Full wwPDB EM Validation Report

Nov 18, 2026 – 01:31 PM EST

PDB ID	:	9ZR3 / pdb_00009zr3
EMDB ID	:	EMD-74588
Title	:	Class II: EF-G bound E. coli 70S INT1-elbow I early translocation intermediate in the presence of GTP-gamma-S
Authors	:	Rundlet, E.J.; Natchiar, K.S.; Holm, M.; Myasnikov, A.G.; Altman, R.; Blanchard, S.C.
Deposited on	:	2025-12-19
Resolution	:	2.71 Å(reported)
Based on initial model	:	7N2V

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

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

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

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

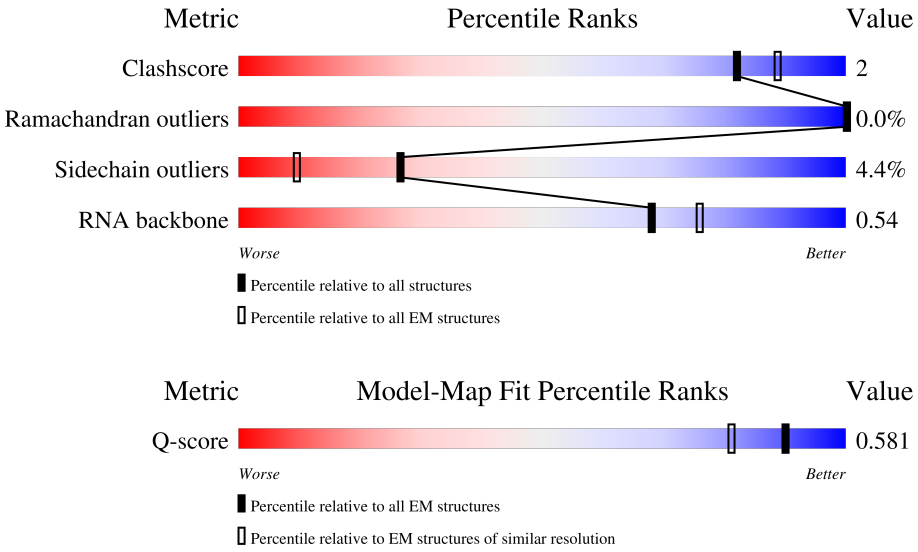
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.2
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.71 Å.

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



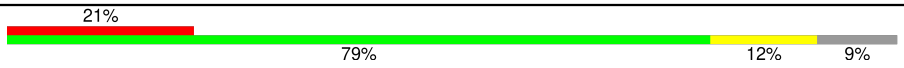
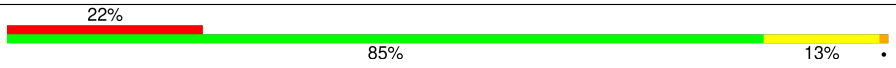
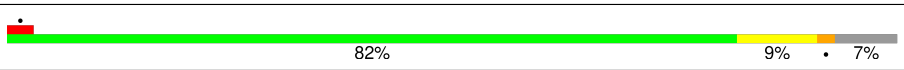
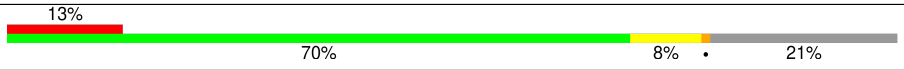
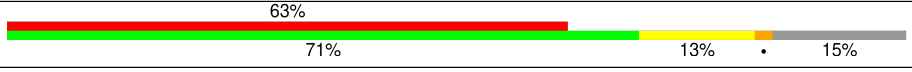
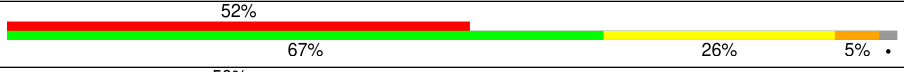
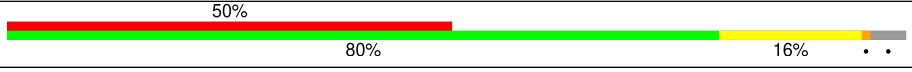
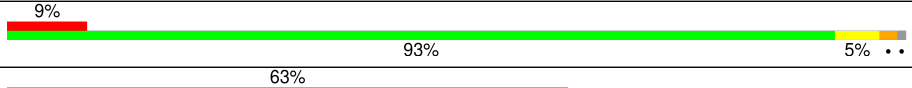
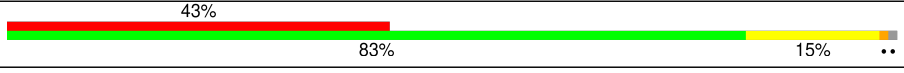
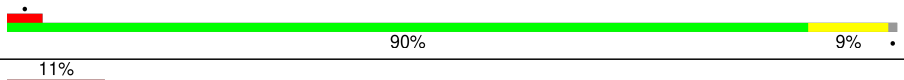
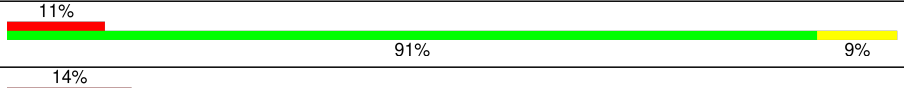
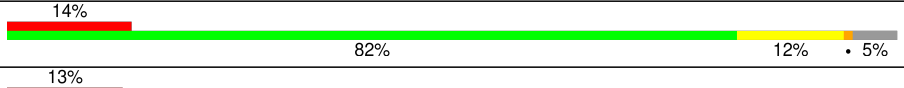
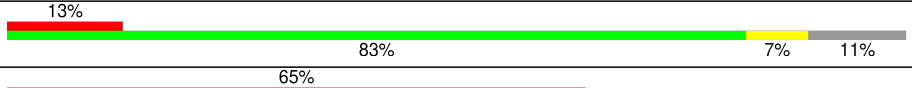
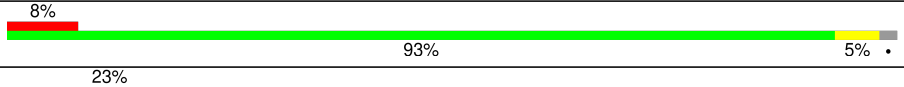
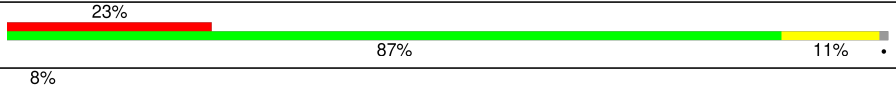
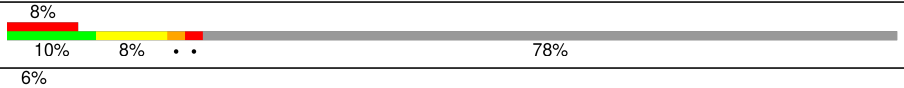
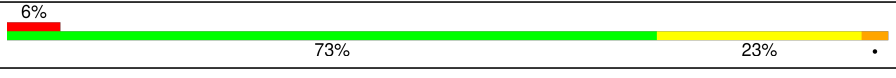
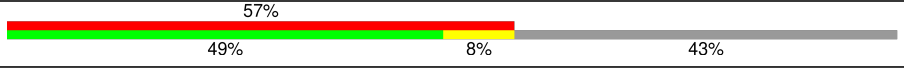
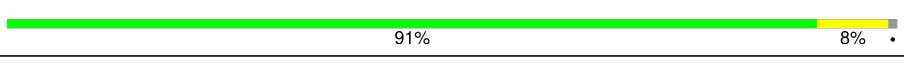
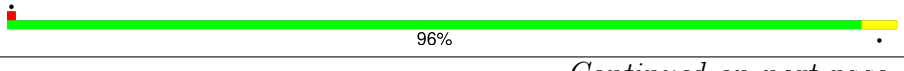
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	10297 (2.21 - 3.21)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	16	1542	7% 70% 26%
2	SB	241	25% 86% 7% 6%

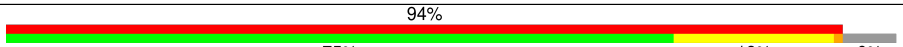
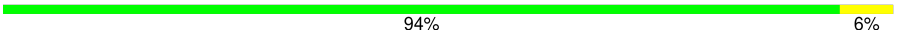
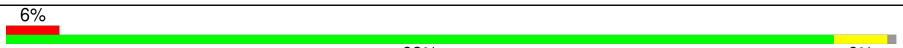
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Mol	Chain	Length	Quality of chain
3	SC	233	
4	SD	206	
5	SE	167	
6	SF	135	
7	SG	179	
8	SH	130	
9	SI	130	
10	SJ	103	
11	SK	129	
12	SL	124	
13	SM	118	
14	SN	101	
15	SO	89	
16	SP	82	
17	SQ	84	
18	SR	75	
19	SS	92	
20	ST	87	
21	SU	71	
22	mR	60	
23	23	2904	
24	5	120	
25	LA	234	
26	LB	273	
27	LC	209	

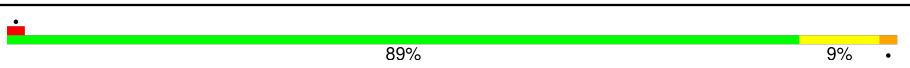
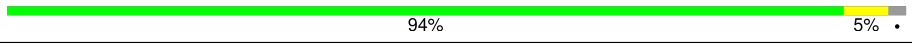
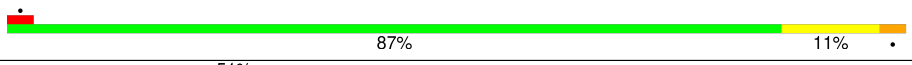
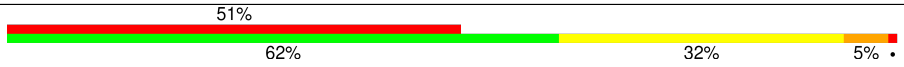
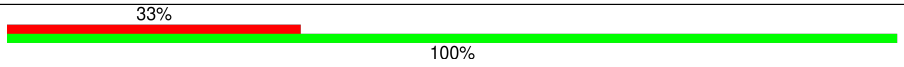
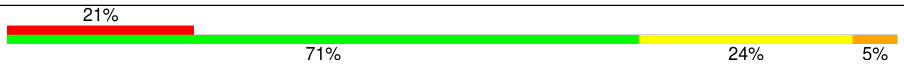
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Mol	Chain	Length	Quality of chain
28	LD	201	
29	LE	179	
30	LF	177	
31	LI	149	
32	LK	142	
33	LM	142	
34	LN	123	
35	LO	144	
36	LP	136	
37	LQ	127	
38	LR	117	
39	LS	115	
40	LT	118	
41	LU	103	
42	LV	110	
43	LW	100	
44	LX	104	
45	LY	94	
46	La	85	
47	Lb	78	
48	Lc	63	
49	Ld	59	
50	Le	70	
51	Lf	57	
52	Lg	55	

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Mol	Chain	Length	Quality of chain
53	Lh	46	
54	Li	65	
55	Lj	38	
56	Pt	76	
57	Pp	3	
58	Dt	76	
59	EF	704	

2 Entry composition

There are 66 unique types of molecules in this entry. The entry contains 154089 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called Small ribosomal subunit RNA 16S.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	16	1533	32907	14683	6036	10655	1533	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	SB	227	1776	1123	318	327	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	SC	211	1653	1046	310	293	4	0	0

- Molecule 4 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	SD	205	1642	1026	315	297	4	0	0

- Molecule 5 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	SE	155	1144	711	216	211	6	0	0

- Molecule 6 is a protein called Small ribosomal subunit protein bS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	SF	106	862	545	156	154	7	0	0

- Molecule 7 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	SG	153	Total	C	N	O	S	0	0
			1203	750	231	218	4		

- Molecule 8 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	SH	129	Total	C	N	O	S	0	0
			979	616	173	184	6		

- Molecule 9 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	SI	127	Total	C	N	O	S	0	0
			1021	634	206	178	3		

- Molecule 10 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	SJ	99	Total	C	N	O	S	0	0
			795	498	152	144	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
11	SK	119	Total	C	N	O	S	0	0
			894	551	179	161	3		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
12	SL	123	Total	C	N	O	S	0	0
			957	591	196	165	5		

- Molecule 13 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	SM	114	Total	C	N	O	S	0	0
			883	546	178	156	3		

- Molecule 14 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	SN	100	Total	C	N	O	S	0	0
			804	499	164	138	3		

- Molecule 15 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	SO	88	Total	C	N	O	S	0	0
			713	439	144	129	1		

- Molecule 16 is a protein called Small ribosomal subunit protein bS16.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	SP	82	Total	C	N	O	S	0	0
			649	406	128	114	1		

- Molecule 17 is a protein called Small ribosomal subunit protein uS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	SQ	80	Total	C	N	O	S	0	0
			648	411	121	113	3		

- Molecule 18 is a protein called Small ribosomal subunit protein bS18.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	SR	67	Total	C	N	O	S	0	0
			555	351	106	97	1		

- Molecule 19 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	SS	84	Total	C	N	O	S	0	0
			668	427	127	112	2		

- Molecule 20 is a protein called Small ribosomal subunit protein bS20.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	ST	85	Total	C	N	O	S	0	0
			664	411	137	113	3		

- Molecule 21 is a protein called Small ribosomal subunit protein bS21.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	SU	70	Total	C	N	O	S	0	0
			589	366	125	97	1		

- Molecule 22 is a RNA chain called Messenger RNA (mRNA).

Mol	Chain	Residues	Atoms					AltConf	Trace
22	mR	13	Total	C	N	O	P	0	0
			274	123	46	92	13		

- Molecule 23 is a RNA chain called Large ribosomal subunit RNA (23S rRNA).

Mol	Chain	Residues	Atoms					AltConf	Trace
23	23	2904	Total	C	N	O	P	0	0
			62355	27824	11469	20158	2904		

- Molecule 24 is a RNA chain called Large ribosomal subunit RNA (5S rRNA).

Mol	Chain	Residues	Atoms					AltConf	Trace
24	5	120	Total	C	N	O	P	0	0
			2570	1144	468	838	120		

- Molecule 25 is a protein called 50S ribosomal protein L1.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	LA	134	Total	C	N	O	S	0	0
			1026	645	186	193	2		

- Molecule 26 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	LB	271	Total	C	N	O	S	0	0
			2082	1288	423	364	7		

- Molecule 27 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	LC	209	Total	C	N	O	S	0	0
			1565	979	288	294	4		

- Molecule 28 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	LD	201	Total	C	N	O	S	0	0
			1551	974	283	289	5		

- Molecule 29 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	LE	177	Total	C	N	O	S	0	0
			1410	899	249	256	6		

- Molecule 30 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	LF	176	Total	C	N	O	S	0	0
			1322	832	243	245	2		

- Molecule 31 is a protein called Large ribosomal subunit protein bL9.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	LI	148	Total	C	N	O	S	0	0
			1101	694	196	210	1		

- Molecule 32 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	LK	134	Total	C	N	O	S	0	0
			979	619	169	185	6		

- Molecule 33 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	LM	142	Total	C	N	O	S	0	0
			1128	714	212	198	4		

- Molecule 34 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	LN	123	Total	C	N	O	S	0	0
			946	593	181	166	6		

- Molecule 35 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	LO	144	Total	C	N	O	S	0	0
			1052	654	207	189	2		

- Molecule 36 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	LP	136	Total	C	N	O	S	0	0
			1075	686	205	178	6		

- Molecule 37 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	LQ	120	Total	C	N	O	S	0	0
			960	593	196	166	5		

- Molecule 38 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms				AltConf	Trace
38	LR	116	Total	C	N	O	0	0
			891	552	178	161		

- Molecule 39 is a protein called Large ribosomal subunit protein bL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	LS	114	Total	C	N	O	S	0	0
			916	574	179	162	1		

- Molecule 40 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms				AltConf	Trace
40	LT	117	Total	C	N	O	0	0
			947	604	192	151		

- Molecule 41 is a protein called Ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	LU	102	Total	C	N	O	S	0	0
			810	513	152	143	2		

- Molecule 42 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	LV	110	Total	C	N	O	S	0	0
			857	532	166	156	3		

- Molecule 43 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	LW	93	Total	C	N	O	S	0	0
			738	466	139	131	2		

- Molecule 44 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
44	LX	102	Total	C	N	O	0	0
			779	492	146	141		

- Molecule 45 is a protein called Large ribosomal subunit protein bL25.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	LY	94	Total	C	N	O	S	0	0
			753	479	137	134	3		

- Molecule 46 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	La	76	Total	C	N	O	S	0	0
			581	360	117	103	1		

- Molecule 47 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	Lb	77	Total	C	N	O	S	0	0
			625	388	129	106	2		

- Molecule 48 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	Lc	61	Total	C	N	O	S	0	0
			495	305	97	92	1		

- Molecule 49 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	Ld	57	Total	C	N	O	S	0	0
			439	276	86	75	2		

- Molecule 50 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	Le	68	Total	C	N	O	S	0	0
			533	330	101	96	6		

- Molecule 51 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	Lf	56	Total	C	N	O	S	0	0
			444	269	94	80	1		

- Molecule 52 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
52	Lg	52	Total	C	N	O	0	0
			427	275	78	74		

- Molecule 53 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	Lh	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

- Molecule 54 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	Li	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 55 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	Lj	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 56 is a RNA chain called Lysine transfer RNA (tRNA-Lys).

Mol	Chain	Residues	Atoms						AltConf	Trace
56	Pt	76	Total	C	N	O	P	S	0	0
			1629	729	283	540	76	1		

- Molecule 57 is a protein called Nascent peptide.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	Pp	3	Total	C	N	O	S	0	0
			30	21	4	4	1		

- Molecule 58 is a RNA chain called Phenylanalyl transfer RNA (tRNA-Phe).

Mol	Chain	Residues	Atoms						AltConf	Trace
58	Dt	76	Total	C	N	O	P	S	0	0
			1638	734	291	535	76	2		

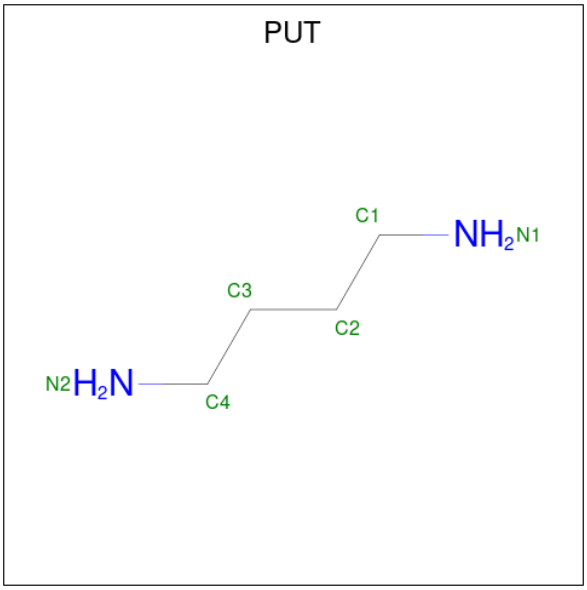
- Molecule 59 is a protein called Elongation factor G.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	EF	704	Total	C	N	O	S	0	0
			5442	3427	942	1048	25		

There is a discrepancy between the modelled and reference sequences:

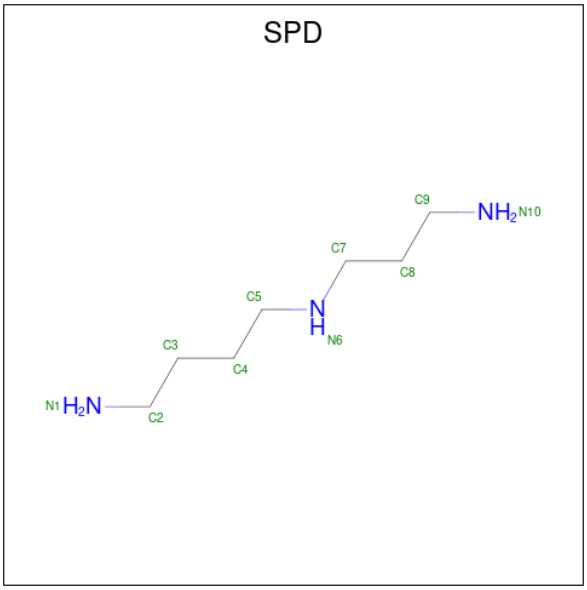
Chain	Residue	Modelled	Actual	Comment	Reference
EF	1	SER	-	expression tag	UNP A7ZSL5

- Molecule 60 is 1,4-DIAMINOBUTANE (CCD ID: PUT) (formula: $C_4H_{12}N_2$).



Mol	Chain	Residues	Atoms	AltConf
60	16	1	Total C N 6 4 2	0
60	16	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0
60	23	1	Total C N 6 4 2	0

- Molecule 61 is SPERMIDINE (CCD ID: SPD) (formula: $C_7H_{19}N_3$).



Mol	Chain	Residues	Atoms	AltConf
61	16	1	Total C N 10 7 3	0
61	23	1	Total C N 10 7 3	0
61	23	1	Total C N 10 7 3	0

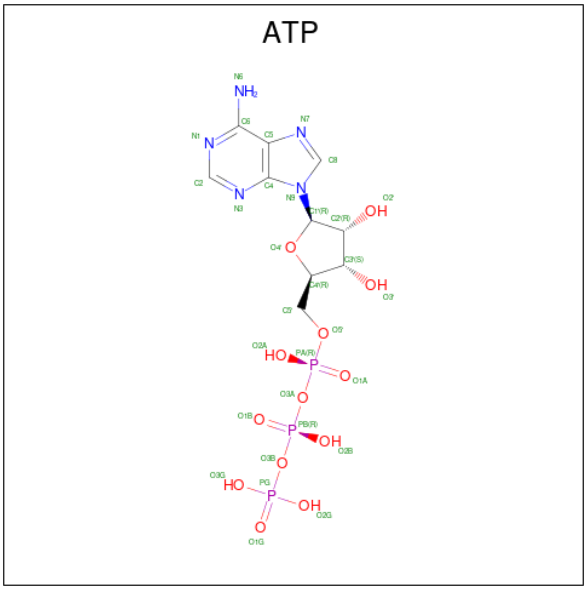
- Molecule 62 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
62	16	78	Total Mg 78 78	0
62	SC	1	Total Mg 1 1	0
62	SD	1	Total Mg 1 1	0
62	SL	1	Total Mg 1 1	0
62	SU	1	Total Mg 1 1	0
62	23	229	Total Mg 229 229	0
62	5	6	Total Mg 6 6	0
62	LB	1	Total Mg 1 1	0
62	LQ	1	Total Mg 1 1	0
62	LT	1	Total Mg 1 1	0
62	Ld	1	Total Mg 1 1	0
62	Lf	1	Total Mg 1 1	0
62	EF	1	Total Mg 1 1	0

- Molecule 63 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms	AltConf
63	16	1	Total K 1 1	0
63	23	8	Total K 8 8	0

- Molecule 64 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).

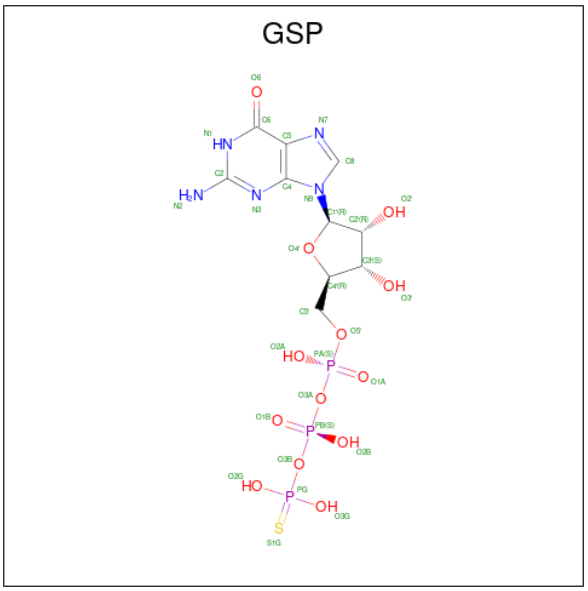


Mol	Chain	Residues	Atoms					AltConf
64	23	1	Total	C	N	O	P	0
			31	10	5	13	3	
64	23	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 65 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
65	Le	1	Total	Zn	0
			1	1	
65	Lj	1	Total	Zn	0
			1	1	

- Molecule 66 is 5'-GUANOSINE-DIPHOSPHATE-MONOTHIOPHOSPHATE (CCD ID: GSP) (formula: $C_{10}H_{16}N_5O_{13}P_3S$).



Mol	Chain	Residues	Atoms						AltConf
66	EF	1	Total	C	N	O	P	S	0
			32	10	5	13	3	1	

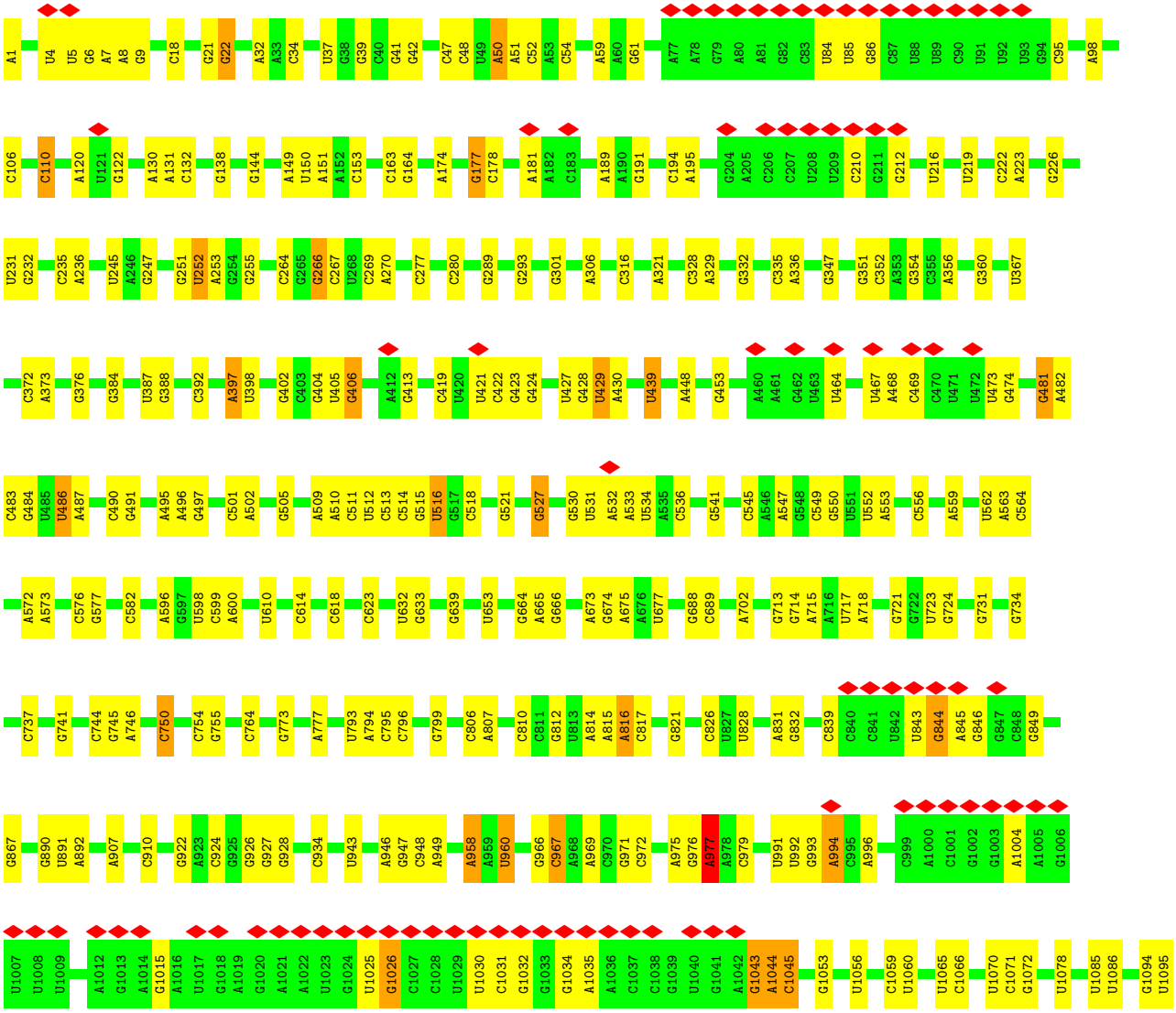
3 Residue-property plots (i)

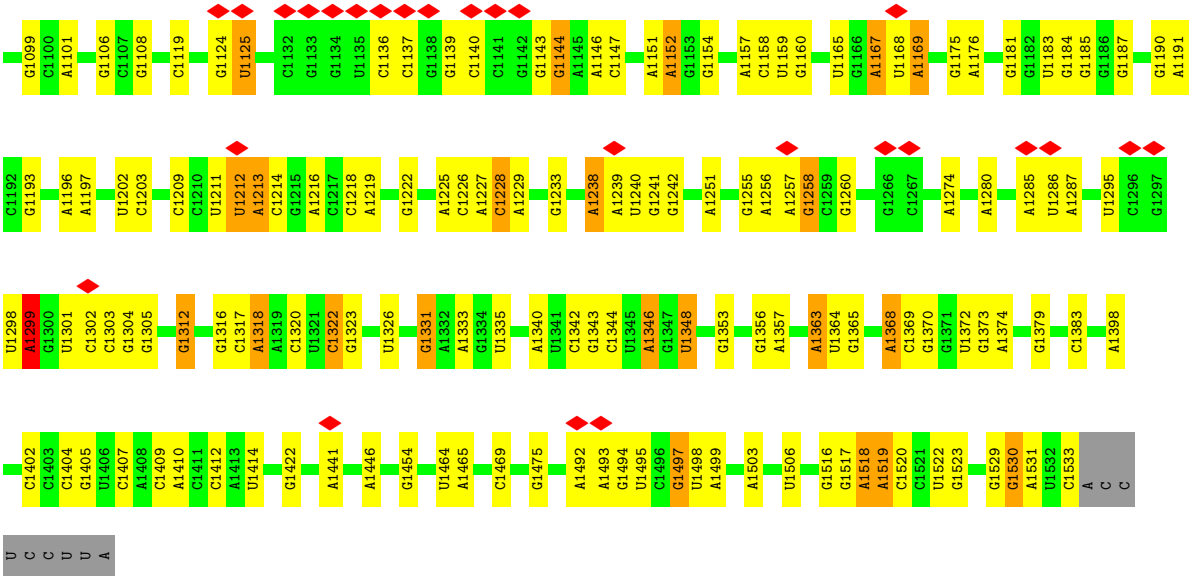
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: Small ribosomal subunit RNA 16S

Chain 16:



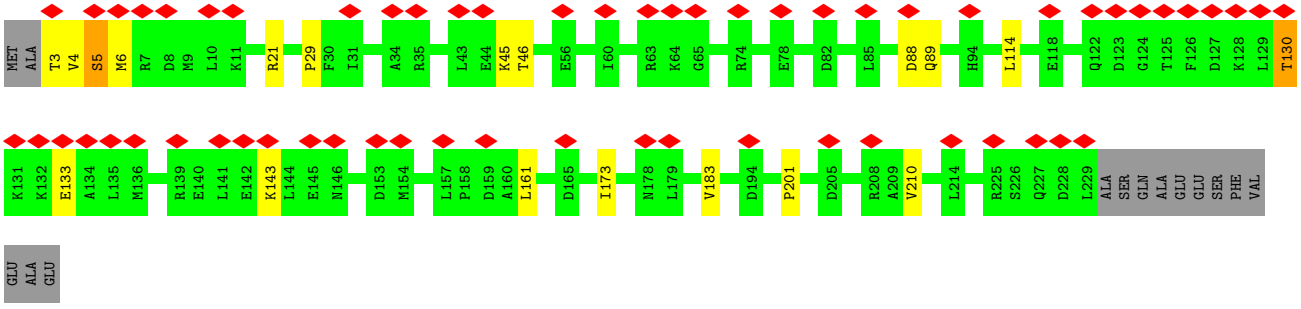




• Molecule 2: 30S ribosomal protein S2

Chain SB:

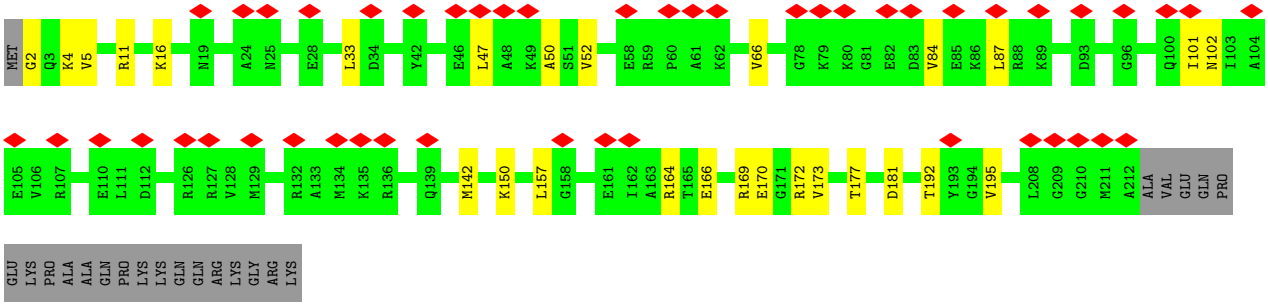




• Molecule 3: 30S ribosomal protein S3

Chain SC:

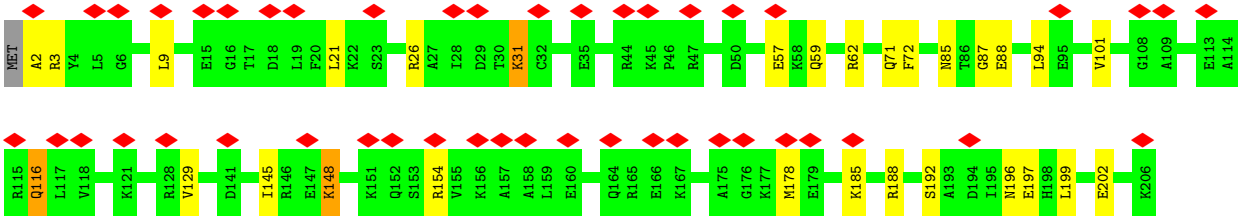




• Molecule 4: Small ribosomal subunit protein uS4

Chain SD:

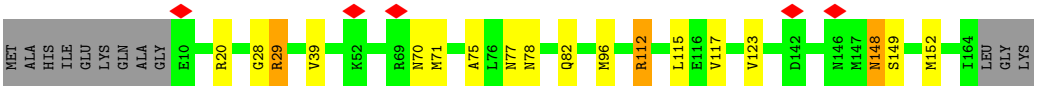




• Molecule 5: Small ribosomal subunit protein uS5

Chain SE:

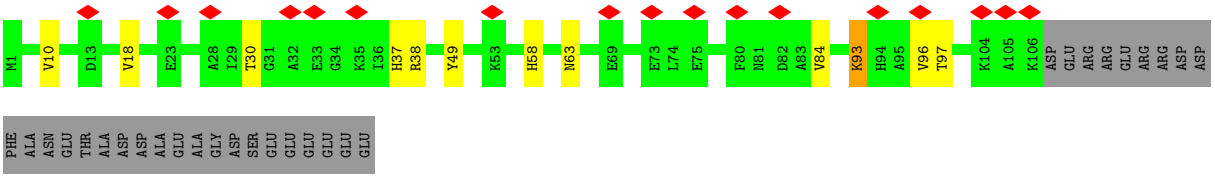




• Molecule 6: Small ribosomal subunit protein bS6

Chain SF:

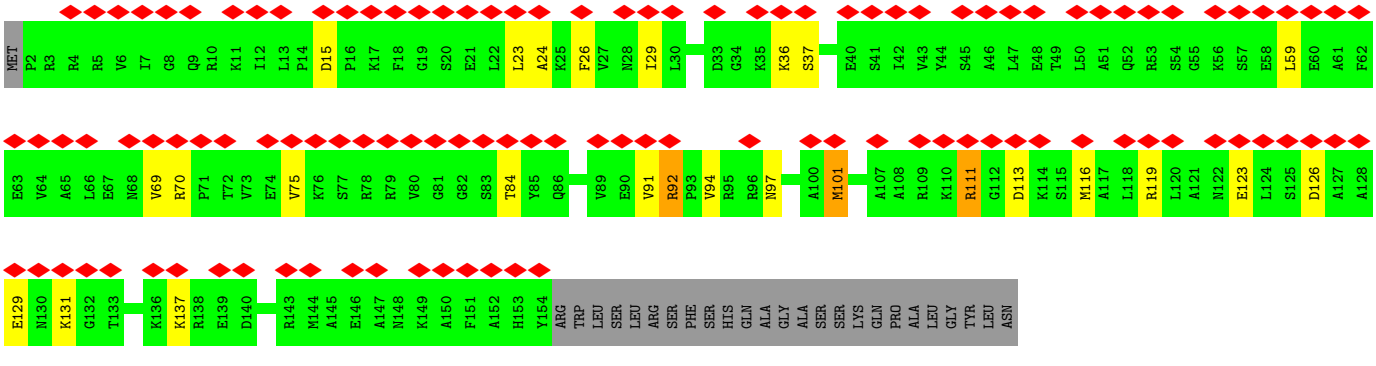




• Molecule 7: Small ribosomal subunit protein uS7

Chain SG:

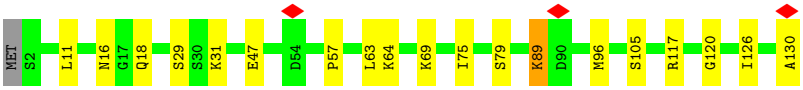




• Molecule 8: Small ribosomal subunit protein uS8

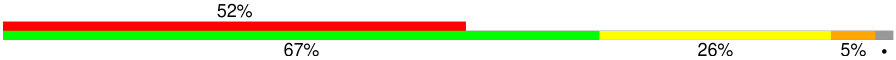
Chain SH:

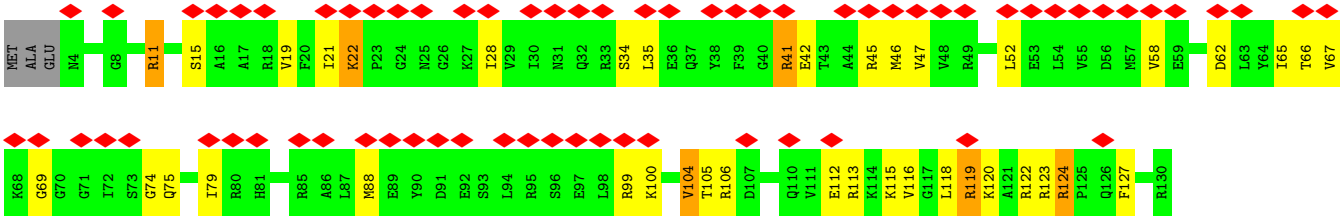




• Molecule 9: Small ribosomal subunit protein uS9

Chain SI:

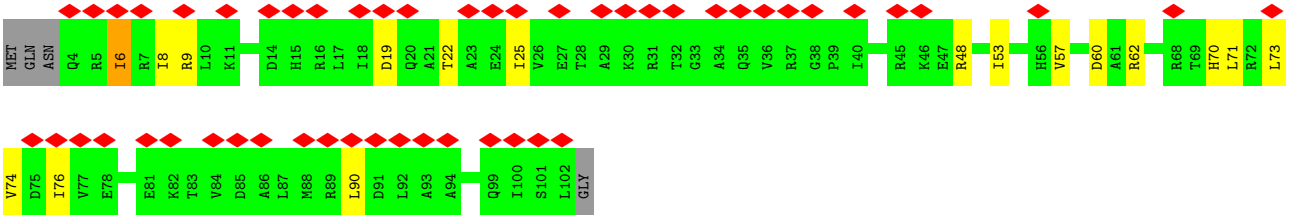




• Molecule 10: Small ribosomal subunit protein uS10

Chain SJ:

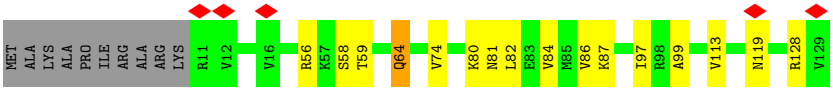




• Molecule 11: 30S ribosomal protein S11

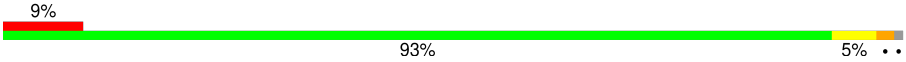
Chain SK:

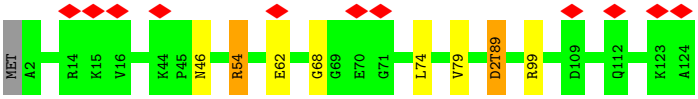




• Molecule 12: 30S ribosomal protein S12

Chain SL:

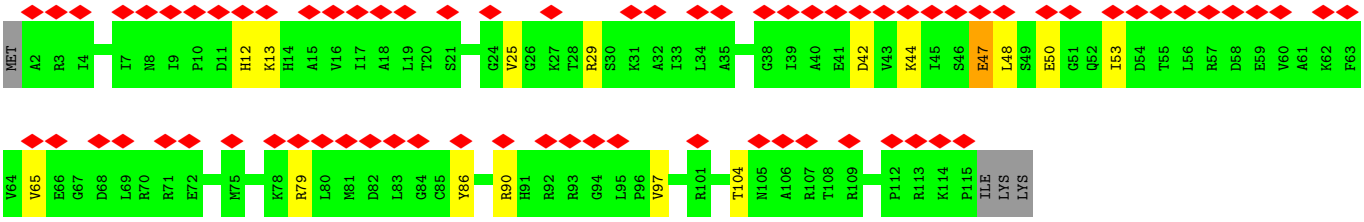




• Molecule 13: Small ribosomal subunit protein uS13

Chain SM:

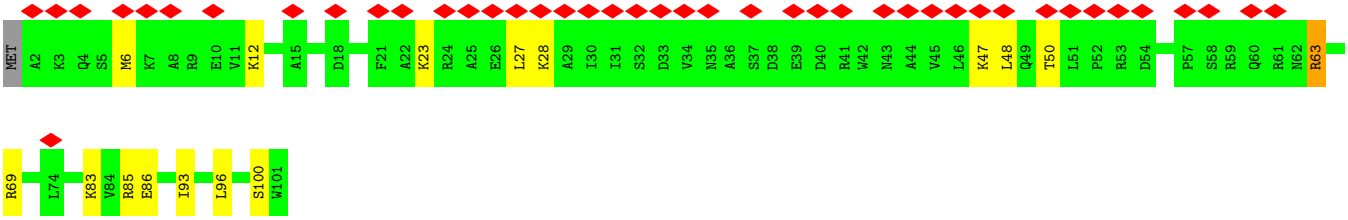




• Molecule 14: Small ribosomal subunit protein uS14

Chain SN:

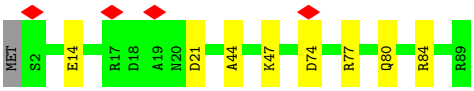




• Molecule 15: Small ribosomal subunit protein uS15

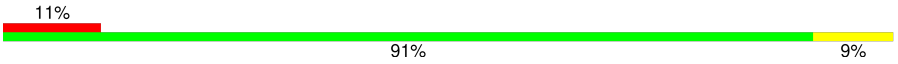
Chain SO:

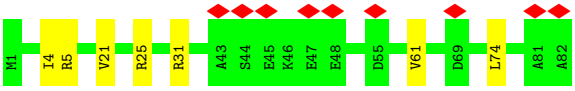




• Molecule 16: Small ribosomal subunit protein bS16

Chain SP:

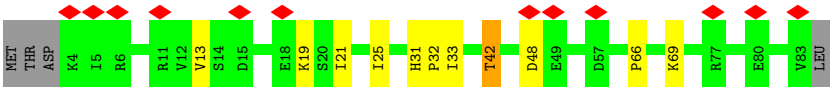




• Molecule 17: Small ribosomal subunit protein uS17

Chain SQ:

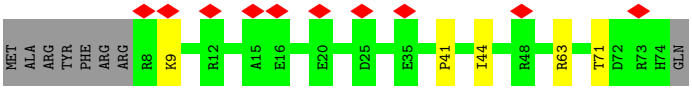




• Molecule 18: Small ribosomal subunit protein bS18

Chain SR:

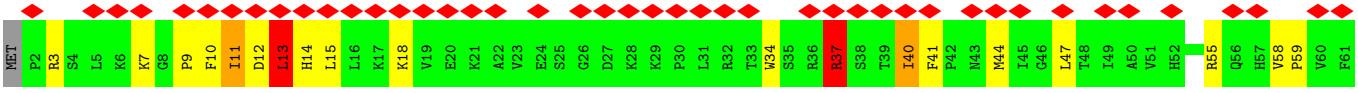


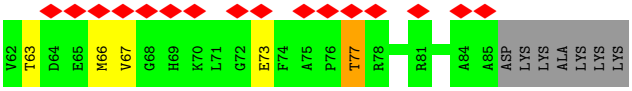


• Molecule 19: Small ribosomal subunit protein uS19

Chain SS:

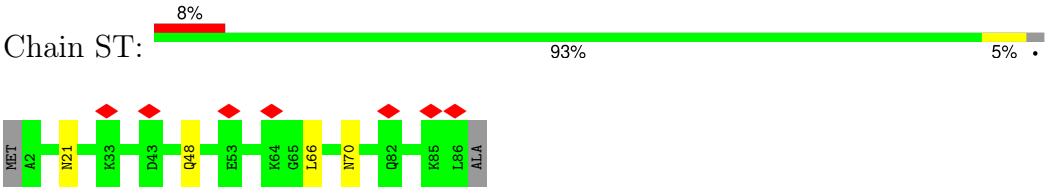






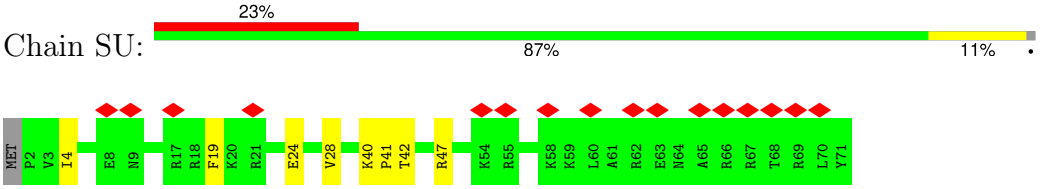
• Molecule 20: Small ribosomal subunit protein bS20

Chain ST:



• Molecule 21: Small ribosomal subunit protein bS21

Chain SU:



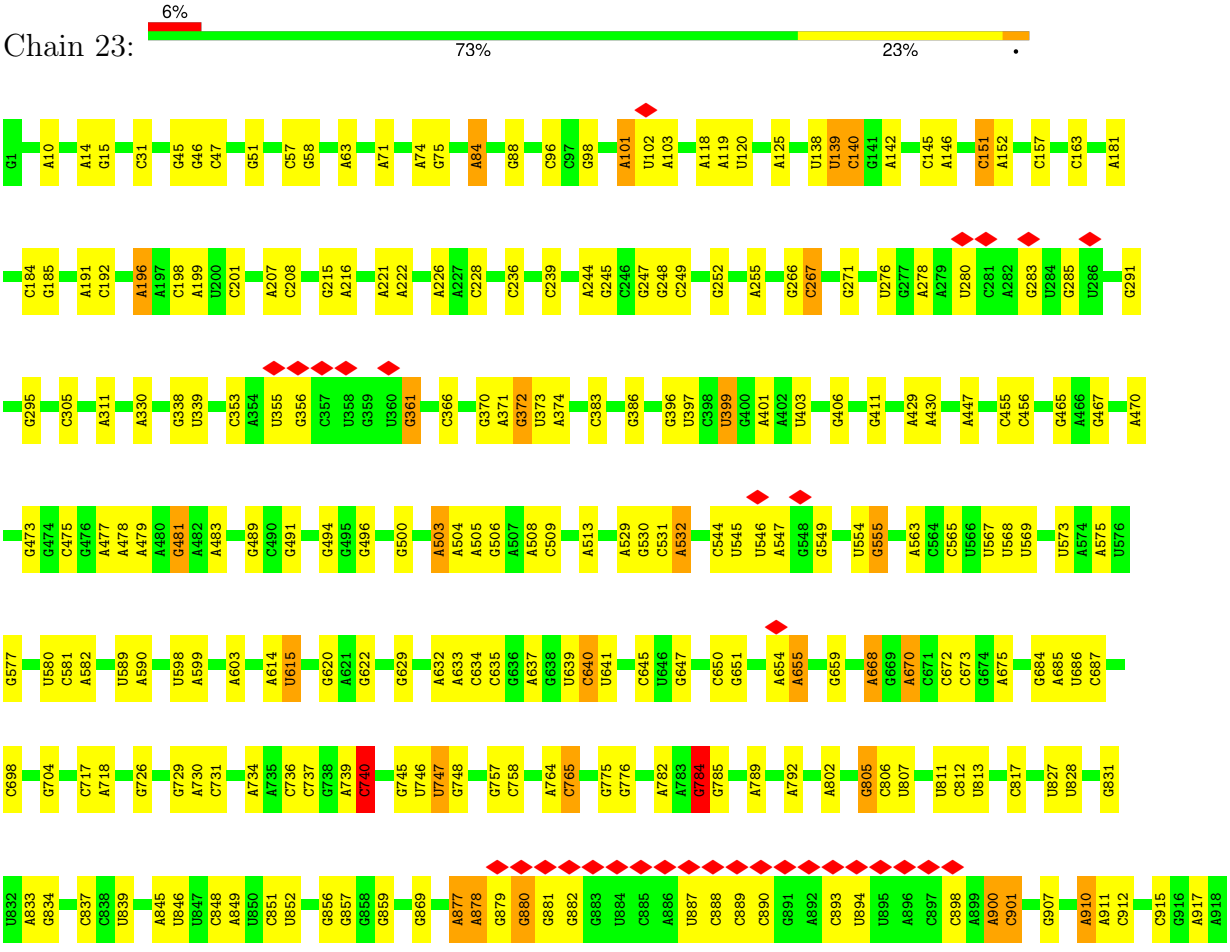
• Molecule 22: Messenger RNA (mRNA)

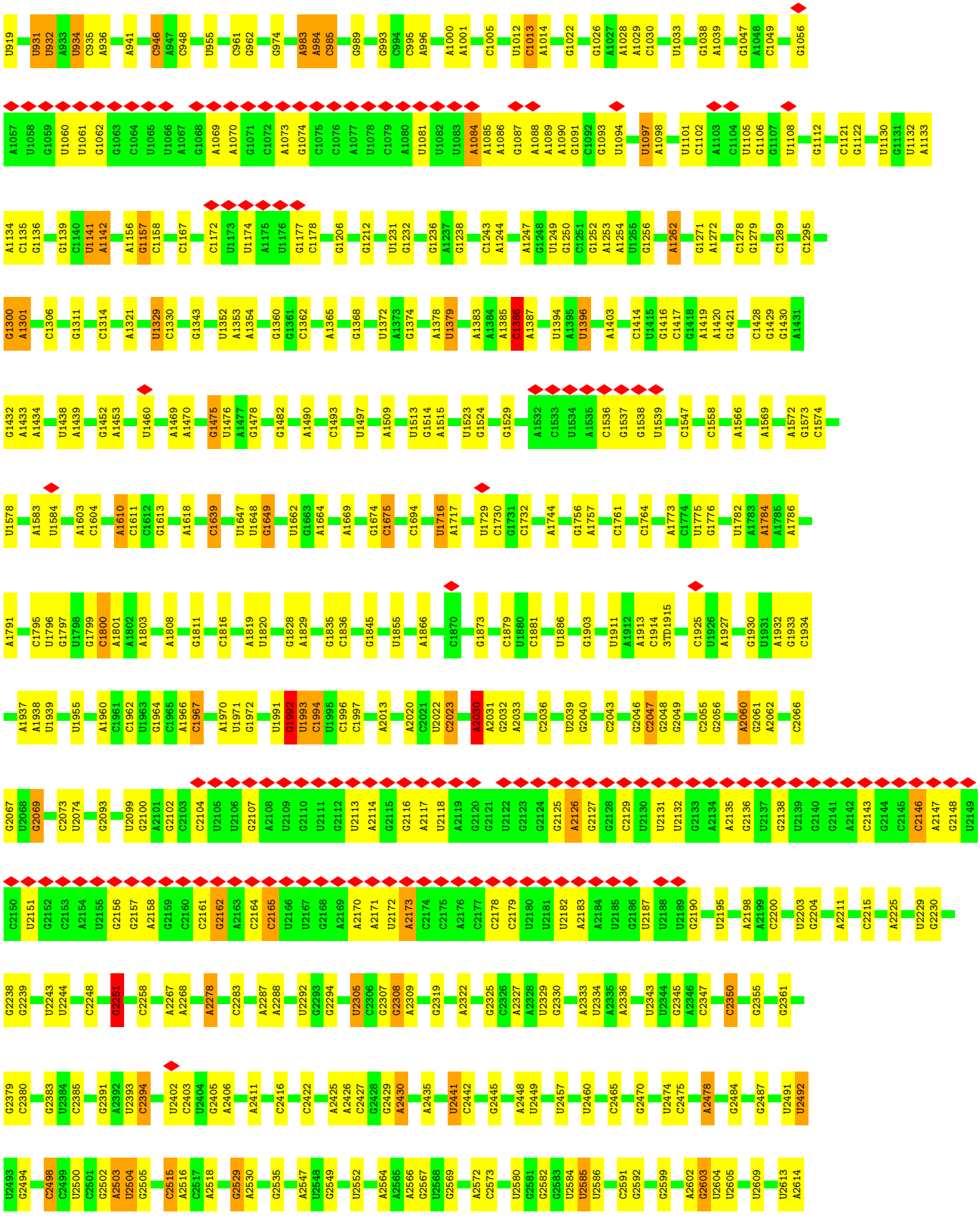
Chain mR:

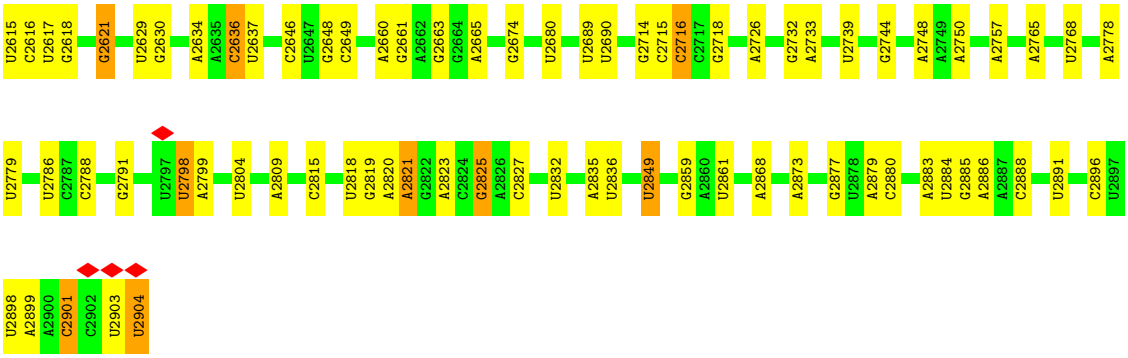


• Molecule 23: Large ribosomal subunit RNA (23S rRNA)

Chain 23:



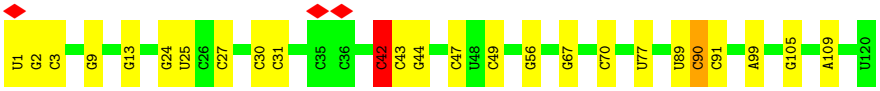

U919 U931 U932 A933 U934 C935 A936 A941 C946 A947 C948 U955 C961 G962 G974 A983 A984 C985 G989 G993 C994 C995 A996 A1000 A1001 C1005 U1012 C1013 A1014 G1022 G1026 A1027 A1028 A1029 C1030 U1033 G1038 A1039 G1047 A1048 C1049 G1056
A1057 U1058 G1059 U1060 U1061 G1062 G1063 C1064 U1066 U1066 A1067 G1068 A1069 A1070 G1071 C1072 A1073 G1074 C1075 C1076 A1077 U1078 C1079 A1080 U1081 U1082 U1083 A1084 A1085 A1086 G1087 A1088 A1089 A1090 G1091 C1092 G1093 U1094 U1097 A1098 U1101 C1102 A1103 C1104 U1105 G1106 G1107 U1108 G1112 C1121 G1122 U1130 G1131 U1132 A1133
A1134 C1135 G1136 G1139 C1140 U1141 A1142 A1156 G1157 C1158 C1167 C1172 U1173 U1174 A1175 U1176 G1177 C1178 G1206 G1212 U1231 G1232 G1236 A1237 G1238 C1243 A1244 A1247 G1248 U1249 G1250 C1251 G1252 A1253 A1254 U1255 G1256 A1262 G1271 A1272 C1278 G1279 C1289 C1295
G1300 A1301 C1306 G1311 C1314 A1321 U1329 C1330 G1343 U1352 A1353 A1354 G1360 G1361 C1362 A1365 G1368 U1372 A1373 G1374 A1378 U1379 A1383 A1384 A1385 C1386 A1387 U1394 A1395 U1396 A1403 C1414 U1415 G1416 C1417 G1418 A1419 A1420 G1421 C1428 G1429 G1430 A1431
G1432 A1433 A1434 U1438 A1439 G1452 A1453 U1460 A1469 A1470 G1475 U1476 A1477 G1478 G1482 A1490 C1493 U1497 A1509 U1513 G1514 A1515 U1523 G1524 G1529 A1532 C1533 U1534 A1535 C1536 G1537 G1538 U1539 C1547 C1558 A1566 A1569 A1572 G1573 C1574
U1578 A1583 U1584 A1603 C1604 A1610 C1611 C1612 G1613 A1618 C1639 U1647 U1648 G1649 U1662 G1663 A1664 A1669 G1674 C1675 C1694 U1716 A1717 U1729 C1730 G1731 C1732 A1744 G1756 A1757 C1761 C1764 A1773 C1774 U1775 G1776 U1782 A1783 A1784 A1785 A1786
A1791 C1795 U1796 G1797 U1798 G1799 C1800 A1801 A1802 A1803 A1808 G1811 C1816 A1819 U1820 G1828 A1829 G1835 C1836 G1845 U1855 A1866 C1870 G1873 C1879 U1880 C1881 U1886 G1903 U1911 A1912 A1913 C1914 3TD1915 C1925 U1926 A1927 G1930 U1931 A1932 G1933 C1934
A1937 A1938 U1939 U1955 A1960 C1961 C1962 U1963 G1964 C1965 A1966 C1967 A1970 U1971 G1972 U1991 G1992 U1993 C1994 U1995 C1996 C1997 A2013 A2020 C2021 U2022 C2023 A2030 A2031 G2032 A2033 C2036 U2039 G2040 C2043 G2046 C2047 G2048 G2049 C2055 G2056 A2060 G2061 A2062 C2066
G2067 U2068 G2069 C2073 U2074 G2093 U2099 G2100 A2101 G2102 C2103 C2104 U2105 U2106 G2107 A2108 U2109 G2110 U2111 G2112 U2113 A2114 G2115 G2116 A2117 U2118 A2119 G2120 G2121 U2122 G2123 G2124 G2125 A2126 G2127 G2128 C2129 U2130 U2131 U2132 G2133 A2134 A2135 G2136 U2137 G2138 U2139 G2140 G2141 A2142 C2143 G2144 C2145 C2146 A2147 G2148 U2149
C2150 U2151 G2152 C2153 A2154 U2155 G2156 G2157 A2158 G2159 C2160 C2161 G2162 A2163 C2164 C2165 U2166 U2167 G2168 A2169 A2170 A2171 U2172 A2173 C2174 C2175 A2176 C2177 C2178 C2179 U2180 U2181 U2182 A2183 A2184 U2185 G2186 U2187 U2188 U2189 G2190 U2195 A2198 A2199 C2200 U2203 G2204 A2211 C2215 A2225 U2229 G2230
G2238 G2239 U2243 U2244 C2248 G2251 C2258 A2267 A2268 A2278 C2283 A2287 A2288 U2292 G2293 G2294 U2305 C2306 G2307 G2308 A2309 G2319 A2322 G2325 C2326 A2327 A2328 U2329 G2330 A2333 U2334 A2335 A2336 U2343 U2344 G2345 A2346 C2347 C2350 G2355 G2361
G2379 C2380 G2383 U2384 C2385 G2391 A2392 U2393 C2394 U2402 C2403 U2404 G2405 A2406 A2411 C2416 C2422 A2425 A2426 C2427 G2428 G2429 A2430 A2435 U2441 C2442 G2445 A2448 U2449 U2457 U2460 C2465 G2470 U2474 C2475 A2478 G2484 G2487 U2491 U2492
U2493 G2494 C2498 C2499 U2500 C2501 G2502 A2503 U2504 G2505 C2515 A2516 C2517 A2518 G2529 A2530 G2535 A2547 U2548 G2549 U2552 A2564 A2565 A2566 G2567 U2568 G2569 A2572 C2573 U2580 G2581 G2582 G2583 U2584 U2585 U2586 C2591 G2592 G2599 A2602 G2603 U2604 U2605 U2609 U2613 A2614



• Molecule 24: Large ribosomal subunit RNA (5S rRNA)

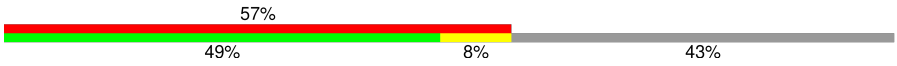
Chain 5:

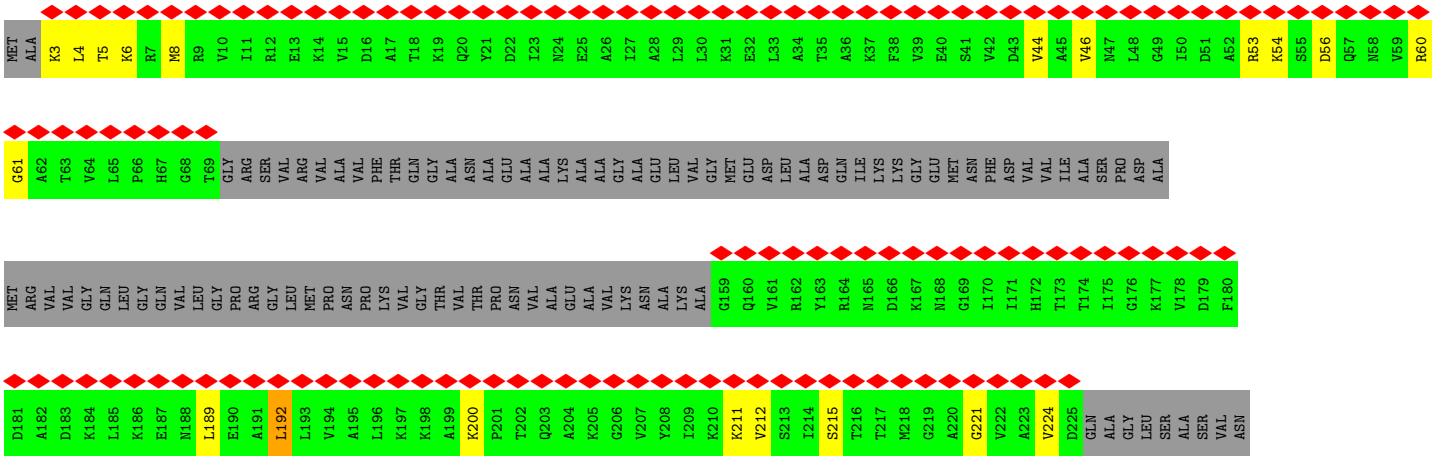




• Molecule 25: 50S ribosomal protein L1

Chain LA:





• Molecule 26: 50S ribosomal protein L2

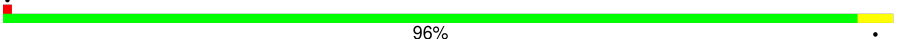
Chain LB:

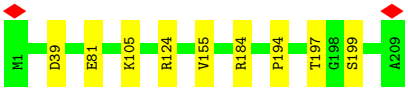




• Molecule 27: 50S ribosomal protein L3

Chain LC:

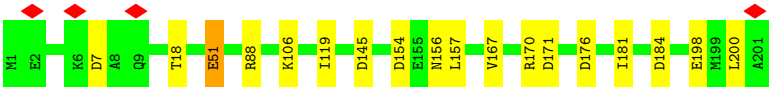




• Molecule 28: Large ribosomal subunit protein uL4

Chain LD:

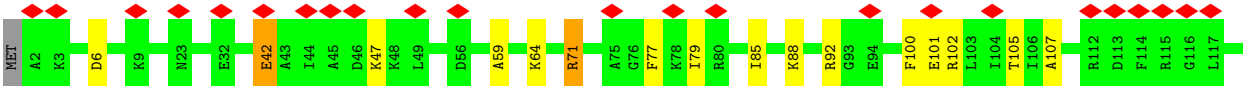


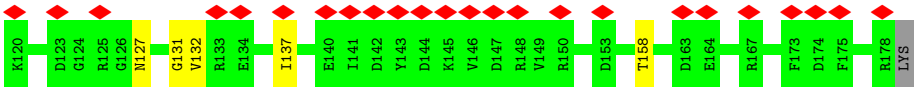


• Molecule 29: Large ribosomal subunit protein uL5

Chain LE:



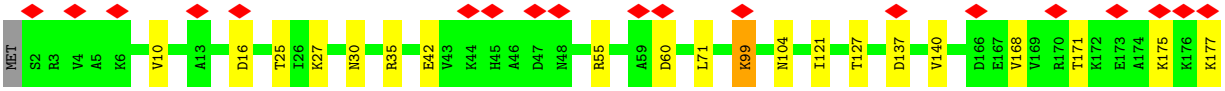




• Molecule 30: Large ribosomal subunit protein uL6

Chain LF:

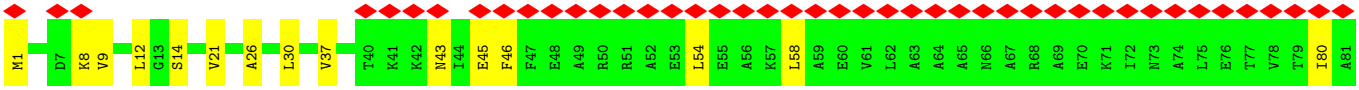


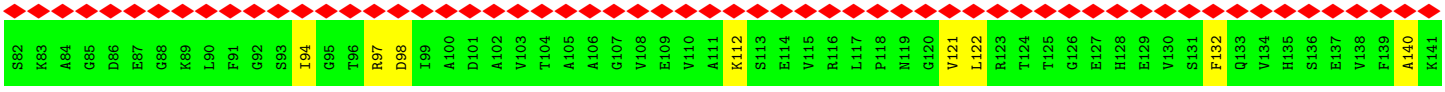


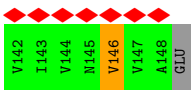
• Molecule 31: Large ribosomal subunit protein bL9

Chain LI:



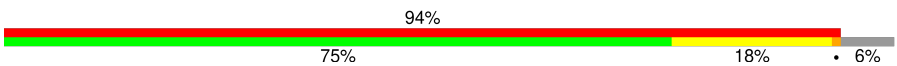


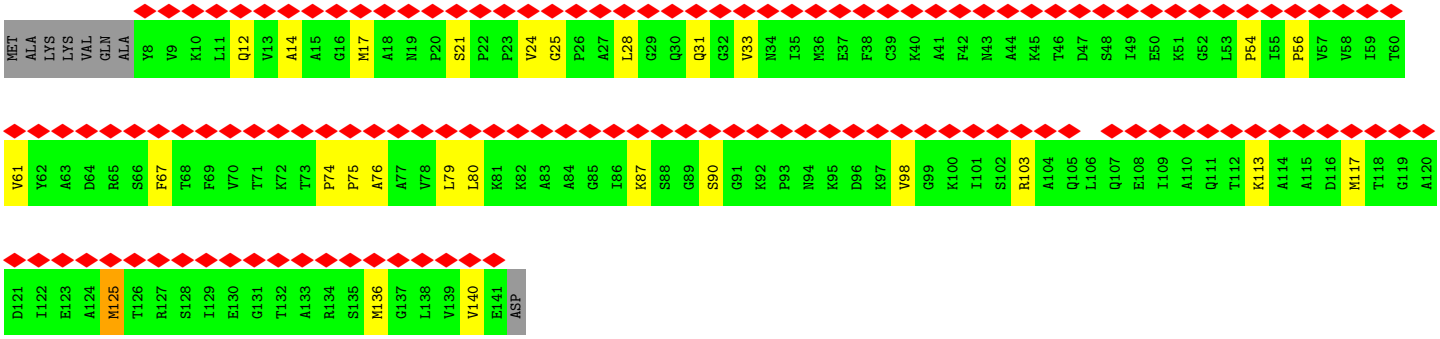




• Molecule 32: 50S ribosomal protein L11

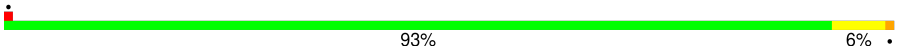
Chain LK:

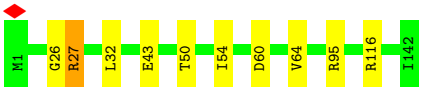




• Molecule 33: Large ribosomal subunit protein uL13

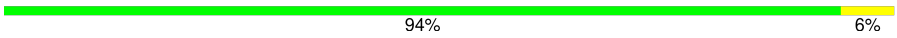
Chain LM:





• Molecule 34: Large ribosomal subunit protein uL14

Chain LN:

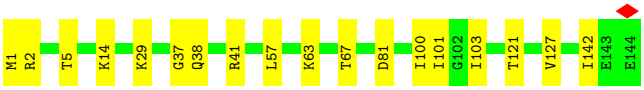




• Molecule 35: Large ribosomal subunit protein uL15

Chain LO:

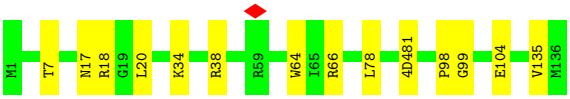




• Molecule 36: 50S ribosomal protein L16

Chain LP:

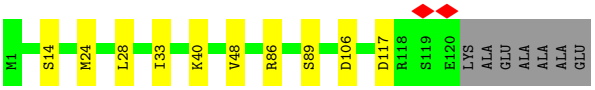




• Molecule 37: Large ribosomal subunit protein bL17

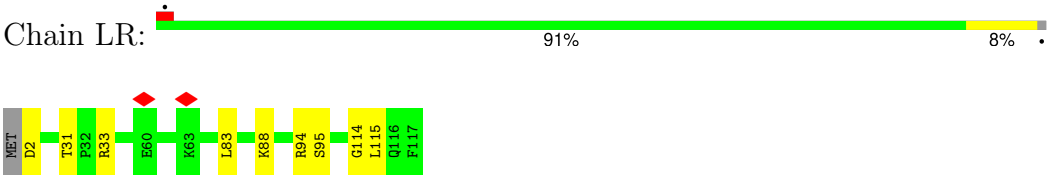
Chain LQ:





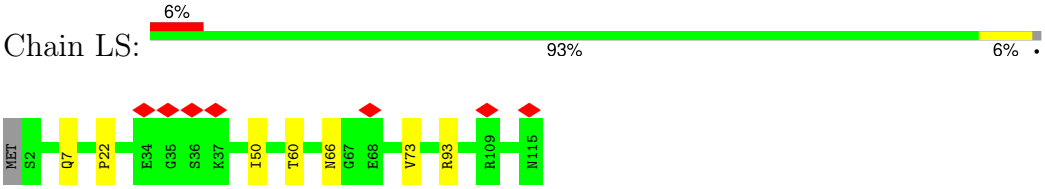
• Molecule 38: Large ribosomal subunit protein uL18

Chain LR:



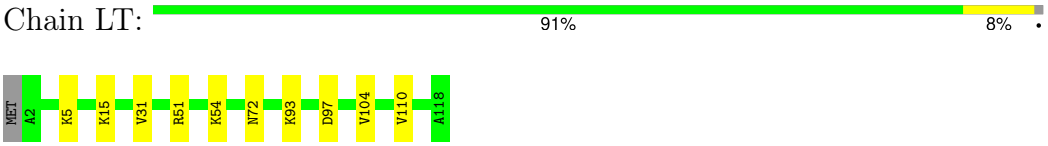
• Molecule 39: Large ribosomal subunit protein bL19

Chain LS:



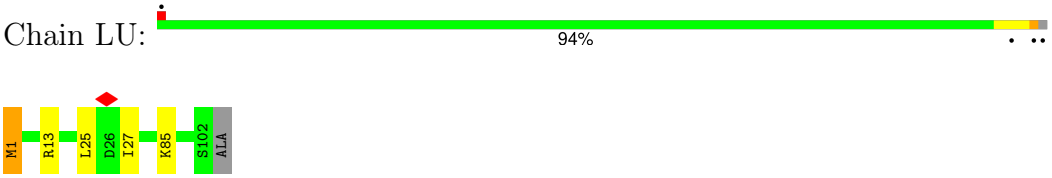
• Molecule 40: 50S ribosomal protein L20

Chain LT:



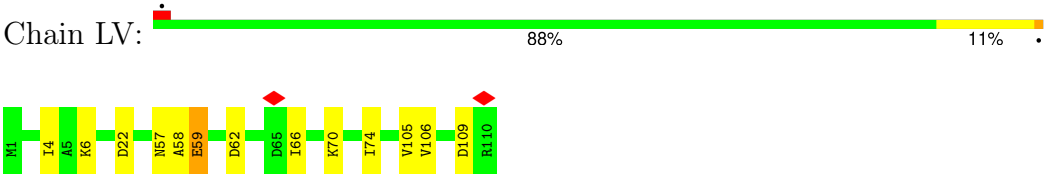
• Molecule 41: Ribosomal protein L21

Chain LU:



