SER
3	C	166	GLU
3	C	176	HIS
3	C	177	THR
3	C	178	LEU
3	C	188	LEU
3	C	191	THR
3	C	196	LEU
3	C	204	LEU
4	D	19	LEU
4	D	35	ARG
4	D	36	ARG
4	D	53	ASP
4	D	122	ARG
4	D	150	GLU
4	D	155	LEU
4	D	157	LEU
4	D	160	GLN
4	D	192	GLU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	D	202	LEU
5	E	5	ASP
5	E	6	PHE
5	E	12	LEU
5	E	26	PHE
5	E	41	VAL
5	E	70	PRO
5	E	79	GLU
5	E	118	ILE
5	E	140	ARG
5	E	150	ARG
5	E	151	LEU
6	F	10	LEU
6	F	19	LEU
6	F	24	GLU
6	F	32	ASN
6	F	43	LEU
6	F	72	VAL
6	F	82	ARG
6	F	95	GLU
7	G	8	GLU
7	G	27	ILE
7	G	47	CYS
7	G	67	GLU
7	G	84	ASN
7	G	97	GLN
7	G	104	LEU
7	G	113	GLU
7	G	136	LYS
7	G	149	ARG
8	H	29	SER
8	H	52	ASP
8	H	63	LEU
8	H	83	ILE
8	H	85	ARG
8	H	88	LYS
8	H	91	ARG
8	H	92	ARG
8	H	98	LYS
8	H	121	ASP
9	I	11	LYS
9	I	14	VAL

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
9	I	38	GLN
9	I	44	VAL
9	I	47	LEU
9	I	50	LEU
9	I	56	LEU
9	I	58	HIS
9	I	64	THR
9	I	79	LEU
9	I	83	ARG
9	I	91	ASP
9	I	96	LEU
9	I	99	LEU
9	I	113	LYS
9	I	118	LYS
10	J	3	LYS
10	J	38	ILE
10	J	45	ARG
10	J	55	LYS
10	J	60	ARG
10	J	62	HIS
10	J	73	ASP
10	J	80	LYS
10	J	85	LEU
10	J	95	GLU
11	K	12	ARG
11	K	29	ILE
11	K	33	THR
11	K	81	ASP
11	K	98	LEU
12	L	18	VAL
12	L	20	LYS
12	L	33	ARG
12	L	36	VAL
12	L	42	THR
12	L	47	LYS
12	L	53	ARG
12	L	59	ARG
12	L	79	GLU
12	L	80	HIS
12	L	82	VAL
12	L	96	VAL
12	L	97	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
12	L	113	ARG
12	L	122	THR
13	M	7	VAL
13	M	12	ASN
13	M	14	ARG
13	M	44	ARG
13	M	48	LEU
13	M	50	GLU
13	M	54	VAL
13	M	59	TYR
13	M	64	TRP
13	M	65	LYS
13	M	67	GLU
13	M	70	LEU
13	M	80	ARG
13	M	105	THR
13	M	108	ARG
13	M	110	ARG
13	M	115	LYS
14	N	12	ARG
14	N	18	VAL
14	N	22	THR
14	N	24	CYS
14	N	25	VAL
14	N	27	CYS
15	O	5	LYS
15	O	8	LYS
15	O	21	ASP
15	O	32	LEU
15	O	33	THR
15	O	39	LEU
15	O	45	VAL
15	O	56	LEU
15	O	65	ARG
15	O	70	LEU
15	O	71	GLN
15	O	81	LEU
15	O	83	GLU
16	P	9	PHE
16	P	29	ASP
16	P	42	ARG
16	P	47	ASP

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Mol	Chain	Res	Type
16	P	53	VAL
16	P	54	GLU
16	P	62	VAL
17	Q	13	ASP
17	Q	34	LYS
17	Q	53	LEU
17	Q	60	ILE
17	Q	86	GLU
18	R	40	LEU
18	R	47	THR
18	R	69	THR
18	R	87	ARG
19	S	15	LEU
19	S	56	GLN
19	S	63	THR
19	S	71	LEU
19	S	78	ARG
19	S	79	THR
20	T	53	LEU
20	T	56	MET
20	T	57	ARG
20	T	62	LEU
20	T	68	LYS
20	T	72	LEU
20	T	74	LYS
20	T	75	ASN
20	T	84	LEU
20	T	92	LEU
20	T	93	GLU
21	U	25	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	204	ASN
2	B	212	GLN
9	I	3	GLN
16	P	82	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1504/1522 (98%)	255 (16%)	46 (3%)

