



Full wwPDB EM Validation Report ⓘ

Oct 13, 2024 – 09:56 pm BST

PDB ID : 6YDP
EMDB ID : EMD-10778
Title : 55S mammalian mitochondrial ribosome with mtEFG1 and P site fMet-tRNAMet (POST)
Authors : Kummer, E.; Ban, N.
Deposited on : 2020-03-20
Resolution : 3.00 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev113
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

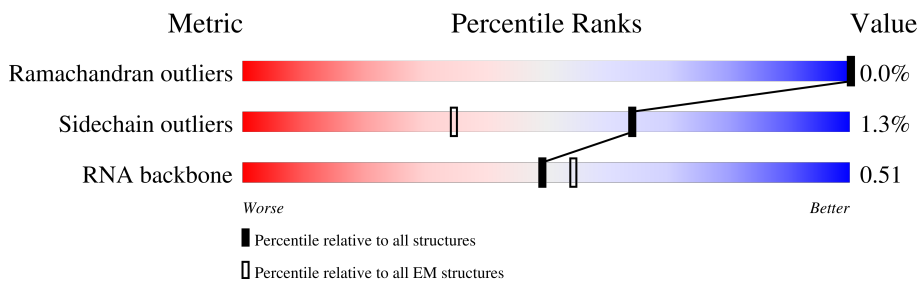
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.00 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	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	B0	148	
2	BU	149	
3	BV	209	
4	BW	210	
5	BX	150	
6	BY	216	
7	Ba	423	
8	Bb	380	

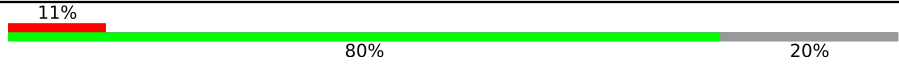







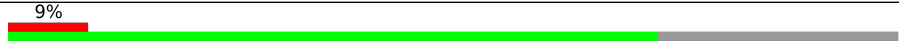

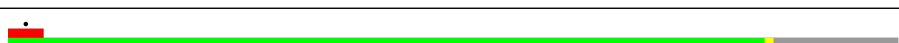


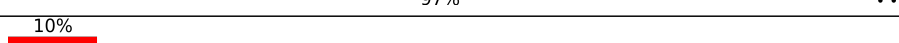
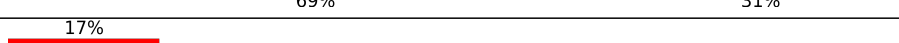
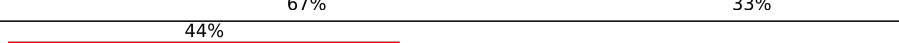
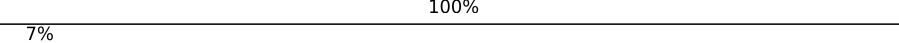
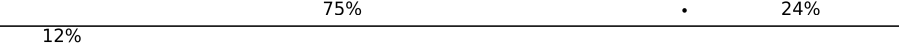
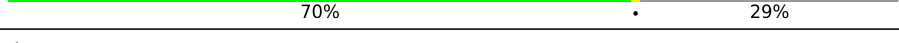
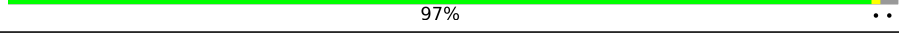





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Mol	Chain	Length	Quality of chain
9	Bc	334	88% 12%
10	Bd	206	66% 32%
11	Be	135	90% 10%
12	Bf	142	73% 24%
13	Bg	159	92% 7%
14	Bh	332	86% 13%
15	Bi	306	85% 15%
16	Bj	279	76% 22%
17	Bk	269	57% 42%
18	Bl	166	80% 20%
19	Bm	198	55% 45%
20	Bn	128	75% 24%
21	Bo	124	78% 22%
22	Bp	112	85% 13%
23	Bq	138	59% 38%
24	Bt	102	91% 8%
25	Bu	205	73% 26%
26	Bv	222	60% 39%
27	Bw	433	88% 11%
28	B1	256	95% 5%
29	Bx	196	81% 17%
30	AA	16770	94%
30	BA	16770	91%
31	AB	289	76% 24%
32	AC	167	78% 21%

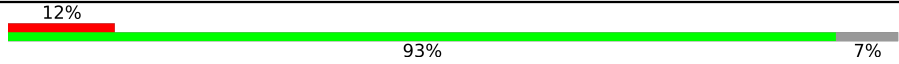
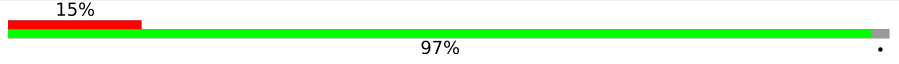
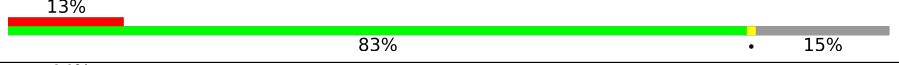
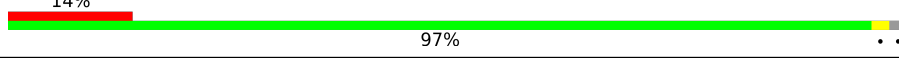
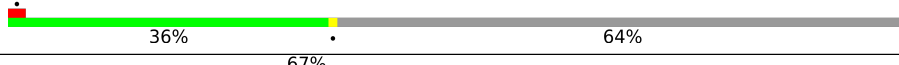
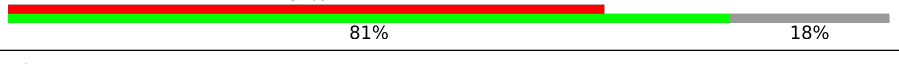
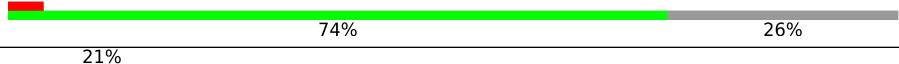






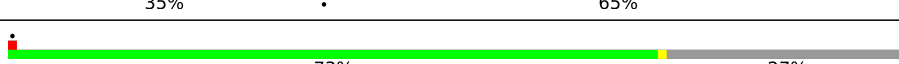
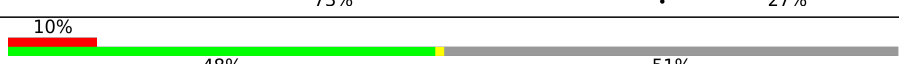
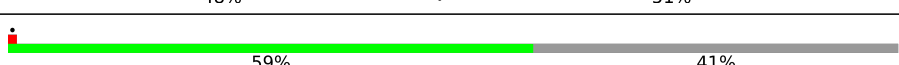
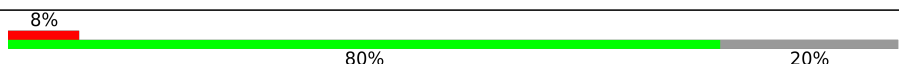




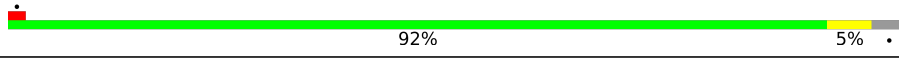
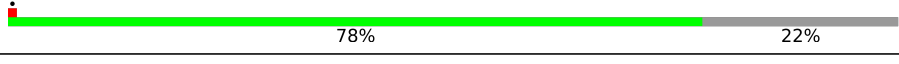


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Mol	Chain	Length	Quality of chain
33	AE	430	
34	AF	276	
35	AG	242	
36	AI	397	
37	AJ	200	
38	AK	196	
39	AL	139	
40	AN	128	
41	AO	239	
42	AP	135	
43	AQ	130	
44	AR	143	
45	AU	87	
46	AV	71	
47	AX	6	
48	AZ	18	
49	Aa	382	
50	Ab	190	
51	Ac	173	
52	Ad	205	
53	Ae	426	
54	Af	188	
55	B2	252	
56	Ag	410	
57	Ah	387	



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Mol	Chain	Length	Quality of chain
58	Ai	106	
59	Aj	218	
60	Ak	325	
61	Am	118	
62	An	199	
63	Ao	699	
64	Ap	258	
65	CL	198	
65	DL	198	
65	EL	198	
65	FL	198	
65	GL	198	
65	HL	198	
65	LL	198	
66	B3	161	
67	B4	126	
68	B5	188	
69	B6	65	
70	B7	95	
71	B8	188	
72	B9	100	
73	BB	73	
74	BC	722	
75	BD	306	
76	BE	348	

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Mol	Chain	Length	Quality of chain
77	BF	294	 85% 15%
78	BI	268	 35% 21% 63%
79	BJ	262	 21% 79% 19%
80	BK	192	 6% 89% 8%
81	BN	178	 99%
82	BO	145	 79% 21%
83	BP	296	 97%
84	BQ	251	 88% 12%
85	BR	169	 89% 9%
86	BS	180	 78% 21%
87	BT	292	 5% 81% 18%

2 Entry composition [i](#)

There are 95 unique types of molecules in this entry. The entry contains 179513 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 Mitochondrial ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B0	110	857	553	156	145	3	0	0

- Molecule 2 is a protein called Mitochondrial ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	BU	140	1159	732	239	185	3	0	0

- Molecule 3 is a protein called Mitochondrial ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	BV	155	1231	789	219	219	4	0	0

- Molecule 4 is a protein called uL22m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	BW	166	1374	876	258	234	6	0	0

- Molecule 5 is a protein called uL23m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	BX	149	1181	752	227	200	2	0	0

- Molecule 6 is a protein called uL24m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	BY	206	1678	1056	308	309	5	0	0

- Molecule 7 is a protein called Mitochondrial ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	Ba	393	3173	2040	556	565	12	0	0

- Molecule 8 is a protein called Mitochondrial ribosomal protein L38.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	Bb	354	2952	1876	542	525	9	0	0

- Molecule 9 is a protein called Mitochondrial ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	Bc	295	2408	1541	410	441	16	0	0

- Molecule 10 is a protein called Uncharacterized protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	Bd	140	1177	742	213	221	1	0	0

- Molecule 11 is a protein called Mitochondrial ribosomal protein L41.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	Be	122	972	628	168	173	3	0	0

- Molecule 12 is a protein called mL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	Bf	108	827	519	154	150	4	0	0

- Molecule 13 is a protein called Mitochondrial ribosomal protein L43.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	Bg	148	1167	727	225	212	3	0	0

- Molecule 14 is a protein called mL44.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	Bh	289	2319	1486	399	426	8	0	0

- Molecule 15 is a protein called Mitochondrial ribosomal protein L45.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	Bi	260	2138	1370	379	379	10	0	0

- Molecule 16 is a protein called Mitochondrial ribosomal protein L46.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	Bj	217	1775	1137	311	321	6	0	0

- Molecule 17 is a protein called 39S ribosomal protein L48, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Bk	155	1246	796	214	231	5	0	0

- Molecule 18 is a protein called Mrpl34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	Bl	133	1097	709	192	194	2	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Bl	59	ARG	LYS	conflict	UNP A0A0R4J8D6

- Molecule 19 is a protein called Mitochondrial ribosomal protein L50.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	Bm	109	893	568	160	162	3	0	0

- Molecule 20 is a protein called Mitochondrial ribosomal protein L51.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	Bn	97	Total	C	N	O	S	0	0
			837	539	166	128	4		

- Molecule 21 is a protein called mL52.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	Bo	97	Total	C	N	O	S	0	0
			772	481	148	141	2		

- Molecule 22 is a protein called mL53.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	Bp	97	Total	C	N	O	S	0	0
			742	459	143	134	6		

- Molecule 23 is a protein called mL54.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	Bq	85	Total	C	N	O	S	0	0
			697	446	128	121	2		

- Molecule 24 is a protein called Mitochondrial ribosomal protein L57.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	Bt	94	Total	C	N	O	S	0	0
			780	485	168	126	1		

- Molecule 25 is a protein called mL62 (ICT1).

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Bu	151	Total	C	N	O	S	0	0
			1198	738	233	222	5		

- Molecule 26 is a protein called mL64.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	Bv	135	Total	C	N	O	S	0	0
			1131	692	223	211	5		

- Molecule 27 is a protein called 39S ribosomal protein S30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	Bw	387	3126	2011	548	555	12	0	0

- Molecule 28 is a protein called Mitochondrial ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	B1	244	2036	1315	363	353	5	0	0

- Molecule 29 is a protein called Mitochondrial ribosomal protein S18A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	Bx	162	1325	845	249	224	7	0	0

- Molecule 30 is a RNA chain called 12S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
30	AA	960	20411	9162	3708	6581	960	0	0
30	BA	1544	32844	14750	5972	10578	1544	0	0

- Molecule 31 is a protein called Mitochondrial ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	AB	220	1762	1126	326	304	6	0	0

- Molecule 32 is a protein called Mitochondrial ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	AC	132	1075	695	195	181	4	0	0

- Molecule 33 is a protein called Mitochondrial ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	AE	343	2732	1707	527	487	11	0	0

- Molecule 34 is a protein called bS6m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	AF	122	981	620	178	177	6	0	0

- Molecule 35 is a protein called Mitochondrial ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	AG	208	1721	1097	314	299	11	0	0

- Molecule 36 is a protein called uS9m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	AI	328	2650	1678	478	481	13	0	0

- Molecule 37 is a protein called Mitochondrial ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	AJ	140	1155	746	197	208	4	0	0

- Molecule 38 is a protein called uS11m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	AK	137	1007	631	193	180	3	0	0

- Molecule 39 is a protein called Mitochondrial ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	AL	109	840	524	172	138	6	0	0

- Molecule 40 is a protein called Mitochondrial ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	AN	101	858	534	174	144	6	0	0

- Molecule 41 is a protein called uS15m.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	AO	175	Total	C	N	O	S	0	0
			1448	919	272	248	9		

- Molecule 42 is a protein called 28S ribosomal protein S16, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	AP	117	Total	C	N	O	S	0	0
			932	588	184	155	5		

- Molecule 43 is a protein called uS17m.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	AQ	112	Total	C	N	O	S	0	0
			875	568	153	151	3		

- Molecule 44 is a protein called Mitochondrial ribosomal protein S18C.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	AR	97	Total	C	N	O	S	0	0
			784	507	132	138	7		

- Molecule 45 is a protein called bS21m.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	AU	86	Total	C	N	O	S	0	0
			734	453	148	125	8		

- Molecule 46 is a RNA chain called fMet-tRNAMet (P site).

Mol	Chain	Residues	Atoms					AltConf	Trace
46	AV	71	Total	C	N	O	P	0	0
			1498	673	264	491	70		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AV	69	C	-	insertion	GB 1208989970
AV	70	C	-	insertion	GB 1208989970
AV	71	A	-	insertion	GB 1208989970

- Molecule 47 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
47	AX	6	128	57	22	43	6	0	0

- Molecule 48 is a protein called unknown peptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
48	AZ	18	90	54	18	18	0	0

- Molecule 49 is a protein called Mitochondrial ribosomal protein S22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	Aa	292	2378	1518	409	442	9	0	0

- Molecule 50 is a protein called mS23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	Ab	135	1101	709	199	192	1	0	0

- Molecule 51 is a protein called Mitochondrial ribosomal protein S25.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	Ac	169	1367	876	236	245	10	0	0

- Molecule 52 is a protein called Mitochondrial ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	Ad	177	1467	904	288	273	2	0	0

- Molecule 53 is a protein called Mitochondrial ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	Ae	388	3109	1971	535	589	14	0	0

- Molecule 54 is a protein called Mitoribosomal protein ms28, mrps28.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	Af	99	Total	C	N	O	S	0	0
			778	494	134	146	4		

- Molecule 55 is a protein called Mitochondrial ribosomal protein L47.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	B2	179	Total	C	N	O	S	0	0
			1548	992	290	260	6		

- Molecule 56 is a protein called Death associated protein 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	Ag	353	Total	C	N	O	S	0	0
			2875	1837	515	513	10		

- Molecule 57 is a protein called Mitochondrial ribosomal protein S31.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	Ah	120	Total	C	N	O	S	0	0
			1015	659	168	185	3		

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Ah	180	UNK	-	insertion	UNP F1RME2
Ah	181	GLN	-	insertion	UNP F1RME2
Ah	182	LYS	-	insertion	UNP F1RME2
Ah	184	GLY	-	insertion	UNP F1RME2
Ah	185	GLU	LYS	conflict	UNP F1RME2
Ah	187	PRO	LYS	conflict	UNP F1RME2
Ah	189	ILE	LEU	conflict	UNP F1RME2
Ah	190	SER	ILE	conflict	UNP F1RME2
Ah	237	SER	-	insertion	UNP F1RME2
Ah	238	PHE	-	insertion	UNP F1RME2

- Molecule 58 is a protein called mS33.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	Ai	99	Total	C	N	O	S	0	0
			824	522	156	143	3		

- Molecule 59 is a protein called mS34.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	Aj	213	Total	C	N	O	S	0	0
			1788	1131	338	311	8		

- Molecule 60 is a protein called Mitochondrial ribosomal protein S35.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	Ak	275	Total	C	N	O	S	0	0
			2222	1414	380	419	9		

- Molecule 61 is a protein called mS37.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	Am	116	Total	C	N	O	S	0	0
			930	577	185	160	8		

- Molecule 62 is a protein called Aurora kinase A interacting protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	An	72	Total	C	N	O	S	0	0
			639	407	139	92	1		

- Molecule 63 is a protein called Pentatricopeptide repeat domain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	Ao	572	Total	C	N	O	S	0	0
			4525	2897	770	834	24		

- Molecule 64 is a protein called 28S ribosomal protein S18b, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	Ap	190	Total	C	N	O	S	0	0
			1564	991	292	273	8		

- Molecule 65 is a protein called Mitochondrial ribosomal protein L12.

Mol	Chain	Residues	Atoms				AltConf	Trace
65	CL	45	Total	C	N	O	0	0
			317	203	52	62		
65	DL	27	Total	C	N	O	0	0
			213	137	33	43		
65	EL	28	Total	C	N	O	0	0
			222	143	35	44		

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Mol	Chain	Residues	Atoms				AltConf	Trace
65	FL	27	Total	C	N	O	0	0
			213	137	33	43		
65	GL	27	Total	C	N	O	0	0
			213	137	33	43		
65	HL	26	Total	C	N	O	0	0
			205	131	32	42		
65	LL	70	Total	C	N	O	0	0
			537	346	93	98		

- Molecule 66 is a protein called uL30m.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	B3	118	Total	C	N	O	S	0	0
			968	622	178	165	3		

- Molecule 67 is a protein called bL31m.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	B4	62	Total	C	N	O	S	0	0
			474	296	94	81	3		

- Molecule 68 is a protein called bL32m.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	B5	110	Total	C	N	O	S	0	0
			902	553	181	162	6		

- Molecule 69 is a protein called bL33m.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	B6	52	Total	C	N	O	S	0	0
			425	274	78	71	2		

- Molecule 70 is a protein called Mitochondrial ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	B7	46	Total	C	N	O	S	0	0
			387	239	89	58	1		

- Molecule 71 is a protein called Mitochondrial ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	B8	95	Total	C	N	O	S	0	0
			833	539	163	129	2		

- Molecule 72 is a protein called Ribosomal protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	B9	38	Total	C	N	O	S	0	0
			335	214	70	47	4		

- Molecule 73 is a RNA chain called CP tRNAPhe.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	BB	67	Total	C	N	O	P	0	0
			1427	640	261	459	67		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BB	72	C	-	insertion	GB 76262549
BB	73	A	-	insertion	GB 76262549

- Molecule 74 is a protein called Elongation factor G, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	BC	694	Total	C	N	O	S	0	0
			5425	3422	935	1035	33		

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BC	30	SER	-	expression tag	UNP Q96RP9
BC	31	GLY	-	expression tag	UNP Q96RP9
BC	32	GLY	-	expression tag	UNP Q96RP9
BC	33	SER	-	expression tag	UNP Q96RP9
BC	34	GLY	-	expression tag	UNP Q96RP9
BC	35	SER	-	expression tag	UNP Q96RP9
BC	36	GLY	-	expression tag	UNP Q96RP9

- Molecule 75 is a protein called uL2m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
75	BD	240	1860	1160	371	319	10	0	0

- Molecule 76 is a protein called ICT1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
76	BE	307	2420	1554	426	430	10	0	0

- Molecule 77 is a protein called Mitochondrial ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
77	BF	250	2011	1294	367	344	6	0	0

- Molecule 78 is a protein called Mitochondrial ribosomal protein L9.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
78	BI	98	805	509	155	141	0	0

- Molecule 79 is a protein called Mitochondrial ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
79	BJ	212	1705	1100	306	290	9	0	0

- Molecule 80 is a protein called Mitochondrial ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
80	BK	176	1339	851	243	243	2	0	0

- Molecule 81 is a protein called uL13m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
81	BN	177	1444	926	258	253	7	0	0

- Molecule 82 is a protein called uL14m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
82	BO	115	896	562	176	154	4	0	0

- Molecule 83 is a protein called uL15m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
83	BP	288	2312	1473	430	403	6	0	0

- Molecule 84 is a protein called uL16m.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
84	BQ	222	1803	1156	331	306	10	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BQ	237	HIS	TYR	conflict	UNP F1RI89

- Molecule 85 is a protein called Uncharacterized protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
85	BR	153	1240	777	236	222	5	0	0

- Molecule 86 is a protein called Mitochondrial ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
86	BS	143	1168	733	227	204	4	0	0

- Molecule 87 is a protein called Mitochondrial ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
87	BT	240	1990	1275	349	357	9	0	0

- Molecule 88 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
88	B0	1	Total Mg 1 1	0
88	Be	1	Total Mg 1 1	0
88	B1	1	Total Mg 1 1	0
88	Bt	1	Total Mg 1 1	0
88	AA	101	Total Mg 101 101	0
88	AB	1	Total Mg 1 1	0
88	AL	1	Total Mg 1 1	0
88	AX	1	Total Mg 1 1	0
88	Ag	1	Total Mg 1 1	0
88	Am	1	Total Mg 1 1	0
88	An	1	Total Mg 1 1	0
88	B3	1	Total Mg 1 1	0
88	BA	205	Total Mg 205 205	0
88	BB	1	Total Mg 1 1	0
88	BC	1	Total Mg 1 1	0
88	BD	3	Total Mg 3 3	0
88	BP	2	Total Mg 2 2	0
88	BQ	1	Total Mg 1 1	0
88	BR	1	Total Mg 1 1	0

- Molecule 89 is ZINC ION (three-letter code: ZN) (formula: Zn).

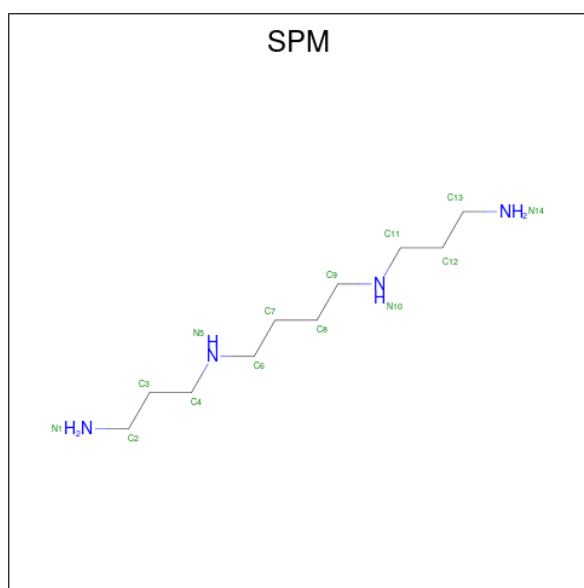
Mol	Chain	Residues	Atoms	AltConf
89	Bx	1	Total Zn 1 1	0

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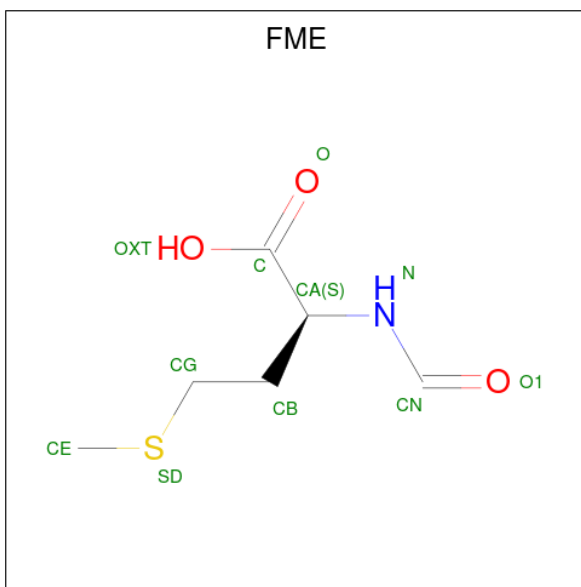
Mol	Chain	Residues	Atoms		AltConf
89	AR	1	Total	Zn	0
			1	1	
89	Ac	1	Total	Zn	0
			1	1	
89	Ap	1	Total	Zn	0
			1	1	
89	B5	1	Total	Zn	0
			1	1	
89	B9	1	Total	Zn	0
			1	1	

- Molecule 90 is SPERMINE (three-letter code: SPM) (formula: $C_{10}H_{26}N_4$).



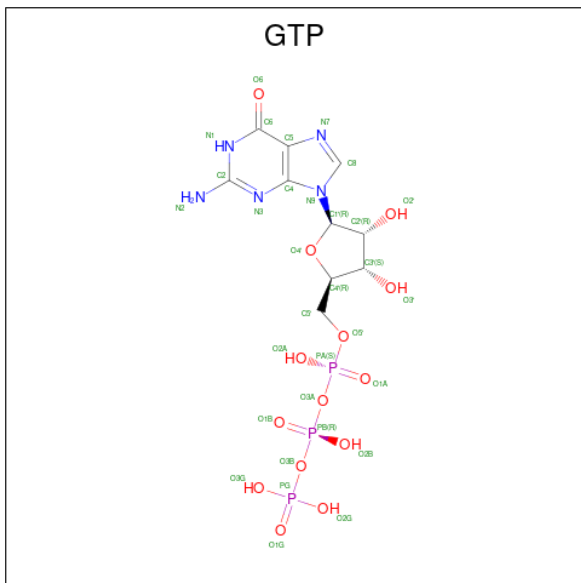
Mol	Chain	Residues	Atoms			AltConf
90	AA	1	Total	C	N	0
			14	10	4	
90	BA	1	Total	C	N	0
			14	10	4	
90	BA	1	Total	C	N	0
			14	10	4	

- Molecule 91 is N-FORMYLMETHIONINE (three-letter code: FME) (formula: $C_6H_{11}NO_3S$) (labeled as "Ligand of Interest" by depositor).



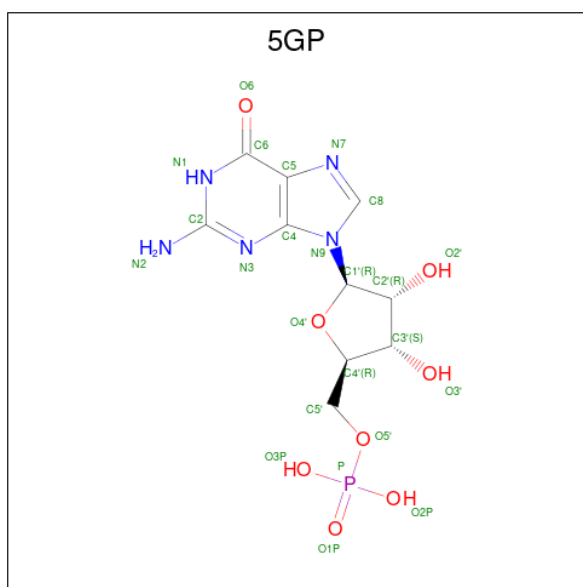
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	S	
91	AV	1	10	6	1	2	1	0

- Molecule 92 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).



