



wwPDB EM Validation Summary Report ⓘ

Nov 8, 2021 – 09:26 pm GMT

PDB ID : 7PD3
EMDB ID : EMD-13329
Title : Structure of the human mitoribosomal large subunit in complex with NSUN4.MTERF4.GTPBP7 and MALSU1.L0R8F8.mt-ACP
Authors : Chandrasekaran, V.; Desai, N.; Burton, N.O.; Yang, H.; Price, J.; Miska, E.A.; Ramakrishnan, V.
Deposited on : 2021-08-04
Resolution : 3.40 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

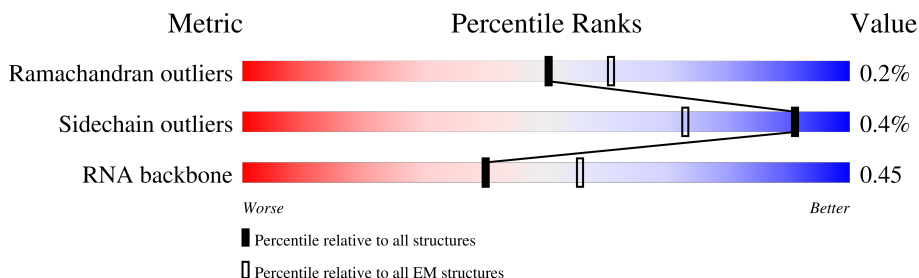
EMDB validation analysis : 0.0.0.dev97
Mogul : 1.8.4 (270009), CSD as541be (2020)
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.23.2

1 Overall quality at a glance

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

The reported resolution of this entry is 3.40 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	0	188	
2	1	65	
3	2	92	
4	3	188	
5	4	103	
6	5	423	
7	6	380	
8	7	338	

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Mol	Chain	Length	Quality of chain
9	8	206	45% 42% 54%
10	9	137	42% 85% 15%
11	A	1559	16% 60% 20% 18%
12	B	69	42% 91% 46% 7%
13	C	267	30% 29% 70%
13	H	267	25% 35% 64%
14	D	305	21% 69% 29%
15	E	348	19% 87% 13%
16	F	311	33% 80% 20%
17	G	261	56% 62% 37%
18	J	192	73% 72% 27%
19	K	178	17% 98%
20	L	145	26% 79% 21%
21	M	296	44% 96%
22	N	251	39% 79% 20%
23	O	175	17% 86% 13%
24	P	180	59% 77% 22%
25	Q	292	25% 74% 26%
26	R	149	23% 94% 6%
27	S	205	25% 76% 24%
28	T	206	15% 80% 19%
29	U	153	41% 98%
30	V	216	75% 91% 6%
31	W	148	25% 74% 26%
32	X	256	48% 93% 5%

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Mol	Chain	Length	Quality of chain
33	Y	250	23% 70% 30%
34	Z	161	25% 75% 25%
35	a	142	25% 57% 42%
36	b	215	27% 68% 31%
37	c	332	52% 82% 17%
38	d	306	60% 68% 31%
39	e	279	78% 77% 22%
40	f	212	49% 55% 45%
41	g	166	45% 77% 22%
42	h	158	57% 63% 37%
43	i	128	16% 75% 24%
44	j	123	33% 68% 31%
45	k	112	68% 71% 29%
46	l	138	15% 17% 83%
47	m	128	35% 34% 65%
48	o	102	35% 88% 11%
49	p	206	59% 61% 38%
50	q	222	77% 89% 11%
51	r	196	22% 73% 26%
52	s	439	31% 84% 16%
53	t	28	100% 100%
54	u	234	45% 46% 53%
55	v	70	99% 97%
56	w	156	51% 50% 49%
57	y	381	42% 64% 36%

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Mol	Chain	Length	Quality of chain
58	x	384	<p>78% 94% • 5%</p>
59	z	334	<p>60% 92% • 7%</p>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
11	OMG	A	2815	X	-	-	-
64	OMG	A	3301	X	-	-	-
69	SAM	x	401	X	-	-	-
70	GCP	z	408	X	-	-	-
70	GCP	z	409	X	-	-	-

2 Entry composition

There are 70 unique types of molecules in this entry. The entry contains 108076 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 39S ribosomal protein L32, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	108	880	545	172	157	6	0	0

- Molecule 2 is a protein called 39S ribosomal protein L33, mitochondrial.

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

- Molecule 3 is a protein called 39S ribosomal protein L34, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	2	45	367	227	81	58	1	0	0

- Molecule 4 is a protein called 39S ribosomal protein L35, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	3	95	831	539	162	127	3	0	0

- Molecule 5 is a protein called 39S ribosomal protein L36, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	4	37	333	212	71	47	3	0	0

- Molecule 6 is a protein called 39S ribosomal protein L37, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	5	392	3199	2067	558	563	11	0	0

- Molecule 7 is a protein called 39S ribosomal protein L38, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	6	324	2640	1694	470	468	8	0	0

- Molecule 8 is a protein called 39S ribosomal protein L39, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	7	287	2334	1495	397	425	17	0	0

- Molecule 9 is a protein called 39S ribosomal protein L40, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	8	94	759	477	137	143	2	0	0

- Molecule 10 is a protein called 39S ribosomal protein L41, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	9	117	947	614	163	168	2	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
11	A	1280	27208	12208	4937	8783	1280	0	0

- Molecule 12 is a RNA chain called mt-tRNAVal.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
12	B	64	1348	607	237	441	63	0	0

- Molecule 13 is a protein called 39S ribosomal protein L9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	C	80	648	421	111	112	4	0	0
13	H	95	784	498	152	134		0	0

- Molecule 14 is a protein called 39S ribosomal protein L2, mitochondrial.

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

- Molecule 15 is a protein called 39S ribosomal protein L3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	E	304	Total	C	N	O	S	0	0
			2396	1539	416	430	11		

- Molecule 16 is a protein called 39S ribosomal protein L4, mitochondrial.

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

- Molecule 17 is a protein called 39S ribosomal protein L10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	G	165	Total	C	N	O	S	0	0
			1338	863	242	223	10		

- Molecule 18 is a protein called 39S ribosomal protein L11, mitochondrial.

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

- Molecule 19 is a protein called 39S ribosomal protein L13, mitochondrial.

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

- Molecule 20 is a protein called 39S ribosomal protein L14, mitochondrial.

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

- Molecule 21 is a protein called 39S ribosomal protein L15, mitochondrial.

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

- Molecule 22 is a protein called 39S ribosomal protein L16, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	N	200	Total	C	N	O	S	0	0
			1617	1035	298	275	9		

- Molecule 23 is a protein called 39S ribosomal protein L17, mitochondrial.

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

- Molecule 24 is a protein called 39S ribosomal protein L18, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	P	141	Total	C	N	O	S	0	0
			1148	719	221	203	5		

- Molecule 25 is a protein called 39S ribosomal protein L19, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Q	217	Total	C	N	O	S	0	0
			1805	1159	317	320	9		

- Molecule 26 is a protein called 39S ribosomal protein L20, mitochondrial.

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

- Molecule 27 is a protein called 39S ribosomal protein L21, mitochondrial.

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

- Molecule 28 is a protein called 39S ribosomal protein L22, mitochondrial.

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

- Molecule 29 is a protein called 39S ribosomal protein L23, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	U	152	Total	C	N	O	S	0	0
			1218	772	233	210	3		

- Molecule 30 is a protein called 39S ribosomal protein L24, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	V	202	Total	C	N	O	S	0	0
			1624	1032	291	293	8		

- Molecule 31 is a protein called 39S ribosomal protein L27, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	W	109	Total	C	N	O	S	0	0
			859	552	162	142	3		

- Molecule 32 is a protein called 39S ribosomal protein L28, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	X	243	Total	C	N	O	S	0	0
			2035	1317	351	362	5		

- Molecule 33 is a protein called 39S ribosomal protein L47, mitochondrial.

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

- Molecule 34 is a protein called 39S ribosomal protein L30, mitochondrial.

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

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
38	d	211	Total	C	N	O	S	0	0
			1741	1123	299	309	10		

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
40	f	116	Total	C	N	O	S	0	0
			915	585	152	175	3		

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

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

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
45	k	80	Total	C	N	O	S	0	0
			627	392	116	114	5		

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

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
48	o	91	Total	C	N	O	S	0	0
			771	487	156	125	3		

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	q	198	1625	1006	317	297	5	0	0

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

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

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

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

- Molecule 53 is a protein called mL65.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
53	t	28	140	84	28	28	0	0

- Molecule 54 is a protein called Mitochondrial assembly of ribosomal large subunit protein 1.

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

- Molecule 55 is a protein called MIEF1 upstream open reading frame protein.

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

- Molecule 56 is a protein called Acyl carrier protein, mitochondrial.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
57	y	245	Total	C	N	O	S	0	0
			1989	1269	344	364	12		

- Molecule 58 is a protein called 5-methylcytosine rRNA methyltransferase NSUN4.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	x	366	Total	C	N	O	S	0	0
			2889	1834	511	527	17		

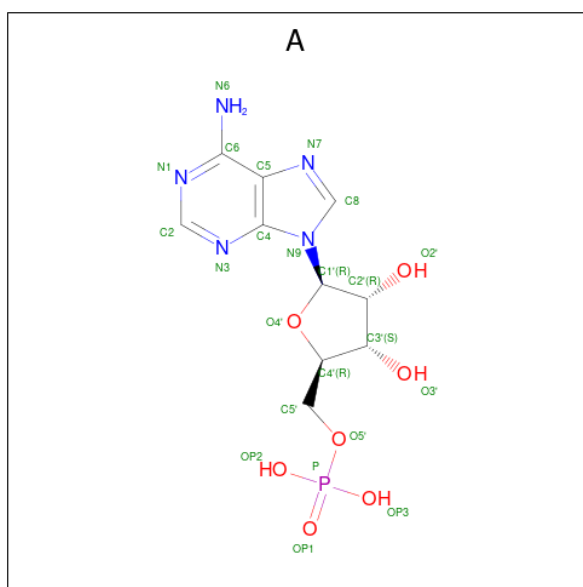
- Molecule 59 is a protein called Mitochondrial ribosome-associated GTPase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	z	311	Total	C	N	O	S	0	0
			2443	1549	445	433	16		

- Molecule 60 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
60	0	1	Total	Zn	0
			1	1	
60	4	1	Total	Zn	0
			1	1	

- Molecule 61 is ADENOSINE-5'-MONOPHOSPHATE (three-letter code: A) (formula: C₁₀H₁₄N₅O₇P).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
61	0	1	Total	C	N	O	P	0
			22	10	5	6	1	
61	4	1	Total	C	N	O	P	0
			66	30	15	18	3	
61	4	1	Total	C	N	O	P	0
			66	30	15	18	3	
61	4	1	Total	C	N	O	P	0
			66	30	15	18	3	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	
61	A	1	Total	C	N	O	P	0
			638	290	145	174	29	

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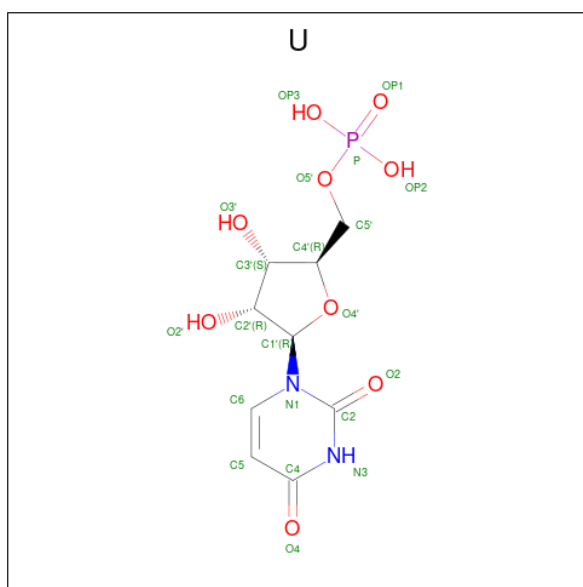
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	A	1	Total 638	C 290	N 145	O 174	P 29	0
61	E	1	Total 154	C 70	N 35	O 42	P 7	0
61	E	1	Total 154	C 70	N 35	O 42	P 7	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
61	E	1	Total 154	C 70	N 35	O 42	P 7	0
61	E	1	Total 154	C 70	N 35	O 42	P 7	0
61	E	1	Total 154	C 70	N 35	O 42	P 7	0
61	E	1	Total 154	C 70	N 35	O 42	P 7	0
61	E	1	Total 154	C 70	N 35	O 42	P 7	0
61	L	1	Total 88	C 40	N 20	O 24	P 4	0
61	L	1	Total 88	C 40	N 20	O 24	P 4	0
61	L	1	Total 88	C 40	N 20	O 24	P 4	0
61	L	1	Total 88	C 40	N 20	O 24	P 4	0
61	O	1	Total 22	C 10	N 5	O 6	P 1	0
61	Q	1	Total 44	C 20	N 10	O 12	P 2	0
61	Q	1	Total 44	C 20	N 10	O 12	P 2	0
61	r	1	Total 110	C 50	N 25	O 30	P 5	0
61	r	1	Total 110	C 50	N 25	O 30	P 5	0
61	r	1	Total 110	C 50	N 25	O 30	P 5	0
61	r	1	Total 110	C 50	N 25	O 30	P 5	0
61	r	1	Total 110	C 50	N 25	O 30	P 5	0
61	u	1	Total 22	C 10	N 5	O 6	P 1	0
61	y	1	Total 22	C 10	N 5	O 6	P 1	0

- Molecule 62 is URIDINE-5'-MONOPHOSPHATE (three-letter code: U) (formula: C₉H₁₃N₂O₉P).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
62	4	1	Total	C	N	O	P	0
			60	27	6	24	3	
62	4	1	Total	C	N	O	P	0
			60	27	6	24	3	
62	4	1	Total	C	N	O	P	0
			60	27	6	24	3	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	
62	A	1	Total	C	N	O	P	0
			380	171	38	152	19	

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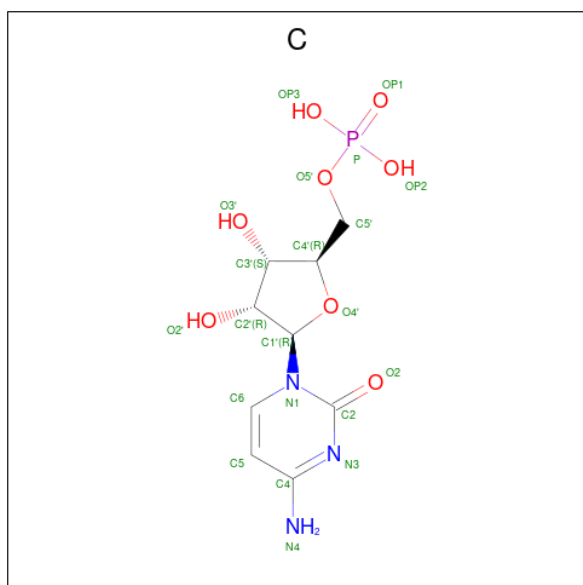
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	A	1	Total 380	C 171	N 38	O 152	P 19	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	E	1	Total 140	C 63	N 14	O 56	P 7	0
62	K	1	Total 40	C 18	N 4	O 16	P 2	0
62	K	1	Total 40	C 18	N 4	O 16	P 2	0
62	L	1	Total 80	C 36	N 8	O 32	P 4	0
62	L	1	Total 80	C 36	N 8	O 32	P 4	0
62	L	1	Total 80	C 36	N 8	O 32	P 4	0
62	L	1	Total 80	C 36	N 8	O 32	P 4	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
62	Q	1	Total 20	C 9	N 2	O 8	P 1	0
62	r	1	Total 80	C 36	N 8	O 32	P 4	0
62	r	1	Total 80	C 36	N 8	O 32	P 4	0
62	r	1	Total 80	C 36	N 8	O 32	P 4	0
62	r	1	Total 80	C 36	N 8	O 32	P 4	0
62	u	1	Total 40	C 18	N 4	O 16	P 2	0
62	u	1	Total 40	C 18	N 4	O 16	P 2	0
62	z	1	Total 40	C 18	N 4	O 16	P 2	0
62	z	1	Total 40	C 18	N 4	O 16	P 2	0

- Molecule 63 is CYTIDINE-5'-MONOPHOSPHATE (three-letter code: C) (formula: $C_9H_{14}N_3O_8P$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
63	4	1	Total 20	C 9	N 3	O 7	P 1	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0
63	A	1	Total 440	C 198	N 66	O 154	P 22	0

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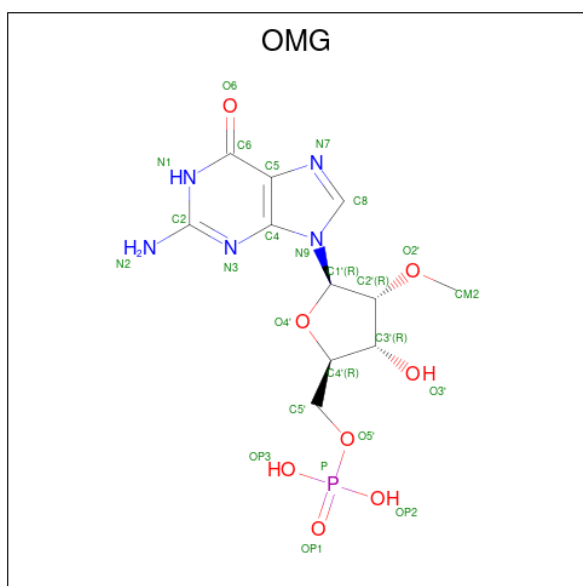
Mol	Chain	Residues	Atoms					AltConf
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	E	1	Total 220	C 99	N 33	O 77	P 11	0
63	L	1	Total 40	C 18	N 6	O 14	P 2	0
63	L	1	Total 40	C 18	N 6	O 14	P 2	0
63	O	1	Total 40	C 18	N 6	O 14	P 2	0
63	O	1	Total 40	C 18	N 6	O 14	P 2	0
63	Q	1	Total 40	C 18	N 6	O 14	P 2	0
63	Q	1	Total 40	C 18	N 6	O 14	P 2	0
63	k	1	Total 20	C 9	N 3	O 7	P 1	0
63	r	1	Total 40	C 18	N 6	O 14	P 2	0
63	r	1	Total 40	C 18	N 6	O 14	P 2	0
63	u	1	Total 60	C 27	N 9	O 21	P 3	0

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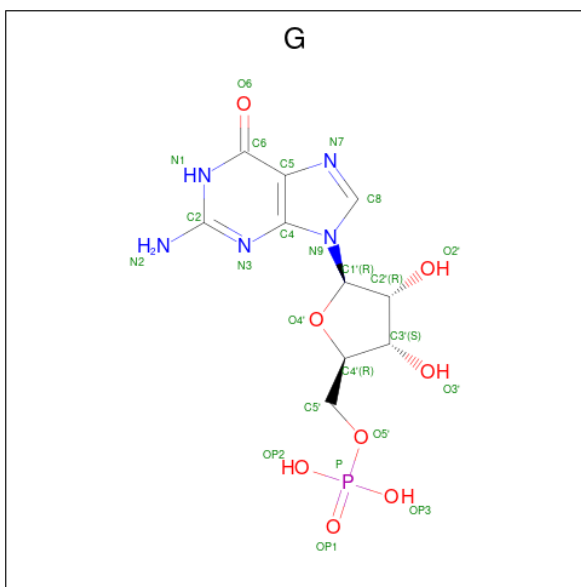
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
63	u	1	Total	C	N	O	P	0
			60	27	9	21	3	
63	u	1	Total	C	N	O	P	0
			60	27	9	21	3	
63	z	1	Total	C	N	O	P	0
			20	9	3	7	1	

- Molecule 64 is O2'-METHYLGUANOSINE-5'-MONOPHOSPHATE (three-letter code: OMG) (formula: C₁₁H₁₆N₅O₈P).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
64	A	1	Total	C	N	O	P	0
			24	11	5	7	1	

- Molecule 65 is GUANOSINE-5'-MONOPHOSPHATE (three-letter code: G) (formula: C₁₀H₁₄N₅O₈P).