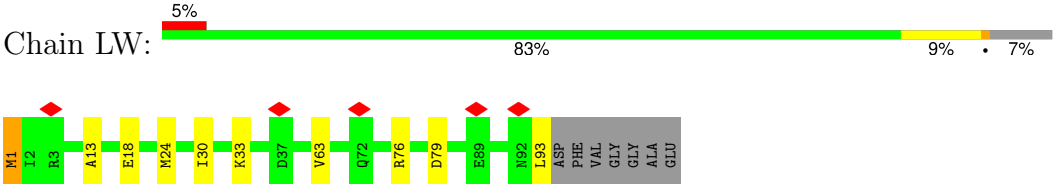
• Molecule 42: 50S ribosomal protein L22

Chain LV:



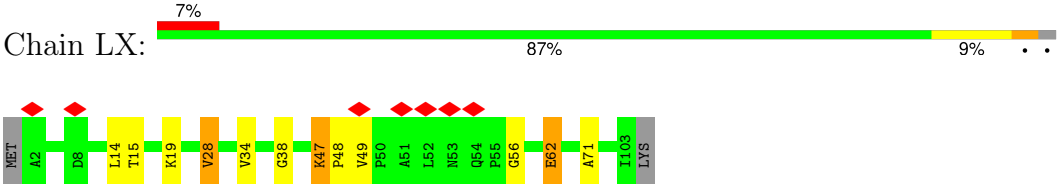
• Molecule 43: 50S ribosomal protein L23

Chain LW:



• Molecule 44: 50S ribosomal protein L24

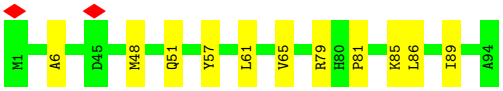
Chain LX:



• Molecule 45: Large ribosomal subunit protein bL25

Chain LY:

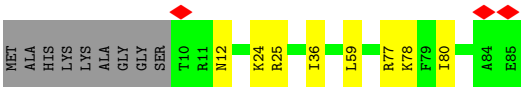




• Molecule 46: 50S ribosomal protein L27

Chain La:





• Molecule 47: 50S ribosomal protein L28

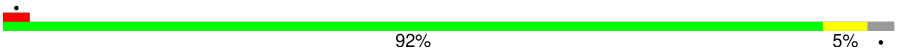
Chain Lb:





• Molecule 48: Large ribosomal subunit protein uL29

Chain Lc:

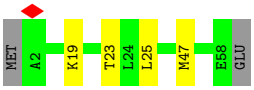




• Molecule 49: 50S ribosomal protein L30

Chain Ld:

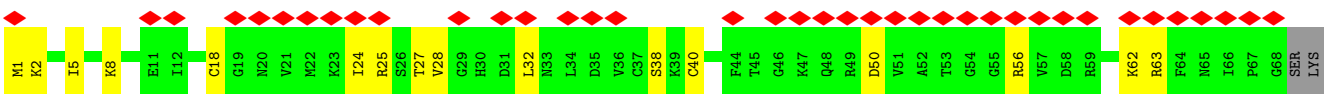




• Molecule 50: 50S ribosomal protein L31

Chain Le:

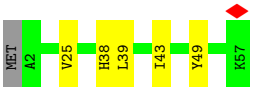




• Molecule 51: 50S ribosomal protein L32

Chain Lf:

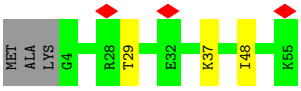




• Molecule 52: 50S ribosomal protein L33

Chain Lg:





• Molecule 53: 50S ribosomal protein L34

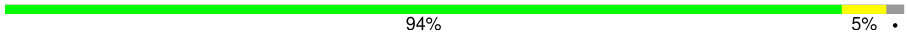
Chain Lh:





• Molecule 54: 50S ribosomal protein L35

Chain Li:

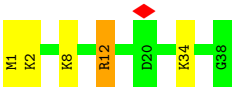




• Molecule 55: 50S ribosomal protein L36

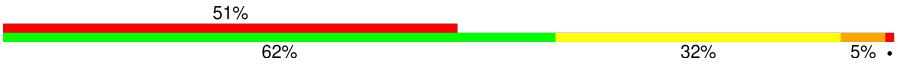
Chain Lj:

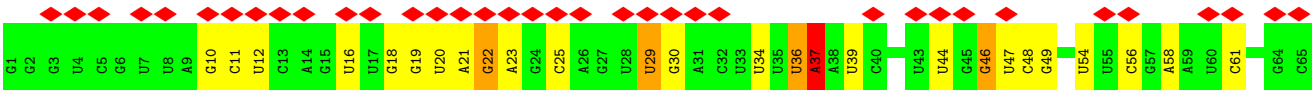


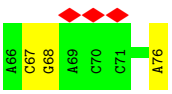


• Molecule 56: Lysine transfer RNA (tRNA-Lys)

Chain Pt:

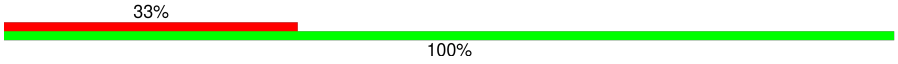






• Molecule 57: Nascent peptide

Chain Pp:

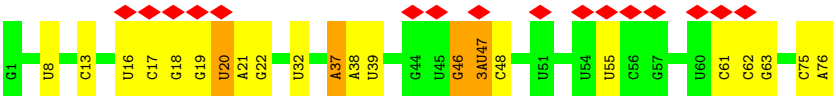




• Molecule 58: Phenylanalyl transfer RNA (tRNA-Phe)

Chain Dt:

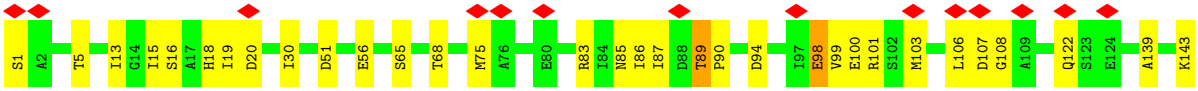


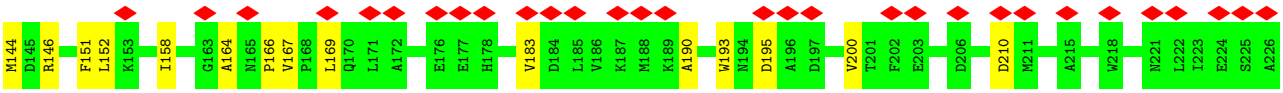


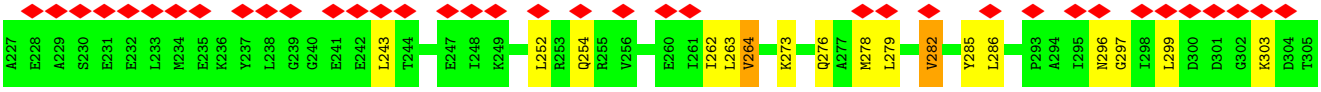
• Molecule 59: Elongation factor G

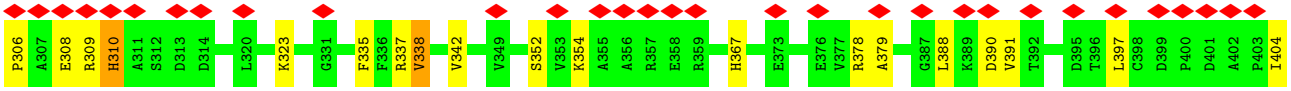
Chain EF:





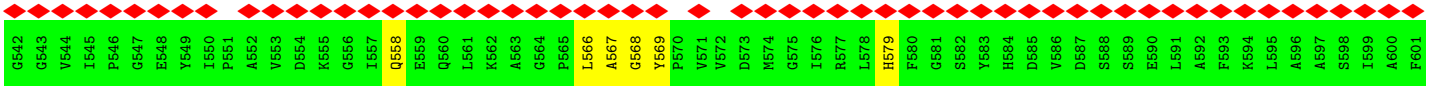


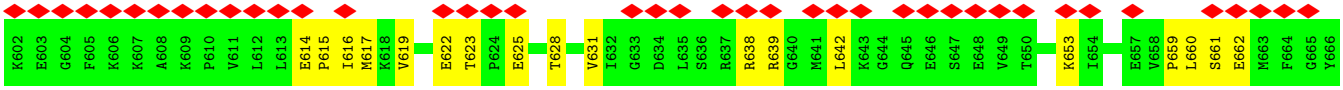


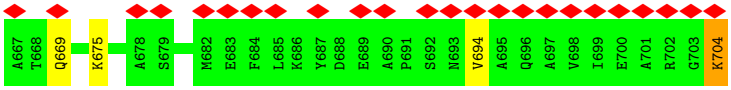












4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	30442	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	1.4596	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.050	Depositor
Minimum map value	-0.022	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.005	Depositor
Map size (Å)	423.936, 423.936, 423.936	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.828, 0.828, 0.828	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: OMG, ATP, 5MC, MG, UR3, GSP, K, PUT, OMU, 5MU, OMC, MIA, MA6, 6MZ, H2U, G7M, U8U, 1MG, D2T, 4OC, 2MG, 4SU, 3TD, PSU, 4D4, SPD, 2MA, ZN, FME, T6A, 3AU

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	16	0.42	2/36594 (0.0%)	1.09	75/57083 (0.1%)
2	SB	0.25	0/1807	0.61	0/2435
3	SC	0.20	0/1680	0.48	0/2263
4	SD	0.21	0/1664	0.51	0/2227
5	SE	0.36	2/1157 (0.2%)	0.63	0/1557
6	SF	0.20	0/881	0.51	0/1189
7	SG	0.29	0/1219	0.70	0/1635
8	SH	0.19	0/989	0.46	0/1326
9	SI	0.24	0/1033	0.68	2/1375 (0.1%)
10	SJ	0.26	0/805	0.57	0/1089
11	SK	0.18	0/910	0.45	1/1229 (0.1%)
12	SL	0.25	0/960	0.58	0/1286
13	SM	0.27	0/892	0.60	0/1193
14	SN	0.29	0/816	0.68	1/1088 (0.1%)
15	SO	0.19	0/721	0.54	0/964
16	SP	0.19	0/659	0.49	0/884
17	SQ	0.22	0/657	0.50	0/881
18	SR	0.16	0/564	0.38	0/756
19	SS	0.44	0/685	0.72	1/922 (0.1%)
20	ST	0.21	0/670	0.48	0/888
21	SU	0.17	0/597	0.47	0/792
22	mR	0.68	1/305 (0.3%)	1.11	1/472 (0.2%)
23	23	0.46	1/69284 (0.0%)	1.10	182/108082 (0.2%)
24	5	0.43	0/2873	1.10	10/4478 (0.2%)
25	LA	0.19	0/1033	0.46	1/1387 (0.1%)
26	LB	0.25	0/2121	0.50	0/2852
27	LC	0.27	0/1586	0.56	0/2134
28	LD	0.21	0/1570	0.46	0/2113
29	LE	0.25	0/1434	0.57	0/1926
30	LF	0.18	0/1342	0.49	0/1816
31	LI	0.21	0/1112	0.53	0/1503

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	LK	0.24	0/993	0.54	0/1341
33	LM	0.41	2/1151 (0.2%)	0.65	0/1551
34	LN	0.28	0/955	0.55	1/1279 (0.1%)
35	LO	0.20	0/1061	0.47	0/1413
36	LP	0.20	0/1081	0.47	0/1443
37	LQ	0.26	0/973	0.60	0/1301
38	LR	0.19	0/901	0.49	0/1209
39	LS	0.17	0/928	0.39	0/1242
40	LT	0.22	0/960	0.49	0/1278
41	LU	0.21	0/823	0.48	0/1100
42	LV	0.18	0/864	0.45	0/1156
43	LW	0.21	0/744	0.46	0/994
44	LX	0.34	1/787 (0.1%)	0.51	0/1051
45	LY	0.18	0/766	0.44	0/1025
46	La	0.35	0/588	0.55	0/779
47	Lb	0.21	0/635	0.51	0/848
48	Lc	0.14	0/496	0.35	0/660
49	Ld	0.20	0/443	0.42	0/593
50	Le	0.18	0/543	0.48	0/726
51	Lf	0.22	0/450	0.51	0/599
52	Lg	0.17	0/434	0.46	0/576
53	Lh	0.27	0/380	0.46	0/498
54	Li	0.22	0/513	0.52	0/676
55	Lj	0.31	0/303	0.51	0/397
56	Pt	0.48	2/1707 (0.1%)	1.14	10/2653 (0.4%)
57	Pp	0.48	0/20	0.72	0/24
58	Dt	0.47	1/1650 (0.1%)	1.09	0/2565
59	EF	0.31	0/5544	0.64	5/7503 (0.1%)
All	All	0.39	12/165313 (0.0%)	0.97	290/246305 (0.1%)

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
5	SE	0	1
14	SN	0	2
19	SS	0	1
29	LE	0	1
33	LM	0	2
46	La	0	2

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Mol	Chain	#Chirality outliers	#Planarity outliers
53	Lh	0	1
55	Lj	0	1
All	All	0	11

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
33	LM	26	GLY	C-N	-7.04	1.24	1.33
44	LX	47	LYS	C-N	7.00	1.42	1.33
58	Dt	20	U	C1'-N1	6.57	1.56	1.46
5	SE	29	ARG	C-N	-6.54	1.24	1.33
33	LM	27	ARG	C-N	6.30	1.42	1.33
22	mR	49	U	C1'-N1	6.15	1.55	1.46
5	SE	28	GLY	C-N	-6.05	1.24	1.33
1	16	527	G7M	O3'-P	5.50	1.61	1.56
56	Pt	37	T6A	O3'-P	5.18	1.61	1.56
1	16	1498	UR3	O3'-P	5.16	1.61	1.56
23	23	2069	G7M	O3'-P	5.06	1.61	1.56
56	Pt	46	G7M	O3'-P	5.05	1.61	1.56

All (290) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
14	SN	86	GLU	CA-CB-CG	-6.65	100.80	114.10
24	5	42	C	O5'-C5'-C4'	6.21	114.37	109.40
23	23	784	G	C2'-C3'-O3'	-6.17	103.82	113.70
23	23	2073	C	C6-N1-C2	-6.00	117.90	120.30
23	23	339	U	N3-C2-O2	-5.99	118.01	122.20
23	23	1174	U	N1-C2-O2	5.99	126.99	122.80
23	23	2394	C	C6-N1-C2	-5.98	117.91	120.30
23	23	748	G	O4'-C1'-N9	5.97	112.68	108.50
23	23	1855	U	N3-C2-O2	-5.95	118.04	122.20
1	16	1060	U	N3-C2-O2	-5.95	118.04	122.20
24	5	25	U	N1-C2-O2	5.94	126.96	122.80
23	23	2036	C	C6-N1-C2	-5.94	117.93	120.30
23	23	2200	C	C6-N1-C2	-5.94	117.93	120.30
23	23	2248	C	C6-N1-C2	-5.93	117.93	120.30
1	16	1060	U	N1-C2-O2	5.92	126.95	122.80
23	23	1934	C	C6-N1-C2	-5.91	117.94	120.30
1	16	924	C	C6-N1-C2	-5.91	117.94	120.30
23	23	1536	C	C6-N1-C2	-5.90	117.94	120.30
23	23	2649	C	C5-C6-N1	5.89	123.94	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
24	5	70	C	C6-N1-C2	-5.89	117.94	120.30
23	23	2267	A	N1-C2-N3	-5.88	126.36	129.30
23	23	2474	U	N1-C2-O2	5.88	126.92	122.80
23	23	2616	C	C6-N1-C2	-5.88	117.95	120.30
23	23	2649	C	C6-N1-C2	-5.88	117.95	120.30
24	5	25	U	N3-C2-O2	-5.88	118.08	122.20
23	23	2441	U	N3-C2-O2	-5.88	118.08	122.20
23	23	736	C	C6-N1-C2	-5.87	117.95	120.30
23	23	201	C	C6-N1-C2	-5.86	117.95	120.30
24	5	77	U	N3-C2-O2	-5.85	118.10	122.20
23	23	151	C	C6-N1-C2	-5.84	117.96	120.30
23	23	47	C	C6-N1-C2	-5.83	117.97	120.30
23	23	1994	C	C6-N1-C2	-5.83	117.97	120.30
56	Pt	10	G	N3-C4-C5	-5.83	125.69	128.60
1	16	796	C	C6-N1-C2	-5.82	117.97	120.30
23	23	2474	U	C2-N1-C1'	5.82	124.69	117.70
23	23	1081	U	N3-C2-O2	-5.81	118.14	122.20
1	16	960	U	C2-N1-C1'	5.80	124.66	117.70
23	23	1108	U	N1-C2-O2	5.80	126.86	122.80
23	23	2815	C	C6-N1-C2	-5.78	117.99	120.30
23	23	1108	U	N3-C2-O2	-5.77	118.16	122.20
23	23	640	C	C5-C6-N1	5.76	123.88	121.00
23	23	615	U	O5'-C5'-C4'	5.76	114.01	109.40
23	23	198	C	C5-C6-N1	5.75	123.88	121.00
23	23	985	C	C6-N1-C2	-5.75	118.00	120.30
1	16	610	U	N3-C2-O2	-5.73	118.19	122.20
1	16	610	U	N1-C2-O2	5.73	126.81	122.80
1	16	1326	U	N3-C2-O2	-5.72	118.19	122.20
23	23	1490	A	C2-N3-C4	5.72	113.46	110.60
23	23	1669	A	C2-N3-C4	5.72	113.46	110.60
1	16	397	A	C2-N3-C4	5.71	113.46	110.60
23	23	1158	C	C6-N1-C2	-5.70	118.02	120.30
23	23	2474	U	N3-C2-O2	-5.70	118.21	122.20
56	Pt	25	C	C6-N1-C2	-5.70	118.02	120.30
23	23	1030	C	C6-N1-C2	-5.70	118.02	120.30
23	23	1049	C	C6-N1-C2	-5.69	118.02	120.30
23	23	2442	C	C6-N1-C2	-5.69	118.02	120.30
1	16	545	C	C6-N1-C2	-5.69	118.02	120.30
1	16	689	C	C6-N1-C2	-5.69	118.03	120.30
23	23	2165	C	N1-C2-O2	5.69	122.31	118.90
23	23	915	C	C6-N1-C2	-5.68	118.03	120.30
23	23	985	C	C2-N1-C1'	5.68	125.05	118.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	316	C	C6-N1-C2	-5.68	118.03	120.30
1	16	1202	U	N1-C2-O2	5.67	126.77	122.80
23	23	1174	U	N3-C2-O2	-5.67	118.23	122.20
23	23	1414	C	C6-N1-C2	-5.67	118.03	120.30
23	23	2896	C	C5-C6-N1	5.66	123.83	121.00
56	Pt	56	C	C6-N1-C2	-5.66	118.04	120.30
23	23	1372	U	N3-C2-O2	-5.65	118.25	122.20
23	23	1243	C	C6-N1-C2	-5.64	118.05	120.30
23	23	366	C	C6-N1-C2	-5.64	118.05	120.30
23	23	1476	U	N3-C2-O2	-5.64	118.25	122.20
1	16	1060	U	C5-C6-N1	5.62	125.51	122.70
1	16	54	C	N1-C2-O2	5.62	122.27	118.90
23	23	2292	U	C5-C6-N1	5.62	125.51	122.70
23	23	1379	U	N1-C2-O2	5.62	126.73	122.80
1	16	1412	C	C6-N1-C2	-5.61	118.06	120.30
23	23	1761	C	C6-N1-C2	-5.60	118.06	120.30
23	23	399	U	N3-C2-O2	-5.60	118.28	122.20
1	16	316	C	C2-N1-C1'	5.60	124.96	118.80
23	23	1262	A	C2-N3-C4	5.60	113.40	110.60
23	23	2104	C	N1-C2-O2	5.60	122.26	118.90
23	23	196	A	C2-N3-C4	5.59	113.40	110.60
1	16	514	C	C6-N1-C2	-5.59	118.06	120.30
23	23	1121	C	C6-N1-C2	-5.59	118.06	120.30
23	23	1343	G	C4-N9-C1'	5.58	133.75	126.50
23	23	2179	C	C6-N1-C2	-5.58	118.07	120.30
23	23	267	C	C6-N1-C2	-5.56	118.07	120.30
23	23	765	C	C2-N1-C1'	5.56	124.92	118.80
23	23	1295	C	C6-N1-C2	-5.56	118.08	120.30
23	23	620	G	O5'-C5'-C4'	5.56	113.85	109.40
23	23	813	U	N3-C2-O2	-5.55	118.32	122.20
23	23	2716	C	C6-N1-C2	-5.53	118.09	120.30
1	16	1060	U	C2-N1-C1'	5.53	124.34	117.70
23	23	2786	U	N3-C2-O2	-5.53	118.33	122.20
1	16	178	C	N1-C2-O2	5.52	122.21	118.90
23	23	2248	C	C2-N1-C1'	5.52	124.87	118.80
1	16	153	C	C6-N1-C2	-5.50	118.10	120.30
23	23	1881	C	C6-N1-C2	-5.50	118.10	120.30
1	16	106	C	C6-N1-C2	-5.50	118.10	120.30
1	16	1414	U	N1-C2-O2	5.50	126.65	122.80
23	23	1775	U	N3-C2-O2	-5.50	118.35	122.20
23	23	1662	U	N3-C2-O2	-5.49	118.36	122.20
23	23	1993	U	N3-C2-O2	-5.48	118.36	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	1675	C	N1-C2-O2	5.48	122.19	118.90
23	23	2825	G	C4-N9-C1'	5.48	133.62	126.50
1	16	556	C	C5-C6-N1	5.47	123.74	121.00
1	16	582	C	C6-N1-C2	-5.47	118.11	120.30
23	23	339	U	C6-N1-C2	-5.47	117.72	121.00
23	23	2465	C	C6-N1-C2	-5.47	118.11	120.30
24	5	77	U	N1-C2-O2	5.47	126.63	122.80
1	16	34	C	C6-N1-C2	-5.47	118.11	120.30
34	LN	93	GLN	CB-CG-CD	5.46	121.89	112.60
23	23	399	U	N1-C2-O2	5.46	126.62	122.80
23	23	1716	U	N3-C2-O2	-5.46	118.38	122.20
23	23	2460	U	N1-C2-O2	5.45	126.61	122.80
23	23	57	C	C6-N1-C2	-5.44	118.12	120.30
56	Pt	29	U	N3-C2-O2	-5.44	118.39	122.20
56	Pt	10	G	C4-N9-C1'	5.43	133.56	126.50
23	23	729	G	O5'-C5'-C4'	5.43	113.74	109.40
23	23	729	G	O4'-C1'-N9	5.42	112.30	108.50
1	16	1299	A	C2-N3-C4	5.42	113.31	110.60
1	16	277	C	C6-N1-C2	-5.41	118.14	120.30
1	16	556	C	C6-N1-C2	-5.41	118.14	120.30
1	16	54	C	C6-N1-C2	-5.41	118.14	120.30
24	5	49	C	C6-N1-C2	-5.40	118.14	120.30
23	23	2492	U	N1-C2-O2	5.40	126.58	122.80
1	16	1202	U	N3-C2-O2	-5.39	118.42	122.20
1	16	178	C	N3-C2-O2	-5.39	118.13	121.90
1	16	773	G	O5'-C5'-C4'	5.39	113.71	109.40
23	23	1879	C	C6-N1-C2	-5.39	118.14	120.30
23	23	157	C	C6-N1-C2	-5.38	118.15	120.30
24	5	27	C	N1-C2-O2	5.38	122.13	118.90
1	16	34	C	C5-C6-N1	5.37	123.69	121.00
23	23	765	C	C6-N1-C2	-5.37	118.15	120.30
1	16	439	U	N3-C2-O2	-5.36	118.44	122.20
23	23	1639	C	N3-C2-O2	-5.36	118.14	121.90
23	23	673	C	N1-C2-O2	5.35	122.11	118.90
23	23	737	C	C6-N1-C2	-5.35	118.16	120.30
23	23	2492	U	N3-C2-O2	-5.35	118.46	122.20
1	16	972	C	C6-N1-C2	-5.34	118.16	120.30
23	23	1301	A	O5'-C5'-C4'	5.34	113.67	109.40
23	23	1855	U	N1-C2-O2	5.34	126.54	122.80
23	23	915	C	C2-N1-C1'	5.34	124.67	118.80
23	23	806	C	C6-N1-C2	-5.34	118.17	120.30
1	16	1165	U	N3-C2-O2	-5.33	118.47	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	2143	C	C6-N1-C2	-5.33	118.17	120.30
23	23	2896	C	C6-N1-C2	-5.33	118.17	120.30
23	23	101	A	C2-N3-C4	5.33	113.26	110.60
11	SK	74	VAL	CA-CB-CG2	5.32	119.44	110.40
23	23	565	C	N1-C2-O2	5.32	122.09	118.90
23	23	1795	C	C5-C6-N1	5.32	123.66	121.00
1	16	1151	A	O5'-C5'-C4'	5.32	113.65	109.40
23	23	1386	C	O4'-C1'-N1	5.32	112.22	108.50
1	16	1147	C	N1-C2-O2	5.31	122.09	118.90
23	23	1157	G	N3-C4-N9	5.31	129.19	126.00
23	23	1574	C	C6-N1-C2	-5.31	118.18	120.30
23	23	740	C	C6-N1-C2	-5.31	118.18	120.30
23	23	1992	G	O5'-C5'-C4'	5.31	113.65	109.40
1	16	844	G	C8-N9-C4	-5.31	104.28	106.40
23	23	2460	U	N3-C2-O2	-5.30	118.49	122.20
1	16	750	C	C6-N1-C2	-5.30	118.18	120.30
1	16	1495	U	N3-C2-O2	-5.30	118.49	122.20
23	23	2393	U	N3-C2-O2	-5.29	118.50	122.20
1	16	1066	C	N1-C2-O2	5.29	122.07	118.90
1	16	1203	C	C6-N1-C2	-5.28	118.19	120.30
23	23	1539	U	N3-C2-O2	-5.28	118.50	122.20
23	23	2248	C	C5-C6-N1	5.27	123.64	121.00
23	23	1536	C	N1-C2-O2	5.27	122.06	118.90
24	5	47	C	N1-C2-O2	5.27	122.06	118.90
23	23	2403	C	C6-N1-C2	-5.26	118.19	120.30
23	23	1081	U	N1-C2-O2	5.26	126.48	122.80
1	16	110	C	N1-C2-O2	5.25	122.05	118.90
1	16	1059	C	C6-N1-C2	-5.25	118.20	120.30
23	23	687	C	N1-C2-O2	5.25	122.05	118.90
23	23	2715	C	C5-C6-N1	5.25	123.62	121.00
1	16	439	U	N1-C2-O2	5.25	126.47	122.80
23	23	1803	A	N7-C8-N9	5.25	116.42	113.80
23	23	1886	U	N1-C2-O2	5.25	126.47	122.80
1	16	764	C	C6-N1-C2	-5.24	118.20	120.30
23	23	1300	G	O5'-C5'-C4'	5.24	113.59	109.40
1	16	1326	U	N1-C2-O2	5.24	126.47	122.80
23	23	2515	C	C6-N1-C2	-5.24	118.20	120.30
23	23	198	C	C6-N1-C2	-5.23	118.21	120.30
1	16	1414	U	N3-C2-O2	-5.23	118.54	122.20
1	16	1469	C	C6-N1-C2	-5.22	118.21	120.30
1	16	1108	G	N3-C4-N9	5.22	129.13	126.00
22	mR	41	U	N3-C2-O2	-5.22	118.55	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	977	A	C2-N3-C4	5.21	113.21	110.60
23	23	1639	C	N1-C2-O2	5.21	122.03	118.90
23	23	2215	C	C6-N1-C2	-5.21	118.22	120.30
23	23	1005	C	C6-N1-C2	-5.20	118.22	120.30
23	23	1394	U	C6-N1-C1'	5.20	128.48	121.20
23	23	2500	U	O5'-C5'-C4'	5.20	113.56	109.40
23	23	305	C	C6-N1-C2	-5.19	118.22	120.30
23	23	2690	U	O5'-C5'-C4'	5.19	113.56	109.40
1	16	219	U	N3-C2-O2	-5.19	118.56	122.20
23	23	1047	G	O4'-C1'-N9	5.19	112.36	108.20
23	23	1611	C	C6-N1-C2	-5.19	118.22	120.30
1	16	910	C	C6-N1-C2	-5.19	118.22	120.30
56	Pt	10	G	N3-C4-N9	5.19	129.11	126.00
23	23	946	C	C6-N1-C2	-5.18	118.23	120.30
56	Pt	25	C	N1-C2-O2	5.18	122.01	118.90
23	23	1476	U	N1-C2-O2	5.18	126.42	122.80
23	23	837	C	C6-N1-C2	-5.17	118.23	120.30
23	23	532	A	C2-N3-C4	5.17	113.19	110.60
23	23	276	U	N1-C2-O2	5.17	126.42	122.80
23	23	1301	A	C2-N3-C4	5.17	113.19	110.60
23	23	2416	C	C6-N1-C2	-5.17	118.23	120.30
23	23	2165	C	C6-N1-C2	-5.17	118.23	120.30
23	23	2441	U	N1-C2-O2	5.17	126.42	122.80
59	EF	568	GLY	CA-C-N	5.17	134.40	121.80
59	EF	568	GLY	C-N-CA	5.17	134.40	121.80
23	23	2798	U	N1-C2-O2	5.16	126.41	122.80
1	16	54	C	N3-C2-O2	-5.16	118.29	121.90
23	23	672	C	C5-C6-N1	5.16	123.58	121.00
23	23	1452	G	C4-N9-C1'	5.16	133.20	126.50
23	23	2827	C	C6-N1-C2	-5.15	118.24	120.30
23	23	2308	G	N3-C4-C5	-5.15	126.02	128.60
23	23	704	G	O4'-C1'-N9	5.15	112.32	108.20
23	23	503	A	O5'-C5'-C4'	5.15	113.52	109.40
23	23	1795	C	C6-N1-C2	-5.14	118.24	120.30
23	23	2380	C	C6-N1-C2	-5.14	118.24	120.30
23	23	845	A	C2-N3-C4	5.14	113.17	110.60
23	23	2267	A	C2-N3-C4	5.14	113.17	110.60
23	23	1639	C	C6-N1-C2	-5.14	118.25	120.30
23	23	151	C	C5-C6-N1	5.13	123.57	121.00
59	EF	254	GLN	CB-CG-CD	5.13	121.33	112.60
23	23	2715	C	C6-N1-C2	-5.13	118.25	120.30
23	23	2901	C	C2-N1-C1'	5.13	124.44	118.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	SI	41	ARG	CA-C-N	5.13	131.34	121.54
9	SI	41	ARG	C-N-CA	5.13	131.34	121.54
1	16	6	G	C4-N9-C1'	5.13	133.17	126.50
23	23	1537	G	C4-N9-C1'	5.13	133.16	126.50
23	23	1669	A	C4-N9-C1'	5.12	135.51	126.30
1	16	1026	G	N3-C4-C5	-5.12	126.04	128.60
1	16	37	U	N3-C2-O2	-5.12	118.62	122.20
23	23	880	G	N3-C4-C5	-5.12	126.04	128.60
23	23	31	C	C5-C6-N1	5.11	123.56	121.00
23	23	383	C	N1-C2-O2	5.11	121.97	118.90
23	23	1362	C	C6-N1-C2	-5.11	118.25	120.30
23	23	2047	C	C6-N1-C2	-5.11	118.25	120.30
23	23	2888	C	C6-N1-C2	-5.11	118.26	120.30
1	16	1303	C	N1-C2-O2	5.10	121.96	118.90
23	23	201	C	N3-C2-O2	-5.10	118.33	121.90
23	23	1886	U	N3-C2-O2	-5.10	118.63	122.20
23	23	650	C	C6-N1-C2	-5.09	118.26	120.30
1	16	1209	C	C6-N1-C2	-5.09	118.26	120.30
1	16	737	C	C5-C6-N1	5.09	123.55	121.00
56	Pt	36	U	N3-C2-O2	-5.09	118.64	122.20
23	23	2195	U	N3-C2-O2	-5.09	118.64	122.20
59	EF	254	GLN	CA-CB-CG	5.08	124.27	114.10
1	16	177	G	N3-C4-C5	-5.08	126.06	128.60
23	23	1836	C	C6-N1-C2	-5.08	118.27	120.30
1	16	1119	C	C6-N1-C2	-5.08	118.27	120.30
19	SS	34	TRP	N-CA-C	-5.08	107.12	113.72
24	5	47	C	C6-N1-C2	-5.08	118.27	120.30
23	23	731	C	C6-N1-C2	-5.07	118.27	120.30
23	23	2757	A	O5'-C5'-C4'	5.07	113.46	109.40
1	16	153	C	C2-N1-C1'	5.07	124.38	118.80
23	23	228	C	O5'-C5'-C4'	5.07	113.46	109.40
23	23	2308	G	N3-C4-N9	5.07	129.04	126.00
1	16	810	C	O5'-C5'-C4'	5.07	113.45	109.40
23	23	2393	U	N1-C2-O2	5.07	126.35	122.80
1	16	356	A	O5'-C5'-C4'	5.07	113.45	109.40
23	23	2798	U	N3-C2-O2	-5.06	118.66	122.20
23	23	236	C	C6-N1-C2	-5.06	118.28	120.30
1	16	563	A	C4-N9-C1'	5.06	135.41	126.30
56	Pt	44	U	C2-N1-C1'	5.06	123.77	117.70
23	23	2074	U	N3-C2-O2	-5.05	118.66	122.20
1	16	392	C	C6-N1-C2	-5.05	118.28	120.30
23	23	2615	U	N3-C2-O2	-5.05	118.67	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	898	C	C6-N1-C2	-5.05	118.28	120.30
59	EF	421	GLU	CA-CB-CG	5.04	124.19	114.10
23	23	758	C	C6-N1-C2	-5.03	118.29	120.30
23	23	305	C	C5-C6-N1	5.03	123.52	121.00
23	23	1289	C	C2-N1-C1'	5.03	124.33	118.80
23	23	2901	C	C6-N1-C2	-5.02	118.29	120.30
1	16	598	U	N3-C2-O2	-5.02	118.69	122.20
1	16	623	C	C6-N1-C2	-5.02	118.29	120.30
23	23	655	A	O5'-C5'-C4'	5.02	113.42	109.40
23	23	717	C	C6-N1-C2	-5.02	118.29	120.30
23	23	2394	C	N1-C2-O2	5.02	121.91	118.90
1	16	943	U	N3-C2-O2	-5.01	118.69	122.20
1	16	1108	G	N3-C4-C5	-5.01	126.09	128.60
23	23	740	C	C5-C6-N1	5.01	123.51	121.00
1	16	132	C	C6-N1-C2	-5.01	118.30	120.30
25	LA	200	LYS	CB-CG-CD	5.01	122.81	111.30
56	Pt	56	C	C5-C6-N1	5.01	123.50	121.00
23	23	1716	U	N1-C2-O2	5.00	126.30	122.80
1	16	469	C	C6-N1-C2	-5.00	118.30	120.30

There are no chirality outliers.

All (11) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
29	LE	71	ARG	Sidechain
33	LM	116	ARG	Sidechain
33	LM	27	ARG	Sidechain
46	La	25	ARG	Sidechain
46	La	77	ARG	Sidechain
53	Lh	39	ARG	Sidechain
55	Lj	12	ARG	Sidechain
5	SE	29	ARG	Sidechain
14	SN	69	ARG	Sidechain
14	SN	85	ARG	Sidechain
19	SS	37	ARG	Sidechain

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	16	32907	0	16578	126	0
2	SB	1776	0	1802	8	0
3	SC	1653	0	1727	14	0
4	SD	1642	0	1707	18	0
5	SE	1144	0	1185	10	0
6	SF	862	0	864	6	0
7	SG	1203	0	1254	12	0
8	SH	979	0	1031	10	0
9	SI	1021	0	1070	26	0
10	SJ	795	0	836	6	0
11	SK	894	0	909	7	0
12	SL	957	0	1017	4	0
13	SM	883	0	941	7	0
14	SN	804	0	844	7	0
15	SO	713	0	734	4	0
16	SP	649	0	666	3	0
17	SQ	648	0	691	7	0
18	SR	555	0	578	3	0
19	SS	668	0	693	18	0
20	ST	664	0	714	2	0
21	SU	589	0	629	3	0
22	mR	274	0	139	4	0
23	23	62355	0	31384	162	0
24	5	2570	0	1301	6	0
25	LA	1026	0	1092	12	0
26	LB	2082	0	2154	10	0
27	LC	1565	0	1616	7	0
28	LD	1551	0	1619	9	0
29	LE	1410	0	1444	12	0
30	LF	1322	0	1371	7	0
31	LI	1101	0	1142	11	0
32	LK	979	0	1028	12	0
33	LM	1128	0	1162	3	0
34	LN	946	0	1023	4	0
35	LO	1052	0	1129	12	0
36	LP	1075	0	1154	7	0
37	LQ	960	0	1000	4	0
38	LR	891	0	923	5	0
39	LS	916	0	962	4	0
40	LT	947	0	1019	6	0
41	LU	810	0	834	3	0
42	LV	857	0	922	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
43	LW	738	0	807	4	0
44	LX	779	0	831	6	0
45	LY	753	0	780	6	0
46	La	581	0	599	4	0
47	Lb	625	0	652	4	0
48	Lc	495	0	526	1	0
49	Ld	439	0	482	1	0
50	Le	533	0	530	12	0
51	Lf	444	0	458	2	0
52	Lg	427	0	464	1	0
53	Lh	377	0	418	3	0
54	Li	504	0	572	2	0
55	Lj	302	0	340	2	0
56	Pt	1629	0	829	6	0
57	Pp	30	0	32	0	0
58	Dt	1638	0	842	2	0
59	EF	5442	0	5406	58	0
60	16	12	0	24	0	0
60	23	60	0	120	1	0
61	16	10	0	19	1	0
61	23	20	0	38	0	0
62	16	78	0	0	0	0
62	23	229	0	0	0	0
62	5	6	0	0	0	0
62	EF	1	0	0	0	0
62	LB	1	0	0	0	0
62	LQ	1	0	0	0	0
62	LT	1	0	0	0	0
62	Ld	1	0	0	0	0
62	Lf	1	0	0	0	0
62	SC	1	0	0	0	0
62	SD	1	0	0	0	0
62	SL	1	0	0	0	0
62	SU	1	0	0	0	0
63	16	1	0	0	0	0
63	23	8	0	0	0	0
64	23	62	0	24	0	0
65	Le	1	0	0	0	0
65	Lj	1	0	0	0	0
66	EF	32	0	12	0	0
All	All	154089	0	105693	625	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 2.

