



Full wwPDB EM Validation Report ⓘ

Nov 7, 2023 – 06:24 am GMT

PDB ID : 8PV5
EMDB ID : EMD-17954
Title : Chaetomium thermophilum pre-60S State 8 - pre-5S rotation without Foot - composite structure
Authors : Thoms, M.; Cheng, J.; Denk, T.; Berninghausen, O.; Beckmann, R.
Deposited on : 2023-07-17
Resolution : 2.86 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev70
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

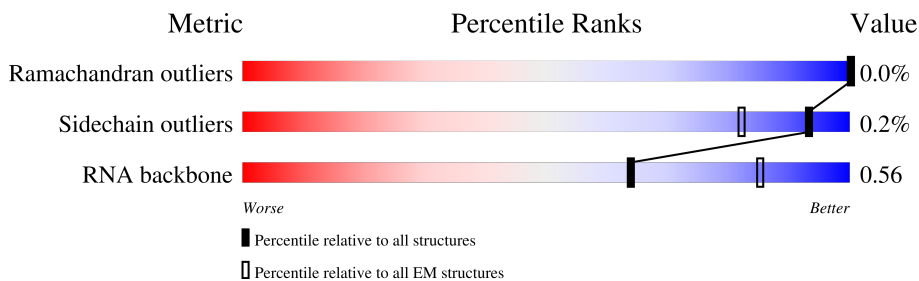
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.86 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.







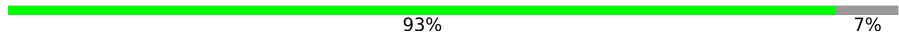
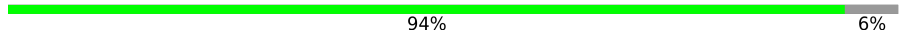


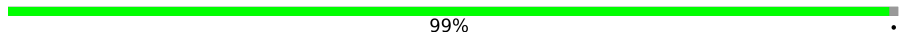
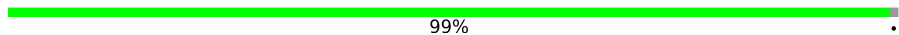
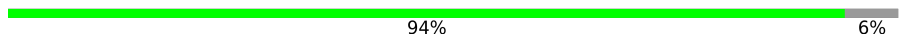
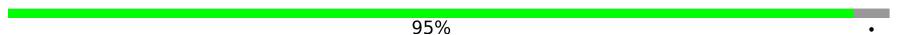



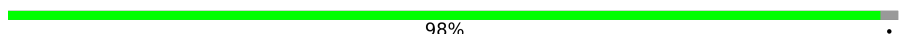
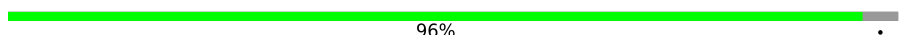
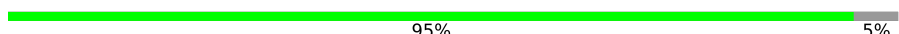
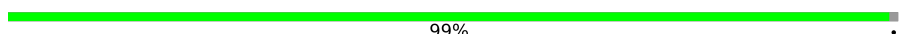
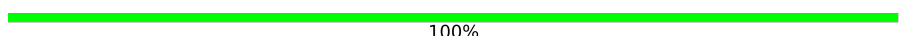
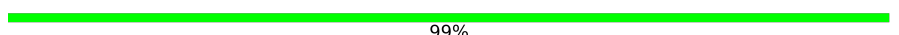


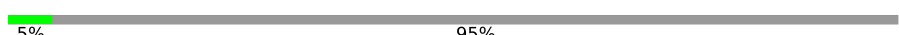
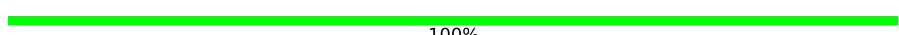
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	C1	3342	
2	C2	156	
3	C4	119	
4	CF	270	
5	CH	661	
6	CK	261	
7	CL	558	
8	CN	246	
9	CO	120	

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Mol	Chain	Length	Quality of chain
10	CQ	225	 80% 19%
11	Cb	117	 86% 14%
12	Cd	627	 74% 26%
13	Cf	350	 81% 19%
14	Cg	202	 93% 7%
15	Ch	517	 94% 6%
16	Cz	123	 81% 18%
17	LA	254	 75% 25%
18	LB	392	 99%
19	LC	365	 99%
20	LD	304	 94% 6%
21	LE	200	 95%
22	LF	249	 99%
23	LG	262	 89% 10%
24	LH	229	 83% 17%
25	LJ	173	 98%
26	LK	165	 96%
27	LL	213	 95% 5%
28	LM	142	 99%
29	LN	203	 100%
30	LO	204	 99%
31	LP	187	 91% 9%
32	LQ	213	 70% 30%
33	LR	2898	 5% 95%
34	LS	174	 100%

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Mol	Chain	Length	Quality of chain
35	LT	160	81% 19%
36	LU	127	83% 17%
37	LV	139	96% ..
38	LX	156	78% 22%
39	LY	138	96% ..
40	LZ	135	99% .
41	La	149	72% 28%
42	Lc	108	87% . 12%
43	Ld	120	92% 8%
44	Le	131	96% .
45	Lf	109	99% .
46	Lg	119	99% .
47	Lh	935	13% 87%
48	Li	110	92% 8%
49	Lj	95	93% 7%
50	Lk	94	79% . 19%
51	Ll	51	98% .
52	Lp	92	99% .
53	Lq	147	95% 5%

2 Entry composition

There are 57 unique types of molecules in this entry. The entry contains 144398 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 26S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	C1	3060	65497	29256	11853	21328	3060	0	0

- Molecule 2 is a RNA chain called 5.8S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	C2	152	3239	1448	579	1060	152	0	0

- Molecule 3 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	C4	119	2536	1131	453	833	119	0	0

- Molecule 4 is a protein called Large ribosomal subunit protein uL10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	CF	245	1934	1215	350	360	9	0	0

- Molecule 5 is a protein called Nucleolar GTP-binding protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	CH	627	5053	3175	920	939	19	0	0

- Molecule 6 is a protein called Ribosome biogenesis protein NSA2 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	CK	237	1903	1198	368	333	4	0	0

- Molecule 7 is a protein called Putative GTP binding protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
7	CL	79	622	389	125	108	0	0

- Molecule 8 is a protein called Eukaryotic translation initiation factor 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	CN	246	1853	1156	322	368	7	0	0

- Molecule 9 is a protein called DUF2423 domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	CO	62	468	290	94	82	2	0	0

- Molecule 10 is a protein called Ribosome biogenesis protein RLP24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	CQ	183	1480	925	304	241	10	0	0

- Molecule 11 is a protein called Zinc finger domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	Cb	101	830	517	161	148	4	0	0

- Molecule 12 is a protein called Nucleolar GTP-binding protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	Cd	462	3691	2350	671	659	11	0	0

- Molecule 13 is a protein called Ribosome production factor 2 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	Cf	285	2282	1443	417	401	21	0	0

- Molecule 14 is a protein called Ribosome biogenesis regulatory protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	Cg	188	Total	C	N	O	S	0	0
			1478	924	283	270	1		

- Molecule 15 is a protein called Ribosome assembly protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	Ch	485	Total	C	N	O	S	1	0
			3812	2396	696	710	10		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Ch	117	ASP	GLU	engineered mutation	UNP G0SC29

- Molecule 16 is a protein called rRNA-processing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	Cz	101	Total	C	N	O	S	0	0
			869	541	180	144	4		

- Molecule 17 is a protein called 60S ribosomal protein L2-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	LA	191	Total	C	N	O	S	0	0
			1454	917	278	256	3		

- Molecule 18 is a protein called 60S ribosomal protein L3-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	LB	389	Total	C	N	O	S	0	0
			3104	1973	579	539	13		

- Molecule 19 is a protein called 60S ribosomal protein L4-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	LC	363	Total	C	N	O	S	0	0
			2751	1737	527	478	9		

- Molecule 20 is a protein called 60S ribosomal protein l5-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	LD	286	Total	C	N	O	S	0	0
			2266	1434	407	422	3		

- Molecule 21 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	LE	191	Total	C	N	O	S	0	0
			1477	944	267	263	3		

- Molecule 22 is a protein called 60S ribosomal protein l7-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	LF	248	Total	C	N	O	S	0	0
			2023	1297	377	346	3		

- Molecule 23 is a protein called 60S ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	LG	235	Total	C	N	O	S	0	0
			1885	1207	349	324	5		

- Molecule 24 is a protein called 60S ribosomal protein l9-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	LH	190	Total	C	N	O	S	0	0
			1495	949	268	272	6		

- Molecule 25 is a protein called Putative ribosomal protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	LJ	169	Total	C	N	O	S	0	0
			1357	850	266	235	6		

- Molecule 26 is a protein called 60S ribosomal protein L12-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	LK	158	Total	C	N	O	S	0	0
			1184	743	215	224	2		

- Molecule 27 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	LL	203	Total	C	N	O	S	0	0
			1587	989	325	271	2		

- Molecule 28 is a protein called 60S ribosomal protein L14-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	LM	141	Total	C	N	O	S	0	0
			1126	714	216	195	1		

- Molecule 29 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	LN	202	Total	C	N	O	S	0	0
			1704	1062	360	278	4		

- Molecule 30 is a protein called 60S ribosomal protein L16-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	LO	203	Total	C	N	O	S	0	0
			1611	1034	305	267	5		

- Molecule 31 is a protein called 60S ribosomal protein l17-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	LP	171	Total	C	N	O	S	0	0
			1343	834	274	232	3		

- Molecule 32 is a protein called Ribosomal protein L18-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	LQ	150	Total	C	N	O	S	0	0
			1200	759	239	200	2		

- Molecule 33 is a protein called Ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	LR	152	Total	C	N	O	S	0	0
			1226	763	259	200	4		

- Molecule 34 is a protein called 60S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	LS	174	1426	917	266	238	5	0	0

- Molecule 35 is a protein called 60S ribosomal protein l21-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	LT	129	1027	651	195	179	2	0	0

- Molecule 36 is a protein called 60S ribosomal protein L22-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	LU	105	846	548	146	151	1	0	0

- Molecule 37 is a protein called 60S ribosomal protein l23-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	LV	135	991	630	184	170	7	0	0

- Molecule 38 is a protein called 60S ribosomal protein L25-like protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
38	LX	122	959	614	174	171	0	0

- Molecule 39 is a protein called 60S ribosomal protein L26-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	LY	133	1056	658	213	183	2	0	0

- Molecule 40 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	LZ	135	1112	713	207	188	4	0	0

- Molecule 41 is a protein called 60S ribosomal protein L28-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	La	108	872	556	168	147	1	0	0

- Molecule 42 is a protein called 60S ribosomal protein l30-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	Lc	95	705	449	122	129	5	0	0

- Molecule 43 is a protein called Putative 60S ribosomal protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	Ld	110	875	555	171	148	1	0	0

- Molecule 44 is a protein called 60S ribosomal protein L32-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	Le	126	1017	640	208	163	6	0	0

- Molecule 45 is a protein called 60S ribosomal protein l33-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	Lf	108	862	546	171	144	1	0	0

- Molecule 46 is a protein called Ribosomal protein l34-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	Lg	118	914	567	186	157	4	0	0

- Molecule 47 is a protein called dolichyl-diphosphooligosaccharide--protein glycotransferase.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
47	Lh	118	981	626	194	161	0	0

- Molecule 48 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	Li	101	Total	C	N	O	S	0	0
			827	509	181	136	1		

- Molecule 49 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	Lj	88	Total	C	N	O	S	0	0
			698	427	154	112	5		

- Molecule 50 is a protein called 60S ribosomal protein L38-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	Lk	76	Total	C	N	O	S	0	0
			632	400	121	109	2		

- Molecule 51 is a protein called Ribosomal protein eL39.

Mol	Chain	Residues	Atoms				AltConf	Trace
51	Ll	50	Total	C	N	O	0	0
			436	275	97	64		

- Molecule 52 is a protein called 60S ribosomal protein L43-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	Lp	91	Total	C	N	O	S	0	0
			698	430	138	124	6		

- Molecule 53 is a protein called Putative 60S ribosomal protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
53	Lq	139	Total	C	N	O	0	0
			1049	657	204	188		

- Molecule 54 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: C₁₀H₁₆N₅O₁₄P₃).