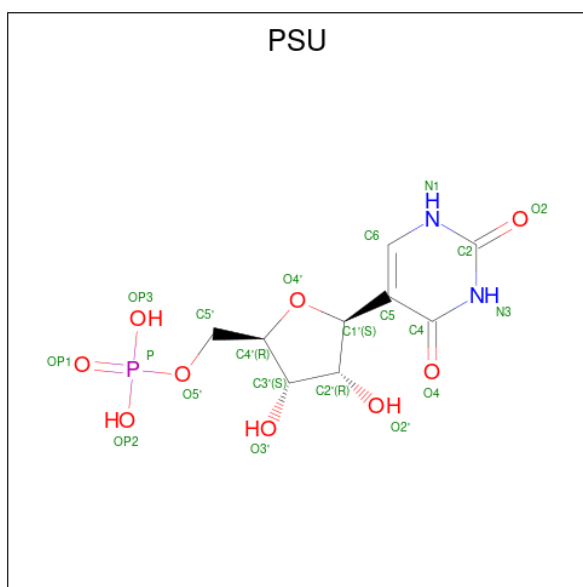
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	
65	A	1	Total	C	N	O	P	0
			345	150	75	105	15	

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
65	A	1	Total 345	C 150	N 75	O 105	P 15	0
65	E	1	Total 138	C 60	N 30	O 42	P 6	0
65	E	1	Total 138	C 60	N 30	O 42	P 6	0
65	E	1	Total 138	C 60	N 30	O 42	P 6	0
65	E	1	Total 138	C 60	N 30	O 42	P 6	0
65	E	1	Total 138	C 60	N 30	O 42	P 6	0
65	E	1	Total 138	C 60	N 30	O 42	P 6	0
65	L	1	Total 46	C 20	N 10	O 14	P 2	0
65	L	1	Total 46	C 20	N 10	O 14	P 2	0
65	r	1	Total 23	C 10	N 5	O 7	P 1	0
65	u	1	Total 46	C 20	N 10	O 14	P 2	0
65	u	1	Total 46	C 20	N 10	O 14	P 2	0
65	y	1	Total 23	C 10	N 5	O 7	P 1	0
65	z	1	Total 92	C 40	N 20	O 28	P 4	0
65	z	1	Total 92	C 40	N 20	O 28	P 4	0
65	z	1	Total 92	C 40	N 20	O 28	P 4	0
65	z	1	Total 92	C 40	N 20	O 28	P 4	0

- Molecule 66 is PSEUDOURIDINE-5'-MONOPHOSPHATE (three-letter code: PSU) (formula: C₉H₁₃N₂O₉P).

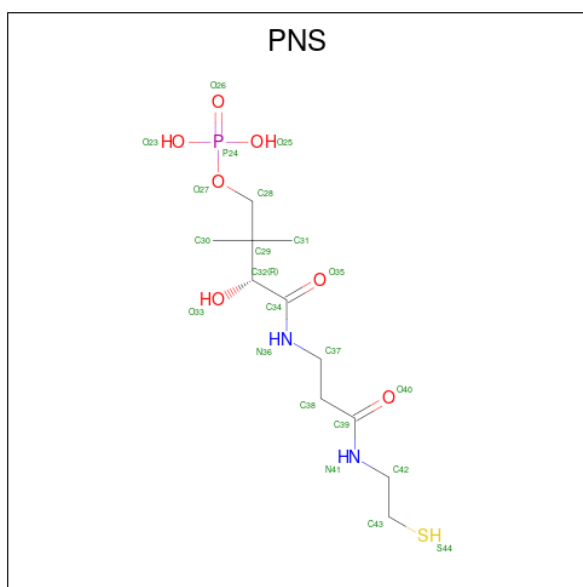


Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
66	A	1	21	9	2	9	1	0

- Molecule 67 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

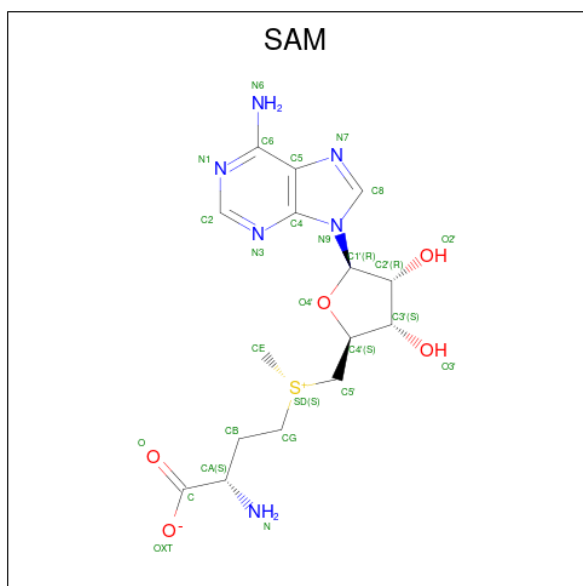
Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
67	A	89	89	89	0
67	E	1	1	1	0
67	o	1	1	1	0

- Molecule 68 is 4'-PHOSPHOPANTETHEINE (three-letter code: PNS) (formula: C₁₁H₂₃N₂O₇PS).



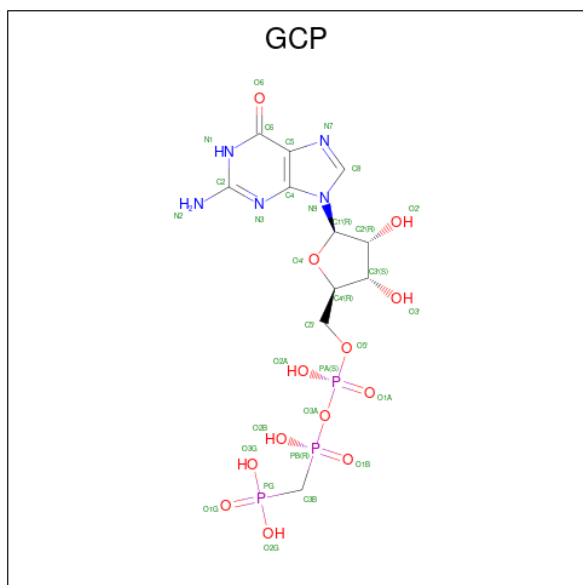
Mol	Chain	Residues	Atoms					AltConf	
			Total	C	N	O	P		S
68	v	1	21	11	2	6	1	1	0

- Molecule 69 is S-ADENOSYLMETHIONINE (three-letter code: SAM) (formula: $C_{15}H_{22}N_6O_5S$).



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

- Molecule 70 is PHOSPHOMETHYLPHOSPHONIC ACID GUANYLATE ESTER (three-letter code: GCP) (formula: $C_{11}H_{18}N_5O_{13}P_3$).

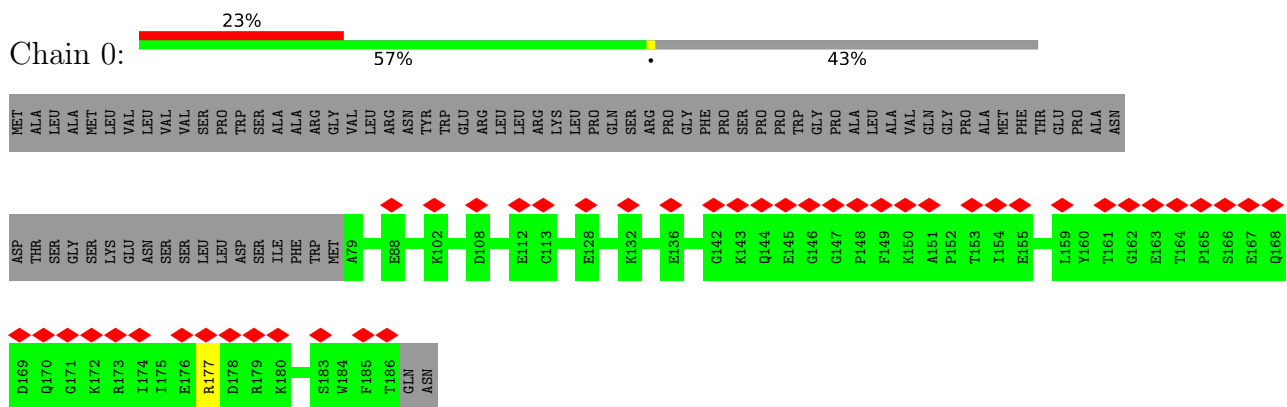


Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
70	z	1	64	22	10	26	6	0
70	z	1	64	22	10	26	6	0

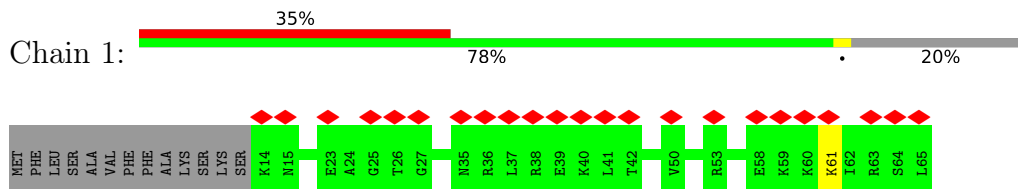
3 Residue-property plots

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.

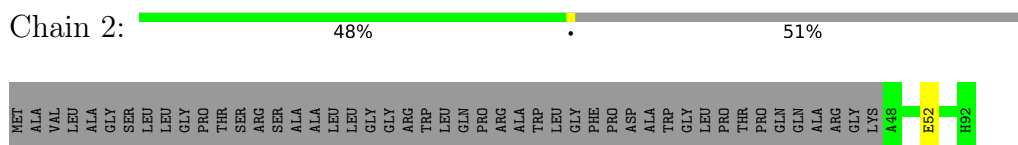
- Molecule 1: 39S ribosomal protein L32, mitochondrial



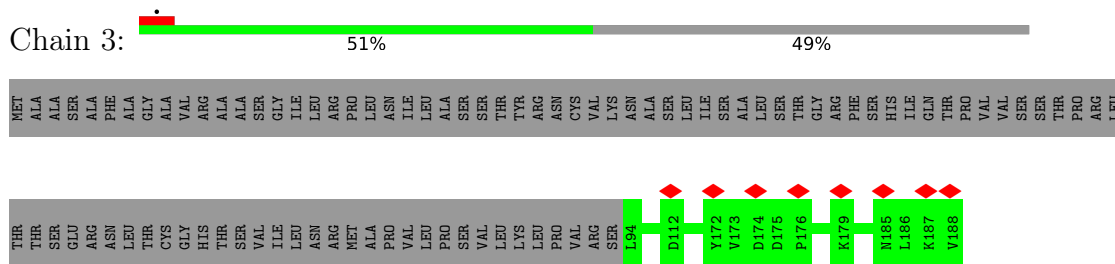
- Molecule 2: 39S ribosomal protein L33, mitochondrial



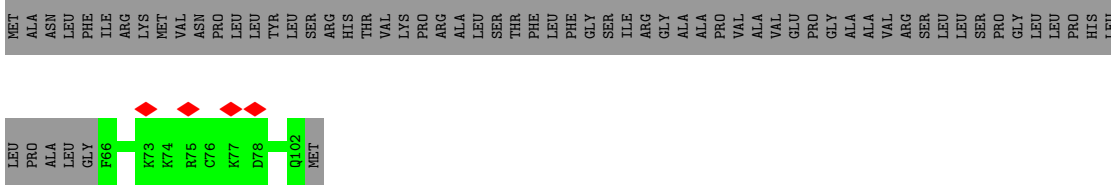
- Molecule 3: 39S ribosomal protein L34, mitochondrial



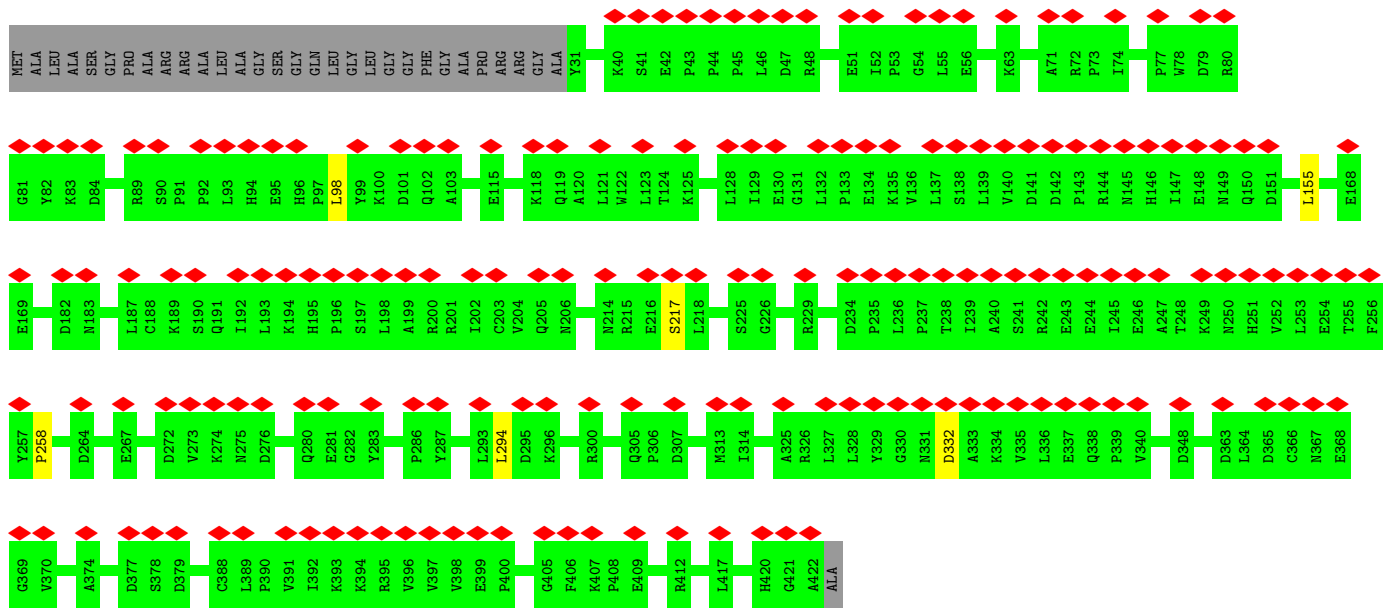
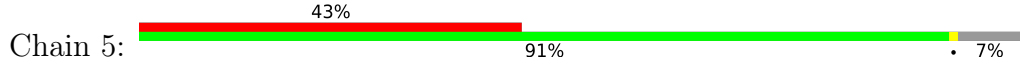
- Molecule 4: 39S ribosomal protein L35, mitochondrial



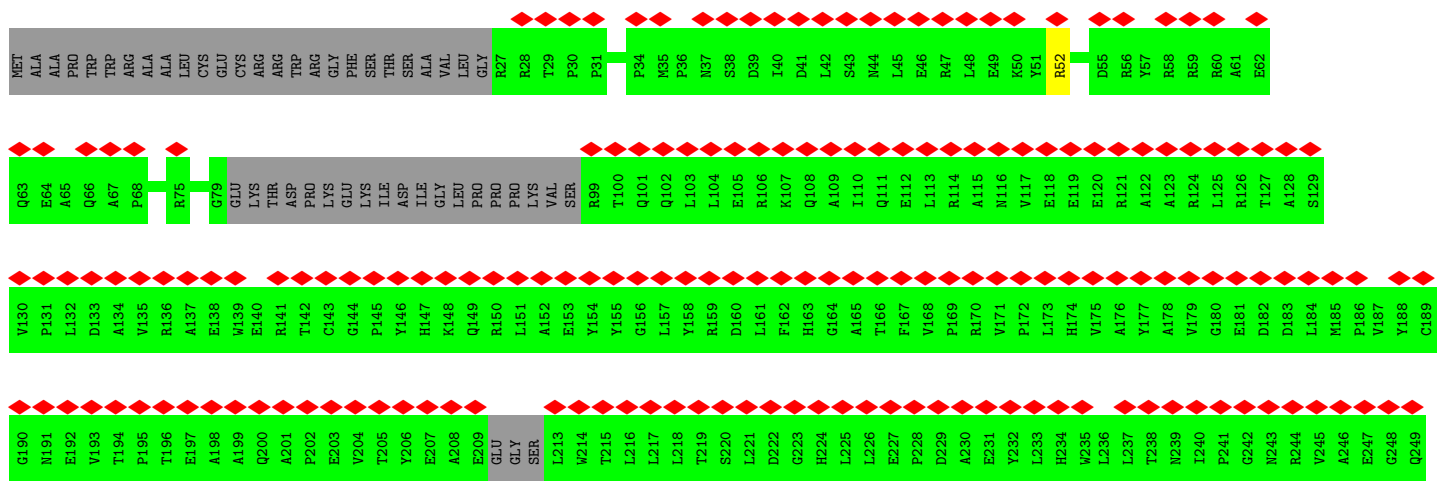
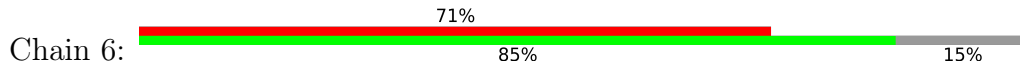
- Molecule 5: 39S ribosomal protein L36, mitochondrial

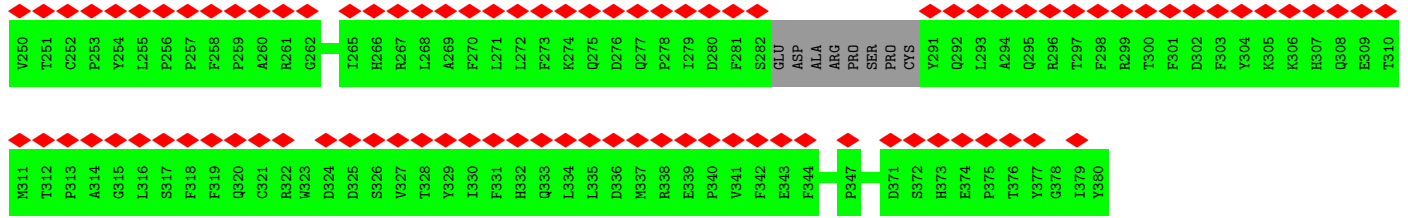


- Molecule 6: 39S ribosomal protein L37, mitochondrial

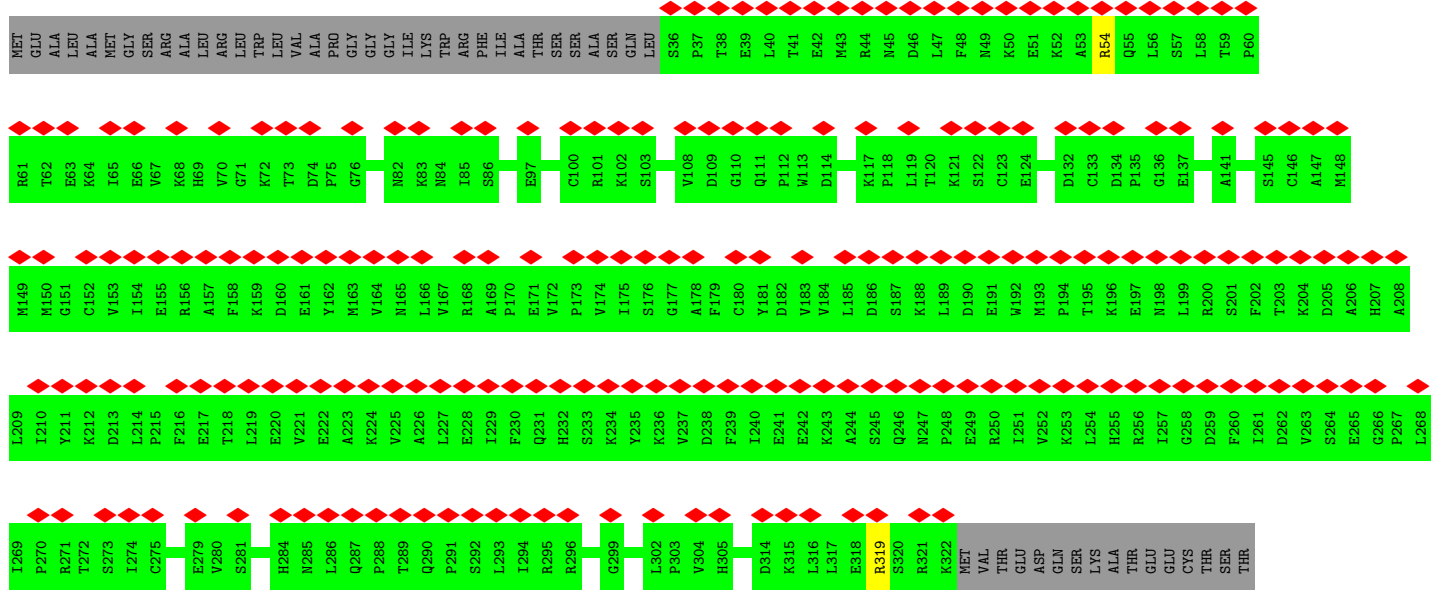
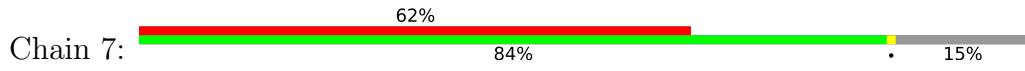


- Molecule 7: 39S ribosomal protein L38, mitochondrial

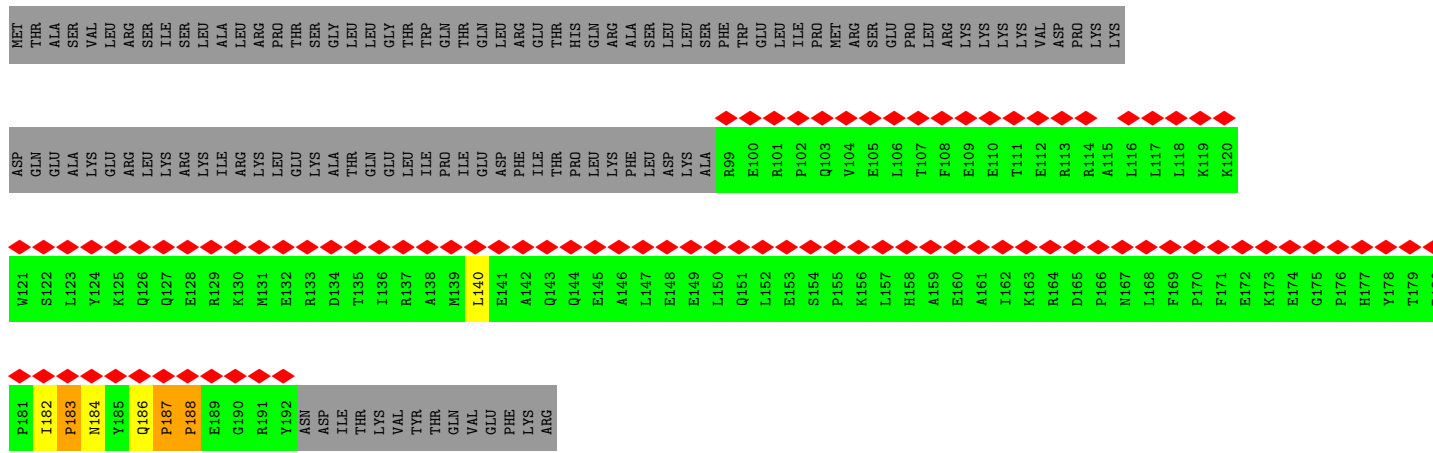
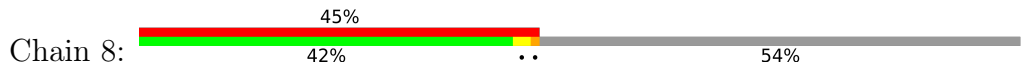




