



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 17, 2022 – 10:17 AM JST

PDB ID : 7DUH
Title : Crystal structure of the *Thermus thermophilus* (HB8) 30S ribosomal subunit with mRNA and cognate transfer RNA anticodon stem-loop and sisomicin derivative N1'AC bound
Authors : DeMirici, H.; Destan, E.
Deposited on : 2021-01-09
Resolution : 3.75 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The 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 : 2.25
buster-report : 1.1.7 (2018)
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) : 2.25

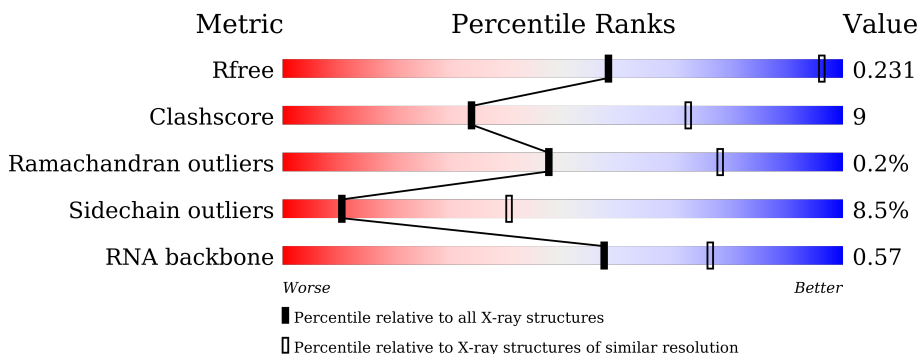
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.75 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	1039 (3.94-3.58)
Clashscore	141614	1051 (3.92-3.60)
Ramachandran outliers	138981	1015 (3.92-3.60)
Sidechain outliers	138945	1011 (3.92-3.60)
RNA backbone	3102	1035 (4.52-3.00)

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 of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	1522	55% 36% 8% ..
2	B	256	62% 26% 9%
3	C	239	64% 19% 14%
4	D	209	66% 32% .
5	E	162	73% 17% 7%
6	F	101	82% 15% .

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Mol	Chain	Length	Quality of chain	
7	G	156	76%	22% ..
8	H	138	80%	16% .
9	I	128	62%	34% ..
10	J	105	61%	30% .. 7%
11	K	129	64%	22% . 10%
12	L	135	59%	31% . 8%
13	M	126	59%	32% . 6%
14	N	61	61%	34% ..
15	O	89	64%	30% ..
16	P	88	69%	24% . 6%
17	Q	105	73%	18% . 6%
18	R	88	56%	22% . 20%
19	S	93	54%	27% 5% 14%
20	T	106	64%	28% . 7%
21	U	27	70%	15% . 11%
22	Y	6	33%	50% 17%
23	W	15	67%	33%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
24	HJO	A	1601	X	-	-	-

2 Entry composition [i](#)

There are 27 unique types of molecules in this entry. The entry contains 52555 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 30S Ribosomal RNA rRNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	A	1512	32507	14477	6012	10506	1512	0	0	0

- 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

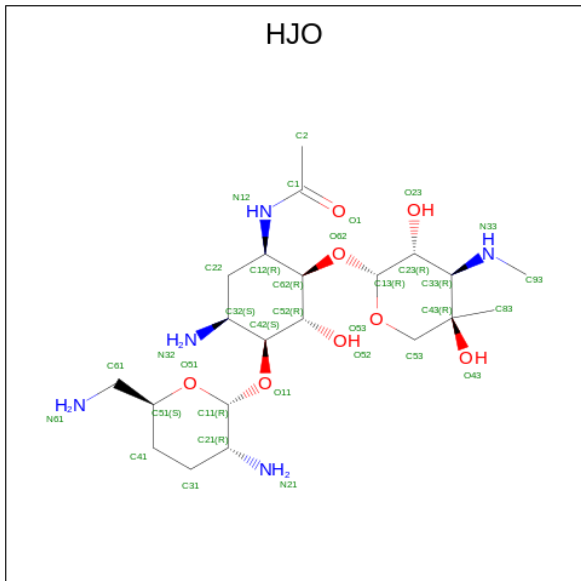
- Molecule 22 is a RNA chain called RNA (5'-R(*UP*UP*UP*UP*UP*U)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
22	Y	6	117	54	12	46	5	0	0	0

- Molecule 23 is a RNA chain called RNA (5'-R(*GP*GP*GP*AP*UP*UP*GP*AP*AP*AP*AP*UP*CP*CP*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
23	W	15	319	144	60	101	14	0	0	0

- Molecule 24 is N-[(1R,2R,3R,4S,5S)-4-[(2R,3R,6S)-6-(aminomethyl)-3-azanyl-oxan-2-yl]oxy-5-azanyl-2-[(2R,3R,4R)-5-methyl-4-(methylamino)-3,5-bis(oxidanyl)oxan-2-yl]oxy-3-oxidanyl-cyclohexyl]ethanamide (three-letter code: HJO) (formula: C₂₁H₄₁N₅O₈) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
24	A	1	34	21	5	8	0	0

- Molecule 25 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
25	A	232	Total Mg 232 232	0	0
25	B	3	Total Mg 3 3	0	0
25	C	3	Total Mg 3 3	0	0
25	D	4	Total Mg 4 4	0	0
25	E	1	Total Mg 1 1	0	0
25	F	1	Total Mg 1 1	0	0
25	H	1	Total Mg 1 1	0	0
25	P	2	Total Mg 2 2	0	0
25	Q	1	Total Mg 1 1	0	0
25	S	1	Total Mg 1 1	0	0

- Molecule 26 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 27 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
27	A	223	Total O 223 223	0	0
27	C	1	Total O 1 1	0	0
27	D	3	Total O 3 3	0	0
27	E	5	Total O 5 5	0	0
27	L	2	Total O 2 2	0	0
27	N	1	Total O 1 1	0	0

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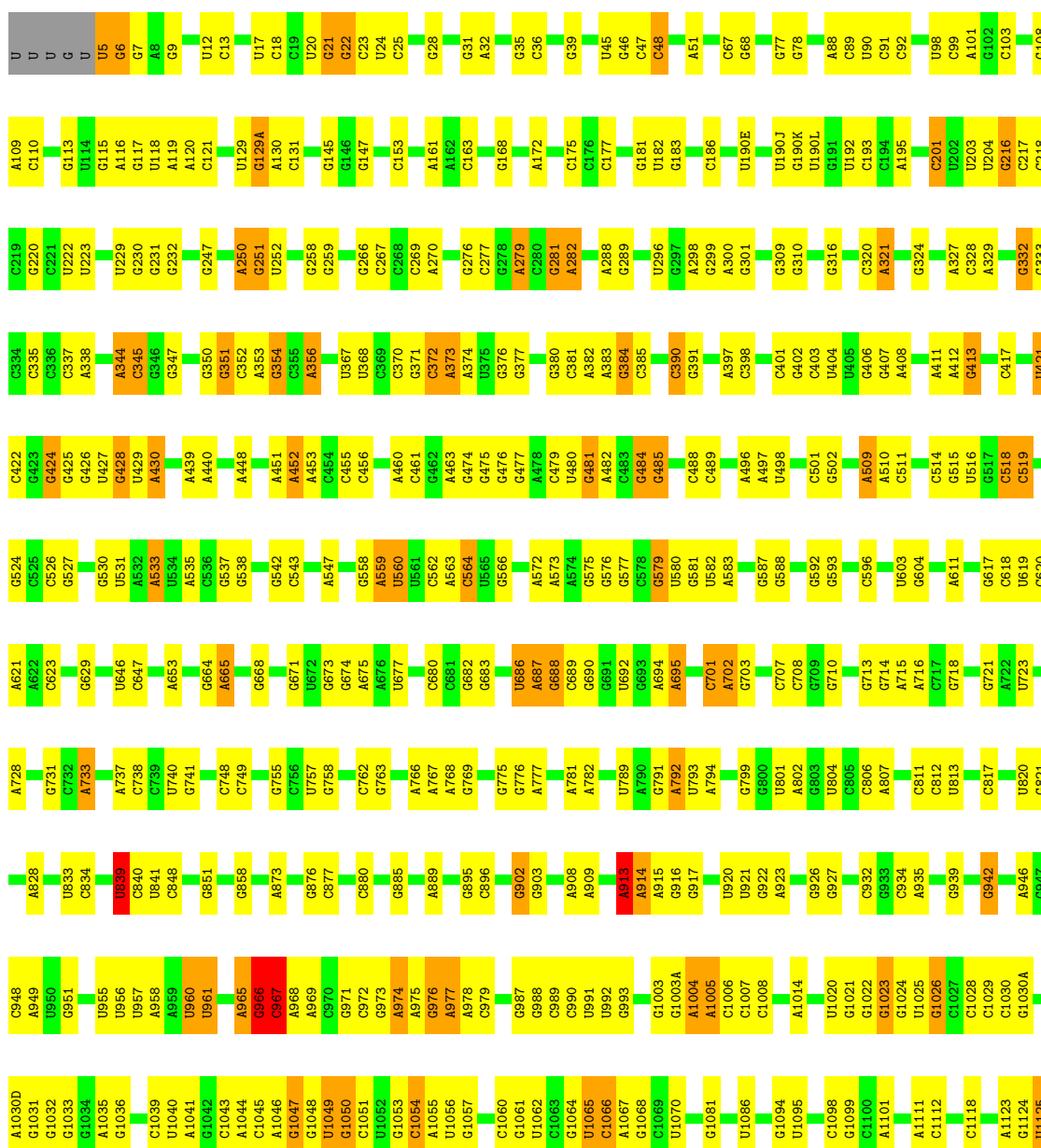
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
27	Q	2	Total O 2 2	0	0
27	T	2	Total O 2 2	0	0

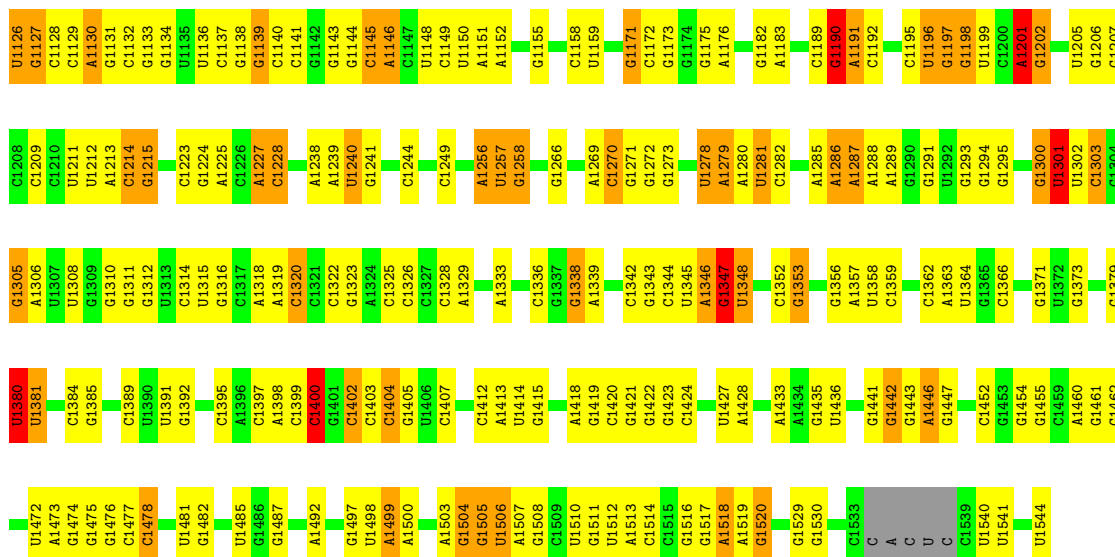
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: 30S Ribosomal RNA rRNA

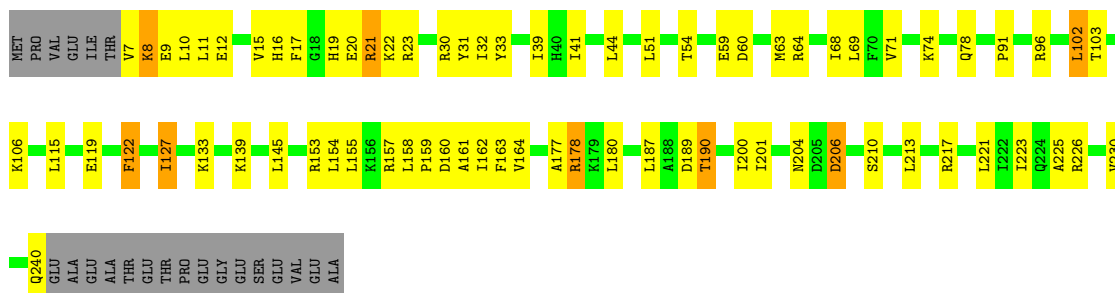
Chain A: 





