



## Full wwPDB EM Validation Report ⓘ

Apr 22, 2024 – 11:44 pm BST

PDB ID : 7NFX  
EMDB ID : EMD-12303  
Title : Mammalian ribosome nascent chain complex with SRP and SRP receptor in early state A  
Authors : Jomaa, A.; Lee, J.H.; Shan, S.; Ban, N.  
Deposited on : 2021-02-08  
Resolution : 3.20 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](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:

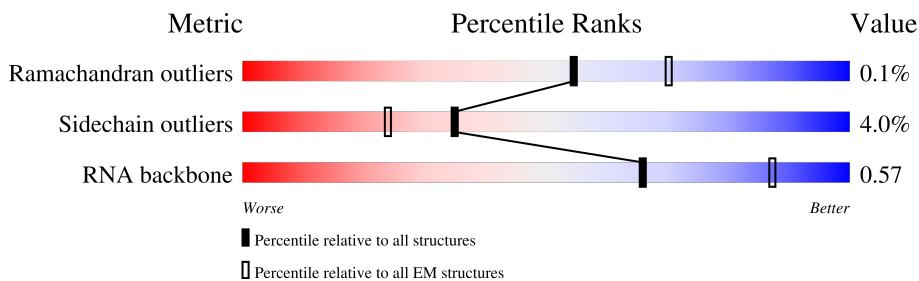
EMDB validation analysis : 0.0.1.dev92  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

# 1 Overall quality at a glance i

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

The reported resolution of this entry is 3.20 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	1	299	
2	5	3493	
3	7	120	
4	8	156	
5	A	245	
6	B	403	
7	C	413	
8	D	297	

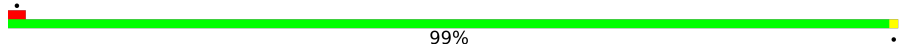
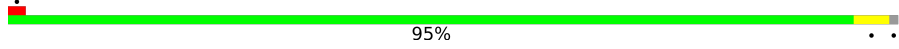
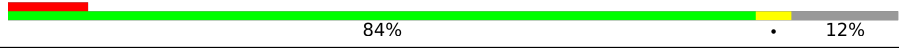
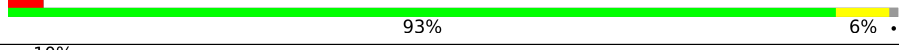
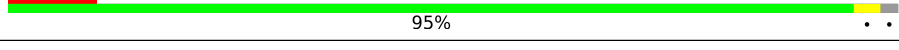

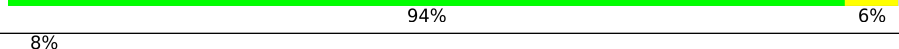
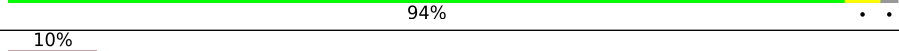
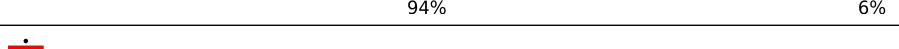
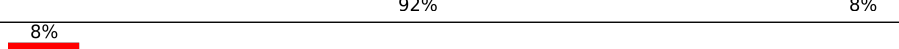
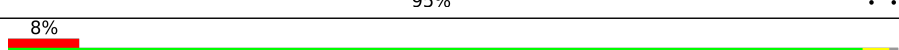
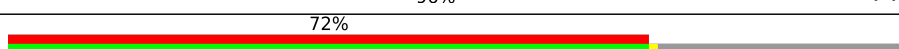

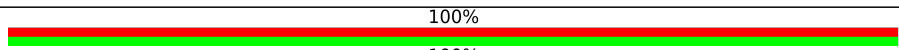






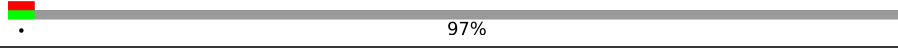

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Mol	Chain	Length	Quality of chain
9	E	291	17% 79% 19%
10	F	225	98%
11	G	319	15% 74% 24%
12	H	192	8% 96%
13	I	214	6% 93% 5%
14	J	178	24% 93% 5%
15	L	210	12% 96%
16	M	218	61% 37%
17	N	204	95%
18	O	199	98%
19	P	153	99%
20	Q	187	97%
21	R	180	10% 98%
22	S	175	97%
23	T	160	12% 96%
24	U	99	23% 98%
25	V	140	90% 6%
26	W	63	5% 97%
27	X	156	74% 24%
28	Y	145	6% 88% 5% 8%
29	Z	136	6% 96%
30	a	148	99%
31	b	223	9% 32% 66%
32	c	94	99%
33	d	125	8% 82% 14%

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Mol	Chain	Length	Quality of chain
34	e	128	 99%
35	f	110	 95%
36	g	129	 84% 12%
37	h	123	 93% 6%
38	i	104	 95%
39	j	97	 86% 11%
40	k	69	 25% 94% 6%
41	l	51	 8% 94%
42	m	52	 10% 94% 6%
43	n	25	 92% 8%
44	o	105	 8% 95%
45	p	92	 8% 96%
46	q	144	 72% 72% 28%
47	r	137	 5% 86% 5% 9%
48	s	21	 100% 100%
49	t	136	 52% 65% 35%
50	u	627	 31% 31% 69%
51	v	271	 69% 67% 31%
52	w	86	 76% 87% 13%
53	x	504	 80% 67% 15% 17%
54	y	638	 23% 23% 77%
55	z	671	 97%

## 2 Entry composition [i](#)

There are 59 unique types of molecules in this entry. The entry contains 148232 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 SRP RNA 7SL.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	1	249	5341	2377	977	1738	249	0	0

- Molecule 2 is a RNA chain called 28S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	5	3493	74854	33335	13681	24346	3492	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	7	120	2558	1141	456	842	119	0	0

- Molecule 4 is a RNA chain called 5.8S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
4	8	156	3314	1480	585	1094	155	0	0

- Molecule 5 is a protein called uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	A	244	1868	1171	382	309	6	0	0

- Molecule 6 is a protein called uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	B	394	3148	2007	591	537	13	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	MET	-	initiating methionine	UNP G1TL06

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	C	362	2883	1812	577	480	14	0	0

- Molecule 8 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	D	292	2386	1509	437	426	14	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	1	MET	-	initiating methionine	UNP G1SYJ6

- Molecule 9 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	E	236	1898	1215	362	318	3	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	126	ARG	LYS	conflict	UNP G1SKF7
E	217	GLN	LYS	conflict	UNP G1SKF7

- Molecule 10 is a protein called uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	F	225	1870	1202	358	301	9	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	175	ALA	THR	conflict	UNP G1SV32
F	185	GLY	ASN	conflict	UNP G1SV32
F	202	ARG	HIS	conflict	UNP G1SV32
F	233	GLU	GLY	conflict	UNP G1SV32

- Molecule 11 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	G	241	1934	1233	371	326	4	0	0

- Molecule 12 is a protein called 60S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	H	190	1516	954	284	272	6	0	0

- Molecule 13 is a protein called 60S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	I	204	1655	1051	319	272	13	0	0

- Molecule 14 is a protein called Ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	J	169	1353	855	252	240	6	0	0

- Molecule 15 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	L	210	1703	1065	354	280	4	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	47	ALA	-	insertion	UNP G1TPV0
L	48	PRO	-	insertion	UNP G1TPV0
L	49	ARG	-	insertion	UNP G1TPV0
L	50	PRO	-	insertion	UNP G1TPV0

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Chain	Residue	Modelled	Actual	Comment	Reference
L	51	ALA	-	insertion	UNP G1TPV0
L	52	SER	-	insertion	UNP G1TPV0
L	53	GLY	-	insertion	UNP G1TPV0
L	54	PRO	-	insertion	UNP G1TPV0
L	55	LEU	-	insertion	UNP G1TPV0

- Molecule 16 is a protein called 60S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	M	138	1137	727	221	182	7	0	0

- Molecule 17 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	N	203	1701	1072	359	266	4	0	0

- Molecule 18 is a protein called uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	O	199	1638	1056	321	256	5	0	0

- Molecule 19 is a protein called uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	P	153	1242	777	241	215	9	0	0

- Molecule 20 is a protein called eL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	Q	187	1506	941	311	249	5	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Q	6	ARG	LEU	conflict	UNP G1TX70
Q	14	ARG	TRP	conflict	UNP G1TX70

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Chain	Residue	Modelled	Actual	Comment	Reference
Q	23	ILE	MET	conflict	UNP G1TX70
Q	24	TYR	CYS	conflict	UNP G1TX70
Q	38	ARG	HIS	conflict	UNP G1TX70
Q	57	ASN	LYS	conflict	UNP G1TX70
Q	66	MET	VAL	conflict	UNP G1TX70
Q	74	GLY	ASP	conflict	UNP G1TX70
Q	75	ARG	PRO	conflict	UNP G1TX70
Q	77	GLY	ASN	conflict	UNP G1TX70
Q	106	SER	THR	conflict	UNP G1TX70
Q	110	ARG	HIS	conflict	UNP G1TX70
Q	117	GLY	GLU	conflict	UNP G1TX70
Q	124	ASP	HIS	conflict	UNP G1TX70
Q	134	CYS	ARG	conflict	UNP G1TX70
Q	150	ARG	GLN	conflict	UNP G1TX70
Q	172	ARG	GLY	conflict	UNP G1TX70
Q	184	ARG	TRP	conflict	UNP G1TX70

- Molecule 21 is a protein called 60S RIBOSOMAL PROTEIN EL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	R	180	1508	933	328	238	9	0	0

- Molecule 22 is a protein called eL20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	S	175	1454	925	284	235	10	0	0

- Molecule 23 is a protein called eL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	T	159	1298	823	252	217	6	0	0

- Molecule 24 is a protein called Ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	U	99	808	518	141	147	2	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
U	32	GLY	ARG	variant	UNP G1TSG1
U	36	ALA	GLU	variant	UNP G1TSG1
U	39	PHE	SER	variant	UNP G1TSG1
U	54	GLY	ARG	variant	UNP G1TSG1
U	60	VAL	ALA	variant	UNP G1TSG1
U	97	ARG	HIS	variant	UNP G1TSG1

- Molecule 25 is a protein called Ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	V	131	979	618	184	172	5	0	0

- Molecule 26 is a protein called Ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	W	63	528	337	103	85	3	0	0

- Molecule 27 is a protein called uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	X	119	976	624	183	168	1	0	0

- Molecule 28 is a protein called Ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	Y	134	1115	700	226	186	3	0	0

- Molecule 29 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	Z	135	1107	714	208	182	3	0	0

- Molecule 30 is a protein called uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	a	147	1162	734	239	185	4	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	1	MET	-	initiating methionine	UNP G1SNY0

- Molecule 31 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	b	75	609	378	130	98	3	0	0

- Molecule 32 is a protein called eL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	c	94	732	465	130	131	6	0	0

- Molecule 33 is a protein called eL31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	d	107	888	560	171	155	2	0	0

- Molecule 34 is a protein called eL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	e	128	1053	667	216	165	5	0	0

- Molecule 35 is a protein called eL33.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	f	109	876	555	174	143	4	0	0

- Molecule 36 is a protein called 60S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	g	114	906	566	187	147	6	0	0

- Molecule 37 is a protein called uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	h	122	Total	C	N	O	S	0	0
			1013	640	204	168	1		

- Molecule 38 is a protein called eL36.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	i	102	Total	C	N	O	S	0	0
			830	520	176	129	5		

- Molecule 39 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	j	86	Total	C	N	O	S	0	0
			705	434	155	111	5		

- Molecule 40 is a protein called eL38.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	k	69	Total	C	N	O	S	0	0
			569	366	103	99	1		

- Molecule 41 is a protein called eL39.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	l	50	Total	C	N	O	S	0	0
			444	281	98	64	1		

- Molecule 42 is a protein called 60S RIBOSOMAL PROTEIN EL40.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	m	52	Total	C	N	O	S	0	0
			429	266	90	67	6		

- Molecule 43 is a protein called 60s ribosomal protein l41.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	n	23	Total	C	N	O	S	0	0
			222	134	61	25	2		

- Molecule 44 is a protein called eL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	o	104	Total	C	N	O	S	0	0
			851	533	174	138	6		

- Molecule 45 is a protein called eL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	p	91	Total	C	N	O	S	0	0
			708	445	136	120	7		

- Molecule 46 is a protein called Signal recognition particle 19 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	q	104	Total	C	N	O	S	0	0
			842	534	152	150	6		

- Molecule 47 is a protein called eL28.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	r	125	Total	C	N	O	S	0	0
			1001	621	206	168	6		

- Molecule 48 is a protein called Signal Sequence.

Mol	Chain	Residues	Atoms				AltConf	Trace
48	s	21	Total	C	N	O	0	0
			105	63	21	21		

- Molecule 49 is a protein called Signal recognition particle 14 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	t	88	Total	C	N	O	S	0	0
			693	438	122	128	5		

- Molecule 50 is a protein called Signal recognition particle subunit SRP68.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	u	196	Total	C	N	O	S	0	0
			1637	1028	307	294	8		

- Molecule 51 is a protein called Signal recognition particle receptor subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	v	186	1455	923	252	274	6	0	0

- Molecule 52 is a protein called Signal recognition particle 9 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	w	75	623	397	108	112	6	1	0

- Molecule 53 is a protein called Signal recognition particle 54 kDa protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	x	417	3236	2042	552	620	22	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
x	226	GLU	GLY	engineered mutation	UNP P61011

- Molecule 54 is a protein called Signal recognition particle receptor subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
54	y	147	1133	724	194	213	2	0	0

- Molecule 55 is a protein called Signal recognition particle subunit SRP72.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	z	19	161	106	26	28	1	0	0

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

Mol	Chain	Residues	Atoms		AltConf
56	g	1	Total	Zn	0
			1	1	
56	j	1	Total	Zn	0
			1	1	
56	m	1	Total	Zn	0
			1	1	

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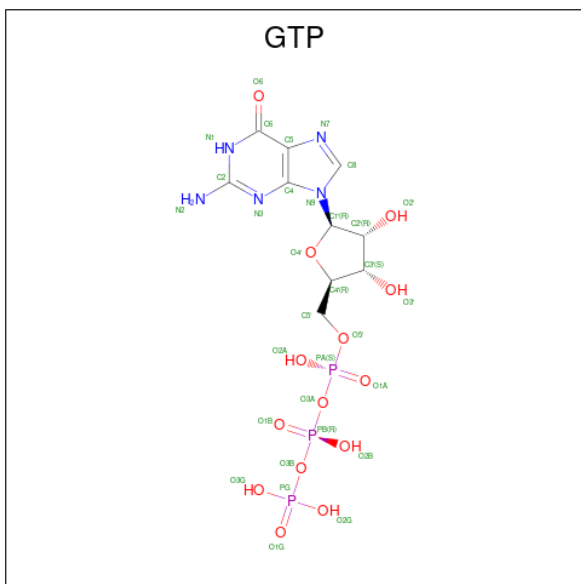
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Mol	Chain	Residues	Atoms		AltConf
56	o	1	Total	Zn	0
			1	1	
56	p	1	Total	Zn	0
			1	1	

- Molecule 57 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

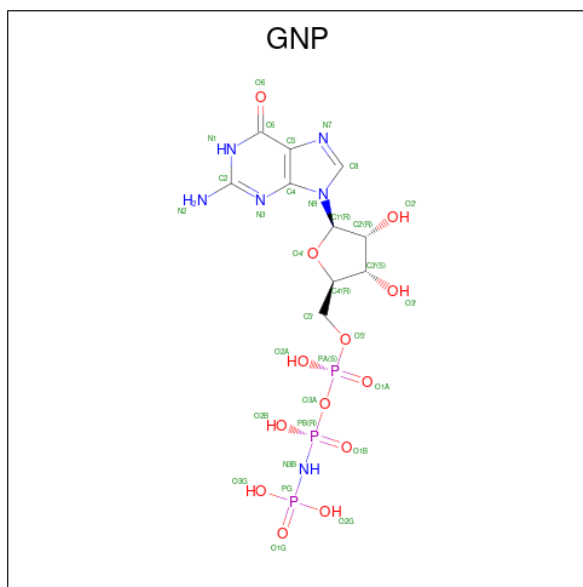
Mol	Chain	Residues	Atoms		AltConf
57	v	1	Total	Mg	0
			1	1	
57	x	1	Total	Mg	0
			1	1	

- Molecule 58 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula:  $C_{10}H_{16}N_5O_{14}P_3$ ).