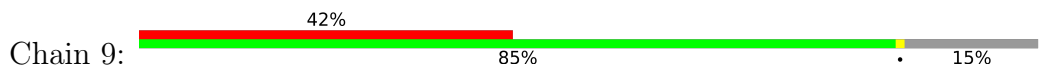
• Molecule 8: 39S ribosomal protein L39, mitochondrial

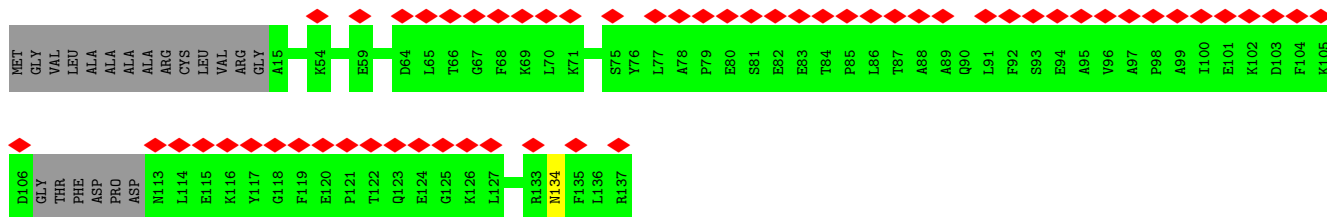


• Molecule 9: 39S ribosomal protein L40, mitochondrial

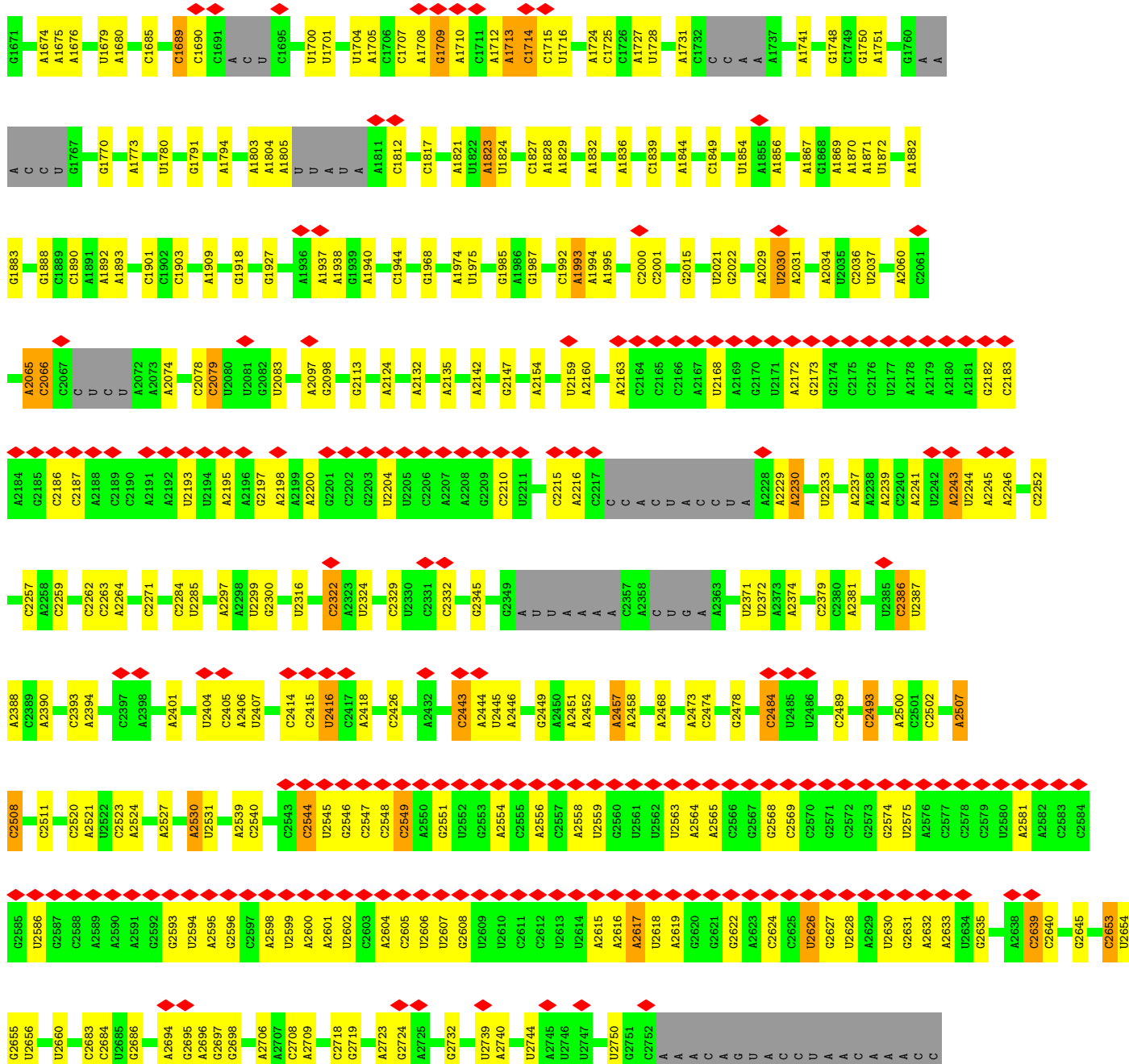


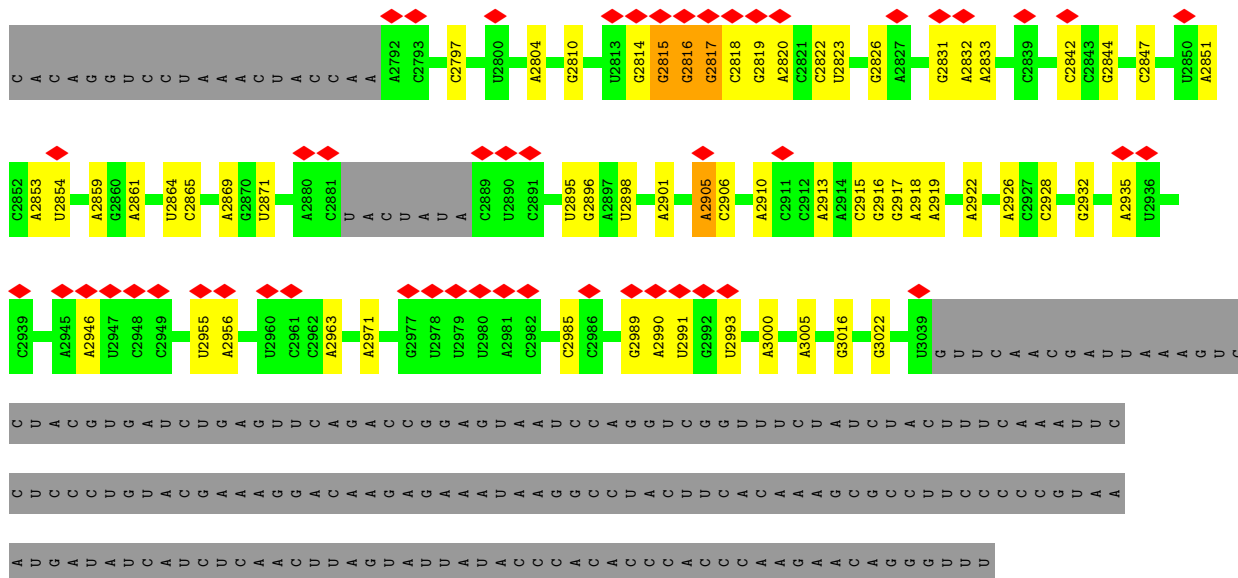
• Molecule 10: 39S ribosomal protein L41, mitochondrial



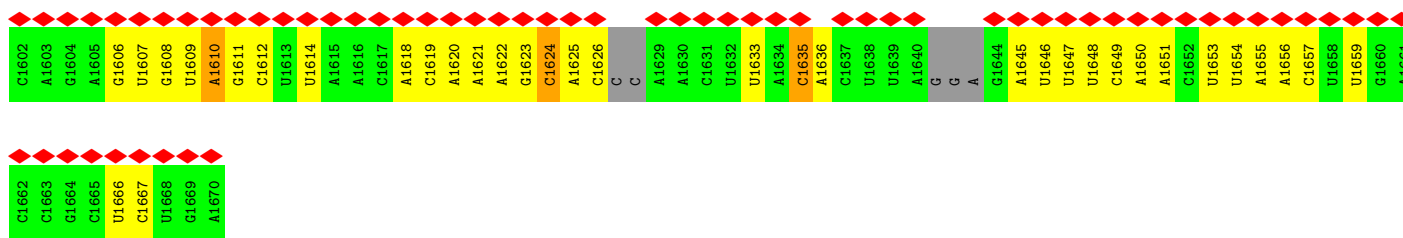
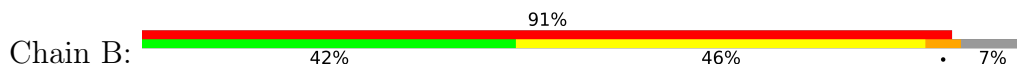


• Molecule 11: 16S rRNA

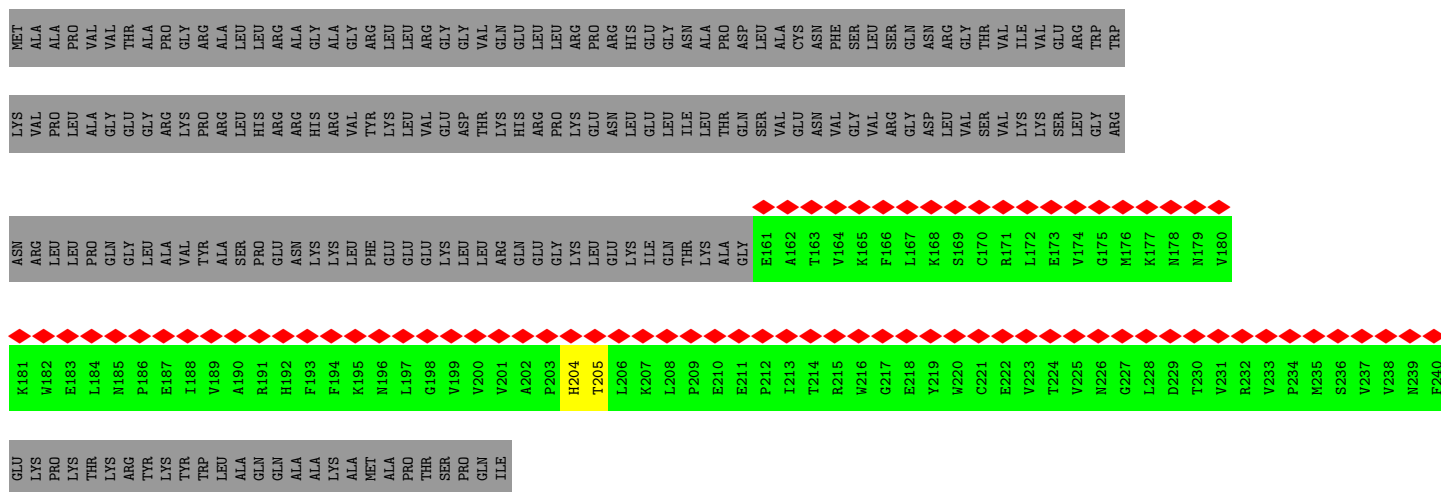




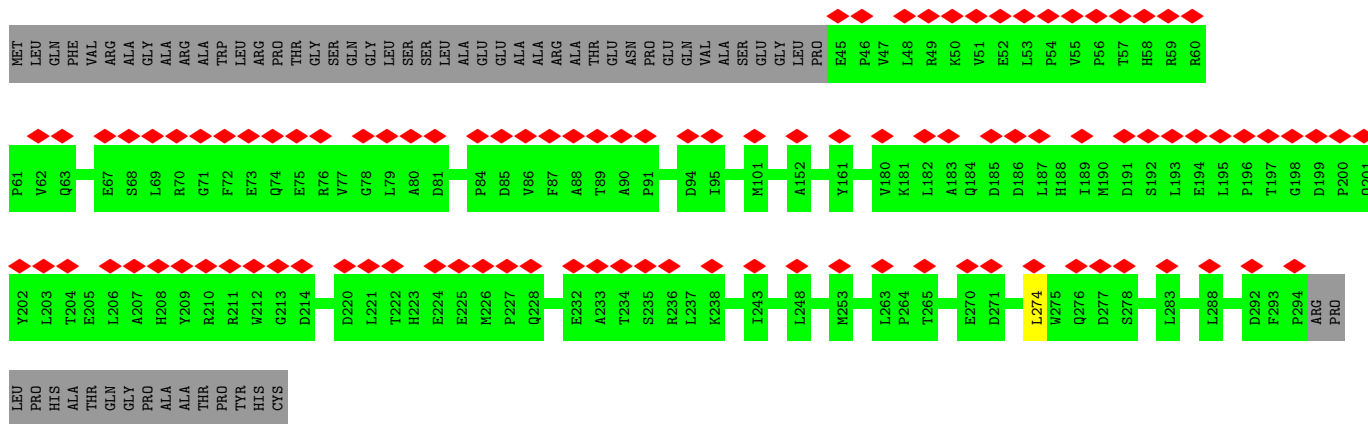
• Molecule 12: mt-tRNAVal



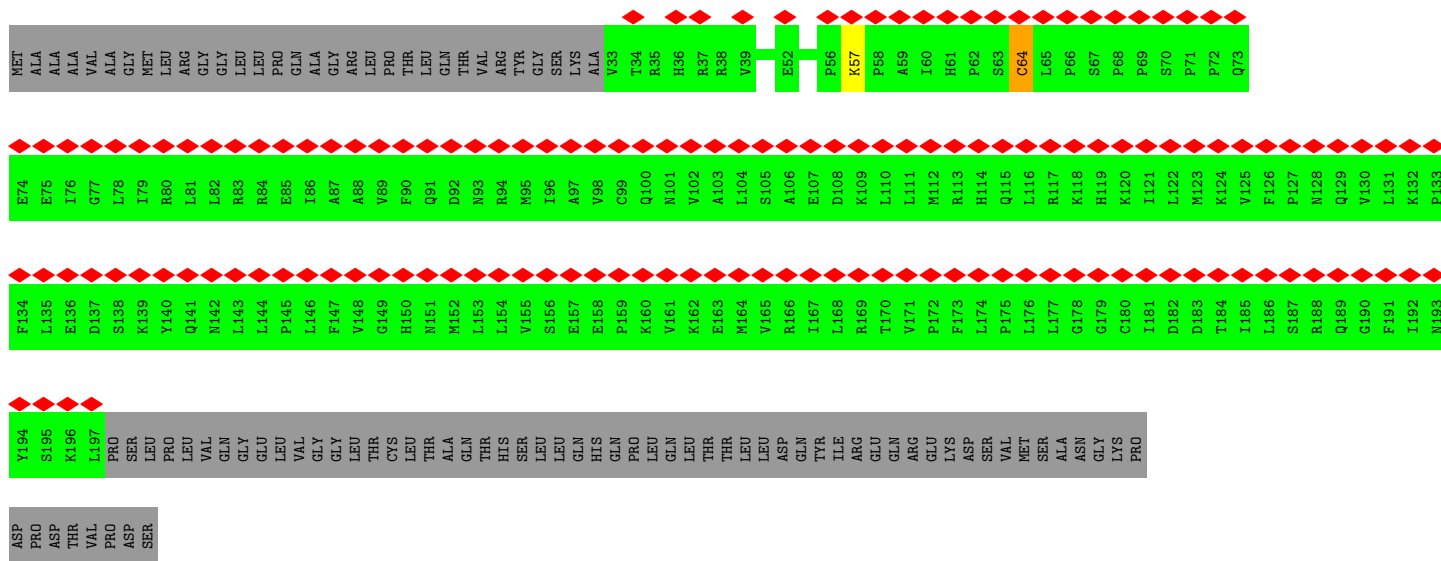
• Molecule 13: 39S ribosomal protein L9, mitochondrial



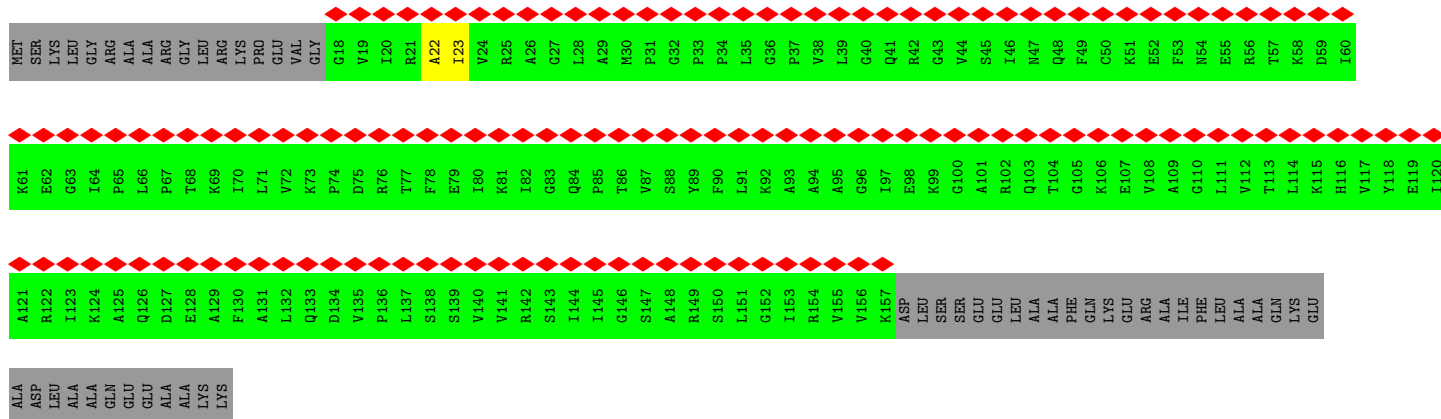
• Molecule 13: 39S ribosomal protein L9, mitochondrial



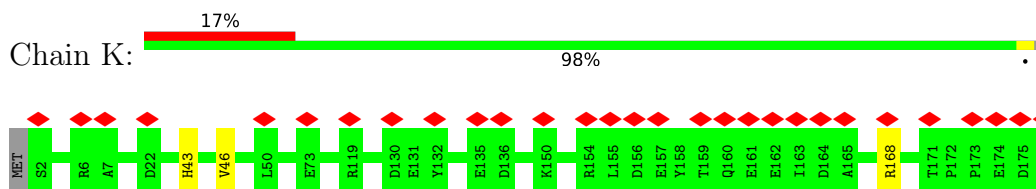
• Molecule 17: 39S ribosomal protein L10, mitochondrial



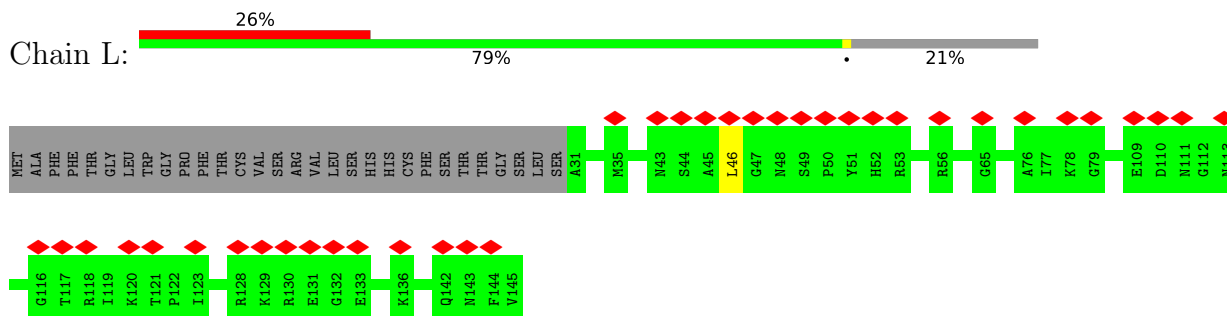
• Molecule 18: 39S ribosomal protein L11, mitochondrial



