wwPDB EM Validation Summary Report

Feb 12, 2026 – 08:11 PM EST

PDB ID	:	9PS7 / pdb_00009ps7
EMDB ID	:	EMD-71825
Title	:	In situ structure of the human mitoribosome in the A/T-P-E state from TACO1-knockout cells
Authors	:	Wang, S.; Xiong, Y.; Zhang, Y.
Deposited on	:	2025-07-25
Resolution	:	3.08 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

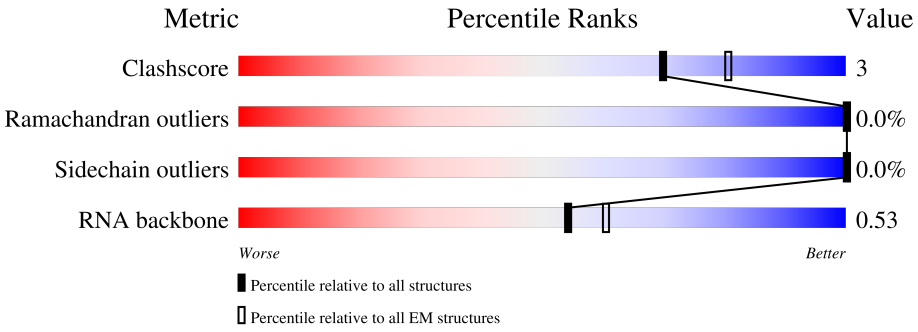
EMDB validation analysis	:	0.0.1.dev131
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.48

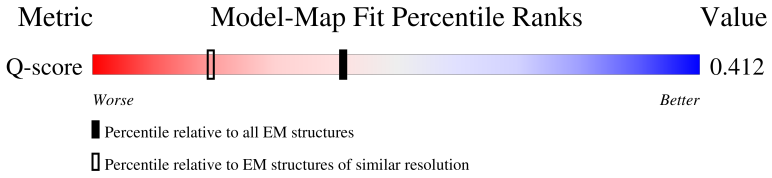
1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.08 Å.

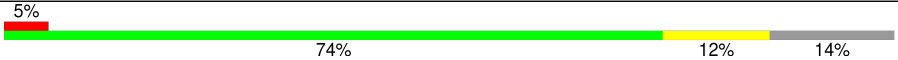
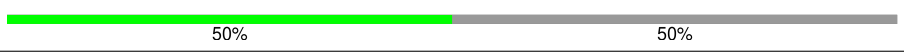
Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.





Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
RNA backbone	6643	2191	-
Q-score	-	25397	14000 (2.58 - 3.58)

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	
2	1	65	
3	2	92	

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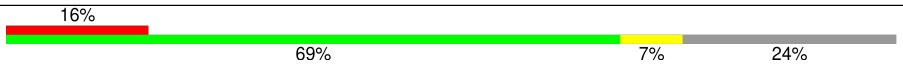
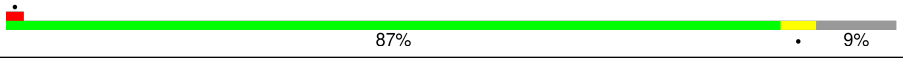
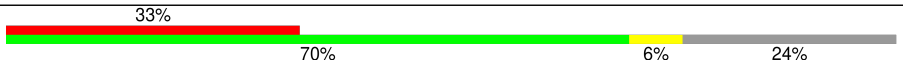
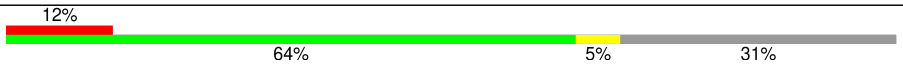
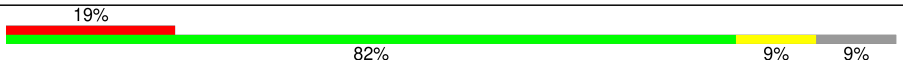
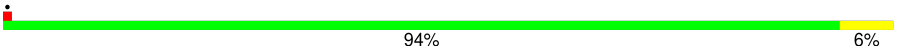
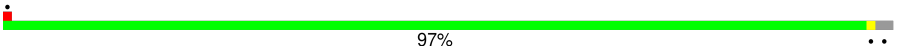
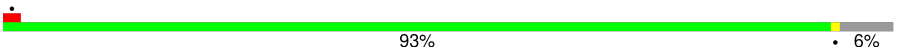
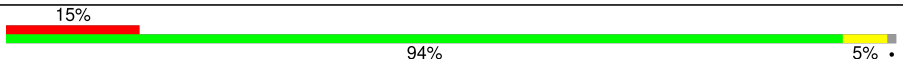
Mol	Chain	Length	Quality of chain
4	3	188	
5	4	103	
6	5	423	
7	6	380	
8	7	338	
9	8	206	
10	9	137	
11	A	1558	
12	D	305	
13	E	348	
14	F	311	
15	H	267	
16	I	261	
17	J	192	
18	K	178	
19	L	145	
20	M	296	
21	N	251	
22	O	175	
23	P	180	
24	Q	292	
25	R	149	
26	S	205	
27	T	206	
28	U	153	

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Mol	Chain	Length	Quality of chain
29	W	148	77% 22%
30	X	256	93% 5%
31	Y	250	72% 28%
32	Z	161	73% 24%
33	g	166	80% 19%
34	z	325	71% 63% 14% 22%
35	V	216	5% 92% 5%
36	b	215	67% 30%
37	d	306	17% 74% 11% 15%
38	e	279	24% 74% 11% 15%
39	h	158	5% 70% 30%
40	i	128	76% 24%
41	j	123	5% 76% 24%
42	k	112	13% 84% 7% 9%
43	l	138	17% 57% 41%
44	m	128	22% 68% 28%
45	n	43	63% 100%
46	o	102	92% 8%
47	q	222	21% 69% 10% 20%
48	r	196	78% 5% 17%
49	t	198	17% 21% 77%
49	u	198	12% 11% 6% 84%
50	c	332	85% 14%
51	f	212	8% 67% 7% 26%
52	p	206	11% 69% 29%

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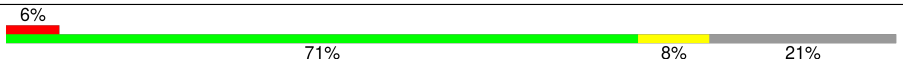
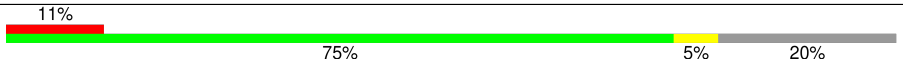
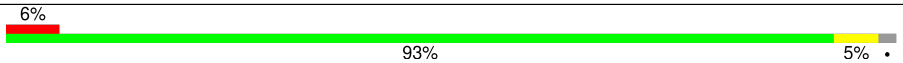
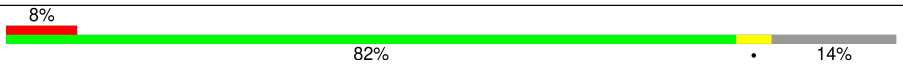
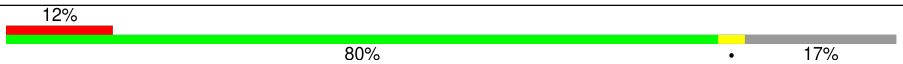
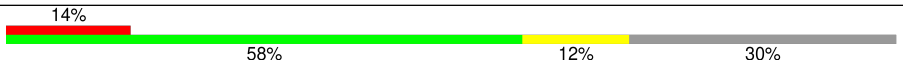
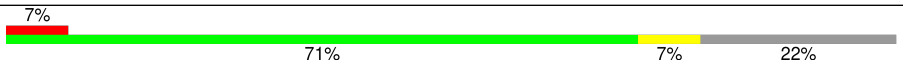
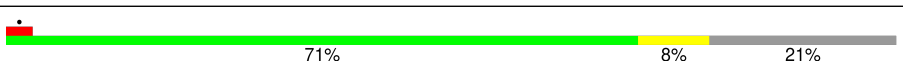
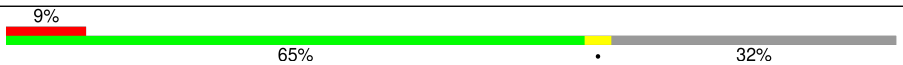
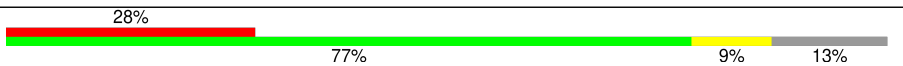
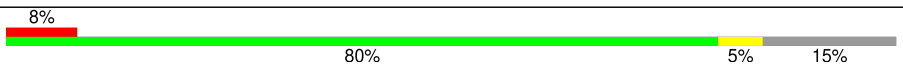
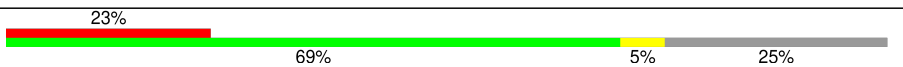
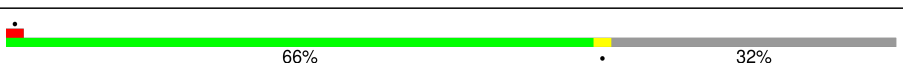
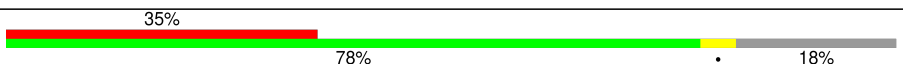
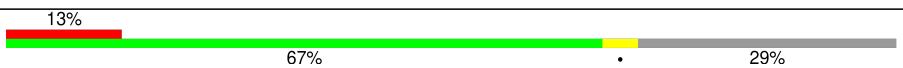
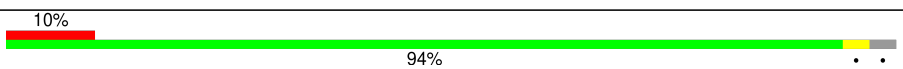
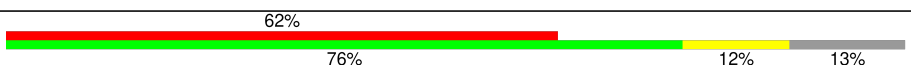
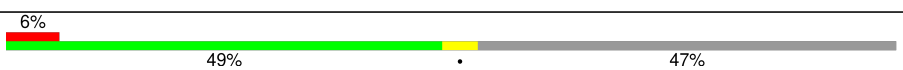
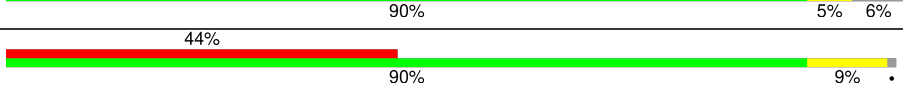
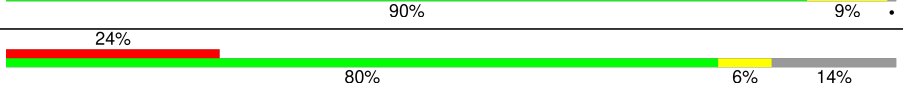
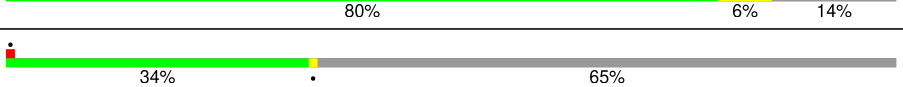
Mol	Chain	Length	Quality of chain
53	s	439	
54	AB	296	
55	AC	167	
56	AD	430	
57	AE	125	
58	AF	242	
59	AG	396	
60	AH	201	
61	AJ	138	
62	AK	128	
63	AL	257	
64	AM	137	
65	AN	130	
66	AO	258	
67	AP	142	
68	AR	360	
69	AS	190	
70	AT	173	
71	AU	205	
72	AV	414	
73	AW	187	
74	AZ	106	
75	A0	217	
76	A1	323	
77	A3	199	

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Mol	Chain	Length	Quality of chain
78	Az	34	59% 56% 44%
79	AY	395	9% 29% 70%
80	AA	954	53% 41% 5%
81	AI	194	64% 6% 29%
82	OX	435	7% 11% 87%
83	a	142	14% 68% 27%
84	Ay	76	13% 64% 26% 8%
85	A4	689	52% 75% 10% 15%
86	AX	398	21% 80% 9% 12%
87	A2	118	25% 97%
88	AQ	87	5% 97%
89	Ah	77	48% 26% 56% 17%
90	Ag	455	72% 44% 42% 13%
91	Ax	71	6% 63% 28% 8%
92	B	72	7% 57% 36% 7%

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
98	FES	r	201	-	-	X	-

2 Entry composition (i)

There are 103 unique types of molecules in this entry. The entry contains 184618 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	110	898	554	176	162	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	56	464	296	89	77	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	46	377	233	83	60	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	832	539	162	128	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	38	342	217	72	49	4	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	394	3210	2073	560	566	11	0	0

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

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

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

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

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

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

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

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

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

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

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	A	deletion	GB 2756414513
A	?	-	C	deletion	GB 2756414513
A	?	-	U	deletion	GB 2756414513

- Molecule 12 is a protein called 39S ribosomal protein L2, mitochondrial.

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

- Molecule 13 is a protein called 39S ribosomal protein L3, mitochondrial.

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

- Molecule 14 is a protein called 39S ribosomal protein L4, mitochondrial.

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

- Molecule 15 is a protein called 39S ribosomal protein L9, mitochondrial.

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

- Molecule 16 is a protein called 39S ribosomal protein L10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	I	181	Total	C	N	O	S	0	0
			1446	932	260	244	10		

- Molecule 17 is a protein called 39S ribosomal protein L11, mitochondrial.

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

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

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

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	1	ACE	-	acetylation	UNP H2QWN0
K	132	TYR	ASP	conflict	UNP H2QWN0

- Molecule 19 is a protein called 39S ribosomal protein L14, mitochondrial.

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

- Molecule 20 is a protein called 39S ribosomal protein L15, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	M	291	Total	C	N	O	S	0	0
			2327	1483	430	408	6		

- Molecule 21 is a protein called 39S ribosomal protein L16, mitochondrial.

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

- Molecule 22 is a protein called 39S ribosomal protein L17, mitochondrial.

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

- Molecule 23 is a protein called 39S ribosomal protein L18, mitochondrial.

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

- Molecule 24 is a protein called 39S ribosomal protein L19, mitochondrial.

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

- Molecule 25 is a protein called 39S ribosomal protein L20, mitochondrial.

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

- Molecule 26 is a protein called 39S ribosomal protein L21, mitochondrial.

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

- Molecule 27 is a protein called 39S ribosomal protein L22, mitochondrial.

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

- Molecule 28 is a protein called 39S ribosomal protein L23, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	U	152	Total	C	N	O	S	0	0
			1248	786	234	225	3		

- Molecule 29 is a protein called 39S ribosomal protein L27, mitochondrial.

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

- Molecule 30 is a protein called 39S ribosomal protein L28, mitochondrial.

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

- Molecule 31 is a protein called 39S ribosomal protein L47, mitochondrial.

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

- Molecule 32 is a protein called 39S ribosomal protein L30, mitochondrial.

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

- Molecule 33 is a protein called 39S ribosomal protein L49, mitochondrial.

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

- Molecule 34 is a protein called Large ribosomal subunit protein uL1m.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	z	252	Total	C	N	O	S	0	0
			2027	1304	336	381	6		

- Molecule 35 is a protein called 39S ribosomal protein L24, mitochondrial.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
36	b	150	Total	C	N	O	S	0	0
			1193	742	231	217	3		

- Molecule 37 is a protein called 39S ribosomal protein L45, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	d	259	Total	C	N	O	S	0	0
			2124	1357	369	384	14		

- Molecule 38 is a protein called 39S ribosomal protein L46, mitochondrial.

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

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

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

- Molecule 40 is a protein called 39S ribosomal protein L51, mitochondrial.

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

- Molecule 41 is a protein called 39S ribosomal protein L52, mitochondrial.

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

- Molecule 42 is a protein called Large ribosomal subunit protein mL53.

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

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
k	1	ACE	-	acetylation	UNP Q96EL3

- Molecule 43 is a protein called 39S ribosomal protein L54, mitochondrial.

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

- Molecule 44 is a protein called 39S ribosomal protein L55, mitochondrial.

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

- Molecule 45 is a protein called Nascent polypeptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
45	n	43	Total	C	N	O	0	0
			215	129	43	43		

- Molecule 46 is a protein called Ribosomal protein 63, mitochondrial.

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

- Molecule 47 is a protein called Growth arrest and DNA damage-inducible proteins-interacting protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	q	177	Total	C	N	O	S	0	0
			1495	929	292	269	5		

- Molecule 48 is a protein called 39S ribosomal protein S18a, mitochondrial.

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

- Molecule 49 is a protein called 39S ribosomal protein L12, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
49	t	46	Total	C	N	O	0	0
			354	228	56	70		
49	u	32	Total	C	N	O	0	0
			257	168	40	49		

- Molecule 50 is a protein called 39S ribosomal protein L44, mitochondrial.

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

- Molecule 51 is a protein called 39S ribosomal protein L48, mitochondrial.

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

- Molecule 52 is a protein called Peptidyl-tRNA hydrolase ICT1, mitochondrial.

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

- Molecule 53 is a protein called 39S ribosomal protein S30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	s	385	Total	C	N	O	S	0	0
			3148	2018	558	558	14		

- Molecule 54 is a protein called 28S ribosomal protein S2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	AB	225	Total	C	N	O	S	0	0
			1828	1164	331	323	10		

- Molecule 55 is a protein called 28S ribosomal protein S24, mitochondrial.

