



## Full wwPDB EM Validation Report ⓘ

Nov 7, 2022 – 04:10 AM EST

PDB ID : 6N8K  
EMDB ID : EMD-0370  
Title : Cryo-EM structure of early cytoplasmic-immediate (ECI) pre-60S ribosomal subunit  
Authors : Zhou, Y.; Musalgaonkar, S.; Johnson, A.W.; Taylor, D.W.  
Deposited on : 2018-11-29  
Resolution : 3.60 Å (reported)  
Based on initial model : 3JCT

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

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

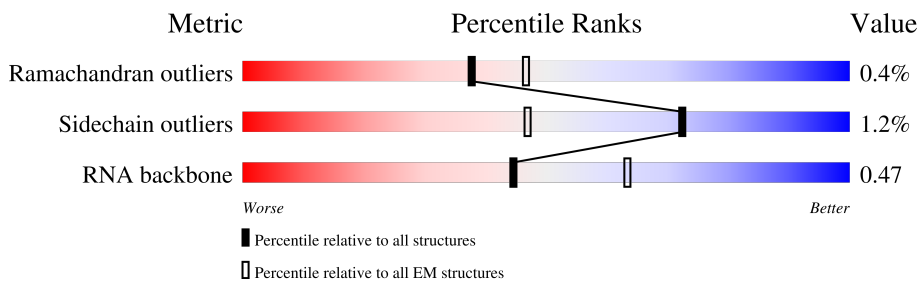
EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

# 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 3.60 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.



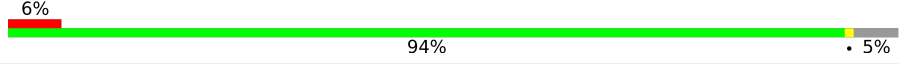

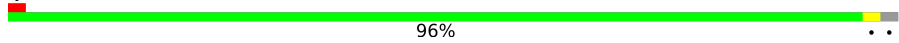

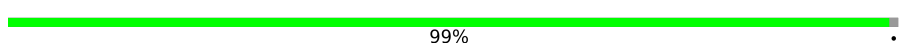

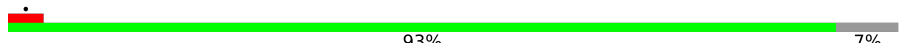





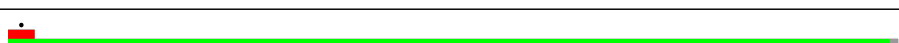
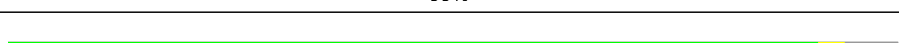
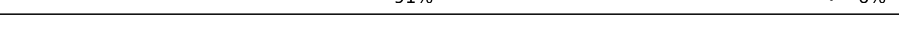
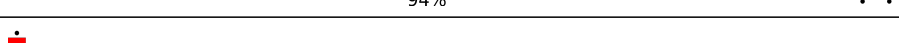
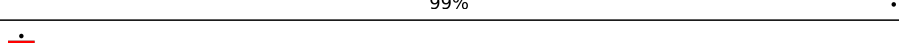
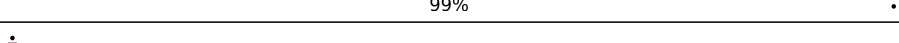
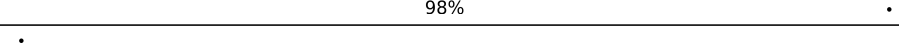

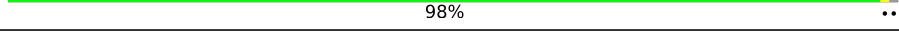
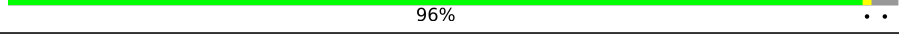


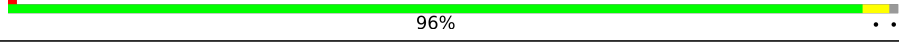
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . 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	s	217	
2	v	518	
3	A	254	
4	a	149	
5	B	387	
6	b	647	
7	C	362	
8	c	105	

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Mol	Chain	Length	Quality of chain
9	d	113	 6% 94% 5%
10	E	176	 88% 9%
11	e	130	 96%
12	F	244	 90% 9%
13	f	107	 99%
14	G	256	 88% 10%
15	g	121	 93% 7%
16	I	166	 5% 77% 21%
17	H	191	 96%
18	h	120	 98%
19	i	100	 96%
20	j	88	 95%
21	k	78	 99%
22	L	199	 91% 6%
23	l	51	 94%
24	M	138	 99%
25	p	92	 99%
26	N	204	 98%
27	u	199	 70% 5% 25%
28	O	199	 98%
29	P	184	 96%
30	Q	186	 81% 17%
31	R	189	 81% 19%
32	S	172	 96%
33	T	160	 36% 62%

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Mol	Chain	Length	Quality of chain
34	U	121	84% 14%
35	V	137	99%
36	W	236	30% 90% 9%
37	X	142	84% 15%
38	Y	127	98%
39	y	245	7% 98%
40	Z	136	99%
41	z	106	7% 52% 48%
42	D	297	82% 15%
43	J	174	91% 6%
44	q	106	53% 86% 5% 8%
45	o	59	7% 90% 8%
46	1	3396	71% 21% 6%
47	2	121	83% 17%
48	3	158	77% 22%

## 2 Entry composition

There are 50 unique types of molecules in this entry. The entry contains 132821 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Ribosomal Protein uL1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	s	210	1050	630	210	210	0	0	

- Molecule 2 is a protein called 60S ribosomal export protein NMD3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	v	252	1970	1261	329	373	7	0	0

- Molecule 3 is a protein called 60S ribosomal protein L2-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	A	245	1863	1162	376	324	1	0	0

- Molecule 4 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	a	94	742	484	131	126	1	0	0

- Molecule 5 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	B	386	3081	1956	584	533	8	0	0

- Molecule 6 is a protein called Nucleolar GTP-binding protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	b	606	4895	3073	876	920	26	0	0

- Molecule 7 is a protein called 60S ribosomal protein L4-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	C	361	Total	C	N	O	S	0	0
			2749	1730	522	494	3		

- Molecule 8 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	c	97	Total	C	N	O	S	0	0
			743	479	124	139	1		

- Molecule 9 is a protein called 60S ribosomal protein L31-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	d	107	Total	C	N	O	S	0	0
			873	553	165	154	1		

- Molecule 10 is a protein called 60S ribosomal protein L6-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	E	160	Total	C	N	O	S	0	0
			1274	820	230	223	1		

- Molecule 11 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	e	127	Total	C	N	O	S	0	0
			1020	647	205	167	1		

- Molecule 12 is a protein called 60S ribosomal protein L7-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	F	222	Total	C	N	O	S	0	0
			1784	1151	324	308	1		

- Molecule 13 is a protein called 60S ribosomal protein L33-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	f	106	Total	C	N	O	S	0	0
			850	540	165	144	1		

- Molecule 14 is a protein called 60S ribosomal protein L8-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	G	230	Total	C	N	O	S	0	0
			1798	1149	323	323	3		

- Molecule 15 is a protein called 60S ribosomal protein L34-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	g	112	Total	C	N	O	S	0	0
			881	546	179	152	4		

- Molecule 16 is a protein called Bud site selection protein 20.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	I	131	Total	C	N	O	S	0	0
			1056	660	195	198	3		

- Molecule 17 is a protein called 60S ribosomal protein L9-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	H	188	Total	C	N	O	S	0	0
			1493	948	271	270	4		

- Molecule 18 is a protein called 60S ribosomal protein L35-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	h	119	Total	C	N	O	S	0	0
			969	615	186	167	1		

- Molecule 19 is a protein called 60S ribosomal protein L36-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	i	96	Total	C	N	O	S	0	0
			743	465	148	128	2		

- Molecule 20 is a protein called 60S ribosomal protein L37-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	j	85	Total	C	N	O	S	0	0
			670	408	146	111	5		

- Molecule 21 is a protein called 60S ribosomal protein L38.

Mol	Chain	Residues	Atoms				AltConf	Trace
21	k	77	Total	C	N	O	0	0
			612	391	115	106		

- Molecule 22 is a protein called 60S ribosomal protein L13-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	L	187	Total	C	N	O	0	0
			1491	929	306	256		

- Molecule 23 is a protein called 60S ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	l	50	Total	C	N	O	S	0	0
			436	272	97	65	2		

- Molecule 24 is a protein called 60S ribosomal protein L14-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	M	137	Total	C	N	O	S	0	0
			1059	678	200	179	2		

- Molecule 25 is a protein called 60S ribosomal protein L43-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	p	91	Total	C	N	O	S	0	0
			694	429	138	121	6		

- Molecule 26 is a protein called 60S ribosomal protein L15-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	N	203	Total	C	N	O	S	0	0
			1720	1077	361	281	1		

- Molecule 27 is a protein called Ribosome biogenesis protein RLP24.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	u	149	Total	C	N	O	S	0	0
			1256	788	252	207	9		

- Molecule 28 is a protein called 60S ribosomal protein L16-A.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	O	197	1555	1003	289	262	1	0	0

- Molecule 29 is a protein called 60S ribosomal protein L17-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	P	178	1409	876	281	252		0	0

- Molecule 30 is a protein called 60S ribosomal protein L18-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	Q	154	1191	753	231	205	2	0	0

- Molecule 31 is a protein called 60S ribosomal protein L19-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	R	154	1241	772	262	207		0	0

- Molecule 32 is a protein called 60S ribosomal protein L20-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	S	170	1425	916	265	241	3	0	0

- Molecule 33 is a protein called 60S ribosomal protein L21-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	T	61	476	295	95	85	1	0	0

- Molecule 34 is a protein called 60S ribosomal protein L22-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	U	104	826	535	136	155		0	0

- Molecule 35 is a protein called 60S ribosomal protein L23-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	V	136	Total	C	N	O	S	0	0
			1003	628	189	179	7		

- Molecule 36 is a protein called Ribosome assembly factor MRT4.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	W	215	Total	C	N	O	S	0	0
			1690	1068	282	335	5		

- Molecule 37 is a protein called 60S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	X	120	Total	C	N	O	S	0	0
			959	617	168	172	2		

- Molecule 38 is a protein called 60S ribosomal protein L26-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	Y	126	Total	C	N	O		0	0
			993	625	192	176			

- Molecule 39 is a protein called Eukaryotic translation initiation factor 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	y	242	Total	C	N	O	S	0	0
			1826	1131	317	372	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
40	Z	135	Total	C	N	O		0	0
			1092	710	202	180			

- Molecule 41 is a protein called UPF0642 protein YBL028C.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	z	55	Total	C	N	O		0	0
			444	273	88	83			

- Molecule 42 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	D	251	1983	1253	353	375	2	0	0

- Molecule 43 is a protein called 60S ribosomal protein L11-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	J	164	1304	816	243	242	3	0	0

- Molecule 44 is a protein called 60S ribosomal protein L42-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	q	97	783	493	158	127	5	0	0

- Molecule 45 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
45	o	54	433	271	94	68	0	0

- Molecule 46 is a RNA chain called *Saccharomyces cerevisiae* S288C 35S pre-ribosomal RNA (RDN37-1), miscRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
46	1	3201	68471	30584	12345	22341	3201	0	0

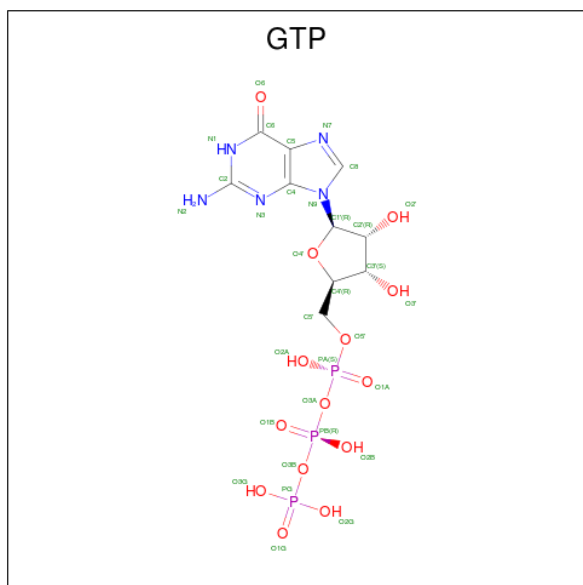
- Molecule 47 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
47	2	121	2579	1152	461	845	121	0	0

- Molecule 48 is a RNA chain called 5.8S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
48	3	157	3333	1491	584	1101	157	0	0

- Molecule 49 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: C<sub>10</sub>H<sub>16</sub>N<sub>5</sub>O<sub>14</sub>P<sub>3</sub>).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
49	b	1	32	10	5	14	3	0

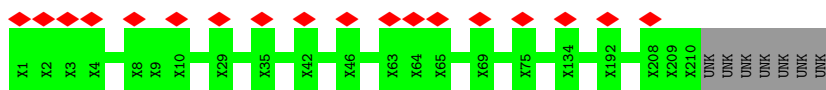
- Molecule 50 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
50	b	1	1	1	0

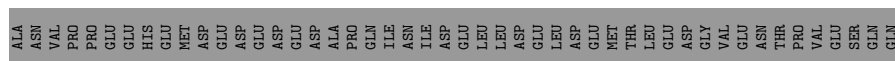
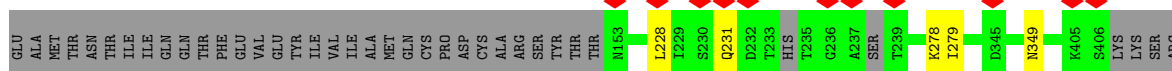
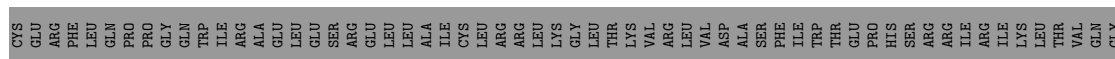
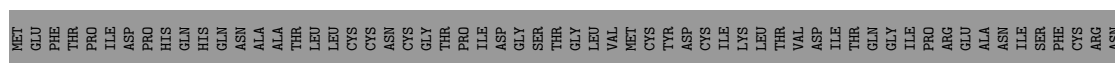
### 3 Residue-property plots [i](#)

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 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.

