Full wwPDB EM Validation 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 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 (i) symbol.

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

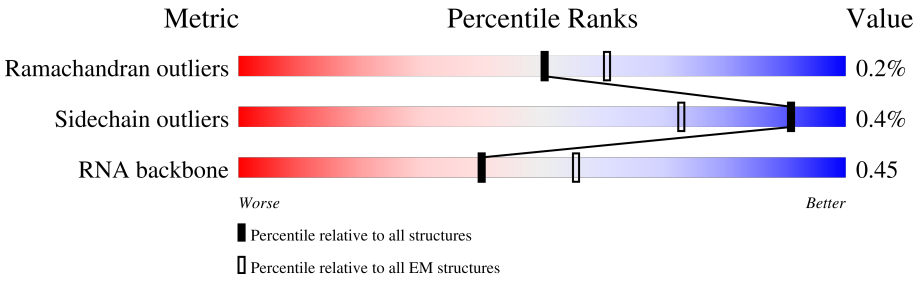
EMDB validation analysis	:	0.0.0.dev97
Mogul	:	1.8.4 (270009), CSD as541be (2020)
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation 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 <=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	23% 57% · 43%
2	1	65	35% 78% · 20%
3	2	92	48% · 51%
4	3	188	· 51% 49%
5	4	103	· 36% 64%
6	5	423	43% 91% · 7%
7	6	380	71% 85% 15%
8	7	338	62% 84% · 15%

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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	91% 42% 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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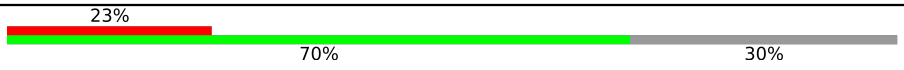
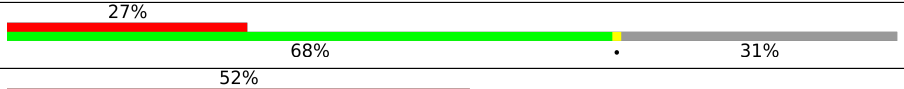
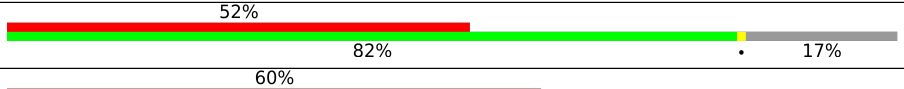
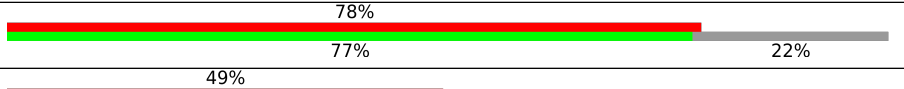
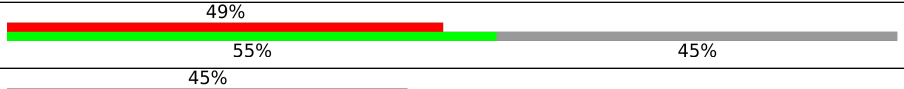
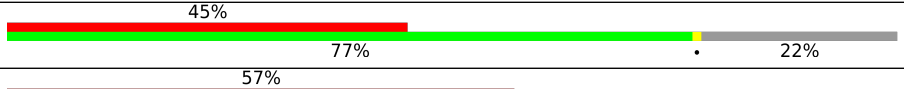
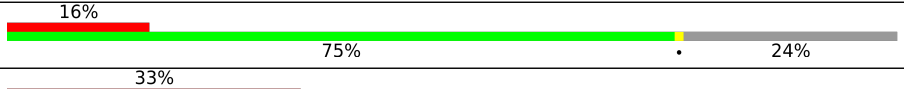
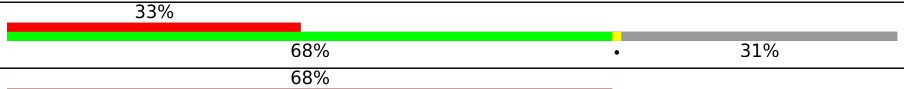
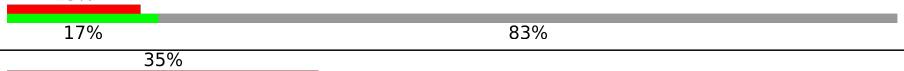
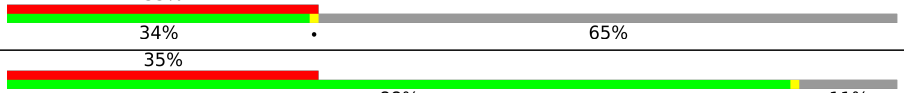
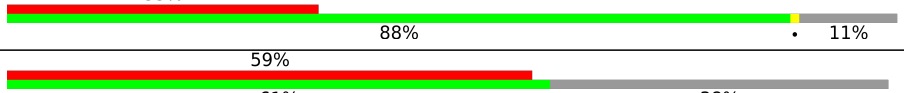
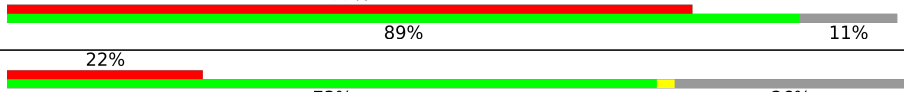
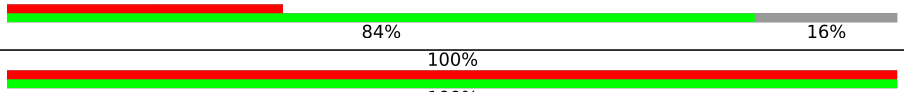
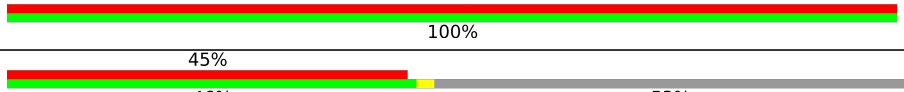
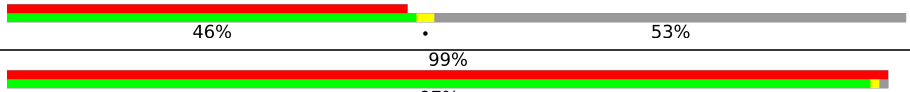
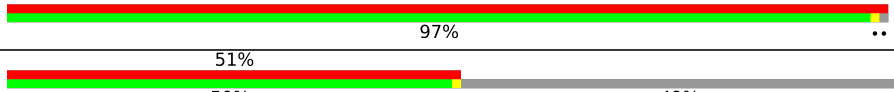
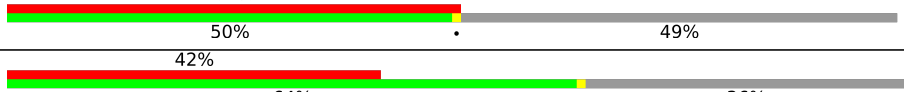
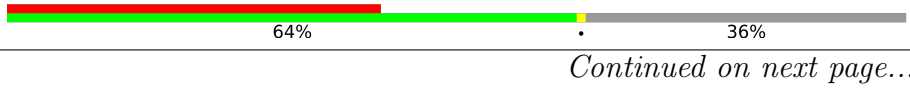
Mol	Chain	Length	Quality of chain
33	Y	250	
34	Z	161	
35	a	142	
36	b	215	
37	c	332	
38	d	306	
39	e	279	
40	f	212	
41	g	166	
42	h	158	
43	i	128	
44	j	123	
45	k	112	
46	l	138	
47	m	128	
48	o	102	
49	p	206	
50	q	222	
51	r	196	
52	s	439	
53	t	28	
54	u	234	
55	v	70	
56	w	156	
57	y	381	

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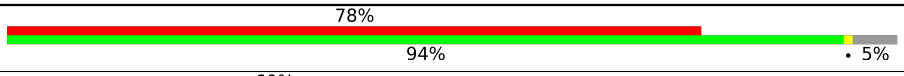
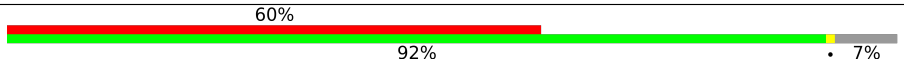
Mol	Chain	Length	Quality of chain
58	x	384	
59	z	334	

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
7	6	324	Total	C	N	O	S	0	0
			2640	1694	470	468	8		

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- Molecule 53 is a protein called mL65.

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

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

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

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

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

- 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		

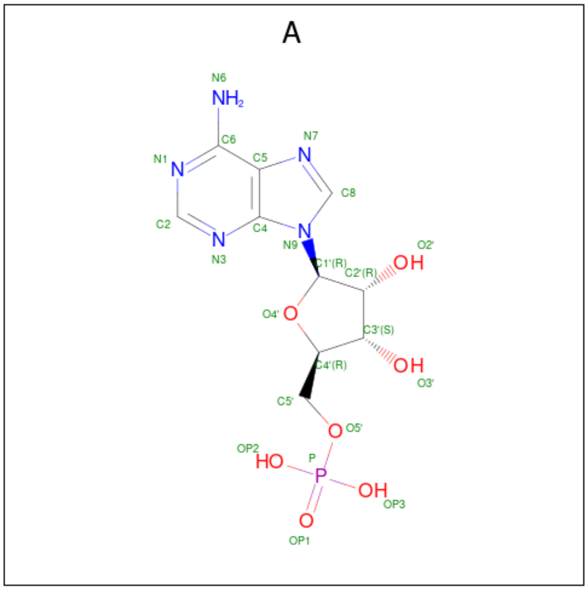
- Molecule 59 is a protein called Mitochondrial ribosome-associated GTPase 1.

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: $C_{10}H_{14}N_5O_7P$).



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

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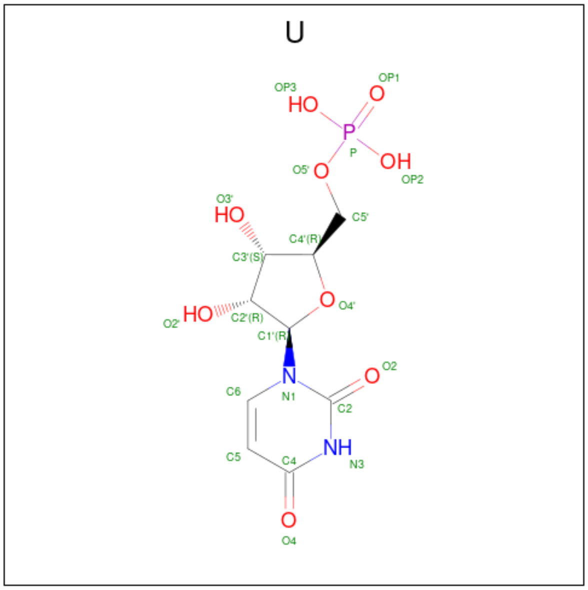
Mol	Chain	Residues	Atoms					AltConf
61	E	1	Total	C	N	O	P	0
			154	70	35	42	7	
61	E	1	Total	C	N	O	P	0
			154	70	35	42	7	
61	E	1	Total	C	N	O	P	0
			154	70	35	42	7	
61	E	1	Total	C	N	O	P	0
			154	70	35	42	7	
61	E	1	Total	C	N	O	P	0
			154	70	35	42	7	
61	L	1	Total	C	N	O	P	0
			88	40	20	24	4	
61	L	1	Total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

- Molecule 62 is URIDINE-5'-MONOPHOSPHATE (three-letter code: U) (formula: $C_9H_{13}N_2O_9P$).



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

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

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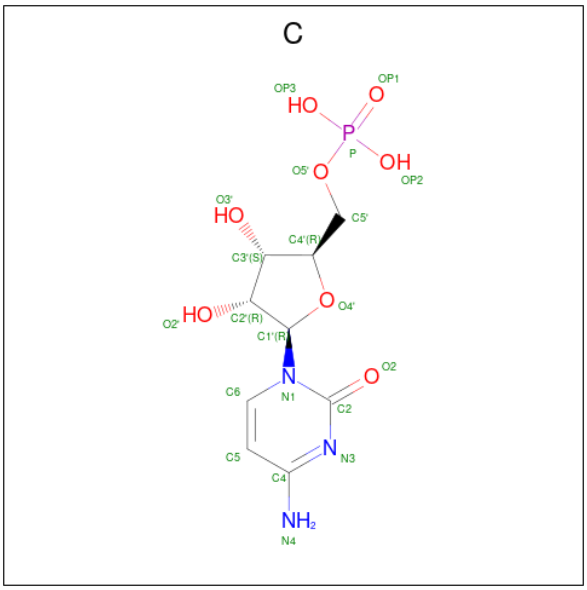
Mol	Chain	Residues	Atoms					AltConf
62	Q	1	Total	C	N	O	P	0
			20	9	2	8	1	
62	r	1	Total	C	N	O	P	0
			80	36	8	32	4	
62	r	1	Total	C	N	O	P	0
			80	36	8	32	4	
62	r	1	Total	C	N	O	P	0
			80	36	8	32	4	
62	r	1	Total	C	N	O	P	0
			80	36	8	32	4	
62	u	1	Total	C	N	O	P	0
			40	18	4	16	2	
62	u	1	Total	C	N	O	P	0
		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

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



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

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

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

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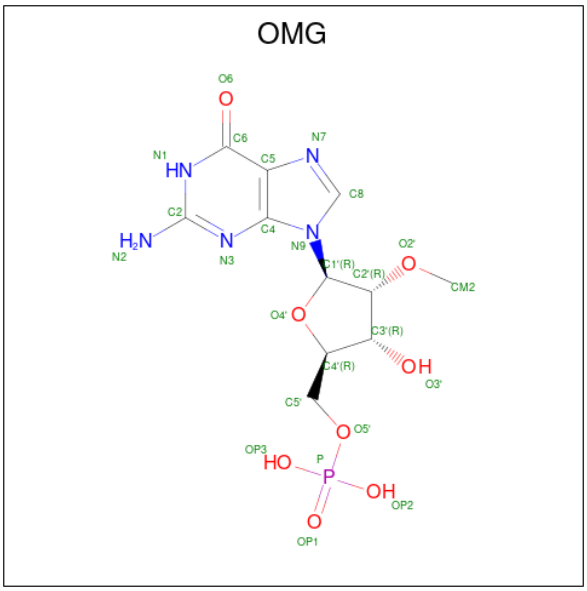
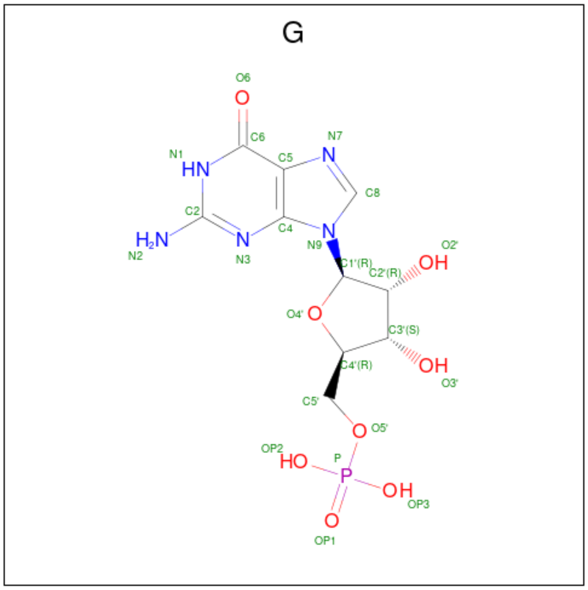
Mol	Chain	Residues	Atoms					AltConf
63	u	1	Total	C	N	O	P	0
			60	27	9	21	3	
63	u	1	Total	C	N	O	P	0
			60	27	9	21	3	
63	z	1	Total	C	N	O	P	0
			20	9	3	7	1	

- Molecule 64 is O2'-METHYLGUANOSINE-5'-MONOPHOSPHATE (three-letter code: OMG) (formula: $C_{11}H_{16}N_5O_8P$).



Mol	Chain	Residues	Atoms					AltConf
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: $C_{10}H_{14}N_5O_8P$).



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

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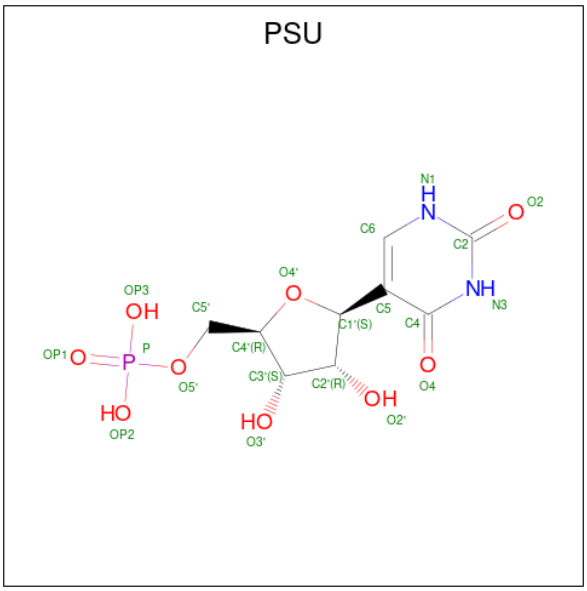
Mol	Chain	Residues	Atoms	AltConf
65	A	1	Total C N O P 345 150 75 105 15	0
65	E	1	Total C N O P 138 60 30 42 6	0
65	E	1	Total C N O P 138 60 30 42 6	0
65	E	1	Total C N O P 138 60 30 42 6	0
65	E	1	Total C N O P 138 60 30 42 6	0
65	E	1	Total C N O P 138 60 30 42 6	0
65	E	1	Total C N O P 138 60 30 42 6	0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

- Molecule 66 is PSEUDOURIDINE-5'-MONOPHOSPHATE (three-letter code: PSU) (formula: $C_9H_{13}N_2O_9P$).

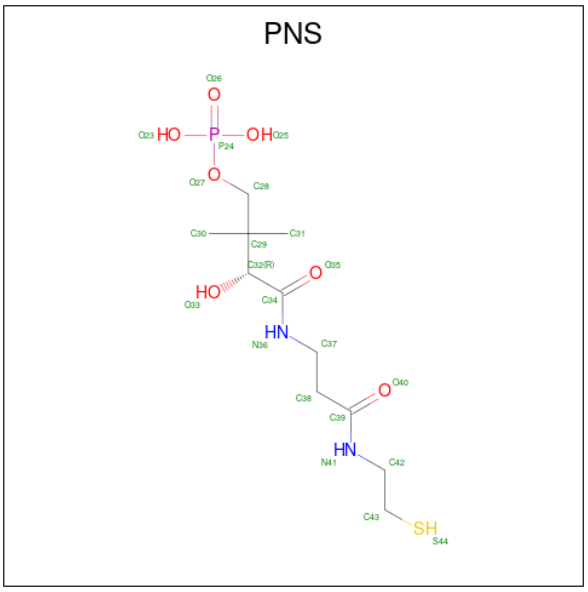


Mol	Chain	Residues	Atoms					AltConf
66	A	1	Total	C	N	O	P	0
			21	9	2	9	1	

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

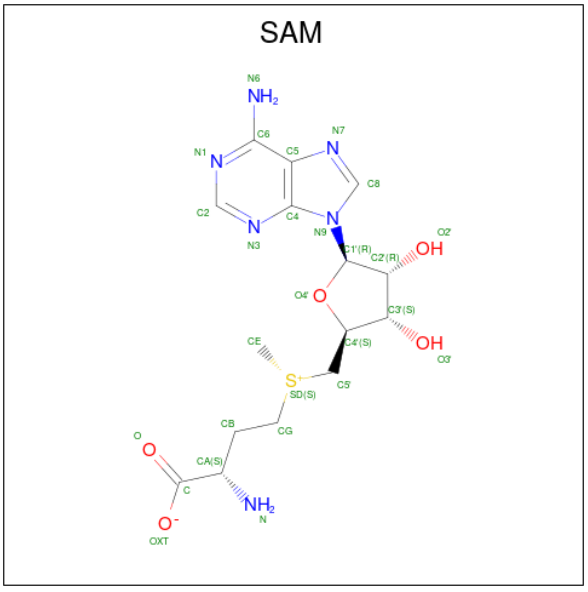
Mol	Chain	Residues	Atoms		AltConf
67	A	89	Total	Mg	0
			89	89	
67	E	1	Total	Mg	0
			1	1	
67	o	1	Total	Mg	0
			1	1	

- Molecule 68 is 4'-PHOSPHOPANTETHEINE (three-letter code: PNS) (formula: $C_{11}H_{23}N_2O_7PS$).