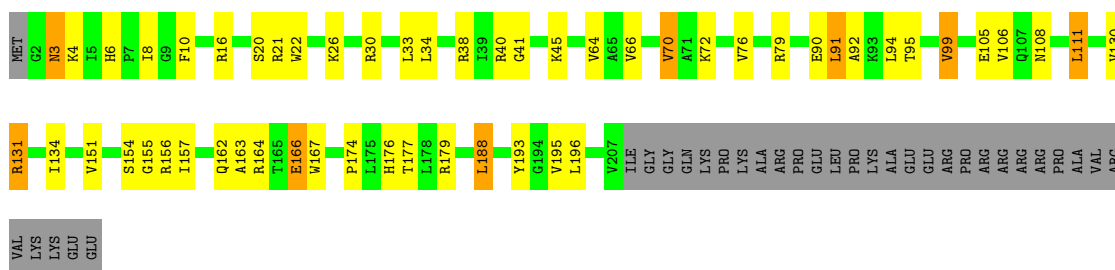
- Molecule 2: 30S ribosomal protein S2

Chain B: 62% 26% 9%



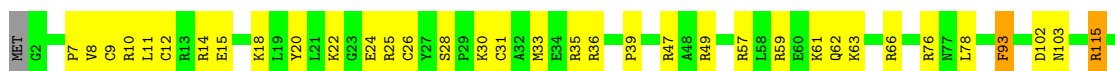
- Molecule 3: 30S ribosomal protein S3

Chain C: 64% 19% 14%



- Molecule 4: 30S ribosomal protein S4

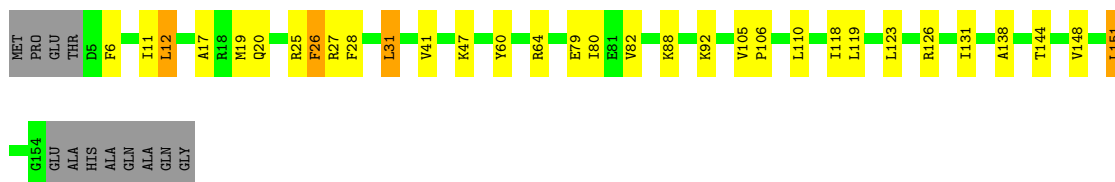
Chain D: 66% 32% 2%





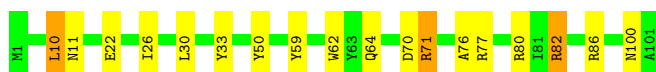
- Molecule 5: 30S ribosomal protein S5

Chain E: 73% 17% 7%



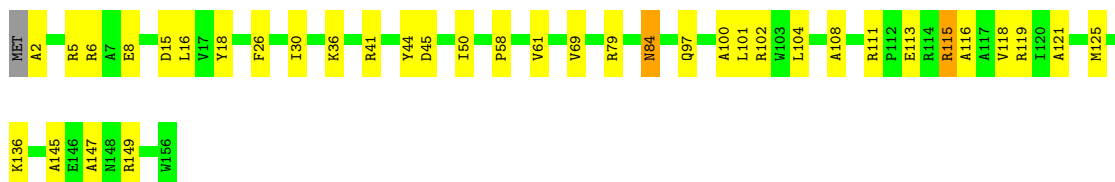
- Molecule 6: 30S ribosomal protein S6

Chain F: 82% 15%



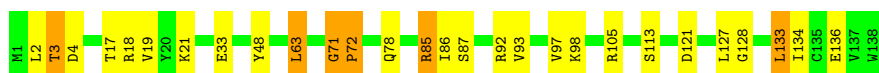
- Molecule 7: 30S ribosomal protein S7

Chain G: 76% 22%



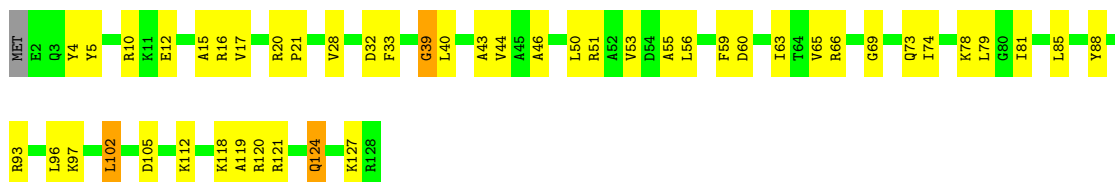
- Molecule 8: 30S ribosomal protein S8

Chain H: 80% 16%



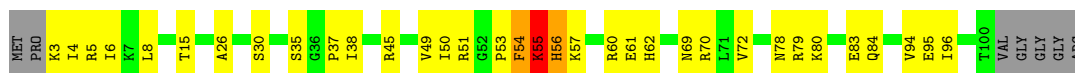
- Molecule 9: 30S ribosomal protein S9

Chain I: 62% 34%



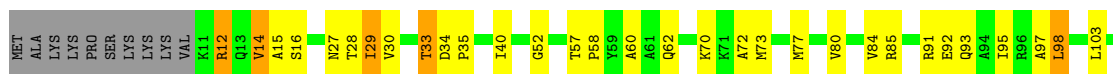
- Molecule 10: 30S ribosomal protein S10

Chain J:  61% 30% 7%



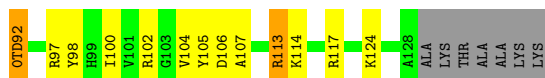
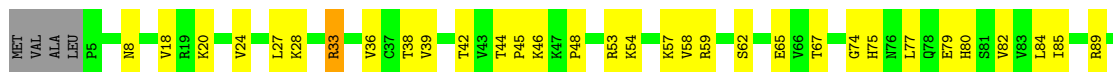
- Molecule 11: 30S ribosomal protein S11

Chain K:  64% 22% 10%



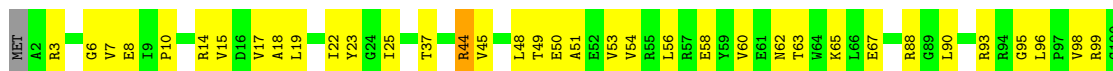
- Molecule 12: 30S ribosomal protein S12

Chain L:  59% 31% 8%



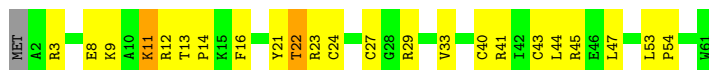
- Molecule 13: 30S ribosomal protein S13

Chain M:  59% 32% 6%



- Molecule 14: 30S ribosomal protein S14 type Z

Chain N:  61% 34% 2%



- Molecule 15: 30S ribosomal protein S15

Chain O:  64% 30% 2%



- Molecule 16: 30S ribosomal protein S16

Chain P:  69% 24% 6%



- Molecule 17: 30S ribosomal protein S17

Chain Q:  73% 18% 6%



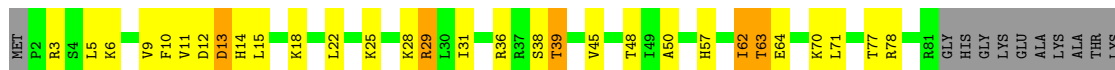
- Molecule 18: 30S ribosomal protein S18

Chain R:  56% 22% 20%



- Molecule 19: 30S ribosomal protein S19

Chain S:  54% 27% 5% 14%



LYS
LYS

- Molecule 20: 30S ribosomal protein S20

Chain T:  64% 28% 7%



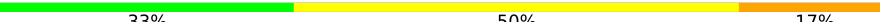
A106

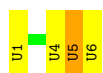
- Molecule 21: 30S ribosomal protein Thx

Chain U:  70% 15% 11%



- Molecule 22: RNA (5'-R(*UP*UP*UP*UP*UP*U)-3')

Chain Y:  33% 50% 17%



- Molecule 23: RNA (5'-R(*GP*GP*GP*AP*UP*UP*GP*AP*AP*AP*AP*UP*CP*CP*C)-3')

Chain W:  67% 33%



4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	400.83Å 400.83Å 174.67Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.83 – 3.75 39.83 – 2.92	Depositor EDS
% Data completeness (in resolution range)	91.3 (39.83-3.75) 63.8 (39.83-2.92)	Depositor EDS
R_{merge}	1.64	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	-0.70 (at 2.90Å)	Xtrriage
Refinement program	PHENIX DEV-3318	Depositor
R, R_{free}	0.188 , 0.230 0.188 , 0.231	Depositor DCC
R_{free} test set	2000 reflections (0.70%)	wwPDB-VP
Wilson B-factor (Å ²)	37.1	Xtrriage
Anisotropy	0.019	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.14 , -10.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.87	EDS
Total number of atoms	52555	wwPDB-VP
Average B, all atoms (Å ²)	161.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.22% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality i

5.1 Standard geometry i

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.25	0/36040	0.77	13/56243 (0.0%)
2	B	0.26	0/1935	0.42	0/2609
3	C	0.26	0/1636	0.46	0/2205
4	D	0.27	0/1733	0.41	0/2318
5	E	0.27	0/1162	0.46	0/1564
6	F	0.24	0/856	0.41	0/1154
7	G	0.25	0/1276	0.38	0/1709
8	H	0.27	0/1136	0.46	0/1527
9	I	0.26	0/1029	0.48	1/1379 (0.1%)
10	J	0.26	0/805	0.49	0/1082
11	K	0.27	0/879	0.44	0/1187
12	L	0.26	0/977	0.48	0/1306
13	M	0.25	0/947	0.45	0/1270
14	N	0.27	0/501	0.44	0/664
15	O	0.24	0/740	0.40	0/987
16	P	0.26	0/716	0.46	0/963
17	Q	0.27	0/836	0.46	0/1117
18	R	0.26	0/579	0.43	0/768
19	S	0.25	0/661	0.46	0/890
20	T	0.26	0/765	0.40	0/1007
21	U	0.24	0/212	0.41	0/277
22	Y	0.27	0/128	0.88	0/196
23	W	0.26	0/357	0.79	0/555
All	All	0.25	0/55906	0.69	14/82977 (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
3	C	0	1
8	H	0	1
10	J	0	2
13	M	0	2
All	All	0	6

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	839	U	C2-N1-C1'	7.92	127.20	117.70
1	A	839	U	N1-C2-O2	7.03	127.72	122.80
1	A	839	U	N3-C2-O2	-6.45	117.68	122.20
1	A	1347	G	P-O3'-C3'	5.57	126.38	119.70
1	A	1301	U	P-O3'-C3'	5.55	126.36	119.70
1	A	1190	G	P-O3'-C3'	5.54	126.34	119.70
1	A	1305	G	P-O3'-C3'	5.52	126.33	119.70
1	A	1380	U	P-O3'-C3'	5.29	126.05	119.70
9	I	39	GLY	N-CA-C	-5.20	100.10	113.10
1	A	1346	A	P-O3'-C3'	5.17	125.90	119.70
1	A	913	A	P-O3'-C3'	5.14	125.87	119.70
1	A	839	U	C6-N1-C1'	-5.08	114.08	121.20
1	A	1201	A	P-O3'-C3'	5.07	125.79	119.70
1	A	792	A	P-O3'-C3'	5.02	125.72	119.70

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	166	GLU	Peptide
8	H	71	GLY	Peptide
10	J	54	PHE	Peptide
10	J	55	LYS	Peptide
13	M	111	LYS	Peptide
13	M	6	GLY	Peptide

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	32507	0	16434	405	0
2	B	1900	0	1951	38	0
3	C	1612	0	1676	30	0
4	D	1703	0	1763	40	0
5	E	1146	0	1207	21	0
6	F	843	0	857	12	0
7	G	1257	0	1296	21	0
8	H	1116	0	1176	16	0
9	I	1010	0	1037	30	0
10	J	792	0	835	25	0
11	K	864	0	881	21	0
12	L	972	0	1058	27	0
13	M	937	0	995	26	0
14	N	492	0	529	24	0
15	O	729	0	768	16	0
16	P	700	0	720	11	0
17	Q	823	0	893	12	0
18	R	574	0	644	14	0
19	S	647	0	673	23	0
20	T	763	0	861	14	0
21	U	208	0	221	4	0
22	Y	117	0	62	3	0
23	W	319	0	164	3	0
24	A	34	0	0	1	0
25	A	232	0	0	0	0
25	B	3	0	0	0	0
25	C	3	0	0	0	0
25	D	4	0	0	0	0
25	E	1	0	0	0	0
25	F	1	0	0	0	0
25	H	1	0	0	0	0
25	P	2	0	0	0	0
25	Q	1	0	0	0	0
25	S	1	0	0	0	0
26	D	1	0	0	0	0
26	N	1	0	0	0	0
27	A	223	0	0	3	0
27	C	1	0	0	0	0
27	D	3	0	0	0	0
27	E	5	0	0	0	0
27	L	2	0	0	0	0
27	N	1	0	0	0	0
27	Q	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
27	T	2	0	0	1	0
All	All	52555	0	36701	742	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 9.