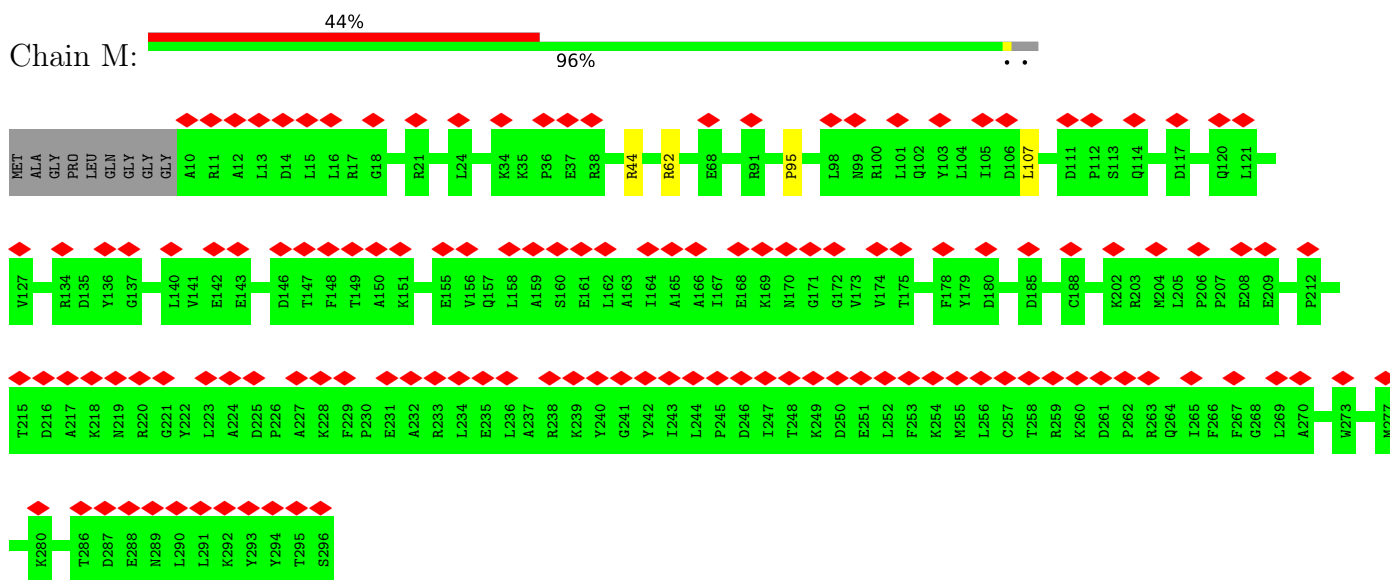
- Molecule 19: 39S ribosomal protein L13, mitochondrial



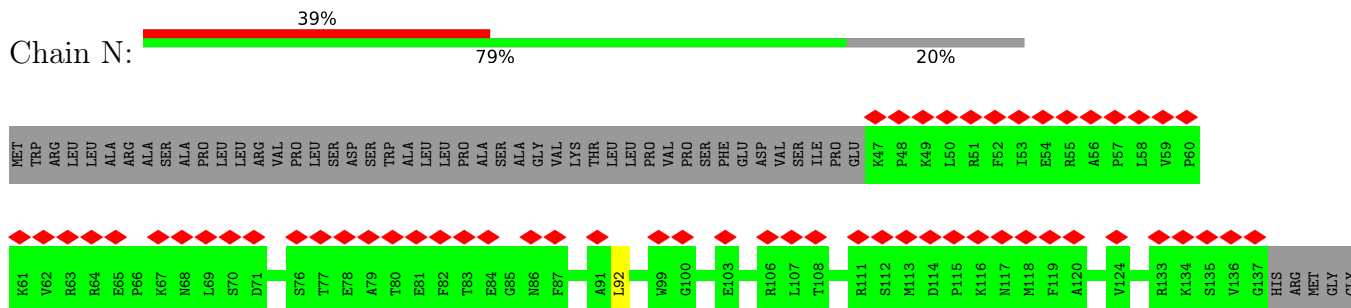
- Molecule 20: 39S ribosomal protein L14, mitochondrial

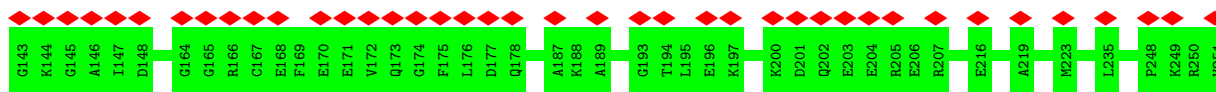


- Molecule 21: 39S ribosomal protein L15, mitochondrial

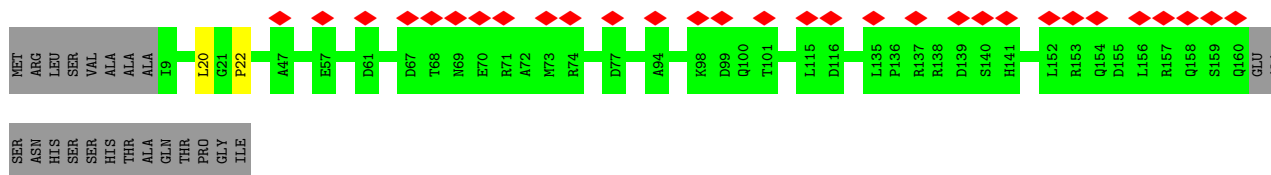
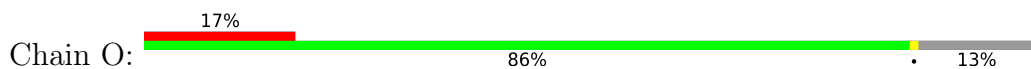


- Molecule 22: 39S ribosomal protein L16, mitochondrial

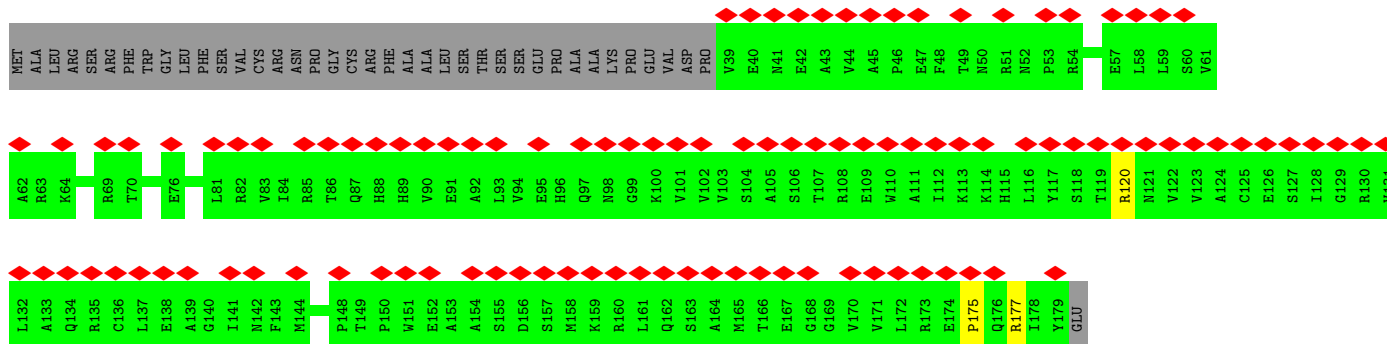
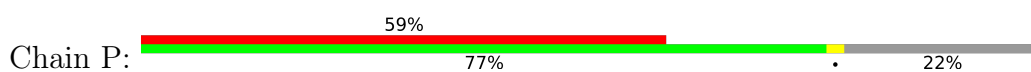




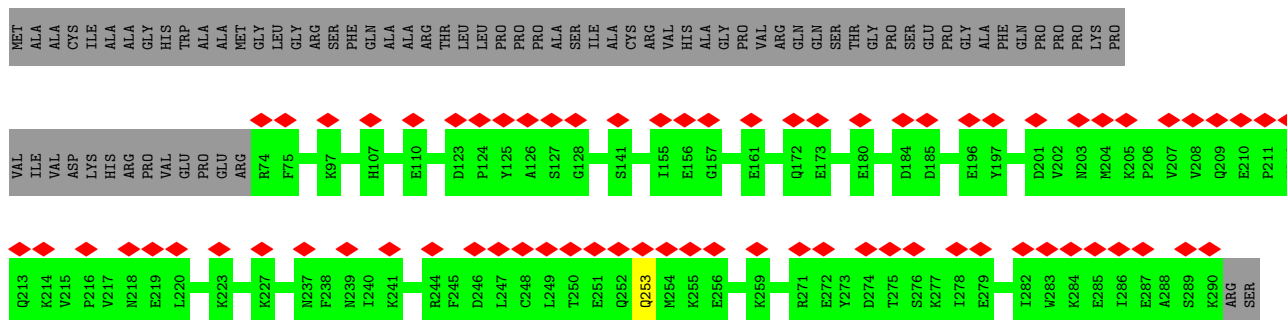
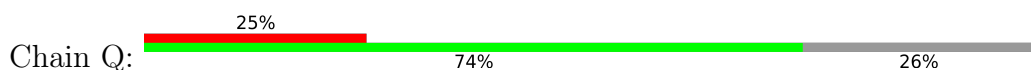
- Molecule 23: 39S ribosomal protein L17, mitochondrial



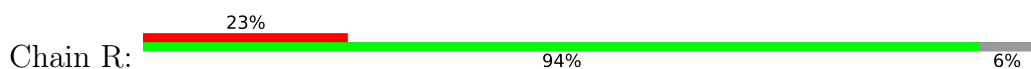
- Molecule 24: 39S ribosomal protein L18, mitochondrial



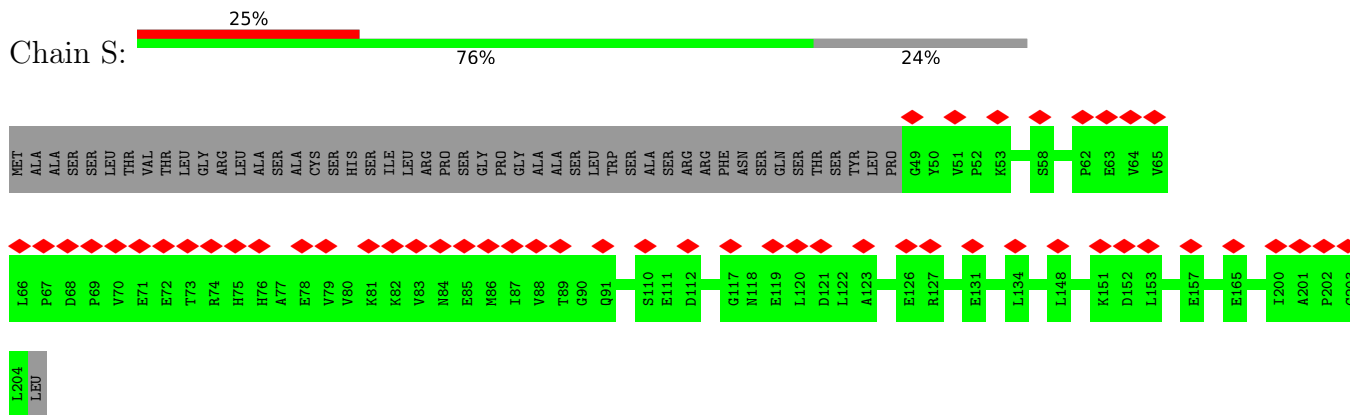
- Molecule 25: 39S ribosomal protein L19, mitochondrial



- Molecule 26: 39S ribosomal protein L20, mitochondrial



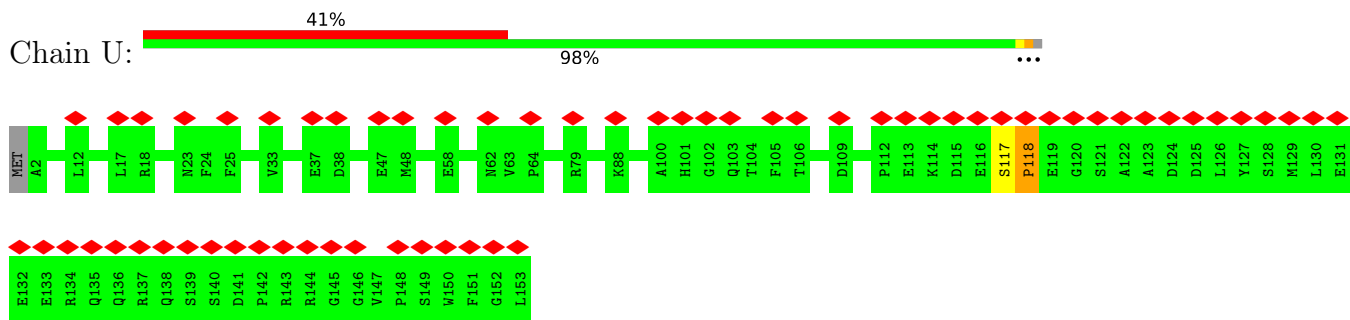
• Molecule 27: 39S ribosomal protein L21, mitochondrial



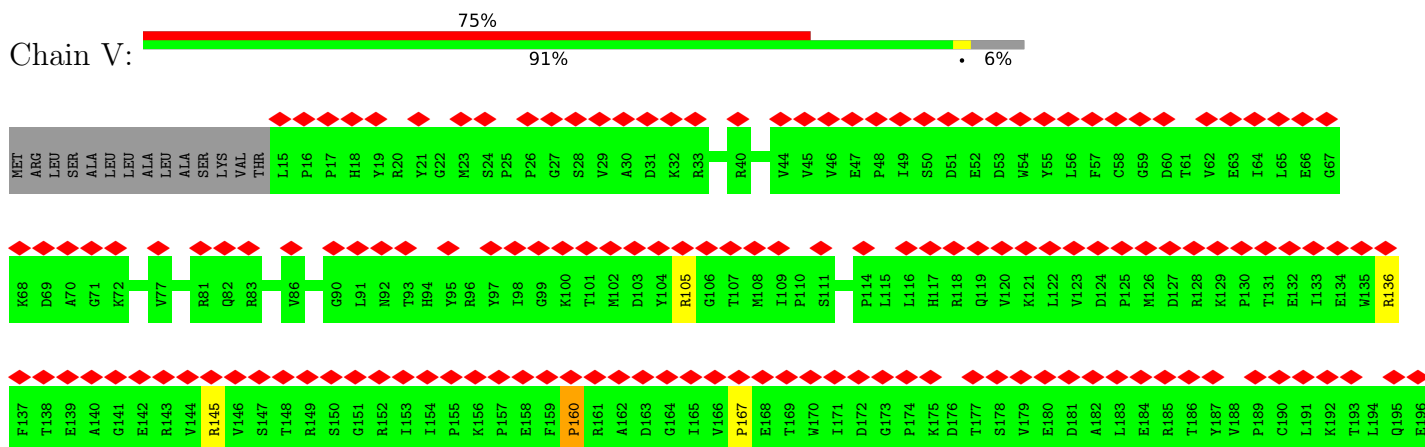
• Molecule 28: 39S ribosomal protein L22, mitochondrial

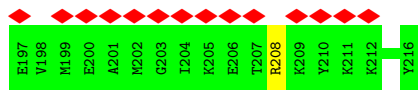


• Molecule 29: 39S ribosomal protein L23, mitochondrial

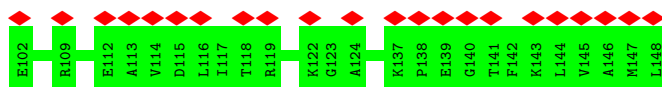
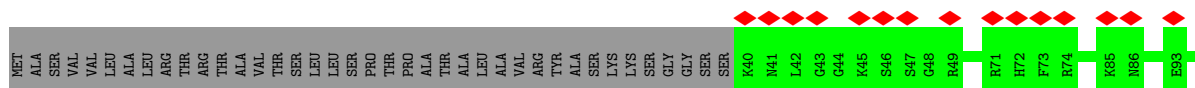
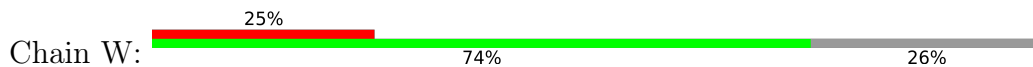


• Molecule 30: 39S ribosomal protein L24, mitochondrial

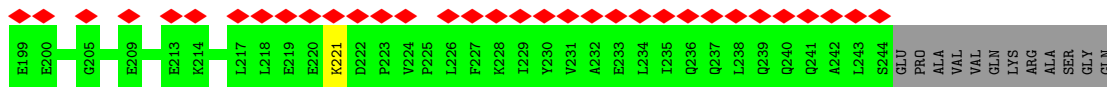
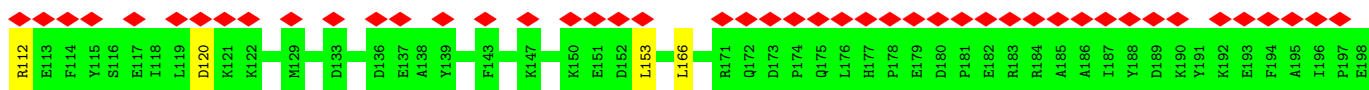
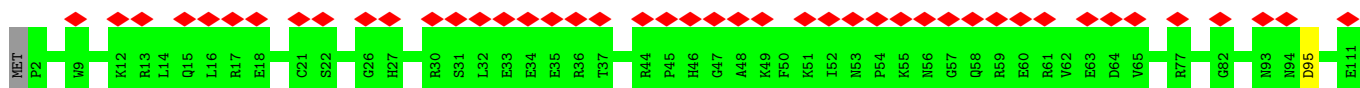
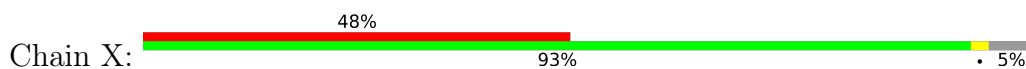




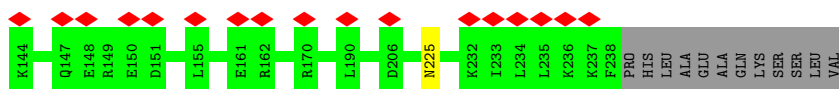
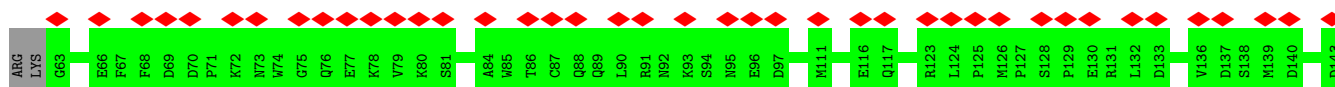
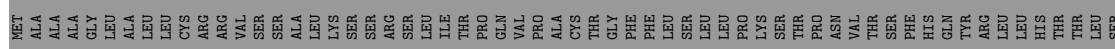
- Molecule 31: 39S ribosomal protein L27, mitochondrial



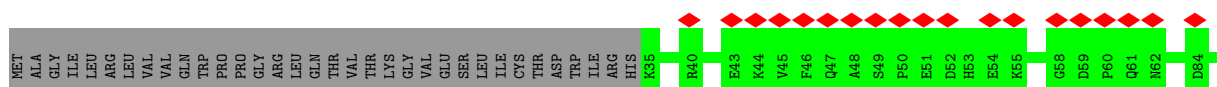
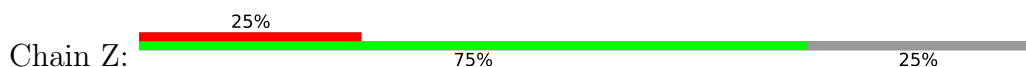
- Molecule 32: 39S ribosomal protein L28, mitochondrial

