



wwPDB EM Validation Summary Report ⓘ

Jul 15, 2026 – 06:04 PM JST

PDB ID : 9VXM / pdb_00009vxm
EMDB ID : EMD-65433
Title : Human mitoribosome in a non-rotated state, with multiple neomycin molecules bound, featuring A/A-site and P/P-site tRNAs
Authors : Zhu, L.; Jia, C.; Wu, M.; Li, W.
Deposited on : 2025-07-19
Resolution : 2.90 Å(reported)

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

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev133
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

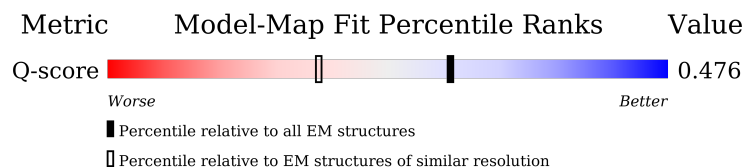
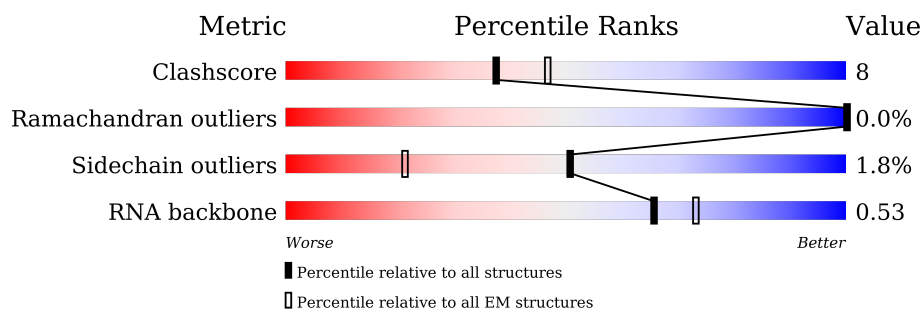
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.90 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	13054 (2.40 - 3.40)

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	0	188	
2	1	65	
3	2	92	

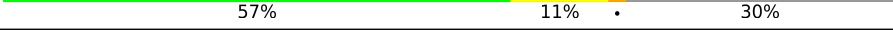
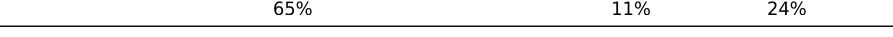
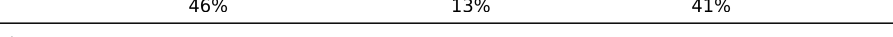
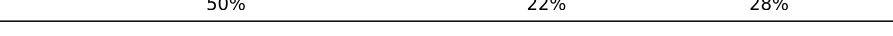
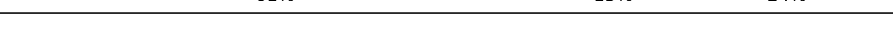
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Mol	Chain	Length	Quality of chain
4	3	188	
5	4	103	
6	5	423	
7	6	380	
8	7	338	
9	8	206	
10	9	137	
11	A	1561	
12	D	305	
13	E	348	
14	F	311	
15	H	267	
16	I	261	
17	J	192	
18	k	178	
19	L	145	
20	M	296	
21	N	251	
22	O	175	
23	P	180	
24	Q	292	
25	R	149	
26	S	205	
27	T	206	
28	U	153	

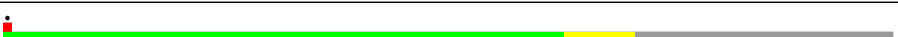
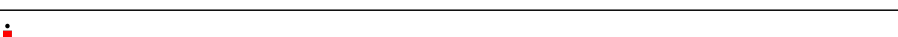
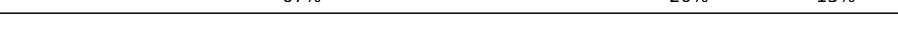
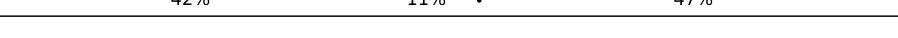
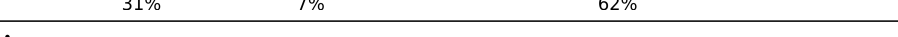
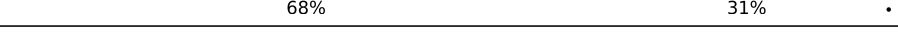
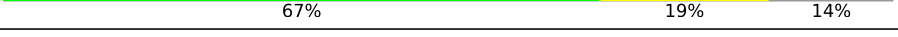
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Mol	Chain	Length	Quality of chain
29	W	148	
30	X	256	
31	Y	250	
32	Z	161	
33	V	216	
34	b	215	
35	e	279	
36	g	166	
37	h	158	
38	i	128	
39	j	123	
40	n	112	
41	l	138	
42	m	128	
43	o	102	
44	q	222	
45	r	196	
46	AA	954	
47	AB	296	
48	AC	167	
49	AD	430	
50	AE	125	
51	AF	242	
52	AG	396	
53	AH	201	

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Mol	Chain	Length	Quality of chain
54	AI	194	
55	AJ	138	
56	AK	128	
57	AL	257	
58	AM	137	
59	AN	130	
60	AO	258	
61	AP	142	
62	C	87	
63	AR	360	
64	AS	190	
65	AT	173	
66	AU	205	
67	AV	414	
68	AW	187	
69	AX	398	
70	AY	395	
71	AZ	106	
72	A0	217	
73	A1	323	
74	G	118	
75	A3	199	
76	A4	689	
77	Az	32	
78	Aw	68	

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Mol	Chain	Length	Quality of chain
79	Ax	70	
80	B	72	
81	a	142	
82	c	332	
83	d	306	
84	f	212	
85	p	206	
86	s	439	

2 Entry composition

There are 98 unique types of molecules in this entry. The entry contains 176080 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Large ribosomal subunit protein bL32m.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	110	Total	C	N	O	S	0	0
			898	554	176	162	6		

- Molecule 2 is a protein called Large ribosomal subunit protein bL33m.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	56	Total	C	N	O	S	0	0
			464	296	89	77	2		

- Molecule 3 is a protein called Large ribosomal subunit protein bL34m.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	2	46	Total	C	N	O	S	0	0
			377	233	83	60	1		

- Molecule 4 is a protein called Large ribosomal subunit protein bL35m.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	3	95	Total	C	N	O	S	0	0
			832	539	162	128	3		

- Molecule 5 is a protein called Large ribosomal subunit protein bL36m.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	4	38	Total	C	N	O	S	0	0
			342	217	72	49	4		

- Molecule 6 is a protein called Large ribosomal subunit protein mL37.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	5	394	Total	C	N	O	S	0	0
			3210	2073	560	566	11		

- Molecule 7 is a protein called Large ribosomal subunit protein mL38.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	6	354	Total	C	N	O	S	0	0
			2948	1881	525	533	9		

- Molecule 8 is a protein called Large ribosomal subunit protein mL39.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	7	294	Total	C	N	O	S	0	0
			2390	1529	405	438	18		

- Molecule 9 is a protein called Large ribosomal subunit protein mL40.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	8	157	Total	C	N	O	S	0	0
			1327	844	235	246	2		

- Molecule 10 is a protein called Large ribosomal subunit protein mL41.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	9	124	Total	C	N	O	S	0	0
			997	644	170	181	2		

- Molecule 11 is a RNA chain called 16S mitochondrial rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	A	1558	Total	C	N	O	P	0	0
			33070	14843	5963	10706	1558		

- Molecule 12 is a protein called Large ribosomal subunit protein uL2m.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	D	238	Total	C	N	O	S	0	0
			1859	1157	376	317	9		

- Molecule 13 is a protein called Large ribosomal subunit protein uL3m.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	E	305	Total	C	N	O	S	0	0
			2406	1545	418	432	11		

- Molecule 14 is a protein called Large ribosomal subunit protein uL4m.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	F	252	Total	C	N	O	S	0	0
			2031	1305	370	350	6		

- Molecule 15 is a protein called Large ribosomal subunit protein bL9m.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	H	202	Total	C	N	O	S	0	0
			1661	1067	304	286	4		

- Molecule 16 is a protein called Large ribosomal subunit protein uL10m.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	I	168	Total	C	N	O	S	0	0
			1351	870	245	226	10		

- Molecule 17 is a protein called Large ribosomal subunit protein uL11m.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	J	175	Total	C	N	O	S	0	0
			1330	847	237	244	2		

- Molecule 18 is a protein called Large ribosomal subunit protein uL13m.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	k	178	Total	C	N	O	S	0	0
			1455	936	259	253	7		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
k	1	ACE	-	acetylation	UNP Q9BYD1

- Molecule 19 is a protein called Large ribosomal subunit protein uL14m.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	L	115	Total	C	N	O	S	0	0
			890	559	171	155	5		

- Molecule 20 is a protein called Large ribosomal subunit protein uL15m.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	M	289	Total	C	N	O	S	0	0
			2314	1476	427	405	6		

- Molecule 21 is a protein called Large ribosomal subunit protein uL16m.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	N	222	Total	C	N	O	S	0	0
			1786	1143	326	307	10		

- Molecule 22 is a protein called Large ribosomal subunit protein bL17m.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	O	154	Total	C	N	O	S	0	0
			1259	792	241	219	7		

- Molecule 23 is a protein called Large ribosomal subunit protein uL18m.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	P	144	Total	C	N	O	S	0	0
			1173	733	224	211	5		

- Molecule 24 is a protein called Large ribosomal subunit protein bL19m.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Q	239	Total	C	N	O	S	0	0
			1990	1277	353	351	9		

- Molecule 25 is a protein called Large ribosomal subunit protein bL20m.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	R	140	Total	C	N	O	S	0	0
			1154	732	231	187	4		

- Molecule 26 is a protein called Large ribosomal subunit protein bL21m.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	S	161	Total	C	N	O	S	0	0
			1293	835	227	227	4		

- Molecule 27 is a protein called Large ribosomal subunit protein uL22m.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	T	166	Total	C	N	O	S	0	0
			1369	875	254	233	7		

- Molecule 28 is a protein called Large ribosomal subunit protein uL23m.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	U	153	Total	C	N	O	S	0	0
			1251	788	234	226	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
U	2	ACE	-	acetylation	UNP Q16540

- Molecule 29 is a protein called Large ribosomal subunit protein bL27m.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	W	116	Total	C	N	O	S	0	0
			904	577	171	153	3		

- Molecule 30 is a protein called Large ribosomal subunit protein bL28m.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	X	244	Total	C	N	O	S	0	0
			2044	1322	352	365	5		

- Molecule 31 is a protein called Large ribosomal subunit protein uL29m.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Y	181	Total	C	N	O	S	0	0
			1556	995	298	259	4		

- Molecule 32 is a protein called Large ribosomal subunit protein uL30m.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Z	122	Total	C	N	O	S	0	0
			996	636	186	171	3		

- Molecule 33 is a protein called Large ribosomal subunit protein uL24m.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	V	205	Total	C	N	O	S	0	0
			1676	1068	298	302	8		

- Molecule 34 is a protein called Large ribosomal subunit protein mL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	b	151	Total	C	N	O	S	0	0
			1196	744	231	218	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
b	2	ACE	-	acetylation	UNP Q8N983

- Molecule 35 is a protein called Large ribosomal subunit protein mL46.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	e	238	Total	C	N	O	S	0	0
			1931	1222	339	364	6		

- Molecule 36 is a protein called Large ribosomal subunit protein mL49.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	g	134	Total	C	N	O	S	0	0
			1113	719	193	199	2		

- Molecule 37 is a protein called Large ribosomal subunit protein mL50.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	h	110	Total	C	N	O	S	0	0
			895	568	156	168	3		

- Molecule 38 is a protein called Large ribosomal subunit protein mL51.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	i	97	Total	C	N	O	S	0	0
			828	532	165	127	4		

- Molecule 39 is a protein called Large ribosomal subunit protein mL52.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	j	94	Total	C	N	O	S	0	0
			745	463	144	136	2		

- Molecule 40 is a protein called Large ribosomal subunit protein mL53.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	n	102	Total	C	N	O	S	0	0
			774	479	148	142	5		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
n	2	ACE	-	acetylation	UNP Q96EL3

- Molecule 41 is a protein called Large ribosomal subunit protein mL54.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	l	82	Total	C	N	O	S	0	0
			688	437	120	128	3		

- Molecule 42 is a protein called Large ribosomal subunit protein mL55.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	m	92	Total	C	N	O	S	0	0
			791	488	159	142	2		

- Molecule 43 is a protein called Large ribosomal subunit protein mL63.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	o	94	Total	C	N	O	S	0	0
			798	501	165	129	3		

- Molecule 44 is a protein called Large ribosomal subunit protein mL64.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	q	128	Total	C	N	O	S	0	0
			1076	671	208	192	5		

- Molecule 45 is a protein called Large ribosomal subunit protein mL66.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	r	162	Total	C	N	O	S	0	0
			1322	839	252	223	8		

- Molecule 46 is a RNA chain called 12S mitochondrial rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	AA	954	Total	C	N	O	P	0	0
			20260	9088	3647	6571	954		

- Molecule 47 is a protein called Small ribosomal subunit protein uS2m.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	AB	224	Total	C	N	O	S	0	0
			1818	1158	328	322	10		

- Molecule 48 is a protein called Small ribosomal subunit protein uS3m.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	AC	132	Total	C	N	O	S	0	0
			1083	699	195	185	4		

- Molecule 49 is a protein called Small ribosomal subunit protein uS5m.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	AD	343	Total	C	N	O	S	0	0
			2731	1713	518	487	13		

- Molecule 50 is a protein called Small ribosomal subunit protein bS6m.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	AE	122	Total	C	N	O	S	0	0
			972	614	177	177	4		

- Molecule 51 is a protein called Small ribosomal subunit protein uS7m.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	AF	208	Total	C	N	O	S	0	0
			1725	1104	312	298	11		

- Molecule 52 is a protein called Small ribosomal subunit protein uS9m.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	AG	327	Total	C	N	O	S	0	0
			2688	1710	477	487	14		

- Molecule 53 is a protein called Small ribosomal subunit protein uS10m.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	AH	140	Total	C	N	O	S	0	0
			1152	745	194	210	3		

- Molecule 54 is a protein called Small ribosomal subunit protein uS11m.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	AI	137	Total	C	N	O	S	0	0
			1020	642	192	182	4		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AI	184	5F0	ASN	conflict	UNP P82912

- Molecule 55 is a protein called Small ribosomal subunit protein uS12m.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	AJ	108	Total	C	N	O	S	0	0
			839	521	169	143	6		

- Molecule 56 is a protein called Small ribosomal subunit protein uS14m.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	AK	101	Total	C	N	O	S	0	0
			862	537	179	141	5		

- Molecule 57 is a protein called Small ribosomal subunit protein uS15m.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	AL	174	Total	C	N	O	S	0	0
			1453	925	270	251	7		

- Molecule 58 is a protein called Small ribosomal subunit protein bS16m.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	AM	119	Total	C	N	O	S	0	0
			942	594	185	157	6		

- Molecule 59 is a protein called Small ribosomal subunit protein uS17m.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	AN	110	Total	C	N	O	S	0	0
			868	562	156	147	3		

- Molecule 60 is a protein called Small ribosomal subunit protein mS40.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	AO	193	Total	C	N	O	S	0	0
			1592	1014	294	277	7		

- Molecule 61 is a protein called Small ribosomal subunit protein bS18m.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	AP	97	Total	C	N	O	S	0	0
			781	501	134	138	8		

- Molecule 62 is a protein called Small ribosomal subunit protein bS21m.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	C	87	Total	C	N	O	S	0	0
			744	460	150	126	8		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	2	ACE	-	acetylation	UNP P82921
C	50	ARG	CYS	variant	UNP P82921

- Molecule 63 is a protein called Small ribosomal subunit protein mS22.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	AR	295	Total	C	N	O	S	0	0
			2409	1533	413	455	8		

- Molecule 64 is a protein called Small ribosomal subunit protein mS23.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	AS	135	Total	C	N	O	S	0	0
			1111	716	198	196	1		

- Molecule 65 is a protein called Small ribosomal subunit protein mS25.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	AT	168	Total	C	N	O	S	0	0
			1371	877	239	244	11		

- Molecule 66 is a protein called Small ribosomal subunit protein mS26.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	AU	176	Total	C	N	O	S	0	0
			1488	916	301	267	4		

- Molecule 67 is a protein called Small ribosomal subunit protein mS27.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	AV	362	Total	C	N	O	S	0	0
			2969	1904	495	558	12		

- Molecule 68 is a protein called Small ribosomal subunit protein bS1m.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	AW	100	Total	C	N	O	S	0	0
			789	498	141	146	4		

- Molecule 69 is a protein called Small ribosomal subunit protein mS29.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	AX	352	Total	C	N	O	S	0	0
			2849	1822	499	517	11		

- Molecule 70 is a protein called Small ribosomal subunit protein mS31.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	AY	149	Total	C	N	O	S	0	0
			1246	801	207	234	4		

- Molecule 71 is a protein called Small ribosomal subunit protein mS33.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	AZ	100	Total	C	N	O	S	0	0
			839	534	153	148	4		

- Molecule 72 is a protein called Small ribosomal subunit protein mS34.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	A0	215	Total	C	N	O	S	0	0
			1787	1130	339	313	5		

- Molecule 73 is a protein called Small ribosomal subunit protein mS35.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	A1	279	Total	C	N	O	S	0	0
			2265	1435	387	432	11		

- Molecule 74 is a protein called Small ribosomal subunit protein mS37.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	G	118	Total	C	N	O	S	0	0
			935	579	182	166	8		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	2	ACE	-	acetylation	UNP Q96BP2

- Molecule 75 is a protein called Small ribosomal subunit protein mS38.

Mol	Chain	Residues	Atoms					AltConf	Trace
75	A3	70	Total	C	N	O	S	0	0
			625	401	134	89	1		

- Molecule 76 is a protein called Small ribosomal subunit protein mS39.

Mol	Chain	Residues	Atoms					AltConf	Trace
76	A4	588	Total	C	N	O	S	0	0
			4768	3053	808	879	28		

- Molecule 77 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
77	Az	16	Total	C	N	O	P	0	0
			339	152	56	115	16		

- Molecule 78 is a RNA chain called A/A-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
78	Aw	68	Total	C	N	O	P	0	0
			1434	646	248	472	68		

- Molecule 79 is a RNA chain called P/P-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	Ax	70	Total	C	N	O	P	0	0
			1482	665	260	487	70		

- Molecule 80 is a RNA chain called mitochondrial tRNAVal.

Mol	Chain	Residues	Atoms					AltConf	Trace
80	B	72	Total	C	N	O	P	0	0
			1524	685	269	498	72		

- Molecule 81 is a protein called Large ribosomal subunit protein mL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
81	a	100	Total	C	N	O	S	0	0
			840	529	152	154	5		

- Molecule 82 is a protein called Large ribosomal subunit protein mL44.

Mol	Chain	Residues	Atoms					AltConf	Trace
82	c	286	Total	C	N	O	S	0	0
			2299	1470	397	423	9		

- Molecule 83 is a protein called Large ribosomal subunit protein mL45.

Mol	Chain	Residues	Atoms					AltConf	Trace
83	d	241	Total	C	N	O	S	0	0
			1985	1273	340	359	13		

- Molecule 84 is a protein called Large ribosomal subunit protein mL48.

Mol	Chain	Residues	Atoms					AltConf	Trace
84	f	157	Total	C	N	O	S	0	0
			1252	799	207	242	4		

- Molecule 85 is a protein called Large ribosomal subunit protein mL62.

Mol	Chain	Residues	Atoms					AltConf	Trace
85	p	147	Total	C	N	O	S	0	0
			1205	748	228	225	4		

- Molecule 86 is a protein called Large ribosomal subunit protein mL65.

Mol	Chain	Residues	Atoms					AltConf	Trace
86	s	386	Total	C	N	O	S	0	0
			3155	2023	559	559	14		

- Molecule 87 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
87	0	1	Total	Zn	0
			1	1	
87	4	1	Total	Zn	0
			1	1	
87	AO	1	Total	Zn	0
			1	1	

- Molecule 88 is POTASSIUM ION (CCD ID: K) (formula: K).

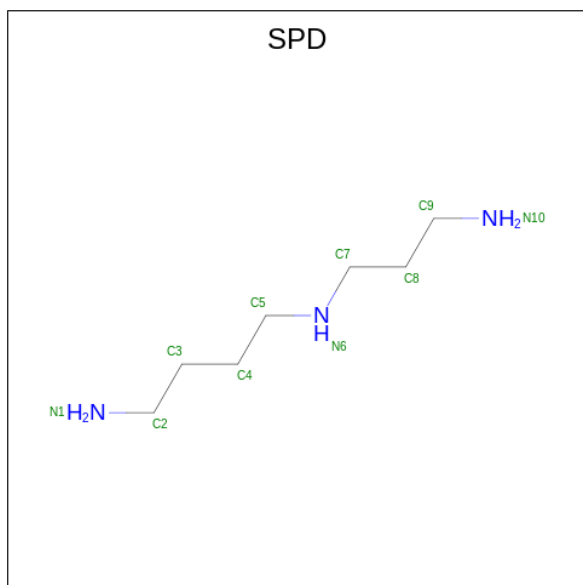
Mol	Chain	Residues	Atoms		AltConf
88	3	1	Total	K	0
			1	1	
88	6	1	Total	K	0
			1	1	
88	A	28	Total	K	0
			28	28	
88	D	1	Total	K	0
			1	1	
88	M	1	Total	K	0
			1	1	
88	N	1	Total	K	0
			1	1	
88	W	1	Total	K	0
			1	1	

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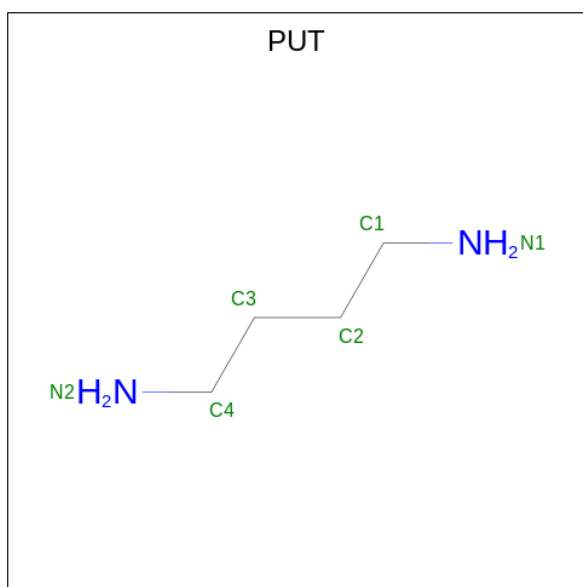
Mol	Chain	Residues	Atoms		AltConf
88	i	1	Total	K	0
			1	1	
88	o	1	Total	K	0
			1	1	
88	AA	17	Total	K	0
			17	17	

- Molecule 89 is SPERMIDINE (CCD ID: SPD) (formula: $C_7H_{19}N_3$).



Mol	Chain	Residues	Atoms			AltConf
89	A	1	Total	C	N	0
			10	7	3	
89	A	1	Total	C	N	0
			10	7	3	
89	A	1	Total	C	N	0
			10	7	3	
89	AA	1	Total	C	N	0
			10	7	3	

- Molecule 90 is 1,4-DIAMINOBUTANE (CCD ID: PUT) (formula: $C_4H_{12}N_2$).

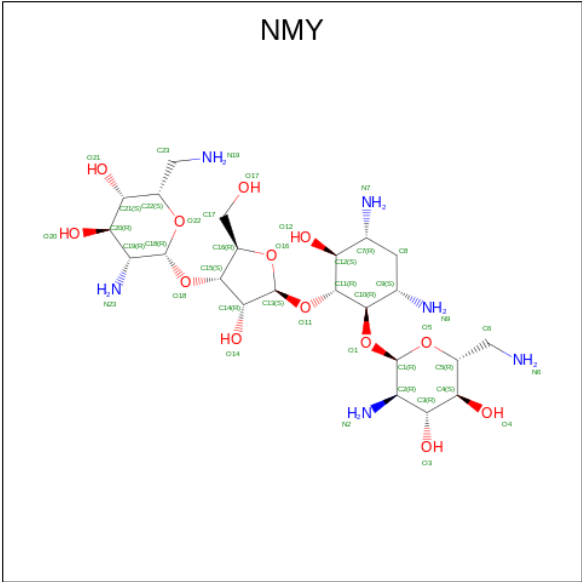


Mol	Chain	Residues	Atoms			AltConf
90	A	1	Total	C	N	0
			6	4	2	

- Molecule 91 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

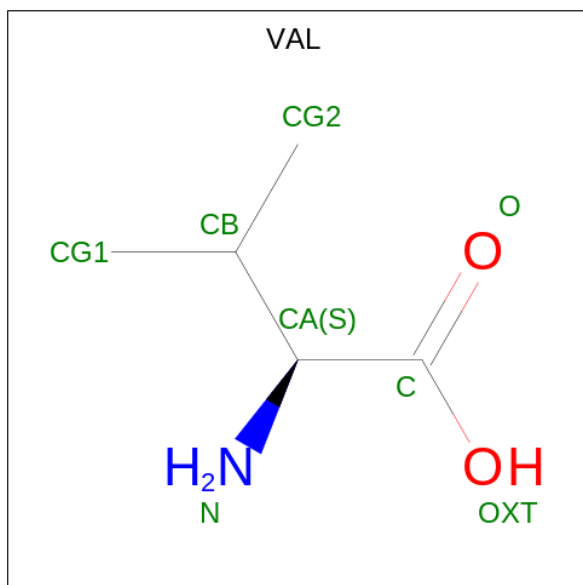
Mol	Chain	Residues	Atoms		AltConf
91	A	138	Total	Mg	0
			138	138	
91	D	2	Total	Mg	0
			2	2	
91	g	1	Total	Mg	0
			1	1	
91	o	1	Total	Mg	0
			1	1	
91	AA	62	Total	Mg	0
			62	62	
91	AB	1	Total	Mg	0
			1	1	
91	AX	1	Total	Mg	0
			1	1	
91	A3	1	Total	Mg	0
			1	1	
91	Az	1	Total	Mg	0
			1	1	

- Molecule 92 is NEOMYCIN (CCD ID: NMY) (formula: C₂₃H₄₆N₆O₁₃) (labeled as "Ligand of Interest" by depositor).