All (742) 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:481:G:HO2'	1:A:482:A:H8	0.97	0.94
1:A:1214:C:H3'	1:A:1215:G:H8	1.37	0.87
1:A:456:C:H42	1:A:476:G:H1	1.28	0.81
20:T:100:ILE:HG22	20:T:102:GLY:H	1.45	0.80
17:Q:22:LEU:HD11	17:Q:39:SER:HB3	1.64	0.79
1:A:1125:U:OP2	1:A:1145:C:N4	2.16	0.79
1:A:1028:C:H42	1:A:1033:G:H1	1.29	0.76
1:A:664:G:H22	1:A:741:G:H1	1.32	0.76
3:C:33:LEU:HD21	14:N:53:LEU:HD22	1.67	0.76
1:A:1128:C:O2'	1:A:1130:A:N7	2.20	0.75
9:I:112:LYS:HA	9:I:119:ALA:HB2	1.69	0.75
1:A:537:G:OP1	12:L:113:ARG:NH2	2.21	0.73
1:A:1266:G:N2	1:A:1269:A:OP2	2.21	0.73
1:A:1190:G:O2'	1:A:1191:A:OP2	2.06	0.73
11:K:80:VAL:HG21	11:K:103:LEU:HD13	1.71	0.73
4:D:102:ASP:HB3	4:D:136:PRO:HB3	1.72	0.72
5:E:17:ALA:HA	5:E:26:PHE:HB3	1.72	0.72
19:S:12:ASP:H	19:S:38:SER:HB3	1.54	0.72
3:C:70:VAL:HG21	3:C:76:VAL:HG21	1.71	0.71
13:M:10:PRO:HB2	13:M:18:ALA:HB1	1.73	0.71
1:A:686:U:HO2'	1:A:687:A:H8	1.39	0.70
1:A:1128:C:OP1	9:I:66:ARG:NH1	2.22	0.70
1:A:417:C:H42	1:A:426:G:H1	1.39	0.70
8:H:86:ILE:HD11	8:H:136:GLU:HG3	1.72	0.70
10:J:61:GLU:OE1	14:N:45:ARG:NH1	2.24	0.70
1:A:617:G:H1	1:A:623:C:H42	1.41	0.69
15:O:39:LEU:HB3	15:O:56:LEU:HD12	1.75	0.69
3:C:20:SER:OG	3:C:40:ARG:NH2	2.24	0.68
14:N:8:GLU:HB2	14:N:11:LYS:HE3	1.75	0.68
1:A:1134:G:H1	1:A:1140:C:H42	1.41	0.68
1:A:972:C:H4'	10:J:57:LYS:HD3	1.76	0.68
1:A:1510:U:H2'	1:A:1511:G:C8	2.29	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:H:4:ASP:OD2	8:H:85:ARG:NH1	2.28	0.67
2:B:21:ARG:HA	2:B:39:ILE:HA	1.75	0.67
9:I:97:LYS:HA	9:I:102:LEU:HD11	1.77	0.67
1:A:1030(A):G:N2	1:A:1030(D):A:OP2	2.28	0.66
1:A:1424:C:H42	1:A:1476:G:H1	1.44	0.66
1:A:21:G:N2	1:A:885:G:O3'	2.28	0.66
1:A:1442:G:O6	1:A:1446:A:N6	2.29	0.66
1:A:1118:C:H42	1:A:1155:G:H1	1.45	0.65
1:A:976:G:OP2	1:A:1358:U:O2'	2.14	0.65
2:B:63:MET:HB3	2:B:225:ALA:HB1	1.79	0.65
1:A:448:A:OP2	1:A:485:G:N2	2.26	0.65
3:C:188:LEU:HD11	3:C:195:VAL:HG13	1.78	0.65
1:A:1213:A:N6	1:A:1215:G:N3	2.44	0.64
9:I:51:ARG:HG3	9:I:56:LEU:HD21	1.79	0.64
1:A:1022:G:N2	1:A:1023:G:N7	2.45	0.64
1:A:1405:G:N7	24:A:1601:HJO:N33	2.44	0.64
1:A:1443:G:H5''	1:A:1446:A:H5'	1.78	0.64
4:D:63:LYS:NZ	4:D:197:PRO:O	2.31	0.64
1:A:298:A:N6	27:A:1901:HOH:O	2.31	0.64
1:A:932:C:H42	1:A:1385:G:H1	1.43	0.63
1:A:1192:C:O2	5:E:25:ARG:NH1	2.31	0.63
1:A:1414:U:H2'	1:A:1415:G:C8	2.33	0.63
16:P:28:ARG:NH1	16:P:29:ASP:OD1	2.31	0.63
1:A:103:C:OP1	20:T:17:ARG:NH1	2.32	0.63
17:Q:13:ASP:HB2	17:Q:53:LEU:HD12	1.79	0.63
1:A:1291:G:OP1	7:G:41:ARG:NH2	2.20	0.63
1:A:1404:5MC:H2'	1:A:1405:G:C8	2.34	0.63
3:C:6:HIS:HE1	3:C:8:ILE:HB	1.64	0.63
1:A:1048:G:H1	1:A:1209:C:H42	1.46	0.63
1:A:407:G:OP1	4:D:115:ARG:NH1	2.32	0.63
1:A:455:C:H42	1:A:477:G:H1	1.45	0.63
1:A:1020:U:H2'	1:A:1021:G:H8	1.64	0.63
12:L:38:THR:HB	12:L:57:LYS:HB2	1.80	0.63
4:D:190:ASP:OD1	4:D:191:ARG:N	2.31	0.62
1:A:1326:C:OP2	21:U:6:ARG:NH2	2.30	0.62
1:A:1412:C:H2'	1:A:1413:A:C8	2.34	0.62
1:A:718:G:O6	18:R:74:ARG:NH1	2.32	0.62
11:K:85:ARG:HD3	11:K:113:PRO:HD3	1.82	0.62
1:A:1005:A:N3	1:A:1026:G:N2	2.47	0.62
9:I:15:ALA:HB2	9:I:65:VAL:HG13	1.81	0.61
14:N:27:CYS:HB3	14:N:43:CYS:SG	2.40	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:276:G:O2'	17:Q:68:ARG:NH1	2.34	0.61
1:A:1379:G:O6	7:G:2:ALA:N	2.33	0.61
1:A:1316:G:N2	1:A:1319:A:OP2	2.33	0.61
1:A:1008:C:N4	1:A:1021:G:H1	1.99	0.61
1:A:372:C:H4'	1:A:373:A:O5'	2.01	0.61
5:E:11:ILE:HB	5:E:31:LEU:HB3	1.82	0.61
1:A:186:C:H5'	20:T:78:ALA:HB1	1.82	0.61
1:A:1474:G:H2'	1:A:1475:G:C8	2.36	0.61
1:A:921:U:O2'	5:E:19:MET:O	2.17	0.60
1:A:533:A:O2'	1:A:535:A:OP2	2.19	0.60
1:A:1278:U:H5'	1:A:1279:A:O4'	2.01	0.60
1:A:31:G:N2	1:A:48:C:OP1	2.28	0.60
20:T:45:GLN:HA	20:T:91:LEU:HD12	1.83	0.60
1:A:45:U:H2'	1:A:46:G:C8	2.37	0.60
1:A:1057:G:H5''	3:C:154:SER:HB2	1.83	0.60
1:A:538:G:H5''	12:L:114:LYS:HB2	1.84	0.60
4:D:22:LYS:HB2	4:D:26:CYS:SG	2.41	0.60
18:R:32:ARG:HA	18:R:69:THR:HG21	1.83	0.60
1:A:1196:U:OP1	1:A:1197:G:H5'	2.01	0.60
7:G:69:VAL:HG21	7:G:104:LEU:HD21	1.84	0.60
1:A:592:G:H2'	1:A:593:G:H8	1.67	0.59
1:A:682:G:H2'	1:A:683:G:H8	1.67	0.59
1:A:1419:G:H1	1:A:1481:U:H3	1.49	0.59
7:G:113:GLU:HB2	7:G:119:ARG:HG2	1.83	0.59
1:A:801:U:H2'	1:A:802:A:C8	2.37	0.59
1:A:1214:C:H3'	1:A:1215:G:C8	2.28	0.59
1:A:1228:C:OP1	13:M:108:ARG:NH2	2.35	0.59
20:T:43:LEU:HB2	20:T:52:ALA:HB2	1.85	0.59
3:C:26:LYS:O	3:C:30:ARG:NH1	2.36	0.59
1:A:21:G:O2'	1:A:22:G:H5'	2.03	0.59
14:N:9:LYS:HD2	14:N:23:ARG:HB2	1.85	0.59
15:O:39:LEU:HD13	15:O:56:LEU:HB2	1.84	0.59
1:A:611:A:H61	1:A:629:G:H1	1.49	0.59
1:A:877:C:HO2'	8:H:3:THR:HG1	1.43	0.58
1:A:811:C:N4	27:A:1902:HOH:O	2.35	0.58
2:B:204:ASN:H	2:B:204:ASN:HD22	1.50	0.58
2:B:223:ILE:HD12	2:B:230:VAL:HG21	1.84	0.58
13:M:49:THR:HG22	13:M:51:ALA:H	1.68	0.58
17:Q:55:ASP:HB3	17:Q:76:LEU:HD21	1.85	0.58
1:A:380:G:N2	1:A:383:A:OP2	2.29	0.58
1:A:1064:G:N2	1:A:1191:A:OP2	2.37	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1060:C:OP1	14:N:45:ARG:NH2	2.36	0.58
17:Q:66:SER:O	17:Q:70:ARG:NH1	2.36	0.58
1:A:250:A:H4'	1:A:251:G:O5'	2.04	0.58
1:A:1145:C:O2'	1:A:1146:A:O5'	2.22	0.57
1:A:902:G:H2'	1:A:903:G:H8	1.68	0.57
3:C:6:HIS:CE1	3:C:8:ILE:HB	2.38	0.57
1:A:1228:C:H4'	13:M:116:THR:HA	1.87	0.57
1:A:1003(A):G:C5	1:A:1004:A:H1'	2.39	0.57
4:D:61:LYS:NZ	4:D:62:GLN:OE1	2.37	0.57
1:A:664:G:N2	1:A:741:G:H1	1.99	0.57
3:C:38:ARG:HH11	3:C:94:LEU:HD21	1.70	0.57
1:A:966:M2G:HM13	1:A:967:5MC:H1'	1.86	0.57
1:A:974:A:OP2	14:N:41:ARG:NH1	2.37	0.57
3:C:91:LEU:HD21	3:C:99:VAL:HG22	1.87	0.56
1:A:579:G:H5'	1:A:728:A:H1'	1.87	0.56
9:I:46:ALA:HB2	9:I:74:ILE:HG23	1.87	0.56
1:A:1112:C:O2	3:C:179:ARG:HB2	2.05	0.56
1:A:1314:C:H5	19:S:6:LYS:HD3	1.71	0.56
2:B:115:LEU:HD13	2:B:145:LEU:HB3	1.87	0.56
5:E:60:TYR:OH	5:E:64:ARG:NH2	2.38	0.56
9:I:5:TYR:HE1	9:I:16:ARG:HB3	1.70	0.56
12:L:104:VAL:HG22	12:L:105:TYR:H	1.70	0.56
1:A:1020:U:H2'	1:A:1021:G:C8	2.40	0.56
1:A:518:C:H2'	1:A:530:G:C8	2.41	0.56
20:T:92:LEU:O	20:T:96:GLY:HA2	2.05	0.56
1:A:1198:G:H2'	1:A:1199:U:C6	2.41	0.56
1:A:1128:C:H42	1:A:1143:G:H1	1.52	0.56
1:A:674:G:H2'	1:A:675:A:C8	2.41	0.56
1:A:951:G:OP2	13:M:102:ARG:NH2	2.38	0.56
1:A:1126:U:O4	1:A:1127:G:N2	2.38	0.56
2:B:8:LYS:O	2:B:217:ARG:NH1	2.38	0.56
8:H:17:THR:O	8:H:78:GLN:NE2	2.39	0.56
1:A:1049:U:H4'	1:A:1050:G:O5'	2.05	0.56
1:A:1056:U:H5'	3:C:163:ALA:HB2	1.86	0.56
1:A:13:C:H41	1:A:20:U:H3	1.53	0.55
1:A:509:A:N3	1:A:543:C:O2'	2.35	0.55
6:F:62:TRP:CH2	6:F:64:GLN:HB2	2.41	0.55
1:A:1064:G:N2	1:A:1190:G:HO2'	2.04	0.55
1:A:916:G:H2'	1:A:917:G:H8	1.71	0.55
1:A:1139:G:H4'	1:A:1140:C:H5'	1.88	0.55
1:A:1031:G:H2'	1:A:1032:G:C8	2.40	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:F:10:LEU:HD12	6:F:59:TYR:HB3	1.87	0.55
9:I:21:PRO:HA	9:I:59:PHE:HA	1.89	0.55
1:A:1454:G:H2'	1:A:1455:G:H8	1.72	0.55
19:S:13:ASP:OD1	19:S:13:ASP:N	2.40	0.55
1:A:430:A:P	4:D:8:VAL:H	2.29	0.55
1:A:671:G:H5'	6:F:77:ARG:HH21	1.70	0.55
4:D:150:GLU:HA	4:D:153:ARG:HG3	1.87	0.55
1:A:939:G:H5''	7:G:102:ARG:NH1	2.23	0.54
6:F:50:TYR:CE1	18:R:77:GLY:HA2	2.41	0.54
1:A:401:C:H2'	1:A:402:G:H8	1.72	0.54
1:A:1414:U:H2'	1:A:1415:G:H8	1.71	0.54
16:P:4:ILE:HG12	16:P:21:VAL:HG22	1.89	0.54
7:G:15:ASP:OD1	7:G:44:TYR:OH	2.24	0.54
1:A:145:G:H1	1:A:177:C:H42	1.55	0.54
7:G:50:ILE:HD11	7:G:61:VAL:HG11	1.88	0.54
15:O:26:GLU:OE1	15:O:77:ARG:NH1	2.33	0.54
1:A:1373:G:H5''	7:G:36:LYS:HE3	1.90	0.54
1:A:108:G:H5'	1:A:109:A:H5''	1.90	0.54
1:A:501:C:OP1	12:L:117:ARG:NH2	2.40	0.54
1:A:413:G:H2'	1:A:428:G:N2	2.22	0.54
1:A:977:A:O2'	1:A:979:C:OP2	2.21	0.54
20:T:75:ASN:OD1	20:T:75:ASN:N	2.35	0.54
1:A:972:C:OP1	10:J:57:LYS:NZ	2.28	0.54
1:A:501:C:H2'	1:A:502:G:C8	2.43	0.54
7:G:84:ASN:OD1	7:G:84:ASN:N	2.41	0.54
13:M:10:PRO:O	13:M:45:VAL:HG11	2.08	0.54
1:A:401:C:H2'	1:A:402:G:C8	2.43	0.53
1:A:1269:A:HO2'	1:A:1325:C:HO2'	1.55	0.53
12:L:33:ARG:HD3	12:L:62:SER:HB3	1.89	0.53
18:R:53:ARG:HD3	18:R:63:GLN:HB2	1.91	0.53
1:A:1124:G:H5'	10:J:35:SER:O	2.08	0.53
10:J:30:SER:HB3	10:J:80:LYS:HB2	1.89	0.53
20:T:43:LEU:O	20:T:47:GLY:N	2.39	0.53
1:A:880:C:OP1	12:L:8:ASN:ND2	2.42	0.53
1:A:1190:G:HO2'	1:A:1191:A:P	2.29	0.53
1:A:153:C:H42	1:A:168:G:H1	1.56	0.53
1:A:7:G:O6	5:E:92:LYS:NZ	2.33	0.53
1:A:231:G:H2'	1:A:232:G:H8	1.74	0.53
1:A:332:G:H2'	1:A:333:G:H8	1.74	0.53
1:A:1308:U:OP1	13:M:98:VAL:N	2.39	0.53
2:B:189:ASP:OD1	2:B:189:ASP:N	2.42	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
18:R:40:LEU:HB3	18:R:79:LEU:HD11	1.90	0.53
1:A:113:G:H1'	1:A:354:G:H5'	1.92	0.52
1:A:452:A:O2'	1:A:453:A:O4'	2.27	0.52
1:A:776:G:N2	1:A:802:A:OP2	2.35	0.52
1:A:914:A:H2'	1:A:915:A:H8	1.73	0.52
2:B:54:THR:HG21	2:B:201:ILE:HD11	1.91	0.52
1:A:1499:A:H1'	1:A:1520:G:H5'	1.91	0.52
10:J:4:ILE:HG22	10:J:6:ILE:HD11	1.91	0.52
12:L:36:VAL:HG22	12:L:82:VAL:HG12	1.90	0.52
1:A:680:C:H42	1:A:710:G:H1	1.58	0.52
1:A:1271:G:H2'	1:A:1272:G:H8	1.74	0.52
1:A:542:G:OP1	4:D:10:ARG:NH2	2.42	0.52
1:A:674:G:H2'	1:A:675:A:H8	1.73	0.52
1:A:1391:U:H2'	1:A:1392:G:C8	2.44	0.52
1:A:89:C:H2'	1:A:90:U:O4'	2.09	0.52
4:D:31:CYS:C	4:D:33:MET:H	2.13	0.52
9:I:43:ALA:HA	9:I:74:ILE:HD13	1.92	0.52
13:M:50:GLU:HA	13:M:53:VAL:HB	1.92	0.52
1:A:939:G:H5''	7:G:102:ARG:HH12	1.75	0.52
1:A:1004:A:H5''	1:A:1025:U:C4	2.45	0.52
1:A:1427:U:H2'	1:A:1428:A:C8	2.45	0.52
1:A:28:G:O2'	1:A:296:U:OP1	2.27	0.52
1:A:1505:G:O2'	1:A:1506:U:OP2	2.22	0.52
3:C:3:ASN:OD1	3:C:4:LYS:NZ	2.38	0.52
3:C:20:SER:HB2	14:N:54:PRO:HD3	1.91	0.52
6:F:33:TYR:HA	6:F:71:ARG:HH21	1.75	0.52
12:L:117:ARG:NH2	12:L:124:LYS:HD3	2.24	0.52
19:S:50:ALA:HB1	19:S:57:HIS:HB3	1.92	0.52
2:B:59:GLU:HB2	2:B:221:LEU:HD11	1.92	0.51
4:D:11:LEU:HD13	4:D:66:ARG:HD3	1.91	0.51
10:J:49:VAL:HG21	14:N:44:LEU:HD23	1.93	0.51
13:M:90:LEU:HD23	13:M:93:ARG:HD2	1.93	0.51
1:A:1048:G:H5''	14:N:3:ARG:HD2	1.91	0.51
1:A:1420:C:H2'	1:A:1421:G:H8	1.74	0.51
4:D:187:ARG:NH1	4:D:188:LEU:H	2.08	0.51
11:K:14:VAL:HG21	11:K:40:ILE:HD13	1.92	0.51
1:A:474:G:H2'	1:A:475:G:H8	1.75	0.51
1:A:563:A:O2'	1:A:566:G:O2'	2.26	0.51
1:A:518:C:H4'	1:A:519:C:O5'	2.10	0.51
1:A:1244:C:H42	1:A:1293:G:H1	1.57	0.51
1:A:1328:C:H2'	1:A:1329:A:C8	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:K:62:GLN:HG3	11:K:97:ALA:HB2	1.93	0.51
18:R:47:THR:HA	18:R:83:GLU:HB2	1.93	0.51
1:A:701:C:H4'	1:A:702:A:O5'	2.10	0.51
1:A:1132:C:H2'	1:A:1133:G:H8	1.76	0.51
2:B:162:ILE:HD12	2:B:177:ALA:HB2	1.92	0.51
1:A:955:U:O2'	1:A:1227:A:N6	2.43	0.51
3:C:134:ILE:HG23	3:C:151:VAL:HB	1.92	0.51
1:A:682:G:H2'	1:A:683:G:C8	2.45	0.51
1:A:973:G:H3'	1:A:974:A:H5''	1.93	0.51
1:A:1328:C:H2'	1:A:1329:A:H8	1.75	0.51
1:A:1500:A:H5''	1:A:1508:G:H5''	1.93	0.51
10:J:50:ILE:HD12	10:J:50:ILE:H	1.74	0.51
10:J:50:ILE:HA	10:J:60:ARG:HG2	1.93	0.51
11:K:72:ALA:HB1	11:K:77:MET:HG3	1.93	0.51
1:A:370:C:O2	1:A:482:A:O2'	2.28	0.51
1:A:592:G:H2'	1:A:593:G:C8	2.44	0.51
1:A:1131:G:H2'	1:A:1132:C:C6	2.46	0.51
1:A:1143:G:H2'	1:A:1144:G:C8	2.45	0.51