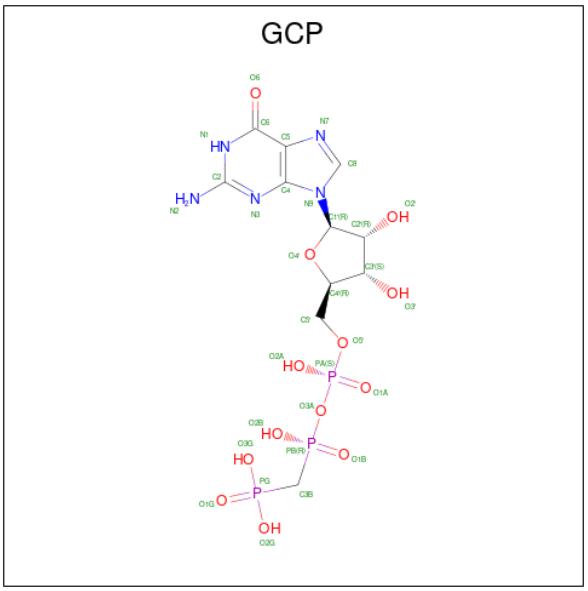
Mol	Chain	Residues	Atoms						AltConf
68	v	1	Total	C	N	O	P	S	0
			21	11	2	6	1	1	

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



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

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



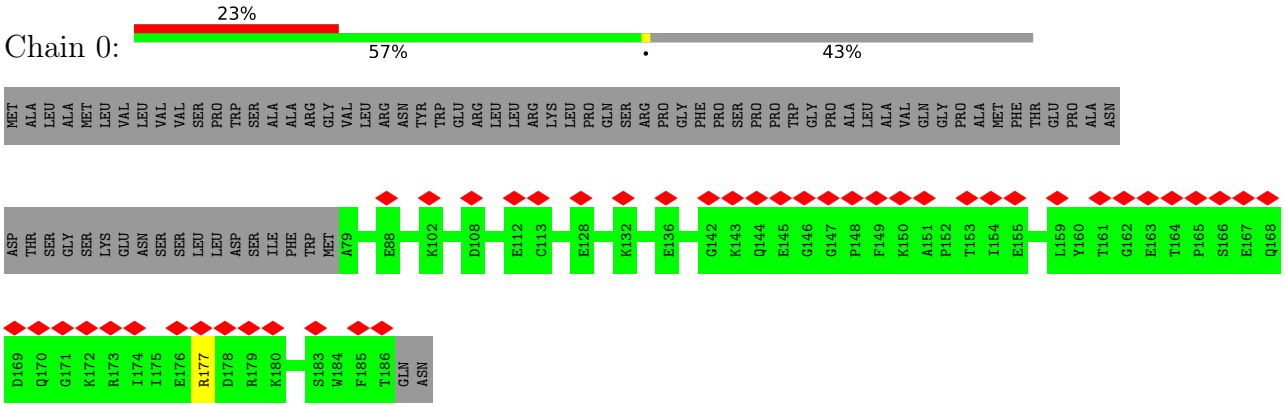
Mol	Chain	Residues	Atoms					AltConf
70	z	1	Total	C	N	O	P	0
			64	22	10	26	6	
70	z	1	Total	C	N	O	P	0
			64	22	10	26	6	

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

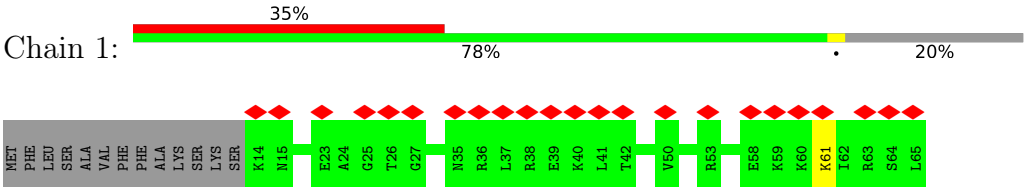
• Molecule 1: 39S ribosomal protein L32, mitochondrial

Chain 0:



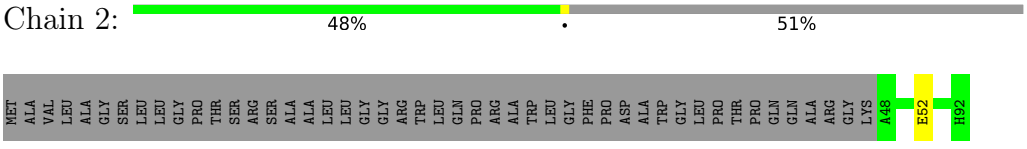
• Molecule 2: 39S ribosomal protein L33, mitochondrial

Chain 1:



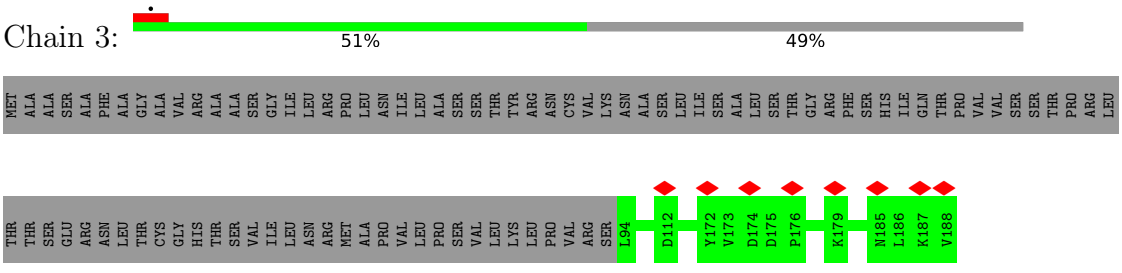
• Molecule 3: 39S ribosomal protein L34, mitochondrial

Chain 2:



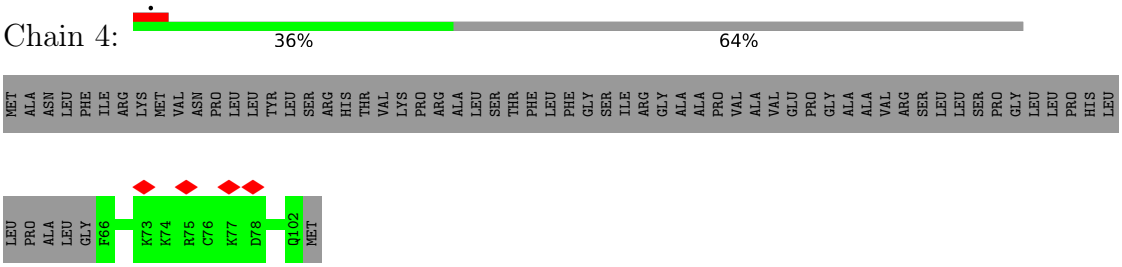
• Molecule 4: 39S ribosomal protein L35, mitochondrial

Chain 3:



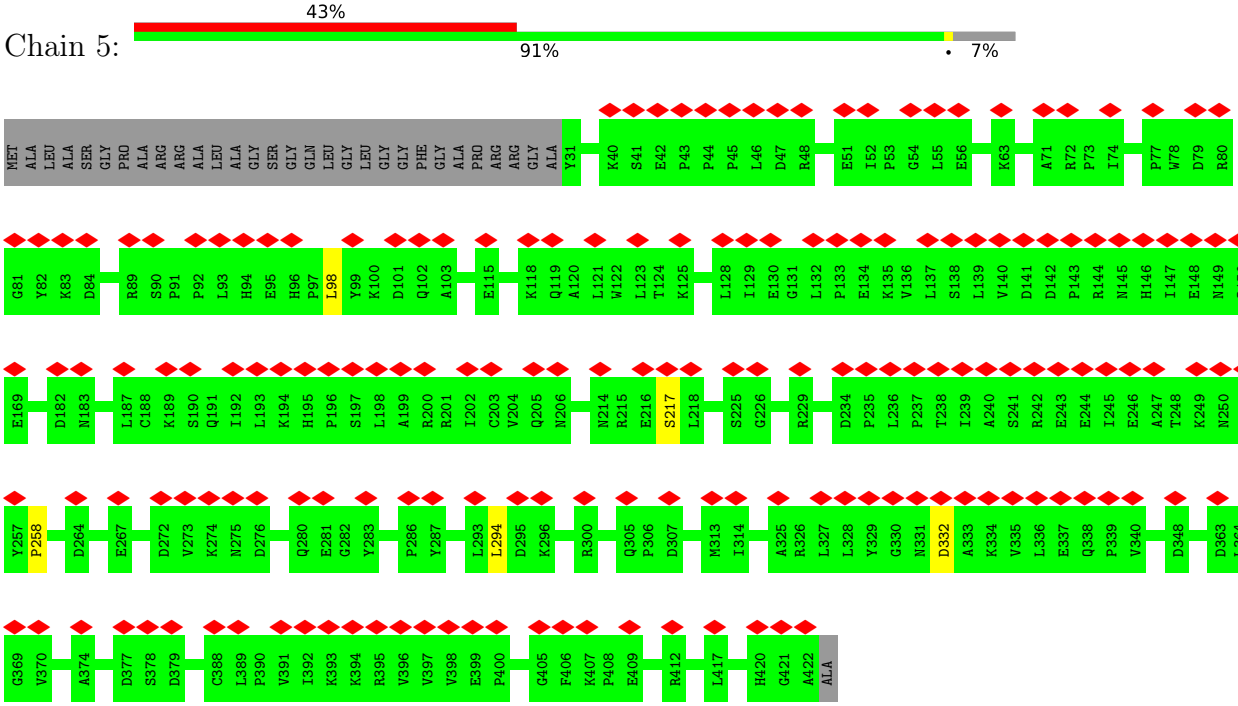
• Molecule 5: 39S ribosomal protein L36, mitochondrial

Chain 4:



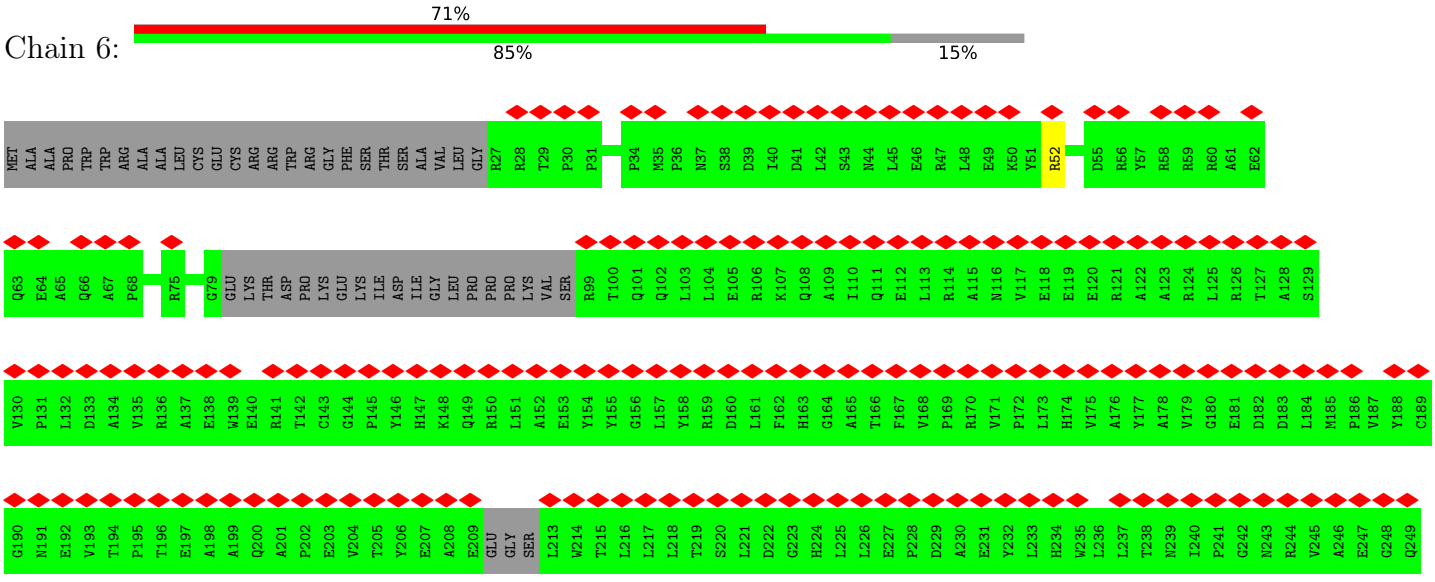
• Molecule 6: 39S ribosomal protein L37, mitochondrial

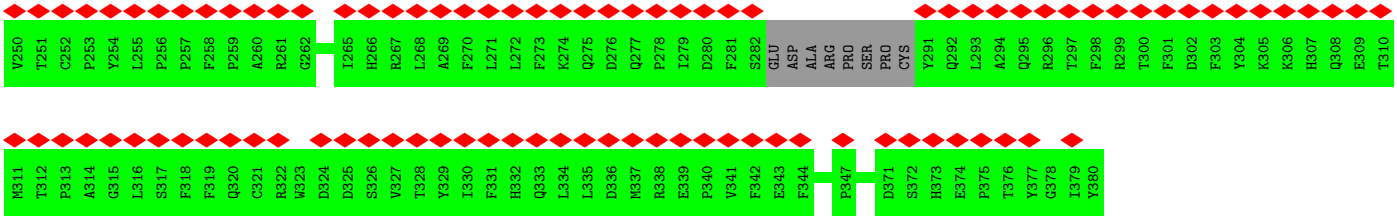
Chain 5:



• Molecule 7: 39S ribosomal protein L38, mitochondrial

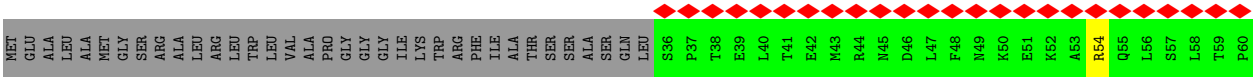
Chain 6:

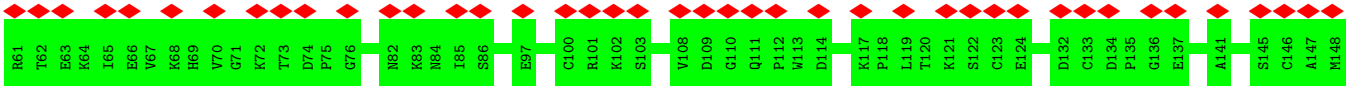


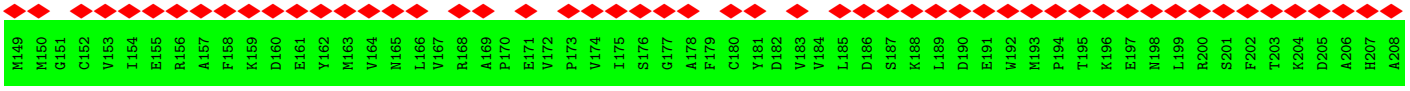


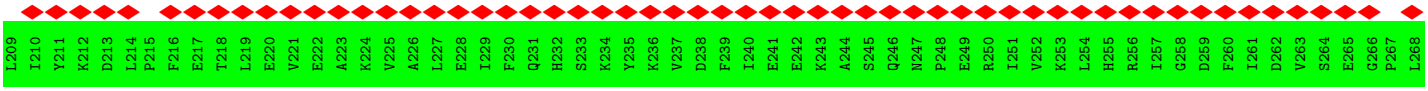
• Molecule 8: 39S ribosomal protein L39, mitochondrial

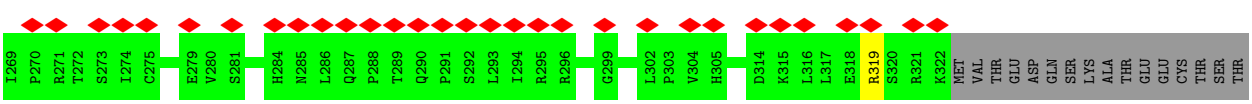
Chain 7:





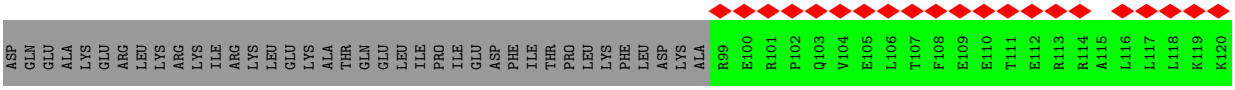


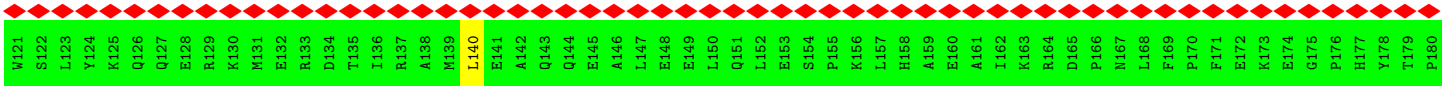


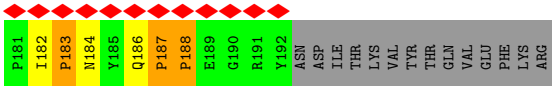


• Molecule 9: 39S ribosomal protein L40, mitochondrial

Chain 8:

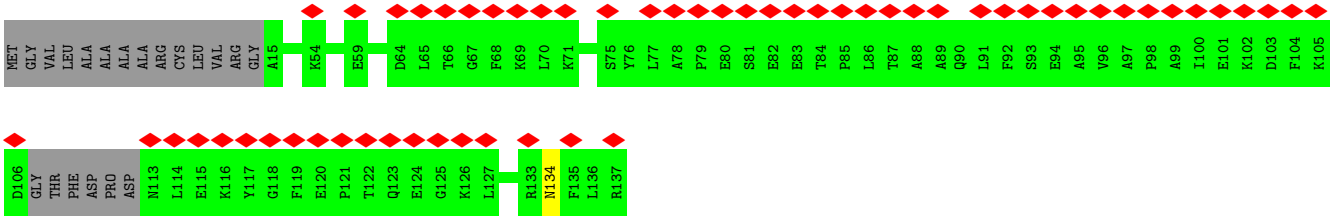






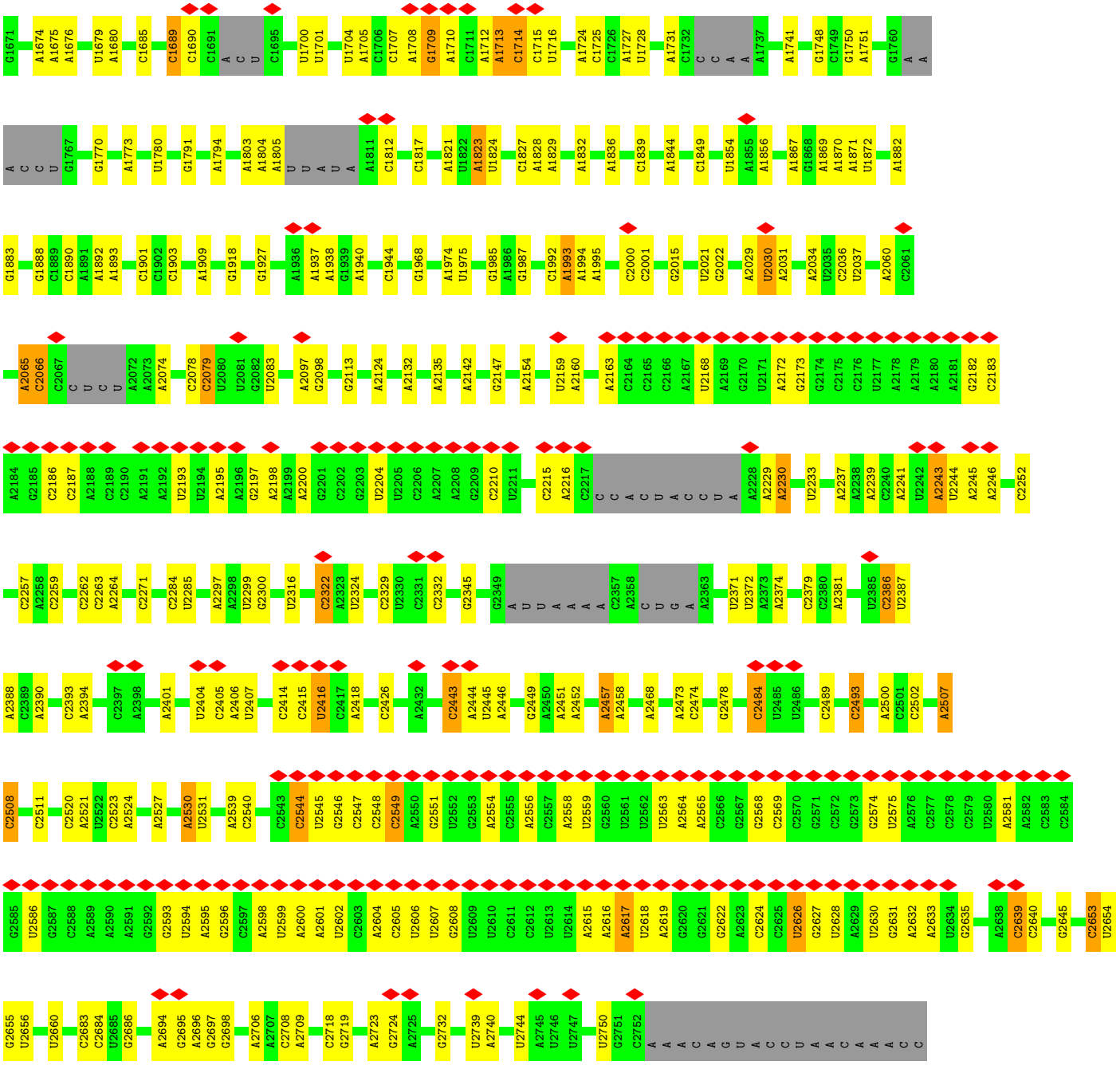
• Molecule 10: 39S ribosomal protein L41, mitochondrial