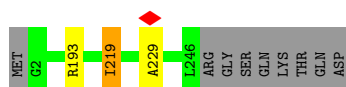
- Molecule 1: Ribosomal Protein uL1



- Molecule 2: 60S ribosomal export protein NMD3

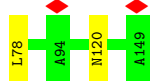
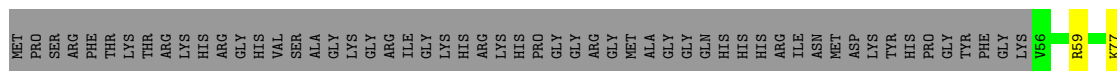


- Molecule 3: 60S ribosomal protein L2-A

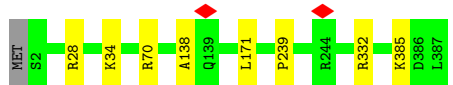


- Molecule 4: 60S ribosomal protein L28

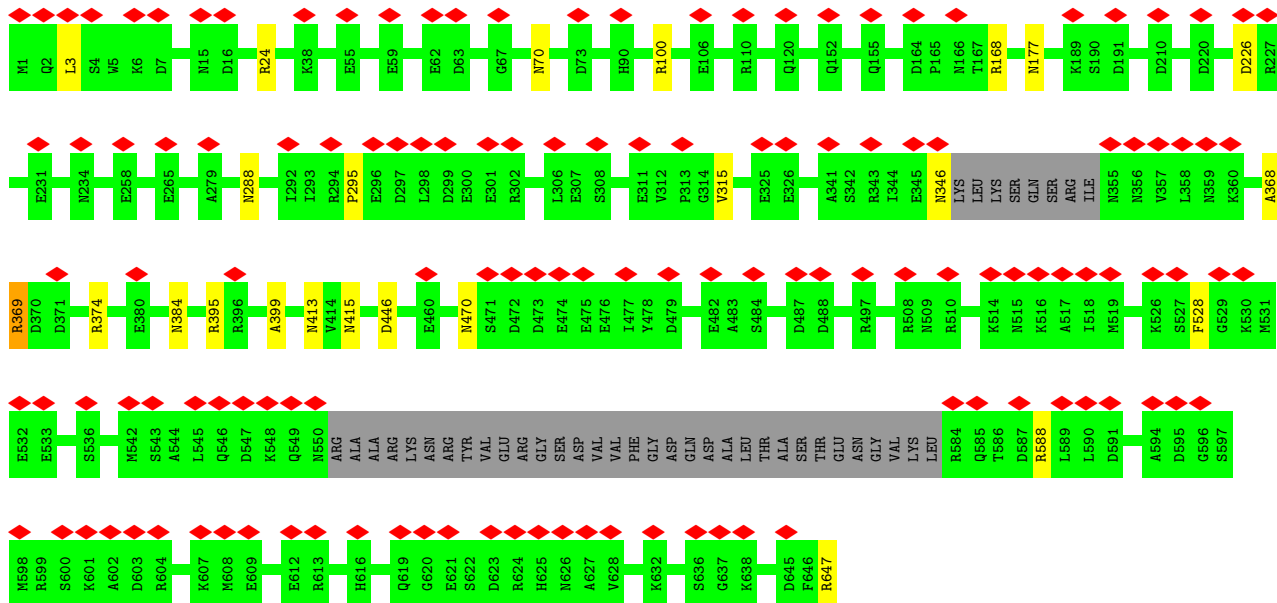
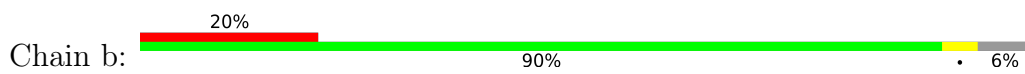




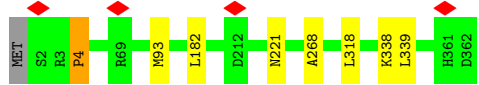
• Molecule 5: 60S ribosomal protein L3



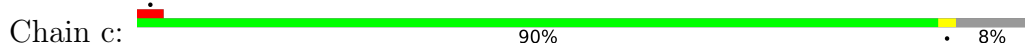
• Molecule 6: Nucleolar GTP-binding protein 1



• Molecule 7: 60S ribosomal protein L4-A

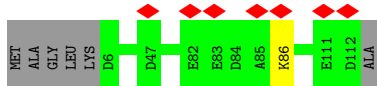


• Molecule 8: 60S ribosomal protein L30

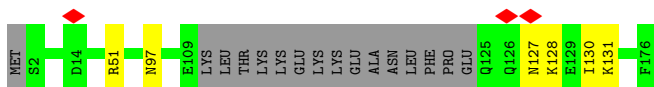
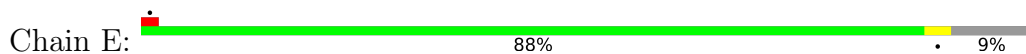




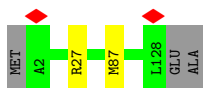
- Molecule 9: 60S ribosomal protein L31-A



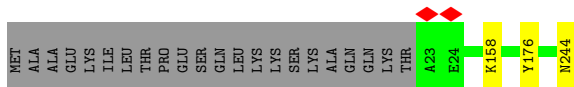
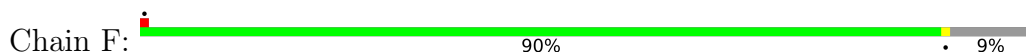
- Molecule 10: 60S ribosomal protein L6-A



- Molecule 11: 60S ribosomal protein L32



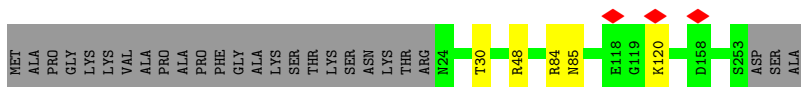
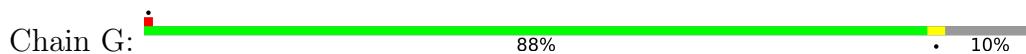
- Molecule 12: 60S ribosomal protein L7-A



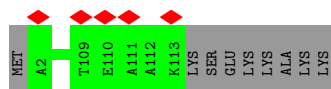
- Molecule 13: 60S ribosomal protein L33-A



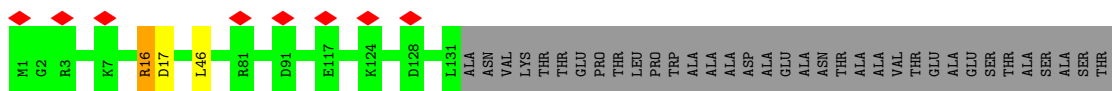
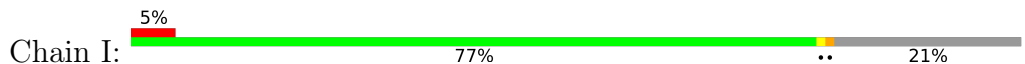
- Molecule 14: 60S ribosomal protein L8-A



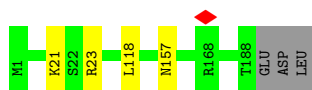
- Molecule 15: 60S ribosomal protein L34-A



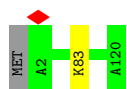
- Molecule 16: Bud site selection protein 20



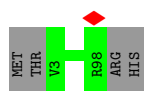
- Molecule 17: 60S ribosomal protein L9-A



- Molecule 18: 60S ribosomal protein L35-A



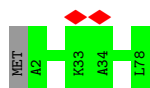
- Molecule 19: 60S ribosomal protein L36-A



- Molecule 20: 60S ribosomal protein L37-A



- Molecule 21: 60S ribosomal protein L38





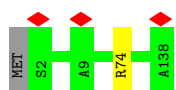
• Molecule 22: 60S ribosomal protein L13-A



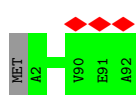
• Molecule 23: 60S ribosomal protein L39



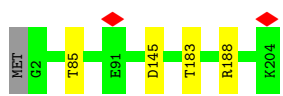
• Molecule 24: 60S ribosomal protein L14-A



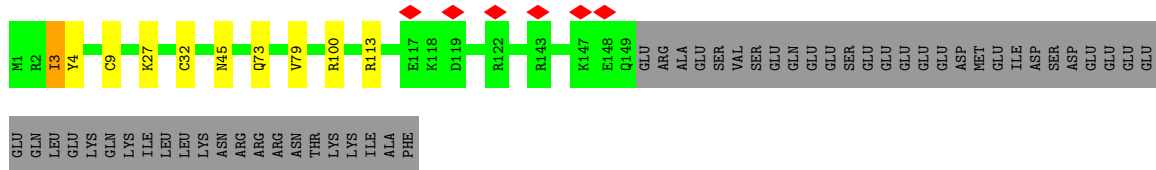
• Molecule 25: 60S ribosomal protein L43-A



• Molecule 26: 60S ribosomal protein L15-A

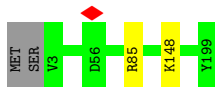


• Molecule 27: Ribosome biogenesis protein RLP24

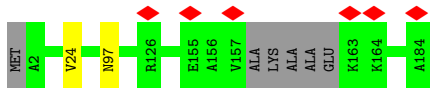


• Molecule 28: 60S ribosomal protein L16-A

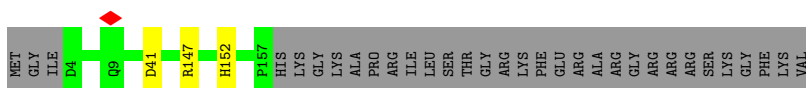
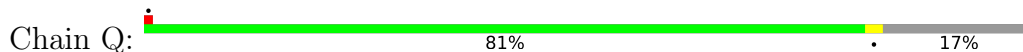




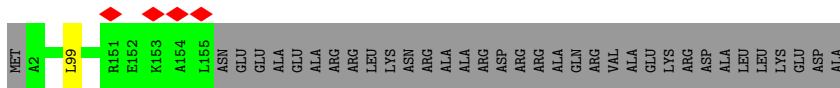
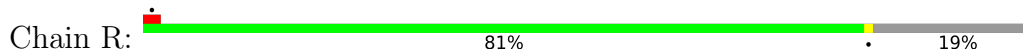
- Molecule 29: 60S ribosomal protein L17-A



- Molecule 30: 60S ribosomal protein L18-A



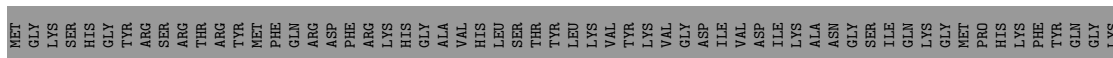
- Molecule 31: 60S ribosomal protein L19-A



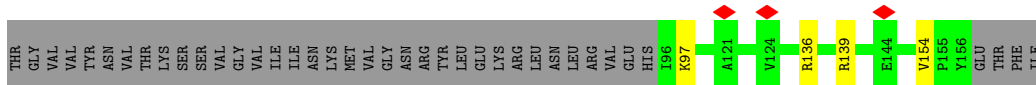
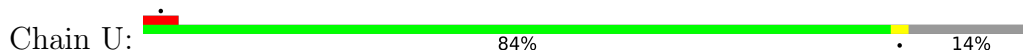
- Molecule 32: 60S ribosomal protein L20-A

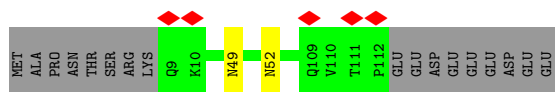


- Molecule 33: 60S ribosomal protein L21-A

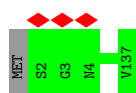


- Molecule 34: 60S ribosomal protein L22-A

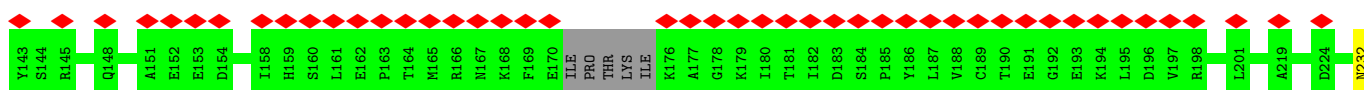
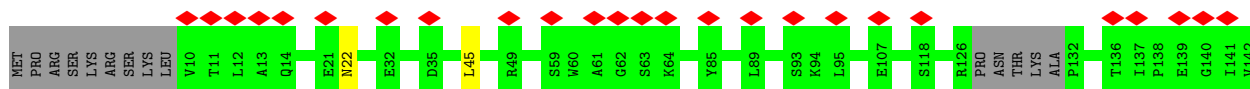




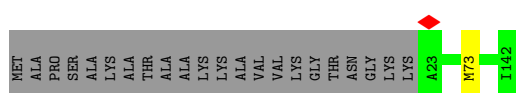
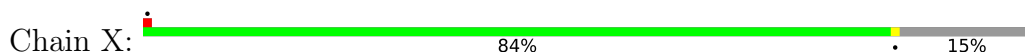
• Molecule 35: 60S ribosomal protein L23-A



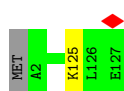
• Molecule 36: Ribosome assembly factor MRT4



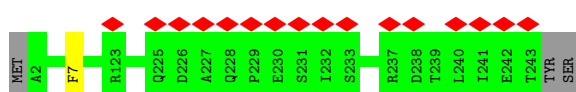
• Molecule 37: 60S ribosomal protein L25



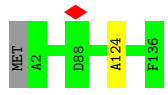
• Molecule 38: 60S ribosomal protein L26-A



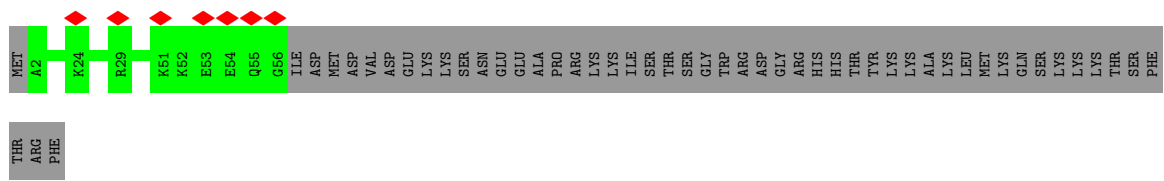
• Molecule 39: Eukaryotic translation initiation factor 6



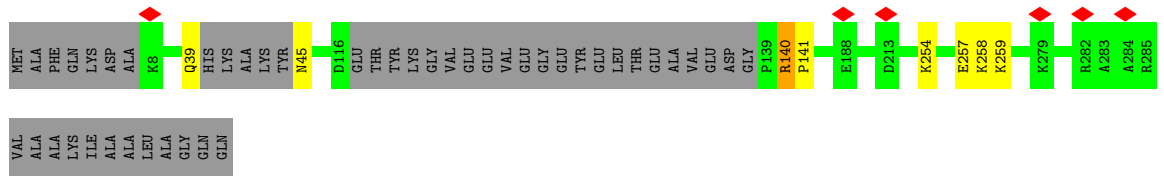
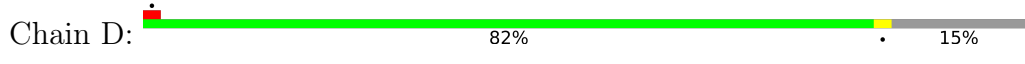
• Molecule 40: 60S ribosomal protein L27-A



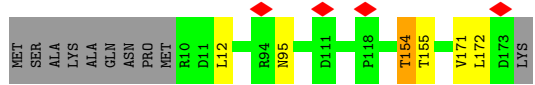
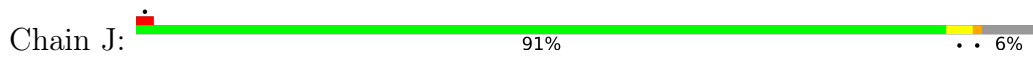
- Molecule 41: UPF0642 protein YBL028C



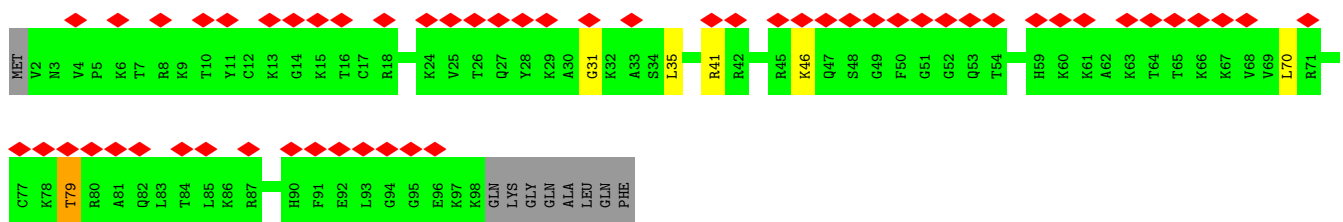
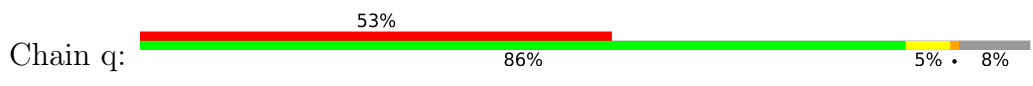
- Molecule 42: 60S ribosomal protein L5



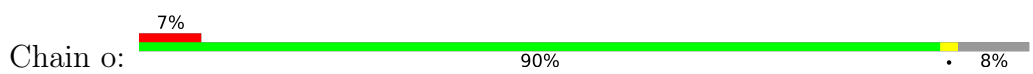
- Molecule 43: 60S ribosomal protein L11-A