1:A:603:U:H2'	1:A:604:G:C8	2.46	0.50
3:C:174:PRO:HB2	3:C:177:THR:HG22	1.93	0.50
9:I:65:VAL:HG11	9:I:73:GLN:HB3	1.93	0.50
1:A:23:C:H2'	1:A:24:U:H6	1.76	0.50
1:A:1249:C:O2'	9:I:73:GLN:OE1	2.28	0.50
1:A:1435:G:H2'	1:A:1436:U:C6	2.45	0.50
12:L:84:LEU:HB2	12:L:104:VAL:HG21	1.93	0.50
1:A:1291:G:H4'	9:I:39:GLY:HA3	1.93	0.50
2:B:12:GLU:HG3	2:B:213:LEU:HD21	1.94	0.50
1:A:407:G:H2'	1:A:408:A:C8	2.46	0.50
2:B:32:ILE:HD11	2:B:190:THR:HG23	1.93	0.50
12:L:27:LEU:HG	12:L:28:LYS:H	1.76	0.50
13:M:54:VAL:O	13:M:58:GLU:HG2	2.10	0.50
23:W:29:G:O6	23:W:42:C:N4	2.44	0.50
1:A:769:G:H4'	1:A:1513:A:H4'	1.92	0.50
1:A:1189:C:OP2	10:J:51:ARG:NH2	2.45	0.50
4:D:115:ARG:HH11	4:D:115:ARG:HB3	1.74	0.50
14:N:27:CYS:SG	14:N:29:ARG:HB2	2.51	0.50
1:A:376:G:H2'	1:A:377:G:C8	2.47	0.50
1:A:558:G:C8	1:A:559:A:H2'	2.47	0.50
1:A:956:U:H2'	1:A:957:U:O4'	2.12	0.50
1:A:1031:G:H2'	1:A:1032:G:H8	1.76	0.50
1:A:1314:C:C5	19:S:6:LYS:HD3	2.47	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:I:53:VAL:HG21	9:I:85:LEU:HD21	1.94	0.50
5:E:11:ILE:HG22	5:E:12:LEU:HD12	1.95	0.49
17:Q:29:HIS:CG	17:Q:30:PRO:HD2	2.47	0.49
4:D:102:ASP:OD1	4:D:103:ASN:N	2.44	0.49
7:G:108:ALA:O	7:G:111:ARG:HB2	2.13	0.49
1:A:1504:G:OP1	1:A:1507:A:H4'	2.12	0.49
2:B:178:ARG:O	8:H:72:PRO:HD3	2.11	0.49
19:S:45:VAL:HA	19:S:62:ILE:HG13	1.93	0.49
4:D:187:ARG:CZ	4:D:188:LEU:H	2.25	0.49
1:A:1189:C:P	10:J:51:ARG:HH22	2.35	0.49
2:B:30:ARG:HD2	2:B:31:TYR:CZ	2.47	0.49
9:I:69:GLY:O	9:I:73:GLN:HG3	2.12	0.49
1:A:5:U:H4'	1:A:6:G:O5'	2.13	0.49
1:A:913:A:H4'	1:A:914:A:O5'	2.13	0.49
1:A:21:G:H4'	1:A:22:G:OP1	2.12	0.49
1:A:580:U:H2'	1:A:581:G:O4'	2.13	0.49
1:A:1294:G:H2'	1:A:1295:G:H8	1.77	0.49
1:A:1420:C:H2'	1:A:1421:G:C8	2.48	0.49
2:B:139:LYS:O	2:B:139:LYS:NZ	2.43	0.49
5:E:105:VAL:HB	5:E:106:PRO:HD3	1.94	0.49
12:L:48:PRO:HD2	12:L:92:OTD:H8	1.94	0.49
1:A:190(J):U:H2'	1:A:190(K):G:C8	2.48	0.49
1:A:201:C:H42	1:A:216:G:H1	1.59	0.49
1:A:1048:G:H1	1:A:1209:C:N4	2.11	0.49
1:A:1281:U:H5'	1:A:1282:C:H5	1.78	0.49
10:J:8:LEU:HD23	10:J:96:ILE:HG12	1.94	0.49
1:A:370:C:H42	1:A:391:G:H1	1.59	0.49
1:A:371:G:O2'	1:A:372:C:H5'	2.13	0.49
1:A:401:C:O2'	1:A:621:A:N3	2.42	0.49
1:A:1356:G:H2'	1:A:1357:A:C8	2.48	0.49
4:D:18:LYS:HA	4:D:33:MET:HG3	1.94	0.49
1:A:1014:A:H4'	19:S:14:HIS:CG	2.47	0.48
1:A:1240:U:OP2	7:G:116:ALA:N	2.46	0.48
1:A:147:G:H1	1:A:175:C:H42	1.61	0.48
1:A:671:G:H5'	6:F:77:ARG:NH2	2.28	0.48
1:A:789:U:O2'	1:A:791:G:N7	2.38	0.48
1:A:955:U:H1'	1:A:1227:A:H61	1.78	0.48
9:I:10:ARG:HD3	9:I:105:ASP:HB3	1.95	0.48
11:K:16:SER:O	11:K:35:PRO:HD3	2.13	0.48
11:K:84:VAL:HG11	11:K:91:ARG:HD3	1.95	0.48
1:A:514:C:H2'	1:A:515:G:C8	2.47	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
11:K:15:ALA:HA	11:K:77:MET:HA	1.94	0.48
1:A:299:G:H2'	1:A:300:A:C8	2.48	0.48
11:K:84:VAL:HG21	11:K:95:ILE:HD11	1.95	0.48
1:A:337:C:H2'	1:A:338:A:C8	2.49	0.48
1:A:689:C:H2'	1:A:690:G:O4'	2.13	0.48
1:A:1320:C:O2	19:S:36:ARG:NH2	2.43	0.48
16:P:22:THR:HA	16:P:33:ILE:HG13	1.95	0.48
1:A:688:G:H2'	1:A:689:C:C6	2.48	0.48
1:A:833:U:H2'	1:A:834:C:C6	2.48	0.48
2:B:68:ILE:HG12	2:B:161:ALA:HB3	1.95	0.48
1:A:908:A:H2'	1:A:909:A:C8	2.47	0.48
4:D:28:SER:O	4:D:30:LYS:N	2.41	0.48
6:F:11:ASN:HD22	6:F:86:ARG:NH2	2.11	0.48
14:N:24:CYS:H	14:N:33:VAL:HG21	1.79	0.48
20:T:83:ARG:NH2	27:T:201:HOH:O	2.45	0.48
1:A:421:U:H5'	1:A:422:C:C5	2.49	0.48
1:A:974:A:OP1	1:A:974:A:H8	1.97	0.48
4:D:184:LYS:HE3	4:D:184:LYS:HB2	1.70	0.48
8:H:86:ILE:HD12	8:H:133:LEU:HD22	1.96	0.48
8:H:113:SER:HB2	8:H:134:ILE:HD11	1.95	0.48
19:S:11:VAL:HG13	19:S:38:SER:HB2	1.96	0.48
10:J:49:VAL:HG13	14:N:41:ARG:HD2	1.95	0.48
1:A:1003:G:N2	1:A:1039:C:O2	2.47	0.48
1:A:390:C:H2'	1:A:391:G:C8	2.49	0.47
1:A:560:U:H5'	1:A:566:G:N2	2.29	0.47
12:L:54:LYS:HG2	12:L:75:HIS:CD2	2.48	0.47
13:M:22:ILE:HB	13:M:25:ILE:HB	1.94	0.47
17:Q:45:HIS:CD2	17:Q:47:PRO:HG3	2.49	0.47
1:A:488:C:H2'	1:A:489:C:C6	2.49	0.47
2:B:158:LEU:HD12	2:B:158:LEU:H	1.79	0.47
3:C:64:VAL:HG12	3:C:66:VAL:HG23	1.96	0.47
3:C:130:VAL:HG11	3:C:157:ILE:HG23	1.96	0.47
1:A:1544:U:H4'	22:Y:1:U:H5'	1.96	0.47
1:A:217:C:H2'	1:A:218:C:C6	2.50	0.47
4:D:24:GLU:HG2	4:D:25:ARG:H	1.79	0.47
11:K:33:THR:OG1	11:K:34:ASP:N	2.46	0.47
13:M:62:ASN:OD1	13:M:62:ASN:N	2.48	0.47
1:A:35:G:H2'	1:A:36:C:C6	2.49	0.47
1:A:1028:C:N3	1:A:1033:G:N2	2.45	0.47
4:D:26:CYS:HA	4:D:31:CYS:HB2	1.96	0.47
4:D:177:ASP:OD1	4:D:180:GLY:N	2.47	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:24:U:H2'	1:A:25:C:C6	2.49	0.47
1:A:456:C:N4	1:A:476:G:H1	2.05	0.47
1:A:474:G:H2'	1:A:475:G:C8	2.49	0.47
1:A:1171:G:H2'	1:A:1172:C:C6	2.50	0.47
1:A:1371:G:O3'	9:I:69:GLY:HA3	2.15	0.47
4:D:78:LEU:HB3	4:D:93:PHE:HE1	1.78	0.47
12:L:42:THR:HA	12:L:53:ARG:O	2.15	0.47
15:O:32:LEU:O	15:O:36:ILE:HG12	2.14	0.47
1:A:67:C:H2'	1:A:68:G:C8	2.50	0.47
1:A:161:A:N1	1:A:347:G:O2'	2.42	0.47
1:A:277:C:H5'	17:Q:68:ARG:NH1	2.30	0.47
1:A:1223:C:OP2	19:S:78:ARG:NH2	2.47	0.47
2:B:17:PHE:HD1	2:B:41:ILE:HD12	1.80	0.47
2:B:74:LYS:NZ	2:B:206:ASP:OD1	2.35	0.47
10:J:80:LYS:H	10:J:80:LYS:HD2	1.80	0.47
11:K:29:ILE:HG12	11:K:30:VAL:N	2.30	0.47
12:L:24:VAL:HG13	12:L:98:TYR:CE2	2.50	0.47
17:Q:67:LYS:O	17:Q:68:ARG:HB2	2.15	0.47
18:R:26:LEU:HD12	18:R:26:LEU:HA	1.75	0.47
20:T:67:ALA:HB2	20:T:77:ALA:HB2	1.97	0.47
1:A:190(K):G:H2'	1:A:190(L):U:C6	2.50	0.47
1:A:411:A:N3	1:A:413:G:O2'	2.41	0.47
1:A:337:C:H2'	1:A:338:A:H8	1.79	0.47
1:A:692:U:H2'	1:A:694:A:OP2	2.15	0.47
4:D:129:ASN:HD21	4:D:144:ASP:HA	1.80	0.47
16:P:3:LYS:HA	16:P:65:GLN:H	1.80	0.47
1:A:948:C:H2'	1:A:949:A:H8	1.80	0.47
1:A:1029:C:H2'	1:A:1030:C:C6	2.49	0.47
13:M:101:GLN:N	13:M:101:GLN:OE1	2.48	0.47
19:S:5:LEU:HD12	19:S:9:VAL:HG13	1.97	0.47
7:G:26:PHE:CE2	7:G:30:ILE:HD11	2.51	0.46
19:S:63:THR:HG22	19:S:64:GLU:H	1.80	0.46
1:A:129:U:O3'	1:A:129(A):G:H3'	2.15	0.46
1:A:1125:U:H3	10:J:5:ARG:NH2	2.14	0.46
1:A:1271:G:H2'	1:A:1272:G:C8	2.50	0.46
2:B:60:ASP:CG	2:B:64:ARG:HH12	2.17	0.46
12:L:85:ILE:HG23	12:L:98:TYR:HB3	1.97	0.46
14:N:24:CYS:HB3	14:N:29:ARG:HB3	1.98	0.46
1:A:677:U:H3	1:A:713:G:H22	1.62	0.46
1:A:737:A:H2'	1:A:738:C:C6	2.50	0.46
2:B:240:GLN:N	2:B:240:GLN:OE1	2.45	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:80:ILE:HD13	5:E:138:ALA:HB1	1.98	0.46
7:G:121:ALA:O	7:G:125:MET:HG3	2.16	0.46
11:K:57:THR:HG23	11:K:60:ALA:H	1.79	0.46
16:P:23:ASP:OD1	16:P:24:ALA:N	2.48	0.46
1:A:427:U:OP2	4:D:36:ARG:NH2	2.49	0.46
1:A:1006:C:H2'	1:A:1007:C:H6	1.80	0.46
1:A:1347:G:N2	1:A:1373:G:H2'	2.31	0.46
12:L:77:LEU:HD21	12:L:107:ALA:HB2	1.97	0.46
15:O:18:PHE:CZ	15:O:21:ASP:HB2	2.51	0.46
1:A:618:C:H5'	1:A:619:U:H5''	1.98	0.46
1:A:668:G:H1	1:A:738:C:H42	1.64	0.46
1:A:1035:A:H2'	1:A:1036:G:C8	2.51	0.46
11:K:70:LYS:HA	11:K:73:MET:HG2	1.97	0.46
16:P:40:ASP:HB3	16:P:48:TRP:HB2	1.96	0.46
1:A:229:U:H2'	1:A:230:G:C8	2.51	0.46
1:A:413:G:H2'	1:A:428:G:H22	1.80	0.46
1:A:582:U:H2'	1:A:583:A:C8	2.51	0.46
2:B:223:ILE:HG12	2:B:226:ARG:HH21	1.80	0.46
11:K:12:ARG:HD2	11:K:14:VAL:HG13	1.97	0.46
11:K:27:ASN:OD1	11:K:28:THR:N	2.48	0.46
1:A:740:U:H4'	15:O:42:HIS:CD2	2.50	0.46
1:A:1070:U:OP1	5:E:20:GLN:HG3	2.16	0.46
1:A:673:G:H2'	1:A:674:G:C8	2.51	0.46
1:A:1399:C:H4'	1:A:1400:5MC:H5''	1.96	0.46
1:A:1404:5MC:HN41	1:A:1497:G:H1	1.63	0.46
1:A:282:A:OP2	1:A:282:A:H8	1.99	0.46
1:A:514:C:H2'	1:A:515:G:H8	1.80	0.46
1:A:1175:G:H2'	1:A:1176:A:C8	2.51	0.45
1:A:1196:U:H3	3:C:162:GLN:NE2	2.14	0.45
15:O:24:SER:HB2	15:O:27:VAL:HG23	1.99	0.45
5:E:28:PHE:O	5:E:47:LYS:HA	2.16	0.45
7:G:26:PHE:HD1	7:G:101:LEU:HD22	1.80	0.45
12:L:53:ARG:NH1	12:L:92:0TD:OD2	2.38	0.45
21:U:25:LYS:HE3	21:U:25:LYS:HA	1.98	0.45
1:A:1345:U:OP1	9:I:120:ARG:NH1	2.48	0.45
1:A:1412:C:H2'	1:A:1413:A:H8	1.81	0.45
13:M:88:ARG:HH11	19:S:3:ARG:HH21	1.64	0.45
1:A:12:U:H4'	1:A:526:C:O2'	2.17	0.45
1:A:98:U:H2'	1:A:99:C:C6	2.50	0.45
1:A:757:U:H2'	1:A:758:G:O4'	2.16	0.45
1:A:902:G:H2'	1:A:903:G:C8	2.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:967:5MC:H2'	1:A:968:A:C8	2.51	0.45
1:A:1422:G:H2'	1:A:1423:G:C8	2.52	0.45
2:B:71:VAL:HB	2:B:164:VAL:HG12	1.97	0.45
3:C:156:ARG:H	3:C:163:ALA:HA	1.81	0.45
6:F:100:ASN:O	6:F:100:ASN:ND2	2.50	0.45
14:N:22:THR:HB	14:N:33:VAL:HB	1.99	0.45
20:T:59:ALA:O	20:T:63:ILE:HG13	2.16	0.45
1:A:279:A:C6	17:Q:98:LEU:HD13	2.51	0.45
1:A:714:G:H2'	1:A:715:A:C8	2.51	0.45
1:A:1148:U:H2'	1:A:1149:C:O4'	2.17	0.45
1:A:1223:C:P	19:S:78:ARG:HH21	2.39	0.45
1:A:1347:G:O6	9:I:10:ARG:NH2	2.50	0.45
1:A:564:C:C2	17:Q:31:LEU:HD11	2.52	0.45
1:A:1205:U:H2'	1:A:1206:G:C8	2.52	0.45
8:H:105:ARG:HA	8:H:105:ARG:HD3	1.70	0.45
10:J:69:ASN:O	10:J:70:ARG:NH1	2.46	0.45
1:A:269:C:H2'	1:A:270:A:C8	2.52	0.45
1:A:376:G:H5''	16:P:5:ARG:HB2	1.97	0.45
1:A:664:G:OP1	18:R:64:ARG:NH1	2.49	0.45
1:A:922:G:H1	1:A:1395:C:H42	1.63	0.45
1:A:1419:G:N2	1:A:1481:U:O2	2.47	0.45
2:B:102:LEU:HB3	2:B:180:LEU:HD12	1.99	0.45
4:D:18:LYS:HE2	4:D:20:TYR:HE1	1.82	0.45
1:A:942:G:H21	9:I:124:GLN:HE22	1.65	0.45
1:A:1197:G:H5''	27:A:1907:HOH:O	2.16	0.45
14:N:47:LEU:HB3	14:N:53:LEU:HD21	1.98	0.45
21:U:10:ARG:O	21:U:13:ILE:HG12	2.15	0.45
1:A:715:A:H2'	1:A:716:A:C8	2.51	0.45
1:A:877:C:O2	8:H:3:THR:HG21	2.16	0.45
1:A:1043:C:H2'	1:A:1044:A:H8	1.82	0.45
4:D:162:LEU:HA	4:D:165:MET:HB2	1.98	0.45
9:I:85:LEU:HD23	9:I:96:LEU:HD21	1.98	0.45
12:L:24:VAL:HG13	12:L:98:TYR:HE2	1.82	0.45
16:P:2:VAL:HG13	16:P:64:ALA:HA	1.97	0.45
1:A:1054:C:N4	23:W:34:G:C8	2.85	0.45
2:B:21:ARG:HG3	2:B:22:LYS:H	1.82	0.45
3:C:155:GLY:HA2	3:C:164:ARG:H	1.82	0.45
10:J:79:ARG:O	10:J:83:GLU:N	2.50	0.45
19:S:28:LYS:HG2	19:S:29:ARG:H	1.82	0.45
1:A:299:G:C6	1:A:300:A:C6	3.05	0.44
1:A:335:C:O2'	1:A:1433:A:N3	2.41	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:965:A:H4'	1:A:966:M2G:OP1	2.17	0.44
1:A:1213:A:N1	1:A:1215:G:H1'	2.31	0.44
13:M:3:ARG:NE	13:M:7:VAL:HG12	2.32	0.44
15:O:35:ARG:NH1	15:O:59:MET:SD	2.90	0.44
1:A:1065:U:H1'	1:A:1066:C:OP2	2.17	0.44
4:D:15:GLU:OE1	4:D:59:ARG:NH2	2.46	0.44
6:F:70:ASP:OD1	6:F:70:ASP:N	2.50	0.44
8:H:97:VAL:HG21	8:H:128:GLY:HA2	1.99	0.44
11:K:98:LEU:HD22	11:K:98:LEU:HA	1.87	0.44
13:M:96:LEU:O	13:M:110:ARG:NH1	2.49	0.44
1:A:920:U:H2'	1:A:921:U:C6	2.52	0.44
1:A:1310:G:H2'	1:A:1311:G:H8	1.81	0.44
1:A:1384:C:H2'	1:A:1385:G:C8	2.53	0.44
1:A:356:A:N3	1:A:368:U:O2'	2.44	0.44
1:A:990:C:H42	1:A:1215:G:H1	1.66	0.44
1:A:1061:G:H2'	1:A:1062:U:O4'	2.17	0.44
20:T:40:ALA:HB2	20:T:55:ILE:HG22	1.99	0.44
1:A:479:C:H2'	1:A:480:U:O4'	2.18	0.44
3:C:8:ILE:HG23	3:C:16:ARG:HG2	2.00	0.44
7:G:18:TYR:OH	7:G:58:PRO:HG2	2.17	0.44
8:H:63:LEU:H	8:H:63:LEU:HD22	1.83	0.44
9:I:46:ALA:HA	9:I:78:LYS:HB2	2.00	0.44
14:N:12:ARG:HG3	14:N:13:THR:H	1.82	0.44
1:A:762:C:H2'	1:A:763:G:C8	2.52	0.44
1:A:1472:U:H2'	1:A:1473:A:C8	2.51	0.44
2:B:160:ASP:N	2:B:160:ASP:OD1	2.50	0.44
3:C:108:ASN:HB3	3:C:111:LEU:HB2	2.00	0.44
4:D:142:PRO:HA	4:D:185:PHE:HD2	1.82	0.44