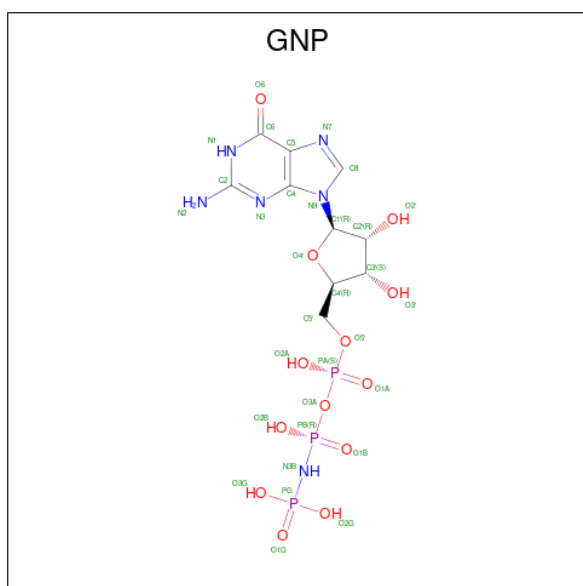
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
92	Ag	1	32	10	5	14	3	0

- Molecule 93 is GUANOSINE-5'-MONOPHOSPHATE (three-letter code: 5GP) (formula: $C_{10}H_{14}N_5O_8P$).



Mol	Chain	Residues	Atoms					AltConf
93	BA	1	Total	C	N	O	P	0
			24	10	5	8	1	
93	BA	1	Total	C	N	O	P	0
			24	10	5	8	1	

- Molecule 94 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula: $C_{10}H_{17}N_6O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



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

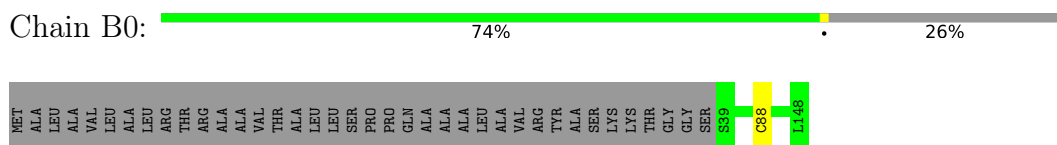
- Molecule 95 is water.

Mol	Chain	Residues	Atoms		AltConf
95	Ag	3	Total 3	O 3	0
95	BC	2	Total 2	O 2	0

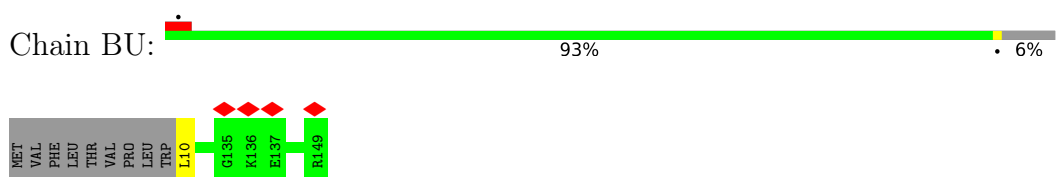
3 Residue-property plots

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.

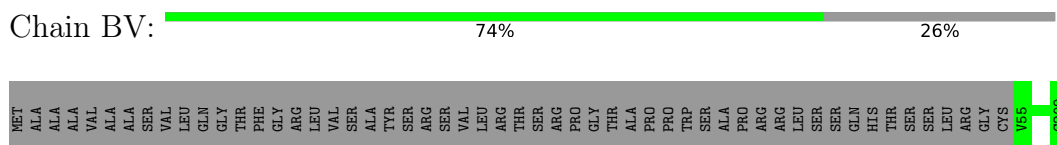
- Molecule 1: Mitochondrial ribosomal protein L27



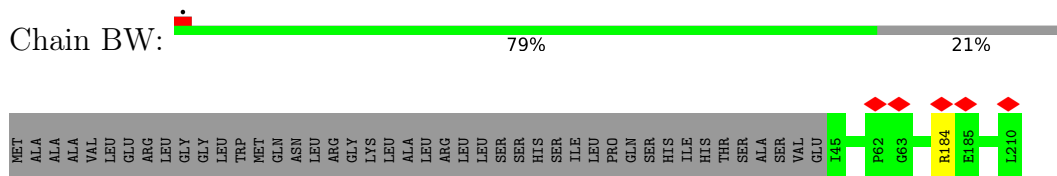
- Molecule 2: Mitochondrial ribosomal protein L20



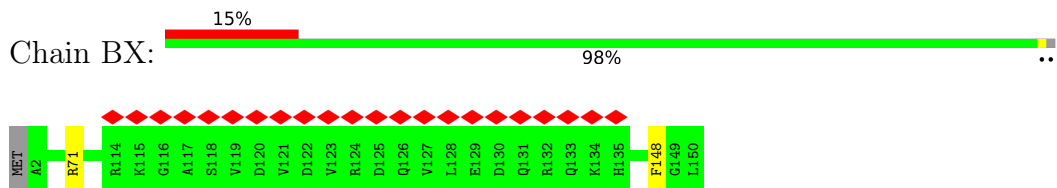
- Molecule 3: Mitochondrial ribosomal protein L21



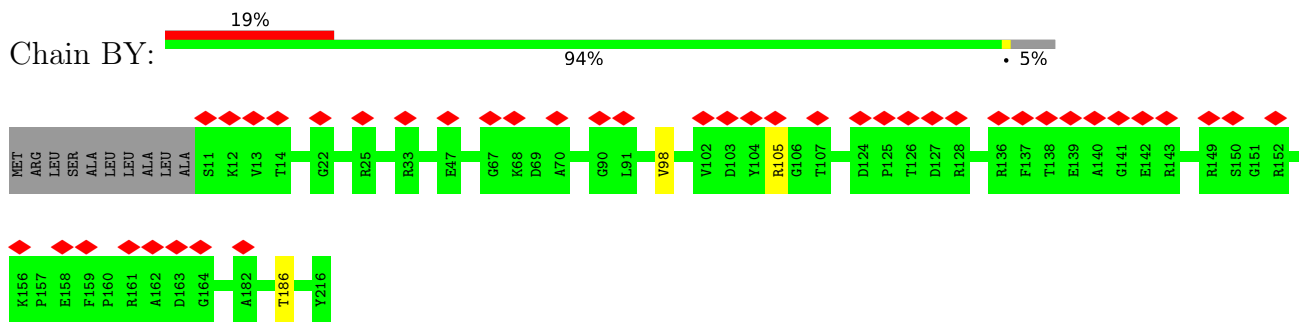
- Molecule 4: uL22m



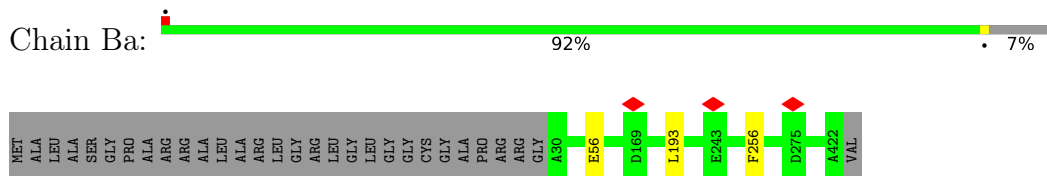
- Molecule 5: uL23m



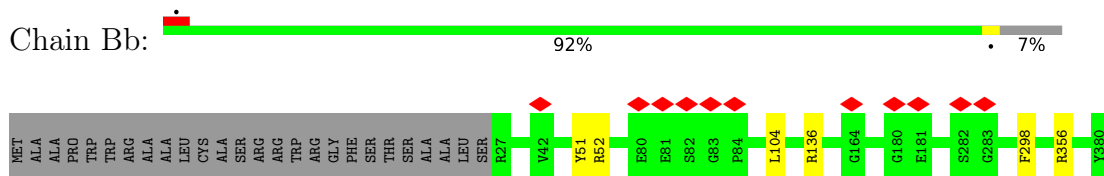
- Molecule 6: uL24m



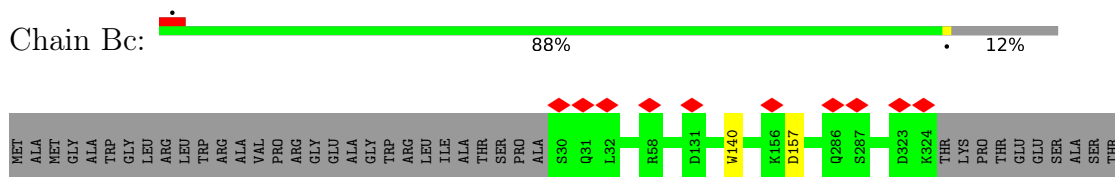
• Molecule 7: Mitochondrial ribosomal protein L37



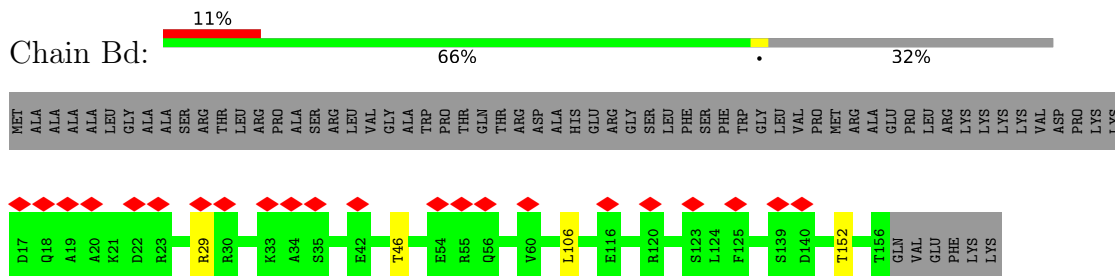
• Molecule 8: Mitochondrial ribosomal protein L38



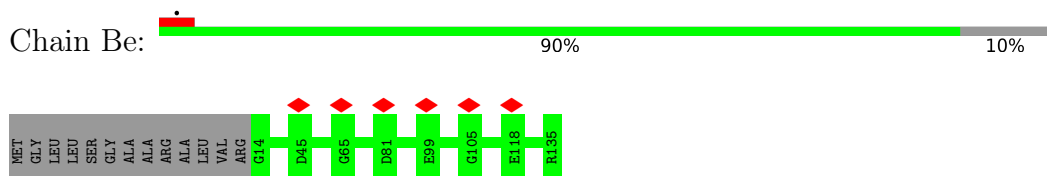
• Molecule 9: Mitochondrial ribosomal protein L39



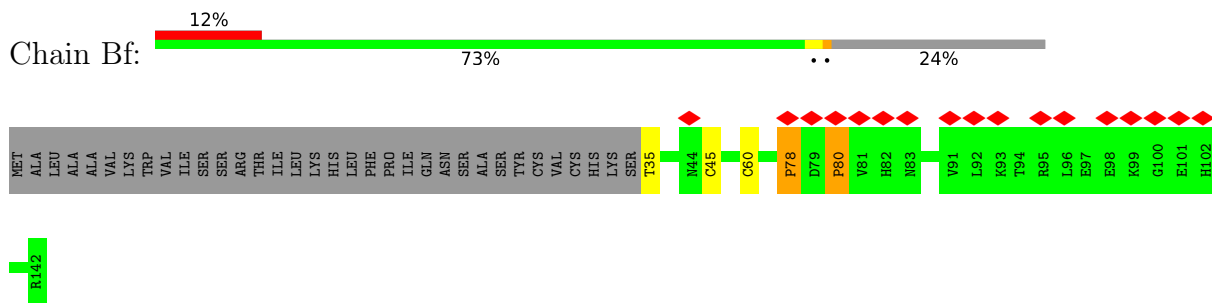
• Molecule 10: Uncharacterized protein



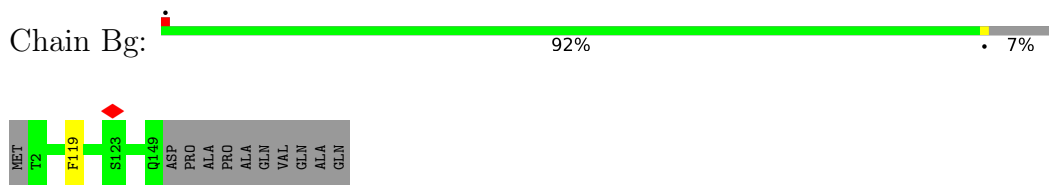
• Molecule 11: Mitochondrial ribosomal protein L41



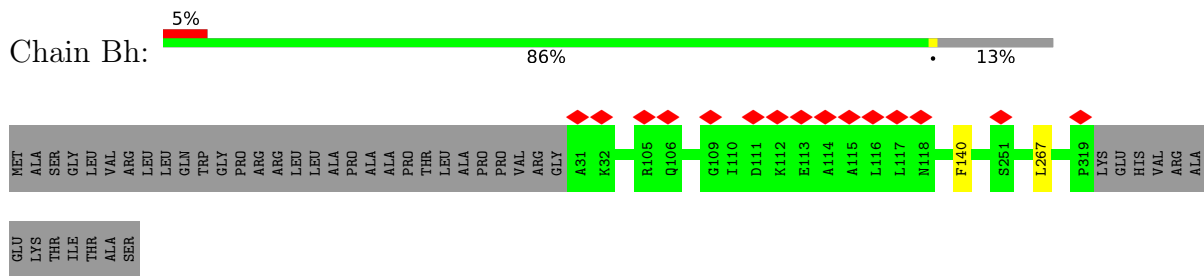
• Molecule 12: mL42



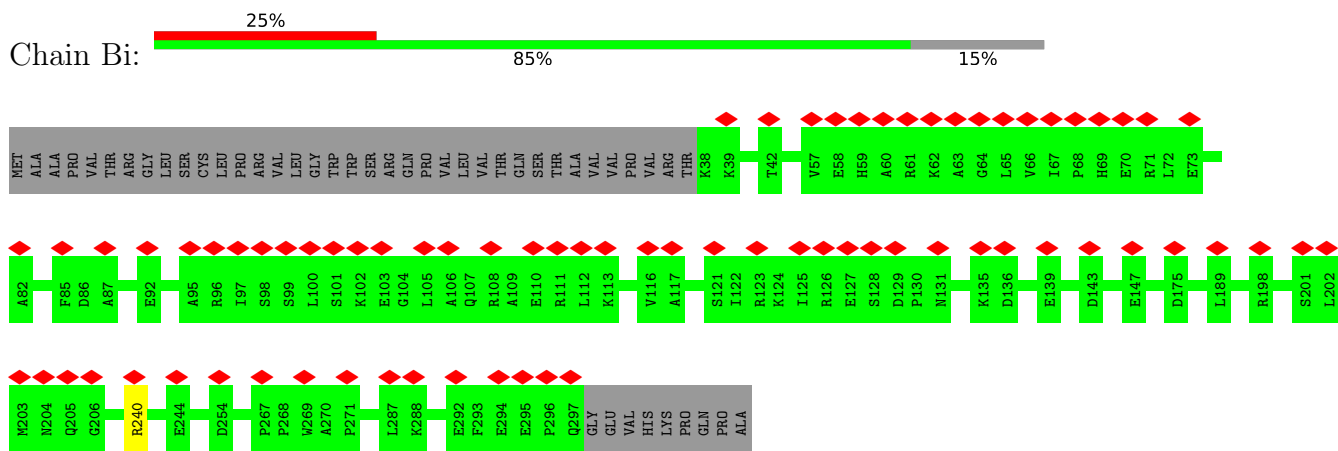
• Molecule 13: Mitochondrial ribosomal protein L43



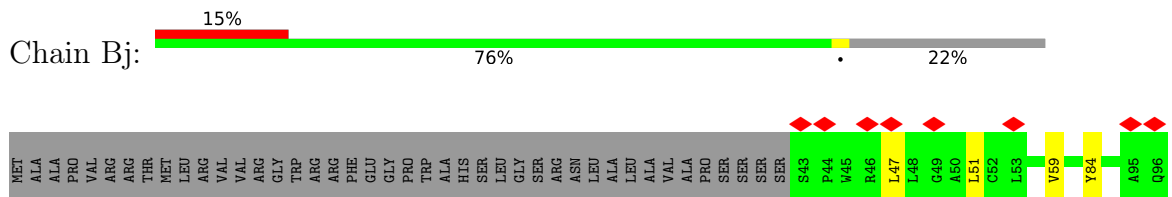
• Molecule 14: mL44

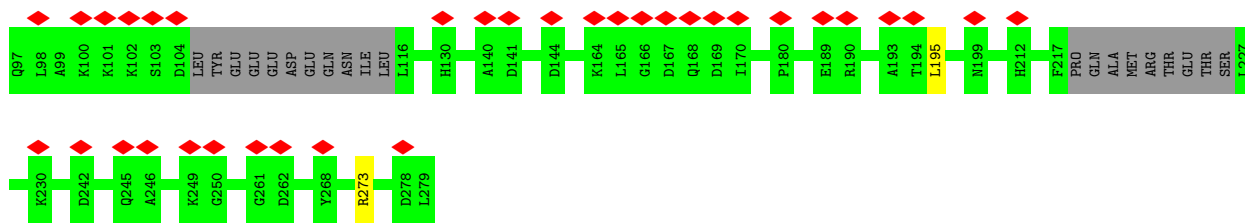


• Molecule 15: Mitochondrial ribosomal protein L45

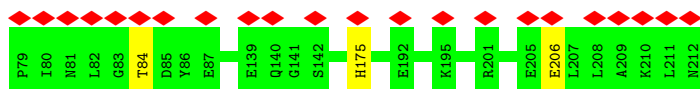
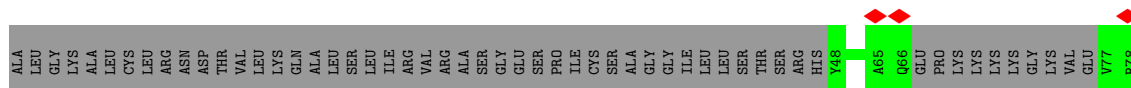


• Molecule 16: Mitochondrial ribosomal protein L46

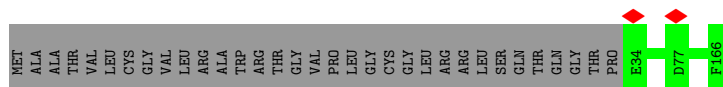
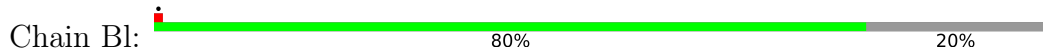




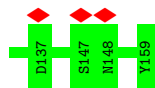
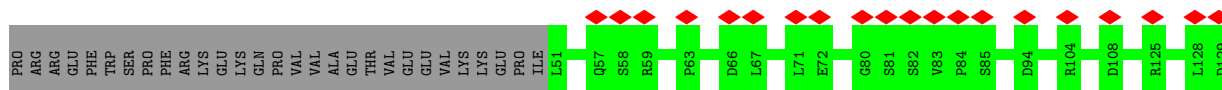
• Molecule 17: 39S ribosomal protein L48, mitochondrial



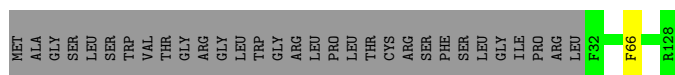
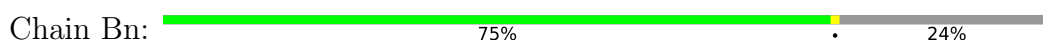
• Molecule 18: Mrpl34



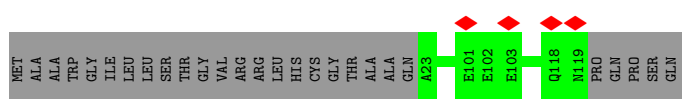
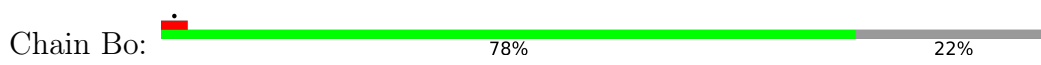
• Molecule 19: Mitochondrial ribosomal protein L50



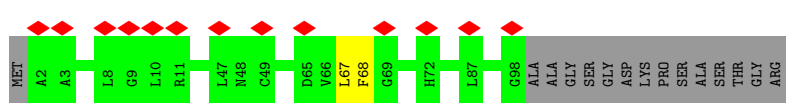
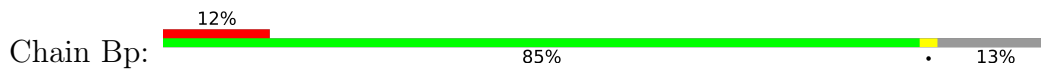
• Molecule 20: Mitochondrial ribosomal protein L51



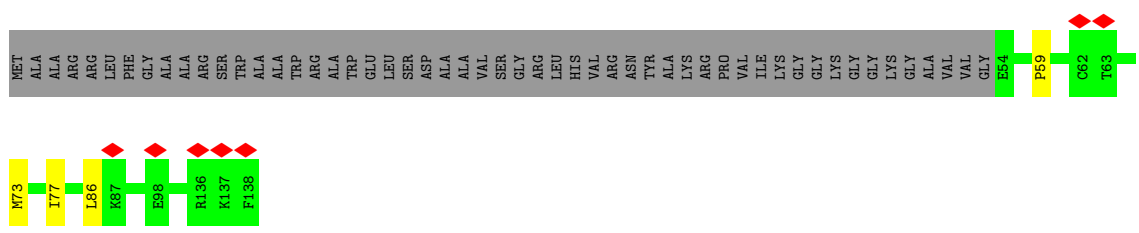
• Molecule 21: mL52



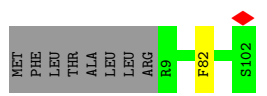
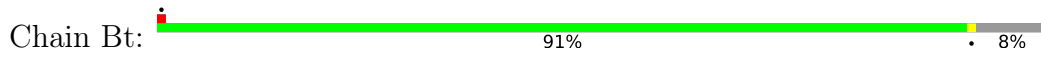
• Molecule 22: mL53



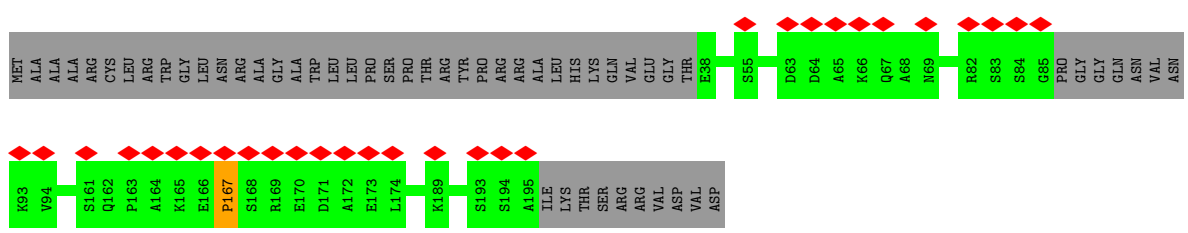
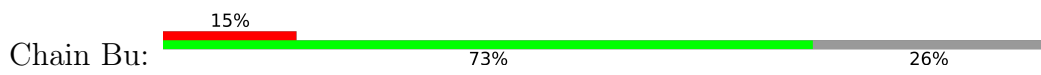
• Molecule 23: mL54



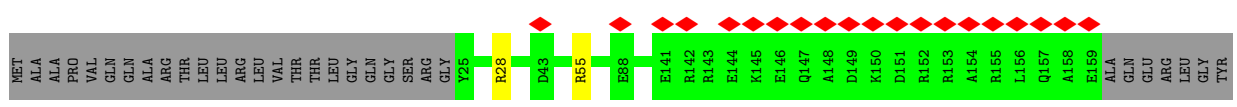
• Molecule 24: Mitochondrial ribosomal protein L57



• Molecule 25: mL62 (ICT1)



• Molecule 26: mL64



Residue ID	Residue Type	Occupancy	Validation Metric	Validation Value	Validation Label
A731	U	1.00	0.00	0.00	0.00
U732	U	1.00	0.00	0.00	0.00
A739	C	1.00	0.00	0.00	0.00
U740	U	1.00	0.00	0.00	0.00
C741	C	1.00	0.00	0.00	0.00
C742	U	1.00	0.00	0.00	0.00
A743	U	1.00	0.00	0.00	0.00
C744	C	1.00	0.00	0.00	0.00
C745	U	1.00	0.00	0.00	0.00
A746	U	1.00	0.00	0.00	0.00
C747	C	1.00	0.00	0.00	0.00
G754	G	1.00	0.00	0.00	0.00
A775	A	1.00	0.00	0.00	0.00
A790	A	1.00	0.00	0.00	0.00
G791	G	1.00	0.00	0.00	0.00
A802	A	1.00	0.00	0.00	0.00
U803	U	1.00	0.00	0.00	0.00
U808	U	1.00	0.00	0.00	0.00
A822	A	1.00	0.00	0.00	0.00
G823	G	1.00	0.00	0.00	0.00
G824	G	1.00	0.00	0.00	0.00
C825	C	1.00	0.00	0.00	0.00
A838	A	1.00	0.00	0.00	0.00
C841	C	1.00	0.00	0.00	0.00
A842	A	1.00	0.00	0.00	0.00
G863	G	1.00	0.00	0.00	0.00
C864	C	1.00	0.00	0.00	0.00
A865	A	1.00	0.00	0.00	0.00
A869	A	1.00	0.00	0.00	0.00
G870	G	1.00	0.00	0.00	0.00
U871	U	1.00	0.00	0.00	0.00
A872	A	1.00	0.00	0.00	0.00
A873	A	1.00	0.00	0.00	0.00
U874	U	1.00	0.00	0.00	0.00
A875	A	1.00	0.00	0.00	0.00
A876	A	1.00	0.00	0.00	0.00
A877	A	1.00	0.00	0.00	0.00
A878	A	1.00	0.00	0.00	0.00
U879	U	1.00	0.00	0.00	0.00
U880	U	1.00	0.00	0.00	0.00
A881	A	1.00	0.00	0.00	0.00
A882	A	1.00	0.00	0.00	0.00
C883	C	1.00	0.00	0.00	0.00
U884	U	1.00	0.00	0.00	0.00
U885	U	1.00	0.00	0.00	0.00
A886	A	1.00	0.00	0.00	0.00
U890	U	1.00	0.00	0.00	0.00
C891	C	1.00	0.00	0.00	0.00
A892	A	1.00	0.00	0.00	0.00
A893	A	1.00	0.00	0.00	0.00
U894	U	1.00	0.00	0.00	0.00
U895	U	1.00	0.00	0.00	0.00
A896	A	1.00	0.00	0.00	0.00
C897	C	1.00	0.00	0.00	0.00
A898	A	1.00	0.00	0.00	0.00
C899	C	1.00	0.00	0.00	0.00
A900	A	1.00	0.00	0.00	0.00
A901	A	1.00	0.00	0.00	0.00
C902	C	1.00	0.00	0.00	0.00
G910	G	1.00	0.00	0.00	0.00
A918	A	1.00	0.00	0.00	0.00
G923	G	1.00	0.00	0.00	0.00
U924	U	1.00	0.00	0.00	0.00
A925	A	1.00	0.00	0.00	0.00
A928	A	1.00	0.00	0.00	0.00
A929	A	1.00	0.00	0.00	0.00
G930	G	1.00	0.00	0.00	0.00
G931	G	1.00	0.00	0.00	0.00
U932	U	1.00	0.00	0.00	0.00
A933	A	1.00	0.00	0.00	0.00
A934	A	1.00	0.00	0.00	0.00
G943	G	1.00	0.00	0.00	0.00
A944	A	1.00	0.00	0.00	0.00
A945	A	1.00	0.00	0.00	0.00
A946	A	1.00	0.00	0.00	0.00
G955	G	1.00	0.00	0.00	0.00
G956	G	1.00	0.00	0.00	0.00
U959	U	1.00	0.00	0.00	0.00
A960	A	1.00	0.00	0.00	0.00
C961	C	1.00	0.00	0.00	0.00
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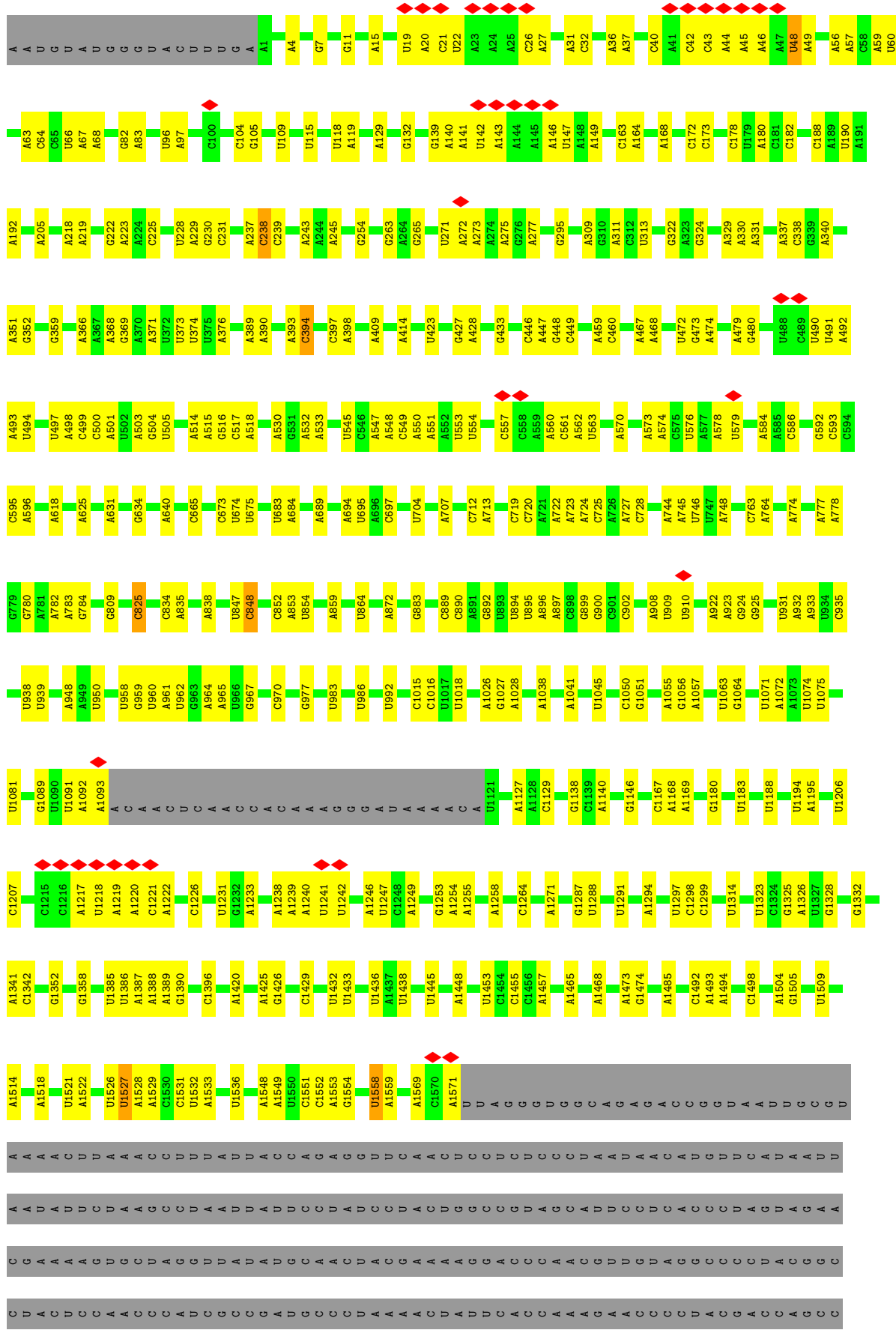
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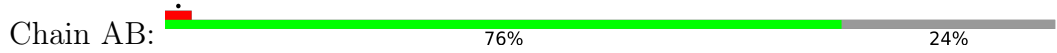
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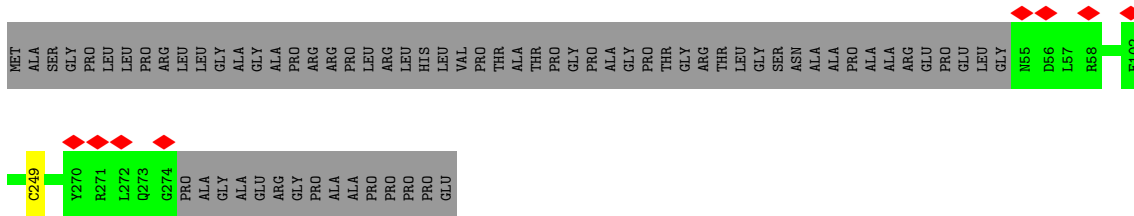