Mol	Chain	Residues	Atoms					AltConf
54	CH	1	Total	C	N	O	P	0
			32	10	5	14	3	
54	Cd	1	Total	C	N	O	P	0
			32	10	5	14	3	

- Molecule 55 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
55	CH	1	Total	Mg	0
			1	1	
55	Cd	2	Total	Mg	0
			2	2	

- Molecule 56 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
56	CQ	1	Total	Zn	0
			1	1	
56	Cb	1	Total	Zn	0
			1	1	
56	Lg	1	Total	Zn	0
			1	1	
56	Lj	1	Total	Zn	0
			1	1	
56	Lp	1	Total	Zn	0
			1	1	

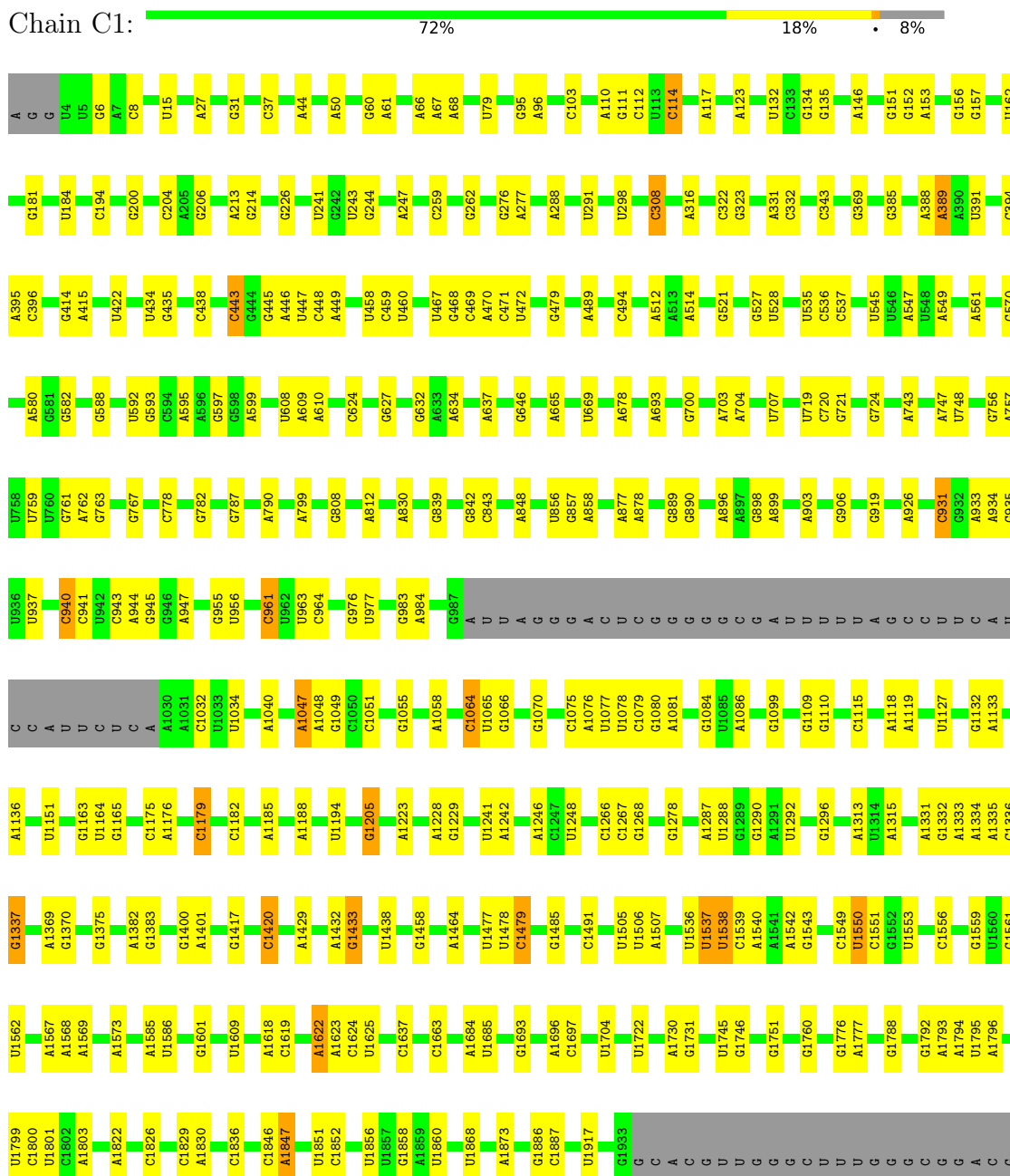
- Molecule 57 is water.

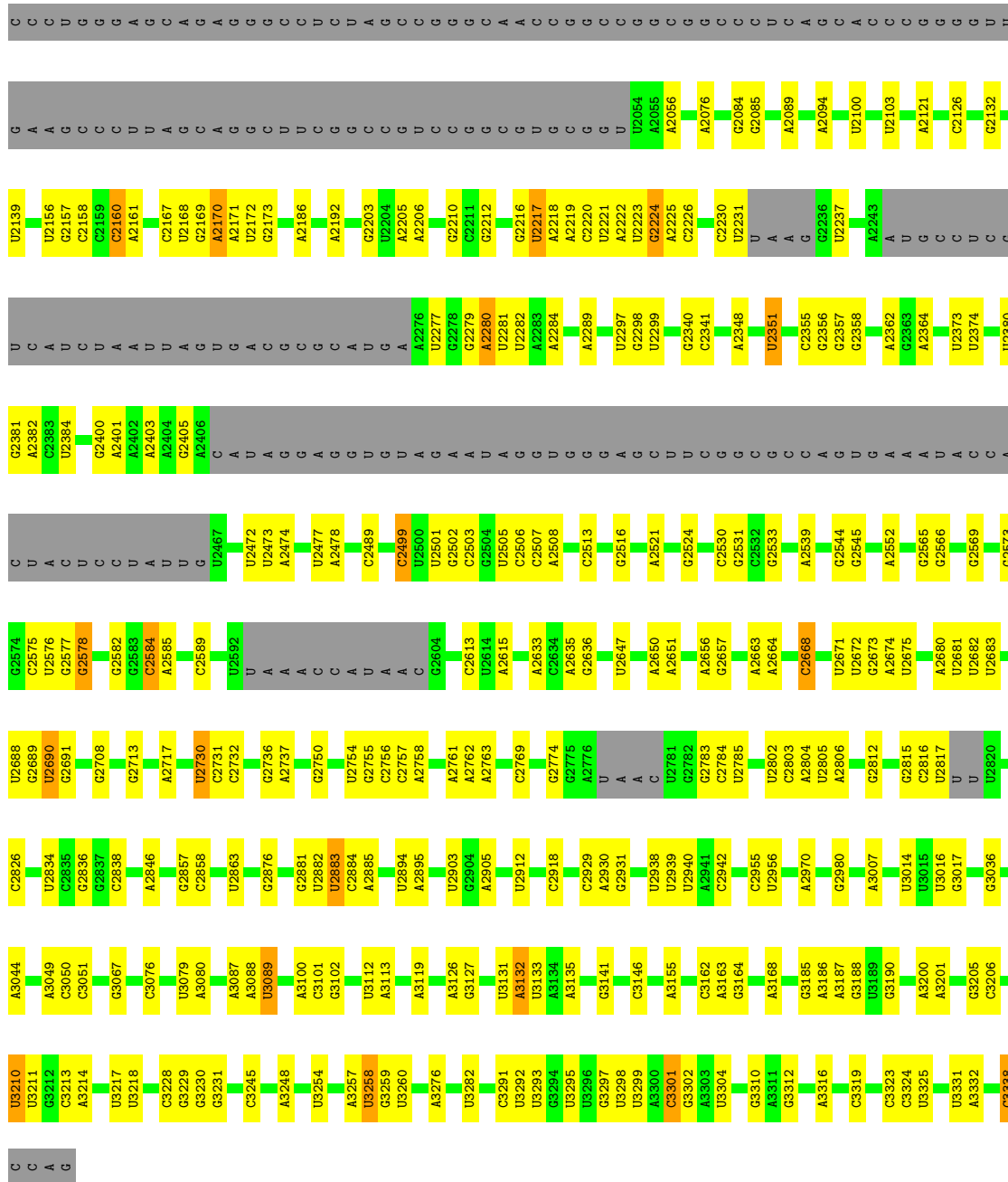
Mol	Chain	Residues	Atoms	AltConf
57	CH	1	Total O 1 1	0
57	Cd	2	Total O 2 2	0

3 Residue-property plots [i](#)

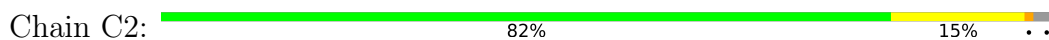
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded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

- Molecule 1: 26S rRNA

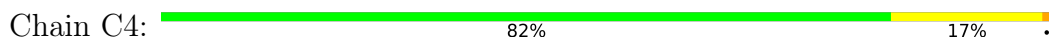




● Molecule 2: 5.8S rRNA

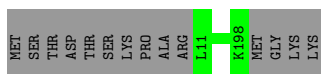


● Molecule 3: 5S rRNA



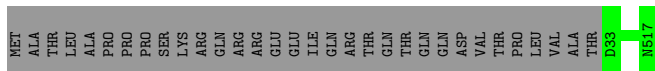
- Molecule 14: Ribosome biogenesis regulatory protein

Chain Cg:  93% 7%




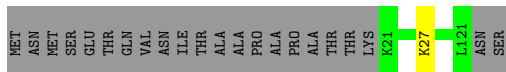
- Molecule 15: Ribosome assembly protein 4

Chain Ch:  94% 6%




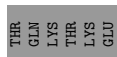
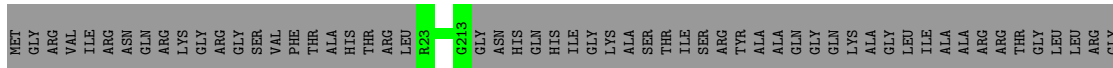
- Molecule 16: rRNA-processing protein

Chain Cz:  81% 18%



- Molecule 17: 60S ribosomal protein L2-like protein

Chain LA:  75% 25%



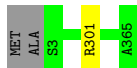
- Molecule 18: 60S ribosomal protein L3-like protein

Chain LB:  99%



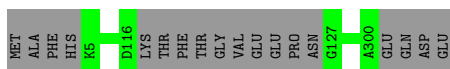
- Molecule 19: 60S ribosomal protein L4-like protein

Chain LC:  99%



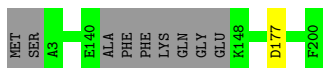
- Molecule 20: 60S ribosomal protein l5-like protein

Chain LD:  94% 6%



- Molecule 21: 60S ribosomal protein L6

Chain LE: 95%



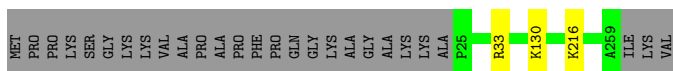
- Molecule 22: 60S ribosomal protein l7-like protein

Chain LF: 99%



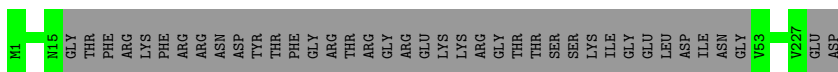
- Molecule 23: 60S ribosomal protein L8

Chain LG: 89% 10%



- Molecule 24: 60S ribosomal protein l9-like protein

Chain LH: 83% 17%



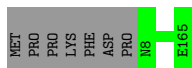
- Molecule 25: Putative ribosomal protein

Chain LJ: 98%



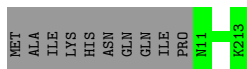
- Molecule 26: 60S ribosomal protein L12-like protein

Chain LK: 96%



- Molecule 27: 60S ribosomal protein L13

Chain LL: 95% 5%



- Molecule 28: 60S ribosomal protein L14-like protein



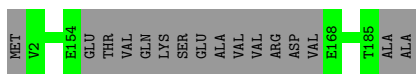
- Molecule 29: Ribosomal protein L15



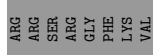
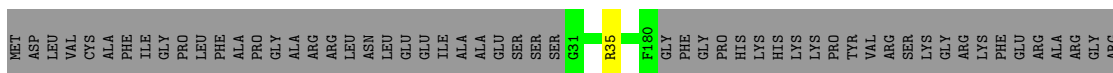
- Molecule 30: 60S ribosomal protein L16-like protein



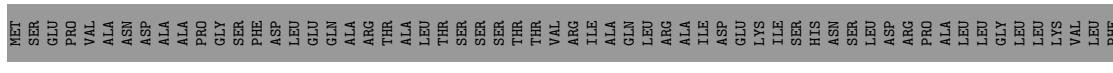
- Molecule 31: 60S ribosomal protein l17-like protein

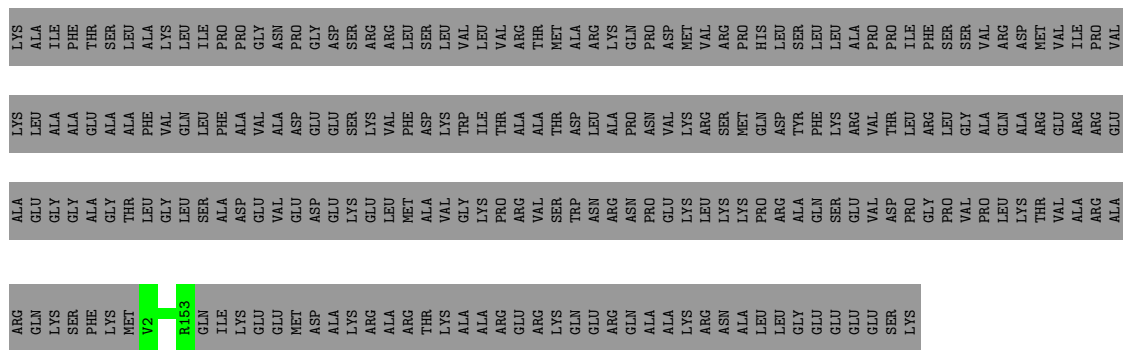


- Molecule 32: Ribosomal protein L18-like protein



- Molecule 33: Ribosomal protein L19



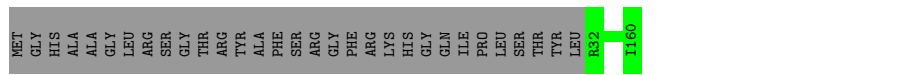
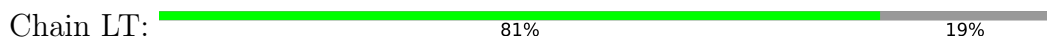


• Molecule 34: 60S ribosomal protein L20

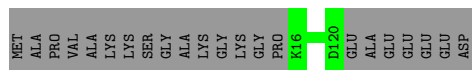
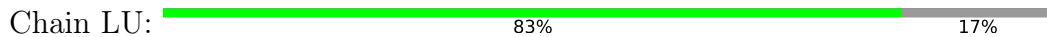


There are no outlier residues recorded for this chain.