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

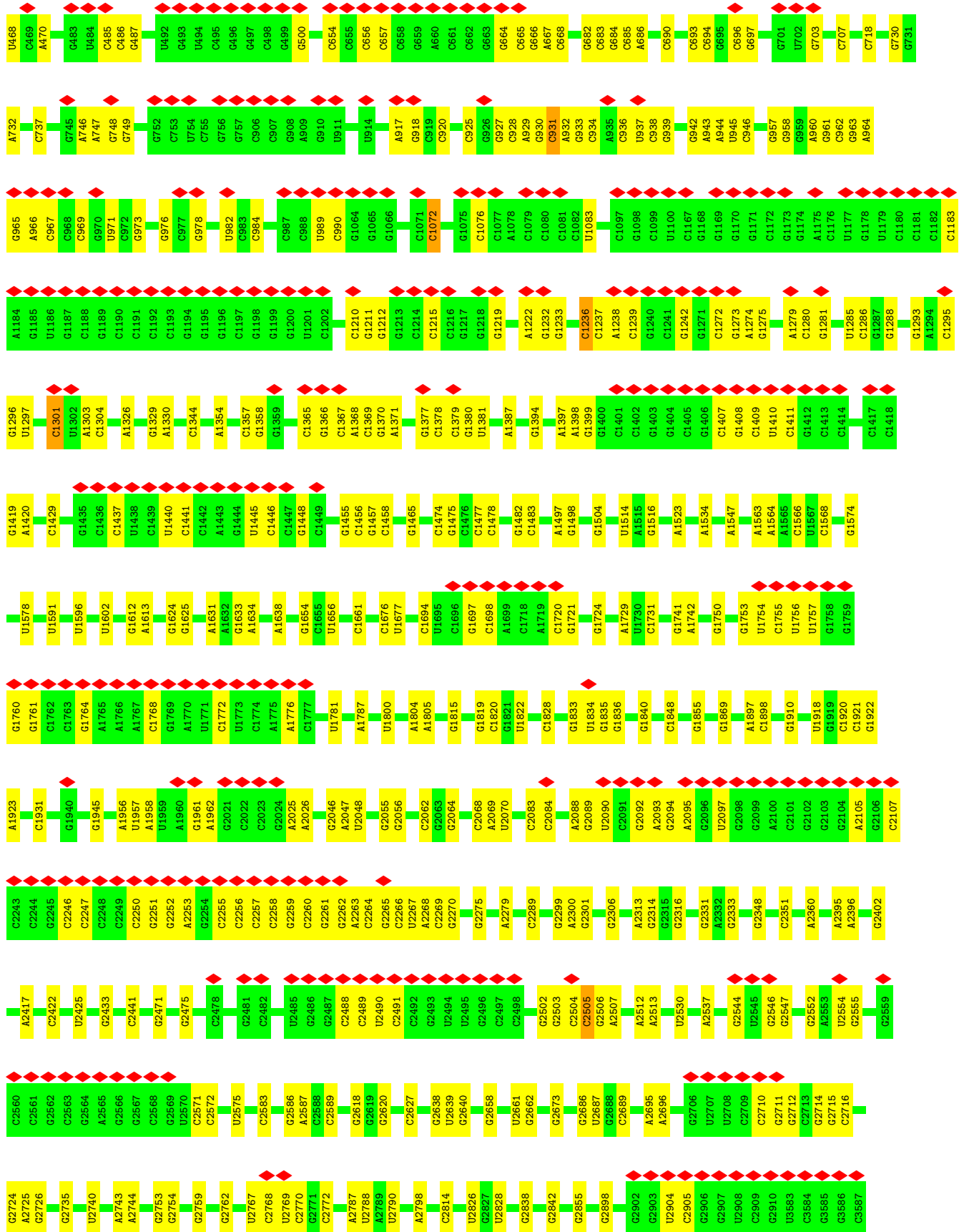
- Molecule 59 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula:  $C_{10}H_{17}N_6O_{13}P_3$ ).



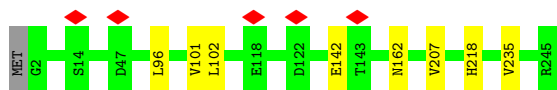
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
59	x	1	32	10	6	13	3	0



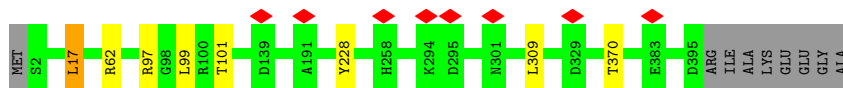




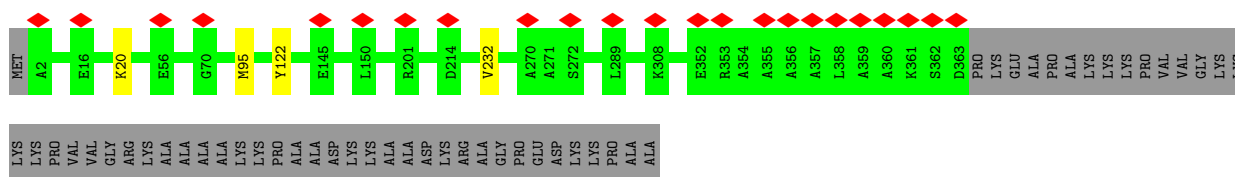
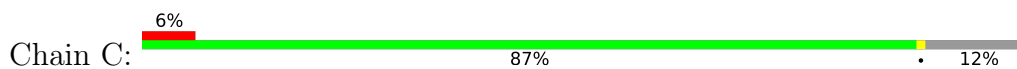




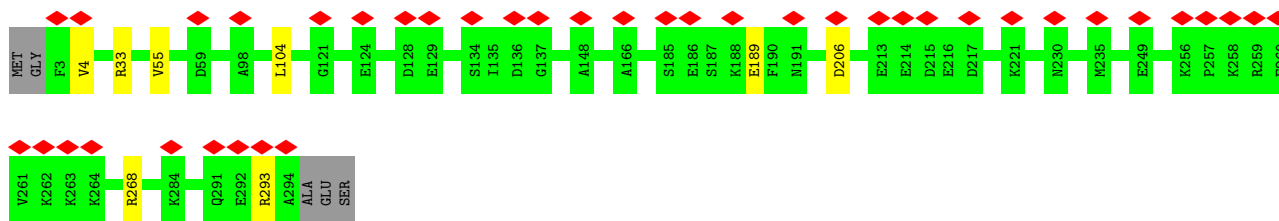
• Molecule 6: uL3



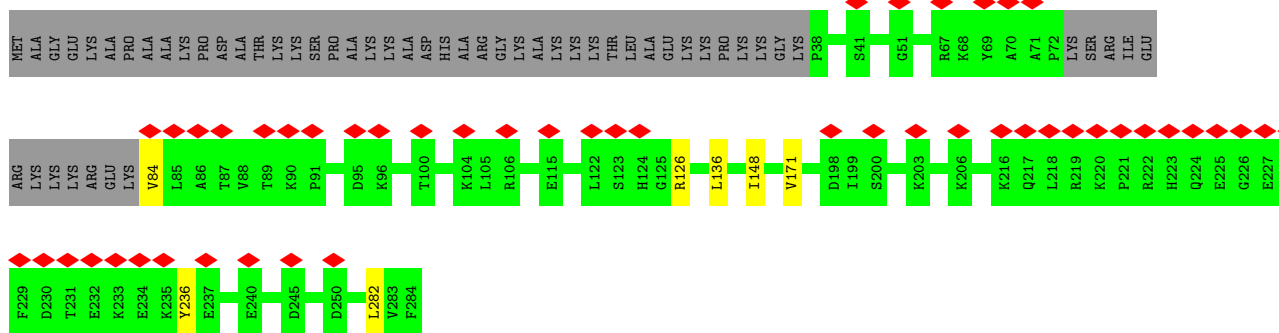
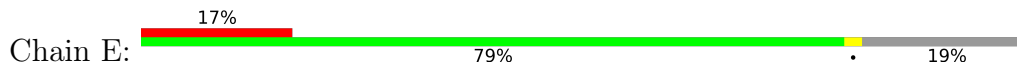
• Molecule 7: 60S ribosomal protein L4



• Molecule 8: 60S ribosomal protein L5



• Molecule 9: 60S ribosomal protein L6




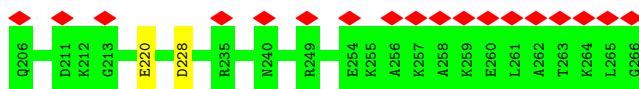
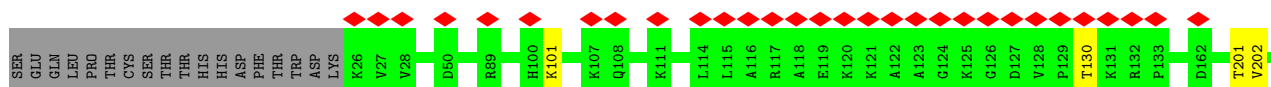
• Molecule 10: uL30

Chain F:  98%



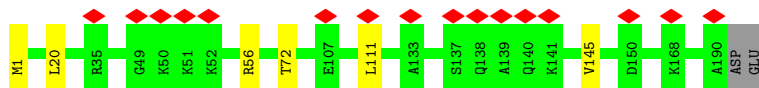
- Molecule 11: 60S ribosomal protein L7a

Chain G:  74%

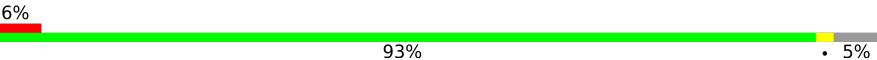


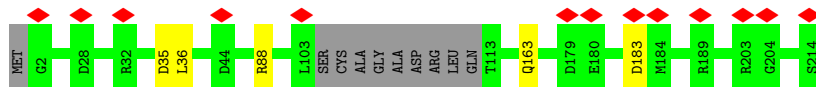
- Molecule 12: 60S ribosomal protein L9

Chain H:  96%



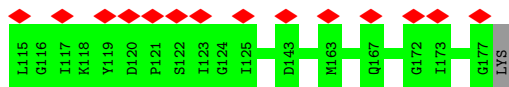
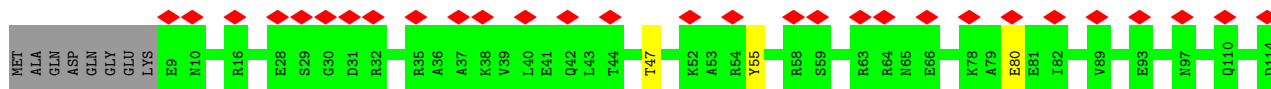
- Molecule 13: 60S ribosomal protein L10

Chain I:  93%



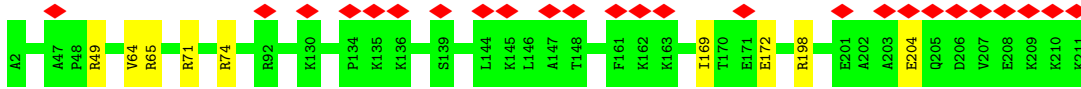
- Molecule 14: Ribosomal protein L11

Chain J:  93%



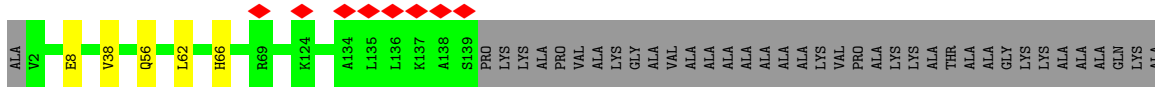
- Molecule 15: 60S ribosomal protein L13

Chain L:  96%



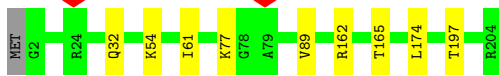
- Molecule 16: 60S ribosomal protein L14

Chain M: 61% 37%



- Molecule 17: Ribosomal protein L15

Chain N: 95%



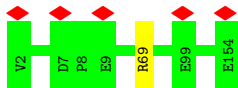
- Molecule 18: uL13

Chain O: 98%



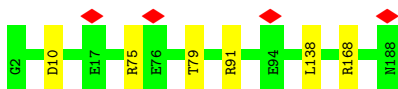
- Molecule 19: uL22

Chain P: 99%



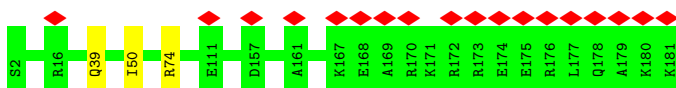
- Molecule 20: eL18

Chain Q: 97%

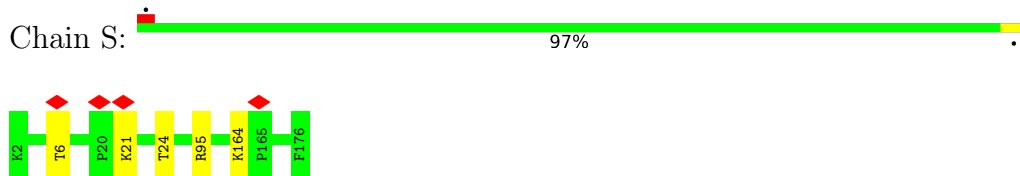


- Molecule 21: 60S RIBOSOMAL PROTEIN EL19

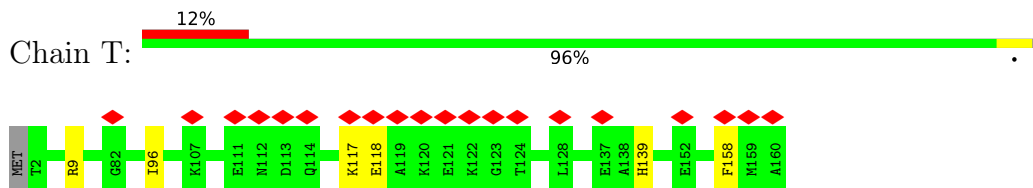
Chain R: 10% 98%



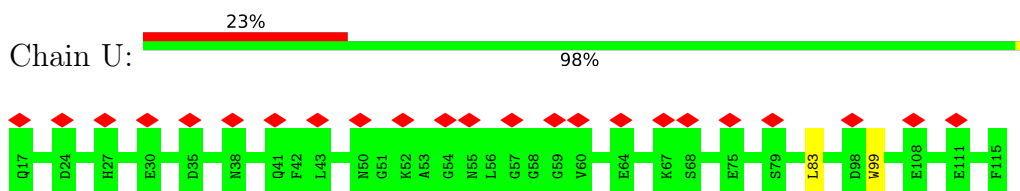
• Molecule 22: eL20



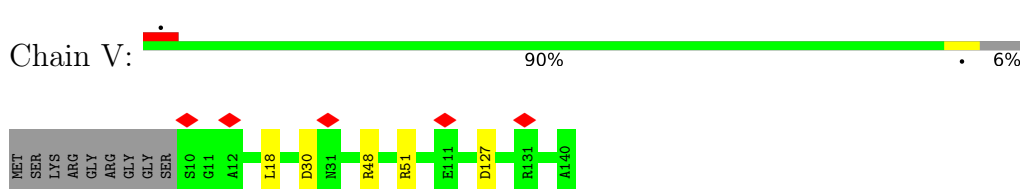
• Molecule 23: eL21



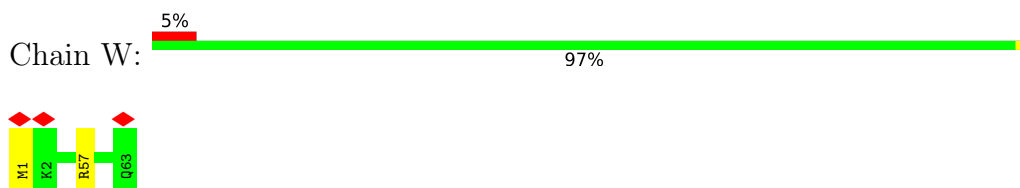
• Molecule 24: Ribosomal protein L22



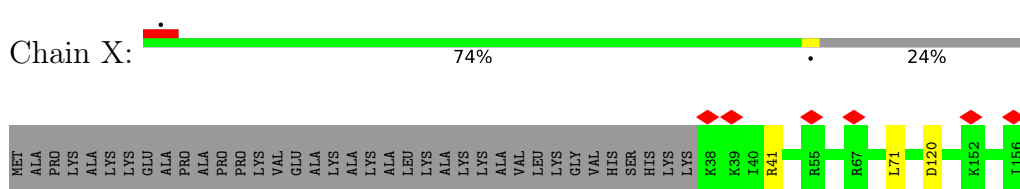
• Molecule 25: Ribosomal protein L23



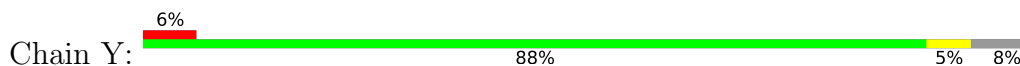
• Molecule 26: Ribosomal protein L24

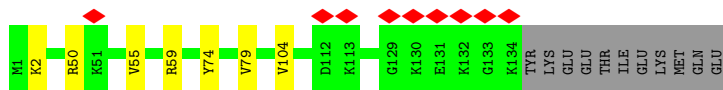


• Molecule 27: uL23

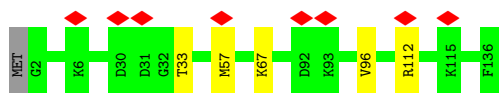
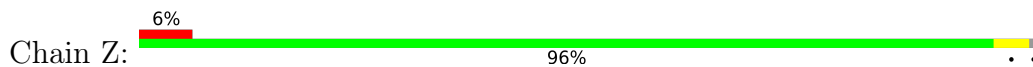