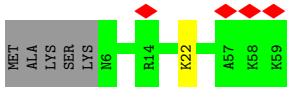


- Molecule 44: 60S ribosomal protein L42-A

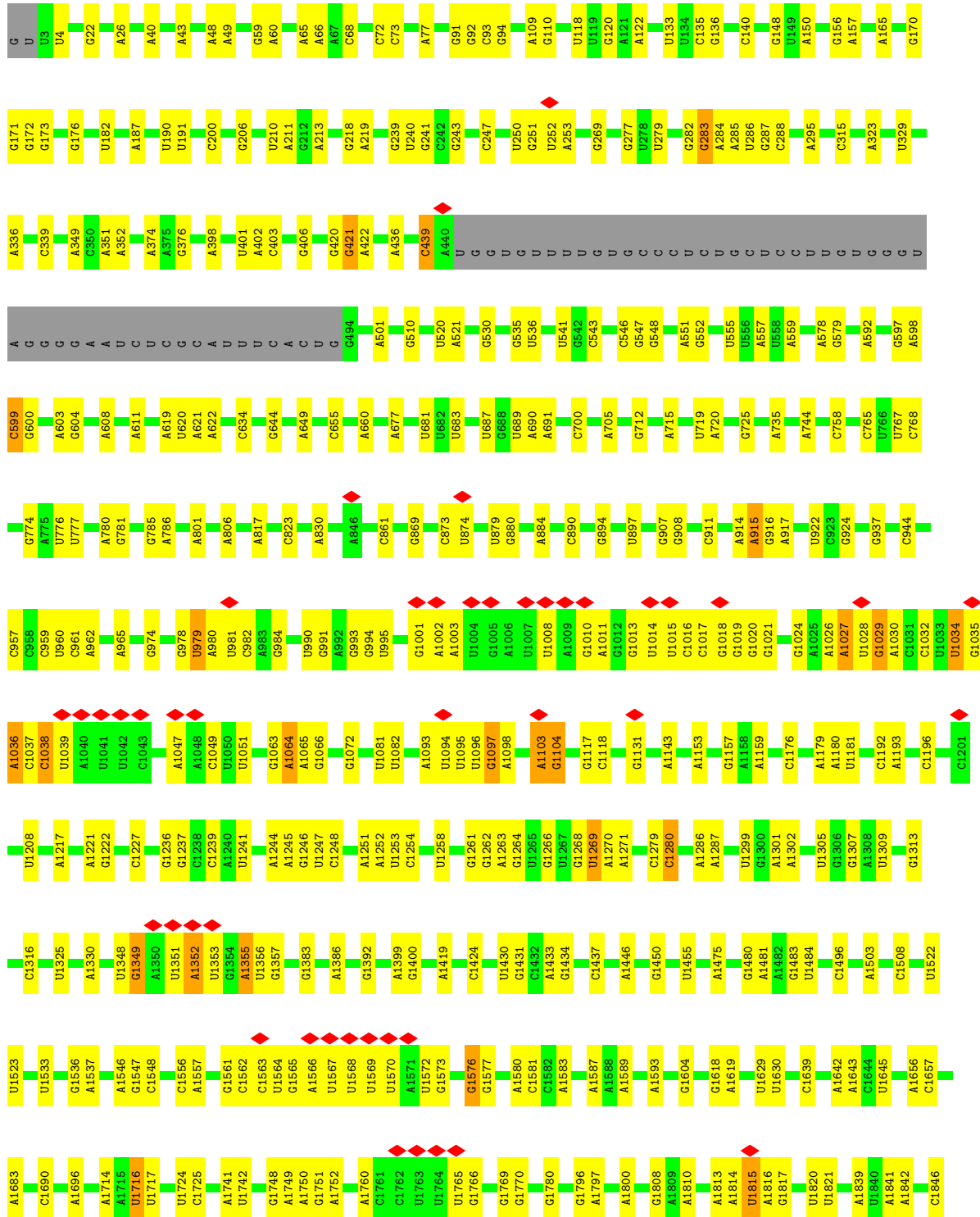


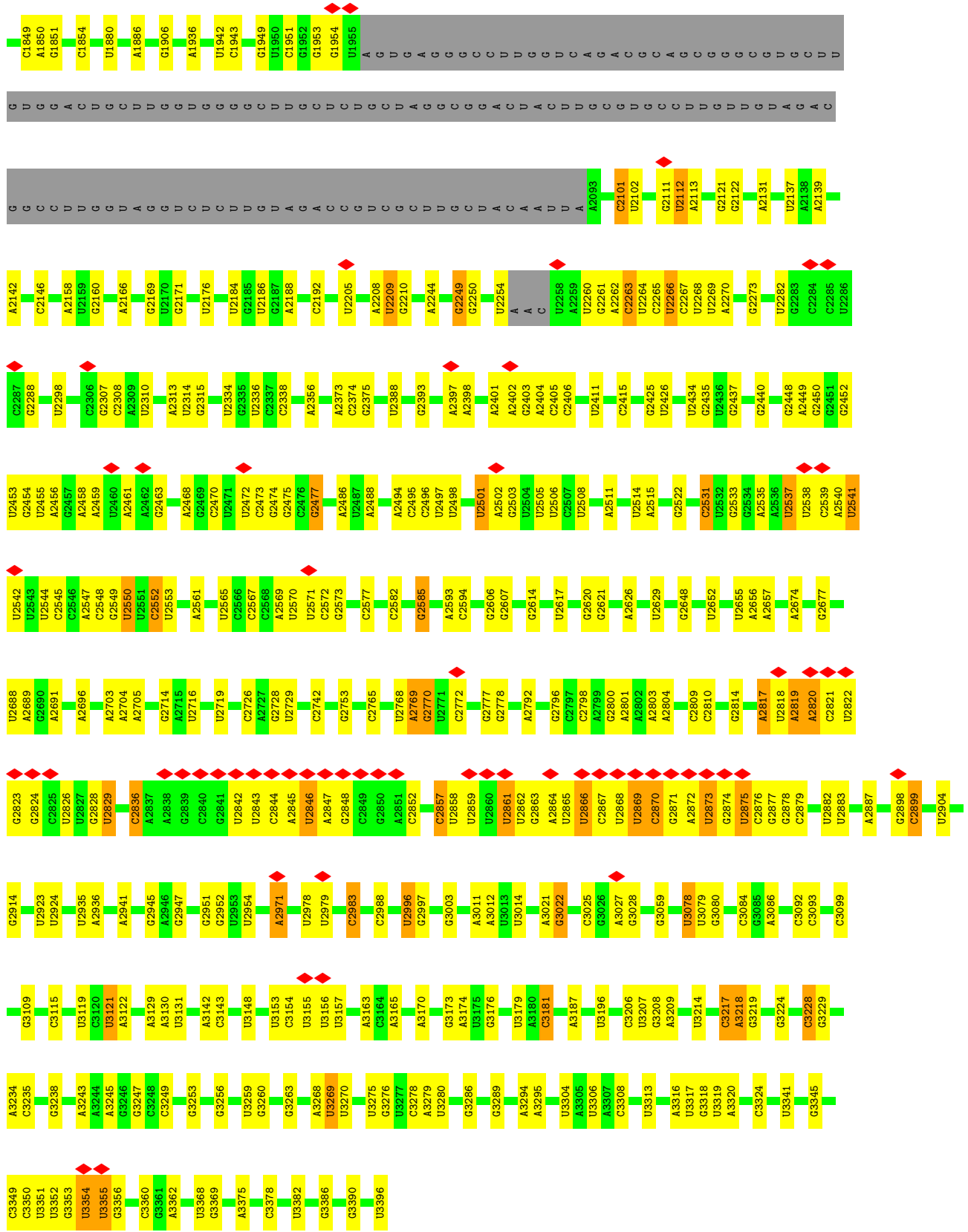
- Molecule 45: 60S ribosomal protein L29



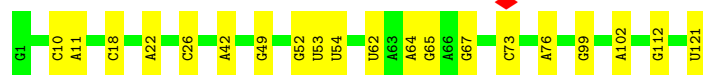
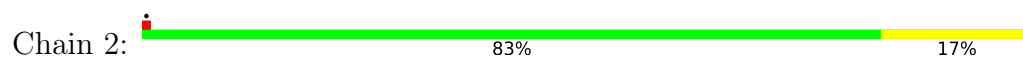


● Molecule 46: *Saccharomyces cerevisiae* S288C 35S pre-ribosomal RNA (RDN37-1), miscRNA

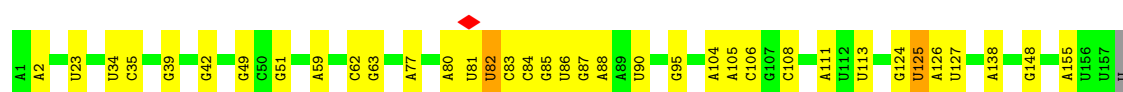
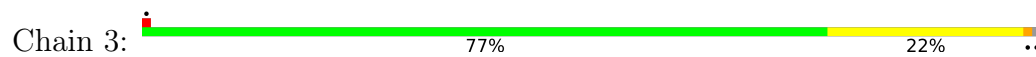




• Molecule 47: 5S rRNA



● Molecule 48: 5.8S rRNA



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	43797	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	22500	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.137	Depositor
Minimum map value	-0.082	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.02	Depositor
Map size ( $\text{\AA}$ )	422.40002, 422.40002, 422.40002	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.1, 1.1, 1.1	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: MG, GTP

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
2	v	0.37	0/2008	0.61	1/2727 (0.0%)
3	A	0.42	0/1897	0.63	0/2550
4	a	0.40	0/758	0.52	0/1023
5	B	0.42	0/3152	0.65	1/4239 (0.0%)
6	b	0.31	0/4977	0.60	1/6689 (0.0%)
7	C	0.38	0/2801	0.59	1/3792 (0.0%)
8	c	0.36	0/751	0.56	0/1008
9	d	0.42	0/887	0.59	1/1191 (0.1%)
10	E	0.35	0/1295	0.56	0/1740
11	e	0.36	0/1041	0.55	0/1394
12	F	0.37	0/1821	0.59	1/2451 (0.0%)
13	f	0.42	0/868	0.53	0/1168
14	G	0.37	0/1830	0.64	0/2469
15	g	0.43	0/891	0.59	0/1191
16	I	0.32	0/1072	0.59	1/1440 (0.1%)
17	H	0.36	0/1514	0.57	1/2039 (0.0%)
18	h	0.34	0/978	0.52	0/1301
19	i	0.33	0/749	0.58	0/995
20	j	0.41	0/685	0.60	0/908
21	k	0.33	0/618	0.53	0/826
22	L	0.38	0/1516	0.62	0/2037
23	l	0.36	0/443	0.62	0/588
24	M	0.35	0/1074	0.53	0/1446
25	p	0.39	0/701	0.58	0/934
26	N	0.45	0/1757	0.58	1/2354 (0.0%)
27	u	0.38	0/1278	0.63	3/1699 (0.2%)
28	O	0.39	0/1585	0.53	0/2128
29	P	0.39	0/1431	0.56	0/1921
30	Q	0.36	0/1211	0.62	1/1633 (0.1%)
31	R	0.38	0/1258	0.58	1/1679 (0.1%)
32	S	0.40	0/1460	0.58	0/1962
33	T	0.31	0/483	0.55	0/650

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
34	U	0.35	0/843	0.57	0/1143
35	V	0.37	0/1018	0.56	0/1369
36	W	0.28	0/1716	0.54	1/2317 (0.0%)
37	X	0.38	0/974	0.57	0/1314
38	Y	0.34	0/1004	0.56	0/1341
39	y	0.34	0/1848	0.57	0/2516
40	Z	0.38	0/1118	0.57	0/1497
41	z	0.26	0/445	0.45	0/585
42	D	0.35	0/2023	0.56	0/2729
43	J	0.30	0/1324	0.62	0/1778
44	q	0.45	0/795	0.91	1/1050 (0.1%)
45	o	0.35	0/444	0.54	0/592
46	1	0.67	1/76644 (0.0%)	0.97	194/119495 (0.2%)
47	2	0.55	0/2883	0.87	0/4491
48	3	0.71	0/3724	0.91	4/5798 (0.1%)
All	All	0.57	1/141593 (0.0%)	0.84	214/208187 (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
2	v	0	1
3	A	0	2
5	B	0	1
6	b	0	5
7	C	0	3
10	E	0	1
12	F	0	1
14	G	0	1
16	I	0	1
17	H	0	1
18	h	0	1
22	L	0	1
26	N	0	1
30	Q	0	1
32	S	0	2
33	T	0	1
38	Y	0	1
39	y	0	1
40	Z	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
42	D	0	3
43	J	0	2
44	q	0	5
All	All	0	37

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
46	1	2971	A	N9-C4	5.52	1.41	1.37

