



Full wwPDB EM Validation Report ⓘ

Oct 13, 2021 – 05:31 pm BST

PDB ID : 7OIC
EMDB ID : EMD-12925
Title : Cryo-EM structure of late human 39S mitoribosome assembly intermediates, state 4
Authors : Cheng, J.; Berninghausen, O.; Beckmann, R.
Deposited on : 2021-05-11
Resolution : 3.10 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

EMDB validation analysis : 0.0.0.dev97
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)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.23.2

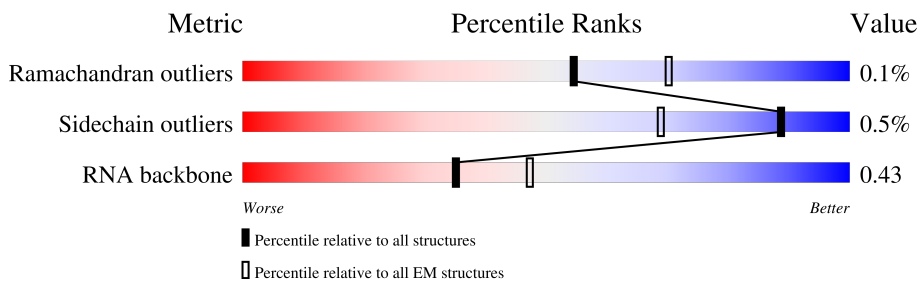
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.10 Å.

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



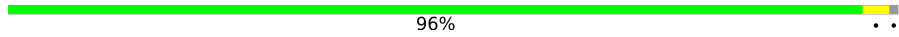

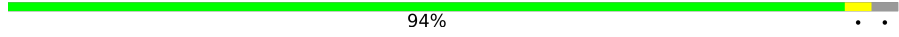




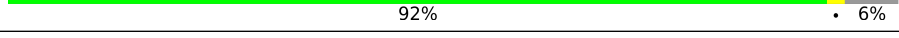
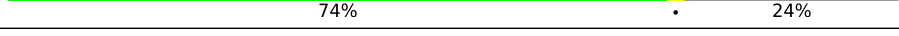

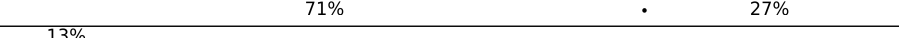
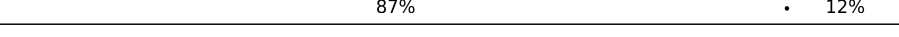

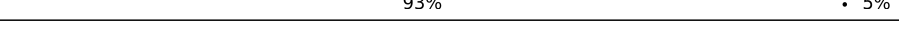


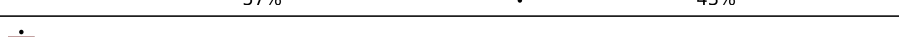

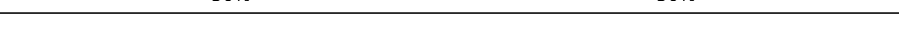




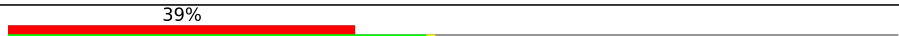

Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	A	1559	
2	B	69	
3	D	305	
4	E	348	
5	F	311	
6	H	267	
7	I	261	
8	J	192	








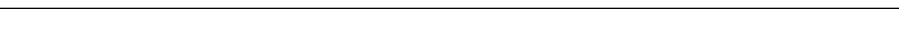
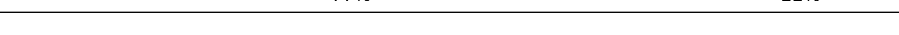
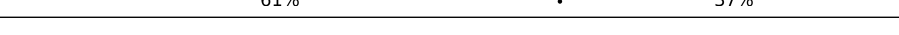
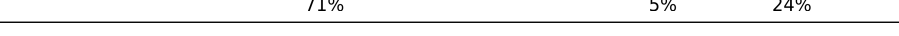










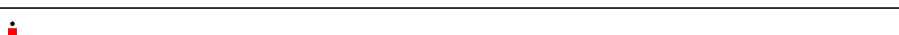
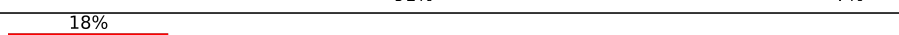
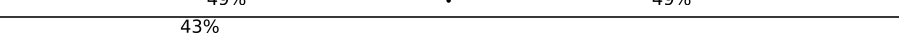
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Mol	Chain	Length	Quality of chain
9	K	178	 96%
10	L	145	 79% 21%
11	M	296	 94%
12	N	251	 81% 18%
13	O	175	 82% 5% 13%
14	P	180	 74% 26%
15	Q	292	 75% 25%
16	R	149	 5% 92% 6%
17	S	205	 74% 24%
18	T	206	 79% 19%
19	U	153	 71% 27%
20	V	216	 13% 87% 12%
21	W	148	 74% 25%
22	X	256	 93% 5%
23	Y	250	 70% 30%
24	Z	161	 73% 25%
25	0	188	 57% 43%
26	1	65	 80% 20%
27	2	92	 50% 50%
28	3	188	 51% 49%
29	4	103	 35% 65%
30	5	423	 88% 11%
31	6	380	 83% 14%
32	7	338	 78% 21%
33	8	206	 39% 47% 52%

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Mol	Chain	Length	Quality of chain
34	9	137	 77% 20%
35	a	142	 56% 42%
36	b	215	 68% 31%
37	c	332	 82% 17%
38	d	306	 52% 47%
39	e	279	 73% 22%
40	f	212	 45% 61% 38%
41	g	166	 77% 22%
42	h	158	 61% 37%
43	i	128	 71% 5% 24%
44	j	123	 68% 31%
45	k	112	 6% 72% 25%
46	l	138	 17% 83%
47	m	128	 35% 34% 65%
48	o	102	 91% 8%
49	p	206	 62% 38%
50	q	222	 53% 46%
51	r	196	 74% 26%
52	s	439	 82% 16%
53	u	234	 47% 53%
54	v	70	 91% 7%
55	w	156	 18% 49% 49%
56	x	384	 43% 88% 11%
57	y	381	 54% 46%

2 Entry composition [i](#)

There are 63 unique types of molecules in this entry. The entry contains 100859 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 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	1383	29374	13181	5314	9496	1383	0	0

- Molecule 2 is a RNA chain called mitochondrial Val tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	B	56	1191	534	214	387	56	0	0

- Molecule 3 is a protein called 39S ribosomal protein L2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	D	217	1692	1046	344	294	8	0	0

- Molecule 4 is a protein called 39S ribosomal protein L3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	300	2365	1523	410	422	10	0	0

- Molecule 5 is a protein called 39S ribosomal protein L4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	250	2013	1294	365	348	6	0	0

- Molecule 6 is a protein called 39S ribosomal protein L9, mitochondrial.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
6	H	95	784	498	152	134	0	0

- Molecule 7 is a protein called 39S ribosomal protein L10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	I	158	Total	C	N	O	S	0	0
			1283	828	235	210	10		

- Molecule 8 is a protein called 39S ribosomal protein L11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	J	140	Total	C	N	O	S	0	0
			1061	680	192	187	2		

- Molecule 9 is a protein called 39S ribosomal protein L13, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	K	177	Total	C	N	O	S	0	0
			1451	934	259	251	7		

- Molecule 10 is a protein called 39S ribosomal protein L14, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	L	115	Total	C	N	O	S	0	0
			889	559	171	154	5		

- Molecule 11 is a protein called 39S ribosomal protein L15, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	M	287	Total	C	N	O	S	0	0
			2305	1472	425	402	6		

- Molecule 12 is a protein called 39S ribosomal protein L16, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	N	205	Total	C	N	O	S	0	0
			1654	1056	308	280	10		

- Molecule 13 is a protein called 39S ribosomal protein L17, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	O	152	Total	C	N	O	S	0	0
			1245	784	239	215	7		

- Molecule 14 is a protein called 39S ribosomal protein L18, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	P	133	1080	677	209	189	5	0	0

- Molecule 15 is a protein called 39S ribosomal protein L19, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	Q	219	1822	1168	322	323	9	0	0

- Molecule 16 is a protein called 39S ribosomal protein L20, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	R	140	1153	732	231	186	4	0	0

- Molecule 17 is a protein called 39S ribosomal protein L21, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	S	156	1251	806	222	219	4	0	0

- Molecule 18 is a protein called 39S ribosomal protein L22, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	T	166	1368	875	254	232	7	0	0

- Molecule 19 is a protein called 39S ribosomal protein L23, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	U	111	922	591	176	153	2	0	0

- Molecule 20 is a protein called 39S ribosomal protein L24, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	V	189	1551	987	278	278	8	0	0

- Molecule 21 is a protein called 39S ribosomal protein L27, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	W	111	871	558	164	146	3	0	0

- Molecule 22 is a protein called 39S ribosomal protein L28, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	X	243	2027	1310	350	362	5	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
X	148	ALA	THR	conflict	UNP Q13084
X	149	SER	PRO	conflict	UNP Q13084
X	150	GLY	LYS	conflict	UNP Q13084

- Molecule 23 is a protein called 39S ribosomal protein L47, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	Y	176	1517	970	291	252	4	0	0

- Molecule 24 is a protein called 39S ribosomal protein L30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	Z	120	978	626	183	166	3	0	0

- Molecule 25 is a protein called 39S ribosomal protein L32, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	0	108	880	545	172	157	6	0	0

- Molecule 26 is a protein called 39S ribosomal protein L33, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	1	52	433	278	83	70	2	0	0

- Molecule 27 is a protein called 39S ribosomal protein L34, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	2	46	Total	C	N	O	S	0	0
			376	233	83	59	1		

- Molecule 28 is a protein called 39S ribosomal protein L35, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	3	95	Total	C	N	O	S	0	0
			831	539	162	127	3		

- Molecule 29 is a protein called 39S ribosomal protein L36, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	4	36	Total	C	N	O	S	0	0
			322	203	70	46	3		

- Molecule 30 is a protein called 39S ribosomal protein L37, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	5	376	Total	C	N	O	S	0	0
			3064	1987	529	538	10		

- Molecule 31 is a protein called 39S ribosomal protein L38, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	6	325	Total	C	N	O	S	0	0
			2636	1692	465	470	9		

- Molecule 32 is a protein called 39S ribosomal protein L39, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	7	266	Total	C	N	O	S	0	0
			2158	1383	371	388	16		

- Molecule 33 is a protein called 39S ribosomal protein L40, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	8	99	Total	C	N	O	S	0	0
			836	535	144	155	2		

- Molecule 34 is a protein called 39S ribosomal protein L41, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	9	109	Total	C	N	O	S	0	0
			873	565	152	154	2		

- Molecule 35 is a protein called 39S ribosomal protein L42, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	a	82	Total	C	N	O	S	0	0
			686	434	124	123	5		

- Molecule 36 is a protein called 39S ribosomal protein L43, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	b	148	Total	C	N	O	S	0	0
			1178	733	229	213	3		

- Molecule 37 is a protein called 39S ribosomal protein L44, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	c	275	Total	C	N	O	S	0	0
			2217	1415	383	410	9		

- Molecule 38 is a protein called 39S ribosomal protein L45, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	d	162	Total	C	N	O	S	0	0
			1347	870	234	235	8		

- Molecule 39 is a protein called 39S ribosomal protein L46, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	e	217	Total	C	N	O	S	0	0
			1762	1124	310	323	5		

- Molecule 40 is a protein called 39S ribosomal protein L48, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	f	131	Total	C	N	O	S	0	0
			1039	663	169	203	4		

- Molecule 41 is a protein called 39S ribosomal protein L49, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	g	129	1067	690	185	190	2	0	0

- Molecule 42 is a protein called 39S ribosomal protein L50, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	h	100	827	524	146	155	2	0	0

- Molecule 43 is a protein called 39S ribosomal protein L51, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	i	97	827	532	165	126	4	0	0

- Molecule 44 is a protein called 39S ribosomal protein L52, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	j	85	684	423	133	126	2	0	0

- Molecule 45 is a protein called 39S ribosomal protein L53, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	k	84	655	407	122	121	5	0	0

- Molecule 46 is a protein called 39S ribosomal protein L54, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
46	l	23	221	137	52	32	0	0

- Molecule 47 is a protein called 39S ribosomal protein L55, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	m	45	372	232	76	62	2	0	0

- Molecule 48 is a protein called Ribosomal protein 63, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	o	94	797	501	165	128	3	0	0

- Molecule 49 is a protein called Peptidyl-tRNA hydrolase ICT1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	p	127	1058	661	201	192	4	0	0

- Molecule 50 is a protein called Growth arrest and DNA damage-inducible proteins-interacting protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	q	119	1002	628	193	176	5	0	0

- Molecule 51 is a protein called 39S ribosomal protein S18a, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	r	146	1203	764	232	199	8	0	0

- Molecule 52 is a protein called 39S ribosomal protein S30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	s	370	3036	1946	542	534	14	0	0

- Molecule 53 is a protein called Mitochondrial assembly of ribosomal large subunit protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	u	111	927	595	155	167	10	0	0

- Molecule 54 is a protein called MIEF1 upstream open reading frame protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
54	v	69	588	372	116	100	0	0

- Molecule 55 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	w	79	638	410	95	128	5	0	0

- Molecule 56 is a protein called 5-methylcytosine rRNA methyltransferase NSUN4.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	N	O	S	Se		
56	x	342	2701	1720	467	496	16	2	6	0

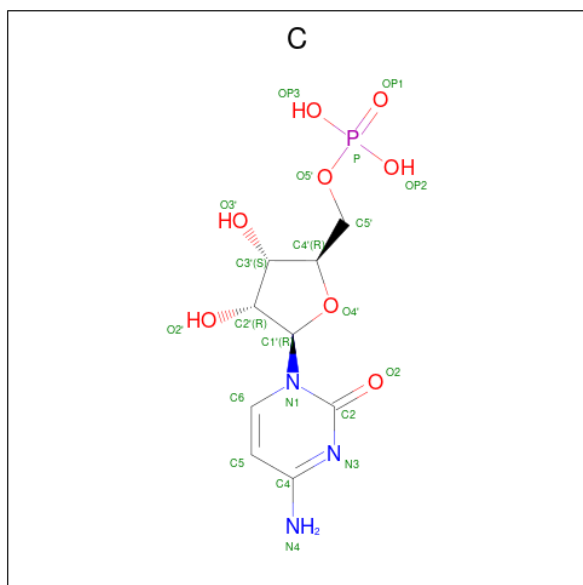
- Molecule 57 is a protein called Transcription termination factor 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
57	y	207	1602	1021	280	292	9	0	0

- Molecule 58 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

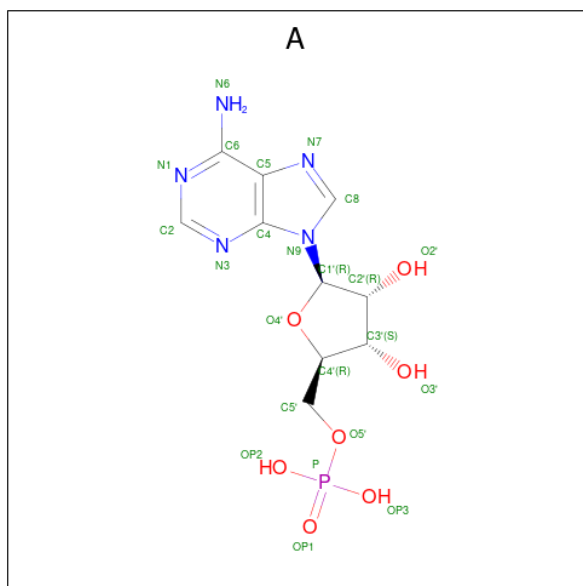
Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
58	A	72	72	72	0
58	F	1	1	1	0
58	M	1	1	1	0
58	W	1	1	1	0
58	g	1	1	1	0

- Molecule 59 is CYTIDINE-5'-MONOPHOSPHATE (three-letter code: C) (formula: C₉H₁₄N₃O₈P).



Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
59	A	1	20	9	3	7	1	0

- Molecule 60 is ADENOSINE-5'-MONOPHOSPHATE (three-letter code: A) (formula: $C_{10}H_{14}N_5O_7P$).

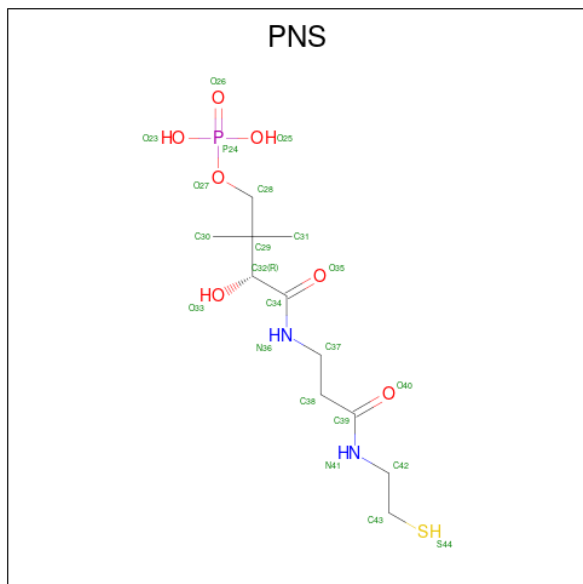


Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
60	A	1	22	10	5	6	1	0

- Molecule 61 is ZINC ION (three-letter code: ZN) (formula: Zn).

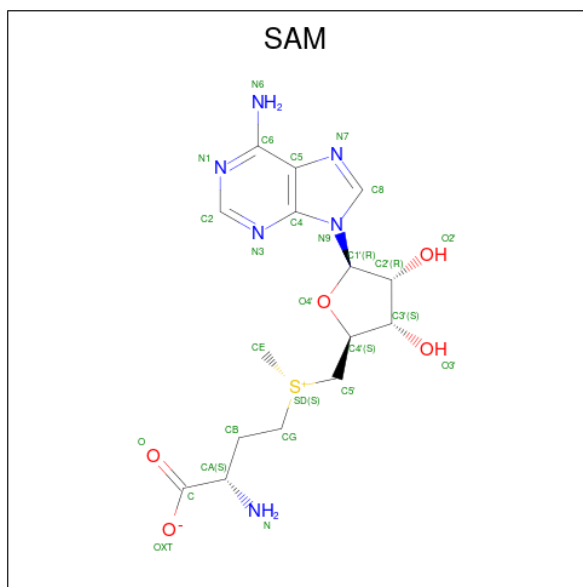
Mol	Chain	Residues	Atoms		AltConf
61	I	1	Total	Zn	0
			1	1	
61	0	1	Total	Zn	0
			1	1	
61	4	1	Total	Zn	0
			1	1	

- Molecule 62 is 4'-PHOSPHOPANTETHEINE (three-letter code: PNS) (formula: $C_{11}H_{23}N_2O_7PS$).



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	N	O	P		S
62	v	1	21	11	2	6	1	1	0

- Molecule 63 is S-ADENOSYLMETHIONINE (three-letter code: SAM) (formula: $C_{15}H_{22}N_6O_5S$).