All (255) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	6	G
1	A	7	G
1	A	9	G
1	A	32	A
1	A	39	G
1	A	47	C
1	A	48	C
1	A	50	A
1	A	51	A
1	A	54	C
1	A	80	G
1	A	81	U
1	A	92	C
1	A	101	A
1	A	116	A
1	A	117	G
1	A	121	C
1	A	129(A)	G
1	A	130	A
1	A	131	C
1	A	163	C
1	A	182	U
1	A	183	G
1	A	195	A
1	A	201	C
1	A	202	U
1	A	203	U
1	A	204	U
1	A	216	G
1	A	220	G
1	A	231	G
1	A	247	G
1	A	251	G
1	A	252	U
1	A	266	G
1	A	267	C
1	A	279	A
1	A	282	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	289	G
1	A	319	G
1	A	321	A
1	A	328	C
1	A	329	A
1	A	332	G
1	A	344	A
1	A	345	C
1	A	346	G
1	A	350	G
1	A	351	G
1	A	352	C
1	A	353	A
1	A	354	G
1	A	367	U
1	A	373	A
1	A	384	G
1	A	390	C
1	A	397	A
1	A	398	C
1	A	406	G
1	A	412	A
1	A	413	G
1	A	421	U
1	A	424	G
1	A	429	U
1	A	439	A
1	A	451	A
1	A	460	A
1	A	461	C
1	A	481	G
1	A	485	G
1	A	486	U
1	A	497	A
1	A	498	U
1	A	509	A
1	A	510	A
1	A	511	C
1	A	517	G
1	A	518	C
1	A	519	C
1	A	524	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	527	7MG
1	A	531	U
1	A	532	A
1	A	533	A
1	A	545	C
1	A	547	A
1	A	559	A
1	A	560	U
1	A	562	C
1	A	564	C
1	A	568	G
1	A	572	A
1	A	573	A
1	A	576	G
1	A	577	G
1	A	579	G
1	A	588	G
1	A	596	C
1	A	653	A
1	A	665	A
1	A	686	U
1	A	687	A
1	A	688	G
1	A	695	A
1	A	701	C
1	A	702	A
1	A	703	G
1	A	723	U
1	A	731	G
1	A	749	C
1	A	755	G
1	A	777	A
1	A	781	A
1	A	782	A
1	A	785	G
1	A	792	A
1	A	793	U
1	A	794	A
1	A	799	G
1	A	813	U
1	A	815	A
1	A	817	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	818	G
1	A	821	G
1	A	828	A
1	A	839	U
1	A	840	C
1	A	841	U
1	A	848	C
1	A	902	G
1	A	914	A
1	A	922	G
1	A	926	G
1	A	927	G
1	A	934	C
1	A	937	A
1	A	942	G
1	A	960	U
1	A	961	U
1	A	966	M2G
1	A	969	A
1	A	971	G
1	A	974	A
1	A	975	A
1	A	976	G
1	A	977	A
1	A	982	U
1	A	984	C
1	A	989	C
1	A	991	U
1	A	992	U
1	A	993	G
1	A	994	A
1	A	995	C
1	A	1004	A
1	A	1005	A
1	A	1006	C
1	A	1020	U
1	A	1023	G
1	A	1024	G
1	A	1026	G
1	A	1030(B)	C
1	A	1031	G
1	A	1045	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	1050	G
1	A	1053	G
1	A	1054	C
1	A	1065	U
1	A	1066	C
1	A	1068	G
1	A	1078	U
1	A	1085	U
1	A	1094	G
1	A	1095	U
1	A	1101	A
1	A	1124	G
1	A	1125	U
1	A	1126	U
1	A	1127	G
1	A	1130	A
1	A	1135	U
1	A	1137	C
1	A	1138	G
1	A	1139	G
1	A	1140	C
1	A	1146	A
1	A	1152	A
1	A	1159	U
1	A	1168	A
1	A	1171	G
1	A	1183	A
1	A	1191	A
1	A	1196	U
1	A	1197	G
1	A	1200	C
1	A	1201	A
1	A	1202	G
1	A	1207	2MG
1	A	1211	U
1	A	1212	U
1	A	1214	C
1	A	1224	G
1	A	1225	A
1	A	1227	A
1	A	1228	C
1	A	1230	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	1238	A
1	A	1241	G
1	A	1245	A
1	A	1256	A
1	A	1257	U
1	A	1258	G
1	A	1270	C
1	A	1278	U
1	A	1279	A
1	A	1280	A
1	A	1281	U
1	A	1286	A
1	A	1287	A
1	A	1289	A
1	A	1297	C
1	A	1300	G
1	A	1301	U
1	A	1302	U
1	A	1303	C
1	A	1305	G
1	A	1306	A
1	A	1316	G
1	A	1320	C
1	A	1322	C
1	A	1336	C
1	A	1346	A
1	A	1347	G
1	A	1348	U
1	A	1353	G
1	A	1359	C
1	A	1362	C
1	A	1381	U
1	A	1398	A
1	A	1400	5MC
1	A	1442	G
1	A	1446	A
1	A	1447	G
1	A	1451	A
1	A	1485	U
1	A	1487	G
1	A	1490	C
1	A	1493	A