• Molecule 35: 60S ribosomal protein l21-like protein



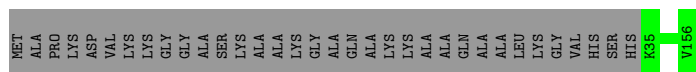
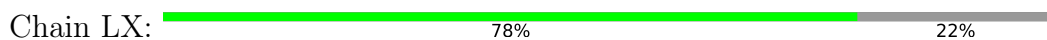
• Molecule 36: 60S ribosomal protein L22-like protein



• Molecule 37: 60S ribosomal protein l23-like protein

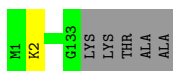


• Molecule 38: 60S ribosomal protein L25-like protein



• Molecule 39: 60S ribosomal protein L26-like protein





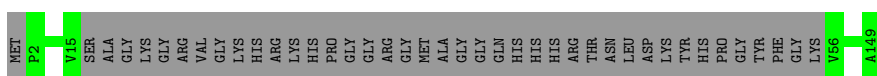
- Molecule 40: 60S ribosomal protein L27

Chain LZ: 99%



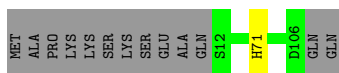
- Molecule 41: 60S ribosomal protein L28-like protein

Chain La: 72%



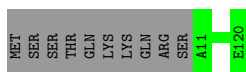
- Molecule 42: 60S ribosomal protein l30-like protein

Chain Lc: 87%



- Molecule 43: Putative 60S ribosomal protein

Chain Ld: 92%



- Molecule 44: 60S ribosomal protein L32-like protein

Chain Le: 96%



- Molecule 45: 60S ribosomal protein l33-like protein

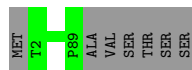
Chain Lf: 99%




- Molecule 46: Ribosomal protein l34-like protein

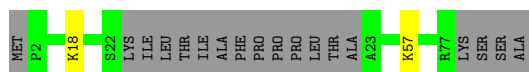
Chain Lg: 99%

Chain Lj:  93% 7%



- Molecule 50: 60S ribosomal protein L38-like protein

Chain Lk:  79% 19%



- Molecule 51: Ribosomal protein eL39

Chain Ll:  98%



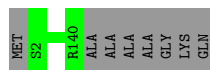
- Molecule 52: 60S ribosomal protein L43-like protein

Chain Lp:  99%



- Molecule 53: Putative 60S ribosomal protein

Chain Lq:  95% 5%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	88358	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	46	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, GTP, OMG, A2M, OMU, MG, OMC

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	C1	0.27	0/72444	0.90	89/112946 (0.1%)
2	C2	0.26	0/3621	0.86	2/5638 (0.0%)
3	C4	0.28	0/2833	0.95	6/4414 (0.1%)
4	CF	0.28	0/1972	0.58	0/2660
5	CH	0.27	0/5137	0.54	0/6915
6	CK	0.26	0/1939	0.54	0/2608
7	CL	0.25	0/631	0.58	0/843
8	CN	0.27	0/1878	0.57	0/2555
9	CO	0.25	0/470	0.53	0/619
10	CQ	0.30	0/1504	0.67	1/2000 (0.1%)
11	Cb	0.25	0/845	0.55	0/1128
12	Cd	0.26	0/3770	0.52	0/5082
13	Cf	0.26	0/2326	0.55	0/3113
14	Cg	0.25	0/1508	0.56	0/2051
15	Ch	0.26	0/3914	0.56	0/5319
16	Cz	0.28	0/877	0.63	0/1148
17	LA	0.26	0/1488	0.57	0/2009
18	LB	0.28	0/3172	0.57	0/4260
19	LC	0.27	0/2808	0.54	0/3785
20	LD	0.26	0/2308	0.51	0/3105
21	LE	0.26	0/1504	0.57	1/2027 (0.0%)
22	LF	0.30	0/2061	0.59	0/2765
23	LG	0.26	0/1914	0.53	0/2561
24	LH	0.25	0/1515	0.51	0/2037
25	LJ	0.26	0/1379	0.60	0/1844
26	LK	0.26	0/1198	0.56	0/1611
27	LL	0.26	0/1614	0.58	0/2168
28	LM	0.30	0/1145	0.61	0/1539
29	LN	0.26	0/1741	0.60	0/2332
30	LO	0.28	0/1645	0.57	1/2205 (0.0%)
31	LP	0.25	0/1364	0.57	0/1835
32	LQ	0.28	0/1218	0.61	0/1639

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	LR	0.25	0/1245	0.56	0/1662
34	LS	0.28	0/1461	0.58	0/1966
35	LT	0.28	0/1046	0.62	0/1409
36	LU	0.26	0/859	0.50	0/1151
37	LV	0.28	0/1009	0.57	1/1357 (0.1%)
38	LX	0.26	0/975	0.55	0/1317
39	LY	0.26	0/1070	0.61	0/1432
40	LZ	0.30	0/1135	0.60	1/1519 (0.1%)
41	La	0.25	0/892	0.57	0/1200
42	Lc	0.28	0/714	0.61	0/960
43	Ld	0.26	0/889	0.56	0/1192
44	Le	0.26	0/1035	0.54	0/1379
45	Lf	0.27	0/883	0.59	0/1187
46	Lg	0.26	0/927	0.59	0/1244
47	Lh	0.25	0/991	0.56	0/1317
48	Li	0.25	0/834	0.60	0/1099
49	Lj	0.26	0/712	0.61	0/944
50	Lk	0.26	0/640	0.57	0/850
51	Ll	0.23	0/446	0.56	0/593
52	Lp	0.25	0/706	0.62	0/940
53	Lq	0.27	0/1067	0.56	0/1442
All	All	0.27	0/153279	0.77	102/222921 (0.0%)

There are no bond length outliers.

All (102) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C1	1562	U	C2-N1-C1'	9.59	129.21	117.70
1	C1	1550	U	N1-C2-O2	9.37	129.36	122.80
1	C1	1562	U	N1-C2-O2	9.28	129.30	122.80
1	C1	1478	U	C2-N1-C1'	9.18	128.72	117.70
1	C1	1550	U	C2-N1-C1'	9.05	128.56	117.70
1	C1	1562	U	N3-C2-O2	-8.53	116.23	122.20
1	C1	1550	U	N3-C2-O2	-8.33	116.37	122.20
1	C1	2730	U	N1-C2-O2	8.19	128.53	122.80
1	C1	2730	U	C2-N1-C1'	8.18	127.52	117.70
1	C1	1478	U	N1-C2-O2	8.16	128.51	122.80
1	C1	1478	U	N3-C2-O2	-7.81	116.73	122.20
1	C1	2730	U	N3-C2-O2	-7.75	116.78	122.20
1	C1	1538	U	N1-C2-O2	7.73	128.21	122.80
1	C1	1538	U	N3-C2-O2	-7.54	116.92	122.20
21	LE	177	ASP	CB-CG-OD1	7.51	125.06	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C1	2681	U	N3-C2-O2	-7.49	116.96	122.20
1	C1	1179	C	C2-N1-C1'	7.42	126.97	118.80
1	C1	1538	U	C2-N1-C1'	7.37	126.55	117.70
1	C1	1179	C	N1-C2-O2	7.29	123.28	118.90
1	C1	103	C	N1-C2-O2	6.82	122.99	118.90
10	CQ	161	ARG	CB-CG-CD	6.69	128.99	111.60
3	C4	42	C	N1-C2-O2	6.57	122.84	118.90
1	C1	1266	C	N1-C2-O2	6.51	122.81	118.90
1	C1	3089	U	C2-N1-C1'	6.47	125.47	117.70
1	C1	1064	C	P-O3'-C3'	6.42	127.41	119.70
1	C1	1537	U	P-O3'-C3'	6.35	127.32	119.70
1	C1	3258	U	P-O3'-C3'	6.32	127.29	119.70
1	C1	2689	G	C4-N9-C1'	6.22	134.59	126.50
1	C1	1562	U	C6-N1-C1'	-6.22	112.49	121.20
3	C4	50	U	N1-C2-O2	6.13	127.09	122.80
1	C1	114	C	C2-N1-C1'	6.10	125.51	118.80
1	C1	2217	U	C2-N1-C1'	6.08	124.99	117.70
1	C1	1266	C	N3-C2-O2	-6.06	117.66	121.90
1	C1	2351	U	N3-C2-O2	-6.04	117.97	122.20
37	LV	99	ASP	CB-CG-OD1	6.03	123.72	118.30
1	C1	1478	U	C6-N1-C1'	-6.02	112.78	121.20
1	C1	2160	C	P-O3'-C3'	6.02	126.92	119.70
1	C1	2681	U	N1-C2-O2	5.96	126.97	122.80
1	C1	1851	U	N3-C2-O2	-5.95	118.04	122.20
1	C1	443	C	C2-N1-C1'	5.89	125.28	118.80
1	C1	3338	C	N1-C2-O2	5.88	122.43	118.90
1	C1	2217	U	N1-C2-O2	5.88	126.92	122.80
1	C1	1205	G	O4'-C1'-N9	5.85	112.88	108.20
1	C1	3016	U	C2-N1-C1'	5.83	124.70	117.70
1	C1	1550	U	C6-N1-C1'	-5.81	113.07	121.20
1	C1	103	C	N3-C2-O2	-5.80	117.84	121.90
1	C1	3338	C	C2-N1-C1'	5.79	125.17	118.80
1	C1	1179	C	N3-C2-O2	-5.78	117.85	121.90
1	C1	2689	G	N3-C4-C5	-5.77	125.71	128.60
1	C1	1479	C	C2-N1-C1'	5.74	125.12	118.80
1	C1	2217	U	N3-C2-O2	-5.73	118.19	122.20
1	C1	79	U	N3-C2-O2	-5.66	118.24	122.20
1	C1	931	C	C2-N1-C1'	5.65	125.02	118.80
1	C1	2689	G	N3-C4-N9	5.65	129.39	126.00
1	C1	940	C	C2-N1-C1'	5.63	125.00	118.80
3	C4	50	U	N3-C2-O2	-5.63	118.26	122.20
1	C1	1337	G	C4-N9-C1'	5.60	133.78	126.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C1	2883	U	P-O3'-C3'	5.59	126.41	119.70
1	C1	1550	U	C5-C6-N1	5.59	125.49	122.70
1	C1	8	C	C2-N1-C1'	5.57	124.93	118.80
1	C1	2100	U	C2-N1-C1'	5.54	124.35	117.70
40	LZ	98	ASP	CB-CG-OD1	5.52	123.27	118.30
1	C1	1852	C	N1-C2-O2	5.52	122.21	118.90
1	C1	308	C	C2-N1-C1'	5.51	124.86	118.80
1	C1	2351	U	N1-C2-O2	5.50	126.65	122.80
1	C1	162	U	N3-C2-O2	-5.48	118.37	122.20
1	C1	37	C	N1-C2-O2	5.47	122.19	118.90
1	C1	1851	U	N1-C2-O2	5.46	126.62	122.80
1	C1	961	C	C2-N1-C1'	5.45	124.80	118.80
1	C1	438	C	C2-N1-C1'	5.43	124.77	118.80
1	C1	2280	A	P-O3'-C3'	5.42	126.21	119.70
1	C1	3301	C	P-O3'-C3'	5.41	126.20	119.70
1	C1	2912	U	N1-C2-O2	5.40	126.58	122.80
1	C1	1047	A	P-O3'-C3'	5.38	126.15	119.70
1	C1	1562	U	C5-C6-N1	5.36	125.38	122.70
1	C1	162	U	N1-C2-O2	5.36	126.55	122.80
3	C4	89	U	N1-C2-O2	5.36	126.55	122.80
1	C1	3291	C	C6-N1-C2	-5.34	118.17	120.30
3	C4	89	U	C2-N1-C1'	5.31	124.07	117.70
1	C1	2505	U	C2-N1-C1'	5.30	124.06	117.70
1	C1	2170	A	P-O3'-C3'	5.28	126.04	119.70
1	C1	1622	A	P-O3'-C3'	5.26	126.01	119.70
1	C1	2584	C	C2-N1-C1'	5.24	124.56	118.80
1	C1	1179	C	C6-N1-C1'	-5.24	114.52	120.80
3	C4	42	C	N3-C2-O2	-5.23	118.24	121.90
1	C1	2224	G	C4-N9-C1'	5.22	133.29	126.50
2	C2	64	U	N3-C2-O2	-5.21	118.55	122.20
1	C1	2668	C	C2-N1-C1'	5.20	124.52	118.80
1	C1	2689	G	C8-N9-C1'	-5.20	120.24	127.00
1	C1	1663	C	N1-C2-O2	5.19	122.01	118.90
30	LO	53	LEU	CA-CB-CG	5.18	127.21	115.30
1	C1	2341	C	C2-N1-C1'	5.15	124.47	118.80
1	C1	2730	U	C6-N1-C1'	-5.15	113.99	121.20
1	C1	842	G	C8-N9-C4	-5.14	104.34	106.40
1	C1	2499	C	C2-N1-C1'	5.14	124.46	118.80
1	C1	1622	A	OP1-P-O3'	5.14	116.50	105.20
2	C2	113	U	C2-N1-C1'	5.14	123.86	117.70
1	C1	3132	A	P-O3'-C3'	5.13	125.86	119.70
1	C1	3016	U	N1-C2-O2	5.11	126.37	122.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C1	3210	U	P-O3'-C3'	5.05	125.76	119.70
1	C1	1478	U	C5-C6-N1	5.05	125.22	122.70
1	C1	443	C	N1-C2-O2	5.02	121.91	118.90