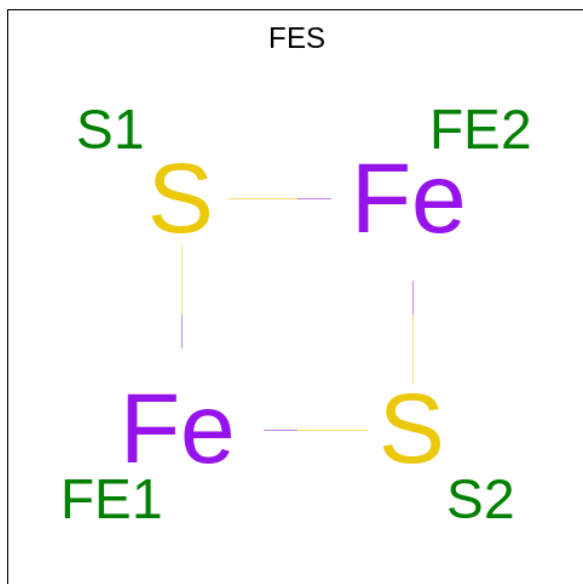
Mol	Chain	Residues	Atoms				AltConf
92	A	1	Total	C	N	O	0
			42	23	6	13	
92	A	1	Total	C	N	O	0
			42	23	6	13	
92	A	1	Total	C	N	O	0
			42	23	6	13	
92	A	1	Total	C	N	O	0
			42	23	6	13	
92	A	1	Total	C	N	O	0
			42	23	6	13	
92	AA	1	Total	C	N	O	0
			42	23	6	13	
92	AA	1	Total	C	N	O	0
			42	23	6	13	
92	AA	1	Total	C	N	O	0
			42	23	6	13	
92	AA	1	Total	C	N	O	0
			42	23	6	13	

- Molecule 93 is VALINE (CCD ID: VAL) (formula: C₅H₁₁NO₂).



Mol	Chain	Residues	Atoms				AltConf
93	e	1	Total	C	N	O	0
			7	5	1	1	

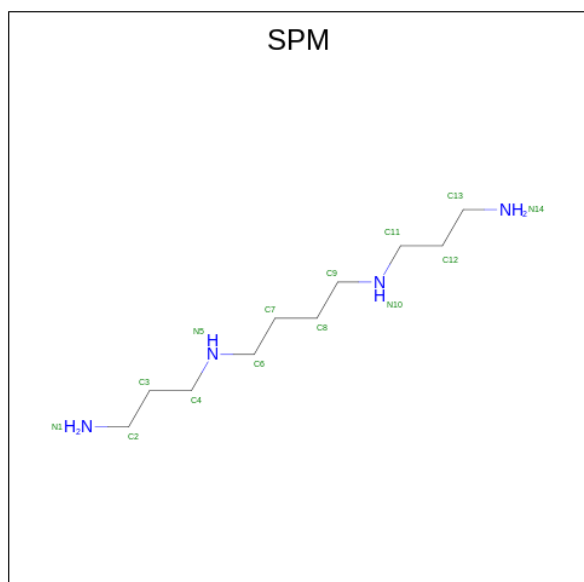
- Molecule 94 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe₂S₂).



Mol	Chain	Residues	Atoms			AltConf
94	r	1	Total	Fe	S	0
			4	2	2	
94	AP	1	Total	Fe	S	0
			4	2	2	
94	AT	1	Total	Fe	S	0
			4	2	2	

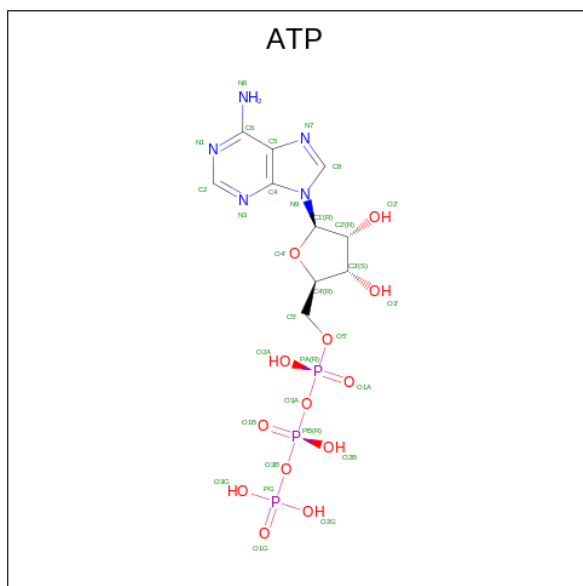
- # NAD

- Molecule 96 is SPERMINE (CCD ID: SPM) (formula: $\text{C}_{10}\text{H}_{26}\text{N}_4$).



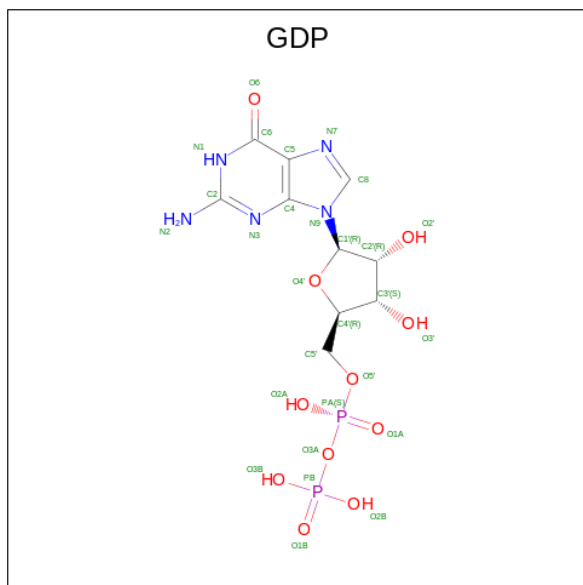
WORLDWIDE
 PDB
PROTEIN DATA BANK

- Molecule 97 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



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

- Molecule 98 is GUANOSINE-5'-DIPHOSPHATE (CCD ID: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).

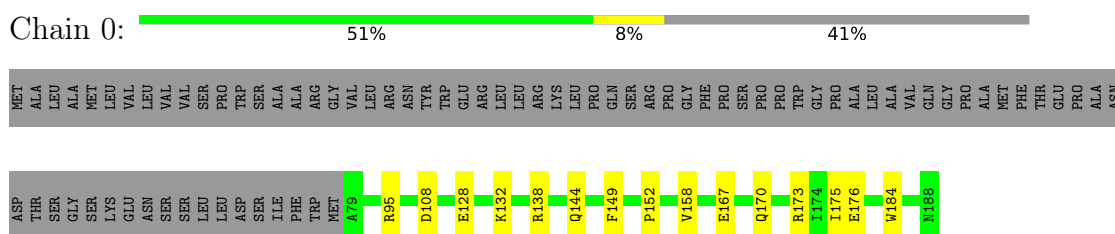


Mol	Chain	Residues	Atoms					AltConf
98	AX	1	Total	C	N	O	P	0
			28	10	5	11	2	

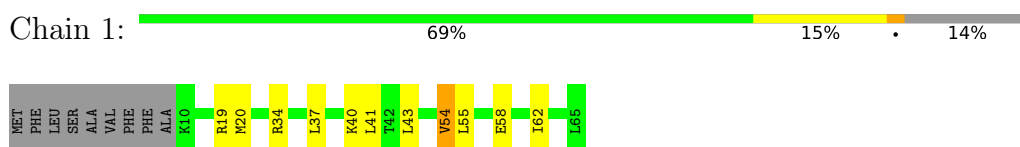
3 Residue-property plots [i](#)

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.

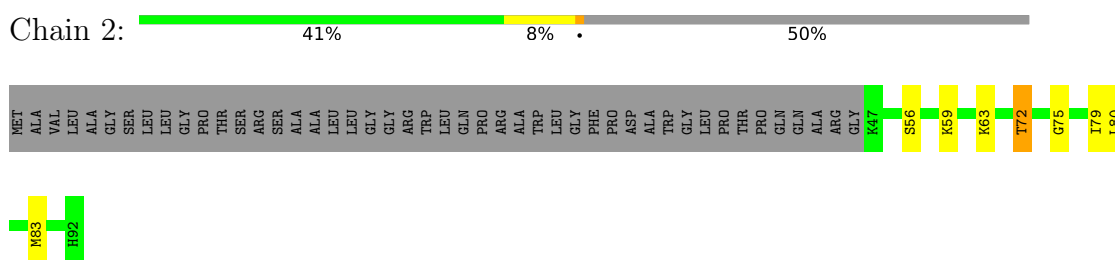
- Molecule 1: Large ribosomal subunit protein bL32m



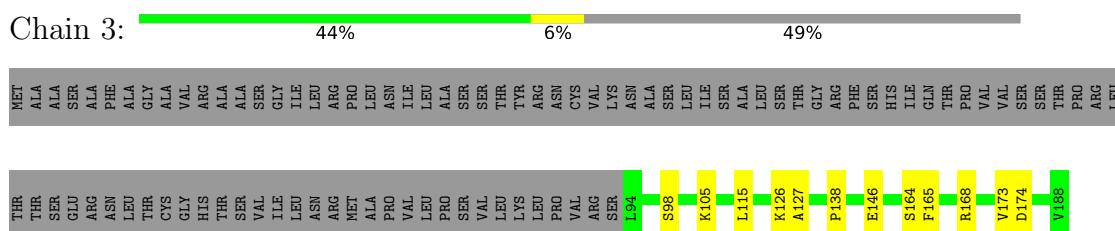
- Molecule 2: Large ribosomal subunit protein bL33m



- Molecule 3: Large ribosomal subunit protein bL34m



- Molecule 4: Large ribosomal subunit protein bL35m



- Molecule 5: Large ribosomal subunit protein bL36m

Chain 4:  35% 63%



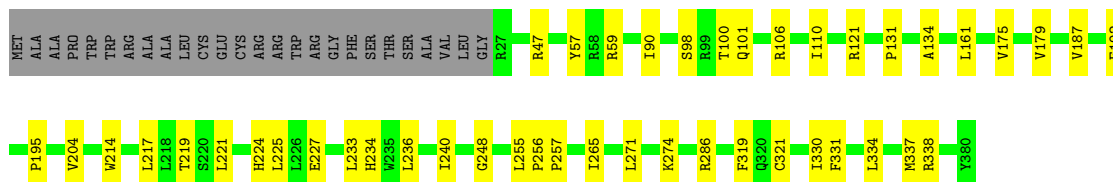
- Molecule 6: Large ribosomal subunit protein mL37

Chain 5:  80% 13% 7%



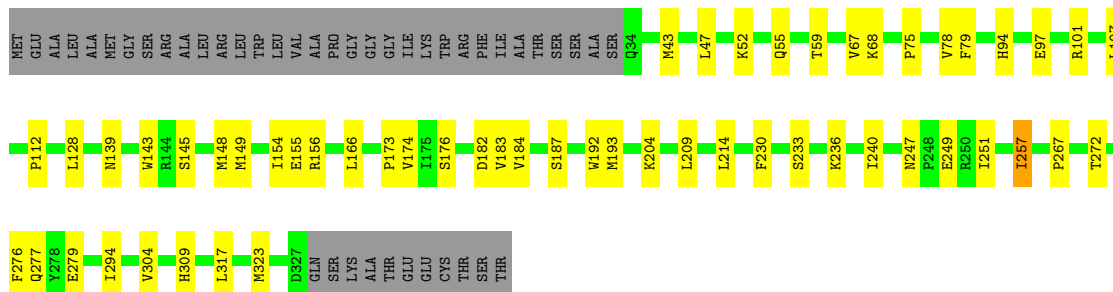
- Molecule 7: Large ribosomal subunit protein mL38

Chain 6:  81% 12% 7%



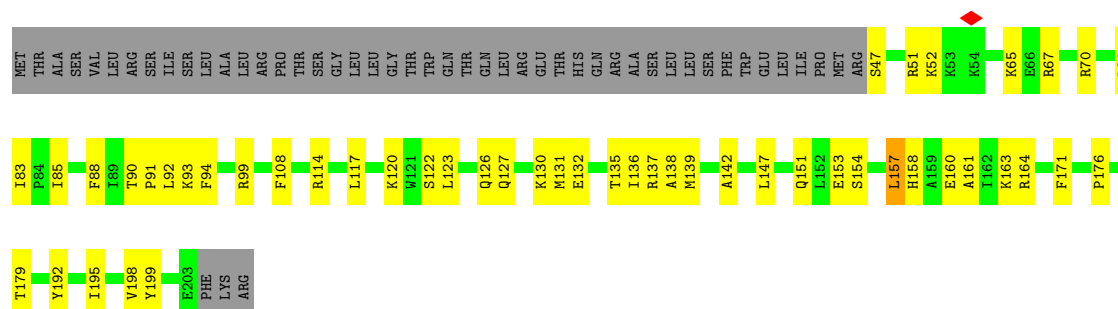
- Molecule 8: Large ribosomal subunit protein mL39

Chain 7:  71% 16% 13%

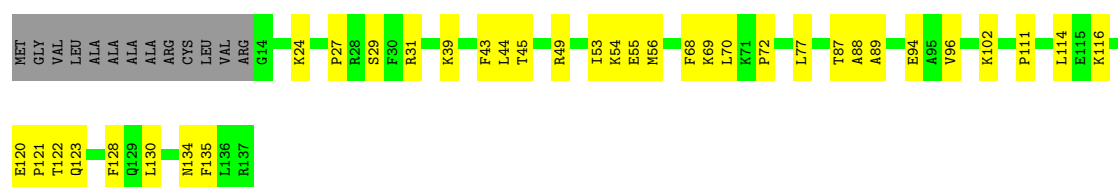


- Molecule 9: Large ribosomal subunit protein mL40

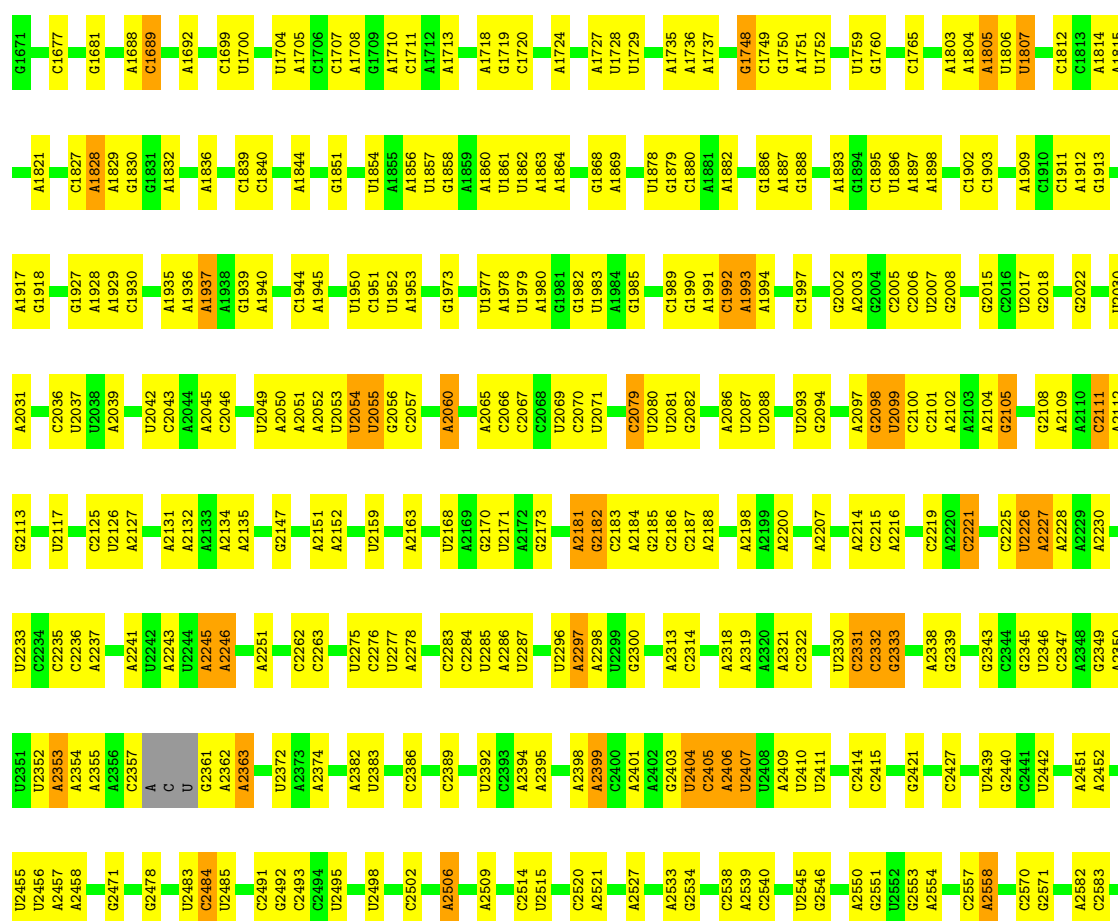
Chain 8:  52% 24% 24%

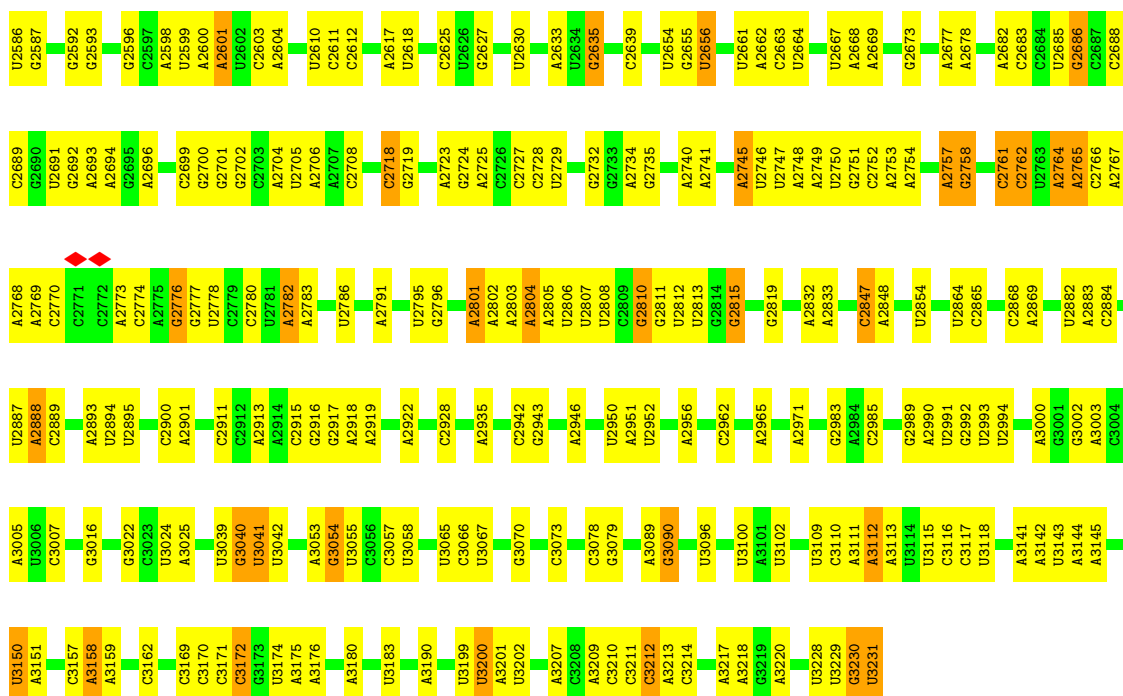


- Molecule 10: Large ribosomal subunit protein mL41

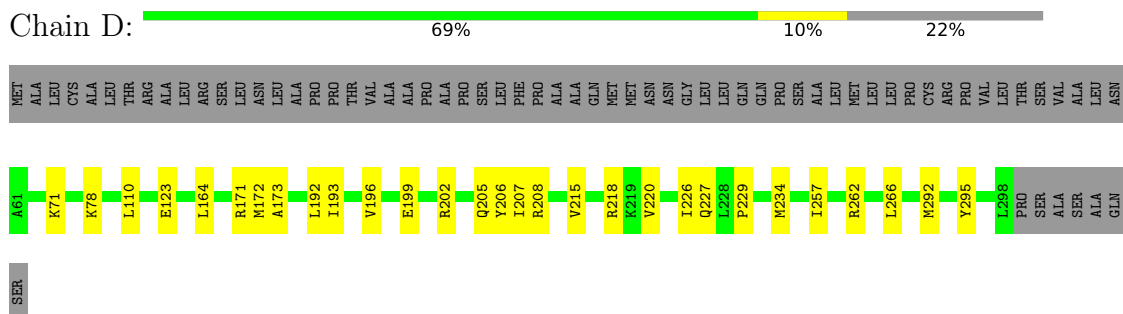


- Molecule 11: 16S mitochondrial rRNA

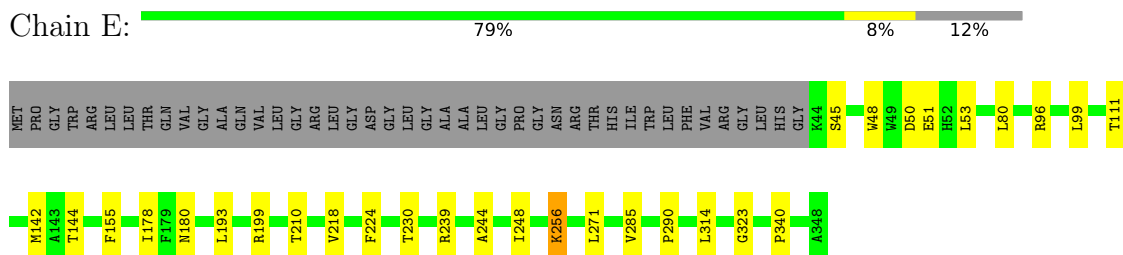




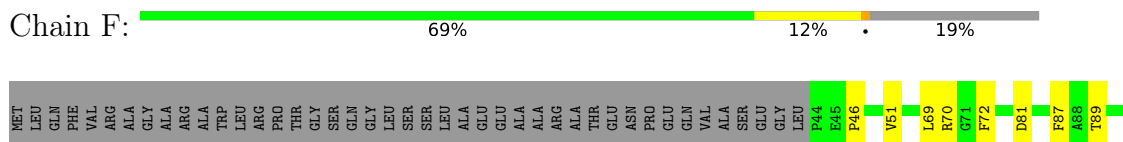
- Molecule 12: Large ribosomal subunit protein uL2m



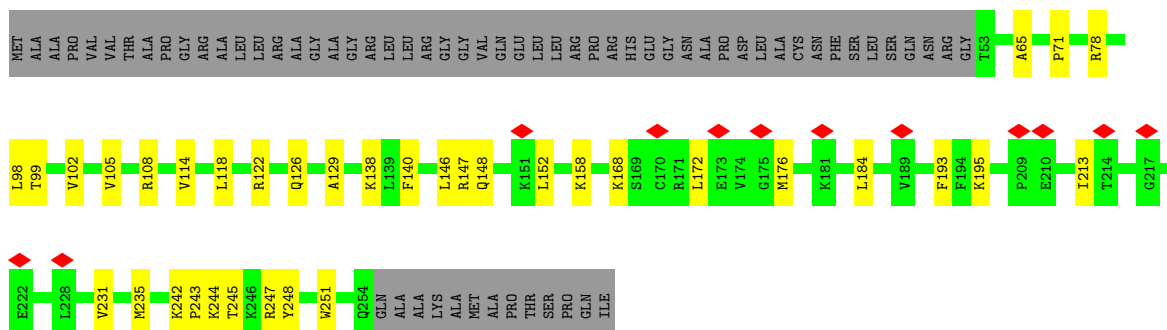
- Molecule 13: Large ribosomal subunit protein uL3m



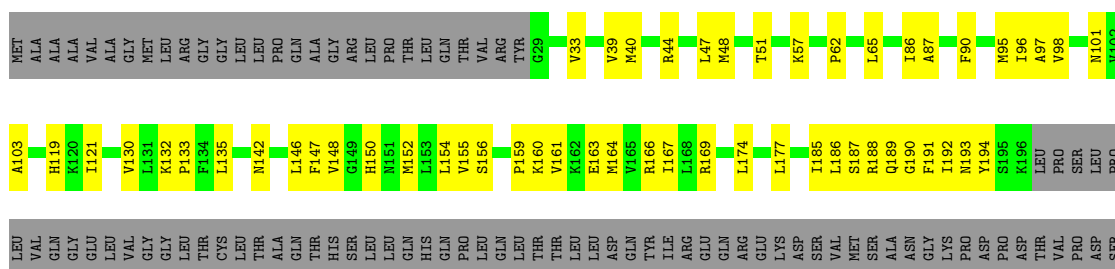
- Molecule 14: Large ribosomal subunit protein uL4m