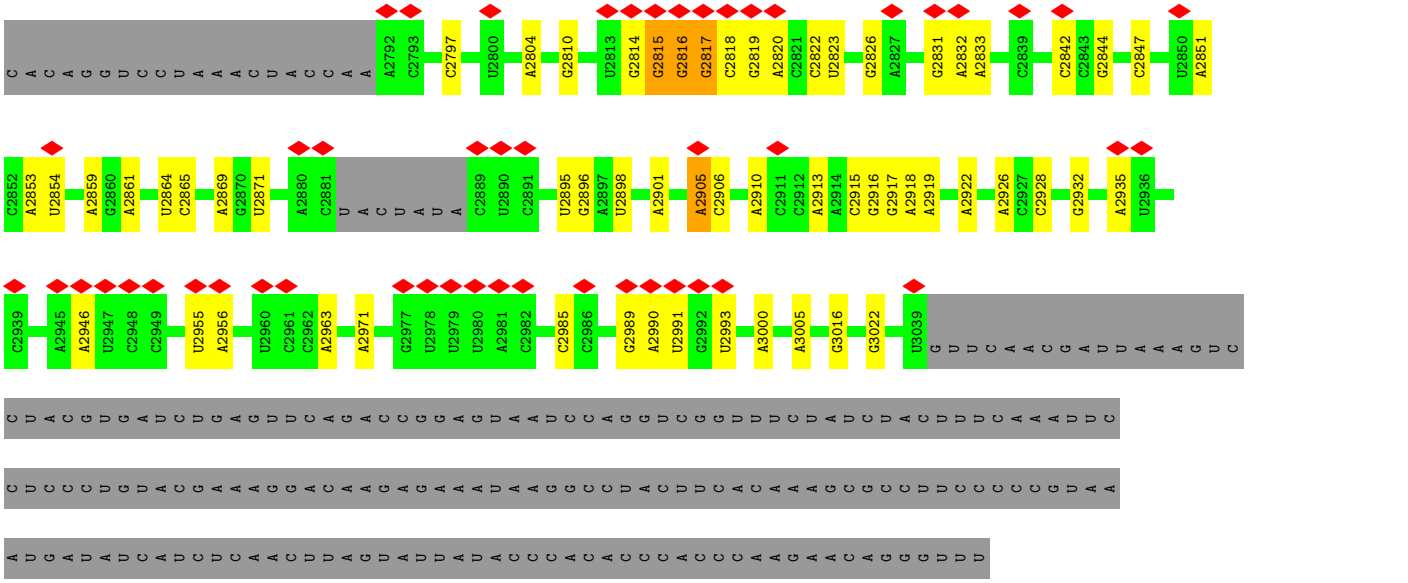
Chain 9:



• Molecule 11: 16S rRNA

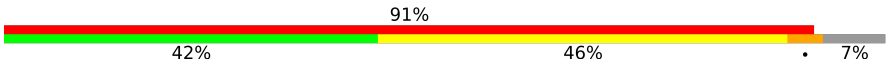
Chain A:

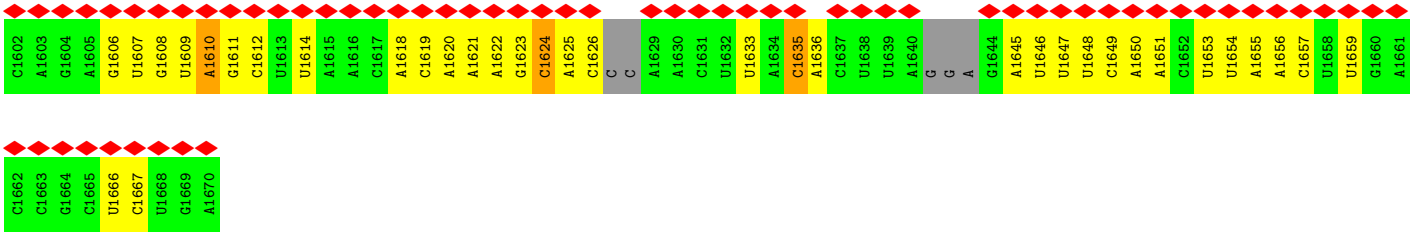




• Molecule 12: mt-tRNAVal

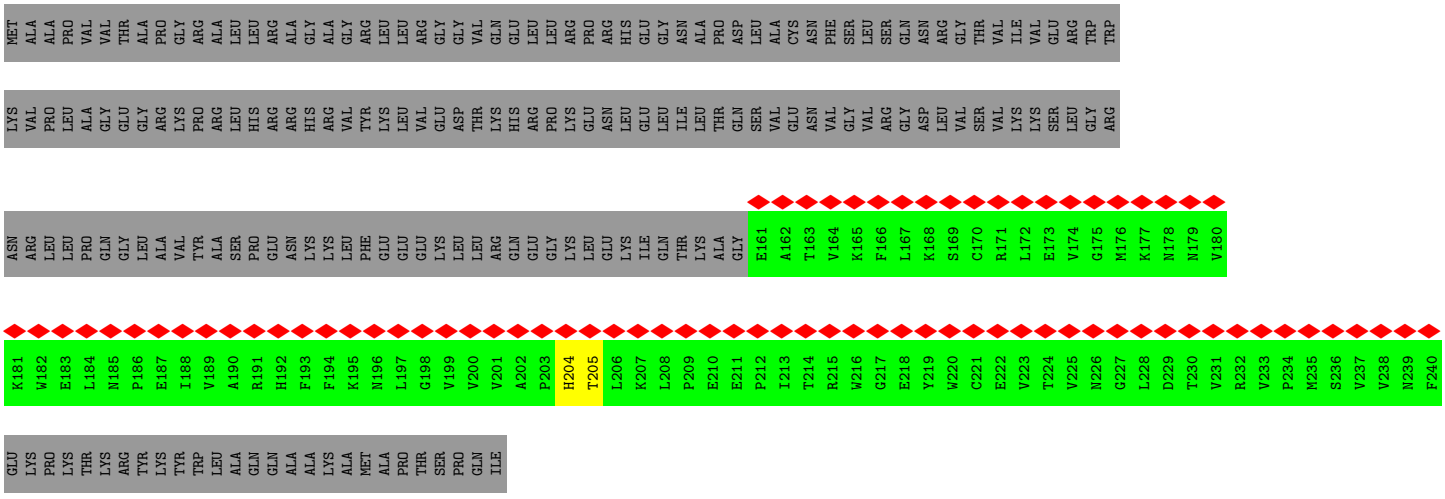
Chain B:





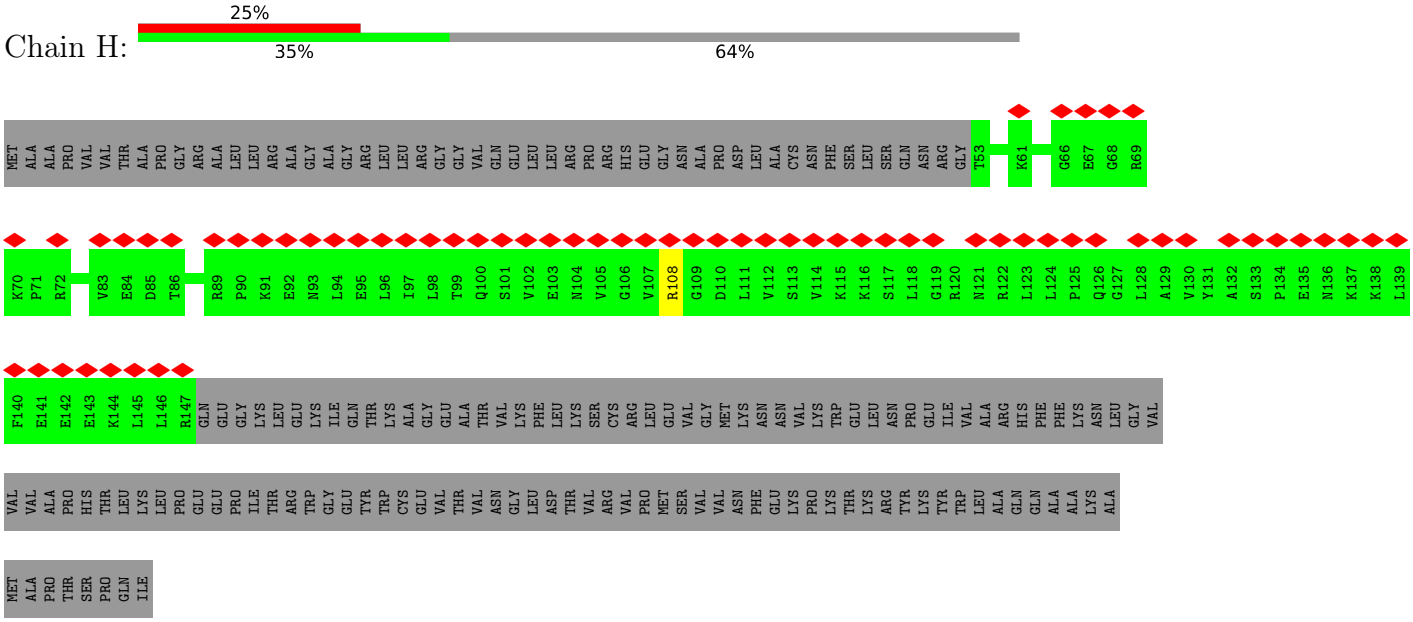
• Molecule 13: 39S ribosomal protein L9, mitochondrial

Chain C:



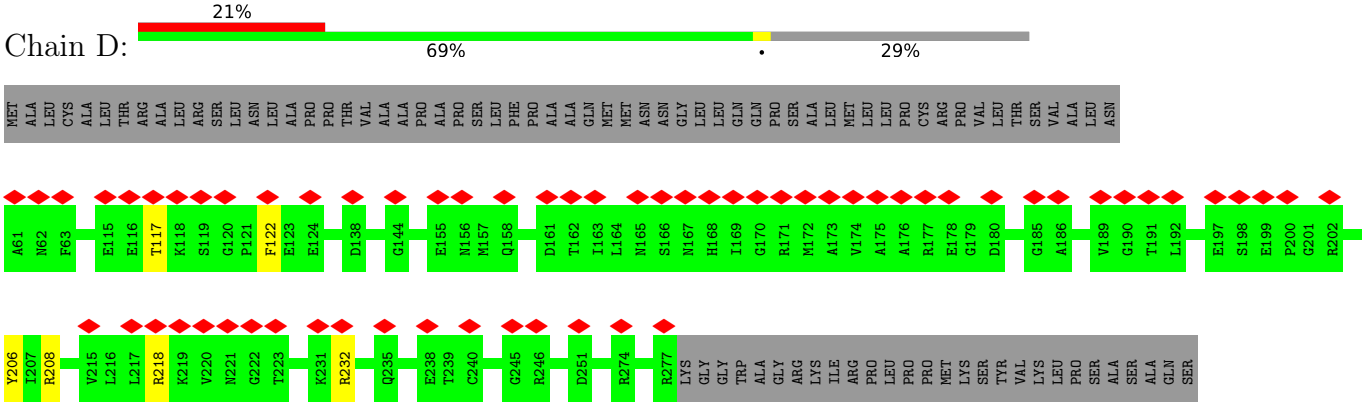
• Molecule 13: 39S ribosomal protein L9, mitochondrial

Chain H:



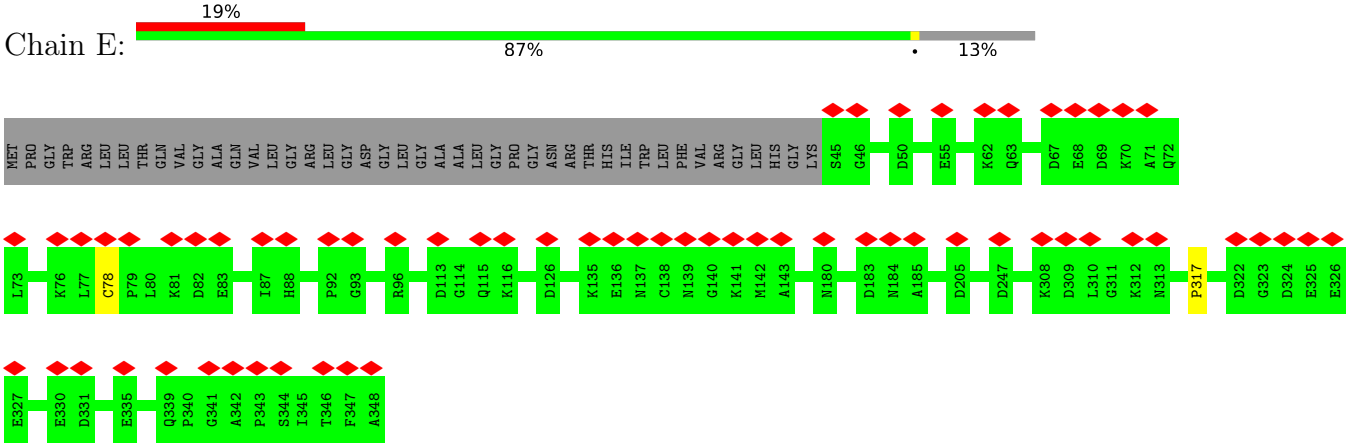
• Molecule 14: 39S ribosomal protein L2, mitochondrial

Chain D:



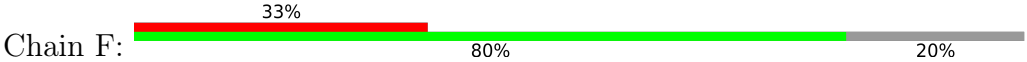
• Molecule 15: 39S ribosomal protein L3, mitochondrial

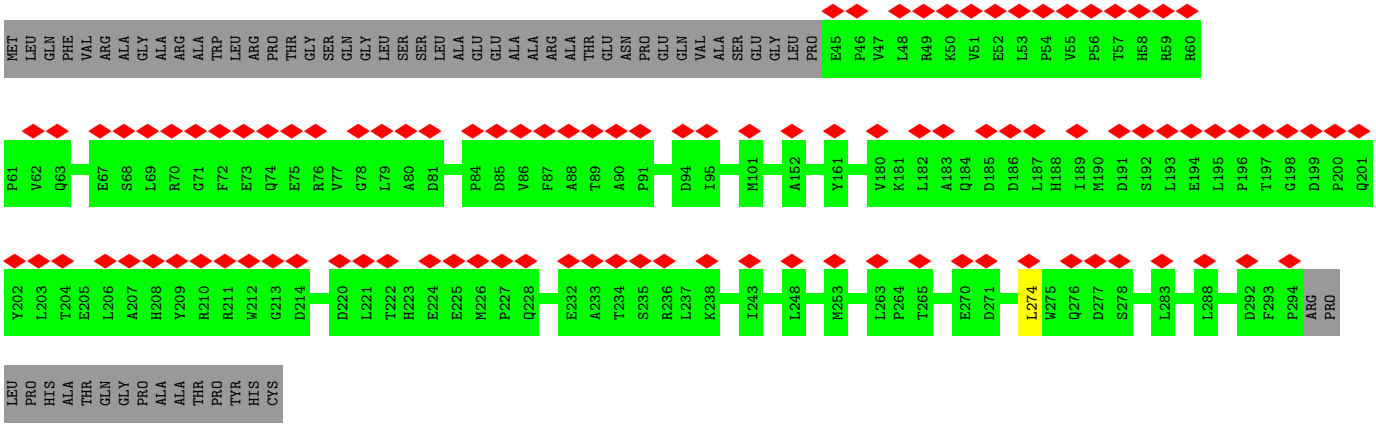
Chain E:



• Molecule 16: 39S ribosomal protein L4, mitochondrial

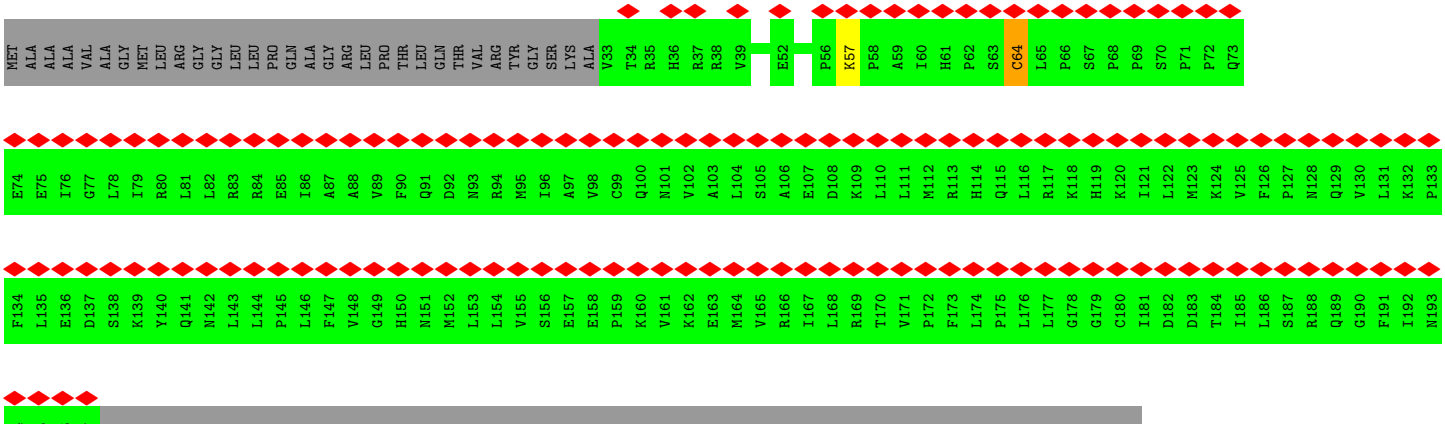
Chain F:





• Molecule 17: 39S ribosomal protein L10, mitochondrial

Chain G:

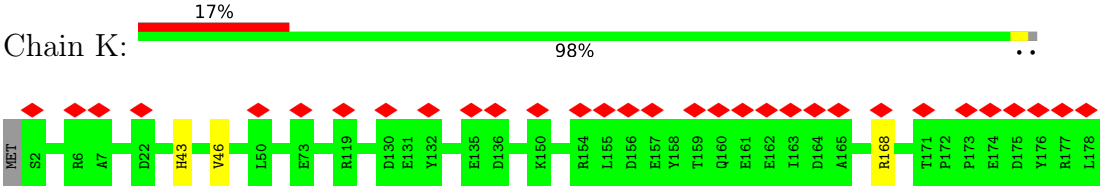


• Molecule 18: 39S ribosomal protein L11, mitochondrial

Chain J:

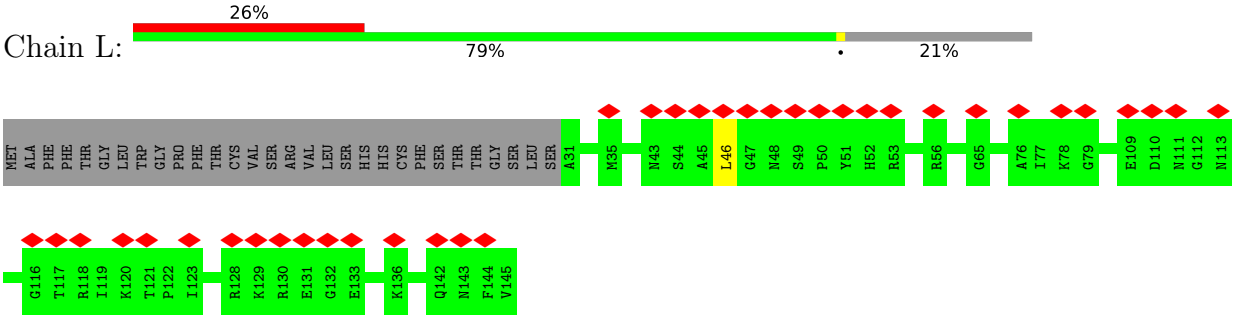
• Molecule 19: 39S ribosomal protein L13, mitochondrial

Chain K:



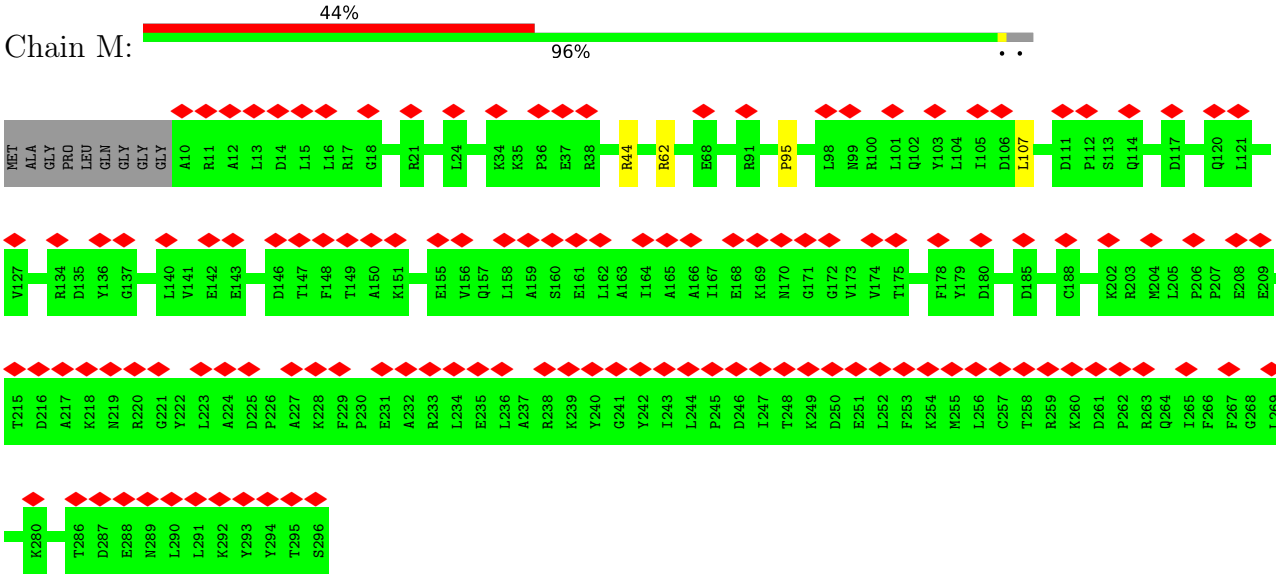
• Molecule 20: 39S ribosomal protein L14, mitochondrial