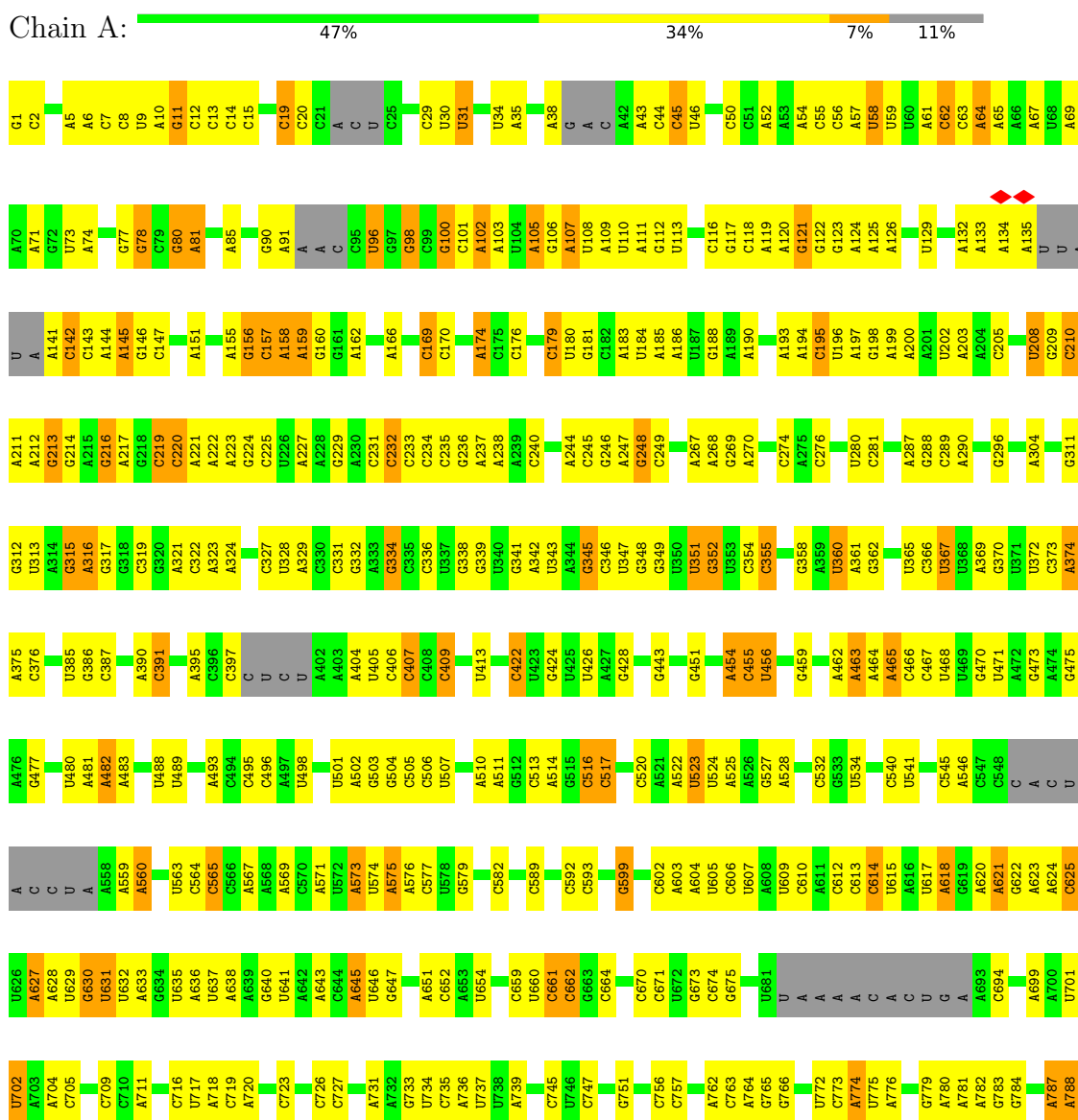


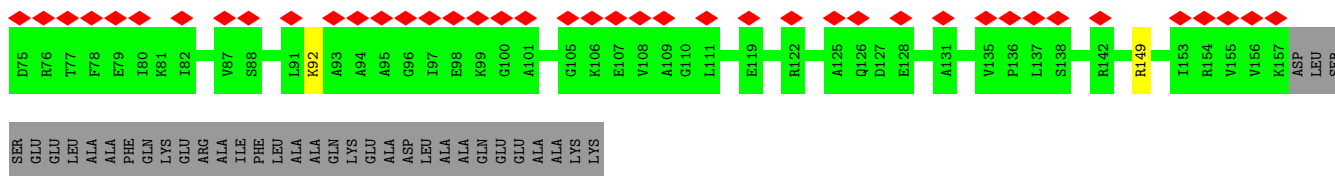
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	S	
63	x	1	27	15	6	5	1	0

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: 16S rRNA

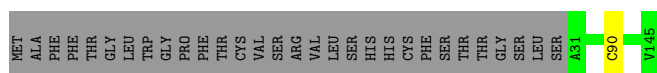
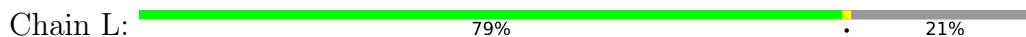




- Molecule 9: 39S ribosomal protein L13, mitochondrial



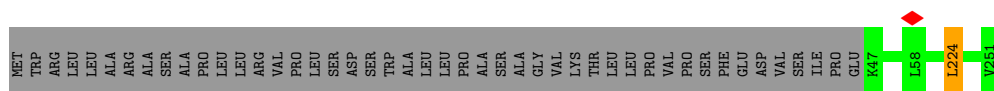
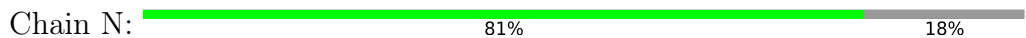
- Molecule 10: 39S ribosomal protein L14, mitochondrial



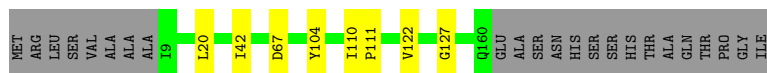
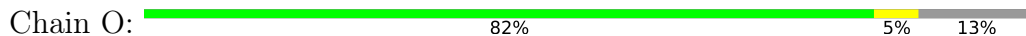
- Molecule 11: 39S ribosomal protein L15, mitochondrial



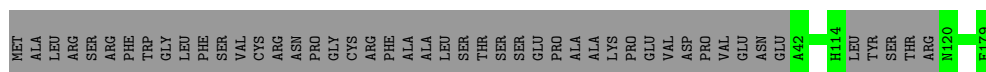
- Molecule 12: 39S ribosomal protein L16, mitochondrial




- Molecule 13: 39S ribosomal protein L17, mitochondrial



- Molecule 14: 39S ribosomal protein L18, mitochondrial



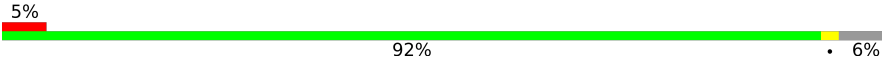
- Molecule 15: 39S ribosomal protein L19, mitochondrial

Chain Q:  75% 25%

MET ALA ALA PHE CYS ILE LEU ALA ALA HIS TRP ALA MET GLY LEU ARG ARG PHE GLN ALA ARG THR LEU LEU PRO PRO PRO SER ILE ALA CYS VAL HIS ALA GLY VAL ARG GLN SER THR PRO GLU PRO GLY PHE ALA GLN PRO PRO LYS PRO

VAL ILE VAL ASP THR LYS ARG PRO VAL GLU PRO GLU ARG R74 K227 S292

- Molecule 16: 39S ribosomal protein L20, mitochondrial

Chain R:  5% 92% 6%

MET VAL PHE LEU THR ALA GLN LEU TRP L10 R11 A131 L132 G133 D134 G136 K136 E137 H149


- Molecule 17: 39S ribosomal protein L21, mitochondrial

Chain S:  74% 24%

MET ALA ALA SER SER LEU THR VAL THR LEU LEU ARG LEU ALA SER ALA CYS SER HIS SER ILE LEU ARG PRO PRO GLY PRO GLY ALA ALA SER LEU TRP ALA ARG ARG ARG ARG PHE ASN SER GLN SER THR SER TYR LEU PRO G49 M118 L134 L144 K162 T187

L204 LEU

- Molecule 18: 39S ribosomal protein L22, mitochondrial

Chain T:  79% 19%


MET ALA ALA VAL LEU GLY GLN LEU LEU ALA ALA TRP ILE HIS ASN LEU ARG ARG ARG GLY LEU LEU ALA LEU VAL PRO GLN TYR ILE THR SER ALA SER SER ASP I47 R95 Y176 V209 L212

- Molecule 19: 39S ribosomal protein L23, mitochondrial

Chain U:  71% 27%

MET R2 D38 M7 F112 GLU LYS ASP GLU SER PRO GLU GLY SER ALA ASP ASP TYR MET LEU LEU GLU ARG GLN GLN GLN SER ASP PRO ARG ARG GLY VAL PRO SER TRP PHE GLY LEU

- Molecule 20: 39S ribosomal protein L24, mitochondrial

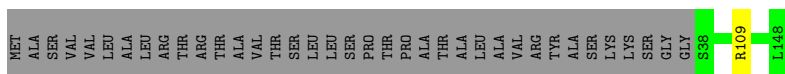
Chain V:  13% 87% 12%

MET ARG LEU SER ALA LEU ALA LEU ALA ALA SER SER VAL THR L15 P16 P17 S24 P25 P26 G27 S28 V29 A30 P36 V46 GLU PRO ILE S50 I64 A70 I96 T101 G106 M126 D127 R128 R136 F137 T138 E139 A140 G141 E142 R149 R152 I153

I154 E158 PRO ARG ALA ASP ILE VAL PRO GLU T169 W170 Y216

- Molecule 21: 39S ribosomal protein L27, mitochondrial

Chain W:  74% 25%



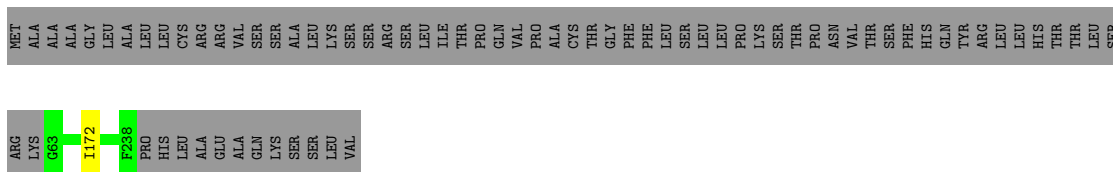
- Molecule 22: 39S ribosomal protein L28, mitochondrial

Chain X:  93% 5%



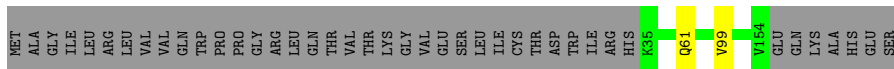
- Molecule 23: 39S ribosomal protein L47, mitochondrial

Chain Y:  70% 30%



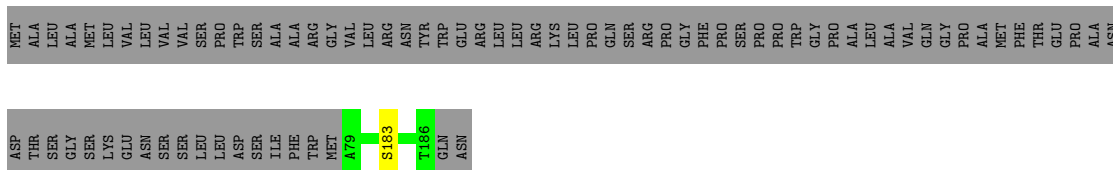
- Molecule 24: 39S ribosomal protein L30, mitochondrial

Chain Z:  73% 25%




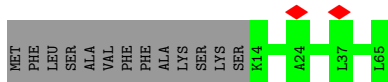
- Molecule 25: 39S ribosomal protein L32, mitochondrial

Chain 0:  57% 43%

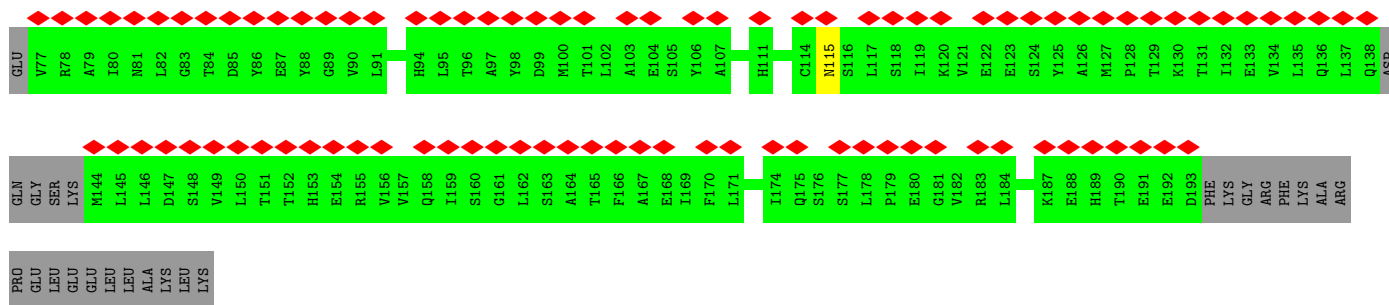


- Molecule 26: 39S ribosomal protein L33, mitochondrial

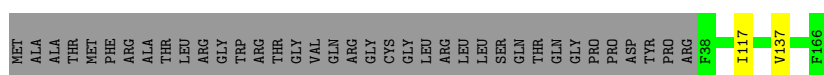
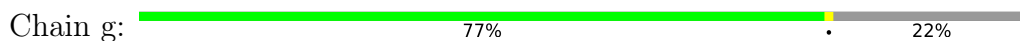
Chain 1:  80% 20%



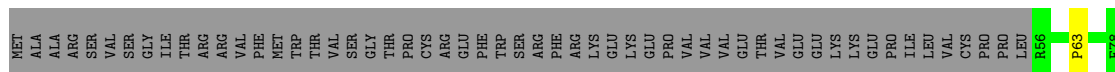
- Molecule 27: 39S ribosomal protein L34, mitochondrial



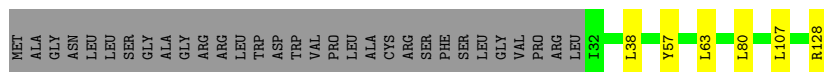
- Molecule 41: 39S ribosomal protein L49, mitochondrial



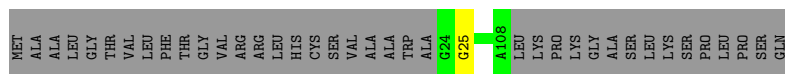
- Molecule 42: 39S ribosomal protein L50, mitochondrial



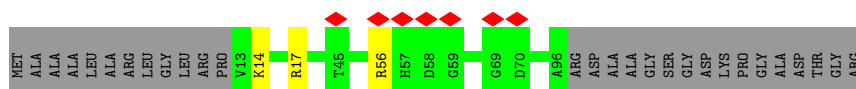
- Molecule 43: 39S ribosomal protein L51, mitochondrial



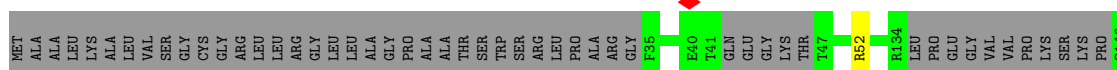
- Molecule 44: 39S ribosomal protein L52, mitochondrial



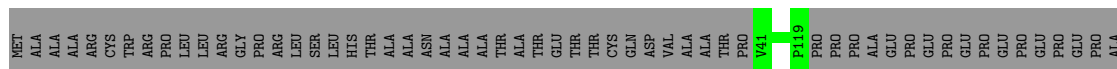
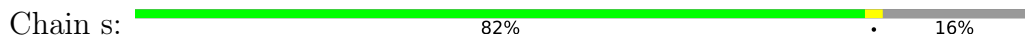
- Molecule 45: 39S ribosomal protein L53, mitochondrial



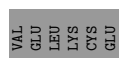
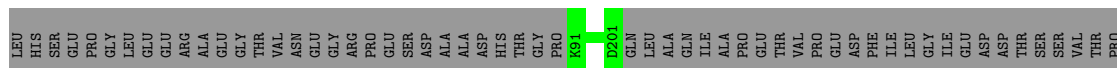
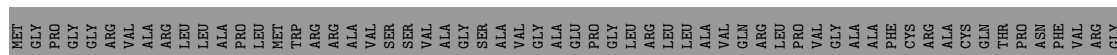
- Molecule 46: 39S ribosomal protein L54, mitochondrial



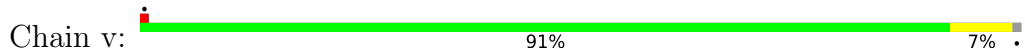
- Molecule 52: 39S ribosomal protein S30, mitochondrial



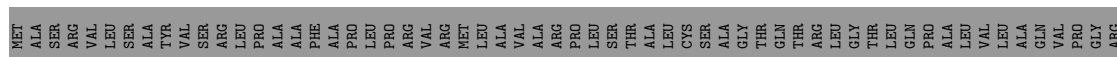
- Molecule 53: Mitochondrial assembly of ribosomal large subunit protein 1



- Molecule 54: MIEF1 upstream open reading frame protein



- Molecule 55: Acyl carrier protein, mitochondrial



- Molecule 56: 5-methylcytosine rRNA methyltransferase NSUN4

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	83176	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	28	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	1.836	Depositor
Minimum map value	-1.104	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.038	Depositor
Recommended contour level	0.05	Depositor
Map size (\AA)	390.24, 390.24, 390.24	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.084, 1.084, 1.084	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, PNS, SAM, ZN