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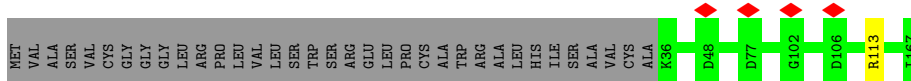
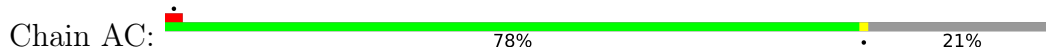
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- Molecule 31: Mitochondrial ribosomal protein S2

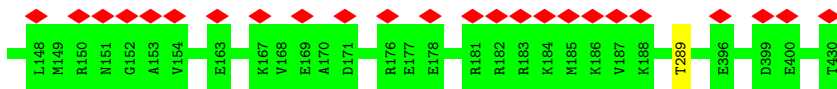
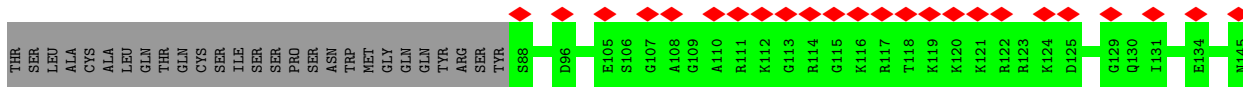
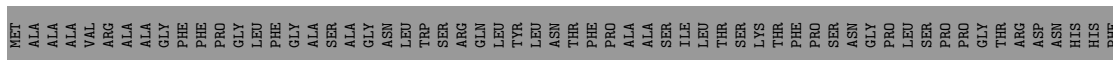
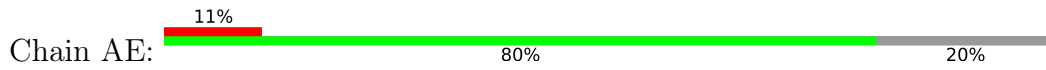




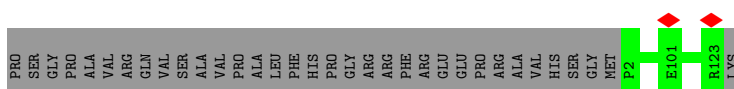
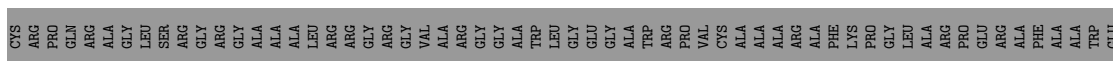
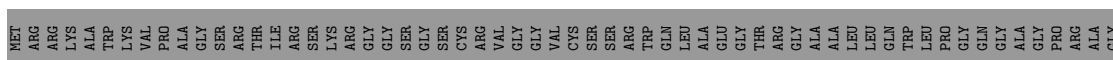
- Molecule 32: Mitochondrial ribosomal protein S24



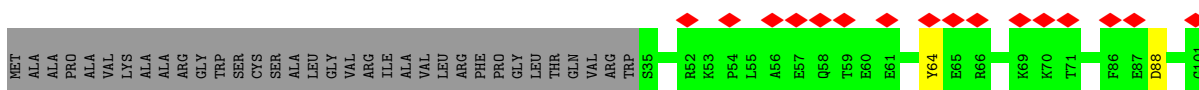
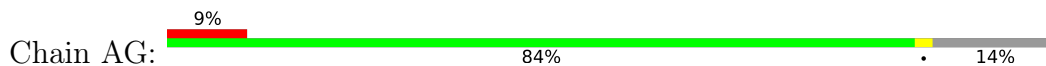
- Molecule 33: Mitochondrial ribosomal protein S5

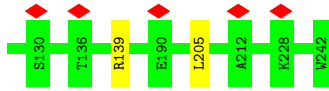


- Molecule 34: bS6m

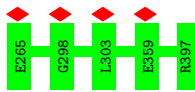
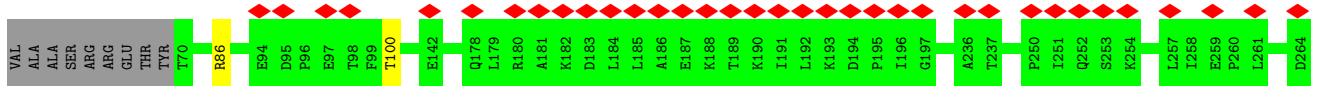
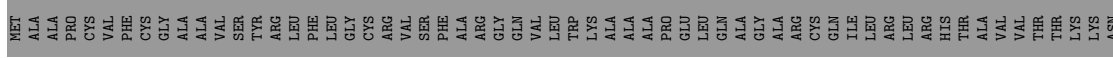
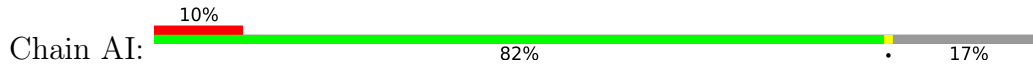


- Molecule 35: Mitochondrial ribosomal protein S7

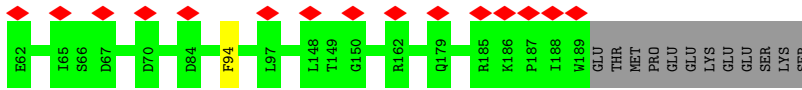
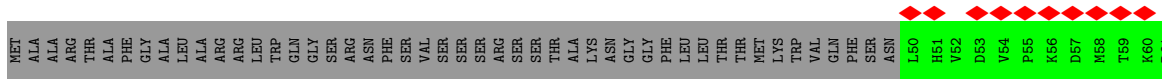
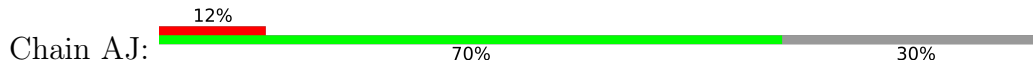




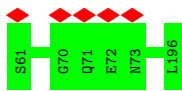
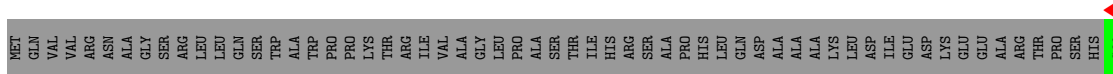
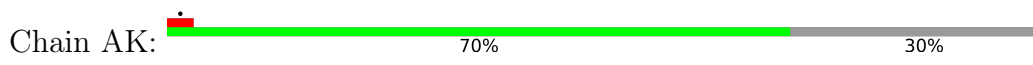
• Molecule 36: uS9m



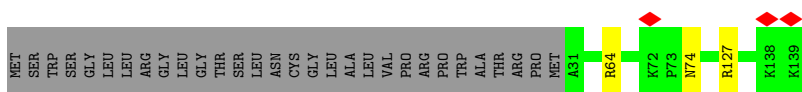
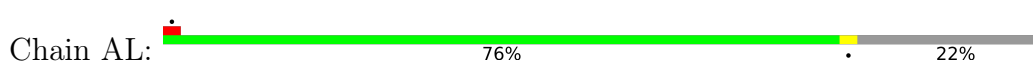
• Molecule 37: Mitochondrial ribosomal protein S10



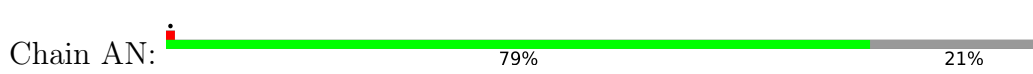
• Molecule 38: uS11m

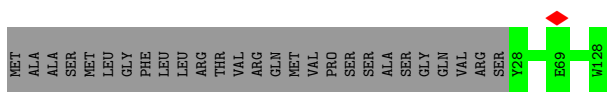


• Molecule 39: Mitochondrial ribosomal protein S12

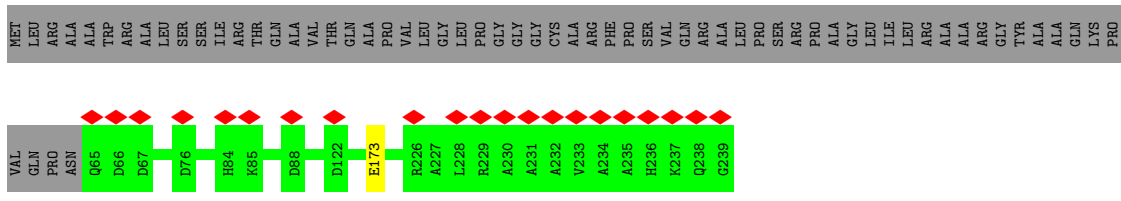
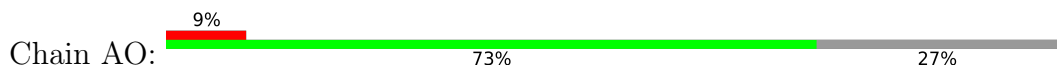


• Molecule 40: Mitochondrial ribosomal protein S14

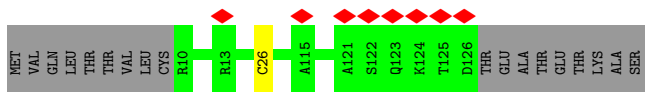
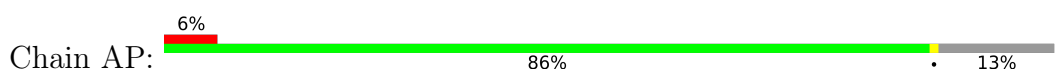




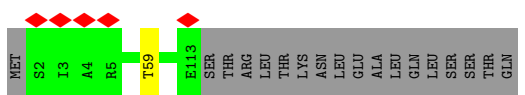
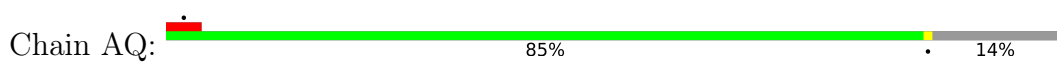
• Molecule 41: uS15m



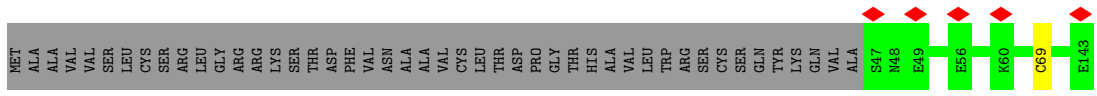
• Molecule 42: 28S ribosomal protein S16, mitochondrial



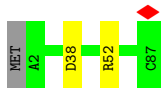
• Molecule 43: uS17m



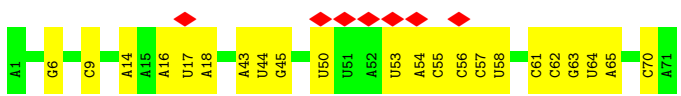
• Molecule 44: Mitochondrial ribosomal protein S18C



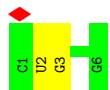
• Molecule 45: bS21m



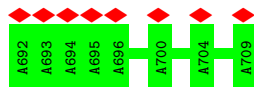
• Molecule 46: fMet-tRNAMet (P site)



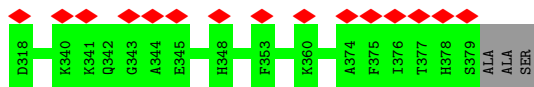
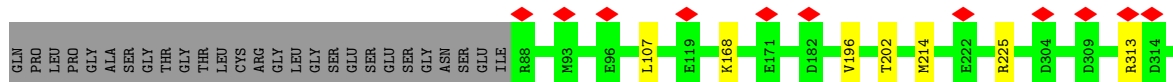
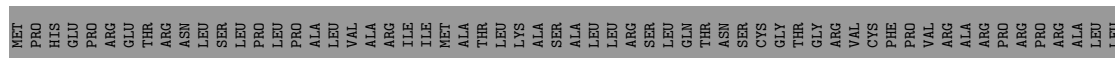
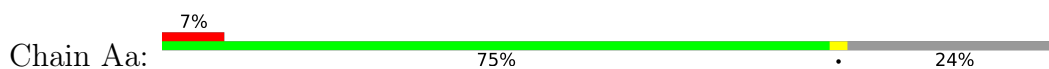
• Molecule 47: mRNA



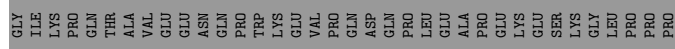
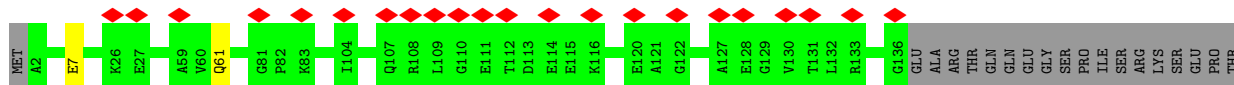
• Molecule 48: unknown peptide



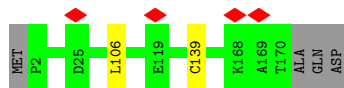
• Molecule 49: Mitochondrial ribosomal protein S22



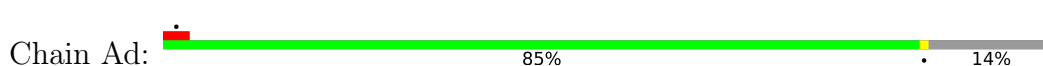
• Molecule 50: mS23

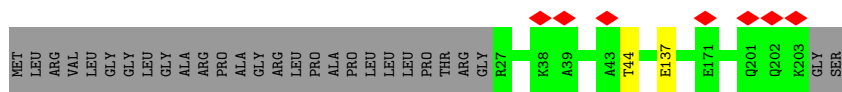


• Molecule 51: Mitochondrial ribosomal protein S25

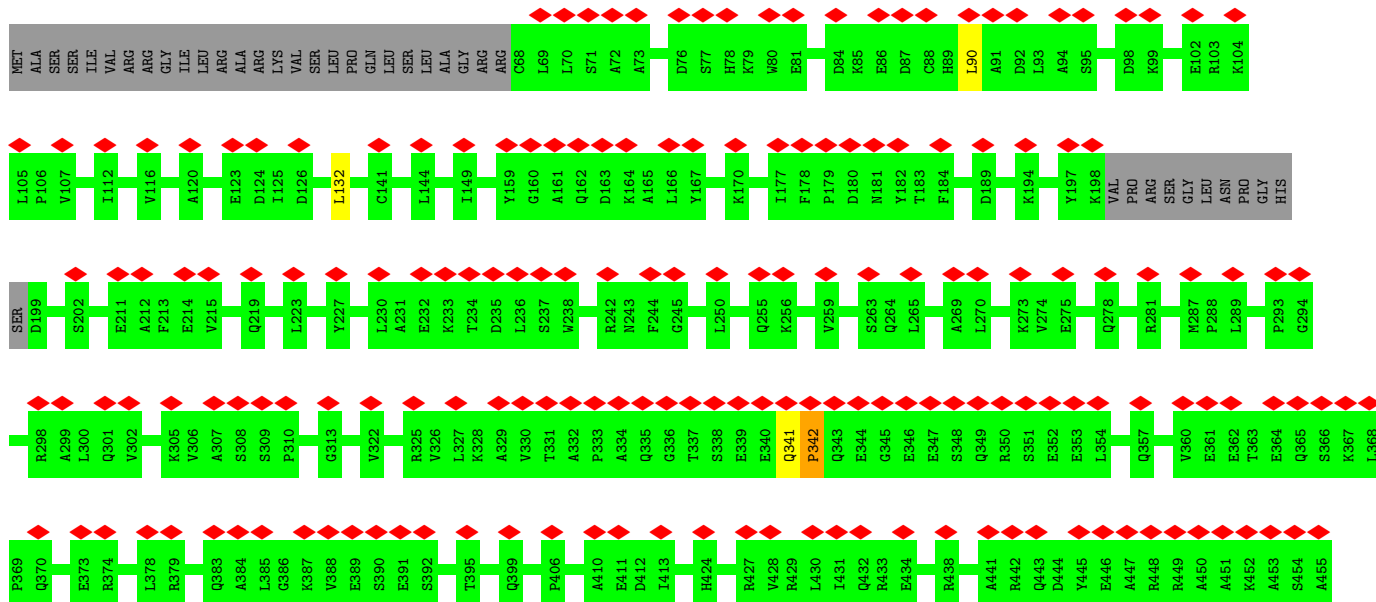
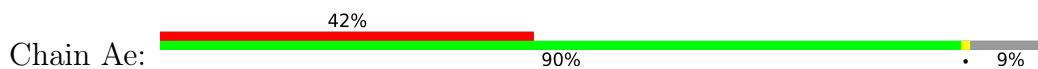


• Molecule 52: Mitochondrial ribosomal protein S26

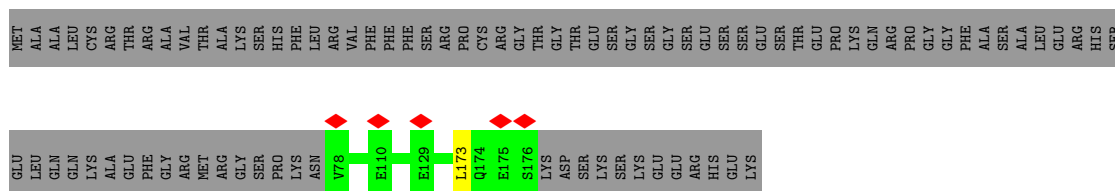




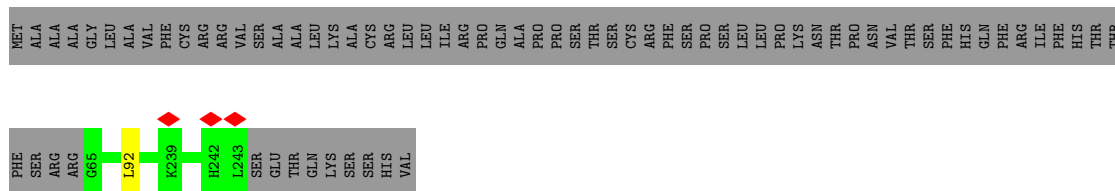
● Molecule 53: Mitochondrial ribosomal protein S27



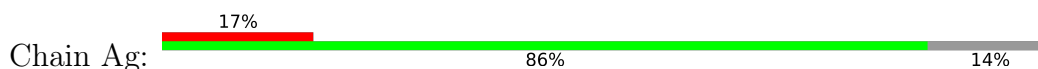
● Molecule 54: Mitoribosomal protein ms28, mrps28

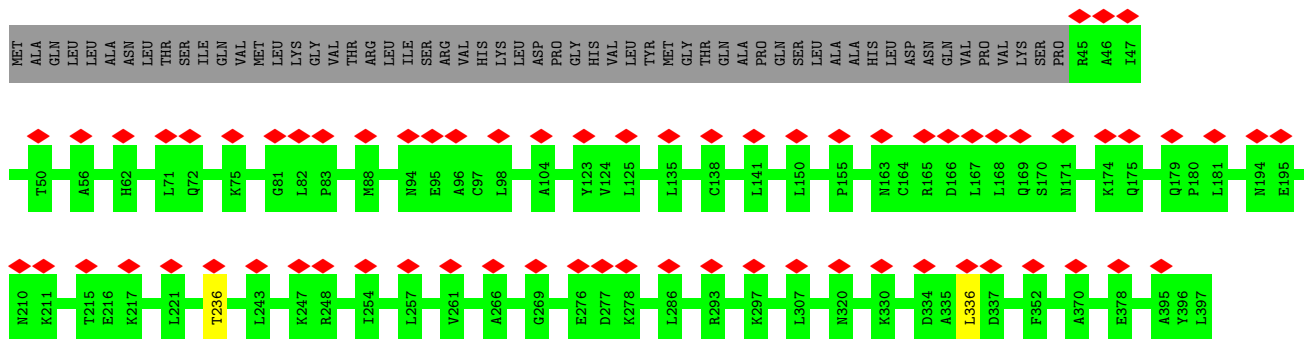


● Molecule 55: Mitochondrial ribosomal protein L47

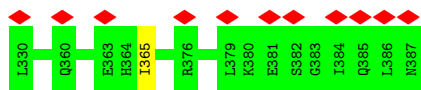
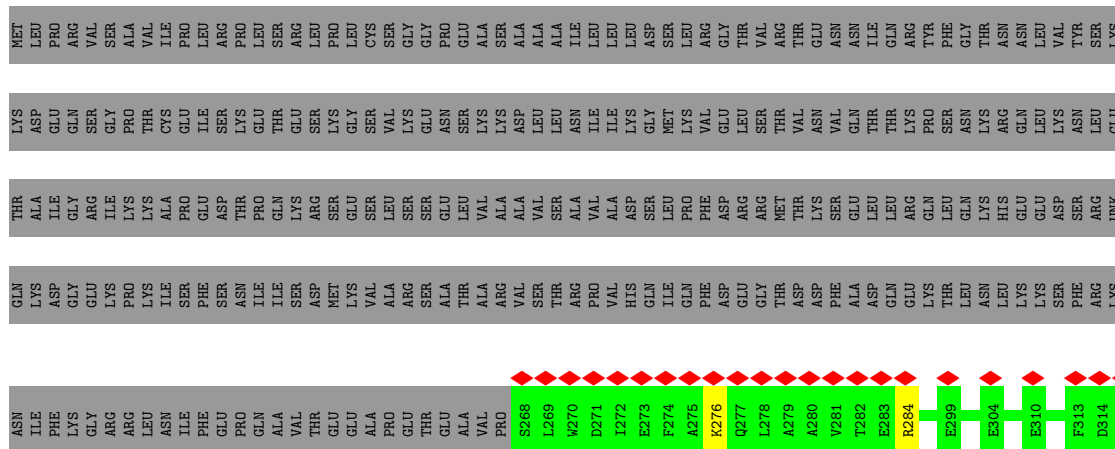


● Molecule 56: Death associated protein 3

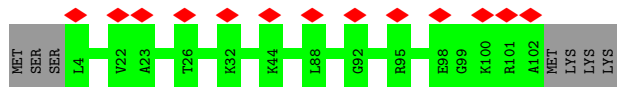




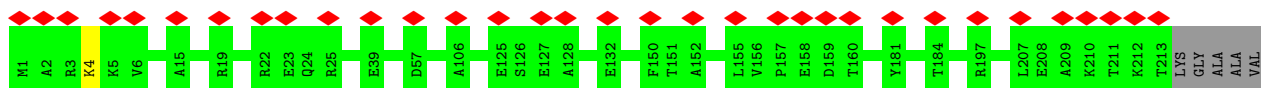
• Molecule 57: Mitochondrial ribosomal protein S31