All (214) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	1	2861	U	C2-N1-C1'	11.62	131.65	117.70
46	1	1269	U	C2-N1-C1'	11.46	131.46	117.70
46	1	3217	C	N1-C2-O2	11.44	125.76	118.90
46	1	2873	U	C2-N1-C1'	11.12	131.05	117.70
46	1	1269	U	N1-C2-O2	10.93	130.45	122.80
46	1	2861	U	N1-C2-O2	10.86	130.40	122.80
46	1	1269	U	N3-C2-O2	-10.49	114.86	122.20
46	1	2861	U	N3-C2-O2	-10.33	114.97	122.20
46	1	2873	U	N1-C2-O2	10.16	129.91	122.80
46	1	2873	U	N3-C2-O2	-9.85	115.30	122.20
46	1	3217	C	C2-N1-C1'	9.75	129.53	118.80
46	1	922	U	C2-N1-C1'	9.56	129.18	117.70
46	1	3217	C	N3-C2-O2	-8.98	115.62	121.90
46	1	2263	C	N1-C2-O2	8.84	124.20	118.90
46	1	283	G	C4-N9-C1'	8.76	137.89	126.50
46	1	922	U	N1-C2-O2	8.53	128.77	122.80
46	1	1013	G	N3-C4-C5	-8.48	124.36	128.60
30	Q	41	ASP	CB-CG-OD1	8.31	125.78	118.30
46	1	2137	U	C2-N1-C1'	8.30	127.66	117.70
46	1	1013	G	N3-C4-N9	8.21	130.93	126.00
46	1	922	U	N3-C2-O2	-7.83	116.72	122.20
46	1	1013	G	C4-N9-C1'	7.79	136.63	126.50
46	1	283	G	C8-N9-C1'	-7.67	117.02	127.00
46	1	2836	C	N1-C2-O2	7.66	123.49	118.90
46	1	2770	G	O5'-P-OP2	-7.62	98.84	105.70
46	1	2112	U	P-O3'-C3'	7.59	128.81	119.70
46	1	2541	U	P-O3'-C3'	7.59	128.81	119.70
46	1	1269	U	C6-N1-C1'	-7.54	110.65	121.20
46	1	979	U	N3-C2-O2	-7.46	116.98	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	1	2137	U	N1-C2-O2	7.43	128.00	122.80
46	1	2861	U	C6-N1-C1'	-7.38	110.87	121.20
46	1	2263	C	N3-C2-O2	-7.32	116.78	121.90
46	1	2112	U	OP2-P-O3'	7.29	121.25	105.20
46	1	1576	G	P-O3'-C3'	7.29	128.44	119.70
46	1	2873	U	C6-N1-C1'	-7.26	111.03	121.20
46	1	1029	G	P-O3'-C3'	7.19	128.33	119.70
46	1	979	U	P-O3'-C3'	7.13	128.26	119.70
46	1	1815	U	P-O3'-C3'	7.06	128.17	119.70
46	1	2137	U	N3-C2-O2	-6.98	117.31	122.20
16	I	46	LEU	CA-CB-CG	6.94	131.26	115.30
46	1	2862	U	C2-N1-C1'	6.88	125.96	117.70
46	1	1038	C	P-O3'-C3'	6.86	127.93	119.70
46	1	2553	U	N1-C2-O2	6.84	127.59	122.80
46	1	2819	A	P-O3'-C3'	6.81	127.87	119.70
46	1	2836	C	N3-C2-O2	-6.79	117.15	121.90
46	1	1027	A	P-O3'-C3'	6.78	127.83	119.70
46	1	2836	C	C6-N1-C2	-6.75	117.60	120.30
46	1	2875	U	O4'-C1'-N1	6.75	113.60	108.20
46	1	3217	C	C6-N1-C1'	-6.73	112.73	120.80
46	1	2769	A	P-O3'-C3'	6.70	127.74	119.70
46	1	3217	C	C6-N1-C2	-6.69	117.62	120.30
46	1	1021	G	O4'-C1'-N9	6.65	113.52	108.20
46	1	2861	U	C5-C6-N1	6.65	126.02	122.70
46	1	2585	G	N3-C4-C5	-6.63	125.28	128.60
46	1	2971	A	C2-N3-C4	6.63	113.92	110.60
46	1	1064	A	P-O3'-C3'	6.57	127.59	119.70
46	1	2537	U	P-O3'-C3'	6.57	127.58	119.70
46	1	2101	C	P-O3'-C3'	6.54	127.55	119.70
26	N	145	ASP	CB-CG-OD1	6.53	124.18	118.30
46	1	922	U	C6-N1-C1'	-6.53	112.06	121.20
46	1	1034	U	C2-N1-C1'	6.51	125.52	117.70
46	1	1352	A	P-O3'-C3'	6.51	127.52	119.70
46	1	3306	U	N3-C2-O2	-6.50	117.65	122.20
46	1	1034	U	N3-C2-O2	-6.44	117.69	122.20
46	1	1013	G	C8-N9-C1'	-6.43	118.64	127.00
46	1	283	G	N3-C4-N9	6.40	129.84	126.00
46	1	3181	C	C2-N1-C1'	6.38	125.82	118.80
46	1	2553	U	N3-C2-O2	-6.38	117.74	122.20
27	u	32	CYS	CA-CB-SG	-6.37	102.53	114.00
46	1	283	G	N3-C4-C5	-6.37	125.42	128.60
46	1	1349	G	N3-C4-C5	-6.36	125.42	128.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	1	2425	G	C4-N9-C1'	6.33	134.74	126.50
46	1	1036	A	C2-N3-C4	6.33	113.76	110.60
46	1	1013	G	C2-N3-C4	6.30	115.05	111.90
46	1	1716	U	P-O3'-C3'	6.26	127.21	119.70
46	1	3350	C	N1-C2-O2	6.24	122.64	118.90
46	1	1349	G	C4-N9-C1'	6.24	134.61	126.50
46	1	2857	C	P-O3'-C3'	6.23	127.18	119.70
48	3	82	U	P-O3'-C3'	6.23	127.18	119.70
46	1	3084	C	C6-N1-C2	-6.19	117.83	120.30
46	1	421	G	C4-N9-C1'	6.13	134.47	126.50
46	1	2550	U	N3-C2-O2	-6.13	117.91	122.20
46	1	3306	U	C2-N1-C1'	6.12	125.05	117.70
5	B	171	LEU	CA-CB-CG	6.10	129.33	115.30
46	1	1097	G	P-O3'-C3'	6.04	126.95	119.70
46	1	2769	A	C8-N9-C4	-6.03	103.39	105.80
46	1	3181	C	N1-C2-O2	6.03	122.52	118.90
46	1	1573	G	C4-N9-C1'	6.03	134.34	126.50
46	1	2585	G	N3-C4-N9	6.00	129.60	126.00
46	1	2425	G	C8-N9-C1'	-5.99	119.21	127.00
46	1	2899	C	C2-N1-C1'	5.98	125.38	118.80
46	1	2861	U	C6-N1-C2	-5.97	117.42	121.00
46	1	599	C	P-O3'-C3'	5.96	126.85	119.70
46	1	2553	U	C2-N1-C1'	5.96	124.85	117.70
46	1	2617	U	N3-C2-O2	-5.95	118.03	122.20
46	1	979	U	N1-C2-O2	5.90	126.93	122.80
48	3	125	U	C2-N1-C1'	5.88	124.76	117.70
46	1	915	A	C4-N9-C1'	5.88	136.88	126.30
46	1	1355	A	P-O3'-C3'	5.88	126.75	119.70
46	1	2263	C	C2-N1-C1'	5.87	125.26	118.80
46	1	2585	G	C4-N9-C1'	5.87	134.13	126.50
46	1	2866	U	P-O3'-C3'	5.86	126.73	119.70
46	1	3228	C	P-O3'-C3'	5.84	126.70	119.70
46	1	2836	C	C2-N1-C1'	5.83	125.21	118.80
46	1	1349	G	N3-C4-N9	5.83	129.50	126.00
46	1	3214	U	N3-C2-O2	-5.83	118.12	122.20
46	1	2726	C	N3-C2-O2	-5.82	117.83	121.90
31	R	99	LEU	CA-CB-CG	5.82	128.68	115.30
46	1	3218	A	P-O3'-C3'	5.80	126.66	119.70
46	1	1352	A	OP1-P-O3'	5.80	117.95	105.20
46	1	1604	G	N3-C4-N9	5.79	129.48	126.00
46	1	2862	U	N1-C2-O2	5.79	126.86	122.80
46	1	2531	C	N1-C2-O2	5.79	122.37	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	1	1269	U	C5-C6-N1	5.78	125.59	122.70
46	1	2425	G	N3-C4-N9	5.77	129.46	126.00
9	d	86	LYS	C-N-CA	5.77	136.12	121.70
46	1	2137	U	C6-N1-C1'	-5.75	113.14	121.20
46	1	2617	U	C2-N1-C1'	5.75	124.60	117.70
46	1	2726	C	C2-N1-C1'	5.74	125.11	118.80
46	1	2846	U	C2-N1-C1'	5.71	124.55	117.70
46	1	2552	C	C2-N1-C1'	5.69	125.06	118.80
46	1	915	A	C2-N3-C4	5.69	113.44	110.60
46	1	3078	U	P-O3'-C3'	5.68	126.52	119.70
44	q	70	LEU	CA-CB-CG	5.65	128.29	115.30
46	1	3269	U	P-O3'-C3'	5.63	126.46	119.70
46	1	283	G	C2-N3-C4	5.63	114.71	111.90
17	H	118	LEU	CA-CB-CG	5.63	128.24	115.30
46	1	3214	U	C2-N1-C1'	5.62	124.44	117.70
46	1	3022	G	C4-N9-C1'	-5.61	119.21	126.50
46	1	700	C	C6-N1-C2	-5.59	118.06	120.30
46	1	2769	A	N7-C8-N9	5.59	116.60	113.80
46	1	2873	U	C5-C6-N1	5.59	125.50	122.70
46	1	1103	A	P-O3'-C3'	5.58	126.40	119.70
46	1	2617	U	N1-C2-O2	5.58	126.71	122.80
46	1	3217	C	C5-C6-N1	5.57	123.79	121.00
46	1	915	A	N3-C4-N9	5.57	131.85	127.40
46	1	2209	U	P-O3'-C3'	5.57	126.38	119.70
46	1	421	G	C8-N9-C1'	-5.56	119.77	127.00
46	1	2869	U	N3-C2-O2	-5.55	118.31	122.20
27	u	3	ILE	CG1-CB-CG2	-5.55	99.19	111.40
46	1	1034	U	N1-C2-O2	5.54	126.68	122.80
46	1	2765	C	C5-C6-N1	5.53	123.76	121.00
46	1	2552	C	N1-C2-O2	5.52	122.21	118.90
36	W	45	LEU	CA-CB-CG	5.50	127.96	115.30
46	1	421	G	N3-C4-N9	5.50	129.30	126.00
7	C	182	LEU	CA-CB-CG	5.49	127.93	115.30
46	1	1280	C	N1-C2-O2	5.48	122.19	118.90
46	1	3350	C	C5-C6-N1	5.46	123.73	121.00
46	1	439	C	C6-N1-C2	-5.46	118.12	120.30
46	1	655	C	C6-N1-C2	-5.44	118.12	120.30
46	1	2862	U	C5-C6-N1	5.42	125.41	122.70
48	3	125	U	N1-C2-O2	5.41	126.59	122.80
27	u	9	CYS	CA-CB-SG	-5.41	104.26	114.00
46	1	2846	U	N1-C2-O2	5.41	126.58	122.80
46	1	3350	C	C6-N1-C2	-5.40	118.14	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	1	2765	C	C2-N3-C4	5.39	122.60	119.90
46	1	957	C	C6-N1-C2	-5.37	118.15	120.30
46	1	2817	A	P-O3'-C3'	5.37	126.15	119.70
46	1	2425	G	C6-C5-N7	-5.37	127.18	130.40
46	1	1424	C	C6-N1-C2	-5.36	118.16	120.30
46	1	1573	G	N3-C4-N9	5.36	129.21	126.00
2	v	228	LEU	CA-CB-CG	5.36	127.62	115.30
46	1	2820	A	OP1-P-OP2	-5.31	111.63	119.60
46	1	1104	G	O5'-P-OP1	-5.28	100.95	105.70
46	1	2846	U	N3-C2-O2	-5.28	118.50	122.20
46	1	2971	A	N3-C4-N9	5.28	131.62	127.40
46	1	3354	U	C2-N1-C1'	5.28	124.03	117.70
46	1	2146	C	C6-N1-C2	-5.27	118.19	120.30
46	1	1854	C	C6-N1-C2	-5.26	118.19	120.30
46	1	2266	U	P-O3'-C3'	5.26	126.01	119.70
46	1	2873	U	C6-N1-C2	-5.24	117.86	121.00
46	1	3022	G	C8-N9-C1'	5.24	133.81	127.00
46	1	1573	G	C8-N9-C1'	-5.23	120.20	127.00
46	1	2550	U	N1-C2-O2	5.23	126.46	122.80
46	1	1261	G	C4-N9-C1'	5.22	133.29	126.50
46	1	1269	U	C6-N1-C2	-5.22	117.87	121.00
46	1	2426	U	N3-C2-O2	-5.21	118.55	122.20
46	1	2971	A	N3-C4-C5	-5.21	123.15	126.80
46	1	2983	C	C2-N1-C1'	5.21	124.53	118.80
46	1	2996	U	N1-C2-O2	5.21	126.45	122.80
46	1	2971	A	C4-N9-C1'	5.19	135.65	126.30
46	1	1103	A	O4'-C1'-N9	5.19	112.35	108.20
46	1	915	A	C8-N9-C1'	-5.19	118.36	127.70
46	1	3214	U	N1-C2-O2	5.18	126.43	122.80
46	1	2425	G	N1-C2-N2	-5.18	111.54	116.20
46	1	2869	U	N1-C2-O2	5.15	126.40	122.80
46	1	2870	C	N1-C2-O2	5.13	121.98	118.90
46	1	2726	C	N1-C2-O2	5.12	121.97	118.90
46	1	2988	C	C6-N1-C2	-5.11	118.25	120.30
46	1	1604	G	N3-C4-C5	-5.11	126.05	128.60
46	1	1573	G	N3-C4-C5	-5.10	126.05	128.60
46	1	3022	G	N3-C4-N9	-5.10	122.94	126.00
6	b	3	LEU	CA-CB-CG	5.09	127.02	115.30
46	1	634	C	C6-N1-C2	-5.08	118.27	120.30
12	F	176	TYR	C-N-CA	-5.08	111.64	122.30
46	1	1261	G	N3-C4-N9	5.07	129.04	126.00
46	1	2338	C	N1-C2-O2	5.07	121.94	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	1	2531	C	C5-C6-N1	5.07	123.54	121.00
46	1	2829	U	C2-N1-C1'	5.06	123.77	117.70
46	1	979	U	C6-N1-C2	-5.06	117.97	121.00
46	1	288	C	C6-N1-C2	-5.05	118.28	120.30
46	1	3121	U	OP1-P-O3'	5.05	116.31	105.20
46	1	2266	U	OP1-P-O3'	5.04	116.30	105.20
46	1	2852	C	C6-N1-C2	-5.04	118.28	120.30
46	1	3181	C	N3-C2-O2	-5.04	118.37	121.90
46	1	2819	A	OP2-P-O3'	5.03	116.27	105.20
46	1	2249	G	P-O3'-C3'	5.02	125.72	119.70
46	1	68	C	C6-N1-C2	-5.02	118.29	120.30
48	3	125	U	N3-C2-O2	-5.01	118.69	122.20
46	1	3355	U	N1-C2-O2	5.00	126.30	122.80
46	1	922	U	C5-C6-N1	5.00	125.20	122.70
46	1	2477	G	C4-N9-C1'	5.00	133.01	126.50
46	1	2501	U	P-O3'-C3'	5.00	125.70	119.70
46	1	2434	U	C2-N1-C1'	5.00	123.70	117.70

There are no chirality outliers.

All (37) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	A	219	ILE	Peptide
3	A	229	ALA	Peptide
5	B	138	ALA	Peptide
7	C	318	LEU	Peptide
7	C	338	LYS	Peptide
7	C	4	PRO	Peptide
42	D	140	ARG	Peptide
42	D	257	GLU	Peptide
42	D	259	LYS	Peptide
10	E	97	ASN	Peptide
12	F	158	LYS	Peptide
14	G	30	THR	Peptide
17	H	21	LYS	Peptide
16	I	16	ARG	Peptide
43	J	154	THR	Peptide
43	J	171	VAL	Peptide
22	L	131	LYS	Peptide
26	N	85	THR	Peptide
30	Q	152	HIS	Peptide
32	S	22	PRO	Peptide

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Mol	Chain	Res	Type	Group
32	S	23	LYS	Peptide
33	T	154	VAL	Peptide
38	Y	125	LYS	Peptide
40	Z	124	ALA	Peptide
6	b	226	ASP	Peptide
6	b	368	ALA	Peptide
6	b	369	ARG	Peptide
6	b	446	ASP	Peptide
6	b	528	PHE	Peptide
18	h	83	LYS	Peptide
44	q	31	GLY	Peptide
44	q	35	LEU	Peptide
44	q	41	ARG	Peptide
44	q	46	LYS	Peptide
44	q	79	THR	Peptide
2	v	278	LYS	Peptide
39	y	7	PHE	Peptide

## 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	
2	v	246/518 (48%)	223 (91%)	21 (8%)	2 (1%)	19	59
3	A	243/254 (96%)	220 (90%)	22 (9%)	1 (0%)	34	71
4	a	92/149 (62%)	85 (92%)	5 (5%)	2 (2%)	6	39
5	B	384/387 (99%)	342 (89%)	40 (10%)	2 (0%)	29	68
6	b	600/647 (93%)	557 (93%)	40 (7%)	3 (0%)	29	68

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	C	359/362 (99%)	329 (92%)	27 (8%)	3 (1%)	19	59
8	c	95/105 (90%)	92 (97%)	3 (3%)	0	100	100
9	d	105/113 (93%)	100 (95%)	5 (5%)	0	100	100
10	E	156/176 (89%)	146 (94%)	8 (5%)	2 (1%)	12	50
11	e	125/130 (96%)	119 (95%)	6 (5%)	0	100	100
12	F	220/244 (90%)	202 (92%)	18 (8%)	0	100	100
13	f	104/107 (97%)	100 (96%)	4 (4%)	0	100	100
14	G	228/256 (89%)	210 (92%)	18 (8%)	0	100	100
15	g	110/121 (91%)	108 (98%)	2 (2%)	0	100	100
16	I	129/166 (78%)	116 (90%)	11 (8%)	2 (2%)	9	46
17	H	186/191 (97%)	170 (91%)	16 (9%)	0	100	100
18	h	117/120 (98%)	113 (97%)	4 (3%)	0	100	100
19	i	94/100 (94%)	88 (94%)	6 (6%)	0	100	100
20	j	83/88 (94%)	77 (93%)	6 (7%)	0	100	100
21	k	75/78 (96%)	72 (96%)	3 (4%)	0	100	100
22	L	185/199 (93%)	166 (90%)	18 (10%)	1 (0%)	29	68
23	l	48/51 (94%)	46 (96%)	2 (4%)	0	100	100
24	M	135/138 (98%)	127 (94%)	8 (6%)	0	100	100
25	p	89/92 (97%)	85 (96%)	4 (4%)	0	100	100
26	N	201/204 (98%)	181 (90%)	20 (10%)	0	100	100
27	u	147/199 (74%)	137 (93%)	6 (4%)	4 (3%)	5	35
28	O	195/199 (98%)	190 (97%)	5 (3%)	0	100	100
29	P	174/184 (95%)	167 (96%)	7 (4%)	0	100	100
30	Q	152/186 (82%)	144 (95%)	8 (5%)	0	100	100
31	R	152/189 (80%)	146 (96%)	6 (4%)	0	100	100
32	S	168/172 (98%)	155 (92%)	11 (6%)	2 (1%)	13	51
33	T	59/160 (37%)	52 (88%)	7 (12%)	0	100	100
34	U	102/121 (84%)	95 (93%)	6 (6%)	1 (1%)	15	55
35	V	134/137 (98%)	131 (98%)	3 (2%)	0	100	100
36	W	209/236 (89%)	204 (98%)	5 (2%)	0	100	100
37	X	118/142 (83%)	113 (96%)	5 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
38	Y	124/127 (98%)	122 (98%)	2 (2%)	0	100	100
39	y	240/245 (98%)	229 (95%)	11 (5%)	0	100	100
40	Z	133/136 (98%)	121 (91%)	12 (9%)	0	100	100
41	z	53/106 (50%)	53 (100%)	0	0	100	100
42	D	245/297 (82%)	229 (94%)	13 (5%)	3 (1%)	13	51
43	J	162/174 (93%)	146 (90%)	12 (7%)	4 (2%)	5	36
44	q	95/106 (90%)	69 (73%)	26 (27%)	0	100	100
45	o	52/59 (88%)	47 (90%)	5 (10%)	0	100	100
All	All	7123/8171 (87%)	6624 (93%)	467 (7%)	32 (0%)	38	71