9:I:20:ARG:O	9:I:60:ASP:N	2.34	0.44
16:P:4:ILE:O	16:P:66:PRO:HA	2.18	0.44
1:A:109:A:H5'	1:A:110:C:H5	1.83	0.44
1:A:695:A:OP1	11:K:52:GLY:HA3	2.18	0.44
1:A:839:U:H2'	1:A:839:U:O2	2.17	0.44
4:D:175:SER:OG	4:D:186:LEU:HD21	2.18	0.44
19:S:29:ARG:HD2	19:S:29:ARG:N	2.33	0.44
1:A:1239:A:H4'	1:A:1240:U:H5''	2.00	0.44
1:A:1338:G:H2'	1:A:1339:A:C8	2.53	0.44
5:E:110:LEU:HD13	5:E:118:ILE:HD13	2.00	0.44
7:G:145:ALA:C	7:G:147:ALA:H	2.20	0.44
13:M:60:VAL:HA	13:M:63:THR:HG22	1.99	0.44
1:A:775:G:H2'	1:A:776:G:O4'	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:91:PRO:HG2	2:B:155:LEU:HG	1.99	0.44
12:L:74:GLY:O	12:L:102:ARG:NH1	2.46	0.44
13:M:23:TYR:HD2	13:M:67:GLU:HA	1.81	0.44
19:S:5:LEU:O	19:S:6:LYS:HE3	2.18	0.44
19:S:71:LEU:HD12	19:S:71:LEU:H	1.83	0.44
1:A:119:A:H4'	1:A:120:A:C8	2.52	0.43
1:A:463:A:OP1	16:P:75:ARG:NH1	2.39	0.43
1:A:1301:U:OP2	1:A:1303:C:N4	2.51	0.43
1:A:1518:MA6:O5'	1:A:1518:MA6:H8	2.17	0.43
1:A:23:C:H2'	1:A:24:U:C6	2.53	0.43
1:A:109:A:H5'	1:A:110:C:C5	2.52	0.43
1:A:946:A:O2'	1:A:1333:A:N3	2.42	0.43
1:A:1256:A:H4'	1:A:1257:U:O5'	2.18	0.43
2:B:19:HIS:CE1	2:B:206:ASP:HB2	2.53	0.43
10:J:55:LYS:HD2	10:J:56:HIS:H	1.82	0.43
18:R:19:LYS:HB2	18:R:19:LYS:HE3	1.69	0.43
1:A:463:A:H5''	16:P:80:PHE:HB3	2.00	0.43
1:A:686:U:O2'	1:A:687:A:H8	1.97	0.43
1:A:707:C:H2'	1:A:708:C:C6	2.53	0.43
1:A:979:C:OP1	1:A:1223:C:N4	2.51	0.43
1:A:1158:C:H4'	2:B:133:LYS:NZ	2.33	0.43
1:A:1300:G:H4'	1:A:1301:U:O5'	2.19	0.43
2:B:155:LEU:HD11	2:B:159:PRO:HG3	2.01	0.43
1:A:766:A:H2'	1:A:767:A:O4'	2.18	0.43
12:L:54:LYS:H	12:L:54:LYS:HD2	1.84	0.43
1:A:344:A:H5'	1:A:345:C:C5	2.53	0.43
1:A:1366:C:O3'	10:J:60:ARG:NH2	2.52	0.43
5:E:144:THR:O	5:E:148:VAL:HG23	2.19	0.43
8:H:87:SER:HB2	8:H:93:VAL:HB	2.00	0.43
1:A:91:C:H2'	1:A:92:C:H6	1.84	0.43
1:A:922:G:H2'	1:A:923:A:C8	2.53	0.43
1:A:1342:C:H2'	1:A:1343:G:C8	2.54	0.43
1:A:1419:G:H2'	1:A:1420:C:C6	2.54	0.43
1:A:1477:C:H2'	1:A:1478:C:C6	2.53	0.43
1:A:424:G:H2'	1:A:425:G:H8	1.84	0.43
13:M:14:ARG:HG3	13:M:44:ARG:HH21	1.83	0.43
1:A:91:C:H2'	1:A:92:C:C6	2.54	0.43
1:A:1064:G:N2	1:A:1190:G:O2'	2.51	0.43
1:A:1342:C:O2'	9:I:124:GLN:HB2	2.19	0.43
1:A:1347:G:H1'	1:A:1348:U:OP2	2.19	0.43
2:B:119:GLU:OE1	2:B:153:ARG:NH2	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
18:R:22:VAL:HG23	18:R:56:THR:HA	2.00	0.43
1:A:281:G:H4'	1:A:282:A:O5'	2.19	0.43
1:A:987:G:H2'	1:A:988:G:C8	2.53	0.43
1:A:1145:C:H1'	1:A:1146:A:C8	2.52	0.43
1:A:1288:A:H2'	1:A:1289:A:C8	2.54	0.43
8:H:19:VAL:HG23	8:H:21:LYS:HG2	2.01	0.43
14:N:21:TYR:CE2	14:N:23:ARG:HG2	2.54	0.43
18:R:41:LYS:HE2	18:R:41:LYS:HB3	1.86	0.43
1:A:424:G:H2'	1:A:425:G:C8	2.54	0.43
5:E:88:LYS:HB3	5:E:123:LEU:HB2	2.01	0.43
11:K:58:PRO:HB2	11:K:93:GLN:HG3	2.01	0.43
14:N:24:CYS:SG	14:N:40:CYS:N	2.91	0.43
15:O:77:ARG:O	15:O:81:LEU:HB2	2.19	0.43
1:A:646:U:H2'	1:A:647:C:C6	2.54	0.42
1:A:664:G:OP1	18:R:64:ARG:HD2	2.19	0.42
10:J:53:PRO:HA	14:N:41:ARG:HH21	1.84	0.42
20:T:50:GLU:HA	20:T:100:ILE:HG13	2.01	0.42
1:A:222:U:H2'	1:A:223:U:C6	2.54	0.42
1:A:1314:C:H2'	1:A:1315:U:C6	2.54	0.42
1:A:806:C:H2'	1:A:807:A:H8	1.85	0.42
1:A:1172:C:H2'	1:A:1173:G:H8	1.82	0.42
1:A:1195:C:H3'	1:A:1196:U:H5''	2.00	0.42
1:A:1343:G:H2'	1:A:1344:C:C6	2.55	0.42
1:A:1402:4OC:HM22	1:A:1403:C:H5'	2.00	0.42
1:A:1427:U:H2'	1:A:1428:A:H8	1.84	0.42
4:D:57:ARG:HG3	4:D:202:LEU:HD13	2.01	0.42
4:D:129:ASN:ND2	4:D:145:GLU:H	2.17	0.42
7:G:16:LEU:H	7:G:16:LEU:HD22	1.84	0.42
1:A:192:U:H2'	1:A:193:C:C6	2.54	0.42
1:A:1308:U:OP2	13:M:99:ARG:HG2	2.18	0.42
1:A:1461:G:H2'	1:A:1462:G:C8	2.53	0.42
4:D:7:PRO:HG2	4:D:10:ARG:HD2	2.01	0.42
4:D:14:ARG:HA	4:D:39:PRO:HB3	2.01	0.42
1:A:77:G:H2'	1:A:78:G:H8	1.83	0.42
1:A:958:A:H61	19:S:77:THR:HG23	1.85	0.42
2:B:15:VAL:HG12	2:B:210:SER:HB3	2.01	0.42
10:J:6:ILE:HD13	10:J:72:VAL:HB	2.01	0.42
10:J:26:ALA:HB1	10:J:84:GLN:HB2	2.01	0.42
1:A:103:C:O2'	1:A:172:A:N1	2.46	0.42
1:A:452:A:HO2'	1:A:453:A:C4'	2.32	0.42
1:A:587:G:O2'	1:A:588:G:OP2	2.30	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:977:A:H2'	1:A:978:A:H5''	2.02	0.42
1:A:1040:U:H2'	1:A:1041:A:H8	1.85	0.42
1:A:1511:G:H2'	1:A:1512:U:O4'	2.20	0.42
5:E:118:ILE:HG12	5:E:119:LEU:N	2.35	0.42
15:O:70:LEU:HD22	15:O:78:TYR:HB2	2.02	0.42
21:U:6:ARG:H	21:U:6:ARG:HG2	1.67	0.42
1:A:324:G:N1	1:A:327:A:OP2	2.52	0.42
1:A:452:A:O2'	1:A:453:A:O5'	2.37	0.42
1:A:1003(A):G:H2'	1:A:1004:A:H4'	2.02	0.42
1:A:1380:U:H1'	1:A:1381:U:OP2	2.20	0.42
3:C:41:GLY:O	3:C:45:LYS:HG2	2.20	0.42
4:D:9:CYS:HA	4:D:12:CYS:SG	2.59	0.42
1:A:484:G:H4'	1:A:485:G:O5'	2.20	0.42
1:A:1513:A:H2'	1:A:1514:C:C6	2.55	0.42
1:A:384:G:H2'	1:A:385:C:C6	2.54	0.42
1:A:665:A:H1'	1:A:733:A:O4'	2.19	0.42
1:A:762:C:H2'	1:A:763:G:H8	1.83	0.42
1:A:1048:G:O3'	1:A:1049:U:H3'	2.19	0.42
1:A:1081:G:H5''	5:E:27:ARG:HH12	1.85	0.42
1:A:1418:A:N6	1:A:1482:G:H1'	2.35	0.42
8:H:18:ARG:HA	8:H:18:ARG:HD3	1.91	0.42
9:I:4:TYR:CE2	9:I:88:TYR:HD1	2.38	0.42
12:L:54:LYS:HD2	12:L:54:LYS:N	2.35	0.42
13:M:19:LEU:HD22	13:M:22:ILE:HD11	2.02	0.42
9:I:93:ARG:HB3	9:I:93:ARG:NH1	2.35	0.42
12:L:82:VAL:O	12:L:106:ASP:HB2	2.20	0.42
13:M:56:LEU:HD23	13:M:56:LEU:HA	1.86	0.42
14:N:8:GLU:O	14:N:11:LYS:HG3	2.20	0.42
15:O:36:ILE:HD13	15:O:59:MET:HE3	2.02	0.42
19:S:25:LYS:HD2	19:S:25:LYS:N	2.35	0.42
1:A:258:G:H2'	1:A:259:G:H8	1.85	0.41
5:E:131:ILE:HD13	5:E:131:ILE:HA	1.95	0.41
1:A:21:G:N1	1:A:573:A:O4'	2.53	0.41
1:A:88:A:H2'	1:A:89:C:O4'	2.20	0.41
1:A:768:A:H2'	1:A:769:G:H8	1.85	0.41
1:A:895:G:H2'	1:A:896:C:C6	2.55	0.41
1:A:1046:A:H3'	1:A:1047:G:H8	1.85	0.41
1:A:1150:U:O4	1:A:1151:A:N6	2.53	0.41
1:A:1286:A:H2'	1:A:1287:A:H4'	2.03	0.41
1:A:1516:G:H2'	1:A:1518:MA6:OP2	2.20	0.41
5:E:82:VAL:HG21	5:E:138:ALA:HA	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:N:9:LYS:NZ	14:N:12:ARG:HH21	2.18	0.41
14:N:14:PRO:C	14:N:16:PHE:H	2.24	0.41
1:A:309:G:H2'	1:A:310:G:H8	1.85	0.41
1:A:806:C:H2'	1:A:807:A:C8	2.56	0.41
2:B:19:HIS:CD2	2:B:20:GLU:H	2.38	0.41
2:B:187:LEU:HD22	2:B:201:ILE:O	2.20	0.41
4:D:18:LYS:HE2	4:D:18:LYS:HB3	1.79	0.41
6:F:22:GLU:OE1	6:F:82:ARG:NH1	2.52	0.41
12:L:89:ARG:HG2	12:L:97:ARG:HA	2.03	0.41
1:A:1127:G:H1	1:A:1145:C:H42	1.66	0.41
1:A:1294:G:H2'	1:A:1295:G:C8	2.55	0.41
1:A:1310:G:OP2	13:M:88:ARG:NH2	2.54	0.41
3:C:105:GLU:HG2	3:C:106:VAL:N	2.35	0.41
6:F:26:ILE:O	6:F:30:LEU:HG	2.21	0.41
7:G:115:ARG:HB2	7:G:118:VAL:HG23	2.01	0.41
12:L:46:LYS:HB2	12:L:92:0TD:CSB	2.51	0.41
13:M:95:GLY:O	13:M:111:LYS:HB2	2.21	0.41
15:O:2:PRO:O	15:O:38:ARG:NH1	2.54	0.41
19:S:39:THR:HG23	19:S:70:LYS:HG2	2.01	0.41
1:A:1086:U:H4'	1:A:1389:C:H5''	2.03	0.41
1:A:1257:U:H4'	1:A:1258:G:O5'	2.21	0.41
1:A:1272:G:H2'	1:A:1273:G:O4'	2.21	0.41
6:F:76:ALA:HB1	6:F:80:ARG:HH21	1.85	0.41
1:A:707:C:OP1	11:K:85:ARG:NH1	2.53	0.41
1:A:921:U:H2'	1:A:922:G:O4'	2.20	0.41
12:L:58:VAL:O	12:L:65:GLU:HA	2.20	0.41
13:M:15:VAL:O	13:M:19:LEU:HG	2.20	0.41
1:A:118:U:H3'	1:A:288:A:H61	1.85	0.41
1:A:316:G:OP2	1:A:351:G:O2'	2.38	0.41
1:A:381:C:H2'	1:A:382:A:O4'	2.21	0.41
15:O:44:LYS:O	15:O:47:LYS:NZ	2.33	0.41
1:A:1098:C:H2'	1:A:1099:G:O4'	2.21	0.41
1:A:1123:A:H4'	10:J:37:PRO:HD2	2.01	0.41
1:A:1352:C:H2'	1:A:1353:G:C8	2.55	0.41
1:A:1441:G:O2'	1:A:1460:A:N6	2.52	0.41
4:D:20:TYR:HD1	4:D:26:CYS:HB3	1.84	0.41
4:D:199:ASN:ND2	4:D:202:LEU:HD23	2.35	0.41
9:I:50:LEU:O	9:I:55:ALA:N	2.52	0.41
11:K:122:LYS:HE3	11:K:122:LYS:HB2	1.85	0.41
14:N:8:GLU:CB	14:N:11:LYS:HE3	2.48	0.41
15:O:75:PRO:O	15:O:79:ARG:HG3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
18:R:47:THR:HB	18:R:49:LYS:HG3	2.03	0.41
1:A:320:C:H2'	1:A:321:A:C8	2.56	0.41
1:A:960:U:H4'	1:A:961:U:C5'	2.51	0.41
1:A:1111:A:N1	3:C:177:THR:HB	2.36	0.41
1:A:1133:G:H1	1:A:1141:C:H42	1.68	0.41
1:A:1270:C:H2'	1:A:1271:G:C8	2.56	0.41
2:B:74:LYS:O	2:B:78:GLN:HG3	2.21	0.41
4:D:176:LEU:HA	4:D:183:GLY:HA2	2.02	0.41
8:H:33:GLU:HG3	8:H:48:TYR:CE2	2.56	0.41
9:I:17:VAL:HG11	9:I:81:ILE:HA	2.02	0.41
20:T:60:GLU:HG3	20:T:81:LYS:HE3	2.03	0.41
1:A:17:U:H2'	1:A:18:C:C6	2.56	0.41
1:A:417:C:N4	1:A:426:G:H1	2.13	0.41
2:B:16:HIS:CE1	2:B:210:SER:HB2	2.56	0.41
3:C:20:SER:HB3	3:C:22:TRP:HE1	1.85	0.41
4:D:78:LEU:HD21	4:D:139:ARG:HH21	1.86	0.41
5:E:31:LEU:HD23	5:E:31:LEU:HA	1.85	0.41
12:L:44:THR:HA	12:L:45:PRO:HD3	1.87	0.41
17:Q:63:ARG:HG2	17:Q:64:PRO:HD2	2.03	0.41
19:S:18:LYS:O	19:S:22:LEU:HG	2.21	0.41
1:A:403:C:H2'	1:A:404:U:H6	1.86	0.40
1:A:620:C:H2'	1:A:621:A:O4'	2.21	0.40
1:A:1201:A:H1'	1:A:1202:G:OP2	2.20	0.40
1:A:1318:A:H4'	19:S:10:PHE:CD2	2.56	0.40
2:B:9:GLU:OE1	2:B:10:LEU:N	2.54	0.40
3:C:26:LYS:NZ	10:J:45:ARG:HE	2.19	0.40
3:C:91:LEU:HD23	3:C:92:ALA:N	2.36	0.40
7:G:5:ARG:HG2	7:G:6:ARG:H	1.86	0.40
8:H:121:ASP:OD1	8:H:121:ASP:N	2.54	0.40
22:Y:4:U:H1'	23:W:34:G:H22	1.86	0.40
1:A:1397:C:N4	22:Y:5:U:OP2	2.54	0.40
1:A:1422:G:H2'	1:A:1423:G:H8	1.85	0.40
18:R:54:ARG:H	18:R:54:ARG:HG3	1.50	0.40
3:C:131:ARG:HE	3:C:131:ARG:HB2	1.37	0.40
5:E:151:LEU:HD23	5:E:151:LEU:HA	1.88	0.40
7:G:100:ALA:O	7:G:104:LEU:HG	2.21	0.40
9:I:127:LYS:HE3	9:I:127:LYS:HB3	1.84	0.40
13:M:3:ARG:HE	13:M:7:VAL:HG12	1.86	0.40
15:O:39:LEU:HD12	15:O:59:MET:HE2	2.02	0.40
15:O:64:ARG:HH21	15:O:68:ARG:HH21	1.68	0.40
1:A:344:A:H4'	1:A:345:C:OP2	2.22	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:559:A:OP1	5:E:126:ARG:NH2	2.55	0.40
1:A:716:A:N3	11:K:118:GLY:HA2	2.35	0.40
1:A:801:U:H2'	1:A:802:A:H8	1.85	0.40
1:A:1418:A:N6	1:A:1482:G:O2'	2.55	0.40
1:A:1454:G:H2'	1:A:1455:G:C8	2.55	0.40
9:I:28:VAL:HG22	9:I:63:ILE:HB	2.04	0.40
1:A:476:G:H2'	1:A:477:G:C8	2.57	0.40
1:A:603:U:H2'	1:A:604:G:H8	1.86	0.40
1:A:1006:C:H2'	1:A:1007:C:C6	2.55	0.40
2:B:122:PHE:HA	2:B:127:ILE:HG23	2.03	0.40
4:D:121:VAL:O	4:D:134:ASP:HA	2.21	0.40
9:I:32:ASP:OD1	9:I:33:PHE:N	2.54	0.40
10:J:15:THR:HG22	10:J:94:VAL:HB	2.04	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	232/256 (91%)	218 (94%)	14 (6%)	0	100	100
3	C	204/239 (85%)	179 (88%)	25 (12%)	0	100	100
4	D	206/209 (99%)	198 (96%)	8 (4%)	0	100	100
5	E	148/162 (91%)	142 (96%)	6 (4%)	0	100	100
6	F	99/101 (98%)	96 (97%)	3 (3%)	0	100	100
7	G	153/156 (98%)	144 (94%)	9 (6%)	0	100	100
8	H	136/138 (99%)	128 (94%)	6 (4%)	2 (2%)	10	45
9	I	125/128 (98%)	111 (89%)	14 (11%)	0	100	100
10	J	96/105 (91%)	81 (84%)	12 (12%)	3 (3%)	4	33
11	K	114/129 (88%)	108 (95%)	6 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
12	L	121/135 (90%)	114 (94%)	7 (6%)	0	100	100
13	M	116/126 (92%)	101 (87%)	15 (13%)	0	100	100
14	N	58/61 (95%)	49 (84%)	9 (16%)	0	100	100
15	O	85/89 (96%)	84 (99%)	1 (1%)	0	100	100
16	P	81/88 (92%)	77 (95%)	4 (5%)	0	100	100
17	Q	97/105 (92%)	94 (97%)	3 (3%)	0	100	100
18	R	68/88 (77%)	64 (94%)	4 (6%)	0	100	100
19	S	78/93 (84%)	70 (90%)	8 (10%)	0	100	100
20	T	97/106 (92%)	87 (90%)	10 (10%)	0	100	100
21	U	22/27 (82%)	22 (100%)	0	0	100	100
All	All	2336/2541 (92%)	2167 (93%)	164 (7%)	5 (0%)	47	78