Chain L:



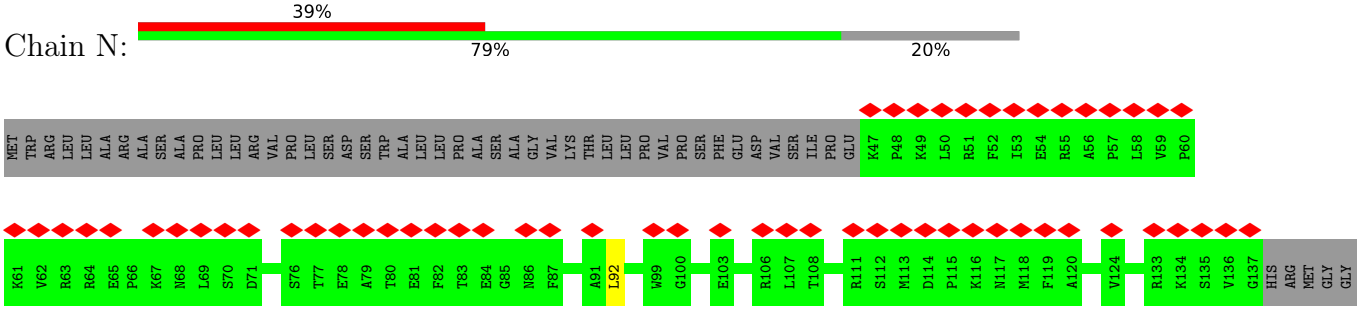
• Molecule 21: 39S ribosomal protein L15, mitochondrial

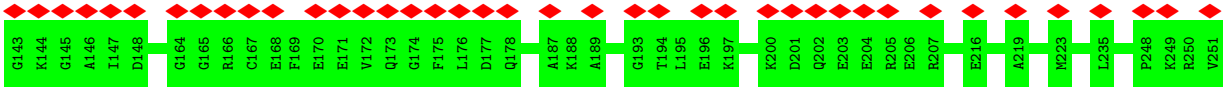
Chain M:



• Molecule 22: 39S ribosomal protein L16, mitochondrial

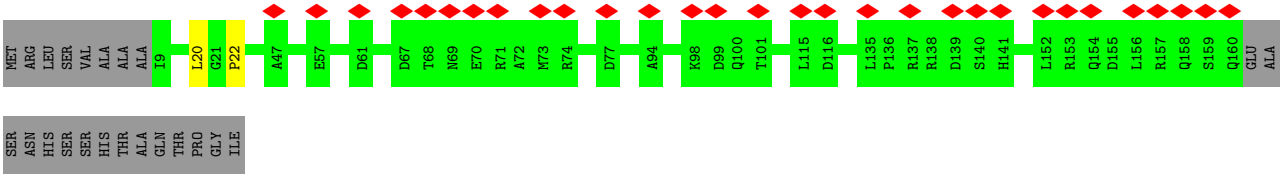
Chain N:





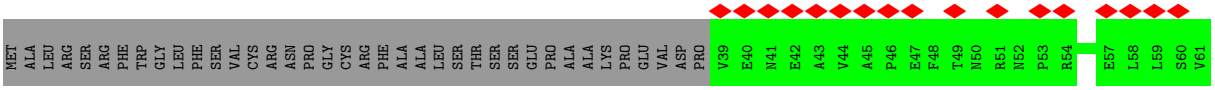
• Molecule 23: 39S ribosomal protein L17, mitochondrial

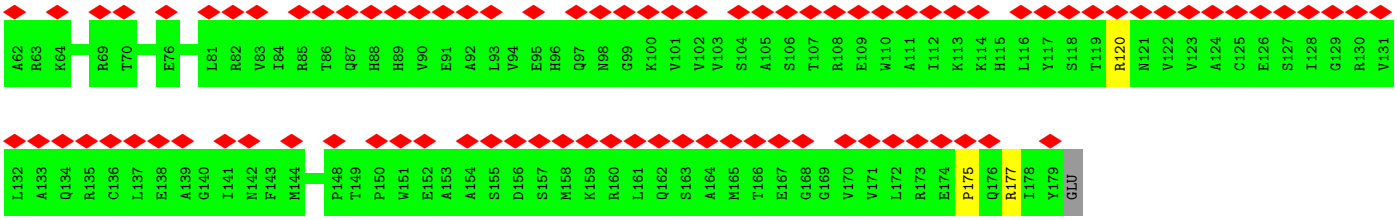
Chain O:



• Molecule 24: 39S ribosomal protein L18, mitochondrial

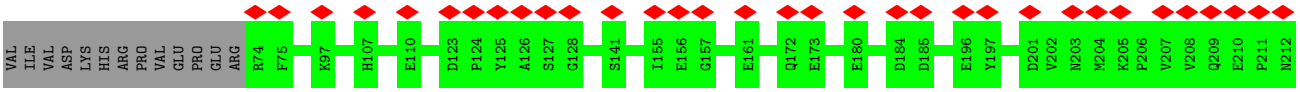
Chain P:

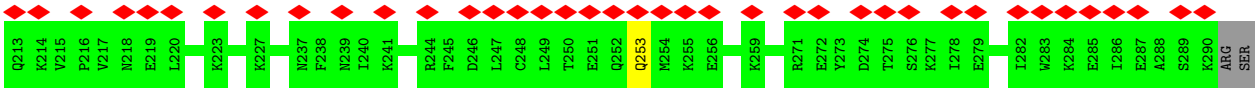




• Molecule 25: 39S ribosomal protein L19, mitochondrial

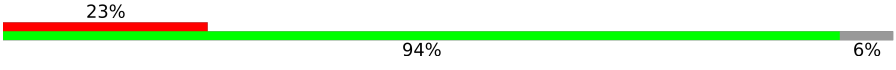
Chain Q:

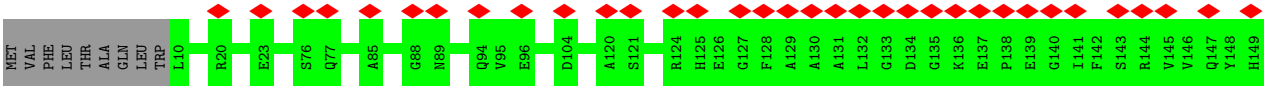




• Molecule 26: 39S ribosomal protein L20, mitochondrial

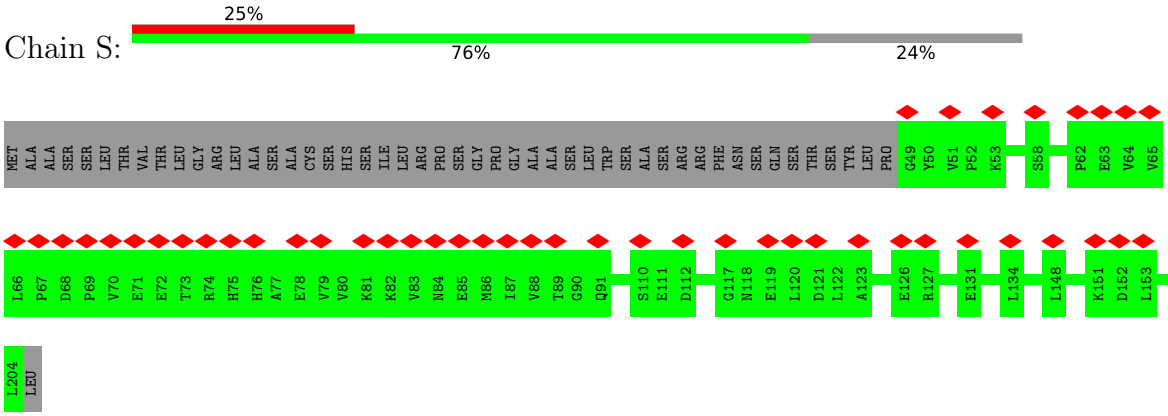
Chain R:





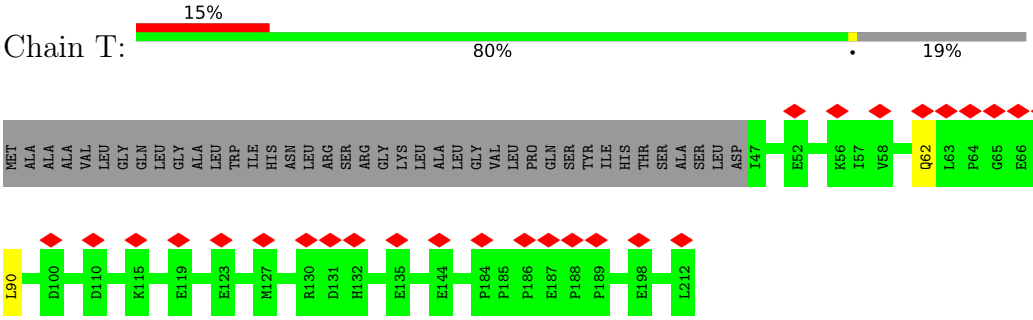
• Molecule 27: 39S ribosomal protein L21, mitochondrial

Chain S:



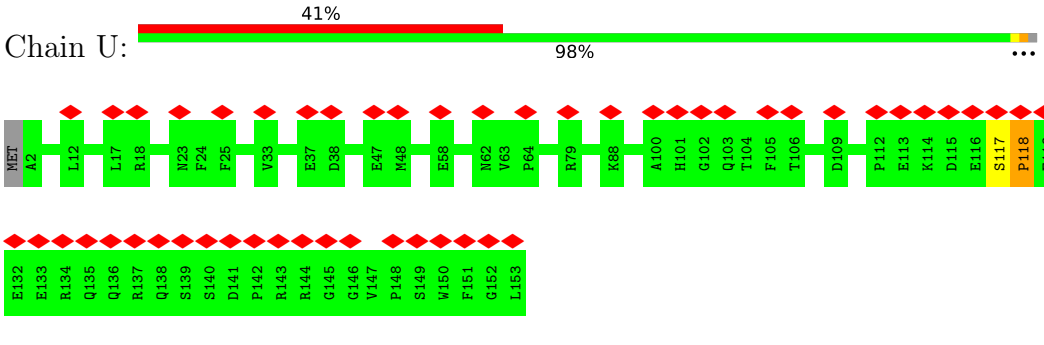
• Molecule 28: 39S ribosomal protein L22, mitochondrial

Chain T:



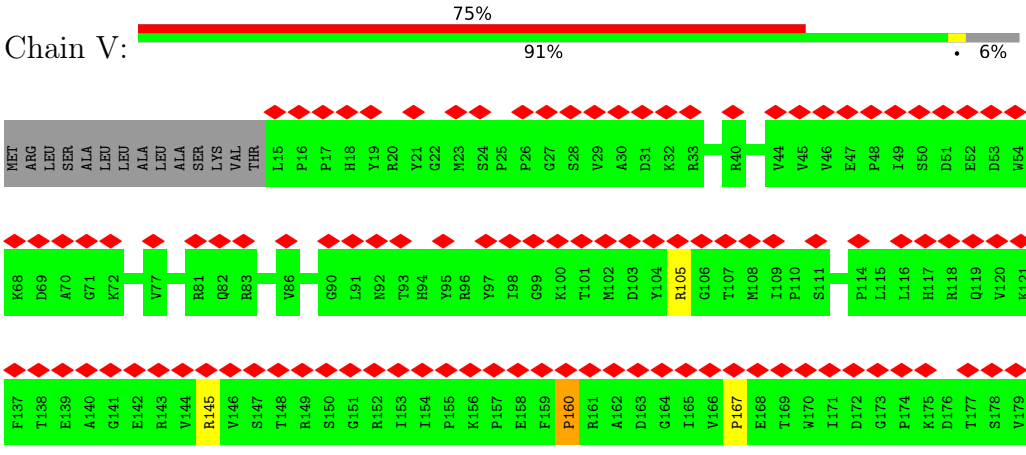
• Molecule 29: 39S ribosomal protein L23, mitochondrial

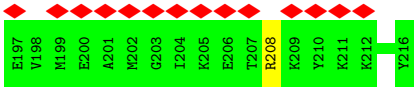
Chain U:



• Molecule 30: 39S ribosomal protein L24, mitochondrial

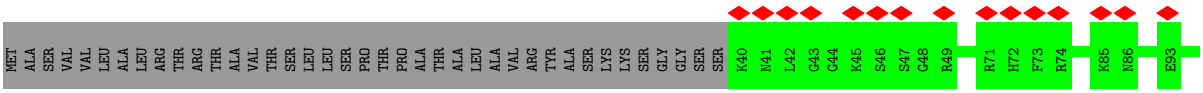
Chain V:

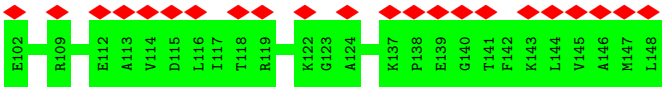




• Molecule 31: 39S ribosomal protein L27, mitochondrial

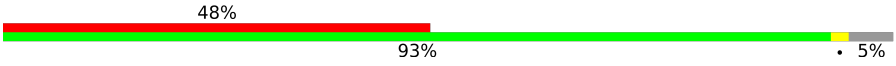
Chain W:

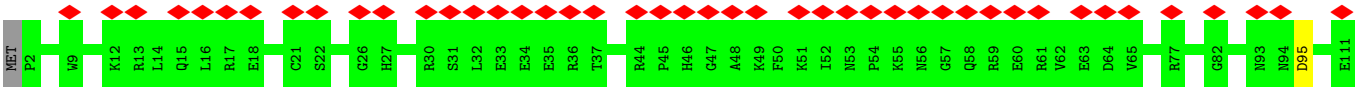


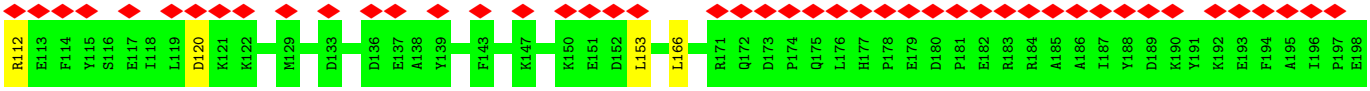


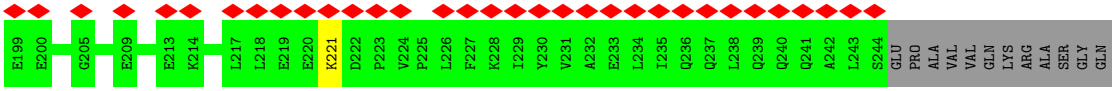
• Molecule 32: 39S ribosomal protein L28, mitochondrial

Chain X:



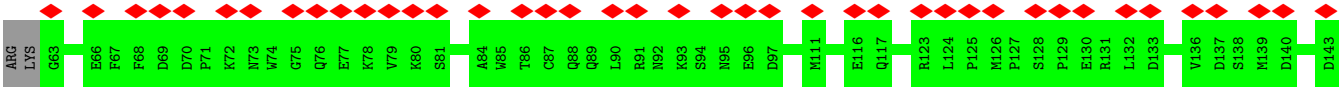


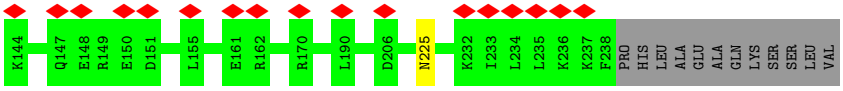




• Molecule 33: 39S ribosomal protein L47, mitochondrial

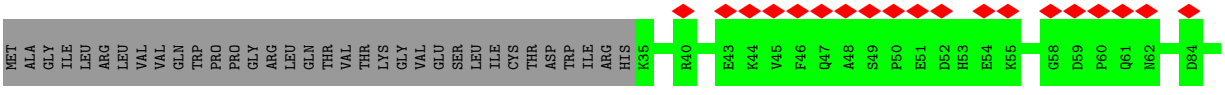
Chain Y:

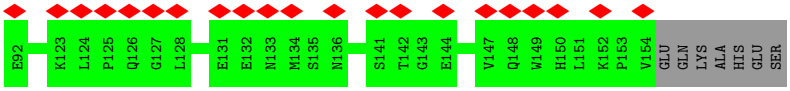




• Molecule 34: 39S ribosomal protein L30, mitochondrial

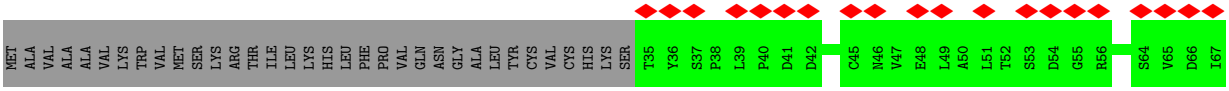
Chain Z:

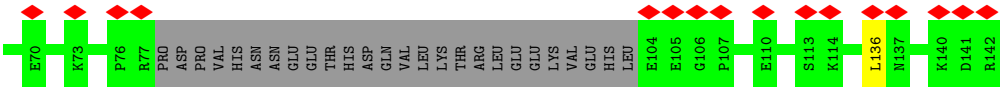




• Molecule 35: 39S ribosomal protein L42, mitochondrial

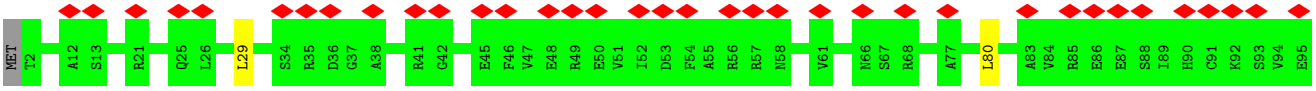
Chain a:

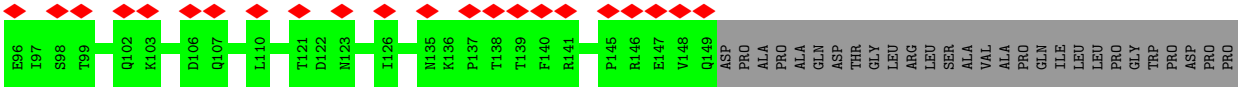




• Molecule 36: 39S ribosomal protein L43, mitochondrial

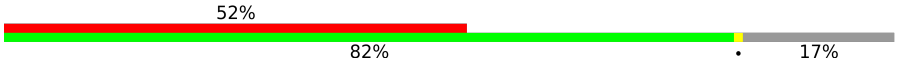
Chain b:

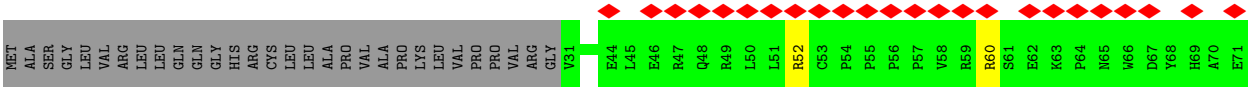


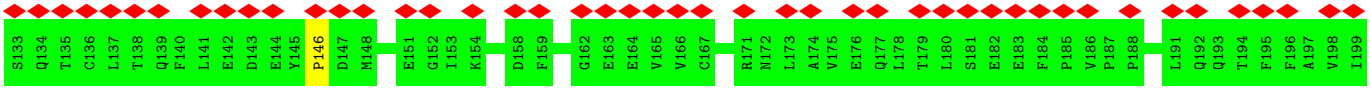


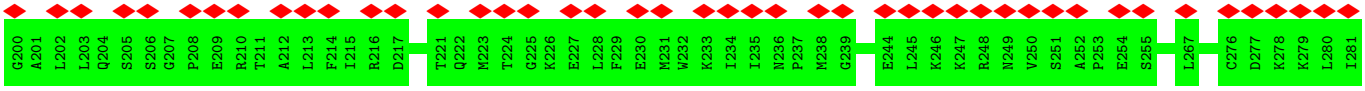
• Molecule 37: 39S ribosomal protein L44, mitochondrial

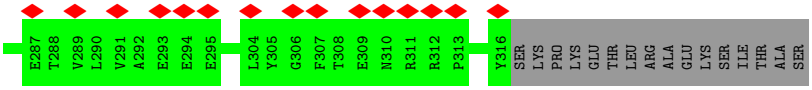
Chain c:





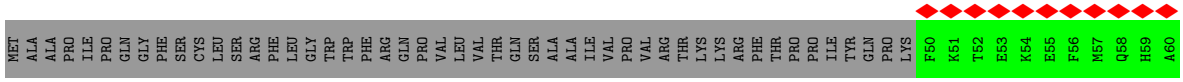






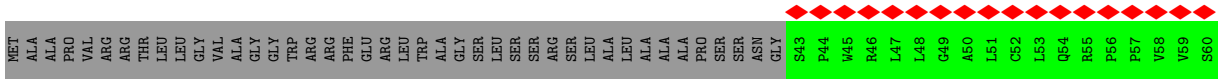
• Molecule 38: 39S ribosomal protein L45, mitochondrial