• Molecule 28: Ribosomal protein L26

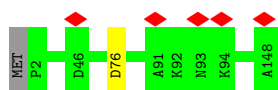




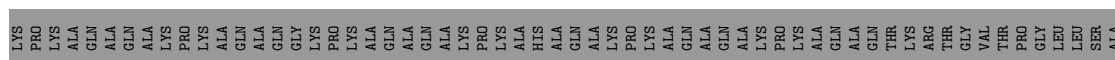
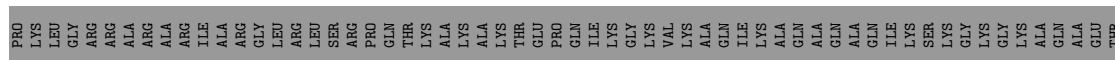
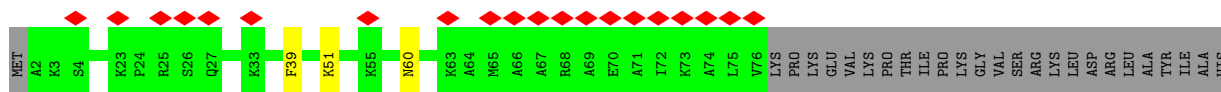
• Molecule 29: 60S ribosomal protein L27



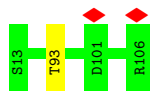
• Molecule 30: uL15



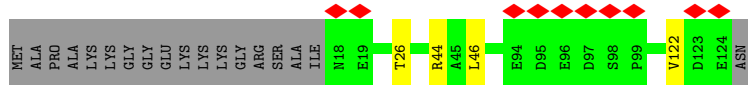
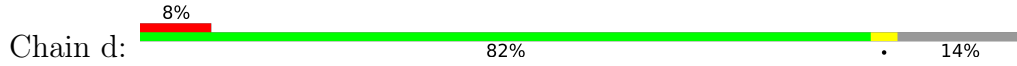
• Molecule 31: 60S ribosomal protein L29



• Molecule 32: eL30



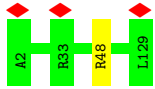
• Molecule 33: eL31



• Molecule 34: eL32

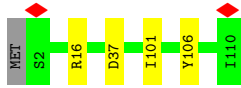


Chain e:  99%




- Molecule 35: eL33

Chain f:  95%



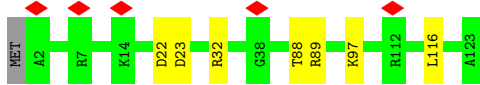
- Molecule 36: 60S ribosomal protein L34

Chain g:  9% 84% 12%

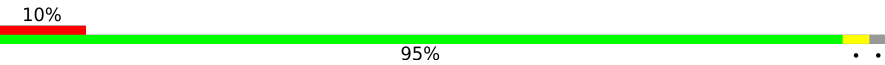


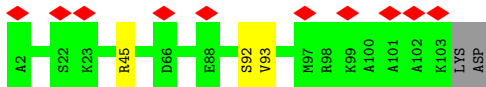
- Molecule 37: uL29

Chain h:  93% 6%




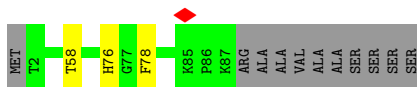
- Molecule 38: eL36

Chain i:  10% 95% 6%

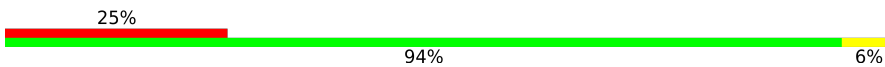


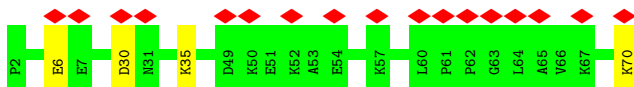
- Molecule 39: Ribosomal protein L37

Chain j:  86% 11%

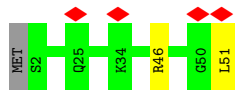


- Molecule 40: eL38

Chain k:  25% 94% 6%



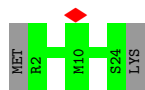
• Molecule 41: eL39



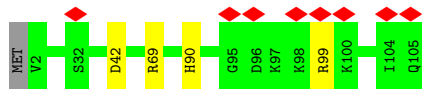
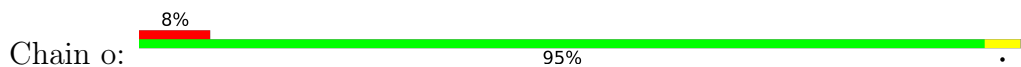
• Molecule 42: 60S RIBOSOMAL PROTEIN EL40



• Molecule 43: 60s ribosomal protein l41



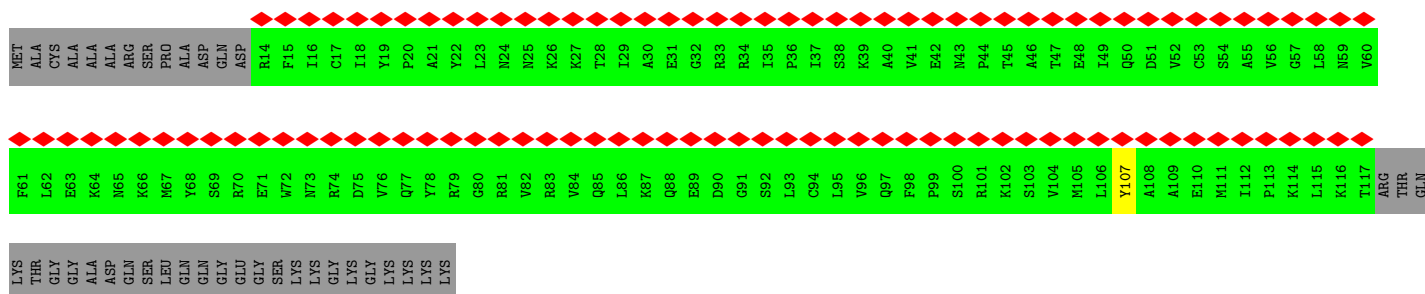
• Molecule 44: eL42



• Molecule 45: eL43



• Molecule 46: Signal recognition particle 19 kDa protein







MET	VAL	D61	L62	E63	F64	G65	H66	I67	J68	K69	L70	M71	N72	O73	P74	Q75	R76	S77	T78	U79	V80	W81	X82	Y83	Z84	A85	B86	C87	D88	E89	F90	G91	H92	I93	J94	K95	L96	M97	N98	O99	P100	Q101	R102	S103	T104	U105	V106	W107	X108	Y109	Z110	A111	B112	C113	D114	E115	F116	G117	H118	I119	J120	K121	L122	M123	N124	O125	P126	Q127	R128	S129	T130	U131	V132	W133	X134	Y135	Z136	A137	B138	C139	D140	E141	F142	G143	H144	I145	J146	K147	L148	M149	N150	O151	P152	Q153	R154	S155	T156	U157	V158	W159	X160	Y161	Z162	A163	B164	C165	D166	E167	F168	G169	H170	I171	J172	K173	L174	M175	N176	O177	P178	Q179	R180	S181	T182	U183	V184	W185	X186	Y187	Z188	A189	B190	C191	D192	E193	F194	G195	H196	I197	J198	K199	L200	M201	N202	O203	P204	Q205	R206	S207	T208	U209	V210	W211	X212	Y213	Z214	A215	B216	C217	D218	E219	F220	G221	H222	I223	J224	K225	L226	M227	N228	O229	P230	Q231	R232	S233	T234	U235	V236	W237	X238	Y239	Z240	A241	B242	C243	D244	E245	F246	G247	H248	I249	J250	K251	L252	M253	N254	O255	P256	Q257	R258	S259	T260	U261	V262	W263	X264	Y265	Z266	A267	B268	C269	D270	E271	F272	G273	H274	I275	J276	K277	L278	M279	N280	O281	P282	Q283	R284	S285	T286	U287	V288	W289	X290	Y291	Z292	A293	B294	C295	D296	E297	F298	G299	H300	I301	J302	K303	L304	M305	N306	O307	P308	Q309	R310	S311	T312	U313	V314	W315	X316	Y317	Z318	A319	B320	C321	D322	E323	F324	G325	H326	I327	J328	K329	L330	M331	N332	O333	P334	Q335	R336	S337	T338	U339	V340	W341	X342	Y343	Z344	A345	B346	C347	D348	E349	F350	G351	H352	I353	J354	K355	L356	M357	N358	O359	P360	Q361	R362	S363	T364	U365	V366	W367	X368	Y369	Z370	A371	B372	C373	D374	E375	F376	G377	H378	I379	J380	K381	L382	M383	N384	O385	P386	Q387	R388	S389	T390	U391	V392	W393	X394	Y395	Z396	A397	B398	C399	D400	E401	F402	G403	H404	I405	J406	K407	L408	M409	N410	O411	P412	Q413	R414	S415	T416	U417	V418	W419	X420	Y421	Z422	A423	B424	C425	D426	E427	F428	G429	H430	I431	J432	K433	L434	M435	N436	O437	P438	Q439	R440	S441	T442	U443	V444	W445	X446	Y447	Z448	A449	B450	C451	D452	E453	F454	G455	H456	I457	J458	K459	L460	M461	N462	O463	P464	Q465	R466	S467	T468	U469	V470	W471	X472	Y473	Z474	A475	B476	C477	D478	E479	F480	G481	H482	I483	J484	K485	L486	M487	N488	O489	P490	Q491	R492	S493	T494	U495	V496	W497	X498	Y499	Z500	A501	B502	C503	D504	E505	F506	G507	H508	I509	J510	K511	L512	M513	N514	O515	P516	Q517	R518	S519	T520	U521	V522	W523	X524	Y525	Z526	A527	B528	C529	D530	E531	F532	G533	H534	I535	J536	K537	L538	M539	N540	O541	P542	Q543	R544	S545	T546	U547	V548	W549	X550	Y551	Z552	A553	B554	C555	D556	E557	F558	G559	H560	I561	J562	K563	L564	M565	N566	O567	P568	Q569	R570	S571	T572	U573	V574	W575	X576	Y577	Z578	A579	B580	C581	D582	E583	F584	G585	H586	I587	J588	K589	L590	M591	N592	O593	P594	Q595	R596	S597	T598	U599	V600	W601	X602	Y603	Z604	A605	B606	C607	D608	E609	F610	G611	H612	I613	J614	K615	L616	M617	N618	O619	P620	Q621	R622	S623	T624	U625	V626	W627	X628	Y629	Z630	A631	B632	C633	D634	E635	F636	G637	H638	I639	J640	K641	L642	M643	N644	O645	P646	Q647	R648	S649	T650	U651	V652	W653	X654	Y655	Z656	A657	B658	C659	D660	E661	F662	G663	H664	I665	J666	K667	L668	M669	N670	O671	P672	Q673	R674	S675	T676	U677	V678	W679	X680	Y681	Z682	A683	B684	C685	D686	E687	F688	G689	H690	I691	J692	K693	L694	M695	N696	O697	P698	Q699	R700	S701	T702	U703	V704	W705	X706	Y707	Z708	A709	B710	C711	D712	E713	F714	G715	H716	I717	J718	K719	L720	M721	N722	O723	P724	Q725	R726	S727	T728	U729	V730	W731	X732	Y733	Z734	A735	B736	C737	D738	E739	F740	G741	H742	I743	J744	K745	L746	M747	N748	O749	P750	Q751	R752	S753	T754	U755	V756	W757	X758	Y759	Z760	A761	B762	C763	D764	E765	F766	G767	H768	I769	J770	K771	L772	M773	N774	O775	P776	Q777	R778	S779	T780	U781	V782	W783	X784	Y785	Z786	A787	B788	C789	D790	E791	F792	G793	H794	I795	J796	K797	L798	M799	N800	O801	P802	Q803	R804	S805	T806	U807	V808	W809	X810	Y811	Z812	A813	B814	C815	D816	E817	F818	G819	H820	I821	J822	K823	L824	M825	N826	O827	P828	Q829	R830	S831	T832	U833	V834	W835	X836	Y837	Z838	A839	B840	C841	D842	E843	F844	G845	H846	I847	J848	K849	L850	M851	N852	O853	P854	Q855	R856	S857	T858	U859	V860	W861	X862	Y863	Z864	A865	B866	C867	D868	E869	F870	G871	H872	I873	J874	K875	L876	M877	N878	O879	P880	Q881	R882	S883	T884	U885	V886	W887	X888	Y889	Z890	A891	B892	C893	D894	E895	F896	G897	H898	I899	J900	K901	L902	M903	N904	O905	P906	Q907	R908	S909	T910	U911	V912	W913	X914	Y915	Z916	A917	B918	C919	D920	E921	F922	G923	H924	I925	J926	K927	L928	M929	N930	O931	P932	Q933	R934	S935	T936	U937	V938	W939	X940	Y941	Z942	A943	B944	C945	D946	E947	F948	G949	H950	I951	J952	K953	L954	M955	N956	O957	P958	Q959	R960	S961	T962	U963	V964	W965	X966	Y967	Z968	A969	B970	C971	D972	E973	F974	G975	H976	I977	J978	K979	L980	M981	N982	O983	P984	Q985	R986	S987	T988	U989	V990	W991	X992	Y993	Z994	A995	B996	C997	D998	E999	F1000	G1001	H1002	I1003	J1004	K1005	L1006	M1007	N1008	O1009	P1010	Q1011	R1012	S1013	T1014	U1015	V1016	W1017	X1018	Y1019	Z1020	A1021	B1022	C1023	D1024	E1025	F1026	G1027	H1028	I1029	J1030	K1031	L1032	M1033	N1034	O1035	P1036	Q1037	R1038	S1039	T1040	U1041	V1042	W1043	X1044	Y1045	Z1046	A1047	B1048	C1049	D1050	E1051	F1052	G1053	H1054	I1055	J1056	K1057	L1058	M1059	N1060	O1061	P1062	Q1063	R1064	S1065	T1066	U1067	V1068	W1069	X1070	Y1071	Z1072	A1073	B1074	C1075	D1076	E1077	F1078	G1079	H1080	I1081	J1082	K1083	L1084	M1085	N1086	O1087	P1088	Q1089	R1090	S1091	T1092	U1093	V1094	W1095	X1096	Y1097	Z1098	A1099	B1100	C1101	D1102	E1103	F1104	G1105	H1106	I1107	J1108	K1109	L1110	M1111	N1112	O1113	P1114	Q1115	R1116	S1117	T1118	U1119	V1120	W1121	X1122	Y1123	Z1124	A1125	B1126	C1127	D1128	E1129	F1130	G1131	H1132	I1133	J1134	K1135	L1136	M1137	N1138	O1139	P1140	Q1141	R1142	S1143	T1144	U1145	V1146	W1147	X1148	Y1149	Z1150	A1151	B1152	C1153	D1154	E1155	F1156	G1157	H1158	I1159	J1160	K1161	L1162	M1163	N1164	O1165	P1166	Q1167	R1168	S1169	T1170	U1171	V1172	W1173	X1174	Y1175	Z1176	A1177	B1178	C1179	D1180	E1181	F1182	G1183	H1184	I1185	J1186	K1187	L1188	M1189	N1190	O1191	P1192	Q1193	R1194	S1195	T1196	U1197	V1198	W1199	X1200	Y1201	Z1202	A1203	B1204	C1205	D1206	E1207	F1208	G1209	H1210	I1211	J1212	K1213	L1214	M1215	N1216	O1217	P1218	Q1219	R1220	S1221	T1222	U1223	V1224	W1225	X1226	Y1227	Z1228	A1229	B1230	C1231	D1232	E1233	F1234	G1235	H1236	I1237	J1238	K1239	L1240	M1241	N1242	O1243	P1244	Q1245	R1246	S1247	T1248	U1249	V1250	W1251	X1252	Y1253	Z1254	A1255	B1256	C1257	D1258	E1259	F1260	G1261	H1262	I1263	J1264	K1265	L1266	M1267	N1268	O1269	P1270	Q1271	R1272	S1273	T1274	U1275	V1276	W1277	X1278	Y1279	Z1280	A1281	B1282	C1283	D1284	E1285	F1286	G1287	H1288	I1289	J1290	K1291	L1292	M1293	N1294	O1295	P1296	Q1297	R1298	S1299	T1300	U1301	V1302	W1303	X1304	Y1305	Z1306	A1307	B1308	C1309	D1310	E1311	F1312	G1313	H1314	I1315	J1316	K1317	L1318	M1319	N1320	O1321	P1322	Q1323	R1324	S1325	T1326	U1327	V1328	W1329	X1330	Y1331	Z1332	A1333	B1334	C1335	D1336	E1337	F1338	G1339	H1340	I1341	J1342	K1343	L1344	M1345	N1346	O1347	P1348	Q1349	R1350	S1351	T1352	U1353	V1354	W1355	X1356	Y1357	Z1358	A1359	B1360	C1361	D1362	E1363	F1364	G1365	H1366	I1367	J1368	K1369	L1370	M1371	N1372	O1373	P1374	Q1375	R1376	S1377	T1378	U1379	V1380	W1381	X1382	Y1383	Z1384	A1385	B1386	C1387	D1388	E1389	F1390	G1391	H1392	I1393	J1394	K1395	L1396	M1397	N1398	O1399	P1400	Q1401	R1402	S1403	T1404	U1405	V1406	W1407	X1408	Y1409	Z1410	A1411	B1412	C1413	D1414	E1415	F1416	G1417	H1418	I1419	J1420	K1421	L1422	M1423	N1424	O1425	P1426	Q1427	R1428	S1429	T1430	U1431	V1432	W1433	X1434	Y1435	Z1436	A1437	B1438	C1439	D1440	E1441	F1442	G1443	H1444	I1445	J1446	K1447	L1448	M1449	N1450	O1451	P1452	Q1453	R1454	S1455	T1456	U1457	V1458	W1459	X1460	Y1461	Z1462	A1463	B1464	C1465	D1466	E1467	F1468	G1469	H1470	I1471	J1472	K1473	L1474	M1475	N1476	O1477	P1478	Q1479	R1480	S1481	T1482	U1483	V1484	W1485	X1486	Y1487	Z1488	A1489	B1490	C1491	D1492	E1493	F1494	G1495	H1496	I1497	J1498	K1499	L1500	M1501
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## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	32881	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	81000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.106	Depositor
Minimum map value	-0.060	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.006	Depositor
Recommended contour level	0.018	Depositor
Map size (Å)	475.776, 475.776, 475.776	wwPDB
Map dimensions	448, 448, 448	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.062, 1.062, 1.062	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, GNP, ZN, 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
1	1	0.17	0/5971	0.78	5/9308 (0.1%)
2	5	0.19	0/83726	0.79	36/130593 (0.0%)
3	7	0.16	0/2858	0.73	0/4455
4	8	0.17	0/3701	0.74	0/5766
5	A	0.24	0/1906	0.43	0/2556
6	B	0.24	0/3216	0.42	0/4311
7	C	0.23	0/2937	0.39	0/3946
8	D	0.24	0/2432	0.40	0/3257
9	E	0.24	0/1936	0.46	0/2600
10	F	0.24	0/1905	0.40	0/2539
11	G	0.24	0/1967	0.42	0/2647
12	H	0.24	0/1535	0.43	0/2063
13	I	0.24	0/1693	0.40	0/2260
14	J	0.23	0/1376	0.42	0/1841
15	L	0.24	0/1734	0.40	0/2317
16	M	0.24	0/1158	0.38	0/1547
17	N	0.23	0/1746	0.39	0/2338
18	O	0.24	0/1671	0.38	0/2234
19	P	0.23	0/1268	0.41	0/1700
20	Q	0.23	0/1530	0.41	0/2041
21	R	0.22	0/1524	0.38	0/2013
22	S	0.24	0/1493	0.41	0/2002
23	T	0.24	0/1326	0.40	0/1770
24	U	0.24	0/822	0.42	0/1103
25	V	0.25	0/993	0.42	0/1332
26	W	0.24	0/541	0.39	0/720
27	X	0.23	0/993	0.39	0/1334
28	Y	0.23	0/1132	0.40	0/1504
29	Z	0.25	0/1130	0.43	0/1507
30	a	0.24	0/1191	0.41	0/1590
31	b	0.23	0/619	0.34	0/818
32	c	0.24	0/742	0.39	0/996