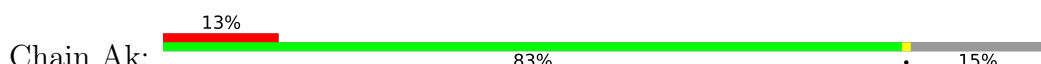
• Molecule 58: mS33

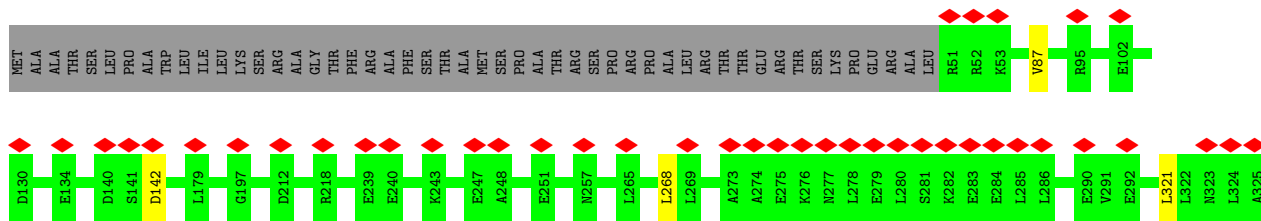


• Molecule 59: mS34

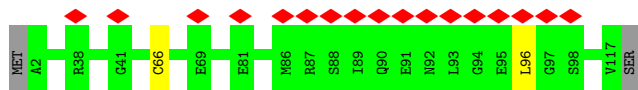


• Molecule 60: Mitochondrial ribosomal protein S35

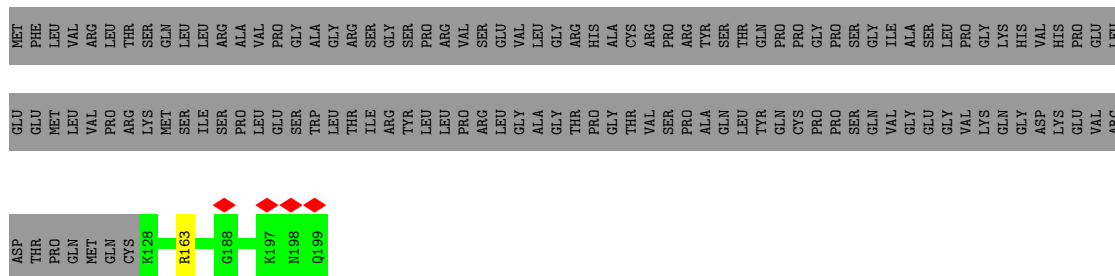




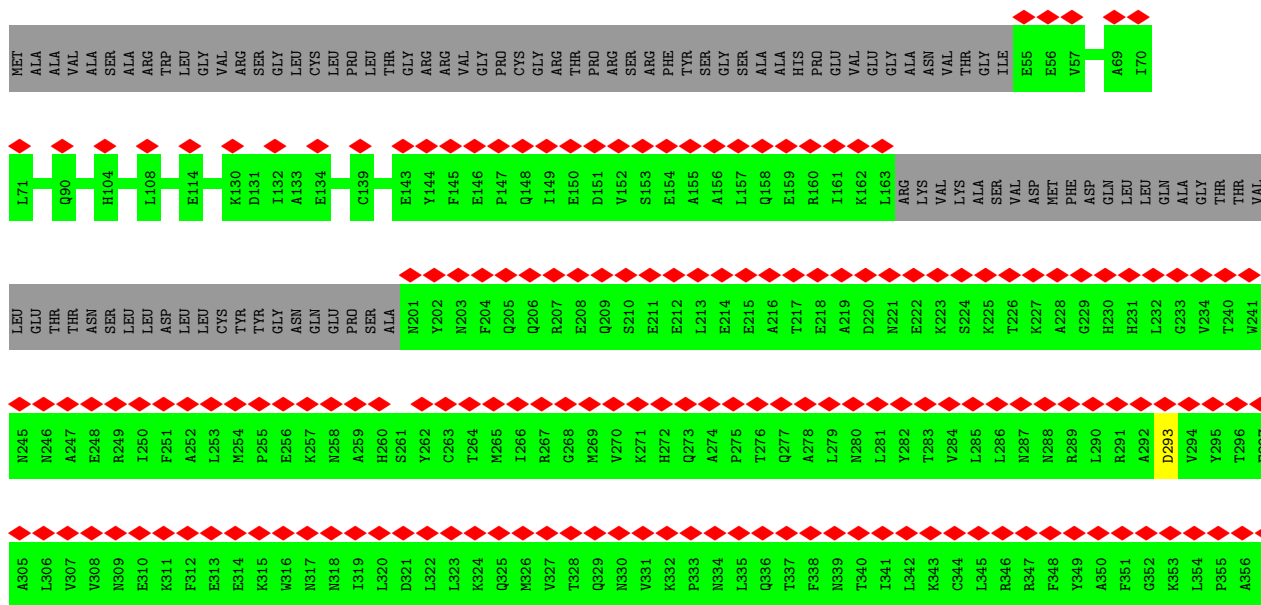
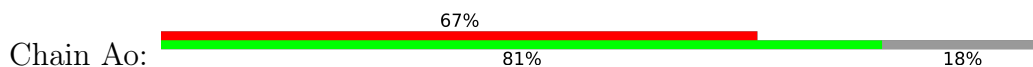
• Molecule 61: mS37

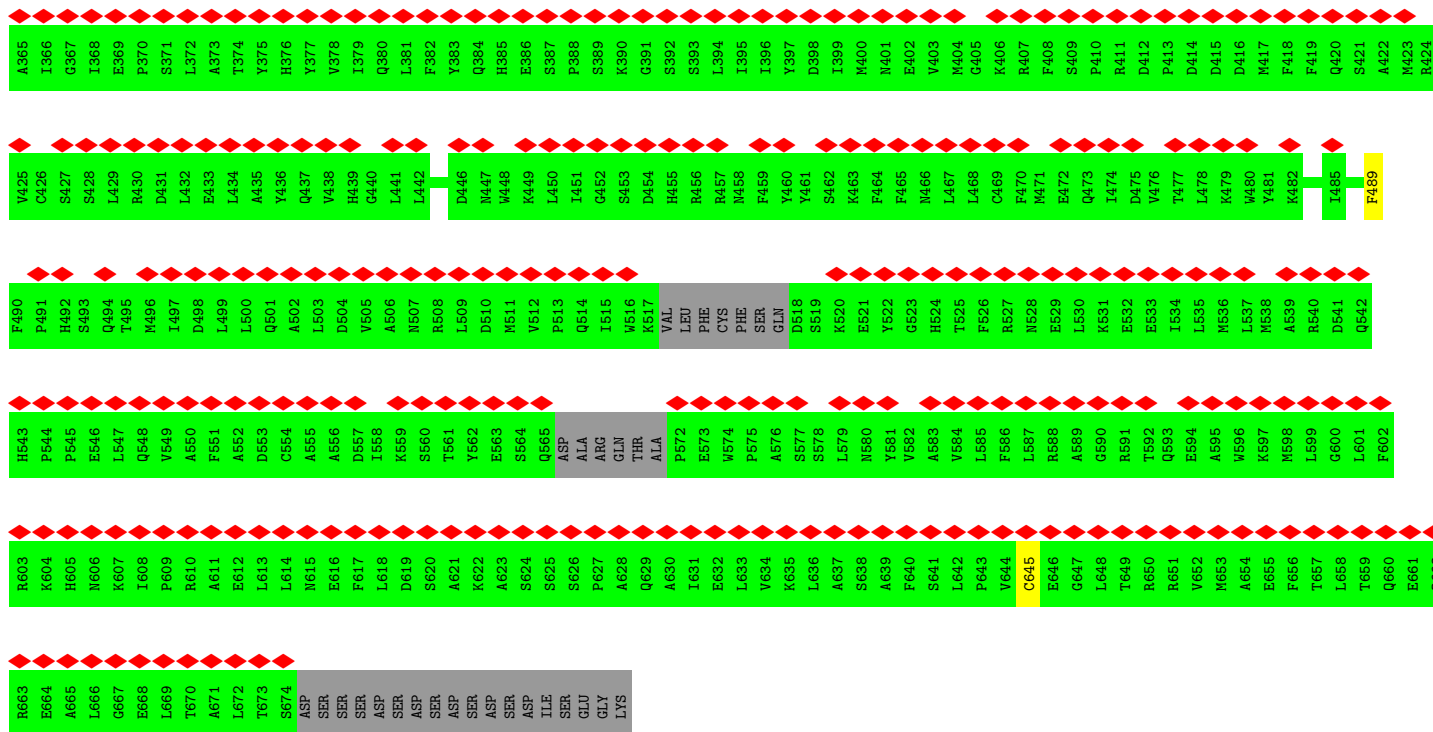


• Molecule 62: Aurora kinase A interacting protein 1

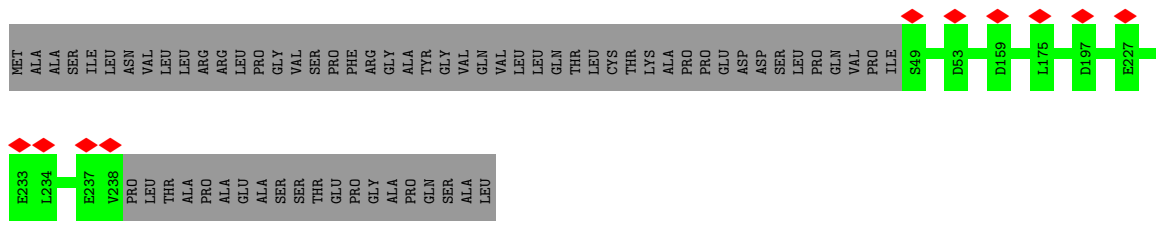
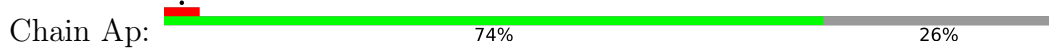


• Molecule 63: Pentatricopeptide repeat domain 3

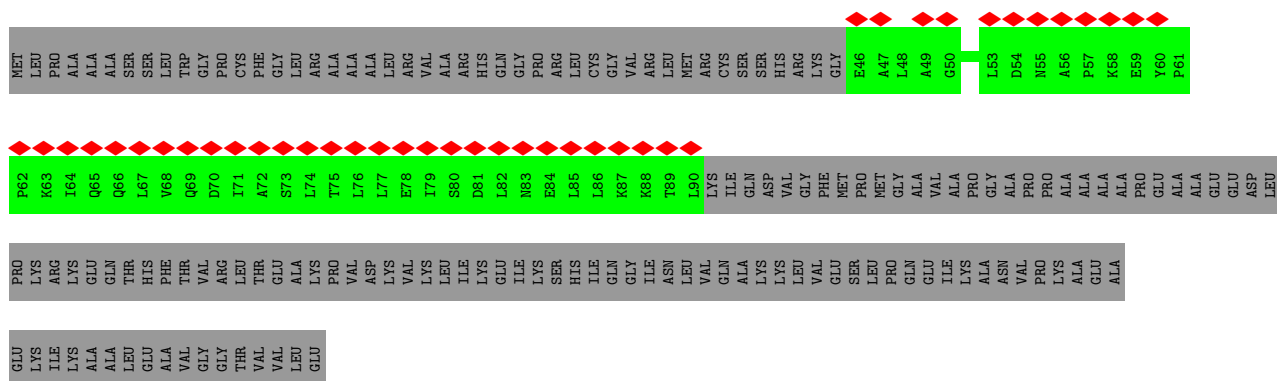




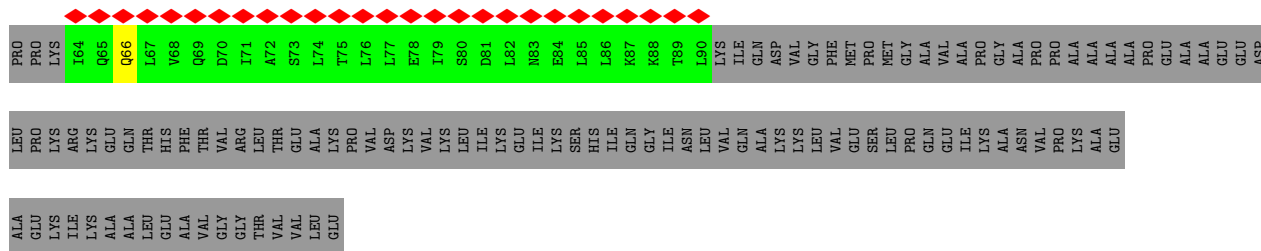
- Molecule 64: 28S ribosomal protein S18b, mitochondrial



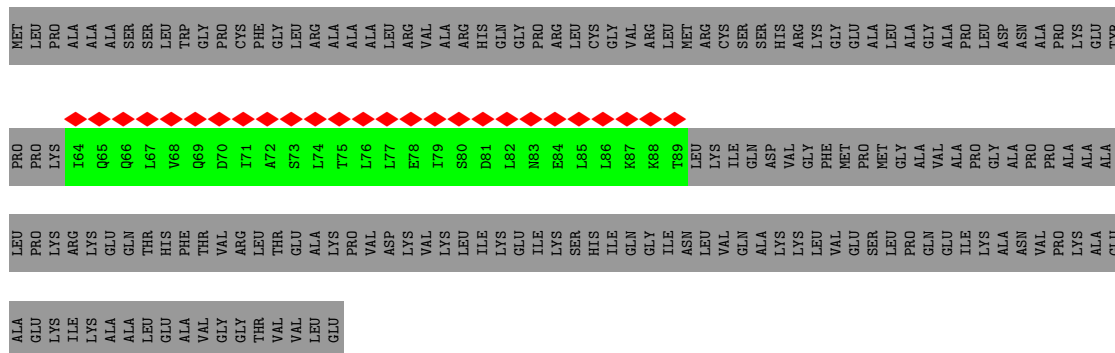
- Molecule 65: Mitochondrial ribosomal protein L12



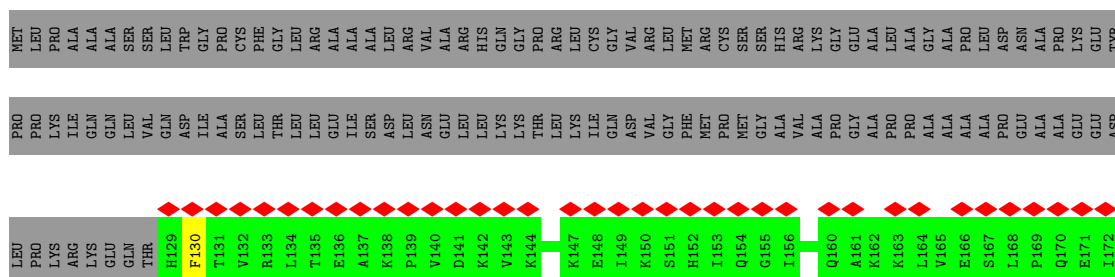
- Molecule 65: Mitochondrial ribosomal protein L12



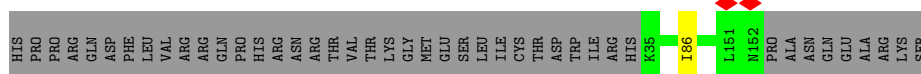
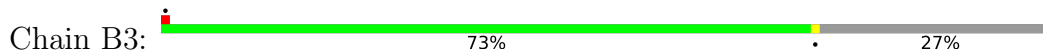
• Molecule 65: Mitochondrial ribosomal protein L12



• Molecule 65: Mitochondrial ribosomal protein L12

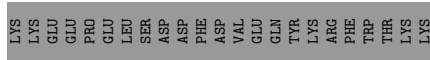
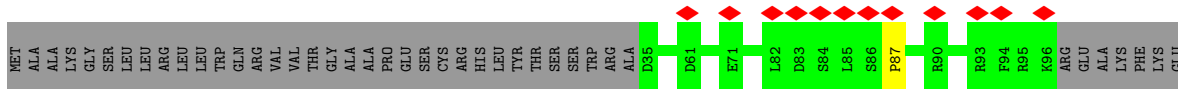


• Molecule 66: uL30m

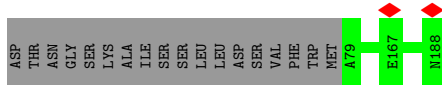


• Molecule 67: bL31m

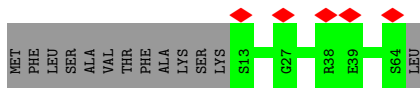
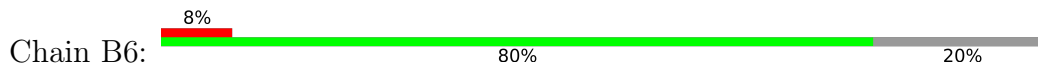




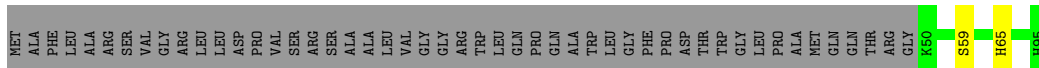
- Molecule 68: bL32m



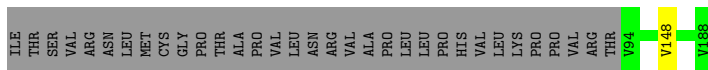
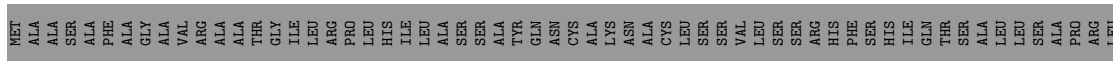
- Molecule 69: bL33m



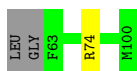
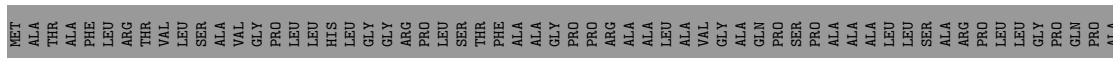
- Molecule 70: Mitochondrial ribosomal protein L34



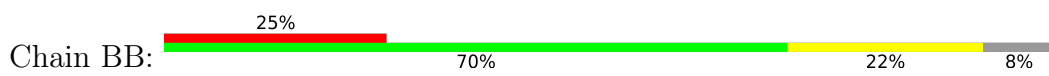
- Molecule 71: Mitochondrial ribosomal protein L35



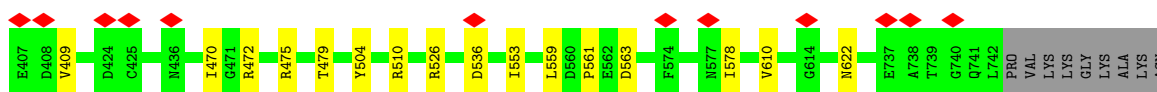
- Molecule 72: Ribosomal protein



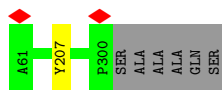
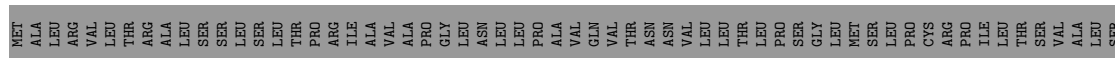
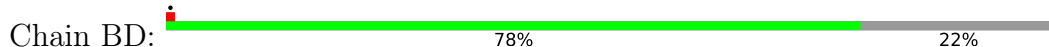
- Molecule 73: CP tRNAPhe



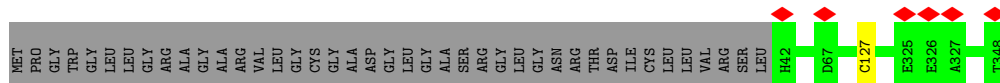
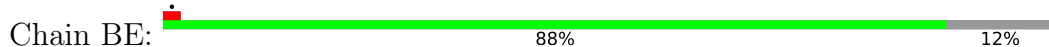
- Molecule 74: Elongation factor G, mitochondrial



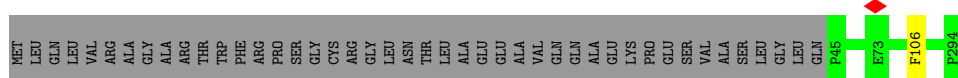
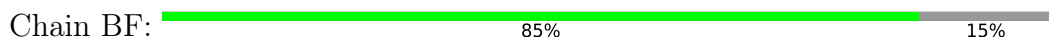
- Molecule 75: uL2m



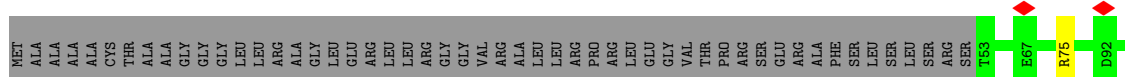
- Molecule 76: ICT1

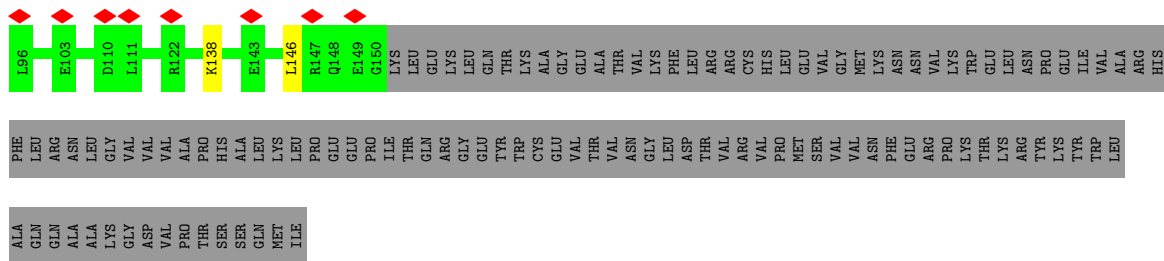


- Molecule 77: Mitochondrial ribosomal protein L4

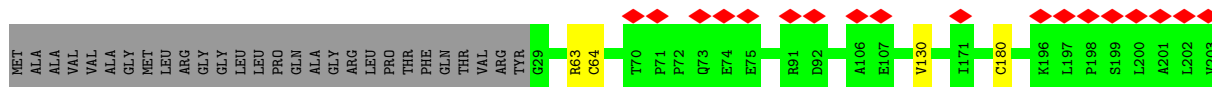
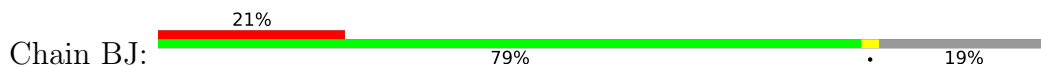


- Molecule 78: Mitochondrial ribosomal protein L9

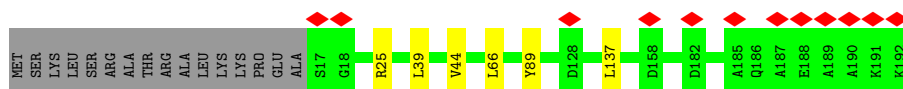
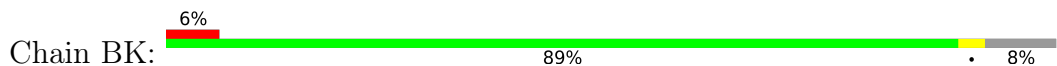




• Molecule 79: Mitochondrial ribosomal protein L10



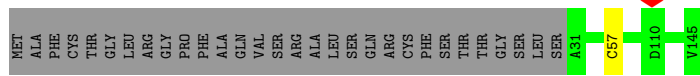
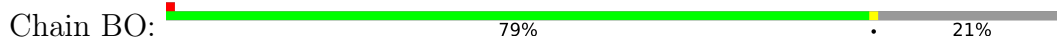
• Molecule 80: Mitochondrial ribosomal protein L11



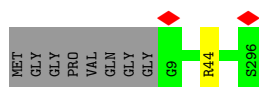
• Molecule 81: uL13m



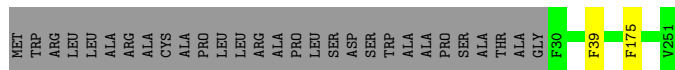
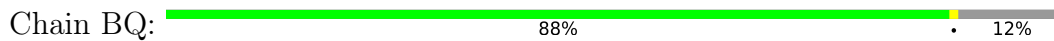
• Molecule 82: uL14m



• Molecule 83: uL15m



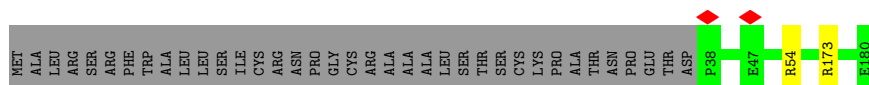
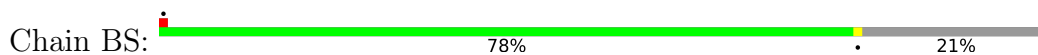
• Molecule 84: uL16m



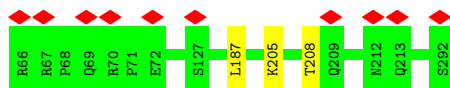
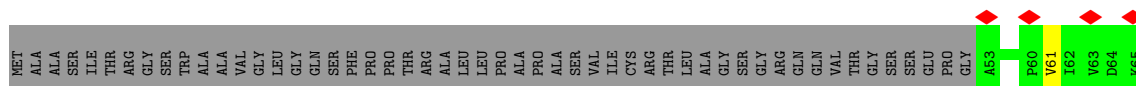
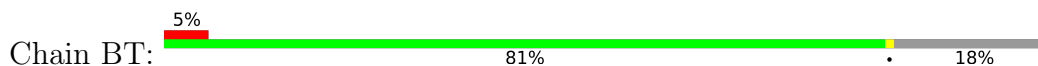
- Molecule 85: Uncharacterized protein



- Molecule 86: Mitochondrial ribosomal protein L18



- Molecule 87: Mitochondrial ribosomal protein L19



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	97764	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.676	Depositor
Minimum map value	-0.297	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.017	Depositor
Recommended contour level	0.045	Depositor
Map size (Å)	444.8, 444.8, 444.8	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.39, 1.39, 1.39	Depositor

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, MG, SPM, GNP, FME, GTP, 5GP

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	B0	0.26	0/880	0.41	0/1189
2	BU	0.24	0/1179	0.37	0/1578
3	BV	0.24	0/1256	0.43	0/1706
4	BW	0.26	0/1407	0.38	0/1891
5	BX	0.26	0/1211	0.41	0/1646
6	BY	0.24	0/1719	0.41	0/2329
7	Ba	0.25	0/3267	0.40	0/4455
8	Bb	0.25	0/3047	0.40	0/4139
9	Bc	0.25	0/2464	0.39	0/3330
10	Bd	0.24	0/1203	0.39	0/1622
11	Be	0.26	0/1000	0.42	0/1345
12	Bf	0.26	0/851	0.51	2/1159 (0.2%)
13	Bg	0.25	0/1191	0.43	0/1614
14	Bh	0.25	0/2372	0.39	0/3211
15	Bi	0.25	0/2199	0.41	0/2980
16	Bj	0.24	0/1811	0.43	0/2436
17	Bk	0.26	0/1270	0.43	0/1714
18	Bl	0.25	0/1135	0.41	0/1549
19	Bm	0.24	0/917	0.37	0/1248
20	Bn	0.24	0/860	0.38	0/1150
21	Bo	0.24	0/787	0.37	0/1056
22	Bp	0.24	0/752	0.44	0/1013
23	Bq	0.24	0/717	0.43	1/971 (0.1%)
24	Bt	0.24	0/798	0.38	0/1073
25	Bu	0.23	0/1214	0.42	1/1630 (0.1%)
26	Bv	0.24	0/1157	0.37	0/1560
27	Bw	0.25	0/3206	0.40	0/4354
28	B1	0.24	0/2093	0.38	0/2835
29	Bx	0.25	0/1364	0.41	0/1849
30	AA	0.20	0/22851	0.75	5/35576 (0.0%)
30	BA	0.25	0/36784	0.78	17/57270 (0.0%)
31	AB	0.26	0/1804	0.41	0/2445

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
32	AC	0.25	0/1105	0.43	0/1496
33	AE	0.25	0/2784	0.42	0/3732
34	AF	0.24	0/999	0.44	0/1347
35	AG	0.24	0/1763	0.38	0/2368
36	AI	0.25	0/2706	0.40	0/3632
37	AJ	0.25	0/1181	0.44	0/1597
38	AK	0.25	0/1027	0.45	0/1389
39	AL	0.25	0/858	0.41	0/1152
40	AN	0.22	0/874	0.38	0/1171
41	AO	0.25	0/1473	0.41	0/1970
42	AP	0.25	0/954	0.43	0/1284
43	AQ	0.24	0/894	0.43	0/1213
44	AR	0.25	0/802	0.42	0/1079
45	AU	0.23	0/745	0.37	0/993
46	AV	0.23	0/1673	0.89	3/2602 (0.1%)
47	AX	0.20	0/142	0.77	0/219
48	AZ	0.25	0/89	0.36	0/123
49	Aa	0.24	0/2428	0.41	0/3279
50	Ab	0.26	0/1126	0.39	0/1514
51	Ac	0.26	0/1399	0.43	0/1881
52	Ad	0.25	0/1490	0.39	0/2005
53	Ae	0.25	0/3171	0.45	1/4292 (0.0%)
54	Af	0.25	0/790	0.44	0/1064
55	B2	0.24	0/1586	0.37	0/2123
56	Ag	0.24	0/2945	0.43	0/3984
57	Ah	0.26	0/1045	0.43	0/1409
58	Ai	0.25	0/841	0.43	0/1121
59	Aj	0.23	0/1835	0.40	0/2484
60	Ak	0.25	0/2268	0.41	0/3069
61	Am	0.24	0/947	0.41	0/1268
62	An	0.24	0/650	0.38	0/858
63	Ao	0.25	0/4625	0.43	0/6267
64	Ap	0.24	0/1616	0.39	0/2195
65	CL	0.24	0/319	0.48	0/435
65	DL	0.25	0/212	0.49	0/286
65	EL	0.23	0/221	0.43	0/297
65	FL	0.23	0/212	0.45	0/286
65	GL	0.25	0/212	0.48	0/286
65	HL	0.23	0/204	0.48	0/275
65	LL	0.24	0/542	0.43	0/729
66	B3	0.24	0/993	0.41	0/1341
67	B4	0.22	0/481	0.47	1/653 (0.2%)
68	B5	0.25	0/917	0.39	0/1227