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Mol	Chain	Res	Type
1	A	1499	A
1	A	1503	A
1	A	1504	G
1	A	1506	U
1	A	1529	G
1	A	1530	G
1	A	1531	A

All (46) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	5	U
1	A	115	G
1	A	129(A)	G
1	A	181	G
1	A	204	U
1	A	250	A
1	A	251	G
1	A	281	G
1	A	328	C
1	A	372	C
1	A	428	G
1	A	484	G
1	A	485	G
1	A	496	A
1	A	509	A
1	A	518	C
1	A	559	A
1	A	575	G
1	A	687	A
1	A	701	C
1	A	748	C
1	A	792	A
1	A	812	C
1	A	913	A
1	A	960	U
1	A	992	U
1	A	1049	U
1	A	1065	U
1	A	1067	A
1	A	1126	U
1	A	1129	C

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Mol	Chain	Res	Type
1	A	1139	G
1	A	1145	C
1	A	1182	G
1	A	1190	G
1	A	1201	A
1	A	1256	A
1	A	1257	U
1	A	1285	A
1	A	1300	G
1	A	1301	U
1	A	1305	G
1	A	1346	A
1	A	1347	G
1	A	1380	U
1	A	1505	G

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

17 non-standard protein/DNA/RNA residues 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
1	M2G	A	966	1	20,27,28	1.78	4 (20%)	22,40,43	2.46	5 (22%)
1	PSU	A	1541	1	17,21,22	1.47	4 (23%)	20,30,33	3.67	5 (25%)
1	2MG	A	1207	1	19,26,27	2.03	3 (15%)	21,38,41	2.10	3 (14%)
1	5MC	A	1404	1	15,22,23	0.86	0	19,32,35	1.00	1 (5%)
1	MA6	A	1519[A]	1	19,26,27	0.68	0	18,38,41	0.96	1 (5%)
1	UR3	A	1498	1	14,22,23	0.70	0	15,32,35	1.00	0
1	7MG	A	527	1	22,26,27	2.06	5 (22%)	28,39,42	1.65	7 (25%)
1	5MC	A	1400	1	15,22,23	0.89	0	19,32,35	1.00	0
1	5MC	A	1407	1	15,22,23	0.87	0	19,32,35	1.02	1 (5%)
1	MA6	A	1519[B]	1	19,26,27	0.67	0	18,38,41	0.91	1 (5%)
1	MA6	A	1518[B]	1	19,26,27	0.67	0	18,38,41	0.92	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
12	0TD	L	92	12	4,9,10	1.02	0	3,11,13	2.31	1 (33%)
1	PSU	A	1540	1	17,21,22	1.44	3 (17%)	20,30,33	3.65	6 (30%)
1	PSU	A	516	1	17,21,22	1.43	3 (17%)	20,30,33	3.67	5 (25%)
1	5MC	A	967	1	15,22,23	0.85	0	19,32,35	1.05	1 (5%)
1	4OC	A	1402	1	16,23,24	0.77	0	17,32,35	0.74	0
1	MA6	A	1518[A]	1	19,26,27	0.66	0	18,38,41	0.89	1 (5%)