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
33	d	0.23	0/903	0.42	0/1216
34	e	0.23	0/1071	0.38	0/1429
35	f	0.25	0/895	0.45	0/1198
36	g	0.23	0/916	0.40	0/1220
37	h	0.22	0/1021	0.37	0/1348
38	i	0.23	0/841	0.39	0/1112
39	j	0.23	0/720	0.43	0/952
40	k	0.24	0/575	0.45	0/761
41	l	0.22	0/454	0.40	0/599
42	m	0.23	0/435	0.42	0/575
43	n	0.20	0/223	0.32	0/284
44	o	0.24	0/864	0.44	0/1140
45	p	0.23	0/718	0.41	0/953
46	q	0.23	0/856	0.41	0/1152
47	r	0.23	0/1017	0.44	0/1364
49	t	0.25	0/699	0.40	0/932
50	u	0.24	0/1665	0.38	0/2229
51	v	0.24	0/1472	0.41	0/1979
52	w	0.23	0/634	0.37	0/851
53	x	0.56	0/3278	0.59	0/4401
54	y	0.25	0/1151	0.45	1/1553 (0.1%)
55	z	0.24	0/168	0.45	0/231
All	All	0.22	0/159348	0.67	42/234487 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
6	B	0	1
22	S	0	1
35	f	0	1
53	x	0	1
All	All	0	4

There are no bond length outliers.

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	1	37	C	N1-C2-O2	9.44	124.56	118.90
1	1	37	C	N3-C2-O2	-8.69	115.81	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	1	37	C	C2-N1-C1'	8.28	127.91	118.80
2	5	931	C	C2-N1-C1'	8.26	127.89	118.80
2	5	1072	C	C2-N1-C1'	8.26	127.89	118.80
2	5	1072	C	N1-C2-O2	8.15	123.79	118.90
2	5	931	C	N1-C2-O2	7.82	123.59	118.90
2	5	3594	C	C2-N1-C1'	7.73	127.30	118.80
2	5	3594	C	N1-C2-O2	7.71	123.53	118.90
2	5	657	C	N3-C2-O2	-7.16	116.89	121.90
2	5	1236	C	N3-C2-O2	-7.09	116.94	121.90
2	5	5061	A	P-O3'-C3'	6.76	127.81	119.70
2	5	931	C	N3-C2-O2	-6.62	117.27	121.90
2	5	931	C	C6-N1-C2	-6.45	117.72	120.30
2	5	4723	A	C6-N1-C2	-6.33	114.80	118.60
1	1	37	C	C6-N1-C2	-6.28	117.79	120.30
54	y	245	PRO	N-CA-CB	6.28	110.84	103.30
2	5	5061	A	OP2-P-O3'	6.23	118.91	105.20
2	5	1236	C	N1-C2-O2	6.21	122.63	118.90
2	5	3594	C	N3-C2-O2	-6.17	117.58	121.90
2	5	1072	C	C6-N1-C1'	-6.12	113.45	120.80
2	5	1301	C	C2-N1-C1'	6.10	125.51	118.80
2	5	1072	C	N3-C2-O2	-5.98	117.72	121.90
2	5	100	C	C2-N1-C1'	5.75	125.12	118.80
2	5	3594	C	C6-N1-C2	-5.62	118.05	120.30
2	5	300	A	C6-N1-C2	-5.55	115.27	118.60
1	1	37	C	C6-N1-C1'	-5.44	114.27	120.80
2	5	931	C	C6-N1-C1'	-5.35	114.38	120.80
2	5	4420	U	C2-N1-C1'	5.32	124.09	117.70
2	5	4420	U	N1-C2-O2	5.24	126.47	122.80
2	5	4413	C	C2-N1-C1'	5.23	124.56	118.80
2	5	245	C	C2-N1-C1'	5.20	124.52	118.80
2	5	4749	C	N1-C2-O2	5.19	122.02	118.90
2	5	3594	C	C6-N1-C1'	-5.19	114.57	120.80
2	5	3741	C	N3-C2-O2	-5.19	118.27	121.90
2	5	2505	C	N1-C2-O2	5.15	121.99	118.90
2	5	1398	A	O4'-C1'-N9	5.13	112.30	108.20
2	5	931	C	C5-C6-N1	5.12	123.56	121.00
2	5	1458	C	N1-C2-O2	5.11	121.97	118.90
2	5	657	C	N1-C2-O2	5.07	121.94	118.90
2	5	1301	C	N1-C2-O2	5.06	121.94	118.90
2	5	4730	C	C2-N1-C1'	5.05	124.36	118.80

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
6	B	17	LEU	Peptide
22	S	164	LYS	Peptide
35	f	106	TYR	Peptide
53	x	298	GLY	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	
5	A	242/245 (99%)	225 (93%)	17 (7%)	0	100	100
6	B	392/403 (97%)	379 (97%)	13 (3%)	0	100	100
7	C	360/413 (87%)	345 (96%)	15 (4%)	0	100	100
8	D	290/297 (98%)	278 (96%)	12 (4%)	0	100	100
9	E	232/291 (80%)	198 (85%)	34 (15%)	0	100	100
10	F	223/225 (99%)	217 (97%)	6 (3%)	0	100	100
11	G	239/319 (75%)	225 (94%)	14 (6%)	0	100	100
12	H	188/192 (98%)	178 (95%)	10 (5%)	0	100	100
13	I	200/214 (94%)	194 (97%)	6 (3%)	0	100	100
14	J	167/178 (94%)	155 (93%)	12 (7%)	0	100	100
15	L	208/210 (99%)	191 (92%)	16 (8%)	1 (0%)	29	67
16	M	136/218 (62%)	132 (97%)	4 (3%)	0	100	100
17	N	201/204 (98%)	192 (96%)	9 (4%)	0	100	100
18	O	197/199 (99%)	193 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
19	P	151/153 (99%)	148 (98%)	3 (2%)	0	100	100
20	Q	185/187 (99%)	180 (97%)	5 (3%)	0	100	100
21	R	178/180 (99%)	174 (98%)	4 (2%)	0	100	100
22	S	173/175 (99%)	166 (96%)	7 (4%)	0	100	100
23	T	157/160 (98%)	148 (94%)	9 (6%)	0	100	100
24	U	97/99 (98%)	90 (93%)	7 (7%)	0	100	100
25	V	129/140 (92%)	125 (97%)	4 (3%)	0	100	100
26	W	61/63 (97%)	61 (100%)	0	0	100	100
27	X	117/156 (75%)	114 (97%)	3 (3%)	0	100	100
28	Y	132/145 (91%)	129 (98%)	3 (2%)	0	100	100
29	Z	133/136 (98%)	122 (92%)	11 (8%)	0	100	100
30	a	145/148 (98%)	136 (94%)	9 (6%)	0	100	100
31	b	73/223 (33%)	70 (96%)	3 (4%)	0	100	100
32	c	92/94 (98%)	90 (98%)	2 (2%)	0	100	100
33	d	105/125 (84%)	101 (96%)	4 (4%)	0	100	100
34	e	126/128 (98%)	122 (97%)	4 (3%)	0	100	100
35	f	107/110 (97%)	100 (94%)	7 (6%)	0	100	100
36	g	112/129 (87%)	112 (100%)	0	0	100	100
37	h	120/123 (98%)	117 (98%)	3 (2%)	0	100	100
38	i	100/104 (96%)	94 (94%)	4 (4%)	2 (2%)	7	38
39	j	84/97 (87%)	84 (100%)	0	0	100	100
40	k	67/69 (97%)	58 (87%)	9 (13%)	0	100	100
41	l	48/51 (94%)	42 (88%)	6 (12%)	0	100	100
42	m	50/52 (96%)	47 (94%)	3 (6%)	0	100	100
43	n	21/25 (84%)	21 (100%)	0	0	100	100
44	o	102/105 (97%)	94 (92%)	8 (8%)	0	100	100
45	p	89/92 (97%)	84 (94%)	5 (6%)	0	100	100
46	q	102/144 (71%)	97 (95%)	5 (5%)	0	100	100
47	r	123/137 (90%)	111 (90%)	11 (9%)	1 (1%)	19	58
49	t	84/136 (62%)	83 (99%)	1 (1%)	0	100	100
50	u	194/627 (31%)	188 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
51	v	182/271 (67%)	180 (99%)	2 (1%)	0	100	100
52	w	74/86 (86%)	74 (100%)	0	0	100	100
53	x	413/504 (82%)	377 (91%)	30 (7%)	6 (2%)	10	44
54	y	143/638 (22%)	126 (88%)	16 (11%)	1 (1%)	22	61
55	z	17/671 (2%)	13 (76%)	4 (24%)	0	100	100
All	All	7561/10091 (75%)	7180 (95%)	370 (5%)	11 (0%)	54	83

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
38	i	92	SER
53	x	96	PRO
53	x	286	LYS
54	y	245	PRO
38	i	93	VAL
53	x	299	ASP
53	x	21	THR
53	x	239	LYS
47	r	21	ASN
15	L	64	VAL
53	x	87	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	
5	A	187/188 (100%)	179 (96%)	8 (4%)	29	64
6	B	336/348 (97%)	328 (98%)	8 (2%)	49	77
7	C	302/337 (90%)	298 (99%)	4 (1%)	69	87
8	D	247/250 (99%)	239 (97%)	8 (3%)	39	71
9	E	208/251 (83%)	201 (97%)	7 (3%)	37	70
10	F	194/195 (100%)	190 (98%)	4 (2%)	53	79

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
11	G	206/273 (76%)	200 (97%)	6 (3%)	42	74
12	H	169/171 (99%)	163 (96%)	6 (4%)	35	69
13	I	174/181 (96%)	169 (97%)	5 (3%)	42	74
14	J	142/149 (95%)	139 (98%)	3 (2%)	53	79
15	L	176/176 (100%)	168 (96%)	8 (4%)	27	63
16	M	117/160 (73%)	112 (96%)	5 (4%)	29	64
17	N	171/172 (99%)	162 (95%)	9 (5%)	22	58
18	O	171/171 (100%)	167 (98%)	4 (2%)	50	78
19	P	134/134 (100%)	133 (99%)	1 (1%)	84	94
20	Q	163/163 (100%)	157 (96%)	6 (4%)	34	68
21	R	159/159 (100%)	156 (98%)	3 (2%)	57	81
22	S	156/156 (100%)	152 (97%)	4 (3%)	46	76
23	T	139/140 (99%)	133 (96%)	6 (4%)	29	64
24	U	89/89 (100%)	87 (98%)	2 (2%)	52	79
25	V	101/107 (94%)	96 (95%)	5 (5%)	24	60
26	W	55/55 (100%)	53 (96%)	2 (4%)	35	69
27	X	107/134 (80%)	104 (97%)	3 (3%)	43	74
28	Y	124/135 (92%)	117 (94%)	7 (6%)	21	57
29	Z	117/118 (99%)	112 (96%)	5 (4%)	29	64
30	a	119/120 (99%)	118 (99%)	1 (1%)	81	93
31	b	62/170 (36%)	59 (95%)	3 (5%)	25	61
32	c	79/79 (100%)	78 (99%)	1 (1%)	69	87
33	d	98/110 (89%)	94 (96%)	4 (4%)	30	66
34	e	114/114 (100%)	113 (99%)	1 (1%)	78	91
35	f	88/89 (99%)	85 (97%)	3 (3%)	37	70
36	g	98/109 (90%)	93 (95%)	5 (5%)	24	60
37	h	109/110 (99%)	102 (94%)	7 (6%)	17	52
38	i	86/88 (98%)	85 (99%)	1 (1%)	71	88
39	j	73/80 (91%)	70 (96%)	3 (4%)	30	66
40	k	64/64 (100%)	60 (94%)	4 (6%)	18	52
41	l	47/48 (98%)	45 (96%)	2 (4%)	29	64

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
42	m	48/48 (100%)	45 (94%)	3 (6%)	18	52
43	n	22/24 (92%)	22 (100%)	0	100	100
44	o	92/93 (99%)	88 (96%)	4 (4%)	29	64
45	p	74/75 (99%)	71 (96%)	3 (4%)	30	66
46	q	93/121 (77%)	92 (99%)	1 (1%)	73	88
47	r	109/121 (90%)	103 (94%)	6 (6%)	21	57
49	t	78/106 (74%)	78 (100%)	0	100	100
50	u	172/529 (32%)	168 (98%)	4 (2%)	50	78
51	v	160/229 (70%)	156 (98%)	4 (2%)	47	77
52	w	69/78 (88%)	69 (100%)	0	100	100
53	x	352/421 (84%)	276 (78%)	76 (22%)	1	5
54	y	116/533 (22%)	115 (99%)	1 (1%)	78	91
55	z	19/572 (3%)	19 (100%)	0	100	100
All	All	6585/8543 (77%)	6319 (96%)	266 (4%)	35	66