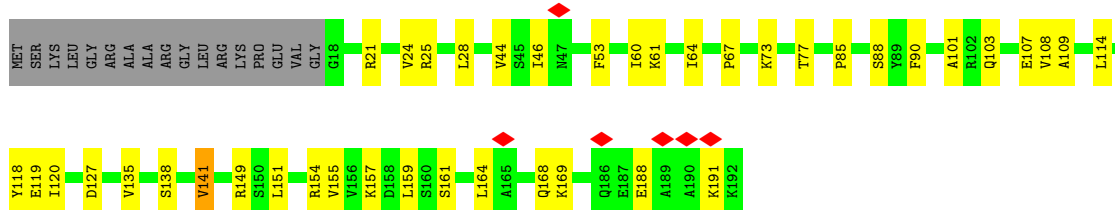
- Molecule 15: Large ribosomal subunit protein bL9m



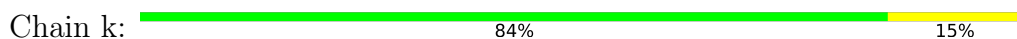
- Molecule 16: Large ribosomal subunit protein uL10m



- Molecule 17: Large ribosomal subunit protein uL11m

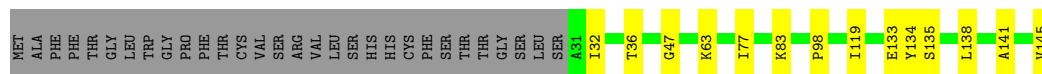


- Molecule 18: Large ribosomal subunit protein uL13m



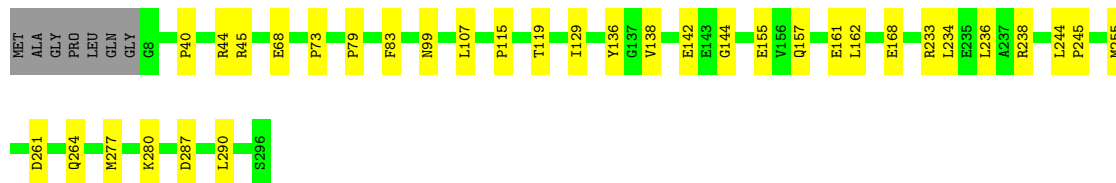
- Molecule 19: Large ribosomal subunit protein uL14m

Chain L:  70% 10% 21%



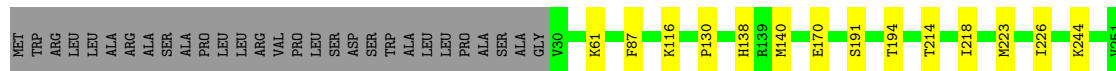
- Molecule 20: Large ribosomal subunit protein uL15m

Chain M:  86% 11%



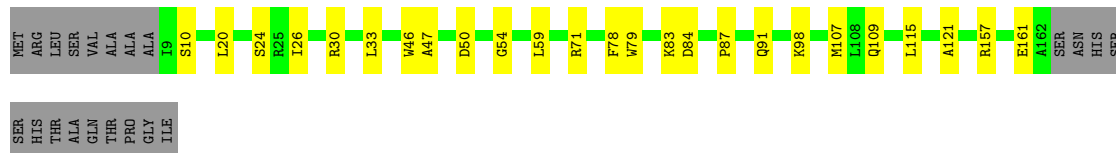
- Molecule 21: Large ribosomal subunit protein uL16m

Chain N:  83% 6% 12%



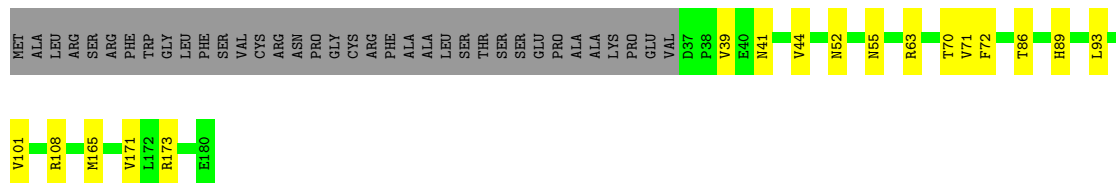
- Molecule 22: Large ribosomal subunit protein bL17m

Chain O:  74% 14% 12%



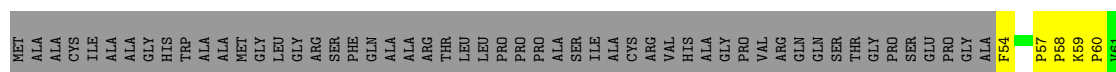
- Molecule 23: Large ribosomal subunit protein uL18m

Chain P:  71% 9% 20%



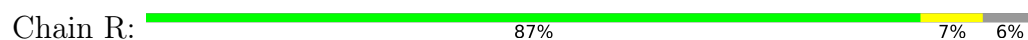
- Molecule 24: Large ribosomal subunit protein bL19m

Chain Q:  70% 12% 18%

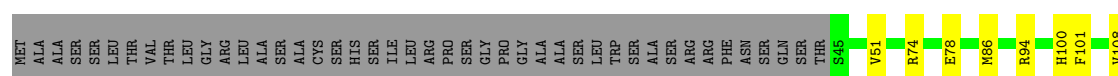




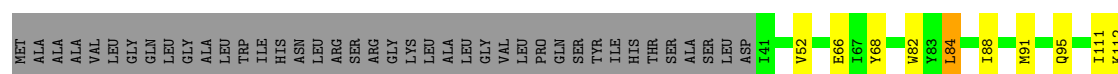
- Molecule 25: Large ribosomal subunit protein bL20m



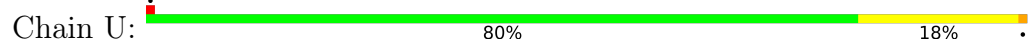
- Molecule 26: Large ribosomal subunit protein bL21m



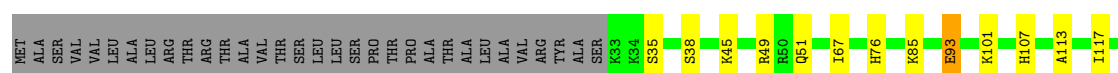
- Molecule 27: Large ribosomal subunit protein uL22m



- Molecule 28: Large ribosomal subunit protein uL23m

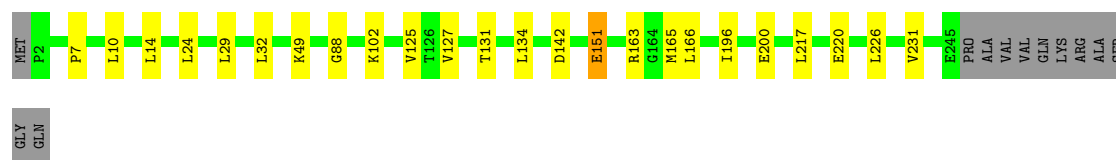


- Molecule 29: Large ribosomal subunit protein bL27m



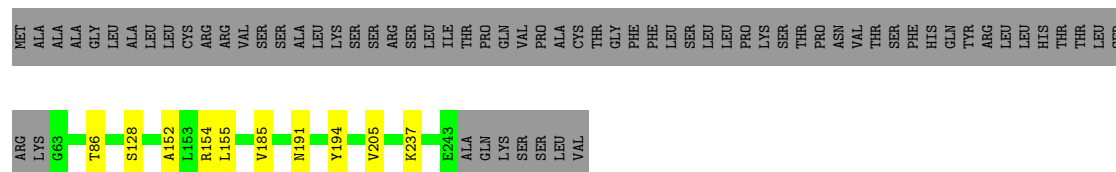
- Molecule 30: Large ribosomal subunit protein bL28m

Chain X:  86% 9% 5%



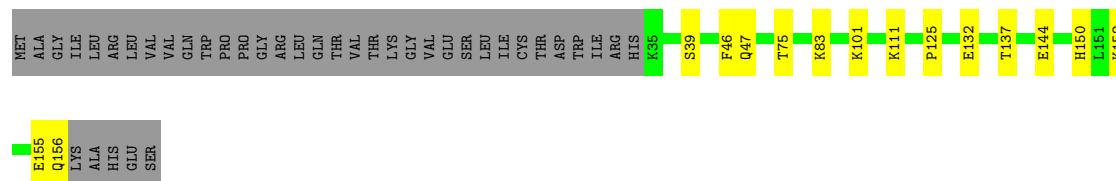
- Molecule 31: Large ribosomal subunit protein uL29m

Chain Y:  68% 28%



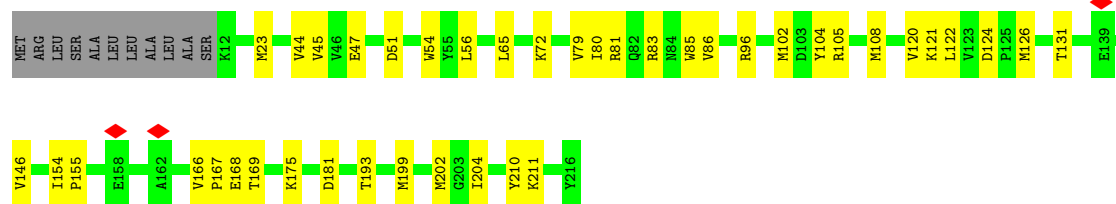
- Molecule 32: Large ribosomal subunit protein uL30m

Chain Z:  66% 9% 24%



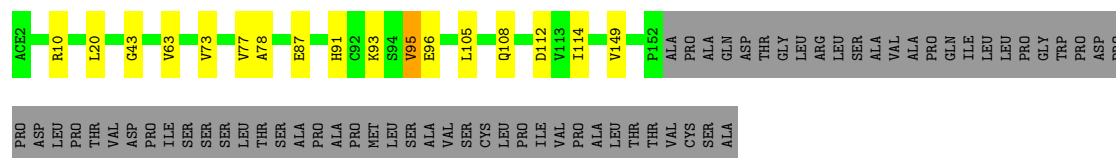
- Molecule 33: Large ribosomal subunit protein uL24m

Chain V:  76% 19% 5%



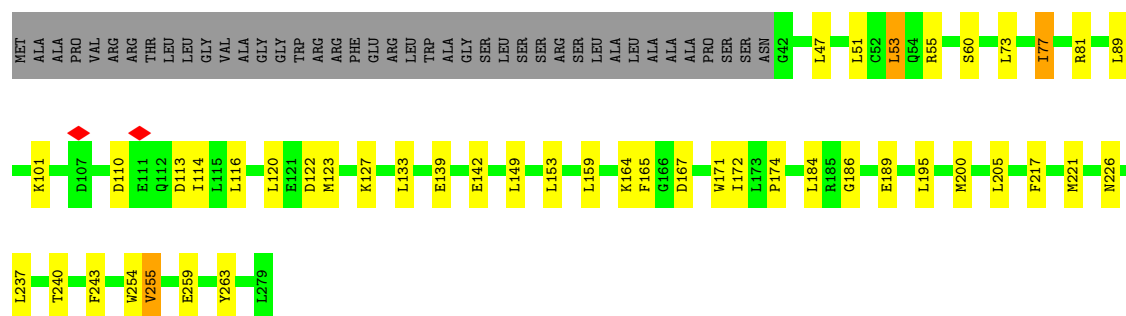
- Molecule 34: Large ribosomal subunit protein mL43

Chain b:  62% 7% 30%



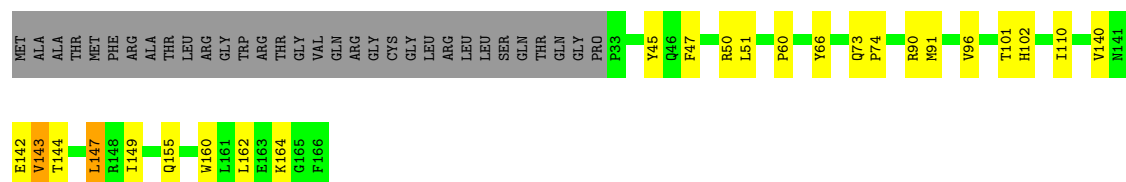
- Molecule 35: Large ribosomal subunit protein mL46

Chain e:  69% 15% 15%



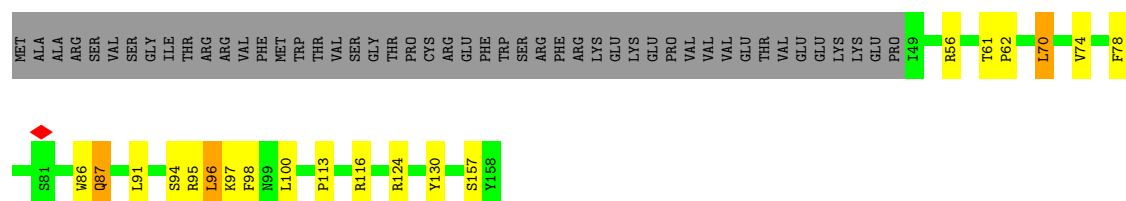
- Molecule 36: Large ribosomal subunit protein mL49

Chain g:  66% 13% 19%



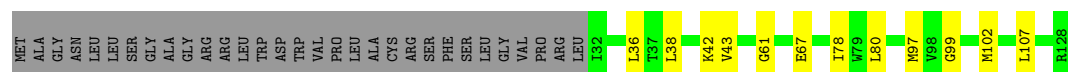
- Molecule 37: Large ribosomal subunit protein mL50

Chain h:  57% 11% 30%



- Molecule 38: Large ribosomal subunit protein mL51

Chain i:  66% 9% 24%



- Molecule 39: Large ribosomal subunit protein mL52

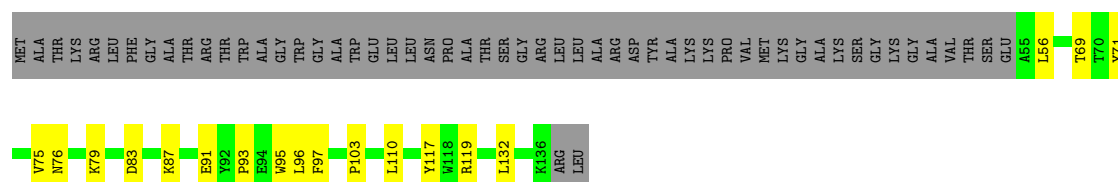
Chain j:  65% 11% 24%



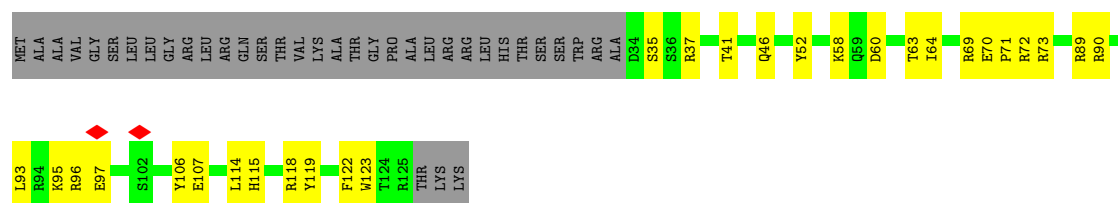
- Molecule 40: Large ribosomal subunit protein mL53



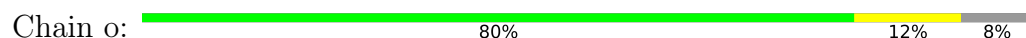
- Molecule 41: Large ribosomal subunit protein mL54



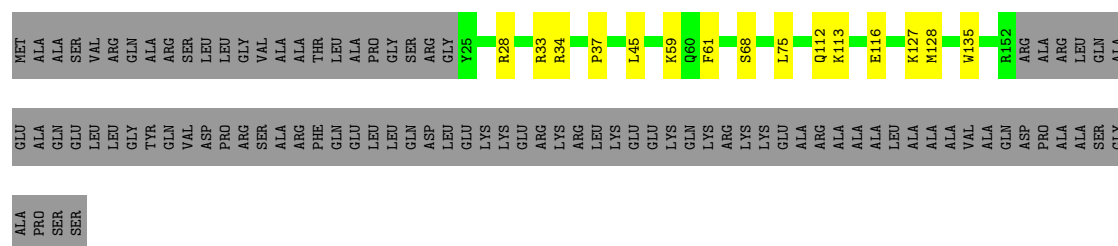
- Molecule 42: Large ribosomal subunit protein mL55



- Molecule 43: Large ribosomal subunit protein mL63



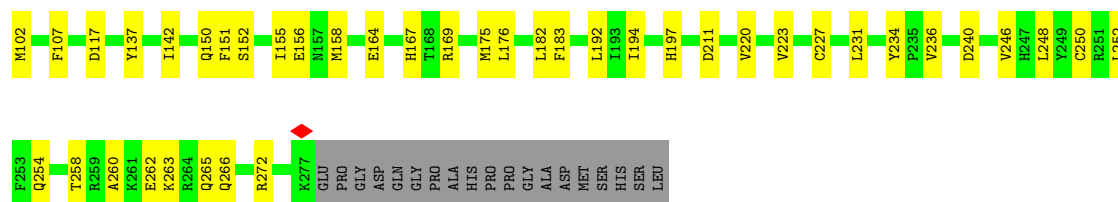
- Molecule 44: Large ribosomal subunit protein mL64



- Molecule 45: Large ribosomal subunit protein mL66

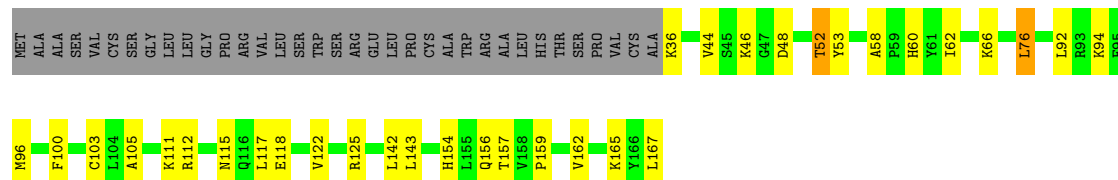






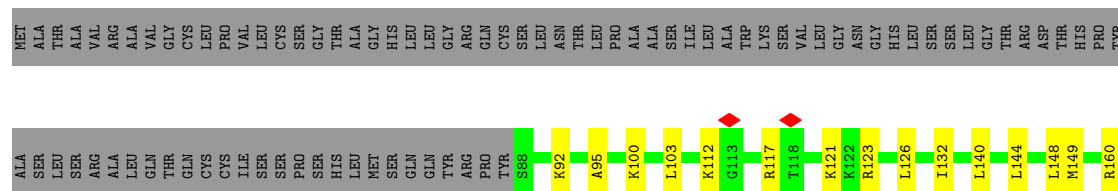
- Molecule 48: Small ribosomal subunit protein uS3m

Chain AC: 59% 19% 21%



- Molecule 49: Small ribosomal subunit protein uS5m

Chain AD: 67% 13% 20%



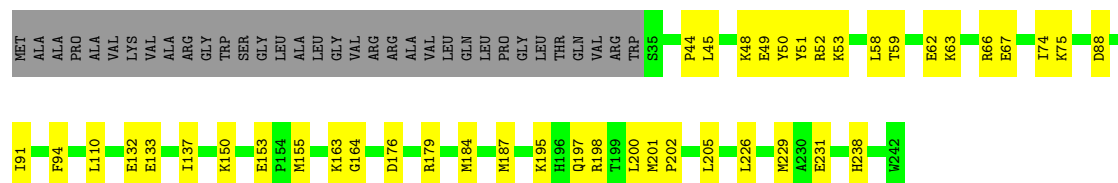
- Molecule 50: Small ribosomal subunit protein bS6m

Chain AE: 75% 22% 3%



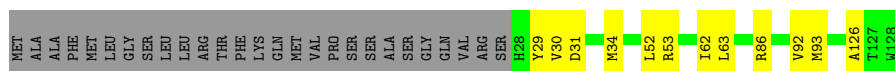
- Molecule 51: Small ribosomal subunit protein uS7m

Chain AF: 68% 18% 14%



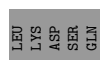
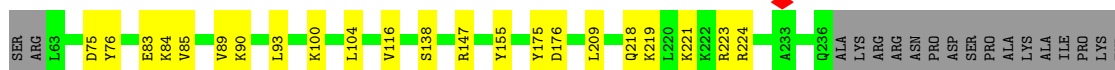
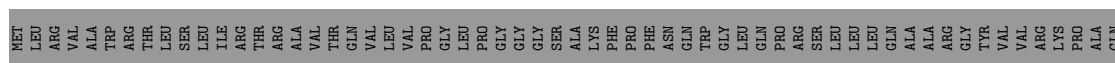
- Molecule 56: Small ribosomal subunit protein uS14m

Chain AK:  70% 9% 21%



- Molecule 57: Small ribosomal subunit protein uS15m

Chain AL:  59% 9% 32%



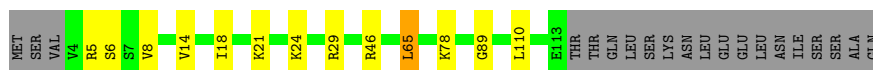
- Molecule 58: Small ribosomal subunit protein bS16m

Chain AM:  71% 16% 13%



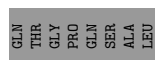
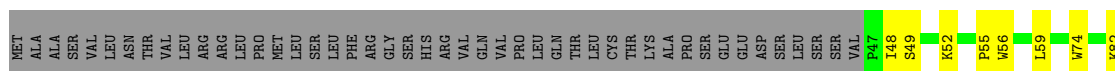
- Molecule 59: Small ribosomal subunit protein uS17m

Chain AN:  75% 9% 15%



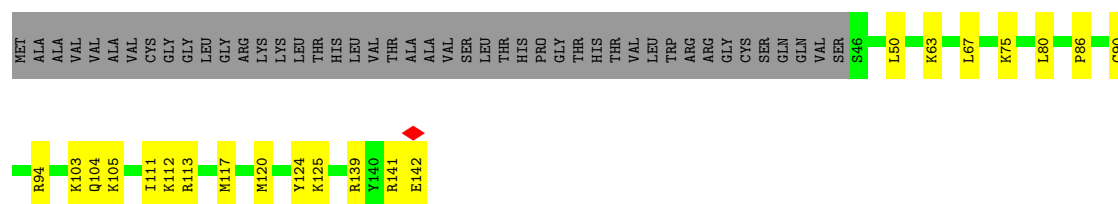
- Molecule 60: Small ribosomal subunit protein mS40

Chain AO:  62% 13% 25%



- Molecule 61: Small ribosomal subunit protein bS18m

Chain AP:  54% 15% 32%



- Molecule 62: Small ribosomal subunit protein bS21m

Chain C:  80% 20%



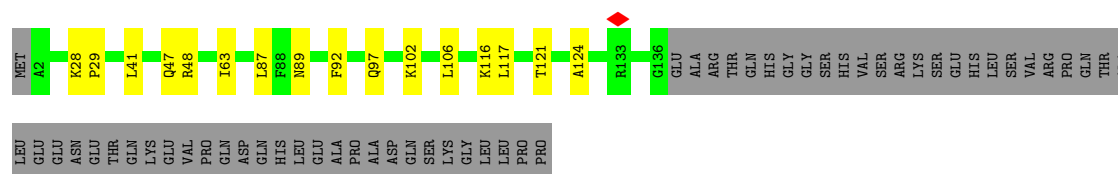
- Molecule 63: Small ribosomal subunit protein mS22

Chain AR:  68% 14% 18%



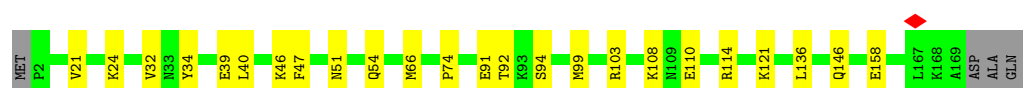
- Molecule 64: Small ribosomal subunit protein mS23

Chain AS:  63% 8% 29%



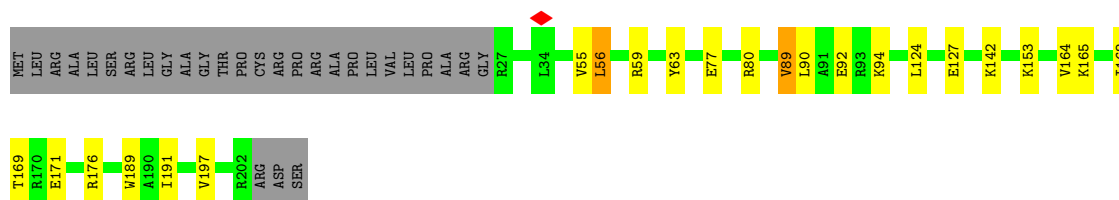
- Molecule 65: Small ribosomal subunit protein mS25