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

- Molecule 56 is a protein called 28S ribosomal protein S5, mitochondrial.

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

- Molecule 57 is a protein called 28S ribosomal protein S6, mitochondrial.

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

- Molecule 58 is a protein called 28S ribosomal protein S7, mitochondrial.

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

- Molecule 59 is a protein called 28S ribosomal protein S9, mitochondrial.

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

- Molecule 60 is a protein called 28S ribosomal protein S10, mitochondrial.

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

- Molecule 61 is a protein called 28S ribosomal protein S12, mitochondrial.

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

- Molecule 62 is a protein called 28S ribosomal protein S14, mitochondrial.

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

- Molecule 63 is a protein called 28S ribosomal protein S15, mitochondrial.

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

- Molecule 64 is a protein called 28S ribosomal protein S16, mitochondrial.

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

- Molecule 65 is a protein called 28S ribosomal protein S17, mitochondrial.

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

- Molecule 66 is a protein called 28S ribosomal protein S18b, mitochondrial.

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

- Molecule 67 is a protein called 28S ribosomal protein S18c, mitochondrial.

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

- Molecule 68 is a protein called 28S ribosomal protein S22, mitochondrial.

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

- Molecule 69 is a protein called 28S ribosomal protein S23, mitochondrial.

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

- Molecule 70 is a protein called 28S ribosomal protein S25, mitochondrial.

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

- Molecule 71 is a protein called 28S ribosomal protein S26, mitochondrial.

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

- Molecule 72 is a protein called 28S ribosomal protein S27, mitochondrial.

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

- Molecule 73 is a protein called 28S ribosomal protein S28, mitochondrial.

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

- Molecule 74 is a protein called 28S ribosomal protein S33, mitochondrial.

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

- Molecule 75 is a protein called Small ribosomal subunit protein mS34.

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

- Molecule 76 is a protein called 28S ribosomal protein S35, mitochondrial.

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

- Molecule 77 is a protein called Aurora kinase A-interacting protein.

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

- Molecule 78 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
78	Az	34	Total	C	N	O	P	0	0
			719	324	123	238	34		

- Molecule 79 is a protein called 28S ribosomal protein S31, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	AY	119	Total	C	N	O	S	0	0
			1010	654	166	188	2		

- Molecule 80 is a RNA chain called 12S mitochondrial rRNA.

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

- Molecule 81 is a protein called 28S ribosomal protein S11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
81	AI	137	Total	C	N	O	S	0	0
			1019	641	193	181	4		

- Molecule 82 is a protein called Mitochondrial inner membrane protein OXA1L.

Mol	Chain	Residues	Atoms					AltConf	Trace
82	OX	55	Total	C	N	O	S	0	0
			468	292	93	81	2		

- Molecule 83 is a protein called 39S ribosomal protein L42, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
83	a	103	Total	C	N	O	S	0	0
			865	543	155	162	5		

- Molecule 84 is a RNA chain called E/E-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
84	Ay	70	Total	C	N	O	P	0	0
			1483	665	261	487	70		

- Molecule 85 is a protein called Pentatricopeptide repeat domain-containing protein 3, mitochondrial.

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

- Molecule 86 is a protein called 28S ribosomal protein S29, mitochondrial.

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

- Molecule 87 is a protein called Small ribosomal subunit protein mS37.

Mol	Chain	Residues	Atoms					AltConf	Trace
87	A2	118	Total	C	N	O	S	0	0
			935	579	182	166	8		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A2	1	ACE	-	acetylation	UNP Q96BP2

- Molecule 88 is a protein called Small ribosomal subunit protein bS21m.

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

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AQ	1	ACE	-	acetylation	UNP P82921
AQ	50	ARG	CYS	variant	UNP P82921

- Molecule 89 is a RNA chain called A/T-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
89	Ah	76	Total	C	N	O	P	0	0
			1616	723	291	527	75		

- Molecule 90 is a protein called Elongation factor Tu, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
90	Ag	394	Total	C	N	O	S	0	0
			3042	1923	538	566	15		

- Molecule 91 is a RNA chain called P/P-tRNA.

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

- Molecule 92 is a RNA chain called mitochondrial tRNAVal.

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

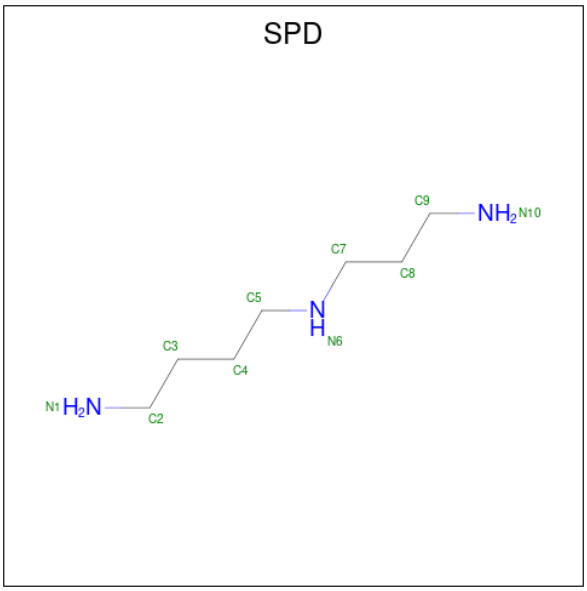
- Molecule 93 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
93	0	1	Total Zn 1 1	0
93	4	1	Total Zn 1 1	0
93	AO	1	Total Zn 1 1	0

- Molecule 94 is POTASSIUM ION (CCD ID: K) (formula: K).

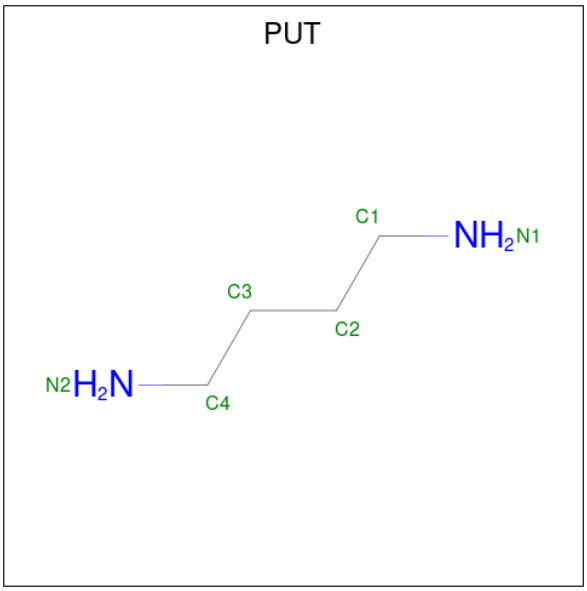
Mol	Chain	Residues	Atoms	AltConf
94	3	1	Total K 1 1	0
94	A	29	Total K 29 29	0
94	D	1	Total K 1 1	0
94	M	1	Total K 1 1	0
94	N	1	Total K 1 1	0
94	P	1	Total K 1 1	0
94	W	1	Total K 1 1	0
94	o	1	Total K 1 1	0
94	Az	1	Total K 1 1	0
94	AA	17	Total K 17 17	0

- Molecule 95 is SPERMIDINE (CCD ID: SPD) (formula: $C_7H_{19}N_3$) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 96 is 1,4-DIAMINOBUTANE (CCD ID: PUT) (formula: $C_4H_{12}N_2$).

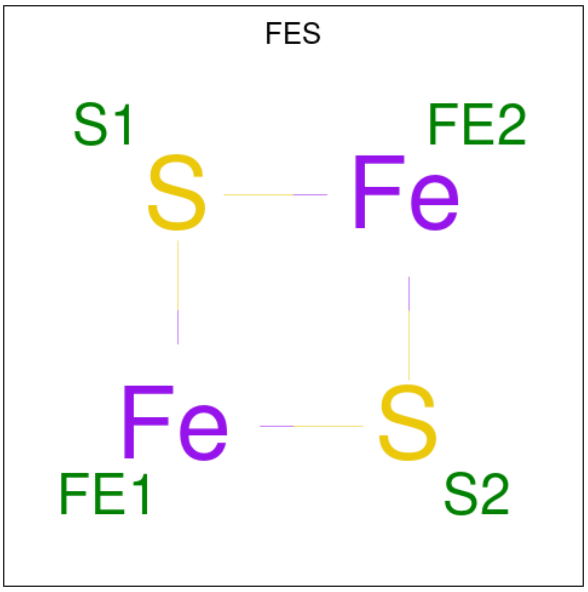


Mol	Chain	Residues	Atoms	AltConf
96	A	1	Total C N 6 4 2	0

- Molecule 97 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

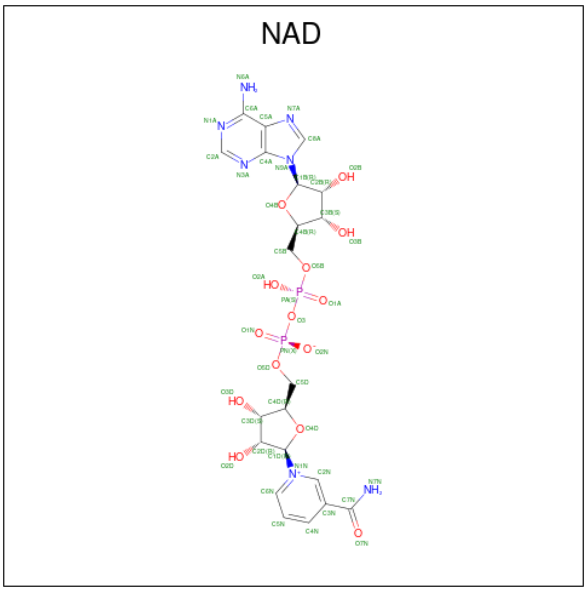
Mol	Chain	Residues	Atoms	AltConf
97	A	137	Total Mg 137 137	0
97	D	2	Total Mg 2 2	0
97	E	1	Total Mg 1 1	0
97	g	1	Total Mg 1 1	0
97	AB	1	Total Mg 1 1	0
97	AK	1	Total Mg 1 1	0
97	A3	1	Total Mg 1 1	0
97	AA	59	Total Mg 59 59	0
97	AX	1	Total Mg 1 1	0

- Molecule 98 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe_2S_2) (labeled as "Ligand of Interest" by depositor).



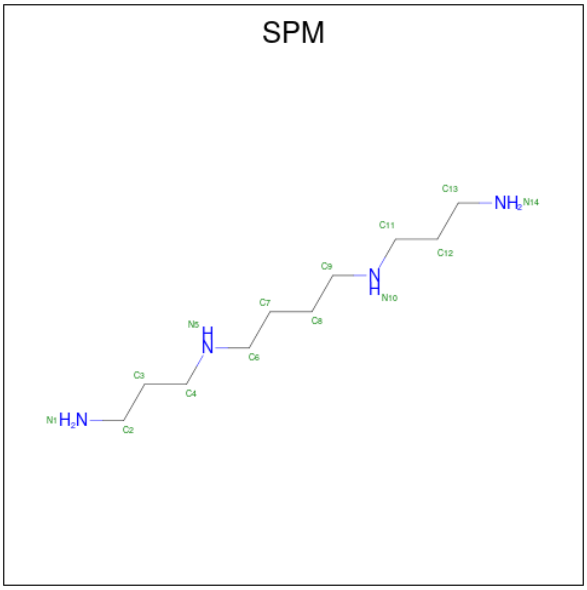
Mol	Chain	Residues	Atoms			AltConf
98	r	1	Total	Fe	S	0
			4	2	2	
98	AP	1	Total	Fe	S	0
			4	2	2	
98	AT	1	Total	Fe	S	0
			4	2	2	

- Molecule 99 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$) (labeled as "Ligand of Interest" by depositor).



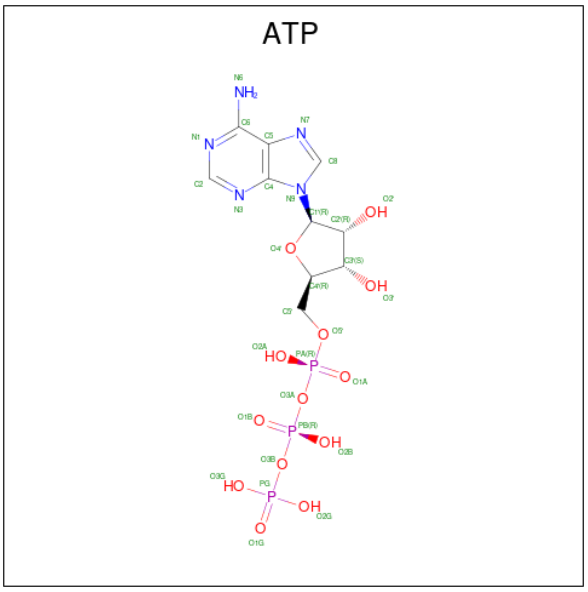
Mol	Chain	Residues	Atoms					AltConf
99	AA	1	Total	C	N	O	P	0
			44	21	7	14	2	

- Molecule 100 is SPERMINE (CCD ID: SPM) (formula: $C_{10}H_{26}N_4$) (labeled as "Ligand of Interest" by depositor).



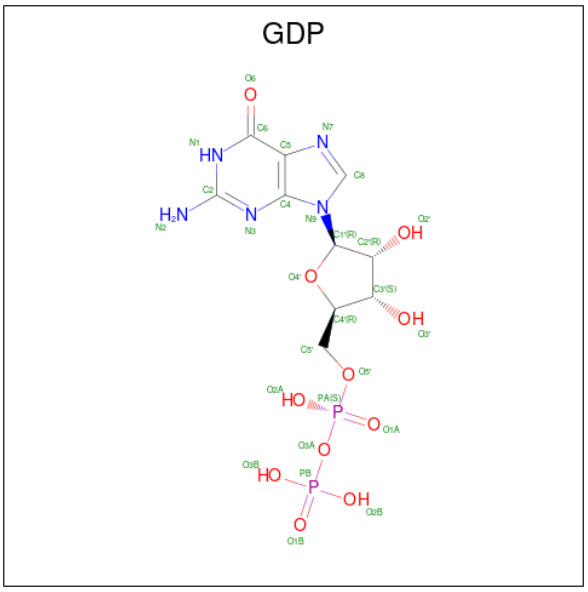
Mol	Chain	Residues	Atoms			AltConf
100	AA	1	Total	C	N	0
			14	10	4	
100	AA	1	Total	C	N	0
			14	10	4	

- Molecule 101 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



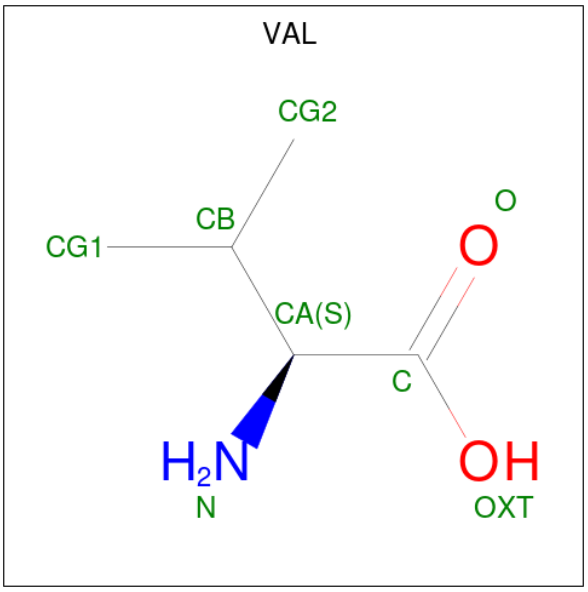
Mol	Chain	Residues	Atoms					AltConf
101	AX	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 102 is GUANOSINE-5'-DIPHOSPHATE (CCD ID: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 103 is VALINE (CCD ID: VAL) (formula: $C_5H_{11}NO_2$).



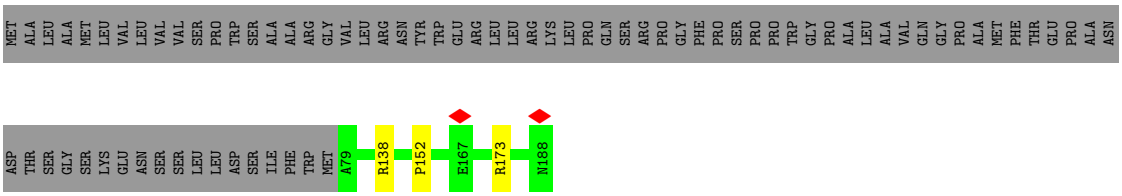
Mol	Chain	Residues	Atoms				AltConf
103	B	1	Total	C	N	O	0
			7	5	1	1	

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.