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
69	B6	0.24	0/430	0.42	0/570
70	B7	0.23	0/395	0.37	0/524
71	B8	0.24	0/853	0.38	0/1136
72	B9	0.25	0/342	0.40	0/450
73	BB	0.32	1/1595 (0.1%)	0.76	0/2475
74	BC	0.26	0/5522	0.45	0/7451
75	BD	0.25	0/1898	0.43	0/2555
76	BE	0.25	0/2493	0.43	0/3387
77	BF	0.24	0/2069	0.40	0/2816
78	BI	0.24	0/819	0.45	0/1101
79	BJ	0.24	0/1742	0.42	0/2358
80	BK	0.25	0/1359	0.40	0/1828
81	BN	0.25	0/1487	0.37	0/2017
82	BO	0.24	0/912	0.42	0/1231
83	BP	0.25	0/2368	0.40	0/3198
84	BQ	0.25	0/1850	0.41	0/2491
85	BR	0.24	0/1262	0.39	0/1700
86	BS	0.24	0/1197	0.43	0/1624
87	BT	0.26	0/2039	0.41	0/2754
All	All	0.24	1/188542 (0.0%)	0.57	31/267584 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
75	BD	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
73	BB	1	G	OP3-P	-10.59	1.48	1.61

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
46	AV	61	C	N3-C2-O2	-7.98	116.31	121.90
30	AA	119	C	C2-N1-C1'	7.76	127.34	118.80
30	BA	1527	U	C2-N1-C1'	7.13	126.26	117.70
46	AV	57	C	N3-C2-O2	-6.72	117.20	121.90
12	Bf	80	PRO	N-CA-CB	6.59	111.20	103.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
30	BA	1527	U	N1-C2-O2	6.49	127.34	122.80
53	Ae	342	PRO	N-CA-CB	6.43	111.02	103.30
12	Bf	78	PRO	N-CA-CB	6.42	111.01	103.30
25	Bu	167	PRO	N-CA-CB	6.41	110.99	103.30
30	BA	825	C	C2-N1-C1'	5.91	125.31	118.80
30	BA	1527	U	N3-C2-O2	-5.76	118.17	122.20
23	Bq	59	PRO	N-CA-CB	5.75	110.20	103.30
30	BA	848	C	C2-N1-C1'	5.72	125.10	118.80
30	AA	119	C	N1-C2-O2	5.72	122.33	118.90
46	AV	61	C	N1-C2-O2	5.71	122.33	118.90
30	BA	397	C	C2-N1-C1'	5.65	125.01	118.80
67	B4	87	PRO	N-CA-CB	5.62	110.05	103.30
30	BA	890	C	N1-C2-O2	5.54	122.22	118.90
30	AA	119	C	C6-N1-C1'	-5.50	114.20	120.80
30	BA	48	U	OP1-P-O3'	5.43	117.14	105.20
30	BA	890	C	C2-N1-C1'	5.35	124.68	118.80
30	BA	825	C	N1-C2-O2	5.26	122.05	118.90
30	BA	238	C	C2-N1-C1'	5.24	124.56	118.80
30	BA	397	C	N1-C2-O2	5.19	122.01	118.90
30	BA	48	U	P-O3'-C3'	5.15	125.88	119.70
30	AA	745	C	C2-N1-C1'	5.13	124.44	118.80
30	AA	745	C	N1-C2-O2	5.10	121.96	118.90
30	BA	64	C	C2-N1-C1'	5.07	124.38	118.80
30	BA	394	C	C2-N1-C1'	5.07	124.37	118.80
30	BA	238	C	N1-C2-O2	5.06	121.94	118.90
30	BA	1558	U	C2-N1-C1'	5.01	123.71	117.70

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
75	BD	207	TYR	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

5.3.1 Protein backbone

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	B0	108/148 (73%)	106 (98%)	2 (2%)	0	100	100
2	BU	138/149 (93%)	138 (100%)	0	0	100	100
3	BV	153/209 (73%)	150 (98%)	3 (2%)	0	100	100
4	BW	164/210 (78%)	159 (97%)	5 (3%)	0	100	100
5	BX	147/150 (98%)	143 (97%)	4 (3%)	0	100	100
6	BY	204/216 (94%)	197 (97%)	7 (3%)	0	100	100
7	Ba	391/423 (92%)	377 (96%)	14 (4%)	0	100	100
8	Bb	352/380 (93%)	330 (94%)	22 (6%)	0	100	100
9	Bc	293/334 (88%)	276 (94%)	17 (6%)	0	100	100
10	Bd	138/206 (67%)	134 (97%)	4 (3%)	0	100	100
11	Be	120/135 (89%)	115 (96%)	5 (4%)	0	100	100
12	Bf	106/142 (75%)	103 (97%)	1 (1%)	2 (2%)	6	31
13	Bg	146/159 (92%)	135 (92%)	11 (8%)	0	100	100
14	Bh	287/332 (86%)	272 (95%)	15 (5%)	0	100	100
15	Bi	258/306 (84%)	249 (96%)	9 (4%)	0	100	100
16	Bj	211/279 (76%)	204 (97%)	7 (3%)	0	100	100
17	Bk	151/269 (56%)	145 (96%)	6 (4%)	0	100	100
18	Bl	131/166 (79%)	128 (98%)	3 (2%)	0	100	100
19	Bm	107/198 (54%)	105 (98%)	2 (2%)	0	100	100
20	Bn	95/128 (74%)	91 (96%)	4 (4%)	0	100	100
21	Bo	95/124 (77%)	93 (98%)	2 (2%)	0	100	100
22	Bp	95/112 (85%)	91 (96%)	4 (4%)	0	100	100
23	Bq	83/138 (60%)	76 (92%)	7 (8%)	0	100	100
24	Bt	92/102 (90%)	88 (96%)	4 (4%)	0	100	100
25	Bu	147/205 (72%)	139 (95%)	7 (5%)	1 (1%)	19	54

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
26	Bv	133/222 (60%)	133 (100%)	0	0	100	100
27	Bw	385/433 (89%)	366 (95%)	19 (5%)	0	100	100
28	B1	242/256 (94%)	239 (99%)	3 (1%)	0	100	100
29	Bx	160/196 (82%)	152 (95%)	8 (5%)	0	100	100
31	AB	218/289 (75%)	205 (94%)	13 (6%)	0	100	100
32	AC	130/167 (78%)	123 (95%)	7 (5%)	0	100	100
33	AE	339/430 (79%)	325 (96%)	14 (4%)	0	100	100
34	AF	120/276 (44%)	115 (96%)	5 (4%)	0	100	100
35	AG	206/242 (85%)	203 (98%)	3 (2%)	0	100	100
36	AI	324/397 (82%)	311 (96%)	13 (4%)	0	100	100
37	AJ	138/200 (69%)	128 (93%)	10 (7%)	0	100	100
38	AK	135/196 (69%)	127 (94%)	8 (6%)	0	100	100
39	AL	107/139 (77%)	104 (97%)	3 (3%)	0	100	100
40	AN	99/128 (77%)	96 (97%)	3 (3%)	0	100	100
41	AO	173/239 (72%)	166 (96%)	7 (4%)	0	100	100
42	AP	115/135 (85%)	111 (96%)	4 (4%)	0	100	100
43	AQ	110/130 (85%)	110 (100%)	0	0	100	100
44	AR	95/143 (66%)	93 (98%)	2 (2%)	0	100	100
45	AU	84/87 (97%)	83 (99%)	1 (1%)	0	100	100
48	AZ	16/18 (89%)	16 (100%)	0	0	100	100
49	Aa	290/382 (76%)	285 (98%)	5 (2%)	0	100	100
50	Ab	133/190 (70%)	132 (99%)	1 (1%)	0	100	100
51	Ac	167/173 (96%)	166 (99%)	1 (1%)	0	100	100
52	Ad	175/205 (85%)	174 (99%)	1 (1%)	0	100	100
53	Ae	386/426 (91%)	363 (94%)	21 (5%)	2 (0%)	25	61
54	Af	97/188 (52%)	92 (95%)	5 (5%)	0	100	100
55	B2	177/252 (70%)	173 (98%)	4 (2%)	0	100	100
56	Ag	351/410 (86%)	339 (97%)	12 (3%)	0	100	100
57	Ah	118/387 (30%)	117 (99%)	1 (1%)	0	100	100
58	Ai	97/106 (92%)	95 (98%)	2 (2%)	0	100	100
59	Aj	211/218 (97%)	204 (97%)	7 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
60	Ak	273/325 (84%)	267 (98%)	6 (2%)	0	100	100
61	Am	114/118 (97%)	111 (97%)	3 (3%)	0	100	100
62	An	70/199 (35%)	68 (97%)	2 (3%)	0	100	100
63	Ao	564/699 (81%)	544 (96%)	20 (4%)	0	100	100
64	Ap	188/258 (73%)	183 (97%)	5 (3%)	0	100	100
65	CL	43/198 (22%)	41 (95%)	2 (5%)	0	100	100
65	DL	25/198 (13%)	25 (100%)	0	0	100	100
65	EL	26/198 (13%)	26 (100%)	0	0	100	100
65	FL	25/198 (13%)	25 (100%)	0	0	100	100
65	GL	25/198 (13%)	25 (100%)	0	0	100	100
65	HL	24/198 (12%)	24 (100%)	0	0	100	100
65	LL	68/198 (34%)	65 (96%)	3 (4%)	0	100	100
66	B3	116/161 (72%)	114 (98%)	2 (2%)	0	100	100
67	B4	60/126 (48%)	51 (85%)	9 (15%)	0	100	100
68	B5	108/188 (57%)	108 (100%)	0	0	100	100
69	B6	50/65 (77%)	50 (100%)	0	0	100	100
70	B7	44/95 (46%)	43 (98%)	1 (2%)	0	100	100
71	B8	93/188 (50%)	92 (99%)	1 (1%)	0	100	100
72	B9	36/100 (36%)	36 (100%)	0	0	100	100
74	BC	688/722 (95%)	628 (91%)	58 (8%)	2 (0%)	37	70
75	BD	238/306 (78%)	230 (97%)	8 (3%)	0	100	100
76	BE	305/348 (88%)	289 (95%)	16 (5%)	0	100	100
77	BF	248/294 (84%)	240 (97%)	8 (3%)	0	100	100
78	BI	96/268 (36%)	94 (98%)	2 (2%)	0	100	100
79	BJ	210/262 (80%)	200 (95%)	10 (5%)	0	100	100
80	BK	174/192 (91%)	165 (95%)	9 (5%)	0	100	100
81	BN	175/178 (98%)	173 (99%)	2 (1%)	0	100	100
82	BO	113/145 (78%)	112 (99%)	1 (1%)	0	100	100
83	BP	286/296 (97%)	276 (96%)	10 (4%)	0	100	100
84	BQ	220/251 (88%)	214 (97%)	6 (3%)	0	100	100
85	BR	151/169 (89%)	144 (95%)	7 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
86	BS	141/180 (78%)	132 (94%)	9 (6%)	0	100	100
87	BT	238/292 (82%)	229 (96%)	9 (4%)	0	100	100
All	All	14978/20291 (74%)	14414 (96%)	557 (4%)	7 (0%)	100	100

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
12	Bf	78	PRO
12	Bf	80	PRO
25	Bu	167	PRO
53	Ae	342	PRO
74	BC	153	CYS
74	BC	561	PRO
53	Ae	341	GLN

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	
1	B0	90/115 (78%)	89 (99%)	1 (1%)	70	87
2	BU	118/127 (93%)	117 (99%)	1 (1%)	79	90
3	BV	136/178 (76%)	136 (100%)	0	100	100
4	BW	144/180 (80%)	143 (99%)	1 (1%)	81	91
5	BX	116/134 (87%)	114 (98%)	2 (2%)	56	81
6	BY	185/192 (96%)	182 (98%)	3 (2%)	58	82
7	Ba	348/365 (95%)	345 (99%)	3 (1%)	75	89
8	Bb	310/328 (94%)	304 (98%)	6 (2%)	52	79
9	Bc	271/299 (91%)	269 (99%)	2 (1%)	81	91
10	Bd	129/181 (71%)	125 (97%)	4 (3%)	35	68
11	Be	100/108 (93%)	100 (100%)	0	100	100
12	Bf	80/133 (60%)	77 (96%)	3 (4%)	28	62

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
13	Bg	128/136 (94%)	127 (99%)	1 (1%)	79	90
14	Bh	251/284 (88%)	249 (99%)	2 (1%)	79	90
15	Bi	236/275 (86%)	235 (100%)	1 (0%)	89	95
16	Bj	190/242 (78%)	184 (97%)	6 (3%)	34	67
17	Bk	135/226 (60%)	132 (98%)	3 (2%)	47	76
18	Bl	122/147 (83%)	122 (100%)	0	100	100
19	Bm	103/178 (58%)	103 (100%)	0	100	100
20	Bn	88/113 (78%)	87 (99%)	1 (1%)	70	87
21	Bo	77/97 (79%)	77 (100%)	0	100	100
22	Bp	79/88 (90%)	77 (98%)	2 (2%)	42	73
23	Bq	70/114 (61%)	67 (96%)	3 (4%)	25	58
24	Bt	75/82 (92%)	74 (99%)	1 (1%)	65	85
25	Bu	126/177 (71%)	126 (100%)	0	100	100
26	Bv	115/183 (63%)	113 (98%)	2 (2%)	56	81
27	Bw	340/373 (91%)	335 (98%)	5 (2%)	60	83
28	B1	219/229 (96%)	219 (100%)	0	100	100
29	Bx	149/173 (86%)	146 (98%)	3 (2%)	50	78
31	AB	187/233 (80%)	186 (100%)	1 (0%)	86	94
32	AC	115/142 (81%)	114 (99%)	1 (1%)	75	89
33	AE	282/351 (80%)	281 (100%)	1 (0%)	89	95
34	AF	107/210 (51%)	107 (100%)	0	100	100
35	AG	181/205 (88%)	177 (98%)	4 (2%)	47	76
36	AI	273/333 (82%)	271 (99%)	2 (1%)	81	91
37	AJ	130/180 (72%)	129 (99%)	1 (1%)	79	90
38	AK	103/151 (68%)	103 (100%)	0	100	100
39	AL	92/116 (79%)	89 (97%)	3 (3%)	33	67
40	AN	92/114 (81%)	92 (100%)	0	100	100
41	AO	159/205 (78%)	158 (99%)	1 (1%)	84	93
42	AP	97/113 (86%)	96 (99%)	1 (1%)	73	88
43	AQ	97/114 (85%)	96 (99%)	1 (1%)	73	88
44	AR	89/127 (70%)	88 (99%)	1 (1%)	70	87

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
45	AU	77/78 (99%)	75 (97%)	2 (3%)	41	72
49	Aa	258/330 (78%)	251 (97%)	7 (3%)	40	71
50	Ab	113/162 (70%)	111 (98%)	2 (2%)	54	80
51	Ac	152/155 (98%)	150 (99%)	2 (1%)	65	85
52	Ad	149/168 (89%)	147 (99%)	2 (1%)	65	85
53	Ae	325/371 (88%)	323 (99%)	2 (1%)	84	93
54	Af	86/160 (54%)	85 (99%)	1 (1%)	67	86
55	B2	164/228 (72%)	163 (99%)	1 (1%)	84	93
56	Ag	312/361 (86%)	310 (99%)	2 (1%)	84	93
57	Ah	109/346 (32%)	106 (97%)	3 (3%)	38	70
58	Ai	86/93 (92%)	86 (100%)	0	100	100
59	Aj	188/190 (99%)	187 (100%)	1 (0%)	86	94
60	Ak	249/289 (86%)	245 (98%)	4 (2%)	58	82
61	Am	100/102 (98%)	98 (98%)	2 (2%)	50	78
62	An	66/174 (38%)	65 (98%)	1 (2%)	60	83
63	Ao	478/611 (78%)	475 (99%)	3 (1%)	84	93
64	Ap	170/225 (76%)	170 (100%)	0	100	100
65	CL	30/157 (19%)	30 (100%)	0	100	100
65	DL	26/157 (17%)	25 (96%)	1 (4%)	28	62
65	EL	27/157 (17%)	27 (100%)	0	100	100
65	FL	26/157 (17%)	26 (100%)	0	100	100
65	GL	26/157 (17%)	25 (96%)	1 (4%)	28	62
65	HL	25/157 (16%)	25 (100%)	0	100	100
65	LL	59/157 (38%)	58 (98%)	1 (2%)	56	81
66	B3	110/150 (73%)	109 (99%)	1 (1%)	75	89
67	B4	45/114 (40%)	45 (100%)	0	100	100
68	B5	99/163 (61%)	99 (100%)	0	100	100
69	B6	49/60 (82%)	49 (100%)	0	100	100
70	B7	41/78 (53%)	39 (95%)	2 (5%)	21	54
71	B8	87/162 (54%)	86 (99%)	1 (1%)	70	87
72	B9	36/77 (47%)	35 (97%)	1 (3%)	38	70

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
74	BC	589/609 (97%)	558 (95%)	31 (5%)	19	51
75	BD	193/248 (78%)	193 (100%)	0	100	100
76	BE	263/290 (91%)	262 (100%)	1 (0%)	89	95
77	BF	217/251 (86%)	216 (100%)	1 (0%)	86	94
78	BI	88/228 (39%)	85 (97%)	3 (3%)	32	66
79	BJ	192/230 (84%)	188 (98%)	4 (2%)	48	77
80	BK	138/151 (91%)	132 (96%)	6 (4%)	25	58
81	BN	156/157 (99%)	155 (99%)	1 (1%)	84	93
82	BO	99/123 (80%)	98 (99%)	1 (1%)	73	88
83	BP	245/249 (98%)	244 (100%)	1 (0%)	89	95
84	BQ	190/210 (90%)	188 (99%)	2 (1%)	70	87
85	BR	132/143 (92%)	130 (98%)	2 (2%)	60	83
86	BS	123/153 (80%)	121 (98%)	2 (2%)	58	82
87	BT	221/258 (86%)	217 (98%)	4 (2%)	54	80
All	All	13148/17297 (76%)	12973 (99%)	175 (1%)	64	85

All (175) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B0	88	CYS
2	BU	10	LEU
4	BW	184	ARG
5	BX	71	ARG
5	BX	148	PHE
6	BY	98	VAL
6	BY	105	ARG
6	BY	186	THR
7	Ba	56	GLU
7	Ba	193	LEU
7	Ba	256	PHE
8	Bb	51	TYR
8	Bb	52	ARG
8	Bb	104	LEU
8	Bb	136	ARG
8	Bb	298	PHE
8	Bb	356	ARG
9	Bc	140	TRP

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Mol	Chain	Res	Type
9	Bc	157	ASP
10	Bd	29	ARG
10	Bd	46	THR
10	Bd	106	LEU
10	Bd	152	THR
12	Bf	35	THR
12	Bf	45	CYS
12	Bf	60	CYS
13	Bg	119	PHE
14	Bh	140	PHE
14	Bh	267	LEU
15	Bi	240	ARG
16	Bj	47	LEU
16	Bj	51	LEU
16	Bj	59	VAL
16	Bj	84	TYR
16	Bj	195	LEU
16	Bj	273	ARG
17	Bk	84	THR
17	Bk	175	HIS
17	Bk	206	GLU
20	Bn	66	PHE
22	Bp	67	LEU
22	Bp	68	PHE
23	Bq	73	MET
23	Bq	77	ILE
23	Bq	86	LEU
24	Bt	82	PHE
26	Bv	28	ARG
26	Bv	55	ARG
27	Bw	89	MET
27	Bw	121	THR
27	Bw	131	LEU
27	Bw	198	ARG
27	Bw	329	TRP
29	Bx	84	GLU
29	Bx	92	PHE
29	Bx	167	HIS
31	AB	249	CYS
32	AC	113	ARG
33	AE	289	THR
35	AG	64	TYR

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Mol	Chain	Res	Type
35	AG	88	ASP
35	AG	139	ARG
35	AG	205	LEU
36	AI	86	ARG
36	AI	100	THR
37	AJ	94	PHE
39	AL	64	ARG
39	AL	74	ASN
39	AL	127	ARG
41	AO	173	GLU
42	AP	26	CYS
43	AQ	59	THR
44	AR	69	CYS
45	AU	38	ASP
45	AU	52	ARG
49	Aa	107	LEU
49	Aa	168	LYS
49	Aa	196	VAL
49	Aa	202	THR
49	Aa	214	MET
49	Aa	225	ARG
49	Aa	313	ARG
50	Ab	7	GLU
50	Ab	61	GLN
51	Ac	106	LEU
51	Ac	139	CYS
52	Ad	44	THR
52	Ad	137	GLU
53	Ae	90	LEU
53	Ae	132	LEU
54	Af	173	LEU
55	B2	92	LEU
56	Ag	236	THR
56	Ag	336	LEU
57	Ah	276	LYS
57	Ah	284	ARG
57	Ah	365	ILE
59	Aj	4	LYS
60	Ak	87	VAL
60	Ak	142	ASP
60	Ak	268	LEU
60	Ak	321	LEU

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Mol	Chain	Res	Type
61	Am	66	CYS
61	Am	96	LEU
62	An	163	ARG
63	Ao	293	ASP
63	Ao	489	PHE
63	Ao	645	CYS
65	DL	81	ASP
65	GL	66	GLN
65	LL	130	PHE
66	B3	86	ILE
70	B7	59	SER
70	B7	65	HIS
71	B8	148	VAL
72	B9	74	ARG
74	BC	43	ASN
74	BC	97	GLN
74	BC	126	ASP
74	BC	203	ILE
74	BC	205	MET
74	BC	219	GLU
74	BC	233	VAL
74	BC	237	GLU
74	BC	238	ILE
74	BC	268	PHE
74	BC	273	ILE
74	BC	290	ARG
74	BC	314	LEU
74	BC	325	ASN
74	BC	328	ILE
74	BC	406	MET
74	BC	409	VAL
74	BC	470	ILE
74	BC	472	ARG
74	BC	475	ARG
74	BC	479	THR
74	BC	504	TYR
74	BC	510	ARG
74	BC	526	ARG
74	BC	536	ASP
74	BC	553	ILE
74	BC	559	LEU
74	BC	563	ASP

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Mol	Chain	Res	Type
74	BC	578	ILE
74	BC	610	VAL
74	BC	622	ASN
76	BE	127	CYS
77	BF	106	PHE
78	BI	75	ARG
78	BI	138	LYS
78	BI	146	LEU
79	BJ	63	ARG
79	BJ	64	CYS
79	BJ	130	VAL
79	BJ	180	CYS
80	BK	25	ARG
80	BK	39	LEU
80	BK	44	VAL
80	BK	66	LEU
80	BK	89	TYR
80	BK	137	LEU
81	BN	67	PHE
82	BO	57	CYS
83	BP	44	ARG
84	BQ	39	PHE
84	BQ	175	PHE
85	BR	25	ARG
85	BR	153	LEU
86	BS	54	ARG
86	BS	173	ARG
87	BT	61	VAL
87	BT	187	LEU
87	BT	205	LYS
87	BT	208	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (239) such sidechains are listed below:

Mol	Chain	Res	Type
1	B0	41	ASN
2	BU	94	GLN
3	BV	88	ASN
3	BV	109	GLN
3	BV	122	ASN
3	BV	175	ASN
4	BW	73	HIS

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Mol	Chain	Res	Type
4	BW	113	GLN
4	BW	171	HIS
5	BX	135	HIS
6	BY	18	ASN
6	BY	84	ASN
6	BY	92	ASN
7	Ba	65	HIS
7	Ba	108	HIS
7	Ba	156	ASN
7	Ba	223	HIS
7	Ba	250	ASN
7	Ba	289	HIS
7	Ba	324	GLN
7	Ba	343	GLN
8	Bb	308	GLN
9	Bc	229	HIS
9	Bc	281	HIS
9	Bc	294	GLN
9	Bc	310	ASN
10	Bd	36	GLN
10	Bd	85	HIS
10	Bd	149	GLN
11	Be	127	GLN
11	Be	132	ASN
12	Bf	62	HIS
12	Bf	121	HIS
13	Bg	17	ASN
13	Bg	127	GLN
13	Bg	131	HIS
13	Bg	135	ASN
14	Bh	65	ASN
14	Bh	177	GLN
15	Bi	161	HIS
15	Bi	205	GLN
15	Bi	251	HIS
16	Bj	245	GLN
16	Bj	251	HIS
17	Bk	54	HIS
17	Bk	108	GLN
17	Bk	138	GLN
17	Bk	158	GLN
17	Bk	175	HIS

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Mol	Chain	Res	Type
17	Bk	177	ASN
19	Bm	96	HIS
20	Bn	69	HIS
20	Bn	122	ASN
21	Bo	31	GLN
21	Bo	69	GLN
22	Bp	15	GLN
22	Bp	35	GLN
22	Bp	72	HIS
23	Bq	71	HIS
24	Bt	33	GLN
24	Bt	34	ASN
24	Bt	85	HIS
25	Bu	95	ASN
25	Bu	145	ASN
25	Bu	162	GLN
26	Bv	134	ASN
26	Bv	157	GLN
27	Bw	65	GLN
27	Bw	201	HIS
27	Bw	337	GLN
27	Bw	376	GLN
27	Bw	381	ASN
27	Bw	385	ASN
27	Bw	402	ASN
27	Bw	414	GLN
28	B1	42	HIS
28	B1	89	HIS
28	B1	93	ASN
29	Bx	130	ASN
29	Bx	184	ASN
31	AB	119	GLN
31	AB	133	HIS
31	AB	147	HIS
31	AB	149	GLN
31	AB	200	ASN
32	AC	37	ASN
32	AC	75	ASN
32	AC	126	GLN
32	AC	154	HIS
33	AE	165	GLN
33	AE	292	HIS

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Mol	Chain	Res	Type
33	AE	317	HIS
33	AE	360	GLN
35	AG	72	GLN
35	AG	96	ASN
35	AG	122	GLN
35	AG	151	ASN
35	AG	196	HIS
35	AG	216	GLN
35	AG	227	HIS
35	AG	233	ASN
36	AI	163	HIS
36	AI	176	HIS
36	AI	221	GLN
36	AI	319	HIS
37	AJ	163	ASN
38	AK	73	ASN
38	AK	89	HIS
38	AK	121	ASN
38	AK	185	HIS
39	AL	35	GLN
39	AL	37	HIS
39	AL	74	ASN
39	AL	77	ASN
39	AL	100	HIS
40	AN	55	ASN
40	AN	60	ASN
40	AN	117	HIS
40	AN	124	GLN
41	AO	78	GLN
41	AO	114	ASN
41	AO	139	ASN
41	AO	147	HIS
41	AO	153	HIS
42	AP	28	ASN
42	AP	100	HIS
43	AQ	23	GLN
43	AQ	76	HIS
45	AU	3	ASN
45	AU	79	ASN
49	Aa	99	ASN
49	Aa	161	ASN
49	Aa	246	HIS

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Mol	Chain	Res	Type
49	Aa	348	HIS
49	Aa	369	GLN
50	Ab	66	HIS
51	Ac	33	ASN
51	Ac	51	ASN
51	Ac	56	GLN
51	Ac	59	ASN
51	Ac	63	GLN
51	Ac	95	ASN
52	Ad	62	GLN
52	Ad	65	GLN
52	Ad	109	ASN
53	Ae	127	HIS
53	Ae	140	ASN
53	Ae	155	GLN
53	Ae	162	GLN
53	Ae	174	GLN
53	Ae	196	ASN
53	Ae	228	HIS
53	Ae	301	GLN
54	Af	122	HIS
56	Ag	89	GLN
56	Ag	94	ASN
56	Ag	169	GLN
56	Ag	179	GLN
56	Ag	189	ASN
56	Ag	200	GLN
56	Ag	227	GLN
56	Ag	298	ASN
56	Ag	386	ASN
56	Ag	389	GLN
57	Ah	321	HIS
57	Ah	341	HIS
57	Ah	364	HIS
57	Ah	373	ASN
59	Aj	88	GLN
60	Ak	124	HIS
60	Ak	263	ASN
61	Am	90	GLN
61	Am	116	HIS
63	Ao	129	GLN
63	Ao	246	ASN

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Mol	Chain	Res	Type
63	Ao	501	GLN
63	Ao	606	ASN
64	Ap	114	HIS
64	Ap	181	HIS
65	CL	69	GLN
65	EL	83	ASN
65	GL	65	GLN
66	B3	67	HIS
68	B5	83	ASN
68	B5	96	ASN
69	B6	31	ASN
71	B8	118	HIS
71	B8	154	GLN
74	BC	154	GLN
74	BC	344	ASN
74	BC	349	ASN
74	BC	459	ASN
74	BC	542	GLN
74	BC	617	HIS
74	BC	661	GLN
74	BC	694	ASN
75	BD	183	HIS
75	BD	196	ASN
75	BD	250	ASN
75	BD	272	ASN
76	BE	69	ASN
76	BE	128	HIS
76	BE	154	HIS
76	BE	197	HIS
76	BE	281	ASN
77	BF	83	HIS
77	BF	97	HIS
77	BF	105	ASN
77	BF	138	HIS
77	BF	276	HIS
77	BF	277	ASN
78	BI	88	HIS
78	BI	121	ASN
79	BJ	41	HIS
79	BJ	119	HIS
79	BJ	193	ASN
80	BK	28	GLN