Chain AT:  83% 14%

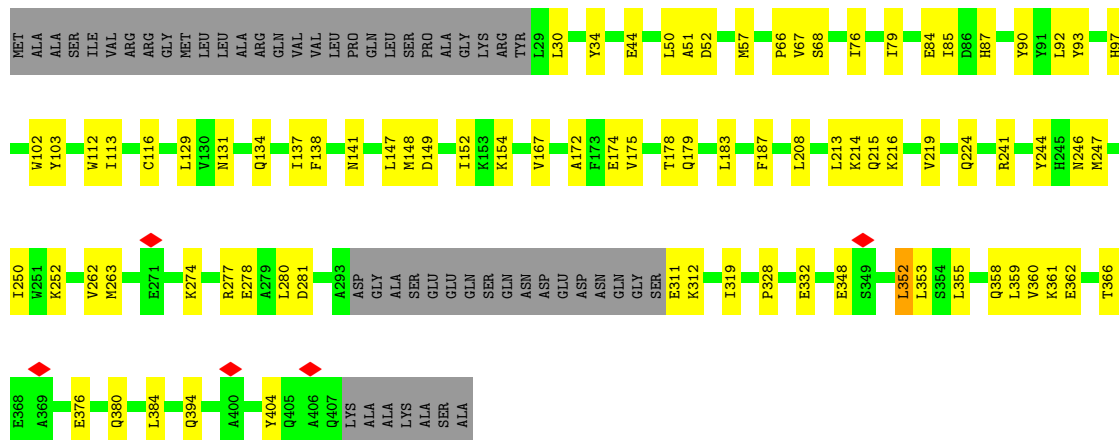


- Molecule 66: Small ribosomal subunit protein mS26

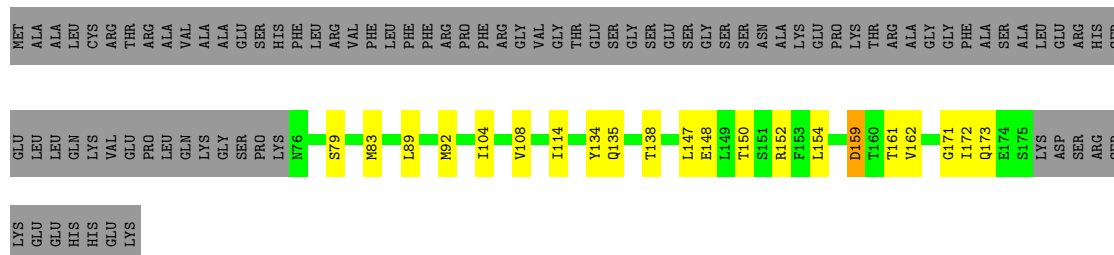
Chain AU:  75% 10% 14%



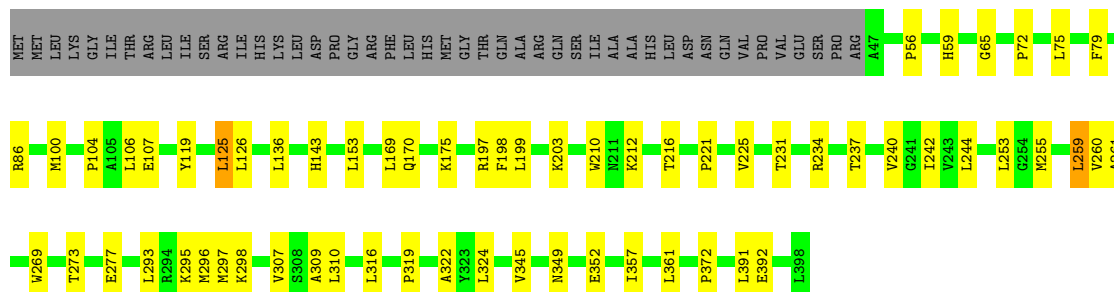
- Molecule 67: Small ribosomal subunit protein mS27



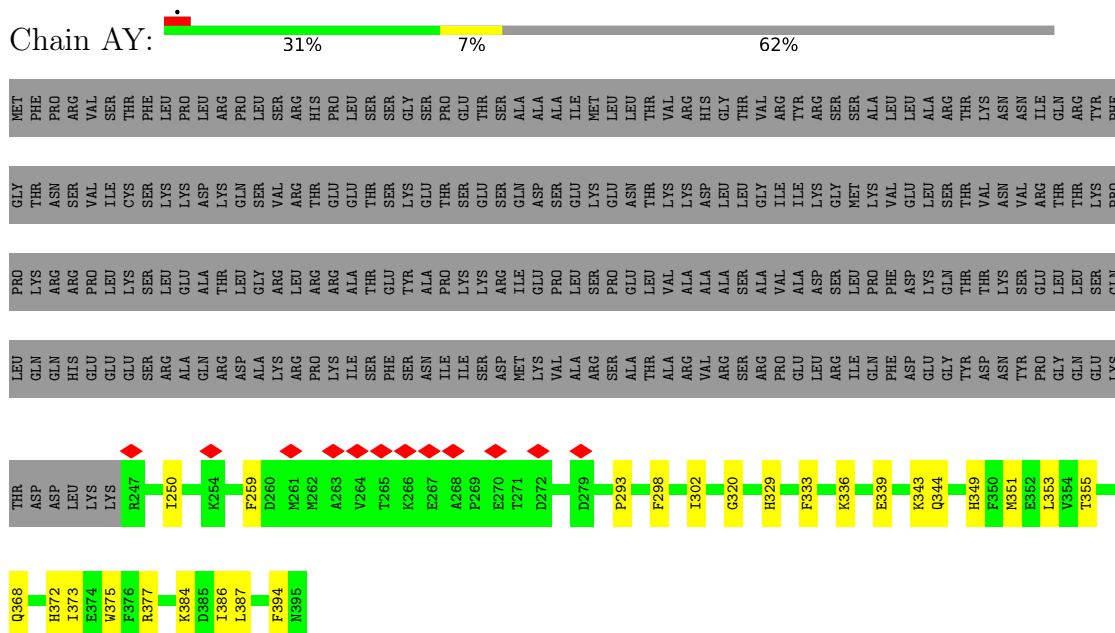
- Molecule 68: Small ribosomal subunit protein bS1m



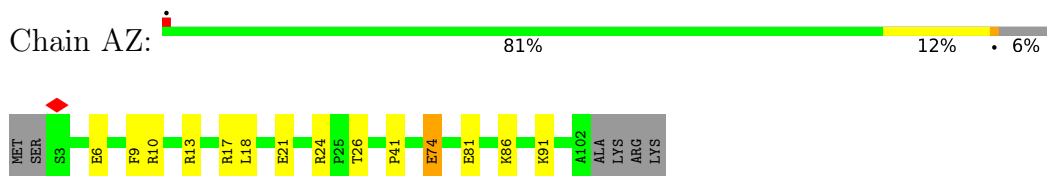
- Molecule 69: Small ribosomal subunit protein mS29



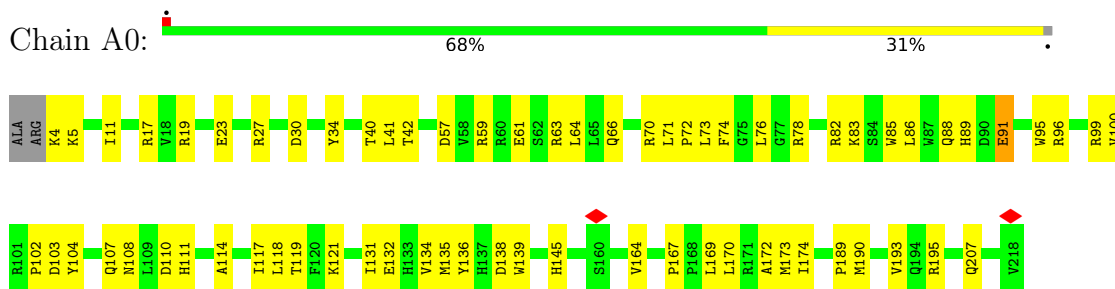
- Molecule 70: Small ribosomal subunit protein mS31



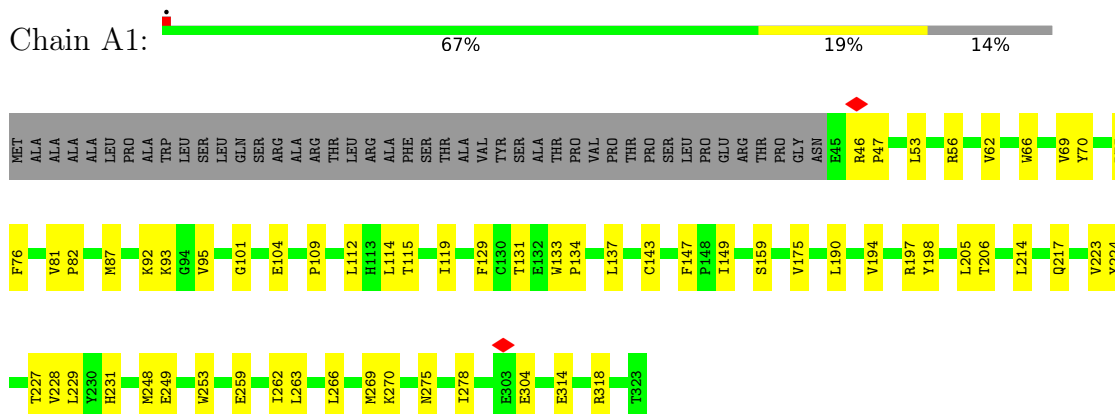
- Molecule 71: Small ribosomal subunit protein mS33



- Molecule 72: Small ribosomal subunit protein mS34



- Molecule 73: Small ribosomal subunit protein mS35



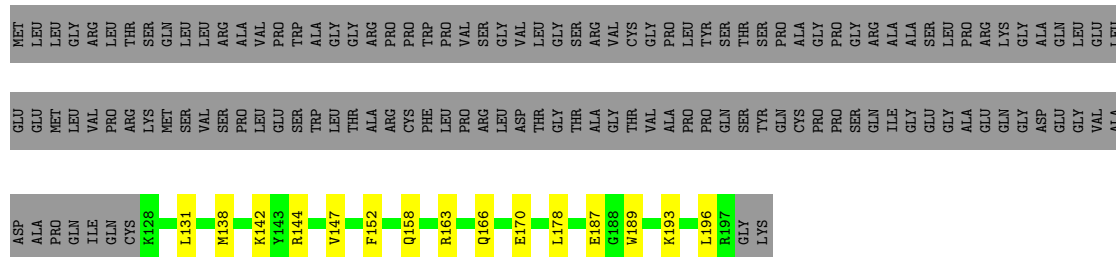
- Molecule 74: Small ribosomal subunit protein mS37

Chain G:  83% 16%



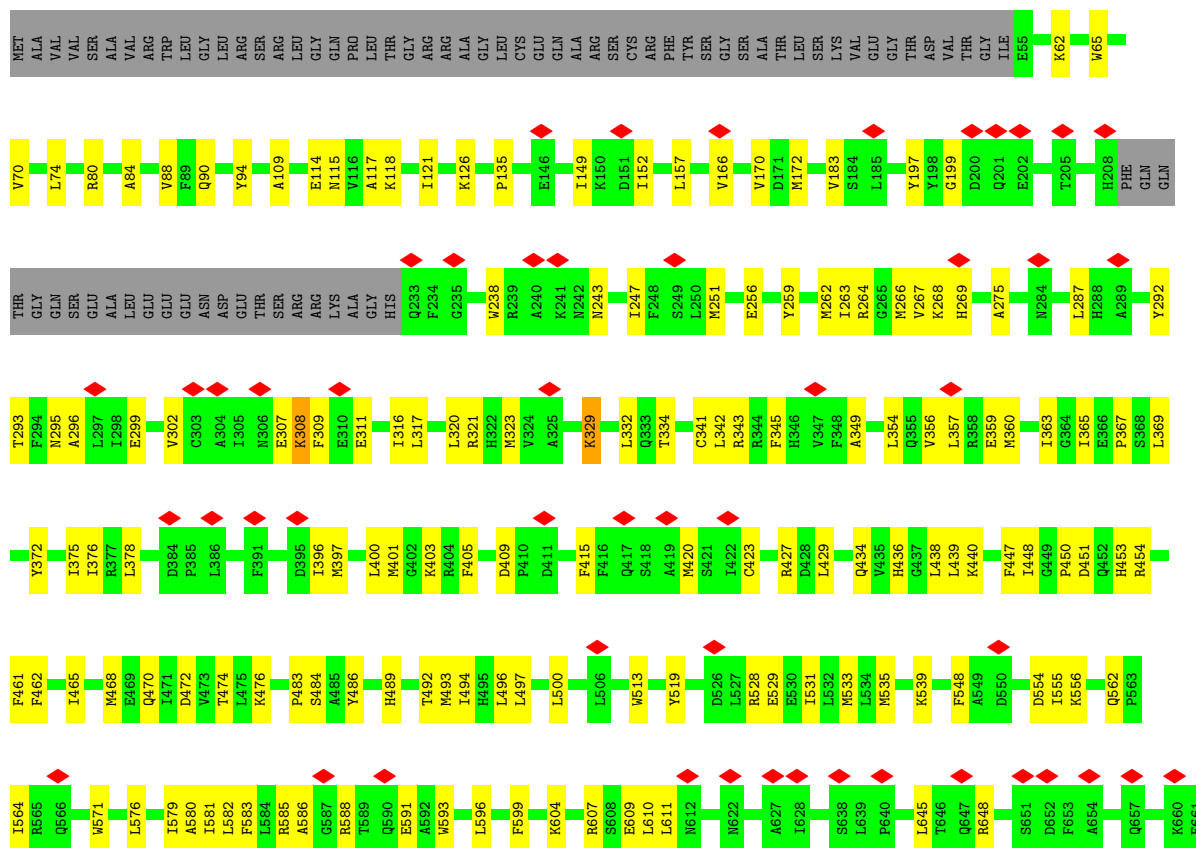
- Molecule 75: Small ribosomal subunit protein mS38

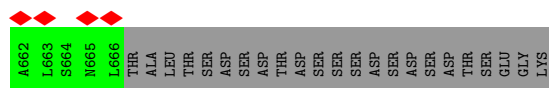
Chain A3:  28% 8% 65%



- Molecule 76: Small ribosomal subunit protein mS39

Chain A4:  8% 63% 22% 15%





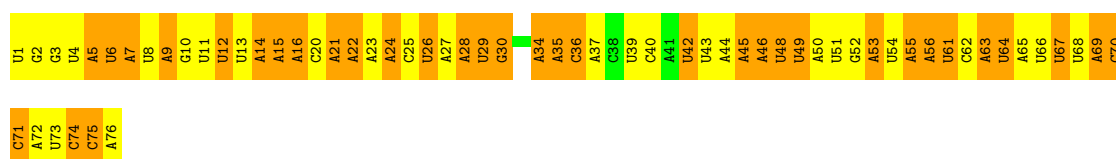
- Molecule 77: mRNA

Chain Az: 38% 9% 50%



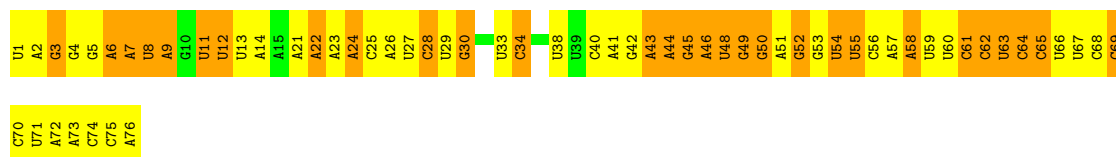
- Molecule 78: A/A-tRNA

Chain Aw: 7% 41% 51%



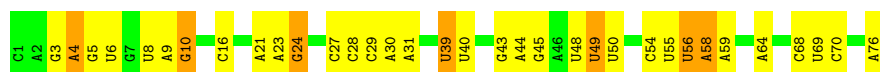
- Molecule 79: P/P-tRNA

Chain Ax: 11% 47% 41%



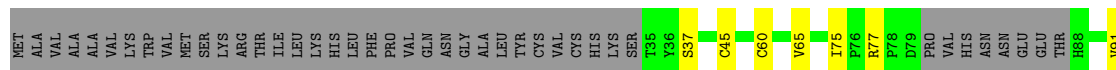
- Molecule 80: mitochondrial tRNA^{Val}

Chain B: 53% 38% 10%



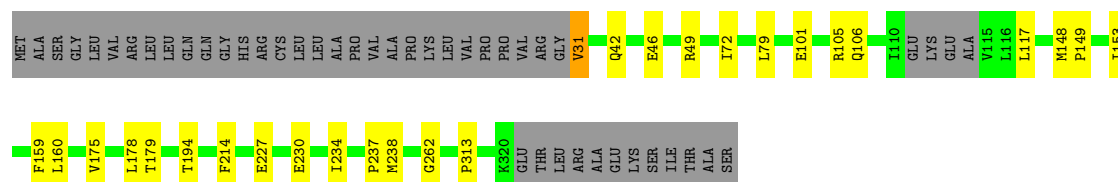
- Molecule 81: Large ribosomal subunit protein mL42

Chain a: 65% 5% 30%

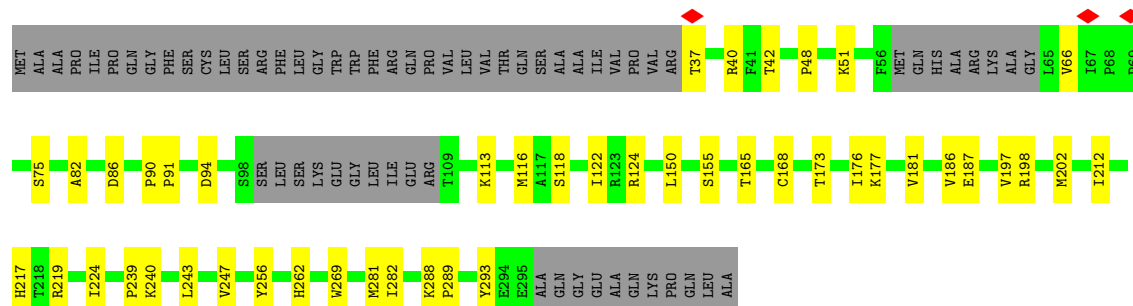


- Molecule 82: Large ribosomal subunit protein mL44

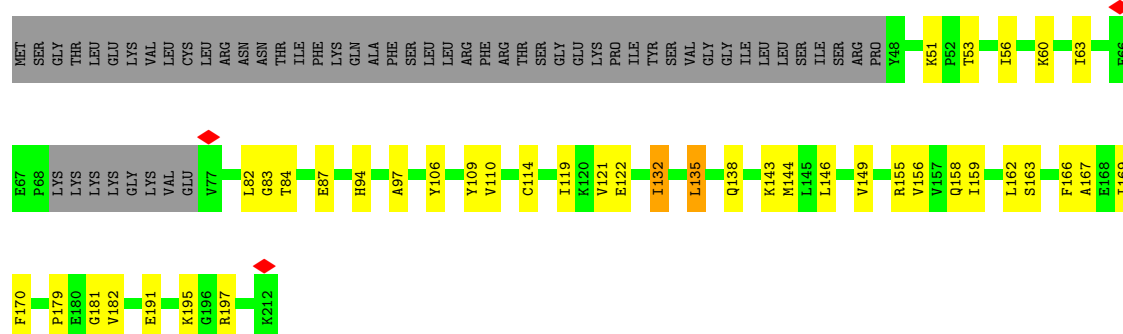
Chain c: 78% 8% 14%



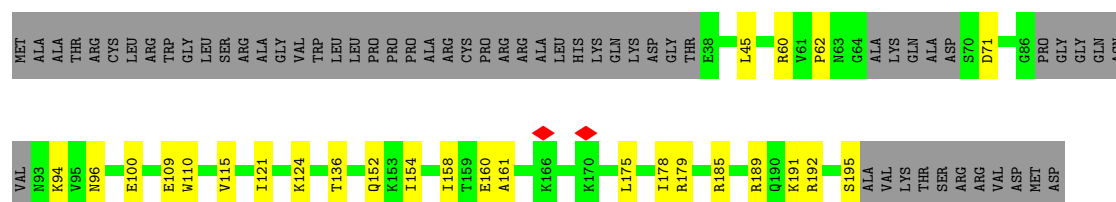
- Molecule 83: Large ribosomal subunit protein mL45



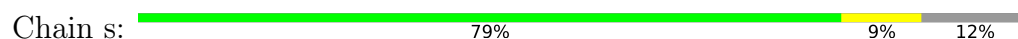
- Molecule 84: Large ribosomal subunit protein mL48

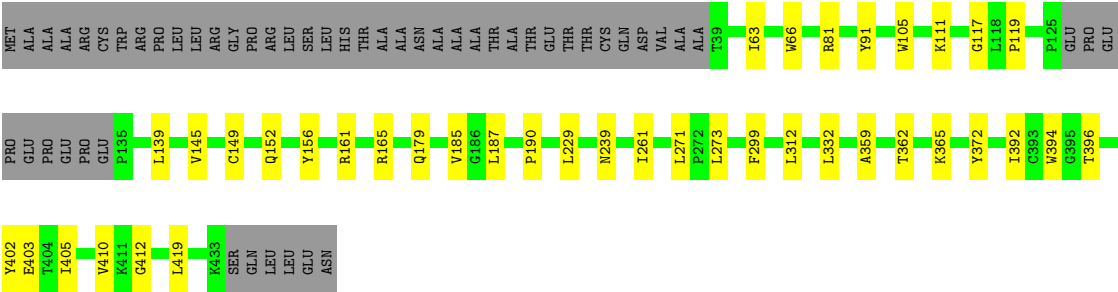


- Molecule 85: Large ribosomal subunit protein mL62



- Molecule 86: Large ribosomal subunit protein mL65





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	47726	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	3.946	Depositor
Minimum map value	-2.515	Depositor
Average map value	-0.002	Depositor
Map value standard deviation	0.130	Depositor
Recommended contour level	0.1	Depositor
Map size ($\text{\AA}$)	552.16, 552.16, 552.16	wwPDB
Map dimensions	680, 680, 680	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.812, 0.812, 0.812	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: NMY, ATP, OMU, 2MG, K, OMG, PSU, ACE, 5MC, 1MA, B8T, NAD, ZN, 5MU, MA6, PUT, GDP, SPM, SPD, FES, MG, 5F0

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	0	0.15	0/913	0.32	0/1224
2	1	0.13	0/469	0.32	0/621
3	2	0.14	0/383	0.22	0/507
4	3	0.15	0/853	0.25	0/1136
5	4	0.15	0/350	0.25	0/461
6	5	0.14	0/3305	0.26	0/4502
7	6	0.14	0/3043	0.31	0/4140
8	7	0.14	0/2447	0.32	0/3310
9	8	0.13	0/1354	0.36	0/1819
10	9	0.13	0/1025	0.30	0/1379
11	A	0.16	0/36876	0.26	0/57402
12	D	0.14	0/1896	0.25	0/2549
13	E	0.14	0/2475	0.27	0/3355
14	F	0.15	0/2090	0.29	0/2842
15	H	0.11	0/1698	0.26	0/2292
16	I	0.14	0/1381	0.35	0/1865
17	J	0.12	0/1348	0.32	0/1813
18	k	0.17	0/1497	0.35	0/2031
19	L	0.15	0/905	0.34	0/1218
20	M	0.15	0/2368	0.28	0/3195
21	N	0.15	0/1833	0.31	0/2468
22	O	0.16	0/1283	0.32	0/1727
23	P	0.14	0/1199	0.27	0/1623
24	Q	0.14	0/2039	0.31	0/2750
25	R	0.15	0/1175	0.26	0/1572
26	S	0.15	0/1320	0.31	0/1789
27	T	0.15	0/1403	0.26	0/1886
28	U	0.14	0/1280	0.27	0/1732
29	W	0.16	0/926	0.28	0/1244
30	X	0.13	0/2099	0.26	0/2837
31	Y	0.13	0/1593	0.25	0/2136

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
32	Z	0.17	0/1021	0.36	0/1378
33	V	0.12	0/1721	0.29	0/2333
34	b	0.15	0/1219	0.30	0/1651
35	e	0.11	0/1970	0.34	0/2658
36	g	0.16	0/1151	0.36	0/1569
37	h	0.11	0/918	0.29	0/1249
38	i	0.15	0/850	0.27	0/1135
39	j	0.13	0/760	0.28	0/1023
40	n	0.13	0/783	0.33	0/1057
41	l	0.09	0/707	0.29	0/960
42	m	0.14	0/805	0.38	0/1081
43	o	0.16	0/819	0.33	0/1097
44	q	0.13	0/1107	0.31	0/1498
45	r	0.13	0/1362	0.29	0/1846
46	AA	0.11	0/22537	0.22	0/35085
47	AB	0.14	0/1859	0.36	0/2513
48	AC	0.13	0/1113	0.32	0/1505
49	AD	0.13	0/2783	0.33	0/3724
50	AE	0.15	0/989	0.36	0/1335
51	AF	0.13	0/1767	0.34	0/2373
52	AG	0.12	0/2746	0.33	0/3681
53	AH	0.13	0/1178	0.35	0/1598
54	AI	0.13	0/1030	0.31	0/1386
55	AJ	0.14	0/855	0.37	0/1148
56	AK	0.12	0/880	0.33	0/1182
57	AL	0.13	0/1477	0.35	0/1974
58	AM	0.12	0/963	0.36	0/1295
59	AN	0.11	0/886	0.29	0/1199
60	AO	0.13	0/1648	0.36	0/2243
61	AP	0.12	0/798	0.32	0/1070
62	C	0.12	0/754	0.28	0/1003
63	AR	0.13	0/2456	0.32	0/3317
64	AS	0.13	0/1138	0.34	0/1533
65	AT	0.12	0/1402	0.33	0/1883
66	AU	0.10	0/1510	0.27	0/2025
67	AV	0.10	0/3030	0.32	0/4093
68	AW	0.15	0/801	0.40	0/1079
69	AX	0.10	0/2921	0.32	0/3954
70	AY	0.14	0/1280	0.38	0/1725
71	AZ	0.14	0/857	0.38	0/1141
72	A0	0.15	0/1834	0.40	0/2484
73	A1	0.11	0/2313	0.31	0/3129
74	G	0.16	0/947	0.43	0/1266