All (625) 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)
1:16:1158:C:H5	1:16:1181:G:H1	1.20	0.89
23:23:285:G:H1	23:23:355:U:H3	1.27	0.82
23:23:877:A:H8	23:23:900:A:H62	1.30	0.78
22:mR:48:C:H3'	22:mR:49:U:H6	1.53	0.74
19:SS:3:ARG:HH21	19:SS:7:LYS:HE2	1.54	0.72
59:EF:388:LEU:HD12	59:EF:391:VAL:HG21	1.70	0.72
23:23:1094:U:H1'	23:23:1097:U:H5	1.55	0.72
23:23:2023:C:H5'	23:23:2617:U:H4'	1.72	0.70
23:23:1084:A:H2'	23:23:1085:A:C8	2.26	0.70
1:16:664:G:H22	1:16:741:G:H1	1.40	0.68
59:EF:94:ASP:HB3	59:EF:465:HIS:HB2	1.77	0.66
49:Ld:23:THR:HG23	49:Ld:47:MET:HG2	1.78	0.66
22:mR:48:C:H3'	22:mR:49:U:C6	2.31	0.65
50:Le:18:CYS:HB3	50:Le:40:CYS:SG	2.37	0.64
59:EF:18:HIS:HD2	59:EF:122:GLN:HB2	1.62	0.63
1:16:1316:G:N2	1:16:1318:A:H3'	2.14	0.63
37:LQ:86:ARG:HD3	37:LQ:117:ASP:HB3	1.79	0.63
23:23:900:A:H3'	23:23:901:C:H6	1.65	0.62
23:23:2602:A:C8	23:23:2603:G:H5'	2.34	0.62
23:23:1478:G:H1	23:23:1513:U:H3	1.46	0.61
1:16:1348:U:H4'	9:SI:122:ARG:HG3	1.82	0.60
23:23:139:U:H5"	23:23:140:C:H5	1.67	0.60
4:SD:59:GLN:HA	4:SD:62:ARG:HB2	1.84	0.60
23:23:2102:G:H1	23:23:2187:U:H3	1.50	0.60
1:16:1071:C:H2'	1:16:1072:G:H8	1.65	0.60
19:SS:67:VAL:HB	50:Le:56:ARG:HH12	1.66	0.60
19:SS:40:ILE:HD11	19:SS:67:VAL:HA	1.83	0.60
1:16:1106:G:H5"	3:SC:172:ARG:HG2	1.82	0.60
59:EF:18:HIS:CD2	59:EF:122:GLN:HB2	2.36	0.59
23:23:651:G:H5'	54:Li:19:LYS:HG3	1.84	0.59
23:23:1000:A:H2'	23:23:1001:A:C8	2.38	0.59
59:EF:158:ILE:HD11	59:EF:166:PRO:HB3	1.83	0.59
36:LP:64:TRP:HB2	36:LP:104:GLU:HB2	1.84	0.59
1:16:1086:U:H3	1:16:1099:G:H22	1.50	0.59
19:SS:12:ASP:O	19:SS:14:HIS:N	2.33	0.58
1:16:1:A:H2	1:16:614:C:H4'	1.68	0.58
7:SG:116:MET:HA	7:SG:119:ARG:HB2	1.83	0.58
6:SF:38:ARG:HB3	6:SF:63:ASN:HB2	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
23:23:2768:U:O2'	33:LM:95:ARG:NH1	2.36	0.58
5:SE:20:ARG:HH12	22:mR:48:C:H5	1.50	0.58
5:SE:20:ARG:HH22	22:mR:48:C:H41	1.52	0.58
31:LI:43:ASN:HA	31:LI:46:PHE:HB2	1.84	0.58
23:23:397:U:H5"	47:Lb:32:ASN:HB2	1.86	0.58
26:LB:144:VAL:HB	26:LB:154:LEU:HB2	1.85	0.58
31:LI:94:ILE:HG23	31:LI:98:ASP:HB3	1.86	0.57
31:LI:97:ARG:HE	31:LI:112:LYS:HD3	1.69	0.57
9:SI:115:LYS:HB2	9:SI:118:LEU:HD13	1.85	0.57
23:23:848:C:H2'	23:23:849:A:H8	1.70	0.57
23:23:1094:U:H1'	23:23:1097:U:C5	2.39	0.56
1:16:1233:G:H5'	9:SI:119:ARG:HH21	1.69	0.56
28:LD:145:ASP:HB3	28:LD:184:ASP:HB2	1.86	0.56
1:16:677:U:H3	1:16:713:G:H22	1.53	0.56
23:23:544:C:H2'	23:23:545:U:O4'	2.06	0.56
23:23:1819:A:H5"	26:LB:160:THR:HG21	1.86	0.56
47:Lb:10:LYS:HE3	47:Lb:54:LYS:HG2	1.86	0.56
23:23:568:U:H1'	23:23:2030:6MZ:H9C1	1.87	0.56
59:EF:338:VAL:HG22	59:EF:379:ALA:HA	1.87	0.56
23:23:2591:C:H2'	23:23:2592:G:C8	2.41	0.56
23:23:2107:G:H1	23:23:2182:U:H3	1.53	0.55
59:EF:617:MET:HE3	59:EF:660:LEU:HB2	1.88	0.55
7:SG:111:ARG:HD2	7:SG:123:GLU:HG2	1.89	0.55
10:SJ:9:ARG:HG3	10:SJ:73:LEU:HD12	1.88	0.55
58:Dt:62:C:H2'	58:Dt:63:G:H8	1.72	0.55
1:16:1071:C:H2'	1:16:1072:G:C8	2.42	0.55
8:SH:18:GLN:HG2	8:SH:63:LEU:HD13	1.89	0.55
23:23:373:U:H2'	23:23:374:A:H8	1.72	0.55
1:16:994:A:C4	1:16:1216:A:H4'	2.42	0.54
7:SG:92:ARG:HE	7:SG:94:VAL:H	1.55	0.54
1:16:1368:A:OP1	9:SI:113:ARG:NH2	2.41	0.54
9:SI:120:LYS:HB2	9:SI:123:ARG:HB3	1.89	0.54
15:SO:44:ALA:O	15:SO:47:LYS:NZ	2.41	0.54
17:SQ:25:ILE:HB	17:SQ:42:THR:HG23	1.89	0.54
1:16:1242:G:H1	1:16:1295:U:H3	1.56	0.54
5:SE:115:LEU:HD13	5:SE:123:VAL:HG11	1.90	0.54
28:LD:181:ILE:HG12	35:LO:1:MET:HE3	1.89	0.54
59:EF:622:GLU:HG3	59:EF:653:LYS:HE2	1.90	0.54
3:SC:11:ARG:NH1	3:SC:177:THR:O	2.41	0.54
8:SH:29:SER:HB3	8:SH:57:PRO:HB2	1.90	0.54
59:EF:143:LYS:HB3	59:EF:146:ARG:HG3	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
23:23:2529:G:H4'	30:LF:175:LYS:HG3	1.89	0.54
1:16:1239:A:H62	1:16:1299:A:H62	1.54	0.54
5:SE:77:ASN:OD1	5:SE:78:ASN:ND2	2.41	0.53
32:LK:103:ARG:HD3	32:LK:140:VAL:HG11	1.89	0.53
32:LK:56:PRO:HD3	32:LK:75:PRO:HD3	1.91	0.53
4:SD:188:ARG:NH2	4:SD:192:SER:O	2.42	0.53
9:SI:34:SER:OG	9:SI:35:LEU:N	2.41	0.53
1:16:1043:G:H2'	1:16:1044:A:C8	2.44	0.53
9:SI:42:GLU:OE1	9:SI:45:ARG:NH1	2.41	0.53
23:23:477:A:H2'	23:23:478:A:C8	2.44	0.53
19:SS:3:ARG:HH12	19:SS:10:PHE:HD1	1.57	0.53
23:23:247:G:OP2	23:23:249:C:N4	2.41	0.53
1:16:1312:G:OP2	50:Le:63:ARG:NH2	2.41	0.53
23:23:900:A:H3'	23:23:901:C:C6	2.44	0.53
40:LT:97:ASP:OD2	41:LU:13:ARG:NH1	2.42	0.53
45:LY:86:LEU:HD13	45:LY:89:ILE:HD11	1.91	0.53
1:16:501:C:H2'	1:16:502:A:C8	2.44	0.52
1:16:718:A:H5'	11:SK:119:ASN:HB2	1.90	0.52
35:LO:127:VAL:HG21	35:LO:142:ILE:HD12	1.91	0.52
1:16:1106:G:O2'	3:SC:169:ARG:NH1	2.43	0.52
9:SI:22:LYS:HG3	9:SI:62:ASP:HB3	1.92	0.52
16:SP:4:ILE:HG12	16:SP:21:VAL:HG22	1.91	0.52
56:Pt:37:T6A:N1	56:Pt:37:T6A:N11	2.55	0.52
1:16:501:C:H2'	1:16:502:A:H8	1.75	0.52
23:23:2305:U:H5"	29:LE:131:GLY:HA3	1.92	0.52
23:23:2355:G:H4'	46:La:24:LYS:HD2	1.90	0.52
30:LF:99:LYS:HE3	30:LF:104:ASN:HD21	1.73	0.52
1:16:8:A:N6	4:SD:202:GLU:O	2.40	0.52
11:SK:87:LYS:HB2	11:SK:113:VAL:HG23	1.91	0.52
32:LK:74:PRO:O	32:LK:113:LYS:NZ	2.43	0.52
33:LM:60:ASP:OD1	33:LM:60:ASP:N	2.41	0.52
59:EF:567:ALA:HA	59:EF:704:LYS:C	2.35	0.52
19:SS:11:ILE:HG23	19:SS:13:LEU:H	1.74	0.52
12:SL:54:ARG:HH21	12:SL:62:GLU:HG3	1.75	0.51
59:EF:638:ARG:NE	59:EF:662:GLU:O	2.39	0.51
23:23:910:A:H2'	23:23:911:A:C8	2.45	0.51
26:LB:5:LYS:HG3	26:LB:17:VAL:HG22	1.93	0.51
2:SB:5:SER:OG	2:SB:6:MET:N	2.42	0.51
59:EF:210:ASP:OD1	59:EF:210:ASP:N	2.40	0.51
59:EF:488:VAL:HG13	59:EF:660:LEU:HD23	1.91	0.51
23:23:494:G:H4'	42:LV:6:LYS:HB2	1.91	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:La:24:LYS:HG3	46:La:36:ILE:HG22	1.92	0.51
59:EF:51:ASP:HB3	59:EF:56:GLU:HB3	1.92	0.51
23:23:632:A:H2'	23:23:633:A:C8	2.46	0.51
7:SG:37:SER:OG	9:SI:41:ARG:NH1	2.44	0.51
14:SN:6:MET:HE3	14:SN:63:ARG:HH12	1.75	0.51
32:LK:117:MET:HB3	32:LK:125:MET:HE3	1.92	0.51
59:EF:83:ARG:HH21	59:EF:85:ASN:HD21	1.58	0.51
36:LP:17:ASN:O	36:LP:38:ARG:NH1	2.43	0.51
37:LQ:28:LEU:HD23	37:LQ:48:VAL:HG21	1.93	0.51
59:EF:323:LYS:HB3	59:EF:335:PHE:HB2	1.93	0.51
47:Lb:31:PRO:HB2	47:Lb:33:LEU:HD13	1.92	0.51
5:SE:75:ALA:O	5:SE:82:GLN:NE2	2.44	0.51
35:LO:100:ILE:HG22	35:LO:101:ILE:HG23	1.93	0.51
1:16:406:G:H21	4:SD:116:GLN:HE22	1.57	0.50
34:LN:121:GLU:OE2	39:LS:66:ASN:ND2	2.44	0.50
8:SH:11:LEU:HD22	8:SH:75:ILE:HD11	1.92	0.50
15:SO:74:ASP:OD2	15:SO:77:ARG:NH1	2.40	0.50
59:EF:488:VAL:HG21	59:EF:661:SER:HB2	1.93	0.50
4:SD:57:GLU:HG2	4:SD:199:LEU:HB2	1.93	0.50
23:23:2182:U:H2'	23:23:2183:A:H8	1.76	0.50
1:16:429:U:H3'	4:SD:9:LEU:HD12	1.94	0.50
1:16:1124:G:N2	1:16:1125:U:O4	2.38	0.50
4:SD:87:GLY:HA3	4:SD:197:GLU:HG3	1.94	0.50
23:23:698:C:O2'	23:23:734:A:N6	2.43	0.50
23:23:2243:U:H2'	23:23:2244:U:C6	2.46	0.50
23:23:2618:G:H21	27:LC:155:VAL:HG21	1.75	0.50
23:23:1093:G:H21	23:23:1098:A:H62	1.58	0.50
23:23:2405:G:O2'	23:23:2411:A:N6	2.44	0.50
42:LV:4:ILE:HG12	42:LV:106:VAL:HG22	1.93	0.50
59:EF:89:THR:HG23	59:EF:99:VAL:HG22	1.94	0.50
7:SG:129:GLU:HG3	7:SG:131:LYS:HG3	1.94	0.50
17:SQ:21:ILE:HG12	17:SQ:48:ASP:HB2	1.93	0.50
43:LW:76:ARG:NH2	43:LW:79:ASP:OD1	2.44	0.50
27:LC:39:ASP:OD1	27:LC:39:ASP:N	2.43	0.50
23:23:2478:A:OP2	55:Lj:2:LYS:NZ	2.43	0.50
1:16:255:G:H4'	17:SQ:19:LYS:HD3	1.93	0.49
1:16:826:C:O2	8:SH:16:ASN:ND2	2.45	0.49
23:23:2788:C:O2'	23:23:2809:A:N3	2.44	0.49
2:SB:88:ASP:O	2:SB:89:GLN:NE2	2.42	0.49
12:SL:89:D2T:OD2	12:SL:89:D2T:N	2.44	0.49
23:23:192:C:O2'	23:23:802:A:N3	2.45	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
31:LI:9:VAL:HB	31:LI:12:LEU:HB2	1.94	0.49
44:LX:28:VAL:HB	44:LX:34:VAL:HG23	1.94	0.49
53:Lh:24:THR:HG23	53:Lh:27:GLY:H	1.77	0.49
1:16:110:C:O2'	16:SP:25:ARG:O	2.30	0.49
1:16:1152:A:OP1	10:SJ:70:HIS:ND1	2.45	0.49
1:16:1175:G:H2'	1:16:1176:A:H8	1.78	0.49
1:16:1305:G:H22	1:16:1331:G:H1'	1.77	0.49
12:SL:46:ASN:ND2	12:SL:89:D2T:SB	2.85	0.49
23:23:1385:A:O2'	23:23:1396:U:O2	2.30	0.49
23:23:2515:C:H2'	23:23:2516:A:H8	1.77	0.49
32:LK:21:SER:O	32:LK:25:GLY:N	2.45	0.49
1:16:831:A:H4'	2:SB:21:ARG:HH21	1.78	0.49
3:SC:47:LEU:HB3	3:SC:50:ALA:HB3	1.95	0.49
23:23:554:U:H2'	23:23:555:G:O4'	2.13	0.49
29:LE:102:ARG:NH1	50:Le:25:ARG:O	2.45	0.49
59:EF:297:GLY:HA2	59:EF:306:PRO:HA	1.94	0.49
23:23:2126:A:O2'	23:23:2162:G:N2	2.45	0.49
24:5:43:C:O2	29:LE:92:ARG:NH1	2.45	0.49
27:LC:184:ARG:HH21	39:LS:7:GLN:HG3	1.78	0.49
39:LS:60:THR:HG23	39:LS:73:VAL:HG22	1.94	0.49
1:16:1304:G:H21	1:16:1333:A:H62	1.59	0.49
52:Lg:37:LYS:HG3	52:Lg:48:ILE:HD13	1.95	0.49
1:16:231:U:H2'	1:16:232:G:H8	1.78	0.49
9:SI:42:GLU:HA	9:SI:45:ARG:HH11	1.78	0.49
1:16:1158:C:H5	1:16:1181:G:N1	2.00	0.49
1:16:1191:A:OP1	3:SC:4:LYS:NZ	2.44	0.49
1:16:181:A:H61	1:16:194:C:H3'	1.77	0.48
1:16:404:G:O6	4:SD:2:ALA:N	2.46	0.48
2:SB:173:ILE:HG12	2:SB:183:VAL:HG11	1.96	0.48
23:23:372:G:H5"	47:Lb:61:LYS:HD3	1.95	0.48
23:23:2135:A:H62	23:23:2156:G:N2	2.11	0.48
59:EF:30:ILE:HD11	59:EF:278:MET:HE1	1.96	0.48
23:23:191:A:H2'	23:23:192:C:C6	2.49	0.48
23:23:668:A:H2'	23:23:670:A:H62	1.77	0.48
23:23:1994:C:OP1	60:23:3014:PUT:N1	2.47	0.48
59:EF:308:GLU:OE2	59:EF:310:HIS:NE2	2.46	0.48
25:LA:189:LEU:HA	25:LA:192:LEU:HD23	1.96	0.48
1:16:891:U:H2'	1:16:892:A:H8	1.78	0.48
1:16:1167:A:O2'	1:16:1169:A:N7	2.47	0.48
28:LD:18:THR:HG23	28:LD:106:LYS:HG2	1.94	0.48
41:LU:25:LEU:HB3	41:LU:27:ILE:HD12	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
59:EF:108:GLY:HA3	59:EF:286:LEU:HD22	1.96	0.48
1:16:501:C:H1'	1:16:549:C:H1'	1.96	0.48
23:23:479:A:N3	23:23:481:G:H5"	2.27	0.48
23:23:2849:U:H4'	23:23:2868:A:C2	2.47	0.48
12:SL:68:GLY:O	12:SL:99:ARG:NH1	2.42	0.48
1:16:1373:G:OP1	9:SI:41:ARG:NH2	2.47	0.47
23:23:2135:A:N6	23:23:2156:G:H21	2.11	0.47
25:LA:54:LYS:HG3	25:LA:56:ASP:H	1.79	0.47
31:LI:1:MET:N	31:LI:21:VAL:O	2.45	0.47
1:16:1191:A:OP2	3:SC:2:GLY:N	2.47	0.47
36:LP:20:LEU:HD13	45:LY:81:PRO:HG3	1.95	0.47
3:SC:164:ARG:NH2	3:SC:166:GLU:OE2	2.44	0.47
4:SD:72:PHE:HE1	4:SD:94:LEU:HD11	1.79	0.47
23:23:581:C:H2'	23:23:582:A:C8	2.49	0.47
56:Pt:36:U:H2'	56:Pt:37:T6A:H8	1.80	0.47
9:SI:52:LEU:HD23	9:SI:58:VAL:HG23	1.96	0.47
9:SI:99:ARG:HG2	9:SI:104:VAL:HG11	1.96	0.47
18:SR:41:PRO:HG2	18:SR:44:ILE:HD12	1.96	0.47
23:23:856:G:H2'	23:23:857:G:C8	2.49	0.47
44:LX:38:GLY:H	44:LX:62:GLU:HG2	1.79	0.47
46:La:59:LEU:HD12	46:La:80:ILE:HD12	1.96	0.47
1:16:674:G:H2'	1:16:675:A:H8	1.79	0.47
1:16:1034:G:H2'	1:16:1035:A:H8	1.78	0.47
2:SB:46:THR:HB	2:SB:201:PRO:HG2	1.97	0.47
1:16:1025:U:H5"	1:16:1026:G:H5'	1.96	0.47
29:LE:127:ASN:HD22	29:LE:158:THR:H	1.63	0.47
32:LK:76:ALA:HA	32:LK:79:LEU:HB2	1.95	0.47
1:16:481:G:O2'	1:16:483:C:N4	2.48	0.47
1:16:1044:A:C5	1:16:1045:C:H1'	2.50	0.47
1:16:1522:U:H2'	1:16:1523:G:H8	1.79	0.47
5:SE:148:ASN:OD1	5:SE:148:ASN:N	2.45	0.47
11:SK:64:GLN:HG2	11:SK:99:ALA:HB2	1.95	0.47
44:LX:47:LYS:HD2	44:LX:48:PRO:HD2	1.96	0.47
59:EF:15:ILE:HG12	59:EF:86:ILE:HD11	1.97	0.47
59:EF:420:VAL:HG12	59:EF:458:ILE:HD13	1.96	0.47
59:EF:638:ARG:HH12	59:EF:669:GLN:HG2	1.80	0.47
1:16:1183:U:O2'	1:16:1185:G:OP2	2.33	0.47
4:SD:85:ASN:HB3	4:SD:88:GLU:HG2	1.96	0.47
59:EF:151:PHE:HB3	59:EF:152:LEU:HD22	1.97	0.47
1:16:376:G:H5"	16:SP:5:ARG:HB2	1.96	0.47
1:16:1160:G:H1	1:16:1176:A:H61	1.63	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:SC:16:LYS:NZ	3:SC:181:ASP:OD1	2.45	0.47
3:SC:84:VAL:HA	3:SC:87:LEU:HB2	1.97	0.47
4:SD:202:GLU:OE1	5:SE:112:ARG:NH2	2.48	0.47
23:23:1056:G:H4'	23:23:1086:A:C8	2.50	0.47
23:23:1386:C:H2'	23:23:1387:A:C8	2.50	0.47
23:23:373:U:H2'	23:23:374:A:C8	2.49	0.47
23:23:500:G:N1	23:23:503:A:OP2	2.45	0.47
8:SH:89:LYS:HD2	8:SH:120:GLY:HA2	1.97	0.46
8:SH:96:MET:HE2	8:SH:130:ALA:HB1	1.96	0.46
23:23:2129:C:H4'	25:LA:5:THR:HG21	1.97	0.46
37:LQ:24:MET:HE1	37:LQ:40:LYS:HD3	1.97	0.46
1:16:1356:G:H2'	1:16:1357:A:H8	1.80	0.46
23:23:2329:U:H2'	23:23:2330:G:C8	2.51	0.46
29:LE:77:PHE:HB2	29:LE:79:ILE:HG12	1.97	0.46
1:16:405:U:OP2	4:SD:3:ARG:NH1	2.48	0.46
9:SI:69:GLY:O	9:SI:75:GLN:NE2	2.48	0.46
23:23:2099:U:H2'	23:23:2100:G:H8	1.81	0.46
23:23:2430:A:N3	23:23:2430:A:H2'	2.30	0.46
1:16:419:C:OP1	1:16:513:C:O2'	2.33	0.46
1:16:505:G:H5'	1:16:534:U:H2'	1.98	0.46
1:16:814:A:H2'	1:16:816:A:H5"	1.97	0.46
23:23:494:G:H21	42:LV:57:ASN:HD21	1.62	0.46
23:23:1791:A:N6	23:23:1828:G:O2'	2.40	0.46
34:LN:1:MET:HE2	34:LN:1:MET:HB3	1.87	0.46
19:SS:44:MET:HA	19:SS:47:LEU:HD13	1.97	0.46
23:23:1278:C:H2'	23:23:1279:G:H8	1.80	0.46
30:LF:16:ASP:HB3	30:LF:27:LYS:HB3	1.97	0.46
26:LB:53:HIS:HA	26:LB:217:ARG:HB2	1.97	0.46
26:LB:142:HIS:ND1	26:LB:193:GLY:O	2.46	0.46
59:EF:659:PRO:HG2	59:EF:662:GLU:HB2	1.96	0.46
19:SS:11:ILE:CG2	19:SS:13:LEU:H	2.28	0.46
24:5:90:C:H5"	36:LP:18:ARG:HG2	1.98	0.46
59:EF:98:GLU:HA	59:EF:101:ARG:HD2	1.98	0.46
59:EF:193:TRP:HB2	59:EF:273:LYS:HD3	1.98	0.46
1:16:50:A:O2'	1:16:360:G:N2	2.49	0.46
1:16:1222:G:OP2	1:16:1322:C:N4	2.42	0.46
9:SI:15:SER:HA	9:SI:69:GLY:HA3	1.98	0.46
13:SM:50:GLU:HA	13:SM:53:ILE:HD12	1.97	0.46
23:23:447:A:OP1	40:LT:5:LYS:NZ	2.49	0.46
23:23:851:C:H2'	23:23:852:U:C6	2.51	0.46
23:23:1353:A:H2'	23:23:1354:A:C8	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:16:946:A:H2'	1:16:947:G:C8	2.50	0.46
1:16:1238:A:H62	1:16:1301:U:H3	1.63	0.46
13:SM:44:LYS:HB2	13:SM:47:GLU:HG2	1.98	0.46
51:Lf:38:HIS:ND1	51:Lf:39:LEU:O	2.45	0.46
1:16:1211:U:H1'	1:16:1213:A:C2	2.51	0.45
43:LW:1:MET:HE2	43:LW:1:MET:HB3	1.80	0.45
1:16:222:C:H2'	1:16:223:A:H8	1.81	0.45
1:16:405:U:O4	4:SD:2:ALA:N	2.49	0.45
23:23:634:C:H2'	23:23:635:C:C6	2.50	0.45
23:23:805:G:H5'	35:LO:38:GLN:HG3	1.97	0.45
23:23:2229:U:H2'	23:23:2230:G:H8	1.81	0.45
23:23:2294:G:OP1	38:LR:94:ARG:NH2	2.49	0.45
23:23:2394:C:H5"	35:LO:63:LYS:HD3	1.98	0.45
30:LF:137:ASP:HB3	30:LF:140:VAL:HG12	1.99	0.45
33:LM:32:LEU:HD22	33:LM:54:ILE:HG21	1.98	0.45
38:LR:88:LYS:HA	38:LR:115:LEU:HD23	1.97	0.45
48:Lc:31:GLN:HB2	48:Lc:37:LEU:HB2	1.98	0.45
8:SH:89:LYS:HE3	8:SH:117:ARG:HG2	1.98	0.45
23:23:878:A:H2'	23:23:879:G:O4'	2.16	0.45
59:EF:282:VAL:HA	59:EF:286:LEU:HD12	1.98	0.45
59:EF:342:VAL:HG11	59:EF:378:ARG:HH11	1.81	0.45
1:16:744:C:H2'	1:16:745:G:H8	1.82	0.45
1:16:1218:C:H2'	1:16:1219:A:H8	1.81	0.45
1:16:1251:A:N3	1:16:1369:C:O2'	2.41	0.45
5:SE:39:VAL:HG23	5:SE:71:MET:HE3	1.98	0.45
23:23:581:C:H2'	23:23:582:A:H8	1.82	0.45
23:23:995:C:OP2	40:LT:54:LYS:NZ	2.49	0.45
25:LA:46:VAL:HG13	25:LA:212:VAL:HG22	1.98	0.45
59:EF:167:VAL:HB	59:EF:263:LEU:HD23	1.98	0.45
59:EF:504:LYS:HB2	59:EF:504:LYS:HE2	1.79	0.45
7:SG:70:ARG:NH1	7:SG:97:ASN:OD1	2.50	0.45
20:ST:21:ASN:HB3	20:ST:66:LEU:HD13	1.99	0.45
23:23:1013:C:H2'	23:23:1014:A:H8	1.81	0.45
24:5:2:G:H2'	24:5:3:C:C6	2.52	0.45
59:EF:468:ILE:HD12	59:EF:469:ILE:HG13	1.99	0.45
1:16:1530:G:H2'	1:16:1531:A:H8	1.82	0.45
59:EF:502:GLU:HA	59:EF:519:VAL:HA	1.99	0.45
29:LE:64:LYS:HD3	50:Le:5:ILE:HG13	1.99	0.45
35:LO:57:LEU:HD22	54:Li:54:ASP:HB3	1.99	0.45
1:16:1316:G:H22	1:16:1318:A:H3'	1.79	0.44
5:SE:149:SER:H	5:SE:152:MET:HE2	1.82	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:SF:10:VAL:HG12	6:SF:58:HIS:HB3	1.97	0.44
8:SH:105:SER:HB2	8:SH:126:ILE:HD11	1.98	0.44
23:23:1469:A:H2'	23:23:1470:A:H8	1.82	0.44
23:23:2636:C:H2'	23:23:2637:U:C6	2.52	0.44
38:LR:83:LEU:HD21	38:LR:114:GLY:HA3	1.99	0.44
1:16:1409:C:H2'	1:16:1410:A:H8	1.82	0.44
2:SB:3:THR:OG1	2:SB:4:VAL:N	2.50	0.44
23:23:483:A:O2'	44:LX:56:GLY:O	2.35	0.44
23:23:641:U:O2'	23:23:2350:C:OP1	2.35	0.44
27:LC:105:LYS:HA	27:LC:105:LYS:HD3	1.84	0.44
36:LP:38:ARG:HB2	36:LP:98:PRO:HD3	1.99	0.44
59:EF:430:LYS:HB2	59:EF:430:LYS:HE2	1.91	0.44
1:16:1372:U:OP1	9:SI:74:GLY:N	2.51	0.44
8:SH:47:GLU:HB2	8:SH:64:LYS:HG3	1.99	0.44
1:16:552:U:H2'	1:16:553:A:H8	1.82	0.44
1:16:1363:A:O2'	1:16:1365:G:N7	2.40	0.44
23:23:1475:G:O2'	23:23:1514:G:O6	2.35	0.44
24:5:1:U:H2'	24:5:2:G:C8	2.52	0.44
2:SB:29:PRO:O	2:SB:45:LYS:NZ	2.51	0.44
20:ST:70:ASN:OD1	20:ST:70:ASN:N	2.50	0.44
25:LA:60:ARG:NH2	25:LA:61:GLY:O	2.50	0.44
59:EF:474:LYS:HG3	59:EF:480:GLU:HG2	2.00	0.44
1:16:1:A:C2	1:16:614:C:H4'	2.52	0.44
1:16:1144:G:H21	1:16:1146:A:H62	1.65	0.44
1:16:1409:C:H2'	1:16:1410:A:C8	2.52	0.44
6:SF:37:HIS:HB3	6:SF:97:THR:HG22	1.99	0.44
5:SE:96:MET:HE3	5:SE:96:MET:HB2	1.89	0.44
19:SS:11:ILE:HG12	19:SS:41:PHE:CE1	2.52	0.44
23:23:817:C:O2'	23:23:839:U:H5"	2.16	0.44
24:5:42:C:OP2	50:Le:2:LYS:NZ	2.45	0.44
32:LK:80:LEU:HD21	32:LK:136:MET:HE2	1.99	0.44
1:16:991:U:C6	1:16:1212:U:H1'	2.53	0.44
15:SO:14:GLU:OE2	15:SO:84:ARG:NH1	2.50	0.44
50:Le:62:LYS:HD2	50:Le:62:LYS:HA	1.80	0.44
1:16:967:5MC:H4'	9:SI:127:PHE:HE1	1.82	0.44
21:SU:4:ILE:HG13	21:SU:19:PHE:HA	2.00	0.44
23:23:932:U:O2'	23:23:934:U:O4	2.34	0.44
41:LU:1:MET:HE3	41:LU:1:MET:HB2	1.91	0.44
4:SD:145:ILE:HG21	4:SD:178:MET:HE3	1.98	0.43
23:23:1105:U:H2'	23:23:1106:G:H8	1.83	0.43
23:23:1992:G:N2	23:23:1996:C:O2'	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
32:LK:31:GLN:HB3	32:LK:61:VAL:HG11	2.00	0.43
13:SM:86:TYR:HB3	19:SS:73:GLU:HB2	2.00	0.43
23:23:145:C:H2'	23:23:146:A:C8	2.53	0.43
23:23:1820:U:C2	26:LB:201:MET:HG2	2.53	0.43
42:LV:58:ALA:HA	42:LV:62:ASP:HB2	1.99	0.43
56:Pt:29:U:OP1	59:EF:515:TYR:OH	2.36	0.43
59:EF:87:ILE:HG13	59:EF:106:LEU:HD21	2.01	0.43
1:16:928:G:O2'	1:16:1533:C:OP1	2.36	0.43
11:SK:56:ARG:O	11:SK:59:THR:OG1	2.36	0.43
23:23:948:C:H1'	23:23:984:A:C8	2.53	0.43
23:23:1438:U:H2'	23:23:1439:A:H8	1.82	0.43
23:23:1649:G:O2'	37:LQ:106:ASP:OD2	2.34	0.43
30:LF:121:ILE:HD11	30:LF:140:VAL:HG13	1.99	0.43
43:LW:13:ALA:HB3	43:LW:33:LYS:HB2	2.00	0.43
44:LX:19:LYS:HE2	44:LX:19:LYS:HB3	1.73	0.43
1:16:599:C:H2'	1:16:600:A:H8	1.84	0.43
3:SC:150:LYS:HB2	3:SC:173:VAL:HG21	2.01	0.43
9:SI:100:LYS:HE2	9:SI:100:LYS:HB2	1.82	0.43
29:LE:59:ALA:O	50:Le:27:THR:OG1	2.31	0.43
31:LI:8:LYS:HD3	31:LI:14:SER:HB3	2.01	0.43
31:LI:26:ALA:HA	31:LI:30:LEU:HB2	2.00	0.43
1:16:745:G:H2'	1:16:746:A:H8	1.84	0.43
23:23:2125:G:H21	23:23:2173:A:H62	1.67	0.43
23:23:2278:A:OP2	46:La:12:ASN:ND2	2.49	0.43
32:LK:33:VAL:HG11	32:LK:67:PHE:HB3	2.00	0.43
42:LV:74:ILE:HD12	42:LV:105:VAL:HG22	2.00	0.43
59:EF:296:ASN:OD1	59:EF:296:ASN:N	2.51	0.43
1:16:977:A:O2'	1:16:979:C:OP2	2.33	0.43
1:16:1344:C:OP1	9:SI:124:ARG:NH1	2.51	0.43
7:SG:23:LEU:HA	7:SG:26:PHE:HB3	2.00	0.43
14:SN:96:LEU:HD12	14:SN:96:LEU:HA	1.86	0.43
23:23:1386:C:H2'	23:23:1387:A:H8	1.83	0.43
38:LR:2:ASP:OD1	38:LR:2:ASP:N	2.51	0.43
59:EF:309:ARG:HE	59:EF:404:ILE:HD13	1.82	0.43
59:EF:623:THR:HG21	59:EF:631:VAL:HG11	2.01	0.43
1:16:486:U:H2'	1:16:487:A:H8	1.84	0.43
1:16:515:G:H2'	1:16:516:PSU:H6	1.84	0.43
10:SJ:8:ILE:HB	10:SJ:74:VAL:HG22	2.00	0.43
23:23:2047:C:H2'	23:23:2048:G:H8	1.83	0.43
23:23:2258:C:O2'	23:23:2427:C:OP2	2.31	0.43
29:LE:107:ALA:HB1	29:LE:137:ILE:HD12	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:16:216:U:H4'	1:16:464:U:H4'	2.01	0.43
1:16:1464:U:H2'	1:16:1465:A:H8	1.84	0.43
9:SI:11:ARG:HE	9:SI:11:ARG:HB2	1.68	0.43
13:SM:13:LYS:HD3	13:SM:44:LYS:HZ1	1.84	0.43
28:LD:170:ARG:NH1	28:LD:176:ASP:OD2	2.43	0.43
50:Le:50:ASP:OD1	50:Le:50:ASP:N	2.46	0.43
59:EF:276:GLN:HA	59:EF:279:LEU:HB2	2.00	0.43
1:16:269:C:H2'	1:16:270:A:C8	2.54	0.43
1:16:1043:G:H2'	1:16:1044:A:H8	1.81	0.43
23:23:739:A:H1'	23:23:740:C:H5	1.84	0.43
23:23:1432:G:H2'	23:23:1433:A:C8	2.54	0.43
28:LD:154:ASP:HB3	28:LD:157:LEU:HB3	2.01	0.43
45:LY:57:TYR:OH	45:LY:79:ARG:NH2	2.52	0.43
1:16:958:A:OP1	19:SS:55:ARG:NH2	2.51	0.43
1:16:1357:A:H61	1:16:1365:G:H1	1.66	0.43
6:SF:49:TYR:OH	18:SR:63:ARG:O	2.35	0.43
14:SN:83:LYS:HD2	14:SN:83:LYS:HA	1.63	0.43
21:SU:40:LYS:HD2	21:SU:42:THR:HG22	2.00	0.43
23:23:84:A:N1	23:23:98:G:O2'	2.48	0.43
23:23:1604:C:O2'	23:23:1610:A:N1	2.50	0.43
23:23:2135:A:H62	23:23:2156:G:H21	1.67	0.43
23:23:2584:U:H2'	23:23:2585:U:H2'	2.01	0.43
23:23:2621:G:OP1	27:LC:124:ARG:NH2	2.49	0.43
36:LP:34:LYS:NZ	36:LP:99:GLY:O	2.52	0.43
59:EF:521:ASP:OD2	59:EF:579:HIS:ND1	2.51	0.43
1:16:673:A:H2'	1:16:674:G:C8	2.53	0.42
1:16:1356:G:H2'	1:16:1357:A:C8	2.54	0.42
1:16:1497:G:H1'	1:16:1518:MA6:H2	1.99	0.42
10:SJ:19:ASP:HA	10:SJ:22:THR:HG22	2.01	0.42
23:23:465:G:OP1	53:Lh:12:ARG:NH2	2.51	0.42
23:23:784:G:H5"	26:LB:226:ASN:HD21	1.84	0.42
23:23:2251:OMG:HM23	23:23:2251:OMG:H1'	1.84	0.42
30:LF:35:ARG:HD3	30:LF:71:LEU:HD23	2.01	0.42
31:LI:132:PHE:HB2	31:LI:140:ALA:HB3	2.00	0.42
40:LT:72:ASN:HB3	40:LT:110:VAL:HG11	2.01	0.42
1:16:18:C:H4'	1:16:1078:U:O2	2.19	0.42
1:16:473:U:H2'	1:16:474:G:H8	1.83	0.42
1:16:713:G:H2'	1:16:714:G:C8	2.54	0.42
1:16:1218:C:H2'	1:16:1219:A:C8	2.53	0.42
23:23:993:G:OP2	40:LT:51:ARG:NH2	2.50	0.42
32:LK:14:ALA:HA	32:LK:54:PRO:HA	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
53:Lh:25:LYS:HE3	53:Lh:25:LYS:HB3	1.74	0.42
1:16:1346:A:N1	1:16:1374:A:H5"	2.34	0.42
4:SD:26:ARG:HH21	4:SD:31:LYS:HE2	1.83	0.42
23:23:151:C:H2'	23:23:152:A:H8	1.83	0.42
28:LD:51:GLU:OE2	28:LD:88:ARG:NH2	2.52	0.42
31:LI:80:ILE:HG21	31:LI:94:ILE:HG12	2.01	0.42
59:EF:614:GLU:HA	59:EF:615:PRO:HD3	1.93	0.42
1:16:266:G:H3'	17:SQ:69:LYS:HB2	2.01	0.42
1:16:1241:G:H2'	1:16:1242:G:H8	1.85	0.42
2:SB:130:THR:HG23	2:SB:133:GLU:HB3	2.01	0.42
13:SM:50:GLU:O	13:SM:53:ILE:HB	2.19	0.42
23:23:807:U:O2'	23:23:2060:A:N1	2.48	0.42
23:23:1311:G:H21	23:23:1603:A:H62	1.67	0.42
44:LX:14:LEU:HD11	44:LX:71:ALA:HB2	2.01	0.42
59:EF:90:PRO:HG3	59:EF:98:GLU:HG3	2.01	0.42
1:16:235:C:H2'	1:16:236:A:H8	1.84	0.42
1:16:490:C:H2'	1:16:491:G:H8	1.83	0.42
7:SG:126:ASP:HB2	7:SG:131:LYS:HB2	2.01	0.42
23:23:577:G:O2'	23:23:1254:A:OP1	2.37	0.42
28:LD:7:ASP:OD1	28:LD:7:ASP:N	2.46	0.42
30:LF:42:GLU:HB3	30:LF:55:ARG:HE	1.84	0.42
59:EF:354:LYS:HE3	59:EF:390:ASP:CG	2.44	0.42
9:SI:88:MET:HE3	9:SI:88:MET:HB3	1.75	0.42
23:23:244:A:H5"	35:LO:67:THR:HG21	2.01	0.42
23:23:355:U:H2'	23:23:356:G:H8	1.84	0.42
28:LD:51:GLU:H	28:LD:51:GLU:HG2	1.68	0.42
51:Lf:43:ILE:HG22	51:Lf:49:TYR:HB2	2.01	0.42
1:16:1228:C:H2'	1:16:1229:A:C8	2.54	0.42
1:16:1404:C:H2'	1:16:1405:G:C8	2.54	0.42
18:SR:9:LYS:HD2	18:SR:9:LYS:HA	1.88	0.42
23:23:569:U:O2'	23:23:983:A:N1	2.48	0.42
23:23:2903:U:H2'	23:23:2904:U:H2'	2.00	0.42
25:LA:8:MET:SD	25:LA:8:MET:N	2.93	0.42
25:LA:211:LYS:HB3	25:LA:211:LYS:HE3	1.85	0.42
29:LE:47:LYS:HB2	29:LE:47:LYS:HE3	1.78	0.42
38:LR:31:THR:HG22	38:LR:33:ARG:H	1.85	0.42
45:LY:48:MET:SD	45:LY:51:GLN:NE2	2.93	0.42
59:EF:473:MET:HB3	59:EF:479:VAL:HB	2.02	0.42
1:16:21:G:H2'	1:16:22:G:C8	2.55	0.42
1:16:1530:G:H2'	1:16:1531:A:C8	2.54	0.42
23:23:882:G:H1	23:23:894:U:H3	1.68	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
23:23:1932:A:H2'	23:23:1933:G:O4'	2.20	0.42
23:23:2066:C:O2'	23:23:2067:G:H5'	2.19	0.42
29:LE:105:THR:HA	50:Le:38:SER:HB2	2.01	0.42
35:LO:2:ARG:H	35:LO:5:THR:HB	1.84	0.42
56:Pt:67:C:H2'	56:Pt:68:G:H8	1.84	0.42
59:EF:183:VAL:HA	59:EF:190:ALA:HA	2.00	0.42
59:EF:639:ARG:HH22	59:EF:694:VAL:HG21	1.84	0.42
3:SC:33:LEU:HD23	3:SC:33:LEU:HA	1.88	0.42
9:SI:112:GLU:OE2	9:SI:115:LYS:NZ	2.44	0.42
19:SS:12:ASP:OD1	19:SS:15:LEU:HD13	2.19	0.42
23:23:833:A:H2'	23:23:834:G:C8	2.54	0.42
23:23:2039:U:H2'	23:23:2040:G:C8	2.54	0.42
23:23:2564:A:OP1	23:23:2648:G:O2'	2.29	0.42
25:LA:189:LEU:HD12	25:LA:192:LEU:HD23	2.01	0.42
34:LN:71:ARG:HA	34:LN:71:ARG:HD3	1.81	0.42
45:LY:6:ALA:HB3	45:LY:65:VAL:HG22	2.02	0.42
56:Pt:22:G:H2'	56:Pt:23:A:H8	1.84	0.42
56:Pt:29:U:H2'	56:Pt:30:G:H8	1.84	0.42
1:16:264:C:O2'	17:SQ:66:PRO:O	2.33	0.42
4:SD:116:GLN:HE21	4:SD:154:ARG:HH12	1.67	0.42
28:LD:106:LYS:NZ	28:LD:200:LEU:O	2.52	0.42
59:EF:164:ALA:HB1	59:EF:262:ILE:HG13	2.01	0.42
23:23:207:A:H2'	23:23:208:C:O4'	2.20	0.41
42:LV:59:GLU:HG3	42:LV:66:ILE:HD11	2.02	0.41
45:LY:85:LYS:HE3	45:LY:85:LYS:HB3	1.87	0.41
3:SC:66:VAL:HB	3:SC:101:ILE:HG13	2.03	0.41
23:23:280:U:O4	23:23:361:G:N2	2.53	0.41
23:23:1141:U:H4'	23:23:1142:A:O4'	2.20	0.41
23:23:1231:U:H2'	23:23:1232:G:H8	1.85	0.41
23:23:1796:U:H2'	23:23:1797:G:H8	1.85	0.41
23:23:2674:G:H4'	34:LN:30:ARG:HD2	2.02	0.41
23:23:2680:U:H5'	27:LC:194:PRO:HA	2.02	0.41
31:LI:80:ILE:HB	31:LI:146:VAL:HG12	2.02	0.41
1:16:59:A:H5"	1:16:387:U:H5"	2.02	0.41
1:16:427:U:O2'	1:16:541:G:OP1	2.36	0.41
1:16:1187:G:H5'	9:SI:115:LYS:HE2	2.01	0.41
8:SH:11:LEU:HB3	8:SH:75:ILE:HG12	2.02	0.41
9:SI:67:VAL:HG11	9:SI:79:ILE:HD11	2.02	0.41
17:SQ:31:HIS:HE1	17:SQ:33:ILE:HD12	1.86	0.41
23:23:2819:G:H2'	23:23:2821:A:N7	2.35	0.41
42:LV:22:ASP:OD1	42:LV:22:ASP:N	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:SG:29:ILE:HD13	7:SG:101:MET:HB3	2.03	0.41
14:SN:50:THR:HG21	19:SS:13:LEU:HD22	2.03	0.41
23:23:851:C:H2'	23:23:852:U:H6	1.86	0.41
23:23:935:C:H2'	23:23:936:A:H8	1.85	0.41
23:23:1056:G:H4'	23:23:1086:A:H8	1.84	0.41
23:23:1429:G:H2'	23:23:1430:G:H8	1.86	0.41
23:23:1800:C:OP1	26:LB:258:ARG:NH2	2.53	0.41
3:SC:33:LEU:HD21	14:SN:93:ILE:HG22	2.02	0.41
21:SU:40:LYS:HG2	21:SU:41:PRO:HD2	2.02	0.41
23:23:629:G:H1'	23:23:639:U:H1'	2.03	0.41
23:23:2116:G:O6	23:23:2165:C:N4	2.54	0.41
43:LW:30:ILE:HD13	43:LW:93:LEU:HD23	2.02	0.41
61:16:2003:SPD:H91	11:SK:128:ARG:HD3	2.03	0.41
9:SI:116:VAL:HG11	10:SJ:62:ARG:HG3	2.03	0.41
14:SN:23:LYS:HA	14:SN:27:LEU:HD23	2.02	0.41
23:23:567:U:OP2	35:LO:29:LYS:NZ	2.43	0.41
23:23:740:C:H5'	23:23:1784:A:H3'	2.03	0.41
23:23:1028:A:H2'	23:23:1029:A:C8	2.56	0.41
23:23:1799:G:OP1	26:LB:258:ARG:NE	2.48	0.41
24:5:30:C:H2'	24:5:31:C:H5'	2.02	0.41
59:EF:103:MET:HE2	59:EF:106:LEU:HD12	2.02	0.41
7:SG:36:LYS:HB3	9:SI:41:ARG:HH12	1.85	0.41
23:23:807:U:OP2	35:LO:41:ARG:NH2	2.53	0.41
23:23:1038:G:H2'	23:23:1039:A:C8	2.55	0.41
23:23:1329:U:H5"	23:23:1330:C:H5	1.85	0.41
23:23:1572:A:H2'	23:23:1573:G:H8	1.86	0.41
23:23:1939:5MU:O2	23:23:1967:C:H4'	2.20	0.41
29:LE:101:GLU:HG3	50:Le:24:ILE:HD11	2.03	0.41
1:16:335:C:H2'	1:16:336:A:C8	2.55	0.41
1:16:750:C:O2'	15:SO:21:ASP:OD1	2.38	0.41
3:SC:142:MET:HE2	3:SC:170:GLU:HG2	2.01	0.41
17:SQ:31:HIS:HA	17:SQ:32:PRO:HD3	1.96	0.41
19:SS:3:ARG:HH11	19:SS:10:PHE:HB2	1.86	0.41
23:23:1716:U:H2'	23:23:1717:A:H8	1.85	0.41
23:23:2146:C:H1'	23:23:2147:A:C2	2.56	0.41
23:23:2660:A:H5'	59:EF:675:LYS:HG2	2.03	0.41
59:EF:1:SER:O	59:EF:378:ARG:NH2	2.47	0.41
59:EF:13:ILE:HA	59:EF:108:GLY:O	2.20	0.41
1:16:150:U:H2'	1:16:151:A:H8	1.86	0.41
1:16:252:U:H2'	1:16:253:A:H8	1.86	0.41
1:16:745:G:H2'	1:16:746:A:C8	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:16:958:A:N6	19:SS:77:THR:O	2.54	0.41
4:SD:148:LYS:HA	4:SD:148:LYS:HD3	1.94	0.41
7:SG:15:ASP:HB2	7:SG:24:ALA:HB2	2.02	0.41
7:SG:113:ASP:HB2	7:SG:119:ARG:HG3	2.03	0.41
10:SJ:6:ILE:HG22	10:SJ:76:ILE:HB	2.02	0.41
19:SS:58:VAL:HA	19:SS:59:PRO:HD3	1.90	0.41
23:23:831:G:H5"	35:LO:37:GLY:HA2	2.02	0.41
25:LA:46:VAL:HG22	25:LA:212:VAL:HG13	2.03	0.41
26:LB:243:HIS:HA	26:LB:244:PRO:HD3	1.93	0.41
36:LP:66:ARG:HE	36:LP:66:ARG:HB3	1.84	0.41
59:EF:68:THR:HG1	59:EF:367:HIS:HD1	1.65	0.41
1:16:948:C:H2'	1:16:949:A:H8	1.86	0.41
14:SN:28:LYS:HZ3	14:SN:48:LEU:HD23	1.86	0.41
23:23:931:U:O2	23:23:1167:C:O2'	2.35	0.41
23:23:2636:C:H5'	27:LC:81:GLU:HB2	2.03	0.41
23:23:2898:U:H2'	23:23:2899:A:C8	2.56	0.41
25:LA:53:ARG:HH21	58:Dt:61:C:H4'	1.86	0.41
40:LT:15:LYS:HB3	40:LT:15:LYS:HE2	1.89	0.41
59:EF:98:GLU:H	59:EF:98:GLU:HG2	1.67	0.41
1:16:1342:C:H2'	1:16:1343:G:C8	2.56	0.40
11:SK:84:VAL:HG21	11:SK:97:ILE:HG23	2.04	0.40
19:SS:63:THR:HG23	19:SS:66:MET:HE3	2.03	0.40
23:23:184:C:H2'	23:23:185:G:H8	1.85	0.40
23:23:589:U:H2'	23:23:590:A:C8	2.57	0.40
23:23:639:U:H2'	23:23:640:C:C6	2.55	0.40
35:LO:81:ASP:HB3	35:LO:100:ILE:HG12	2.03	0.40
55:Lj:1:MET:HE2	55:Lj:34:LYS:HD2	2.02	0.40
59:EF:139:ALA:HB3	59:EF:264:VAL:HA	2.02	0.40
1:16:795:C:O2'	11:SK:128:ARG:O	2.33	0.40
6:SF:10:VAL:HA	6:SF:84:VAL:HA	2.03	0.40
6:SF:93:LYS:H	6:SF:93:LYS:HG2	1.60	0.40
23:23:429:A:H2'	23:23:430:A:C8	2.57	0.40
23:23:580:U:H2'	23:23:581:C:C6	2.57	0.40
32:LK:87:LYS:HA	32:LK:87:LYS:HD3	1.87	0.40
39:LS:22:PRO:HD3	39:LS:50:ILE:HD12	2.02	0.40
1:16:402:G:OP1	4:SD:71:GLN:NE2	2.50	0.40
1:16:714:G:H2'	1:16:715:A:C8	2.56	0.40
19:SS:37:ARG:H	19:SS:37:ARG:HG3	1.65	0.40
23:23:546:U:H6	23:23:546:U:H2'	1.72	0.40
31:LI:94:ILE:HB	31:LI:122:LEU:HD23	2.04	0.40
1:16:806:C:H2'	1:16:807:A:H8	1.87	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:SM:90:ARG:HB2	13:SM:97:VAL:HG12	2.03	0.40
23:23:598:U:H2'	23:23:599:A:H8	1.86	0.40
23:23:2636:C:H2'	23:23:2637:U:H6	1.86	0.40
25:LA:215:SER:HB2	25:LA:221:GLY:HA2	2.03	0.40
29:LE:42:GLU:H	29:LE:42:GLU:HG3	1.61	0.40
32:LK:90:SER:HA	32:LK:98:VAL:HG11	2.03	0.40
1:16:41:G:H2'	1:16:42:G:H8	1.87	0.40
1:16:1015:G:N2	1:16:1218:C:O2	2.54	0.40
1:16:1255:G:O2'	1:16:1258:G:N3	2.49	0.40
13:SM:25:VAL:HG12	13:SM:29:ARG:HH11	1.86	0.40
23:23:1796:U:H2'	23:23:1797:G:C8	2.57	0.40
23:23:2151:U:OP1	25:LA:3:LYS:NZ	2.44	0.40
50:Le:5:ILE:HD12	50:Le:5:ILE:HA	1.93	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	SB	225/241 (93%)	216 (96%)	9 (4%)	0	100	100
3	SC	209/233 (90%)	200 (96%)	9 (4%)	0	100	100
4	SD	203/206 (98%)	203 (100%)	0	0	100	100
5	SE	153/167 (92%)	149 (97%)	4 (3%)	0	100	100
6	SF	104/135 (77%)	100 (96%)	4 (4%)	0	100	100
7	SG	151/179 (84%)	141 (93%)	10 (7%)	0	100	100
8	SH	127/130 (98%)	124 (98%)	3 (2%)	0	100	100
9	SI	125/130 (96%)	121 (97%)	4 (3%)	0	100	100
10	SJ	97/103 (94%)	90 (93%)	7 (7%)	0	100	100
11	SK	117/129 (91%)	109 (93%)	8 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
12	SL	120/124 (97%)	115 (96%)	5 (4%)	0	100	100
13	SM	112/118 (95%)	108 (96%)	4 (4%)	0	100	100
14	SN	98/101 (97%)	96 (98%)	2 (2%)	0	100	100
15	SO	86/89 (97%)	84 (98%)	2 (2%)	0	100	100
16	SP	80/82 (98%)	75 (94%)	5 (6%)	0	100	100
17	SQ	78/84 (93%)	75 (96%)	3 (4%)	0	100	100
18	SR	65/75 (87%)	65 (100%)	0	0	100	100
19	SS	82/92 (89%)	79 (96%)	1 (1%)	2 (2%)	4	11
20	ST	83/87 (95%)	82 (99%)	1 (1%)	0	100	100
21	SU	68/71 (96%)	68 (100%)	0	0	100	100
25	LA	130/234 (56%)	126 (97%)	4 (3%)	0	100	100
26	LB	269/273 (98%)	263 (98%)	6 (2%)	0	100	100
27	LC	207/209 (99%)	198 (96%)	9 (4%)	0	100	100
28	LD	199/201 (99%)	193 (97%)	6 (3%)	0	100	100
29	LE	175/179 (98%)	168 (96%)	7 (4%)	0	100	100
30	LF	174/177 (98%)	161 (92%)	13 (8%)	0	100	100
31	LI	146/149 (98%)	140 (96%)	6 (4%)	0	100	100
32	LK	132/142 (93%)	125 (95%)	7 (5%)	0	100	100
33	LM	140/142 (99%)	137 (98%)	3 (2%)	0	100	100
34	LN	121/123 (98%)	121 (100%)	0	0	100	100
35	LO	142/144 (99%)	140 (99%)	2 (1%)	0	100	100
36	LP	133/136 (98%)	133 (100%)	0	0	100	100
37	LQ	118/127 (93%)	116 (98%)	2 (2%)	0	100	100
38	LR	114/117 (97%)	111 (97%)	3 (3%)	0	100	100
39	LS	112/115 (97%)	108 (96%)	4 (4%)	0	100	100
40	LT	115/118 (98%)	115 (100%)	0	0	100	100
41	LU	100/103 (97%)	95 (95%)	5 (5%)	0	100	100
42	LV	108/110 (98%)	106 (98%)	2 (2%)	0	100	100
43	LW	91/100 (91%)	89 (98%)	2 (2%)	0	100	100
44	LX	100/104 (96%)	95 (95%)	5 (5%)	0	100	100
45	LY	92/94 (98%)	92 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
46	La	74/85 (87%)	72 (97%)	2 (3%)	0	100	100
47	Lb	75/78 (96%)	75 (100%)	0	0	100	100
48	Lc	59/63 (94%)	59 (100%)	0	0	100	100
49	Ld	55/59 (93%)	54 (98%)	1 (2%)	0	100	100
50	Le	66/70 (94%)	61 (92%)	5 (8%)	0	100	100
51	Lf	54/57 (95%)	52 (96%)	2 (4%)	0	100	100
52	Lg	50/55 (91%)	49 (98%)	1 (2%)	0	100	100
53	Lh	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
54	Li	62/65 (95%)	59 (95%)	3 (5%)	0	100	100
55	Lj	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
57	Pp	1/3 (33%)	1 (100%)	0	0	100	100
59	EF	702/704 (100%)	676 (96%)	25 (4%)	1 (0%)	48	72
All	All	6579/6996 (94%)	6368 (97%)	208 (3%)	3 (0%)	100	100