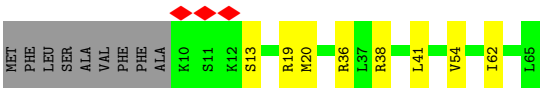
• Molecule 1: 39S ribosomal protein L32, mitochondrial

Chain 0:



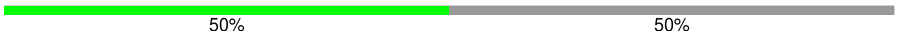
• Molecule 2: 39S ribosomal protein L33, mitochondrial

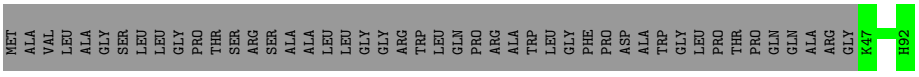
Chain 1:



• Molecule 3: 39S ribosomal protein L34, mitochondrial

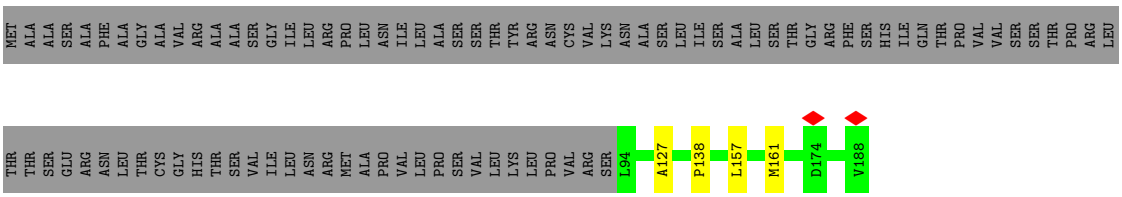
Chain 2:





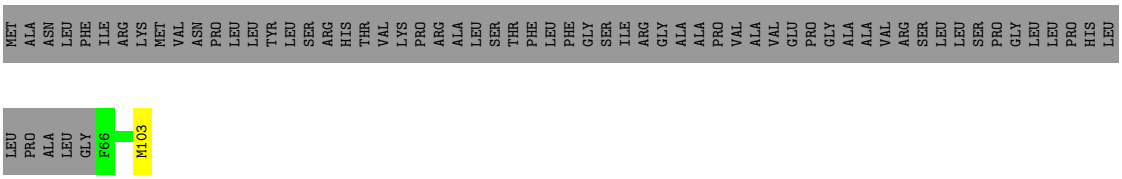
• Molecule 4: 39S ribosomal protein L35, mitochondrial

Chain 3:



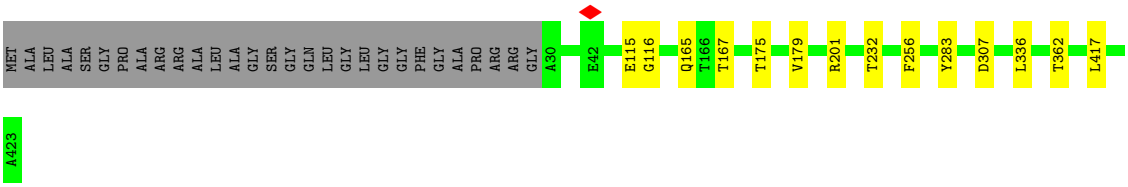
• Molecule 5: 39S ribosomal protein L36, mitochondrial

Chain 4:



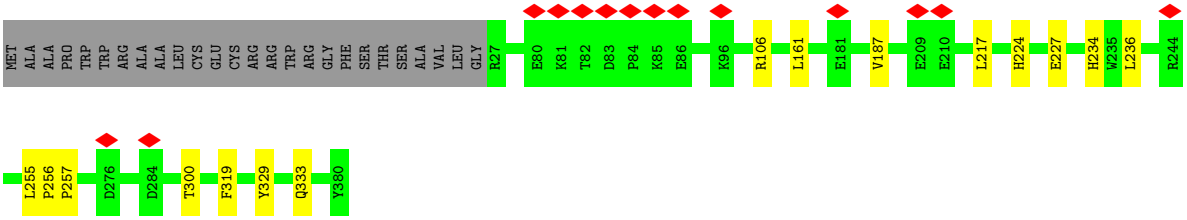
• Molecule 6: 39S ribosomal protein L37, mitochondrial

Chain 5:



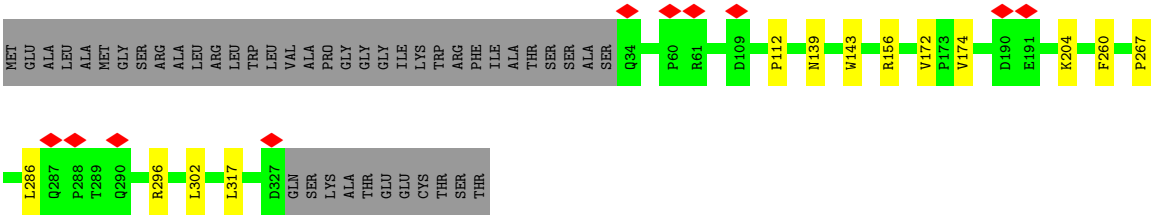
• Molecule 7: 39S ribosomal protein L38, mitochondrial

Chain 6:



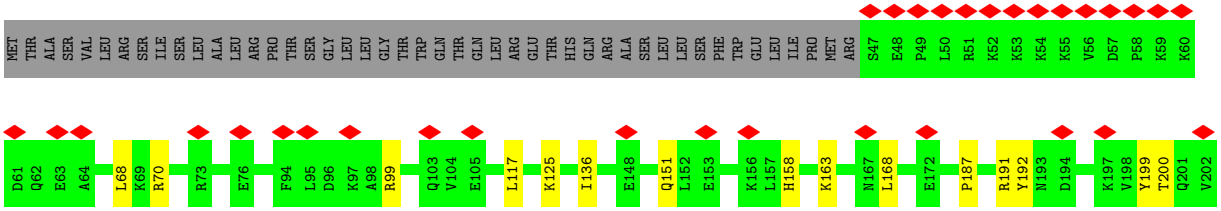
• Molecule 8: 39S ribosomal protein L39, mitochondrial

Chain 7:



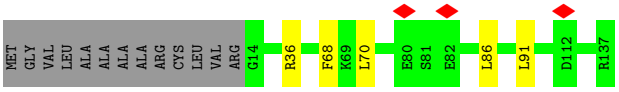
• Molecule 9: 39S ribosomal protein L40, mitochondrial

Chain 8:



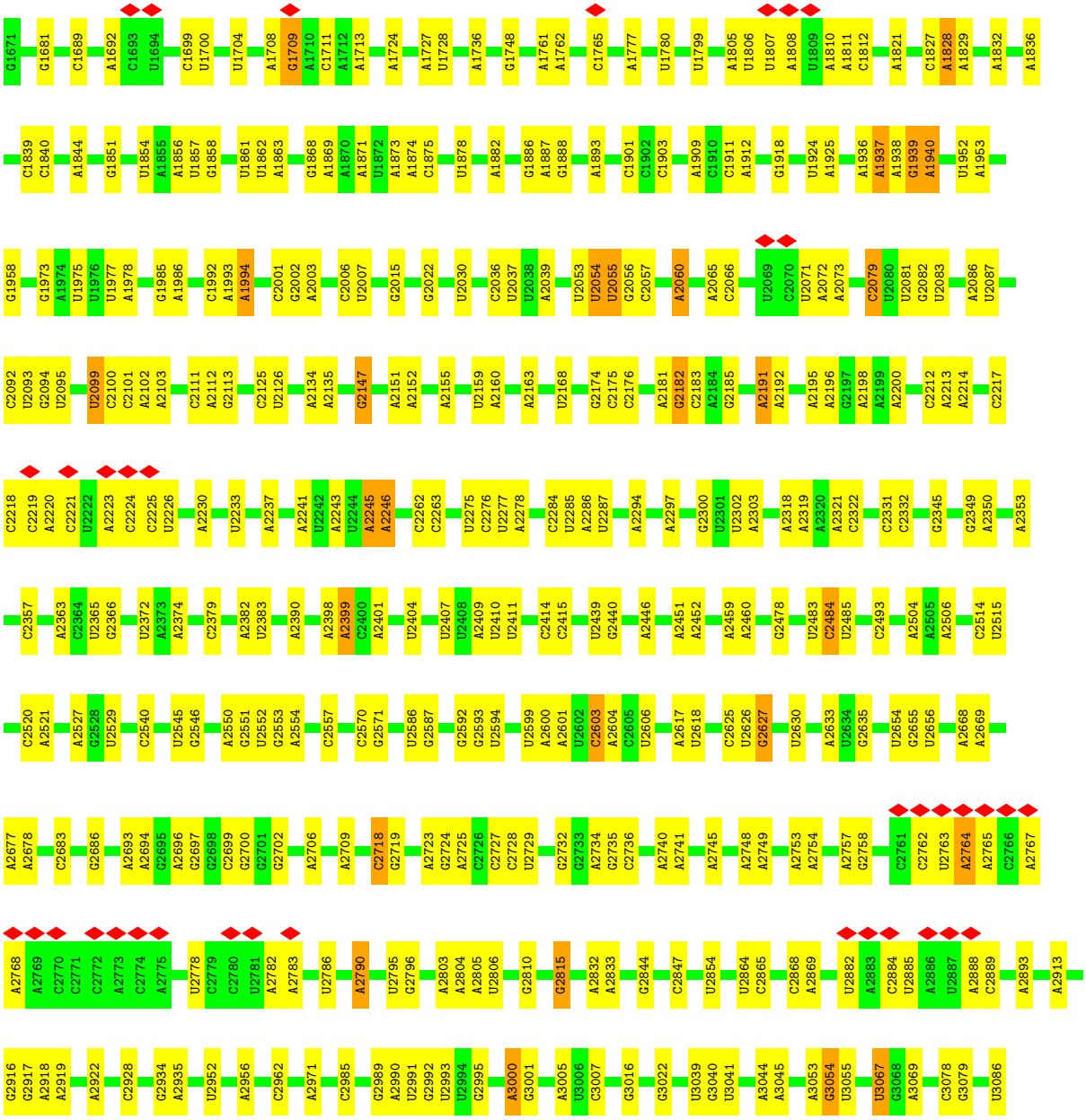
• Molecule 10: 39S ribosomal protein L41, mitochondrial

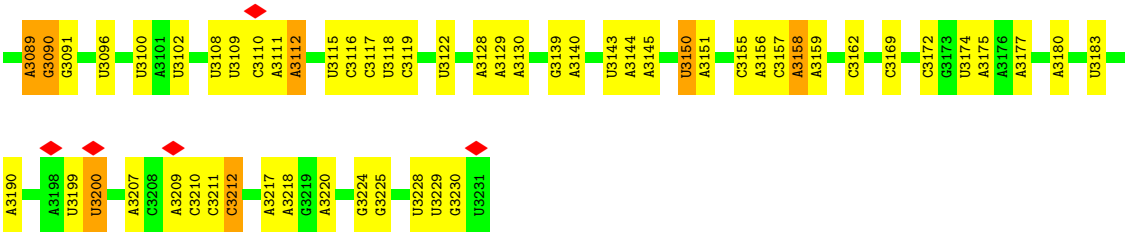
Chain 9:



• Molecule 11: 16S mitochondrial rRNA

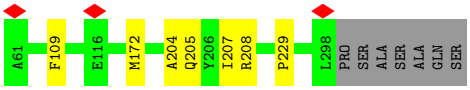
Chain A:





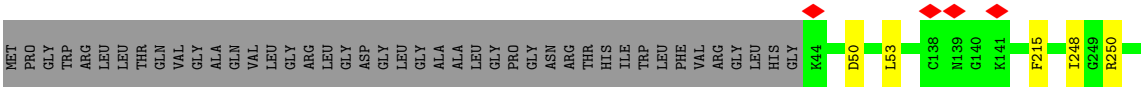
• Molecule 12: 39S ribosomal protein L2, mitochondrial

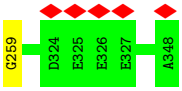
Chain D:



• Molecule 13: 39S ribosomal protein L3, mitochondrial

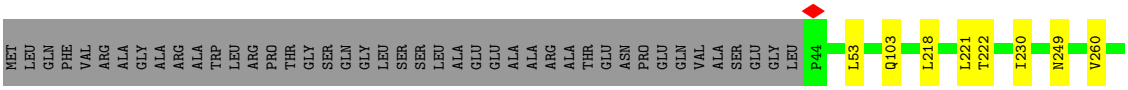
Chain E:

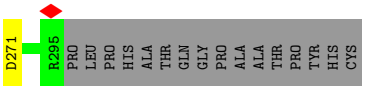




• Molecule 14: 39S ribosomal protein L4, mitochondrial

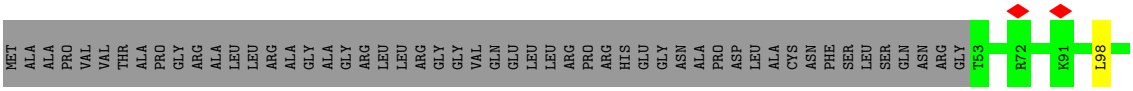
Chain F:

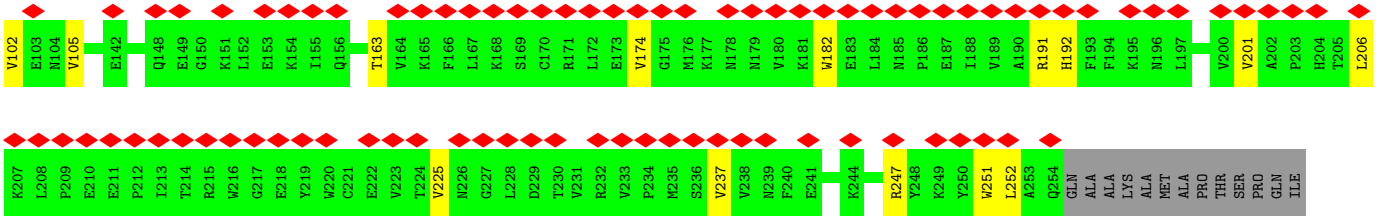




• Molecule 15: 39S ribosomal protein L9, mitochondrial

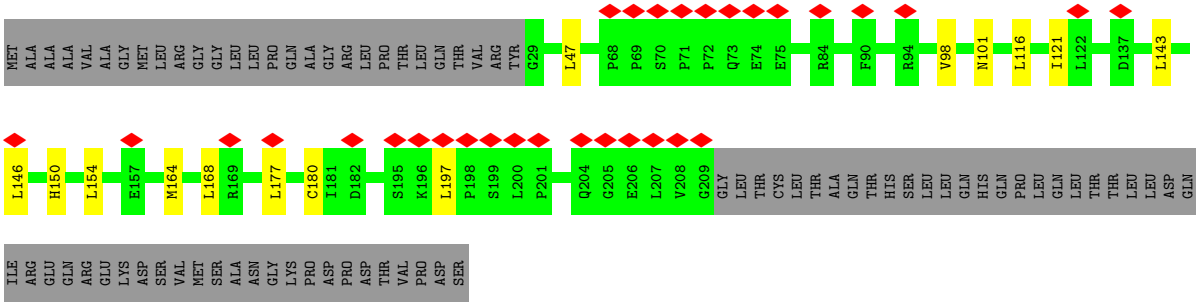
Chain H:





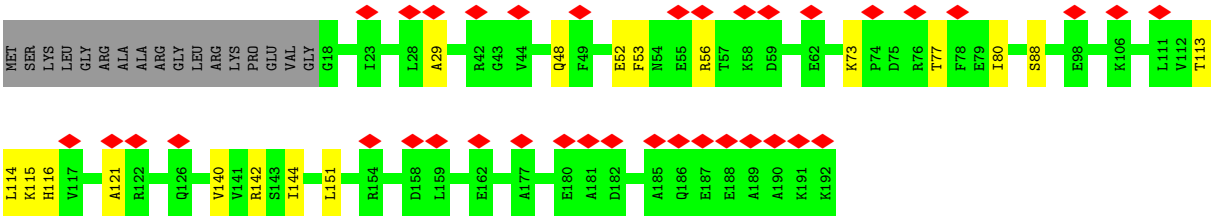
• Molecule 16: 39S ribosomal protein L10, mitochondrial

Chain I:



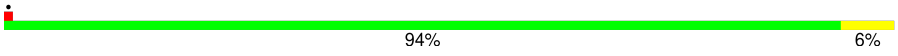
• Molecule 17: 39S ribosomal protein L11, mitochondrial

Chain J:



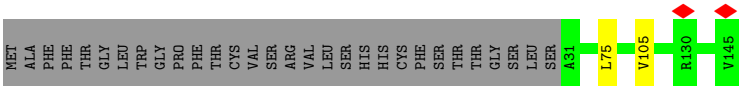
• Molecule 18: Large ribosomal subunit protein uL13m

Chain K:



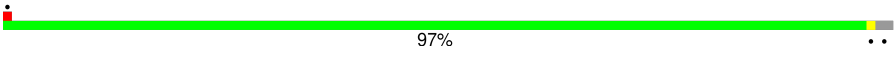
• Molecule 19: 39S ribosomal protein L14, mitochondrial

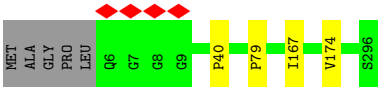
Chain L:



• Molecule 20: 39S ribosomal protein L15, mitochondrial

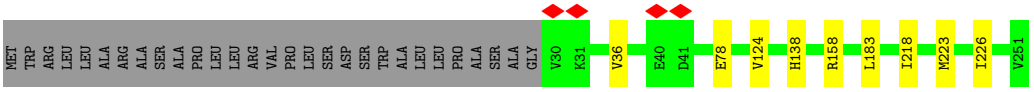
Chain M:





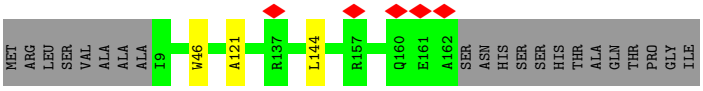
• Molecule 21: 39S ribosomal protein L16, mitochondrial

Chain N:



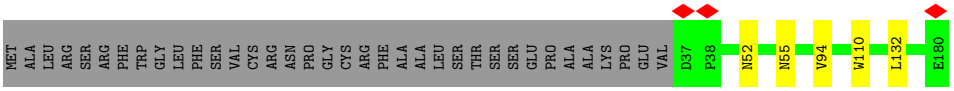
• Molecule 22: 39S ribosomal protein L17, mitochondrial