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	
4	CF	243/270 (90%)	242 (100%)	1 (0%)	0	100	100
5	CH	621/661 (94%)	616 (99%)	5 (1%)	0	100	100
6	CK	231/261 (88%)	224 (97%)	7 (3%)	0	100	100
7	CL	77/558 (14%)	76 (99%)	1 (1%)	0	100	100
8	CN	244/246 (99%)	239 (98%)	5 (2%)	0	100	100
9	CO	56/120 (47%)	55 (98%)	1 (2%)	0	100	100
10	CQ	181/225 (80%)	181 (100%)	0	0	100	100
11	Cb	99/117 (85%)	98 (99%)	1 (1%)	0	100	100
12	Cd	458/627 (73%)	446 (97%)	12 (3%)	0	100	100
13	Cf	281/350 (80%)	277 (99%)	4 (1%)	0	100	100
14	Cg	186/202 (92%)	185 (100%)	1 (0%)	0	100	100
15	Ch	484/517 (94%)	469 (97%)	15 (3%)	0	100	100
16	Cz	99/123 (80%)	99 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
17	LA	189/254 (74%)	185 (98%)	4 (2%)	0	100	100
18	LB	387/392 (99%)	381 (98%)	6 (2%)	0	100	100
19	LC	361/365 (99%)	354 (98%)	7 (2%)	0	100	100
20	LD	282/304 (93%)	280 (99%)	2 (1%)	0	100	100
21	LE	187/200 (94%)	182 (97%)	5 (3%)	0	100	100
22	LF	246/249 (99%)	240 (98%)	5 (2%)	1 (0%)	34	62
23	LG	233/262 (89%)	230 (99%)	3 (1%)	0	100	100
24	LH	188/229 (82%)	185 (98%)	3 (2%)	0	100	100
25	LJ	167/173 (96%)	165 (99%)	2 (1%)	0	100	100
26	LK	156/165 (94%)	154 (99%)	2 (1%)	0	100	100
27	LL	201/213 (94%)	199 (99%)	2 (1%)	0	100	100
28	LM	139/142 (98%)	137 (99%)	2 (1%)	0	100	100
29	LN	200/203 (98%)	195 (98%)	5 (2%)	0	100	100
30	LO	201/204 (98%)	197 (98%)	4 (2%)	0	100	100
31	LP	167/187 (89%)	164 (98%)	3 (2%)	0	100	100
32	LQ	148/213 (70%)	147 (99%)	1 (1%)	0	100	100
33	LR	150/2898 (5%)	148 (99%)	2 (1%)	0	100	100
34	LS	172/174 (99%)	167 (97%)	5 (3%)	0	100	100
35	LT	127/160 (79%)	124 (98%)	3 (2%)	0	100	100
36	LU	103/127 (81%)	99 (96%)	4 (4%)	0	100	100
37	LV	133/139 (96%)	132 (99%)	1 (1%)	0	100	100
38	LX	120/156 (77%)	117 (98%)	3 (2%)	0	100	100
39	LY	131/138 (95%)	125 (95%)	6 (5%)	0	100	100
40	LZ	133/135 (98%)	130 (98%)	3 (2%)	0	100	100
41	La	104/149 (70%)	104 (100%)	0	0	100	100
42	Lc	93/108 (86%)	93 (100%)	0	0	100	100
43	Ld	108/120 (90%)	108 (100%)	0	0	100	100
44	Le	124/131 (95%)	121 (98%)	3 (2%)	0	100	100
45	Lf	106/109 (97%)	105 (99%)	1 (1%)	0	100	100
46	Lg	116/119 (98%)	113 (97%)	3 (3%)	0	100	100
47	Lh	114/935 (12%)	112 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
48	Li	99/110 (90%)	99 (100%)	0	0	100	100
49	Lj	86/95 (90%)	85 (99%)	1 (1%)	0	100	100
50	Lk	74/94 (79%)	73 (99%)	1 (1%)	0	100	100
51	Ll	48/51 (94%)	46 (96%)	2 (4%)	0	100	100
52	Lp	89/92 (97%)	86 (97%)	3 (3%)	0	100	100
53	Lq	137/147 (93%)	132 (96%)	5 (4%)	0	100	100
All	All	9079/14219 (64%)	8921 (98%)	157 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
22	LF	197	VAL

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	
4	CF	212/236 (90%)	212 (100%)	0	100	100
5	CH	547/575 (95%)	545 (100%)	2 (0%)	91	96
6	CK	206/225 (92%)	205 (100%)	1 (0%)	88	96
7	CL	61/458 (13%)	61 (100%)	0	100	100
8	CN	205/206 (100%)	205 (100%)	0	100	100
9	CO	48/99 (48%)	48 (100%)	0	100	100
10	CQ	144/192 (75%)	142 (99%)	2 (1%)	67	86
11	Cb	85/101 (84%)	85 (100%)	0	100	100
12	Cd	403/541 (74%)	402 (100%)	1 (0%)	93	98
13	Cf	250/310 (81%)	249 (100%)	1 (0%)	91	96
14	Cg	158/176 (90%)	158 (100%)	0	100	100
15	Ch	408/436 (94%)	408 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
16	Cz	89/107 (83%)	88 (99%)	1 (1%)	73	90
17	LA	150/198 (76%)	150 (100%)	0	100	100
18	LB	329/331 (99%)	329 (100%)	0	100	100
19	LC	282/285 (99%)	281 (100%)	1 (0%)	91	96
20	LD	221/253 (87%)	221 (100%)	0	100	100
21	LE	157/166 (95%)	157 (100%)	0	100	100
22	LF	213/215 (99%)	212 (100%)	1 (0%)	88	96
23	LG	199/222 (90%)	196 (98%)	3 (2%)	65	86
24	LH	167/200 (84%)	167 (100%)	0	100	100
25	LJ	140/150 (93%)	140 (100%)	0	100	100
26	LK	127/136 (93%)	127 (100%)	0	100	100
27	LL	158/176 (90%)	158 (100%)	0	100	100
28	LM	116/117 (99%)	116 (100%)	0	100	100
29	LN	179/180 (99%)	179 (100%)	0	100	100
30	LO	162/163 (99%)	162 (100%)	0	100	100
31	LP	133/152 (88%)	133 (100%)	0	100	100
32	LQ	128/178 (72%)	127 (99%)	1 (1%)	81	93
33	LR	125/2396 (5%)	125 (100%)	0	100	100
34	LS	152/154 (99%)	152 (100%)	0	100	100
35	LT	110/135 (82%)	110 (100%)	0	100	100
36	LU	92/108 (85%)	92 (100%)	0	100	100
37	LV	98/102 (96%)	98 (100%)	0	100	100
38	LX	104/129 (81%)	104 (100%)	0	100	100
39	LY	116/119 (98%)	115 (99%)	1 (1%)	78	92
40	LZ	121/121 (100%)	121 (100%)	0	100	100
41	La	93/122 (76%)	93 (100%)	0	100	100
42	Lc	76/88 (86%)	75 (99%)	1 (1%)	69	88
43	Ld	90/105 (86%)	90 (100%)	0	100	100
44	Le	109/114 (96%)	109 (100%)	0	100	100
45	Lf	89/90 (99%)	89 (100%)	0	100	100
46	Lg	95/102 (93%)	95 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
47	Lh	106/781 (14%)	106 (100%)	0	100	100
48	Li	85/93 (91%)	85 (100%)	0	100	100
49	Lj	72/78 (92%)	72 (100%)	0	100	100
50	Lk	73/88 (83%)	71 (97%)	2 (3%)	44	74
51	Ll	45/46 (98%)	45 (100%)	0	100	100
52	Lp	73/74 (99%)	73 (100%)	0	100	100
53	Lq	104/112 (93%)	104 (100%)	0	100	100
All	All	7705/11941 (64%)	7687 (100%)	18 (0%)	93	98

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	CH	310	LYS
5	CH	391	LYS
6	CK	190	ASN
10	CQ	161	ARG
10	CQ	174	LYS
12	Cd	298	ARG
13	Cf	308	LYS
16	Cz	27	LYS
19	LC	301	ARG
22	LF	23	LYS
23	LG	33	ARG
23	LG	130	LYS
23	LG	216	LYS
32	LQ	35	ARG
39	LY	2	LYS
42	Lc	71	HIS
50	Lk	18	LYS
50	Lk	57	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
44	Le	122	ASN
49	Lj	76	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	C1	3051/3342 (91%)	580 (19%)	24 (0%)
2	C2	150/156 (96%)	22 (14%)	1 (0%)
3	C4	118/119 (99%)	19 (16%)	0
All	All	3319/3617 (91%)	621 (18%)	25 (0%)

All (621) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	C1	6	G
1	C1	15	U
1	C1	27	A
1	C1	31	G
1	C1	44	A
1	C1	50	A
1	C1	60	G
1	C1	61	A
1	C1	66	A
1	C1	67	A
1	C1	68	A
1	C1	95	G
1	C1	96	A
1	C1	110	A
1	C1	111	G
1	C1	112	C
1	C1	114	C
1	C1	117	A
1	C1	123	A
1	C1	132	U
1	C1	134	G
1	C1	135	G
1	C1	146	A
1	C1	152	G
1	C1	153	A
1	C1	156	G
1	C1	157	G
1	C1	181	G
1	C1	184	U
1	C1	194	C
1	C1	200	G
1	C1	204	C
1	C1	206	G

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Mol	Chain	Res	Type
1	C1	213	A
1	C1	214	G
1	C1	226	G
1	C1	241	U
1	C1	244	G
1	C1	247	A
1	C1	259	C
1	C1	262	G
1	C1	276	G
1	C1	277	A
1	C1	288	A
1	C1	291	U
1	C1	298	U
1	C1	308	C
1	C1	316	A
1	C1	322	C
1	C1	323	G
1	C1	331	A
1	C1	332	C
1	C1	343	C
1	C1	369	G
1	C1	388	A
1	C1	389	A2M
1	C1	391	U
1	C1	394	C
1	C1	395	A
1	C1	396	C
1	C1	414	G
1	C1	415	A
1	C1	422	U
1	C1	434	U
1	C1	435	G
1	C1	443	C
1	C1	445	G
1	C1	446	A
1	C1	447	U
1	C1	448	C
1	C1	449	A
1	C1	458	U
1	C1	459	C
1	C1	460	U
1	C1	467	U