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
1	M2G	A	966	1	-	3/7/29/30	0/3/3/3
1	PSU	A	1541	1	-	1/7/25/26	0/2/2/2
1	2MG	A	1207	1	-	2/5/27/28	0/3/3/3
1	5MC	A	1404	1	-	0/5/25/26	0/2/2/2
1	MA6	A	1519[A]	1	-	1/7/29/30	0/3/3/3
1	UR3	A	1498	1	-	1/5/25/26	0/2/2/2
1	7MG	A	527	1	-	2/7/37/38	0/3/3/3
1	5MC	A	1400	1	-	4/5/25/26	0/2/2/2
1	5MC	A	1407	1	-	0/5/25/26	0/2/2/2
1	MA6	A	1519[B]	1	-	0/7/29/30	0/3/3/3
1	MA6	A	1518[B]	1	-	0/7/29/30	0/3/3/3
12	0TD	L	92	12	-	1/3/12/14	-
1	PSU	A	1540	1	-	1/7/25/26	0/2/2/2
1	PSU	A	516	1	-	0/7/25/26	0/2/2/2
1	5MC	A	967	1	-	2/5/25/26	0/2/2/2
1	4OC	A	1402	1	-	2/9/29/30	0/2/2/2
1	MA6	A	1518[A]	1	-	1/7/29/30	0/3/3/3

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1207	2MG	C2-N2	6.49	1.39	1.34
1	A	966	M2G	C6-N1	5.56	1.42	1.33
1	A	527	7MG	C8-N9	-5.38	1.33	1.45
1	A	1207	2MG	C6-N1	5.07	1.41	1.33
1	A	527	7MG	C2-N2	4.65	1.43	1.33
1	A	527	7MG	C4-N3	4.15	1.39	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	966	M2G	C2-N2	3.36	1.40	1.34
1	A	966	M2G	C2-N1	3.26	1.40	1.34
1	A	1540	PSU	C2-N1	-3.18	1.31	1.38
1	A	1541	PSU	C2-N1	-3.18	1.31	1.38
1	A	516	PSU	C2-N1	-3.16	1.31	1.38
1	A	1540	PSU	C2-N3	-3.08	1.32	1.38
1	A	1541	PSU	C2-N3	-3.07	1.32	1.38
1	A	516	PSU	C2-N3	-3.05	1.32	1.38
1	A	966	M2G	C4-N3	2.74	1.39	1.35
1	A	527	7MG	CM7-N7	-2.46	1.41	1.46
1	A	1541	PSU	O4-C4	-2.43	1.18	1.24
1	A	1540	PSU	O4-C4	-2.41	1.18	1.24
1	A	516	PSU	O4-C4	-2.39	1.18	1.24
1	A	527	7MG	C6-N1	2.35	1.37	1.33
1	A	1541	PSU	O4'-C1'	-2.09	1.41	1.44
1	A	1207	2MG	C4-N3	2.03	1.38	1.35