Chain d:



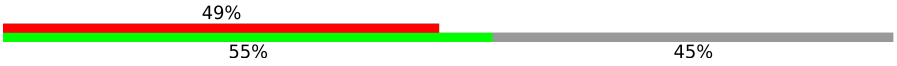
• Molecule 39: 39S ribosomal protein L46, mitochondrial

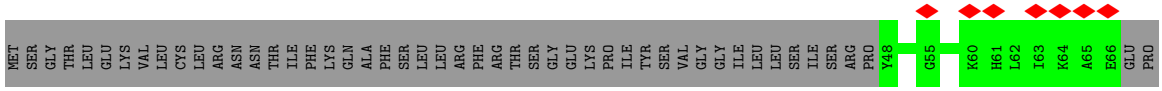
Chain e:

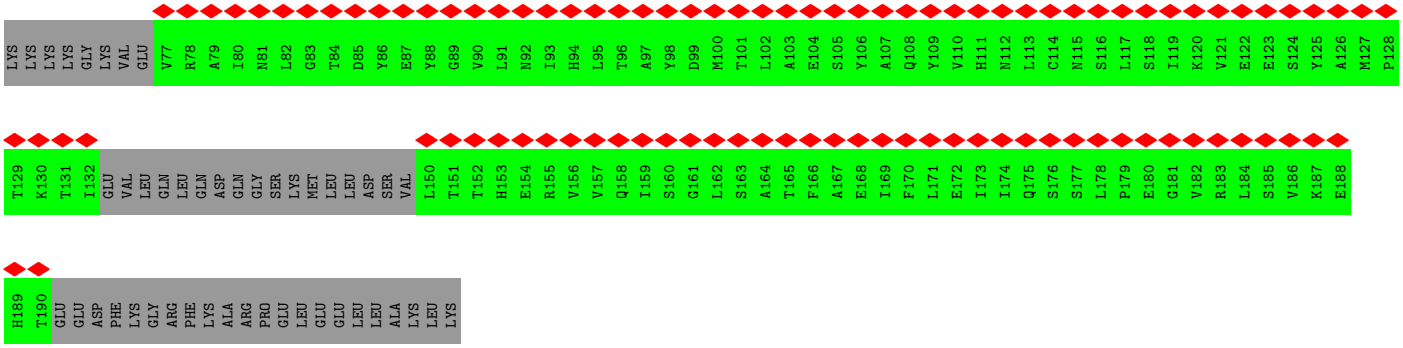


• Molecule 40: 39S ribosomal protein L48, mitochondrial

Chain f:

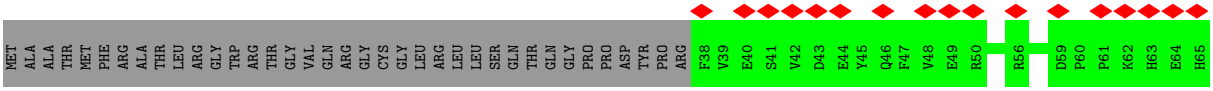






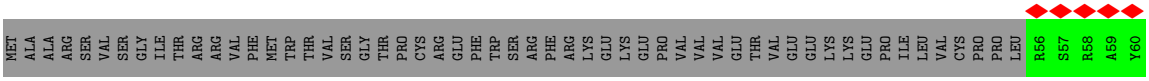
• Molecule 41: 39S ribosomal protein L49, mitochondrial

Chain g:



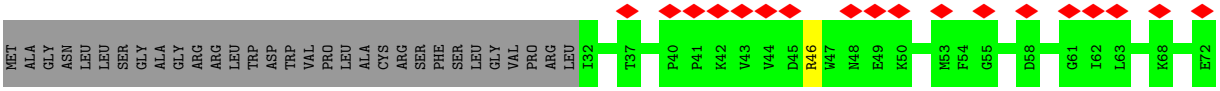
• Molecule 42: 39S ribosomal protein L50, mitochondrial

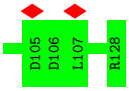
Chain h:



• Molecule 43: 39S ribosomal protein L51, mitochondrial

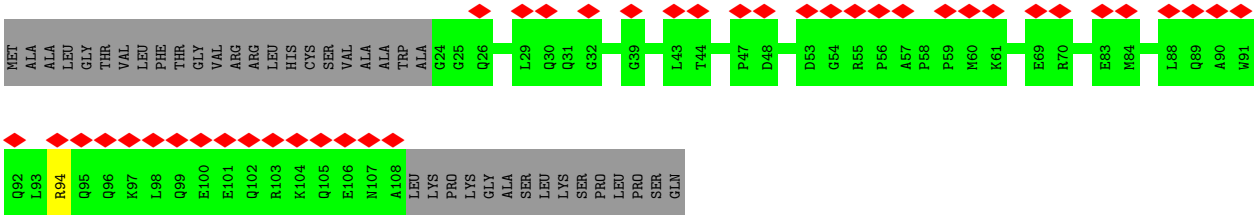
Chain i:





• Molecule 44: 39S ribosomal protein L52, mitochondrial

Chain j:

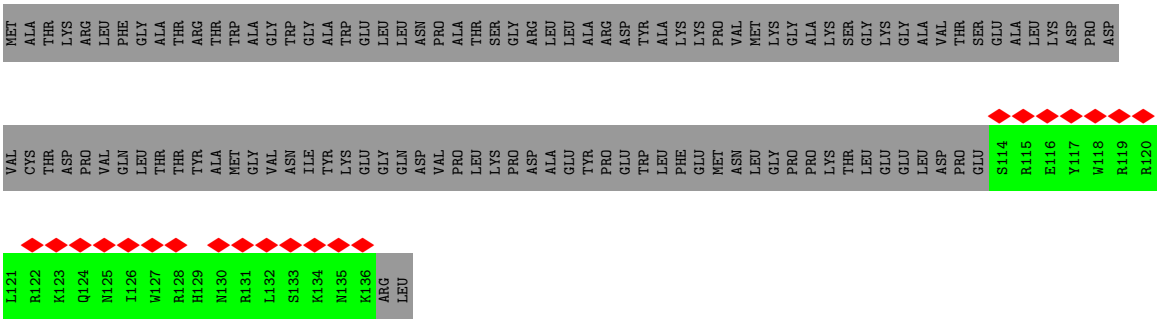


• Molecule 45: 39S ribosomal protein L53, mitochondrial

Chain k:

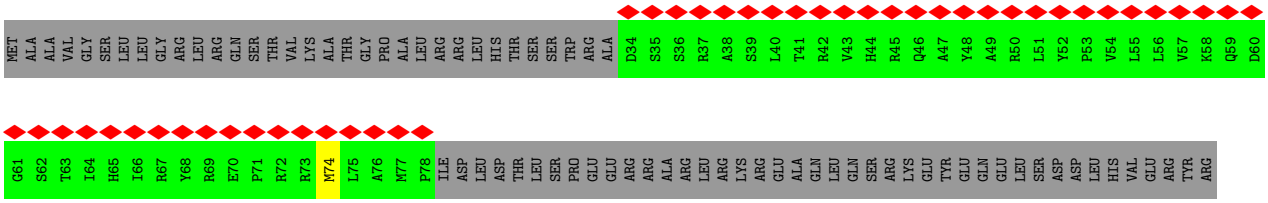
• Molecule 46: 39S ribosomal protein L54, mitochondrial

Chain l:



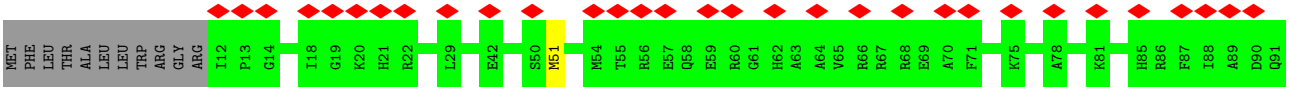
• Molecule 47: 39S ribosomal protein L55, mitochondrial

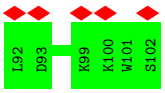
Chain m:



• Molecule 48: Ribosomal protein 63, mitochondrial

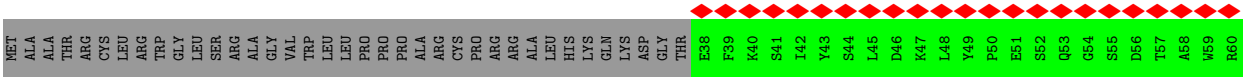
Chain o:

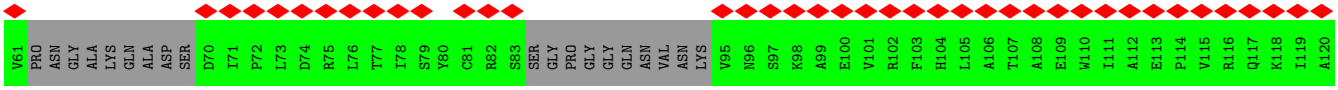


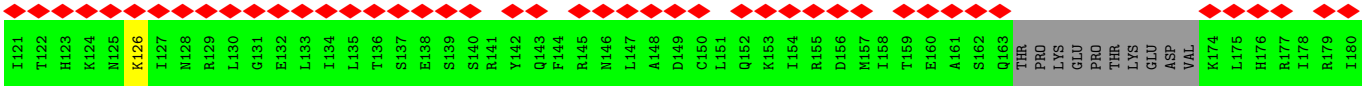


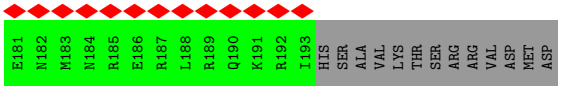
• Molecule 49: Peptidyl-tRNA hydrolase ICT1, mitochondrial

Chain p:



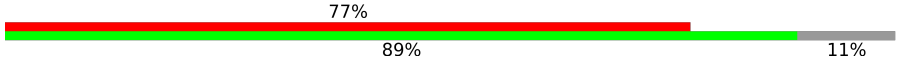


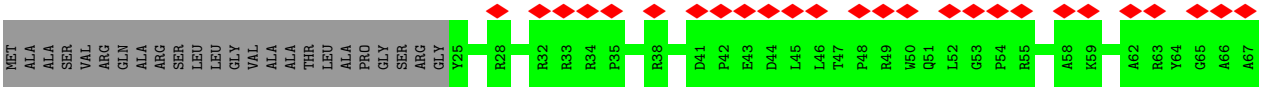


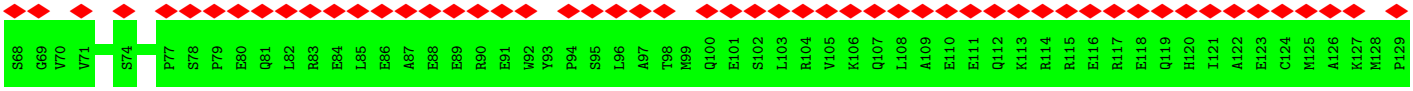


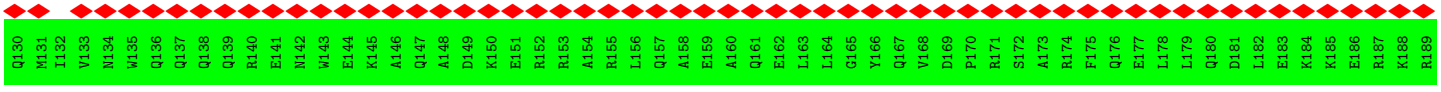
• Molecule 50: Growth arrest and DNA damage-inducible proteins-interacting protein 1

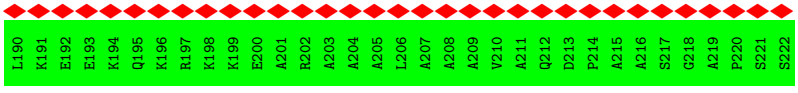
Chain q:





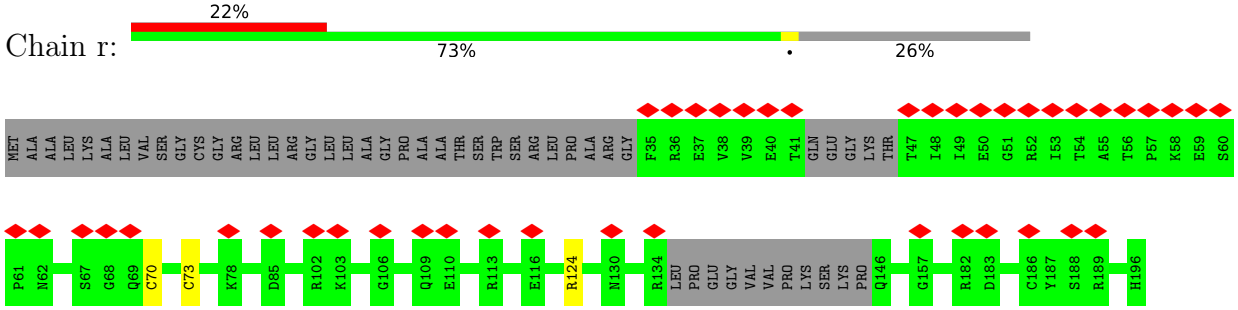






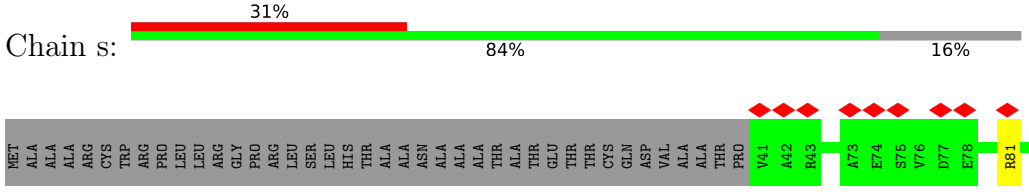
• Molecule 51: 39S ribosomal protein S18a, mitochondrial

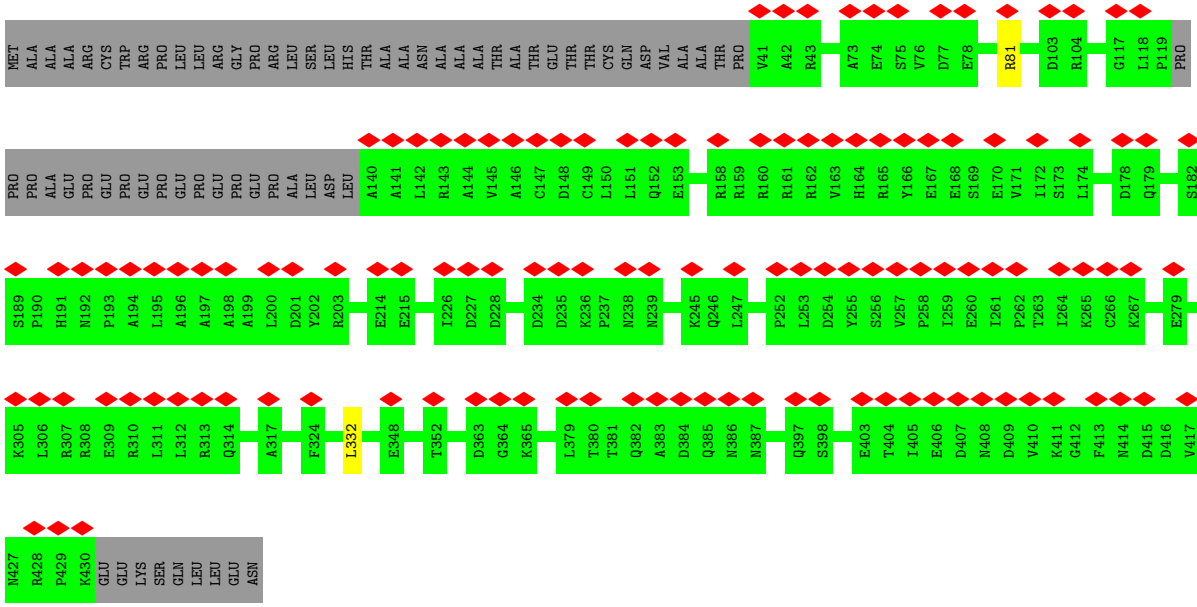
Chain r:



• Molecule 52: 39S ribosomal protein S30, mitochondrial

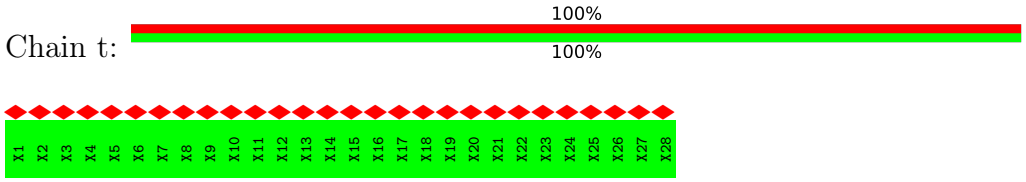
Chain s:





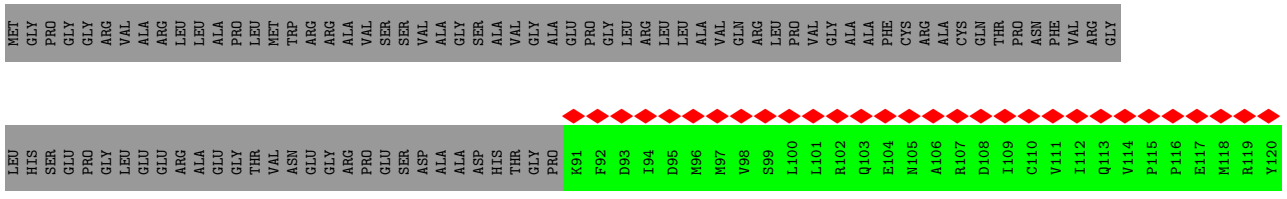
• Molecule 53: mL65

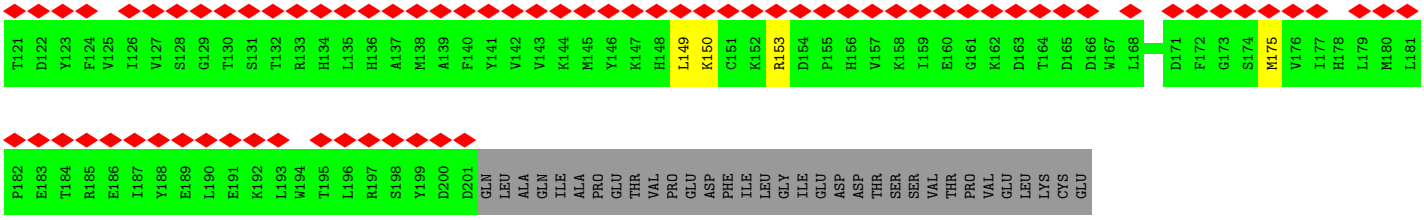
Chain t:



• Molecule 54: Mitochondrial assembly of ribosomal large subunit protein 1

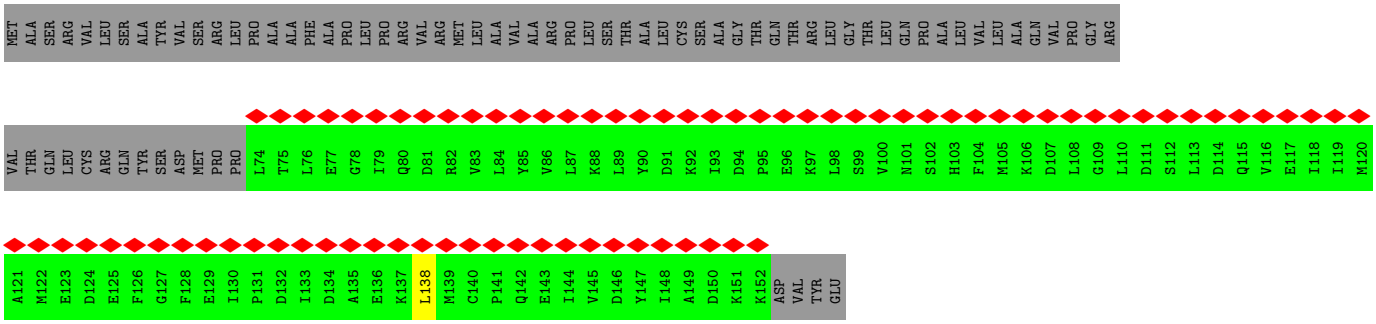
Chain u:



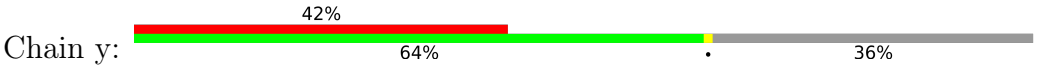


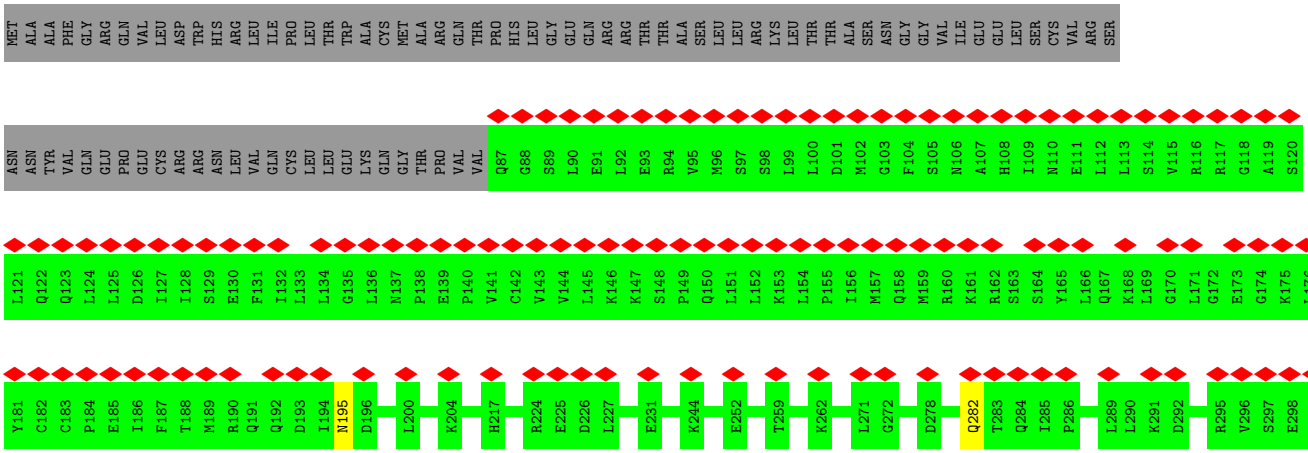
• Molecule 55: MIEF1 upstream open reading frame protein