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	1.58	274/32860 (0.8%)	1.38	423/51128 (0.8%)
2	B	0.38	0/1328	1.10	4/2056 (0.2%)
3	D	0.49	0/1723	0.67	1/2317 (0.0%)
4	E	0.77	0/2433	0.75	2/3299 (0.1%)
5	F	0.91	0/2071	0.82	1/2817 (0.0%)
6	H	0.57	0/798	0.83	3/1073 (0.3%)
7	I	0.37	0/1308	0.65	1/1761 (0.1%)
8	J	0.27	0/1077	0.56	0/1452
9	K	0.84	1/1495 (0.1%)	0.77	2/2029 (0.1%)
10	L	0.63	0/904	0.72	1/1218 (0.1%)
11	M	0.86	2/2359 (0.1%)	0.78	5/3185 (0.2%)
12	N	0.48	0/1697	0.62	1/2281 (0.0%)
13	O	0.79	1/1269 (0.1%)	0.89	5/1708 (0.3%)
14	P	0.54	0/1103	0.64	0/1491
15	Q	0.65	0/1863	0.68	0/2509
16	R	0.93	0/1174	0.83	1/1572 (0.1%)
17	S	0.84	1/1276 (0.1%)	0.81	3/1729 (0.2%)
18	T	0.88	2/1402 (0.1%)	0.73	1/1886 (0.1%)
19	U	0.83	0/946	0.73	1/1283 (0.1%)
20	V	0.41	0/1590	0.60	0/2151
21	W	0.78	0/893	0.64	0/1204
22	X	0.63	0/2081	0.69	5/2812 (0.2%)
23	Y	0.70	0/1552	0.65	1/2079 (0.0%)
24	Z	0.71	1/1003 (0.1%)	0.71	1/1354 (0.1%)
25	0	0.74	0/895	0.74	1/1201 (0.1%)
26	1	0.34	0/438	0.70	0/583
27	2	1.00	0/382	0.73	0/507
28	3	0.97	0/852	0.73	0/1136
29	4	0.55	0/329	0.57	0/435
30	5	0.43	0/3154	0.66	3/4295 (0.1%)
31	6	0.56	0/2722	0.71	6/3709 (0.2%)
32	7	0.50	0/2207	0.66	1/2978 (0.0%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	8	0.27	0/855	0.54	0/1152
34	9	0.67	0/896	0.72	0/1205
35	a	0.67	1/709 (0.1%)	0.63	0/963
36	b	0.79	0/1202	0.79	1/1626 (0.1%)
37	c	0.60	0/2264	0.64	1/3059 (0.0%)
38	d	0.39	0/1385	0.71	1/1877 (0.1%)
39	e	0.27	0/1797	0.60	0/2422
40	f	0.37	0/1055	0.55	0/1427
41	g	0.82	1/1102 (0.1%)	0.75	1/1503 (0.1%)
42	h	0.47	0/847	0.76	1/1150 (0.1%)
43	i	0.96	0/849	0.97	6/1135 (0.5%)
44	j	0.58	0/698	0.60	0/940
45	k	0.31	0/665	0.69	0/897
46	l	0.23	0/226	0.45	0/299
47	m	0.27	0/379	0.60	0/510
48	o	0.76	1/818 (0.1%)	0.75	0/1097
49	p	0.47	0/1071	0.59	0/1433
50	q	0.53	0/1033	0.61	1/1401 (0.1%)
51	r	0.67	0/1238	0.66	0/1676
52	s	0.65	0/3114	0.69	4/4225 (0.1%)
53	u	0.45	0/949	0.76	0/1281
54	v	0.35	0/597	0.79	2/796 (0.3%)
55	w	0.29	0/647	0.67	0/871
56	x	0.28	0/2779	0.58	1/3775 (0.0%)
57	y	0.27	0/1630	0.54	1/2200 (0.0%)
All	All	1.02	285/105989 (0.3%)	0.99	493/150158 (0.3%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
3	D	0	1
4	E	0	1
5	F	0	1
9	K	0	2
11	M	0	3
12	N	0	1
13	O	0	2
15	Q	0	1
16	R	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
20	V	0	1
30	5	0	1
31	6	0	1
34	9	0	3
38	d	0	1
42	h	0	1
43	i	0	1
44	j	0	1
45	k	0	1
52	s	0	3
All	All	0	27

All (285) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	158	A	N9-C4	-15.03	1.28	1.37
1	A	197	A	N9-C4	-8.83	1.32	1.37
1	A	158	A	N3-C4	-8.43	1.29	1.34
1	A	625	C	N3-C4	-7.83	1.28	1.33
1	A	637	U	C2-N3	-7.65	1.32	1.37
1	A	158	A	C2-N3	-7.62	1.26	1.33
1	A	197	A	N3-C4	-7.58	1.30	1.34
1	A	195	C	N1-C6	-7.23	1.32	1.37
1	A	481	A	C5-C4	-7.23	1.33	1.38
1	A	622	G	N9-C8	-7.09	1.32	1.37
1	A	85	A	N7-C5	-7.06	1.35	1.39
1	A	373	C	N3-C4	-7.03	1.29	1.33
1	A	112	G	C5-C4	-6.92	1.33	1.38
1	A	106	G	C8-N7	-6.67	1.26	1.30
1	A	122	G	C5-C4	-6.64	1.33	1.38
1	A	334	G	N7-C5	-6.63	1.35	1.39
1	A	1003	G	C5-C4	-6.61	1.33	1.38
1	A	100	G	C2-N3	-6.56	1.27	1.32
1	A	374	A	C8-N7	-6.48	1.27	1.31
1	A	621	A	N7-C5	-6.48	1.35	1.39
1	A	121	G	C8-N7	-6.45	1.27	1.30
1	A	116	C	N3-C4	-6.42	1.29	1.33
1	A	641	U	C2-N3	-6.38	1.33	1.37
1	A	195	C	C5-C6	-6.36	1.29	1.34
1	A	13	C	N3-C4	-6.33	1.29	1.33
1	A	237	A	N7-C5	-6.30	1.35	1.39
1	A	313	U	C2-N3	-6.30	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	121	G	C5-C4	-6.30	1.33	1.38
1	A	123	G	N1-C2	-6.29	1.32	1.37
1	A	1481	A	N7-C5	-6.29	1.35	1.39
1	A	216	G	C8-N7	-6.28	1.27	1.30
1	A	112	G	N1-C2	-6.28	1.32	1.37
18	T	209	VAL	CB-CG2	-6.26	1.39	1.52
1	A	1027	G	C8-N7	-6.25	1.27	1.30
1	A	1002	A	C5-C4	-6.25	1.34	1.38
1	A	249	C	N3-C4	-6.24	1.29	1.33
1	A	80	G	N7-C5	-6.24	1.35	1.39
1	A	108	U	C2-N3	-6.23	1.33	1.37
1	A	621	A	N9-C4	-6.22	1.34	1.37
1	A	188	G	N7-C5	-6.20	1.35	1.39
1	A	194	A	C5-C4	-6.20	1.34	1.38
1	A	58	U	C2-N3	-6.19	1.33	1.37
1	A	482	A	N9-C4	-6.19	1.34	1.37
1	A	604	A	N9-C4	-6.19	1.34	1.37
1	A	349	G	C5-C4	-6.15	1.34	1.38
1	A	117	G	N9-C8	-6.14	1.33	1.37
1	A	348	G	C6-N1	-6.12	1.35	1.39
1	A	627	A	C6-N1	-6.12	1.31	1.35
1	A	1031	G	C6-N1	-6.09	1.35	1.39
1	A	607	U	C2-N3	-6.08	1.33	1.37
11	M	141	VAL	CB-CG1	-6.07	1.40	1.52
1	A	633	A	C6-N1	-6.06	1.31	1.35
1	A	232	C	N3-C4	-6.03	1.29	1.33
1	A	632	U	N3-C4	-6.03	1.33	1.38
1	A	1044	A	N7-C5	-6.03	1.35	1.39
11	M	187	VAL	CB-CG2	-6.03	1.40	1.52
1	A	64	A	N9-C4	6.02	1.41	1.37
1	A	630	G	C8-N7	-6.00	1.27	1.30
1	A	234	C	C4-C5	-5.98	1.38	1.43
13	O	122	VAL	CB-CG2	-5.97	1.40	1.52
1	A	336	C	N3-C4	-5.96	1.29	1.33
1	A	234	C	N3-C4	-5.94	1.29	1.33
1	A	1005	G	C5-C4	-5.93	1.34	1.38
1	A	210	C	C4-C5	-5.92	1.38	1.43
18	T	176	VAL	CB-CG2	-5.92	1.40	1.52
1	A	632	U	C2-N3	-5.92	1.33	1.37
1	A	1032	G	C5-C4	-5.88	1.34	1.38
1	A	174	A	C5-C4	-5.87	1.34	1.38
1	A	1432	U	C4-C5	-5.87	1.38	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	69	A	N3-C4	-5.87	1.31	1.34
1	A	334	G	N9-C8	-5.87	1.33	1.37
1	A	194	A	N3-C4	-5.86	1.31	1.34
1	A	1028	G	C8-N7	-5.86	1.27	1.30
1	A	1027	G	C6-N1	-5.85	1.35	1.39
1	A	78	G	C5-C4	-5.84	1.34	1.38
1	A	225	C	C2-N3	-5.83	1.31	1.35
1	A	74	A	N7-C5	-5.83	1.35	1.39
1	A	623	A	C8-N7	-5.83	1.27	1.31
1	A	622	G	C6-N1	-5.82	1.35	1.39
1	A	1058	C	N3-C4	-5.82	1.29	1.33
1	A	158	A	N7-C5	-5.82	1.35	1.39
1	A	246	G	N7-C5	-5.82	1.35	1.39
1	A	122	G	N9-C8	-5.82	1.33	1.37
1	A	1012	A	C5-C4	-5.78	1.34	1.38
1	A	623	A	N7-C5	-5.77	1.35	1.39
1	A	451	G	C5-C4	-5.77	1.34	1.38
1	A	358	G	C6-N1	-5.76	1.35	1.39
1	A	991	U	C2-N3	-5.76	1.33	1.37
1	A	147	C	N3-C4	-5.75	1.29	1.33
1	A	117	G	C5-C4	-5.75	1.34	1.38
1	A	339	G	C6-N1	-5.73	1.35	1.39
1	A	1013	C	N3-C4	-5.73	1.29	1.33
1	A	211	A	N3-C4	-5.71	1.31	1.34
1	A	112	G	N7-C5	-5.71	1.35	1.39
1	A	638	A	C5-C6	-5.71	1.35	1.41
1	A	120	A	N7-C5	-5.70	1.35	1.39
1	A	349	G	N9-C8	-5.70	1.33	1.37
1	A	52	A	C6-N1	-5.70	1.31	1.35
1	A	346	C	N3-C4	-5.70	1.29	1.33
1	A	190	A	N9-C8	-5.69	1.33	1.37
1	A	1019	C	N3-C4	-5.69	1.29	1.33
1	A	995	U	C2-N3	-5.69	1.33	1.37
1	A	237	A	C8-N7	-5.69	1.27	1.31
1	A	339	G	C5-C4	-5.68	1.34	1.38
1	A	197	A	N7-C5	-5.66	1.35	1.39
1	A	1433	C	N3-C4	-5.66	1.29	1.33
1	A	599	G	C6-N1	-5.66	1.35	1.39
1	A	105	A	C6-N1	-5.65	1.31	1.35
1	A	783	G	C8-N7	-5.65	1.27	1.30
1	A	77	G	C2-N2	-5.64	1.28	1.34
1	A	117	G	C8-N7	-5.64	1.27	1.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	352	G	N7-C5	-5.64	1.35	1.39
1	A	190	A	C8-N7	-5.64	1.27	1.31
1	A	1018	C	N3-C4	-5.63	1.30	1.33
1	A	248	G	C5-C4	-5.63	1.34	1.38
1	A	59	U	C2-N3	-5.63	1.33	1.37
1	A	73	U	C2-N3	-5.63	1.33	1.37
1	A	116	C	N1-C6	-5.62	1.33	1.37
1	A	424	G	N9-C8	-5.62	1.33	1.37
1	A	12	C	N3-C4	-5.60	1.30	1.33
1	A	119	A	N9-C4	-5.60	1.34	1.37
1	A	1008	A	N7-C5	-5.60	1.35	1.39
1	A	80	G	C5-C4	-5.59	1.34	1.38
1	A	5	A	N9-C4	-5.57	1.34	1.37
1	A	1058	C	C4-C5	-5.56	1.38	1.43
1	A	342	A	N7-C5	-5.56	1.35	1.39
1	A	195	C	C4-C5	-5.56	1.38	1.43
1	A	342	A	C8-N7	-5.55	1.27	1.31
1	A	157	C	N3-C4	-5.55	1.30	1.33
1	A	209	G	C6-N1	-5.54	1.35	1.39
1	A	121	G	N1-C2	-5.52	1.33	1.37
1	A	633	A	C5-C4	-5.51	1.34	1.38
1	A	480	U	C2-N3	-5.51	1.33	1.37
1	A	214	G	C5-C4	-5.50	1.34	1.38
1	A	246	G	C5-C4	-5.49	1.34	1.38
1	A	193	A	C5-C4	-5.48	1.34	1.38
1	A	81	A	N9-C8	-5.48	1.33	1.37
1	A	198	G	C8-N7	-5.46	1.27	1.30
1	A	122	G	C6-N1	-5.46	1.35	1.39
1	A	1012	A	C6-N1	-5.45	1.31	1.35
1	A	144	A	N7-C5	-5.45	1.35	1.39
1	A	224	G	N9-C8	-5.44	1.34	1.37
1	A	620	A	C5-C4	-5.44	1.34	1.38
1	A	174	A	C8-N7	-5.43	1.27	1.31
1	A	160	G	C2-N3	-5.42	1.28	1.32
1	A	635	U	C2-N3	-5.42	1.33	1.37
1	A	374	A	N7-C5	-5.41	1.36	1.39
1	A	244	A	C6-N1	-5.41	1.31	1.35
1	A	327	C	C2-N3	-5.41	1.31	1.35
1	A	155	A	C6-N1	-5.41	1.31	1.35
1	A	122	G	N1-C2	-5.40	1.33	1.37
1	A	13	C	C2-N3	-5.40	1.31	1.35
1	A	1006	A	C5-C4	-5.40	1.34	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	213	G	N7-C5	-5.40	1.36	1.39
1	A	606	C	N3-C4	-5.40	1.30	1.33
1	A	208	U	N3-C4	-5.40	1.33	1.38
1	A	334	G	C8-N7	-5.38	1.27	1.30
1	A	315	G	C5-C4	-5.38	1.34	1.38
1	A	1058	C	N1-C6	-5.38	1.33	1.37
1	A	473	G	C2-N3	-5.37	1.28	1.32
1	A	1032	G	C6-N1	-5.37	1.35	1.39
1	A	1044	A	C6-N1	-5.37	1.31	1.35
1	A	123	G	C5-C4	-5.36	1.34	1.38
1	A	198	G	C2-N3	-5.36	1.28	1.32
1	A	100	G	C5-C4	-5.36	1.34	1.38
1	A	146	G	C5-C4	-5.36	1.34	1.38
1	A	800	G	C5-C4	-5.36	1.34	1.38
1	A	468	U	C2-N3	-5.36	1.33	1.37
1	A	466	C	C4-C5	-5.34	1.38	1.43
1	A	579	G	N1-C2	-5.34	1.33	1.37
1	A	117	G	N7-C5	-5.34	1.36	1.39
1	A	101	C	N3-C4	-5.34	1.30	1.33
1	A	756	C	N1-C6	-5.33	1.33	1.37
1	A	1011	G	N1-C2	-5.33	1.33	1.37
1	A	358	G	C8-N7	-5.32	1.27	1.30
35	a	123	TRP	CB-CG	-5.31	1.40	1.50
48	o	42	GLU	CB-CG	-5.30	1.42	1.52
1	A	784	G	C5-C4	-5.29	1.34	1.38
1	A	1391	G	C8-N7	-5.29	1.27	1.30
1	A	345	G	N7-C5	-5.29	1.36	1.39
1	A	993	C	C4-C5	-5.28	1.38	1.43
1	A	311	G	C2-N3	-5.28	1.28	1.32
1	A	609	U	C2-N3	-5.27	1.34	1.37
1	A	985	G	C6-N1	-5.27	1.35	1.39
1	A	372	U	C2-N3	-5.27	1.34	1.37
1	A	188	G	C8-N7	-5.26	1.27	1.30
1	A	348	G	C5-C4	-5.26	1.34	1.38
1	A	459	G	C5-C6	-5.26	1.37	1.42
1	A	463	A	N9-C4	-5.26	1.34	1.37
1	A	638	A	C5-C4	-5.26	1.35	1.38
1	A	358	G	N1-C2	-5.25	1.33	1.37
1	A	640	G	C5-C4	-5.25	1.34	1.38
1	A	365	U	C2-N3	-5.25	1.34	1.37
1	A	111	A	N7-C5	-5.24	1.36	1.39
1	A	224	G	N1-C2	-5.24	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	159	A	C5-C6	-5.24	1.36	1.41
1	A	198	G	N7-C5	-5.24	1.36	1.39
1	A	238	A	N9-C4	-5.23	1.34	1.37
1	A	349	G	C2-N3	-5.23	1.28	1.32
1	A	459	G	C5-C4	-5.23	1.34	1.38
1	A	2	C	N3-C4	-5.23	1.30	1.33
1	A	13	C	C4-C5	-5.22	1.38	1.43
1	A	623	A	N9-C8	-5.22	1.33	1.37
1	A	145	A	N7-C5	-5.22	1.36	1.39
1	A	1262	G	C5-C4	-5.21	1.34	1.38
1	A	783	G	C5-C4	-5.21	1.34	1.38
1	A	227	A	C5-C4	-5.21	1.35	1.38
1	A	312	G	N9-C8	-5.20	1.34	1.37
1	A	69	A	N9-C4	-5.20	1.34	1.37
1	A	147	C	C2-N3	-5.19	1.31	1.35
1	A	81	A	N7-C5	-5.19	1.36	1.39
1	A	1023	A	N7-C5	-5.18	1.36	1.39
1	A	338	G	N7-C5	-5.18	1.36	1.39
1	A	123	G	C6-N1	-5.17	1.35	1.39
1	A	190	A	C6-N1	-5.17	1.31	1.35
1	A	630	G	C5-C4	-5.17	1.34	1.38
1	A	622	G	N1-C2	-5.17	1.33	1.37
1	A	248	G	C6-N1	-5.17	1.35	1.39
1	A	220	C	N3-C4	-5.16	1.30	1.33
1	A	1476	G	C5-C4	-5.16	1.34	1.38
1	A	111	A	C8-N7	-5.16	1.27	1.31
1	A	146	G	C6-N1	-5.16	1.35	1.39
1	A	119	A	C5-C4	-5.15	1.35	1.38
1	A	246	G	C6-N1	-5.14	1.35	1.39
1	A	1045	A	C8-N7	-5.14	1.27	1.31
1	A	195	C	N3-C4	-5.14	1.30	1.33
1	A	220	C	N1-C6	-5.14	1.34	1.37
1	A	224	G	C5-C4	-5.14	1.34	1.38
1	A	1481	A	N9-C4	-5.14	1.34	1.37
17	S	187	THR	C-N	-5.14	1.22	1.34
1	A	622	G	C8-N7	-5.13	1.27	1.30
1	A	480	U	N3-C4	-5.13	1.33	1.38
1	A	1548	A	N9-C4	-5.13	1.34	1.37
1	A	245	C	N3-C4	-5.13	1.30	1.33
1	A	313	U	N3-C4	-5.13	1.33	1.38
1	A	1322	G	N7-C5	-5.12	1.36	1.39
1	A	462	A	N3-C4	-5.12	1.31	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	763	C	N3-C4	-5.12	1.30	1.33
1	A	190	A	N7-C5	-5.11	1.36	1.39
1	A	751	G	C6-N1	-5.11	1.35	1.39
1	A	797	A	C5-C4	-5.11	1.35	1.38
1	A	106	G	C6-N1	-5.11	1.35	1.39
1	A	647	G	C5-C4	-5.11	1.34	1.38
1	A	617	U	C2-N3	-5.11	1.34	1.37
1	A	459	G	N7-C5	-5.10	1.36	1.39
1	A	1078	A	N9-C4	5.10	1.41	1.37
1	A	52	A	C5-C6	-5.10	1.36	1.41
1	A	1033	C	N3-C4	-5.10	1.30	1.33
1	A	1247	G	C5-C4	-5.09	1.34	1.38
1	A	119	A	C8-N7	-5.09	1.27	1.31
1	A	1488	A	C5-C6	-5.09	1.36	1.41
1	A	74	A	C8-N7	-5.09	1.27	1.31
1	A	211	A	N7-C5	-5.09	1.36	1.39
1	A	579	G	C6-N1	-5.09	1.35	1.39
1	A	454	A	C5-C6	-5.08	1.36	1.41
1	A	481	A	C8-N7	-5.08	1.27	1.31
1	A	342	A	C5-C4	-5.08	1.35	1.38
1	A	71	A	N9-C4	-5.08	1.34	1.37
1	A	475	G	C5-C4	-5.08	1.34	1.38
1	A	801	G	C5-C4	-5.08	1.34	1.38
1	A	188	G	N9-C8	-5.07	1.34	1.37
1	A	618	A	N7-C5	-5.07	1.36	1.39
1	A	348	G	C2-N3	-5.07	1.28	1.32
1	A	987	C	N3-C4	-5.06	1.30	1.33
1	A	11	G	C2-N3	-5.05	1.28	1.32
1	A	633	A	N9-C4	-5.05	1.34	1.37
41	g	137	VAL	CB-CG2	-5.05	1.42	1.52
1	A	221	A	N9-C8	-5.05	1.33	1.37
1	A	351	U	C2-N3	-5.05	1.34	1.37
1	A	247	A	N3-C4	-5.04	1.31	1.34
1	A	229	G	C6-N1	-5.04	1.36	1.39
1	A	1045	A	N7-C5	-5.04	1.36	1.39
1	A	481	A	N9-C4	-5.03	1.34	1.37
1	A	349	G	C6-N1	-5.03	1.36	1.39
1	A	347	U	N3-C4	-5.03	1.33	1.38
1	A	1012	A	N9-C4	-5.03	1.34	1.37
24	Z	99	VAL	CB-CG2	-5.03	1.42	1.52
1	A	582	C	C4-C5	-5.02	1.39	1.43
1	A	109	A	C8-N7	-5.02	1.28	1.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	69	A	C5-C4	-5.02	1.35	1.38
1	A	355	C	N3-C4	-5.01	1.30	1.33
1	A	1003	G	N9-C8	-5.01	1.34	1.37
1	A	1488	A	N7-C5	-5.01	1.36	1.39
1	A	999	A	N9-C8	-5.00	1.33	1.37
9	K	90	VAL	CB-CG1	-5.00	1.42	1.52