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
75	A3	0.13	0/636	0.34	0/839
76	A4	0.12	0/4877	0.37	0/6598
77	Az	0.41	0/378	0.67	0/586
78	Aw	0.39	0/1603	0.69	0/2488
79	Ax	0.39	0/1655	0.66	0/2569
80	B	0.10	0/1627	0.21	0/2527
81	a	0.13	0/866	0.27	0/1174
82	c	0.13	0/2347	0.30	0/3171
83	d	0.12	0/2039	0.28	0/2759
84	f	0.14	0/1273	0.35	0/1716
85	p	0.13	0/1223	0.34	0/1641
86	s	0.14	0/3239	0.27	0/4400
All	All	0.15	0/184534	0.31	0/262371

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
54	AI	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
54	AI	183	HIS	Mainchain,Peptide
54	AI	184	5F0	Mainchain

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	898	0	916	12	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	1	464	0	511	7	0
3	2	377	0	406	4	0
4	3	832	0	883	8	0
5	4	342	0	361	2	0
6	5	3210	0	3206	34	0
7	6	2948	0	2841	31	0
8	7	2390	0	2397	38	0
9	8	1327	0	1368	44	0
10	9	997	0	987	26	0
11	A	33070	0	16793	336	0
12	D	1859	0	1919	31	0
13	E	2406	0	2415	18	0
14	F	2031	0	2065	27	0
15	H	1661	0	1734	27	0
16	I	1351	0	1425	40	0
17	J	1330	0	1407	33	0
18	k	1455	0	1452	19	0
19	L	890	0	941	8	0
20	M	2314	0	2384	21	0
21	N	1786	0	1817	17	0
22	O	1259	0	1294	18	0
23	P	1173	0	1165	12	0
24	Q	1990	0	2031	85	0
25	R	1154	0	1214	7	0
26	S	1293	0	1365	13	0
27	T	1369	0	1410	9	0
28	U	1251	0	1232	18	0
29	W	904	0	934	13	0
30	X	2044	0	2060	20	0
31	Y	1556	0	1597	7	0
32	Z	996	0	1044	10	0
33	V	1676	0	1687	29	0
34	b	1196	0	1195	7	0
35	e	1931	0	1914	46	0
36	g	1113	0	1097	17	0
37	h	895	0	881	14	0
38	i	828	0	857	11	0
39	j	745	0	746	10	0
40	n	774	0	784	20	0
41	l	688	0	674	18	0
42	m	791	0	790	92	0
43	o	798	0	804	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
44	q	1076	0	1049	13	0
45	r	1322	0	1348	19	0
46	AA	20260	0	10286	288	0
47	AB	1818	0	1807	29	0
48	AC	1083	0	1088	23	0
49	AD	2731	0	2804	40	0
50	AE	972	0	999	33	0
51	AF	1725	0	1769	31	0
52	AG	2688	0	2687	41	0
53	AH	1152	0	1183	38	0
54	AI	1020	0	1053	11	0
55	AJ	839	0	887	18	0
56	AK	862	0	885	11	0
57	AL	1453	0	1540	19	0
58	AM	942	0	965	20	0
59	AN	868	0	928	9	0
60	AO	1592	0	1557	22	0
61	AP	781	0	806	22	0
62	C	744	0	758	14	0
63	AR	2409	0	2428	35	0
64	AS	1111	0	1115	10	0
65	AT	1371	0	1393	16	0
66	AU	1488	0	1499	20	0
67	AV	2969	0	2960	115	0
68	AW	789	0	802	12	0
69	AX	2849	0	2841	55	0
70	AY	1246	0	1197	29	0
71	AZ	839	0	855	28	0
72	A0	1787	0	1796	48	0
73	A1	2265	0	2294	69	0
74	G	935	0	971	16	0
75	A3	625	0	699	16	0
76	A4	4768	0	4766	118	0
77	Az	339	0	169	29	0
78	Aw	1434	0	725	138	0
79	Ax	1482	0	752	102	0
80	B	1524	0	779	15	0
81	a	840	0	810	4	0
82	c	2299	0	2320	20	0
83	d	1985	0	1976	32	0
84	f	1252	0	1269	31	0
85	p	1205	0	1223	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
86	s	3155	0	3139	20	0
87	0	1	0	0	0	0
87	4	1	0	0	0	0
87	AO	1	0	0	0	0
88	3	1	0	0	0	0
88	6	1	0	0	0	0
88	A	28	0	0	0	0
88	AA	17	0	0	0	0
88	D	1	0	0	0	0
88	M	1	0	0	0	0
88	N	1	0	0	0	0
88	W	1	0	0	0	0
88	i	1	0	0	0	0
88	o	1	0	0	0	0
89	A	30	0	57	0	0
89	AA	10	0	19	0	0
90	A	6	0	12	0	0
91	A	138	0	0	0	0
91	A3	1	0	0	0	0
91	AA	62	0	0	0	0
91	AB	1	0	0	0	0
91	AX	1	0	0	0	0
91	Az	1	0	0	0	0
91	D	2	0	0	0	0
91	g	1	0	0	0	0
91	o	1	0	0	0	0
92	A	210	0	229	20	0
92	AA	168	0	184	23	0
93	e	7	0	8	1	0
94	AP	4	0	0	0	0
94	AT	4	0	0	0	0
94	r	4	0	0	1	0
95	AA	44	0	26	0	0
96	AA	14	0	26	0	0
97	AX	31	0	12	0	0
98	AX	28	0	12	1	0
All	All	176080	0	148765	2437	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

The worst 5 of 2437 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:AA:1076:5MU:C5	46:AA:1076:5MU:C4	1.79	1.70
78:Aw:25:C:C2'	78:Aw:26:U:H5''	1.28	1.62
42:m:122:PHE:CD1	53:AH:183:HIS:HD2	1.20	1.59
42:m:122:PHE:HD1	53:AH:183:HIS:CD2	1.20	1.56
42:m:119:TYR:CE2	73:A1:228:VAL:CA	1.84	1.55

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	108/188 (57%)	107 (99%)	1 (1%)	0	100	100
2	1	54/65 (83%)	52 (96%)	2 (4%)	0	100	100
3	2	44/92 (48%)	44 (100%)	0	0	100	100
4	3	93/188 (50%)	92 (99%)	1 (1%)	0	100	100
5	4	36/103 (35%)	36 (100%)	0	0	100	100
6	5	392/423 (93%)	385 (98%)	7 (2%)	0	100	100
7	6	352/380 (93%)	343 (97%)	9 (3%)	0	100	100
8	7	292/338 (86%)	283 (97%)	9 (3%)	0	100	100
9	8	155/206 (75%)	152 (98%)	3 (2%)	0	100	100
10	9	122/137 (89%)	119 (98%)	3 (2%)	0	100	100
12	D	236/305 (77%)	231 (98%)	5 (2%)	0	100	100
13	E	303/348 (87%)	296 (98%)	7 (2%)	0	100	100
14	F	250/311 (80%)	249 (100%)	1 (0%)	0	100	100
15	H	200/267 (75%)	198 (99%)	2 (1%)	0	100	100
16	I	166/261 (64%)	163 (98%)	3 (2%)	0	100	100
17	J	173/192 (90%)	170 (98%)	3 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
18	k	176/178 (99%)	172 (98%)	4 (2%)	0	100	100
19	L	113/145 (78%)	111 (98%)	2 (2%)	0	100	100
20	M	287/296 (97%)	284 (99%)	3 (1%)	0	100	100
21	N	220/251 (88%)	218 (99%)	2 (1%)	0	100	100
22	O	152/175 (87%)	149 (98%)	3 (2%)	0	100	100
23	P	142/180 (79%)	142 (100%)	0	0	100	100
24	Q	237/292 (81%)	234 (99%)	2 (1%)	1 (0%)	30	59
25	R	138/149 (93%)	138 (100%)	0	0	100	100
26	S	159/205 (78%)	158 (99%)	1 (1%)	0	100	100
27	T	164/206 (80%)	159 (97%)	5 (3%)	0	100	100
28	U	151/153 (99%)	150 (99%)	1 (1%)	0	100	100
29	W	114/148 (77%)	113 (99%)	1 (1%)	0	100	100
30	X	242/256 (94%)	239 (99%)	3 (1%)	0	100	100
31	Y	179/250 (72%)	177 (99%)	2 (1%)	0	100	100
32	Z	120/161 (74%)	119 (99%)	1 (1%)	0	100	100
33	V	203/216 (94%)	199 (98%)	4 (2%)	0	100	100
34	b	149/215 (69%)	144 (97%)	5 (3%)	0	100	100
35	e	236/279 (85%)	225 (95%)	11 (5%)	0	100	100
36	g	132/166 (80%)	132 (100%)	0	0	100	100
37	h	108/158 (68%)	105 (97%)	3 (3%)	0	100	100
38	i	95/128 (74%)	95 (100%)	0	0	100	100
39	j	92/123 (75%)	91 (99%)	1 (1%)	0	100	100
40	n	100/112 (89%)	98 (98%)	2 (2%)	0	100	100
41	l	80/138 (58%)	80 (100%)	0	0	100	100
42	m	90/128 (70%)	85 (94%)	5 (6%)	0	100	100
43	o	92/102 (90%)	91 (99%)	1 (1%)	0	100	100
44	q	126/222 (57%)	125 (99%)	1 (1%)	0	100	100
45	r	160/196 (82%)	158 (99%)	2 (1%)	0	100	100
47	AB	220/296 (74%)	217 (99%)	3 (1%)	0	100	100
48	AC	130/167 (78%)	128 (98%)	2 (2%)	0	100	100
49	AD	341/430 (79%)	335 (98%)	6 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
50	AE	120/125 (96%)	119 (99%)	1 (1%)	0	100	100
51	AF	206/242 (85%)	205 (100%)	1 (0%)	0	100	100
52	AG	323/396 (82%)	316 (98%)	7 (2%)	0	100	100
53	AH	138/201 (69%)	136 (99%)	1 (1%)	1 (1%)	18	48
54	AI	134/194 (69%)	132 (98%)	2 (2%)	0	100	100
55	AJ	106/138 (77%)	103 (97%)	3 (3%)	0	100	100
56	AK	99/128 (77%)	99 (100%)	0	0	100	100
57	AL	172/257 (67%)	170 (99%)	2 (1%)	0	100	100
58	AM	117/137 (85%)	116 (99%)	1 (1%)	0	100	100
59	AN	108/130 (83%)	105 (97%)	3 (3%)	0	100	100
60	AO	191/258 (74%)	188 (98%)	3 (2%)	0	100	100
61	AP	95/142 (67%)	94 (99%)	1 (1%)	0	100	100
62	C	85/87 (98%)	83 (98%)	2 (2%)	0	100	100
63	AR	293/360 (81%)	288 (98%)	5 (2%)	0	100	100
64	AS	133/190 (70%)	132 (99%)	1 (1%)	0	100	100
65	AT	166/173 (96%)	164 (99%)	2 (1%)	0	100	100
66	AU	174/205 (85%)	173 (99%)	1 (1%)	0	100	100
67	AV	358/414 (86%)	352 (98%)	6 (2%)	0	100	100
68	AW	98/187 (52%)	98 (100%)	0	0	100	100
69	AX	350/398 (88%)	346 (99%)	4 (1%)	0	100	100
70	AY	147/395 (37%)	145 (99%)	2 (1%)	0	100	100
71	AZ	98/106 (92%)	97 (99%)	1 (1%)	0	100	100
72	A0	213/217 (98%)	207 (97%)	6 (3%)	0	100	100
73	A1	277/323 (86%)	271 (98%)	6 (2%)	0	100	100
74	G	116/118 (98%)	114 (98%)	2 (2%)	0	100	100
75	A3	68/199 (34%)	67 (98%)	1 (2%)	0	100	100
76	A4	584/689 (85%)	575 (98%)	9 (2%)	0	100	100
81	a	96/142 (68%)	95 (99%)	1 (1%)	0	100	100
82	c	282/332 (85%)	279 (99%)	3 (1%)	0	100	100
83	d	235/306 (77%)	228 (97%)	7 (3%)	0	100	100
84	f	153/212 (72%)	149 (97%)	4 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
85	p	141/206 (68%)	138 (98%)	3 (2%)	0	100	100
86	s	382/439 (87%)	375 (98%)	7 (2%)	0	100	100
All	All	14182/17971 (79%)	13950 (98%)	230 (2%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
53	AH	126	ILE
24	Q	62	ILE

5.3.2 Protein sidechains ⓘ

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	
1	0	99/164 (60%)	98 (99%)	1 (1%)	68	89
2	1	53/60 (88%)	51 (96%)	2 (4%)	29	64
3	2	40/72 (56%)	38 (95%)	2 (5%)	22	53
4	3	88/166 (53%)	87 (99%)	1 (1%)	65	88
5	4	37/89 (42%)	37 (100%)	0	100	100
6	5	353/368 (96%)	346 (98%)	7 (2%)	48	78
7	6	313/332 (94%)	310 (99%)	3 (1%)	68	89
8	7	270/303 (89%)	264 (98%)	6 (2%)	45	77
9	8	146/190 (77%)	140 (96%)	6 (4%)	27	61
10	9	104/112 (93%)	100 (96%)	4 (4%)	29	64
12	D	192/245 (78%)	191 (100%)	1 (0%)	81	93
13	E	260/290 (90%)	257 (99%)	3 (1%)	63	86
14	F	219/262 (84%)	215 (98%)	4 (2%)	51	80
15	H	182/228 (80%)	179 (98%)	3 (2%)	55	83
16	I	153/232 (66%)	151 (99%)	2 (1%)	61	86
17	J	138/150 (92%)	132 (96%)	6 (4%)	26	60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
18	k	155/155 (100%)	152 (98%)	3 (2%)	50	79
19	L	98/124 (79%)	96 (98%)	2 (2%)	48	78
20	M	245/249 (98%)	244 (100%)	1 (0%)	84	94
21	N	189/211 (90%)	188 (100%)	1 (0%)	81	93
22	O	134/150 (89%)	132 (98%)	2 (2%)	57	84
23	P	126/155 (81%)	126 (100%)	0	100	100
24	Q	221/256 (86%)	220 (100%)	1 (0%)	81	93
25	R	118/126 (94%)	115 (98%)	3 (2%)	42	74
26	S	146/180 (81%)	146 (100%)	0	100	100
27	T	146/176 (83%)	141 (97%)	5 (3%)	32	66
28	U	134/134 (100%)	128 (96%)	6 (4%)	24	58
29	W	94/119 (79%)	93 (99%)	1 (1%)	65	88
30	X	220/229 (96%)	219 (100%)	1 (0%)	81	93
31	Y	163/223 (73%)	161 (99%)	2 (1%)	63	86
32	Z	113/147 (77%)	112 (99%)	1 (1%)	70	90
33	V	183/191 (96%)	176 (96%)	7 (4%)	29	64
34	b	132/185 (71%)	127 (96%)	5 (4%)	29	64
35	e	207/236 (88%)	201 (97%)	6 (3%)	37	71
36	g	124/148 (84%)	121 (98%)	3 (2%)	43	75
37	h	104/148 (70%)	99 (95%)	5 (5%)	23	55
38	i	86/110 (78%)	85 (99%)	1 (1%)	63	86
39	j	74/97 (76%)	72 (97%)	2 (3%)	39	73
40	n	83/89 (93%)	82 (99%)	1 (1%)	63	86
41	l	76/116 (66%)	76 (100%)	0	100	100
42	m	85/113 (75%)	82 (96%)	3 (4%)	32	66
43	o	80/87 (92%)	78 (98%)	2 (2%)	42	74
44	q	110/178 (62%)	110 (100%)	0	100	100
45	r	147/169 (87%)	143 (97%)	4 (3%)	39	73
47	AB	197/249 (79%)	193 (98%)	4 (2%)	48	78
48	AC	115/143 (80%)	110 (96%)	5 (4%)	26	60
49	AD	286/357 (80%)	283 (99%)	3 (1%)	68	89

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
50	AE	104/107 (97%)	103 (99%)	1 (1%)	68	89
51	AF	185/209 (88%)	182 (98%)	3 (2%)	55	83
52	AG	285/342 (83%)	283 (99%)	2 (1%)	76	92
53	AH	130/180 (72%)	126 (97%)	4 (3%)	35	69
54	AI	104/146 (71%)	102 (98%)	2 (2%)	50	79
55	AJ	93/118 (79%)	92 (99%)	1 (1%)	65	88
56	AK	91/113 (80%)	90 (99%)	1 (1%)	65	88
57	AL	158/226 (70%)	157 (99%)	1 (1%)	78	93
58	AM	97/113 (86%)	96 (99%)	1 (1%)	68	89
59	AN	96/115 (84%)	94 (98%)	2 (2%)	47	77
60	AO	174/230 (76%)	173 (99%)	1 (1%)	78	93
61	AP	88/123 (72%)	87 (99%)	1 (1%)	65	88
62	C	78/78 (100%)	78 (100%)	0	100	100
63	AR	264/318 (83%)	258 (98%)	6 (2%)	44	76
64	AS	116/164 (71%)	114 (98%)	2 (2%)	53	82
65	AT	153/157 (98%)	150 (98%)	3 (2%)	48	78
66	AU	152/174 (87%)	148 (97%)	4 (3%)	40	73
67	AV	325/364 (89%)	318 (98%)	7 (2%)	45	77
68	AW	87/158 (55%)	81 (93%)	6 (7%)	14	41
69	AX	311/351 (89%)	308 (99%)	3 (1%)	68	89
70	AY	137/357 (38%)	137 (100%)	0	100	100
71	AZ	90/95 (95%)	89 (99%)	1 (1%)	65	88
72	A0	188/189 (100%)	185 (98%)	3 (2%)	55	83
73	A1	257/291 (88%)	253 (98%)	4 (2%)	55	83
74	G	100/100 (100%)	99 (99%)	1 (1%)	68	89
75	A3	65/166 (39%)	61 (94%)	4 (6%)	16	46
76	A4	526/609 (86%)	515 (98%)	11 (2%)	47	77
81	a	96/133 (72%)	94 (98%)	2 (2%)	47	77
82	c	251/288 (87%)	249 (99%)	2 (1%)	73	90
83	d	223/274 (81%)	219 (98%)	4 (2%)	51	80
84	f	139/188 (74%)	135 (97%)	4 (3%)	37	71

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
85	p	135/181 (75%)	134 (99%)	1 (1%)	76	92
86	s	340/381 (89%)	334 (98%)	6 (2%)	51	80
All	All	12676/15551 (82%)	12451 (98%)	225 (2%)	51	80

5 of 225 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
45	r	39	VAL
86	s	312	LEU
55	AJ	127	ARG
86	s	161	ARG
76	A4	259	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 117 such sidechains are listed below:

Mol	Chain	Res	Type
45	r	109	GLN
82	c	204	GLN
54	AI	163	HIS
82	c	168	HIS
70	AY	285	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
11	A	1556/1561 (99%)	246 (15%)	3 (0%)
46	AA	953/954 (99%)	146 (15%)	1 (0%)
77	Az	15/32 (46%)	4 (26%)	0
78	Aw	67/68 (98%)	39 (58%)	0
79	Ax	68/70 (97%)	34 (50%)	0
80	B	71/72 (98%)	16 (22%)	0
All	All	2730/2757 (99%)	485 (17%)	4 (0%)

5 of 485 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
11	A	1681	G
11	A	1689	C
11	A	1692	A

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Mol	Chain	Res	Type
11	A	1699	C
11	A	1700	U

All (4) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
11	A	2030	U
11	A	2245	A
11	A	2331	C
46	AA	1539	C

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
11	PSU	A	3067	11	18,21,22	1.98	8 (44%)	22,30,33	1.81	4 (18%)
46	MA6	AA	1584	46	23,26,27	1.52	4 (17%)	34,38,41	3.91	13 (38%)
11	OMU	A	3039	88,11	19,22,23	3.03	8 (42%)	26,31,34	1.70	5 (19%)
11	OMG	A	3040	11,78	23,26,27	3.06	10 (43%)	33,38,41	2.69	11 (33%)
46	B8T	AA	1486	91,46	19,22,23	3.30	8 (42%)	26,31,34	0.84	1 (3%)
46	MA6	AA	1583	46	23,26,27	1.54	4 (17%)	34,38,41	3.96	13 (38%)
80	1MA	B	9	80	21,25,26	3.18	6 (28%)	31,37,40	2.28	8 (25%)
80	2MG	B	10	80	23,26,27	2.86	9 (39%)	32,38,41	2.21	11 (34%)
80	PSU	B	39	80	18,21,22	1.92	7 (38%)	22,30,33	1.79	3 (13%)
46	5MC	AA	1488	46	18,22,23	3.85	7 (38%)	26,32,35	0.96	1 (3%)
54	5F0	AI	184	54	8,8,9	1.47	2 (25%)	7,9,11	1.82	2 (28%)
11	1MA	A	2617	11	21,25,26	3.19	6 (28%)	31,37,40	2.37	8 (25%)
46	5MU	AA	1076	46	19,22,23	7.09	8 (42%)	28,32,35	3.41	10 (35%)
11	OMG	A	2815	88,11,79	23,26,27	3.05	10 (43%)	33,38,41	2.69	11 (33%)

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
11	PSU	A	3067	11	-	0/7/25/26	0/2/2/2
46	MA6	AA	1584	46	-	1/11/29/30	0/3/3/3
11	OMU	A	3039	88,11	-	0/9/27/28	0/2/2/2
11	OMG	A	3040	11,78	-	0/9/27/28	0/3/3/3
46	B8T	AA	1486	91,46	-	0/7/27/28	0/2/2/2
46	MA6	AA	1583	46	-	0/11/29/30	0/3/3/3
80	1MA	B	9	80	-	2/7/25/26	0/3/3/3
80	2MG	B	10	80	-	0/9/27/28	0/3/3/3
80	PSU	B	39	80	-	0/7/25/26	0/2/2/2
46	5MC	AA	1488	46	-	0/7/25/26	0/2/2/2
54	5F0	AI	184	54	-	0/9/9/10	-
11	1MA	A	2617	11	-	0/7/25/26	0/3/3/3
46	5MU	AA	1076	46	-	0/7/25/26	0/2/2/2
11	OMG	A	2815	88,11,79	-	1/9/27/28	0/3/3/3

The worst 5 of 97 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
46	AA	1076	5MU	C4-C5	20.71	1.79	1.44
46	AA	1076	5MU	C6-N1	14.41	1.62	1.38
46	AA	1076	5MU	C6-C5	-11.51	1.15	1.34
46	AA	1076	5MU	C4-N3	-11.12	1.18	1.38
46	AA	1488	5MC	C6-C5	9.64	1.50	1.34

The worst 5 of 101 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	AA	1583	MA6	N1-C6-N6	-15.38	100.27	117.08
46	AA	1584	MA6	N1-C6-N6	-15.34	100.31	117.08
46	AA	1076	5MU	C5-C4-N3	10.29	124.09	115.31
11	A	2815	OMG	C1'-N9-C8	-8.79	101.68	126.70
11	A	3040	OMG	C1'-N9-C8	-8.73	101.85	126.70

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	A	2815	OMG	C1'-C2'-O2'-CM2

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Mol	Chain	Res	Type	Atoms
80	B	9	1MA	C3'-C4'-C5'-O5'
46	AA	1584	MA6	C4'-C5'-O5'-P
80	B	9	1MA	O4'-C4'-C5'-O5'

There are no ring outliers.