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
19	SS	9	PRO
19	SS	13	LEU
59	EF	569	TYR

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	SB	189/199 (95%)	183 (97%)	6 (3%)	34	62
3	SC	172/190 (90%)	166 (96%)	6 (4%)	32	59
4	SD	172/173 (99%)	164 (95%)	8 (5%)	23	49
5	SE	118/126 (94%)	114 (97%)	4 (3%)	32	60
6	SF	92/116 (79%)	88 (96%)	4 (4%)	26	52

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
7	SG	126/147 (86%)	117 (93%)	9 (7%)	13 32
8	SH	104/105 (99%)	100 (96%)	4 (4%)	29 56
9	SI	105/107 (98%)	91 (87%)	14 (13%)	4 9
10	SJ	87/90 (97%)	79 (91%)	8 (9%)	8 20
11	SK	92/99 (93%)	86 (94%)	6 (6%)	15 35
12	SL	102/103 (99%)	99 (97%)	3 (3%)	37 65
13	SM	92/96 (96%)	85 (92%)	7 (8%)	12 29
14	SN	83/84 (99%)	79 (95%)	4 (5%)	23 48
15	SO	76/77 (99%)	75 (99%)	1 (1%)	61 81
16	SP	65/65 (100%)	62 (95%)	3 (5%)	24 50
17	SQ	74/78 (95%)	72 (97%)	2 (3%)	39 68
18	SR	58/65 (89%)	57 (98%)	1 (2%)	53 77
19	SS	72/79 (91%)	66 (92%)	6 (8%)	10 25
20	ST	65/66 (98%)	64 (98%)	1 (2%)	57 79
21	SU	60/61 (98%)	57 (95%)	3 (5%)	22 46
25	LA	110/181 (61%)	105 (96%)	5 (4%)	24 50
26	LB	216/218 (99%)	208 (96%)	8 (4%)	30 57
27	LC	164/164 (100%)	162 (99%)	2 (1%)	63 82
28	LD	165/165 (100%)	159 (96%)	6 (4%)	31 58
29	LE	148/150 (99%)	141 (95%)	7 (5%)	23 49
30	LF	137/138 (99%)	128 (93%)	9 (7%)	15 35
31	LI	113/114 (99%)	107 (95%)	6 (5%)	20 44
32	LK	104/110 (94%)	99 (95%)	5 (5%)	23 48
33	LM	116/116 (100%)	113 (97%)	3 (3%)	40 69
34	LN	104/104 (100%)	102 (98%)	2 (2%)	50 75
35	LO	103/103 (100%)	100 (97%)	3 (3%)	37 65
36	LP	108/108 (100%)	105 (97%)	3 (3%)	38 67
37	LQ	100/103 (97%)	97 (97%)	3 (3%)	36 64
38	LR	86/87 (99%)	85 (99%)	1 (1%)	63 82
39	LS	99/100 (99%)	98 (99%)	1 (1%)	68 85
40	LT	89/90 (99%)	86 (97%)	3 (3%)	32 60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
41	LU	84/84 (100%)	82 (98%)	2 (2%)	43 70
42	LV	93/93 (100%)	90 (97%)	3 (3%)	34 62
43	LW	80/84 (95%)	76 (95%)	4 (5%)	22 46
44	LX	83/85 (98%)	79 (95%)	4 (5%)	23 48
45	LY	78/78 (100%)	77 (99%)	1 (1%)	61 81
46	La	58/63 (92%)	57 (98%)	1 (2%)	53 77
47	Lb	67/68 (98%)	63 (94%)	4 (6%)	17 39
48	Lc	54/55 (98%)	53 (98%)	1 (2%)	50 75
49	Ld	47/49 (96%)	45 (96%)	2 (4%)	26 52
50	Le	60/62 (97%)	56 (93%)	4 (7%)	15 34
51	Lf	47/48 (98%)	46 (98%)	1 (2%)	47 73
52	Lg	47/49 (96%)	46 (98%)	1 (2%)	47 73
53	Lh	38/38 (100%)	37 (97%)	1 (3%)	40 69
54	Li	51/52 (98%)	50 (98%)	1 (2%)	48 74
55	Lj	34/34 (100%)	32 (94%)	2 (6%)	18 40
57	Pp	2/2 (100%)	2 (100%)	0	100 100
59	EF	576/578 (100%)	532 (92%)	44 (8%)	12 29
All	All	5465/5699 (96%)	5222 (96%)	243 (4%)	27 51

All (243) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	SB	5	SER
2	SB	114	LEU
2	SB	130	THR
2	SB	143	LYS
2	SB	161	LEU
2	SB	210	VAL
3	SC	5	VAL
3	SC	52	VAL
3	SC	102	ASN
3	SC	157	LEU
3	SC	192	THR
3	SC	195	VAL
4	SD	21	LEU
4	SD	31	LYS

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Mol	Chain	Res	Type
4	SD	101	VAL
4	SD	116	GLN
4	SD	129	VAL
4	SD	148	LYS
4	SD	185	LYS
4	SD	196	ASN
5	SE	70	ASN
5	SE	112	ARG
5	SE	117	VAL
5	SE	148	ASN
6	SF	18	VAL
6	SF	30	THR
6	SF	93	LYS
6	SF	96	VAL
7	SG	59	LEU
7	SG	69	VAL
7	SG	75	VAL
7	SG	84	THR
7	SG	91	VAL
7	SG	92	ARG
7	SG	101	MET
7	SG	111	ARG
7	SG	137	LYS
8	SH	31	LYS
8	SH	69	LYS
8	SH	79	SER
8	SH	89	LYS
9	SI	11	ARG
9	SI	19	VAL
9	SI	21	ILE
9	SI	22	LYS
9	SI	28	ILE
9	SI	46	MET
9	SI	47	VAL
9	SI	65	ILE
9	SI	66	THR
9	SI	104	VAL
9	SI	105	THR
9	SI	106	ARG
9	SI	119	ARG
9	SI	124	ARG
10	SJ	6	ILE

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Mol	Chain	Res	Type
10	SJ	25	ILE
10	SJ	48	ARG
10	SJ	53	ILE
10	SJ	57	VAL
10	SJ	60	ASP
10	SJ	71	LEU
10	SJ	90	LEU
11	SK	58	SER
11	SK	64	GLN
11	SK	80	LYS
11	SK	81	ASN
11	SK	82	LEU
11	SK	86	VAL
12	SL	54	ARG
12	SL	74	LEU
12	SL	79	VAL
13	SM	12	HIS
13	SM	42	ASP
13	SM	47	GLU
13	SM	48	LEU
13	SM	65	VAL
13	SM	79	ARG
13	SM	104	THR
14	SN	12	LYS
14	SN	47	LYS
14	SN	63	ARG
14	SN	100	SER
15	SO	80	GLN
16	SP	31	ARG
16	SP	61	VAL
16	SP	74	LEU
17	SQ	13	VAL
17	SQ	42	THR
18	SR	71	THR
19	SS	11	ILE
19	SS	13	LEU
19	SS	18	LYS
19	SS	37	ARG
19	SS	40	ILE
19	SS	77	THR
20	ST	48	GLN
21	SU	24	GLU

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Mol	Chain	Res	Type
21	SU	28	VAL
21	SU	47	ARG
25	LA	4	LEU
25	LA	6	LYS
25	LA	44	VAL
25	LA	192	LEU
25	LA	224	VAL
26	LB	4	VAL
26	LB	20	VAL
26	LB	77	VAL
26	LB	141	VAL
26	LB	181	MET
26	LB	205	LEU
26	LB	252	THR
26	LB	268	VAL
27	LC	197	THR
27	LC	199	SER
28	LD	51	GLU
28	LD	119	ILE
28	LD	156	ASN
28	LD	167	VAL
28	LD	171	ASP
28	LD	198	GLU
29	LE	6	ASP
29	LE	42	GLU
29	LE	71	ARG
29	LE	85	ILE
29	LE	88	LYS
29	LE	100	PHE
29	LE	132	VAL
30	LF	10	VAL
30	LF	25	THR
30	LF	30	ASN
30	LF	60	ASP
30	LF	99	LYS
30	LF	127	THR
30	LF	168	VAL
30	LF	171	THR
30	LF	177	LYS
31	LI	37	VAL
31	LI	45	GLU
31	LI	54	LEU

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Mol	Chain	Res	Type
31	LI	58	LEU
31	LI	121	VAL
31	LI	146	VAL
32	LK	12	GLN
32	LK	17	MET
32	LK	24	VAL
32	LK	28	LEU
32	LK	125	MET
33	LM	43	GLU
33	LM	50	THR
33	LM	64	VAL
34	LN	75	SER
34	LN	113	MET
35	LO	14	LYS
35	LO	103	ILE
35	LO	121	THR
36	LP	7	THR
36	LP	78	LEU
36	LP	135	VAL
37	LQ	14	SER
37	LQ	33	ILE
37	LQ	89	SER
38	LR	95	SER
39	LS	93	ARG
40	LT	31	VAL
40	LT	93	LYS
40	LT	104	VAL
41	LU	1	MET
41	LU	85	LYS
42	LV	59	GLU
42	LV	70	LYS
42	LV	109	ASP
43	LW	1	MET
43	LW	18	GLU
43	LW	24	MET
43	LW	63	VAL
44	LX	15	THR
44	LX	28	VAL
44	LX	49	VAL
44	LX	62	GLU
45	LY	61	LEU
46	La	78	LYS

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Mol	Chain	Res	Type
47	Lb	7	VAL
47	Lb	33	LEU
47	Lb	65	ASP
47	Lb	76	GLU
48	Lc	17	GLU
49	Ld	19	LYS
49	Ld	25	LEU
50	Le	1	MET
50	Le	8	LYS
50	Le	28	VAL
50	Le	32	LEU
51	Lf	25	VAL
52	Lg	29	THR
53	Lh	39	ARG
54	Li	35	LYS
55	Lj	8	LYS
55	Lj	12	ARG
59	EF	5	THR
59	EF	16	SER
59	EF	19	ILE
59	EF	20	ASP
59	EF	65	SER
59	EF	75	MET
59	EF	89	THR
59	EF	98	GLU
59	EF	100	GLU
59	EF	107	ASP
59	EF	144	MET
59	EF	169	LEU
59	EF	195	ASP
59	EF	200	VAL
59	EF	243	LEU
59	EF	252	LEU
59	EF	264	VAL
59	EF	282	VAL
59	EF	285	TYR
59	EF	299	LEU
59	EF	303	LYS
59	EF	310	HIS
59	EF	337	ARG
59	EF	338	VAL
59	EF	352	SER

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Mol	Chain	Res	Type
59	EF	397	LEU
59	EF	409	MET
59	EF	427	ASP
59	EF	431	MET
59	EF	450	ASP
59	EF	466	LEU
59	EF	492	GLU
59	EF	494	ILE
59	EF	501	VAL
59	EF	512	ARG
59	EF	522	MET
59	EF	558	GLN
59	EF	566	LEU
59	EF	616	ILE
59	EF	619	VAL
59	EF	625	GLU
59	EF	628	THR
59	EF	642	LEU
59	EF	704	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (110) such sidechains are listed below:

Mol	Chain	Res	Type
2	SB	42	ASN
2	SB	122	GLN
2	SB	168	HIS
3	SC	3	GLN
3	SC	8	ASN
3	SC	19	ASN
3	SC	100	GLN
4	SD	36	GLN
4	SD	59	GLN
4	SD	116	GLN
4	SD	126	ASN
4	SD	140	ASN
5	SE	12	GLN
5	SE	19	ASN
5	SE	78	ASN
5	SE	97	GLN
6	SF	14	GLN
6	SF	37	HIS
6	SF	52	ASN

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Mol	Chain	Res	Type
7	SG	122	ASN
7	SG	148	ASN
8	SH	4	GLN
8	SH	18	GLN
9	SI	50	GLN
10	SJ	15	HIS
10	SJ	64	GLN
11	SK	15	GLN
11	SK	28	ASN
11	SK	64	GLN
12	SL	77	HIS
13	SM	105	ASN
14	SN	4	GLN
15	SO	28	GLN
15	SO	37	ASN
15	SO	62	GLN
16	SP	40	ASN
16	SP	79	ASN
17	SQ	9	GLN
17	SQ	47	HIS
17	SQ	50	ASN
18	SR	74	HIS
20	ST	13	GLN
20	ST	52	ASN
20	ST	61	GLN
20	ST	78	ASN
21	SU	56	HIS
25	LA	20	GLN
25	LA	47	ASN
26	LB	60	GLN
26	LB	90	ASN
26	LB	197	ASN
26	LB	226	ASN
27	LC	42	ASN
27	LC	58	ASN
27	LC	126	ASN
27	LC	136	ASN
28	LD	9	GLN
29	LE	127	ASN
30	LF	30	ASN
30	LF	45	HIS
30	LF	88	GLN

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Mol	Chain	Res	Type
30	LF	101	ASN
30	LF	104	ASN
30	LF	116	GLN
31	LI	18	GLN
31	LI	43	ASN
31	LI	66	ASN
32	LK	43	ASN
34	LN	3	GLN
34	LN	88	ASN
35	LO	93	ASN
36	LP	13	HIS
36	LP	88	ASN
36	LP	97	GLN
37	LQ	18	GLN
37	LQ	23	ASN
37	LQ	107	ASN
39	LS	3	ASN
40	LT	59	GLN
40	LT	72	ASN
41	LU	12	HIS
41	LU	43	ASN
42	LV	15	GLN
42	LV	57	ASN
43	LW	28	ASN
43	LW	48	GLN
43	LW	72	GLN
44	LX	54	GLN
44	LX	99	ASN
45	LY	75	GLN
46	La	76	ASN
47	Lb	23	ASN
47	Lb	36	HIS
48	Lc	20	ASN
48	Lc	25	GLN
48	Lc	36	GLN
50	Le	41	HIS
50	Le	65	ASN
59	EF	12	ASN
59	EF	18	HIS
59	EF	156	ASN
59	EF	170	GLN
59	EF	216	ASN

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Mol	Chain	Res	Type
59	EF	220	GLN
59	EF	351	ASN
59	EF	482	ASN
59	EF	508	GLN
59	EF	530	ASN
59	EF	669	GLN
59	EF	696	GLN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	16	1532/1542 (99%)	245 (15%)	4 (0%)
22	mR	12/60 (20%)	6 (50%)	0
23	23	2903/2904 (99%)	465 (16%)	6 (0%)
24	5	119/120 (99%)	13 (10%)	0
56	Pt	75/76 (98%)	17 (22%)	0
58	Dt	75/76 (98%)	15 (20%)	0
All	All	4716/4778 (98%)	761 (16%)	10 (0%)

All (761) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	16	4	U
1	16	5	U
1	16	7	A
1	16	9	G
1	16	22	G
1	16	32	A
1	16	39	G
1	16	47	C
1	16	48	C
1	16	50	A
1	16	51	A
1	16	52	C
1	16	61	G
1	16	84	U
1	16	85	U
1	16	86	G
1	16	95	C
1	16	98	A
1	16	120	A

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Mol	Chain	Res	Type
1	16	122	G
1	16	130	A
1	16	131	A
1	16	138	G
1	16	144	G
1	16	149	A
1	16	163	C
1	16	164	G
1	16	174	A
1	16	177	G
1	16	189	A
1	16	191	G
1	16	195	A
1	16	210	C
1	16	212	G
1	16	226	G
1	16	245	U
1	16	247	G
1	16	251	G
1	16	252	U
1	16	266	G
1	16	267	C
1	16	280	C
1	16	289	G
1	16	293	G
1	16	301	G
1	16	306	A
1	16	321	A
1	16	328	C
1	16	329	A
1	16	332	G
1	16	347	G
1	16	351	G
1	16	352	C
1	16	354	G
1	16	367	U
1	16	372	C
1	16	373	A
1	16	384	G
1	16	388	G
1	16	397	A
1	16	398	U