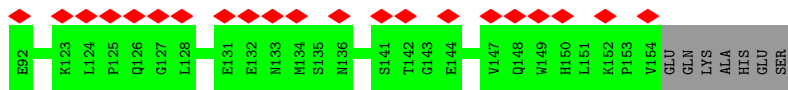


- Molecule 33: 39S ribosomal protein L47, mitochondrial

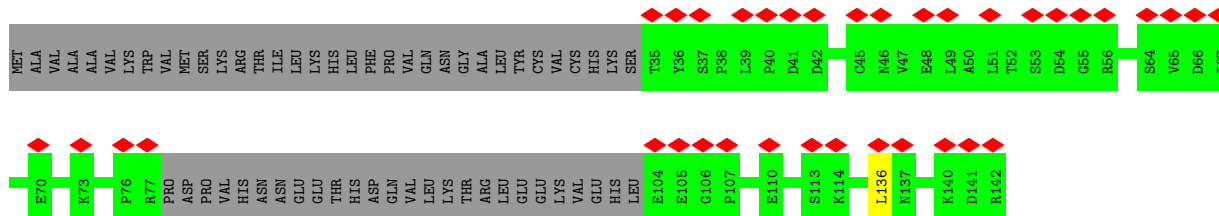


- Molecule 34: 39S ribosomal protein L30, mitochondrial

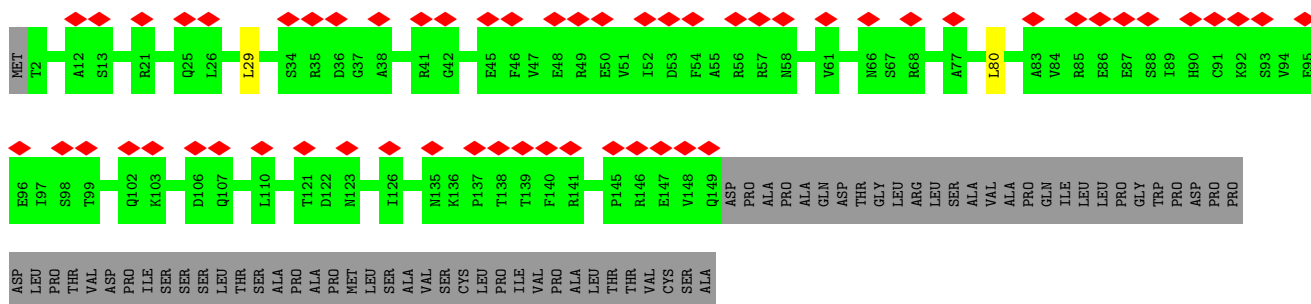




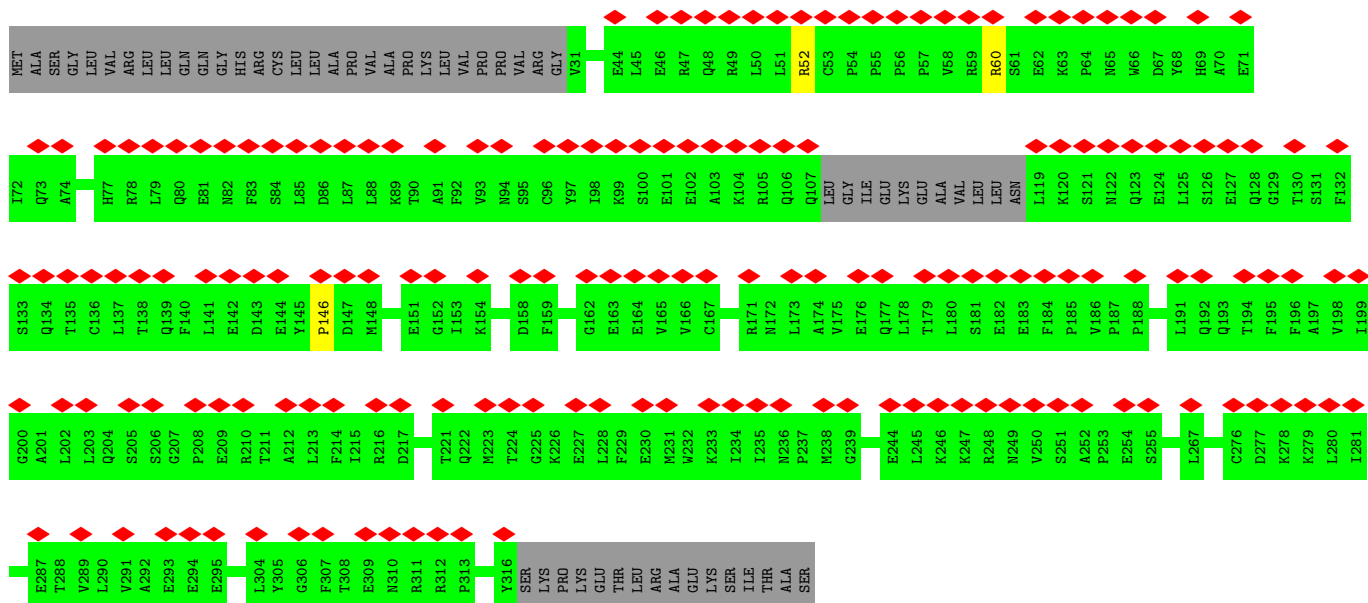
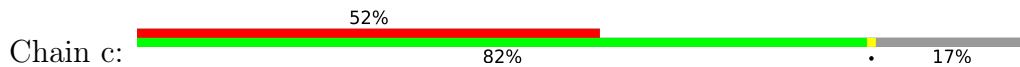
- Molecule 35: 39S ribosomal protein L42, mitochondrial



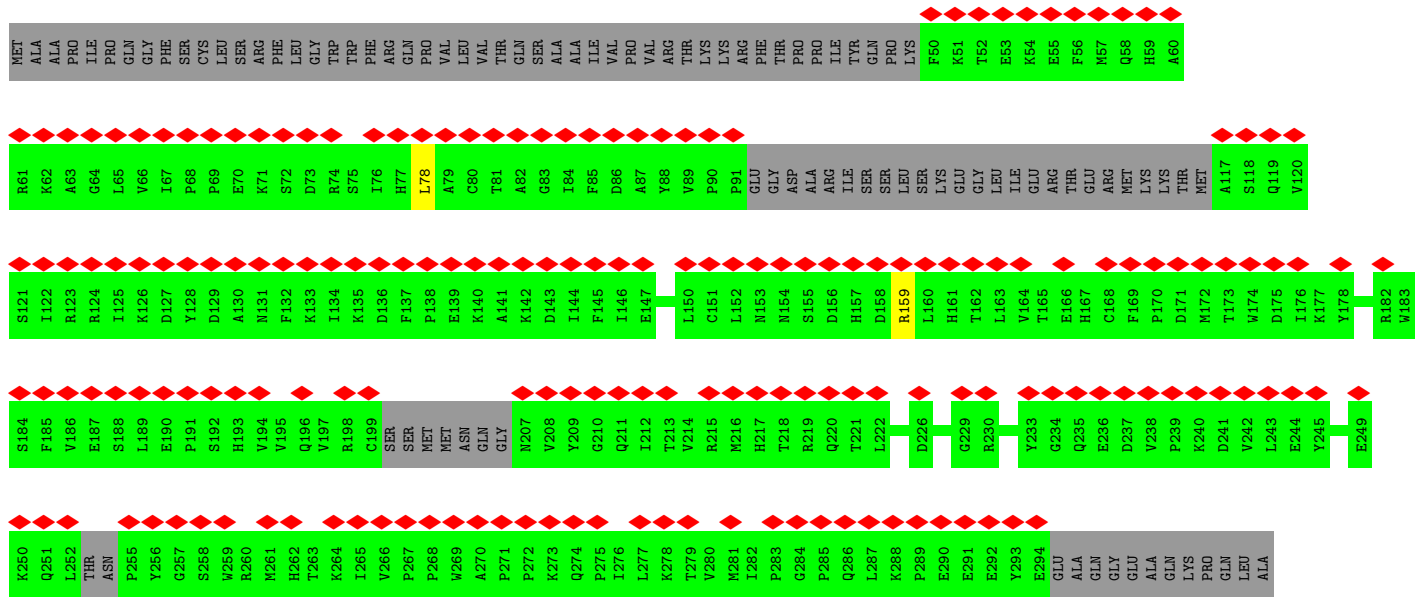
- Molecule 36: 39S ribosomal protein L43, mitochondrial



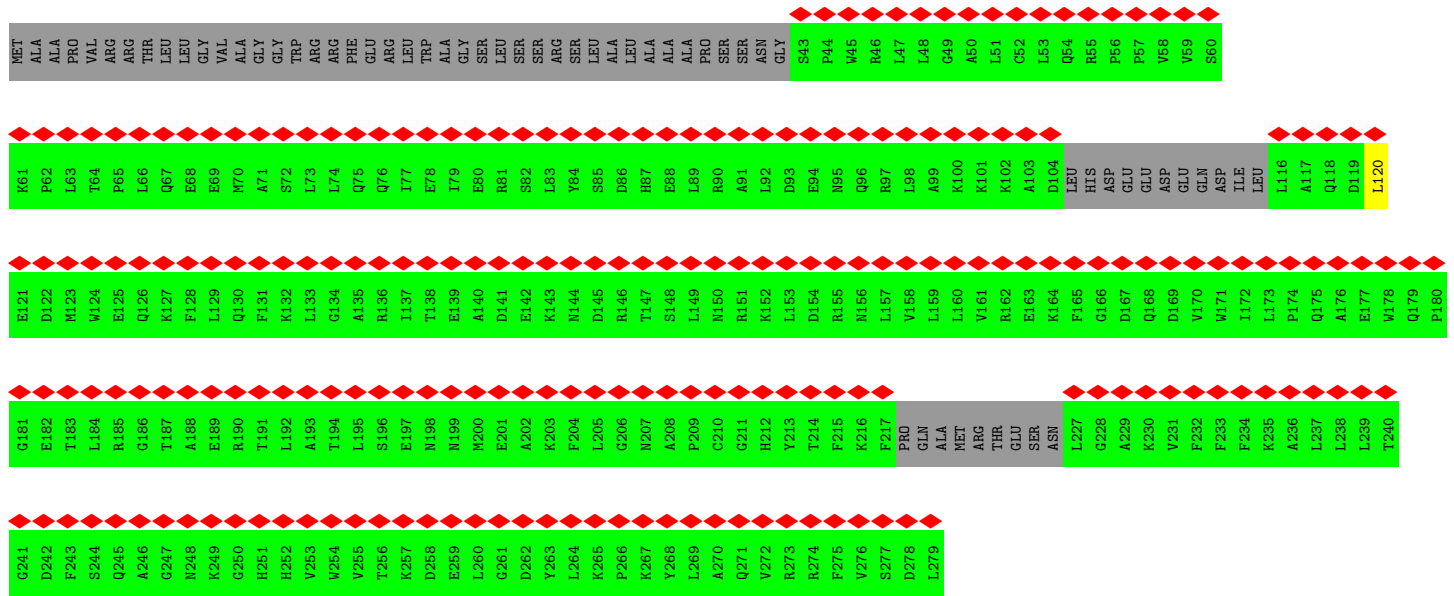
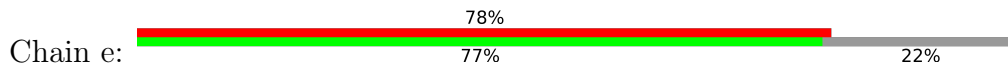
- Molecule 37: 39S ribosomal protein L44, mitochondrial



• Molecule 38: 39S ribosomal protein L45, mitochondrial

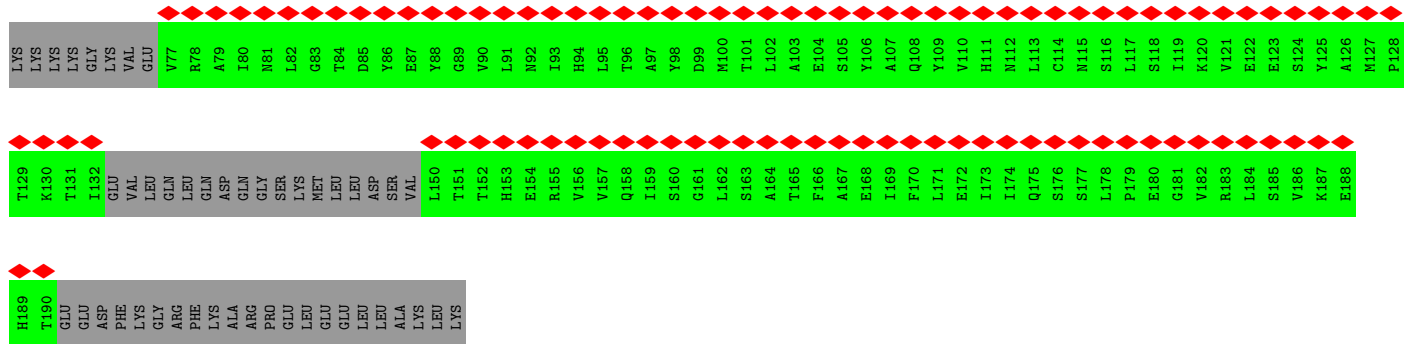


• Molecule 39: 39S ribosomal protein L46, mitochondrial

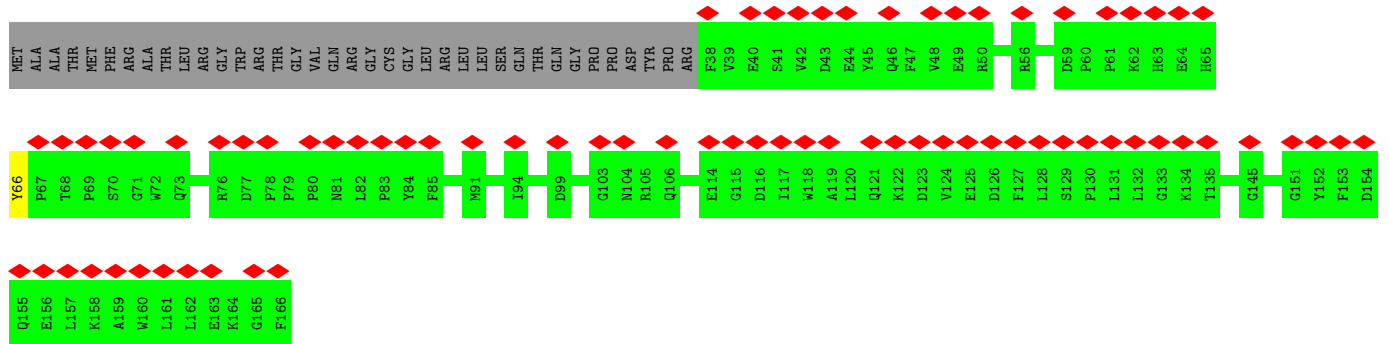
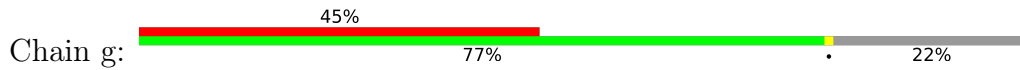


• Molecule 40: 39S ribosomal protein L48, mitochondrial

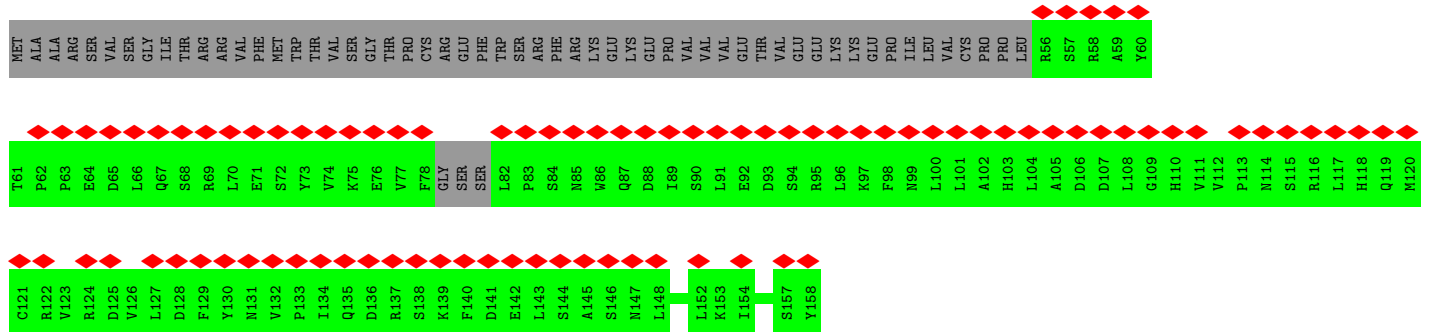




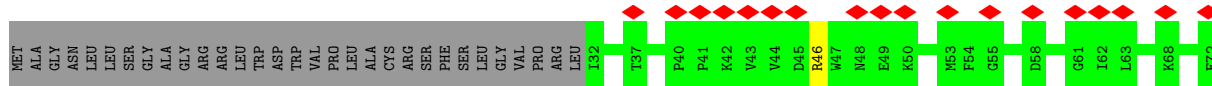
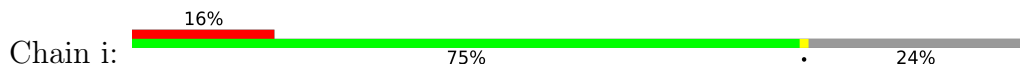
• Molecule 41: 39S ribosomal protein L49, mitochondrial



• Molecule 42: 39S ribosomal protein L50, mitochondrial

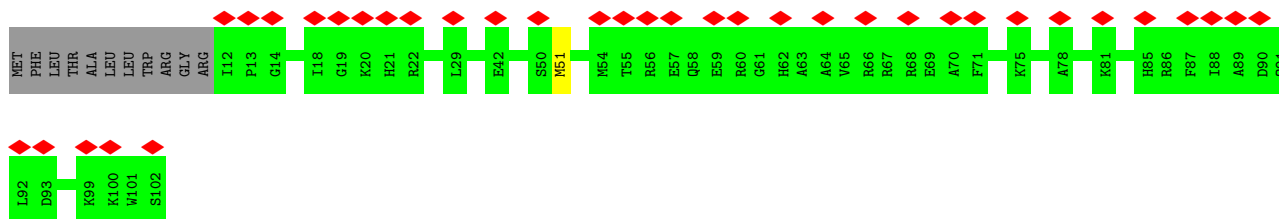
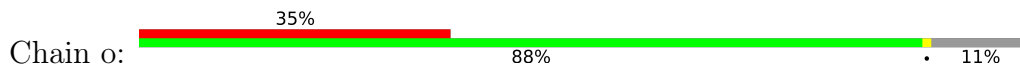


• Molecule 43: 39S ribosomal protein L51, mitochondrial

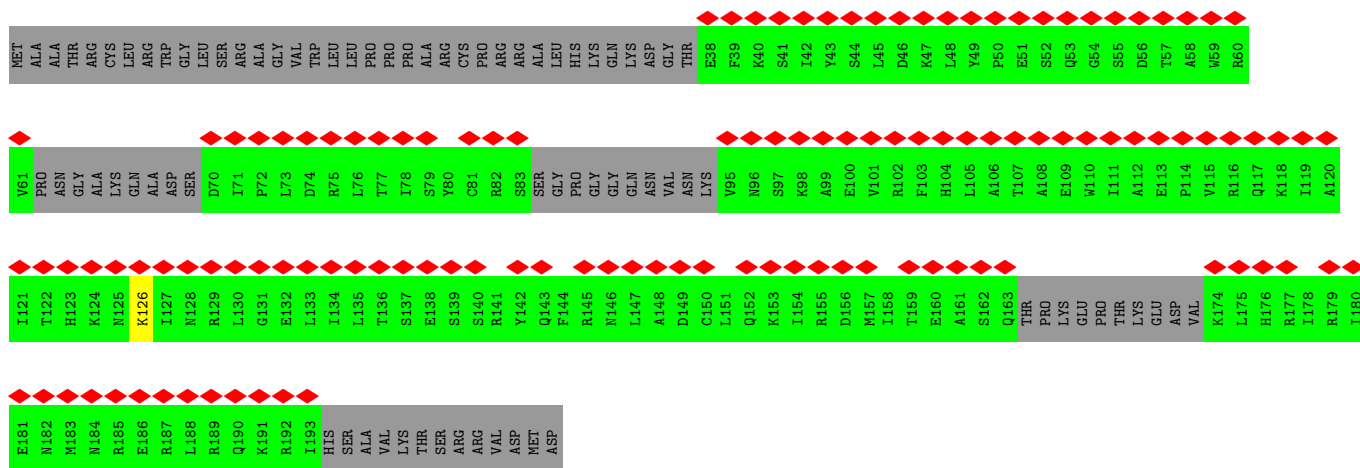


GLN
PHE
TRP
THR
ARG
THR
LYS
LYS

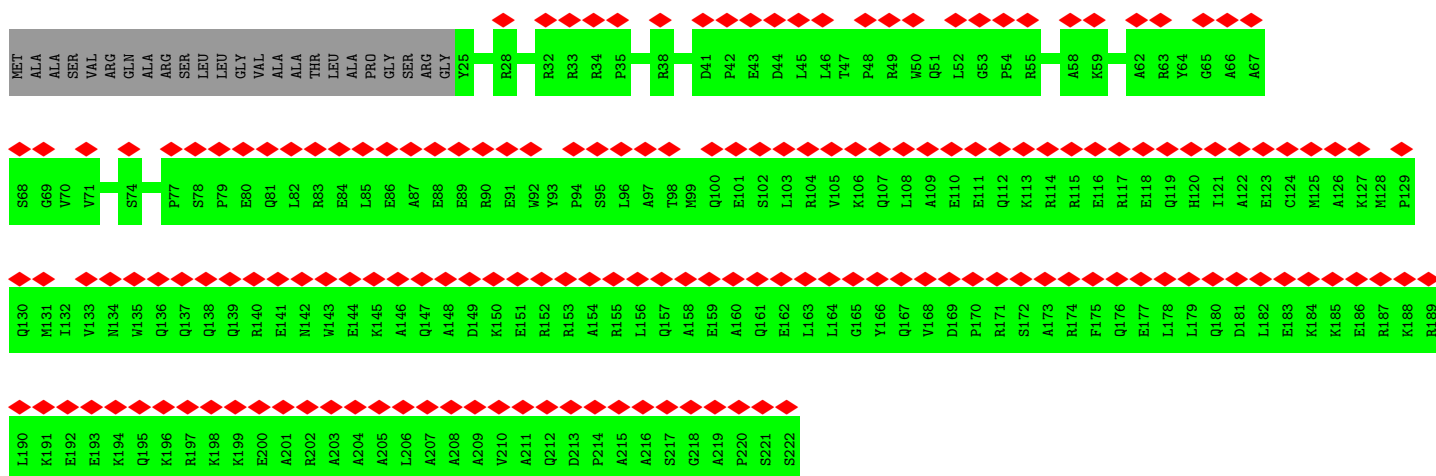
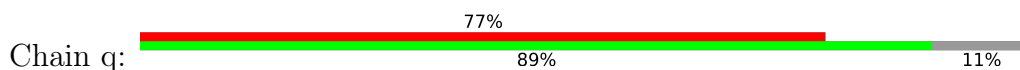
• Molecule 48: Ribosomal protein 63, mitochondrial