7 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	A	3040	OMG	2	0
46	AA	1486	B8T	1	0
46	AA	1583	MA6	1	0
80	B	39	PSU	1	0
46	AA	1488	5MC	2	0
46	AA	1076	5MU	1	0
11	A	2815	OMG	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 286 ligands modelled in this entry, 264 are monoatomic - leaving 22 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	$\# Z > 2$
89	SPD	A	3303	91	9,9,9	0.27	0	8,8,8	0.26	0
92	NMY	A	3471	-	45,45,45	0.52	0	63,67,67	1.22	7 (11%)
92	NMY	A	3470	-	45,45,45	0.73	1 (2%)	63,67,67	1.09	4 (6%)
94	FES	r	201	16,45	0,4,4	-	-	-	-	-
89	SPD	AA	1703	-	9,9,9	0.26	0	8,8,8	0.31	0
94	FES	AP	201	61,50	0,4,4	-	-	-	-	-
97	ATP	AX	501	91	29,33,33	2.99	12 (41%)	44,52,52	2.39	14 (31%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
92	NMY	AA	1785	-	45,45,45	0.69	0	63,67,67	0.95	4 (6%)
93	VAL	e	301	-	4,6,7	0.52	0	6,7,9	0.94	0
92	NMY	A	3474	-	45,45,45	0.55	0	63,67,67	1.01	3 (4%)
92	NMY	AA	1784	-	45,45,45	0.74	0	63,67,67	1.08	5 (7%)
94	FES	AT	201	58,65	0,4,4	-	-	-	-	-
95	NAD	AA	1701	91	45,48,48	0.73	1 (2%)	63,73,73	0.76	2 (3%)
92	NMY	A	3472	11	45,45,45	0.58	0	63,67,67	1.11	5 (7%)
89	SPD	A	3302	-	9,9,9	0.27	0	8,8,8	0.25	0
90	PUT	A	3304	-	5,5,5	0.16	0	4,4,4	0.21	0
89	SPD	A	3301	-	9,9,9	0.27	0	8,8,8	0.28	0
92	NMY	A	3473	-	45,45,45	0.83	1 (2%)	63,67,67	0.93	2 (3%)
92	NMY	AA	1783	-	45,45,45	0.61	0	63,67,67	0.97	4 (6%)
92	NMY	AA	1786	-	45,45,45	0.66	0	63,67,67	1.03	3 (4%)
96	SPM	AA	1702	-	13,13,13	0.35	0	12,12,12	0.98	0
98	GDP	AX	503	-	28,30,30	1.13	3 (10%)	44,47,47	1.83	8 (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
89	SPD	A	3303	91	-	0/7/7/7	-
92	NMY	A	3471	-	-	10/18/94/94	0/4/4/4
92	NMY	A	3470	-	-	6/18/94/94	0/4/4/4
94	FES	r	201	16,45	-	-	0/1/1/1
89	SPD	AA	1703	-	-	2/7/7/7	-
94	FES	AP	201	61,50	-	-	0/1/1/1
97	ATP	AX	501	91	-	7/22/38/38	0/3/3/3
92	NMY	AA	1785	-	-	5/18/94/94	1/4/4/4
93	VAL	e	301	-	-	1/5/6/8	-
92	NMY	A	3474	-	-	10/18/94/94	1/4/4/4
92	NMY	AA	1784	-	-	5/18/94/94	0/4/4/4
94	FES	AT	201	58,65	-	-	0/1/1/1
95	NAD	AA	1701	91	-	7/30/62/62	0/5/5/5
92	NMY	A	3472	11	-	11/18/94/94	0/4/4/4
89	SPD	A	3302	-	-	0/7/7/7	-
90	PUT	A	3304	-	-	0/3/3/3	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
89	SPD	A	3301	-	-	1/7/7/7	-
92	NMY	A	3473	-	-	8/18/94/94	0/4/4/4
92	NMY	AA	1783	-	-	7/18/94/94	1/4/4/4
92	NMY	AA	1786	-	-	8/18/94/94	0/4/4/4
96	SPM	AA	1702	-	-	0/11/11/11	-
98	GDP	AX	503	-	-	3/16/32/32	0/3/3/3

The worst 5 of 18 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
97	AX	501	ATP	C2'-C3'	-10.74	1.23	1.53
97	AX	501	ATP	O4'-C1'	-4.66	1.31	1.42
97	AX	501	ATP	C6-N6	4.54	1.45	1.34
97	AX	501	ATP	C2'-C1'	4.17	1.66	1.53
97	AX	501	ATP	C5'-C4'	-3.95	1.39	1.51

The worst 5 of 61 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
98	AX	503	GDP	C5-C4-N3	-6.04	118.67	128.46
97	AX	501	ATP	N3-C2-N1	-5.50	120.00	128.60
97	AX	501	ATP	N6-C6-N1	-5.47	106.37	118.35
97	AX	501	ATP	C5-C4-N3	-5.25	119.90	126.75
98	AX	503	GDP	C2-N3-C4	4.79	120.83	112.30

There are no chirality outliers.

5 of 91 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
92	A	3470	NMY	C14-C13-O11-C11
92	A	3470	NMY	O16-C13-O11-C11
92	A	3471	NMY	C2-C1-O1-C10
92	A	3471	NMY	C14-C13-O11-C11
92	A	3471	NMY	O22-C22-C23-N19

All (3) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
92	AA	1785	NMY	C18-C19-C20-C21-C22-O22
92	A	3474	NMY	C10-C11-C12-C7-C8-C9

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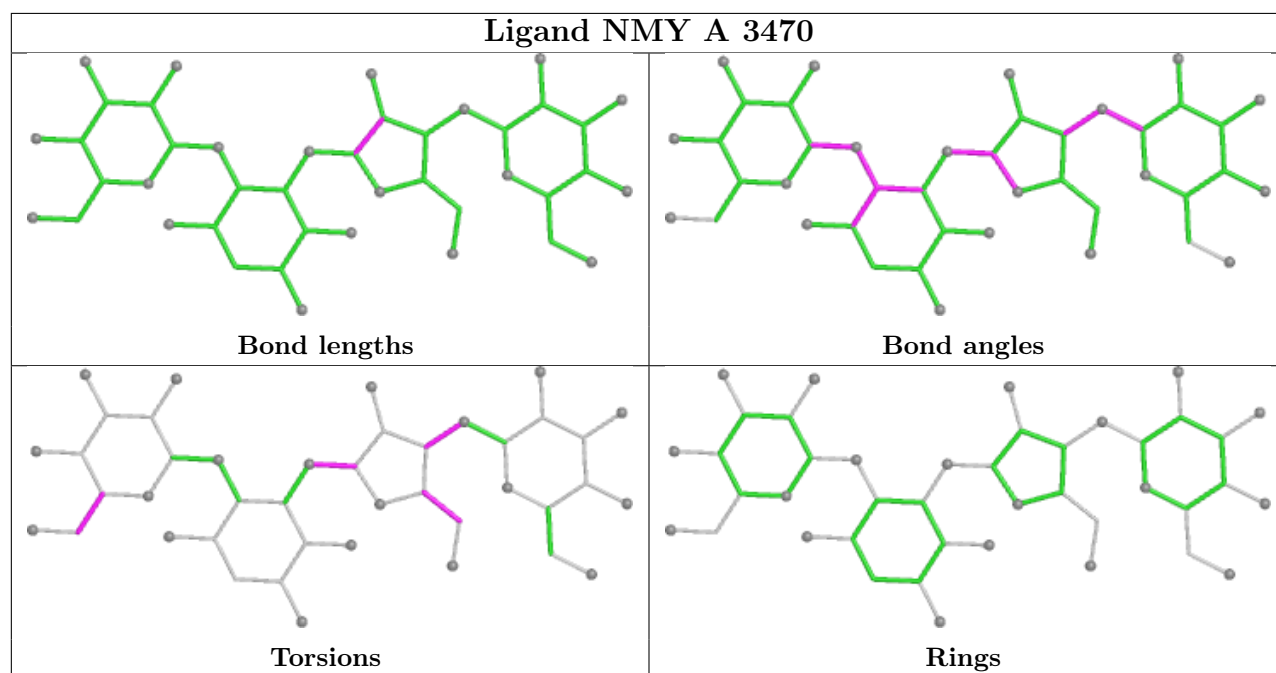
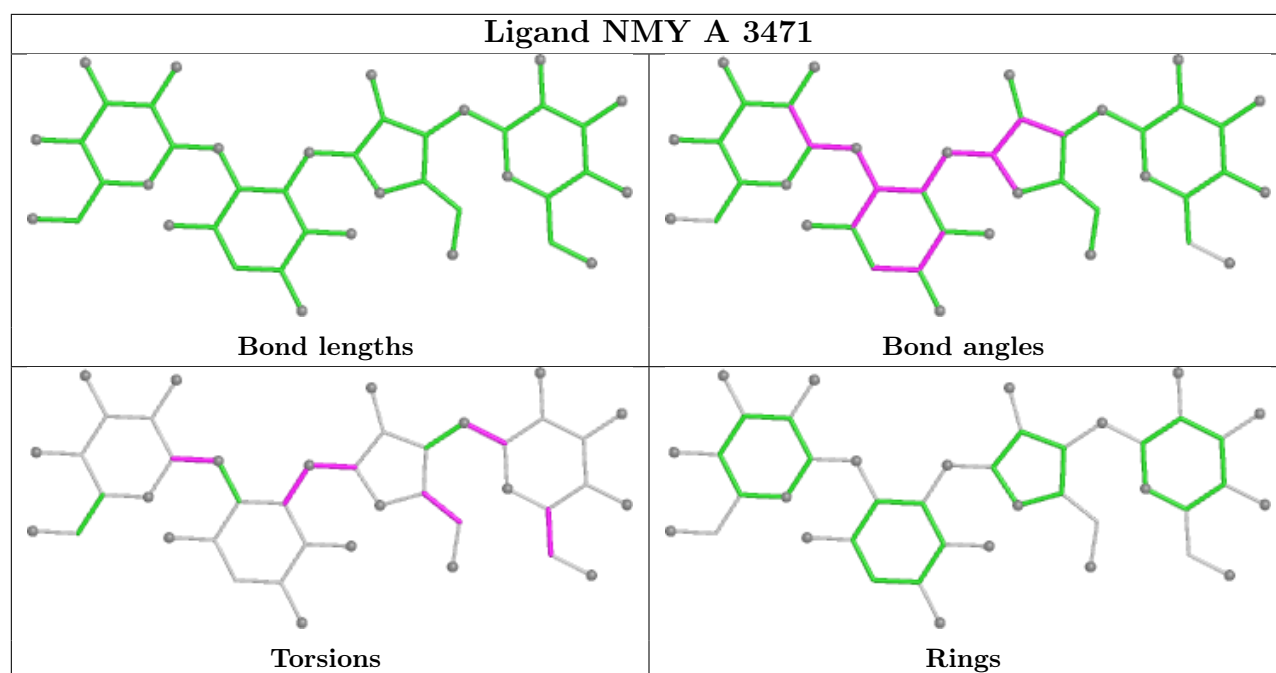
Continued from previous page...

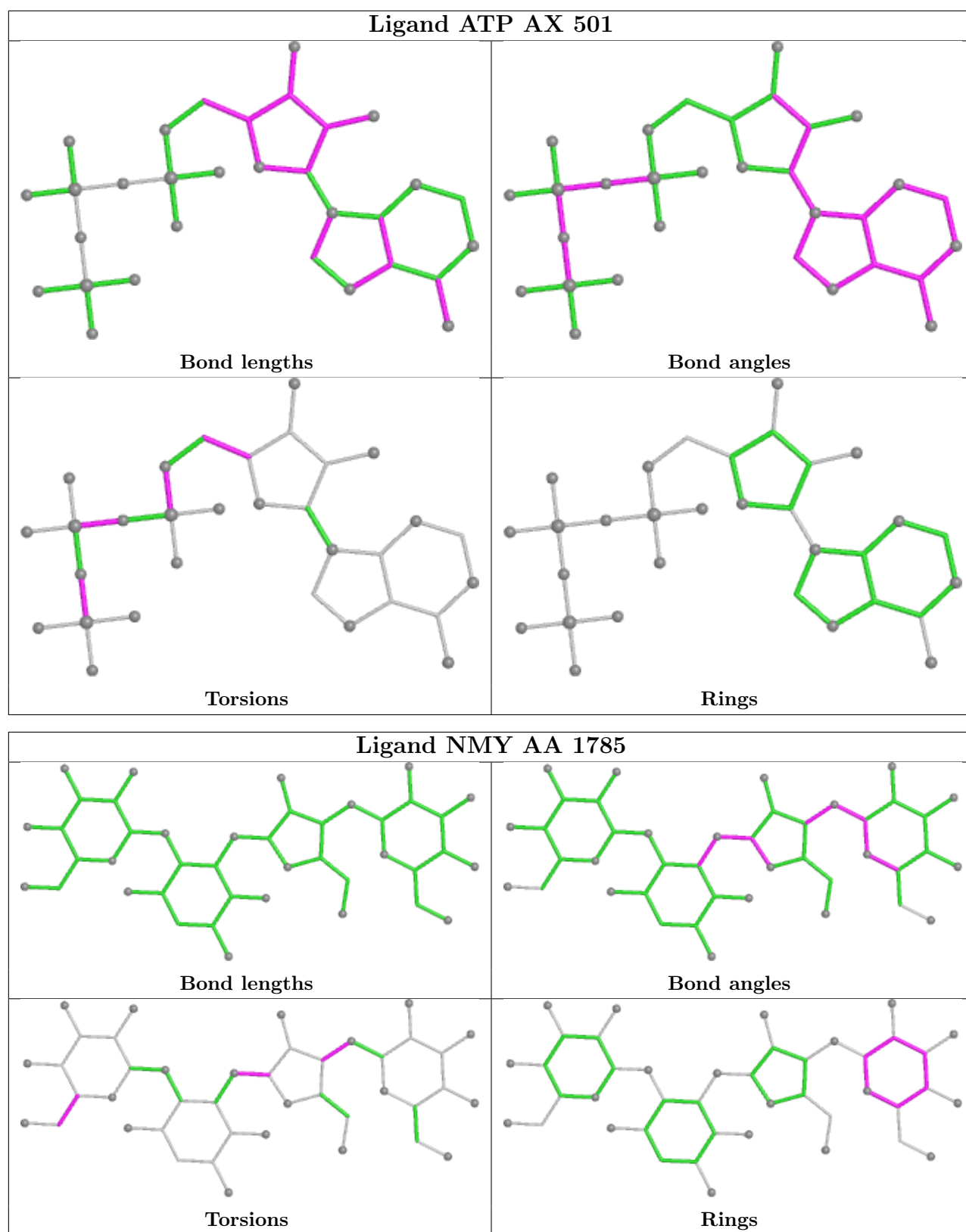
Mol	Chain	Res	Type	Atoms
92	AA	1783	NMY	C10-C11-C12-C7-C8-C9

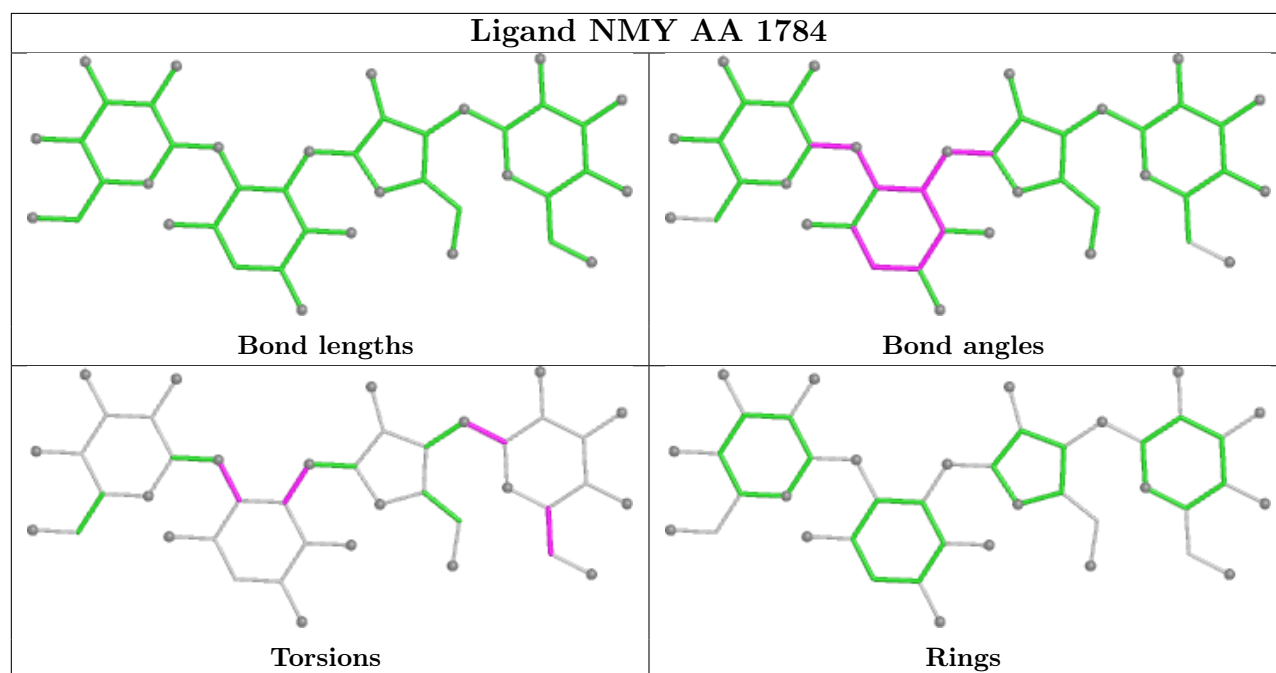
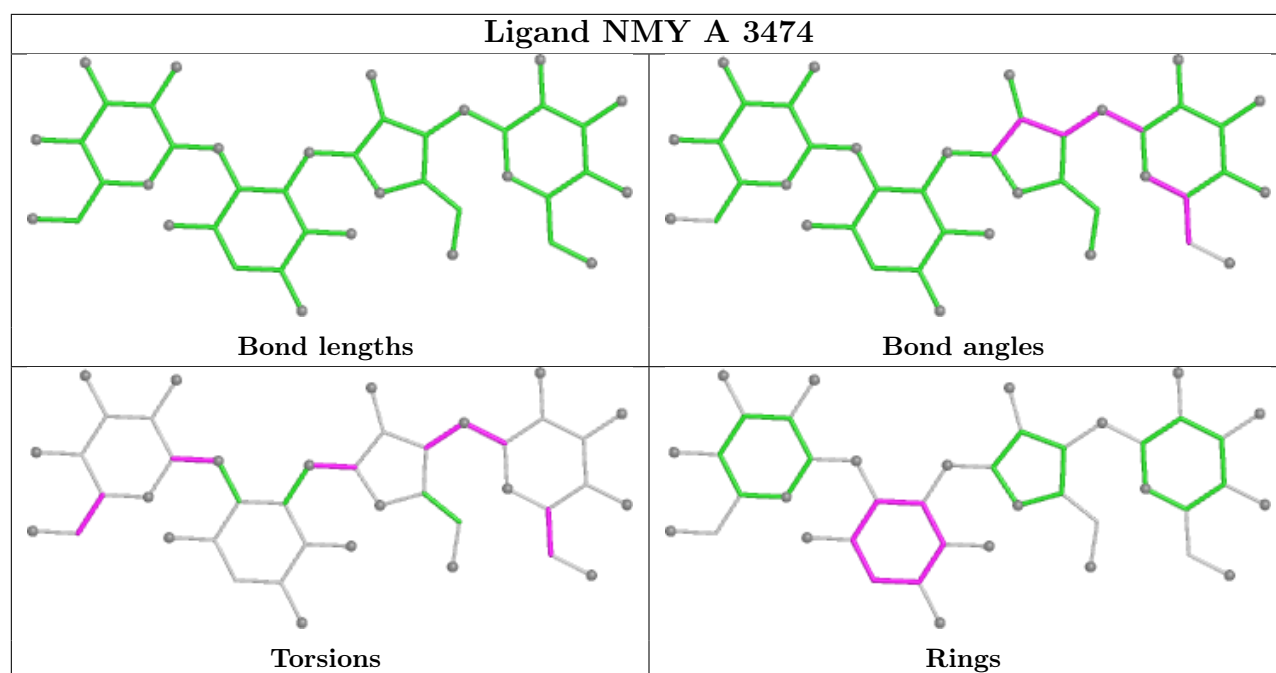
11 monomers are involved in 46 short contacts:

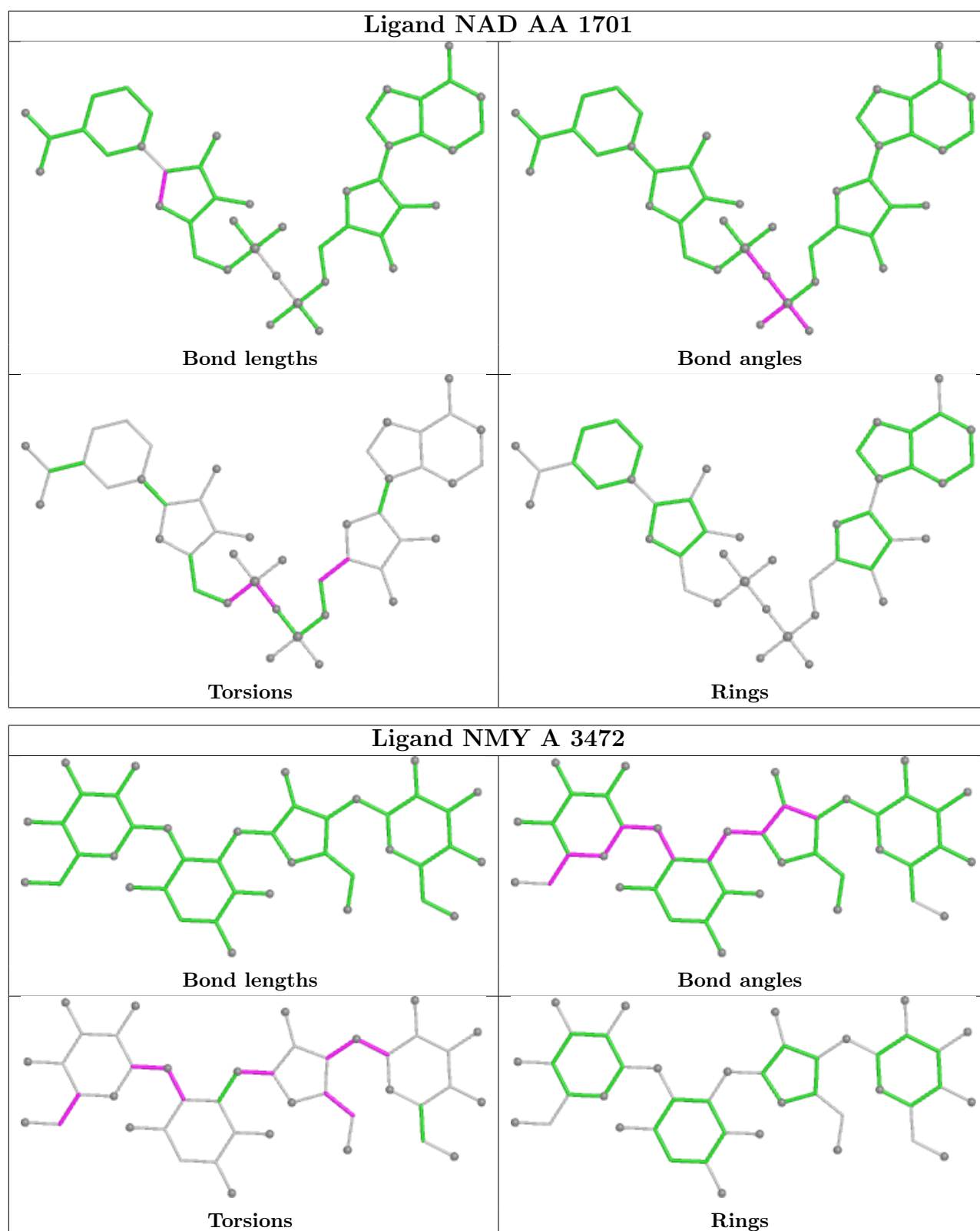
Mol	Chain	Res	Type	Clashes	Symm-Clashes
92	A	3471	NMY	1	0
94	r	201	FES	1	0
92	AA	1785	NMY	5	0
93	e	301	VAL	1	0
92	A	3474	NMY	6	0
92	AA	1784	NMY	5	0
92	A	3472	NMY	10	0
92	A	3473	NMY	3	0
92	AA	1783	NMY	10	0
92	AA	1786	NMY	3	0
98	AX	503	GDP	1	0

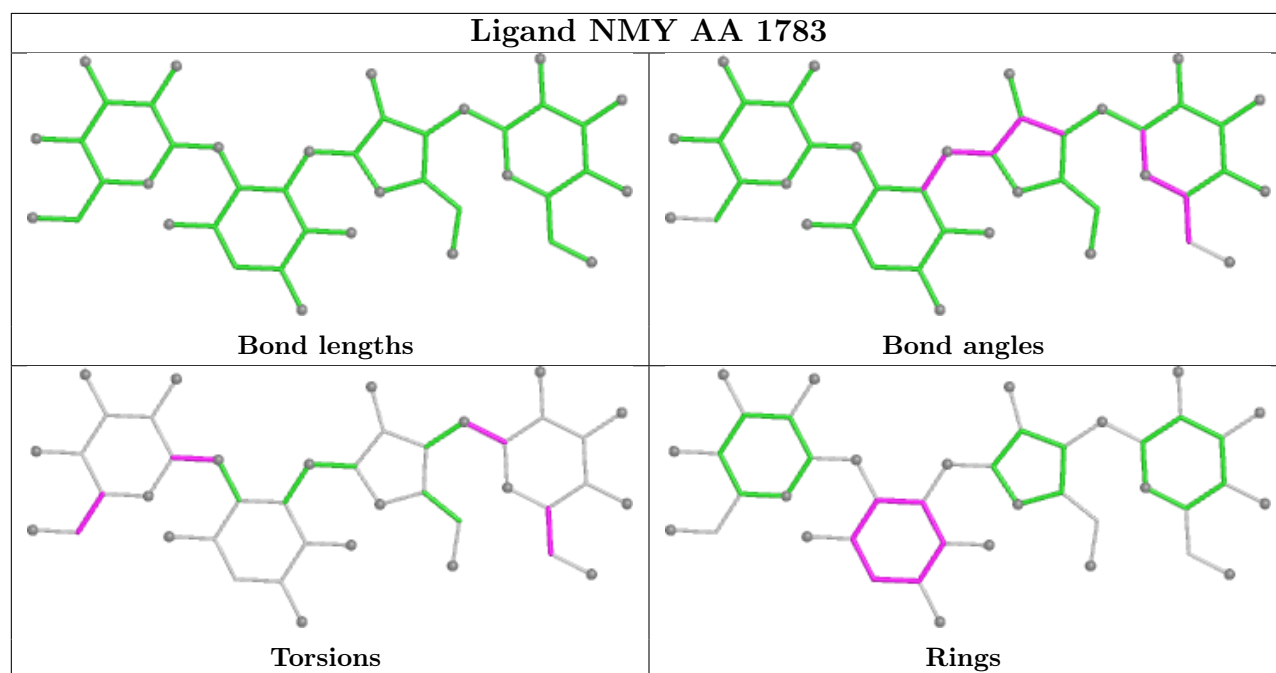
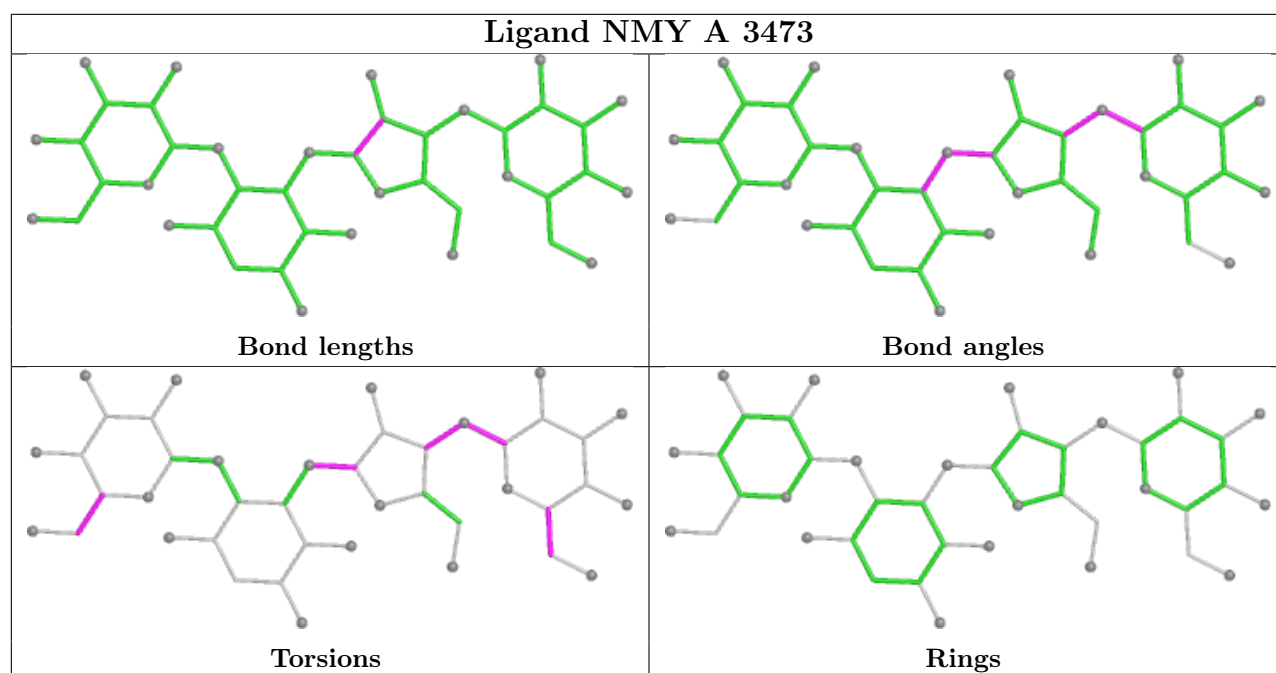
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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.