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Mol	Chain	Res	Type
1	16	406	G
1	16	413	G
1	16	421	U
1	16	422	C
1	16	423	G
1	16	424	G
1	16	429	U
1	16	430	A
1	16	439	U
1	16	448	A
1	16	453	G
1	16	467	U
1	16	468	A
1	16	481	G
1	16	482	A
1	16	484	G
1	16	486	U
1	16	495	A
1	16	496	A
1	16	497	G
1	16	509	A
1	16	510	A
1	16	511	C
1	16	512	U
1	16	518	C
1	16	521	G
1	16	527	G7M
1	16	530	G
1	16	531	U
1	16	532	A
1	16	533	A
1	16	536	C
1	16	547	A
1	16	550	G
1	16	559	A
1	16	562	U
1	16	564	C
1	16	572	A
1	16	573	A
1	16	576	C
1	16	577	G
1	16	596	A

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Mol	Chain	Res	Type
1	16	618	C
1	16	632	U
1	16	633	G
1	16	639	G
1	16	653	U
1	16	665	A
1	16	666	G
1	16	688	G
1	16	702	A
1	16	717	U
1	16	721	G
1	16	723	U
1	16	724	G
1	16	731	G
1	16	734	G
1	16	754	C
1	16	755	G
1	16	777	A
1	16	793	U
1	16	794	A
1	16	799	G
1	16	812	G
1	16	815	A
1	16	816	A
1	16	817	C
1	16	821	G
1	16	828	U
1	16	832	G
1	16	839	C
1	16	843	U
1	16	844	G
1	16	845	A
1	16	846	G
1	16	849	G
1	16	867	G
1	16	890	G
1	16	907	A
1	16	922	G
1	16	926	G
1	16	927	G
1	16	934	C
1	16	958	A

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Mol	Chain	Res	Type
1	16	960	U
1	16	969	A
1	16	971	G
1	16	975	A
1	16	976	G
1	16	977	A
1	16	993	G
1	16	994	A
1	16	996	A
1	16	1004	A
1	16	1030	U
1	16	1031	C
1	16	1032	G
1	16	1043	G
1	16	1044	A
1	16	1045	C
1	16	1053	G
1	16	1056	U
1	16	1065	U
1	16	1070	U
1	16	1085	U
1	16	1094	G
1	16	1095	U
1	16	1101	A
1	16	1125	U
1	16	1136	C
1	16	1137	C
1	16	1139	G
1	16	1140	C
1	16	1143	G
1	16	1144	G
1	16	1152	A
1	16	1154	G
1	16	1157	A
1	16	1159	U
1	16	1167	A
1	16	1168	U
1	16	1169	A
1	16	1184	G
1	16	1190	G
1	16	1193	G
1	16	1196	A

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Mol	Chain	Res	Type
1	16	1197	A
1	16	1212	U
1	16	1213	A
1	16	1214	C
1	16	1225	A
1	16	1226	C
1	16	1227	A
1	16	1228	C
1	16	1238	A
1	16	1240	U
1	16	1256	A
1	16	1257	A
1	16	1258	G
1	16	1260	G
1	16	1274	A
1	16	1280	A
1	16	1285	A
1	16	1286	U
1	16	1287	A
1	16	1298	U
1	16	1299	A
1	16	1302	C
1	16	1312	G
1	16	1317	C
1	16	1318	A
1	16	1320	C
1	16	1322	C
1	16	1323	G
1	16	1331	G
1	16	1335	U
1	16	1340	A
1	16	1346	A
1	16	1348	U
1	16	1353	G
1	16	1363	A
1	16	1364	U
1	16	1368	A
1	16	1370	G
1	16	1379	G
1	16	1383	C
1	16	1398	A
1	16	1422	G

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Mol	Chain	Res	Type
1	16	1441	A
1	16	1446	A
1	16	1454	G
1	16	1475	G
1	16	1492	A
1	16	1493	A
1	16	1494	G
1	16	1497	G
1	16	1499	A
1	16	1503	A
1	16	1506	U
1	16	1517	G
1	16	1519	MA6
1	16	1520	C
1	16	1529	G
1	16	1530	G
22	mR	39	G
22	mR	40	U
22	mR	43	A
22	mR	46	G
22	mR	48	C
22	mR	49	U
23	23	10	A
23	23	14	A
23	23	15	G
23	23	45	G
23	23	46	G
23	23	51	G
23	23	58	G
23	23	63	A
23	23	71	A
23	23	74	A
23	23	75	G
23	23	84	A
23	23	88	G
23	23	96	C
23	23	101	A
23	23	102	U
23	23	103	A
23	23	118	A
23	23	119	A
23	23	120	U

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Mol	Chain	Res	Type
23	23	125	A
23	23	138	U
23	23	139	U
23	23	140	C
23	23	142	A
23	23	163	C
23	23	181	A
23	23	196	A
23	23	199	A
23	23	215	G
23	23	216	A
23	23	221	A
23	23	222	A
23	23	226	A
23	23	239	C
23	23	245	G
23	23	248	G
23	23	252	G
23	23	255	A
23	23	266	G
23	23	267	C
23	23	271	G
23	23	278	A
23	23	283	G
23	23	291	G
23	23	295	G
23	23	311	A
23	23	330	A
23	23	338	G
23	23	353	C
23	23	361	G
23	23	370	G
23	23	371	A
23	23	372	G
23	23	386	G
23	23	396	G
23	23	399	U
23	23	401	A
23	23	403	U
23	23	406	G
23	23	411	G
23	23	455	C

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Mol	Chain	Res	Type
23	23	456	C
23	23	467	G
23	23	470	A
23	23	473	G
23	23	475	C
23	23	481	G
23	23	489	G
23	23	491	G
23	23	496	G
23	23	504	A
23	23	505	A
23	23	506	G
23	23	508	A
23	23	509	C
23	23	513	A
23	23	529	A
23	23	530	G
23	23	531	C
23	23	532	A
23	23	547	A
23	23	549	G
23	23	555	G
23	23	563	A
23	23	573	U
23	23	575	A
23	23	603	A
23	23	614	A
23	23	615	U
23	23	622	G
23	23	637	A
23	23	645	C
23	23	647	G
23	23	654	A
23	23	655	A
23	23	659	G
23	23	668	A
23	23	670	A
23	23	675	A
23	23	684	G
23	23	685	A
23	23	686	U
23	23	718	A

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Mol	Chain	Res	Type
23	23	726	G
23	23	730	A
23	23	740	C
23	23	747	5MU
23	23	757	G
23	23	764	A
23	23	765	C
23	23	775	G
23	23	776	G
23	23	782	A
23	23	784	G
23	23	785	G
23	23	789	A
23	23	792	A
23	23	805	G
23	23	811	U
23	23	812	C
23	23	827	U
23	23	828	U
23	23	846	U
23	23	859	G
23	23	869	G
23	23	877	A
23	23	878	A
23	23	880	G
23	23	881	G
23	23	887	U
23	23	888	C
23	23	889	C
23	23	890	C
23	23	893	C
23	23	900	A
23	23	901	C
23	23	907	G
23	23	910	A
23	23	912	C
23	23	917	A
23	23	919	U
23	23	931	U
23	23	932	U
23	23	934	U
23	23	941	A

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Mol	Chain	Res	Type
23	23	946	C
23	23	961	C
23	23	962	G
23	23	974	G
23	23	983	A
23	23	984	A
23	23	985	C
23	23	989	G
23	23	996	A
23	23	1012	U
23	23	1013	C
23	23	1022	G
23	23	1026	G
23	23	1033	U
23	23	1060	U
23	23	1061	U
23	23	1062	G
23	23	1069	A
23	23	1070	A
23	23	1073	A
23	23	1074	G
23	23	1084	A
23	23	1087	G
23	23	1088	A
23	23	1089	A
23	23	1090	A
23	23	1091	G
23	23	1097	U
23	23	1101	U
23	23	1102	C
23	23	1112	G
23	23	1122	G
23	23	1130	U
23	23	1132	U
23	23	1133	A
23	23	1134	A
23	23	1135	C
23	23	1136	G
23	23	1139	G
23	23	1141	U
23	23	1142	A
23	23	1156	A

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Mol	Chain	Res	Type
23	23	1157	G
23	23	1172	C
23	23	1177	G
23	23	1178	C
23	23	1206	G
23	23	1212	G
23	23	1236	G
23	23	1238	G
23	23	1244	A
23	23	1247	A
23	23	1249	U
23	23	1250	G
23	23	1252	G
23	23	1253	A
23	23	1256	G
23	23	1262	A
23	23	1271	G
23	23	1272	A
23	23	1300	G
23	23	1301	A
23	23	1306	C
23	23	1314	C
23	23	1321	A
23	23	1329	U
23	23	1352	U
23	23	1360	G
23	23	1365	A
23	23	1368	G
23	23	1374	G
23	23	1378	A
23	23	1379	U
23	23	1383	A
23	23	1386	C
23	23	1396	U
23	23	1403	A
23	23	1416	G
23	23	1417	C
23	23	1419	A
23	23	1420	A
23	23	1421	G
23	23	1428	C
23	23	1434	A

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Mol	Chain	Res	Type
23	23	1453	A
23	23	1460	U
23	23	1475	G
23	23	1482	G
23	23	1493	C
23	23	1497	U
23	23	1509	A
23	23	1515	A
23	23	1523	U
23	23	1524	G
23	23	1529	G
23	23	1538	G
23	23	1547	C
23	23	1558	C
23	23	1566	A
23	23	1569	A
23	23	1578	U
23	23	1583	A
23	23	1584	U
23	23	1610	A
23	23	1613	G
23	23	1639	C
23	23	1647	U
23	23	1648	U
23	23	1649	G
23	23	1664	A
23	23	1674	G
23	23	1675	C
23	23	1694	C
23	23	1729	U
23	23	1730	C
23	23	1732	C
23	23	1744	A
23	23	1756	G
23	23	1757	A
23	23	1764	C
23	23	1773	A
23	23	1776	G
23	23	1782	U
23	23	1784	A
23	23	1786	A
23	23	1800	C

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Mol	Chain	Res	Type
23	23	1801	A
23	23	1808	A
23	23	1811	G
23	23	1816	C
23	23	1829	A
23	23	1845	G
23	23	1866	A
23	23	1873	G
23	23	1903	G
23	23	1913	A
23	23	1914	C
23	23	1925	C
23	23	1927	A
23	23	1930	G
23	23	1937	A
23	23	1938	A
23	23	1955	U
23	23	1960	A
23	23	1964	G
23	23	1966	A
23	23	1967	C
23	23	1970	A
23	23	1971	U
23	23	1972	G
23	23	1991	U
23	23	1992	G
23	23	1993	U
23	23	1997	C
23	23	2013	A
23	23	2020	A
23	23	2022	U
23	23	2023	C
23	23	2030	6MZ
23	23	2031	A
23	23	2032	G
23	23	2033	A
23	23	2043	C
23	23	2046	G
23	23	2049	G
23	23	2055	C
23	23	2056	G
23	23	2060	A

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Mol	Chain	Res	Type
23	23	2061	G
23	23	2062	A
23	23	2069	G7M
23	23	2093	G
23	23	2113	U
23	23	2114	A
23	23	2117	A
23	23	2118	U
23	23	2126	A
23	23	2127	G
23	23	2131	U
23	23	2132	U
23	23	2136	G
23	23	2138	G
23	23	2146	C
23	23	2148	G
23	23	2157	G
23	23	2158	A
23	23	2161	C
23	23	2162	G
23	23	2164	C
23	23	2170	A
23	23	2171	A
23	23	2172	U
23	23	2173	A
23	23	2178	C
23	23	2190	G
23	23	2198	A
23	23	2203	U
23	23	2204	G
23	23	2211	A
23	23	2225	A
23	23	2238	G
23	23	2239	G
23	23	2251	OMG
23	23	2268	A
23	23	2278	A
23	23	2283	C
23	23	2287	A
23	23	2288	A
23	23	2305	U
23	23	2307	G

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Mol	Chain	Res	Type
23	23	2308	G
23	23	2309	A
23	23	2319	G
23	23	2322	A
23	23	2325	G
23	23	2327	A
23	23	2333	A
23	23	2334	U
23	23	2336	A
23	23	2343	U
23	23	2345	G
23	23	2347	C
23	23	2350	C
23	23	2361	G
23	23	2379	G
23	23	2383	G
23	23	2385	C
23	23	2391	G
23	23	2402	U
23	23	2406	A
23	23	2422	C
23	23	2425	A
23	23	2426	A
23	23	2429	G
23	23	2430	A
23	23	2435	A
23	23	2441	U
23	23	2448	A
23	23	2470	G
23	23	2475	C
23	23	2478	A
23	23	2484	G
23	23	2487	G
23	23	2491	U
23	23	2492	U
23	23	2494	G
23	23	2498	OMC
23	23	2502	G
23	23	2503	2MA
23	23	2504	PSU
23	23	2505	G
23	23	2518	A

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Mol	Chain	Res	Type
23	23	2529	G
23	23	2530	A
23	23	2535	G
23	23	2547	A
23	23	2549	G
23	23	2566	A
23	23	2567	G
23	23	2569	G
23	23	2572	A
23	23	2573	C
23	23	2582	G
23	23	2585	U
23	23	2586	U
23	23	2599	G
23	23	2603	G
23	23	2609	U
23	23	2613	U
23	23	2614	A
23	23	2621	G
23	23	2629	U
23	23	2630	G
23	23	2634	A
23	23	2636	C
23	23	2646	C
23	23	2661	G
23	23	2663	G
23	23	2665	A
23	23	2689	U
23	23	2714	G
23	23	2716	C
23	23	2718	G
23	23	2726	A
23	23	2732	G
23	23	2733	A
23	23	2739	U
23	23	2744	G
23	23	2748	A
23	23	2750	A
23	23	2765	A
23	23	2778	A
23	23	2779	U
23	23	2791	G

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Mol	Chain	Res	Type
23	23	2798	U
23	23	2799	A
23	23	2804	U
23	23	2818	U
23	23	2820	A
23	23	2821	A
23	23	2823	A
23	23	2825	G
23	23	2832	U
23	23	2835	A
23	23	2836	U
23	23	2849	U
23	23	2859	G
23	23	2861	U
23	23	2873	A
23	23	2877	G
23	23	2879	A
23	23	2880	C
23	23	2883	A
23	23	2884	U
23	23	2885	G
23	23	2886	A
23	23	2891	U
23	23	2901	C
23	23	2904	U
24	5	9	G
24	5	13	G
24	5	24	G
24	5	42	C
24	5	44	G
24	5	56	G
24	5	67	G
24	5	89	U
24	5	90	C
24	5	91	C
24	5	99	A
24	5	105	G
24	5	109	A
56	Pt	11	C
56	Pt	12	U
56	Pt	16	U
56	Pt	18	G

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Mol	Chain	Res	Type
56	Pt	19	G
56	Pt	20	U
56	Pt	21	A
56	Pt	22	G
56	Pt	37	T6A
56	Pt	46	G7M
56	Pt	47	U
56	Pt	48	C
56	Pt	49	G
56	Pt	54	U
56	Pt	58	A
56	Pt	61	C
56	Pt	76	A
58	Dt	13	C
58	Dt	16	U
58	Dt	17	C
58	Dt	18	G
58	Dt	19	G
58	Dt	20	U
58	Dt	21	A
58	Dt	22	G
58	Dt	37	MIA
58	Dt	38	A
58	Dt	46	G7M
58	Dt	47	3AU
58	Dt	48	C
58	Dt	75	C
58	Dt	76	A

All (10) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	16	251	G
1	16	428	G
1	16	429	U
1	16	992	U
23	23	784	G
23	23	827	U
23	23	984	A
23	23	1087	G
23	23	2430	A
23	23	2820	A

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

47 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	$\#\|Z\| > 2$
23	1MG	23	745	23	23,26,27	1.18	3 (13%)	33,39,42	1.73	5 (15%)
12	D2T	SL	89	12	8,9,10	2.90	2 (25%)	6,11,13	2.42	4 (66%)
23	2MG	23	2445	23	23,26,27	1.25	3 (13%)	33,38,41	2.22	6 (18%)
23	PSU	23	2580	23	18,21,22	1.42	4 (22%)	21,30,33	2.11	4 (19%)
23	PSU	23	2604	23	18,21,22	1.41	3 (16%)	21,30,33	2.04	4 (19%)
23	PSU	23	2457	23	18,21,22	1.41	3 (16%)	21,30,33	2.12	4 (19%)
57	FME	Pp	77	57	8,9,10	0.70	0	8,9,11	1.24	0
56	U8U	Pt	34	22,56	20,24,25	1.36	2 (10%)	22,34,37	1.14	4 (18%)
58	PSU	Dt	39	58	18,21,22	1.41	3 (16%)	21,30,33	1.94	4 (19%)
1	5MC	16	1407	1	19,22,23	1.50	2 (10%)	26,32,35	1.19	2 (7%)
23	2MG	23	1835	23	23,26,27	1.26	4 (17%)	33,38,41	2.38	9 (27%)
23	G7M	23	2069	23	23,26,27	0.67	1 (4%)	34,39,42	0.67	1 (2%)
1	2MG	16	966	1	23,26,27	1.24	4 (17%)	33,38,41	2.20	7 (21%)
23	OMC	23	2498	23,62	19,22,23	0.92	0	25,31,34	0.97	1 (4%)
58	PSU	Dt	55	58	18,21,22	1.39	2 (11%)	21,30,33	1.99	3 (14%)
36	4D4	LP	81	36	9,11,12	0.88	0	7,13,15	1.61	1 (14%)
23	PSU	23	1911	23	18,21,22	1.41	2 (11%)	21,30,33	2.03	3 (14%)
56	G7M	Pt	46	56	23,26,27	0.73	1 (4%)	34,39,42	0.60	1 (2%)
58	3AU	Dt	47	58	24,28,29	0.99	0	30,40,43	1.32	2 (6%)
1	5MC	16	967	1	19,22,23	1.56	3 (15%)	26,32,35	1.05	2 (7%)
23	PSU	23	2605	23	18,21,22	1.42	3 (16%)	21,30,33	2.03	4 (19%)
23	OMG	23	2251	23,56	23,26,27	1.18	3 (13%)	32,38,41	2.01	6 (18%)
58	MIA	Dt	37	58	28,31,32	2.35	6 (21%)	38,44,47	2.86	14 (36%)
23	H2U	23	2449	23	18,21,22	1.01	2 (11%)	19,30,33	0.97	1 (5%)
1	4OC	16	1402	62,1	20,23,24	0.75	0	25,32,35	1.06	1 (4%)
1	2MG	16	1516	1	23,26,27	1.24	4 (17%)	33,38,41	2.19	6 (18%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
23	6MZ	23	1618	23	22,25,26	1.48	4 (18%)	29,36,39	2.24	9 (31%)
1	MA6	16	1519	1	23,26,27	1.57	4 (17%)	33,38,41	2.18	10 (30%)
1	UR3	16	1498	1	19,22,23	0.97	0	26,32,35	1.77	3 (11%)
23	PSU	23	955	23	18,21,22	1.43	3 (16%)	21,30,33	2.05	3 (14%)
23	5MC	23	1962	23	19,22,23	1.58	3 (15%)	26,32,35	1.13	2 (7%)
23	PSU	23	2504	23,63	18,21,22	1.53	4 (22%)	21,30,33	2.09	4 (19%)
23	3TD	23	1915	23	19,22,23	1.23	2 (10%)	23,32,35	2.36	3 (13%)
1	MA6	16	1518	1	23,26,27	1.59	4 (17%)	33,38,41	2.18	10 (30%)
23	PSU	23	746	23,62	18,21,22	1.42	2 (11%)	21,30,33	1.99	3 (14%)
58	4SU	Dt	8	58	18,21,22	1.83	5 (27%)	25,30,33	2.22	4 (16%)
23	OMU	23	2552	23	19,22,23	1.20	3 (15%)	25,31,34	1.79	6 (24%)
23	2MA	23	2503	23,62,63	22,25,26	1.49	4 (18%)	32,37,40	2.35	9 (28%)
56	PSU	Pt	39	56	18,21,22	1.37	2 (11%)	21,30,33	2.00	4 (19%)
23	5MU	23	1939	23	19,22,23	0.31	0	27,32,35	0.37	0
23	5MU	23	747	23	19,22,23	1.45	6 (31%)	27,32,35	2.12	7 (25%)
1	G7M	16	527	1	23,26,27	0.70	1 (4%)	34,39,42	0.62	1 (2%)
58	G7M	Dt	46	58	23,26,27	0.73	1 (4%)	34,39,42	0.63	1 (2%)
56	T6A	Pt	37	56	31,34,35	1.44	6 (19%)	43,49,52	1.91	10 (23%)
23	6MZ	23	2030	23	22,25,26	1.48	5 (22%)	29,36,39	2.44	11 (37%)
58	PSU	Dt	32	58	18,21,22	1.52	5 (27%)	21,30,33	2.23	5 (23%)
1	PSU	16	516	1	18,21,22	1.36	3 (16%)	21,30,33	2.01	5 (23%)

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
23	1MG	23	745	23	-	0/7/25/26	0/3/3/3
12	D2T	SL	89	12	-	1/7/12/14	-
23	2MG	23	2445	23	-	1/9/27/28	0/3/3/3
23	PSU	23	2580	23	-	1/7/25/26	0/2/2/2
23	PSU	23	2604	23	-	0/7/25/26	0/2/2/2
23	PSU	23	2457	23	-	0/7/25/26	0/2/2/2
57	FME	Pp	77	57	-	4/7/9/11	-
56	U8U	Pt	34	22,56	-	1/10/28/29	0/2/2/2
58	PSU	Dt	39	58	-	0/7/25/26	0/2/2/2
1	5MC	16	1407	1	-	0/7/25/26	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
23	2MG	23	1835	23	-	0/9/27/28	0/3/3/3
23	G7M	23	2069	23	-	0/7/25/26	0/3/3/3
1	2MG	16	966	1	-	0/9/27/28	0/3/3/3
23	OMC	23	2498	23,62	-	2/9/27/28	0/2/2/2
58	PSU	Dt	55	58	-	0/7/25/26	0/2/2/2
36	4D4	LP	81	36	-	3/11/12/14	-
23	PSU	23	1911	23	-	0/7/25/26	0/2/2/2
56	G7M	Pt	46	56	-	3/7/25/26	0/3/3/3
58	3AU	Dt	47	58	-	5/16/34/35	0/2/2/2
1	5MC	16	967	1	-	0/7/25/26	0/2/2/2
23	PSU	23	2605	23	-	0/7/25/26	0/2/2/2
23	OMG	23	2251	23,56	-	3/9/27/28	0/3/3/3
58	MIA	Dt	37	58	-	7/15/33/34	0/3/3/3
23	H2U	23	2449	23	-	0/7/38/39	0/2/2/2
1	4OC	16	1402	62,1	-	1/9/29/30	0/2/2/2
1	2MG	16	1516	1	-	0/9/27/28	0/3/3/3
23	6MZ	23	1618	23	-	0/9/27/28	0/3/3/3
1	MA6	16	1519	1	-	2/11/29/30	0/3/3/3
1	UR3	16	1498	1	-	0/7/25/26	0/2/2/2
23	PSU	23	955	23	-	0/7/25/26	0/2/2/2
23	5MC	23	1962	23	-	0/7/25/26	0/2/2/2
23	PSU	23	2504	23,63	-	2/7/25/26	0/2/2/2
23	3TD	23	1915	23	-	2/7/25/26	0/2/2/2
1	MA6	16	1518	1	-	0/11/29/30	0/3/3/3
23	PSU	23	746	23,62	-	4/7/25/26	0/2/2/2
58	4SU	Dt	8	58	-	0/7/25/26	0/2/2/2
23	OMU	23	2552	23	-	0/9/27/28	0/2/2/2
23	2MA	23	2503	23,62,63	-	2/7/25/26	0/3/3/3
56	PSU	Pt	39	56	-	0/7/25/26	0/2/2/2
23	5MU	23	1939	23	-	0/7/25/26	0/2/2/2
23	5MU	23	747	23	-	2/7/25/26	0/2/2/2
1	G7M	16	527	1	-	3/7/25/26	0/3/3/3
58	G7M	Dt	46	58	-	0/7/25/26	0/3/3/3
56	T6A	Pt	37	56	-	15/23/41/42	0/3/3/3
23	6MZ	23	2030	23	-	2/9/27/28	0/3/3/3
58	PSU	Dt	32	58	-	0/7/25/26	0/2/2/2
1	PSU	16	516	1	-	0/7/25/26	0/2/2/2

All (127) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
58	Dt	37	MIA	C2-S10	-7.02	1.69	1.75
58	Dt	37	MIA	C13-C14	6.85	1.52	1.32
23	23	1962	5MC	C5-C4	5.69	1.48	1.44
1	16	967	5MC	C5-C4	5.59	1.48	1.44
12	SL	89	D2T	CB-SB	-5.42	1.76	1.82
1	16	1407	5MC	C5-C4	5.37	1.48	1.44
12	SL	89	D2T	CB-CA	-5.22	1.53	1.54
58	Dt	8	4SU	C4-S4	-5.00	1.59	1.68
1	16	1518	MA6	C5-C4	4.95	1.47	1.39
1	16	1519	MA6	C5-C4	4.92	1.47	1.39
58	Dt	37	MIA	C5-C4	4.90	1.47	1.39
23	23	1618	6MZ	C5-C4	4.62	1.47	1.39
23	23	2503	2MA	C5-C4	4.50	1.47	1.39
56	Pt	34	U8U	C2-S2	-4.41	1.60	1.67
56	Pt	37	T6A	C5-C4	4.39	1.46	1.39
23	23	2030	6MZ	C5-C4	4.34	1.46	1.39
23	23	2504	PSU	C6-C5	3.98	1.39	1.35
23	23	1915	3TD	C6-C5	3.68	1.39	1.35
58	Dt	55	PSU	C6-C5	3.54	1.39	1.35
23	23	1911	PSU	C6-C5	3.47	1.39	1.35
1	16	1518	MA6	C5-C6	3.43	1.50	1.41
23	23	2605	PSU	C6-C5	3.42	1.39	1.35
1	16	1519	MA6	C5-C6	3.41	1.50	1.41
56	Pt	39	PSU	C6-C5	3.39	1.39	1.35
58	Dt	39	PSU	C6-C5	3.37	1.39	1.35
23	23	955	PSU	C6-C5	3.35	1.39	1.35
23	23	746	PSU	C6-C5	3.31	1.39	1.35
58	Dt	8	4SU	C4-N3	-3.31	1.34	1.37
23	23	2604	PSU	C6-C5	3.24	1.38	1.35
58	Dt	32	PSU	C4-N3	-3.16	1.32	1.38
23	23	745	1MG	C5-C4	3.16	1.47	1.38
23	23	1835	2MG	C5-C4	3.05	1.47	1.38
1	16	1516	2MG	C5-C4	3.03	1.47	1.38
1	16	966	2MG	C5-C4	3.02	1.47	1.38
23	23	2580	PSU	C6-C5	3.01	1.38	1.35
23	23	2251	OMG	C5-C4	2.99	1.47	1.38
23	23	2457	PSU	C6-C5	2.97	1.38	1.35
23	23	2445	2MG	C5-C4	2.97	1.46	1.38
23	23	747	5MU	C4-N3	-2.95	1.33	1.38
1	16	516	PSU	C6-C5	2.86	1.38	1.35
23	23	2457	PSU	C4-N3	-2.85	1.33	1.38
23	23	2605	PSU	C4-N3	-2.84	1.33	1.38
23	23	2604	PSU	C4-N3	-2.82	1.33	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
58	Dt	37	MIA	C5-C6	2.81	1.48	1.41
23	23	955	PSU	C4-N3	-2.81	1.33	1.38
56	Pt	34	U8U	C4-N3	-2.78	1.33	1.38
23	23	2030	6MZ	C5-N7	-2.77	1.34	1.39
23	23	2504	PSU	C4-N3	-2.72	1.33	1.38
23	23	1835	2MG	C6-N1	-2.71	1.33	1.38
23	23	2030	6MZ	C5-C6	2.70	1.48	1.41
23	23	2552	OMU	C4-N3	-2.70	1.34	1.38
23	23	746	PSU	C4-N3	-2.69	1.33	1.38
58	Dt	8	4SU	C5-C4	-2.68	1.39	1.42
23	23	2503	2MA	C5-C6	2.67	1.48	1.41
23	23	1618	6MZ	C5-C6	2.67	1.48	1.41
58	Dt	32	PSU	C6-C5	2.66	1.38	1.35
23	23	1911	PSU	C4-N3	-2.66	1.33	1.38
58	Dt	39	PSU	C4-N3	-2.65	1.33	1.38
1	16	1407	5MC	C6-C5	2.64	1.38	1.34
1	16	967	5MC	C6-C5	2.64	1.38	1.34
23	23	2445	2MG	C6-N1	-2.63	1.33	1.38
23	23	2580	PSU	C4-N3	-2.63	1.33	1.38
23	23	1962	5MC	C6-C5	2.62	1.38	1.34
23	23	747	5MU	C2-N1	2.61	1.42	1.38
23	23	2449	H2U	C2-N3	-2.61	1.33	1.38
56	Pt	37	T6A	C5-N7	-2.60	1.34	1.39
58	Dt	55	PSU	C4-N3	-2.59	1.34	1.38
23	23	2251	OMG	C6-N1	-2.58	1.34	1.38
56	Pt	46	G7M	C8-N7	2.57	1.37	1.33
56	Pt	39	PSU	C4-N3	-2.57	1.34	1.38
58	Dt	46	G7M	C8-N7	2.57	1.37	1.33
23	23	747	5MU	C6-C5	2.55	1.38	1.34
1	16	516	PSU	C4-N3	-2.50	1.34	1.38
1	16	1516	2MG	C6-N1	-2.49	1.34	1.38
23	23	1618	6MZ	C5-N7	-2.49	1.34	1.39
58	Dt	37	MIA	C5-N7	-2.47	1.34	1.39
23	23	1915	3TD	C2-N1	-2.47	1.34	1.37
1	16	527	G7M	C8-N7	2.46	1.37	1.33
23	23	2503	2MA	C5-N7	-2.42	1.34	1.39
23	23	745	1MG	C2-N1	2.42	1.41	1.37
1	16	966	2MG	C6-N1	-2.40	1.34	1.38
23	23	747	5MU	C6-N1	-2.40	1.33	1.38
23	23	1962	5MC	C6-N1	-2.39	1.33	1.38
56	Pt	37	T6A	C5-C6	2.34	1.47	1.41
58	Dt	32	PSU	C2-N3	-2.29	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
23	23	2069	G7M	C8-N7	2.27	1.36	1.33
58	Dt	8	4SU	C2-N1	2.27	1.42	1.38
23	23	2605	PSU	C2-N3	-2.27	1.33	1.37
23	23	2251	OMG	C5-N7	-2.25	1.34	1.39
23	23	2449	H2U	C4-N3	-2.25	1.33	1.37
23	23	2030	6MZ	C8-N7	2.24	1.36	1.31
23	23	747	5MU	C2-N3	-2.23	1.34	1.38
23	23	2503	2MA	C8-N7	2.22	1.36	1.31
23	23	2552	OMU	C2-N3	-2.22	1.34	1.38
1	16	967	5MC	C6-N1	-2.20	1.34	1.38
23	23	2552	OMU	C5-C4	-2.18	1.39	1.43
23	23	745	1MG	C5-N7	-2.17	1.34	1.39
58	Dt	37	MIA	C8-N7	2.16	1.35	1.31
23	23	1835	2MG	C5-N7	-2.14	1.34	1.39
23	23	2504	PSU	C2-N3	-2.14	1.33	1.37
23	23	2580	PSU	C2-N1	-2.14	1.33	1.36
23	23	1618	6MZ	C8-N7	2.14	1.35	1.31
58	Dt	32	PSU	C2-N1	-2.12	1.33	1.36
23	23	2445	2MG	C5-N7	-2.12	1.34	1.39
1	16	1518	MA6	C4-N9	-2.12	1.33	1.37
23	23	2457	PSU	C2-N3	-2.11	1.34	1.37
1	16	1516	2MG	C5-N7	-2.11	1.34	1.39
23	23	2504	PSU	C2-N1	-2.11	1.33	1.36
1	16	966	2MG	C5-N7	-2.10	1.34	1.39
56	Pt	37	T6A	C8-N7	2.09	1.35	1.31
23	23	747	5MU	C4-C5	2.08	1.48	1.44
1	16	1518	MA6	C8-N7	2.08	1.35	1.31
58	Dt	8	4SU	C2-N3	-2.08	1.34	1.38
58	Dt	32	PSU	C2'-C1'	-2.07	1.50	1.53
23	23	955	PSU	C2-N3	-2.07	1.34	1.37
23	23	2030	6MZ	C4-N9	-2.07	1.33	1.37
23	23	2580	PSU	O4'-C1'	-2.06	1.41	1.43
23	23	2604	PSU	C2-N3	-2.06	1.34	1.37
1	16	966	2MG	C2-N3	2.06	1.35	1.32
1	16	1519	MA6	C8-N7	2.05	1.35	1.31
1	16	516	PSU	C2-N1	-2.05	1.34	1.36
1	16	1519	MA6	C5-N7	-2.04	1.35	1.39
23	23	1835	2MG	C2-N3	2.04	1.35	1.32
58	Dt	39	PSU	C2-N3	-2.04	1.34	1.37
56	Pt	37	T6A	C10-N6	-2.04	1.33	1.37
1	16	1516	2MG	C2-N3	2.03	1.35	1.32
56	Pt	37	T6A	C6-N6	-2.02	1.35	1.39