All (32) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
7	C	339	LEU
10	E	131	LYS
27	u	3	ILE
42	D	140	ARG
5	B	34	LYS
22	L	63	VAL
27	u	73	GLN
27	u	79	VAL
43	J	95	ASN
43	J	155	THR
2	v	279	ILE
6	b	369	ARG
6	b	399	ALA
7	C	4	PRO
16	I	17	ASP
27	u	4	TYR
43	J	154	THR
2	v	231	GLN
3	A	219	ILE
32	S	24	LEU
4	a	77	LYS
4	a	78	LEU
7	C	268	ALA
16	I	16	ARG
32	S	13	ARG
34	U	52	ASN

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Mol	Chain	Res	Type
42	D	258	LYS
43	J	172	LEU
6	b	295	PRO
42	D	141	PRO
5	B	239	PRO
10	E	130	ILE

### 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	v	220/467 (47%)	219 (100%)	1 (0%)	88	95
3	A	188/196 (96%)	187 (100%)	1 (0%)	88	95
4	a	77/119 (65%)	75 (97%)	2 (3%)	46	74
5	B	322/323 (100%)	318 (99%)	4 (1%)	71	87
6	b	537/573 (94%)	521 (97%)	16 (3%)	41	71
7	C	288/289 (100%)	286 (99%)	2 (1%)	84	93
8	c	81/88 (92%)	79 (98%)	2 (2%)	47	75
9	d	94/97 (97%)	94 (100%)	0	100	100
10	E	138/153 (90%)	135 (98%)	3 (2%)	52	77
11	e	109/111 (98%)	107 (98%)	2 (2%)	59	81
12	F	186/205 (91%)	185 (100%)	1 (0%)	88	95
13	f	90/91 (99%)	90 (100%)	0	100	100
14	G	189/208 (91%)	185 (98%)	4 (2%)	53	78
15	g	95/103 (92%)	95 (100%)	0	100	100
16	I	116/141 (82%)	116 (100%)	0	100	100
17	H	168/171 (98%)	166 (99%)	2 (1%)	71	87
18	h	104/105 (99%)	104 (100%)	0	100	100
19	i	78/82 (95%)	78 (100%)	0	100	100
20	j	69/71 (97%)	68 (99%)	1 (1%)	67	85

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
21	k	68/69 (99%)	68 (100%)	0	100	100
22	L	147/159 (92%)	143 (97%)	4 (3%)	44	73
23	l	45/46 (98%)	43 (96%)	2 (4%)	28	63
24	M	108/109 (99%)	107 (99%)	1 (1%)	78	90
25	p	71/72 (99%)	71 (100%)	0	100	100
26	N	175/176 (99%)	173 (99%)	2 (1%)	73	88
27	u	132/180 (73%)	128 (97%)	4 (3%)	41	71
28	O	160/162 (99%)	158 (99%)	2 (1%)	69	86
29	P	143/146 (98%)	141 (99%)	2 (1%)	67	85
30	Q	126/151 (83%)	125 (99%)	1 (1%)	81	91
31	R	127/154 (82%)	127 (100%)	0	100	100
32	S	154/156 (99%)	153 (99%)	1 (1%)	86	94
33	T	50/137 (36%)	47 (94%)	3 (6%)	19	54
34	U	91/107 (85%)	90 (99%)	1 (1%)	73	88
35	V	104/105 (99%)	104 (100%)	0	100	100
36	W	184/213 (86%)	182 (99%)	2 (1%)	73	88
37	X	104/118 (88%)	103 (99%)	1 (1%)	76	88
38	Y	109/110 (99%)	109 (100%)	0	100	100
39	y	207/211 (98%)	207 (100%)	0	100	100
40	Z	115/116 (99%)	115 (100%)	0	100	100
41	z	48/95 (50%)	48 (100%)	0	100	100
42	D	203/245 (83%)	200 (98%)	3 (2%)	65	84
43	J	140/150 (93%)	139 (99%)	1 (1%)	84	93
44	q	84/91 (92%)	83 (99%)	1 (1%)	71	87
45	o	43/47 (92%)	42 (98%)	1 (2%)	50	76
All	All	6087/6918 (88%)	6014 (99%)	73 (1%)	72	87

All (73) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	v	349	ASN
3	A	193	ARG
4	a	59	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	a	120	ASN
5	B	28	ARG
5	B	70	ARG
5	B	332	ARG
5	B	385	LYS
6	b	24	ARG
6	b	70	ASN
6	b	100	ARG
6	b	168	ARG
6	b	177	ASN
6	b	288	ASN
6	b	315	VAL
6	b	346	ASN
6	b	374	ARG
6	b	384	ASN
6	b	395	ARG
6	b	413	ASN
6	b	415	ASN
6	b	470	ASN
6	b	588	ARG
6	b	647	ARG
7	C	93	MET
7	C	221	ASN
8	c	61	MET
8	c	86	ARG
10	E	51	ARG
10	E	127	ASN
10	E	128	LYS
11	e	27	ARG
11	e	87	MET
12	F	244	ASN
14	G	48	ARG
14	G	84	ARG
14	G	85	ASN
14	G	120	LYS
17	H	23	ARG
17	H	157	ASN
20	j	25	ARG
22	L	21	ARG
22	L	101	ARG
22	L	180	ARG
22	L	188	ARG

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Mol	Chain	Res	Type
23	l	20	ASN
23	l	43	ASN
24	M	74	ARG
26	N	183	THR
26	N	188	ARG
27	u	27	LYS
27	u	45	ASN
27	u	100	ARG
27	u	113	ARG
28	O	85	ARG
28	O	148	LYS
29	P	24	VAL
29	P	97	ASN
30	Q	147	ARG
32	S	80	ARG
33	T	97	LYS
33	T	136	ARG
33	T	139	ARG
34	U	49	ASN
36	W	22	ASN
36	W	232	ASN
37	X	73	MET
42	D	39	GLN
42	D	45	ASN
42	D	254	LYS
43	J	12	LEU
44	q	79	THR
45	o	22	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (57) such sidechains are listed below:

Mol	Chain	Res	Type
2	v	349	ASN
2	v	364	HIS
3	A	79	ASN
3	A	132	ASN
4	a	120	ASN
5	B	11	HIS
5	B	371	GLN
6	b	26	GLN
6	b	70	ASN
6	b	155	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
6	b	177	ASN
6	b	208	HIS
6	b	217	GLN
6	b	288	ASN
6	b	346	ASN
6	b	384	ASN
6	b	413	ASN
6	b	415	ASN
6	b	470	ASN
6	b	549	GLN
7	C	110	ASN
7	C	114	ASN
7	C	221	ASN
9	d	57	GLN
12	F	61	ASN
12	F	172	ASN
12	F	244	ASN
14	G	85	ASN
14	G	138	HIS
16	I	110	GLN
17	H	183	HIS
18	h	59	ASN
22	L	25	HIS
22	L	120	GLN
23	l	11	GLN
23	l	20	ASN
24	M	41	GLN
26	N	37	HIS
27	u	24	ASN
27	u	45	ASN
29	P	97	ASN
30	Q	10	HIS
32	S	8	GLN
32	S	122	HIS
34	U	25	ASN
34	U	49	ASN
34	U	87	ASN
35	V	7	GLN
35	V	98	ASN
36	W	22	ASN
36	W	91	GLN
36	W	232	ASN

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Mol	Chain	Res	Type
39	y	178	GLN
42	D	45	ASN
43	J	95	ASN
44	q	59	HIS
44	q	90	HIS

### 5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
46	1	3197/3396 (94%)	745 (23%)	39 (1%)
47	2	120/121 (99%)	20 (16%)	0
48	3	156/158 (98%)	35 (22%)	2 (1%)
All	All	3473/3675 (94%)	800 (23%)	41 (1%)

All (800) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
46	1	4	U
46	1	22	G
46	1	26	A
46	1	40	A
46	1	43	A
46	1	48	A
46	1	49	A
46	1	59	G
46	1	60	A
46	1	65	A
46	1	66	A
46	1	72	C
46	1	73	C
46	1	77	A
46	1	91	G
46	1	92	G
46	1	93	C
46	1	94	G
46	1	109	A
46	1	110	G
46	1	118	U
46	1	120	G
46	1	122	A
46	1	133	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	135	C
46	1	136	G
46	1	140	C
46	1	148	G
46	1	150	A
46	1	156	G
46	1	157	A
46	1	165	A
46	1	170	G
46	1	171	G
46	1	172	G
46	1	173	G
46	1	176	G
46	1	182	U
46	1	187	A
46	1	190	U
46	1	191	U
46	1	200	C
46	1	206	G
46	1	210	U
46	1	211	A
46	1	213	A
46	1	218	G
46	1	219	A
46	1	240	U
46	1	241	G
46	1	243	G
46	1	247	C
46	1	250	U
46	1	251	G
46	1	252	U
46	1	253	A
46	1	269	G
46	1	277	G
46	1	279	U
46	1	282	G
46	1	283	G
46	1	284	A
46	1	285	A
46	1	286	U
46	1	287	G
46	1	295	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	315	C
46	1	323	A
46	1	329	U
46	1	336	A
46	1	339	C
46	1	349	A
46	1	351	A
46	1	352	A
46	1	374	A
46	1	376	G
46	1	398	A
46	1	401	U
46	1	402	A
46	1	403	C
46	1	406	G
46	1	420	G
46	1	421	G
46	1	422	A
46	1	436	A
46	1	439	C
46	1	501	A
46	1	510	G
46	1	520	U
46	1	521	A
46	1	530	G
46	1	535	G
46	1	536	U
46	1	541	U
46	1	543	C
46	1	546	C
46	1	547	G
46	1	548	G
46	1	551	A
46	1	552	G
46	1	555	U
46	1	557	A
46	1	559	A
46	1	578	A
46	1	579	G
46	1	592	A
46	1	597	G
46	1	598	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	600	G
46	1	603	A
46	1	604	G
46	1	608	A
46	1	611	A
46	1	619	A
46	1	620	U
46	1	621	A
46	1	622	A
46	1	644	G
46	1	649	A
46	1	660	A
46	1	677	A
46	1	681	U
46	1	683	U
46	1	687	U
46	1	689	U
46	1	690	A
46	1	691	A
46	1	705	A
46	1	712	G
46	1	715	A
46	1	719	U
46	1	720	A
46	1	725	G
46	1	735	A
46	1	744	A
46	1	758	C
46	1	765	C
46	1	767	U
46	1	768	C
46	1	774	G
46	1	776	U
46	1	777	U
46	1	780	A
46	1	781	G
46	1	785	G
46	1	786	A
46	1	801	A
46	1	806	A
46	1	817	A
46	1	823	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	830	A
46	1	861	C
46	1	869	G
46	1	873	C
46	1	874	U
46	1	879	U
46	1	880	G
46	1	884	A
46	1	890	C
46	1	894	G
46	1	897	U
46	1	907	G
46	1	908	G
46	1	911	C
46	1	914	A
46	1	915	A
46	1	916	G
46	1	917	A
46	1	924	G
46	1	937	G
46	1	944	C
46	1	959	C
46	1	960	U
46	1	961	C
46	1	962	A
46	1	965	A
46	1	974	G
46	1	978	G
46	1	979	U
46	1	980	A
46	1	981	U
46	1	982	C
46	1	984	G
46	1	990	U
46	1	991	G
46	1	993	G
46	1	994	G
46	1	995	U
46	1	1001	G
46	1	1002	A
46	1	1003	A
46	1	1008	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	1010	G
46	1	1011	A
46	1	1014	U
46	1	1015	U
46	1	1016	C
46	1	1017	C
46	1	1018	G
46	1	1019	G
46	1	1020	G
46	1	1024	G
46	1	1026	A
46	1	1027	A
46	1	1028	U
46	1	1029	G
46	1	1030	A
46	1	1032	C
46	1	1034	U
46	1	1035	G
46	1	1036	A
46	1	1037	C
46	1	1038	C
46	1	1039	U
46	1	1047	A
46	1	1049	C
46	1	1051	U
46	1	1063	G
46	1	1064	A
46	1	1065	A
46	1	1066	G
46	1	1072	G
46	1	1081	U
46	1	1082	U
46	1	1093	A
46	1	1094	U
46	1	1095	U
46	1	1096	U
46	1	1097	G
46	1	1098	A
46	1	1103	A
46	1	1104	G
46	1	1117	G
46	1	1118	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	1131	G
46	1	1143	A
46	1	1153	A
46	1	1157	G
46	1	1159	A
46	1	1176	C
46	1	1179	A
46	1	1180	A
46	1	1181	U
46	1	1192	C
46	1	1193	A
46	1	1196	C
46	1	1208	U
46	1	1217	A
46	1	1221	A
46	1	1222	G
46	1	1227	C
46	1	1236	G
46	1	1237	G
46	1	1239	C
46	1	1241	U
46	1	1244	A
46	1	1245	A
46	1	1246	G
46	1	1247	U
46	1	1248	C
46	1	1251	A
46	1	1252	A
46	1	1253	U
46	1	1254	C
46	1	1258	U
46	1	1262	G
46	1	1263	A
46	1	1264	G
46	1	1266	G
46	1	1268	G
46	1	1269	U
46	1	1270	A
46	1	1271	A
46	1	1279	C
46	1	1280	C
46	1	1286	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	1287	A
46	1	1299	U
46	1	1301	A
46	1	1302	A
46	1	1305	U
46	1	1307	G
46	1	1309	U
46	1	1313	G
46	1	1316	C
46	1	1325	U
46	1	1330	A
46	1	1348	U
46	1	1349	G
46	1	1351	U
46	1	1352	A
46	1	1353	U
46	1	1355	A
46	1	1356	U
46	1	1357	G
46	1	1383	G
46	1	1386	A
46	1	1392	G
46	1	1399	A
46	1	1400	G
46	1	1419	A
46	1	1430	U
46	1	1431	G
46	1	1433	A
46	1	1434	G
46	1	1437	C
46	1	1446	A
46	1	1450	G
46	1	1455	U
46	1	1475	A
46	1	1480	G
46	1	1481	A
46	1	1483	G
46	1	1484	U
46	1	1496	C
46	1	1503	A
46	1	1508	C
46	1	1522	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	1523	U
46	1	1533	U
46	1	1536	G
46	1	1537	A
46	1	1546	A
46	1	1547	G
46	1	1548	C
46	1	1556	C
46	1	1557	A
46	1	1561	G
46	1	1562	C
46	1	1563	C
46	1	1564	U
46	1	1565	G
46	1	1566	A
46	1	1567	U
46	1	1568	U
46	1	1569	U
46	1	1570	U
46	1	1572	U
46	1	1576	G
46	1	1577	G
46	1	1580	A
46	1	1581	C
46	1	1583	A
46	1	1587	A
46	1	1589	A
46	1	1593	A
46	1	1618	G
46	1	1619	A
46	1	1629	U
46	1	1630	U
46	1	1639	C
46	1	1642	A
46	1	1643	A
46	1	1645	U
46	1	1656	A
46	1	1657	C
46	1	1683	A
46	1	1690	C
46	1	1696	A
46	1	1714	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	1716	U
46	1	1717	U
46	1	1724	U
46	1	1725	C
46	1	1741	A
46	1	1742	U
46	1	1748	G
46	1	1749	A
46	1	1750	A
46	1	1751	G
46	1	1752	A
46	1	1760	A
46	1	1765	U
46	1	1766	G
46	1	1769	G
46	1	1770	G
46	1	1780	G
46	1	1796	G
46	1	1797	A
46	1	1800	A
46	1	1808	G
46	1	1810	A
46	1	1813	A
46	1	1814	A
46	1	1816	A
46	1	1817	G
46	1	1820	U
46	1	1821	U
46	1	1839	A
46	1	1841	A
46	1	1842	A
46	1	1846	C
46	1	1849	C
46	1	1850	A
46	1	1851	G
46	1	1880	U
46	1	1886	A
46	1	1906	G
46	1	1936	A
46	1	1942	U
46	1	1943	C
46	1	1949	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	1951	C
46	1	1953	G
46	1	1954	G
46	1	2101	C
46	1	2102	U
46	1	2111	G
46	1	2112	U
46	1	2113	A
46	1	2121	G
46	1	2122	G
46	1	2131	A
46	1	2139	A
46	1	2142	A
46	1	2158	A
46	1	2160	G
46	1	2166	A
46	1	2169	G
46	1	2171	G
46	1	2176	U
46	1	2184	U
46	1	2186	U
46	1	2188	A
46	1	2192	C
46	1	2205	U
46	1	2208	A
46	1	2209	U
46	1	2210	G
46	1	2244	A
46	1	2249	G
46	1	2250	G
46	1	2254	U
46	1	2260	U
46	1	2261	G
46	1	2262	A
46	1	2263	C
46	1	2265	C
46	1	2267	C
46	1	2268	U
46	1	2269	U
46	1	2270	A
46	1	2273	G
46	1	2282	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	2288	G
46	1	2298	U
46	1	2307	G
46	1	2308	C
46	1	2310	U
46	1	2313	A
46	1	2314	U
46	1	2315	G
46	1	2334	U
46	1	2336	U
46	1	2356	A
46	1	2373	A
46	1	2374	C
46	1	2375	G
46	1	2388	U
46	1	2393	G
46	1	2397	A
46	1	2398	A
46	1	2401	A
46	1	2402	A
46	1	2403	G
46	1	2404	A
46	1	2405	C
46	1	2406	C
46	1	2411	U
46	1	2415	C
46	1	2435	G
46	1	2437	G
46	1	2440	G
46	1	2448	G
46	1	2449	A
46	1	2450	G
46	1	2452	G
46	1	2453	U
46	1	2454	G
46	1	2455	U
46	1	2456	A
46	1	2458	A
46	1	2459	A
46	1	2461	A
46	1	2463	G
46	1	2468	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	2470	C
46	1	2472	U
46	1	2473	C
46	1	2474	G
46	1	2475	G
46	1	2477	G
46	1	2486	A
46	1	2488	A
46	1	2494	A
46	1	2495	C
46	1	2496	C
46	1	2497	U
46	1	2498	U
46	1	2502	A
46	1	2503	G
46	1	2505	U
46	1	2506	U
46	1	2508	U
46	1	2511	A
46	1	2514	U
46	1	2515	A
46	1	2522	G
46	1	2531	C
46	1	2533	G
46	1	2535	A
46	1	2537	U
46	1	2538	U
46	1	2539	C
46	1	2540	A
46	1	2541	U
46	1	2542	U
46	1	2544	U
46	1	2545	C
46	1	2547	A
46	1	2548	C
46	1	2549	G
46	1	2550	U
46	1	2552	C
46	1	2561	A
46	1	2565	U
46	1	2567	C
46	1	2569	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	2570	U
46	1	2571	U
46	1	2572	C
46	1	2573	G
46	1	2577	C
46	1	2582	C
46	1	2585	G
46	1	2593	A
46	1	2594	C
46	1	2606	G
46	1	2607	G
46	1	2614	G
46	1	2620	G
46	1	2621	G
46	1	2626	A
46	1	2629	U
46	1	2648	G
46	1	2652	U
46	1	2655	U
46	1	2656	A
46	1	2657	A
46	1	2674	A
46	1	2677	G
46	1	2688	U
46	1	2689	A
46	1	2691	A
46	1	2696	A
46	1	2703	A
46	1	2704	A
46	1	2705	A
46	1	2714	G
46	1	2716	U
46	1	2719	U
46	1	2728	G
46	1	2729	U
46	1	2742	C
46	1	2753	G
46	1	2768	U
46	1	2770	G
46	1	2772	C
46	1	2777	G
46	1	2778	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	2792	A
46	1	2796	G
46	1	2798	C
46	1	2800	G
46	1	2801	A
46	1	2803	A
46	1	2804	A
46	1	2809	C
46	1	2810	C
46	1	2814	G
46	1	2817	A
46	1	2818	U
46	1	2819	A
46	1	2820	A
46	1	2821	C
46	1	2822	U
46	1	2823	G
46	1	2824	G
46	1	2826	U
46	1	2828	G
46	1	2829	U
46	1	2836	C
46	1	2842	U
46	1	2843	U
46	1	2844	C
46	1	2845	A
46	1	2846	U
46	1	2847	A
46	1	2848	G
46	1	2857	C
46	1	2858	U
46	1	2859	U
46	1	2861	U
46	1	2863	G
46	1	2864	A
46	1	2865	U
46	1	2866	U
46	1	2867	C
46	1	2868	U
46	1	2869	U
46	1	2870	C
46	1	2871	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	2872	A
46	1	2873	U
46	1	2874	G
46	1	2875	U
46	1	2876	C
46	1	2877	G
46	1	2878	G
46	1	2879	C
46	1	2882	U
46	1	2883	U
46	1	2887	A
46	1	2898	G
46	1	2899	C
46	1	2904	U
46	1	2914	G
46	1	2923	U
46	1	2924	U
46	1	2935	U
46	1	2936	A
46	1	2941	A
46	1	2945	G
46	1	2947	G
46	1	2951	G
46	1	2952	G
46	1	2954	U
46	1	2971	A
46	1	2978	U
46	1	2979	U
46	1	2983	C
46	1	2996	U
46	1	2997	G
46	1	3003	G
46	1	3011	A
46	1	3012	A
46	1	3014	U
46	1	3021	A
46	1	3022	G
46	1	3025	C
46	1	3027	A
46	1	3028	G
46	1	3059	G
46	1	3078	U