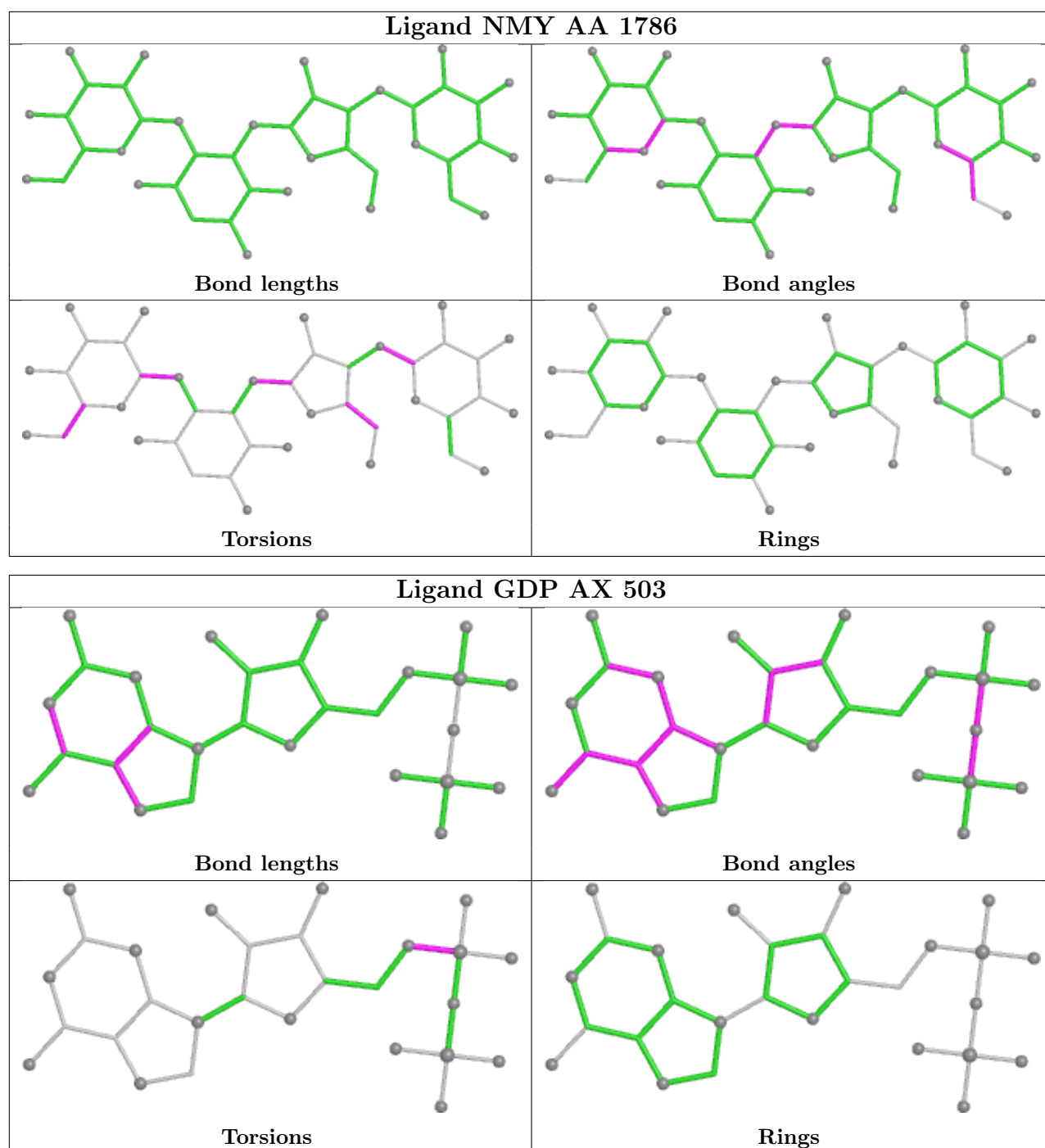












5.7 Other polymers [i](#)

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
79	Ax	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	Ax	15:A	O3'	21:A	P	9.38

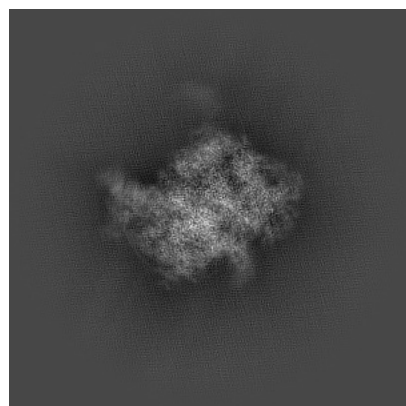
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-65433. These allow visual inspection of the internal detail of the map and identification of artifacts.

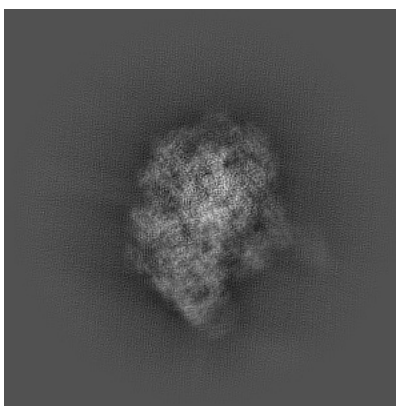
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

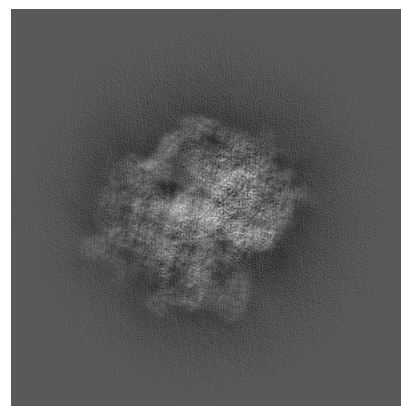
6.1.1 Primary map



X

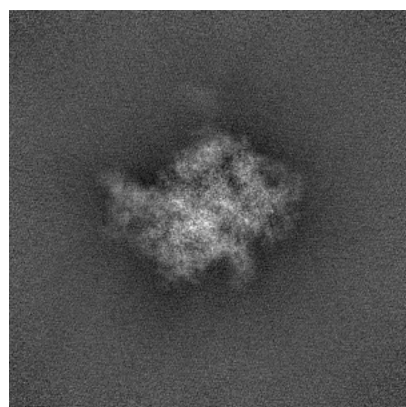


Y

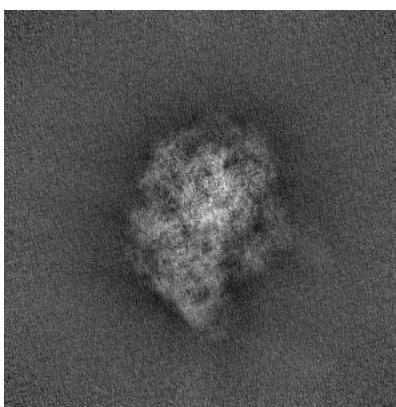


Z

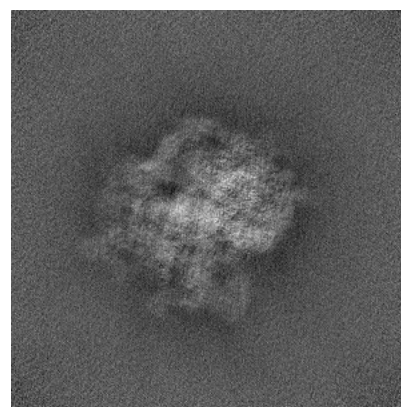
6.1.2 Raw map



X



Y

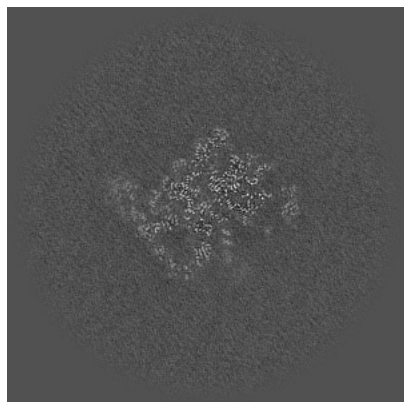


Z

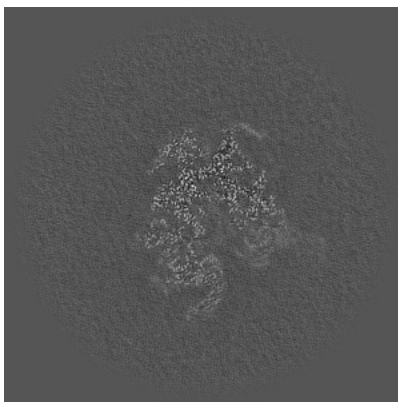
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

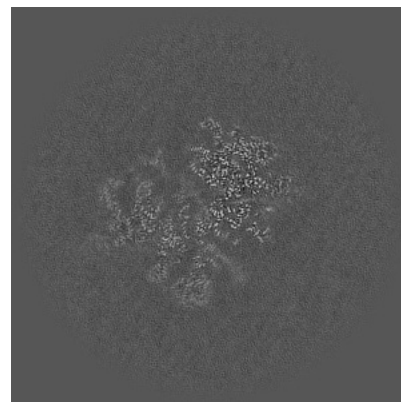
6.2.1 Primary map



X Index: 340

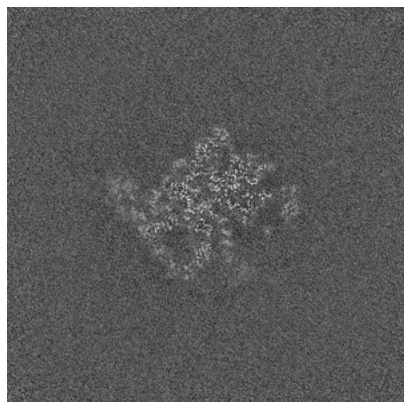


Y Index: 340

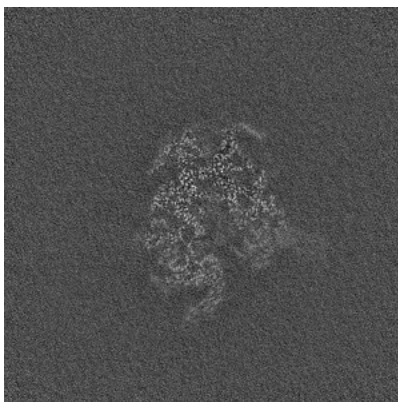


Z Index: 340

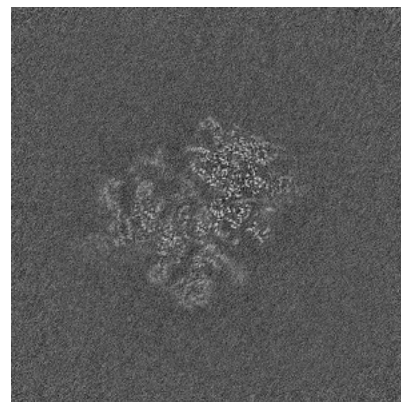
6.2.2 Raw map



X Index: 340



Y Index: 340

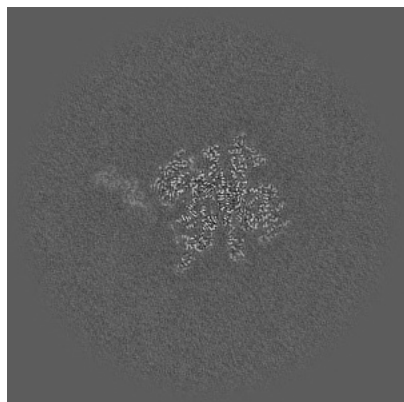


Z Index: 340

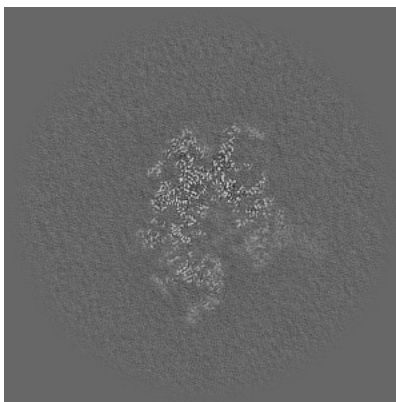
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

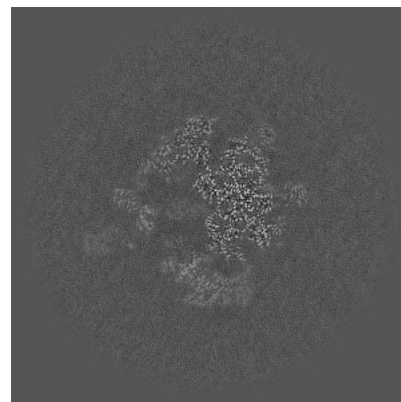
6.3.1 Primary map



X Index: 378

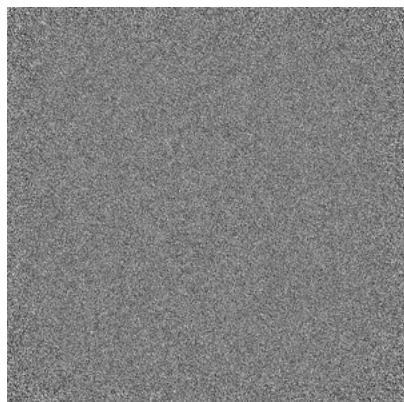


Y Index: 337

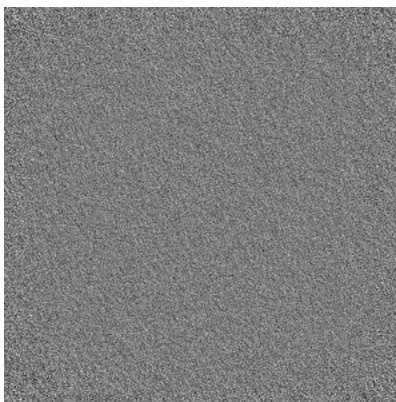


Z Index: 369

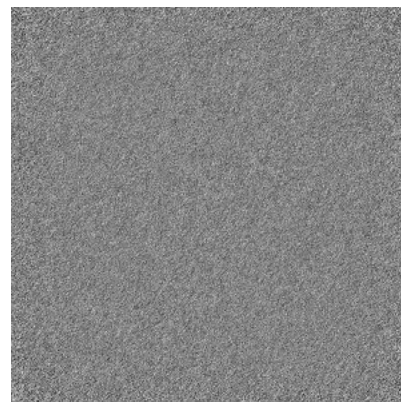
6.3.2 Raw map



X Index: 0



Y Index: 0

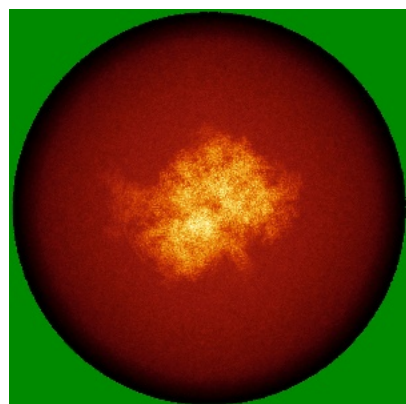


Z Index: 0

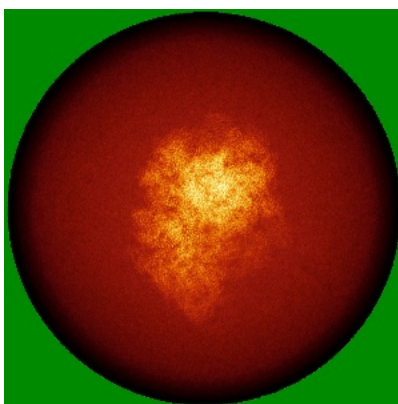
The images above show the largest variance slices of the map in three orthogonal directions.

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

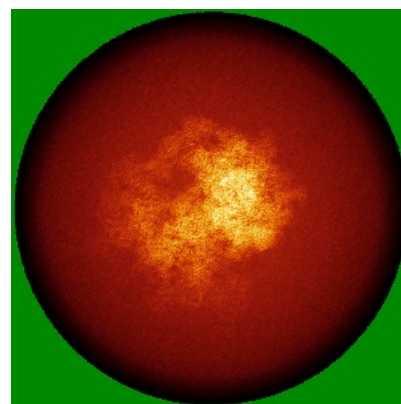
6.4.1 Primary map



X

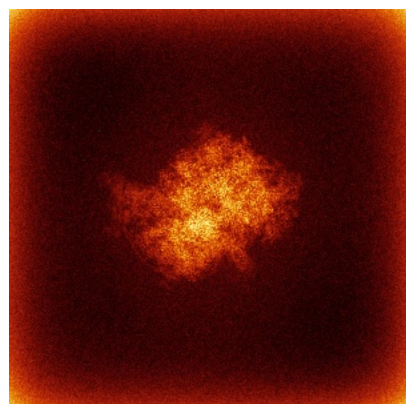


Y

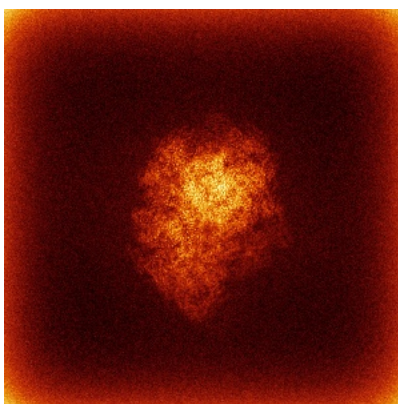


Z

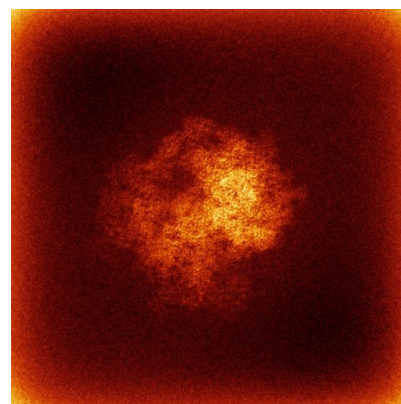
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



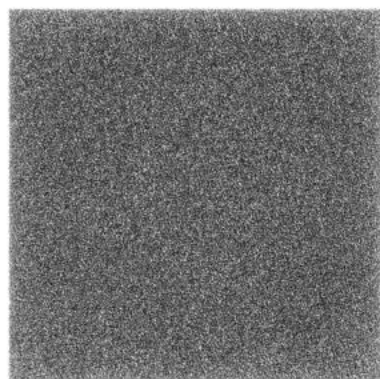
Y



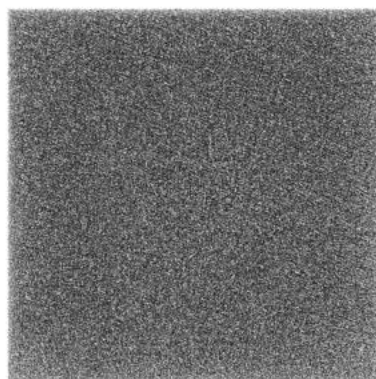
Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

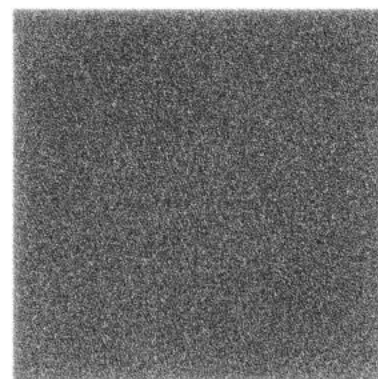
6.5.2 Raw map



X



Y



Z

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

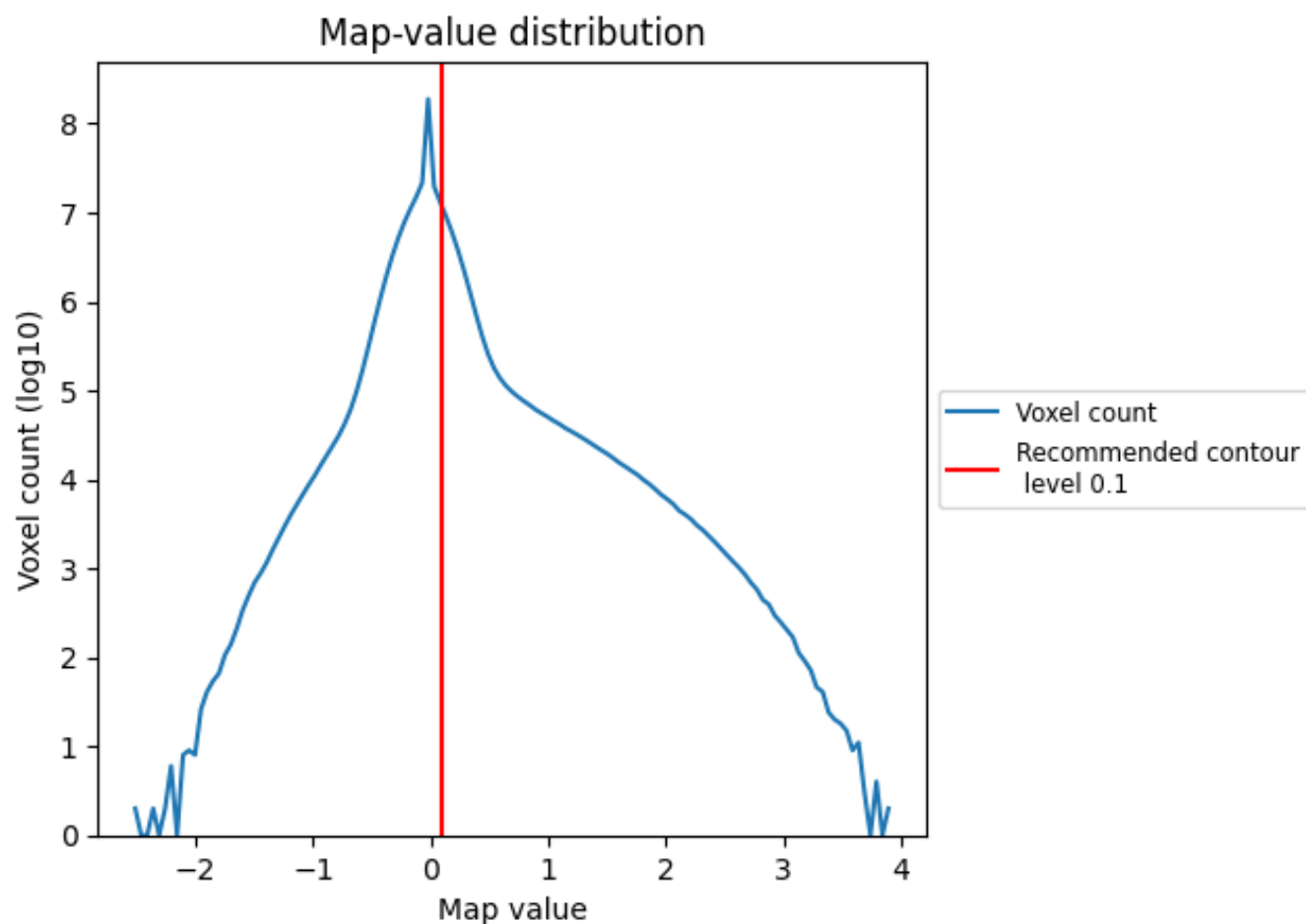
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