All (209) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
58	Dt	37	MIA	C5-C4-N3	-9.10	117.60	127.18
23	23	2503	2MA	C5-C4-N3	-8.50	118.22	127.18
58	Dt	37	MIA	C12-C13-C14	-8.19	112.31	127.01
23	23	1835	2MG	C2-N3-C4	8.10	122.13	112.00
1	16	966	2MG	C2-N3-C4	7.31	121.14	112.00
23	23	2445	2MG	C2-N3-C4	7.30	121.14	112.00
1	16	1516	2MG	C2-N3-C4	7.25	121.07	112.00
58	Dt	37	MIA	N3-C4-N9	7.19	136.11	126.99
58	Dt	32	PSU	N1-C2-N3	6.91	122.46	115.17
1	16	1498	UR3	C4-N3-C2	-6.85	119.07	124.58
23	23	1835	2MG	C5-C4-N3	-6.82	117.53	128.39
23	23	1915	3TD	N1-C2-N3	6.70	121.00	116.13
23	23	2457	PSU	N1-C2-N3	6.63	122.16	115.17
23	23	2503	2MA	N3-C4-N9	6.53	135.28	126.99
58	Dt	8	4SU	C4-N3-C2	-6.46	121.12	127.31
23	23	2604	PSU	N1-C2-N3	6.46	121.98	115.17
23	23	2580	PSU	N1-C2-N3	6.43	121.95	115.17
23	23	2251	OMG	C5-C4-N3	-6.40	118.21	128.39
23	23	955	PSU	N1-C2-N3	6.39	121.91	115.17
23	23	2504	PSU	N1-C2-N3	6.38	121.89	115.17
23	23	1915	3TD	C1'-C5-C4	6.38	127.28	117.61
23	23	1911	PSU	N1-C2-N3	6.28	121.79	115.17
23	23	746	PSU	N1-C2-N3	6.27	121.78	115.17
23	23	2445	2MG	C5-C4-N3	-6.23	118.47	128.39
56	Pt	39	PSU	N1-C2-N3	6.23	121.74	115.17
58	Dt	55	PSU	N1-C2-N3	6.22	121.73	115.17
23	23	2605	PSU	N1-C2-N3	6.18	121.69	115.17
1	16	1516	2MG	C5-C4-N3	-6.08	118.71	128.39
1	16	516	PSU	N1-C2-N3	6.06	121.56	115.17
1	16	966	2MG	C5-C4-N3	-6.04	118.78	128.39
58	Dt	39	PSU	N1-C2-N3	6.01	121.51	115.17
23	23	1618	6MZ	C5-C4-N3	-5.99	118.47	126.72
23	23	2030	6MZ	C5-C4-N3	-5.97	118.50	126.72
58	Dt	8	4SU	C5-C4-N3	5.91	120.25	114.75
56	Pt	37	T6A	C5-C4-N3	-5.78	118.76	126.72
1	16	1519	MA6	C5-C4-N3	-5.35	119.35	126.72
23	23	2030	6MZ	C9-N6-C6	-5.34	117.90	122.85
23	23	747	5MU	N3-C2-N1	5.34	121.84	114.89
23	23	745	1MG	C5-C4-N3	-5.33	119.91	128.39
23	23	2251	OMG	C2-N3-C4	5.28	121.39	112.30
1	16	1518	MA6	C4-C5-N7	-5.13	104.71	110.58
23	23	1835	2MG	N9-C4-N3	5.08	136.12	125.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	1518	MA6	C5-C4-N3	-4.98	119.86	126.72
1	16	1519	MA6	C4-C5-N7	-4.97	104.89	110.58
23	23	1618	6MZ	N3-C4-N9	4.95	135.58	127.17
23	23	747	5MU	C4-N3-C2	-4.93	120.88	127.34
58	Dt	47	3AU	C4-N3-C2	-4.80	119.02	124.66
23	23	1915	3TD	C4-N3-C2	-4.78	119.55	124.61
1	16	1518	MA6	C2-N1-C6	4.78	123.50	111.83
23	23	2251	OMG	N9-C4-N3	4.76	135.47	125.95
56	Pt	37	T6A	N3-C4-N9	4.71	135.18	127.17
1	16	1519	MA6	C2-N1-C6	4.68	123.26	111.83
58	Dt	32	PSU	C4-N3-C2	-4.59	120.04	126.37
23	23	2445	2MG	N9-C4-N3	4.59	135.12	125.95
23	23	745	1MG	C2-N3-C4	4.49	122.07	111.98
23	23	2552	OMU	C4-N3-C2	-4.36	121.19	126.61
1	16	966	2MG	N9-C4-N3	4.36	134.66	125.95
23	23	2552	OMU	N3-C2-N1	4.36	120.56	114.89
1	16	1516	2MG	N9-C4-N3	4.35	134.64	125.95
23	23	2030	6MZ	N3-C4-N9	4.34	134.55	127.17
12	SL	89	D2T	CB1-SB-CB	4.28	110.06	102.36
23	23	2457	PSU	C4-N3-C2	-4.24	120.53	126.37
23	23	2580	PSU	O2-C2-N1	-4.18	118.48	122.79
23	23	2030	6MZ	C6-C5-N7	4.15	136.96	132.43
23	23	746	PSU	C4-N3-C2	-4.14	120.66	126.37
23	23	2030	6MZ	C4-C5-N7	-4.11	105.88	110.58
58	Dt	37	MIA	C16-C14-C13	-4.10	110.36	122.66
58	Dt	8	4SU	N3-C2-N1	4.07	120.19	114.89
23	23	2605	PSU	C4-N3-C2	-4.04	120.81	126.37
23	23	2457	PSU	O2-C2-N1	-4.02	118.64	122.79
56	Pt	39	PSU	C4-N3-C2	-4.02	120.84	126.37
23	23	2604	PSU	C4-N3-C2	-4.02	120.84	126.37
23	23	955	PSU	C4-N3-C2	-4.01	120.85	126.37
23	23	1911	PSU	C4-N3-C2	-4.00	120.86	126.37
58	Dt	8	4SU	C5-C4-S4	-3.99	119.75	124.31
23	23	2580	PSU	C4-N3-C2	-3.96	120.91	126.37
58	Dt	55	PSU	C4-N3-C2	-3.95	120.93	126.37
23	23	745	1MG	N9-C4-N3	3.93	133.82	125.95
1	16	516	PSU	O2-C2-N1	-3.92	118.75	122.79
23	23	2030	6MZ	C2-N3-C4	3.87	121.28	111.83
23	23	1618	6MZ	C2-N3-C4	3.85	121.23	111.83
23	23	2552	OMU	C5-C4-N3	3.83	120.16	114.80
23	23	955	PSU	O2-C2-N1	-3.82	118.85	122.79
23	23	747	5MU	C5-C4-N3	3.81	118.64	115.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
56	Pt	37	T6A	N6-C10-N11	3.78	118.97	113.77
23	23	2504	PSU	C4-N3-C2	-3.75	121.20	126.37
1	16	1519	MA6	N3-C4-N9	3.69	133.45	127.17
56	Pt	37	T6A	C2-N3-C4	3.67	120.80	111.83
1	16	1519	MA6	C2-N3-C4	3.66	120.76	111.83
23	23	1911	PSU	O2-C2-N1	-3.65	119.02	122.79
58	Dt	37	MIA	C15-C14-C13	-3.65	111.72	122.66
58	Dt	37	MIA	C2-N3-C4	3.63	121.80	112.29
23	23	746	PSU	O2-C2-N1	-3.63	119.04	122.79
23	23	747	5MU	O4-C4-C5	-3.63	120.77	124.92
23	23	2504	PSU	O2-C2-N1	-3.62	119.05	122.79
58	Dt	39	PSU	C4-N3-C2	-3.61	121.40	126.37
23	23	2503	2MA	C4-C5-N7	-3.61	106.46	110.58
1	16	516	PSU	C4-N3-C2	-3.60	121.41	126.37
58	Dt	32	PSU	O2-C2-N1	-3.59	119.09	122.79
56	Pt	39	PSU	O2-C2-N1	-3.52	119.16	122.79
1	16	1518	MA6	C2-N3-C4	3.52	120.42	111.83
58	Dt	37	MIA	C4-C5-N7	-3.51	106.56	110.58
23	23	2604	PSU	O2-C2-N1	-3.45	119.23	122.79
1	16	1519	MA6	N1-C2-N3	-3.45	123.36	128.58
58	Dt	39	PSU	O2-C2-N1	-3.45	119.23	122.79
1	16	1518	MA6	C5-N7-C8	3.45	108.87	103.45
1	16	1518	MA6	N1-C2-N3	-3.42	123.40	128.58
23	23	1618	6MZ	N1-C2-N3	-3.41	123.42	128.58
1	16	1516	2MG	C6-C5-N7	3.40	136.48	130.29
56	Pt	37	T6A	N3-C2-N1	-3.40	123.43	128.58
1	16	1498	UR3	C5-C4-N3	3.40	119.52	115.04
1	16	1518	MA6	N3-C4-N9	3.40	132.95	127.17
1	16	966	2MG	C6-C5-N7	3.36	136.41	130.29
1	16	1519	MA6	C5-N7-C8	3.35	108.71	103.45
23	23	2030	6MZ	N1-C2-N3	-3.33	123.54	128.58
58	Dt	55	PSU	O2-C2-N1	-3.33	119.35	122.79
1	16	1518	MA6	C6-C5-N7	3.26	138.64	133.43
23	23	1618	6MZ	C4-C5-N7	-3.25	106.87	110.58
23	23	747	5MU	C5-C6-N1	-3.24	119.79	123.31
23	23	2445	2MG	C6-C5-N7	3.24	136.19	130.29
23	23	1618	6MZ	C9-N6-C6	-3.24	119.85	122.85
23	23	2605	PSU	O2-C2-N1	-3.23	119.46	122.79
23	23	1618	6MZ	C6-C5-N7	3.22	135.94	132.43
23	23	1835	2MG	C6-C5-N7	3.22	136.15	130.29
23	23	2504	PSU	C6-C5-C4	-3.17	116.03	118.17
23	23	1962	5MC	C5-C6-N1	-3.16	119.88	123.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	16	1407	5MC	C5-C4-N3	-3.15	118.53	121.75
56	Pt	37	T6A	C4-C5-N7	-3.11	107.02	110.58
1	16	1407	5MC	O2-C2-N3	-3.10	117.44	122.33
23	23	2251	OMG	C6-C5-N7	3.09	135.92	130.29
23	23	2552	OMU	O4-C4-C5	-3.06	119.89	125.16
36	LP	81	4D4	NE-CZ-NH2	3.05	125.92	120.67
1	16	1519	MA6	C6-C5-N7	3.04	138.29	133.43
23	23	2030	6MZ	C5-N7-C8	3.03	108.22	103.45
56	Pt	37	T6A	C6-C5-N7	2.93	135.62	132.43
1	16	967	5MC	C5-C6-N1	-2.89	120.18	123.31
1	16	1518	MA6	C4-N9-C8	2.86	108.74	105.74
1	16	1402	4OC	O2-C2-N3	-2.84	117.85	122.33
23	23	2503	2MA	N6-C6-N1	2.79	120.80	117.03
58	Dt	47	3AU	C5-C4-N3	2.79	119.50	115.64
23	23	1962	5MC	C5-C4-N3	-2.79	118.89	121.75
1	16	967	5MC	C5-C4-N3	-2.76	118.92	121.75
23	23	745	1MG	C6-C5-N7	2.76	135.49	129.36
23	23	1618	6MZ	C4-N9-C8	2.70	108.57	105.74
1	16	1516	2MG	C4-C5-N7	-2.70	106.40	110.67
1	16	516	PSU	C6-C5-C4	-2.69	116.36	118.17
12	SL	89	D2T	OD2-CG-CB	2.68	118.94	113.15
56	Pt	34	U8U	O4-C4-C5	-2.65	120.26	124.71
23	23	2503	2MA	C5-N7-C8	2.64	107.60	103.45
23	23	2445	2MG	C4-C5-N7	-2.62	106.52	110.67
1	16	966	2MG	C4-C5-N7	-2.59	106.56	110.67
23	23	745	1MG	C4-C5-N7	-2.59	106.57	110.67
58	Dt	37	MIA	C5-N7-C8	2.57	107.49	103.45
56	Pt	37	T6A	C4-N9-C8	2.57	108.44	105.74
23	23	747	5MU	C1'-N1-C2	2.56	122.19	117.59
23	23	1835	2MG	C4-C5-N7	-2.56	106.62	110.67
56	Pt	34	U8U	C1'-N1-C6	-2.55	116.95	121.15
58	Dt	37	MIA	C6-C5-N7	2.53	135.19	132.43
23	23	2580	PSU	O4'-C1'-C2'	2.48	108.58	105.15
23	23	2251	OMG	C4-C5-N7	-2.48	106.74	110.67
23	23	747	5MU	O2-C2-N3	-2.47	116.93	121.49
23	23	1618	6MZ	C5-N7-C8	2.46	107.32	103.45
1	16	1519	MA6	C4-N9-C8	2.46	108.32	105.74
1	16	1518	MA6	N9-C8-N7	-2.43	110.49	113.94
23	23	2030	6MZ	C4-N9-C8	2.43	108.29	105.74
23	23	2498	OMC	C2'-C1'-N1	-2.41	109.67	114.24
58	Dt	39	PSU	C6-C5-C4	-2.40	116.55	118.17
58	Dt	32	PSU	C5-C6-N1	-2.39	118.82	122.14

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
23	23	2552	OMU	O2-C2-N1	-2.39	119.69	122.80
23	23	2503	2MA	C4-N9-C8	2.37	108.23	105.74
23	23	2503	2MA	C2-N1-C6	2.37	121.74	118.10
56	Pt	34	U8U	S2-C2-N3	-2.35	113.58	119.44
56	Pt	34	U8U	C5-C4-N3	2.33	118.77	115.21
56	Pt	37	T6A	C5-N7-C8	2.31	107.08	103.45
58	Dt	37	MIA	N6-C6-N1	2.31	121.42	118.33
23	23	2030	6MZ	N9-C8-N7	-2.30	110.67	113.94
1	16	1498	UR3	C1'-N1-C2	2.29	120.78	117.04
58	Dt	37	MIA	C11-S10-C2	-2.25	100.56	102.25
23	23	2605	PSU	C6-C5-C4	-2.25	116.66	118.17
1	16	966	2MG	N1-C2-N2	2.24	118.84	116.56
58	Dt	37	MIA	N3-C2-N1	-2.23	122.92	127.00
58	Dt	32	PSU	C3'-C2'-C1'	2.20	104.29	101.69
23	23	2552	OMU	C6-N1-C2	-2.19	118.33	121.00
23	23	1835	2MG	C2-N1-C6	-2.18	121.91	124.55
58	Dt	37	MIA	C2-N1-C6	2.17	121.65	117.54
1	16	1519	MA6	N9-C8-N7	-2.16	110.87	113.94
23	23	2445	2MG	O6-C6-C5	-2.15	120.85	126.53
23	23	1835	2MG	C5-C6-N1	2.15	118.72	113.25
23	23	2251	OMG	O6-C6-C5	-2.14	120.88	126.53
1	16	966	2MG	O6-C6-C5	-2.14	120.89	126.53
56	Pt	46	G7M	N9-C8-N7	-2.14	107.29	112.48
56	Pt	37	T6A	C2-N1-C6	2.12	122.28	115.24
1	16	1516	2MG	O6-C6-C5	-2.12	120.94	126.53
1	16	516	PSU	O4'-C1'-C2'	2.11	108.08	105.15
23	23	2457	PSU	C5-C6-N1	-2.10	119.22	122.14
12	SL	89	D2T	O-C-CA	-2.10	119.37	124.77
23	23	2503	2MA	C6-C5-N7	2.09	136.13	132.09
23	23	1835	2MG	N1-C2-N2	2.08	118.69	116.56
23	23	2449	H2U	C5-C4-N3	2.08	118.90	116.69
23	23	2069	G7M	N9-C8-N7	-2.07	107.45	112.48
58	Dt	37	MIA	C4-N9-C8	2.07	107.91	105.74
23	23	2604	PSU	C5-C6-N1	-2.06	119.28	122.14
23	23	1835	2MG	O6-C6-C5	-2.06	121.10	126.53
58	Dt	46	G7M	N9-C8-N7	-2.06	107.48	112.48
1	16	527	G7M	N9-C8-N7	-2.06	107.49	112.48
12	SL	89	D2T	OD1-CG-CB	-2.02	118.21	122.44
23	23	2030	6MZ	C2-N1-C6	2.02	121.93	115.24
56	Pt	39	PSU	O4'-C1'-C2'	2.01	107.94	105.15
23	23	2503	2MA	C2-N3-C4	2.01	121.91	115.02

There are no chirality outliers.

All (66) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	16	1519	MA6	O4'-C4'-C5'-O5'
12	SL	89	D2T	CG-CB-SB-CB1
56	Pt	37	T6A	N6-C10-N11-C12
56	Pt	37	T6A	O10-C10-N11-C12
56	Pt	37	T6A	N11-C12-C14-O14
56	Pt	37	T6A	N11-C12-C14-C15
56	Pt	37	T6A	C13-C12-C14-O14
56	Pt	37	T6A	C13-C12-C14-C15
23	23	746	PSU	C2'-C1'-C5-C4
23	23	746	PSU	C2'-C1'-C5-C6
23	23	746	PSU	O4'-C1'-C5-C6
23	23	747	5MU	O4'-C4'-C5'-O5'
23	23	1915	3TD	O4'-C1'-C5-C4
23	23	1915	3TD	O4'-C1'-C5-C6
23	23	2251	OMG	O4'-C4'-C5'-O5'
23	23	2251	OMG	C1'-C2'-O2'-CM2
23	23	2503	2MA	O4'-C4'-C5'-O5'
23	23	2504	PSU	O4'-C4'-C5'-O5'
57	Pp	77	FME	O1-CN-N-CA
58	Dt	37	MIA	C5-C6-N6-C12
58	Dt	37	MIA	N1-C6-N6-C12
58	Dt	37	MIA	N6-C12-C13-C14
58	Dt	37	MIA	C12-C13-C14-C15
1	16	527	G7M	C3'-C4'-C5'-O5'
56	Pt	37	T6A	O4'-C4'-C5'-O5'
56	Pt	37	T6A	C3'-C4'-C5'-O5'
23	23	747	5MU	C3'-C4'-C5'-O5'
23	23	2251	OMG	C3'-C4'-C5'-O5'
58	Dt	47	3AU	N40-C12-C13-O31
1	16	527	G7M	O4'-C4'-C5'-O5'
56	Pt	46	G7M	O4'-C4'-C5'-O5'
23	23	2503	2MA	C3'-C4'-C5'-O5'
58	Dt	37	MIA	O4'-C4'-C5'-O5'
58	Dt	37	MIA	C3'-C4'-C5'-O5'
1	16	1519	MA6	C3'-C4'-C5'-O5'
23	23	2030	6MZ	O4'-C4'-C5'-O5'
23	23	2030	6MZ	C3'-C4'-C5'-O5'
23	23	2498	OMC	C3'-C4'-C5'-O5'
23	23	2504	PSU	C3'-C4'-C5'-O5'
57	Pp	77	FME	CA-CB-CG-SD
58	Dt	47	3AU	C3'-C4'-C5'-O5'
56	Pt	37	T6A	N11-C12-C13-ODA

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Mol	Chain	Res	Type	Atoms
23	23	2498	OMC	O4'-C4'-C5'-O5'
56	Pt	37	T6A	C14-C12-C13-ODA
56	Pt	37	T6A	C14-C12-C13-ODB
1	16	1402	4OC	O4'-C4'-C5'-O5'
56	Pt	46	G7M	C3'-C4'-C5'-O5'
56	Pt	37	T6A	C13-C12-N11-C10
56	Pt	37	T6A	N11-C12-C13-ODB
56	Pt	37	T6A	C5-C6-N6-C10
58	Dt	47	3AU	O4'-C4'-C5'-O5'
58	Dt	47	3AU	N3-C10-C11-C12
36	LP	81	4D4	NE-CD-CG-CB
57	Pp	77	FME	N-CA-CB-CG
57	Pp	77	FME	CB-CG-SD-CE
23	23	746	PSU	O4'-C1'-C5-C4
23	23	2580	PSU	O4'-C4'-C5'-O5'
36	LP	81	4D4	OB-CB-CG-CD
56	Pt	46	G7M	C4'-C5'-O5'-P
56	Pt	34	U8U	N-C-C5-C6
56	Pt	37	T6A	N1-C6-N6-C10
23	23	2445	2MG	C3'-C4'-C5'-O5'
1	16	527	G7M	C4'-C5'-O5'-P
36	LP	81	4D4	O-C-CA-CB
58	Dt	37	MIA	C4'-C5'-O5'-P
58	Dt	47	3AU	N40-C12-C13-O30

There are no ring outliers.

8 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	SL	89	D2T	2	0
1	16	967	5MC	1	0
23	23	2251	OMG	1	0
1	16	1518	MA6	1	0
23	23	1939	5MU	1	0
56	Pt	37	T6A	2	0
23	23	2030	6MZ	1	0
1	16	516	PSU	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 352 ligands modelled in this entry, 334 are monoatomic - leaving 18 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	$\#\|Z\| > 2$
60	PUT	23	3008	-	5,5,5	0.11	0	4,4,4	0.18	0
60	PUT	23	3005	-	5,5,5	0.12	0	4,4,4	0.20	0
60	PUT	23	3009	-	5,5,5	0.12	0	4,4,4	0.17	0
61	SPD	23	3013	-	9,9,9	0.24	0	8,8,8	0.28	0
60	PUT	23	3010	-	5,5,5	0.14	0	4,4,4	0.18	0
66	GSP	EF	901	62	33,34,34	1.89	1 (3%)	47,54,54	1.71	9 (19%)
64	ATP	23	3001	-	32,33,33	0.38	0	48,52,52	0.37	0
60	PUT	16	2001	-	5,5,5	0.13	0	4,4,4	0.19	0
60	PUT	23	3006	-	5,5,5	0.14	0	4,4,4	0.14	0
60	PUT	23	3014	-	5,5,5	0.10	0	4,4,4	0.24	0
61	SPD	16	2003	-	9,9,9	0.17	0	8,8,8	0.23	0
60	PUT	23	3003	-	5,5,5	0.11	0	4,4,4	0.19	0
60	PUT	23	3004	-	5,5,5	0.15	0	4,4,4	0.17	0
64	ATP	23	3002	-	32,33,33	0.26	0	48,52,52	0.36	0
60	PUT	23	3007	-	5,5,5	0.11	0	4,4,4	0.20	0
60	PUT	23	3011	-	5,5,5	0.10	0	4,4,4	0.23	0
60	PUT	16	2002	-	5,5,5	0.14	0	4,4,4	0.20	0
61	SPD	23	3012	-	9,9,9	0.26	0	8,8,8	0.29	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
60	PUT	23	3008	-	-	2/3/3/3	-
60	PUT	23	3005	-	-	1/3/3/3	-
60	PUT	23	3009	-	-	0/3/3/3	-
61	SPD	23	3013	-	-	5/7/7/7	-
60	PUT	23	3010	-	-	1/3/3/3	-
66	GSP	EF	901	62	-	0/21/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
64	ATP	23	3001	-	-	7/22/38/38	0/3/3/3
60	PUT	16	2001	-	-	0/3/3/3	-
60	PUT	23	3006	-	-	1/3/3/3	-
60	PUT	23	3014	-	-	0/3/3/3	-
61	SPD	16	2003	-	-	4/7/7/7	-
60	PUT	23	3003	-	-	2/3/3/3	-
60	PUT	23	3004	-	-	1/3/3/3	-
64	ATP	23	3002	-	-	7/22/38/38	0/3/3/3
60	PUT	23	3007	-	-	0/3/3/3	-
60	PUT	23	3011	-	-	0/3/3/3	-
60	PUT	16	2002	-	-	0/3/3/3	-
61	SPD	23	3012	-	-	1/7/7/7	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
66	EF	901	GSP	PG-S1G	-9.48	1.70	1.90

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
66	EF	901	GSP	C5-C4-N3	-4.56	121.13	128.39
66	EF	901	GSP	C2-N3-C4	4.52	120.09	112.30
66	EF	901	GSP	PB-O3B-PG	-4.24	117.65	133.17
66	EF	901	GSP	N9-C8-N7	-2.84	108.13	113.40
66	EF	901	GSP	C2-N1-C6	-2.84	119.97	125.11
66	EF	901	GSP	N9-C4-N3	2.83	131.61	125.95
66	EF	901	GSP	C8-N7-C5	2.53	108.78	104.26
66	EF	901	GSP	C5-C6-N1	2.50	119.62	113.25
66	EF	901	GSP	O6-C6-C5	-2.47	120.02	126.53

There are no chirality outliers.

All (32) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
64	23	3001	ATP	PB-O3B-PG-O2G
64	23	3002	ATP	C5'-O5'-PA-O1A
64	23	3002	ATP	C5'-O5'-PA-O2A
61	23	3013	SPD	C3-C4-C5-N6
61	23	3012	SPD	N6-C7-C8-C9

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Mol	Chain	Res	Type	Atoms
61	16	2003	SPD	C4-C5-N6-C7
60	23	3008	PUT	C1-C2-C3-C4
61	23	3013	SPD	N6-C7-C8-C9
61	23	3013	SPD	C8-C7-N6-C5
60	23	3005	PUT	N1-C1-C2-C3
64	23	3002	ATP	O4'-C4'-C5'-O5'
60	23	3003	PUT	C1-C2-C3-C4
64	23	3001	ATP	O4'-C4'-C5'-O5'
64	23	3002	ATP	C4'-C5'-O5'-PA
64	23	3001	ATP	PG-O3B-PB-O2B
61	16	2003	SPD	C8-C7-N6-C5
61	23	3013	SPD	C2-C3-C4-C5
60	23	3004	PUT	C1-C2-C3-C4
64	23	3001	ATP	C5'-O5'-PA-O1A
64	23	3002	ATP	C5'-O5'-PA-O3A
61	16	2003	SPD	C7-C8-C9-N10
60	23	3010	PUT	C1-C2-C3-C4
60	23	3003	PUT	C2-C3-C4-N2
60	23	3006	PUT	C2-C3-C4-N2
60	23	3008	PUT	N1-C1-C2-C3
64	23	3001	ATP	PB-O3B-PG-O1G
64	23	3001	ATP	PG-O3B-PB-O1B
64	23	3002	ATP	PB-O3A-PA-O1A
64	23	3002	ATP	PB-O3A-PA-O2A
64	23	3001	ATP	C4'-C5'-O5'-PA
61	16	2003	SPD	N1-C2-C3-C4
61	23	3013	SPD	C4-C5-N6-C7

There are no ring outliers.

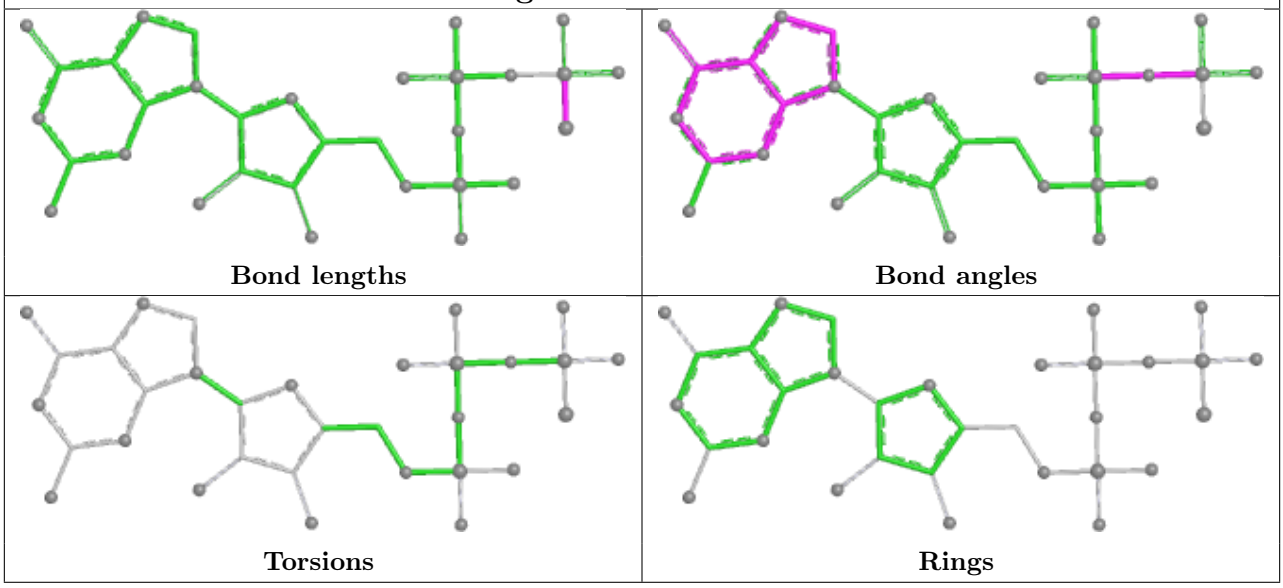
2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
60	23	3014	PUT	1	0
61	16	2003	SPD	1	0

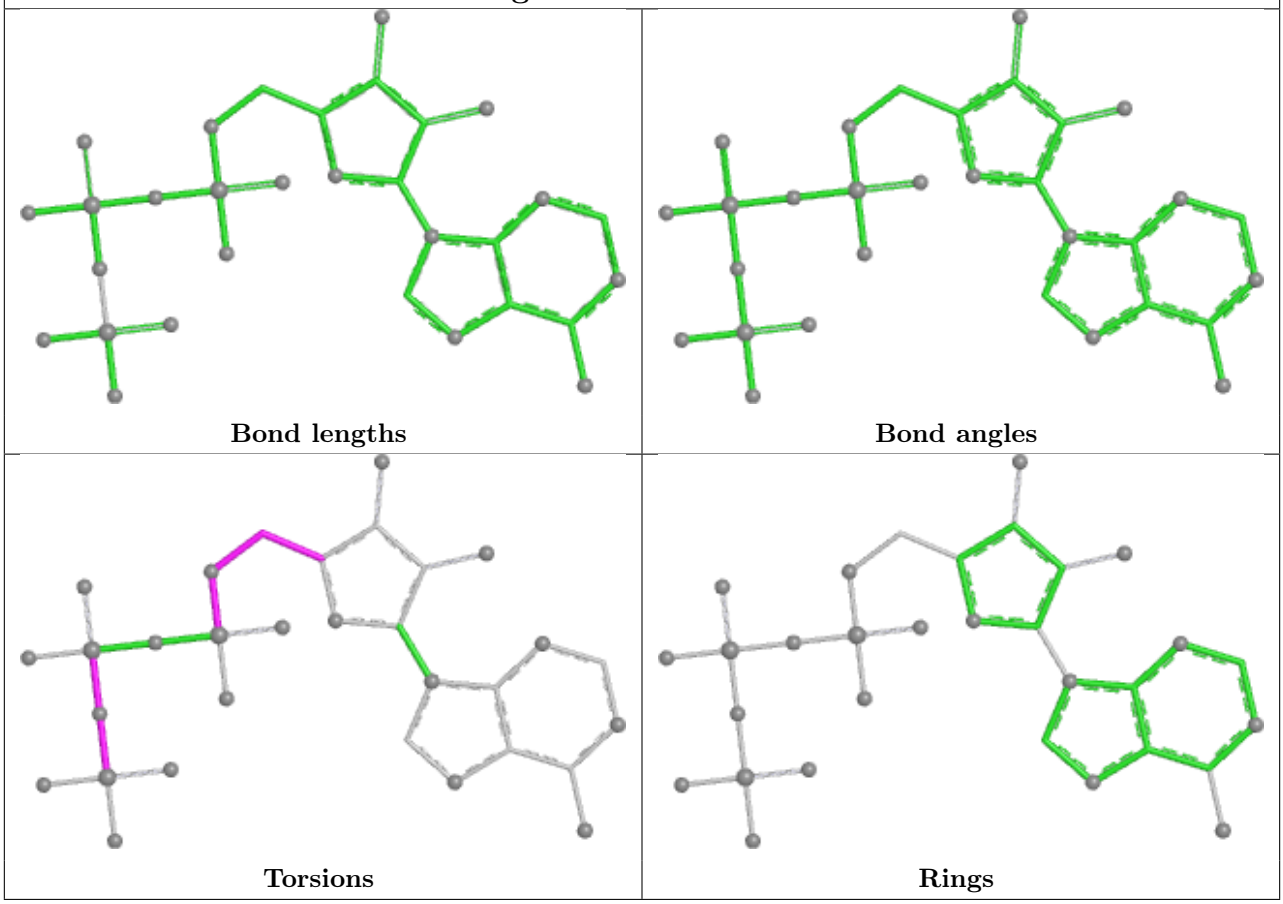
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring

in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

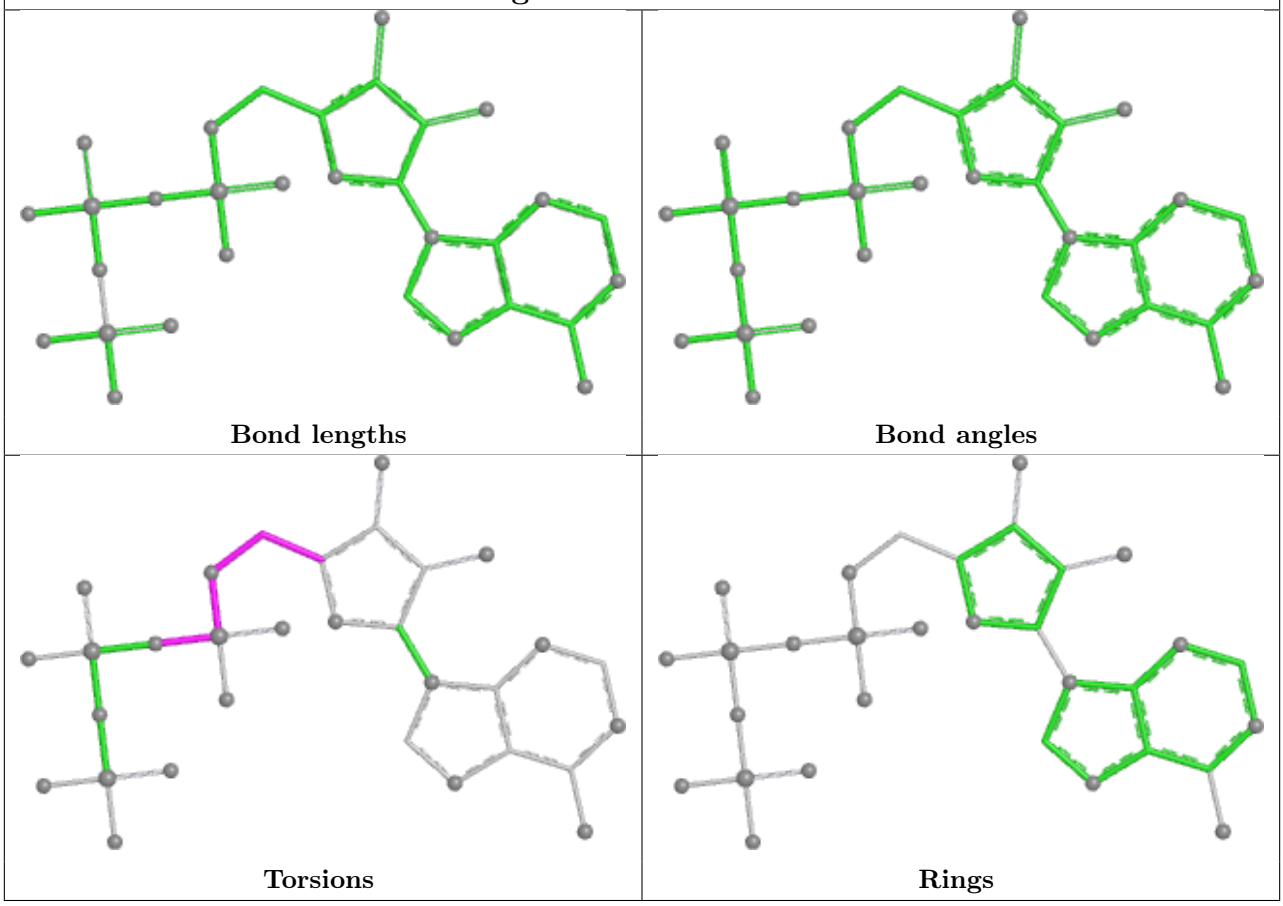
Ligand GSP EF 901



Ligand ATP 23 3001



Ligand ATP 23 3002



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.

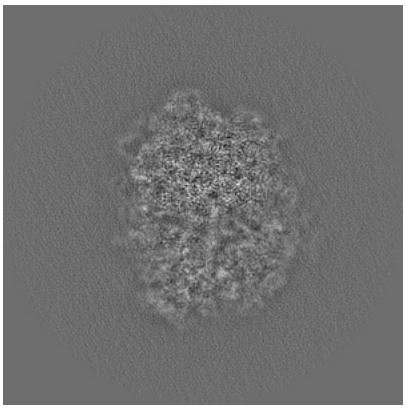
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-74588. These allow visual inspection of the internal detail of the map and identification of artifacts.