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
10	J	55	LYS
10	J	56	HIS
8	H	71	GLY
10	J	54	PHE
8	H	72	PRO

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	202/220 (92%)	180 (89%)	22 (11%)	6	29
3	C	160/188 (85%)	141 (88%)	19 (12%)	5	26
4	D	180/181 (99%)	165 (92%)	15 (8%)	11	41
5	E	115/123 (94%)	108 (94%)	7 (6%)	18	51
6	F	90/90 (100%)	87 (97%)	3 (3%)	38	64

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	G	126/127 (99%)	118 (94%)	8 (6%)	18	49
8	H	119/119 (100%)	111 (93%)	8 (7%)	16	48
9	I	98/99 (99%)	90 (92%)	8 (8%)	11	41
10	J	87/92 (95%)	82 (94%)	5 (6%)	20	53
11	K	88/99 (89%)	82 (93%)	6 (7%)	16	47
12	L	103/110 (94%)	93 (90%)	10 (10%)	8	34
13	M	94/101 (93%)	84 (89%)	10 (11%)	6	30
14	N	49/50 (98%)	47 (96%)	2 (4%)	30	59
15	O	79/80 (99%)	70 (89%)	9 (11%)	5	28
16	P	72/74 (97%)	67 (93%)	5 (7%)	15	47
17	Q	94/97 (97%)	87 (93%)	7 (7%)	13	44
18	R	61/77 (79%)	56 (92%)	5 (8%)	11	41
19	S	71/80 (89%)	63 (89%)	8 (11%)	6	28
20	T	76/82 (93%)	66 (87%)	10 (13%)	4	23
21	U	19/22 (86%)	17 (90%)	2 (10%)	7	30
All	All	1983/2111 (94%)	1814 (92%)	169 (8%)	10	40