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Mol	Chain	Res	Type
1	C1	468	G
1	C1	469	C
1	C1	470	A
1	C1	471	C
1	C1	472	U
1	C1	479	G
1	C1	489	A
1	C1	494	C
1	C1	512	A
1	C1	514	A
1	C1	521	G
1	C1	527	G
1	C1	528	U
1	C1	535	U
1	C1	536	C
1	C1	537	C
1	C1	545	U
1	C1	547	A
1	C1	549	A
1	C1	561	A
1	C1	570	G
1	C1	580	A
1	C1	582	G
1	C1	588	G
1	C1	592	U
1	C1	593	G
1	C1	595	A
1	C1	597	G
1	C1	599	A
1	C1	608	U
1	C1	609	A
1	C1	610	A
1	C1	624	C
1	C1	632	G
1	C1	634	A
1	C1	665	A
1	C1	669	U
1	C1	678	A
1	C1	693	A
1	C1	700	G
1	C1	703	A
1	C1	704	A

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Mol	Chain	Res	Type
1	C1	707	U
1	C1	719	U
1	C1	720	C
1	C1	721	G
1	C1	724	G
1	C1	743	A
1	C1	747	A
1	C1	748	U
1	C1	756	G
1	C1	757	A
1	C1	759	U
1	C1	761	G
1	C1	762	A
1	C1	763	G
1	C1	767	G
1	C1	782	G
1	C1	790	A
1	C1	799	A
1	C1	808	G
1	C1	812	A
1	C1	830	A
1	C1	839	G
1	C1	843	C
1	C1	856	U
1	C1	857	G
1	C1	877	A
1	C1	878	A
1	C1	889	G
1	C1	890	G
1	C1	896	A
1	C1	898	G
1	C1	899	A
1	C1	903	A
1	C1	906	G
1	C1	919	G
1	C1	926	A
1	C1	931	C
1	C1	933	A
1	C1	934	A
1	C1	935	G
1	C1	937	U
1	C1	940	C

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Mol	Chain	Res	Type
1	C1	941	C
1	C1	943	C
1	C1	944	A
1	C1	945	G
1	C1	947	A
1	C1	955	G
1	C1	956	U
1	C1	961	C
1	C1	963	U
1	C1	964	C
1	C1	976	G
1	C1	977	U
1	C1	983	G
1	C1	984	A
1	C1	1032	C
1	C1	1034	U
1	C1	1040	A
1	C1	1047	A
1	C1	1048	A
1	C1	1049	G
1	C1	1051	C
1	C1	1055	G
1	C1	1058	A
1	C1	1064	C
1	C1	1065	U
1	C1	1066	G
1	C1	1070	G
1	C1	1075	C
1	C1	1076	A
1	C1	1077	U
1	C1	1078	U
1	C1	1079	C
1	C1	1080	G
1	C1	1081	A
1	C1	1084	G
1	C1	1086	A
1	C1	1099	G
1	C1	1109	G
1	C1	1110	G
1	C1	1115	C
1	C1	1118	A
1	C1	1119	A

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Mol	Chain	Res	Type
1	C1	1127	U
1	C1	1132	G
1	C1	1133	A
1	C1	1136	A
1	C1	1151	U
1	C1	1163	G
1	C1	1164	U
1	C1	1165	G
1	C1	1175	C
1	C1	1176	A
1	C1	1179	C
1	C1	1182	C
1	C1	1185	A
1	C1	1188	A
1	C1	1194	U
1	C1	1205	G
1	C1	1228	A
1	C1	1229	G
1	C1	1241	U
1	C1	1242	A
1	C1	1246	A
1	C1	1248	U
1	C1	1268	G
1	C1	1278	G
1	C1	1287	A
1	C1	1288	U
1	C1	1290	G
1	C1	1292	U
1	C1	1296	G
1	C1	1313	A
1	C1	1315	A
1	C1	1331	A
1	C1	1332	G
1	C1	1333	A
1	C1	1334	A
1	C1	1335	A
1	C1	1336	C
1	C1	1337	G
1	C1	1369	A
1	C1	1370	G
1	C1	1375	G
1	C1	1382	A

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Mol	Chain	Res	Type
1	C1	1383	G
1	C1	1400	G
1	C1	1401	A
1	C1	1417	G
1	C1	1420	OMC
1	C1	1429	A
1	C1	1433	OMG
1	C1	1438	U
1	C1	1458	G
1	C1	1464	A
1	C1	1477	U
1	C1	1479	C
1	C1	1485	G
1	C1	1491	OMC
1	C1	1505	U
1	C1	1506	U
1	C1	1507	A
1	C1	1536	U
1	C1	1538	U
1	C1	1539	C
1	C1	1540	A
1	C1	1542	A
1	C1	1543	G
1	C1	1549	C
1	C1	1550	U
1	C1	1551	C
1	C1	1553	U
1	C1	1556	C
1	C1	1559	G
1	C1	1561	G
1	C1	1567	A
1	C1	1568	A
1	C1	1569	A
1	C1	1573	A
1	C1	1585	A
1	C1	1586	U
1	C1	1601	G
1	C1	1609	U
1	C1	1618	A
1	C1	1619	C
1	C1	1622	A
1	C1	1623	A

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Mol	Chain	Res	Type
1	C1	1624	C
1	C1	1625	U
1	C1	1637	C
1	C1	1684	A
1	C1	1685	U
1	C1	1693	G
1	C1	1696	A
1	C1	1697	C
1	C1	1704	U
1	C1	1722	U
1	C1	1730	A
1	C1	1731	G
1	C1	1745	U
1	C1	1746	G
1	C1	1751	G
1	C1	1760	G
1	C1	1776	G
1	C1	1777	A
1	C1	1788	G
1	C1	1792	G
1	C1	1793	A
1	C1	1794	A
1	C1	1795	U
1	C1	1796	A
1	C1	1799	U
1	C1	1800	C
1	C1	1801	U
1	C1	1803	A
1	C1	1822	A
1	C1	1826	C
1	C1	1829	C
1	C1	1830	A
1	C1	1846	C
1	C1	1847	A2M
1	C1	1856	U
1	C1	1858	G
1	C1	1860	U
1	C1	1873	A
1	C1	1886	G
1	C1	1887	C
1	C1	2056	A
1	C1	2076	A

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Mol	Chain	Res	Type
1	C1	2084	G
1	C1	2085	G
1	C1	2089	A
1	C1	2094	A
1	C1	2103	U
1	C1	2121	A
1	C1	2126	C
1	C1	2132	G
1	C1	2139	U
1	C1	2156	U
1	C1	2157	G
1	C1	2158	C
1	C1	2161	A
1	C1	2167	C
1	C1	2168	U
1	C1	2169	G
1	C1	2170	A
1	C1	2171	A
1	C1	2172	U
1	C1	2173	G
1	C1	2186	A
1	C1	2192	A
1	C1	2203	G
1	C1	2205	A
1	C1	2206	A
1	C1	2210	G
1	C1	2212	G
1	C1	2216	G
1	C1	2217	U
1	C1	2218	A
1	C1	2219	A
1	C1	2220	C
1	C1	2221	U
1	C1	2222	A
1	C1	2223	U
1	C1	2224	G
1	C1	2225	A
1	C1	2226	C
1	C1	2230	C
1	C1	2231	U
1	C1	2237	U
1	C1	2279	G

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Mol	Chain	Res	Type
1	C1	2281	U
1	C1	2282	U
1	C1	2284	A
1	C1	2297	U
1	C1	2298	G
1	C1	2299	U
1	C1	2340	G
1	C1	2348	A
1	C1	2351	U
1	C1	2355	C
1	C1	2356	G
1	C1	2357	G
1	C1	2362	A
1	C1	2364	A
1	C1	2373	U
1	C1	2374	U
1	C1	2381	G
1	C1	2382	A
1	C1	2400	G
1	C1	2401	A
1	C1	2403	A
1	C1	2405	G
1	C1	2472	U
1	C1	2473	U
1	C1	2474	A
1	C1	2477	U
1	C1	2478	A
1	C1	2489	C
1	C1	2499	C
1	C1	2501	U
1	C1	2502	G
1	C1	2503	C
1	C1	2506	C
1	C1	2507	C
1	C1	2508	A
1	C1	2513	C
1	C1	2516	G
1	C1	2521	A
1	C1	2524	G
1	C1	2530	C
1	C1	2531	G
1	C1	2533	G

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Mol	Chain	Res	Type
1	C1	2539	A
1	C1	2544	G
1	C1	2545	G
1	C1	2552	A
1	C1	2565	G
1	C1	2566	G
1	C1	2569	G
1	C1	2573	G
1	C1	2575	C
1	C1	2576	U
1	C1	2577	G
1	C1	2578	OMG
1	C1	2582	G
1	C1	2584	C
1	C1	2585	A
1	C1	2589	C
1	C1	2613	C
1	C1	2615	A
1	C1	2633	A
1	C1	2635	A
1	C1	2636	G
1	C1	2647	U
1	C1	2650	A
1	C1	2651	A
1	C1	2656	A
1	C1	2657	G
1	C1	2663	A
1	C1	2664	A
1	C1	2668	C
1	C1	2671	U
1	C1	2672	U
1	C1	2673	G
1	C1	2674	A
1	C1	2675	U
1	C1	2680	A
1	C1	2682	U
1	C1	2690	OMU
1	C1	2691	G
1	C1	2708	G
1	C1	2713	G
1	C1	2717	A
1	C1	2730	U

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Mol	Chain	Res	Type
1	C1	2731	C
1	C1	2732	C
1	C1	2736	G
1	C1	2737	A
1	C1	2750	G
1	C1	2754	U
1	C1	2755	G
1	C1	2756	C
1	C1	2757	C
1	C1	2758	A
1	C1	2761	A
1	C1	2762	A
1	C1	2763	A
1	C1	2769	C
1	C1	2783	G
1	C1	2784	C
1	C1	2785	U
1	C1	2802	U
1	C1	2803	C
1	C1	2804	A
1	C1	2805	U
1	C1	2806	A
1	C1	2812	G
1	C1	2815	G
1	C1	2816	C
1	C1	2817	U
1	C1	2826	C
1	C1	2834	U
1	C1	2836	G
1	C1	2846	A
1	C1	2857	G
1	C1	2858	C
1	C1	2863	U
1	C1	2882	U
1	C1	2883	U
1	C1	2884	C
1	C1	2885	A
1	C1	2894	U
1	C1	2895	A
1	C1	2903	U
1	C1	2905	A
1	C1	2929	C

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Mol	Chain	Res	Type
1	C1	2930	A
1	C1	2931	G
1	C1	2938	U
1	C1	2939	U
1	C1	2940	U
1	C1	2942	C
1	C1	2955	C
1	C1	2956	U
1	C1	2970	A
1	C1	2980	G
1	C1	3007	A
1	C1	3014	U
1	C1	3017	G
1	C1	3036	G
1	C1	3044	A
1	C1	3049	A
1	C1	3050	C
1	C1	3051	C
1	C1	3067	G
1	C1	3076	C
1	C1	3080	A
1	C1	3087	A
1	C1	3088	A
1	C1	3089	U
1	C1	3100	A
1	C1	3101	C
1	C1	3102	G
1	C1	3112	U
1	C1	3113	A
1	C1	3119	A
1	C1	3126	A
1	C1	3127	G
1	C1	3131	U
1	C1	3133	U
1	C1	3135	A
1	C1	3141	G
1	C1	3146	C
1	C1	3155	A
1	C1	3162	C
1	C1	3163	A
1	C1	3164	G
1	C1	3168	A

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Mol	Chain	Res	Type
1	C1	3185	G
1	C1	3186	A
1	C1	3187	A
1	C1	3188	G
1	C1	3190	G
1	C1	3200	A
1	C1	3201	A
1	C1	3206	C
1	C1	3210	U
1	C1	3211	U
1	C1	3213	C
1	C1	3214	A
1	C1	3217	U
1	C1	3218	U
1	C1	3228	C
1	C1	3229	G
1	C1	3231	G
1	C1	3245	C
1	C1	3248	A
1	C1	3254	U
1	C1	3257	A
1	C1	3258	U
1	C1	3259	G
1	C1	3260	U
1	C1	3276	A
1	C1	3282	U
1	C1	3292	U
1	C1	3293	U
1	C1	3295	U
1	C1	3297	G
1	C1	3299	U
1	C1	3302	G
1	C1	3304	U
1	C1	3310	G
1	C1	3312	G
1	C1	3316	A
1	C1	3319	C
1	C1	3323	C
1	C1	3324	C
1	C1	3325	U
1	C1	3331	U
1	C1	3332	A