All (266) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
5	A	96	LEU
5	A	101	VAL
5	A	102	LEU
5	A	142	GLU
5	A	162	ASN
5	A	207	VAL
5	A	218	HIS
5	A	235	VAL
6	B	17	LEU
6	B	62	ARG
6	B	97	ARG
6	B	99	LEU
6	B	101	THR
6	B	228	TYR
6	B	309	LEU
6	B	370	THR
7	C	20	LYS
7	C	95	MET
7	C	122	TYR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
7	C	232	VAL
8	D	4	VAL
8	D	33	ARG
8	D	55	VAL
8	D	104	LEU
8	D	189	GLU
8	D	206	ASP
8	D	268	ARG
8	D	293	ARG
9	E	84	VAL
9	E	126	ARG
9	E	136	LEU
9	E	148	ILE
9	E	171	VAL
9	E	236	TYR
9	E	282	LEU
10	F	44	LEU
10	F	49	ARG
10	F	91	LEU
10	F	190	GLU
11	G	101	LYS
11	G	130	THR
11	G	201	THR
11	G	202	VAL
11	G	220	GLU
11	G	228	ASP
12	H	1	MET
12	H	20	LEU
12	H	56	ARG
12	H	72	THR
12	H	111	LEU
12	H	145	VAL
13	I	35	ASP
13	I	36	LEU
13	I	88	ARG
13	I	163	GLN
13	I	183	ASP
14	J	47	THR
14	J	55	TYR
14	J	80	GLU
15	L	49	ARG
15	L	65	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
15	L	71	ARG
15	L	74	ARG
15	L	169	ILE
15	L	172	GLU
15	L	198	ARG
15	L	204	GLU
16	M	8	GLU
16	M	38	VAL
16	M	56	GLN
16	M	62	LEU
16	M	66	HIS
17	N	32	GLN
17	N	54	LYS
17	N	61	ILE
17	N	77	LYS
17	N	89	VAL
17	N	162	ARG
17	N	165	THR
17	N	174	LEU
17	N	197	THR
18	O	18	ARG
18	O	42	ASN
18	O	145	VAL
18	O	186	GLU
19	P	69	ARG
20	Q	10	ASP
20	Q	75	ARG
20	Q	79	THR
20	Q	91	ARG
20	Q	138	LEU
20	Q	168	ARG
21	R	39	GLN
21	R	50	ILE
21	R	74	ARG
22	S	6	THR
22	S	21	LYS
22	S	24	THR
22	S	95	ARG
23	T	9	ARG
23	T	96	ILE
23	T	117	LYS
23	T	118	GLU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
23	T	139	HIS
23	T	158	PHE
24	U	83	LEU
24	U	99	TRP
25	V	18	LEU
25	V	30	ASP
25	V	48	ARG
25	V	51	ARG
25	V	127	ASP
26	W	1	MET
26	W	57	ARG
27	X	41	ARG
27	X	71	LEU
27	X	120	ASP
28	Y	2	LYS
28	Y	50	ARG
28	Y	55	VAL
28	Y	59	ARG
28	Y	74	TYR
28	Y	79	VAL
28	Y	104	VAL
29	Z	33	THR
29	Z	57	MET
29	Z	67	LYS
29	Z	96	VAL
29	Z	112	ARG
30	a	76	ASP
31	b	39	PHE
31	b	51	LYS
31	b	60	ASN
32	c	93	THR
33	d	26	THR
33	d	44	ARG
33	d	46	LEU
33	d	122	VAL
34	e	48	ARG
35	f	16	ARG
35	f	37	ASP
35	f	101	ILE
36	g	5	LEU
36	g	11	LEU
36	g	32	TYR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
36	g	53	LEU
36	g	73	HIS
37	h	22	ASP
37	h	23	ASP
37	h	32	ARG
37	h	88	THR
37	h	89	ARG
37	h	97	LYS
37	h	116	LEU
38	i	45	ARG
39	j	58	THR
39	j	76	HIS
39	j	78	PHE
40	k	6	GLU
40	k	30	ASP
40	k	35	LYS
40	k	70	LYS
41	l	46	ARG
41	l	51	LEU
42	m	97	ARG
42	m	111	ARG
42	m	119	ASN
44	o	42	ASP
44	o	69	ARG
44	o	90	HIS
44	o	99	ARG
45	p	8	VAL
45	p	49	ARG
45	p	54	ILE
46	q	107	TYR
47	r	28	GLU
47	r	67	ARG
47	r	80	THR
47	r	103	HIS
47	r	105	ASP
47	r	124	VAL
50	u	82	ARG
50	u	93	ARG
50	u	226	THR
50	u	228	GLU
51	v	67	VAL
51	v	114	THR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
51	v	121	HIS
51	v	158	PHE
53	x	6	LEU
53	x	12	SER
53	x	18	SER
53	x	19	ASN
53	x	21	THR
53	x	25	GLU
53	x	31	MET
53	x	33	LYS
53	x	36	CYS
53	x	43	ASP
53	x	46	ILE
53	x	47	LYS
53	x	53	ARG
53	x	55	ASN
53	x	56	VAL
53	x	57	LYS
53	x	60	ILE
53	x	63	GLU
53	x	65	MET
53	x	69	LEU
53	x	71	LYS
53	x	72	ARG
53	x	73	LYS
53	x	76	GLN
53	x	82	GLU
53	x	86	LEU
53	x	91	VAL
53	x	97	THR
53	x	105	MET
53	x	112	SER
53	x	117	THR
53	x	119	SER
53	x	120	LYS
53	x	121	LEU
53	x	127	ARG
53	x	131	LYS
53	x	132	THR
53	x	134	LEU
53	x	146	ASP
53	x	148	LEU

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Mol	Chain	Res	Type
53	x	149	LYS
53	x	154	LYS
53	x	156	ARG
53	x	164	THR
53	x	166	MET
53	x	169	VAL
53	x	180	LYS
53	x	185	GLU
53	x	187	ILE
53	x	188	ILE
53	x	196	LYS
53	x	202	PHE
53	x	207	GLN
53	x	221	MET
53	x	224	SER
53	x	230	GLU
53	x	240	VAL
53	x	244	SER
53	x	245	VAL
53	x	248	THR
53	x	250	LEU
53	x	251	ASP
53	x	260	LEU
53	x	261	SER
53	x	267	LYS
53	x	268	SER
53	x	279	ILE
53	x	286	LYS
53	x	287	THR
53	x	291	ILE
53	x	292	SER
53	x	293	LYS
53	x	297	MET
53	x	299	ASP
53	x	300	ILE
53	x	316	GLU
54	y	55	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
5	A	38	HIS

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Mol	Chain	Res	Type
7	C	85	HIS
8	D	39	GLN
8	D	111	ASN
9	E	163	GLN
9	E	275	ASN
9	E	280	HIS
10	F	241	GLN
11	G	195	HIS
12	H	39	ASN
17	N	201	HIS
19	P	80	GLN
23	T	3	ASN
28	Y	14	ASN
33	d	100	ASN
46	q	24	ASN
47	r	6	GLN
53	x	45	ASN
53	x	102	ASN
53	x	338	ASN
53	x	383	ASN
54	y	87	HIS

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	1	245/299 (81%)	50 (20%)	6 (2%)
2	5	3478/3493 (99%)	738 (21%)	87 (2%)
3	7	119/120 (99%)	14 (11%)	0
4	8	155/156 (99%)	34 (21%)	1 (0%)
All	All	3997/4068 (98%)	836 (20%)	94 (2%)

All (836) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	1	4	G
1	1	17	C
1	1	29	C
1	1	32	A
1	1	33	G
1	1	36	A
1	1	38	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	1	39	C
1	1	40	G
1	1	54	G
1	1	60	U
1	1	63	C
1	1	64	U
1	1	99	C
1	1	100	C
1	1	101	G
1	1	102	A
1	1	105	G
1	1	108	U
1	1	109	G
1	1	111	C
1	1	113	G
1	1	114	C
1	1	119	A
1	1	120	G
1	1	144	C
1	1	151	C
1	1	174	G
1	1	175	G
1	1	177	G
1	1	184	A
1	1	187	G
1	1	191	C
1	1	212	C
1	1	215	A
1	1	227	G
1	1	231	A
1	1	232	G
1	1	233	U
1	1	234	A
1	1	235	G
1	1	236	U
1	1	237	G
1	1	245	G
1	1	246	C
1	1	247	C
1	1	249	G
1	1	251	G
1	1	252	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	1	254	U
2	5	2	G
2	5	8	U
2	5	12	A
2	5	13	U
2	5	21	G
2	5	25	A
2	5	30	C
2	5	39	A
2	5	42	A
2	5	48	G
2	5	49	U
2	5	59	A
2	5	64	A
2	5	65	A
2	5	66	A
2	5	73	A
2	5	76	A
2	5	91	G
2	5	104	G
2	5	108	A
2	5	109	G
2	5	110	C
2	5	116	G
2	5	117	C
2	5	118	C
2	5	119	G
2	5	126	C
2	5	134	G
2	5	135	G
2	5	136	C
2	5	143	C
2	5	144	G
2	5	157	U
2	5	159	C
2	5	165	A
2	5	170	C
2	5	171	U
2	5	172	C
2	5	173	C
2	5	179	G
2	5	183	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	184	U
2	5	185	C
2	5	186	G
2	5	187	U
2	5	188	G
2	5	189	G
2	5	197	A
2	5	200	U
2	5	201	C
2	5	202	C
2	5	205	C
2	5	210	C
2	5	216	C
2	5	217	C
2	5	218	A
2	5	219	G
2	5	221	C
2	5	224	U
2	5	226	G
2	5	227	A
2	5	233	U
2	5	246	G
2	5	257	C
2	5	265	C
2	5	266	C
2	5	267	G
2	5	276	C
2	5	277	G
2	5	278	G
2	5	280	G
2	5	297	U
2	5	306	A
2	5	309	C
2	5	310	G
2	5	315	G
2	5	316	U
2	5	322	C
2	5	334	A
2	5	340	C
2	5	363	A
2	5	386	A
2	5	387	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	407	A
2	5	409	G
2	5	410	A
2	5	412	G
2	5	413	G
2	5	431	G
2	5	432	U
2	5	446	C
2	5	450	G
2	5	451	C
2	5	452	A
2	5	453	G
2	5	454	U
2	5	455	C
2	5	468	U
2	5	470	A
2	5	485	C
2	5	486	C
2	5	487	G
2	5	500	G
2	5	654	C
2	5	656	C
2	5	664	G
2	5	665	C
2	5	666	G
2	5	667	A
2	5	668	C
2	5	682	G
2	5	683	C
2	5	684	G
2	5	685	C
2	5	686	A
2	5	690	C
2	5	694	C
2	5	696	C
2	5	697	G
2	5	703	G
2	5	707	C
2	5	718	C
2	5	730	G
2	5	732	A
2	5	737	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	746	A
2	5	747	A
2	5	748	G
2	5	749	G
2	5	918	G
2	5	920	C
2	5	925	C
2	5	927	G
2	5	928	C
2	5	929	A
2	5	930	G
2	5	931	C
2	5	932	A
2	5	933	G
2	5	934	C
2	5	936	C
2	5	937	U
2	5	938	C
2	5	939	G
2	5	942	G
2	5	944	A
2	5	945	U
2	5	946	C
2	5	957	G
2	5	958	G
2	5	960	A
2	5	961	G
2	5	962	C
2	5	963	G
2	5	964	A
2	5	965	G
2	5	966	A
2	5	967	C
2	5	969	C
2	5	971	U
2	5	973	G
2	5	976	G
2	5	978	G
2	5	982	U
2	5	984	C
2	5	989	U
2	5	990	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	1072	C
2	5	1076	C
2	5	1083	U
2	5	1183	C
2	5	1210	C
2	5	1211	G
2	5	1212	G
2	5	1215	C
2	5	1219	G
2	5	1222	A
2	5	1233	G
2	5	1236	C
2	5	1237	C
2	5	1238	A
2	5	1239	C
2	5	1242	G
2	5	1272	C
2	5	1273	G
2	5	1274	A
2	5	1275	G
2	5	1279	A
2	5	1280	C
2	5	1281	G
2	5	1285	U
2	5	1286	C
2	5	1288	G
2	5	1293	G
2	5	1295	C
2	5	1296	G
2	5	1297	U
2	5	1301	C
2	5	1303	A
2	5	1304	C
2	5	1326	A
2	5	1330	A
2	5	1344	C
2	5	1354	A
2	5	1358	G
2	5	1366	G
2	5	1367	C
2	5	1369	C
2	5	1370	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	1371	A
2	5	1377	G
2	5	1378	C
2	5	1379	C
2	5	1380	G
2	5	1381	U
2	5	1387	A
2	5	1394	G
2	5	1397	A
2	5	1399	G
2	5	1407	C
2	5	1408	G
2	5	1409	C
2	5	1410	U
2	5	1411	C
2	5	1420	A
2	5	1429	C
2	5	1437	C
2	5	1440	U
2	5	1441	C
2	5	1445	U
2	5	1446	C
2	5	1448	G
2	5	1456	C
2	5	1457	G
2	5	1465	G
2	5	1475	G
2	5	1477	C
2	5	1478	C
2	5	1482	G
2	5	1483	C
2	5	1497	A
2	5	1498	G
2	5	1504	G
2	5	1514	U
2	5	1516	G
2	5	1523	A
2	5	1534	A
2	5	1547	A
2	5	1563	A
2	5	1564	A
2	5	1566	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	1568	C
2	5	1574	G
2	5	1578	U
2	5	1591	U
2	5	1596	U
2	5	1602	U
2	5	1612	G
2	5	1613	A
2	5	1624	G
2	5	1625	G
2	5	1631	A
2	5	1633	G
2	5	1634	A
2	5	1638	A
2	5	1654	G
2	5	1656	U
2	5	1661	C
2	5	1676	C
2	5	1677	U
2	5	1694	C
2	5	1697	G
2	5	1698	C
2	5	1720	C
2	5	1721	G
2	5	1724	G
2	5	1729	A
2	5	1731	C
2	5	1741	G
2	5	1742	A
2	5	1750	G
2	5	1753	G
2	5	1754	U
2	5	1755	C
2	5	1756	U
2	5	1757	U
2	5	1760	G
2	5	1761	G
2	5	1764	G
2	5	1768	C
2	5	1772	C
2	5	1776	A
2	5	1781	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	1787	A
2	5	1800	U
2	5	1804	A
2	5	1805	A
2	5	1815	G
2	5	1819	G
2	5	1820	C
2	5	1822	U
2	5	1828	C
2	5	1833	G
2	5	1834	U
2	5	1835	G
2	5	1836	G
2	5	1840	G
2	5	1848	C
2	5	1855	G
2	5	1869	G
2	5	1897	A
2	5	1898	C
2	5	1910	G
2	5	1918	U
2	5	1920	C
2	5	1921	C
2	5	1922	G
2	5	1923	A
2	5	1931	C
2	5	1945	G
2	5	1956	A
2	5	1957	U
2	5	1958	A
2	5	1961	G
2	5	1962	A
2	5	2025	A
2	5	2026	A
2	5	2047	A
2	5	2048	U
2	5	2055	G
2	5	2056	G
2	5	2062	C
2	5	2064	G
2	5	2069	A
2	5	2070	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	2084	C
2	5	2088	A
2	5	2089	G
2	5	2090	U
2	5	2092	G
2	5	2093	A
2	5	2094	G
2	5	2095	A
2	5	2097	U
2	5	2105	A
2	5	2107	C
2	5	2246	C
2	5	2247	C
2	5	2250	C
2	5	2251	G
2	5	2252	G
2	5	2253	A
2	5	2255	C
2	5	2257	C
2	5	2258	C
2	5	2259	G
2	5	2260	C
2	5	2261	G
2	5	2263	A
2	5	2264	C
2	5	2265	G
2	5	2266	C
2	5	2267	U
2	5	2268	A
2	5	2269	C
2	5	2270	G
2	5	2275	G
2	5	2279	A
2	5	2289	C
2	5	2299	G
2	5	2300	A
2	5	2301	G
2	5	2306	G
2	5	2313	A
2	5	2314	G
2	5	2316	G
2	5	2331	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	2333	G
2	5	2348	G
2	5	2351	C
2	5	2360	A
2	5	2395	A
2	5	2396	A
2	5	2402	G
2	5	2417	A
2	5	2422	C
2	5	2425	U
2	5	2433	G
2	5	2441	C
2	5	2471	G
2	5	2475	G
2	5	2488	C
2	5	2489	C
2	5	2490	U
2	5	2491	C
2	5	2503	G
2	5	2504	C
2	5	2505	C
2	5	2506	G
2	5	2507	A
2	5	2512	A
2	5	2513	A
2	5	2530	U
2	5	2537	A
2	5	2544	G
2	5	2546	G
2	5	2547	G
2	5	2552	G
2	5	2554	U
2	5	2555	G
2	5	2571	C
2	5	2572	C
2	5	2575	U
2	5	2583	C
2	5	2586	G
2	5	2587	A
2	5	2589	C
2	5	2618	G
2	5	2620	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	2627	C
2	5	2638	G
2	5	2640	G
2	5	2658	G
2	5	2661	U
2	5	2662	G
2	5	2673	G
2	5	2686	G
2	5	2687	U
2	5	2689	C
2	5	2695	A
2	5	2696	A
2	5	2710	C
2	5	2711	G
2	5	2712	G
2	5	2714	G
2	5	2715	G
2	5	2716	C
2	5	2724	G
2	5	2725	A
2	5	2726	G
2	5	2735	G
2	5	2740	U
2	5	2743	A
2	5	2744	A
2	5	2753	G
2	5	2754	G
2	5	2759	G
2	5	2762	G
2	5	2767	U
2	5	2768	C
2	5	2769	U
2	5	2770	C
2	5	2772	C
2	5	2787	A
2	5	2788	U
2	5	2790	U
2	5	2798	A
2	5	2814	C
2	5	2826	U
2	5	2828	U
2	5	2838	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	2842	G
2	5	2855	G
2	5	2898	G
2	5	2904	U
2	5	2905	C
2	5	3591	C
2	5	3593	C
2	5	3594	C
2	5	3596	A
2	5	3597	G
2	5	3605	C
2	5	3606	U
2	5	3615	G
2	5	3625	G
2	5	3626	G
2	5	3635	A
2	5	3662	A
2	5	3672	G
2	5	3673	C
2	5	3692	A
2	5	3696	C
2	5	3698	G
2	5	3710	G
2	5	3711	A
2	5	3714	G
2	5	3729	U
2	5	3739	C
2	5	3748	A
2	5	3753	G
2	5	3756	A
2	5	3759	A
2	5	3760	A
2	5	3772	U
2	5	3773	U
2	5	3774	A
2	5	3776	G
2	5	3777	G
2	5	3784	A
2	5	3786	U
2	5	3798	U
2	5	3799	A
2	5	3810	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	3811	G
2	5	3812	C
2	5	3814	U
2	5	3817	A
2	5	3819	G
2	5	3838	U
2	5	3839	G
2	5	3840	U
2	5	3876	A
2	5	3877	A
2	5	3878	C
2	5	3879	G
2	5	3889	G
2	5	3897	G
2	5	3901	A
2	5	3905	A
2	5	3906	A
2	5	3907	G
2	5	3908	A
2	5	3915	U
2	5	3916	G
2	5	3917	A
2	5	3926	C
2	5	3927	U
2	5	3938	G
2	5	3939	G
2	5	3943	A
2	5	4069	U
2	5	4070	U
2	5	4073	A
2	5	4076	G
2	5	4077	A
2	5	4085	A
2	5	4086	G
2	5	4088	C
2	5	4090	G
2	5	4094	G
2	5	4097	G
2	5	4114	C
2	5	4115	G
2	5	4116	C
2	5	4117	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	4119	C
2	5	4120	U
2	5	4122	G
2	5	4125	C
2	5	4127	A
2	5	4142	C
2	5	4143	G
2	5	4144	C
2	5	4145	C
2	5	4158	C
2	5	4162	C
2	5	4163	U
2	5	4165	C
2	5	4166	G
2	5	4170	A
2	5	4171	C
2	5	4183	G
2	5	4184	G
2	5	4191	G
2	5	4203	A
2	5	4212	A
2	5	4217	G
2	5	4218	U
2	5	4225	G
2	5	4229	U
2	5	4232	U
2	5	4233	A
2	5	4234	A
2	5	4241	C
2	5	4249	G
2	5	4251	A
2	5	4254	G
2	5	4255	A
2	5	4267	G
2	5	4268	A
2	5	4271	A
2	5	4273	A
2	5	4280	A
2	5	4290	U
2	5	4291	G
2	5	4297	G
2	5	4302	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	4303	C
2	5	4304	A
2	5	4305	G
2	5	4306	U
2	5	4314	C
2	5	4318	C
2	5	4319	C
2	5	4329	G
2	5	4330	G
2	5	4332	C
2	5	4336	A
2	5	4349	C
2	5	4350	C
2	5	4354	U
2	5	4355	G
2	5	4377	G
2	5	4378	A
2	5	4387	C
2	5	4393	G
2	5	4394	A
2	5	4395	U
2	5	4398	C
2	5	4419	U
2	5	4421	C
2	5	4422	A
2	5	4437	U
2	5	4440	G
2	5	4444	C
2	5	4448	G
2	5	4449	A
2	5	4464	A
2	5	4471	U
2	5	4473	A
2	5	4475	G
2	5	4476	C
2	5	4482	U
2	5	4488	A
2	5	4500	U
2	5	4512	U
2	5	4513	A
2	5	4518	A
2	5	4524	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	4528	G
2	5	4529	G
2	5	4531	U
2	5	4548	A
2	5	4549	G
2	5	4560	C
2	5	4567	G
2	5	4570	G
2	5	4575	G
2	5	4577	U
2	5	4586	G
2	5	4590	A
2	5	4617	G
2	5	4627	U
2	5	4636	U
2	5	4637	G
2	5	4639	G
2	5	4647	G
2	5	4652	G
2	5	4656	A
2	5	4657	U
2	5	4667	C
2	5	4670	C
2	5	4671	C
2	5	4672	A
2	5	4677	U
2	5	4678	G
2	5	4691	A
2	5	4695	C
2	5	4697	U
2	5	4700	A
2	5	4709	U
2	5	4720	C
2	5	4730	C
2	5	4731	G
2	5	4732	G
2	5	4737	G
2	5	4738	C
2	5	4743	G
2	5	4744	A
2	5	4745	G
2	5	4746	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	4750	G
2	5	4753	U
2	5	4756	C
2	5	4758	U
2	5	4764	A
2	5	4768	G
2	5	4770	U
2	5	4771	C
2	5	4869	U
2	5	4871	C
2	5	4873	G
2	5	4875	G
2	5	4876	U
2	5	4877	G
2	5	4883	C
2	5	4884	G
2	5	4886	C
2	5	4889	G
2	5	4890	G
2	5	4895	C
2	5	4896	G
2	5	4901	G
2	5	4902	C
2	5	4910	G
2	5	4911	A
2	5	4913	G
2	5	4919	G
2	5	4927	G
2	5	4931	G
2	5	4933	C
2	5	4936	G
2	5	4937	C
2	5	4939	C
2	5	4944	C
2	5	4945	G
2	5	4948	C
2	5	4949	G
2	5	4950	U
2	5	4951	G
2	5	4952	G
2	5	4959	U
2	5	4964	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	4965	U
2	5	4966	A
2	5	4976	U
2	5	4988	U
2	5	4989	U
2	5	4991	U
2	5	5006	U
2	5	5013	C
2	5	5017	G
2	5	5023	C
2	5	5024	C
2	5	5025	C
2	5	5026	U
2	5	5027	C
2	5	5028	G
2	5	5041	G
2	5	5047	C
2	5	5050	C
2	5	5052	C
2	5	5053	U
2	5	5054	C
2	5	5056	A
2	5	5060	A
2	5	5061	A
2	5	5062	G
3	7	7	G
3	7	22	A
3	7	33	U
3	7	40	U
3	7	49	A
3	7	51	G
3	7	53	U
3	7	54	A
3	7	63	C
3	7	64	G
3	7	100	A
3	7	110	G
3	7	111	C
3	7	120	U
4	8	2	G
4	8	16	G
4	8	34	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	8	35	C
4	8	39	G
4	8	51	U
4	8	59	A
4	8	62	A
4	8	63	U
4	8	75	G
4	8	77	A
4	8	79	G
4	8	80	A
4	8	81	C
4	8	82	A
4	8	83	C
4	8	84	A
4	8	85	U
4	8	86	U
4	8	87	G
4	8	90	C
4	8	94	G
4	8	103	A
4	8	105	C
4	8	110	U
4	8	111	U
4	8	113	C
4	8	114	G
4	8	123	U
4	8	125	C
4	8	126	C
4	8	127	U
4	8	128	C
4	8	153	C