All (169) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	7	VAL
2	B	8	LYS
2	B	11	LEU
2	B	21	ARG
2	B	23	ARG
2	B	33	TYR
2	B	44	LEU
2	B	51	LEU
2	B	69	LEU
2	B	96	ARG
2	B	102	LEU
2	B	103	THR
2	B	106	LYS
2	B	122	PHE
2	B	127	ILE
2	B	154	LEU
2	B	157	ARG

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Mol	Chain	Res	Type
2	B	163	PHE
2	B	178	ARG
2	B	190	THR
2	B	200	ILE
2	B	206	ASP
3	C	3	ASN
3	C	10	PHE
3	C	21	ARG
3	C	34	LEU
3	C	70	VAL
3	C	72	LYS
3	C	79	ARG
3	C	90	GLU
3	C	91	LEU
3	C	95	THR
3	C	99	VAL
3	C	111	LEU
3	C	131	ARG
3	C	166	GLU
3	C	167	TRP
3	C	176	HIS
3	C	188	LEU
3	C	193	TYR
3	C	196	LEU
4	D	35	ARG
4	D	47	ARG
4	D	49	ARG
4	D	76	ARG
4	D	93	PHE
4	D	115	ARG
4	D	122	ARG
4	D	131	ARG
4	D	135	LEU
4	D	150	GLU
4	D	152	SER
4	D	155	LEU
4	D	157	LEU
4	D	163	GLU
4	D	193	ASP
5	E	6	PHE
5	E	12	LEU
5	E	26	PHE

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Mol	Chain	Res	Type
5	E	31	LEU
5	E	41	VAL
5	E	79	GLU
5	E	151	LEU
6	F	10	LEU
6	F	71	ARG
6	F	82	ARG
7	G	8	GLU
7	G	45	ASP
7	G	79	ARG
7	G	84	ASN
7	G	97	GLN
7	G	115	ARG
7	G	136	LYS
7	G	149	ARG
8	H	2	LEU
8	H	3	THR
8	H	63	LEU
8	H	85	ARG
8	H	92	ARG
8	H	98	LYS
8	H	127	LEU
8	H	133	LEU
9	I	12	GLU
9	I	40	LEU
9	I	44	VAL
9	I	79	LEU
9	I	102	LEU
9	I	118	LYS
9	I	121	ARG
9	I	124	GLN
10	J	3	LYS
10	J	38	ILE
10	J	62	HIS
10	J	78	ASN
10	J	95	GLU
11	K	12	ARG
11	K	14	VAL
11	K	29	ILE
11	K	33	THR
11	K	92	GLU
11	K	98	LEU

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Mol	Chain	Res	Type
12	L	18	VAL
12	L	20	LYS
12	L	33	ARG
12	L	39	VAL
12	L	59	ARG
12	L	67	THR
12	L	79	GLU
12	L	80	HIS
12	L	100	ILE
12	L	113	ARG
13	M	8	GLU
13	M	17	VAL
13	M	37	THR
13	M	44	ARG
13	M	48	LEU
13	M	65	LYS
13	M	105	THR
13	M	108	ARG
13	M	110	ARG
13	M	117	VAL
14	N	11	LYS
14	N	22	THR
15	O	5	LYS
15	O	33	THR
15	O	39	LEU
15	O	41	GLU
15	O	45	VAL
15	O	65	ARG
15	O	70	LEU
15	O	81	LEU
15	O	83	GLU
16	P	29	ASP
16	P	55	ARG
16	P	62	VAL
16	P	67	THR
16	P	83	GLU
17	Q	34	LYS
17	Q	36	ILE
17	Q	53	LEU
17	Q	59	ILE
17	Q	60	ILE
17	Q	70	ARG

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Mol	Chain	Res	Type
17	Q	76	LEU
18	R	31	LEU
18	R	42	ARG
18	R	47	THR
18	R	54	ARG
18	R	87	ARG
19	S	13	ASP
19	S	15	LEU
19	S	29	ARG
19	S	31	ILE
19	S	39	THR
19	S	48	THR
19	S	62	ILE
19	S	63	THR
20	T	53	LEU
20	T	56	MET
20	T	57	ARG
20	T	62	LEU
20	T	68	LYS
20	T	73	HIS
20	T	79	ARG
20	T	84	LEU
20	T	92	LEU
20	T	93	GLU
21	U	9	ARG
21	U	25	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	19	HIS
2	B	204	ASN
8	H	78	GLN
9	I	124	GLN
10	J	84	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1508/1522 (99%)	243 (16%)	45 (2%)

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
22	Y	5/6 (83%)	2 (40%)	0
23	W	14/15 (93%)	2 (14%)	0
All	All	1527/1543 (98%)	247 (16%)	45 (2%)

All (247) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	6	G
1	A	9	G
1	A	22	G
1	A	32	A
1	A	39	G
1	A	47	C
1	A	48	C
1	A	51	A
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	190(E)	U
1	A	195	A
1	A	201	C
1	A	203	U
1	A	204	U
1	A	216	G
1	A	220	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
1	A	289	G
1	A	301	G
1	A	321	A

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Mol	Chain	Res	Type
1	A	328	C
1	A	329	A
1	A	332	G
1	A	344	A
1	A	345	C
1	A	350	G
1	A	351	G
1	A	352	C
1	A	353	A
1	A	354	G
1	A	356	A
1	A	367	U
1	A	373	A
1	A	374	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	430	A
1	A	439	A
1	A	440	A
1	A	451	A
1	A	452	A
1	A	460	A
1	A	461	C
1	A	481	G
1	A	485	G
1	A	497	A
1	A	498	U
1	A	509	A
1	A	510	A
1	A	511	C
1	A	518	C
1	A	519	C
1	A	524	G
1	A	531	U

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Mol	Chain	Res	Type
1	A	533	A
1	A	547	A
1	A	559	A
1	A	560	U
1	A	562	C
1	A	564	C
1	A	572	A
1	A	576	G
1	A	577	G
1	A	579	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	721	G
1	A	723	U
1	A	731	G
1	A	733	A
1	A	749	C
1	A	755	G
1	A	777	A
1	A	781	A
1	A	782	A
1	A	793	U
1	A	794	A
1	A	799	G
1	A	804	U
1	A	812	C
1	A	813	U
1	A	817	C
1	A	820	U
1	A	821	G
1	A	828	A
1	A	839	U
1	A	840	C
1	A	841	U

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Mol	Chain	Res	Type
1	A	848	C
1	A	851	G
1	A	858	G
1	A	873	A
1	A	876	G
1	A	889	A
1	A	902	G
1	A	914	A
1	A	926	G
1	A	927	G
1	A	934	C
1	A	935	A
1	A	942	G
1	A	960	U
1	A	961	U
1	A	966	M2G
1	A	967	5MC
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	989	C
1	A	991	U
1	A	992	U
1	A	993	G
1	A	1004	A
1	A	1005	A
1	A	1023	G
1	A	1024	G
1	A	1026	G
1	A	1045	C
1	A	1047	G
1	A	1050	G
1	A	1051	C
1	A	1053	G
1	A	1054	C
1	A	1055	A
1	A	1065	U
1	A	1066	C
1	A	1068	G

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Mol	Chain	Res	Type
1	A	1094	G
1	A	1095	U
1	A	1101	A
1	A	1125	U
1	A	1126	U
1	A	1127	G
1	A	1129	C
1	A	1130	A
1	A	1136	U
1	A	1137	C
1	A	1138	G
1	A	1139	G
1	A	1146	A
1	A	1152	A
1	A	1159	U
1	A	1171	G
1	A	1183	A
1	A	1191	A
1	A	1196	U
1	A	1197	G
1	A	1198	G
1	A	1201	A
1	A	1202	G
1	A	1211	U
1	A	1212	U
1	A	1214	C
1	A	1215	G
1	A	1224	G
1	A	1225	A
1	A	1227	A
1	A	1228	C
1	A	1238	A
1	A	1240	U
1	A	1241	G
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

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Mol	Chain	Res	Type
1	A	1286	A
1	A	1287	A
1	A	1300	G
1	A	1301	U
1	A	1302	U
1	A	1303	C
1	A	1306	A
1	A	1312	G
1	A	1320	C
1	A	1322	C
1	A	1323	G
1	A	1336	C
1	A	1338	G
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	1363	A
1	A	1364	U
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	1452	C
1	A	1478	C
1	A	1485	U
1	A	1487	G
1	A	1492	A
1	A	1499	A
1	A	1503	A
1	A	1504	G
1	A	1506	U
1	A	1517	G
1	A	1520	G
1	A	1529	G
1	A	1530	G
22	Y	5	U
22	Y	6	U

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Mol	Chain	Res	Type
23	W	30	G
23	W	33	U

All (45) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	5	U
1	A	21	G
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	429	U
1	A	484	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	965	A
1	A	992	U
1	A	1049	U
1	A	1065	U
1	A	1067	A
1	A	1145	C
1	A	1182	G
1	A	1190	G
1	A	1201	A
1	A	1256	A

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Mol	Chain	Res	Type
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](#)

15 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	PSU	A	1540	1	17,21,22	1.04	1 (5%)	20,30,33	3.23	6 (30%)
1	MA6	A	1518	1	19,26,27	1.08	1 (5%)	18,38,41	0.69	0
1	7MG	A	527	1	22,26,27	2.20	6 (27%)	28,39,42	1.78	7 (25%)
1	M2G	A	966	1	20,27,28	2.00	4 (20%)	22,40,43	2.42	5 (22%)
1	5MC	A	1400	1	15,22,23	0.89	0	19,32,35	1.09	1 (5%)
1	5MC	A	1404	1	15,22,23	0.89	0	19,32,35	1.07	2 (10%)
1	5MC	A	1407	1	15,22,23	0.90	0	19,32,35	1.05	2 (10%)
1	2MG	A	1207	1	19,26,27	2.27	4 (21%)	21,38,41	1.98	2 (9%)
1	UR3	A	1498	1	14,22,23	1.05	2 (14%)	15,32,35	1.05	1 (6%)
1	PSU	A	1541	1,25	17,21,22	1.06	2 (11%)	20,30,33	3.19	6 (30%)
1	PSU	A	516	1,25	17,21,22	1.04	2 (11%)	20,30,33	3.13	6 (30%)
1	MA6	A	1519	1	19,26,27	1.23	2 (10%)	18,38,41	0.60	0
1	5MC	A	967	1	15,22,23	0.94	0	19,32,35	1.09	2 (10%)
12	0TD	L	92	12	4,9,10	0.80	0	3,11,13	1.86	1 (33%)
1	4OC	A	1402	1	16,23,24	0.99	1 (6%)	17,32,35	0.74	0

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

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1207	2MG	C2-N2	6.86	1.39	1.34
1	A	1207	2MG	C6-N1	5.98	1.43	1.33
1	A	527	7MG	C4-N3	5.89	1.41	1.34
1	A	966	M2G	C6-N1	5.88	1.43	1.33
1	A	527	7MG	C2-N2	5.06	1.44	1.33
1	A	527	7MG	C8-N9	-4.70	1.34	1.45
1	A	966	M2G	C2-N2	3.96	1.41	1.34
1	A	966	M2G	C2-N1	3.67	1.41	1.34
1	A	966	M2G	C4-N3	3.29	1.40	1.35
1	A	1519	MA6	C6-N1	3.22	1.37	1.33
1	A	1541	PSU	C4-N3	3.20	1.38	1.33
1	A	1540	PSU	C4-N3	3.13	1.38	1.33
1	A	516	PSU	C4-N3	3.07	1.38	1.33
1	A	1518	MA6	C6-N1	3.06	1.37	1.33
1	A	1498	UR3	C6-N1	2.83	1.39	1.35
1	A	527	7MG	C5-C6	2.81	1.45	1.41
1	A	527	7MG	C6-N1	2.74	1.37	1.33
1	A	1207	2MG	C2-N1	2.37	1.42	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1402	4OC	C5-C4	2.35	1.45	1.39
1	A	1519	MA6	C2-N1	2.34	1.38	1.33
1	A	516	PSU	O4'-C1'	-2.17	1.41	1.44
1	A	1498	UR3	C4-N3	2.14	1.41	1.38
1	A	527	7MG	CM7-N7	-2.13	1.42	1.46
1	A	1207	2MG	C4-N3	2.12	1.39	1.35
1	A	1541	PSU	O4'-C1'	-2.10	1.41	1.44