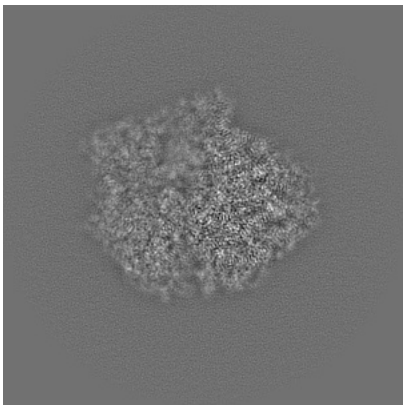
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

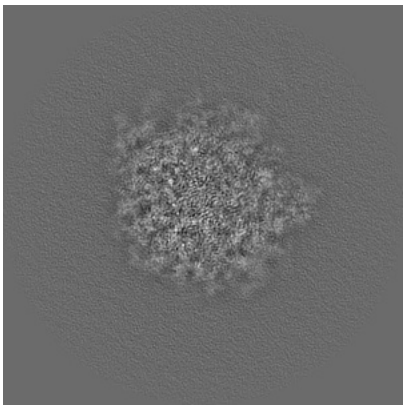
6.1.1 Primary map



X

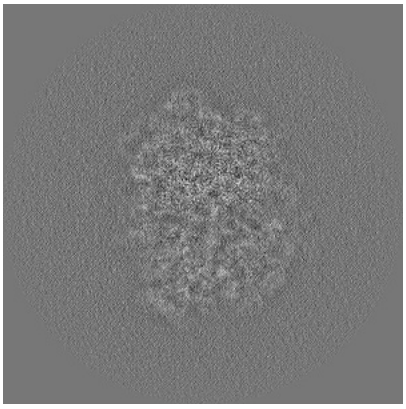


Y

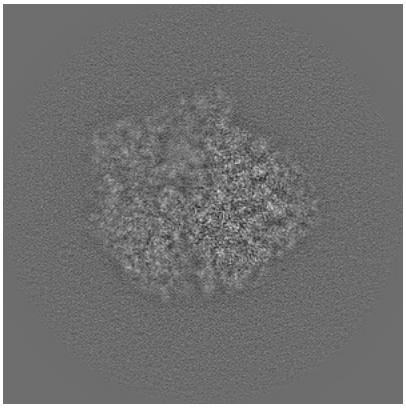


Z

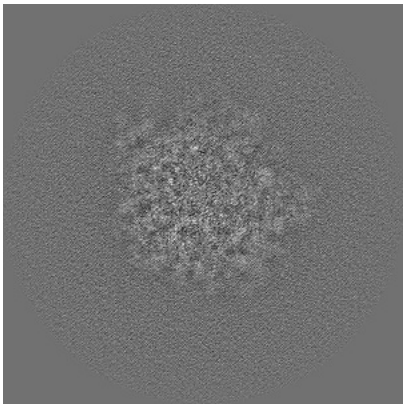
6.1.2 Raw map



X



Y

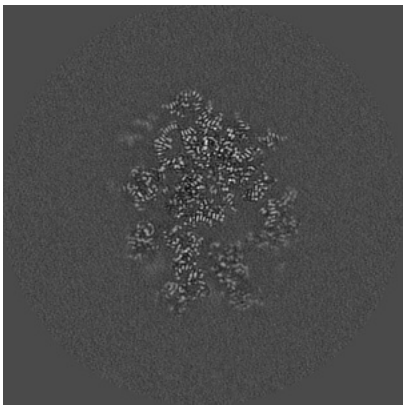


Z

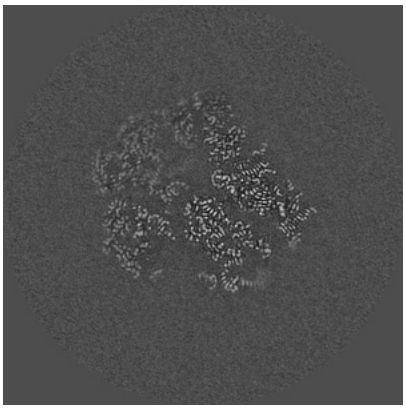
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

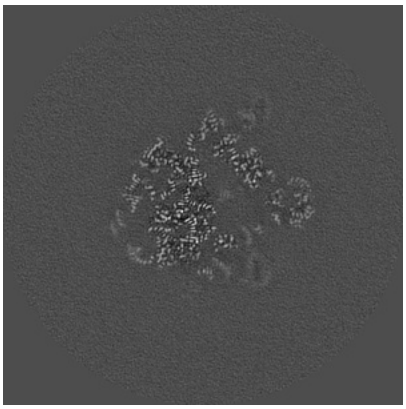
6.2.1 Primary map



X Index: 256

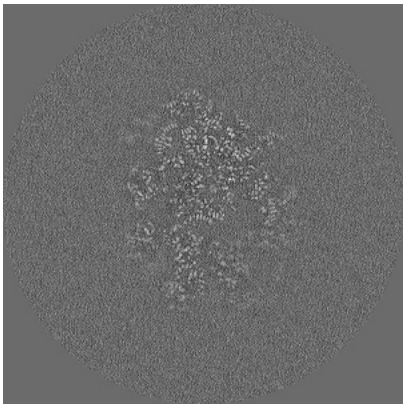


Y Index: 256

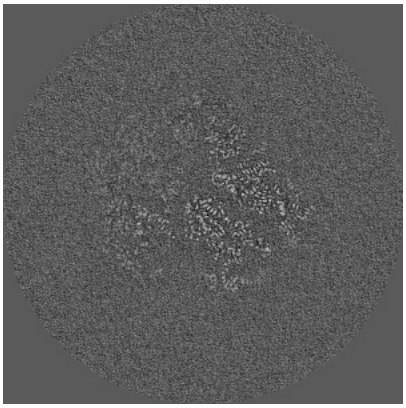


Z Index: 256

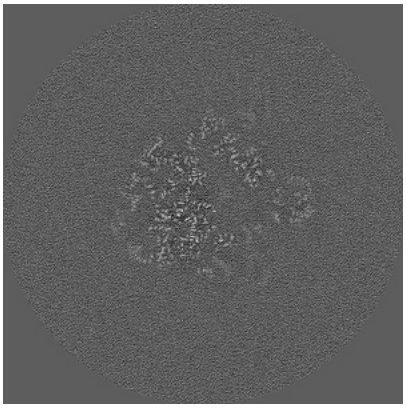
6.2.2 Raw map



X Index: 256



Y Index: 256

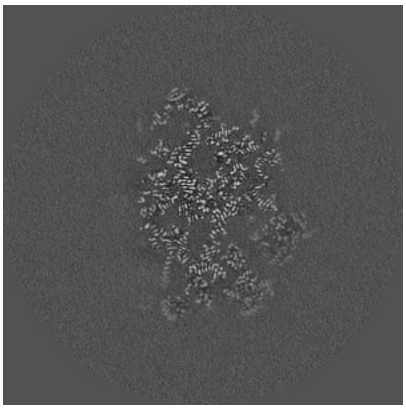


Z Index: 256

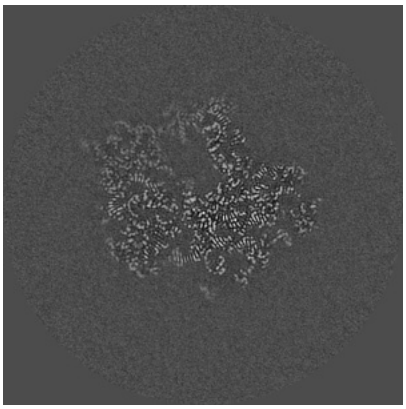
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

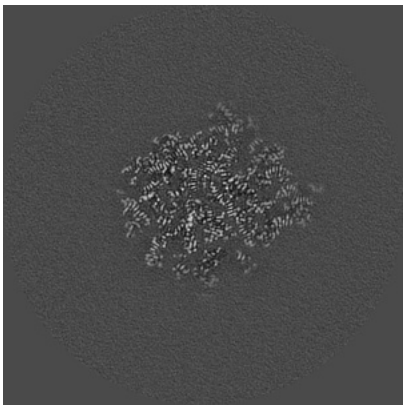
6.3.1 Primary map



X Index: 239

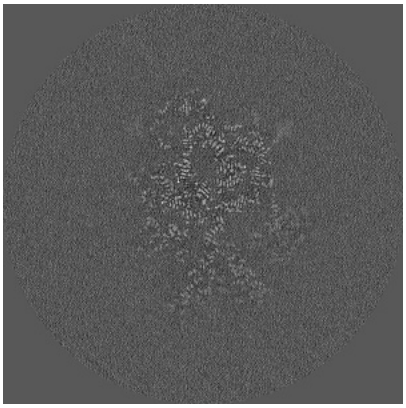


Y Index: 237

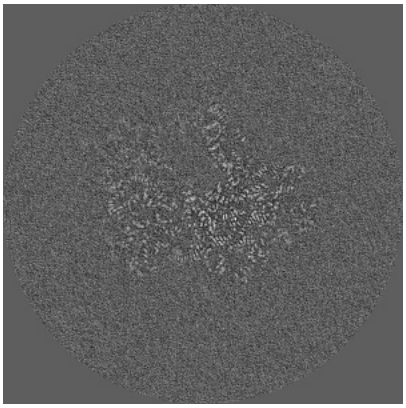


Z Index: 282

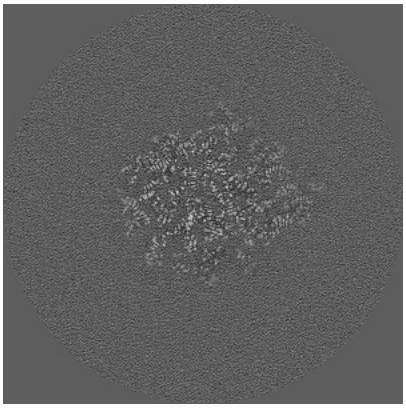
6.3.2 Raw map



X Index: 244



Y Index: 237

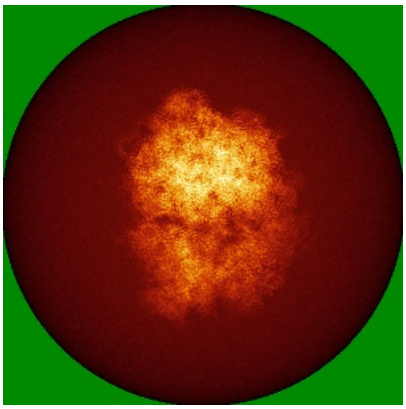


Z Index: 282

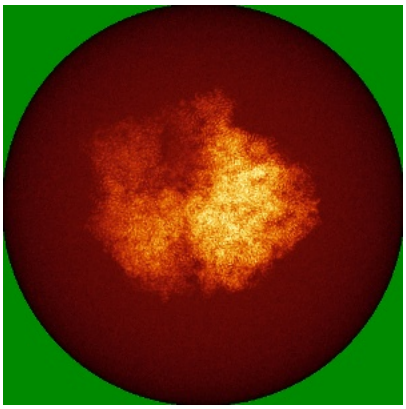
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

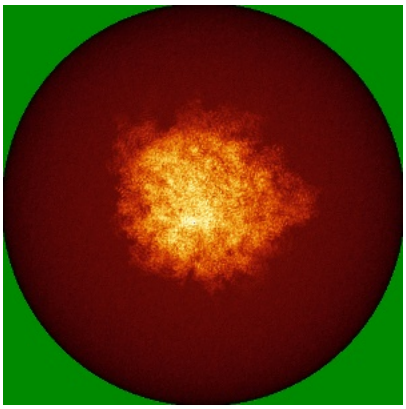
6.4.1 Primary map



X

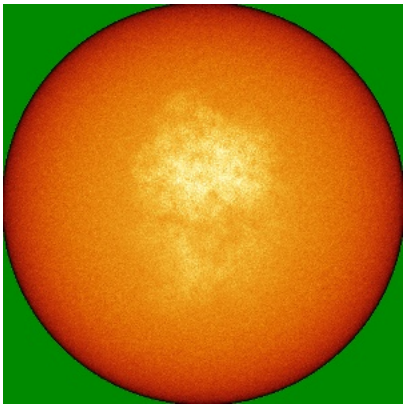


Y

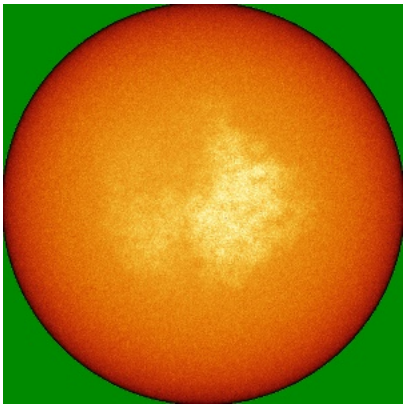


Z

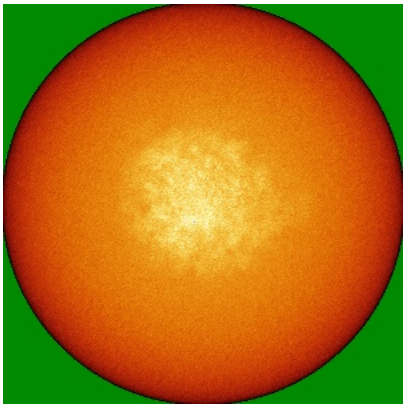
6.4.2 Raw map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

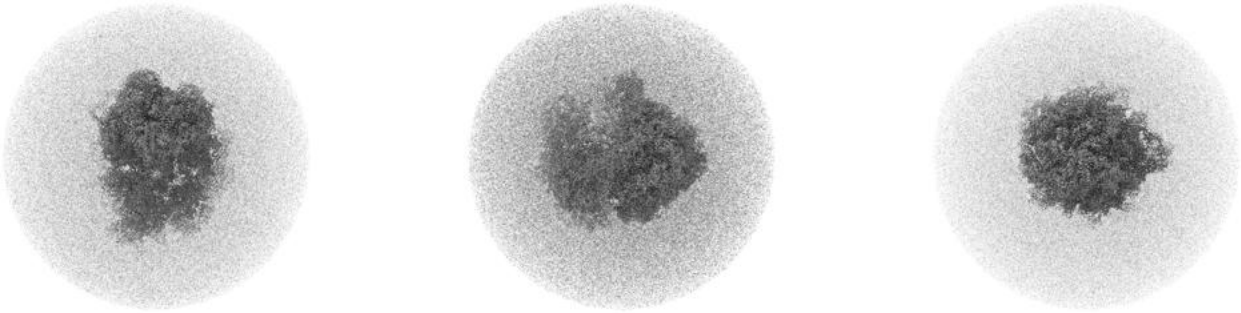
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.005. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

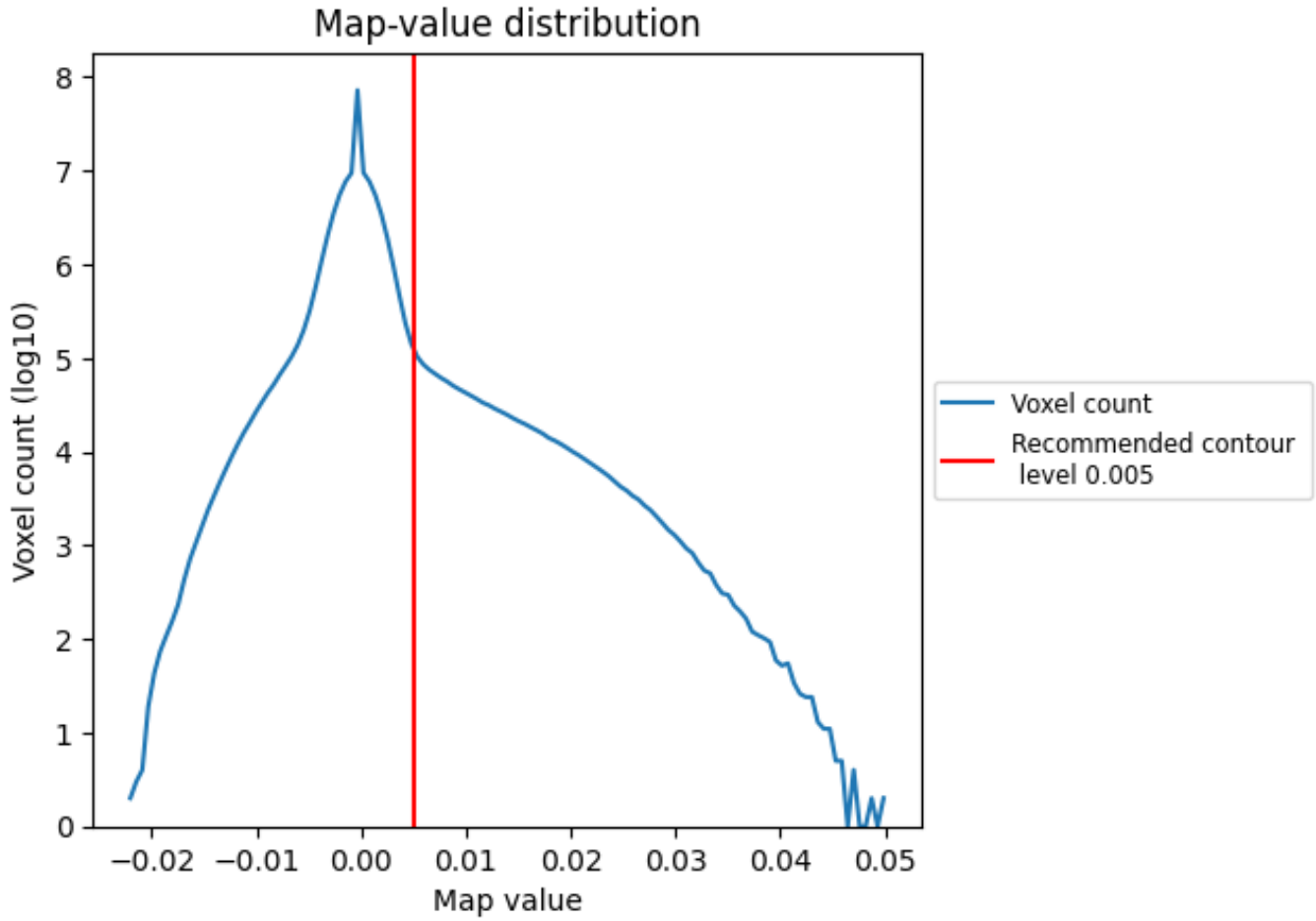
6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis

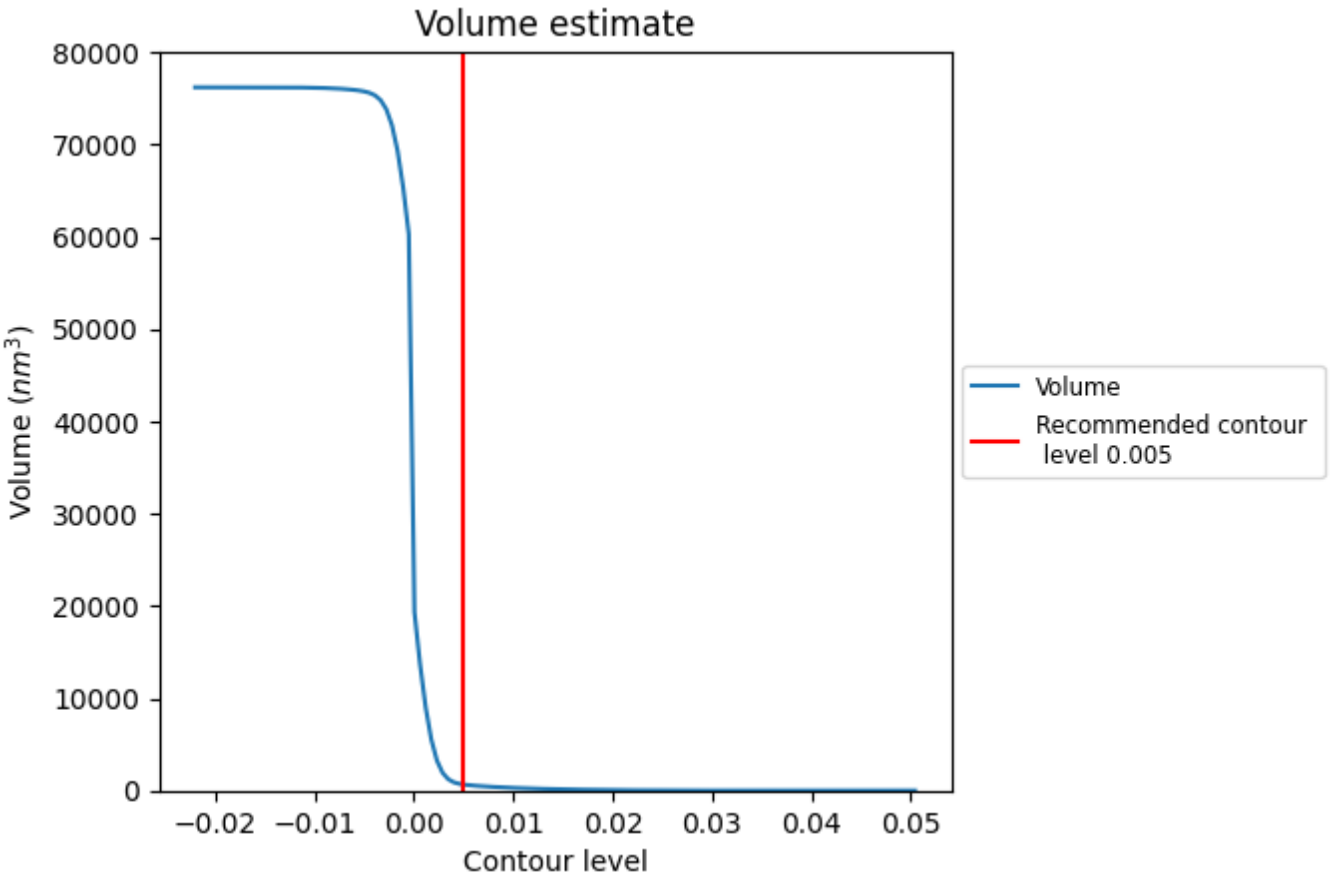
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

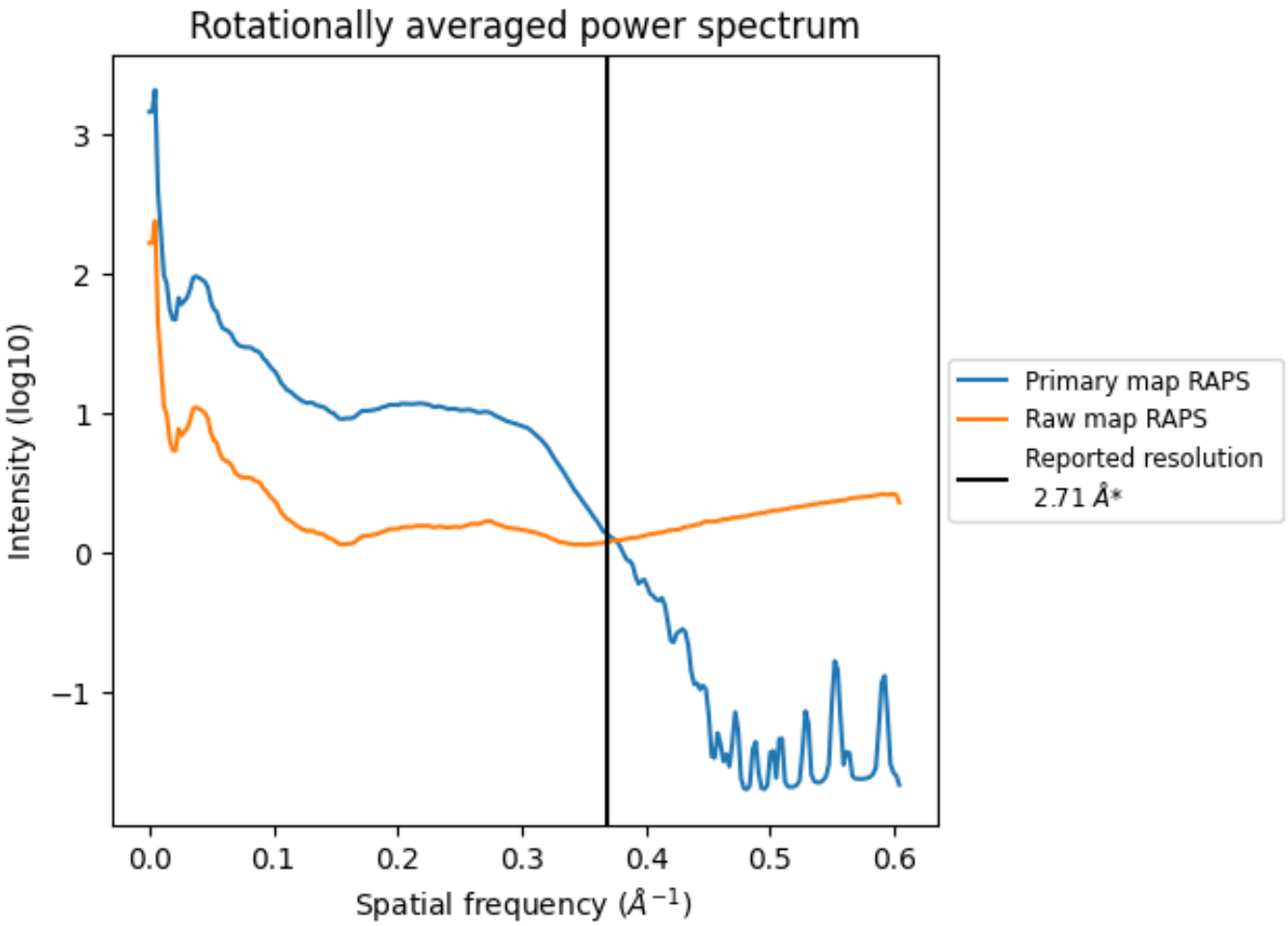
7.2 Volume estimate



The volume at the recommended contour level is 654 nm^3; this corresponds to an approximate mass of 591 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)

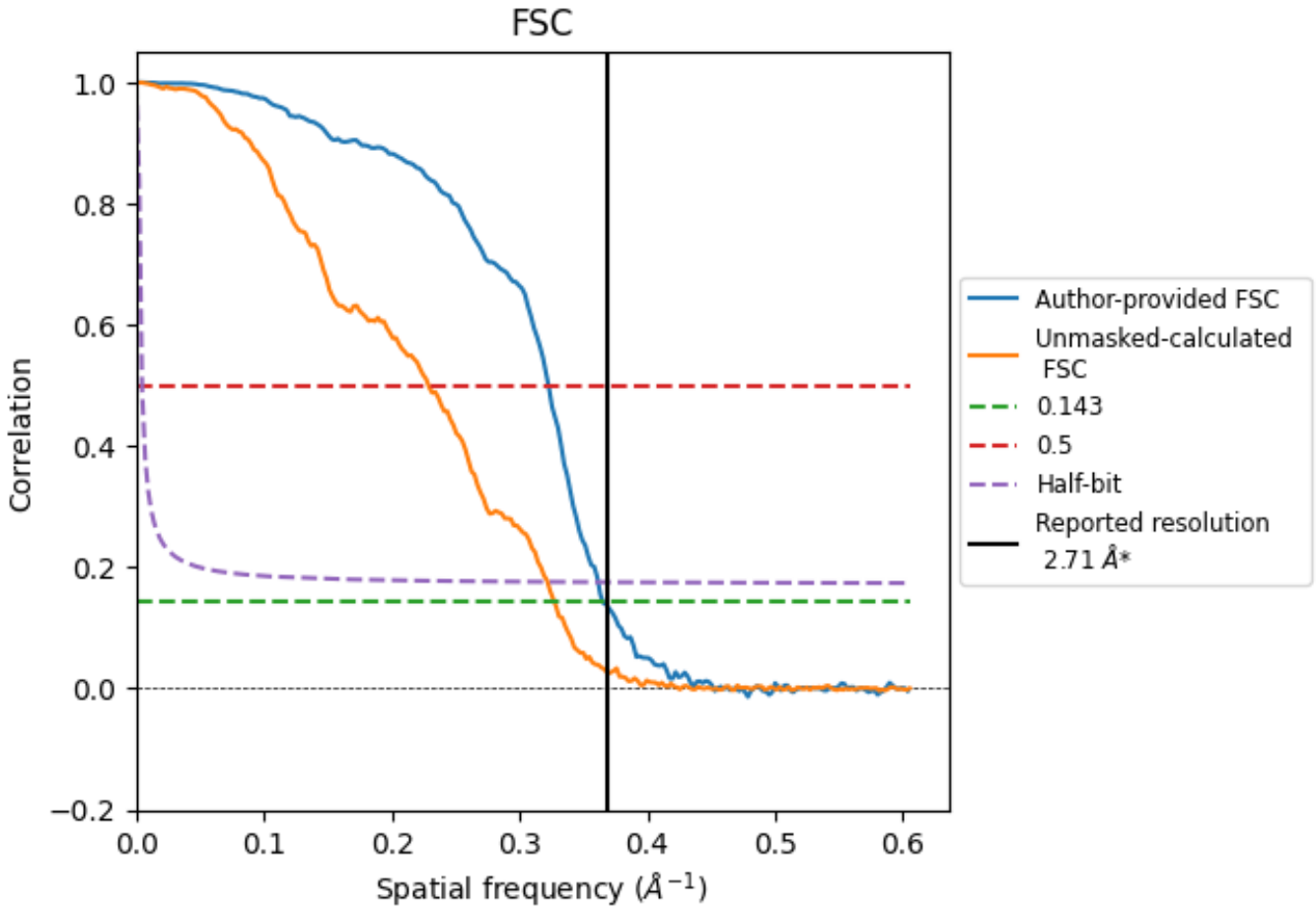


*Reported resolution corresponds to spatial frequency of 0.369 Å^{-1}

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.369 Å^{-1}

8.2 Resolution estimates (i)

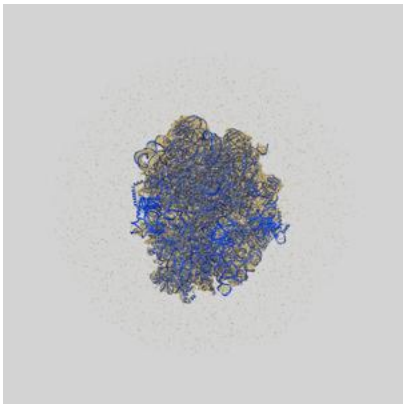
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.71	-	-
Author-provided FSC curve	2.74	3.10	2.77
Unmasked-calculated*	3.06	4.37	3.11

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.06 differs from the reported value 2.71 by more than 10 %

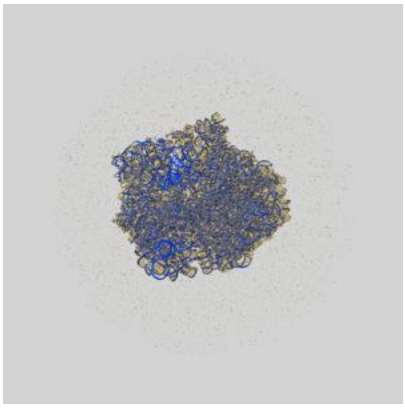
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-74588 and PDB model 9ZR3. Per-residue inclusion information can be found in section 3 on page 19.

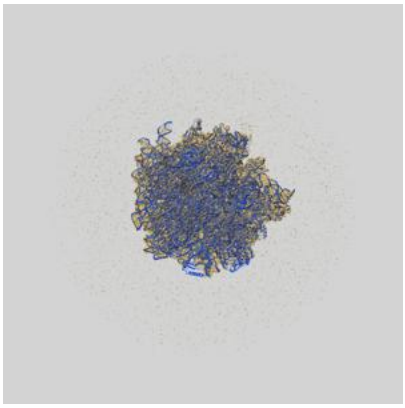
9.1 Map-model overlay



X



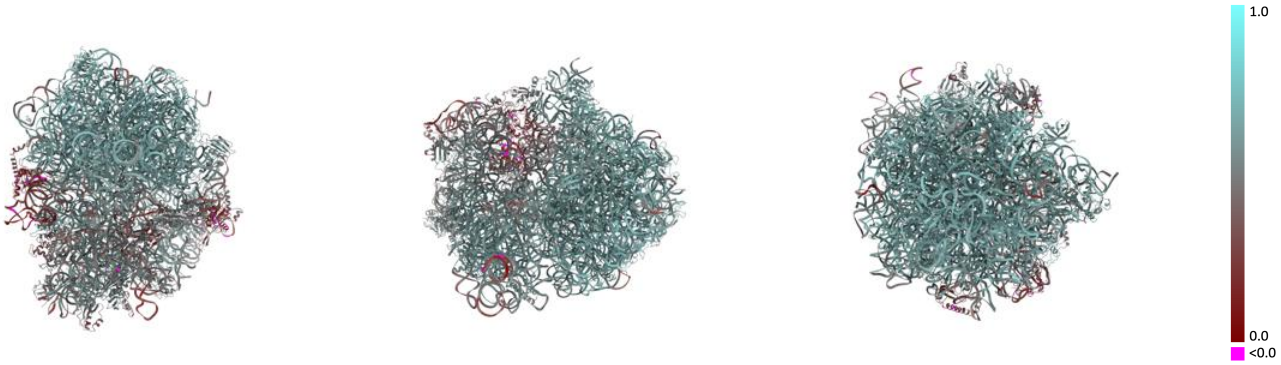
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.005 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

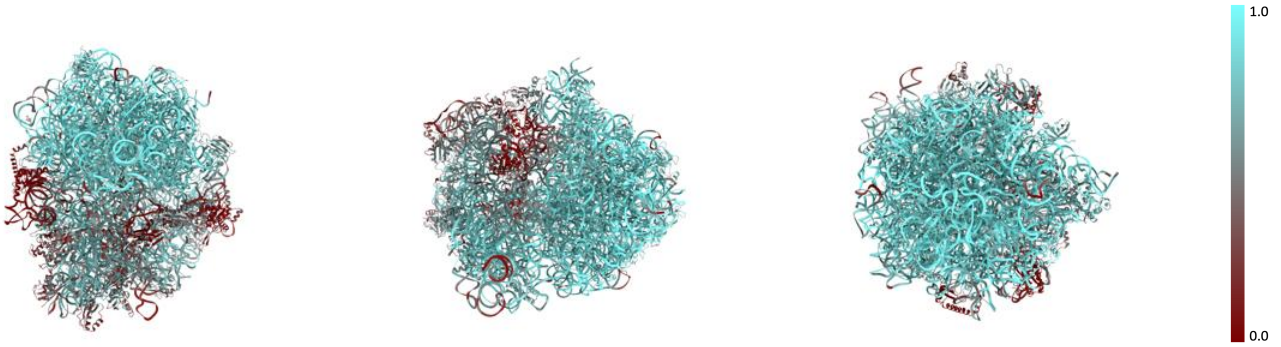
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

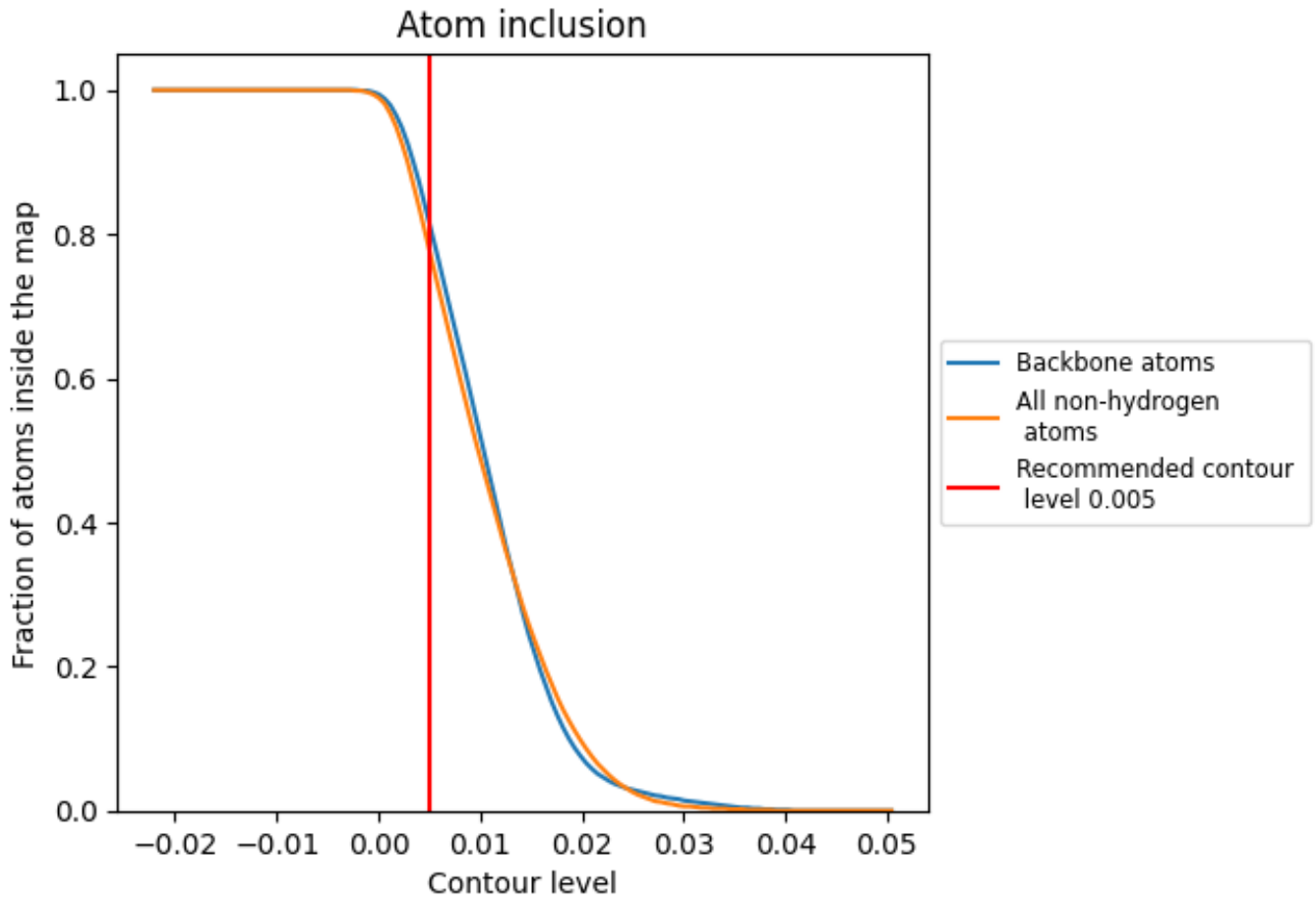
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.005).

9.4 Atom inclusion (i)



At the recommended contour level, 82% of all backbone atoms, 78% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.005) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7780	0.5810
16	0.7900	0.5600
23	0.8940	0.6160
5	0.8770	0.6000
Dt	0.6610	0.5110
EF	0.4180	0.4910
LA	0.0220	0.2740
LB	0.9050	0.6580
LC	0.8820	0.6510
LD	0.8440	0.6370
LE	0.5320	0.5300
LF	0.6690	0.5690
LI	0.2010	0.3570
LK	0.0150	0.2120
LM	0.8890	0.6500
LN	0.8850	0.6520
LO	0.8670	0.6420
LP	0.8640	0.6500
LQ	0.9070	0.6540
LR	0.7370	0.6020
LS	0.8210	0.6310
LT	0.9190	0.6650
LU	0.8550	0.6340
LV	0.8830	0.6490
LW	0.7940	0.6350
LX	0.7650	0.6030
LY	0.7790	0.6170
La	0.8570	0.6450
Lb	0.8620	0.6400
Lc	0.7680	0.6100
Ld	0.8690	0.6470
Le	0.3750	0.4350
Lf	0.8630	0.6470
Lg	0.7640	0.6140
Lh	0.9300	0.6710



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Chain	Atom inclusion	Q-score
Li	0.9250	0.6700
Lj	0.8500	0.6320
Pp	0.5670	0.6310
Pt	0.4080	0.4360
SB	0.5400	0.5290
SC	0.5580	0.5380
SD	0.5590	0.5470
SE	0.7520	0.6050
SF	0.5960	0.5380
SG	0.3060	0.4400
SH	0.7490	0.6130
SI	0.4250	0.4860
SJ	0.3940	0.4710
SK	0.7350	0.6020
SL	0.6960	0.5950
SM	0.3510	0.4340
SN	0.4730	0.5000
SO	0.7230	0.6010
SP	0.6990	0.5920
SQ	0.6580	0.5700
SR	0.6670	0.5880
SS	0.2970	0.4300
ST	0.6410	0.5650
SU	0.5910	0.5550
mR	0.5180	0.4900