All (94) RNA pucker outliers are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	1	37	C
1	1	38	U
1	1	39	C
1	1	118	A
1	1	234	A
1	1	236	U
2	5	1	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	47	A
2	5	48	G
2	5	125	C
2	5	134	G
2	5	170	C
2	5	187	U
2	5	216	C
2	5	218	A
2	5	226	G
2	5	245	C
2	5	265	C
2	5	275	C
2	5	385	A
2	5	406	C
2	5	451	C
2	5	486	C
2	5	664	G
2	5	684	G
2	5	693	C
2	5	917	A
2	5	930	G
2	5	932	A
2	5	943	A
2	5	957	G
2	5	965	G
2	5	1211	G
2	5	1232	G
2	5	1236	C
2	5	1238	A
2	5	1296	G
2	5	1329	G
2	5	1357	C
2	5	1365	C
2	5	1368	A
2	5	1380	G
2	5	1407	C
2	5	1419	G
2	5	1440	U
2	5	1455	G
2	5	1474	C
2	5	1633	G
2	5	1720	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
2	5	1804	A
2	5	1835	G
2	5	2046	G
2	5	2068	C
2	5	2083	C
2	5	2088	A
2	5	2089	G
2	5	2093	A
2	5	2256	C
2	5	2257	C
2	5	2260	C
2	5	2262	G
2	5	2502	G
2	5	2506	G
2	5	2546	G
2	5	2639	U
2	5	2661	U
2	5	2695	A
2	5	3625	G
2	5	3697	U
2	5	3876	A
2	5	3888	G
2	5	3904	G
2	5	4069	U
2	5	4119	C
2	5	4170	A
2	5	4232	U
2	5	4448	G
2	5	4528	G
2	5	4656	A
2	5	4699	U
2	5	4719	G
2	5	4885	U
2	5	4888	U
2	5	4889	G
2	5	4935	C
2	5	4942	C
2	5	4948	C
2	5	4965	U
2	5	5022	U
2	5	5027	C
2	5	5059	C

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Mol	Chain	Res	Type
2	5	5060	A
2	5	5061	A
4	8	124	U

## 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 9 ligands modelled in this entry, 7 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$
58	GTP	v	301	57	26,34,34	1.09	2 (7%)	32,54,54	1.75	7 (21%)
59	GNP	x	601	57	29,34,34	1.60	7 (24%)	33,54,54	2.11	6 (18%)

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
58	GTP	v	301	57	-	4/18/38/38	0/3/3/3
59	GNP	x	601	57	-	7/14/38/38	0/3/3/3

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
59	x	601	GNP	PB-O3A	4.14	1.64	1.59
58	v	301	GTP	C5-C6	-3.89	1.39	1.47
59	x	601	GNP	C6-N1	3.13	1.38	1.33
59	x	601	GNP	PG-N3B	3.08	1.71	1.63
59	x	601	GNP	PB-O1B	3.06	1.51	1.46
59	x	601	GNP	PG-O1G	2.80	1.50	1.46
58	v	301	GTP	C2-N3	2.22	1.38	1.33
59	x	601	GNP	PB-O2B	-2.19	1.50	1.56
59	x	601	GNP	C5-C6	2.12	1.45	1.41

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
59	x	601	GNP	C5-C6-N1	-8.45	111.87	123.43
59	x	601	GNP	C2-N1-C6	5.87	125.26	115.93
58	v	301	GTP	PB-O3B-PG	-4.81	116.32	132.83
58	v	301	GTP	PA-O3A-PB	-3.72	120.07	132.83
58	v	301	GTP	C5-C6-N1	3.25	119.69	113.95
58	v	301	GTP	C3'-C2'-C1'	3.10	105.64	100.98
58	v	301	GTP	C8-N7-C5	3.02	108.74	102.99
58	v	301	GTP	C2-N1-C6	-2.93	119.70	125.10
59	x	601	GNP	PB-O3A-PA	-2.93	122.31	132.62
59	x	601	GNP	N3-C2-N1	-2.74	123.57	127.22
59	x	601	GNP	C4-C5-C6	-2.55	118.37	120.80
59	x	601	GNP	C2-N3-C4	-2.17	112.88	115.36
58	v	301	GTP	O6-C6-C5	-2.11	120.25	124.37

There are no chirality outliers.

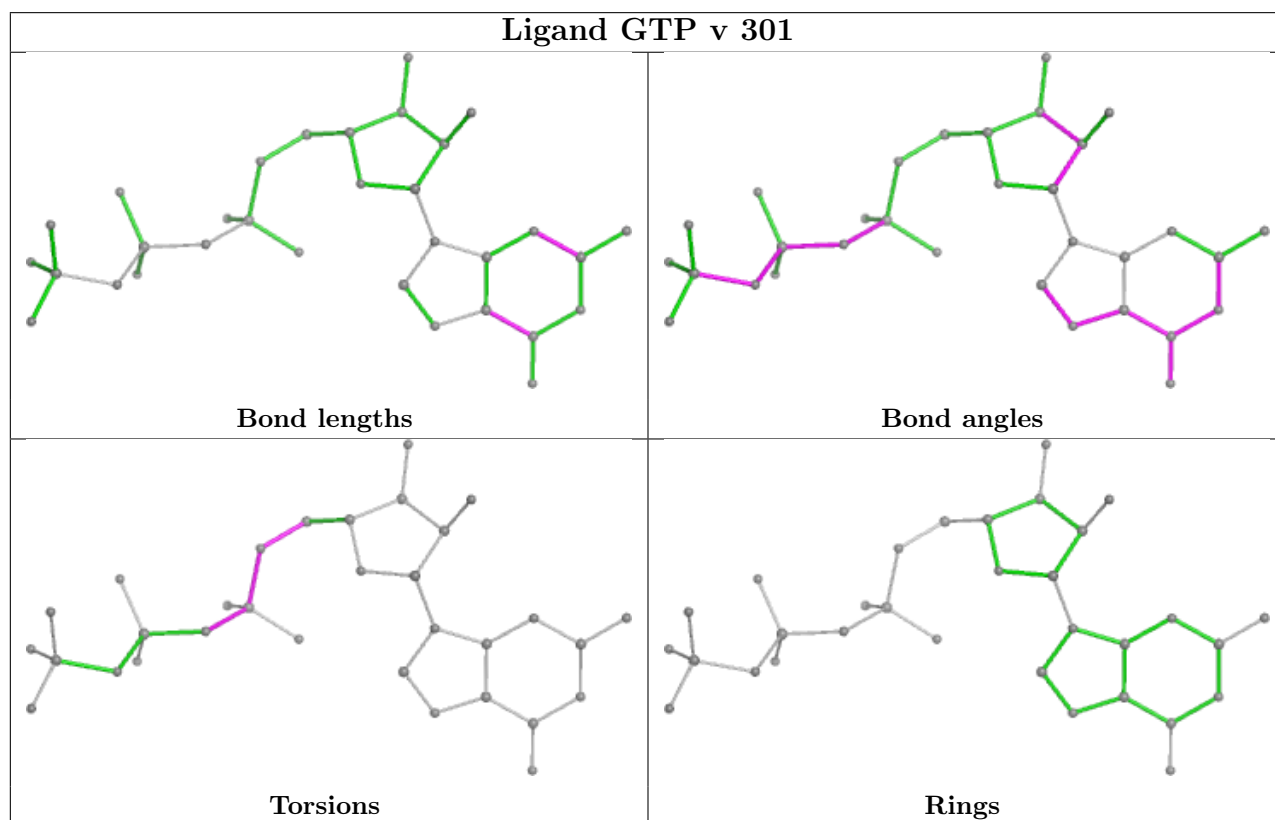
All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
59	x	601	GNP	PG-N3B-PB-O1B
59	x	601	GNP	PG-N3B-PB-O3A
59	x	601	GNP	C5'-O5'-PA-O1A
59	x	601	GNP	O4'-C4'-C5'-O5'
58	v	301	GTP	PB-O3A-PA-O1A
58	v	301	GTP	C4'-C5'-O5'-PA
59	x	601	GNP	C5'-O5'-PA-O3A
59	x	601	GNP	C3'-C4'-C5'-O5'
59	x	601	GNP	PB-O3A-PA-O1A
58	v	301	GTP	C5'-O5'-PA-O3A
58	v	301	GTP	PB-O3A-PA-O2A

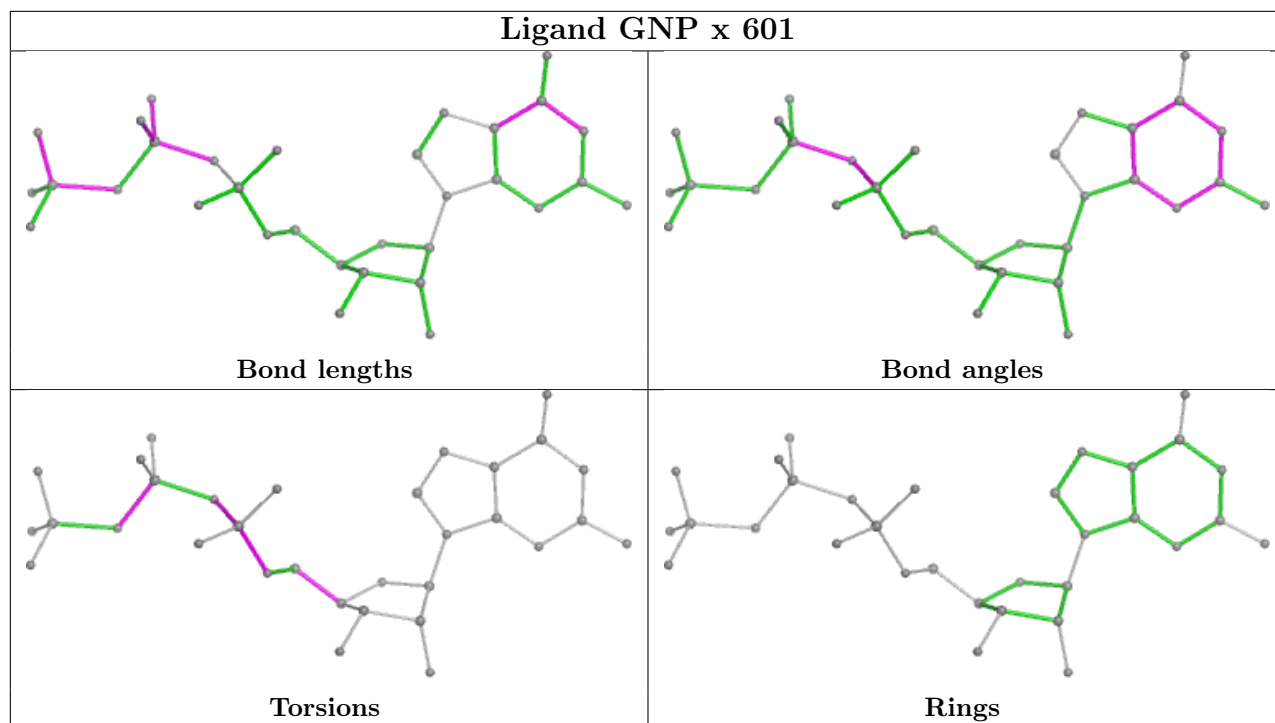
There are no ring outliers.