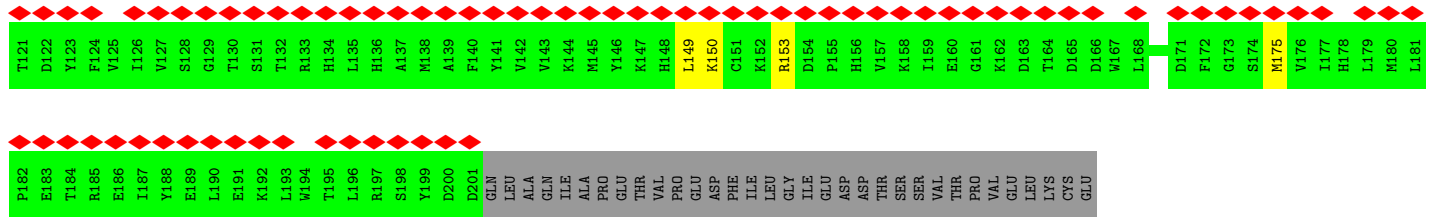


• Molecule 49: Peptidyl-tRNA hydrolase ICT1, mitochondrial



• Molecule 50: Growth arrest and DNA damage-inducible proteins-interacting protein 1

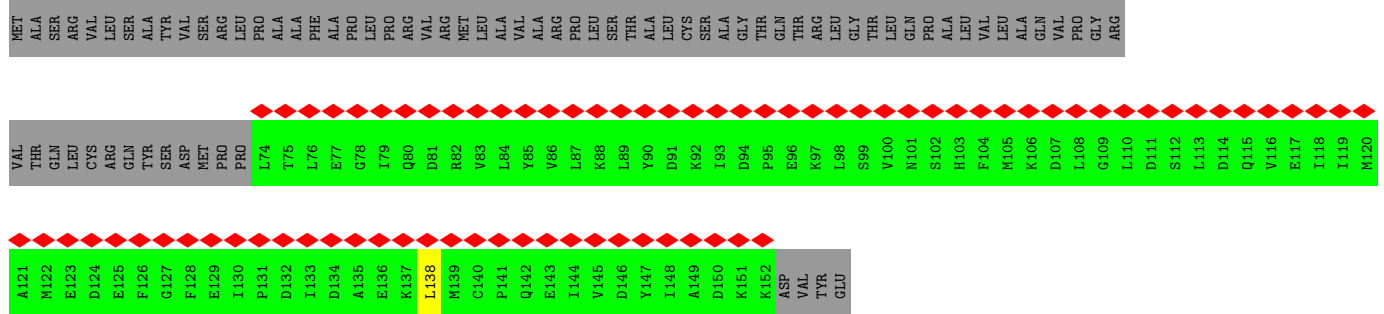




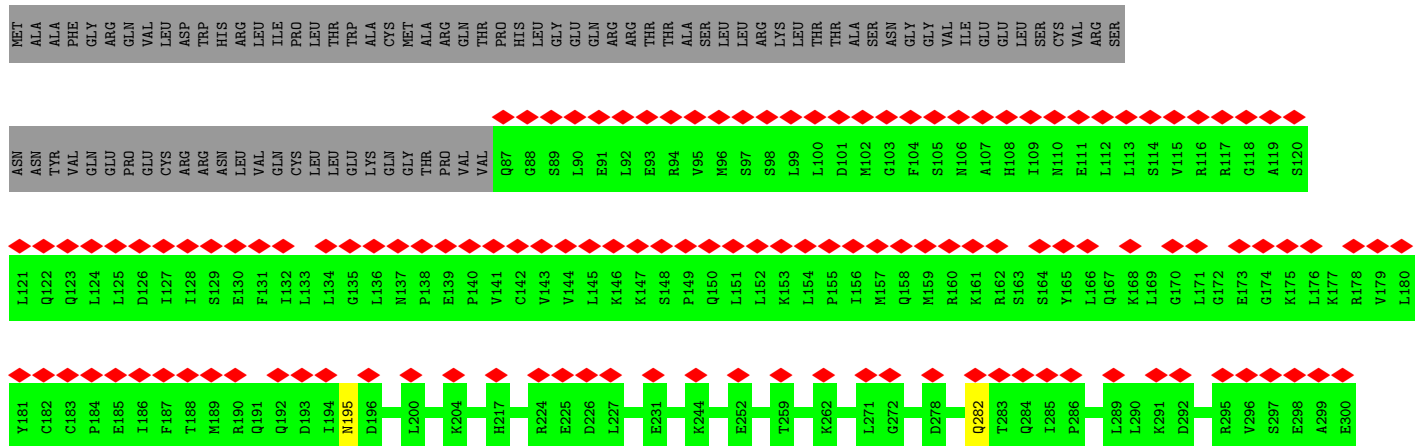
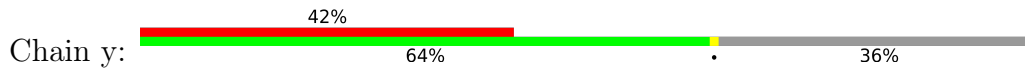
• Molecule 55: MIEF1 upstream open reading frame protein

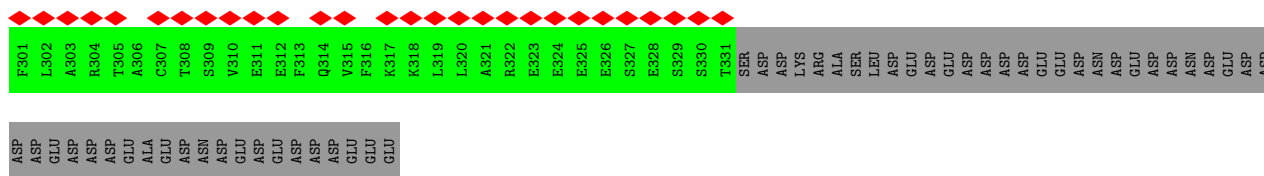


• Molecule 56: Acyl carrier protein, mitochondrial

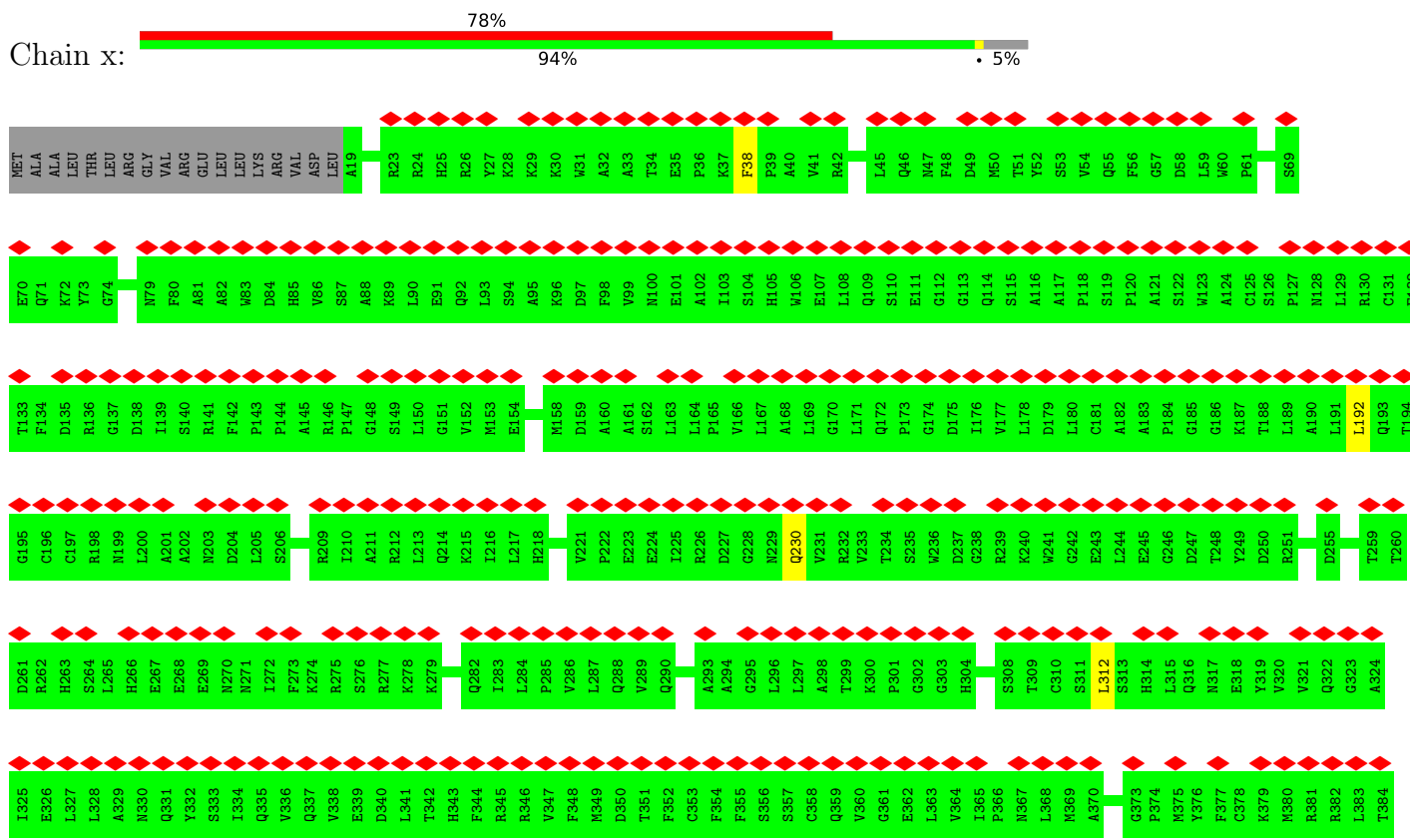


• Molecule 57: Transcription termination factor 4, mitochondrial

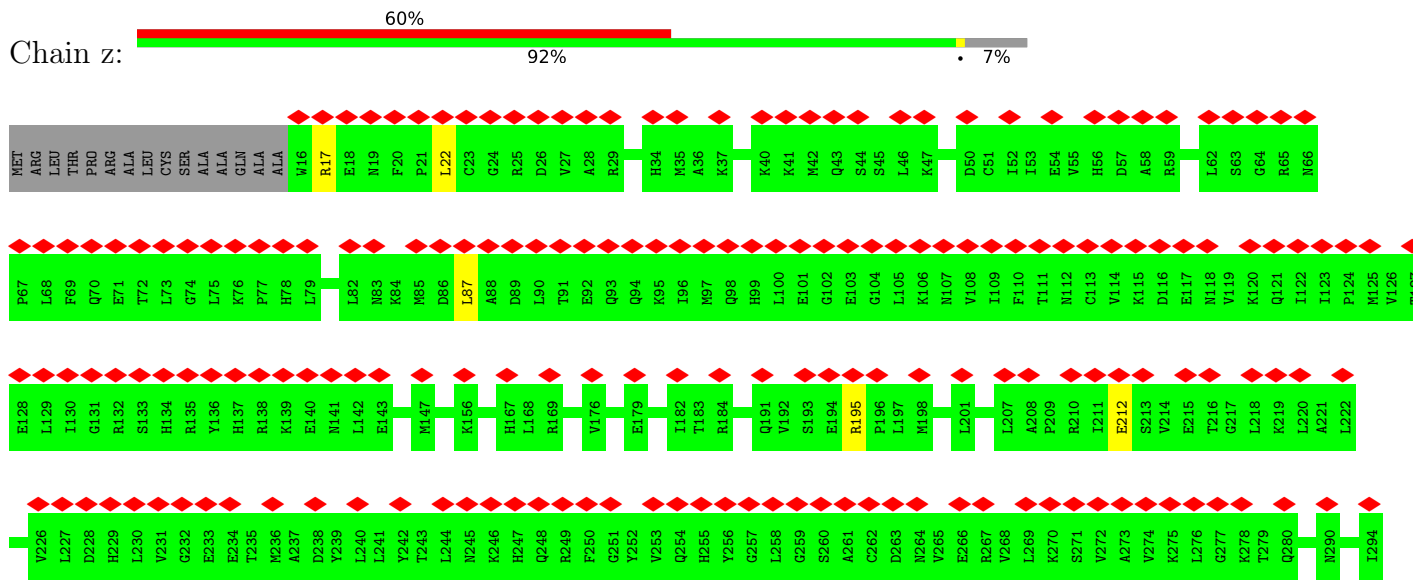


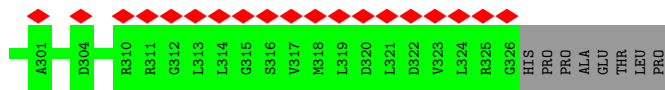


• Molecule 58: 5-methylcytosine rRNA methyltransferase NSUN4



• Molecule 59: Mitochondrial ribosome-associated GTPase 1





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	66340	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 ($e^-/\text{\AA}^2$)	1.1	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	0.723	Depositor
Minimum map value	-0.325	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	532.48, 532.48, 532.48	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.04, 1.04, 1.04	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SAM, GCP, OMG, PSU, OMU, MG, PNS, ZN

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	0	0.37	0/895	0.70	0/1201
2	1	0.29	0/438	0.66	0/583
3	2	0.29	0/373	0.73	0/496
4	3	0.34	0/852	0.67	0/1136
5	4	0.35	0/341	0.78	0/451
6	5	0.33	0/3294	0.70	5/4488 (0.1%)
7	6	0.34	0/2726	0.68	0/3715
8	7	0.33	0/2391	0.63	0/3234
9	8	0.33	0/774	0.72	4/1043 (0.4%)
10	9	0.33	0/972	0.65	0/1306
11	A	0.36	0/30393	0.95	87/47299 (0.2%)
12	B	6.67	7/1504 (0.5%)	1.16	15/2333 (0.6%)
13	C	0.26	0/665	0.58	0/905
13	H	0.29	0/798	0.67	0/1073
14	D	0.38	0/1723	0.77	0/2317
15	E	0.35	0/2465	0.64	1/3344 (0.0%)
16	F	0.37	0/2071	0.71	1/2817 (0.0%)
17	G	0.30	0/1368	0.67	1/1849 (0.1%)
18	J	0.31	0/1077	0.67	1/1452 (0.1%)
19	K	0.38	0/1495	0.73	2/2029 (0.1%)
20	L	0.37	0/904	0.77	1/1218 (0.1%)
21	M	0.35	0/2359	0.79	4/3185 (0.1%)
22	N	0.35	0/1658	0.68	1/2229 (0.0%)
23	O	0.51	1/1269 (0.1%)	0.90	4/1708 (0.2%)
24	P	0.41	0/1173	0.79	1/1588 (0.1%)
25	Q	0.36	0/1846	0.72	0/2487
26	R	0.33	0/1174	0.68	0/1572
27	S	0.35	0/1276	0.71	0/1729
28	T	0.34	0/1402	0.71	2/1886 (0.1%)
29	U	0.34	0/1248	0.68	1/1692 (0.1%)
30	V	0.32	0/1666	0.67	2/2260 (0.1%)
31	W	0.38	0/881	0.69	0/1188

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
32	X	0.35	0/2090	0.73	5/2825 (0.2%)
33	Y	0.33	0/1552	0.66	0/2079
34	Z	0.34	0/1003	0.65	0/1354
35	a	0.35	0/709	0.69	1/963 (0.1%)
36	b	0.38	0/1202	0.75	2/1626 (0.1%)
37	c	0.39	0/2264	0.71	1/3059 (0.0%)
38	d	0.33	0/1790	0.67	1/2423 (0.0%)
39	e	0.28	0/1797	0.63	1/2422 (0.0%)
40	f	0.32	0/931	0.61	0/1259
41	g	0.33	0/1102	0.71	0/1503
42	h	0.32	0/847	0.62	0/1150
43	i	0.39	0/849	0.76	0/1135
44	j	0.33	0/698	0.67	0/940
45	k	0.28	0/635	0.63	0/855
46	l	0.22	0/226	0.67	0/299
47	m	0.35	0/379	0.93	2/510 (0.4%)
48	o	0.33	0/792	0.75	1/1064 (0.1%)
49	p	0.28	0/1071	0.65	1/1433 (0.1%)
50	q	0.27	0/1661	0.58	0/2236
51	r	0.42	0/1238	0.79	2/1676 (0.1%)
52	s	0.36	0/3114	0.72	1/4225 (0.0%)
54	u	0.30	0/949	0.65	1/1281 (0.1%)
55	v	0.27	0/597	0.61	0/796
56	w	0.28	0/647	0.56	1/871 (0.1%)
57	y	0.33	0/2020	0.64	0/2714
58	x	0.34	0/2958	0.73	2/4014 (0.0%)
59	z	0.31	0/2484	0.71	2/3349 (0.1%)
All	All	0.86	8/109076 (0.0%)	0.79	157/153874 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
11	A	2	0
14	D	0	3
17	G	0	1
21	M	0	1
25	Q	0	1
41	g	0	1
51	r	0	1

Continued on next page...

Continued from previous page...

Mol	Chain	#Chirality outliers	#Planarity outliers
58	x	0	1
59	z	0	1
All	All	2	10

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	B	1635	C	N1-C6	125.71	2.12	1.37
12	B	1635	C	N3-C4	111.05	2.11	1.33
12	B	1635	C	C2-N3	99.96	2.15	1.35
12	B	1635	C	C4-C5	89.56	2.14	1.43
12	B	1635	C	C5-C6	84.86	2.02	1.34

The worst 5 of 157 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
23	O	22	PRO	N-CD-CG	-14.56	81.36	103.20
12	B	1624	C	OP1-P-O3'	-11.72	79.41	105.20
12	B	1635	C	C6-N1-C2	11.69	124.97	120.30
12	B	1635	C	N1-C2-N3	-10.28	112.00	119.20
11	A	2079	C	N1-C2-O2	9.35	124.51	118.90

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
11	A	2815	OMG	C3',C4'

5 of 10 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
14	D	122	PHE	Peptide
14	D	206	TYR	Peptide
14	D	208	ARG	Sidechain
17	G	64	CYS	Peptide
21	M	62	ARG	Sidechain

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	0	106/188 (56%)	101 (95%)	5 (5%)	0	100	100
2	1	50/65 (77%)	50 (100%)	0	0	100	100
3	2	43/92 (47%)	42 (98%)	0	1 (2%)	6	28
4	3	93/188 (50%)	93 (100%)	0	0	100	100
5	4	35/103 (34%)	35 (100%)	0	0	100	100
6	5	390/423 (92%)	367 (94%)	22 (6%)	1 (0%)	41	72
7	6	316/380 (83%)	305 (96%)	11 (4%)	0	100	100
8	7	285/338 (84%)	262 (92%)	23 (8%)	0	100	100
9	8	92/206 (45%)	77 (84%)	9 (10%)	6 (6%)	1	8
10	9	113/137 (82%)	104 (92%)	9 (8%)	0	100	100
13	C	78/267 (29%)	68 (87%)	8 (10%)	2 (3%)	5	26
13	H	93/267 (35%)	90 (97%)	3 (3%)	0	100	100
14	D	215/305 (70%)	186 (86%)	28 (13%)	1 (0%)	29	61
15	E	302/348 (87%)	286 (95%)	15 (5%)	1 (0%)	41	72
16	F	248/311 (80%)	234 (94%)	14 (6%)	0	100	100
17	G	163/261 (62%)	155 (95%)	8 (5%)	0	100	100
18	J	138/192 (72%)	120 (87%)	17 (12%)	1 (1%)	22	55
19	K	175/178 (98%)	167 (95%)	8 (5%)	0	100	100
20	L	113/145 (78%)	104 (92%)	9 (8%)	0	100	100
21	M	285/296 (96%)	270 (95%)	15 (5%)	0	100	100
22	N	196/251 (78%)	189 (96%)	7 (4%)	0	100	100
23	O	150/175 (86%)	144 (96%)	6 (4%)	0	100	100
24	P	139/180 (77%)	133 (96%)	6 (4%)	0	100	100
25	Q	215/292 (74%)	200 (93%)	15 (7%)	0	100	100
26	R	138/149 (93%)	136 (99%)	2 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
27	S	154/205 (75%)	146 (95%)	8 (5%)	0	100	100
28	T	164/206 (80%)	158 (96%)	6 (4%)	0	100	100
29	U	150/153 (98%)	137 (91%)	11 (7%)	2 (1%)	12	39
30	V	200/216 (93%)	192 (96%)	7 (4%)	1 (0%)	29	61
31	W	107/148 (72%)	107 (100%)	0	0	100	100
32	X	241/256 (94%)	228 (95%)	13 (5%)	0	100	100
33	Y	174/250 (70%)	170 (98%)	4 (2%)	0	100	100
34	Z	118/161 (73%)	113 (96%)	5 (4%)	0	100	100
35	a	78/142 (55%)	74 (95%)	4 (5%)	0	100	100
36	b	146/215 (68%)	134 (92%)	12 (8%)	0	100	100
37	c	271/332 (82%)	264 (97%)	7 (3%)	0	100	100
38	d	203/306 (66%)	194 (96%)	9 (4%)	0	100	100
39	e	211/279 (76%)	196 (93%)	15 (7%)	0	100	100
40	f	110/212 (52%)	97 (88%)	13 (12%)	0	100	100
41	g	127/166 (76%)	118 (93%)	9 (7%)	0	100	100
42	h	96/158 (61%)	92 (96%)	4 (4%)	0	100	100
43	i	95/128 (74%)	91 (96%)	4 (4%)	0	100	100
44	j	83/123 (68%)	80 (96%)	3 (4%)	0	100	100
45	k	76/112 (68%)	73 (96%)	3 (4%)	0	100	100
46	l	21/138 (15%)	21 (100%)	0	0	100	100
47	m	43/128 (34%)	35 (81%)	8 (19%)	0	100	100
48	o	89/102 (87%)	82 (92%)	7 (8%)	0	100	100
49	p	119/206 (58%)	117 (98%)	2 (2%)	0	100	100
50	q	196/222 (88%)	195 (100%)	1 (0%)	0	100	100
51	r	140/196 (71%)	134 (96%)	6 (4%)	0	100	100
52	s	366/439 (83%)	354 (97%)	12 (3%)	0	100	100
54	u	109/234 (47%)	102 (94%)	6 (6%)	1 (1%)	17	49
55	v	67/70 (96%)	66 (98%)	1 (2%)	0	100	100
56	w	77/156 (49%)	69 (90%)	8 (10%)	0	100	100
57	y	243/381 (64%)	228 (94%)	14 (6%)	1 (0%)	34	67
58	x	364/384 (95%)	326 (90%)	37 (10%)	1 (0%)	41	72