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Mol	Chain	Res	Type
1	C1	3338	C
2	C2	34	U
2	C2	35	C
2	C2	38	U
2	C2	49	G
2	C2	59	A
2	C2	62	A
2	C2	63	G
2	C2	86	U
2	C2	87	G
2	C2	90	U
2	C2	95	G
2	C2	104	A
2	C2	106	C
2	C2	113	U
2	C2	116	G
2	C2	123	G
2	C2	125	U
2	C2	126	A
2	C2	128	U
2	C2	129	C
2	C2	148	G
2	C2	151	C
3	C4	7	G
3	C4	22	A
3	C4	29	G
3	C4	54	U
3	C4	55	A
3	C4	64	A
3	C4	66	G
3	C4	75	A
3	C4	76	G
3	C4	82	G
3	C4	83	G
3	C4	84	G
3	C4	85	U
3	C4	86	C
3	C4	89	U
3	C4	90	G
3	C4	97	A
3	C4	101	A
3	C4	111	G

All (25) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	C1	151	G
1	C1	243	U
1	C1	898	G
1	C1	1047	A
1	C1	1064	C
1	C1	1077	U
1	C1	1267	C
1	C1	1537	U
1	C1	1622	A
1	C1	2157	G
1	C1	2160	C
1	C1	2225	A
1	C1	2280	A
1	C1	2575	C
1	C1	2883	U
1	C1	3079	U
1	C1	3132	A
1	C1	3205	G
1	C1	3210	U
1	C1	3230	G
1	C1	3258	U
1	C1	3298	U
1	C1	3301	C
1	C1	3324	C
2	C2	127	U

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

34 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	OMU	C1	2690	1	19,22,23	3.06	6 (31%)	26,31,34	1.70	5 (19%)
1	OMG	C1	2774	1	18,26,27	1.12	2 (11%)	19,38,41	0.86	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	OMU	C1	2688	1	19,22,23	3.07	6 (31%)	26,31,34	1.69	5 (19%)
1	OMC	C1	1420	1	19,22,23	0.63	0	26,31,34	1.51	4 (15%)
1	OMU	C1	1917	1	19,22,23	3.09	6 (31%)	26,31,34	1.68	5 (19%)
1	OMG	C1	385	1	18,26,27	1.13	2 (11%)	19,38,41	0.82	1 (5%)
1	OMG	C1	1433	1	18,26,27	1.14	2 (11%)	19,38,41	0.85	1 (5%)
1	A2M	C1	2289	1	18,25,26	4.37	9 (50%)	18,36,39	3.77	4 (22%)
1	OMC	C1	2838	1	19,22,23	0.66	0	26,31,34	1.50	4 (15%)
1	OMC	C1	778	1	19,22,23	0.55	0	26,31,34	0.93	1 (3%)
1	OMG	C1	646	1	18,26,27	1.13	2 (11%)	19,38,41	0.89	1 (5%)
1	A2M	C1	858	1	18,25,26	4.37	9 (50%)	18,36,39	3.87	4 (22%)
1	OMG	C1	2881	1	18,26,27	1.11	2 (11%)	19,38,41	0.83	1 (5%)
1	OMU	C1	2277	1	19,22,23	3.06	6 (31%)	26,31,34	1.61	4 (15%)
1	A2M	C1	848	1	18,25,26	4.36	9 (50%)	18,36,39	3.83	4 (22%)
1	OMC	C1	1812	1	19,22,23	0.54	0	26,31,34	0.62	0
1	A2M	C1	637	1	18,25,26	4.35	9 (50%)	18,36,39	3.90	4 (22%)
1	A2M	C1	1223	1	18,25,26	4.31	9 (50%)	18,36,39	3.85	4 (22%)
1	A2M	C1	1432	1	18,25,26	4.36	9 (50%)	18,36,39	3.85	4 (22%)
1	OMG	C1	627	1	18,26,27	1.16	2 (11%)	19,38,41	0.87	1 (5%)
1	OMG	C1	2358	1	18,26,27	1.15	2 (11%)	19,38,41	0.85	1 (5%)
1	A2M	C1	389	1	18,25,26	4.37	9 (50%)	18,36,39	3.82	4 (22%)
1	OMC	C1	1491	1	19,22,23	0.54	0	26,31,34	0.73	0
1	OMU	C1	2380	1	19,22,23	3.06	6 (31%)	26,31,34	1.68	5 (19%)
1	OMC	C1	2918	1	19,22,23	0.55	0	26,31,34	0.79	1 (3%)
1	A2M	C1	1847	1	18,25,26	4.34	9 (50%)	18,36,39	3.96	4 (22%)
1	OMC	C1	1836	1	19,22,23	0.56	0	26,31,34	0.87	1 (3%)
1	OMU	C1	1868	1	19,22,23	3.07	6 (31%)	26,31,34	1.73	5 (19%)
1	OMG	C1	787	1	18,26,27	1.13	2 (11%)	19,38,41	0.85	1 (5%)
1	OMG	C1	2578	1	18,26,27	1.13	2 (11%)	19,38,41	0.88	1 (5%)
1	OMU	C1	2384	1	19,22,23	3.08	6 (31%)	26,31,34	1.67	4 (15%)
1	OMG	C1	2876	1	18,26,27	1.14	2 (11%)	19,38,41	0.83	1 (5%)
1	OMU	C1	2683	1	19,22,23	3.05	6 (31%)	26,31,34	1.64	4 (15%)
1	OMC	C1	2300	1	19,22,23	0.53	0	26,31,34	0.70	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	OMU	C1	2690	1	-	2/9/27/28	0/2/2/2
1	OMG	C1	2774	1	-	0/5/27/28	0/3/3/3
1	OMU	C1	2688	1	-	0/9/27/28	0/2/2/2
1	OMC	C1	1420	1	-	3/9/27/28	0/2/2/2
1	OMU	C1	1917	1	-	2/9/27/28	0/2/2/2
1	OMG	C1	385	1	-	0/5/27/28	0/3/3/3
1	OMG	C1	1433	1	-	2/5/27/28	0/3/3/3
1	A2M	C1	2289	1	-	0/5/27/28	0/3/3/3
1	OMC	C1	2838	1	-	2/9/27/28	0/2/2/2
1	OMC	C1	778	1	-	0/9/27/28	0/2/2/2
1	OMG	C1	646	1	-	0/5/27/28	0/3/3/3
1	A2M	C1	858	1	-	1/5/27/28	0/3/3/3
1	OMG	C1	2881	1	-	0/5/27/28	0/3/3/3
1	OMU	C1	2277	1	-	0/9/27/28	0/2/2/2
1	A2M	C1	848	1	-	1/5/27/28	0/3/3/3
1	OMC	C1	1812	1	-	0/9/27/28	0/2/2/2
1	A2M	C1	637	1	-	2/5/27/28	0/3/3/3
1	A2M	C1	1223	1	-	2/5/27/28	0/3/3/3
1	A2M	C1	1432	1	-	0/5/27/28	0/3/3/3
1	OMG	C1	627	1	-	1/5/27/28	0/3/3/3
1	OMG	C1	2358	1	-	0/5/27/28	0/3/3/3
1	A2M	C1	389	1	-	4/5/27/28	0/3/3/3
1	OMC	C1	1491	1	-	1/9/27/28	0/2/2/2
1	OMU	C1	2380	1	-	0/9/27/28	0/2/2/2
1	OMC	C1	2918	1	-	0/9/27/28	0/2/2/2
1	A2M	C1	1847	1	-	3/5/27/28	0/3/3/3
1	OMC	C1	1836	1	-	0/9/27/28	0/2/2/2
1	OMU	C1	1868	1	-	0/9/27/28	0/2/2/2
1	OMG	C1	787	1	-	0/5/27/28	0/3/3/3
1	OMG	C1	2578	1	-	3/5/27/28	0/3/3/3
1	OMU	C1	2384	1	-	1/9/27/28	0/2/2/2
1	OMG	C1	2876	1	-	0/5/27/28	0/3/3/3
1	OMU	C1	2683	1	-	1/9/27/28	0/2/2/2
1	OMC	C1	2300	1	-	0/9/27/28	0/2/2/2