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1541	PSU	N3-C2-N1	-11.07	119.63	128.43
1	A	1540	PSU	N3-C2-N1	-10.93	119.74	128.43
1	A	516	PSU	N3-C2-N1	-10.73	119.90	128.43
1	A	966	M2G	C5-C6-N1	-8.09	112.37	123.43
1	A	1207	2MG	C5-C6-N1	-7.59	113.05	123.43
1	A	966	M2G	C2-N1-C6	5.94	123.25	116.18
1	A	1541	PSU	C2-N3-C4	5.77	120.01	115.14
1	A	1540	PSU	C2-N3-C4	5.75	119.99	115.14
1	A	516	PSU	C2-N3-C4	5.53	119.81	115.14
1	A	527	7MG	N3-C4-N9	4.92	133.23	126.91
1	A	527	7MG	C5-C4-N3	-4.29	119.49	126.49
1	A	1541	PSU	C5-C4-N3	-4.15	120.02	125.36
1	A	1540	PSU	C5-C4-N3	-4.13	120.03	125.36
1	A	516	PSU	C5-C4-N3	-4.12	120.05	125.36
1	A	527	7MG	N9-C8-N7	4.00	109.09	103.38
1	A	1207	2MG	C2-N1-C6	3.68	121.76	115.18
1	A	516	PSU	C5-C6-N1	-3.47	120.17	124.44
1	A	1541	PSU	C6-N1-C2	3.29	120.79	115.36
1	A	516	PSU	C6-N1-C2	3.27	120.76	115.36
1	A	1540	PSU	C6-N1-C2	3.20	120.64	115.36
1	A	1541	PSU	C5-C6-N1	-3.19	120.52	124.44
1	A	1540	PSU	C5-C6-N1	-3.08	120.66	124.44
1	A	1540	PSU	C5-C1'-C2'	-3.06	109.86	115.32
1	A	966	M2G	N3-C2-N2	2.79	120.01	117.18
12	L	92	0TD	CSB-SB-CB	-2.54	96.86	101.85
1	A	527	7MG	C2-N1-C6	2.51	119.92	115.93
1	A	1404	5MC	C4-N3-C2	2.46	118.99	116.02
1	A	527	7MG	C4-C5-C6	2.46	117.84	115.20
1	A	527	7MG	C2-N3-C4	2.38	120.48	113.89
1	A	516	PSU	O4'-C1'-C2'	2.22	108.26	104.66
1	A	967	5MC	C4-N3-C2	2.21	118.69	116.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1400	5MC	N4-C4-N3	-2.16	113.98	117.03
1	A	966	M2G	N1-C2-N2	-2.15	115.02	117.19
1	A	967	5MC	N4-C4-N3	-2.11	114.06	117.03
1	A	1407	5MC	C4-N3-C2	2.10	118.55	116.02
1	A	966	M2G	C2-N3-C4	-2.08	112.92	115.28
1	A	527	7MG	N3-C2-N1	-2.06	122.18	125.42
1	A	1541	PSU	O4'-C1'-C2'	2.05	107.98	104.66
1	A	1407	5MC	N4-C4-N3	-2.02	114.17	117.03
1	A	1498	UR3	C3'-C2'-C1'	2.00	104.00	100.98
1	A	1404	5MC	CM5-C5-C6	2.00	122.91	118.68

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
12	L	92	0TD	O-C-CA-CB
12	L	92	0TD	CG-CB-SB-CSB
1	A	966	M2G	C4'-C5'-O5'-P
1	A	967	5MC	O4'-C4'-C5'-O5'
1	A	1400	5MC	O4'-C4'-C5'-O5'
1	A	1402	4OC	O4'-C4'-C5'-O5'
1	A	1519	MA6	C3'-C4'-C5'-O5'
1	A	1519	MA6	C5-C6-N6-C9
1	A	1400	5MC	C3'-C4'-C5'-O5'
1	A	1402	4OC	C3'-C4'-C5'-O5'
1	A	1519	MA6	O4'-C4'-C5'-O5'
1	A	967	5MC	C3'-C4'-C5'-O5'
1	A	966	M2G	O4'-C4'-C5'-O5'
1	A	966	M2G	C3'-C4'-C5'-O5'
1	A	1519	MA6	C5-C6-N6-C10
1	A	1402	4OC	C3'-C2'-O2'-CM2

There are no ring outliers.

7 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	1518	MA6	2	0
1	A	966	M2G	2	0
1	A	1400	5MC	1	0
1	A	1404	5MC	2	0
1	A	967	5MC	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	L	92	0TD	3	0
1	A	1402	4OC	1	0

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 252 ligands modelled in this entry, 251 are monoatomic - leaving 1 for Mogul analysis.

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	$\# Z > 2$
24	HJO	A	1601	-	32,36,36	1.68	7 (21%)	39,53,53	2.66	15 (38%)

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
24	HJO	A	1601	-	1/1/13/15	10/15/69/69	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
24	A	1601	HJO	O53-C53	5.01	1.50	1.43
24	A	1601	HJO	C1-N12	3.89	1.47	1.34
24	A	1601	HJO	O51-C51	2.86	1.49	1.44
24	A	1601	HJO	O53-C13	2.71	1.47	1.41
24	A	1601	HJO	C23-C33	-2.26	1.48	1.53
24	A	1601	HJO	C41-C31	-2.23	1.47	1.52
24	A	1601	HJO	C2-C1	2.03	1.54	1.50

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
24	A	1601	HJO	O43-C43-C83	-10.23	85.71	108.13
24	A	1601	HJO	C11-O51-C51	-6.66	105.76	113.13
24	A	1601	HJO	C53-O53-C13	4.19	118.27	111.53
24	A	1601	HJO	O62-C13-C23	-3.98	97.78	108.10
24	A	1601	HJO	O11-C11-C21	3.20	113.59	108.23
24	A	1601	HJO	C93-N33-C33	-2.80	110.30	114.38
24	A	1601	HJO	O11-C11-O51	-2.77	102.93	110.67
24	A	1601	HJO	O62-C62-C12	2.63	115.03	108.85
24	A	1601	HJO	O11-C42-C52	2.62	114.26	107.28
24	A	1601	HJO	O62-C62-C52	2.52	113.98	107.28
24	A	1601	HJO	C13-C23-C33	-2.27	105.59	109.34
24	A	1601	HJO	C12-N12-C1	-2.19	119.79	122.90
24	A	1601	HJO	C2-C1-N12	2.18	119.80	116.10
24	A	1601	HJO	O53-C13-C23	2.18	113.38	110.04
24	A	1601	HJO	C31-C41-C51	2.05	113.98	110.82

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
24	A	1601	HJO	C43

All (10) torsion outliers are listed below:

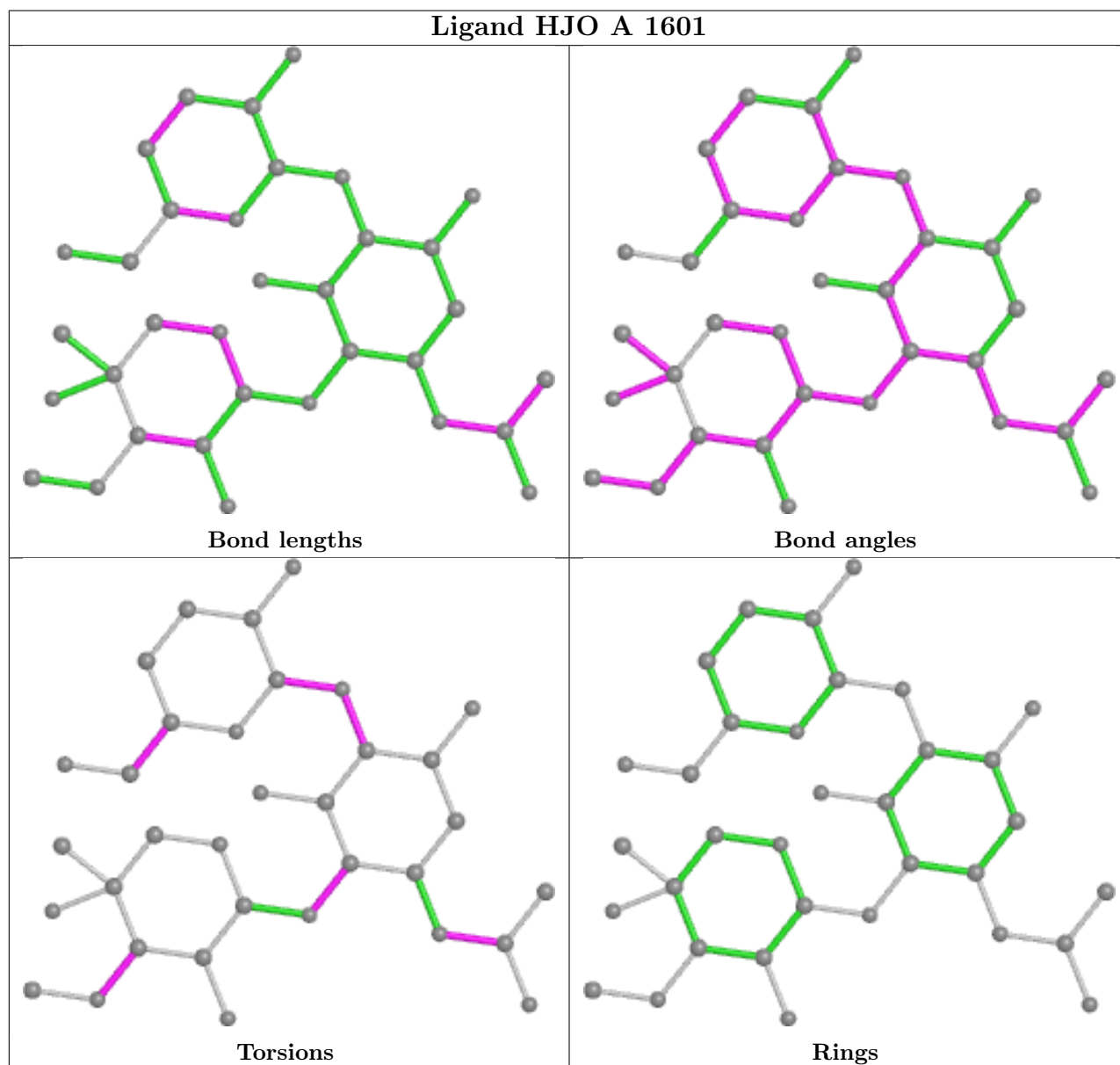
Mol	Chain	Res	Type	Atoms
24	A	1601	HJO	C21-C11-O11-C42
24	A	1601	HJO	C23-C33-N33-C93
24	A	1601	HJO	C41-C51-C61-N61
24	A	1601	HJO	O51-C51-C61-N61
24	A	1601	HJO	O51-C11-O11-C42
24	A	1601	HJO	C52-C62-O62-C13
24	A	1601	HJO	C2-C1-N12-C12
24	A	1601	HJO	O1-C1-N12-C12
24	A	1601	HJO	C52-C42-O11-C11
24	A	1601	HJO	C32-C42-O11-C11

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
24	A	1601	HJO	1	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 than 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.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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.

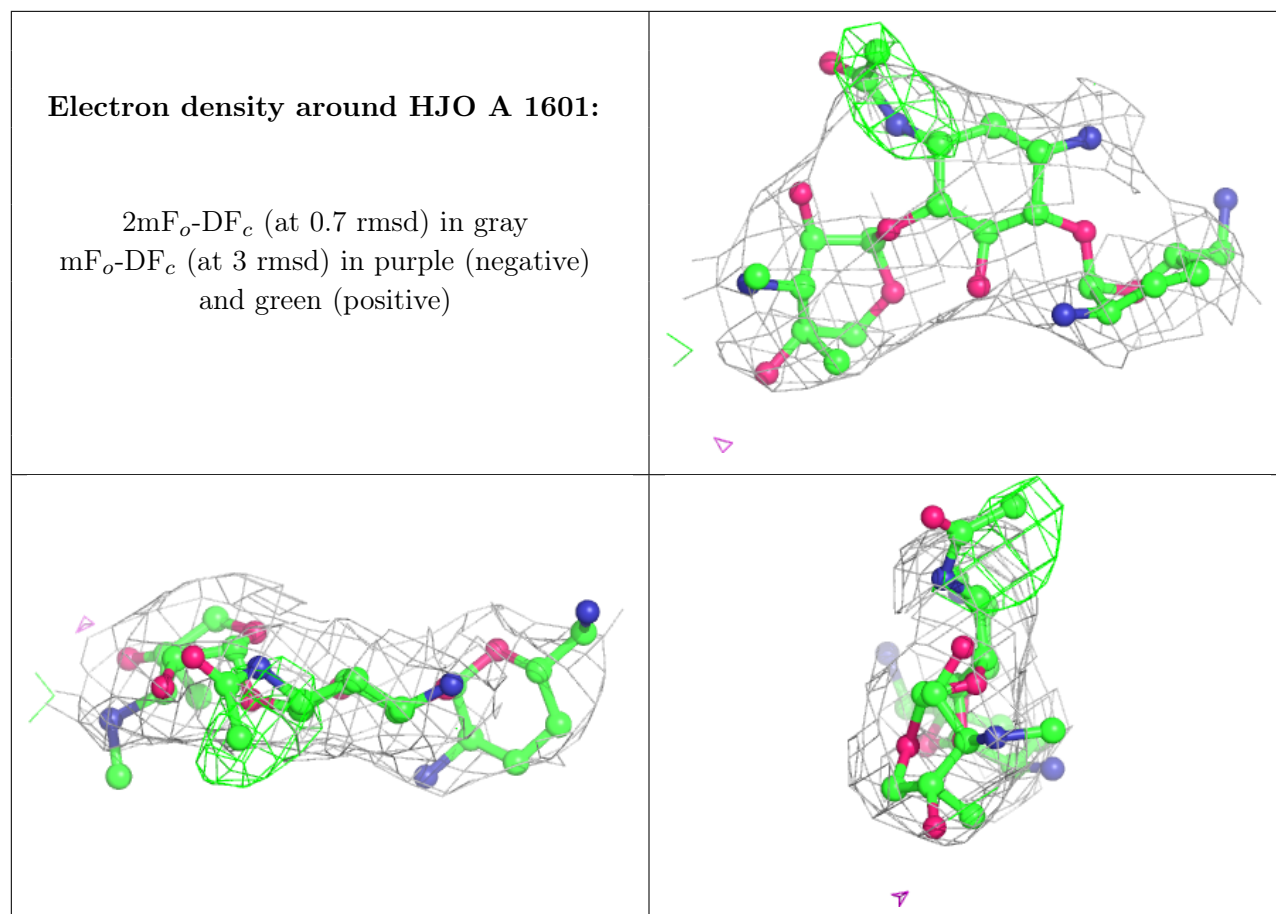
6.3 Carbohydrates

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.

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



6.5 Other polymers [i](#)

Unable to reproduce the depositor's R factor - this section is therefore empty.