All (493) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	158	A	C2-N3-C4	-17.12	102.04	110.60
1	A	158	A	N3-C4-N9	-12.97	117.02	127.40
1	A	158	A	N3-C4-C5	12.04	135.23	126.80
1	A	853	C	C2-N1-C1'	11.92	131.92	118.80
1	A	523	U	C5-C4-O4	11.74	132.94	125.90
1	A	852	U	C2-N1-C1'	11.22	131.16	117.70
1	A	1322	G	C6-C5-N7	-10.89	123.86	130.40
1	A	523	U	N3-C4-O4	-10.74	111.88	119.40
1	A	1322	G	C5-C6-O6	-10.46	122.33	128.60
1	A	625	C	N3-C2-O2	-10.45	114.58	121.90
1	A	874	C	N3-C2-O2	-9.94	114.94	121.90
1	A	1502	C	C2-N1-C1'	9.91	129.70	118.80
1	A	156	G	C8-N9-C4	-9.75	102.50	106.40
52	s	229	LEU	CA-CB-CG	9.68	137.56	115.30
1	A	170	C	C6-N1-C2	-9.60	116.46	120.30
1	A	1542	C	C2-N1-C1'	9.54	129.29	118.80
1	A	604	A	C5-N7-C8	-9.49	99.15	103.90
1	A	170	C	C5-C6-N1	9.49	125.75	121.00
1	A	565	C	C6-N1-C2	-9.48	116.51	120.30
1	A	853	C	N1-C2-O2	9.42	124.55	118.90
1	A	158	A	C5-C6-N1	-9.37	113.01	117.70
1	A	45	C	C2-N1-C1'	9.33	129.06	118.80
1	A	1322	G	N1-C6-O6	9.30	125.48	119.90
1	A	565	C	C2-N1-C1'	9.15	128.86	118.80
1	A	852	U	N1-C2-O2	9.12	129.18	122.80
1	A	59	U	N3-C2-O2	-9.07	115.85	122.20
1	A	652	C	N1-C2-O2	9.03	124.32	118.90
1	A	772	U	C5-C4-O4	8.96	131.28	125.90
1	A	582	C	C6-N1-C2	-8.92	116.73	120.30
1	A	702	U	N3-C2-O2	-8.92	115.96	122.20
1	A	145	A	N7-C8-N9	8.89	118.25	113.80
1	A	1322	G	N3-C4-N9	8.89	131.34	126.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	612	C	C6-N1-C2	-8.83	116.77	120.30
1	A	1228	U	N3-C2-O2	-8.82	116.03	122.20
1	A	614	C	N1-C2-O2	8.75	124.15	118.90
1	A	565	C	N3-C2-O2	-8.74	115.78	121.90
1	A	709	C	C2-N1-C1'	8.74	128.41	118.80
1	A	1534	C	C2-N1-C1'	8.73	128.41	118.80
1	A	853	C	C6-N1-C1'	-8.71	110.34	120.80
1	A	1230	C	C2-N1-C1'	8.71	128.38	118.80
1	A	823	C	C2-N1-C1'	8.68	128.34	118.80
1	A	1481	A	N7-C8-N9	8.66	118.13	113.80
1	A	1500	C	C2-N1-C1'	8.63	128.29	118.80
1	A	1500	C	N1-C2-O2	8.63	124.08	118.90
1	A	1339	C	C6-N1-C2	-8.58	116.87	120.30
1	A	81	A	N7-C8-N9	8.53	118.07	113.80
1	A	652	C	N3-C2-O2	-8.53	115.93	121.90
1	A	236	G	N1-C6-O6	-8.44	114.84	119.90
1	A	158	A	C5-N7-C8	-8.41	99.69	103.90
1	A	1502	C	N1-C2-O2	8.40	123.94	118.90
1	A	604	A	C4-C5-N7	8.25	114.83	110.70
1	A	772	U	N3-C4-O4	-8.22	113.64	119.40
1	A	705	C	C5-C6-N1	8.21	125.10	121.00
13	O	42	ILE	CG1-CB-CG2	-8.19	93.38	111.40
1	A	661	C	N1-C2-O2	8.18	123.81	118.90
1	A	1481	A	C5-N7-C8	-8.18	99.81	103.90
43	i	80	LEU	CA-CB-CG	8.10	133.94	115.30
1	A	112	G	C5-C6-N1	8.07	115.54	111.50
1	A	772	U	N3-C2-O2	-8.05	116.57	122.20
1	A	1184	U	N1-C2-O2	8.04	128.43	122.80
1	A	391	C	C5-C6-N1	8.00	125.00	121.00
1	A	374	A	N3-C4-N9	7.96	133.77	127.40
1	A	604	A	O4'-C1'-N9	7.95	114.56	108.20
43	i	107	LEU	CB-CG-CD2	-7.95	97.49	111.00
1	A	158	A	N1-C2-N3	7.90	133.25	129.30
1	A	1339	C	N3-C2-O2	-7.83	116.42	121.90
1	A	1339	C	C2-N1-C1'	7.83	127.41	118.80
2	B	1627	C	C6-N1-C2	-7.80	117.18	120.30
1	A	612	C	C2-N1-C1'	7.79	127.37	118.80
43	i	80	LEU	CB-CG-CD2	-7.76	97.80	111.00
1	A	823	C	N1-C2-O2	7.75	123.55	118.90
1	A	625	C	N1-C2-O2	7.74	123.55	118.90
1	A	645	A	O4'-C1'-N9	7.73	114.38	108.20
1	A	1322	G	C4-C5-N7	7.73	113.89	110.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	123	G	N1-C6-O6	-7.71	115.28	119.90
1	A	1042	G	N1-C6-O6	-7.71	115.28	119.90
1	A	1542	C	C5-C6-N1	7.71	124.85	121.00
1	A	614	C	N3-C2-O2	-7.70	116.51	121.90
24	Z	61	GLN	C-N-CA	7.69	140.93	121.70
1	A	1230	C	C6-N1-C1'	-7.68	111.59	120.80
1	A	156	G	N7-C8-N9	7.67	116.93	113.10
1	A	1165	C	C6-N1-C2	-7.66	117.23	120.30
1	A	1322	G	C4-N9-C1'	7.66	136.46	126.50
22	X	120	ASP	CB-CG-OD1	7.64	125.18	118.30
1	A	1542	C	N1-C2-O2	7.60	123.46	118.90
1	A	589	C	N1-C2-O2	7.59	123.45	118.90
1	A	852	U	C6-N1-C1'	-7.57	110.60	121.20
1	A	852	U	N3-C2-O2	-7.56	116.91	122.20
1	A	853	C	N3-C2-O2	-7.54	116.62	121.90
1	A	1322	G	C8-N9-C1'	-7.49	117.27	127.00
1	A	517	C	N3-C2-O2	-7.48	116.66	121.90
1	A	1322	G	N9-C4-C5	-7.45	102.42	105.40
1	A	852	U	C5-C6-N1	7.44	126.42	122.70
54	v	29	ASP	CB-CG-OD1	7.42	124.97	118.30
1	A	874	C	N1-C2-O2	7.41	123.34	118.90
1	A	45	C	N1-C2-O2	7.39	123.34	118.90
1	A	343	U	O5'-P-OP1	-7.38	99.06	105.70
1	A	288	G	O4'-C1'-N9	7.37	114.10	108.20
1	A	1534	C	N1-C2-O2	7.32	123.29	118.90
1	A	614	C	C2-N1-C1'	7.32	126.85	118.80
1	A	604	A	N7-C8-N9	7.31	117.45	113.80
1	A	1488	A	C5-N7-C8	-7.29	100.25	103.90
43	i	63	LEU	CA-CB-CG	7.20	131.87	115.30
1	A	1228	U	C2-N1-C1'	7.16	126.29	117.70
1	A	64	A	C2-N3-C4	7.15	114.17	110.60
31	6	360	ARG	C-N-CA	7.15	139.57	121.70
1	A	80	G	O4'-C1'-N9	7.14	113.92	108.20
1	A	1401	U	C5-C6-N1	7.12	126.26	122.70
1	A	31	U	N3-C2-O2	-7.11	117.22	122.20
1	A	231	C	C6-N1-C2	-7.10	117.46	120.30
1	A	1452	U	C2-N1-C1'	7.08	126.20	117.70
1	A	45	C	C6-N1-C1'	-7.08	112.31	120.80
54	v	14	ARG	CA-CB-CG	7.08	128.97	113.40
1	A	612	C	N3-C2-O2	-7.06	116.96	121.90
16	R	10	LEU	CA-CB-CG	7.06	131.53	115.30
19	U	38	ASP	CB-CG-OD1	7.01	124.61	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1502	C	C6-N1-C2	-7.00	117.50	120.30
22	X	222	ASP	CB-CG-OD2	6.99	124.59	118.30
31	6	193	VAL	C-N-CA	6.97	139.13	121.70
11	M	154	ILE	CG1-CB-CG2	-6.96	96.10	111.40
1	A	787	A	P-O3'-C3'	6.95	128.04	119.70
1	A	145	A	C8-N9-C4	-6.94	103.02	105.80
1	A	661	C	C2-N1-C1'	6.94	126.44	118.80
1	A	823	C	N3-C2-O2	-6.94	117.04	121.90
31	6	161	LEU	CA-CB-CG	6.92	131.23	115.30
1	A	613	C	N1-C2-O2	6.92	123.05	118.90
1	A	123	G	C5-C6-N1	6.89	114.95	111.50
1	A	1531	A	P-O3'-C3'	6.89	127.96	119.70
1	A	870	C	N1-C2-O2	6.88	123.03	118.90
13	O	104	TYR	CB-CG-CD1	6.87	125.12	121.00
1	A	112	G	C5-C6-O6	-6.86	124.48	128.60
1	A	661	C	N3-C2-O2	-6.86	117.10	121.90
1	A	1184	U	C2-N1-C1'	6.86	125.93	117.70
1	A	1534	C	C6-N1-C1'	-6.84	112.59	120.80
1	A	804	C	C5-C6-N1	6.83	124.42	121.00
1	A	573	A	P-O3'-C3'	6.83	127.89	119.70
1	A	709	C	N1-C2-O2	6.83	123.00	118.90
1	A	1165	C	C5-C6-N1	6.80	124.40	121.00
1	A	747	C	N1-C2-O2	6.77	122.96	118.90
1	A	179	C	C6-N1-C2	-6.76	117.60	120.30
17	S	182	LYS	CD-CE-NZ	-6.75	96.17	111.70
1	A	1502	C	C6-N1-C1'	-6.75	112.71	120.80
1	A	641	U	N3-C2-O2	-6.74	117.48	122.20
1	A	652	C	C2-N1-C1'	6.74	126.21	118.80
31	6	216	LEU	CA-CB-CG	6.74	130.79	115.30
1	A	1502	C	N3-C2-O2	-6.71	117.20	121.90
1	A	1236	C	C6-N1-C2	-6.70	117.62	120.30
1	A	100	G	O5'-P-OP2	-6.69	99.68	105.70
5	F	280	TYR	CA-CB-CG	6.68	126.09	113.40
1	A	612	C	N1-C2-O2	6.67	122.90	118.90
1	A	341	G	N1-C6-O6	-6.66	115.91	119.90
1	A	349	G	N1-C6-O6	-6.66	115.91	119.90
1	A	1162	A	N7-C8-N9	6.64	117.12	113.80
1	A	1056	C	C6-N1-C2	-6.64	117.64	120.30
1	A	1542	C	C6-N1-C2	-6.63	117.65	120.30
52	s	251	VAL	CG1-CB-CG2	-6.62	100.31	110.90
2	B	1627	C	N3-C2-O2	-6.62	117.27	121.90
1	A	516	C	N1-C2-O2	6.61	122.86	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	360	U	OP2-P-O3'	6.61	119.74	105.20
1	A	582	C	C5-C6-N1	6.61	124.30	121.00
1	A	235	C	C6-N1-C2	-6.59	117.66	120.30
1	A	1534	C	N3-C2-O2	-6.59	117.29	121.90
1	A	1501	C	C6-N1-C2	-6.58	117.67	120.30
1	A	195	C	N3-C4-C5	6.58	124.53	121.90
1	A	1058	C	C6-N1-C2	-6.54	117.68	120.30
1	A	709	C	C6-N1-C1'	-6.53	112.97	120.80
1	A	612	C	C5-C6-N1	6.51	124.26	121.00
1	A	702	U	C2-N1-C1'	6.51	125.51	117.70
1	A	375	A	C5-C6-N1	6.50	120.95	117.70
1	A	853	C	C6-N1-C2	-6.50	117.70	120.30
1	A	1542	C	C6-N1-C1'	-6.49	113.01	120.80
1	A	107	A	O4'-C1'-N9	6.48	113.39	108.20
1	A	1195	C	N3-C2-O2	-6.48	117.37	121.90
1	A	1078	A	C6-N1-C2	-6.47	114.72	118.60
1	A	407	C	N1-C2-O2	6.46	122.78	118.90
1	A	1	G	O4'-C1'-N9	6.46	113.36	108.20
1	A	112	G	O4'-C1'-N9	6.46	113.36	108.20
1	A	1056	C	N3-C2-O2	-6.45	117.38	121.90
1	A	575	A	O4'-C1'-N9	6.45	113.36	108.20
1	A	374	A	C5-C6-N1	6.45	120.92	117.70
1	A	506	C	N3-C2-O2	-6.43	117.40	121.90
1	A	169	C	C6-N1-C2	-6.43	117.73	120.30
1	A	1488	A	C4-C5-N7	6.43	113.92	110.70
1	A	1548	A	O5'-P-OP2	-6.43	99.91	105.70
1	A	1058	C	C5-C6-N1	6.43	124.21	121.00
1	A	374	A	N9-C4-C5	-6.42	103.23	105.80
1	A	59	U	N1-C2-O2	6.42	127.30	122.80
1	A	1014	C	C2-N1-C1'	6.42	125.86	118.80
1	A	589	C	C2-N1-C1'	6.40	125.84	118.80
1	A	19	C	C2-N1-C1'	6.39	125.83	118.80
1	A	613	C	C2-N1-C1'	6.39	125.83	118.80
1	A	19	C	N1-C2-O2	6.39	122.73	118.90
1	A	610	C	C2-N1-C1'	6.39	125.83	118.80
1	A	604	A	N1-C6-N6	6.39	122.43	118.60
1	A	219	C	C6-N1-C2	-6.38	117.75	120.30
1	A	214	G	C8-N9-C4	6.38	108.95	106.40
1	A	625	C	N3-C4-N4	-6.36	113.55	118.00
1	A	225	C	N3-C4-C5	6.36	124.44	121.90
1	A	1488	A	N7-C8-N9	6.36	116.98	113.80
1	A	808	G	N3-C4-N9	6.34	129.80	126.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	K	145	LEU	CA-CB-CG	6.33	129.87	115.30
13	O	104	TYR	CB-CG-CD2	-6.33	117.20	121.00
1	A	1501	C	N1-C2-O2	6.33	122.70	118.90
1	A	409	C	N1-C2-O2	6.33	122.70	118.90
1	A	1499	C	C2-N1-C1'	6.32	125.75	118.80
3	D	207	ILE	CG1-CB-CG2	-6.31	97.52	111.40
1	A	81	A	C8-N9-C4	-6.31	103.28	105.80
17	S	144	LEU	CA-CB-CG	6.30	129.80	115.30
1	A	819	C	C2-N1-C1'	6.29	125.72	118.80
1	A	702	U	N1-C2-O2	6.29	127.21	122.80
52	s	243	ILE	CG1-CB-CG2	-6.29	97.56	111.40
1	A	466	C	C5-C6-N1	6.29	124.14	121.00
1	A	808	G	C8-N9-C1'	-6.28	118.83	127.00
1	A	709	C	O4'-C1'-N1	6.27	113.22	108.20
1	A	1195	C	N1-C2-O2	6.27	122.66	118.90
2	B	1626	C	N1-C2-O2	6.27	122.66	118.90
1	A	102	A	C2-N3-C4	6.26	113.73	110.60
1	A	1228	U	N1-C2-O2	6.25	127.18	122.80
1	A	788	A	O5'-P-OP1	-6.24	100.08	105.70
1	A	1501	C	N3-C2-O2	-6.23	117.54	121.90
13	O	20	LEU	CA-CB-CG	6.23	129.62	115.30
1	A	1001	C	C6-N1-C2	-6.22	117.81	120.30
1	A	1500	C	C5-C6-N1	6.22	124.11	121.00
1	A	44	C	N1-C2-O2	6.21	122.63	118.90
1	A	506	C	C6-N1-C2	-6.21	117.81	120.30
1	A	705	C	C4-C5-C6	-6.21	114.29	117.40
17	S	134	LEU	CA-CB-CG	6.20	129.56	115.30
1	A	455	C	C6-N1-C2	-6.19	117.82	120.30
13	O	67	ASP	CB-CG-OD2	6.19	123.87	118.30
1	A	426	U	C5-C4-O4	-6.19	122.19	125.90
1	A	459	G	C4-C5-N7	6.18	113.27	110.80
1	A	125	A	N1-C6-N6	-6.17	114.90	118.60
1	A	1184	U	C6-N1-C1'	-6.12	112.62	121.20
38	d	175	ASP	CB-CG-OD2	6.11	123.80	118.30
1	A	603	A	N1-C2-N3	-6.10	126.25	129.30
1	A	1481	A	C6-C5-N7	-6.09	128.04	132.30
31	6	226	LEU	CA-CB-CG	6.09	129.31	115.30
1	A	122	G	N1-C6-O6	-6.08	116.25	119.90
1	A	118	C	C6-N1-C2	-6.07	117.87	120.30
1	A	407	C	N3-C2-O2	-6.06	117.66	121.90
1	A	1226	G	O4'-C1'-N9	6.06	113.05	108.20
1	A	1452	U	N1-C2-O2	6.06	127.04	122.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	466	C	C2-N1-C1'	6.05	125.46	118.80
37	c	241	LEU	CB-CG-CD1	-6.05	100.71	111.00