Chain O:



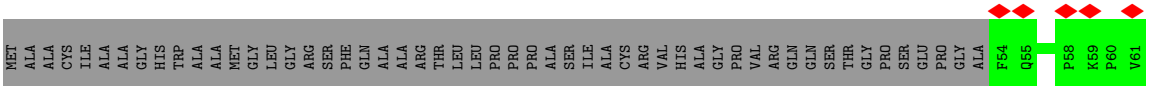
• Molecule 23: 39S ribosomal protein L18, mitochondrial

Chain P:



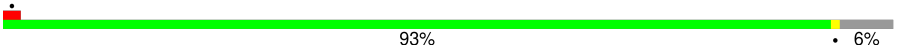
• Molecule 24: 39S ribosomal protein L19, mitochondrial

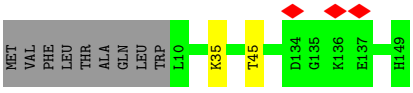
Chain Q:



• Molecule 25: 39S ribosomal protein L20, mitochondrial

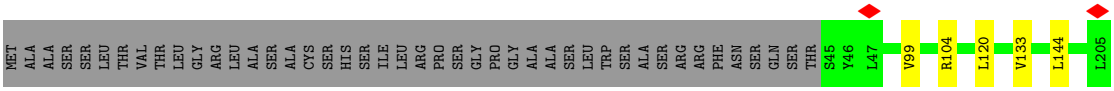
Chain R:





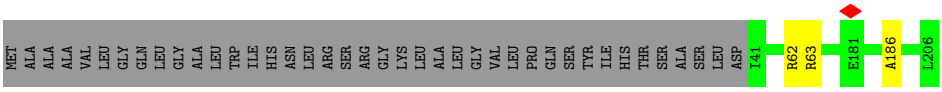
• Molecule 26: 39S ribosomal protein L21, mitochondrial

Chain S:



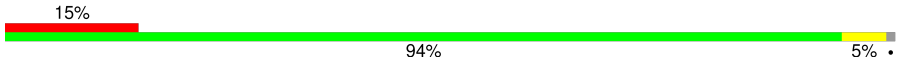
• Molecule 27: 39S ribosomal protein L22, mitochondrial

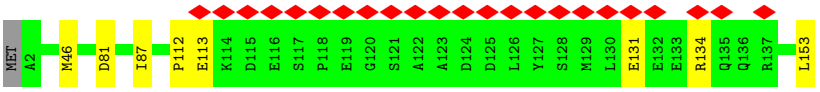
Chain T:



• Molecule 28: 39S ribosomal protein L23, mitochondrial

Chain U:



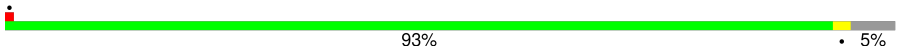


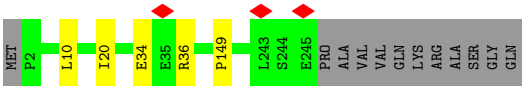
• Molecule 29: 39S ribosomal protein L27, mitochondrial

Chain W:

• Molecule 30: 39S ribosomal protein L28, mitochondrial

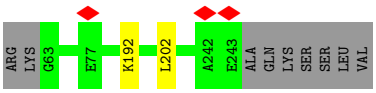
Chain X:





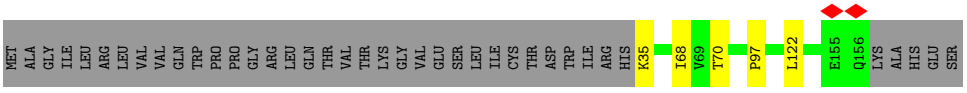
• Molecule 31: 39S ribosomal protein L47, mitochondrial

Chain Y:



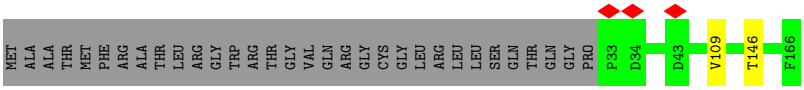
• Molecule 32: 39S ribosomal protein L30, mitochondrial

Chain Z:



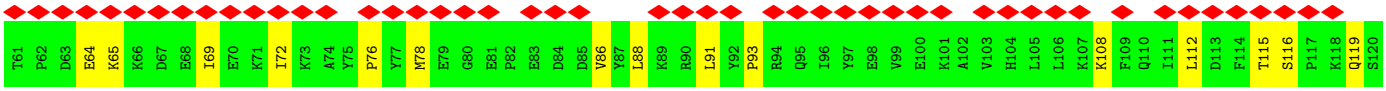
• Molecule 33: 39S ribosomal protein L49, mitochondrial

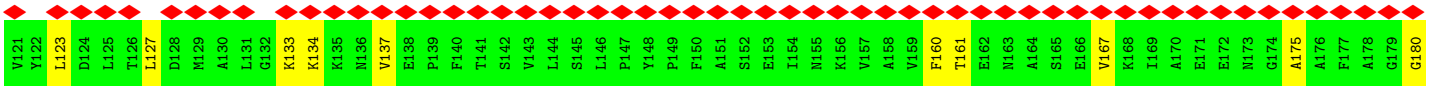
Chain g:

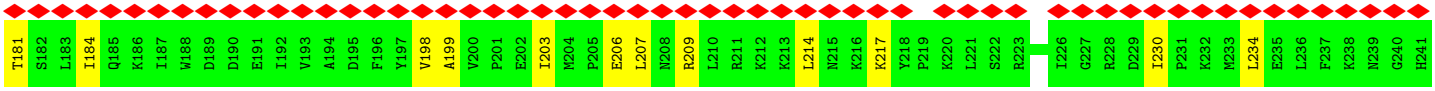


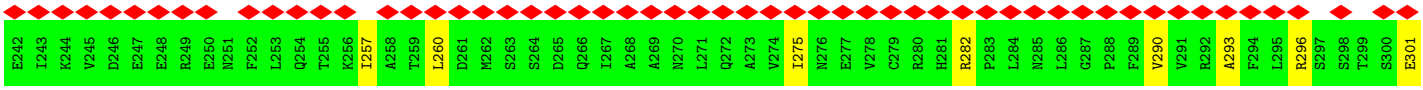
• Molecule 34: Large ribosomal subunit protein uL1m

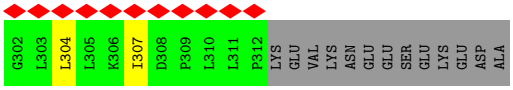
Chain z:





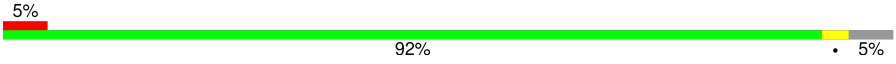


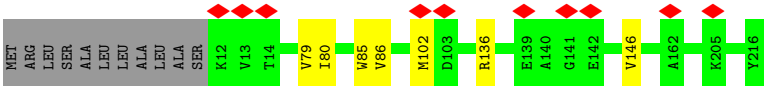




• Molecule 35: 39S ribosomal protein L24, mitochondrial

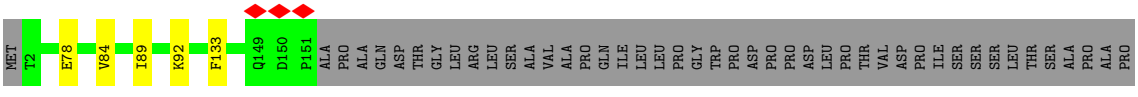
Chain V:





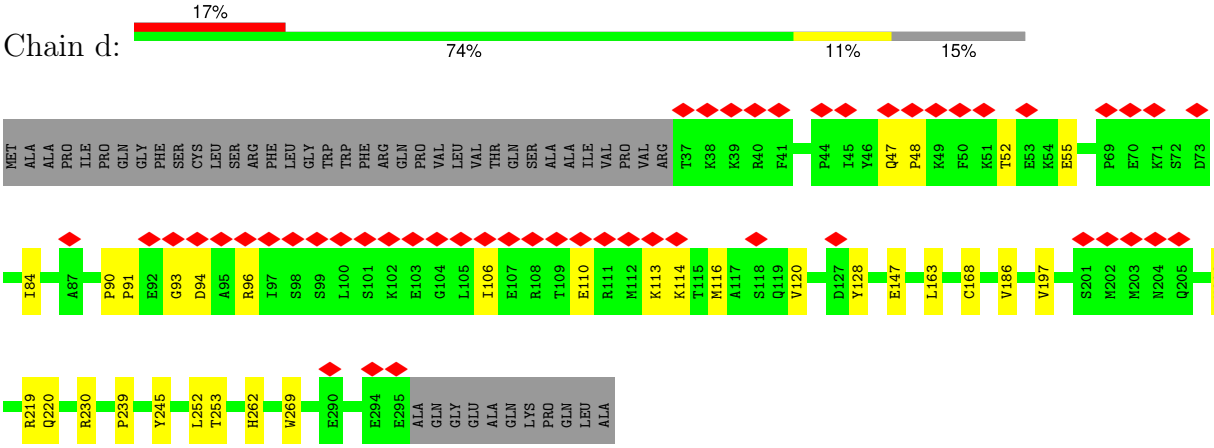
• Molecule 36: 39S ribosomal protein L43, mitochondrial

Chain b:



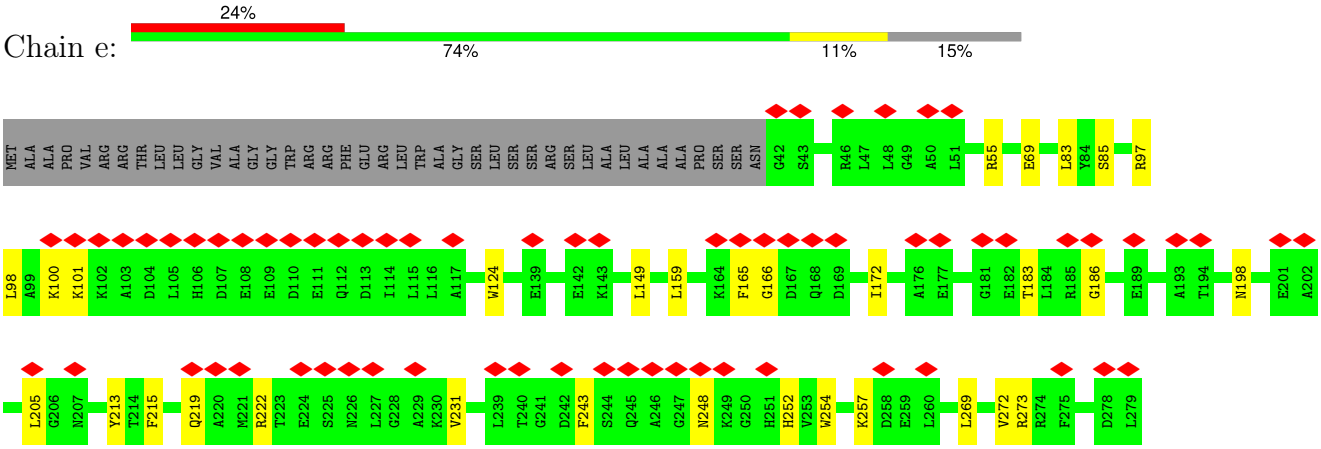
• Molecule 37: 39S ribosomal protein L45, mitochondrial

Chain d:



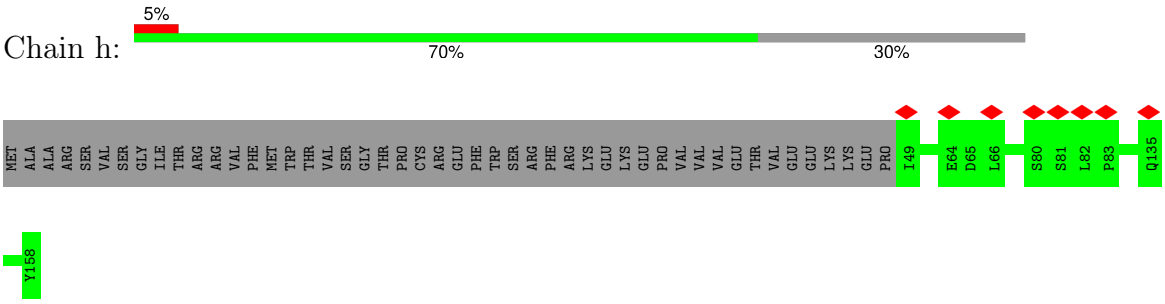
• Molecule 38: 39S ribosomal protein L46, mitochondrial

Chain e:



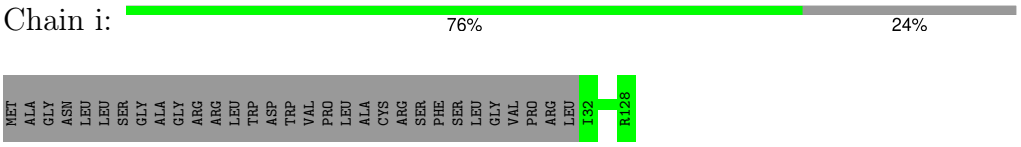
• Molecule 39: 39S ribosomal protein L50, mitochondrial

Chain h:



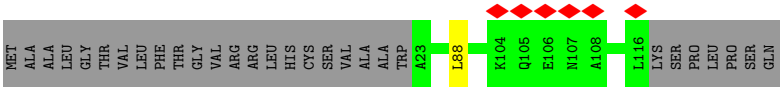
• Molecule 40: 39S ribosomal protein L51, mitochondrial

Chain i:

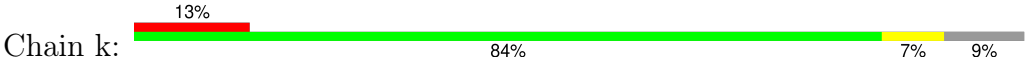


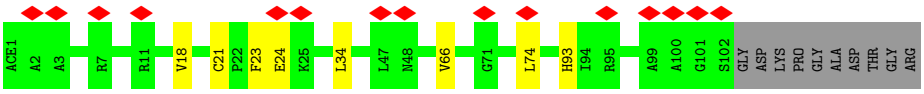
• Molecule 41: 39S ribosomal protein L52, mitochondrial

Chain j:

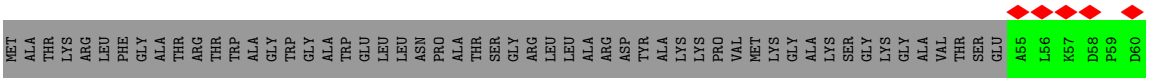


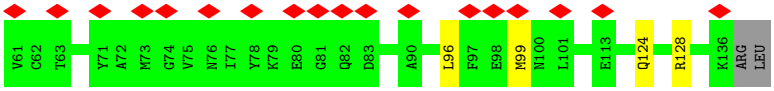
• Molecule 42: Large ribosomal subunit protein mL53



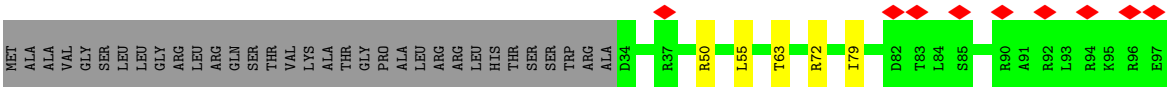


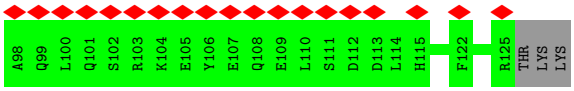
• Molecule 43: 39S ribosomal protein L54, mitochondrial



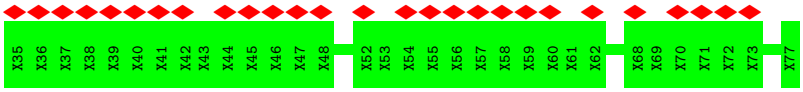


• Molecule 44: 39S ribosomal protein L55, mitochondrial

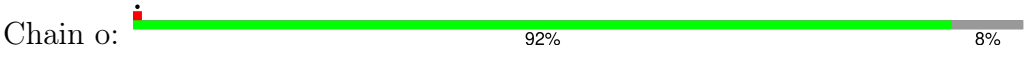


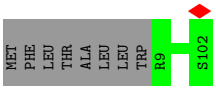


• Molecule 45: Nascent polypeptide



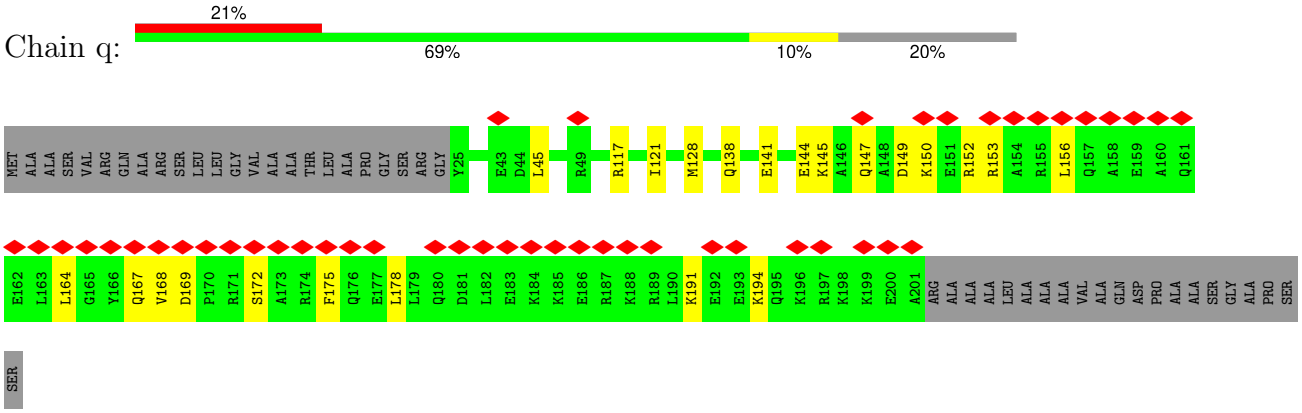
• Molecule 46: Ribosomal protein 63, mitochondrial