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Mol	Chain	Res	Type
80	BK	48	GLN
80	BK	133	GLN
81	BN	48	HIS
81	BN	74	GLN
81	BN	80	HIS
81	BN	97	GLN
81	BN	140	ASN
82	BO	89	HIS
83	BP	71	GLN
83	BP	87	HIS
83	BP	153	ASN
84	BQ	98	HIS
84	BQ	181	HIS
84	BQ	202	GLN
84	BQ	210	GLN
85	BR	101	ASN
85	BR	112	ASN
85	BR	142	ASN
85	BR	148	GLN
86	BS	142	ASN
87	BT	172	GLN
87	BT	219	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
30	AA	958/16770 (5%)	168 (17%)	0
30	BA	1542/16770 (9%)	399 (25%)	2 (0%)
46	AV	70/71 (98%)	20 (28%)	0
47	AX	5/6 (83%)	1 (20%)	1 (20%)
73	BB	64/73 (87%)	15 (23%)	0
All	All	2639/33690 (7%)	603 (22%)	3 (0%)

All (603) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
30	AA	5	A
30	AA	10	U
30	AA	18	G
30	AA	27	U
30	AA	34	U

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Mol	Chain	Res	Type
30	AA	41	A
30	AA	42	A
30	AA	43	U
30	AA	54	A
30	AA	55	G
30	AA	58	U
30	AA	65	C
30	AA	67	C
30	AA	75	A
30	AA	81	U
30	AA	83	C
30	AA	98	A
30	AA	115	A
30	AA	120	A
30	AA	127	A
30	AA	147	G
30	AA	152	A
30	AA	161	C
30	AA	164	C
30	AA	165	G
30	AA	170	A
30	AA	171	C
30	AA	173	G
30	AA	175	A
30	AA	186	U
30	AA	191	C
30	AA	212	A
30	AA	216	A
30	AA	222	A
30	AA	223	U
30	AA	224	U
30	AA	231	G
30	AA	235	A
30	AA	238	C
30	AA	244	C
30	AA	247	G
30	AA	253	G
30	AA	256	G
30	AA	258	C
30	AA	259	A
30	AA	273	A
30	AA	281	G

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Mol	Chain	Res	Type
30	AA	287	C
30	AA	288	G
30	AA	294	A
30	AA	296	G
30	AA	297	A
30	AA	308	A
30	AA	309	A
30	AA	310	A
30	AA	314	A
30	AA	315	U
30	AA	316	C
30	AA	317	A
30	AA	320	A
30	AA	328	A
30	AA	337	C
30	AA	345	U
30	AA	354	C
30	AA	355	U
30	AA	362	A
30	AA	368	A
30	AA	372	C
30	AA	381	G
30	AA	395	C
30	AA	399	A
30	AA	407	U
30	AA	417	C
30	AA	421	A
30	AA	433	U
30	AA	455	A
30	AA	457	C
30	AA	458	C
30	AA	461	A
30	AA	464	A
30	AA	471	U
30	AA	472	A
30	AA	477	A
30	AA	479	C
30	AA	498	U
30	AA	502	A
30	AA	503	A
30	AA	518	A
30	AA	531	U

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Mol	Chain	Res	Type
30	AA	538	C
30	AA	540	U
30	AA	561	U
30	AA	566	U
30	AA	571	A
30	AA	574	C
30	AA	576	C
30	AA	578	G
30	AA	589	C
30	AA	593	C
30	AA	596	U
30	AA	597	U
30	AA	604	U
30	AA	616	C
30	AA	618	G
30	AA	619	C
30	AA	620	C
30	AA	625	U
30	AA	633	C
30	AA	639	A
30	AA	644	A
30	AA	645	A
30	AA	646	C
30	AA	649	U
30	AA	665	A
30	AA	681	A
30	AA	682	G
30	AA	685	C
30	AA	698	A
30	AA	699	U
30	AA	707	A
30	AA	708	A
30	AA	709	A
30	AA	711	A
30	AA	720	A
30	AA	722	A
30	AA	731	A
30	AA	732	U
30	AA	739	A
30	AA	743	A
30	AA	754	G
30	AA	775	A

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Mol	Chain	Res	Type
30	AA	790	A
30	AA	791	G
30	AA	802	A
30	AA	803	U
30	AA	808	U
30	AA	823	G
30	AA	825	C
30	AA	838	A
30	AA	841	C
30	AA	842	A
30	AA	863	G
30	AA	865	A
30	AA	869	A
30	AA	876	A
30	AA	877	A
30	AA	883	C
30	AA	885	U
30	AA	886	A
30	AA	893	A
30	AA	894	U
30	AA	899	C
30	AA	902	C
30	AA	910	G
30	AA	918	A
30	AA	923	G
30	AA	925	A
30	AA	928	A
30	AA	930	G
30	AA	932	U
30	AA	934	A
30	AA	943	G
30	AA	945	A
30	AA	946	A
30	AA	955	G
30	AA	956	G
30	AA	959	U
30	AA	960	A
46	AV	6	G
46	AV	9	C
46	AV	14	A
46	AV	16	A
46	AV	17	U

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Mol	Chain	Res	Type
46	AV	18	A
46	AV	43	A
46	AV	44	U
46	AV	45	G
46	AV	50	U
46	AV	53	U
46	AV	54	A
46	AV	55	C
46	AV	56	C
46	AV	58	U
46	AV	62	C
46	AV	63	G
46	AV	64	U
46	AV	65	A
46	AV	70	C
47	AX	3	G
30	BA	4	A
30	BA	7	G
30	BA	11	G
30	BA	15	A
30	BA	19	U
30	BA	20	A
30	BA	21	C
30	BA	22	U
30	BA	26	C
30	BA	27	A
30	BA	31	A
30	BA	32	C
30	BA	36	A
30	BA	37	A
30	BA	40	C
30	BA	42	C
30	BA	43	C
30	BA	44	A
30	BA	45	A
30	BA	46	A
30	BA	49	A
30	BA	56	A
30	BA	57	A
30	BA	59	A
30	BA	60	U
30	BA	63	A

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Mol	Chain	Res	Type
30	BA	66	U
30	BA	67	A
30	BA	68	A
30	BA	82	G
30	BA	83	A
30	BA	96	U
30	BA	97	A
30	BA	104	C
30	BA	105	G
30	BA	109	U
30	BA	115	U
30	BA	118	U
30	BA	119	A
30	BA	129	A
30	BA	132	G
30	BA	139	G
30	BA	140	A
30	BA	141	A
30	BA	142	U
30	BA	143	A
30	BA	146	A
30	BA	147	U
30	BA	149	A
30	BA	163	C
30	BA	164	A
30	BA	168	A
30	BA	172	C
30	BA	173	C
30	BA	178	C
30	BA	180	A
30	BA	182	C
30	BA	188	C
30	BA	190	U
30	BA	192	A
30	BA	205	A
30	BA	218	A
30	BA	219	A
30	BA	222	G
30	BA	223	A
30	BA	225	C
30	BA	228	U
30	BA	229	A

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Mol	Chain	Res	Type
30	BA	230	G
30	BA	231	C
30	BA	237	A
30	BA	238	C
30	BA	239	C
30	BA	243	A
30	BA	245	A
30	BA	254	G
30	BA	263	G
30	BA	265	G
30	BA	271	U
30	BA	272	A
30	BA	273	A
30	BA	275	A
30	BA	277	A
30	BA	295	G
30	BA	309	A
30	BA	311	A
30	BA	313	U
30	BA	322	G
30	BA	324	G
30	BA	329	A
30	BA	330	A
30	BA	331	A
30	BA	337	A
30	BA	338	C
30	BA	340	A
30	BA	351	A
30	BA	352	G
30	BA	359	G
30	BA	366	A
30	BA	368	A
30	BA	369	G
30	BA	371	A
30	BA	373	U
30	BA	374	U
30	BA	376	A
30	BA	389	A
30	BA	390	A
30	BA	393	A
30	BA	394	C
30	BA	398	A

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Mol	Chain	Res	Type
30	BA	409	A
30	BA	414	A
30	BA	423	U
30	BA	427	G
30	BA	428	A
30	BA	433	G
30	BA	446	C
30	BA	447	A
30	BA	448	G
30	BA	449	C
30	BA	459	A
30	BA	460	C
30	BA	467	A
30	BA	468	A
30	BA	472	U
30	BA	473	G
30	BA	474	A
30	BA	479	A
30	BA	480	G
30	BA	490	U
30	BA	491	U
30	BA	492	A
30	BA	493	A
30	BA	494	U
30	BA	497	U
30	BA	498	A
30	BA	499	C
30	BA	500	C
30	BA	501	A
30	BA	503	A
30	BA	504	G
30	BA	505	U
30	BA	514	A
30	BA	515	A
30	BA	516	G
30	BA	517	C
30	BA	518	A
30	BA	530	A
30	BA	532	A
30	BA	533	A
30	BA	545	U
30	BA	547	A

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Mol	Chain	Res	Type
30	BA	548	A
30	BA	549	C
30	BA	550	A
30	BA	551	A
30	BA	553	U
30	BA	554	U
30	BA	557	C
30	BA	560	A
30	BA	561	C
30	BA	562	A
30	BA	563	U
30	BA	570	A
30	BA	573	A
30	BA	574	A
30	BA	576	U
30	BA	578	A
30	BA	579	U
30	BA	584	A
30	BA	586	C
30	BA	592	G
30	BA	593	C
30	BA	595	C
30	BA	596	A
30	BA	618	A
30	BA	625	A
30	BA	631	A
30	BA	634	G
30	BA	640	A
30	BA	665	C
30	BA	673	C
30	BA	674	U
30	BA	675	U
30	BA	683	U
30	BA	684	A
30	BA	689	A
30	BA	694	A
30	BA	695	U
30	BA	697	C
30	BA	704	U
30	BA	707	A
30	BA	712	C
30	BA	713	A

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Mol	Chain	Res	Type
30	BA	719	C
30	BA	720	C
30	BA	722	A
30	BA	723	A
30	BA	724	A
30	BA	725	C
30	BA	727	A
30	BA	728	C
30	BA	744	A
30	BA	745	A
30	BA	746	U
30	BA	748	A
30	BA	763	C
30	BA	764	A
30	BA	774	A
30	BA	777	A
30	BA	778	A
30	BA	780	G
30	BA	782	A
30	BA	783	A
30	BA	784	G
30	BA	809	G
30	BA	825	C
30	BA	834	C
30	BA	835	A
30	BA	838	A
30	BA	847	U
30	BA	848	C
30	BA	852	C
30	BA	853	A
30	BA	854	U
30	BA	859	A
30	BA	864	U
30	BA	872	A
30	BA	883	G
30	BA	889	C
30	BA	892	G
30	BA	894	U
30	BA	895	U
30	BA	896	A
30	BA	897	A
30	BA	899	G

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Mol	Chain	Res	Type
30	BA	900	G
30	BA	902	C
30	BA	908	A
30	BA	909	U
30	BA	910	U
30	BA	922	A
30	BA	923	A
30	BA	924	G
30	BA	925	G
30	BA	931	U
30	BA	932	A
30	BA	933	A
30	BA	935	C
30	BA	938	U
30	BA	939	U
30	BA	948	A
30	BA	950	U
30	BA	958	U
30	BA	959	G
30	BA	960	U
30	BA	961	A
30	BA	962	U
30	BA	964	A
30	BA	965	A
30	BA	967	G
30	BA	970	C
30	BA	977	G
30	BA	983	U
30	BA	986	U
30	BA	992	U
30	BA	1015	C
30	BA	1016	C
30	BA	1018	U
30	BA	1026	A
30	BA	1027	G
30	BA	1028	A
30	BA	1038	A
30	BA	1041	A
30	BA	1045	U
30	BA	1050	C
30	BA	1051	G
30	BA	1055	A

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Mol	Chain	Res	Type
30	BA	1056	G
30	BA	1057	A
30	BA	1063	U
30	BA	1064	G
30	BA	1071	U
30	BA	1072	A
30	BA	1074	U
30	BA	1075	U
30	BA	1081	U
30	BA	1089	G
30	BA	1091	U
30	BA	1092	A
30	BA	1093	A
30	BA	1127	A
30	BA	1129	C
30	BA	1138	G
30	BA	1140	A
30	BA	1146	G
30	BA	1167	C
30	BA	1168	A
30	BA	1169	A
30	BA	1180	G
30	BA	1183	U
30	BA	1188	U
30	BA	1194	U
30	BA	1195	A
30	BA	1206	U
30	BA	1207	C
30	BA	1217	A
30	BA	1218	U
30	BA	1219	A
30	BA	1220	A
30	BA	1221	C
30	BA	1222	A
30	BA	1226	C
30	BA	1231	U
30	BA	1233	A
30	BA	1238	A
30	BA	1239	A
30	BA	1240	A
30	BA	1241	U
30	BA	1242	U

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Mol	Chain	Res	Type
30	BA	1246	A
30	BA	1247	U
30	BA	1249	A
30	BA	1253	G
30	BA	1254	A
30	BA	1255	A
30	BA	1258	A
30	BA	1264	C
30	BA	1271	A
30	BA	1287	G
30	BA	1288	U
30	BA	1291	U
30	BA	1294	A
30	BA	1298	C
30	BA	1299	C
30	BA	1314	U
30	BA	1323	U
30	BA	1325	G
30	BA	1326	A
30	BA	1328	G
30	BA	1332	G
30	BA	1341	A
30	BA	1342	C
30	BA	1352	G
30	BA	1358	G
30	BA	1385	U
30	BA	1386	U
30	BA	1387	A
30	BA	1388	A
30	BA	1389	A
30	BA	1390	G
30	BA	1396	C
30	BA	1420	A
30	BA	1425	A
30	BA	1426	G
30	BA	1429	C
30	BA	1432	U
30	BA	1433	U
30	BA	1436	U
30	BA	1438	U
30	BA	1445	U
30	BA	1448	A

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Mol	Chain	Res	Type
30	BA	1453	U
30	BA	1455	C
30	BA	1457	A
30	BA	1465	A
30	BA	1468	A
30	BA	1473	A
30	BA	1474	G
30	BA	1485	A
30	BA	1492	C
30	BA	1493	A
30	BA	1494	A
30	BA	1498	C
30	BA	1504	A
30	BA	1505	G
30	BA	1509	U
30	BA	1514	A
30	BA	1518	A
30	BA	1521	U
30	BA	1522	A
30	BA	1526	U
30	BA	1527	U
30	BA	1528	A
30	BA	1529	A
30	BA	1531	C
30	BA	1532	U
30	BA	1533	A
30	BA	1536	U
30	BA	1548	A
30	BA	1549	A
30	BA	1551	C
30	BA	1552	C
30	BA	1553	A
30	BA	1554	G
30	BA	1558	U
30	BA	1559	A
30	BA	1569	A
30	BA	1571	A
73	BB	3	U
73	BB	5	A
73	BB	8	U
73	BB	9	A
73	BB	13	U

Continued on next page...

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Mol	Chain	Res	Type
73	BB	21	C
73	BB	23	A
73	BB	29	G
73	BB	34	U
73	BB	43	C
73	BB	44	U
73	BB	46	G
73	BB	47	A
73	BB	48	U
73	BB	69	C

All (3) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
47	AX	2	U
30	BA	48	U
30	BA	1297	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 340 ligands modelled in this entry, 332 are monoatomic - leaving 8 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
93	5GP	BA	15906	-	22,26,26	1.25	2 (9%)	26,40,40	1.29	4 (15%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
92	GTP	Ag	500	88	26,34,34	1.13	2 (7%)	32,54,54	1.63	7 (21%)
90	SPM	AA	16801	-	13,13,13	0.31	0	12,12,12	0.80	0
90	SPM	BA	15909	-	13,13,13	0.34	0	12,12,12	0.75	0
91	FME	AV	101	46	8,9,10	0.96	0	7,9,11	0.89	0
90	SPM	BA	15908	-	13,13,13	0.30	0	12,12,12	0.80	0
94	GNP	BC	1000	88	29,34,34	1.58	7 (24%)	33,54,54	2.13	6 (18%)
93	5GP	BA	15907	88	22,26,26	1.25	2 (9%)	26,40,40	1.25	4 (15%)

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
93	5GP	BA	15906	-	-	1/6/26/26	0/3/3/3
92	GTP	Ag	500	88	-	1/18/38/38	0/3/3/3
90	SPM	AA	16801	-	-	5/11/11/11	-
90	SPM	BA	15909	-	-	4/11/11/11	-
91	FME	AV	101	46	-	3/7/9/11	-
90	SPM	BA	15908	-	-	3/11/11/11	-
94	GNP	BC	1000	88	-	2/14/38/38	0/3/3/3
93	5GP	BA	15907	88	-	1/6/26/26	0/3/3/3

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
94	BC	1000	GNP	PB-O3A	4.30	1.64	1.59
93	BA	15907	5GP	C5-C6	-4.10	1.39	1.47
93	BA	15906	5GP	C5-C6	-4.06	1.39	1.47
92	Ag	500	GTP	C5-C6	-4.06	1.39	1.47
94	BC	1000	GNP	C6-N1	3.11	1.38	1.33
94	BC	1000	GNP	PB-O1B	3.02	1.50	1.46
94	BC	1000	GNP	PG-N3B	2.91	1.71	1.63
93	BA	15906	5GP	C6-N1	-2.62	1.34	1.37
94	BC	1000	GNP	PG-O1G	2.59	1.50	1.46
93	BA	15907	5GP	C6-N1	-2.54	1.34	1.37
94	BC	1000	GNP	PB-O2B	-2.17	1.50	1.56
92	Ag	500	GTP	C2-N3	2.15	1.38	1.33
94	BC	1000	GNP	C5-C6	2.07	1.44	1.41

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
94	BC	1000	GNP	C5-C6-N1	-8.44	111.89	123.43
94	BC	1000	GNP	C2-N1-C6	5.80	125.14	115.93
92	Ag	500	GTP	PA-O3A-PB	-3.95	119.28	132.83
92	Ag	500	GTP	PB-O3B-PG	-3.62	120.41	132.83
92	Ag	500	GTP	C5-C6-N1	3.28	119.74	113.95
93	BA	15906	5GP	C5-C6-N1	3.27	119.72	113.95
93	BA	15907	5GP	C5-C6-N1	3.16	119.53	113.95
92	Ag	500	GTP	C3'-C2'-C1'	3.15	105.73	100.98
92	Ag	500	GTP	C8-N7-C5	3.06	108.83	102.99
92	Ag	500	GTP	C2-N1-C6	-2.94	119.68	125.10
94	BC	1000	GNP	PB-O3A-PA	-2.81	122.74	132.62
94	BC	1000	GNP	N3-C2-N1	-2.74	123.57	127.22
94	BC	1000	GNP	C4-C5-C6	-2.52	118.39	120.80
93	BA	15906	5GP	C2-N1-C6	-2.47	120.55	125.10
93	BA	15906	5GP	C8-N7-C5	2.39	107.55	102.99
93	BA	15907	5GP	C8-N7-C5	2.38	107.53	102.99
93	BA	15907	5GP	C2-N1-C6	-2.27	120.91	125.10
94	BC	1000	GNP	C2-N3-C4	-2.18	112.86	115.36
93	BA	15907	5GP	O6-C6-C5	-2.15	120.17	124.37
92	Ag	500	GTP	O6-C6-C5	-2.14	120.20	124.37
93	BA	15906	5GP	O6-C6-C5	-2.10	120.27	124.37

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
91	AV	101	FME	C-CA-CB-CG
94	BC	1000	GNP	PG-N3B-PB-O1B
94	BC	1000	GNP	PG-N3B-PB-O3A
90	BA	15908	SPM	C7-C8-C9-N10
91	AV	101	FME	N-CA-CB-CG
90	BA	15909	SPM	C7-C8-C9-N10
91	AV	101	FME	CB-CG-SD-CE
90	BA	15909	SPM	N1-C2-C3-C4
90	BA	15909	SPM	N5-C6-C7-C8
90	AA	16801	SPM	N10-C11-C12-C13
90	AA	16801	SPM	C6-C7-C8-C9
90	AA	16801	SPM	C7-C8-C9-N10
90	BA	15908	SPM	C6-C7-C8-C9
93	BA	15907	5GP	C5'-O5'-P-O3P
90	AA	16801	SPM	C8-C9-N10-C11

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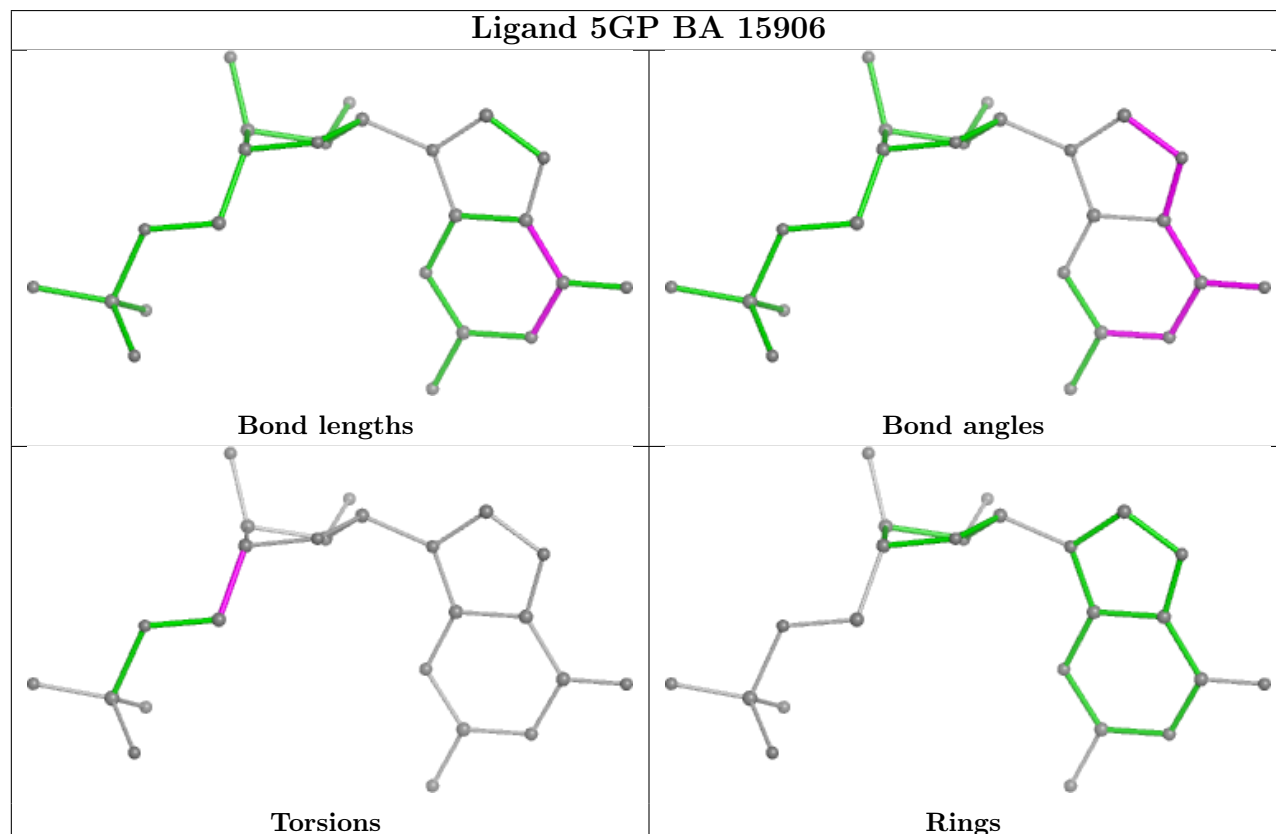
Continued from previous page...

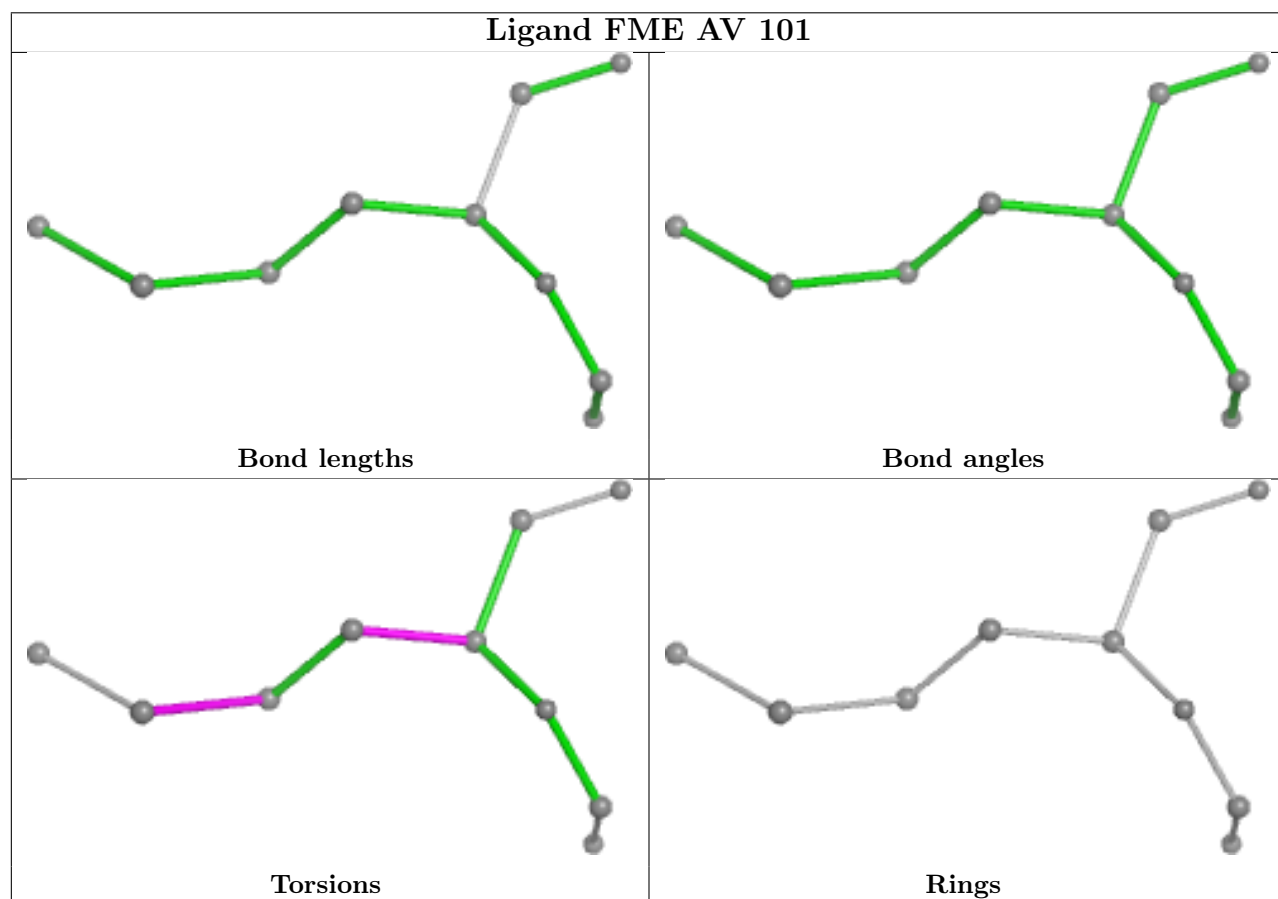
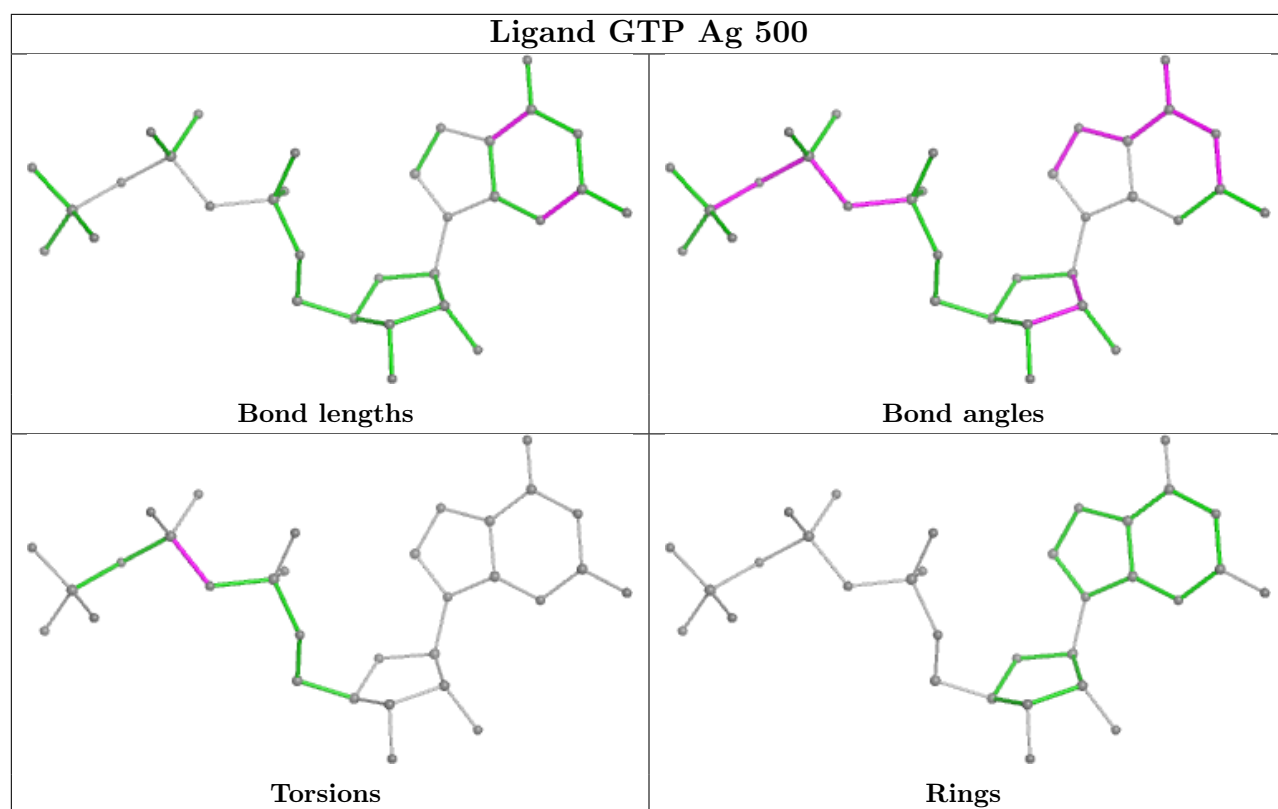
Mol	Chain	Res	Type	Atoms
92	Ag	500	GTP	PA-O3A-PB-O2B
90	AA	16801	SPM	C7-C6-N5-C4
90	BA	15908	SPM	C3-C4-N5-C6
90	BA	15909	SPM	C7-C6-N5-C4
93	BA	15906	5GP	O4'-C4'-C5'-O5'