*Continued on next page...*



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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	3079	U
46	1	3080	G
46	1	3086	A
46	1	3092	C
46	1	3093	C
46	1	3099	C
46	1	3109	G
46	1	3115	C
46	1	3119	U
46	1	3122	A
46	1	3129	A
46	1	3130	A
46	1	3131	U
46	1	3142	A
46	1	3143	C
46	1	3148	U
46	1	3153	U
46	1	3154	C
46	1	3155	U
46	1	3156	U
46	1	3157	U
46	1	3163	A
46	1	3165	A
46	1	3170	A
46	1	3173	G
46	1	3174	A
46	1	3176	G
46	1	3179	U
46	1	3181	C
46	1	3187	A
46	1	3196	U
46	1	3206	C
46	1	3207	U
46	1	3208	G
46	1	3209	A
46	1	3217	C
46	1	3218	A
46	1	3219	G
46	1	3224	G
46	1	3229	G
46	1	3234	A
46	1	3235	C

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	3238	G
46	1	3243	A
46	1	3245	A
46	1	3247	G
46	1	3249	C
46	1	3253	G
46	1	3256	G
46	1	3259	U
46	1	3260	G
46	1	3263	G
46	1	3268	A
46	1	3269	U
46	1	3270	U
46	1	3275	U
46	1	3276	G
46	1	3278	C
46	1	3279	A
46	1	3280	U
46	1	3286	G
46	1	3289	G
46	1	3294	A
46	1	3295	A
46	1	3304	U
46	1	3308	C
46	1	3313	U
46	1	3316	A
46	1	3317	U
46	1	3318	G
46	1	3319	U
46	1	3320	A
46	1	3324	C
46	1	3341	U
46	1	3345	G
46	1	3349	C
46	1	3351	U
46	1	3352	U
46	1	3354	U
46	1	3355	U
46	1	3356	G
46	1	3360	C
46	1	3362	A
46	1	3368	U

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	3369	G
46	1	3375	A
46	1	3378	C
46	1	3382	U
46	1	3386	G
46	1	3390	G
46	1	3396	U
47	2	10	C
47	2	11	A
47	2	18	C
47	2	22	A
47	2	26	C
47	2	42	A
47	2	49	G
47	2	52	G
47	2	53	U
47	2	54	U
47	2	62	U
47	2	64	A
47	2	65	G
47	2	67	G
47	2	73	C
47	2	76	A
47	2	99	G
47	2	102	A
47	2	112	G
47	2	121	U
48	3	2	A
48	3	23	U
48	3	34	U
48	3	35	C
48	3	39	G
48	3	42	G
48	3	49	G
48	3	51	G
48	3	59	A
48	3	62	C
48	3	63	G
48	3	77	A
48	3	80	A
48	3	81	U
48	3	82	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
48	3	83	C
48	3	84	C
48	3	86	U
48	3	87	G
48	3	88	A
48	3	90	U
48	3	95	G
48	3	104	A
48	3	105	A
48	3	106	C
48	3	108	C
48	3	111	A
48	3	113	U
48	3	124	G
48	3	125	U
48	3	126	A
48	3	127	U
48	3	138	A
48	3	148	G
48	3	155	A

All (41) RNA pucker outliers are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
46	1	239	G
46	1	285	A
46	1	547	G
46	1	599	C
46	1	916	G
46	1	979	U
46	1	1027	A
46	1	1029	G
46	1	1038	C
46	1	1064	A
46	1	1097	G
46	1	1103	A
46	1	1352	A
46	1	1355	A
46	1	1576	G
46	1	1716	U
46	1	1815	U
46	1	2101	C

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Mol	Chain	Res	Type
46	1	2112	U
46	1	2209	U
46	1	2249	G
46	1	2264	U
46	1	2266	U
46	1	2453	U
46	1	2501	U
46	1	2537	U
46	1	2541	U
46	1	2593	A
46	1	2769	A
46	1	2817	A
46	1	2819	A
46	1	2857	C
46	1	2866	U
46	1	3078	U
46	1	3121	U
46	1	3218	A
46	1	3228	C
46	1	3269	U
46	1	3353	G
48	3	82	U
48	3	85	G

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

There are no non-standard protein/DNA/RNA residues in this entry.

#### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

#### 5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
49	GTP	b	701	50	26,34,34	1.16	2 (7%)	32,54,54	1.65	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
49	GTP	b	701	50	-	3/18/38/38	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
49	b	701	GTP	C5-C6	-4.07	1.39	1.47
49	b	701	GTP	C2-N3	2.03	1.38	1.33

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
49	b	701	GTP	PB-O3B-PG	-4.29	118.10	132.83
49	b	701	GTP	PA-O3A-PB	-3.67	120.23	132.83
49	b	701	GTP	C5-C6-N1	3.22	119.63	113.95
49	b	701	GTP	C8-N7-C5	3.19	109.06	102.99
49	b	701	GTP	C2-N1-C6	-2.95	119.67	125.10
49	b	701	GTP	C3'-C2'-C1'	2.54	104.81	100.98
49	b	701	GTP	O6-C6-C5	-2.10	120.26	124.37

There are no chirality outliers.

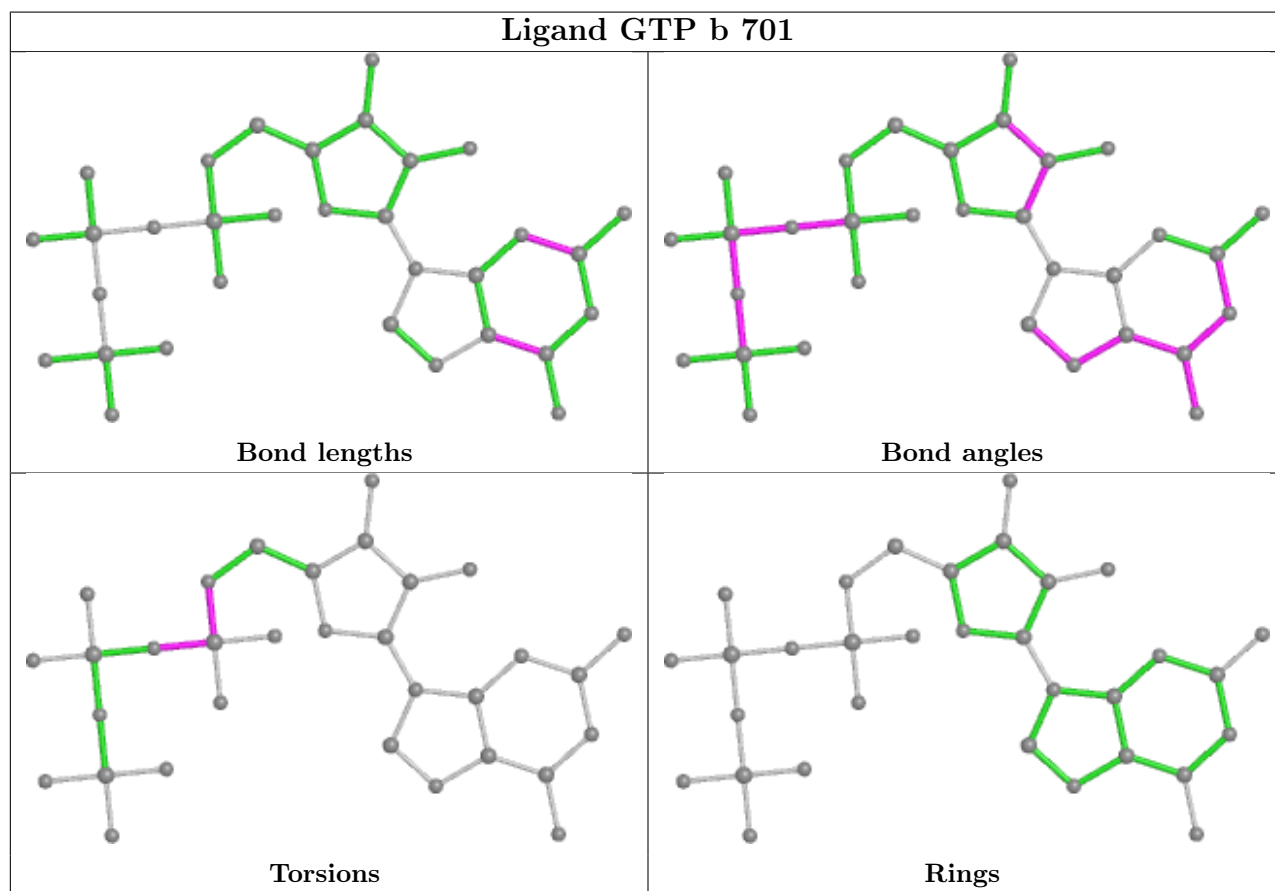
All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
49	b	701	GTP	C5'-O5'-PA-O1A
49	b	701	GTP	PB-O3A-PA-O1A
49	b	701	GTP	C5'-O5'-PA-O3A

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.

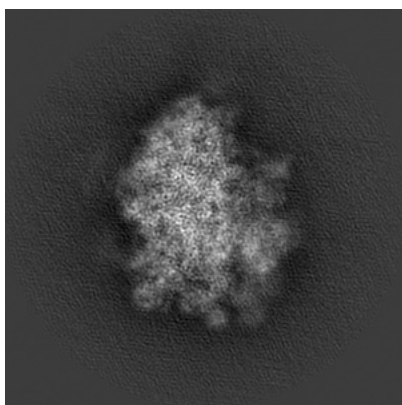
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-0370. These allow visual inspection of the internal detail of the map and identification of artifacts.