23	Y	172	ILE	CG1-CB-CG2	-6.05	98.09	111.40
1	A	1500	C	C6-N1-C1'	-6.05	113.54	120.80
11	M	158	LEU	CA-CB-CG	6.04	129.19	115.30
1	A	1500	C	N3-C2-O2	-6.03	117.68	121.90
1	A	993	C	C5-C6-N1	6.03	124.01	121.00
1	A	823	C	C6-N1-C2	-6.02	117.89	120.30
1	A	1481	A	C8-N9-C4	-6.01	103.39	105.80
36	b	26	LEU	CA-CB-CG	6.01	129.13	115.30
9	K	21	LEU	CB-CG-CD2	-6.00	100.80	111.00
1	A	81	A	C5-N7-C8	-5.99	100.90	103.90
1	A	631	U	C5-C6-N1	5.99	125.70	122.70
1	A	670	C	N1-C2-O2	5.99	122.49	118.90
1	A	360	U	P-O3'-C3'	5.99	126.88	119.70
1	A	823	C	C6-N1-C1'	-5.99	113.62	120.80
30	5	98	LEU	CA-CB-CG	5.97	129.04	115.30
1	A	1487	C	N3-C2-O2	-5.95	117.73	121.90
1	A	62	C	C5-C6-N1	5.94	123.97	121.00
1	A	808	G	C4-N9-C1'	5.94	134.22	126.50
12	N	224	LEU	CA-CB-CG	5.94	128.95	115.30
1	A	236	G	C6-C5-N7	5.93	133.96	130.40
1	A	853	C	C5-C6-N1	5.93	123.97	121.00
1	A	208	U	N3-C2-O2	-5.93	118.05	122.20
1	A	1487	C	C2-N1-C1'	5.92	125.32	118.80
1	A	565	C	N1-C2-O2	5.92	122.45	118.90
43	i	107	LEU	CA-CB-CG	5.92	128.91	115.30
1	A	316	A	P-O3'-C3'	5.91	126.79	119.70
1	A	117	G	N1-C6-O6	-5.88	116.37	119.90
1	A	1502	C	C5-C6-N1	5.88	123.94	121.00
1	A	1308	U	N1-C2-O2	5.87	126.91	122.80
1	A	468	U	N3-C2-O2	-5.87	118.09	122.20
1	A	773	C	C2-N1-C1'	5.87	125.25	118.80
1	A	874	C	C6-N1-C2	-5.87	117.95	120.30
1	A	1270	A	N1-C6-N6	-5.86	115.08	118.60
25	0	183	SER	C-N-CA	5.85	136.34	121.70
1	A	45	C	C5-C6-N1	5.84	123.92	121.00
1	A	853	C	OP1-P-O3'	5.84	118.05	105.20
1	A	1129	U	C2-N3-C4	-5.83	123.50	127.00
1	A	96	U	N3-C4-O4	-5.82	115.33	119.40
1	A	145	A	C5-N7-C8	-5.82	100.99	103.90
30	5	417	LEU	CB-CG-CD1	-5.81	101.12	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	645	A	N7-C8-N9	5.80	116.70	113.80
1	A	819	C	C5-C6-N1	5.80	123.90	121.00
1	A	367	U	C2-N1-C1'	-5.80	110.74	117.70
1	A	31	U	N1-C2-O2	5.79	126.86	122.80
1	A	236	G	C5-C6-O6	5.79	132.07	128.60
1	A	374	A	C2-N3-C4	5.78	113.49	110.60
1	A	77	G	N1-C2-N3	5.77	127.36	123.90
1	A	1464	C	C6-N1-C2	-5.77	117.99	120.30
1	A	808	G	N9-C4-C5	-5.76	103.10	105.40
1	A	870	C	N3-C2-O2	-5.76	117.87	121.90
1	A	565	C	O4'-C1'-N1	5.75	112.80	108.20
1	A	466	C	N1-C2-O2	5.73	122.34	118.90
1	A	1322	G	C4-C5-C6	5.73	122.24	118.80
1	A	141	A	OP1-P-O3'	5.72	117.79	105.20
1	A	575	A	P-O3'-C3'	5.71	126.55	119.70
1	A	1162	A	C5-N7-C8	-5.71	101.05	103.90
1	A	208	U	N1-C2-O2	5.69	126.78	122.80
1	A	709	C	N3-C2-O2	-5.68	117.92	121.90
11	M	185	ASP	CB-CG-OD1	5.67	123.40	118.30
1	A	391	C	C6-N1-C2	-5.67	118.03	120.30
1	A	347	U	N3-C2-O2	-5.66	118.24	122.20
1	A	281	C	C6-N1-C2	-5.66	118.03	120.30
1	A	1500	C	C6-N1-C2	-5.64	118.04	120.30
1	A	1456	C	C5-C6-N1	5.64	123.82	121.00
1	A	747	C	C2-N1-C1'	5.63	124.99	118.80
1	A	1327	A	N1-C6-N6	-5.63	115.22	118.60
1	A	733	G	C4-N9-C1'	5.62	133.81	126.50
6	H	69	ARG	C-N-CA	5.62	135.75	121.70
1	A	374	A	N3-C4-C5	-5.61	122.87	126.80
1	A	1387	C	C6-N1-C2	-5.60	118.06	120.30
1	A	1481	A	C4-C5-N7	5.59	113.50	110.70
1	A	532	C	C2-N1-C1'	5.58	124.94	118.80
1	A	1227	A	C5-N7-C8	-5.58	101.11	103.90
1	A	55	C	C6-N1-C2	-5.57	118.07	120.30
1	A	1399	A	N9-C4-C5	-5.56	103.58	105.80
1	A	141	A	C2-N3-C4	5.56	113.38	110.60
1	A	156	G	C8-N9-C1'	5.54	134.21	127.00
1	A	702	U	C6-N1-C2	-5.54	117.68	121.00
1	A	362	G	C5-N7-C8	-5.53	101.53	104.30
1	A	1078	A	N3-C4-C5	-5.53	122.93	126.80
1	A	142	C	O5'-P-OP1	-5.53	100.72	105.70
1	A	143	C	N1-C2-O2	5.53	122.22	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	996	U	N3-C2-O2	-5.53	118.33	122.20
1	A	1079	A	N7-C8-N9	5.53	116.56	113.80
1	A	1230	C	N1-C2-O2	5.52	122.21	118.90
22	X	79	LEU	CA-CB-CG	5.52	128.00	115.30
1	A	1014	C	N1-C2-O2	5.51	122.21	118.90
1	A	620	A	N1-C2-N3	-5.50	126.55	129.30
1	A	772	U	N1-C2-N3	5.50	118.20	114.90
1	A	498	U	N3-C2-O2	-5.49	118.36	122.20
1	A	504	G	N1-C2-N2	-5.49	111.26	116.20
1	A	808	G	C6-C5-N7	-5.49	127.11	130.40
1	A	661	C	C6-N1-C1'	-5.48	114.22	120.80
1	A	1464	C	N1-C2-O2	5.48	122.19	118.90
1	A	757	C	C5-C6-N1	5.47	123.74	121.00
1	A	819	C	C6-N1-C2	-5.47	118.11	120.30
4	E	218	VAL	CG1-CB-CG2	5.47	119.65	110.90
1	A	50	C	C6-N1-C2	-5.47	118.11	120.30
1	A	1184	U	N3-C2-O2	-5.47	118.37	122.20
1	A	44	C	N3-C2-O2	-5.46	118.08	121.90
1	A	289	C	N1-C2-O2	5.46	122.18	118.90
1	A	376	C	N3-C4-N4	-5.46	114.18	118.00
1	A	1328	U	N3-C2-O2	-5.46	118.38	122.20
1	A	1547	A	OP1-P-O3'	5.46	117.21	105.20
1	A	374	A	C6-C5-N7	-5.46	128.48	132.30
1	A	102	A	O4'-C1'-N9	5.45	112.56	108.20
30	5	382	LEU	CA-CB-CG	5.45	127.84	115.30
7	I	176	LEU	CA-CB-CG	5.45	127.83	115.30
1	A	1542	C	N3-C2-O2	-5.45	118.09	121.90
1	A	662	C	C5-C4-N4	-5.44	116.39	120.20
1	A	276	C	C2-N1-C1'	5.43	124.78	118.80
1	A	1432	U	O5'-P-OP1	-5.43	100.82	105.70
1	A	1464	C	N3-C2-O2	-5.43	118.10	121.90
1	A	362	G	C4-C5-N7	5.42	112.97	110.80
1	A	747	C	N3-C2-O2	-5.42	118.11	121.90
1	A	73	U	N3-C2-O2	-5.42	118.41	122.20
1	A	645	A	C5-N7-C8	-5.42	101.19	103.90
1	A	997	U	N3-C2-O2	-5.42	118.41	122.20
1	A	50	C	N3-C2-O2	-5.41	118.11	121.90
1	A	1133	A	C6-C5-N7	-5.41	128.51	132.30
1	A	673	G	C8-N9-C4	-5.41	104.24	106.40
1	A	1319	G	OP2-P-O3'	5.40	117.08	105.20
1	A	774	A	N1-C6-N6	-5.39	115.36	118.60
22	X	101	LEU	CA-CB-CG	5.39	127.70	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	589	C	C6-N1-C1'	-5.39	114.33	120.80
1	A	659	C	N1-C2-O2	5.39	122.13	118.90
1	A	1017	C	C5-C6-N1	5.39	123.69	121.00
1	A	662	C	C2-N3-C4	-5.39	117.21	119.90
1	A	636	A	C2-N3-C4	5.38	113.29	110.60
1	A	1258	C	C2-N1-C1'	5.38	124.72	118.80
1	A	156	G	N1-C2-N3	5.38	127.13	123.90
1	A	1277	U	N1-C2-O2	5.38	126.57	122.80
1	A	1198	C	C6-N1-C2	-5.38	118.15	120.30
1	A	1056	C	N1-C2-O2	5.37	122.12	118.90
1	A	1452	U	N3-C2-O2	-5.37	118.44	122.20
1	A	290	A	C2-N3-C4	5.37	113.29	110.60
1	A	77	G	C2-N3-C4	-5.36	109.22	111.90
1	A	1133	A	N7-C8-N9	5.36	116.48	113.80
1	A	632	U	N1-C2-O2	5.34	126.54	122.80
1	A	156	G	N9-C4-C5	5.33	107.53	105.40
1	A	1534	C	O4'-C1'-N1	5.33	112.46	108.20
1	A	841	C	C2-N1-C1'	5.33	124.66	118.80
1	A	454	A	C2-N3-C4	-5.31	107.94	110.60
1	A	1187	U	N1-C2-O2	5.31	126.51	122.80
1	A	422	C	N3-C4-C5	5.30	124.02	121.90
1	A	582	C	C2-N1-C1'	5.30	124.63	118.80
1	A	985	G	C6-C5-N7	-5.29	127.22	130.40
1	A	614	C	C6-N1-C2	-5.29	118.18	120.30
10	L	90	CYS	C-N-CA	-5.29	108.48	121.70
1	A	1162	A	C6-C5-N7	-5.29	128.60	132.30
1	A	73	U	C6-N1-C2	-5.28	117.83	121.00
1	A	354	C	C6-N1-C2	-5.28	118.19	120.30
1	A	1339	C	N1-C2-O2	5.28	122.06	118.90
1	A	409	C	N3-C2-O2	-5.27	118.21	121.90
1	A	1078	A	N3-C4-N9	5.27	131.61	127.40
52	s	301	LEU	CA-CB-CG	5.27	127.42	115.30
1	A	1027	G	N9-C4-C5	-5.26	103.29	105.40
1	A	319	C	C5-C6-N1	5.26	123.63	121.00
32	7	269	ILE	CG1-CB-CG2	-5.25	99.85	111.40
1	A	465	A	N1-C6-N6	-5.25	115.45	118.60
11	M	140	LEU	CB-CG-CD1	-5.24	102.09	111.00
1	A	98	G	C4-C5-N7	5.24	112.89	110.80
1	A	406	C	C5-C6-N1	5.24	123.62	121.00
1	A	733	G	C6-C5-N7	-5.24	127.26	130.40
1	A	73	U	C5-C6-N1	5.24	125.32	122.70
42	h	136	ASP	C-N-CA	5.24	134.79	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	q	52	LEU	CA-CB-CG	5.24	127.34	115.30
1	A	1014	C	C6-N1-C2	-5.23	118.21	120.30
1	A	352	G	C4-C5-N7	5.23	112.89	110.80
1	A	560	A	O5'-P-OP1	5.23	116.97	110.70
1	A	313	U	N3-C2-O2	-5.23	118.54	122.20
1	A	376	C	N3-C4-C5	5.22	123.99	121.90
1	A	565	C	C6-N1-C1'	-5.22	114.54	120.80
1	A	965	G	N3-C4-N9	5.21	129.13	126.00
1	A	62	C	C6-N1-C2	-5.21	118.22	120.30
1	A	347	U	C6-N1-C2	-5.21	117.87	121.00
1	A	470	G	N1-C6-O6	-5.21	116.77	119.90
1	A	1501	C	C2-N1-C1'	5.21	124.53	118.80
1	A	1028	G	O4'-C1'-N9	5.21	112.36	108.20
1	A	605	U	N3-C2-O2	-5.20	118.56	122.20
1	A	632	U	N3-C2-O2	-5.20	118.56	122.20
1	A	374	A	C8-N9-C1'	-5.20	118.34	127.70
1	A	176	C	C6-N1-C2	-5.20	118.22	120.30
1	A	810	A	N7-C8-N9	5.20	116.40	113.80
1	A	113	U	N1-C2-O2	5.19	126.44	122.80
1	A	860	A	P-O3'-C3'	5.19	125.93	119.70
18	T	95	ARG	C-N-CA	-5.19	111.40	122.30
1	A	674	C	C5-C6-N1	5.19	123.59	121.00
41	g	117	ILE	CG1-CB-CG2	-5.19	99.98	111.40
57	y	202	LYS	C-N-CA	5.19	134.68	121.70
1	A	659	C	C2-N1-C1'	5.19	124.50	118.80
1	A	14	C	N3-C4-C5	5.18	123.97	121.90
1	A	56	C	C6-N1-C2	-5.18	118.23	120.30
1	A	374	A	C4-N9-C1'	5.17	135.61	126.30
1	A	64	A	N3-C4-N9	5.17	131.53	127.40
6	H	103	GLU	CA-CB-CG	5.17	124.77	113.40
1	A	1033	C	C6-N1-C2	-5.17	118.23	120.30
1	A	15	C	N3-C2-O2	-5.16	118.28	121.90
1	A	1432	U	C5-C4-O4	-5.16	122.81	125.90
1	A	19	C	N3-C2-O2	-5.16	118.29	121.90
1	A	465	A	C2-N3-C4	5.15	113.18	110.60
1	A	498	U	N1-C2-O2	5.15	126.41	122.80
4	E	231	HIS	C-N-CA	5.14	133.10	122.30
11	M	16	LEU	CA-CB-CG	5.14	127.12	115.30
1	A	1321	U	N1-C2-O2	5.14	126.40	122.80
1	A	636	A	N1-C2-N3	-5.14	126.73	129.30
6	H	69	ARG	NE-CZ-NH1	5.13	122.87	120.30
1	A	106	G	N1-C6-O6	-5.13	116.82	119.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	64	A	N3-C4-C5	-5.12	123.22	126.80
1	A	405	U	C2-N1-C1'	5.11	123.84	117.70
1	A	604	A	C6-C5-N7	-5.11	128.72	132.30
1	A	993	C	C6-N1-C2	-5.11	118.26	120.30
1	A	1129	U	N1-C2-N3	5.11	117.96	114.90
43	i	38	LEU	CA-CB-CG	5.10	127.04	115.30
1	A	1259	C	C6-N1-C2	-5.10	118.26	120.30
1	A	1162	A	C4-N9-C1'	5.09	135.47	126.30
56	x	380	MET	CA-CB-CG	5.09	121.96	113.30
1	A	156	G	C5-N7-C8	-5.09	101.75	104.30
1	A	1542	C	O4'-C1'-N1	5.09	112.27	108.20
1	A	44	C	C2-N1-C1'	5.08	124.39	118.80
1	A	409	C	C6-N1-C2	-5.08	118.27	120.30
1	A	483	A	C5-C6-N1	5.08	120.24	117.70
1	A	456	U	C5-C6-N1	5.07	125.23	122.70
1	A	1495	C	C6-N1-C2	-5.07	118.27	120.30
2	B	1626	C	C2-N1-C1'	5.07	124.37	118.80
31	6	255	LEU	CA-CB-CG	5.06	126.94	115.30
1	A	1387	C	C5-C6-N1	5.06	123.53	121.00
1	A	622	G	N7-C8-N9	5.06	115.63	113.10
1	A	73	U	N1-C2-O2	5.06	126.34	122.80
1	A	610	C	C6-N1-C1'	-5.05	114.73	120.80
1	A	625	C	C6-N1-C2	-5.05	118.28	120.30
1	A	783	G	C4-C5-N7	5.05	112.82	110.80
1	A	1321	U	N3-C2-O2	-5.05	118.67	122.20
1	A	643	A	C4-C5-N7	5.05	113.22	110.70
1	A	147	C	N3-C4-C5	5.05	123.92	121.90
1	A	210	C	O5'-P-OP2	-5.05	101.16	105.70
1	A	169	C	C5-C6-N1	5.04	123.52	121.00
1	A	196	U	C5-C6-N1	5.04	125.22	122.70
1	A	1464	C	C2-N1-C1'	5.04	124.34	118.80
1	A	158	A	C8-N9-C1'	5.03	136.76	127.70
1	A	664	C	C6-N1-C2	-5.03	118.29	120.30
1	A	613	C	N3-C2-O2	-5.02	118.38	121.90
1	A	505	C	N1-C2-O2	5.02	121.91	118.90
1	A	406	C	C2-N1-C1'	5.01	124.31	118.80
1	A	456	U	C6-N1-C2	-5.01	117.99	121.00
1	A	1014	C	C5-C6-N1	5.01	123.50	121.00
1	A	1488	A	C6-C5-N7	-5.01	128.79	132.30
22	X	10	LEU	CA-CB-CG	5.01	126.82	115.30
1	A	800	G	O4'-C1'-N9	5.00	112.20	108.20