All (140) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C1	858	A2M	C3'-C2'	-12.80	1.24	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C1	2289	A2M	C3'-C2'	-12.77	1.24	1.52
1	C1	848	A2M	C3'-C2'	-12.73	1.24	1.52
1	C1	1432	A2M	C3'-C2'	-12.72	1.24	1.52
1	C1	637	A2M	C3'-C2'	-12.69	1.24	1.52
1	C1	389	A2M	C3'-C2'	-12.67	1.24	1.52
1	C1	1847	A2M	C3'-C2'	-12.65	1.24	1.52
1	C1	1223	A2M	C3'-C2'	-12.60	1.24	1.52
1	C1	848	A2M	O4'-C1'	8.14	1.52	1.41
1	C1	1847	A2M	O4'-C1'	8.08	1.52	1.41
1	C1	1432	A2M	O4'-C1'	8.06	1.52	1.41
1	C1	2289	A2M	O4'-C1'	8.04	1.52	1.41
1	C1	389	A2M	O4'-C1'	8.03	1.52	1.41
1	C1	858	A2M	O4'-C1'	7.98	1.52	1.41
1	C1	637	A2M	O4'-C1'	7.98	1.52	1.41
1	C1	1223	A2M	O4'-C1'	7.67	1.51	1.41
1	C1	1917	OMU	C2-N1	7.51	1.50	1.38
1	C1	2384	OMU	C2-N1	7.37	1.50	1.38
1	C1	1868	OMU	C2-N1	7.28	1.50	1.38
1	C1	2690	OMU	C2-N1	7.25	1.50	1.38
1	C1	2277	OMU	C2-N1	7.24	1.50	1.38
1	C1	2380	OMU	C2-N1	7.22	1.50	1.38
1	C1	2688	OMU	C2-N1	7.22	1.50	1.38
1	C1	2683	OMU	C2-N1	7.21	1.50	1.38
1	C1	2384	OMU	C2-N3	7.18	1.50	1.38
1	C1	2683	OMU	C2-N3	7.15	1.50	1.38
1	C1	2688	OMU	C2-N3	7.14	1.50	1.38
1	C1	1868	OMU	C2-N3	7.14	1.50	1.38
1	C1	2380	OMU	C2-N3	7.13	1.50	1.38
1	C1	2277	OMU	C2-N3	7.12	1.50	1.38
1	C1	1917	OMU	C2-N3	7.11	1.50	1.38
1	C1	2690	OMU	C2-N3	7.10	1.50	1.38
1	C1	637	A2M	O4'-C4'	-6.64	1.30	1.45
1	C1	1223	A2M	O4'-C4'	-6.57	1.30	1.45
1	C1	389	A2M	O4'-C4'	-6.54	1.30	1.45
1	C1	1432	A2M	O4'-C4'	-6.53	1.30	1.45
1	C1	858	A2M	O4'-C4'	-6.49	1.30	1.45
1	C1	1847	A2M	O4'-C4'	-6.42	1.30	1.45
1	C1	2289	A2M	O4'-C4'	-6.41	1.30	1.45
1	C1	848	A2M	O4'-C4'	-6.37	1.30	1.45
1	C1	2688	OMU	C6-C5	6.22	1.49	1.35
1	C1	2277	OMU	C6-C5	6.21	1.49	1.35
1	C1	1917	OMU	C6-C5	6.20	1.49	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C1	2384	OMU	C6-C5	6.20	1.49	1.35
1	C1	2690	OMU	C6-C5	6.19	1.49	1.35
1	C1	2380	OMU	C6-C5	6.18	1.49	1.35
1	C1	1868	OMU	C6-C5	6.17	1.49	1.35
1	C1	2683	OMU	C6-C5	6.14	1.49	1.35
1	C1	2289	A2M	C3'-C4'	5.34	1.66	1.53
1	C1	848	A2M	C3'-C4'	5.27	1.66	1.53
1	C1	1223	A2M	C3'-C4'	5.26	1.66	1.53
1	C1	858	A2M	C3'-C4'	5.25	1.66	1.53
1	C1	1432	A2M	C3'-C4'	5.25	1.66	1.53
1	C1	1847	A2M	C3'-C4'	5.14	1.66	1.53
1	C1	389	A2M	C3'-C4'	5.13	1.66	1.53
1	C1	637	A2M	C3'-C4'	5.04	1.65	1.53
1	C1	2380	OMU	C4-N3	4.30	1.46	1.38
1	C1	2683	OMU	C4-N3	4.27	1.46	1.38
1	C1	2384	OMU	C4-N3	4.25	1.46	1.38
1	C1	2277	OMU	C4-N3	4.24	1.46	1.38
1	C1	2690	OMU	C4-N3	4.20	1.46	1.38
1	C1	1868	OMU	C4-N3	4.20	1.46	1.38
1	C1	1917	OMU	C4-N3	4.19	1.46	1.38
1	C1	2688	OMU	C4-N3	4.18	1.46	1.38
1	C1	389	A2M	O2'-C2'	3.60	1.51	1.42
1	C1	858	A2M	O2'-C2'	3.51	1.51	1.42
1	C1	637	A2M	O2'-C2'	3.48	1.51	1.42
1	C1	1847	A2M	O2'-C2'	3.47	1.51	1.42
1	C1	1223	A2M	O2'-C2'	3.46	1.51	1.42
1	C1	2289	A2M	O2'-C2'	3.45	1.51	1.42
1	C1	848	A2M	O2'-C2'	3.43	1.51	1.42
1	C1	1432	A2M	O2'-C2'	3.42	1.51	1.42
1	C1	1223	A2M	C6-N6	3.16	1.45	1.34
1	C1	2289	A2M	C6-N6	3.15	1.45	1.34
1	C1	637	A2M	C6-N6	3.13	1.45	1.34
1	C1	848	A2M	C6-N6	3.13	1.45	1.34
1	C1	1847	A2M	C6-N6	3.12	1.45	1.34
1	C1	389	A2M	C6-N6	3.12	1.45	1.34
1	C1	858	A2M	C6-N6	3.12	1.45	1.34
1	C1	1432	A2M	C6-N6	3.10	1.45	1.34
1	C1	627	OMG	C8-N7	-2.97	1.30	1.35
1	C1	385	OMG	C8-N7	-2.91	1.30	1.35
1	C1	2876	OMG	C8-N7	-2.84	1.30	1.35
1	C1	1433	OMG	C8-N7	-2.83	1.30	1.35
1	C1	2578	OMG	C8-N7	-2.81	1.30	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C1	2358	OMG	C8-N7	-2.80	1.30	1.35
1	C1	646	OMG	C8-N7	-2.79	1.30	1.35
1	C1	2688	OMU	C6-N1	2.74	1.44	1.38
1	C1	389	A2M	C5-C4	-2.74	1.33	1.40
1	C1	2289	A2M	C5-C4	-2.73	1.33	1.40
1	C1	2774	OMG	C8-N7	-2.73	1.30	1.35
1	C1	2277	OMU	C6-N1	2.73	1.44	1.38
1	C1	1917	OMU	C6-N1	2.72	1.44	1.38
1	C1	1432	A2M	C5-C4	-2.72	1.33	1.40
1	C1	2881	OMG	C8-N7	-2.72	1.30	1.35
1	C1	2683	OMU	C6-N1	2.71	1.44	1.38
1	C1	848	A2M	C5-C4	-2.71	1.33	1.40
1	C1	1868	OMU	C6-N1	2.71	1.44	1.38
1	C1	787	OMG	C8-N7	-2.71	1.30	1.35
1	C1	1223	A2M	C5-C4	-2.70	1.33	1.40
1	C1	2380	OMU	C6-N1	2.69	1.44	1.38
1	C1	858	A2M	C5-C4	-2.69	1.33	1.40
1	C1	1847	A2M	C5-C4	-2.68	1.33	1.40
1	C1	2690	OMU	C6-N1	2.67	1.44	1.38
1	C1	2384	OMU	C6-N1	2.67	1.44	1.38
1	C1	637	A2M	C5-C4	-2.67	1.33	1.40
1	C1	627	OMG	C5-C6	-2.40	1.42	1.47
1	C1	2876	OMG	C5-C6	-2.40	1.42	1.47
1	C1	787	OMG	C5-C6	-2.39	1.42	1.47
1	C1	2358	OMG	C5-C6	-2.35	1.42	1.47
1	C1	646	OMG	C5-C6	-2.34	1.42	1.47
1	C1	2578	OMG	C5-C6	-2.33	1.42	1.47
1	C1	2688	OMU	C5-C4	2.32	1.48	1.43
1	C1	2774	OMG	C5-C6	-2.32	1.42	1.47
1	C1	1868	OMU	C5-C4	2.32	1.48	1.43
1	C1	2881	OMG	C5-C6	-2.31	1.42	1.47
1	C1	1433	OMG	C5-C6	-2.30	1.42	1.47
1	C1	385	OMG	C5-C6	-2.30	1.42	1.47
1	C1	389	A2M	C2-N3	2.29	1.35	1.32
1	C1	2277	OMU	C5-C4	2.24	1.48	1.43
1	C1	2690	OMU	C5-C4	2.24	1.48	1.43
1	C1	848	A2M	C2-N3	2.24	1.35	1.32
1	C1	1847	A2M	O3'-C3'	2.23	1.48	1.43
1	C1	637	A2M	C2-N3	2.22	1.35	1.32
1	C1	1917	OMU	C5-C4	2.22	1.48	1.43
1	C1	2380	OMU	C5-C4	2.21	1.48	1.43
1	C1	2384	OMU	C5-C4	2.20	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C1	848	A2M	O3'-C3'	2.20	1.48	1.43
1	C1	1847	A2M	C2-N3	2.19	1.35	1.32
1	C1	858	A2M	C2-N3	2.17	1.35	1.32
1	C1	389	A2M	O3'-C3'	2.17	1.48	1.43
1	C1	2683	OMU	C5-C4	2.15	1.48	1.43
1	C1	1223	A2M	C2-N3	2.14	1.35	1.32
1	C1	1432	A2M	O3'-C3'	2.13	1.48	1.43
1	C1	2289	A2M	C2-N3	2.13	1.35	1.32
1	C1	2289	A2M	O3'-C3'	2.12	1.48	1.43
1	C1	1432	A2M	C2-N3	2.11	1.35	1.32
1	C1	858	A2M	O3'-C3'	2.09	1.47	1.43
1	C1	637	A2M	O3'-C3'	2.08	1.47	1.43
1	C1	1223	A2M	O3'-C3'	2.06	1.47	1.43

All (90) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C1	389	A2M	C1'-N9-C4	10.91	145.81	126.64
1	C1	637	A2M	C1'-N9-C4	10.91	145.81	126.64
1	C1	1847	A2M	C1'-N9-C4	10.88	145.75	126.64
1	C1	1432	A2M	C1'-N9-C4	10.79	145.60	126.64
1	C1	858	A2M	C1'-N9-C4	10.63	145.32	126.64
1	C1	848	A2M	C1'-N9-C4	10.41	144.94	126.64
1	C1	1223	A2M	C1'-N9-C4	10.34	144.81	126.64
1	C1	2289	A2M	C1'-N9-C4	9.93	144.09	126.64
1	C1	1847	A2M	C5-C6-N6	9.13	134.22	120.35
1	C1	1223	A2M	C5-C6-N6	9.00	134.03	120.35
1	C1	2289	A2M	C5-C6-N6	8.97	133.98	120.35
1	C1	858	A2M	C5-C6-N6	8.92	133.90	120.35
1	C1	848	A2M	C5-C6-N6	8.85	133.80	120.35
1	C1	637	A2M	C5-C6-N6	8.79	133.70	120.35
1	C1	1432	A2M	C5-C6-N6	8.69	133.56	120.35
1	C1	389	A2M	C5-C6-N6	8.34	133.03	120.35
1	C1	1847	A2M	N6-C6-N1	-6.17	105.77	118.57
1	C1	848	A2M	N6-C6-N1	-6.05	106.02	118.57
1	C1	1223	A2M	N6-C6-N1	-6.01	106.09	118.57
1	C1	2289	A2M	N6-C6-N1	-5.95	106.23	118.57
1	C1	858	A2M	N6-C6-N1	-5.93	106.28	118.57
1	C1	637	A2M	N6-C6-N1	-5.87	106.39	118.57
1	C1	1432	A2M	N6-C6-N1	-5.85	106.43	118.57
1	C1	2289	A2M	N3-C2-N1	-5.80	119.61	128.68
1	C1	637	A2M	N3-C2-N1	-5.74	119.70	128.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C1	1847	A2M	N3-C2-N1	-5.67	119.82	128.68
1	C1	858	A2M	N3-C2-N1	-5.65	119.84	128.68
1	C1	848	A2M	N3-C2-N1	-5.65	119.84	128.68
1	C1	1223	A2M	N3-C2-N1	-5.63	119.89	128.68
1	C1	1432	A2M	N3-C2-N1	-5.61	119.90	128.68
1	C1	389	A2M	N6-C6-N1	-5.61	106.92	118.57
1	C1	389	A2M	N3-C2-N1	-5.61	119.91	128.68
1	C1	1868	OMU	C4-N3-C2	-5.28	119.62	126.58
1	C1	2688	OMU	C4-N3-C2	-5.22	119.70	126.58
1	C1	2690	OMU	C4-N3-C2	-5.18	119.74	126.58
1	C1	2380	OMU	C4-N3-C2	-5.16	119.77	126.58
1	C1	1917	OMU	C4-N3-C2	-5.02	119.95	126.58
1	C1	2384	OMU	C4-N3-C2	-4.98	120.02	126.58
1	C1	2683	OMU	C4-N3-C2	-4.92	120.09	126.58
1	C1	2277	OMU	C4-N3-C2	-4.82	120.22	126.58
1	C1	2838	OMC	C1'-N1-C2	4.69	128.89	118.42
1	C1	1420	OMC	C1'-N1-C2	4.61	128.70	118.42
1	C1	2688	OMU	N3-C2-N1	3.88	120.04	114.89
1	C1	1917	OMU	N3-C2-N1	3.80	119.93	114.89
1	C1	1868	OMU	N3-C2-N1	3.79	119.92	114.89
1	C1	2384	OMU	N3-C2-N1	3.77	119.90	114.89
1	C1	2690	OMU	N3-C2-N1	3.75	119.87	114.89
1	C1	2380	OMU	N3-C2-N1	3.70	119.80	114.89
1	C1	2277	OMU	N3-C2-N1	3.63	119.71	114.89
1	C1	2683	OMU	N3-C2-N1	3.61	119.68	114.89
1	C1	2838	OMC	C1'-N1-C6	-3.47	113.28	120.84
1	C1	1868	OMU	C5-C4-N3	3.41	119.94	114.84
1	C1	2380	OMU	C5-C4-N3	3.35	119.85	114.84
1	C1	1420	OMC	C1'-N1-C6	-3.33	113.58	120.84
1	C1	2690	OMU	C5-C4-N3	3.30	119.78	114.84
1	C1	2688	OMU	C5-C4-N3	3.30	119.77	114.84
1	C1	2683	OMU	C5-C4-N3	3.26	119.71	114.84
1	C1	2384	OMU	C5-C4-N3	3.19	119.62	114.84
1	C1	1917	OMU	C5-C4-N3	3.17	119.59	114.84
1	C1	2277	OMU	C5-C4-N3	3.11	119.49	114.84
1	C1	1868	OMU	O4-C4-C5	-2.91	120.05	125.16
1	C1	2380	OMU	O4-C4-C5	-2.89	120.08	125.16
1	C1	2690	OMU	O4-C4-C5	-2.88	120.09	125.16
1	C1	2384	OMU	O4-C4-C5	-2.86	120.14	125.16
1	C1	2683	OMU	O4-C4-C5	-2.85	120.15	125.16
1	C1	2688	OMU	O4-C4-C5	-2.79	120.25	125.16
1	C1	1917	OMU	O4-C4-C5	-2.72	120.37	125.16

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C1	2277	OMU	O4-C4-C5	-2.70	120.41	125.16
1	C1	778	OMC	C1'-N1-C2	2.68	124.39	118.42
1	C1	1836	OMC	C1'-N1-C2	2.65	124.34	118.42
1	C1	2838	OMC	O2-C2-N3	-2.58	118.13	122.33
1	C1	1420	OMC	O2-C2-N1	2.54	124.14	118.89
1	C1	646	OMG	O6-C6-C5	2.49	129.25	124.37
1	C1	1420	OMC	O2-C2-N3	-2.42	118.40	122.33
1	C1	1433	OMG	O6-C6-C5	2.36	128.99	124.37
1	C1	2774	OMG	O6-C6-C5	2.35	128.97	124.37
1	C1	2578	OMG	O6-C6-C5	2.34	128.94	124.37
1	C1	2881	OMG	O6-C6-C5	2.34	128.94	124.37
1	C1	627	OMG	O6-C6-C5	2.33	128.93	124.37
1	C1	787	OMG	O6-C6-C5	2.28	128.83	124.37
1	C1	2838	OMC	O2-C2-N1	2.27	123.58	118.89
1	C1	385	OMG	O6-C6-C5	2.26	128.79	124.37
1	C1	1917	OMU	C1'-N1-C2	2.26	121.66	117.57
1	C1	2358	OMG	O6-C6-C5	2.24	128.75	124.37
1	C1	2876	OMG	O6-C6-C5	2.22	128.72	124.37
1	C1	2688	OMU	O2-C2-N1	-2.21	119.85	122.79
1	C1	1868	OMU	O2-C2-N1	-2.15	119.93	122.79
1	C1	2690	OMU	O2-C2-N1	-2.14	119.94	122.79
1	C1	2918	OMC	C1'-N1-C2	2.11	123.12	118.42
1	C1	2380	OMU	O2-C2-N1	-2.09	120.01	122.79