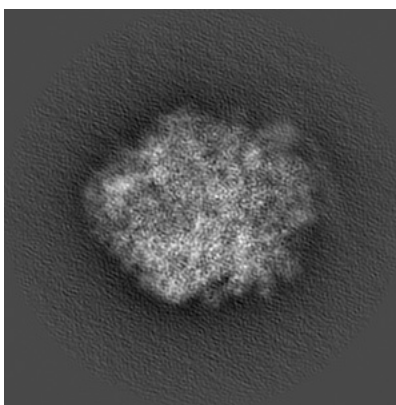
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

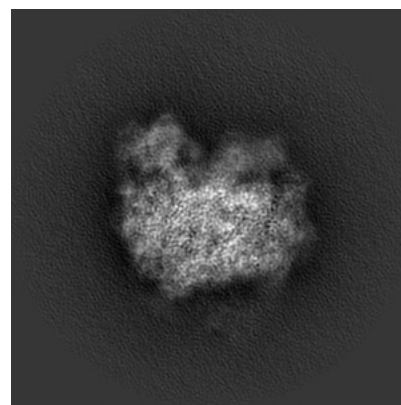
#### 6.1.1 Primary map



X



Y

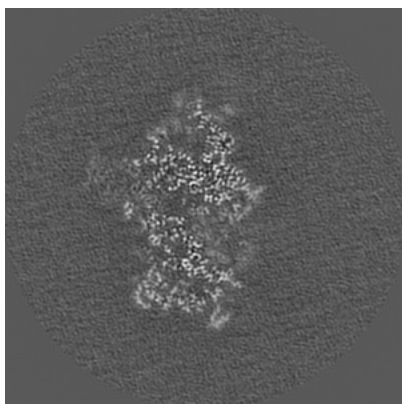


Z

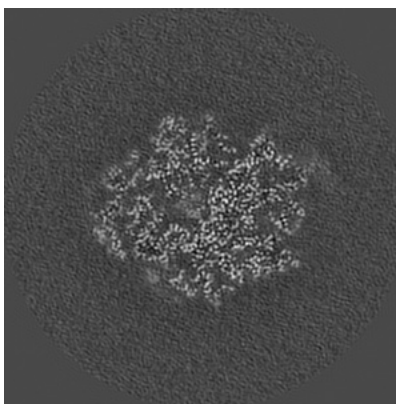
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

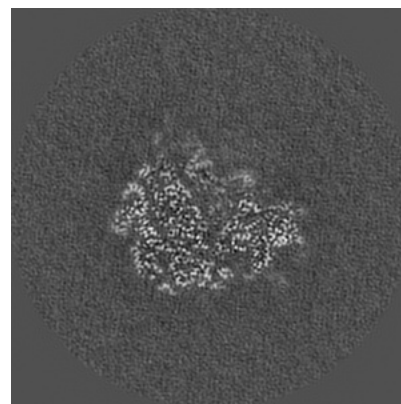
#### 6.2.1 Primary map



X Index: 192



Y Index: 192



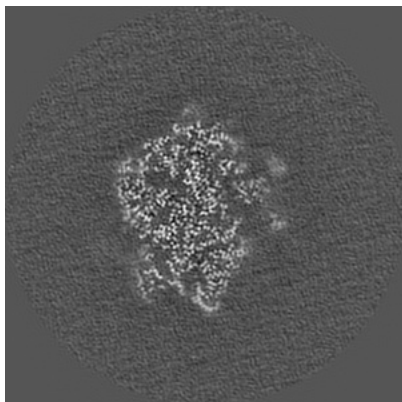
Z Index: 192



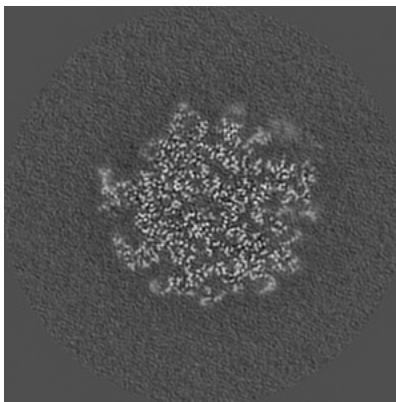
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

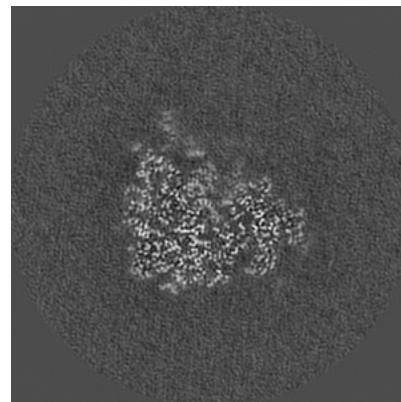
### 6.3.1 Primary map



X Index: 165



Y Index: 173

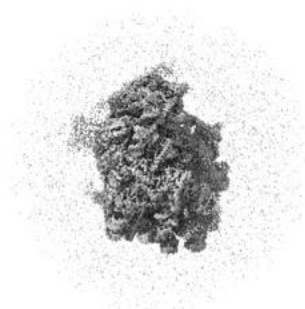


Z Index: 186

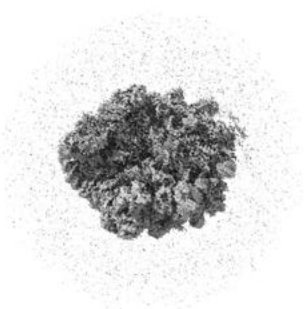
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.02. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

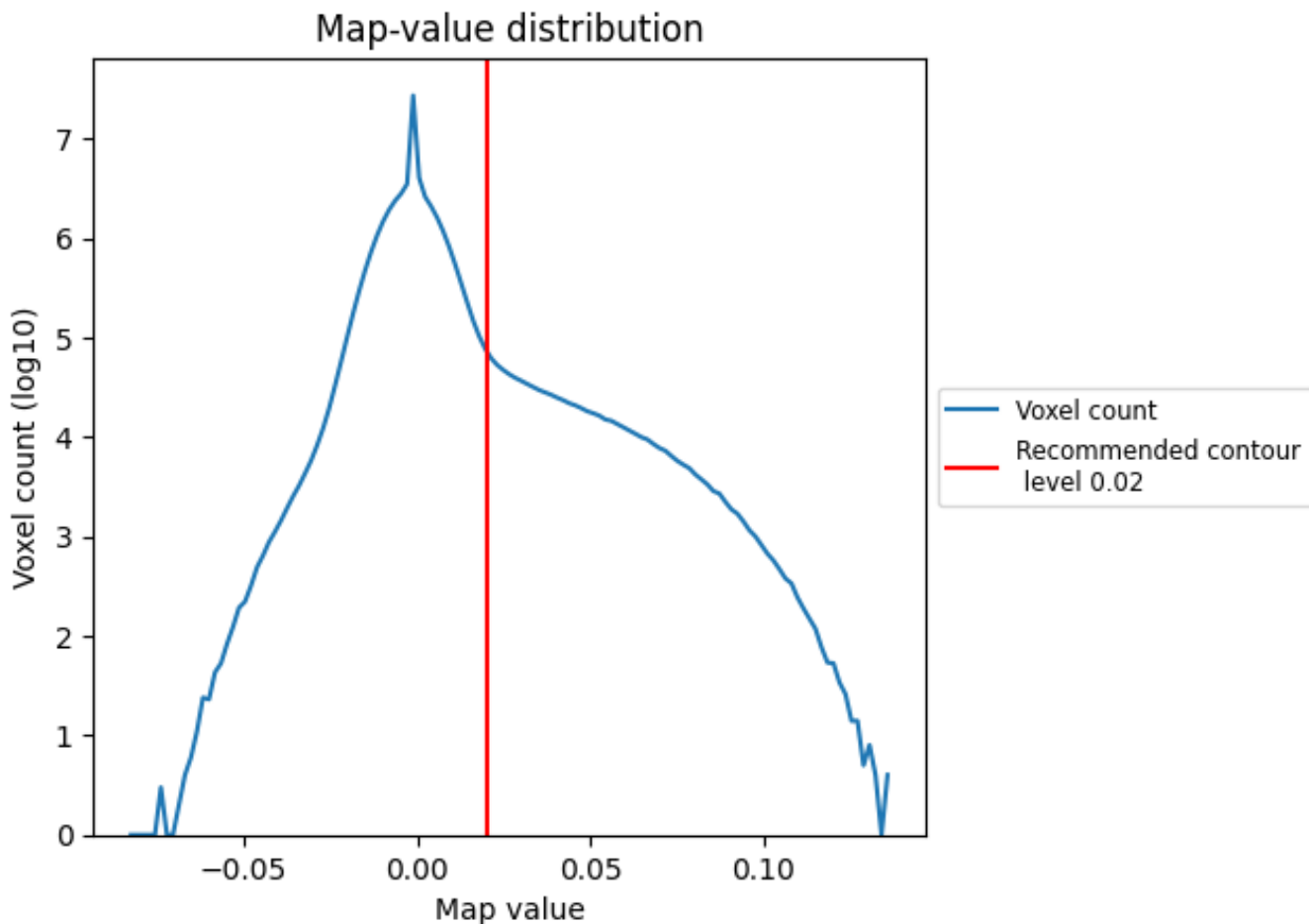
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

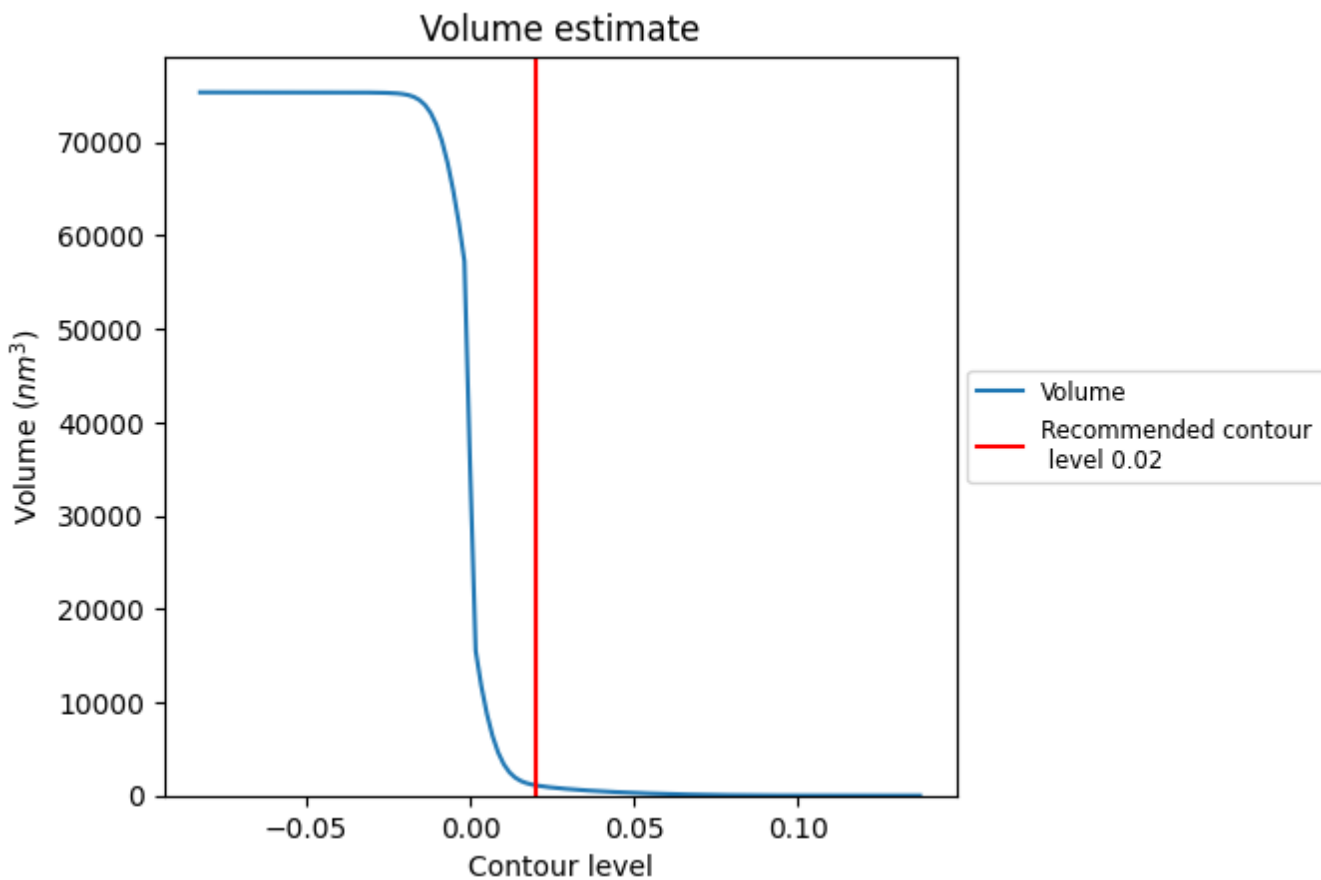
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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.

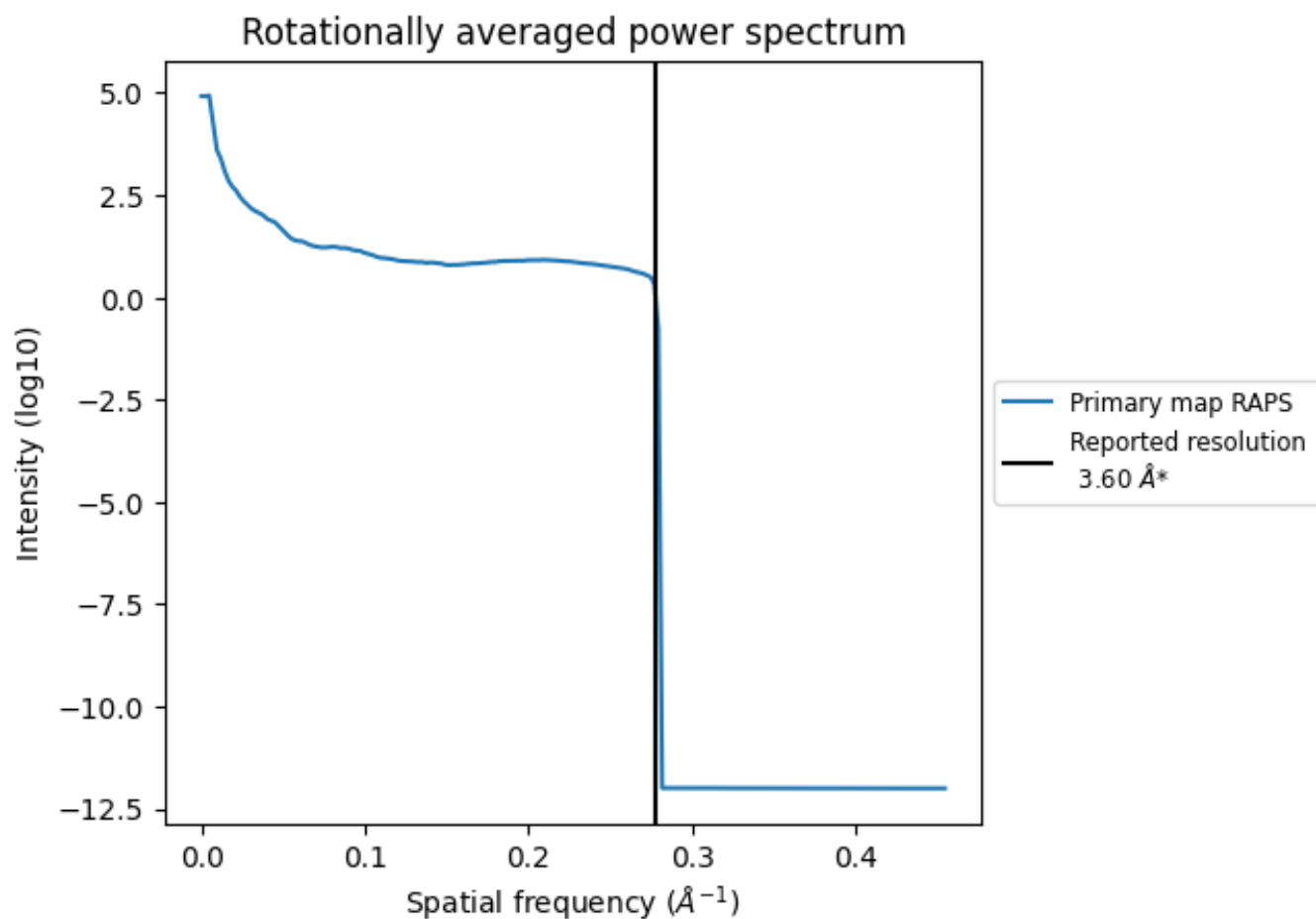
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1106 nm<sup>3</sup>; this corresponds to an approximate mass of 999 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](#)