There are no chirality outliers.

All (27) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
30	5	68	PRO	Peptide
31	6	234	HIS	Peptide
34	9	45	THR	Peptide
34	9	47	GLY	Peptide
34	9	71	LYS	Peptide
3	D	206	TYR	Peptide
4	E	249	GLY	Peptide
5	F	140	SER	Peptide
9	K	158	TYR	Peptide
9	K	159	THR	Peptide
11	M	152	VAL	Peptide
11	M	279	ASP	Peptide
11	M	53	HIS	Peptide
12	N	224	LEU	Peptide
13	O	110	ILE	Peptide
13	O	127	GLY	Peptide
15	Q	227	LYS	Peptide
16	R	137	GLU	Peptide
20	V	170	TRP	Peptide
38	d	268	PRO	Peptide
42	h	63	PRO	Peptide
43	i	57	TYR	Peptide
44	j	25	GLY	Peptide
45	k	14	LYS	Peptide
52	s	270	LYS	Peptide
52	s	283	PHE	Peptide
52	s	314	GLN	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	
3	D	215/305 (70%)	198 (92%)	16 (7%)	1 (0%)	29	64
4	E	296/348 (85%)	275 (93%)	21 (7%)	0	100	100
5	F	248/311 (80%)	229 (92%)	19 (8%)	0	100	100
6	H	93/267 (35%)	90 (97%)	3 (3%)	0	100	100
7	I	154/261 (59%)	145 (94%)	9 (6%)	0	100	100
8	J	138/192 (72%)	130 (94%)	8 (6%)	0	100	100
9	K	175/178 (98%)	158 (90%)	16 (9%)	1 (1%)	25	59
10	L	113/145 (78%)	101 (89%)	12 (11%)	0	100	100
11	M	285/296 (96%)	262 (92%)	23 (8%)	0	100	100
12	N	203/251 (81%)	191 (94%)	12 (6%)	0	100	100
13	O	150/175 (86%)	130 (87%)	19 (13%)	1 (1%)	22	57
14	P	129/180 (72%)	123 (95%)	6 (5%)	0	100	100
15	Q	217/292 (74%)	195 (90%)	22 (10%)	0	100	100
16	R	138/149 (93%)	129 (94%)	9 (6%)	0	100	100
17	S	154/205 (75%)	146 (95%)	8 (5%)	0	100	100
18	T	164/206 (80%)	159 (97%)	5 (3%)	0	100	100
19	U	109/153 (71%)	100 (92%)	9 (8%)	0	100	100
20	V	183/216 (85%)	166 (91%)	16 (9%)	1 (0%)	29	64
21	W	109/148 (74%)	105 (96%)	4 (4%)	0	100	100
22	X	241/256 (94%)	219 (91%)	22 (9%)	0	100	100
23	Y	174/250 (70%)	162 (93%)	12 (7%)	0	100	100
24	Z	118/161 (73%)	110 (93%)	8 (7%)	0	100	100
25	0	106/188 (56%)	95 (90%)	11 (10%)	0	100	100
26	1	50/65 (77%)	45 (90%)	5 (10%)	0	100	100
27	2	44/92 (48%)	42 (96%)	2 (4%)	0	100	100
28	3	93/188 (50%)	86 (92%)	7 (8%)	0	100	100
29	4	34/103 (33%)	31 (91%)	3 (9%)	0	100	100
30	5	368/423 (87%)	328 (89%)	40 (11%)	0	100	100
31	6	313/380 (82%)	269 (86%)	44 (14%)	0	100	100
32	7	258/338 (76%)	235 (91%)	23 (9%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
33	8	97/206 (47%)	92 (95%)	5 (5%)	0	100	100
34	9	105/137 (77%)	92 (88%)	13 (12%)	0	100	100
35	a	78/142 (55%)	75 (96%)	3 (4%)	0	100	100
36	b	146/215 (68%)	133 (91%)	13 (9%)	0	100	100
37	c	271/332 (82%)	251 (93%)	20 (7%)	0	100	100
38	d	156/306 (51%)	139 (89%)	16 (10%)	1 (1%)	25	59
39	e	211/279 (76%)	203 (96%)	8 (4%)	0	100	100
40	f	125/212 (59%)	115 (92%)	10 (8%)	0	100	100
41	g	127/166 (76%)	118 (93%)	9 (7%)	0	100	100
42	h	96/158 (61%)	85 (88%)	10 (10%)	1 (1%)	15	49
43	i	95/128 (74%)	86 (90%)	9 (10%)	0	100	100
44	j	83/123 (68%)	79 (95%)	4 (5%)	0	100	100
45	k	82/112 (73%)	73 (89%)	9 (11%)	0	100	100
46	l	21/138 (15%)	21 (100%)	0	0	100	100
47	m	43/128 (34%)	41 (95%)	2 (5%)	0	100	100
48	o	92/102 (90%)	91 (99%)	1 (1%)	0	100	100
49	p	119/206 (58%)	112 (94%)	7 (6%)	0	100	100
50	q	117/222 (53%)	113 (97%)	4 (3%)	0	100	100
51	r	140/196 (71%)	131 (94%)	9 (6%)	0	100	100
52	s	366/439 (83%)	335 (92%)	31 (8%)	0	100	100
53	u	109/234 (47%)	102 (94%)	7 (6%)	0	100	100
54	v	67/70 (96%)	64 (96%)	3 (4%)	0	100	100
55	w	77/156 (49%)	70 (91%)	7 (9%)	0	100	100
56	x	344/384 (90%)	319 (93%)	25 (7%)	0	100	100
57	y	205/381 (54%)	191 (93%)	14 (7%)	0	100	100
All	All	8444/11894 (71%)	7785 (92%)	653 (8%)	6 (0%)	54	83

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	D	207	ILE
20	V	101	THR
42	h	138	SER

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Mol	Chain	Res	Type
9	K	160	GLN
38	d	163	LEU
13	O	111	PRO

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	
3	D	175/245 (71%)	175 (100%)	0	100	100
4	E	255/290 (88%)	255 (100%)	0	100	100
5	F	217/262 (83%)	217 (100%)	0	100	100
6	H	86/228 (38%)	85 (99%)	1 (1%)	71	88
7	I	145/232 (62%)	144 (99%)	1 (1%)	84	93
8	J	113/150 (75%)	111 (98%)	2 (2%)	59	82
9	K	155/156 (99%)	155 (100%)	0	100	100
10	L	98/124 (79%)	98 (100%)	0	100	100
11	M	245/249 (98%)	245 (100%)	0	100	100
12	N	172/211 (82%)	172 (100%)	0	100	100
13	O	133/150 (89%)	133 (100%)	0	100	100
14	P	115/155 (74%)	115 (100%)	0	100	100
15	Q	201/256 (78%)	201 (100%)	0	100	100
16	R	118/126 (94%)	117 (99%)	1 (1%)	81	92
17	S	141/180 (78%)	140 (99%)	1 (1%)	84	93
18	T	146/176 (83%)	146 (100%)	0	100	100
19	U	99/135 (73%)	98 (99%)	1 (1%)	76	90
20	V	169/191 (88%)	169 (100%)	0	100	100
21	W	91/119 (76%)	90 (99%)	1 (1%)	73	89
22	X	217/227 (96%)	216 (100%)	1 (0%)	88	94
23	Y	159/223 (71%)	159 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
24	Z	111/147 (76%)	111 (100%)	0	100	100
25	0	97/164 (59%)	97 (100%)	0	100	100
26	1	49/60 (82%)	49 (100%)	0	100	100
27	2	40/72 (56%)	40 (100%)	0	100	100
28	3	88/166 (53%)	88 (100%)	0	100	100
29	4	35/89 (39%)	35 (100%)	0	100	100
30	5	337/368 (92%)	336 (100%)	1 (0%)	92	96
31	6	266/332 (80%)	263 (99%)	3 (1%)	73	89
32	7	242/303 (80%)	241 (100%)	1 (0%)	91	96
33	8	91/190 (48%)	89 (98%)	2 (2%)	52	78
34	9	91/112 (81%)	91 (100%)	0	100	100
35	a	78/133 (59%)	77 (99%)	1 (1%)	69	87
36	b	130/186 (70%)	129 (99%)	1 (1%)	81	92
37	c	241/288 (84%)	240 (100%)	1 (0%)	91	96
38	d	151/274 (55%)	150 (99%)	1 (1%)	84	93
39	e	188/236 (80%)	188 (100%)	0	100	100
40	f	117/188 (62%)	116 (99%)	1 (1%)	78	91
41	g	119/148 (80%)	119 (100%)	0	100	100
42	h	95/148 (64%)	95 (100%)	0	100	100
43	i	86/110 (78%)	85 (99%)	1 (1%)	71	88
44	j	68/97 (70%)	68 (100%)	0	100	100
45	k	74/90 (82%)	72 (97%)	2 (3%)	44	74
46	l	23/116 (20%)	23 (100%)	0	100	100
47	m	40/113 (35%)	39 (98%)	1 (2%)	47	75
48	o	80/87 (92%)	80 (100%)	0	100	100
49	p	117/181 (65%)	117 (100%)	0	100	100
50	q	103/178 (58%)	103 (100%)	0	100	100
51	r	133/169 (79%)	132 (99%)	1 (1%)	81	92
52	s	326/381 (86%)	325 (100%)	1 (0%)	92	96
53	u	105/200 (52%)	105 (100%)	0	100	100
54	v	59/60 (98%)	56 (95%)	3 (5%)	24	56

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
55	w	73/136 (54%)	71 (97%)	2 (3%)	44	74
56	x	294/327 (90%)	290 (99%)	4 (1%)	67	86
57	y	161/350 (46%)	160 (99%)	1 (1%)	86	94
All	All	7558/10284 (74%)	7521 (100%)	37 (0%)	89	94

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	H	75	ARG
7	I	93	ASN
8	J	92	LYS
8	J	149	ARG
16	R	11	ARG
17	S	118	ASN
19	U	77	ASN
21	W	109	ARG
22	X	175	GLN
30	5	334	LYS
31	6	52	ARG
31	6	136	ARG
31	6	170	ARG
32	7	44	ARG
33	8	129	ARG
33	8	156	LYS
35	a	137	ASN
36	b	58	ASN
37	c	311	ARG
38	d	182	ARG
40	f	115	ASN
43	i	128	ARG
45	k	17	ARG
45	k	56	ARG
47	m	42	ARG
51	r	52	ARG
52	s	230	ARG
54	v	19	GLN
54	v	28	ARG
54	v	41	LYS
55	w	97	LYS
55	w	106	LYS
56	x	96	LYS

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Mol	Chain	Res	Type
56	x	300	LYS
56	x	326[A]	GLU
56	x	326[B]	GLU
57	y	190	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
3	D	94	HIS
3	D	205	GLN
3	D	271	ASN
7	I	114	HIS
15	Q	132	GLN
19	U	77	ASN
25	0	118	GLN
31	6	234	HIS
40	f	112	ASN
40	f	115	ASN
46	l	124	GLN
52	s	358	GLN
52	s	427	ASN
54	v	43	GLN
56	x	316	GLN
56	x	322	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1370/1559 (87%)	419 (30%)	15 (1%)
2	B	51/69 (73%)	18 (35%)	1 (1%)
All	All	1421/1628 (87%)	437 (30%)	16 (1%)

All (437) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	6	A
1	A	7	C
1	A	8	C
1	A	9	U
1	A	10	A

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Mol	Chain	Res	Type
1	A	11	G
1	A	19	C
1	A	20	C
1	A	29	C
1	A	30	U
1	A	31	U
1	A	34	U
1	A	35	A
1	A	38	A
1	A	43	A
1	A	45	C
1	A	46	U
1	A	54	A
1	A	57	A
1	A	58	U
1	A	61	A
1	A	62	C
1	A	63	C
1	A	64	A
1	A	65	A
1	A	67	A
1	A	78	G
1	A	80	G
1	A	81	A
1	A	90	G
1	A	91	A
1	A	96	U
1	A	98	G
1	A	100	G
1	A	102	A
1	A	103	A
1	A	105	A
1	A	107	A
1	A	110	U
1	A	121	G
1	A	124	A
1	A	126	A
1	A	129	U
1	A	132	A
1	A	133	A
1	A	134	A
1	A	135	A

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Mol	Chain	Res	Type
1	A	142	C
1	A	145	A
1	A	151	A
1	A	156	G
1	A	157	C
1	A	158	A
1	A	159	A
1	A	162	A
1	A	166	A
1	A	169	C
1	A	174	A
1	A	179	C
1	A	180	U
1	A	181	G
1	A	183	A
1	A	184	U
1	A	185	A
1	A	186	A
1	A	195	C
1	A	199	A
1	A	200	A
1	A	202	U
1	A	203	A
1	A	205	C
1	A	208	U
1	A	210	C
1	A	212	A
1	A	213	G
1	A	216	G
1	A	217	A
1	A	219	C
1	A	220	C
1	A	222	A
1	A	223	A
1	A	232	C
1	A	233	C
1	A	240	C
1	A	248	G
1	A	267	A
1	A	268	A
1	A	269	G
1	A	270	A

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Mol	Chain	Res	Type
1	A	274	C
1	A	280	U
1	A	287	A
1	A	296	G
1	A	304	A
1	A	315	G
1	A	316	A
1	A	317	G
1	A	321	A
1	A	322	C
1	A	323	A
1	A	324	A
1	A	328	U
1	A	329	A
1	A	331	C
1	A	332	G
1	A	334	G
1	A	345	G
1	A	351	U
1	A	352	G
1	A	355	C
1	A	360	U
1	A	361	A
1	A	366	C
1	A	367	U
1	A	369	A
1	A	370	G
1	A	374	A
1	A	385	U
1	A	386	G
1	A	387	C
1	A	390	A
1	A	391	C
1	A	395	A
1	A	397	C
1	A	404	A
1	A	407	C
1	A	409	C
1	A	413	U
1	A	422	C
1	A	428	G
1	A	443	G

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Mol	Chain	Res	Type
1	A	454	A
1	A	455	C
1	A	456	U
1	A	463	A
1	A	464	A
1	A	465	A
1	A	467	C
1	A	471	U
1	A	477	G
1	A	482	A
1	A	488	U
1	A	489	U
1	A	493	A
1	A	495	C
1	A	496	C
1	A	501	U
1	A	502	A
1	A	503	G
1	A	507	U
1	A	510	A
1	A	511	A
1	A	513	C
1	A	514	A
1	A	516	C
1	A	517	C
1	A	520	C
1	A	522	A
1	A	523	U
1	A	524	U
1	A	525	A
1	A	527	G
1	A	528	A
1	A	534	U
1	A	540	C
1	A	541	U
1	A	545	C
1	A	546	A
1	A	559	A
1	A	560	A
1	A	563	U
1	A	564	C
1	A	565	C

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Mol	Chain	Res	Type
1	A	567	A
1	A	569	A
1	A	571	A
1	A	573	A
1	A	574	U
1	A	575	A
1	A	576	A
1	A	577	C
1	A	592	C
1	A	593	C
1	A	599	G
1	A	602	C
1	A	614	C
1	A	615	U
1	A	618	A
1	A	621	A
1	A	624	A
1	A	625	C
1	A	627	A
1	A	628	A
1	A	629	U
1	A	630	G
1	A	631	U
1	A	645	A
1	A	646	U
1	A	651	A
1	A	654	U
1	A	660	U
1	A	661	C
1	A	662	C
1	A	671	C
1	A	675	G
1	A	694	C
1	A	699	A
1	A	701	U
1	A	702	U
1	A	704	A
1	A	711	A
1	A	716	C
1	A	717	U
1	A	718	A
1	A	719	C

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Mol	Chain	Res	Type
1	A	720	A
1	A	723	C
1	A	726	C
1	A	727	C
1	A	731	A
1	A	734	U
1	A	735	C
1	A	736	A
1	A	737	U
1	A	739	A
1	A	745	C
1	A	762	A
1	A	764	A
1	A	765	G
1	A	766	G
1	A	774	A
1	A	775	U
1	A	776	A
1	A	779	G
1	A	780	A
1	A	781	A
1	A	782	A
1	A	787	A
1	A	788	A
1	A	793	A
1	A	798	A
1	A	808	G
1	A	814	C
1	A	819	C
1	A	823	C
1	A	830	A
1	A	836	A
1	A	837	A
1	A	841	C
1	A	842	A
1	A	850	C
1	A	851	A
1	A	852	U
1	A	853	C
1	A	854	A
1	A	857	A
1	A	861	U

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Mol	Chain	Res	Type
1	A	870	C
1	A	872	G
1	A	874	C
1	A	965	G
1	A	968	U
1	A	971	A
1	A	975	G
1	A	976	G
1	A	982	G
1	A	984	U
1	A	985	G
1	A	986	U
1	A	989	C
1	A	990	U
1	A	1013	C
1	A	1014	C
1	A	1016	G
1	A	1024	A
1	A	1025	G
1	A	1026	A
1	A	1029	C
1	A	1036	A
1	A	1038	C
1	A	1039	A
1	A	1048	C
1	A	1049	G
1	A	1052	A
1	A	1053	A
1	A	1054	G
1	A	1055	A
1	A	1057	C
1	A	1062	G
1	A	1070	A
1	A	1074	U
1	A	1075	A
1	A	1079	A
1	A	1083	A
1	A	1087	A
1	A	1088	G
1	A	1124	C
1	A	1134	A
1	A	1135	A

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Mol	Chain	Res	Type
1	A	1140	G
1	A	1143	U
1	A	1144	G
1	A	1145	G
1	A	1151	C
1	A	1161	G
1	A	1162	A
1	A	1163	A
1	A	1177	C
1	A	1179	G
1	A	1181	A
1	A	1183	A
1	A	1184	U
1	A	1185	G
1	A	1191	A
1	A	1194	U
1	A	1195	C
1	A	1197	C
1	A	1199	A
1	A	1210	A
1	A	1221	C
1	A	1222	A
1	A	1223	A
1	A	1225	U
1	A	1226	G
1	A	1235	A
1	A	1236	C
1	A	1239	G
1	A	1240	A
1	A	1241	C
1	A	1243	A
1	A	1244	A
1	A	1247	G
1	A	1248	A
1	A	1250	C
1	A	1252	A
1	A	1253	G
1	A	1256	A
1	A	1258	C
1	A	1263	G
1	A	1265	A
1	A	1266	U

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Mol	Chain	Res	Type
1	A	1282	U
1	A	1285	U
1	A	1286	A
1	A	1287	G
1	A	1288	A
1	A	1292	C
1	A	1293	A
1	A	1294	U
1	A	1295	A
1	A	1308	U
1	A	1311	A
1	A	1314	A
1	A	1316	C
1	A	1319	G
1	A	1320	A
1	A	1321	U
1	A	1323	U
1	A	1324	U
1	A	1330	A
1	A	1331	G
1	A	1335	A
1	A	1341	A
1	A	1342	U
1	A	1345	U
1	A	1346	G
1	A	1351	C
1	A	1352	G
1	A	1360	A
1	A	1371	U
1	A	1372	U
1	A	1373	C
1	A	1379	U
1	A	1383	A
1	A	1384	G
1	A	1386	C
1	A	1390	C
1	A	1393	G
1	A	1399	A
1	A	1400	G
1	A	1402	U
1	A	1416	U
1	A	1421	G

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Mol	Chain	Res	Type
1	A	1423	C
1	A	1426	U
1	A	1427	U
1	A	1428	U
1	A	1430	U
1	A	1438	U
1	A	1439	U
1	A	1444	U
1	A	1452	U
1	A	1453	G
1	A	1459	A
1	A	1461	G
1	A	1464	C
1	A	1465	A
1	A	1471	A
1	A	1473	U
1	A	1480	U
1	A	1485	C
1	A	1487	C
1	A	1488	A
1	A	1490	A
1	A	1492	C
1	A	1498	C
1	A	1499	C
1	A	1502	C
1	A	1506	A
1	A	1510	A
1	A	1514	C
1	A	1519	C
1	A	1520	A
1	A	1525	A
1	A	1526	G
1	A	1532	U
1	A	1537	A
1	A	1547	A
1	A	1548	A
2	B	1607	U
2	B	1608	G
2	B	1609	U
2	B	1611	G
2	B	1613	U
2	B	1614	U

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Mol	Chain	Res	Type
2	B	1615	A
2	B	1625	A
2	B	1629	A
2	B	1631	C
2	B	1632	U
2	B	1640	A
2	B	1641	G
2	B	1642	G
2	B	1644	G
2	B	1645	A
2	B	1659	U
2	B	1669	G

All (16) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	64	A
1	A	316	A
1	A	360	U
1	A	516	C
1	A	573	A
1	A	575	A
1	A	787	A
1	A	853	C
1	A	860	A
1	A	1235	A
1	A	1319	G
1	A	1371	U
1	A	1398	G
1	A	1422	U
1	A	1531	A
2	B	1607	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

Of 83 ligands modelled in this entry, 79 are monoatomic - leaving 4 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
59	C	A	1673	-	15,21,22	0.82	0	17,30,33	0.97	1 (5%)
63	SAM	x	401	-	21,29,29	1.20	2 (9%)	18,42,42	1.54	1 (5%)
62	PNS	v	101	-	13,20,21	2.34	3 (23%)	18,26,29	1.34	3 (16%)
60	A	A	1674	-	18,24,25	0.72	1 (5%)	18,35,38	0.81	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
59	C	A	1673	-	-	2/5/25/26	0/2/2/2
63	SAM	x	401	-	-	3/8/33/33	0/3/3/3
62	PNS	v	101	-	-	11/24/26/27	-
60	A	A	1674	-	-	2/3/25/26	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
62	v	101	PNS	C39-N41	5.46	1.45	1.33
62	v	101	PNS	C34-N36	5.38	1.45	1.33
63	x	401	SAM	C2-N3	4.03	1.38	1.32
63	x	401	SAM	C2-N1	2.34	1.38	1.33
62	v	101	PNS	O35-C34	-2.14	1.19	1.23
60	A	1674	A	C8-N7	-2.13	1.30	1.34

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
63	x	401	SAM	N3-C2-N1	-5.43	120.20	128.68
59	A	1673	C	C2-N3-C4	3.30	119.69	116.34
62	v	101	PNS	C37-C38-C39	-3.01	107.34	112.36
62	v	101	PNS	C43-C42-N41	-2.58	106.42	112.31
62	v	101	PNS	C37-N36-C34	-2.54	118.06	122.59

There are no chirality outliers.