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1541	PSU	N1-C2-N3	-11.42	119.35	128.43
1	A	516	PSU	N1-C2-N3	-11.41	119.36	128.43
1	A	1540	PSU	N1-C2-N3	-11.28	119.46	128.43
1	A	516	PSU	C4-N3-C2	8.99	122.73	115.14
1	A	1541	PSU	C4-N3-C2	8.88	122.64	115.14
1	A	1540	PSU	C4-N3-C2	8.64	122.44	115.14
1	A	966	M2G	C5-C6-N1	-8.41	111.94	123.43
1	A	1207	2MG	C5-C6-N1	-7.69	112.91	123.43
1	A	966	M2G	C6-N1-C2	5.98	123.30	116.18
1	A	516	PSU	C5-C4-N3	-4.57	119.47	125.36
1	A	1541	PSU	C5-C4-N3	-4.47	119.61	125.36
1	A	1540	PSU	C5-C4-N3	-4.42	119.66	125.36
1	A	1207	2MG	C6-N1-C2	4.09	122.50	115.18
1	A	1540	PSU	C6-N1-C2	4.00	121.97	115.36
1	A	1541	PSU	C6-N1-C2	3.94	121.86	115.36
1	A	516	PSU	C6-N1-C2	3.89	121.78	115.36
1	A	527	7MG	N3-C4-N9	3.87	131.88	126.91
1	A	1540	PSU	C5-C6-N1	-3.66	119.94	124.44
1	A	527	7MG	C5-C4-N3	-3.61	120.60	126.49
1	A	527	7MG	N7-C8-N9	3.54	108.44	103.38
1	A	516	PSU	C5-C6-N1	-3.45	120.20	124.44
1	A	1541	PSU	C5-C6-N1	-3.44	120.21	124.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	L	92	0TD	CSB-SB-CB	-3.44	95.10	101.85
1	A	966	M2G	N3-C2-N2	2.77	119.99	117.18
1	A	527	7MG	C6-N1-C2	2.63	120.11	115.93
1	A	1518[A]	MA6	N1-C6-N6	-2.52	114.40	117.06
1	A	1519[A]	MA6	N1-C6-N6	-2.45	114.48	117.06
1	A	1207	2MG	C4-C5-N7	2.43	111.93	109.40
1	A	1518[B]	MA6	N1-C6-N6	-2.42	114.51	117.06
1	A	527	7MG	C2-N3-C4	2.36	120.42	113.89
1	A	1519[B]	MA6	N1-C6-N6	-2.31	114.62	117.06
1	A	527	7MG	N1-C2-N3	-2.31	121.79	125.42
1	A	966	M2G	N1-C2-N2	-2.31	114.86	117.19
1	A	966	M2G	C2-N3-C4	-2.29	112.68	115.28
1	A	967	5MC	C2-N3-C4	2.26	118.75	116.02
1	A	1404	5MC	N4-C4-N3	-2.08	114.09	117.03
1	A	527	7MG	C6-C5-C4	2.05	117.40	115.20
1	A	1407	5MC	N4-C4-N3	-2.05	114.13	117.03
1	A	1540	PSU	O4'-C1'-C2'	2.02	107.92	104.66

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1207	2MG	O4'-C4'-C5'-O5'
1	A	1498	UR3	O4'-C1'-N1-C6
1	A	527	7MG	C3'-C4'-C5'-O5'
1	A	1400	5MC	O4'-C4'-C5'-O5'
1	A	1400	5MC	O4'-C1'-N1-C6
1	A	1400	5MC	C2'-C1'-N1-C6
1	A	1518[A]	MA6	C5-C6-N6-C10
12	L	92	0TD	CG-CB-SB-CSB
1	A	1207	2MG	C3'-C4'-C5'-O5'
1	A	1400	5MC	C3'-C4'-C5'-O5'
1	A	1402	4OC	O4'-C4'-C5'-O5'
1	A	1402	4OC	C3'-C4'-C5'-O5'
1	A	967	5MC	O4'-C4'-C5'-O5'
1	A	966	M2G	C3'-C4'-C5'-O5'
1	A	527	7MG	O4'-C4'-C5'-O5'
1	A	966	M2G	O4'-C4'-C5'-O5'
1	A	967	5MC	C3'-C4'-C5'-O5'
1	A	1519[A]	MA6	C5-C6-N6-C9
1	A	1541	PSU	O4'-C1'-C5-C4
1	A	1540	PSU	C2'-C1'-C5-C6

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Mol	Chain	Res	Type	Atoms
1	A	966	M2G	C4'-C5'-O5'-P

There are no ring outliers.

9 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	966	M2G	1	0
1	A	1519[A]	MA6	1	0
1	A	1498	UR3	4	0
1	A	1400	5MC	1	2
1	A	1519[B]	MA6	2	0
1	A	1518[B]	MA6	1	0
12	L	92	0TD	2	0
1	A	967	5MC	2	0
1	A	1518[A]	MA6	3	0

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 256 ligands modelled in this entry, 256 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

There are no chain breaks in this entry.



## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.