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	C1	389	A2M	O4'-C4'-C5'-O5'
1	C1	389	A2M	C3'-C4'-C5'-O5'
1	C1	389	A2M	C1'-C2'-O2'-CM'
1	C1	858	A2M	C1'-C2'-O2'-CM'
1	C1	1223	A2M	C1'-C2'-O2'-CM'
1	C1	1433	OMG	O4'-C4'-C5'-O5'
1	C1	1917	OMU	C1'-C2'-O2'-CM2
1	C1	2578	OMG	O4'-C4'-C5'-O5'
1	C1	2683	OMU	C1'-C2'-O2'-CM2
1	C1	2690	OMU	C3'-C4'-C5'-O5'
1	C1	2690	OMU	O4'-C4'-C5'-O5'
1	C1	2838	OMC	O4'-C1'-N1-C2
1	C1	2838	OMC	O4'-C1'-N1-C6
1	C1	1433	OMG	C3'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
1	C1	1491	OMC	O4'-C4'-C5'-O5'
1	C1	2578	OMG	C3'-C4'-C5'-O5'
1	C1	1847	A2M	C3'-C4'-C5'-O5'
1	C1	637	A2M	C1'-C2'-O2'-CM'
1	C1	848	A2M	O4'-C4'-C5'-O5'
1	C1	637	A2M	O4'-C4'-C5'-O5'
1	C1	1223	A2M	O4'-C4'-C5'-O5'
1	C1	1420	OMC	C2'-C1'-N1-C6
1	C1	389	A2M	C4'-C5'-O5'-P
1	C1	2578	OMG	C4'-C5'-O5'-P
1	C1	1917	OMU	O4'-C4'-C5'-O5'
1	C1	1420	OMC	C2'-C1'-N1-C2
1	C1	1847	A2M	C4'-C5'-O5'-P
1	C1	1847	A2M	O4'-C4'-C5'-O5'
1	C1	2384	OMU	C1'-C2'-O2'-CM2
1	C1	627	OMG	O4'-C4'-C5'-O5'
1	C1	1420	OMC	O4'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 8 are monoatomic - leaving 2 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
54	GTP	Cd	1000	55	26,34,34	1.14	2 (7%)	32,54,54	1.52	7 (21%)
54	GTP	CH	701	55	26,34,34	1.14	2 (7%)	32,54,54	1.61	7 (21%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
54	GTP	Cd	1000	55	-	5/18/38/38	0/3/3/3
54	GTP	CH	701	55	-	4/18/38/38	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
54	Cd	1000	GTP	C5-C6	-4.08	1.39	1.47
54	CH	701	GTP	C5-C6	-4.05	1.39	1.47
54	CH	701	GTP	C2-N3	2.10	1.38	1.33
54	Cd	1000	GTP	C2-N3	2.03	1.38	1.33

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
54	CH	701	GTP	PA-O3A-PB	-3.60	120.48	132.83
54	CH	701	GTP	PB-O3B-PG	-3.45	120.97	132.83
54	Cd	1000	GTP	PB-O3B-PG	-3.40	121.17	132.83
54	Cd	1000	GTP	C5-C6-N1	3.20	119.60	113.95
54	CH	701	GTP	C5-C6-N1	3.14	119.49	113.95
54	CH	701	GTP	C3'-C2'-C1'	3.06	105.58	100.98
54	Cd	1000	GTP	C8-N7-C5	3.00	108.71	102.99
54	CH	701	GTP	C8-N7-C5	3.00	108.70	102.99
54	Cd	1000	GTP	C2-N1-C6	-2.88	119.80	125.10
54	Cd	1000	GTP	C3'-C2'-C1'	2.83	105.25	100.98
54	CH	701	GTP	C2-N1-C6	-2.81	119.93	125.10
54	Cd	1000	GTP	PA-O3A-PB	-2.22	125.20	132.83
54	Cd	1000	GTP	O6-C6-C5	-2.17	120.14	124.37
54	CH	701	GTP	O6-C6-C5	-2.08	120.31	124.37

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
54	CH	701	GTP	C5'-O5'-PA-O3A
54	CH	701	GTP	C5'-O5'-PA-O1A
54	CH	701	GTP	O4'-C4'-C5'-O5'
54	Cd	1000	GTP	C5'-O5'-PA-O1A

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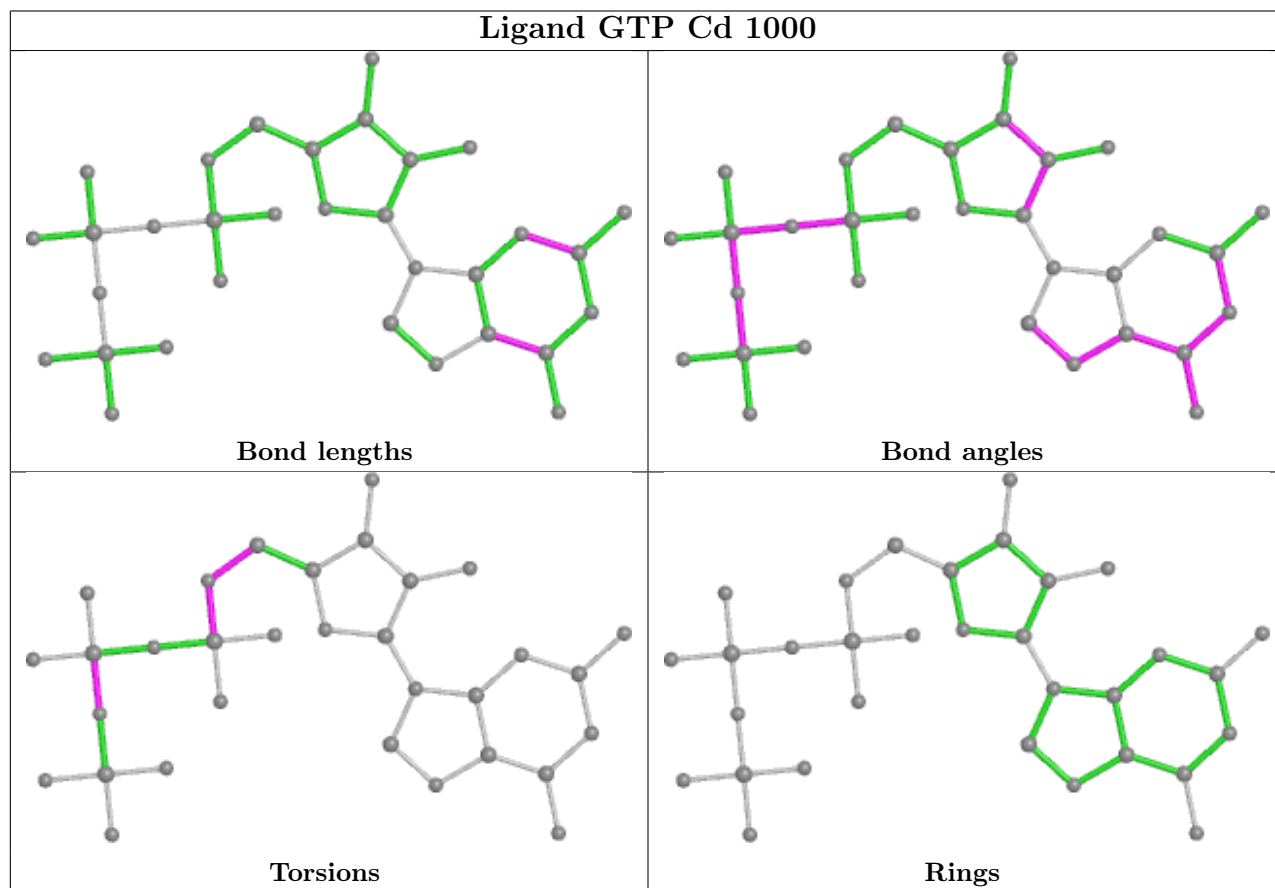
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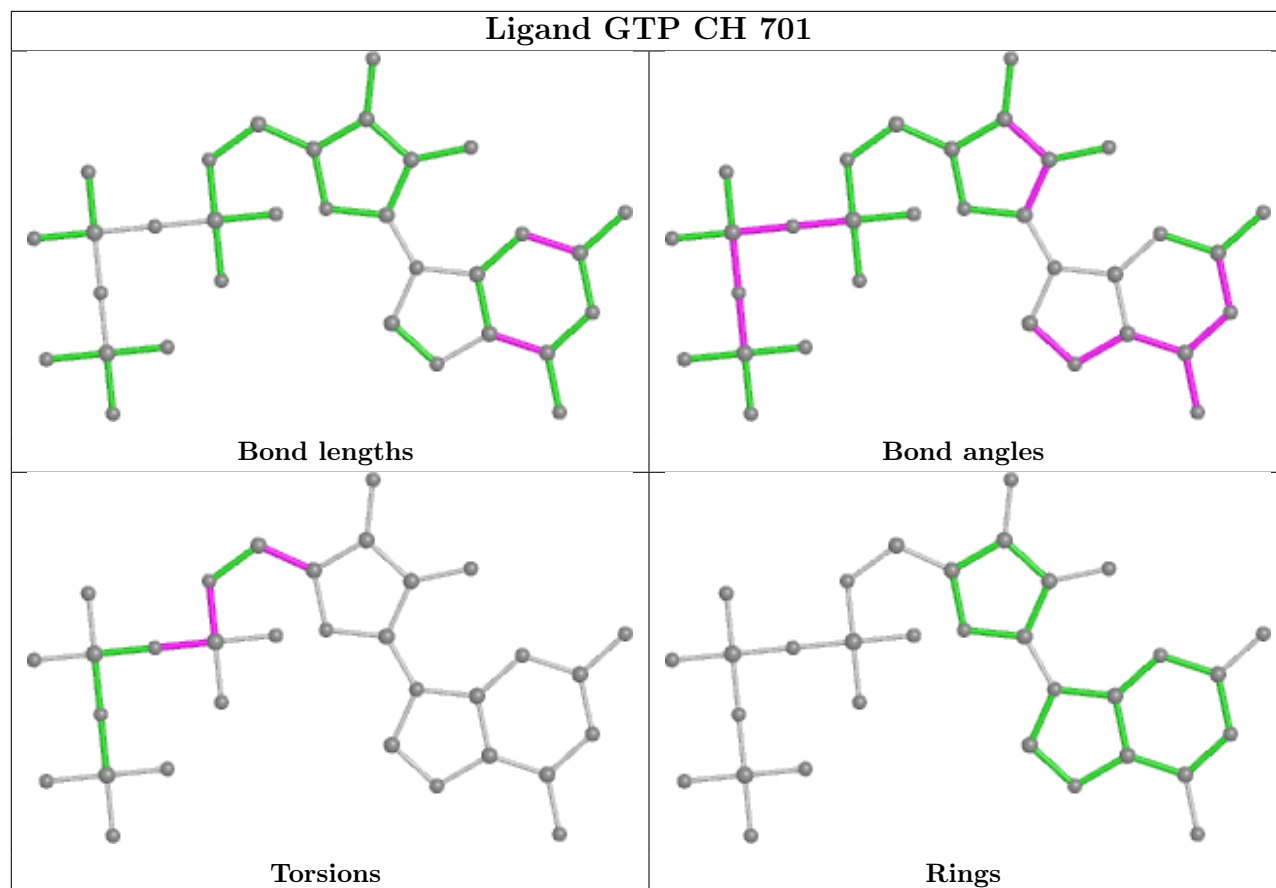
Mol	Chain	Res	Type	Atoms
54	Cd	1000	GTP	C5'-O5'-PA-O2A
54	CH	701	GTP	PB-O3A-PA-O2A
54	Cd	1000	GTP	C4'-C5'-O5'-PA
54	Cd	1000	GTP	C5'-O5'-PA-O3A
54	Cd	1000	GTP	PG-O3B-PB-O1B

There are no ring outliers.

No monomer is involved in short contacts.

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





5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [\(i\)](#)

There are no chain breaks in this entry.

6 Map visualisation

This section contains visualisations of the EMDB entry EMD-17954. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

This section was not generated.

6.2 Central slices

This section was not generated.

6.3 Largest variance slices

This section was not generated.

6.4 Orthogonal standard-deviation projections (False-color)

This section was not generated.

6.5 Orthogonal surface views

This section was not generated.

6.6 Mask visualisation

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

This section was not generated.

7.2 Volume estimate versus contour level

This section was not generated.

7.3 Rotationally averaged power spectrum

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit

This section was not generated.