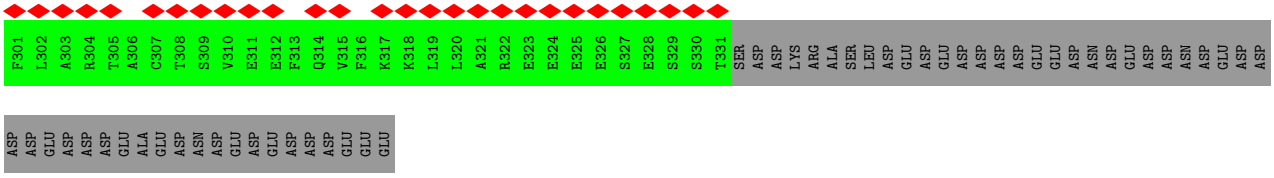
• Molecule 56: Acyl carrier protein, mitochondrial



• Molecule 57: Transcription termination factor 4, mitochondrial

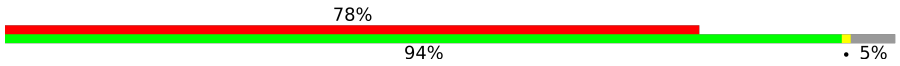


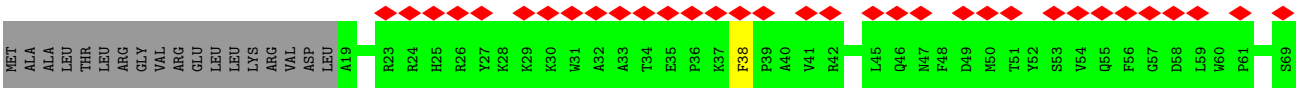


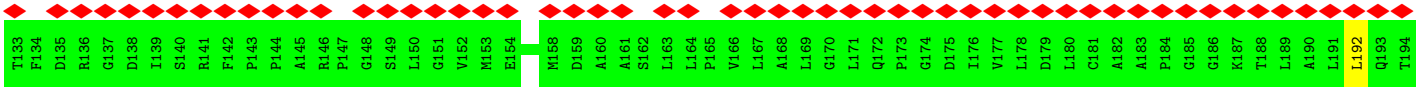


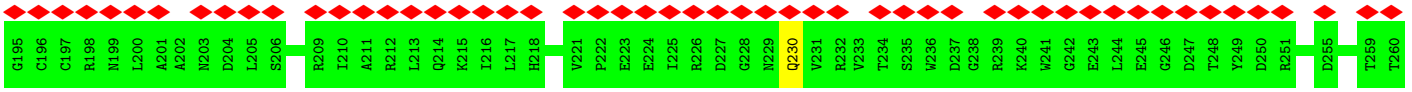
• Molecule 58: 5-methylcytosine rRNA methyltransferase NSUN4

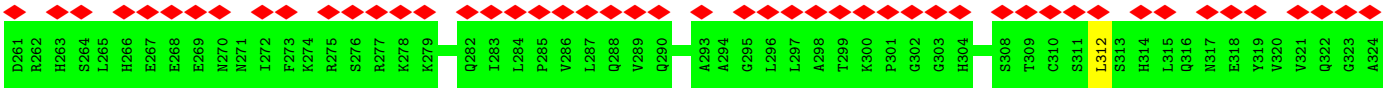
Chain x:

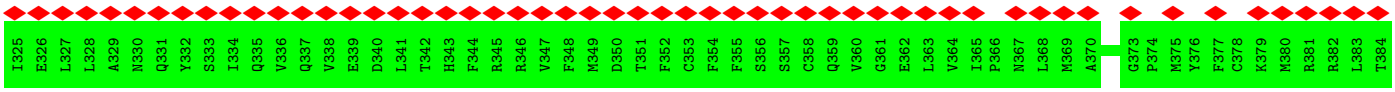






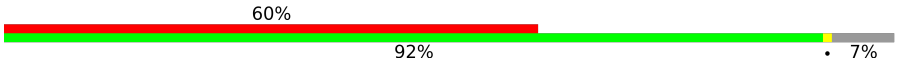


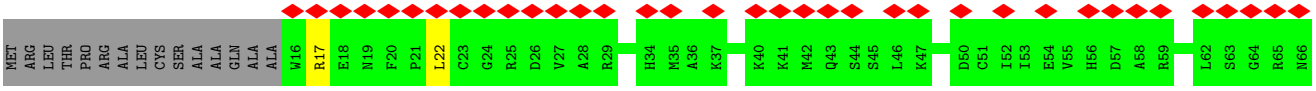


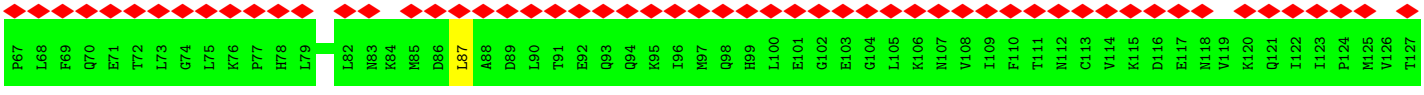


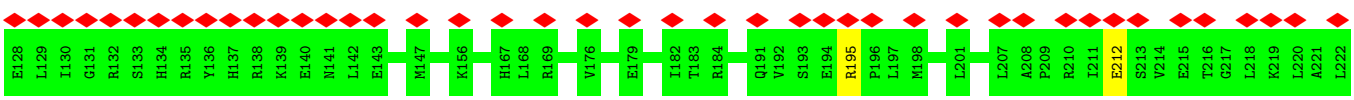
• Molecule 59: Mitochondrial ribosome-associated GTPase 1

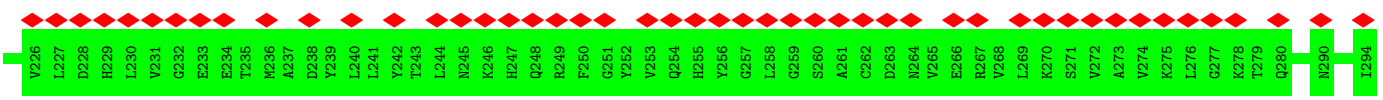
Chain z:

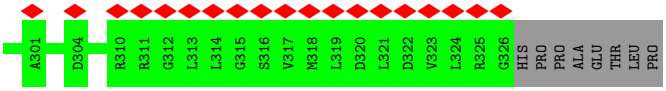











A301
D304
R310
R311
G312
L313
L314
G315
S316
V317
M318
L319
D320
L321
D322
V323
L324
R325
G326
HIS
PRO
PRO
ALA
GLU
THR
LEU
PRO

4 Experimental information (i)

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 ($e^-/Å^2$)	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

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

All (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
12	B	1625	A	P-OP2	84.14	2.92	1.49
12	B	1635	C	N1-C2	79.65	2.19	1.40
23	O	22	PRO	CG-CD	-11.31	1.13	1.50

All (157) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
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
51	r	73	CYS	CA-CB-SG	9.16	130.49	114.00
28	T	62	GLN	C-N-CA	9.12	144.49	121.70
12	B	1625	A	O5'-P-OP2	8.97	121.46	110.70
11	A	2079	C	C2-N1-C1'	8.88	128.57	118.80
11	A	2493	C	C2-N1-C1'	8.38	128.02	118.80
11	A	2493	C	N1-C2-O2	8.14	123.78	118.90
11	A	2322	C	C6-N1-C2	-7.97	117.11	120.30
11	A	2079	C	N3-C2-O2	-7.67	116.53	121.90
11	A	2379	C	N1-C2-O2	7.62	123.47	118.90
11	A	2322	C	N1-C2-O2	7.53	123.42	118.90
19	K	43	HIS	C-N-CA	7.51	140.48	121.70
11	A	2473	A	N9-C4-C5	-7.47	102.81	105.80
51	r	70	CYS	CA-CB-SG	7.43	127.37	114.00
11	A	2653	C	C6-N1-C2	-7.42	117.33	120.30
11	A	2898	U	C2-N1-C1'	7.41	126.59	117.70
21	M	95	PRO	CA-N-CD	-7.36	101.20	111.50
11	A	2474	C	C6-N1-C2	-7.28	117.39	120.30
11	A	1709	G	P-O3'-C3'	7.25	128.40	119.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
38	d	78	LEU	CA-CB-CG	7.22	131.92	115.30
47	m	74	MET	CA-CB-CG	7.19	125.52	113.30
37	c	146	PRO	CA-N-CD	-7.17	101.46	111.50
11	A	2372	U	C2-N1-C1'	7.13	126.26	117.70
11	A	2386	C	N1-C2-O2	7.08	123.14	118.90
21	M	107	LEU	CA-CB-CG	7.06	131.53	115.30
23	O	22	PRO	CA-CB-CG	-7.01	90.69	104.00
11	A	2484	C	N1-C2-O2	6.96	123.08	118.90
32	X	166	LEU	CA-CB-CG	6.95	131.28	115.30
12	B	1624	C	OP2-P-O3'	6.87	120.32	105.20
32	X	95	ASP	CB-CG-OD1	6.86	124.47	118.30
12	B	1635	C	C2-N3-C4	6.82	123.31	119.90
11	A	2322	C	N3-C2-O2	-6.78	117.15	121.90
11	A	2372	U	N1-C2-O2	6.77	127.54	122.80
11	A	2379	C	C2-N1-C1'	6.75	126.22	118.80
11	A	2898	U	N3-C2-O2	-6.67	117.53	122.20
49	p	126	LYS	CA-CB-CG	6.67	128.08	113.40
11	A	2617	A	P-O3'-C3'	6.66	127.69	119.70
9	8	187	PRO	N-CA-CB	6.65	111.28	103.30
47	m	74	MET	CG-SD-CE	6.64	110.83	100.20
12	B	1635	C	N1-C2-O2	6.62	122.88	118.90
17	G	64	CYS	CA-CB-SG	6.62	125.92	114.00
11	A	2372	U	N3-C2-O2	-6.61	117.57	122.20
11	A	1689	C	C2-N1-C1'	6.60	126.06	118.80
11	A	2030	U	P-O3'-C3'	6.60	127.62	119.70
11	A	2457	A	P-O3'-C3'	6.58	127.60	119.70
11	A	2484	C	C2-N1-C1'	6.58	126.03	118.80
11	A	1823	A	P-O3'-C3'	6.55	127.56	119.70
11	A	2816	G	C4-N9-C1'	6.52	134.97	126.50
12	B	1635	C	C4-C5-C6	6.52	120.66	117.40
11	A	2493	C	N3-C2-O2	-6.44	117.39	121.90
11	A	2079	C	C6-N1-C2	-6.43	117.73	120.30
11	A	2066	C	N1-C2-O2	6.39	122.73	118.90
11	A	2544	C	P-O3'-C3'	6.37	127.34	119.70
9	8	188	PRO	N-CA-CB	6.33	110.89	103.30
29	U	118	PRO	N-CA-CB	6.30	110.86	103.30
11	A	2816	G	N3-C4-N9	6.27	129.76	126.00
52	s	332	LEU	CA-CB-CG	6.24	129.64	115.30
9	8	183	PRO	N-CA-CB	6.21	110.75	103.30
6	5	332	ASP	CB-CG-OD1	6.19	123.87	118.30
11	A	2416	U	N1-C2-O2	6.19	127.13	122.80
32	X	153	LEU	CA-CB-CG	6.18	129.52	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
11	A	2816	G	N3-C4-C5	-6.15	125.53	128.60
59	z	87	LEU	CA-CB-CG	6.14	129.42	115.30
6	5	258	PRO	CA-N-CD	-6.14	102.91	111.50
48	o	51	MET	CA-CB-CG	6.12	123.70	113.30
11	A	1690	C	N1-C2-O2	6.12	122.57	118.90
11	A	2626	U	O5'-P-OP1	6.05	117.96	110.70
56	w	138	LEU	CA-CB-CG	6.04	129.20	115.30
11	A	2898	U	N1-C2-O2	6.02	127.01	122.80
11	A	2066	C	N3-C2-O2	-6.02	117.69	121.90
11	A	1689	C	N1-C2-O2	6.01	122.50	118.90
11	A	2066	C	C6-N1-C2	-6.00	117.90	120.30
11	A	2322	C	C5-C6-N1	6.00	124.00	121.00
11	A	2379	C	N3-C2-O2	-5.97	117.72	121.90
21	M	95	PRO	N-CD-CG	-5.96	94.27	103.20
11	A	2065	A	O5'-P-OP2	-5.96	100.34	105.70
11	A	2493	C	C6-N1-C1'	-5.95	113.66	120.80
11	A	2079	C	C6-N1-C1'	-5.93	113.68	120.80
6	5	155	LEU	CA-CB-CG	5.88	128.82	115.30
23	O	22	PRO	CA-N-CD	-5.87	103.28	111.50
32	X	120	ASP	CB-CG-OD1	5.85	123.56	118.30
12	B	1624	C	P-O3'-C3'	5.80	126.67	119.70
11	A	2617	A	OP1-P-O3'	5.77	117.89	105.20
35	a	136	LEU	CA-CB-CG	5.77	128.56	115.30
11	A	2817	G	O5'-P-OP1	-5.75	100.52	105.70
20	L	46	LEU	CA-CB-CG	5.73	128.48	115.30
11	A	2135	A	C2-N3-C4	5.68	113.44	110.60
11	A	2243	A	P-O3'-C3'	5.68	126.51	119.70
12	B	1635	C	P-O3'-C3'	5.66	126.49	119.70
11	A	2271	C	N1-C2-O2	5.65	122.29	118.90
36	b	80	LEU	CA-CB-CG	5.63	128.25	115.30
11	A	2816	G	C8-N9-C1'	-5.63	119.68	127.00
11	A	1993	A	N7-C8-N9	5.62	116.61	113.80
11	A	2639	C	N1-C2-O2	5.62	122.28	118.90
11	A	2386	C	N3-C2-O2	-5.62	117.96	121.90
28	T	90	LEU	CB-CG-CD2	-5.59	101.49	111.00
22	N	92	LEU	CA-CB-CG	5.54	128.05	115.30
11	A	1725	C	N1-C2-O2	5.54	122.22	118.90
58	x	312	LEU	CA-CB-CG	5.53	128.02	115.30
24	P	175	PRO	CA-N-CD	-5.53	103.76	111.50
11	A	1993	A	C2-N3-C4	5.52	113.36	110.60
9	8	140	LEU	CA-CB-CG	5.51	127.98	115.30
11	A	2530	A	P-O3'-C3'	5.51	126.32	119.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
54	u	149	LEU	C-N-CA	5.51	135.47	121.70
30	V	167	PRO	N-CA-CB	5.48	109.88	103.30
12	B	1610	A	C4-N9-C1'	5.45	136.11	126.30
30	V	160	PRO	N-CA-CB	5.43	109.82	103.30
12	B	1645	A	C2-N3-C4	5.43	113.31	110.60
11	A	1993	A	C4-N9-C1'	5.42	136.05	126.30
11	A	1993	A	C8-N9-C4	-5.42	103.63	105.80
11	A	1715	C	C2-N1-C1'	5.41	124.75	118.80
11	A	2484	C	N3-C2-O2	-5.41	118.11	121.90
19	K	46	VAL	CA-CB-CG1	5.41	119.01	110.90
21	M	107	LEU	CB-CG-CD2	-5.40	101.82	111.00
11	A	2507	A	P-O3'-C3'	5.36	126.14	119.70
11	A	2816	G	P-O3'-C3'	5.35	126.12	119.70
39	e	120	LEU	CB-CG-CD2	5.35	120.09	111.00
11	A	2443	C	N1-C2-O2	5.34	122.11	118.90
11	A	2653	C	N3-C2-O2	-5.32	118.17	121.90
11	A	1714	C	N1-C2-O2	5.32	122.09	118.90
11	A	2386	C	C2-N1-C1'	5.32	124.65	118.80
11	A	1714	C	C2-N1-C1'	5.30	124.63	118.80
15	E	78	CYS	CA-CB-SG	5.29	123.53	114.00
6	5	98	LEU	CA-CB-CG	5.28	127.44	115.30
11	A	2549	C	C2-N1-C1'	5.28	124.61	118.80
11	A	2230	A	O5'-P-OP1	5.25	117.00	110.70
11	A	2473	A	N3-C4-N9	5.25	131.60	127.40
6	5	294	LEU	CA-CB-CG	5.24	127.36	115.30
18	J	22	ALA	C-N-CA	5.24	134.79	121.70
11	A	2386	C	C6-N1-C2	-5.22	118.21	120.30
11	A	1701	U	N3-C2-O2	-5.17	118.58	122.20
12	B	1666	U	OP1-P-O3'	5.13	116.49	105.20
58	x	192	LEU	CB-CG-CD2	-5.13	102.28	111.00
11	A	2508	C	C6-N1-C2	-5.13	118.25	120.30
11	A	1993	A	N3-C4-N9	5.12	131.50	127.40
11	A	2493	C	C6-N1-C2	-5.11	118.25	120.30
11	A	2473	A	C4-C5-N7	5.10	113.25	110.70
11	A	1993	A	N3-C4-C5	-5.08	123.25	126.80
11	A	2322	C	C2-N1-C1'	5.08	124.39	118.80
11	A	2079	C	C5-C6-N1	5.07	123.54	121.00
59	z	22	LEU	CA-CB-CG	5.07	126.96	115.30
11	A	1690	C	N3-C2-O2	-5.07	118.35	121.90
11	A	1713	A	P-O3'-C3'	5.06	125.77	119.70
11	A	2079	C	O4'-C1'-N1	5.06	112.25	108.20
23	O	20	LEU	CA-CB-CG	5.05	126.91	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
12	B	1635	C	N3-C4-C5	-5.04	119.89	121.90
11	A	2445	U	C2-N1-C1'	5.04	123.75	117.70
11	A	1689	C	C6-N1-C1'	-5.04	114.76	120.80
11	A	2905	A	P-O3'-C3'	5.03	125.74	119.70
16	F	274	LEU	CA-CB-CG	5.03	126.87	115.30
36	b	29	LEU	CA-CB-CG	5.02	126.85	115.30
12	B	1645	A	C4-N9-C1'	5.02	135.33	126.30
32	X	120	ASP	CB-CG-OD2	-5.00	113.80	118.30

All (2) chirality outliers are listed below:

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

All (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
25	Q	253	GLN	Peptide
41	g	66	TYR	Peptide
51	r	124	ARG	Sidechain
58	x	38	PHE	Peptide
59	z	195	ARG	Peptide

5.2 Too-close contacts (i)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
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
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

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
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
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

All (20) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	2	52	GLU

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Mol	Chain	Res	Type
6	5	217	SER
9	8	182	ILE
9	8	184	ASN
9	8	186	GLN
9	8	187	PRO
9	8	188	PRO
18	J	23	ILE
29	U	117	SER
29	U	118	PRO
54	u	150	LYS
13	C	205	THR
58	x	230	GLN
9	8	183	PRO
13	C	204	HIS
14	D	117	THR
30	V	160	PRO
59	z	212	GLU
57	y	282	GLN
15	E	317	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
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

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
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
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

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
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
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

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	0	177	ARG
2	1	61	LYS
7	6	52	ARG
8	7	54	ARG
8	7	319	ARG
10	9	134	ASN
14	D	218	ARG
14	D	232	ARG
17	G	57	LYS
13	H	108	ARG
19	K	168	ARG
21	M	44	ARG
24	P	120	ARG
24	P	177	ARG

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Mol	Chain	Res	Type
30	V	105	ARG
30	V	136	ARG
30	V	145	ARG
30	V	208	ARG
32	X	112	ARG
32	X	221	LYS
33	Y	225	ASN
37	c	52	ARG
37	c	60	ARG
38	d	159	ARG
43	i	46	ARG
44	j	94	ARG
52	s	81	ARG
54	u	153	ARG
54	u	175	MET
55	v	6	ARG
57	y	195	ASN
59	z	17	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
6	5	380	GLN
6	5	384	GLN
16	F	184	GLN
19	K	26	GLN
19	K	126	HIS
19	K	147	GLN
24	P	52	ASN
33	Y	117	GLN
38	d	211	GLN
50	q	134	ASN
51	r	184	ASN
58	x	79	ASN

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%)