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
59	z	309/334 (92%)	275 (89%)	33 (11%)	1 (0%)	41	72
All	All	9118/12495 (73%)	8586 (94%)	512 (6%)	20 (0%)	50	78

5 of 20 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	2	52	GLU
6	5	217	SER
9	8	182	ILE
9	8	184	ASN
9	8	186	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	0	97/164 (59%)	96 (99%)	1 (1%)	76	88
2	1	49/60 (82%)	48 (98%)	1 (2%)	55	77
3	2	39/72 (54%)	39 (100%)	0	100	100
4	3	88/166 (53%)	88 (100%)	0	100	100
5	4	36/89 (40%)	36 (100%)	0	100	100
6	5	353/368 (96%)	353 (100%)	0	100	100
7	6	265/332 (80%)	264 (100%)	1 (0%)	91	95
8	7	263/303 (87%)	261 (99%)	2 (1%)	81	91
9	8	76/190 (40%)	76 (100%)	0	100	100
10	9	99/112 (88%)	98 (99%)	1 (1%)	76	88
13	C	73/228 (32%)	73 (100%)	0	100	100
13	H	86/228 (38%)	85 (99%)	1 (1%)	71	85
14	D	175/245 (71%)	173 (99%)	2 (1%)	73	86
15	E	259/290 (89%)	259 (100%)	0	100	100
16	F	217/262 (83%)	217 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
17	G	153/232 (66%)	152 (99%)	1 (1%)	84	92
18	J	113/150 (75%)	113 (100%)	0	100	100
19	K	155/156 (99%)	154 (99%)	1 (1%)	86	94
20	L	98/124 (79%)	98 (100%)	0	100	100
21	M	245/249 (98%)	244 (100%)	1 (0%)	91	95
22	N	169/211 (80%)	169 (100%)	0	100	100
23	O	133/150 (89%)	133 (100%)	0	100	100
24	P	123/155 (79%)	121 (98%)	2 (2%)	62	81
25	Q	199/256 (78%)	199 (100%)	0	100	100
26	R	118/126 (94%)	118 (100%)	0	100	100
27	S	141/180 (78%)	141 (100%)	0	100	100
28	T	146/176 (83%)	146 (100%)	0	100	100
29	U	124/135 (92%)	124 (100%)	0	100	100
30	V	172/191 (90%)	168 (98%)	4 (2%)	50	74
31	W	89/119 (75%)	89 (100%)	0	100	100
32	X	219/229 (96%)	217 (99%)	2 (1%)	78	90
33	Y	159/223 (71%)	158 (99%)	1 (1%)	86	94
34	Z	111/147 (76%)	111 (100%)	0	100	100
35	a	78/133 (59%)	78 (100%)	0	100	100
36	b	130/186 (70%)	130 (100%)	0	100	100
37	c	241/288 (84%)	239 (99%)	2 (1%)	81	91
38	d	193/274 (70%)	192 (100%)	1 (0%)	88	94
39	e	188/236 (80%)	188 (100%)	0	100	100
40	f	101/188 (54%)	101 (100%)	0	100	100
41	g	119/148 (80%)	119 (100%)	0	100	100
42	h	95/148 (64%)	95 (100%)	0	100	100
43	i	86/110 (78%)	85 (99%)	1 (1%)	71	85
44	j	68/97 (70%)	67 (98%)	1 (2%)	65	82
45	k	71/90 (79%)	71 (100%)	0	100	100
46	l	23/116 (20%)	23 (100%)	0	100	100
47	m	40/113 (35%)	40 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
48	o	78/87 (90%)	78 (100%)	0	100	100
49	p	117/181 (65%)	117 (100%)	0	100	100
50	q	163/178 (92%)	163 (100%)	0	100	100
51	r	133/169 (79%)	133 (100%)	0	100	100
52	s	326/381 (86%)	325 (100%)	1 (0%)	92	97
54	u	105/200 (52%)	103 (98%)	2 (2%)	57	78
55	v	59/60 (98%)	58 (98%)	1 (2%)	60	80
56	w	73/136 (54%)	73 (100%)	0	100	100
57	y	227/350 (65%)	226 (100%)	1 (0%)	91	95
58	x	313/328 (95%)	313 (100%)	0	100	100
59	z	270/287 (94%)	269 (100%)	1 (0%)	91	95
All	All	8139/10802 (75%)	8107 (100%)	32 (0%)	91	95

5 of 32 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
54	u	175	MET
55	v	6	ARG
24	P	120	ARG
21	M	44	ARG
57	y	195	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
33	Y	117	GLN
38	d	211	GLN
58	x	79	ASN
50	q	134	ASN
19	K	26	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
11	A	1269/1559 (81%)	322 (25%)	20 (1%)
12	B	61/69 (88%)	31 (50%)	2 (3%)

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
All	All	1330/1628 (81%)	353 (26%)	22 (1%)

5 of 353 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
11	A	1674	A
11	A	1675	A
11	A	1676	A
11	A	1679	U
11	A	1680	A

5 of 22 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
11	A	2631	G
11	A	2816	G
11	A	2815	OMG
11	A	2818	C
11	A	2243	A

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

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

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
11	OMG	A	2815	11	2/2/5/5	-	-

There are no bond length outliers.

There are no bond angle outliers.

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
11	A	2815	OMG	C3'
11	A	2815	OMG	C4'

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 275 ligands modelled in this entry, 93 are monoatomic - leaving 182 for Mogul analysis.

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
70	GCP	z	409	-	2/2/7/7	-	-
69	SAM	x	401	58	1/1/7/7	-	-
70	GCP	z	408	-	1/1/7/7	-	-
64	OMG	A	3301	11,62	3/3/5/5	-	-

There are no bond length outliers.

There are no bond angle outliers.

5 of 7 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
64	A	3301	OMG	C4'
64	A	3301	OMG	C2'
64	A	3301	OMG	C1'
69	x	401	SAM	CA
70	z	408	GCP	C2'

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

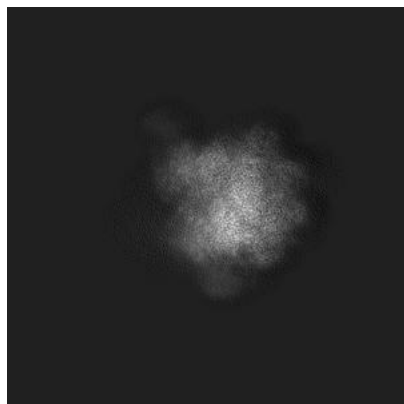
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13329. These allow visual inspection of the internal detail of the map and identification of artifacts.

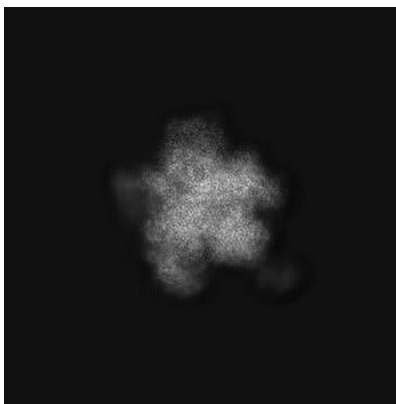
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

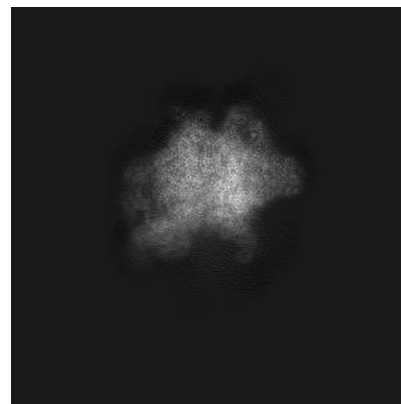
6.1.1 Primary map



X

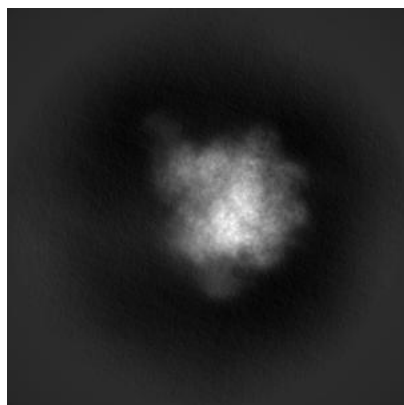


Y

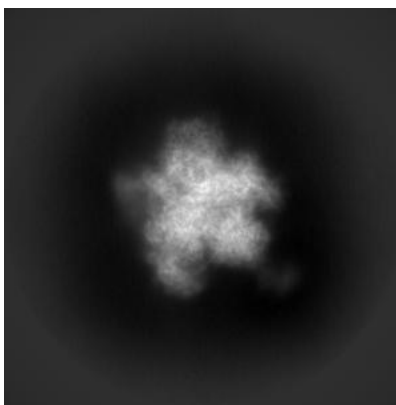


Z

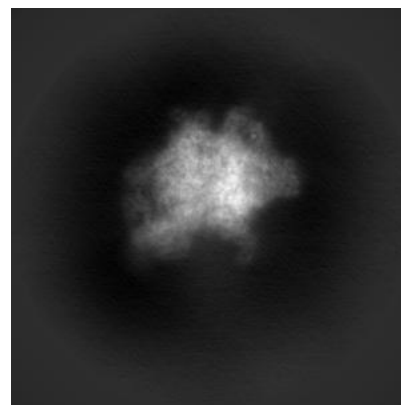
6.1.2 Raw map



X



Y

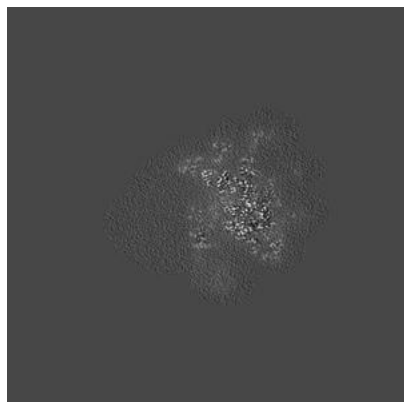


Z

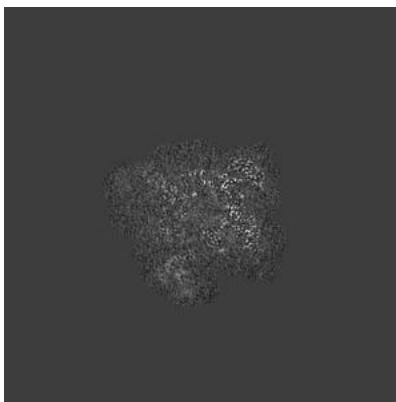
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

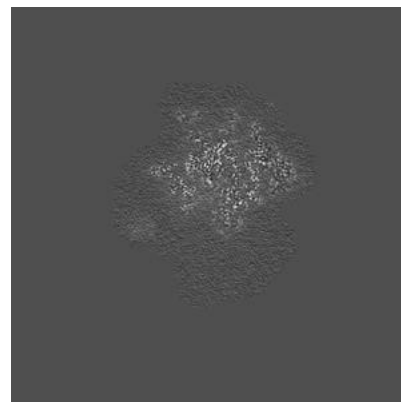
6.2.1 Primary map



X Index: 256

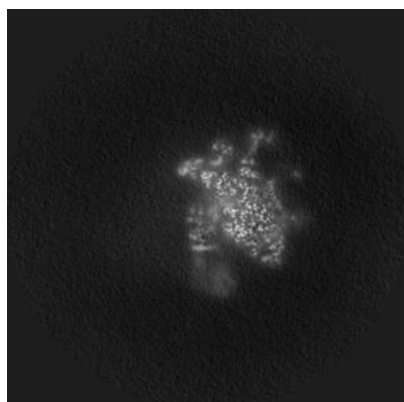


Y Index: 256

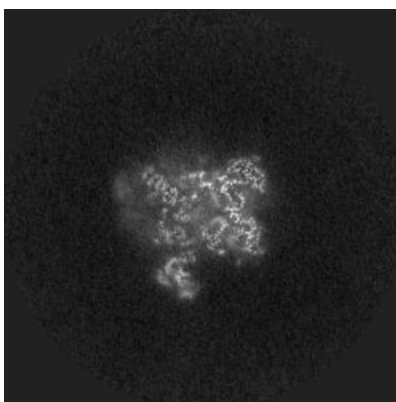


Z Index: 256

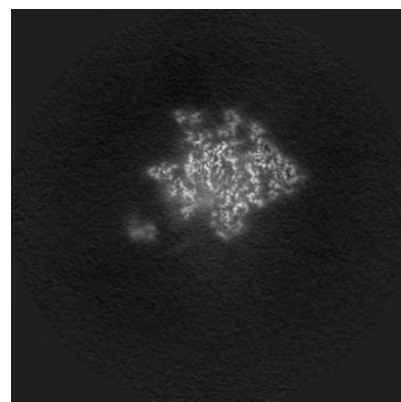
6.2.2 Raw map



X Index: 256



Y Index: 256

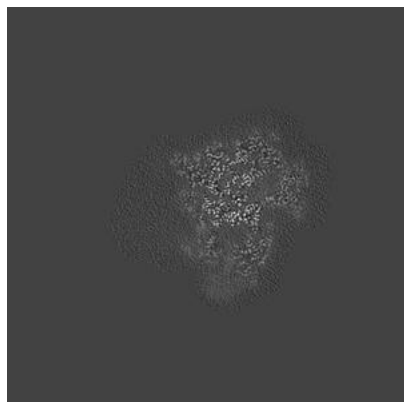


Z Index: 256

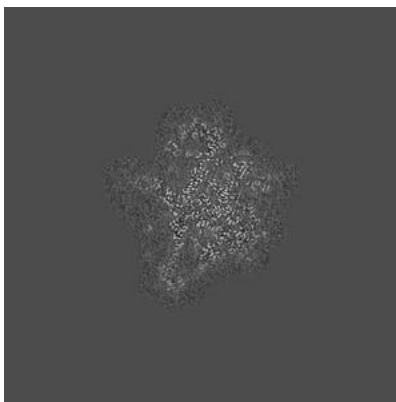
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

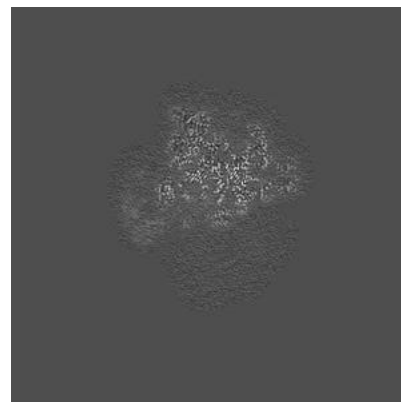
6.3.1 Primary map



X Index: 286

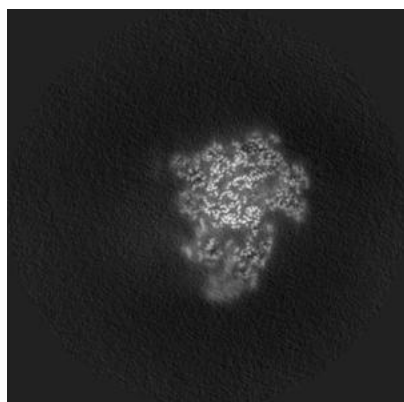


Y Index: 304

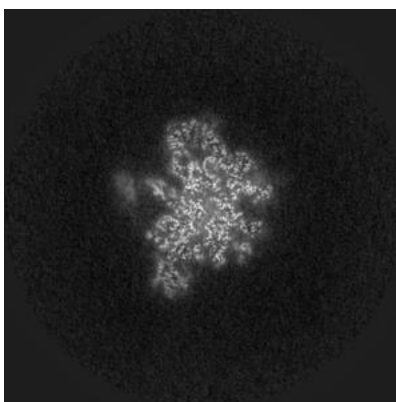


Z Index: 240

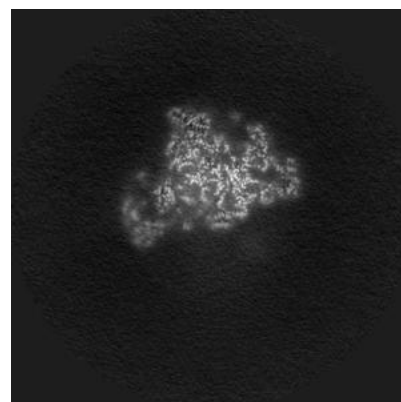
6.3.2 Raw map



X Index: 285



Y Index: 291

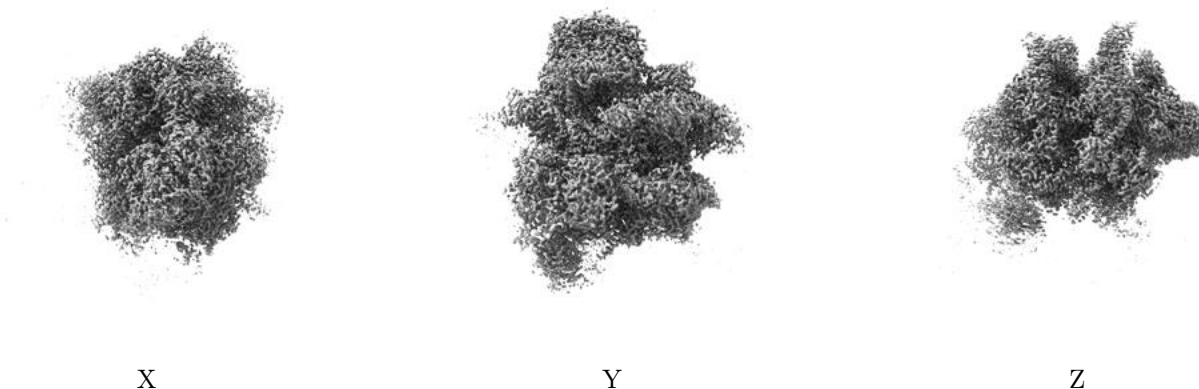


Z Index: 240

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

6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.15. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.4.2 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.