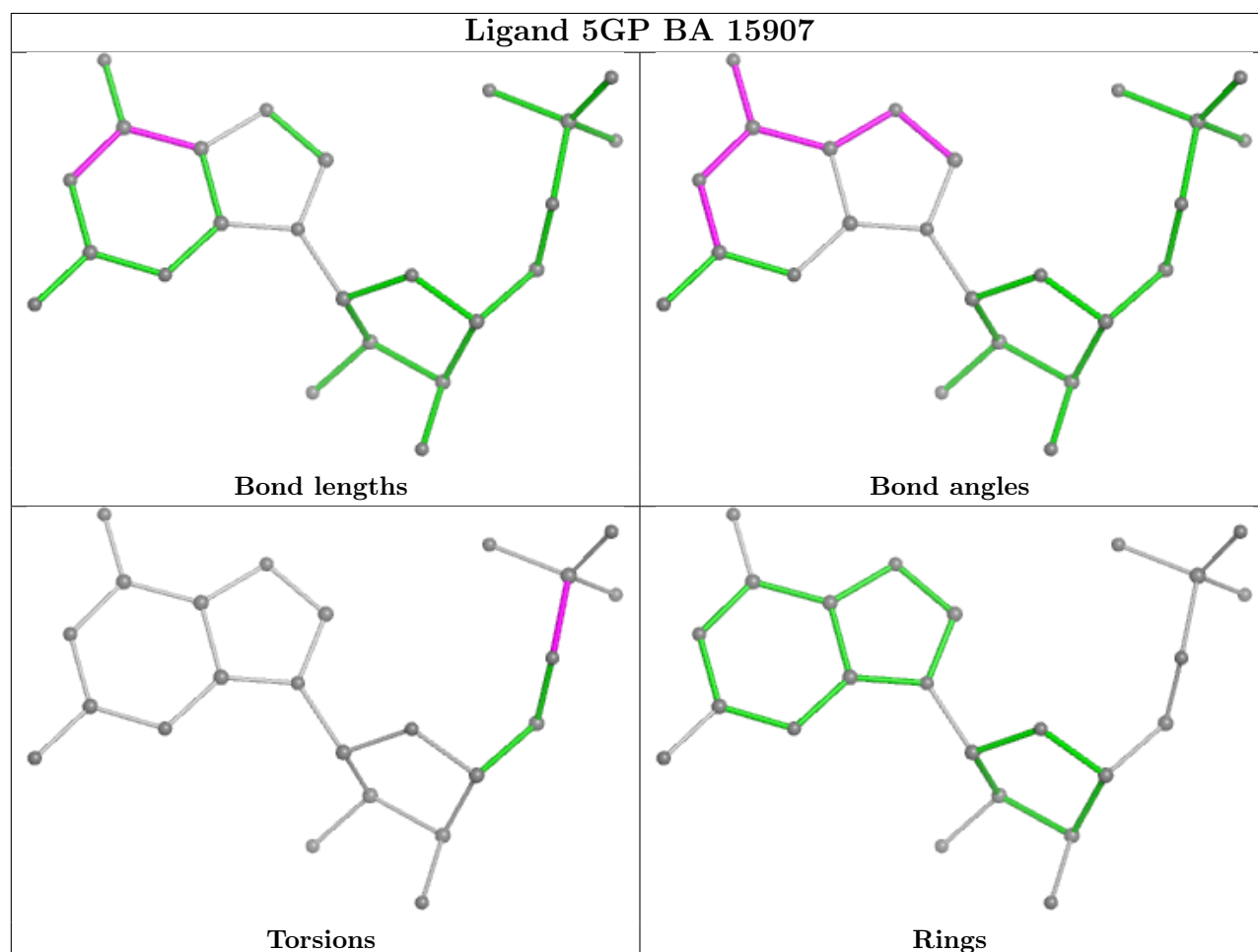
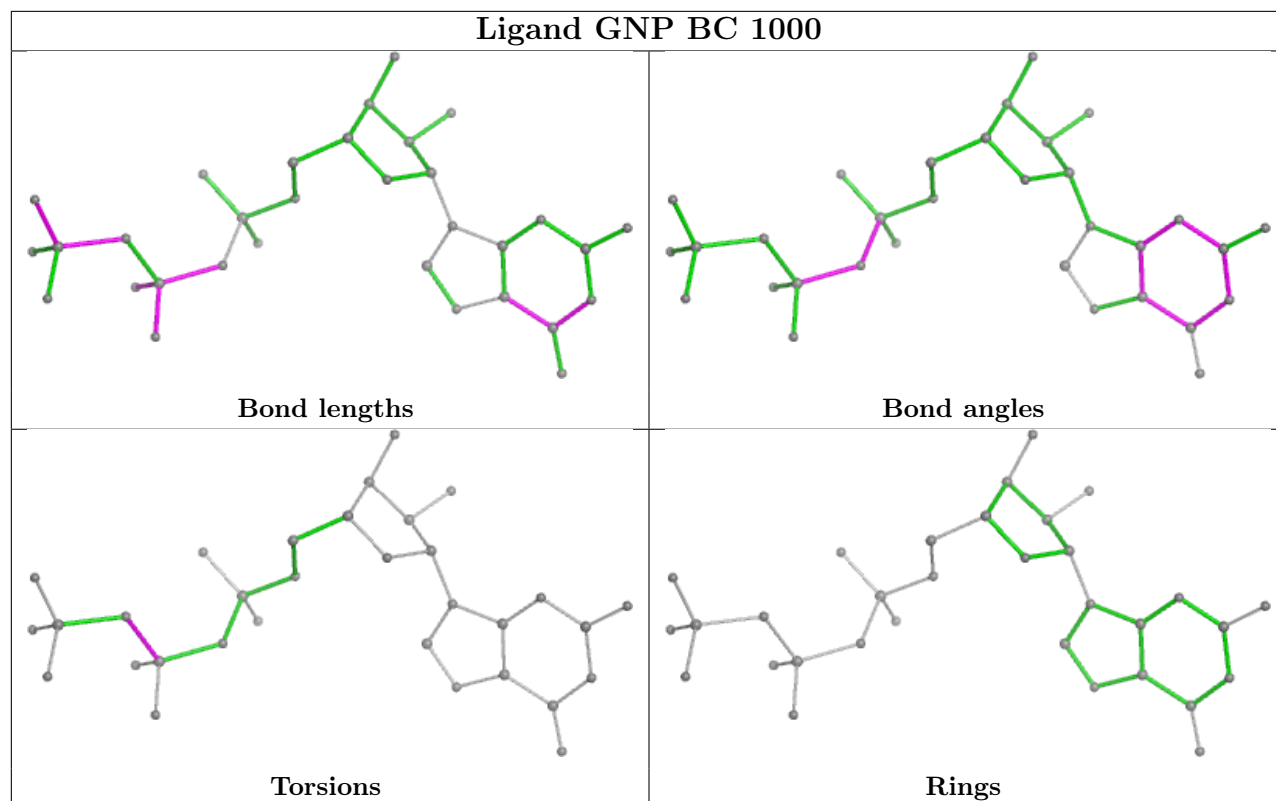
There are no ring outliers.

No monomer is involved in short contacts.

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







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
63	Ao	1
30	AA	1
33	AE	1
36	AI	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	Ao	234:VAL	C	240:THR	N	8.13
1	AA	532:G	O3'	533:C	P	4.55
1	AE	188:LYS	C	189:ARG	N	3.53
1	AI	249:ILE	C	250:PRO	N	3.18

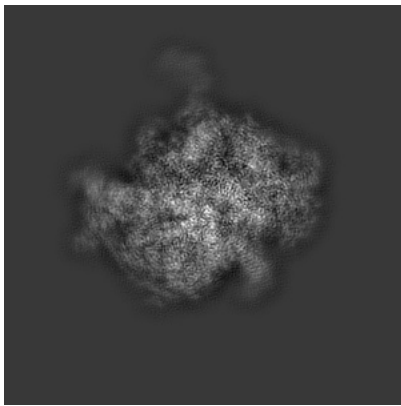
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-10778. These allow visual inspection of the internal detail of the map and identification of artifacts.

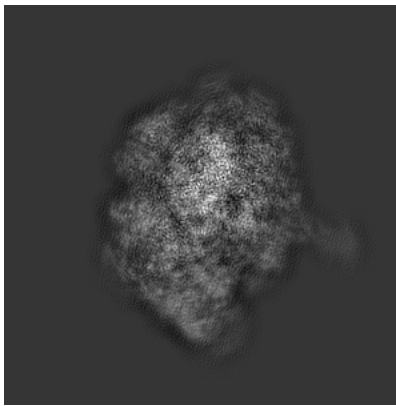
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

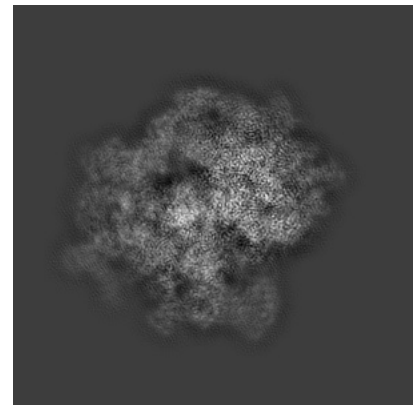
6.1.1 Primary map



X

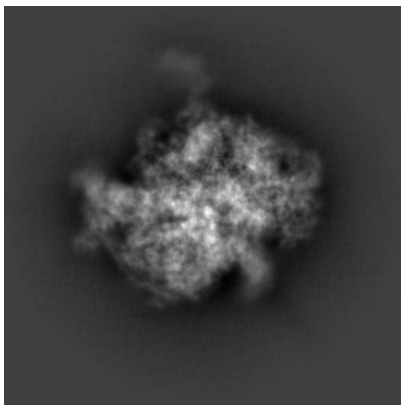


Y

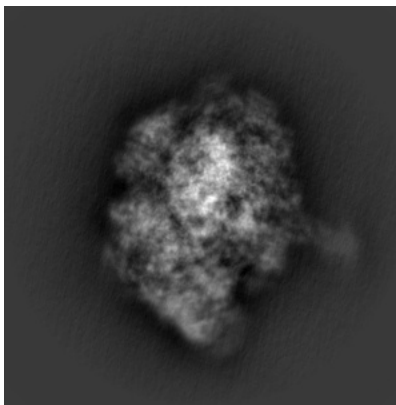


Z

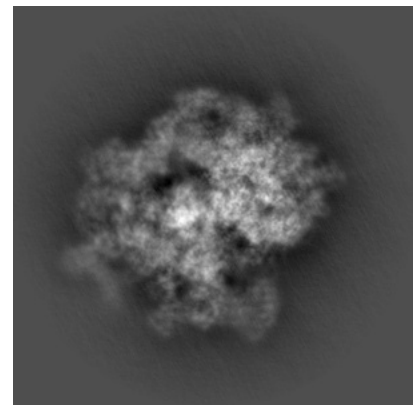
6.1.2 Raw map



X



Y

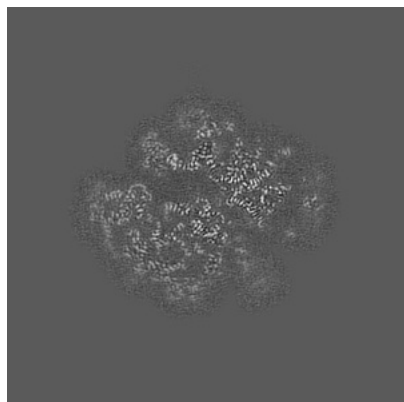


Z

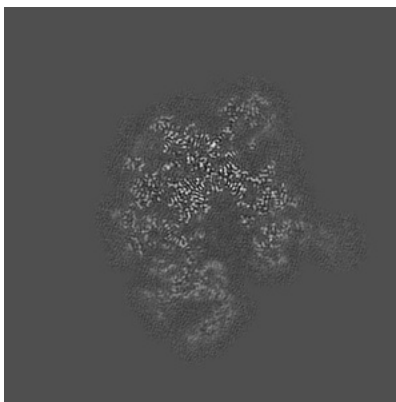
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

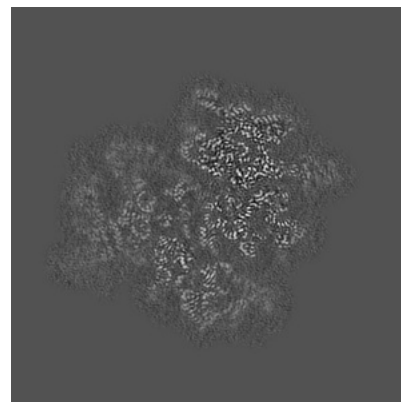
6.2.1 Primary map



X Index: 160

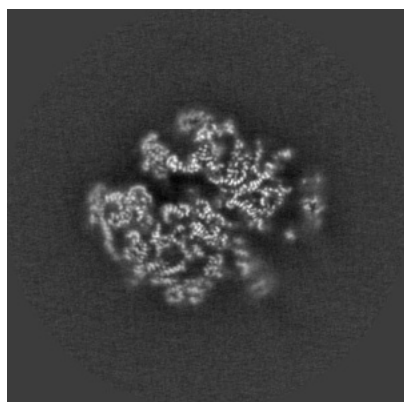


Y Index: 160

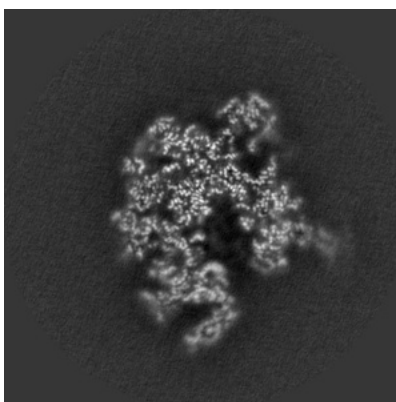


Z Index: 160

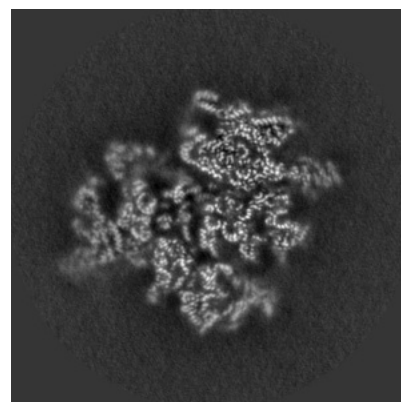
6.2.2 Raw map



X Index: 160



Y Index: 160

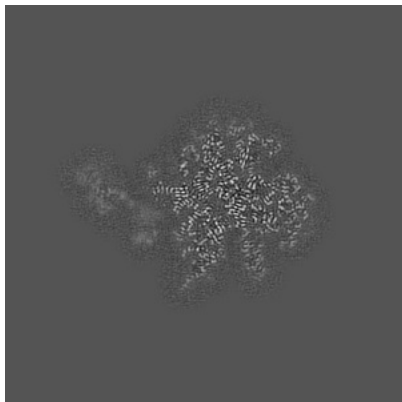


Z Index: 160

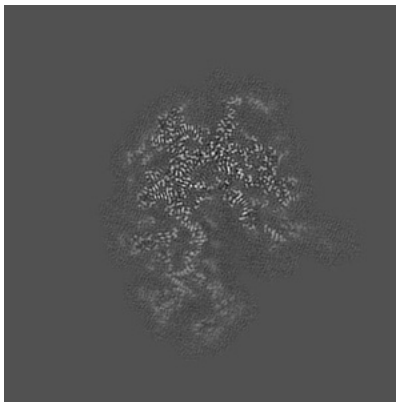
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

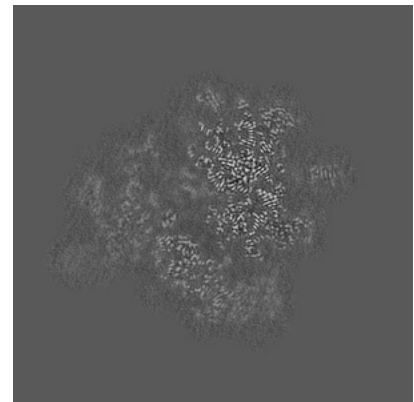
6.3.1 Primary map



X Index: 182

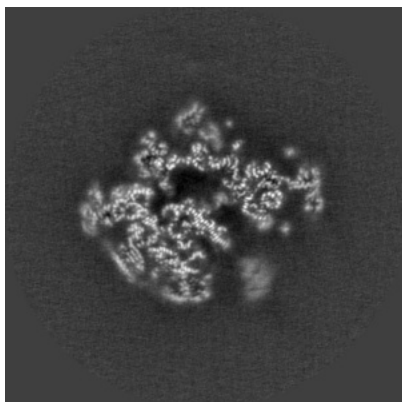


Y Index: 166

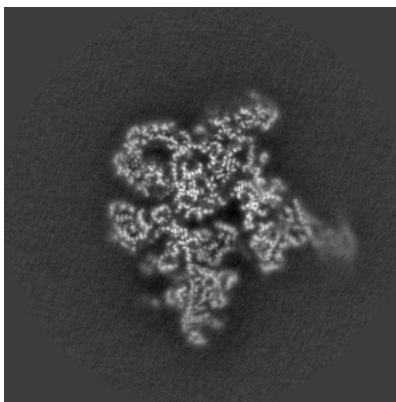


Z Index: 166

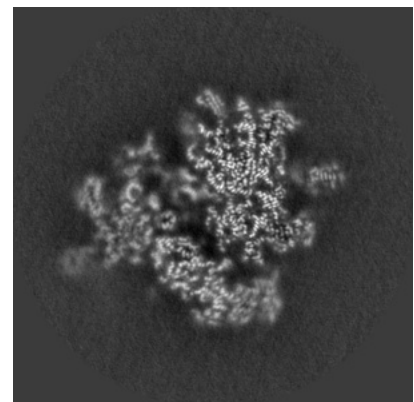
6.3.2 Raw map



X Index: 154



Y Index: 150

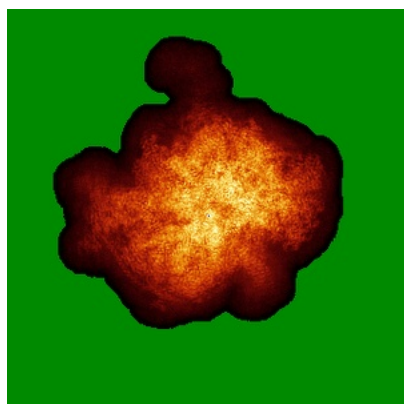


Z Index: 166

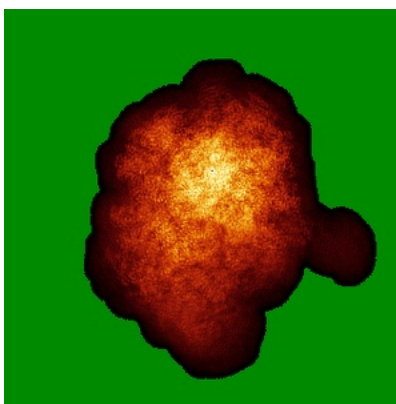
The images above show the largest variance slices of the map in three orthogonal directions.

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

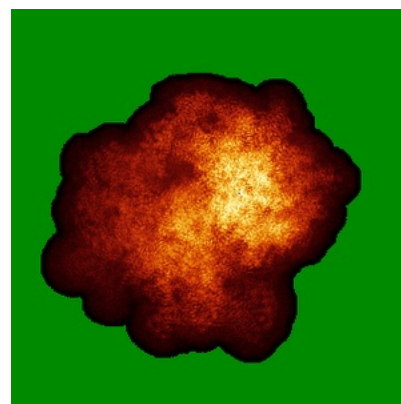
6.4.1 Primary map



X



Y

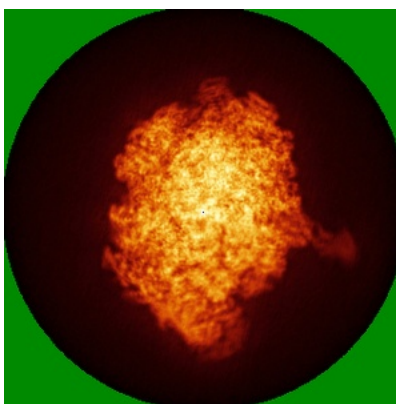


Z

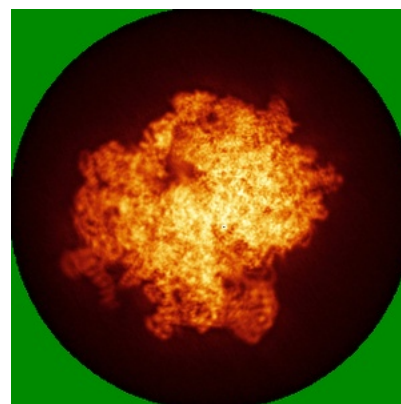
6.4.2 Raw map



X



Y

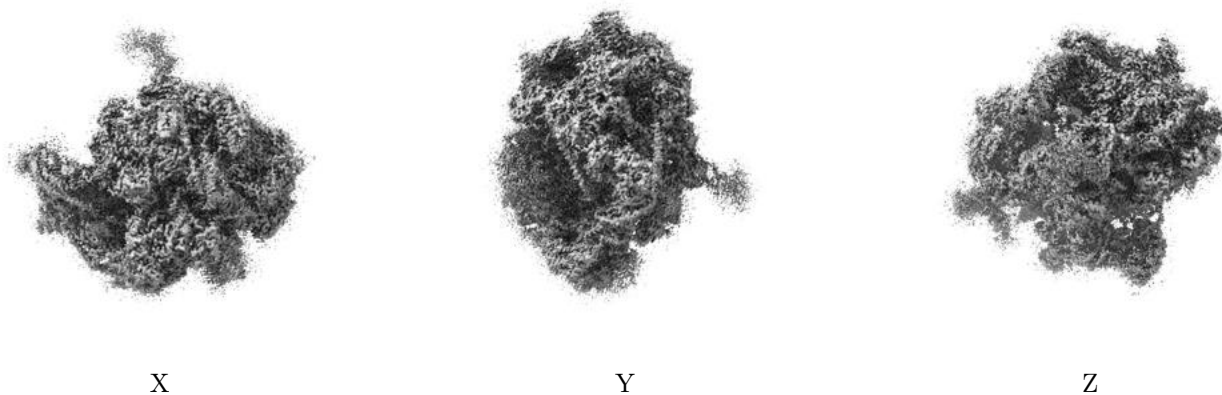


Z

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.

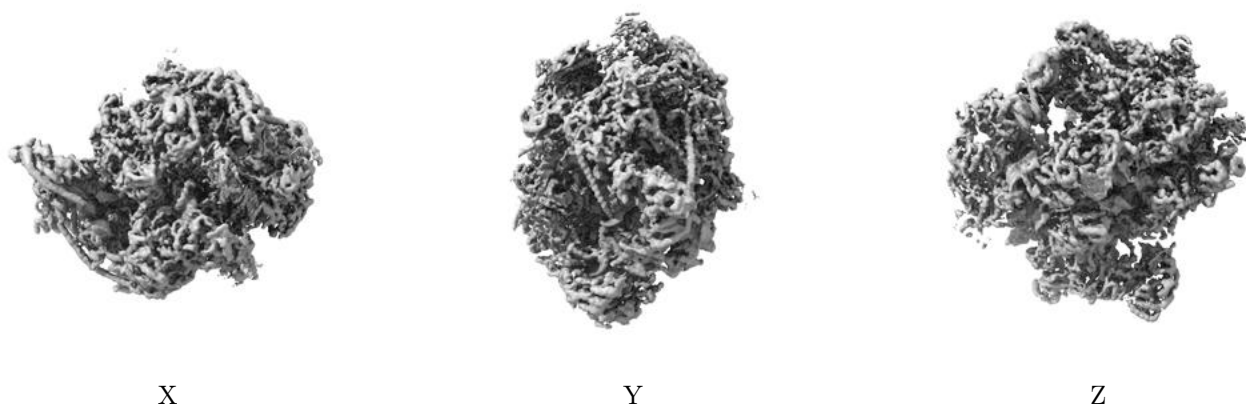
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.045. 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



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.