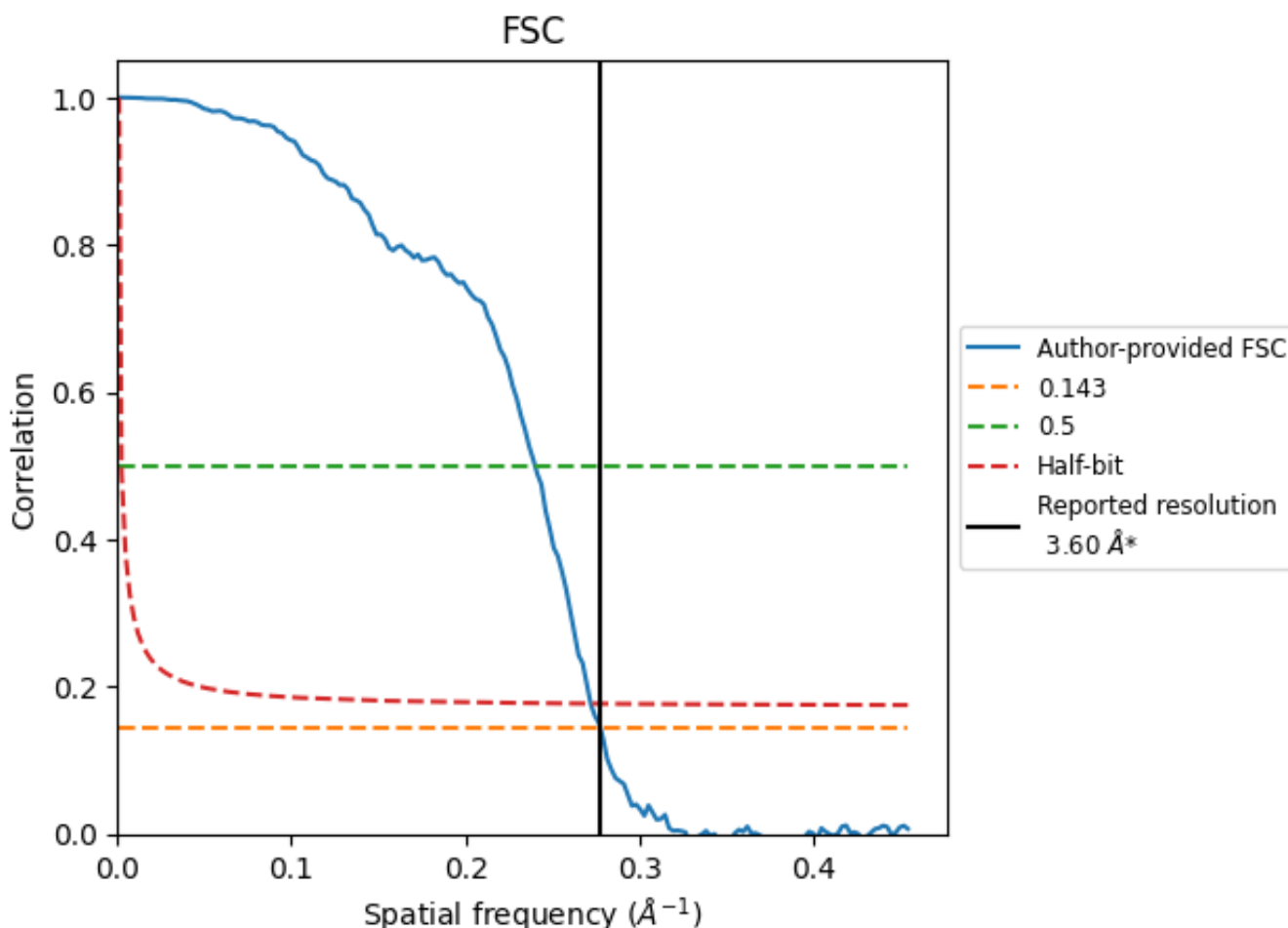


\*Reported resolution corresponds to spatial frequency of 0.278 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

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 [i](#)



\*Reported resolution corresponds to spatial frequency of 0.278 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

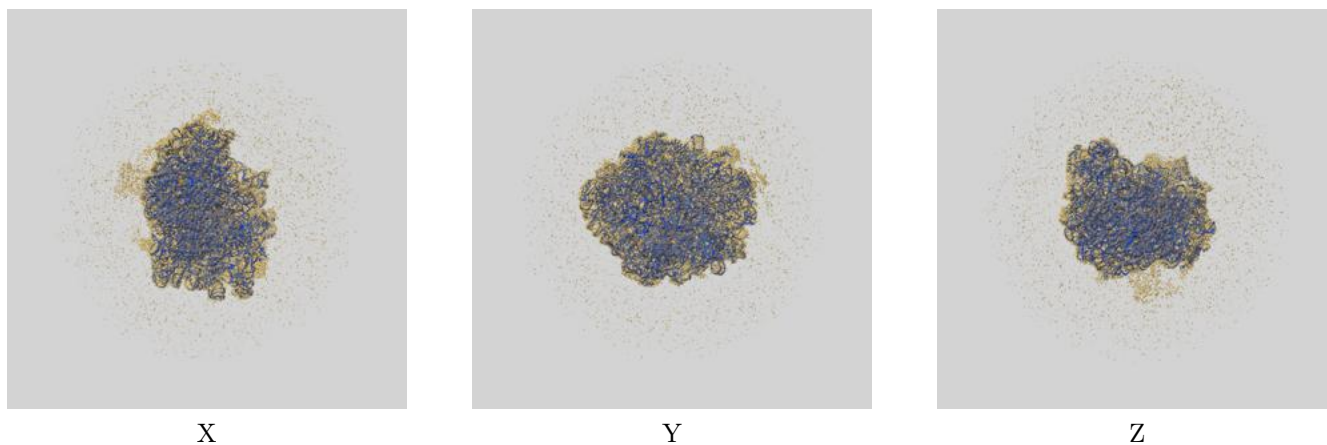
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.60	-	-
Author-provided FSC curve	3.60	4.16	3.68
Unmasked-calculated*	-	-	-

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-0370 and PDB model 6N8K. Per-residue inclusion information can be found in section 3 on page 13.

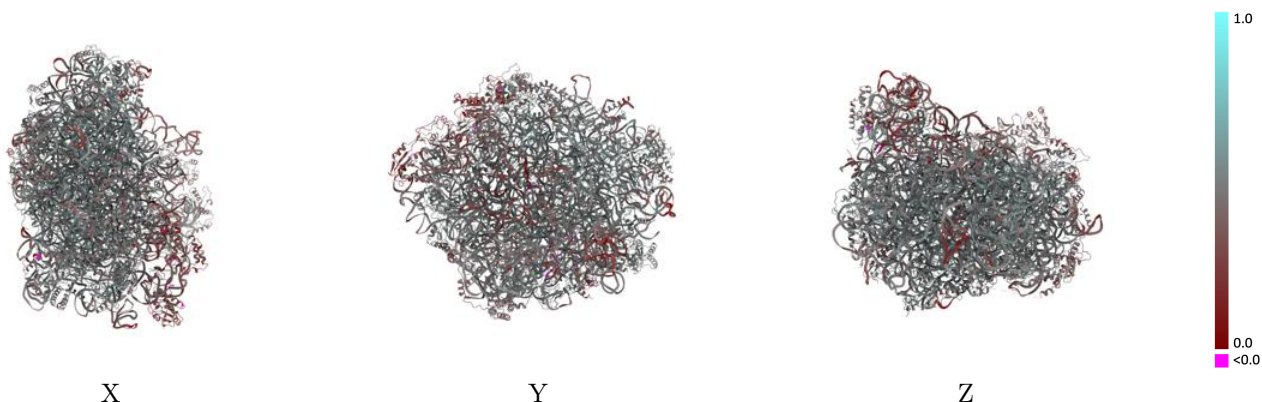
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.02 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.

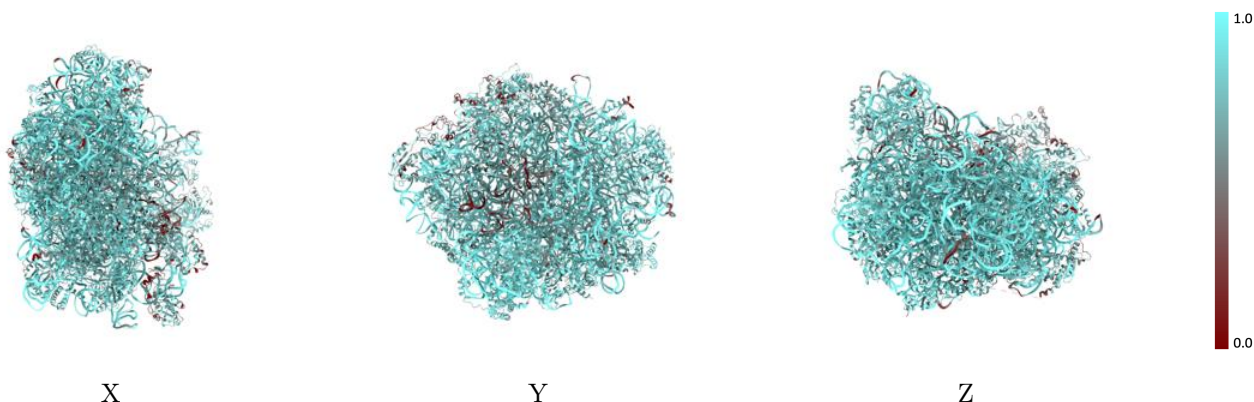


## 9.2 Q-score mapped to coordinate model [i](#)



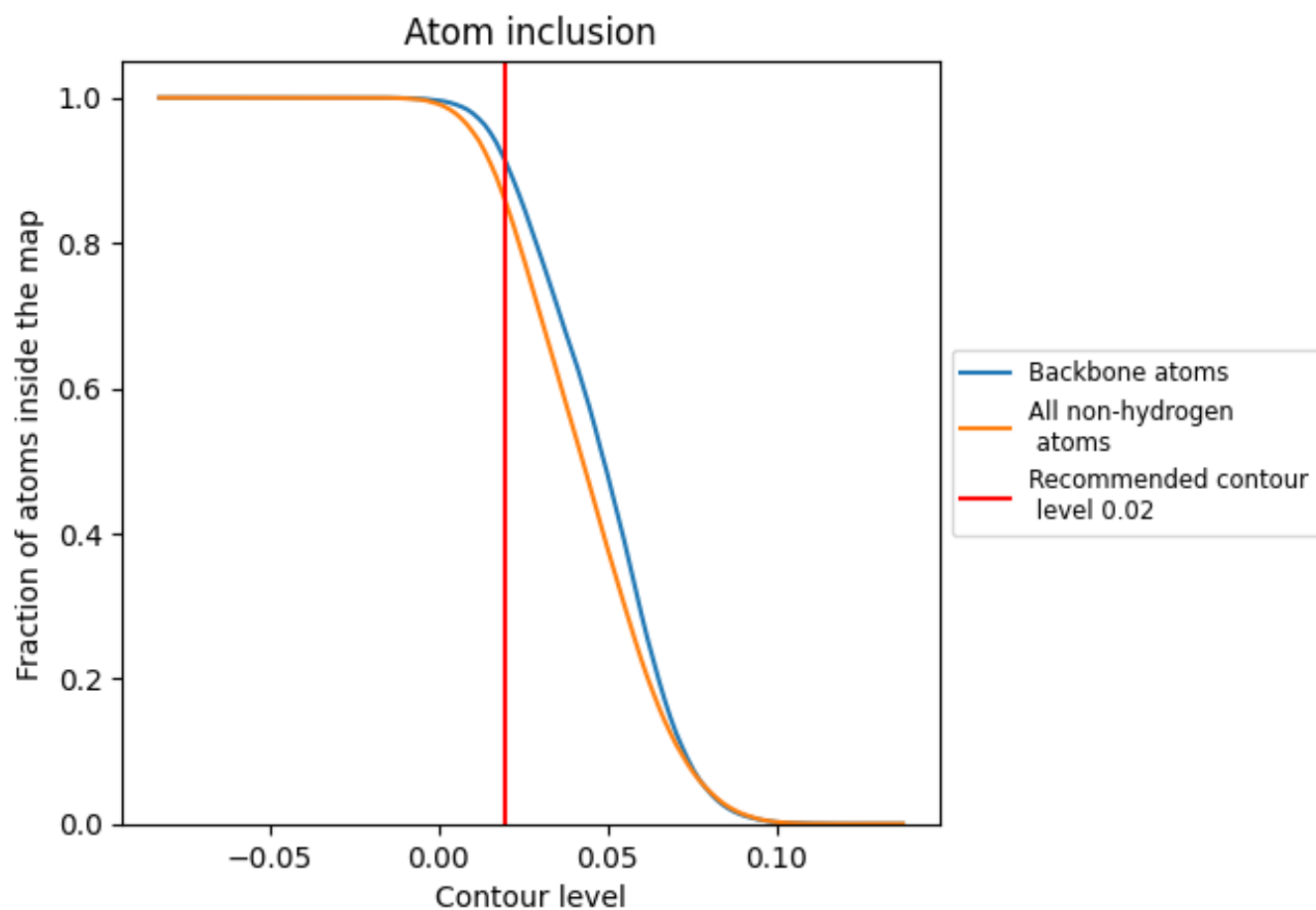
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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](#)



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 (0.02).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 86% 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 (0.02) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8558	 0.4650
1	 0.9119	 0.4690
2	 0.9562	 0.4720
3	 0.9481	 0.4930
A	 0.8515	 0.5170
B	 0.8505	 0.5000
C	 0.8381	 0.4970
D	 0.8082	 0.4310
E	 0.7869	 0.4630
F	 0.8249	 0.4810
G	 0.8296	 0.4720
H	 0.8034	 0.4680
I	 0.6731	 0.4530
J	 0.7591	 0.4110
L	 0.8488	 0.4860
M	 0.8246	 0.4750
N	 0.8589	 0.5200
O	 0.8468	 0.5050
P	 0.8217	 0.4990
Q	 0.8447	 0.4940
R	 0.8351	 0.4920
S	 0.8344	 0.4940
T	 0.7495	 0.4080
U	 0.7796	 0.4220
V	 0.7886	 0.5000
W	 0.5247	 0.2860
X	 0.8420	 0.5000
Y	 0.8458	 0.4980
Z	 0.8151	 0.4810
a	 0.8542	 0.4970
b	 0.5980	 0.3790
c	 0.8167	 0.4620
d	 0.8052	 0.4850
e	 0.8048	 0.5130
f	 0.8514	 0.5240



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Chain	Atom inclusion	Q-score
g	 0.7934	 0.5050
h	 0.8250	 0.4830
i	 0.8192	 0.4850
j	 0.8649	 0.5290
k	 0.7529	 0.4520
l	 0.8578	 0.5180
o	 0.7872	 0.4660
p	 0.8221	 0.4940
q	 0.3613	 0.1000
s	 0.8105	 0.3830
u	 0.7672	 0.4450
v	 0.6975	 0.4390
y	 0.7565	 0.4440
z	 0.5853	 0.4070