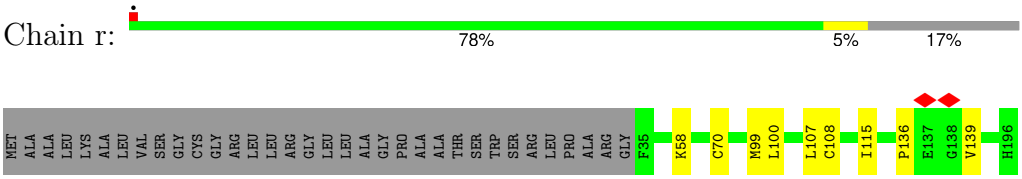
• Molecule 47: Growth arrest and DNA damage-inducible proteins-interacting protein 1

Chain q:



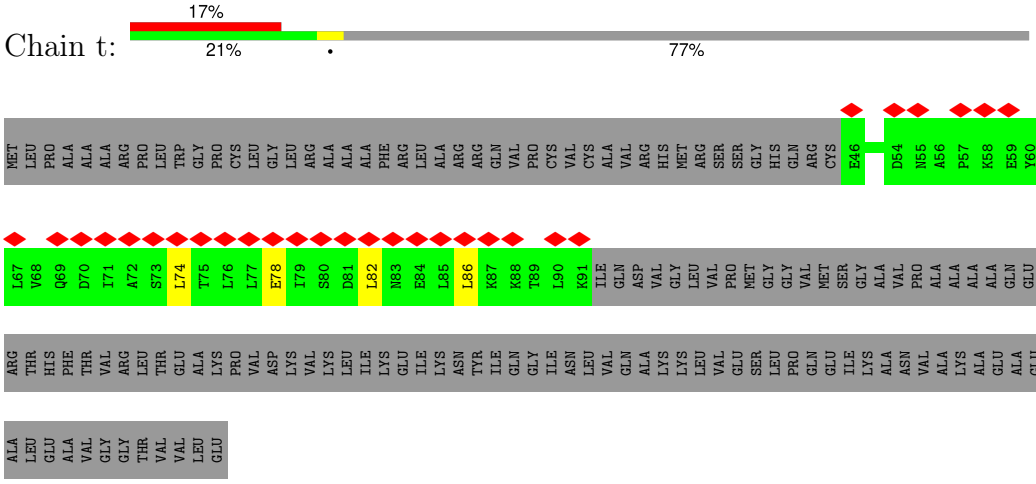
• Molecule 48: 39S ribosomal protein S18a, mitochondrial

Chain r:



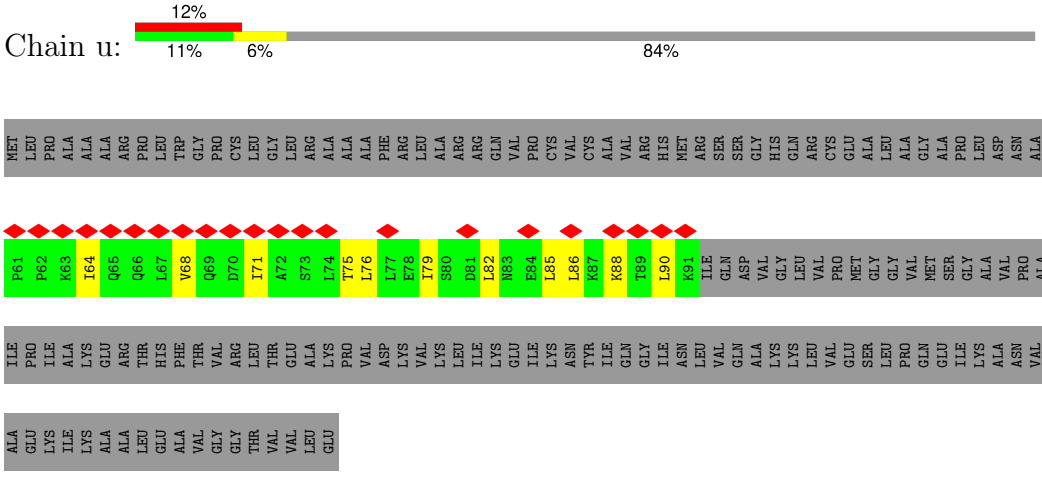
• Molecule 49: 39S ribosomal protein L12, mitochondrial

Chain t:



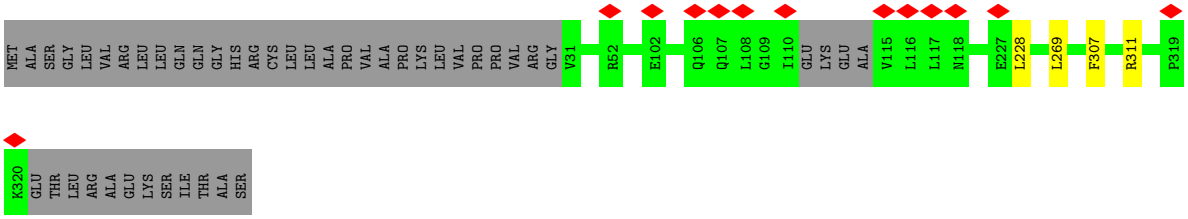
• Molecule 49: 39S ribosomal protein L12, mitochondrial

Chain u:



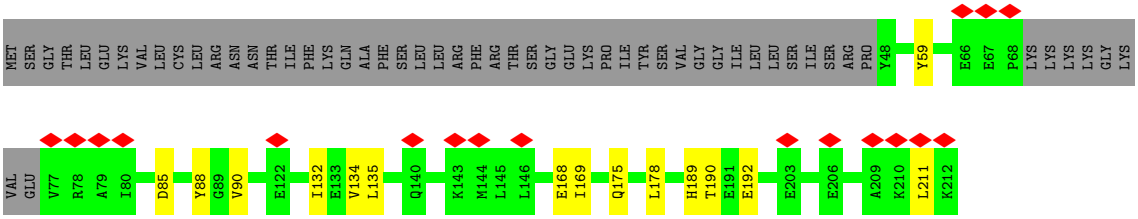
• Molecule 50: 39S ribosomal protein L44, mitochondrial

Chain c:



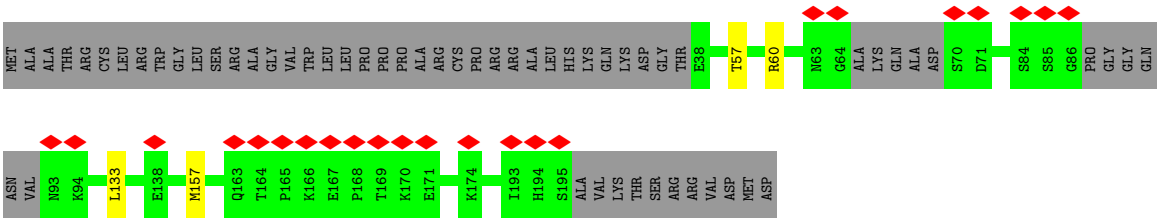
• Molecule 51: 39S ribosomal protein L48, mitochondrial

Chain f:



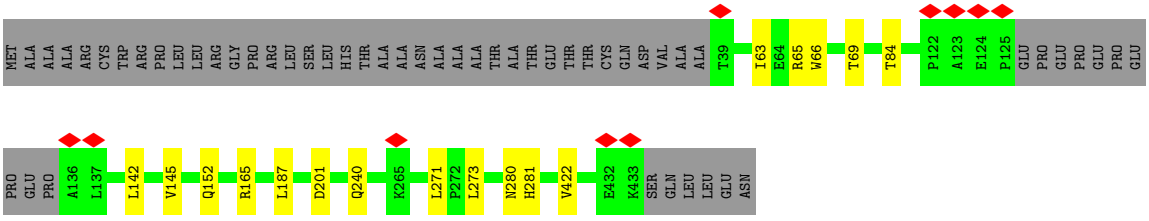
• Molecule 52: Peptidyl-tRNA hydrolase ICT1, mitochondrial

Chain p:



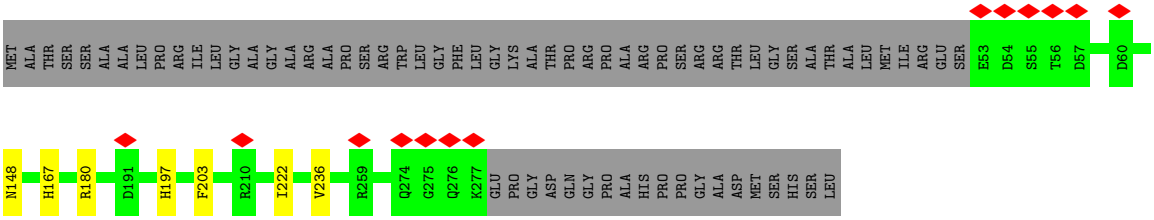
• Molecule 53: 39S ribosomal protein S30, mitochondrial

Chain s:

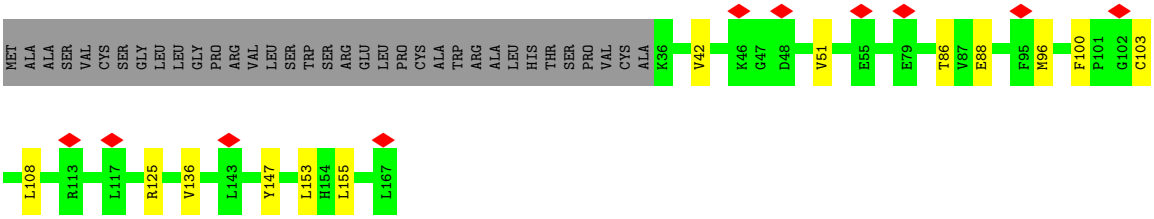


• Molecule 54: 28S ribosomal protein S2, mitochondrial

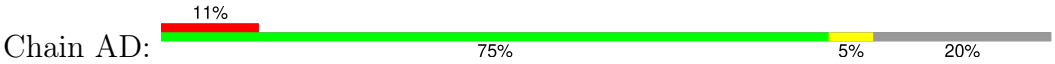
Chain AB:

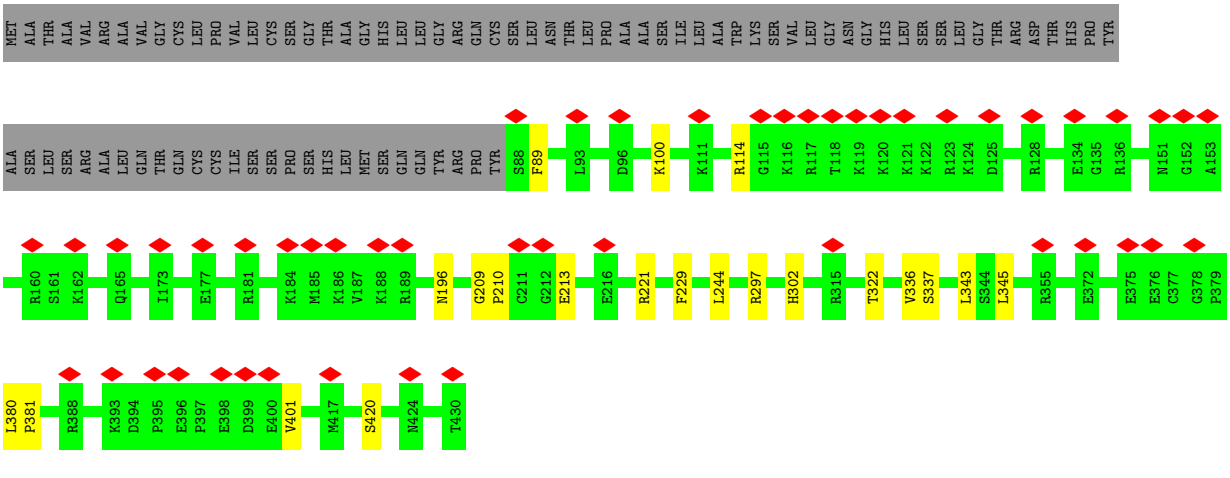


• Molecule 55: 28S ribosomal protein S24, mitochondrial



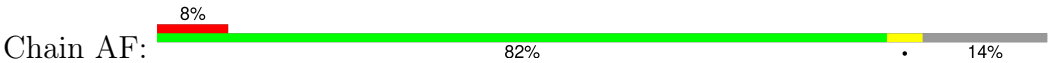
• Molecule 56: 28S ribosomal protein S5, mitochondrial

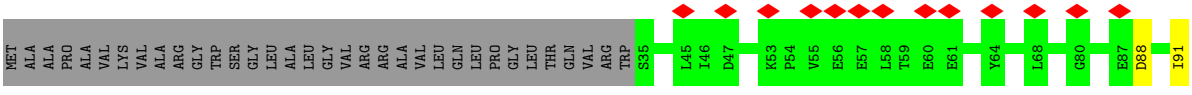


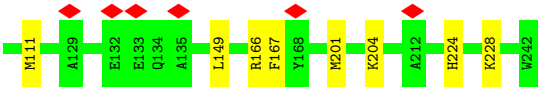


• Molecule 57: 28S ribosomal protein S6, mitochondrial

• Molecule 58: 28S ribosomal protein S7, mitochondrial

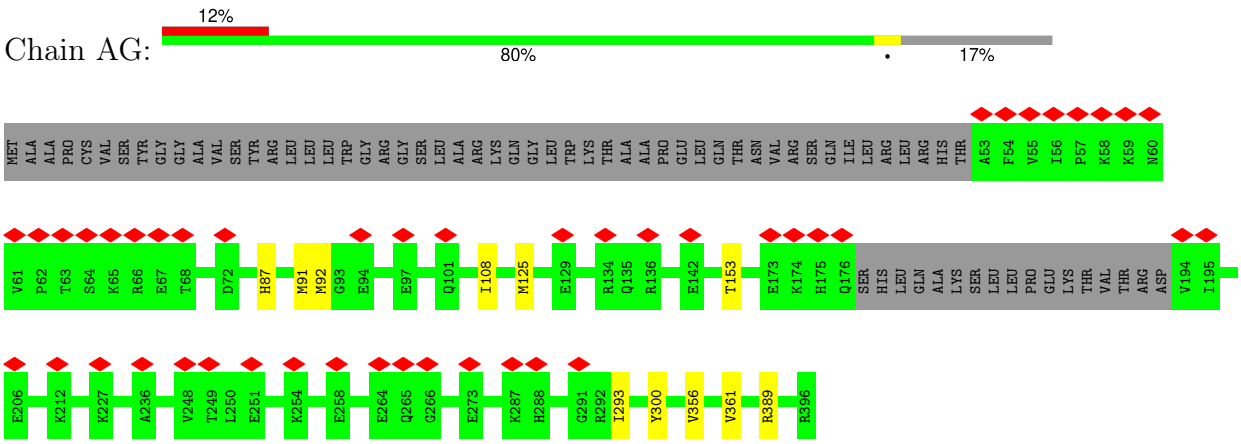






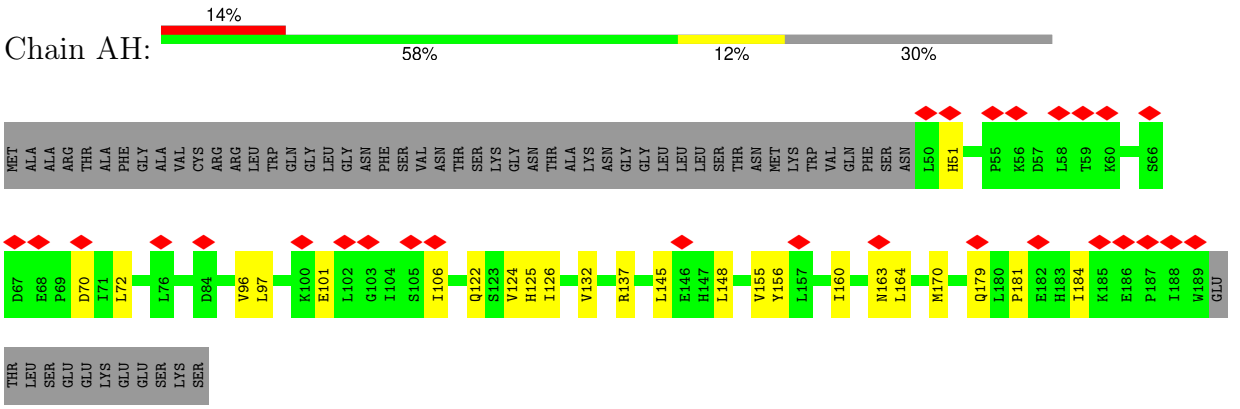
• Molecule 59: 28S ribosomal protein S9, mitochondrial

Chain AG:



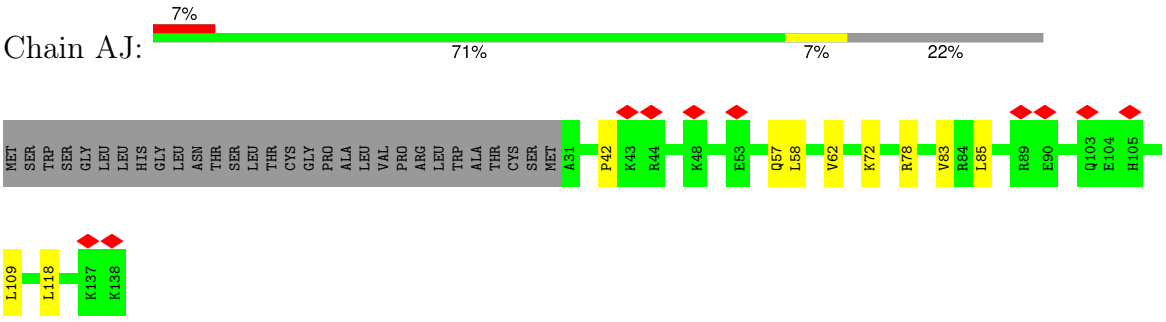
• Molecule 60: 28S ribosomal protein S10, mitochondrial

Chain AH:



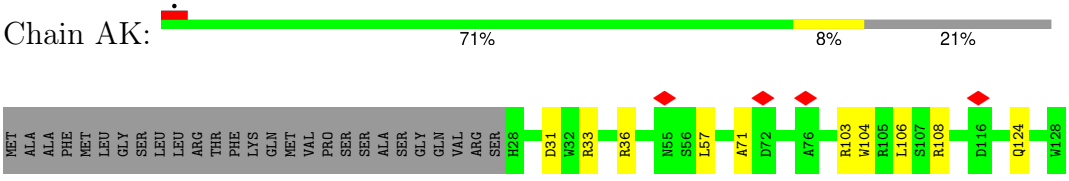
• Molecule 61: 28S ribosomal protein S12, mitochondrial

Chain AJ:



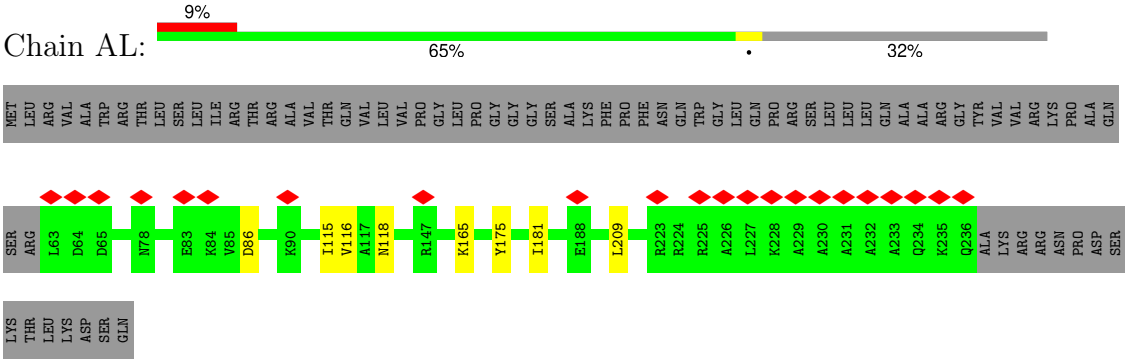
• Molecule 62: 28S ribosomal protein S14, mitochondrial

Chain AK:



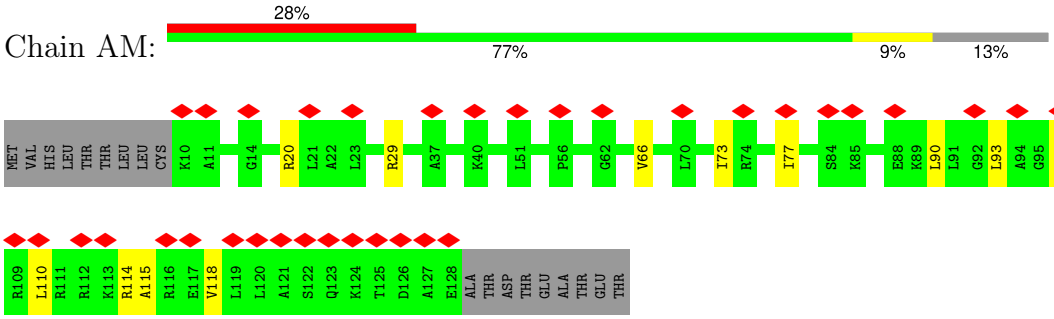
• Molecule 63: 28S ribosomal protein S15, mitochondrial

Chain AL:



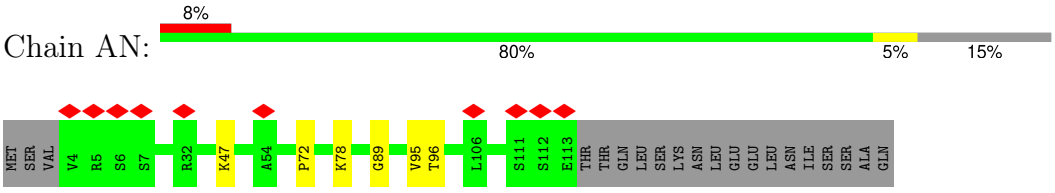
• Molecule 64: 28S ribosomal protein S16, mitochondrial

Chain AM:



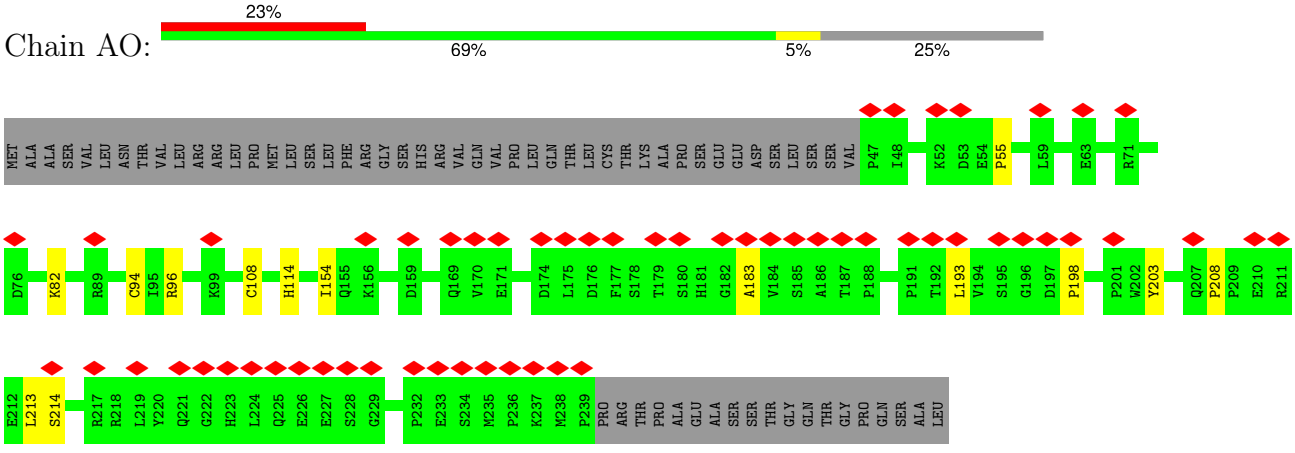
• Molecule 65: 28S ribosomal protein S17, mitochondrial

Chain AN:



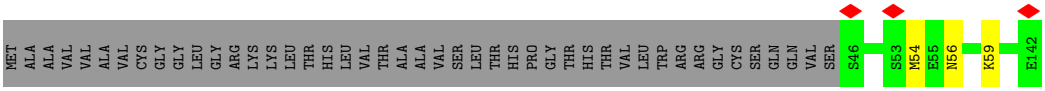
• Molecule 66: 28S ribosomal protein S18b, mitochondrial

Chain AO:



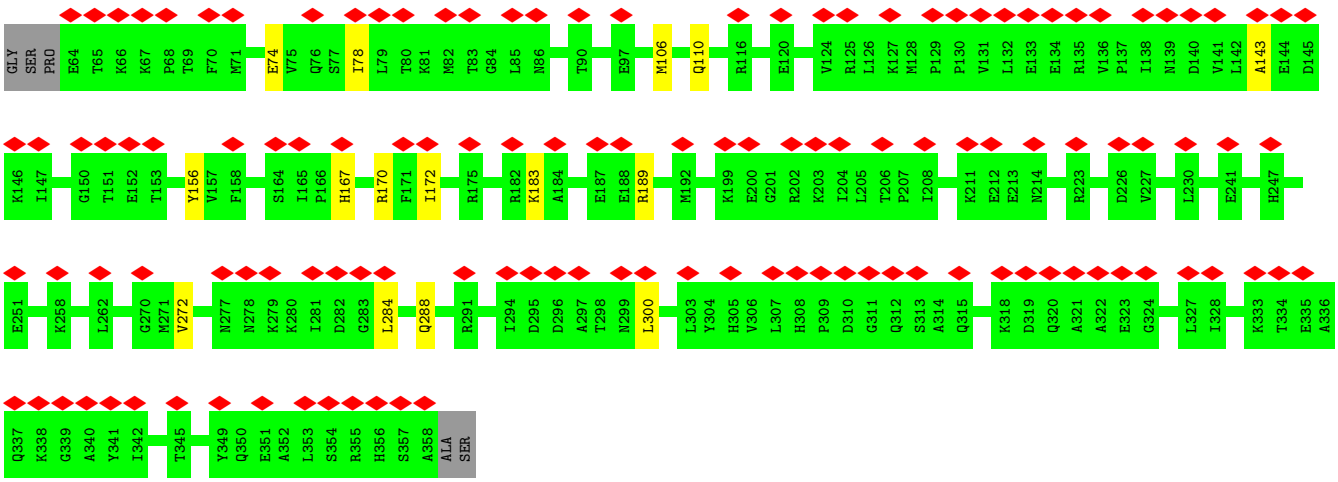
• Molecule 67: 28S ribosomal protein S18c, mitochondrial

Chain AP:



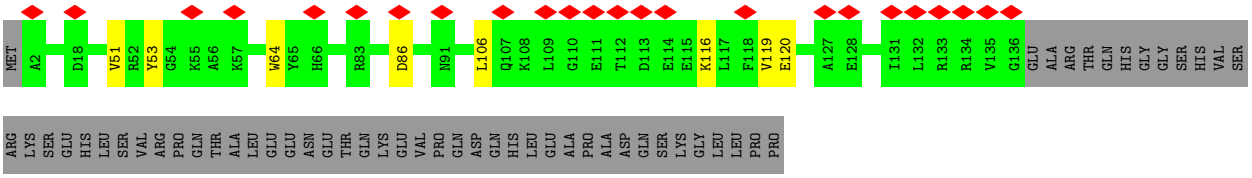
• Molecule 68: 28S ribosomal protein S22, mitochondrial

Chain AR:



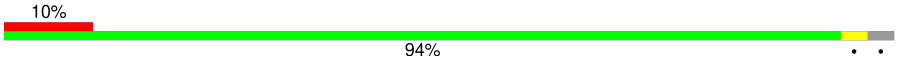
• Molecule 69: 28S ribosomal protein S23, mitochondrial

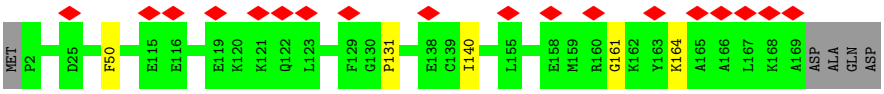
Chain AS:



• Molecule 70: 28S ribosomal protein S25, mitochondrial

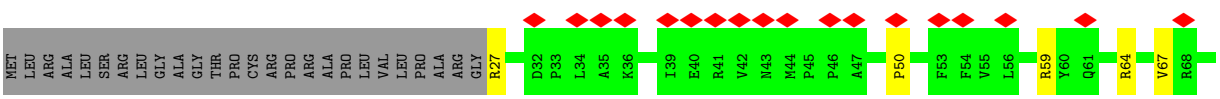
Chain AT:

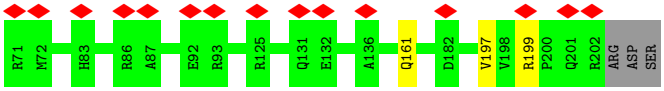




• Molecule 71: 28S ribosomal protein S26, mitochondrial

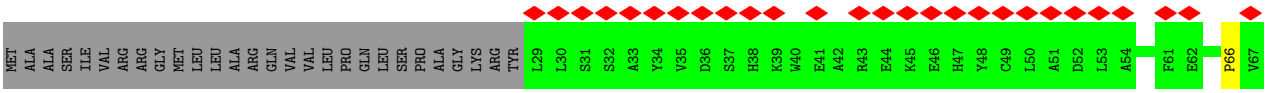
Chain AU:

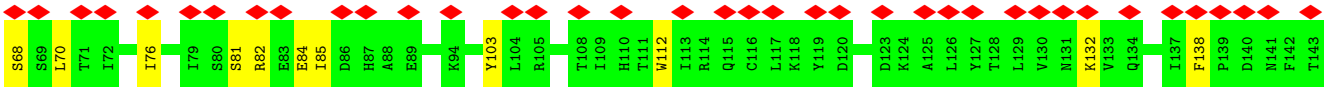


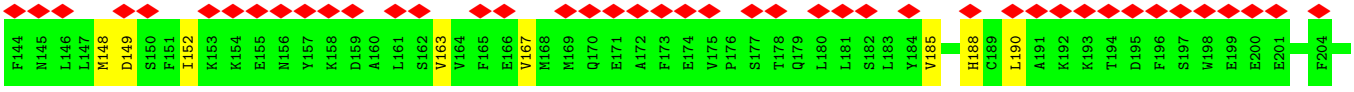


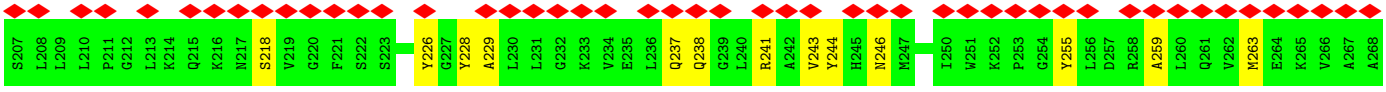
• Molecule 72: 28S ribosomal protein S27, mitochondrial

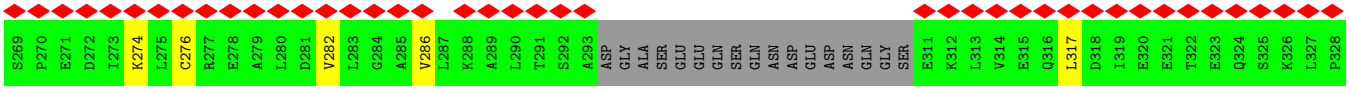
Chain AV:

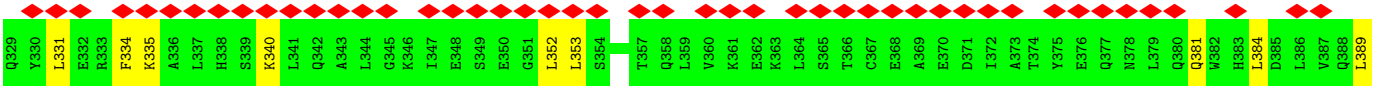


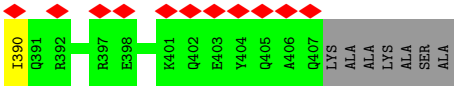






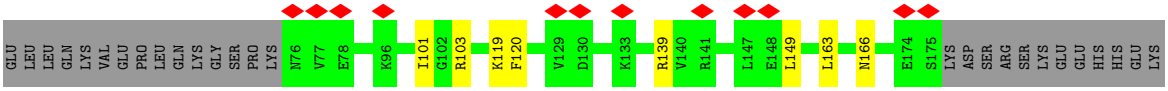






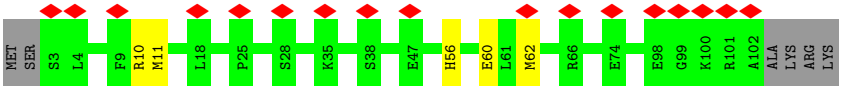
• Molecule 73: 28S ribosomal protein S28, mitochondrial

Chain AW:



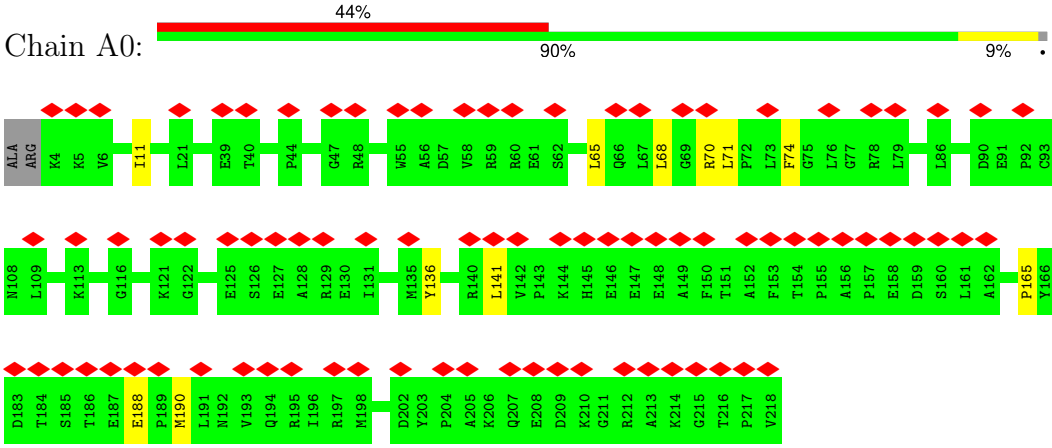
• Molecule 74: 28S ribosomal protein S33, mitochondrial