All (18) torsion outliers are listed below:

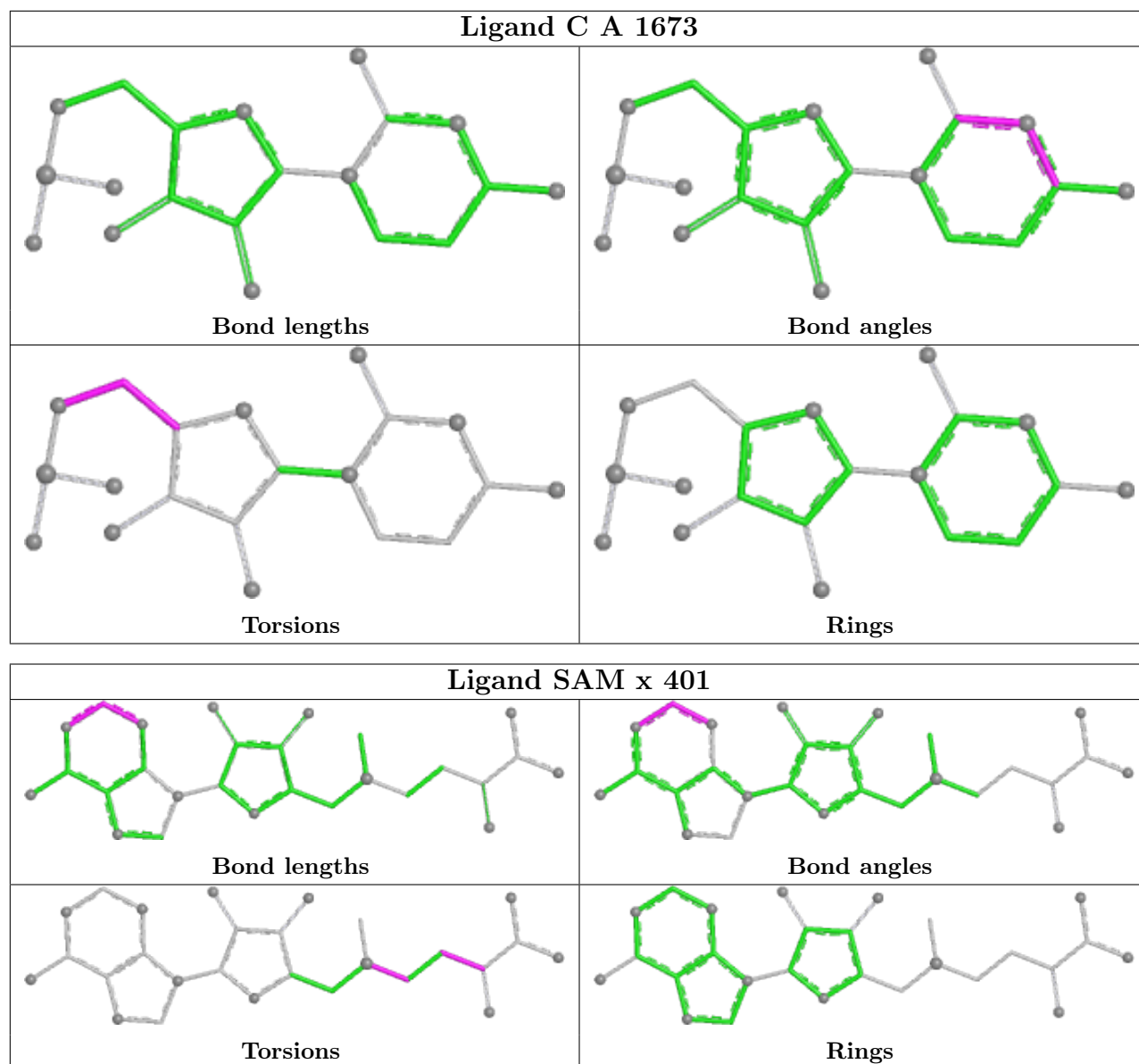
Mol	Chain	Res	Type	Atoms
62	v	101	PNS	O27-C28-C29-C32
62	v	101	PNS	C28-C29-C32-O33
62	v	101	PNS	C28-C29-C32-C34
62	v	101	PNS	C30-C29-C32-C34
62	v	101	PNS	C31-C29-C32-O33
62	v	101	PNS	C31-C29-C32-C34
62	v	101	PNS	N36-C37-C38-C39
62	v	101	PNS	N41-C42-C43-S44
63	x	401	SAM	N-CA-CB-CG
63	x	401	SAM	C-CA-CB-CG
60	A	1674	A	O4'-C4'-C5'-O5'
60	A	1674	A	C3'-C4'-C5'-O5'
62	v	101	PNS	C30-C29-C32-O33
63	x	401	SAM	CB-CG-SD-C5'
62	v	101	PNS	O27-C28-C29-C30
62	v	101	PNS	O27-C28-C29-C31
59	A	1673	C	O4'-C4'-C5'-O5'
59	A	1673	C	C4'-C5'-O5'-P

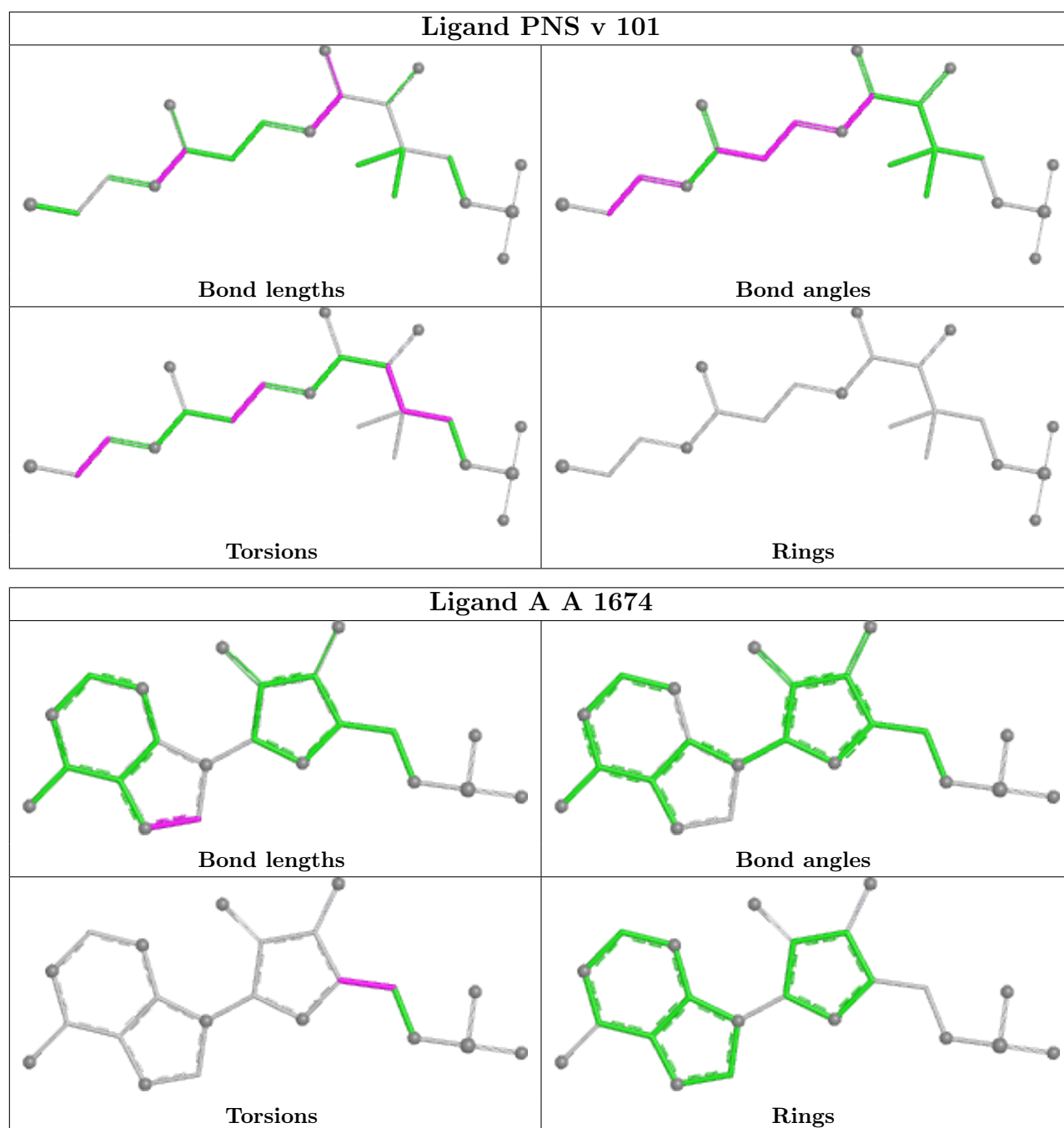
There are no ring outliers.

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.

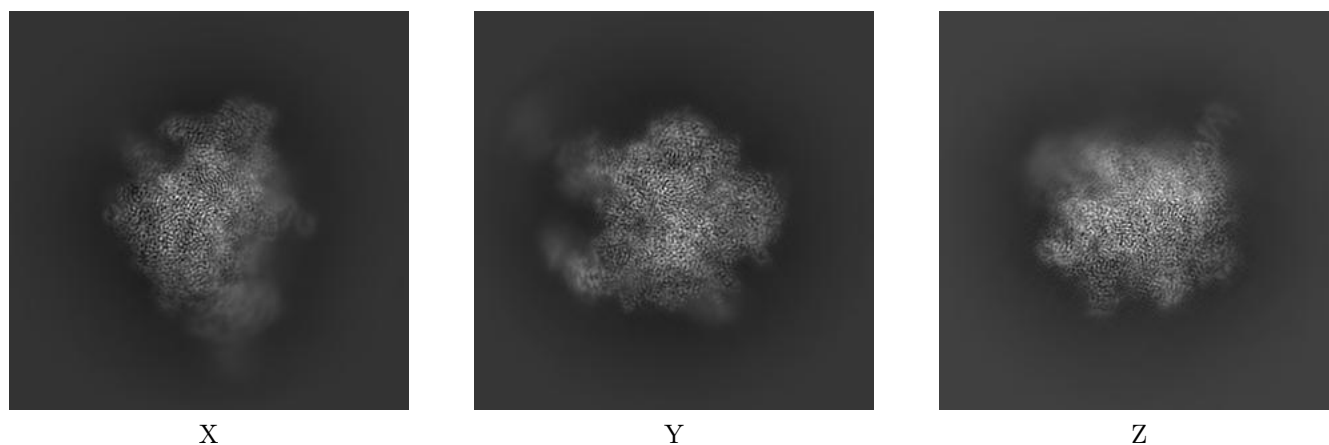
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-12925. 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](#)

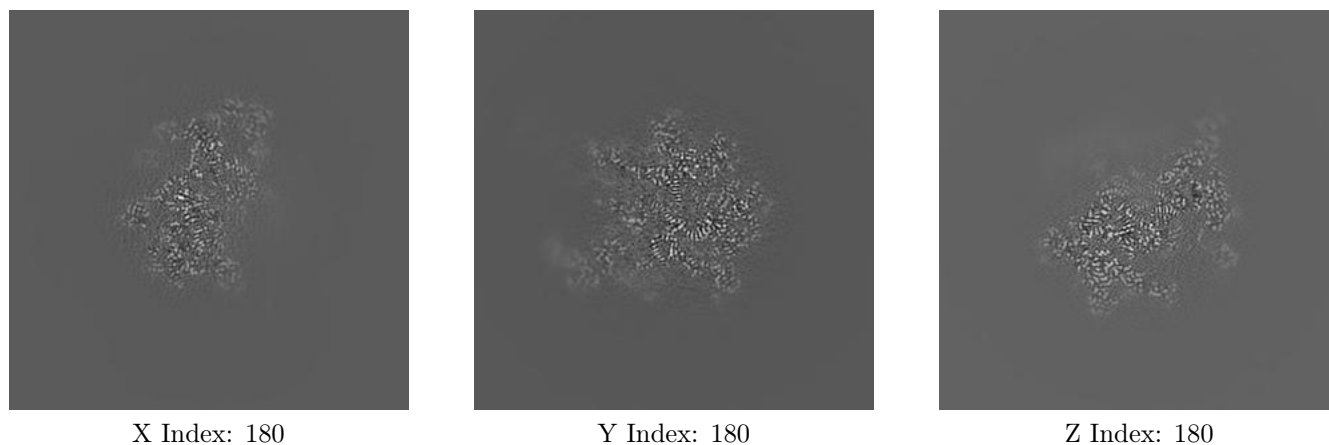
6.1.1 Primary map



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

6.2 Central slices [i](#)

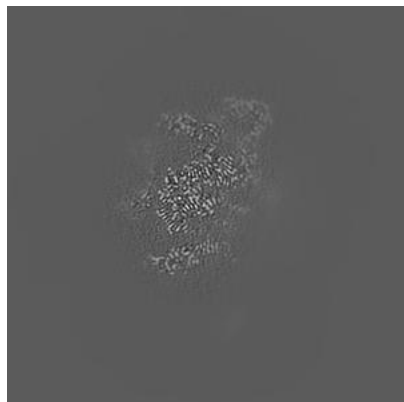
6.2.1 Primary map



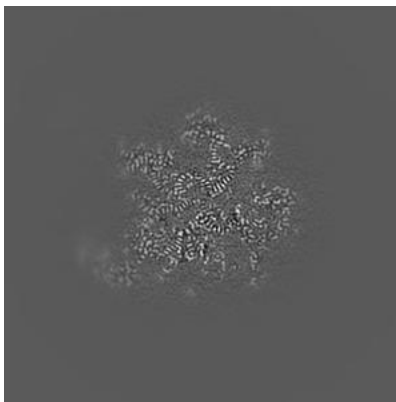
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

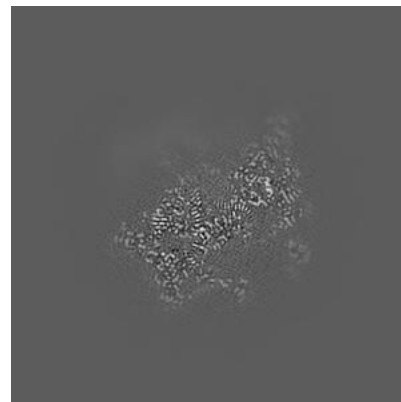
6.3.1 Primary map



X Index: 169



Y Index: 172



Z Index: 182

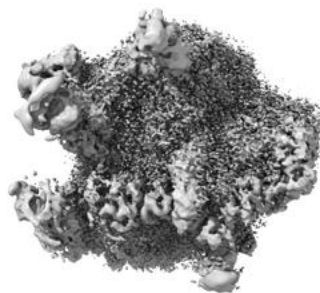
The images above show the largest variance slices of the map in three orthogonal directions.