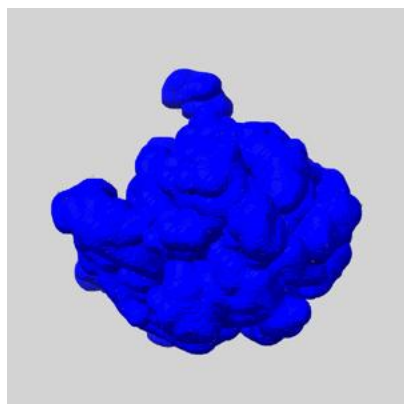
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

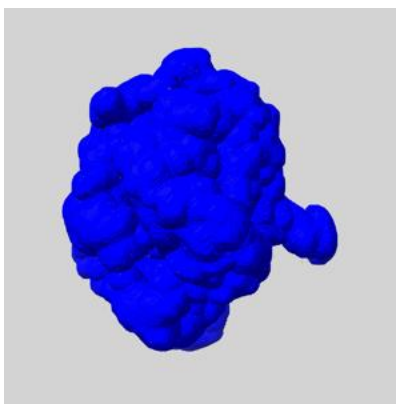
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

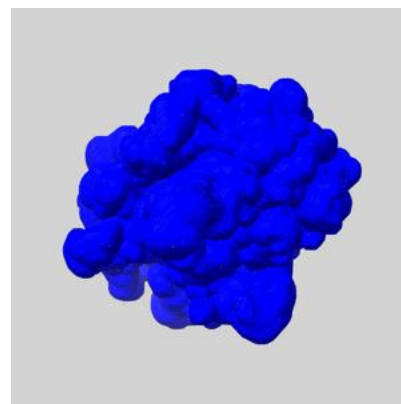
6.6.1 emd_10778_msk_1.map [i](#)



X



Y

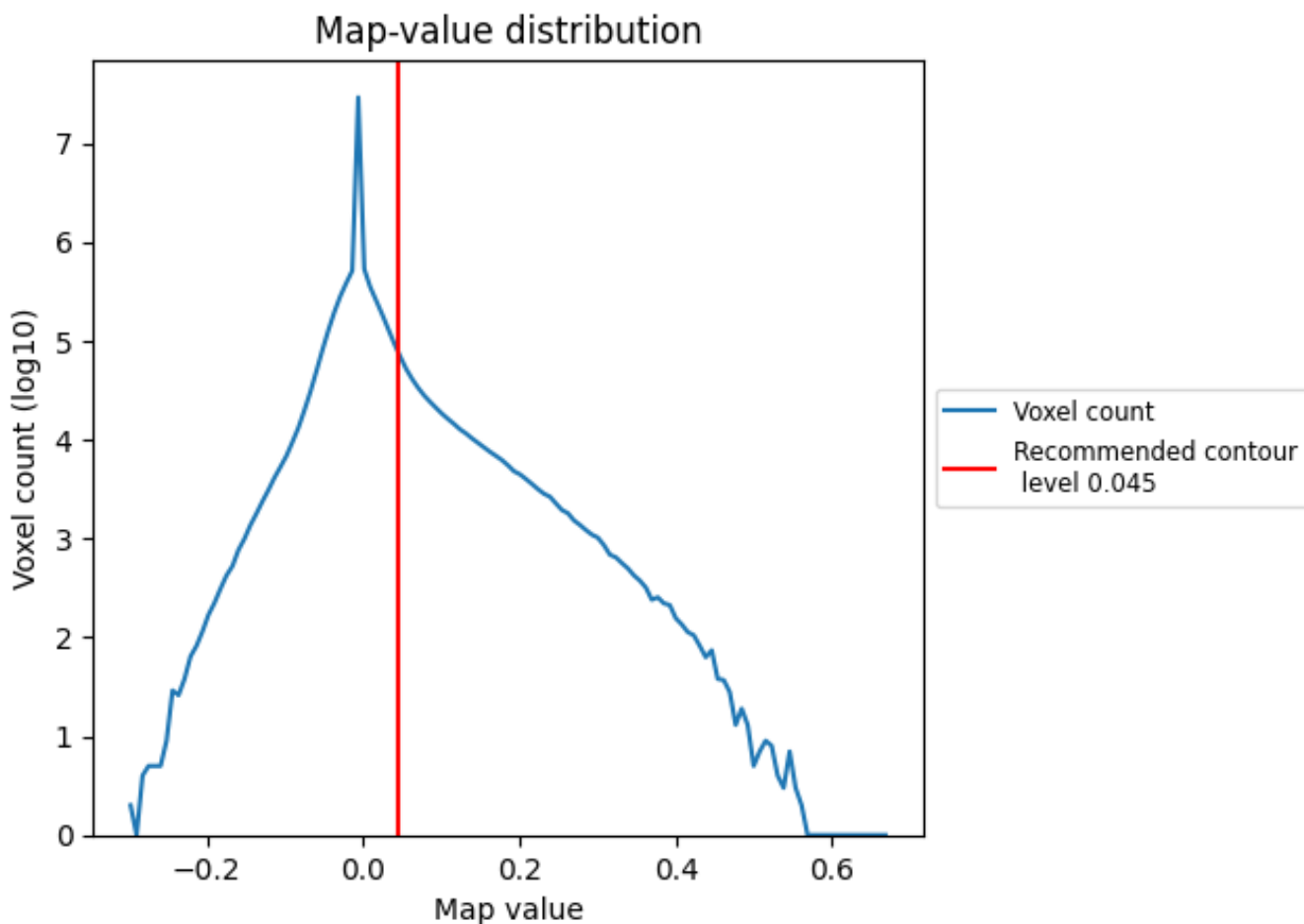


Z

7 Map analysis [i](#)

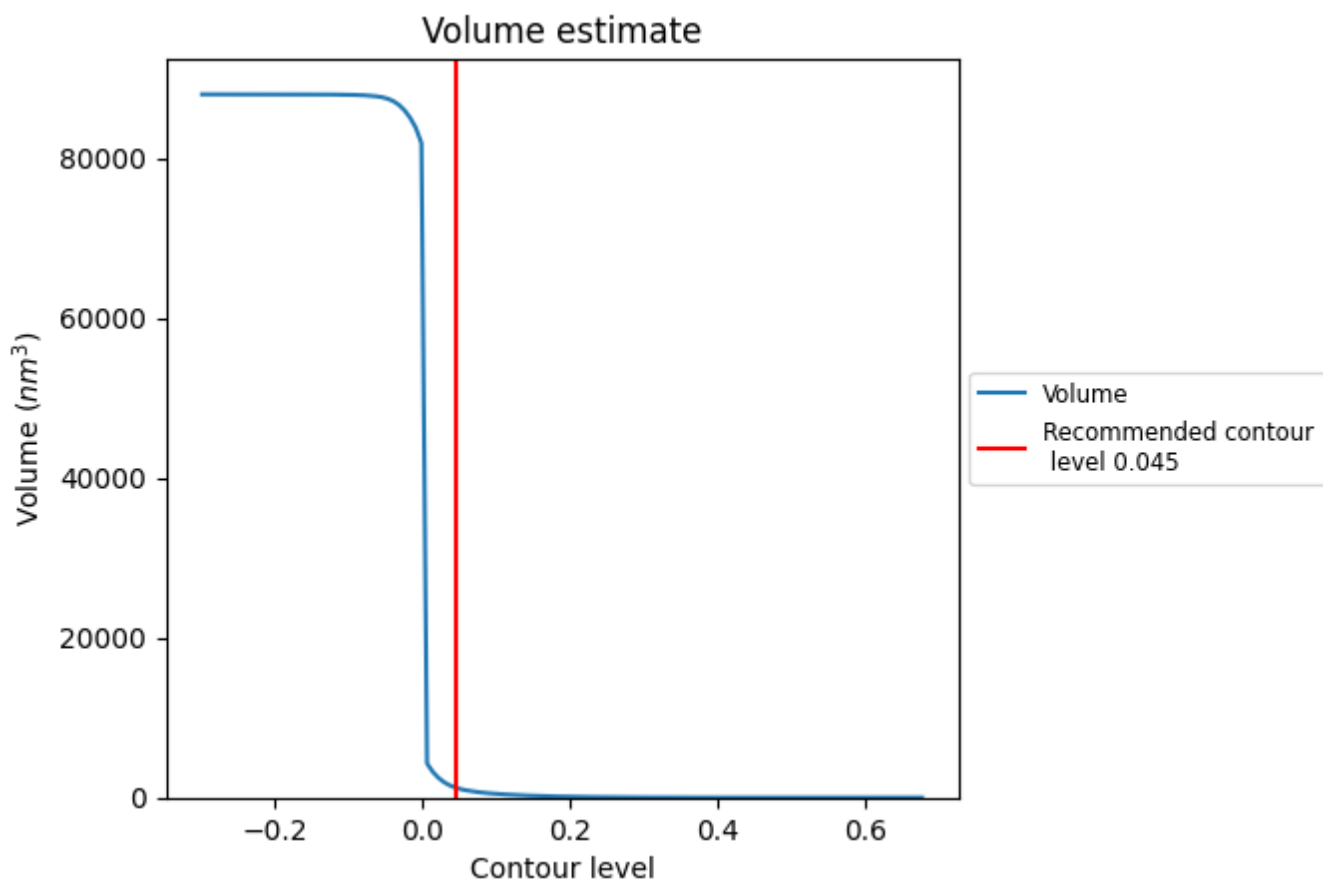
This section contains the results of statistical analysis of the map.

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.

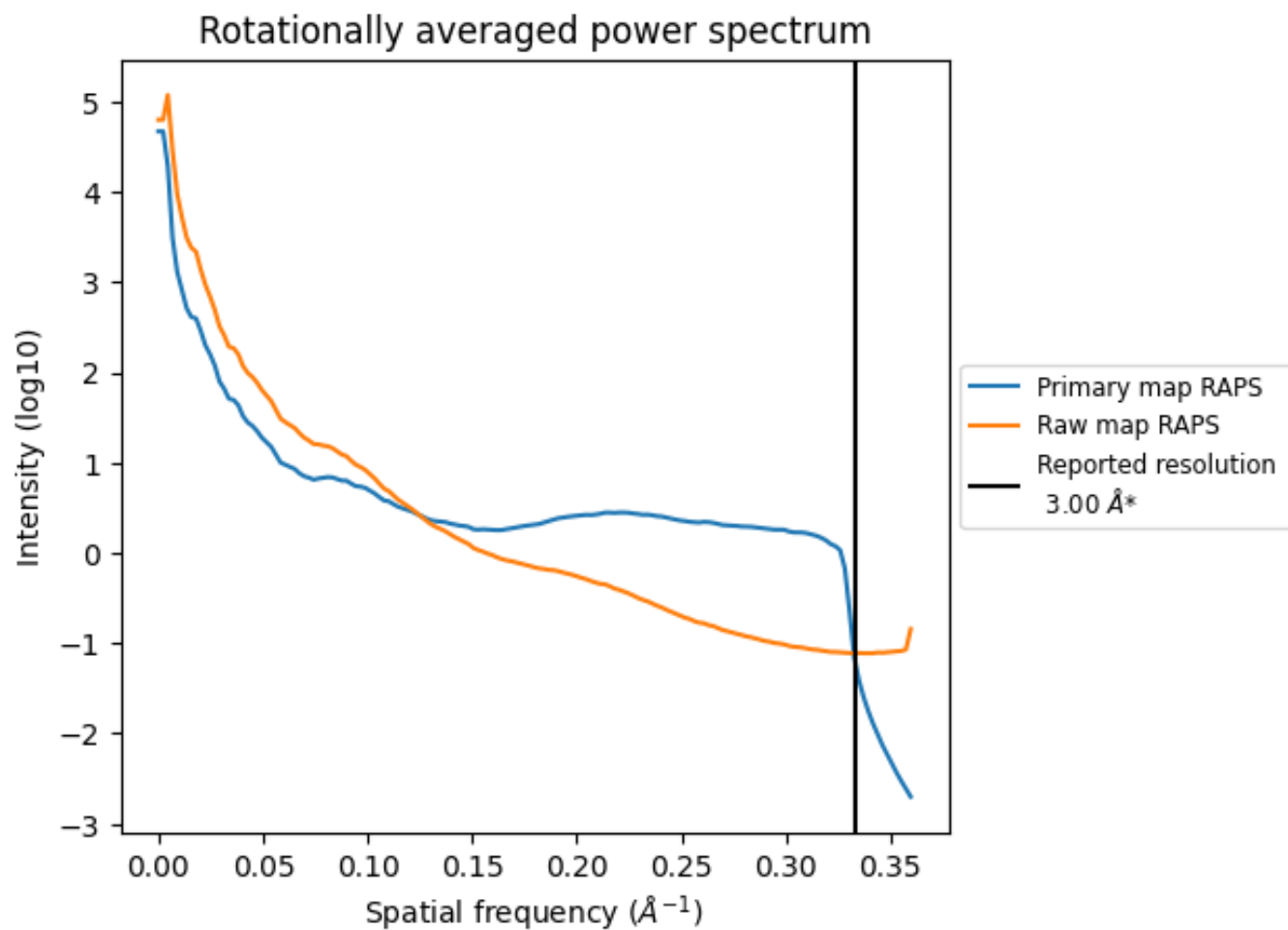
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1257 nm^3 ; this corresponds to an approximate mass of 1135 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

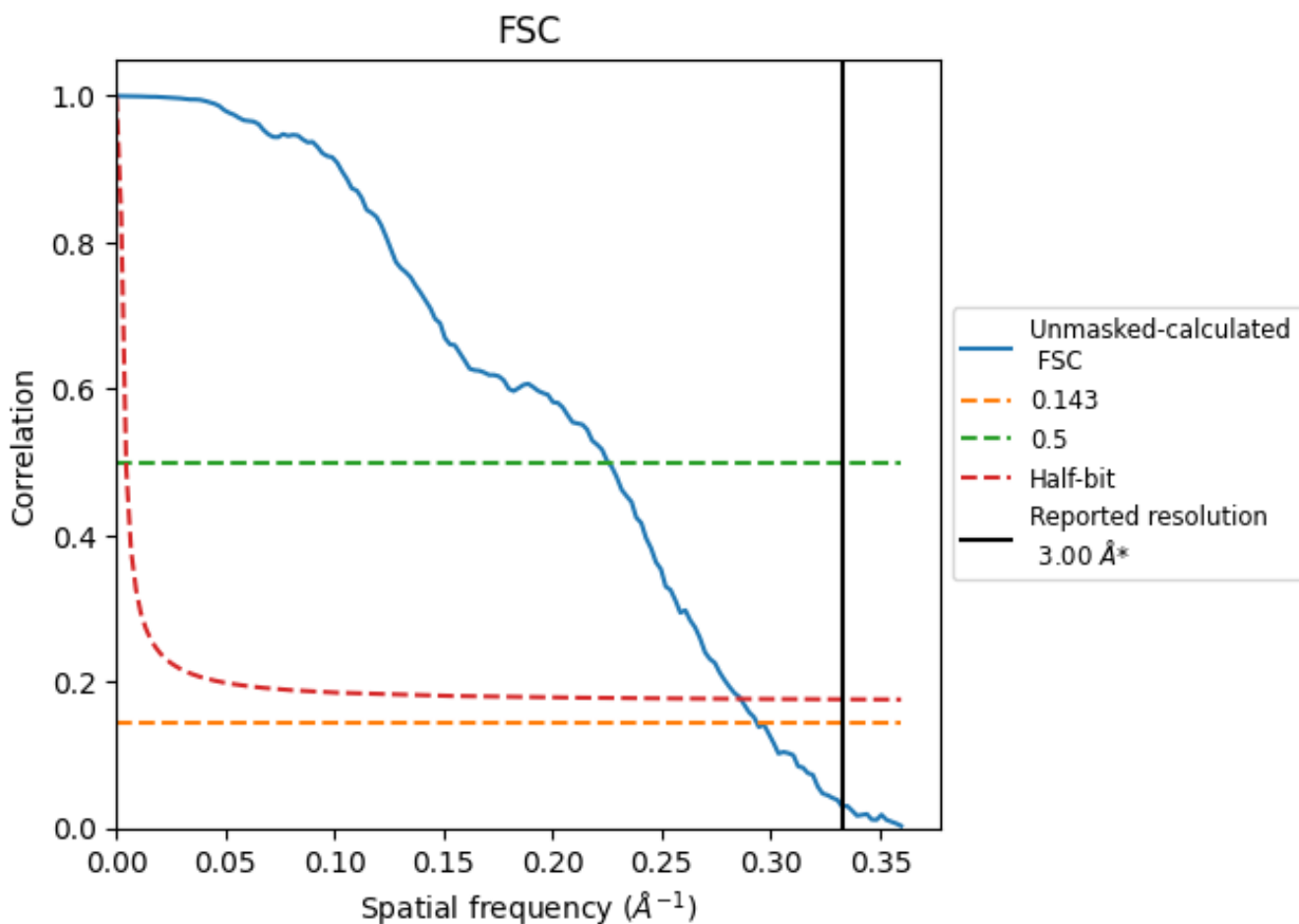


*Reported resolution corresponds to spatial frequency of 0.333 \AA^{-1}

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 0.333 Å⁻¹

8.2 Resolution estimates [i](#)

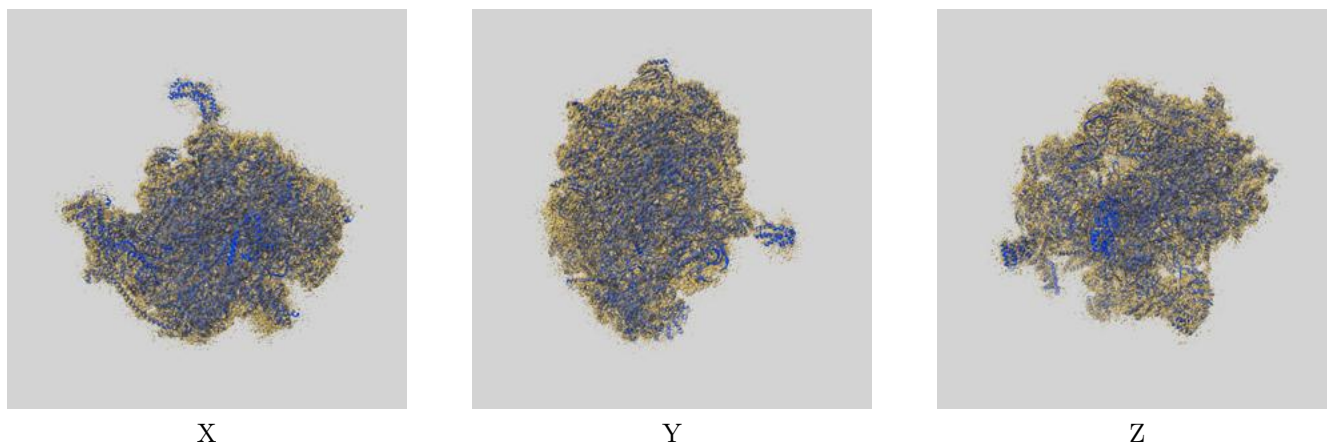
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.00	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.41	4.44	3.50

*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 3.41 differs from the reported value 3.0 by more than 10 %

9 Map-model fit [i](#)

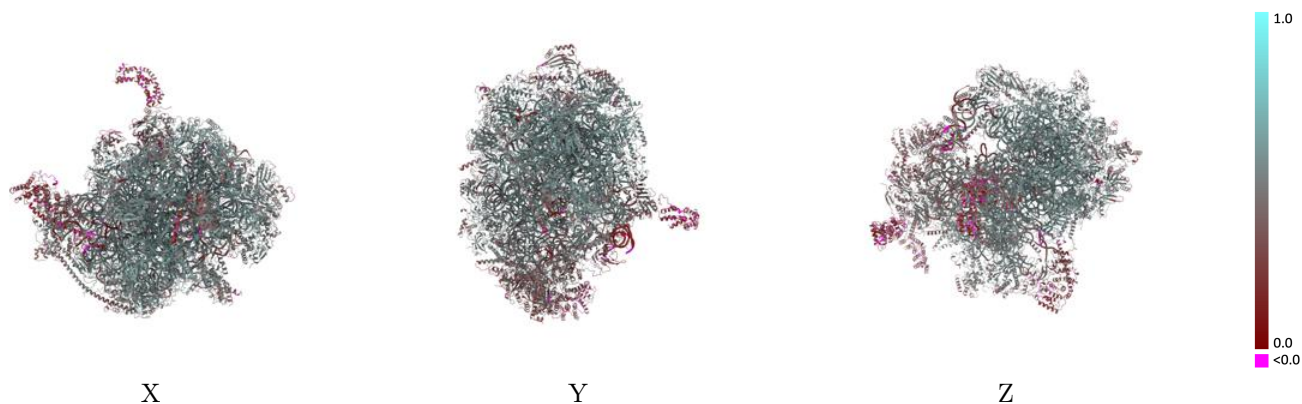
This section contains information regarding the fit between EMDB map EMD-10778 and PDB model 6YDP. Per-residue inclusion information can be found in section 3 on page 26.

9.1 Map-model overlay [i](#)



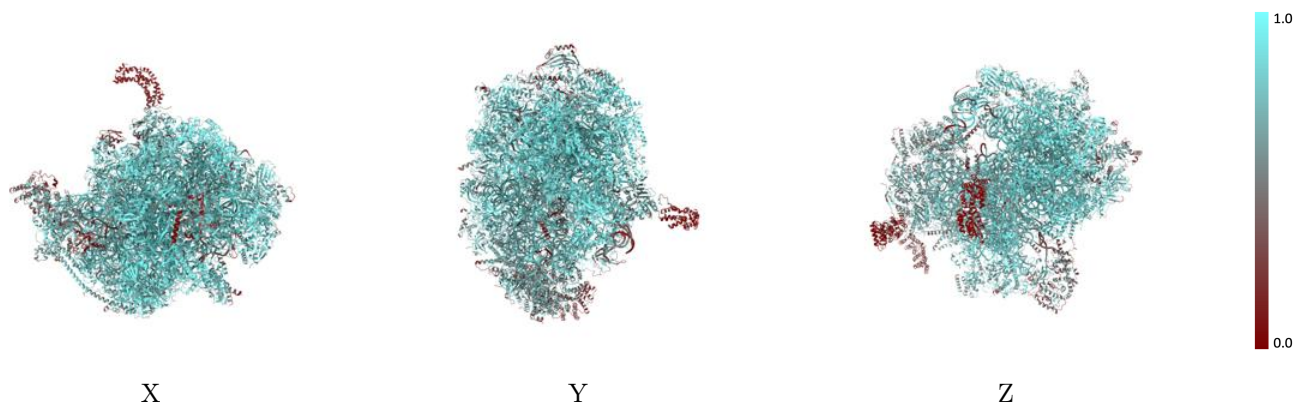
The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



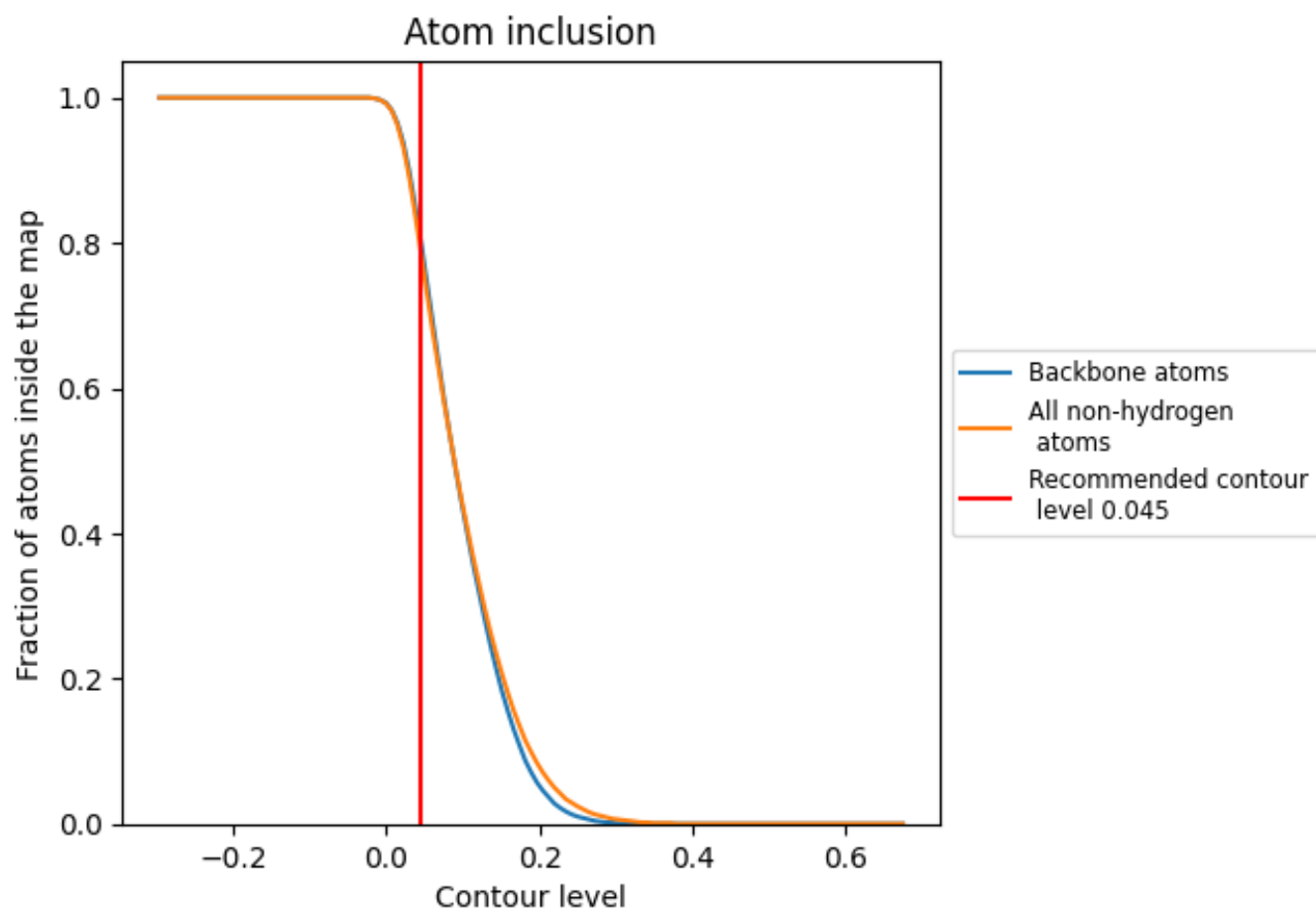
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.045).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 80% of all backbone atoms, 79% 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 (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7870	 0.4840
AA	 0.8810	 0.4940
AB	 0.8350	 0.5080
AC	 0.7240	 0.4790
AE	 0.7210	 0.4870
AF	 0.7890	 0.5000
AG	 0.6670	 0.4220
AI	 0.7050	 0.4290
AJ	 0.6520	 0.4140
AK	 0.8200	 0.5130
AL	 0.8460	 0.5520
AN	 0.7370	 0.4570
AO	 0.7190	 0.4720
AP	 0.7920	 0.5000
AQ	 0.8330	 0.5360
AR	 0.8380	 0.5290
AU	 0.8400	 0.5230
AV	 0.7670	 0.4210
AX	 0.7210	 0.4760
AZ	 0.5440	 0.2110
Aa	 0.7300	 0.4330
Ab	 0.7220	 0.4460
Ac	 0.8010	 0.5080
Ad	 0.7400	 0.4310
Ae	 0.4470	 0.2310
Af	 0.7720	 0.4840
Ag	 0.6120	 0.3520
Ah	 0.5300	 0.3420
Ai	 0.6640	 0.4080
Aj	 0.6670	 0.4090
Ak	 0.6180	 0.3740
Am	 0.6820	 0.4650
An	 0.7980	 0.5240
Ao	 0.2040	 0.2230
Ap	 0.8020	 0.4690







































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Chain	Atom inclusion	Q-score
B0	 0.9110	 0.5790
B1	 0.7990	 0.5030
B2	 0.8420	 0.5370
B3	 0.8940	 0.5640
B4	 0.7140	 0.4090
B5	 0.8700	 0.5480
B6	 0.7070	 0.4880
B7	 0.9540	 0.6030
B8	 0.9080	 0.5860
B9	 0.9250	 0.5750
BA	 0.9280	 0.5540
BB	 0.6730	 0.3130
BC	 0.8010	 0.5080
BD	 0.8820	 0.5620
BE	 0.8880	 0.5580
BF	 0.8960	 0.5540
BI	 0.7340	 0.4620
BJ	 0.5750	 0.3810
BK	 0.7420	 0.4710
BN	 0.9090	 0.5740
BO	 0.8700	 0.5570
BP	 0.8770	 0.5440
BQ	 0.8810	 0.5630
BR	 0.8920	 0.5570
BS	 0.8770	 0.5330
BT	 0.8150	 0.5240
BU	 0.8840	 0.5610
BV	 0.8780	 0.5500
BW	 0.8800	 0.5700
BX	 0.8050	 0.5160
BY	 0.6380	 0.4530
Ba	 0.8690	 0.5290
Bb	 0.8410	 0.4970
Bc	 0.7950	 0.4810
Bd	 0.6480	 0.3720
Be	 0.8000	 0.4920
Bf	 0.7810	 0.4850
Bg	 0.8860	 0.5620
Bh	 0.8390	 0.5120
Bi	 0.5570	 0.4080
Bj	 0.6080	 0.3060
Bk	 0.6730	 0.4310

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Chain	Atom inclusion	Q-score
Bl	 0.8830	 0.5380
Bm	 0.6080	 0.4340
Bn	 0.9060	 0.5750
Bo	 0.8400	 0.5170
Bp	 0.6590	 0.3810
Bq	 0.7530	 0.4420
Bt	 0.8890	 0.5640
Bu	 0.6700	 0.4230
Bv	 0.6870	 0.4510
Bw	 0.8630	 0.5340
Bx	 0.8420	 0.5150
CL	 0.1140	 0.1270
DL	 0.1450	 0.2010
EL	 0.0720	 0.2050
FL	 0.0190	 0.1690
GL	 0.0420	 0.1720
HL	 0.0540	 0.1950
LL	 0.1830	 0.2320