All (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
11	A	1685	C
11	A	1689	C
11	A	1700	U
11	A	1704	U
11	A	1705	A
11	A	1707	C
11	A	1708	A
11	A	1709	G
11	A	1710	A
11	A	1712	A
11	A	1713	A
11	A	1714	C
11	A	1716	U
11	A	1724	A
11	A	1727	A
11	A	1728	U
11	A	1731	A
11	A	1741	A
11	A	1748	G
11	A	1750	G
11	A	1751	A
11	A	1770	G
11	A	1773	A
11	A	1780	U
11	A	1791	G
11	A	1794	A
11	A	1803	A
11	A	1804	A
11	A	1805	A
11	A	1812	C
11	A	1817	C
11	A	1821	A

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Mol	Chain	Res	Type
11	A	1824	U
11	A	1827	C
11	A	1828	A
11	A	1829	A
11	A	1832	A
11	A	1836	A
11	A	1839	C
11	A	1844	A
11	A	1849	C
11	A	1854	U
11	A	1856	A
11	A	1867	A
11	A	1869	A
11	A	1870	A
11	A	1872	U
11	A	1882	A
11	A	1883	G
11	A	1888	G
11	A	1890	C
11	A	1892	A
11	A	1893	A
11	A	1901	C
11	A	1903	C
11	A	1909	A
11	A	1918	G
11	A	1927	G
11	A	1937	A
11	A	1938	A
11	A	1940	A
11	A	1944	C
11	A	1968	G
11	A	1974	A
11	A	1975	U
11	A	1985	G
11	A	1987	G
11	A	1992	C
11	A	1993	A
11	A	1994	A
11	A	1995	A
11	A	2000	C
11	A	2001	C
11	A	2015	G

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Mol	Chain	Res	Type
11	A	2021	U
11	A	2022	G
11	A	2029	A
11	A	2030	U
11	A	2031	A
11	A	2034	A
11	A	2036	C
11	A	2037	U
11	A	2060	A
11	A	2065	A
11	A	2066	C
11	A	2074	A
11	A	2078	C
11	A	2079	C
11	A	2083	U
11	A	2097	A
11	A	2098	G
11	A	2113	G
11	A	2124	A
11	A	2132	A
11	A	2142	A
11	A	2147	G
11	A	2154	A
11	A	2159	U
11	A	2160	A
11	A	2163	A
11	A	2168	U
11	A	2172	A
11	A	2173	G
11	A	2182	G
11	A	2183	C
11	A	2187	C
11	A	2193	U
11	A	2195	A
11	A	2197	G
11	A	2198	A
11	A	2200	A
11	A	2204	U
11	A	2210	C
11	A	2215	C
11	A	2216	A
11	A	2229	A

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Mol	Chain	Res	Type
11	A	2230	A
11	A	2233	U
11	A	2237	A
11	A	2239	A
11	A	2241	A
11	A	2243	A
11	A	2244	U
11	A	2245	A
11	A	2246	A
11	A	2252	C
11	A	2257	C
11	A	2259	C
11	A	2262	C
11	A	2263	C
11	A	2264	A
11	A	2284	C
11	A	2285	U
11	A	2297	A
11	A	2299	U
11	A	2300	G
11	A	2316	U
11	A	2322	C
11	A	2324	U
11	A	2329	C
11	A	2332	C
11	A	2345	G
11	A	2371	U
11	A	2374	A
11	A	2381	A
11	A	2386	C
11	A	2387	U
11	A	2388	A
11	A	2390	A
11	A	2393	C
11	A	2394	A
11	A	2401	A
11	A	2404	U
11	A	2405	C
11	A	2406	A
11	A	2407	U
11	A	2414	C
11	A	2415	C

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Mol	Chain	Res	Type
11	A	2416	U
11	A	2418	A
11	A	2426	C
11	A	2443	C
11	A	2444	A
11	A	2446	A
11	A	2449	G
11	A	2451	A
11	A	2452	A
11	A	2458	A
11	A	2468	A
11	A	2478	G
11	A	2484	C
11	A	2489	C
11	A	2493	C
11	A	2500	A
11	A	2502	C
11	A	2507	A
11	A	2508	C
11	A	2511	C
11	A	2520	C
11	A	2521	A
11	A	2523	C
11	A	2524	A
11	A	2527	A
11	A	2531	U
11	A	2539	A
11	A	2540	C
11	A	2545	U
11	A	2546	G
11	A	2547	C
11	A	2548	C
11	A	2549	C
11	A	2551	G
11	A	2554	A
11	A	2556	A
11	A	2558	A
11	A	2559	U
11	A	2563	U
11	A	2564	A
11	A	2565	A
11	A	2568	G

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Mol	Chain	Res	Type
11	A	2569	C
11	A	2575	U
11	A	2581	A
11	A	2586	U
11	A	2593	G
11	A	2594	U
11	A	2595	A
11	A	2596	G
11	A	2598	A
11	A	2599	U
11	A	2600	A
11	A	2601	A
11	A	2602	U
11	A	2604	A
11	A	2605	C
11	A	2606	U
11	A	2607	U
11	A	2608	G
11	A	2615	A
11	A	2616	A
11	A	2617	A
11	A	2618	U
11	A	2619	A
11	A	2622	G
11	A	2624	C
11	A	2626	U
11	A	2627	G
11	A	2628	U
11	A	2630	U
11	A	2631	G
11	A	2632	A
11	A	2633	A
11	A	2635	G
11	A	2639	C
11	A	2640	C
11	A	2645	G
11	A	2654	U
11	A	2655	G
11	A	2656	U
11	A	2660	U
11	A	2683	C
11	A	2684	C

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Mol	Chain	Res	Type
11	A	2686	G
11	A	2694	A
11	A	2695	G
11	A	2696	A
11	A	2697	G
11	A	2698	G
11	A	2706	A
11	A	2708	C
11	A	2709	A
11	A	2718	C
11	A	2719	G
11	A	2723	A
11	A	2724	G
11	A	2732	G
11	A	2739	U
11	A	2740	A
11	A	2744	U
11	A	2750	U
11	A	2797	C
11	A	2804	A
11	A	2810	G
11	A	2814	G
11	A	2815	OMG
11	A	2816	G
11	A	2817	G
11	A	2819	G
11	A	2820	A
11	A	2822	C
11	A	2823	U
11	A	2826	G
11	A	2831	G
11	A	2832	A
11	A	2833	A
11	A	2842	C
11	A	2844	G
11	A	2847	C
11	A	2851	A
11	A	2853	A
11	A	2854	U
11	A	2859	A
11	A	2861	A
11	A	2864	U

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Mol	Chain	Res	Type
11	A	2865	C
11	A	2869	A
11	A	2871	U
11	A	2895	U
11	A	2896	G
11	A	2901	A
11	A	2906	C
11	A	2910	A
11	A	2913	A
11	A	2915	C
11	A	2916	G
11	A	2917	G
11	A	2918	A
11	A	2919	A
11	A	2922	A
11	A	2926	A
11	A	2928	C
11	A	2932	G
11	A	2935	A
11	A	2946	A
11	A	2955	U
11	A	2956	A
11	A	2963	A
11	A	2971	A
11	A	2985	C
11	A	2989	G
11	A	2990	A
11	A	2991	U
11	A	2993	U
11	A	3000	A
11	A	3005	A
11	A	3016	G
11	A	3022	G
12	B	1606	G
12	B	1608	G
12	B	1609	U
12	B	1610	A
12	B	1611	G
12	B	1612	C
12	B	1614	U
12	B	1618	A
12	B	1619	C

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Mol	Chain	Res	Type
12	B	1620	A
12	B	1621	A
12	B	1622	A
12	B	1623	G
12	B	1624	C
12	B	1626	C
12	B	1633	U
12	B	1635	C
12	B	1636	A
12	B	1646	U
12	B	1647	U
12	B	1648	U
12	B	1649	C
12	B	1650	A
12	B	1651	A
12	B	1653	U
12	B	1654	U
12	B	1655	A
12	B	1656	A
12	B	1657	C
12	B	1659	U
12	B	1667	C

All (22) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
11	A	1709	G
11	A	1713	A
11	A	1823	A
11	A	1871	A
11	A	2030	U
11	A	2186	C
11	A	2243	A
11	A	2245	A
11	A	2457	A
11	A	2507	A
11	A	2530	A
11	A	2544	C
11	A	2574	G
11	A	2617	A
11	A	2631	G
11	A	2653	C

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Mol	Chain	Res	Type
11	A	2815	OMG
11	A	2816	G
11	A	2818	C
11	A	2905	A
12	B	1607	U
12	B	1635	C

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.

All (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'
70	z	409	GCP	C2'
70	z	409	GCP	C4'

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 (i)

There are no chain breaks in this entry.

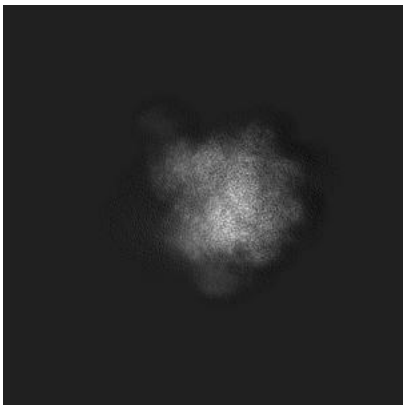
6 Map visualisation

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.

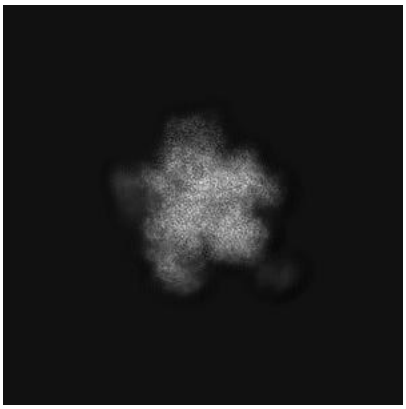
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

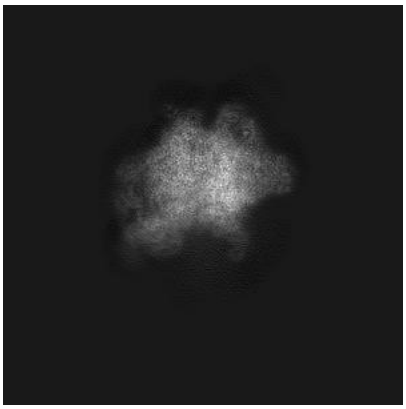
6.1.1 Primary map



X

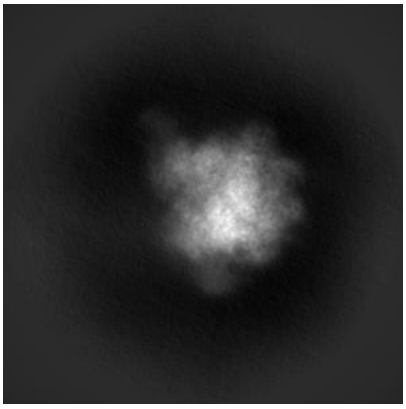


Y

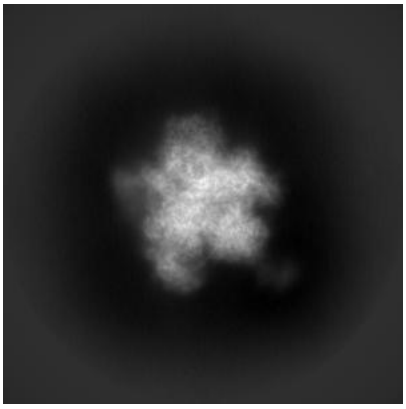


Z

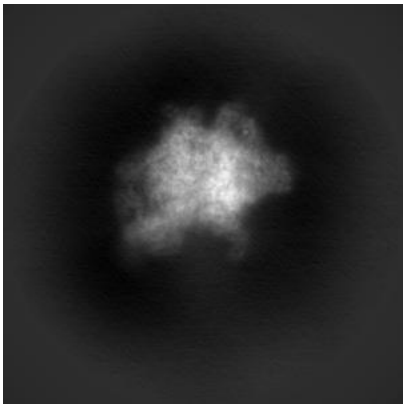
6.1.2 Raw map



X



Y

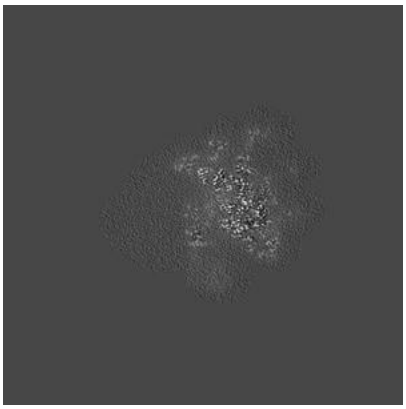


Z

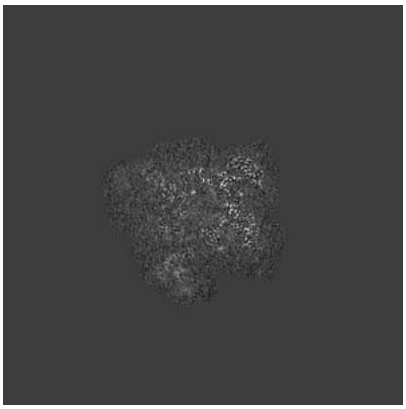
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

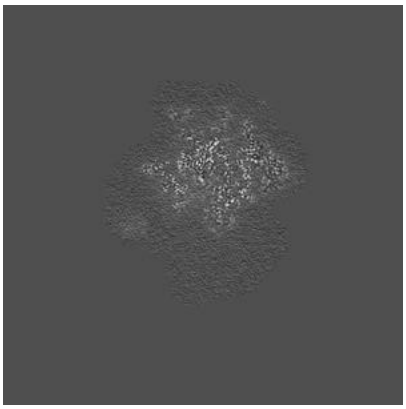
6.2.1 Primary map



X Index: 256

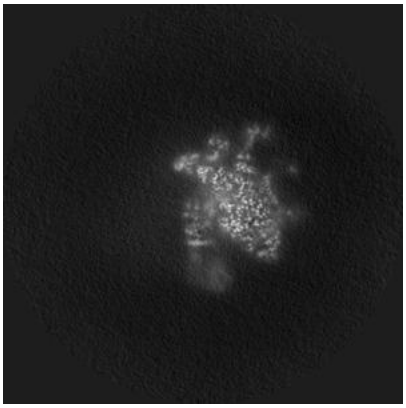


Y Index: 256

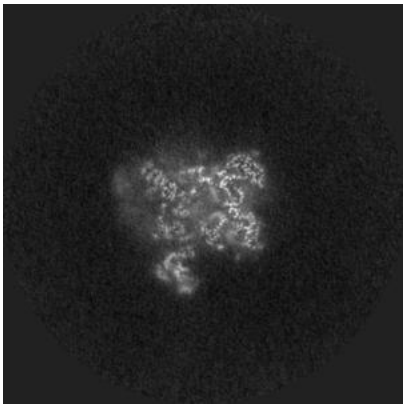


Z Index: 256

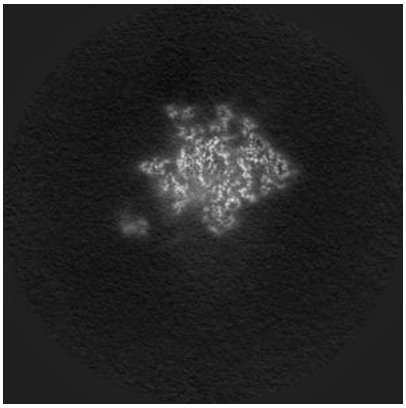
6.2.2 Raw map



X Index: 256



Y Index: 256

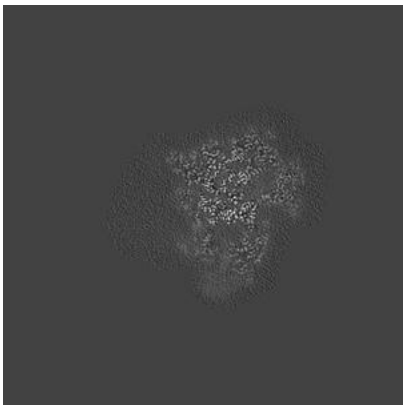


Z Index: 256

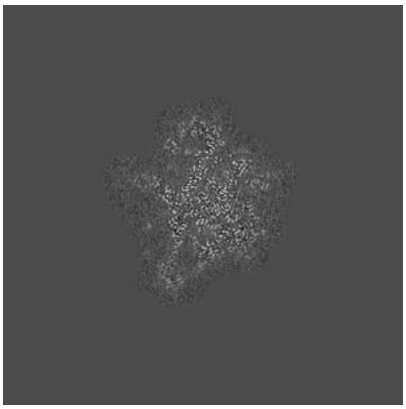
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

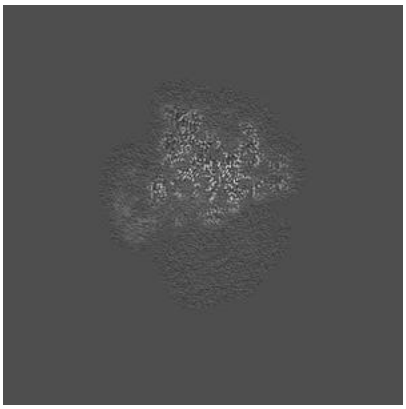
6.3.1 Primary map



X Index: 286

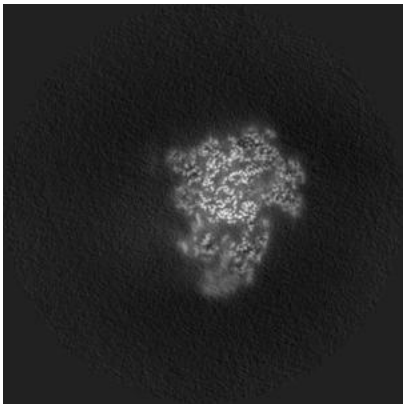


Y Index: 304

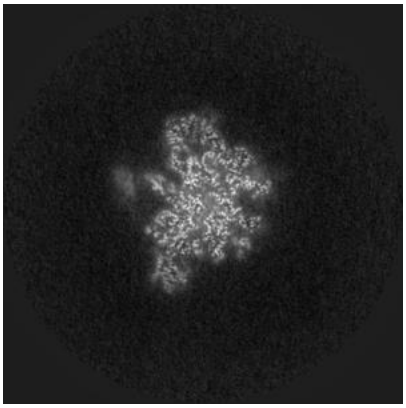


Z Index: 240

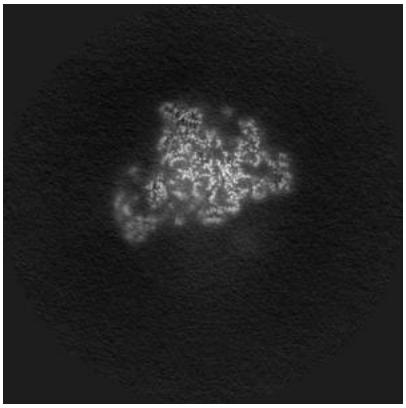
6.3.2 Raw map



X Index: 285



Y Index: 291



Z Index: 240

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

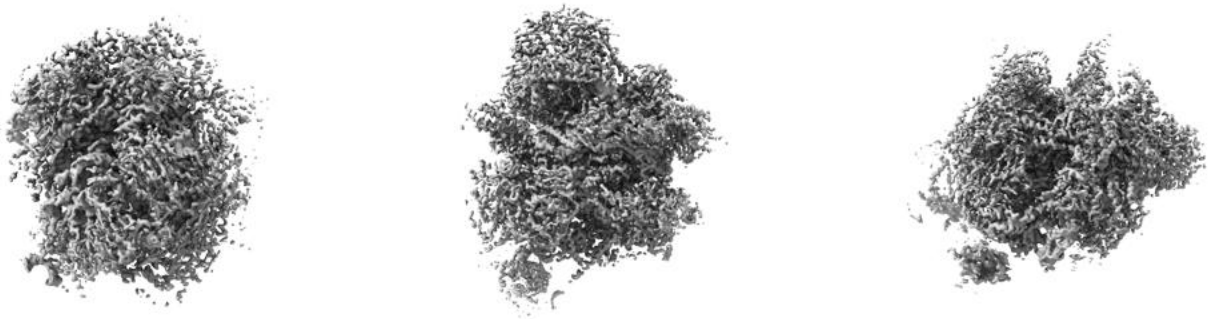
6.4 Orthogonal surface views (i)

6.4.1 Primary map

X Y Z

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



X Y Z

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

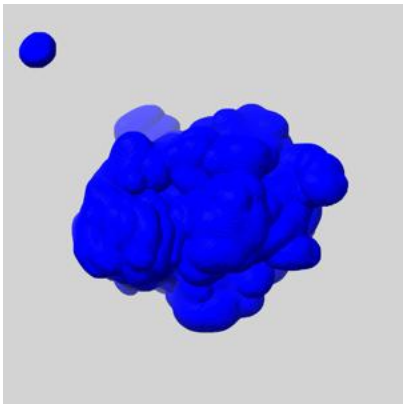
6.5 Mask visualisation (i)

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

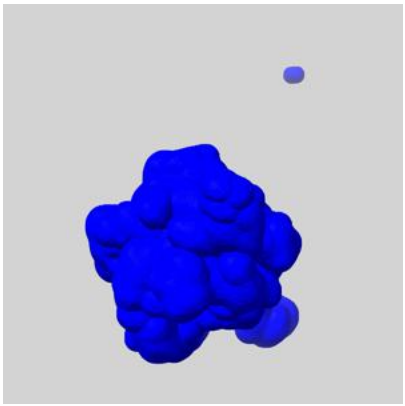
A mask typically either:

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

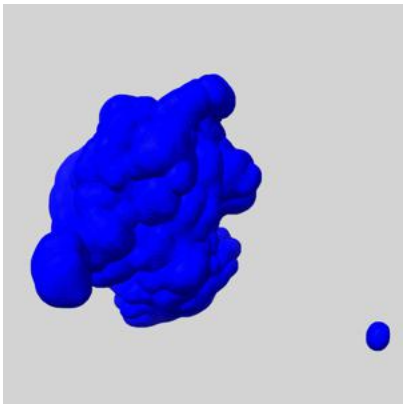
6.5.1 emd_13329_msk_1.map (i)



X



Y

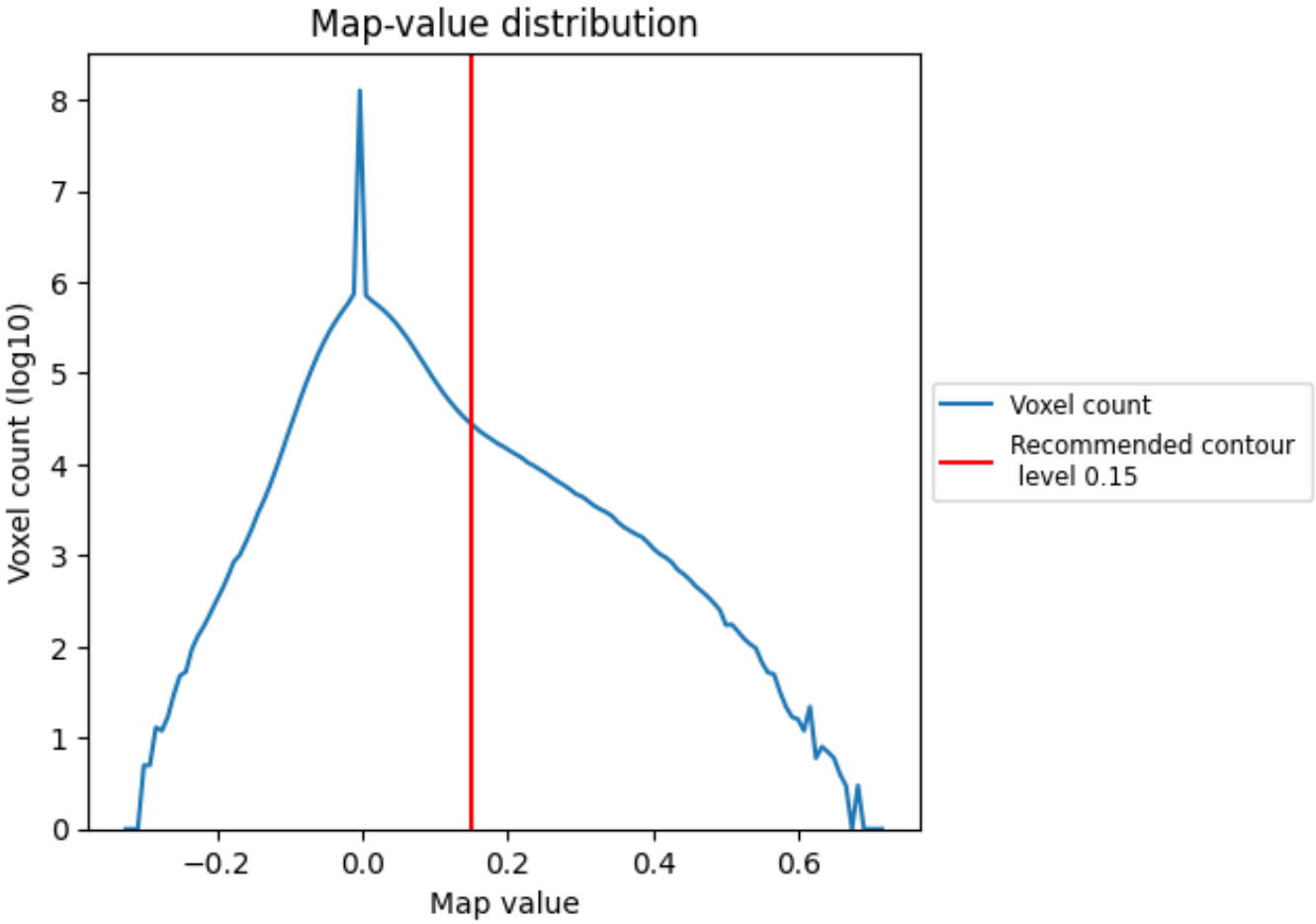


Z

7 Map analysis

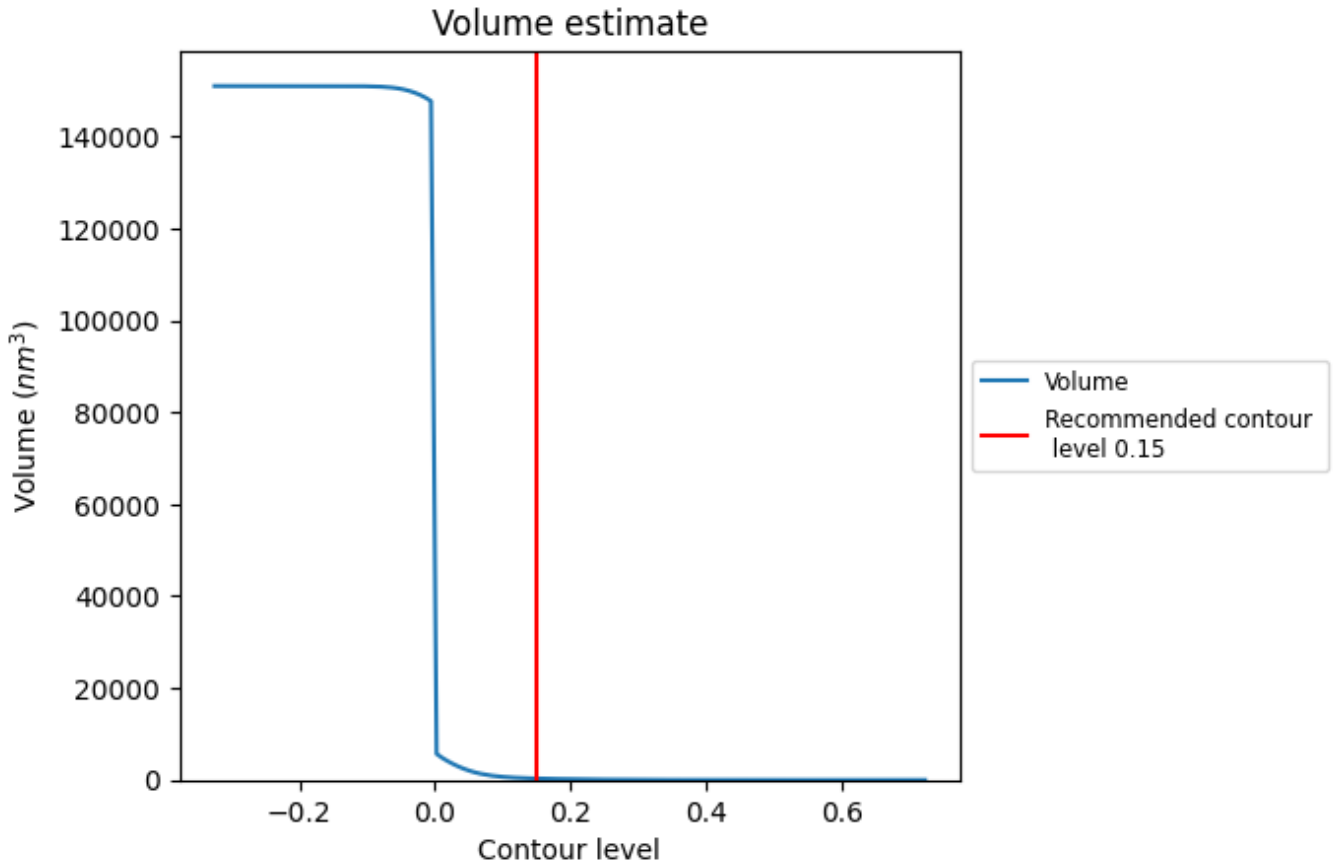
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

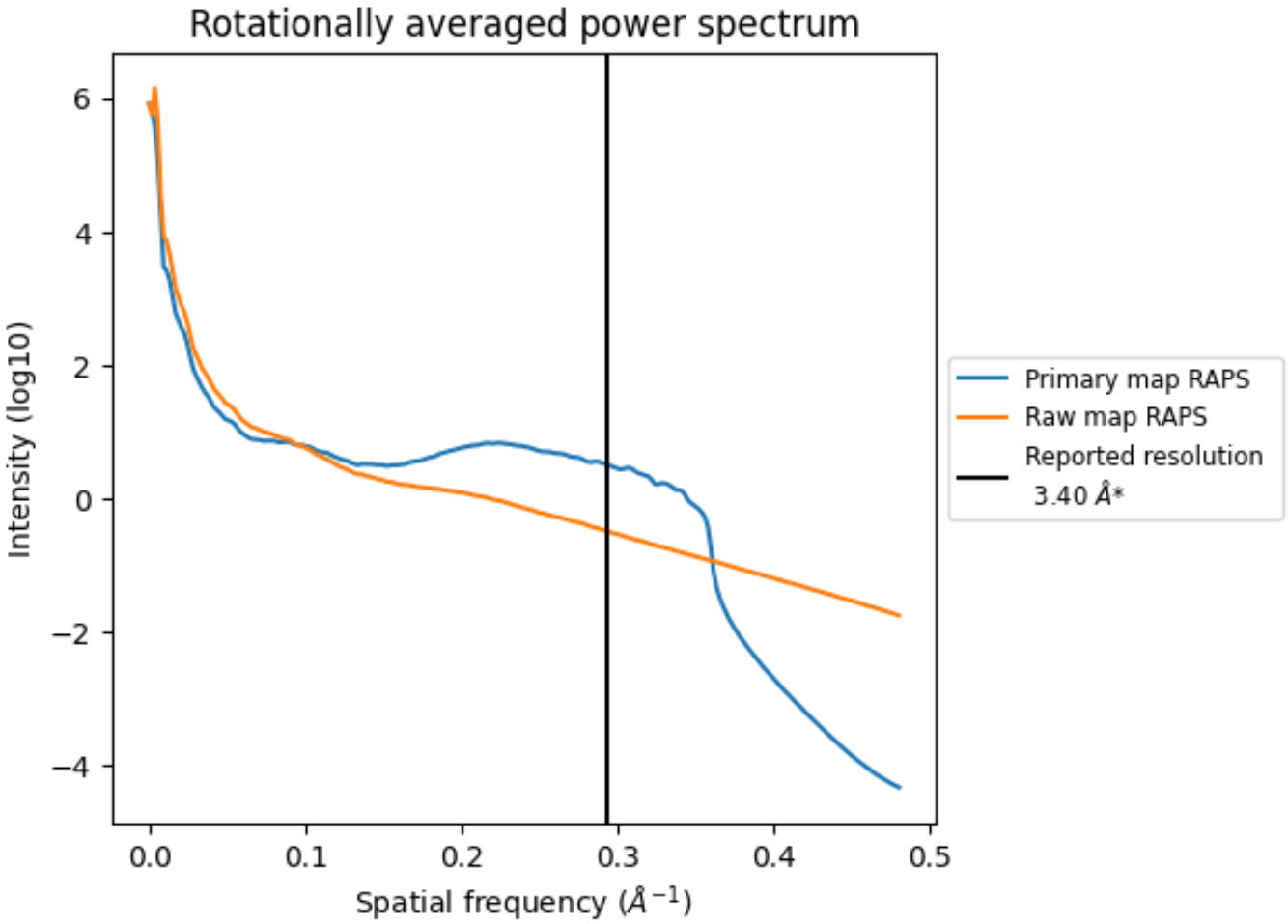
7.2 Volume estimate



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)

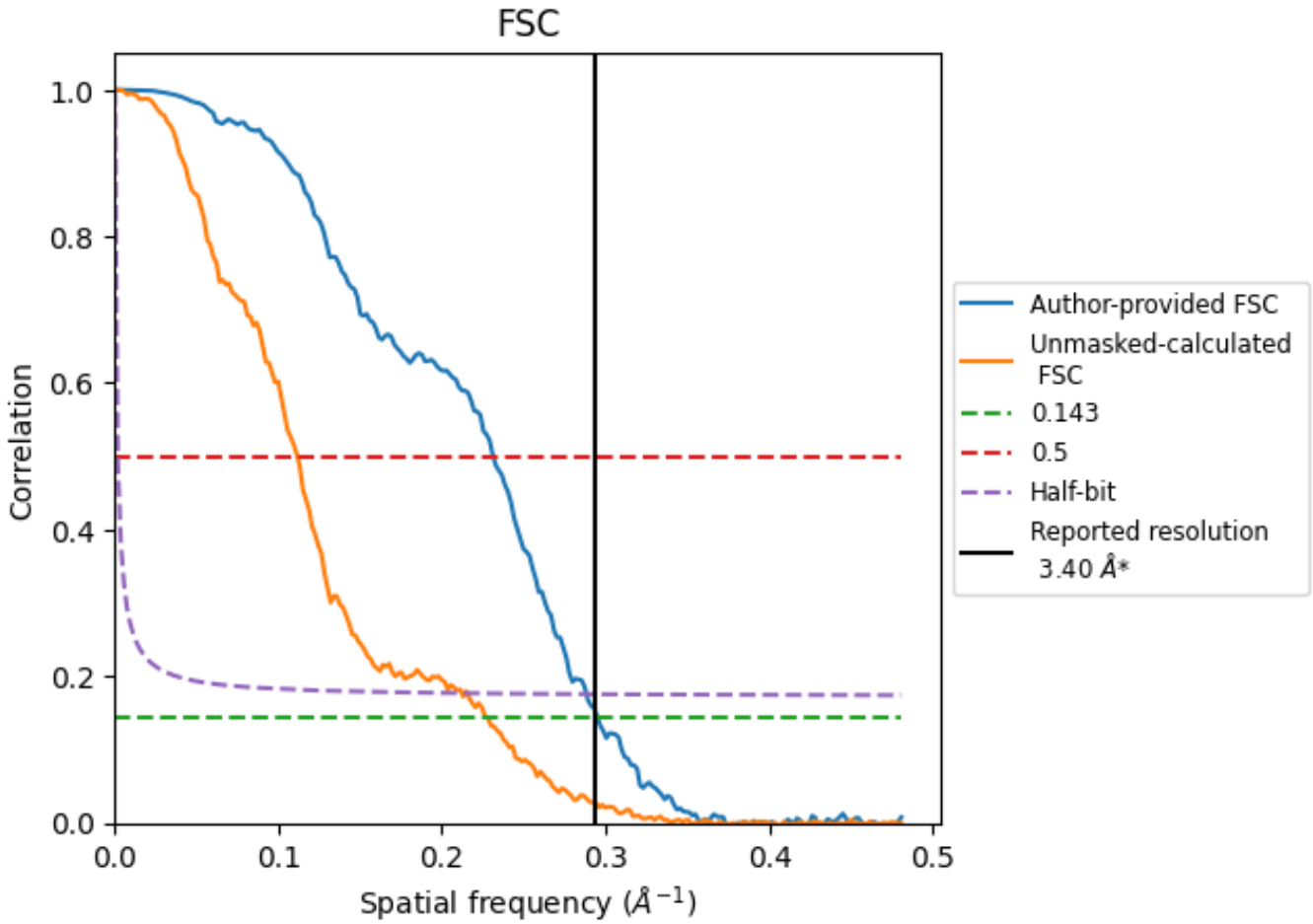


*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.294 Å^{-1}

8.2 Resolution estimates (i)

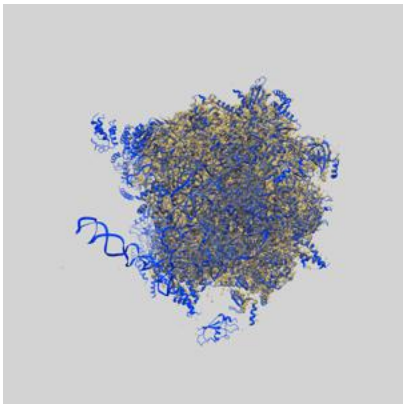
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.39	4.32	3.47
Unmasked-calculated*	4.38	8.96	4.71

*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 %

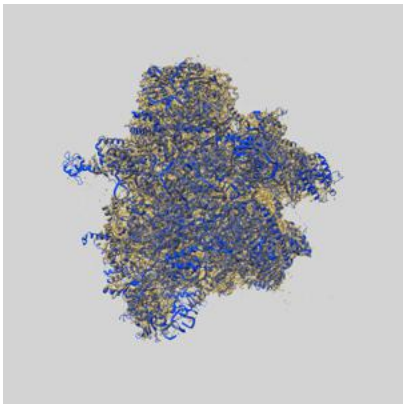
9 Map-model fit

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.

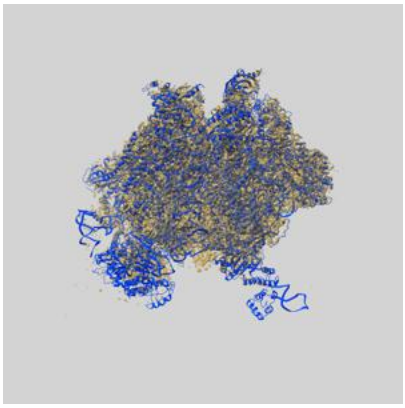
9.1 Map-model overlay



X



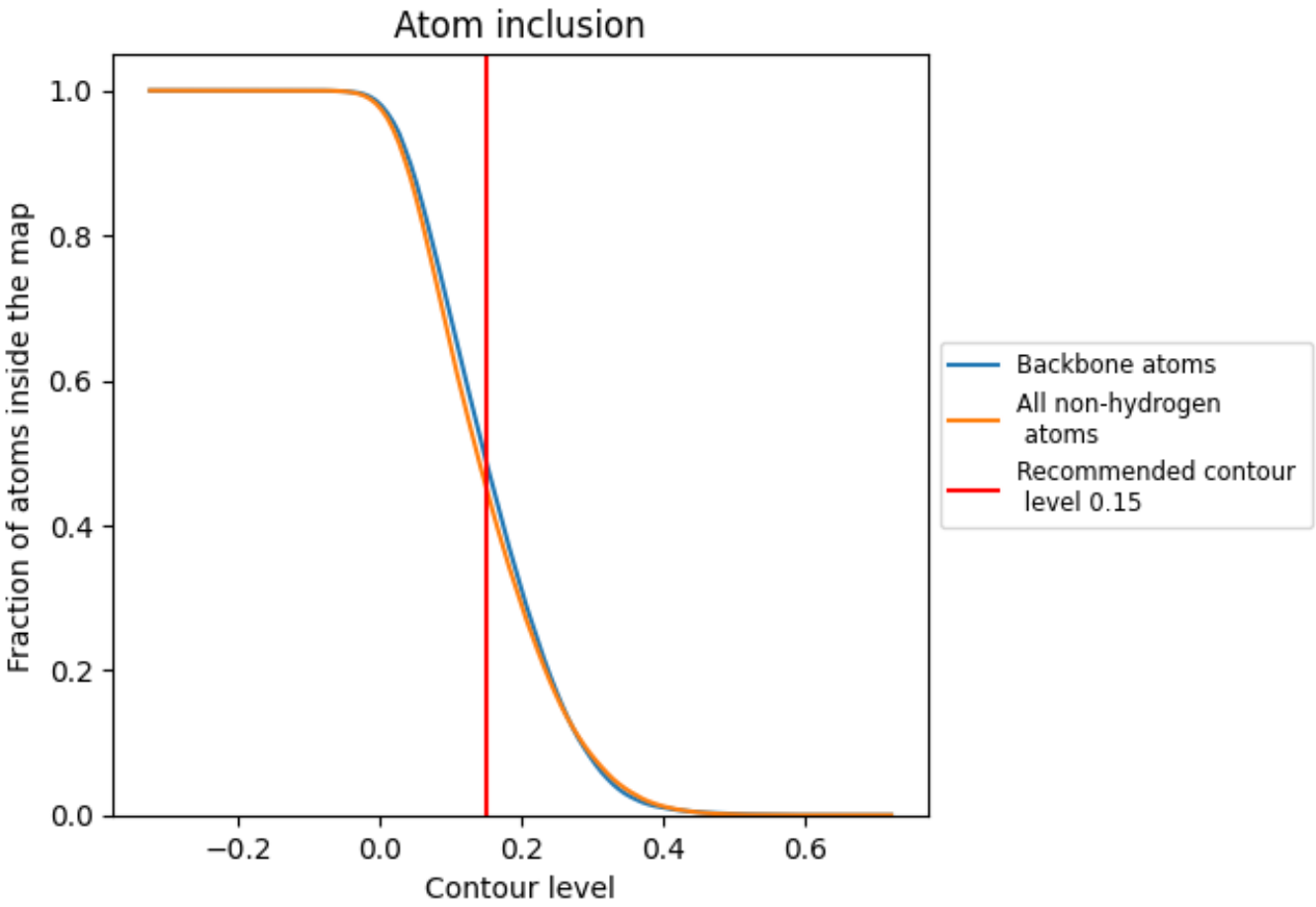
Y



Z

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.