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 0.05. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

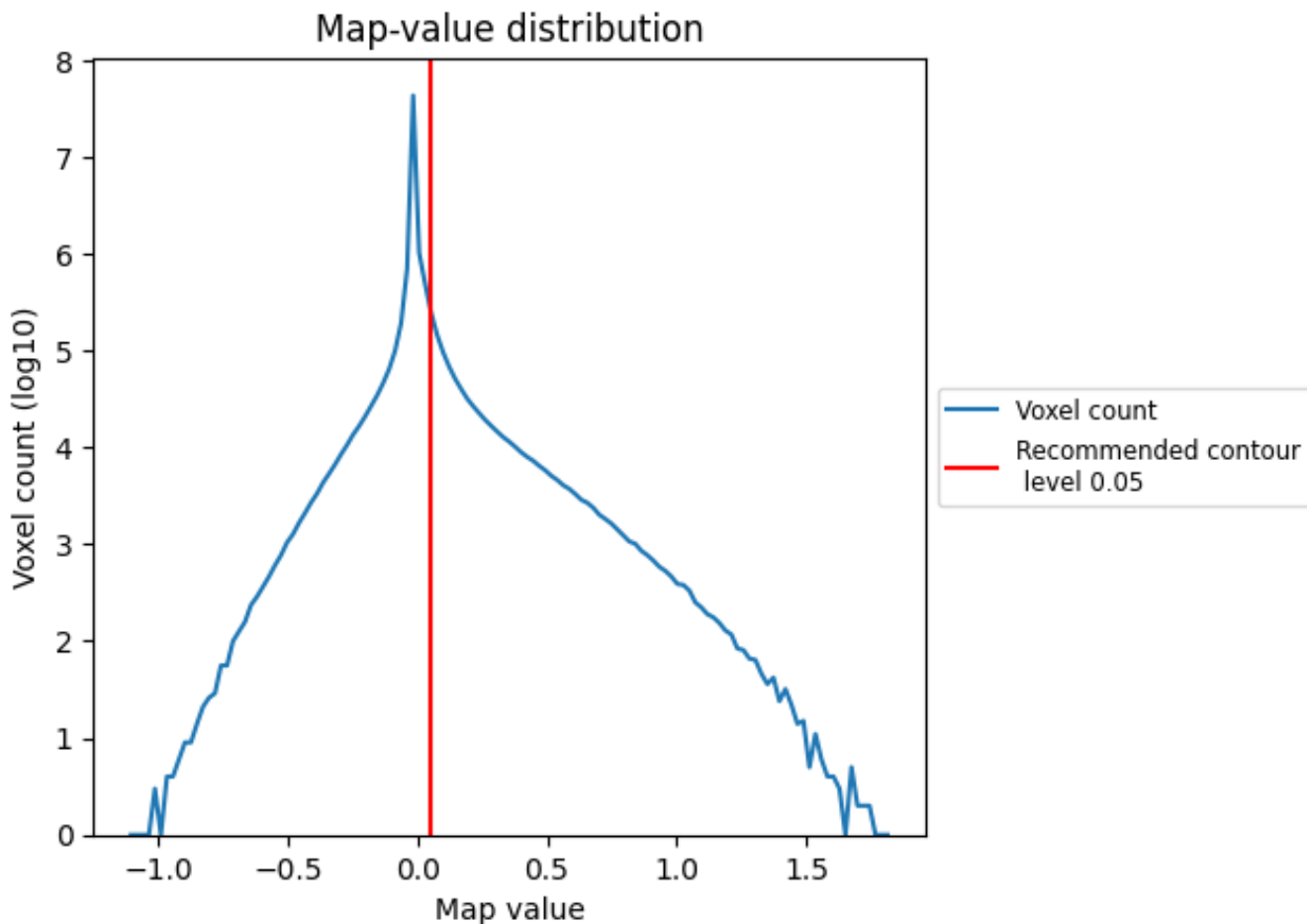
6.5 Mask visualisation

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

7 Map analysis [i](#)

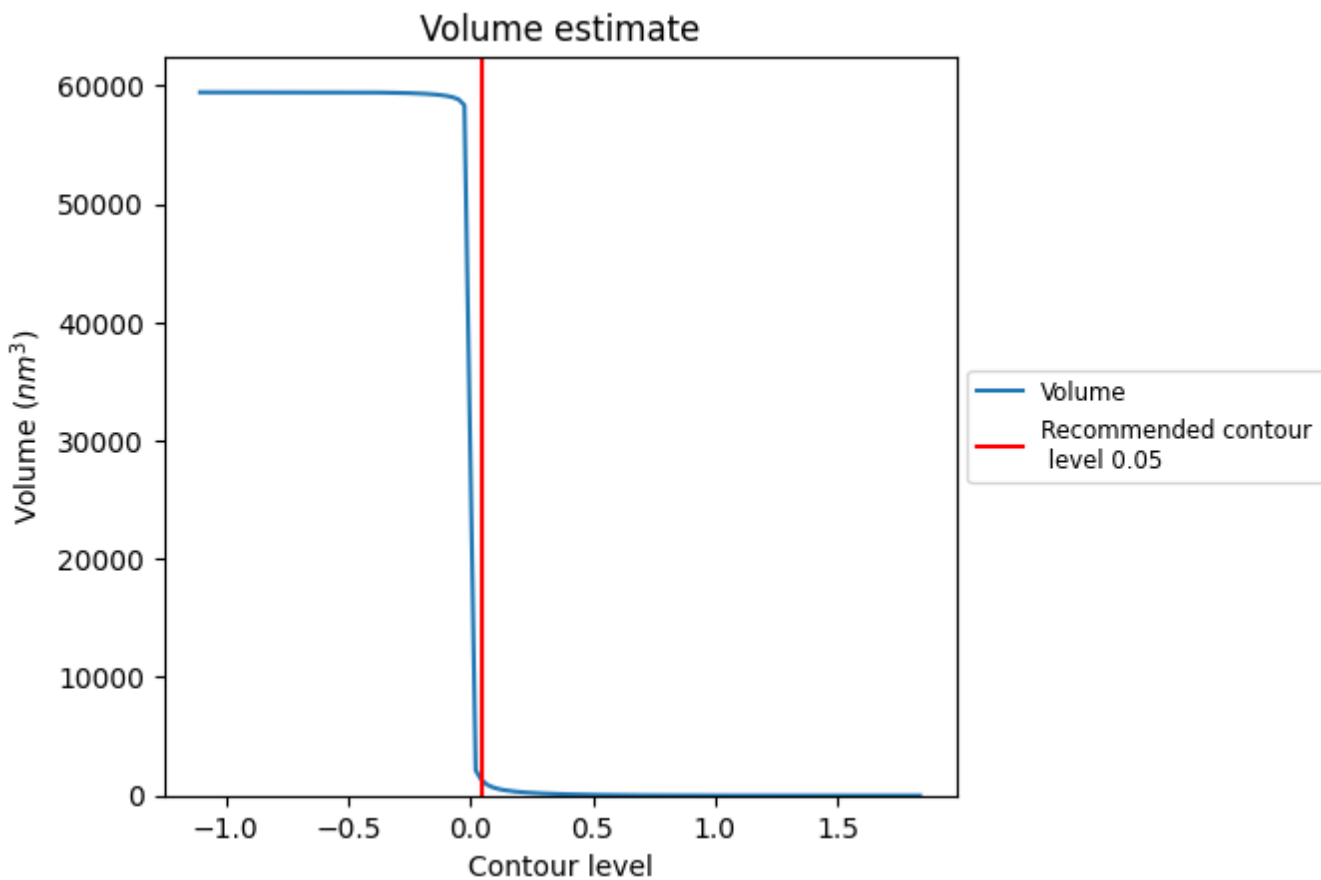
This section contains the results of statistical analysis of the map.

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.

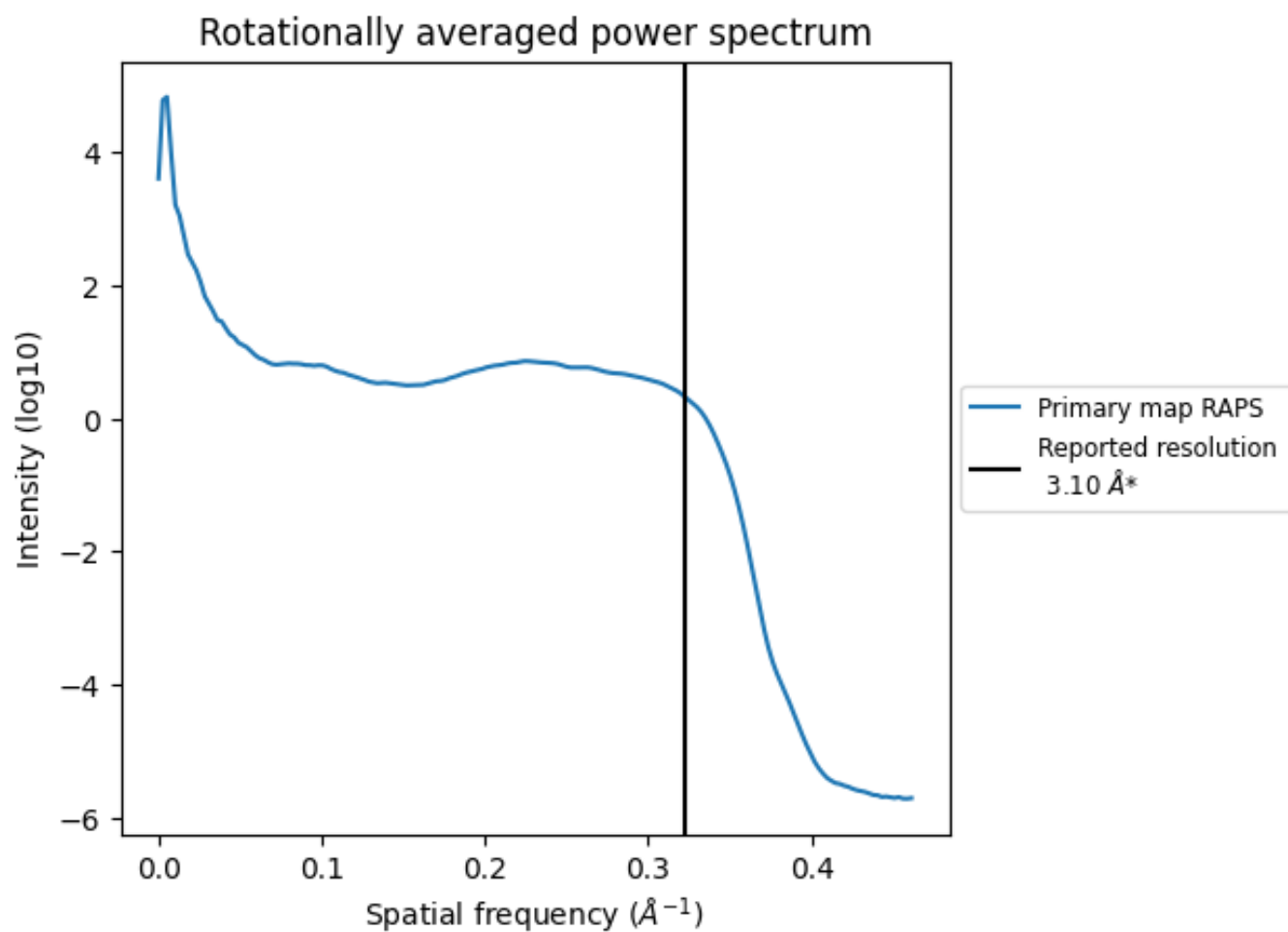
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1237 nm³; this corresponds to an approximate mass of 1118 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](#)

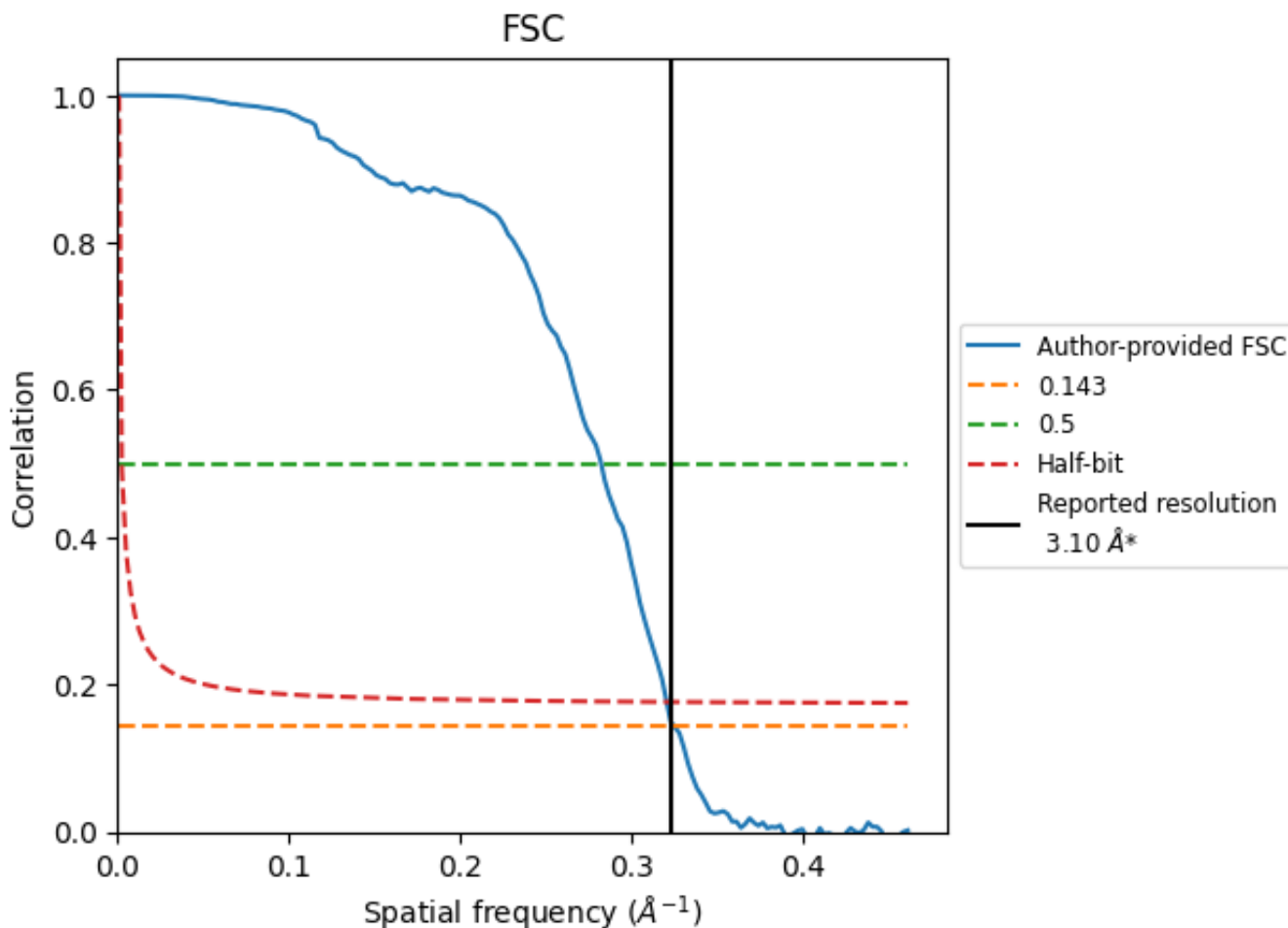


*Reported resolution corresponds to spatial frequency of 0.323\AA^{-1}

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 0.323 Å⁻¹

8.2 Resolution estimates [i](#)

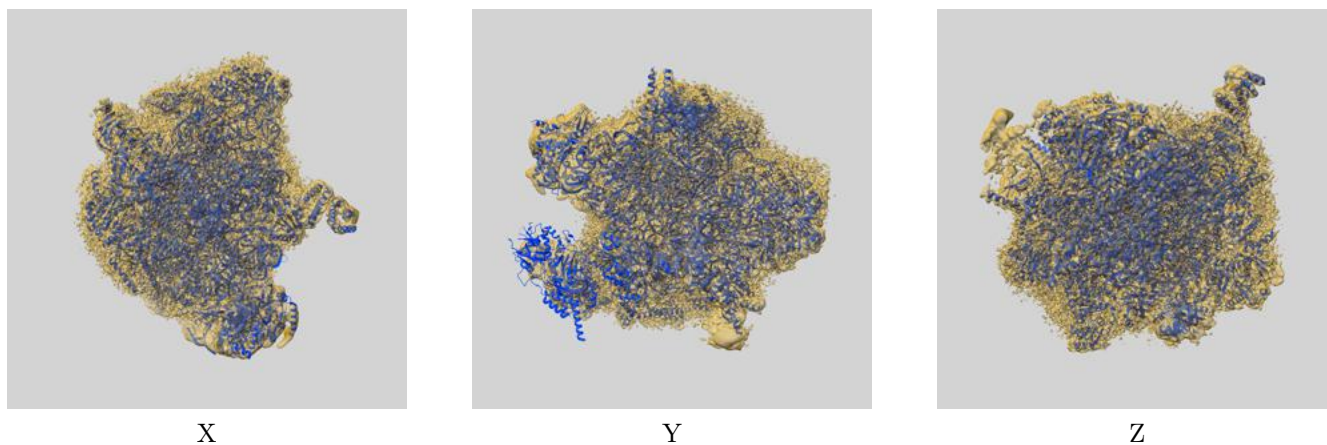
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	3.08	3.54	3.12
Unmasked-calculated*	-	-	-

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

9 Map-model fit [i](#)

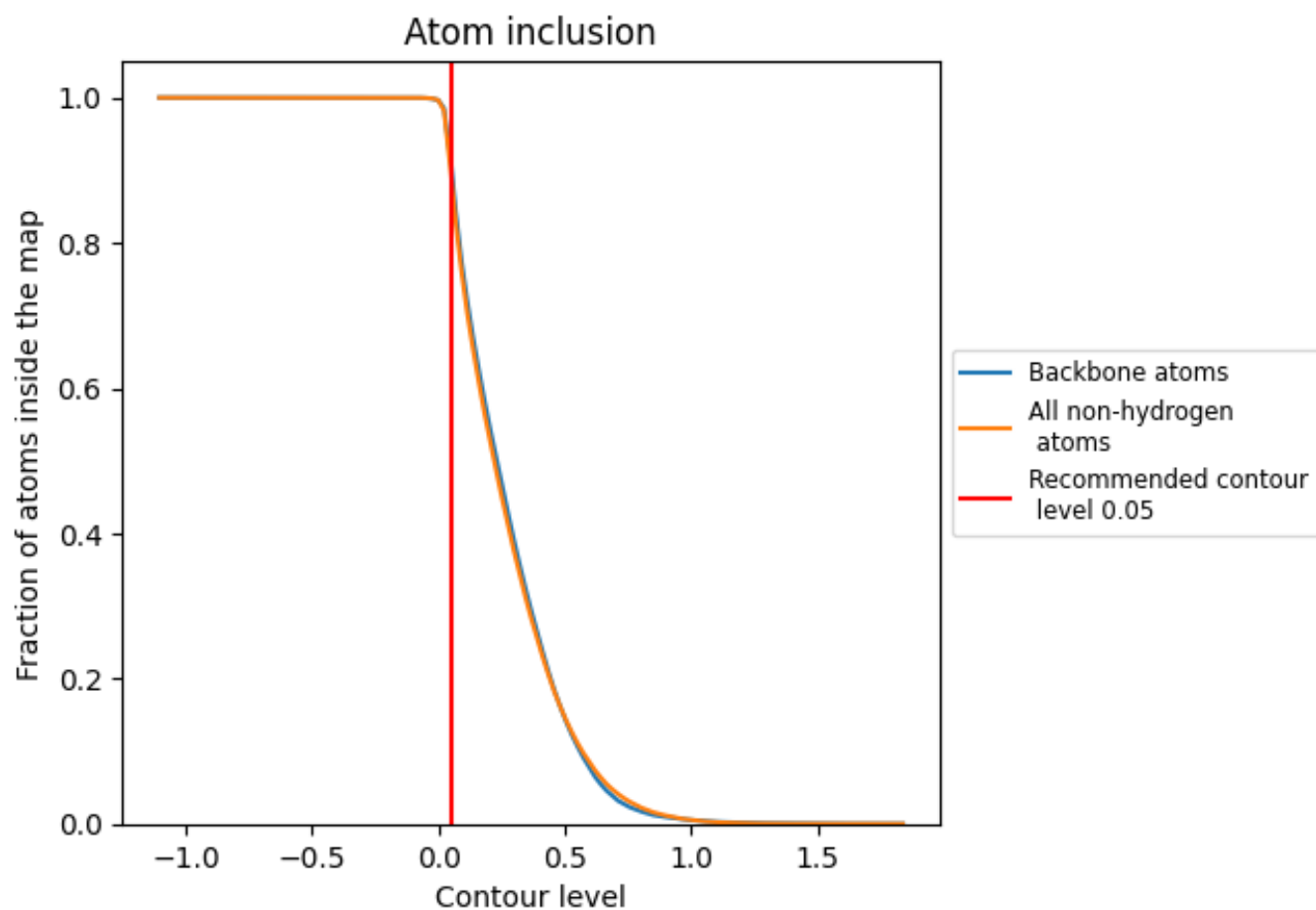
This section contains information regarding the fit between EMDB map EMD-12925 and PDB model 7OIC. Per-residue inclusion information can be found in section 3 on page 17.

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.05 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 Atom inclusion [i](#)



At the recommended contour level, 91% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.