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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	5	15
1	1	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	5	462:G	O3'	467:U	P	20.97
1	5	4776:G	O3'	4859:C	P	17.65
1	5	4097:G	O3'	4112:C	P	17.38
1	5	2910:G	O3'	3583:U	P	17.30
1	5	757:G	O3'	906:C	P	17.29
1	5	500:G	O3'	652:G	P	16.28
1	5	990:C	O3'	1064:G	P	16.09
1	5	3950:U	O3'	4065:G	P	14.48
1	5	1962:A	O3'	2021:G	P	13.62

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	5	2107:C	O3'	2243:C	P	13.33
1	5	1242:G	O3'	1271:G	P	11.73
1	5	1840:G	O3'	1842:G	P	4.64
1	5	1699:A	O3'	1718:C	P	4.57
1	1	105:G	O3'	106:G	P	4.51
1	5	1222:A	O3'	1232:G	P	4.47
1	5	1100:U	O3'	1167:C	P	3.80

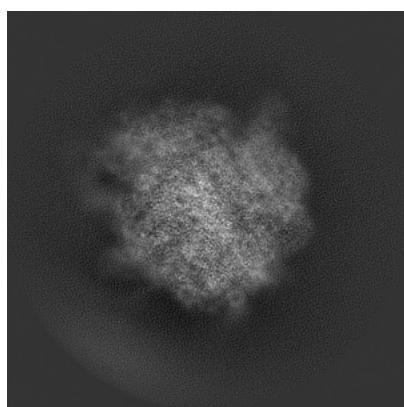
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-12303. These allow visual inspection of the internal detail of the map and identification of artifacts.

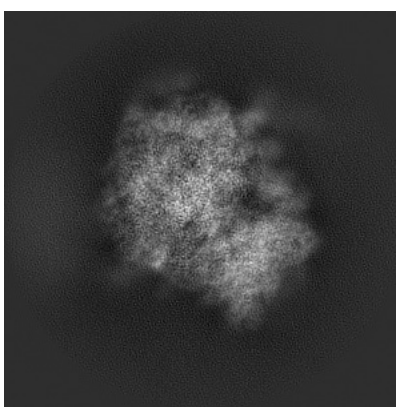
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

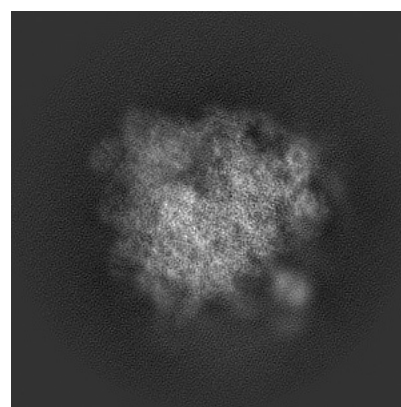
#### 6.1.1 Primary map



X



Y

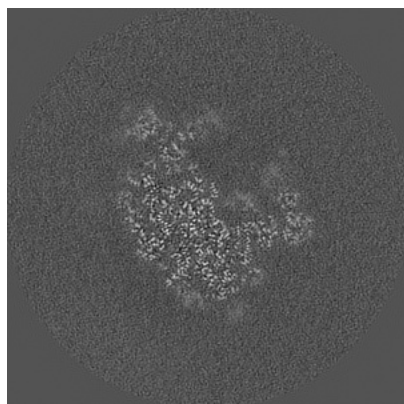


Z

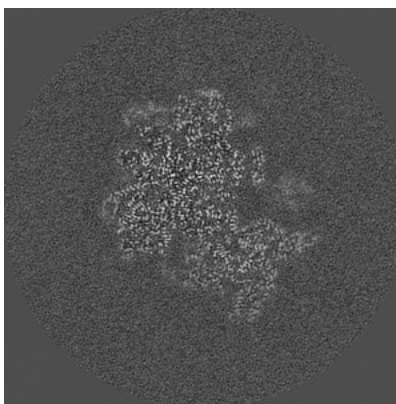
The images above show the map projected in three orthogonal directions.

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

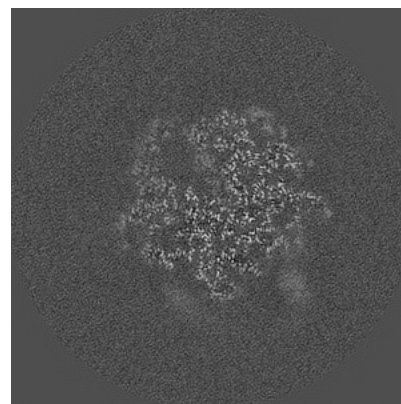
#### 6.2.1 Primary map



X Index: 224



Y Index: 224

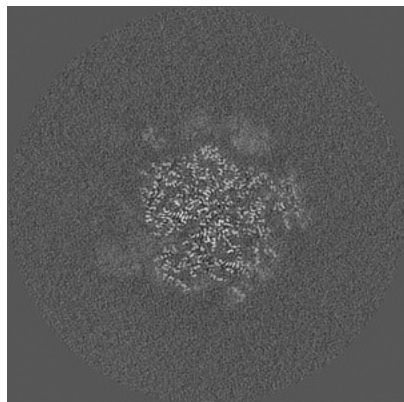


Z Index: 224

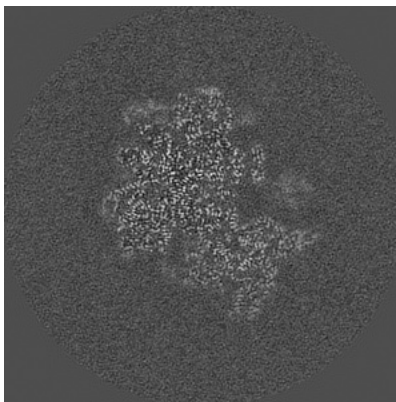
The images above show central slices of the map in three orthogonal directions.

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

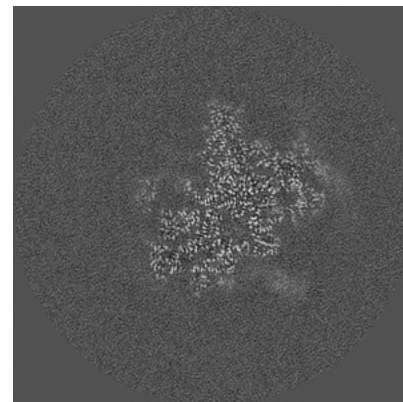
### 6.3.1 Primary map



X Index: 259



Y Index: 224

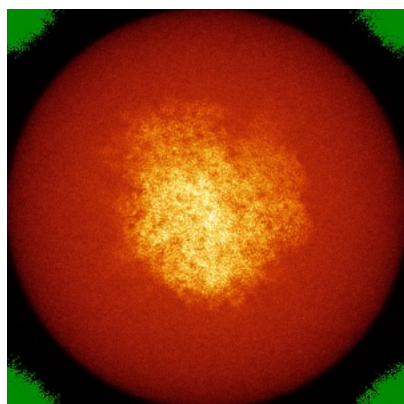


Z Index: 195

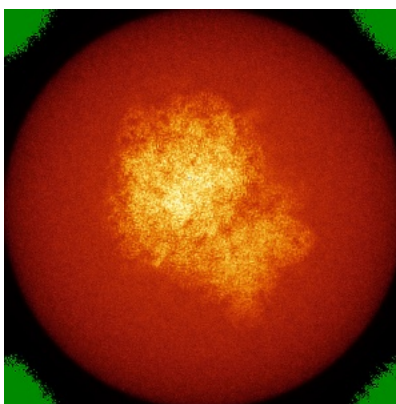
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

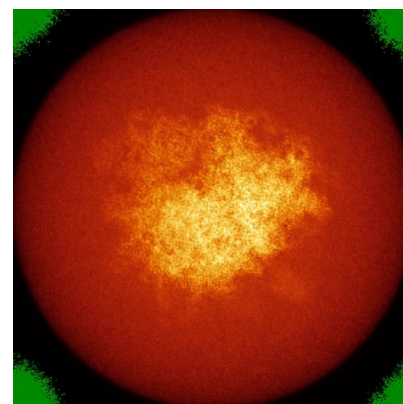
### 6.4.1 Primary map



X



Y

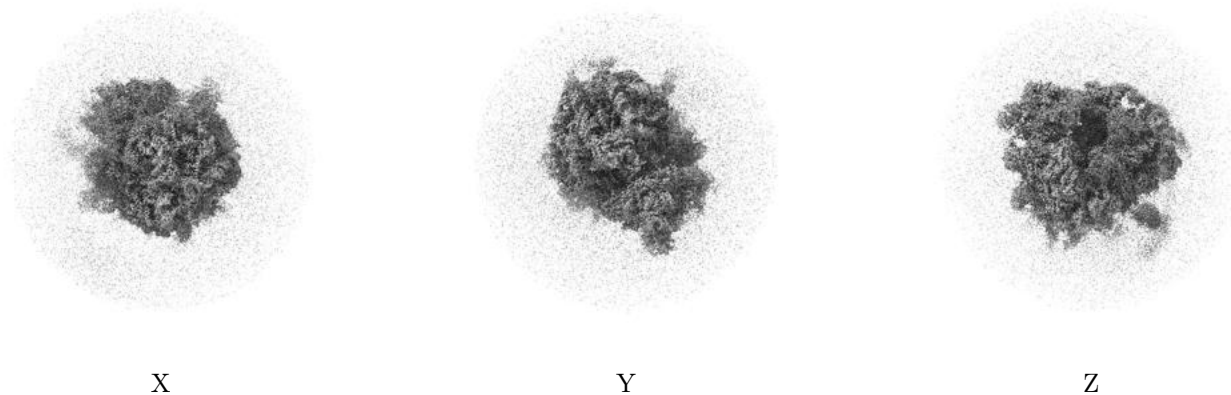


Z

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

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

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.018. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

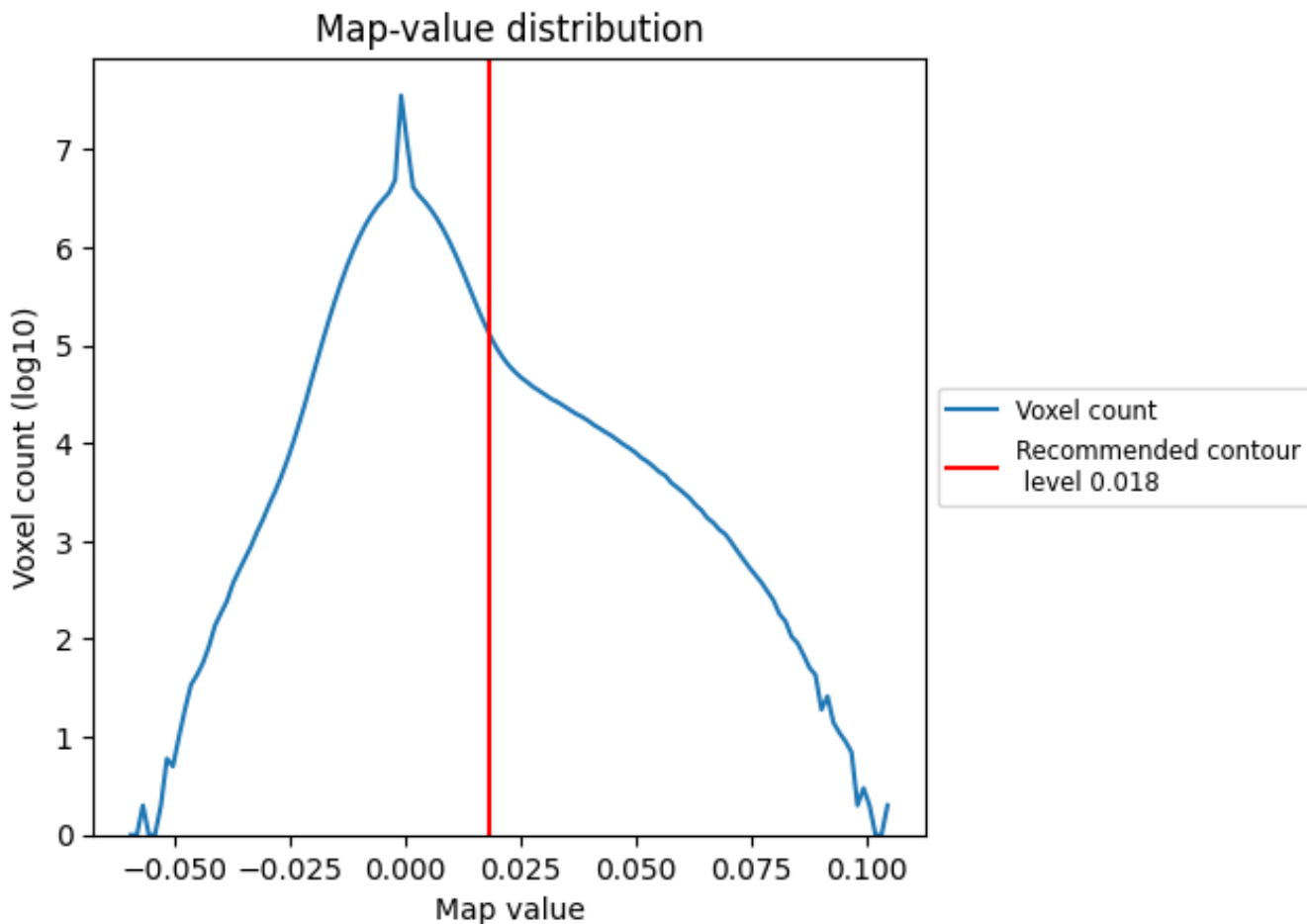
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

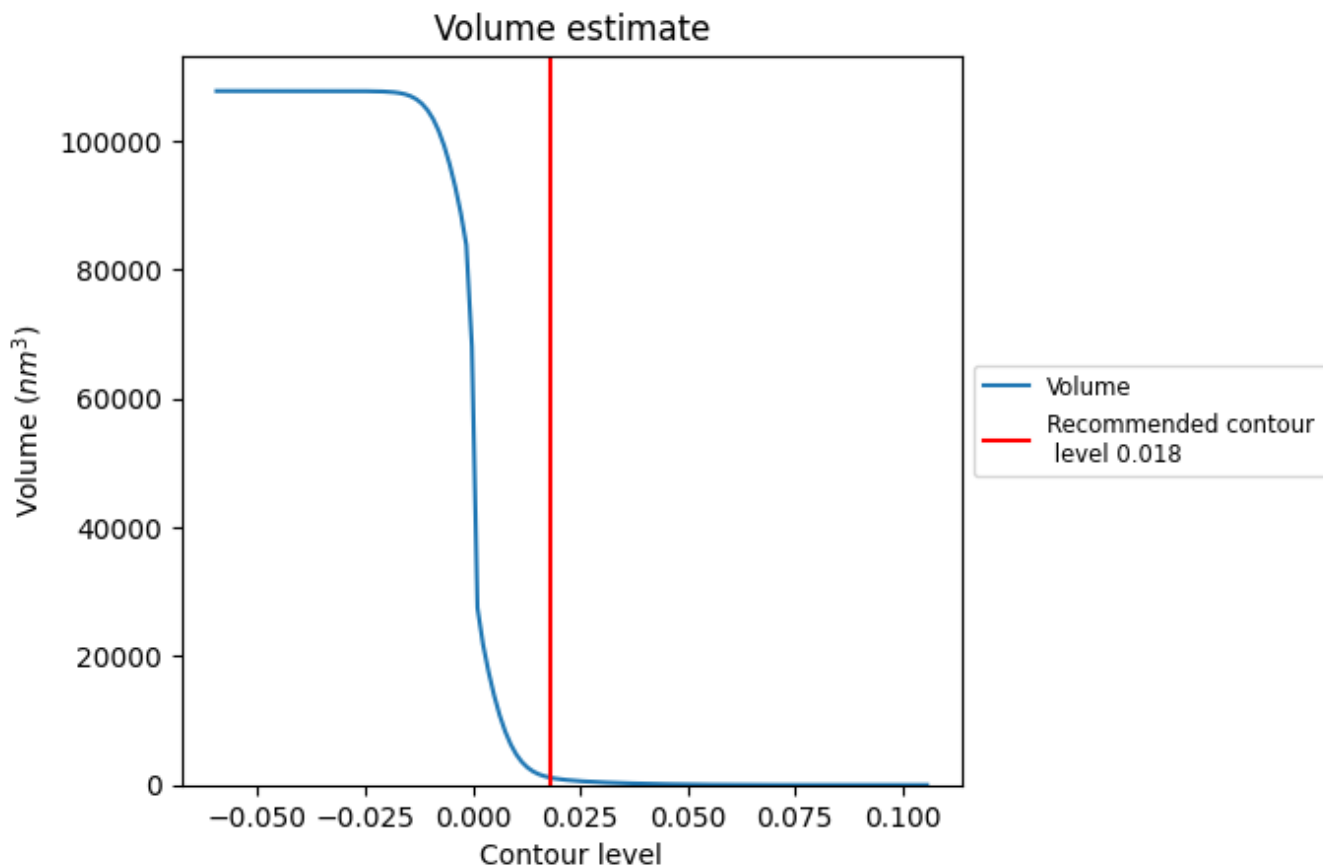
This section contains the results of statistical analysis of the map.