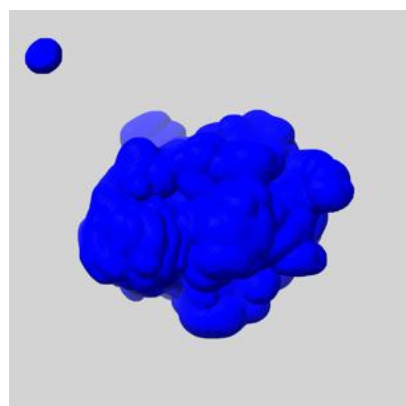
6.5 Mask visualisation [i](#)

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

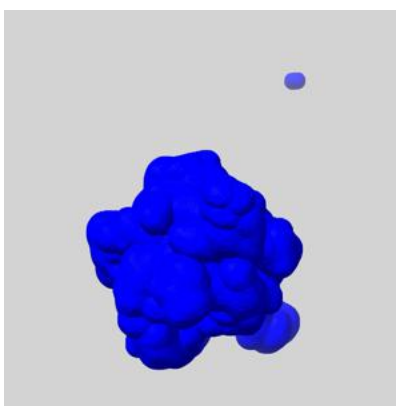
A mask typically either:

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

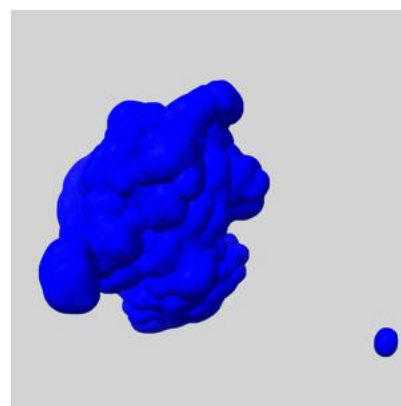
6.5.1 emd_13329_msk_1.map [i](#)



X



Y

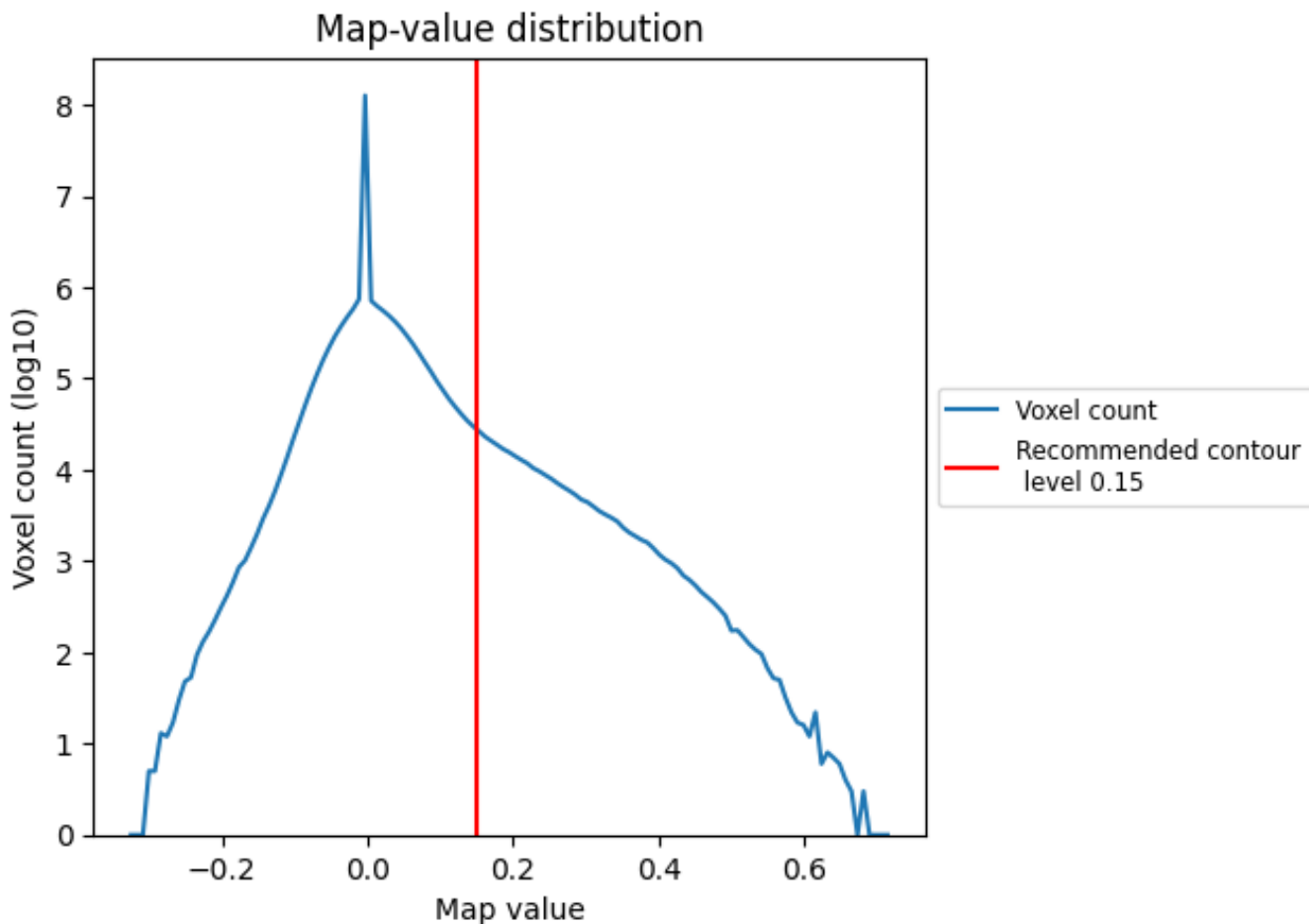


Z

7 Map analysis [i](#)

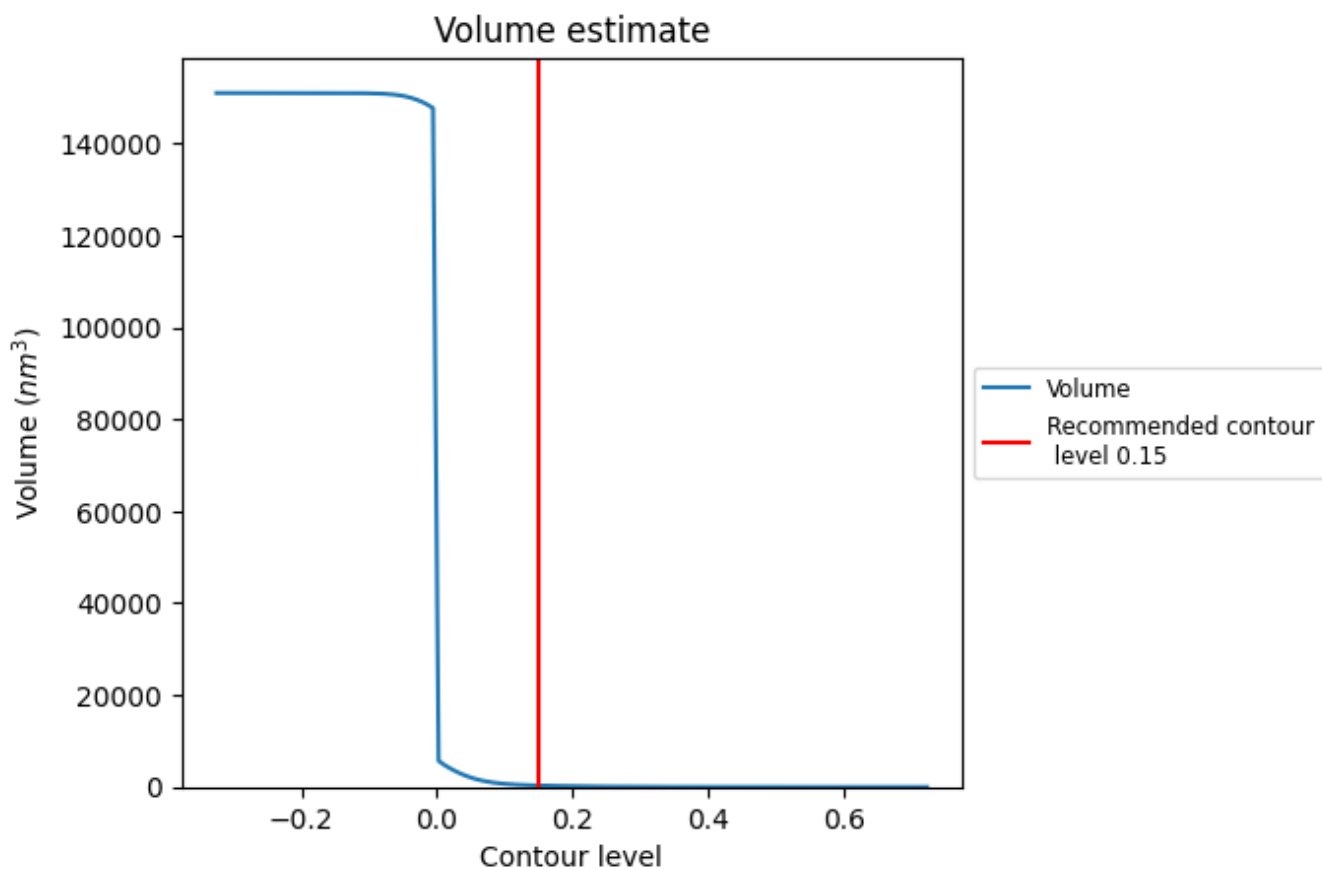
This section contains the results of statistical analysis of the map.

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.

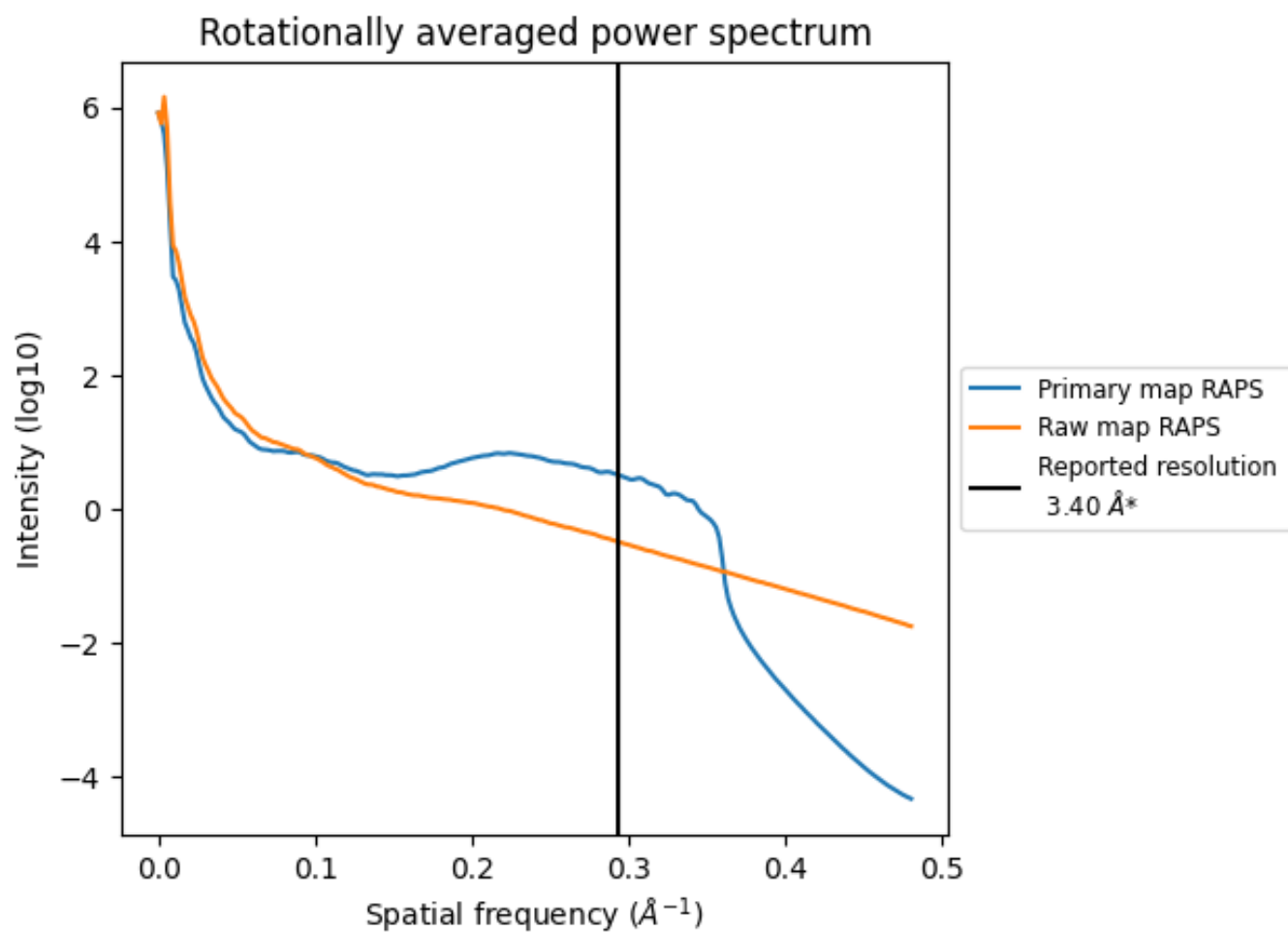
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 315 nm^3 ; this corresponds to an approximate mass of 284 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](#)

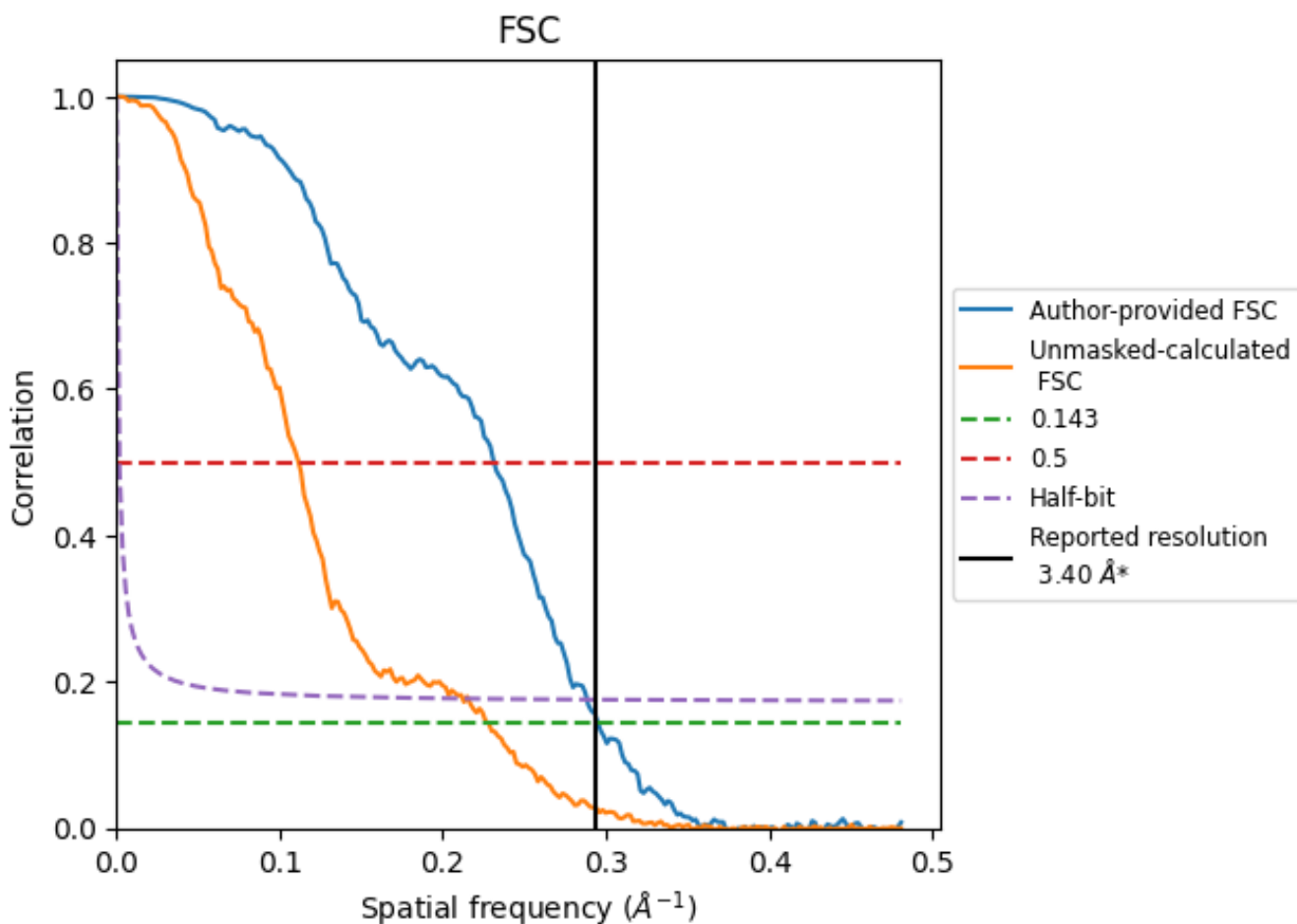


*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

8.2 Resolution estimates [i](#)

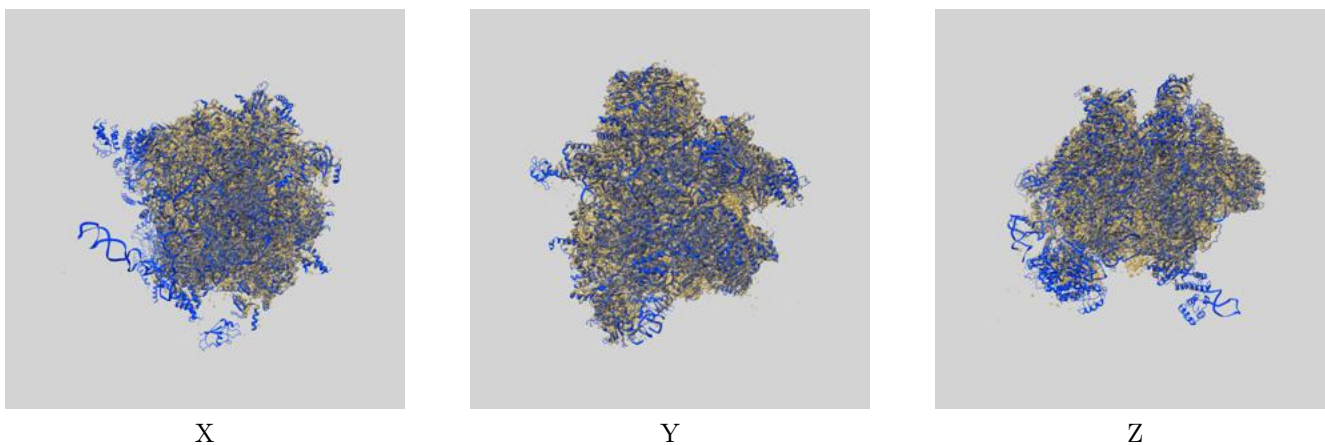
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.39	4.32	3.47
Unmasked-calculated*	4.38	8.96	4.71

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.38 differs from the reported value 3.4 by more than 10 %

9 Map-model fit [i](#)

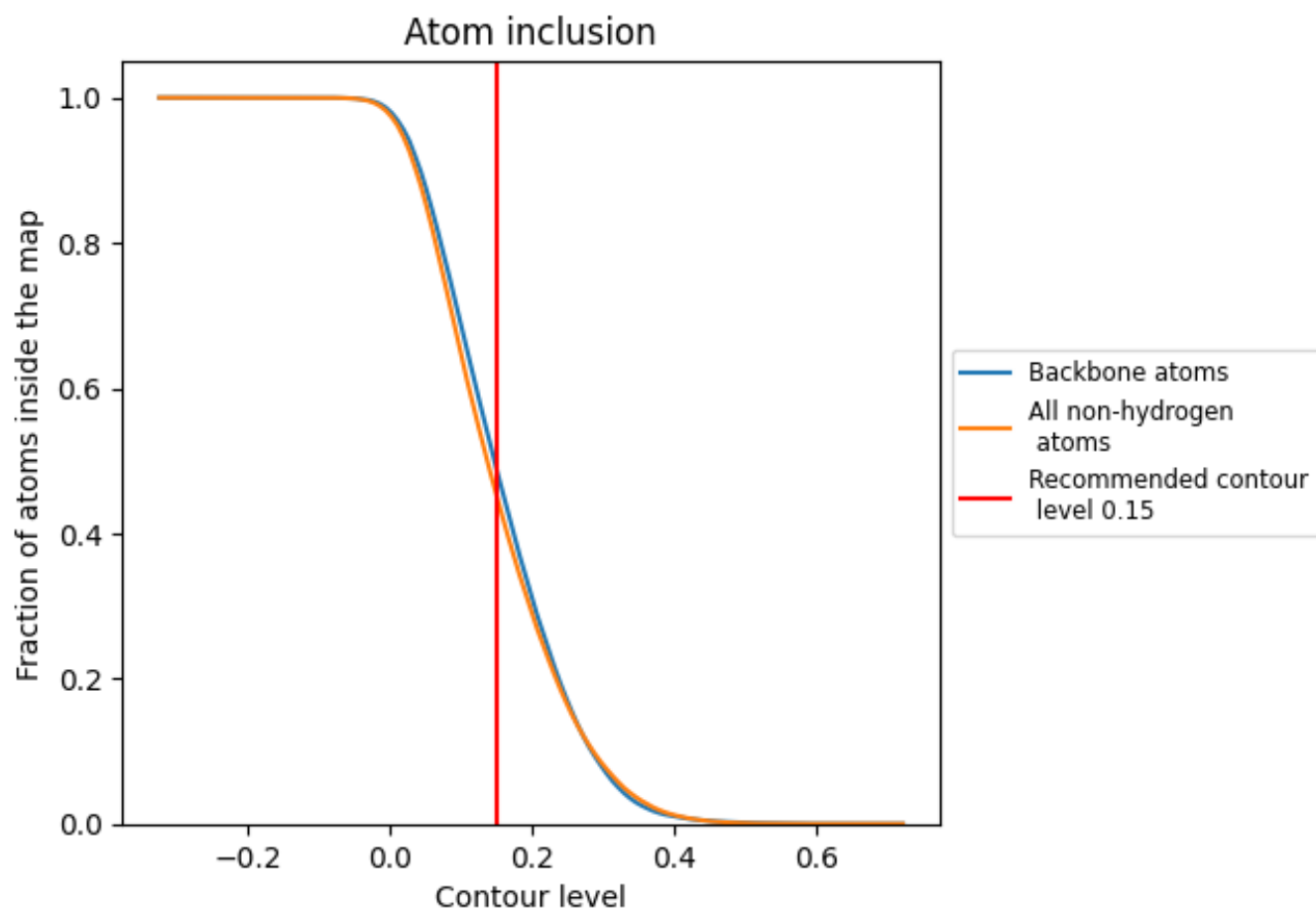
This section contains information regarding the fit between EMDB map EMD-13329 and PDB model 7PD3. Per-residue inclusion information can be found in section 3 on page 29.

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.15 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Atom inclusion [i](#)



At the recommended contour level, 49% of all backbone atoms, 45% of all non-hydrogen atoms, are inside the map.