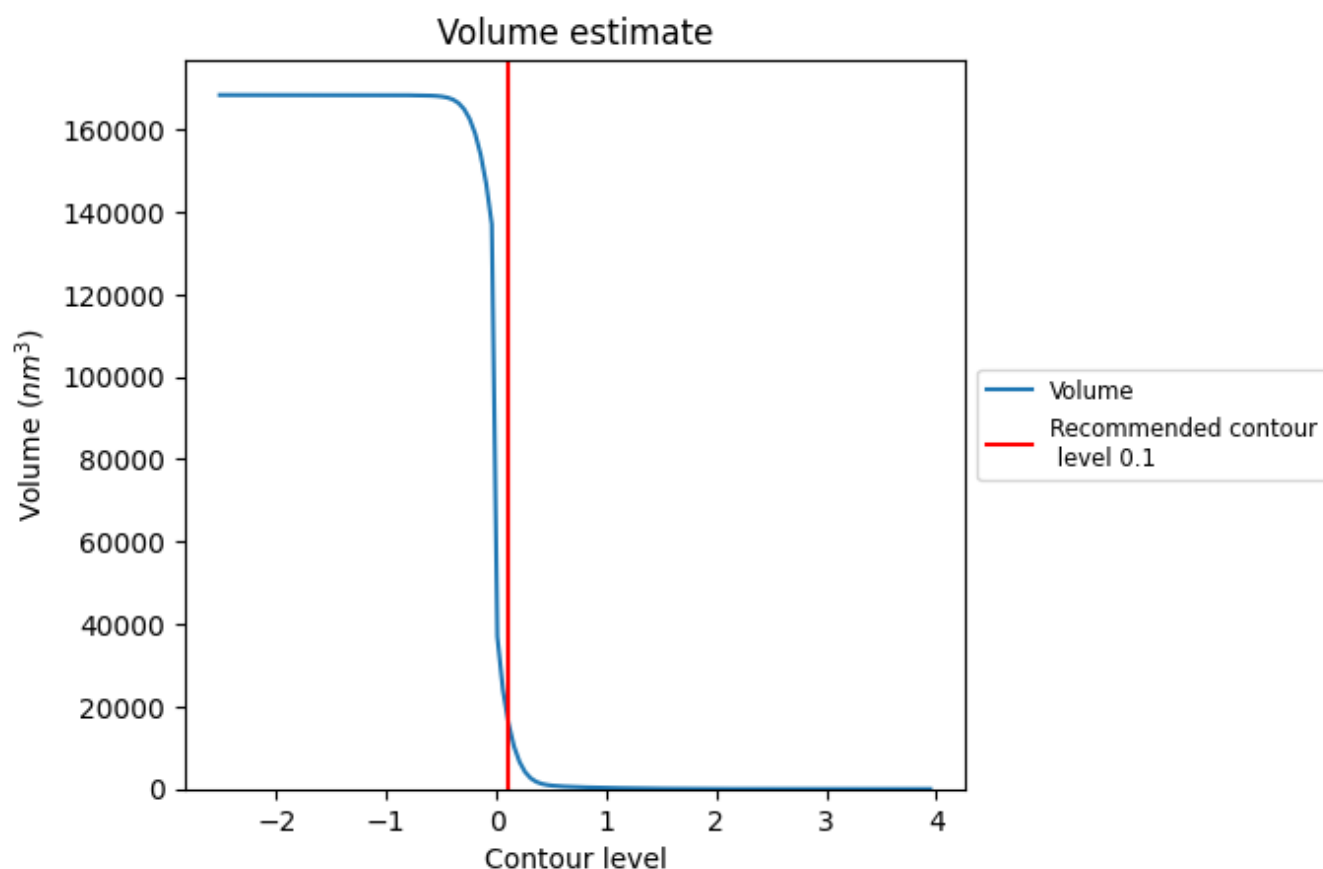
This section contains the results of statistical analysis of the map.

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.

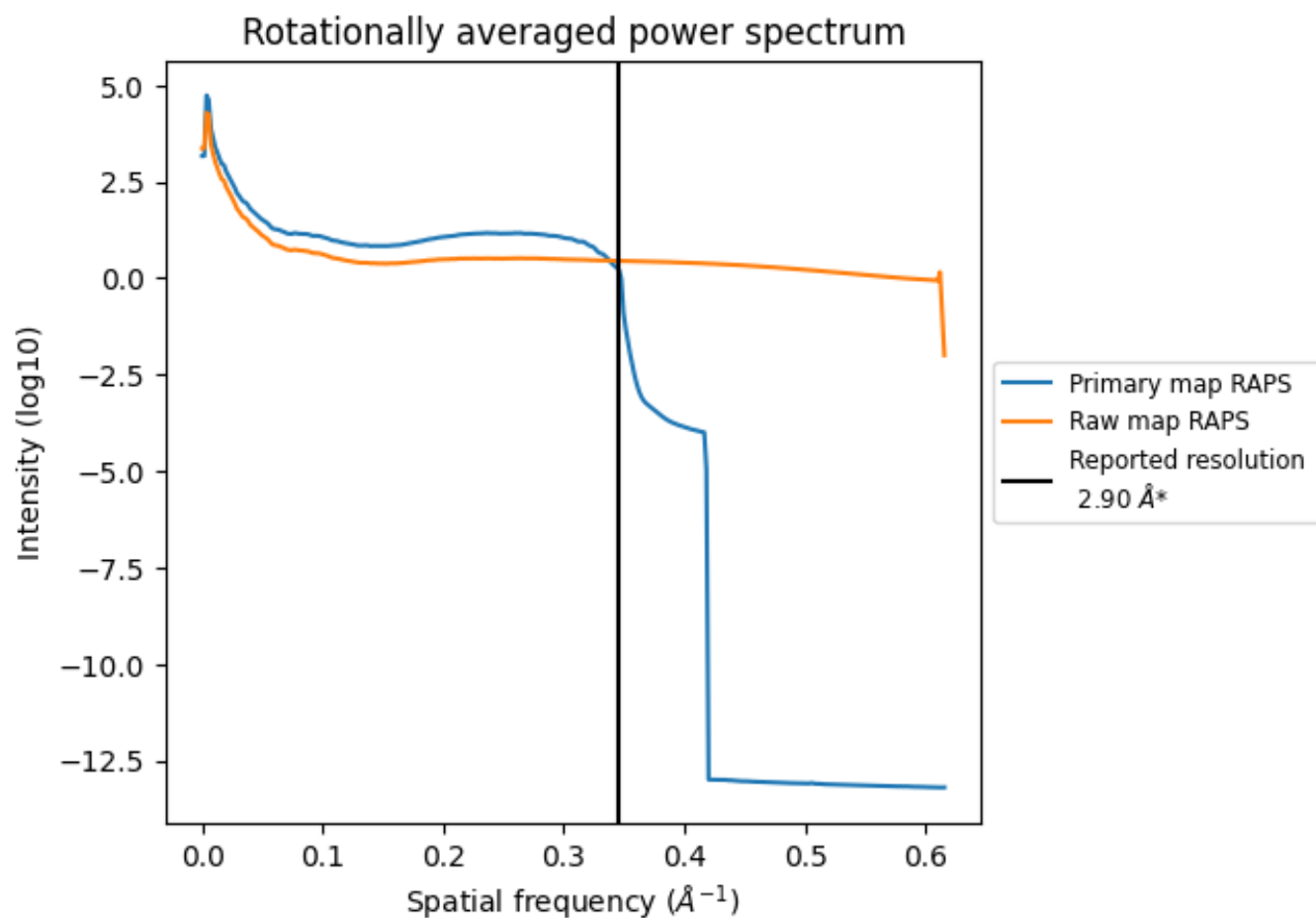
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 17573 nm^3 ; this corresponds to an approximate mass of 15874 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 ⓘ

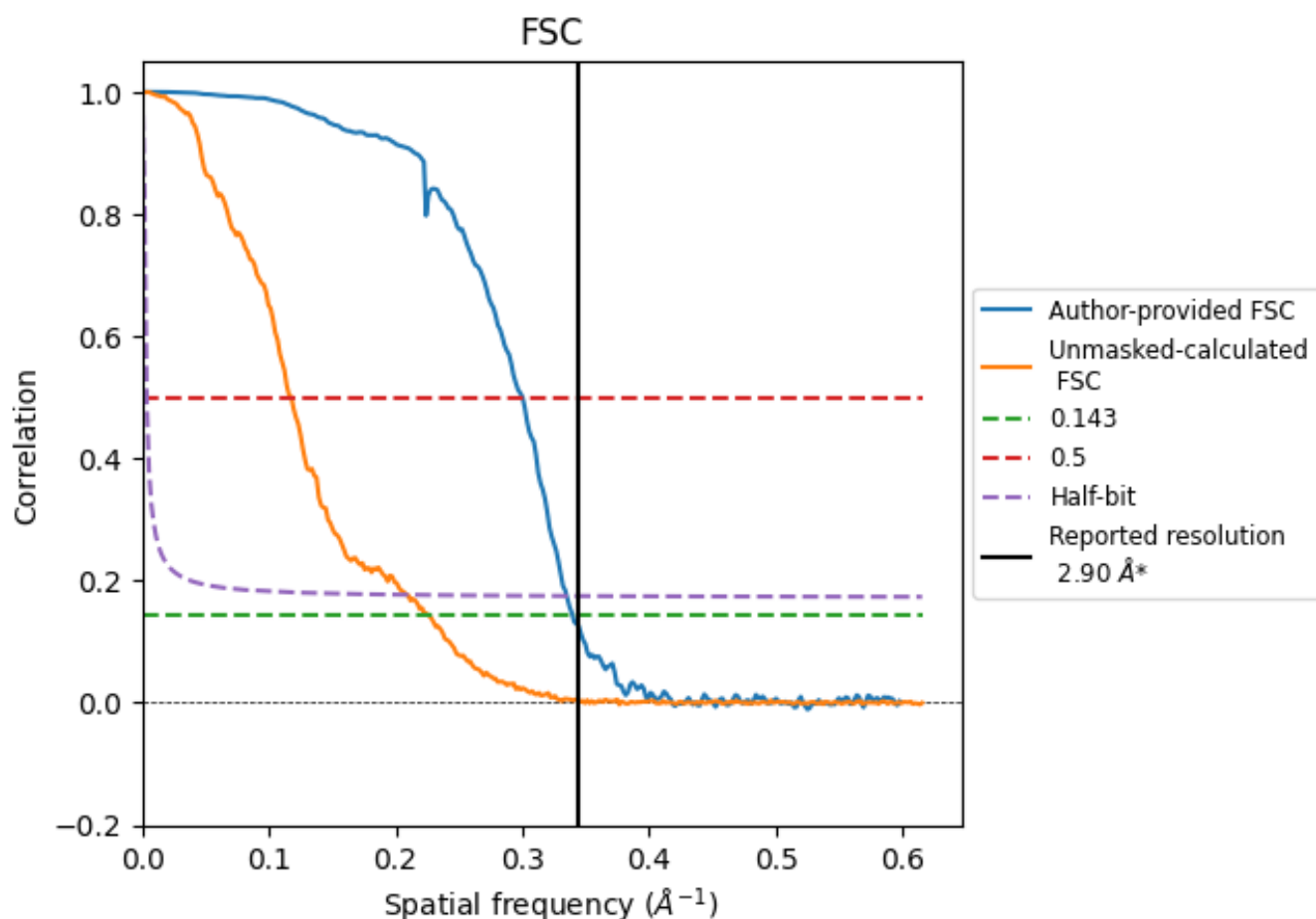


*Reported resolution corresponds to spatial frequency of 0.345 Å⁻¹

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 0.345 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

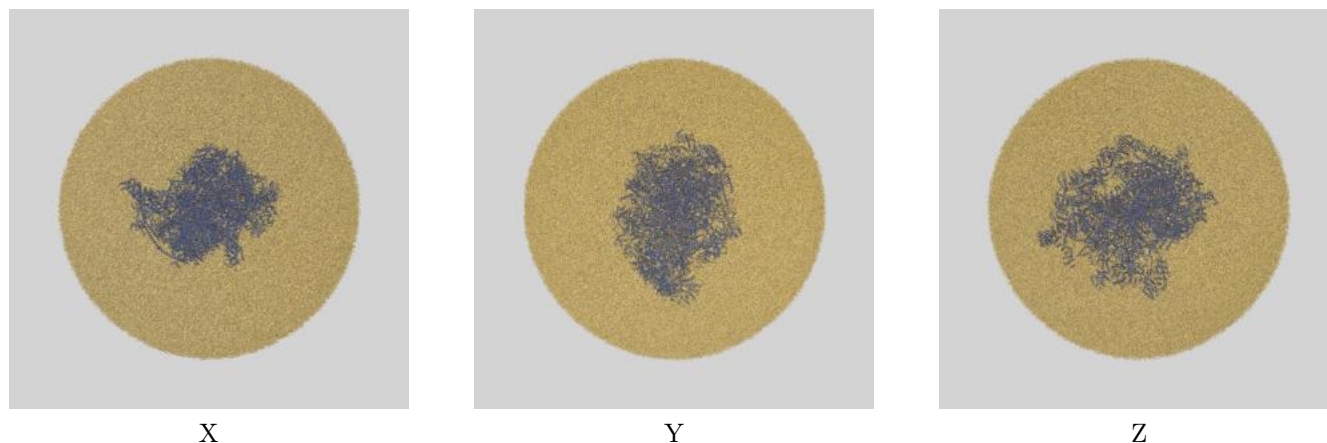
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.90	-	-
Author-provided FSC curve	2.94	3.33	2.98
Unmasked-calculated*	4.42	8.49	4.80

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.42 differs from the reported value 2.9 by more than 10 %

9 Map-model fit [i](#)

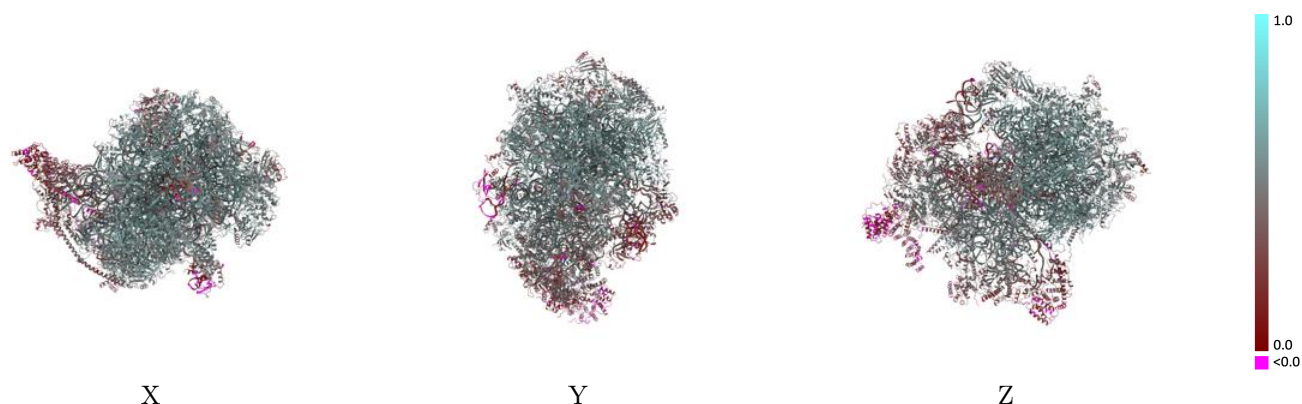
This section contains information regarding the fit between EMDB map EMD-65433 and PDB model 9VXM. Per-residue inclusion information can be found in section [3](#) on page [27](#).

9.1 Map-model overlay [i](#)



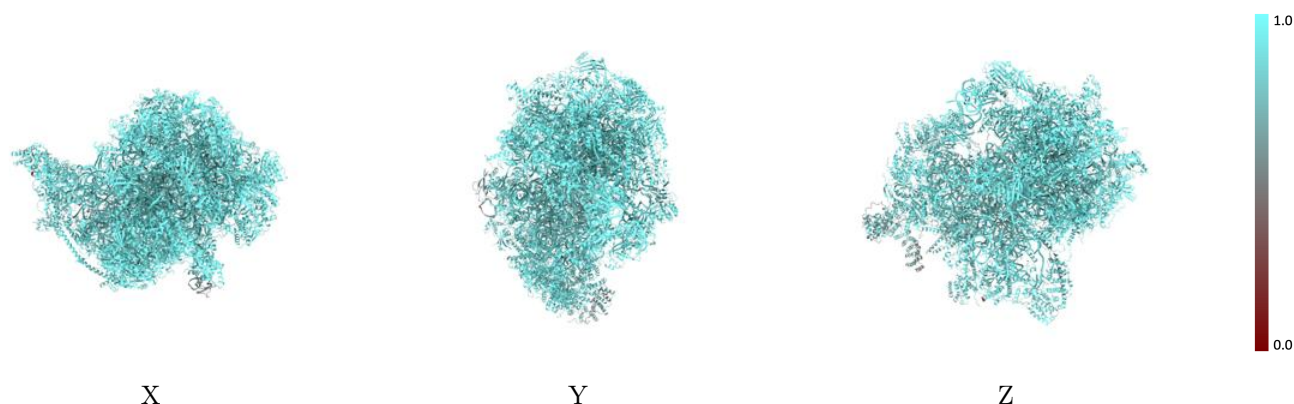
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



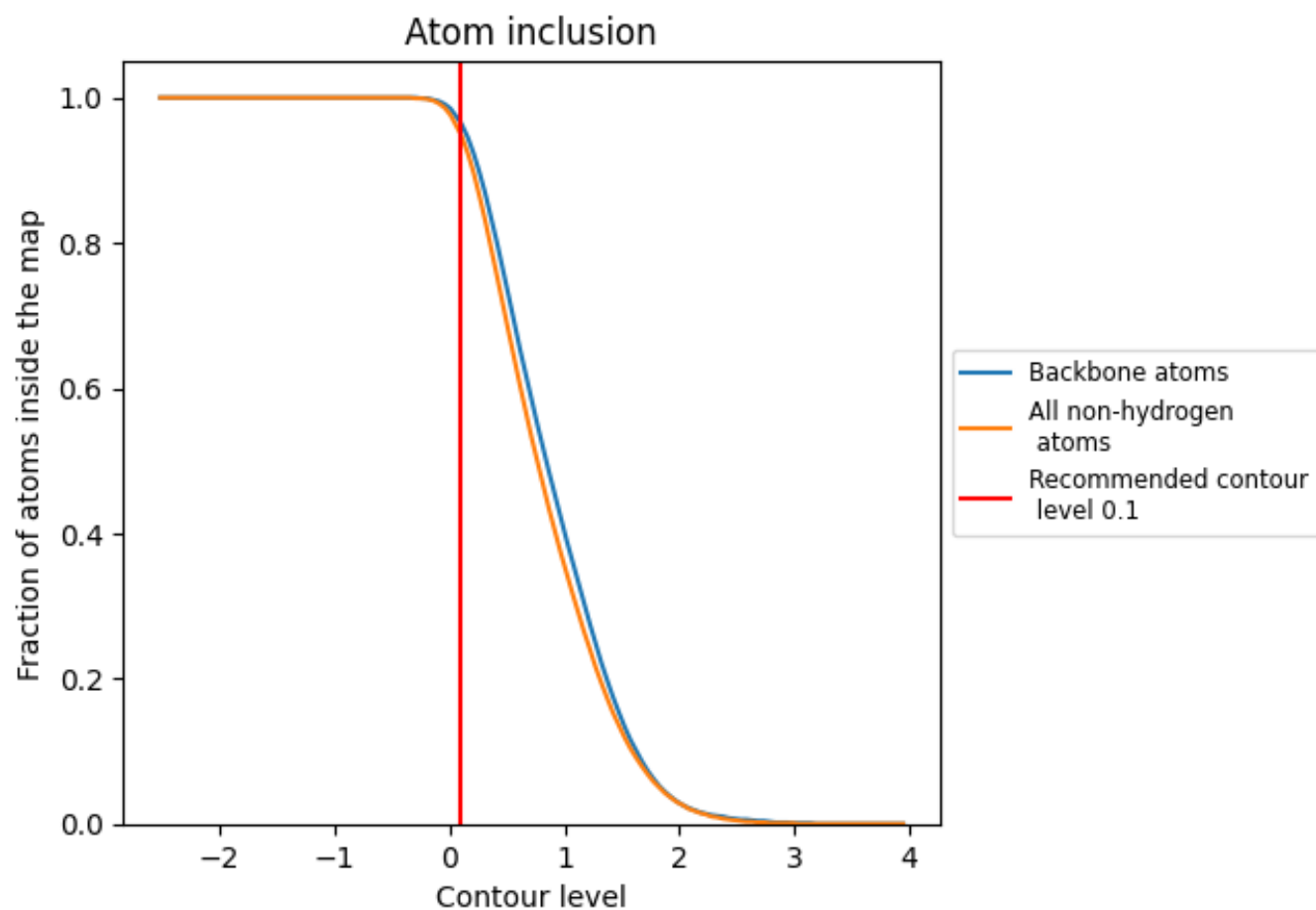
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 95% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9490	 0.4760
0	 0.9710	 0.5520
1	 0.9800	 0.5400
2	 0.9890	 0.6120
3	 0.9800	 0.6010
4	 0.9850	 0.5770
5	 0.9800	 0.5460
6	 0.9740	 0.4960
7	 0.9730	 0.4940
8	 0.8810	 0.3550
9	 0.9690	 0.5100
A	 0.9780	 0.5480
A0	 0.9180	 0.3160
A1	 0.9100	 0.3350
A3	 0.9660	 0.5440
A4	 0.7240	 0.1450
AA	 0.9820	 0.5150
AB	 0.9530	 0.4970
AC	 0.9520	 0.4980
AD	 0.9270	 0.4670
AE	 0.9600	 0.5180
AF	 0.9440	 0.4290
AG	 0.9160	 0.4150
AH	 0.9250	 0.4100
AI	 0.9690	 0.5050
AJ	 0.9440	 0.5000
AK	 0.9550	 0.4830
AL	 0.9450	 0.4820
AM	 0.9190	 0.4010
AN	 0.9620	 0.5150
AO	 0.9360	 0.3870
AP	 0.9620	 0.5190
AR	 0.8970	 0.3200
AS	 0.9260	 0.4230
AT	 0.9530	 0.4720



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Chain	Atom inclusion	Q-score
AU	 0.9170	 0.3730
AV	 0.8620	 0.1920
AW	 0.9610	 0.4740
AX	 0.9210	 0.3380
AY	 0.8220	 0.2690
AZ	 0.9210	 0.4100
Aw	 0.8220	 0.3210
Ax	 0.9280	 0.4060
Az	 0.9060	 0.4350
B	 0.9650	 0.3370
C	 0.9770	 0.5510
D	 0.9880	 0.5880
E	 0.9830	 0.5660
F	 0.9820	 0.5610
G	 0.9290	 0.4360
H	 0.7960	 0.2620
I	 0.9330	 0.3630
J	 0.8490	 0.2230
L	 0.9780	 0.5650
M	 0.9840	 0.5620
N	 0.9750	 0.5540
O	 0.9840	 0.5760
P	 0.9860	 0.5530
Q	 0.9740	 0.5310
R	 0.9870	 0.5820
S	 0.9850	 0.5660
T	 0.9900	 0.5870
U	 0.9340	 0.5090
V	 0.9310	 0.4630
W	 0.9900	 0.5950
X	 0.9720	 0.5360
Y	 0.9770	 0.5580
Z	 0.9820	 0.5820
a	 0.9560	 0.5280
b	 0.9830	 0.5700
c	 0.9770	 0.5240
d	 0.9240	 0.4330
e	 0.9140	 0.2940
f	 0.8940	 0.4120
g	 0.9830	 0.5410
h	 0.9280	 0.4300
i	 0.9900	 0.5940

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Chain	Atom inclusion	Q-score
j	 0.9680	 0.5280
k	 0.9860	 0.5790
l	 0.9040	 0.3070
m	 0.8830	 0.3130
n	 0.9120	 0.3540
o	 0.9800	 0.5910
p	 0.9270	 0.4450
q	 0.9510	 0.4700
r	 0.9780	 0.5340
s	 0.9810	 0.5560