### 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.

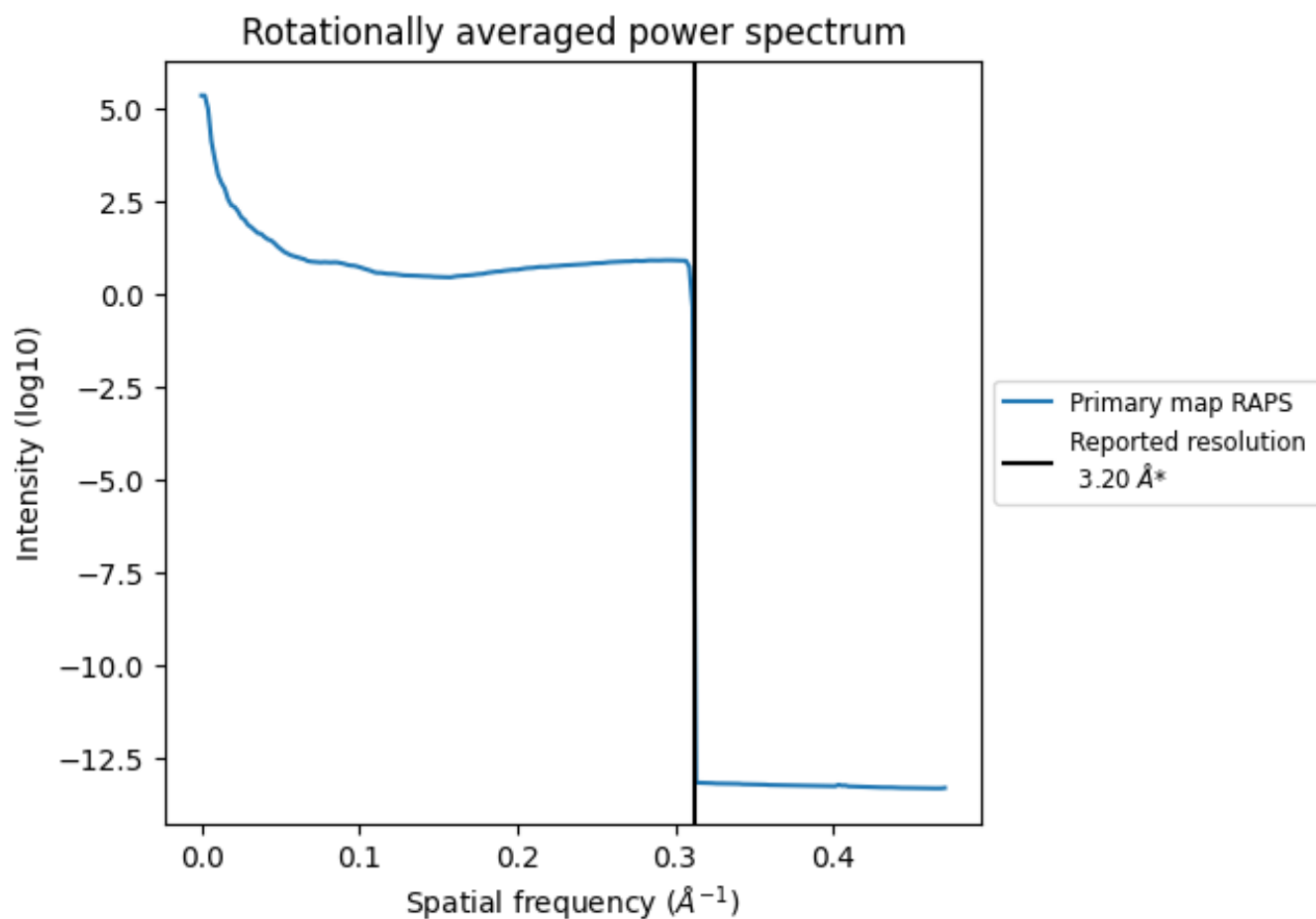
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1146  $\text{nm}^3$ ; this corresponds to an approximate mass of 1035 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  $0.312 \text{\AA}^{-1}$



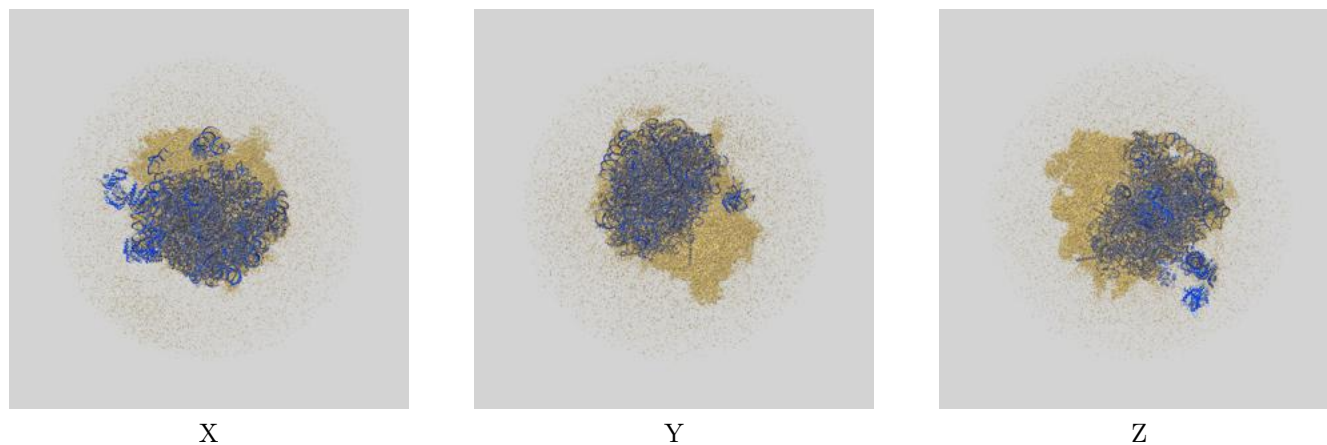
## 8 Fourier-Shell correlation

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

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

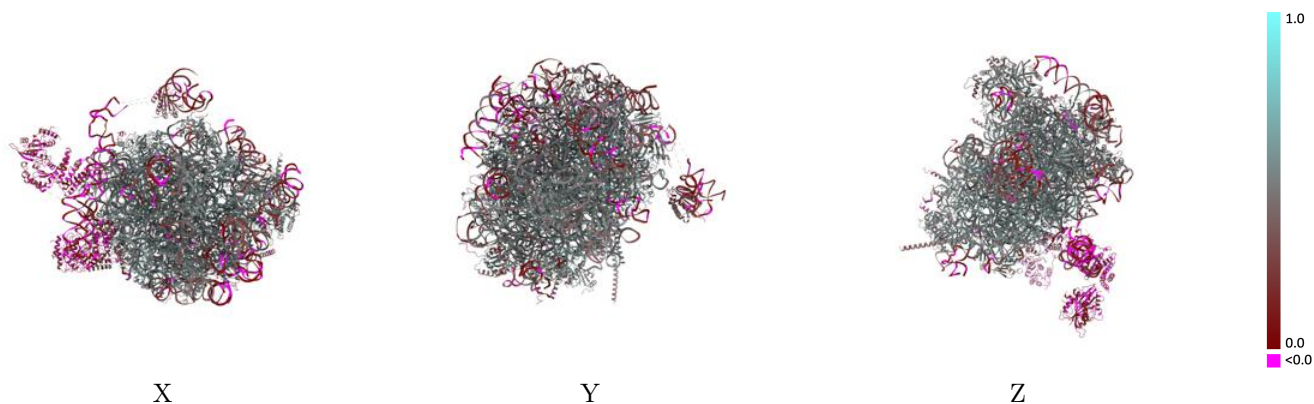
This section contains information regarding the fit between EMDB map EMD-12303 and PDB model 7NFX. Per-residue inclusion information can be found in section 3 on page 17.

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



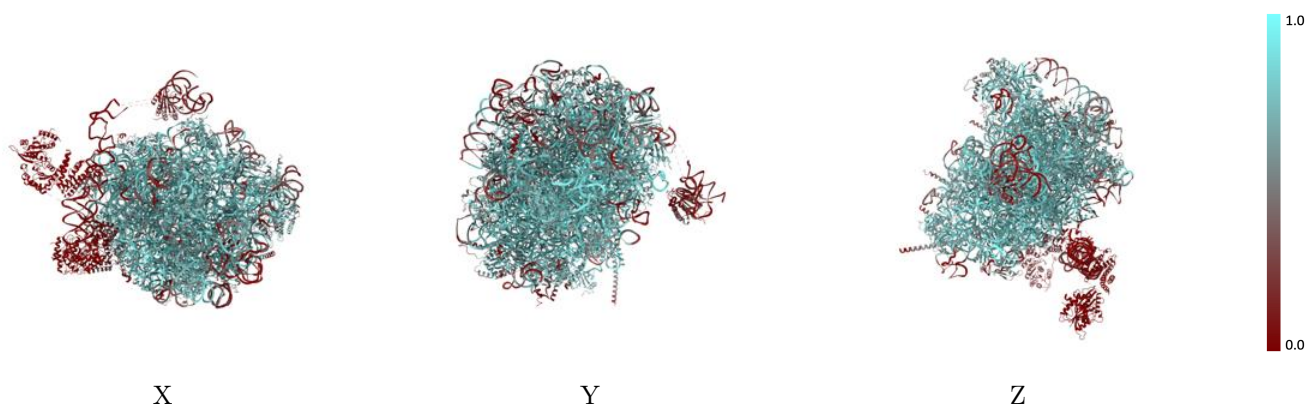
The images above show the 3D surface view of the map at the recommended contour level 0.018 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



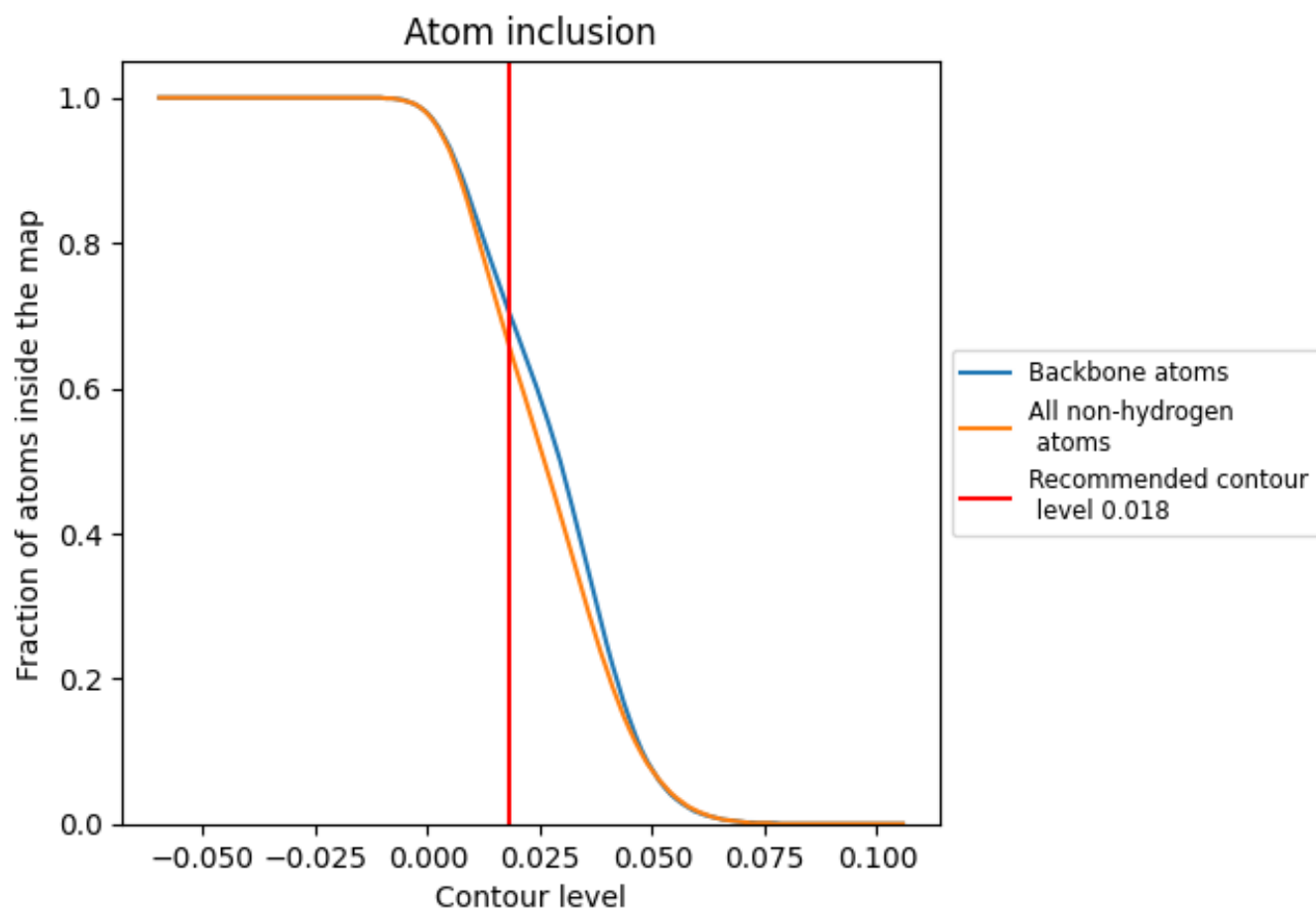
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.018).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 71% of all backbone atoms, 66% 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 (0.018) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6620	 0.4320
1	 0.0850	 0.0720
5	 0.7430	 0.4430
7	 0.8460	 0.4990
8	 0.7720	 0.4660
A	 0.7610	 0.5380
B	 0.7500	 0.5330
C	 0.7390	 0.5180
D	 0.6490	 0.4730
E	 0.6030	 0.4290
F	 0.7460	 0.5160
G	 0.5920	 0.4500
H	 0.6620	 0.4970
I	 0.7070	 0.4970
J	 0.5620	 0.4360
L	 0.6530	 0.4810
M	 0.7190	 0.5120
N	 0.7880	 0.5400
O	 0.7470	 0.5210
P	 0.7500	 0.5410
Q	 0.7630	 0.5250
R	 0.6810	 0.4920
S	 0.7440	 0.5180
T	 0.6830	 0.4940
U	 0.5580	 0.4470
V	 0.7340	 0.5280
W	 0.7150	 0.5250
X	 0.6920	 0.4980
Y	 0.7290	 0.5210
Z	 0.6990	 0.4930
a	 0.7710	 0.5330
b	 0.6040	 0.4410
c	 0.7060	 0.5000
d	 0.6870	 0.5070
e	 0.7760	 0.5450



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Chain	Atom inclusion	Q-score
f	 0.7740	 0.5370
g	 0.7170	 0.5110
h	 0.6810	 0.4990
i	 0.6340	 0.4600
j	 0.8010	 0.5320
k	 0.5910	 0.4400
l	 0.7350	 0.5220
m	 0.7120	 0.4930
n	 0.7070	 0.4920
o	 0.6750	 0.4910
p	 0.7160	 0.5190
q	 0.0280	 0.1090
r	 0.7260	 0.5140
s	 0.0290	 0.0640
t	 0.2060	 0.3110
u	 0.0310	 0.0940
v	 0.0030	 0.1180
w	 0.1740	 0.2720
x	 0.0670	 0.1390
y	 0.0100	 0.0960
z	 0.0130	 0.0740