Chain AZ:



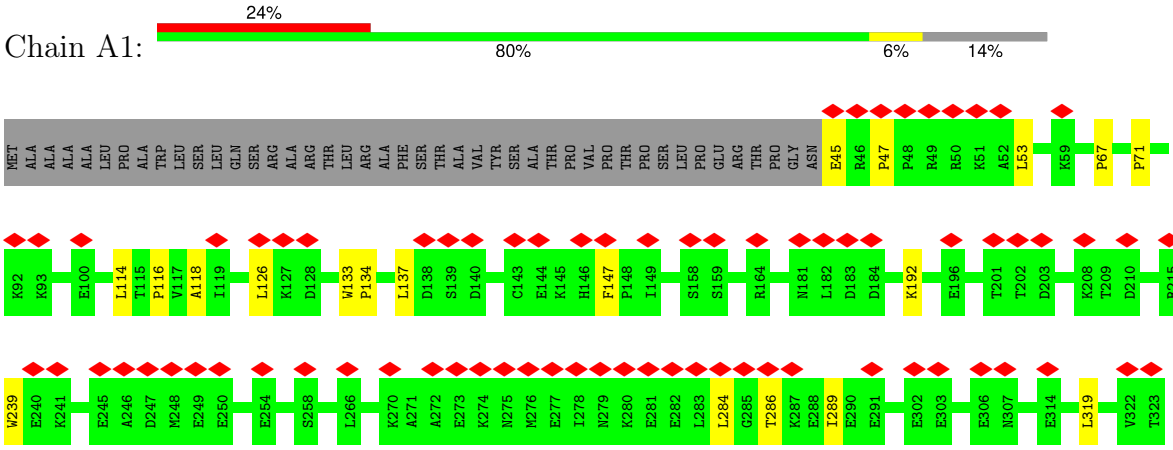
• Molecule 75: Small ribosomal subunit protein mS34

Chain A0:



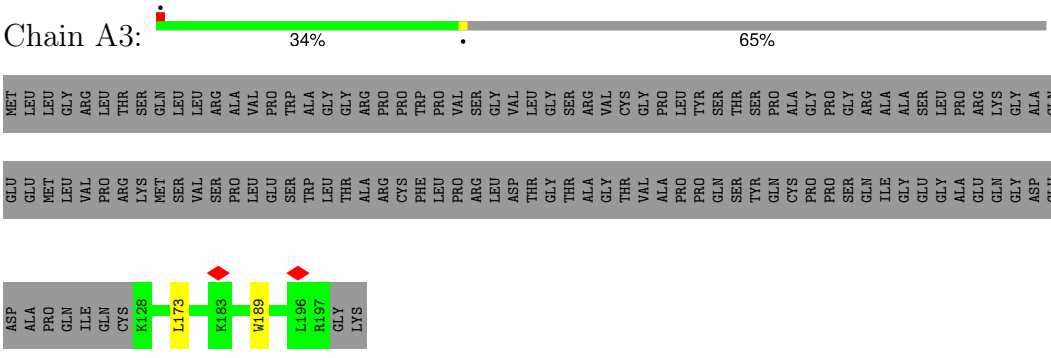
• Molecule 76: 28S ribosomal protein S35, mitochondrial

Chain A1:



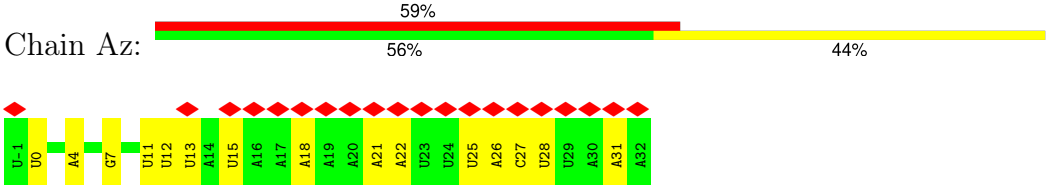
• Molecule 77: Aurora kinase A-interacting protein

Chain A3:



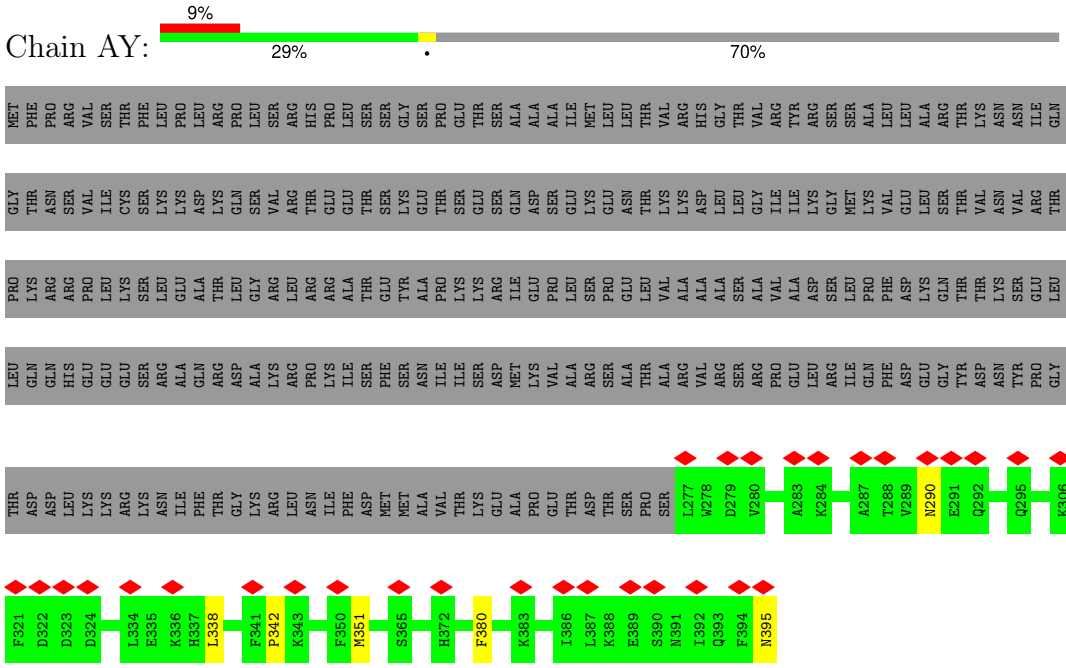
• Molecule 78: mRNA

Chain Az:



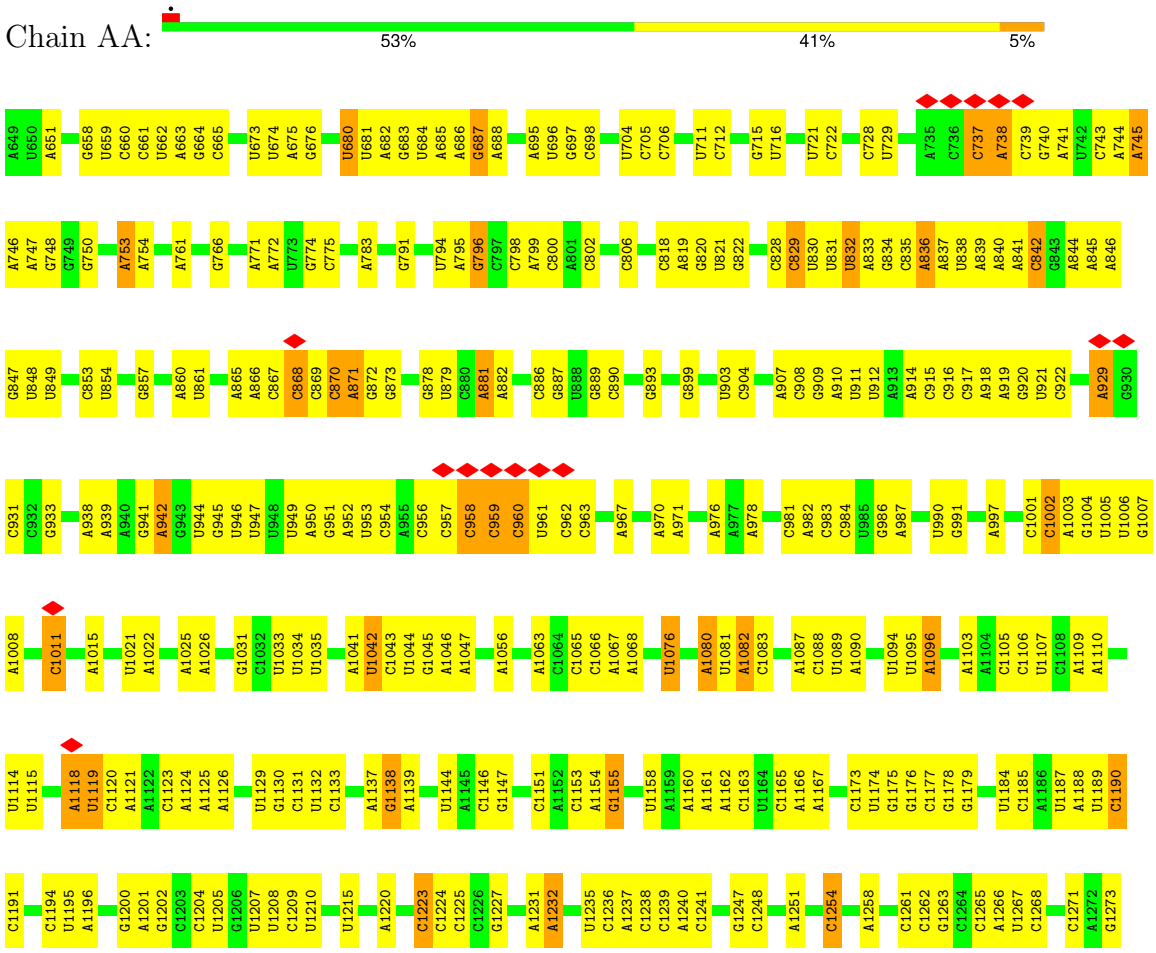
• Molecule 79: 28S ribosomal protein S31, mitochondrial

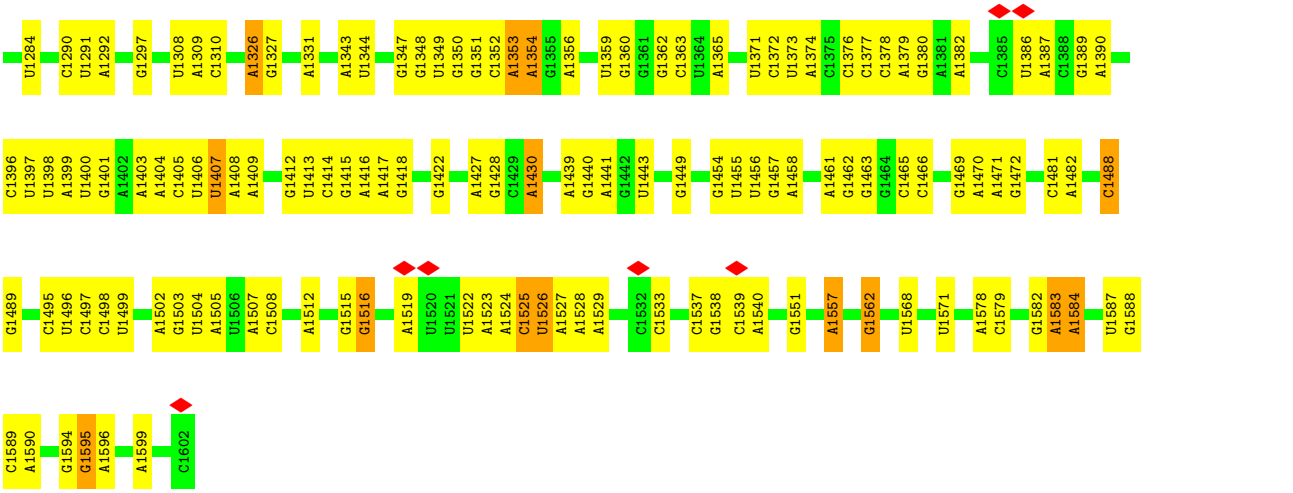
Chain AY:



• Molecule 80: 12S mitochondrial rRNA

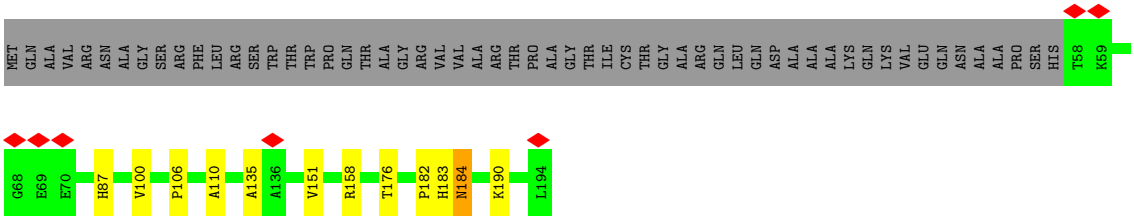
Chain AA:





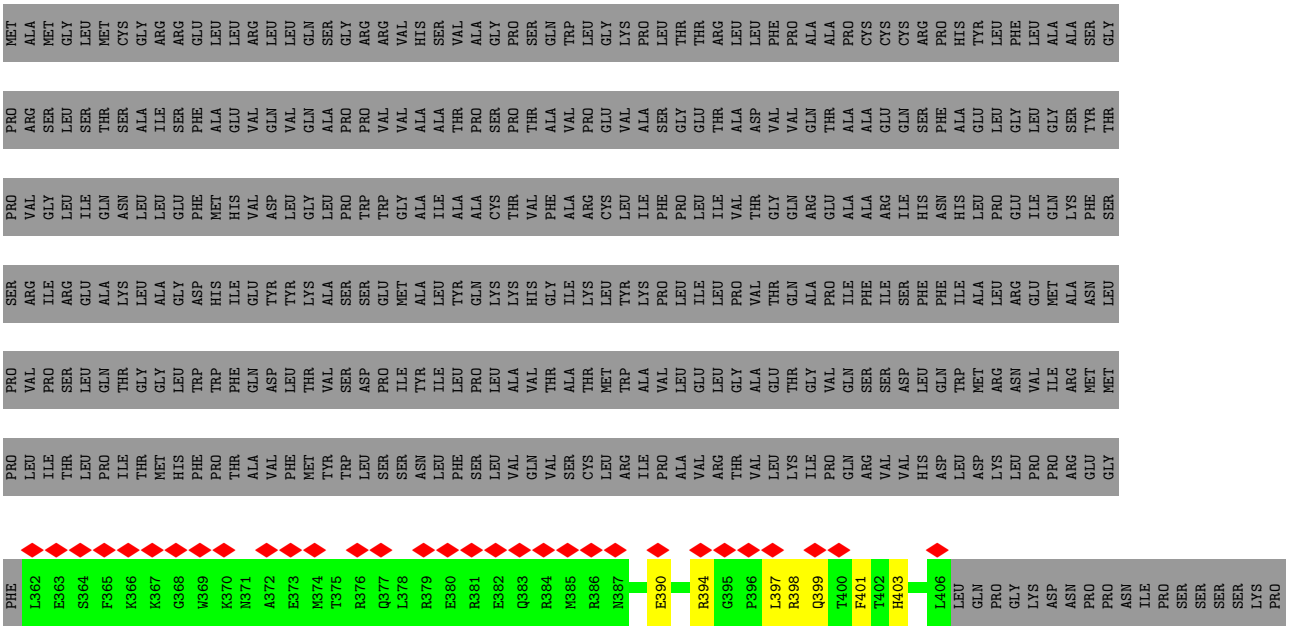
• Molecule 81: 28S ribosomal protein S11, mitochondrial

Chain AI:



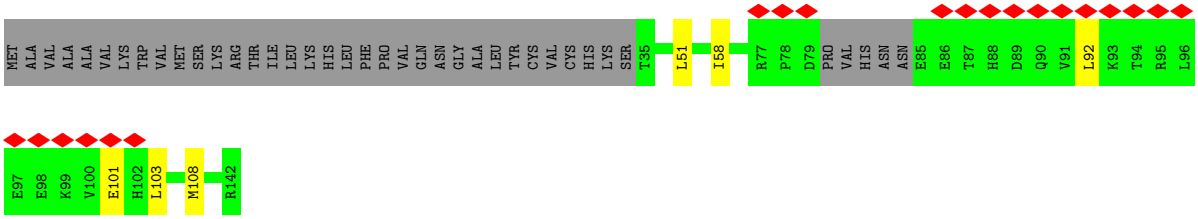
• Molecule 82: Mitochondrial inner membrane protein OXA1L

Chain OX:



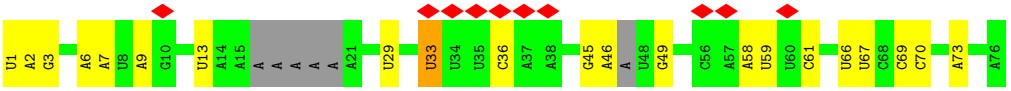
• Molecule 83: 39S ribosomal protein L42, mitochondrial

Chain a:



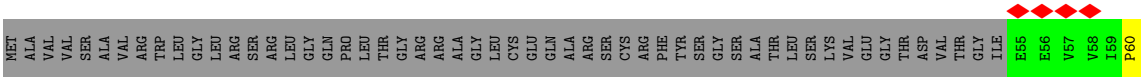
• Molecule 84: E/E-tRNA

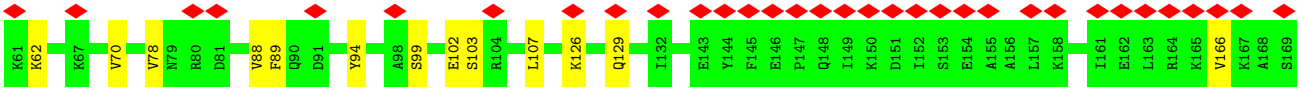
Chain Ay:

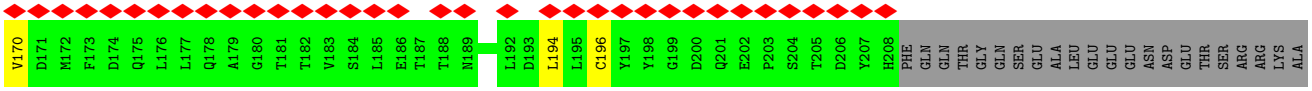


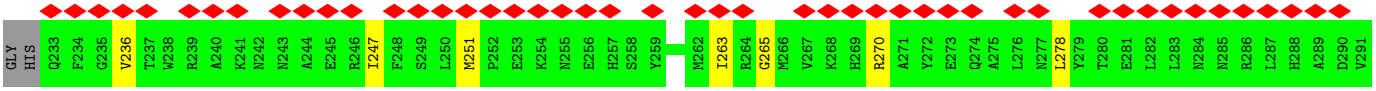
• Molecule 85: Pentatricopeptide repeat domain-containing protein 3, mitochondrial

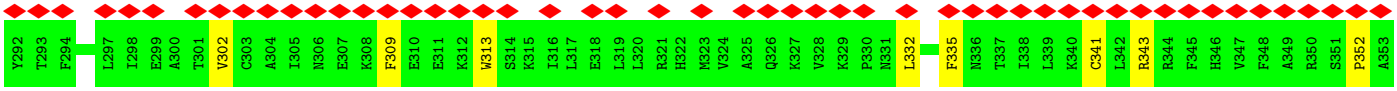
Chain A4:

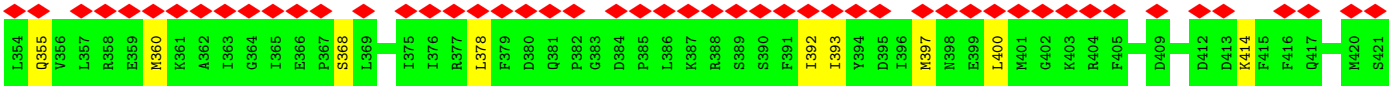


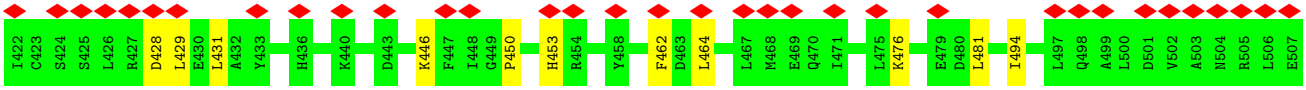


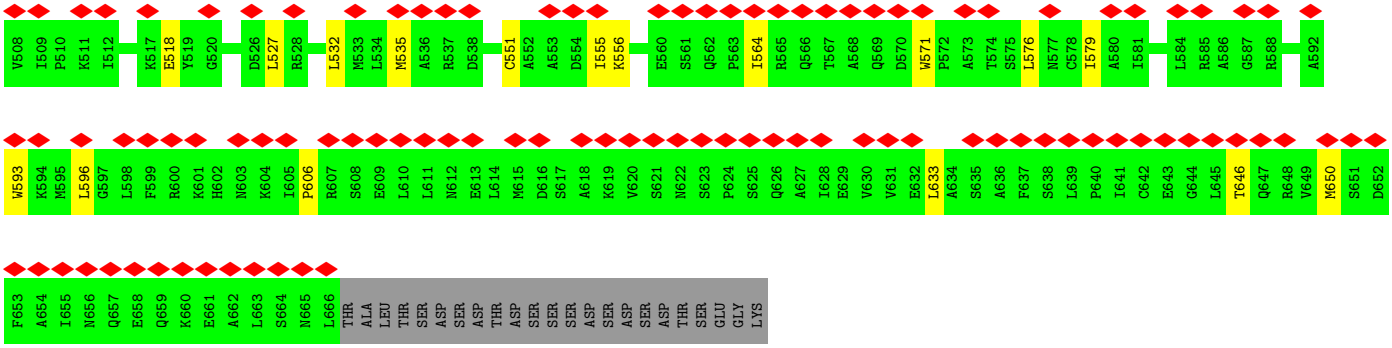






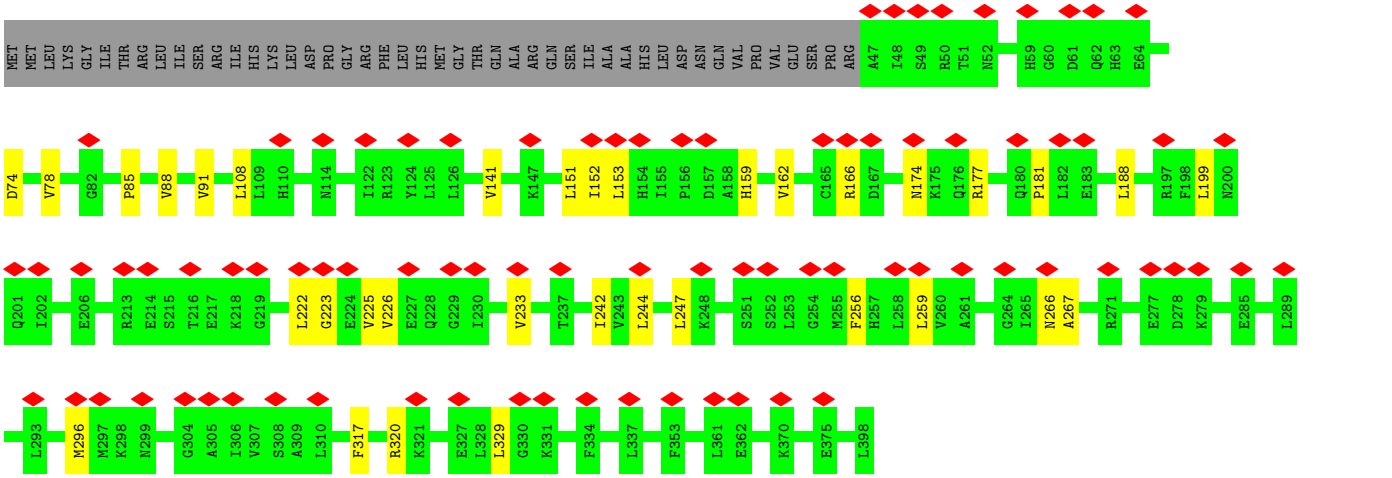






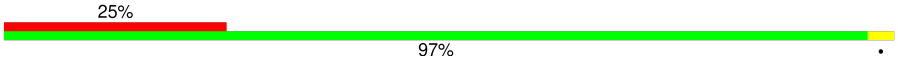
• Molecule 86: 28S ribosomal protein S29, mitochondrial

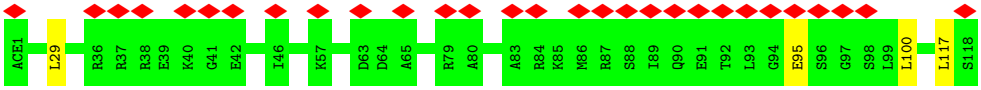
Chain AX:



• Molecule 87: Small ribosomal subunit protein mS37

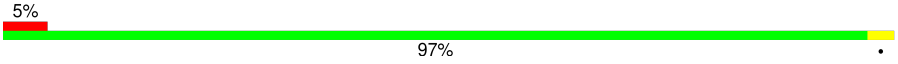
Chain A2:

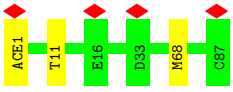




• Molecule 88: Small ribosomal subunit protein bS21m

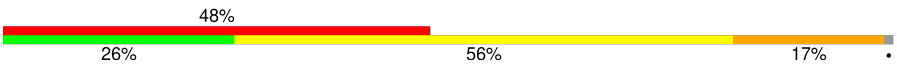
Chain AQ:

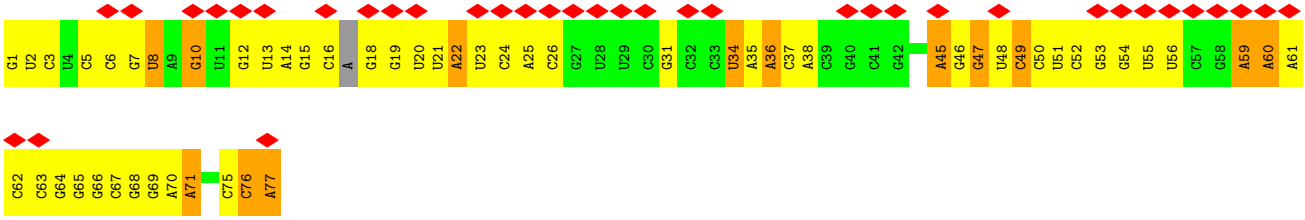




• Molecule 89: A/T-tRNA

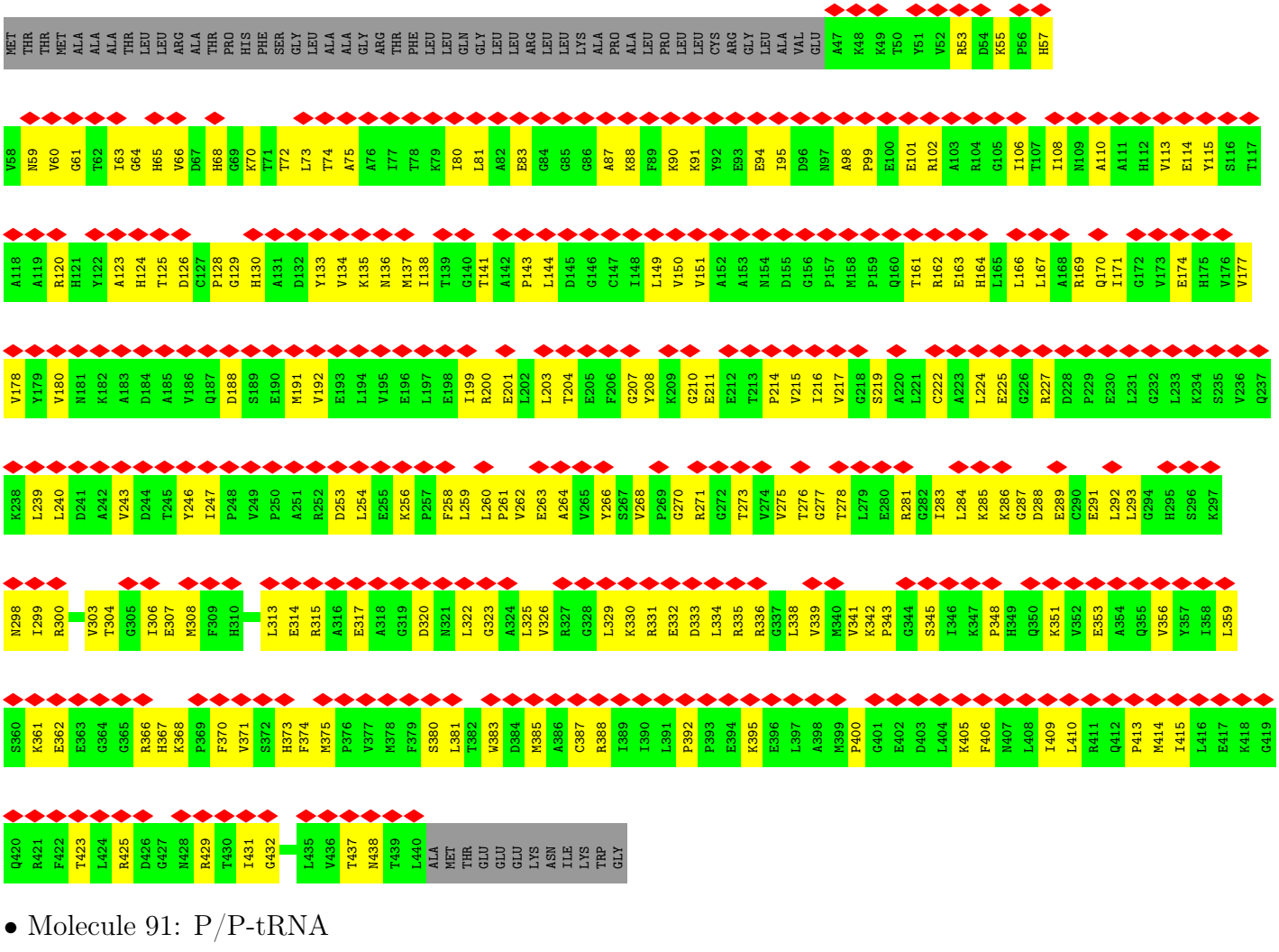
Chain Ah:





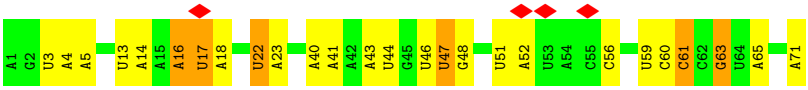
• Molecule 90: Elongation factor Tu, mitochondrial

Chain Ag:



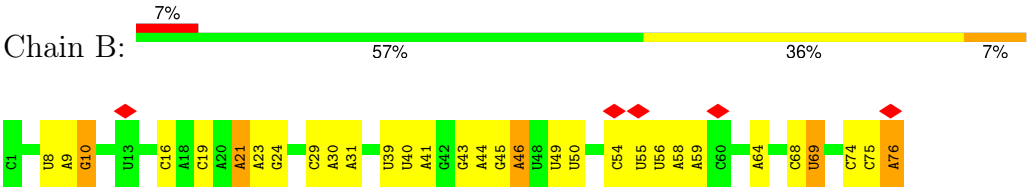
• Molecule 91: P/P-tRNA

Chain Ax:



• Molecule 92: mitochondrial tRNAVal

Chain B:


7%
57%
36%
7%
C1
U8
A9
G10
U13
C16
A18
C19
A20
A21
A23
G24
C29
A30
A31
U39
U40
A41
G42
G43
A44
G45
A46
U48
U49
U50
C54
U55
U56
A58
A59
C60
A64
C68
U69
C74
C75
A76

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	32749	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	55	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.178	Depositor
Minimum map value	-0.078	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.027	Depositor
Map size (Å)	512.63995, 512.63995, 512.63995	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.068, 1.068, 1.068	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: OMU, K, PUT, PSU, 5MU, MA6, B8T, FES, GDP, ATP, ZN, 1MA, NAD, OMG, 5MC, MG, SPD, SPM, 2MG, ACE

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	0.29	0/913	0.28	0/1224
2	1	0.27	0/469	0.30	0/621
3	2	0.39	0/383	0.33	0/507
4	3	0.37	0/853	0.31	0/1136
5	4	0.33	0/350	0.26	0/461
6	5	0.28	0/3305	0.30	0/4502
7	6	0.25	0/3043	0.30	0/4140
8	7	0.25	0/2447	0.28	0/3310
9	8	0.20	0/1354	0.34	0/1819
10	9	0.28	0/1025	0.30	0/1379
11	A	0.37	0/36876	0.32	0/57402
12	D	0.31	0/1896	0.29	0/2549
13	E	0.32	0/2475	0.33	0/3355
14	F	0.34	0/2090	0.32	0/2842
15	H	0.20	0/1698	0.29	0/2292
16	I	0.22	0/1478	0.34	0/1999
17	J	0.18	0/1348	0.30	0/1813
18	K	0.35	0/1497	0.30	0/2031
19	L	0.29	0/905	0.31	0/1218
20	M	0.33	0/2381	0.33	0/3212
21	N	0.31	0/1833	0.30	0/2468
22	O	0.32	0/1283	0.30	0/1727
23	P	0.29	0/1199	0.27	0/1623
24	Q	0.28	0/2039	0.29	0/2750
25	R	0.35	0/1175	0.30	0/1572
26	S	0.33	0/1320	0.31	0/1789
27	T	0.33	0/1403	0.29	0/1886
28	U	0.31	0/1279	0.36	0/1730
29	W	0.34	0/926	0.29	0/1244
30	X	0.29	0/2099	0.27	0/2837
31	Y	0.31	0/1593	0.29	0/2136

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	Z	0.32	0/1021	0.30	0/1378
33	g	0.30	0/1151	0.30	0/1569
34	z	0.15	0/2067	0.37	0/2793
35	V	0.27	0/1721	0.28	0/2333
36	b	0.32	0/1218	0.31	0/1649
37	d	0.23	0/2181	0.37	0/2949
38	e	0.17	0/1970	0.32	0/2658
39	h	0.24	0/918	0.25	0/1249
40	i	0.36	0/850	0.30	0/1135
41	j	0.29	0/760	0.26	0/1023
42	k	0.20	0/783	0.27	0/1057
43	l	0.18	0/707	0.29	0/960
44	m	0.18	0/805	0.34	0/1081
46	o	0.33	0/819	0.32	0/1097
47	q	0.22	0/1529	0.31	0/2055
48	r	0.29	0/1362	0.30	0/1846
49	t	0.16	0/358	0.31	0/486
49	u	0.19	0/259	0.41	0/350
50	c	0.28	0/2347	0.28	0/3171
51	f	0.24	0/1273	0.34	0/1716
52	p	0.23	0/1223	0.29	0/1641
53	s	0.30	0/3231	0.30	0/4389
54	AB	0.23	0/1871	0.28	0/2531
55	AC	0.21	0/1113	0.32	0/1505
56	AD	0.21	0/2783	0.27	0/3724
57	AE	0.23	0/989	0.29	0/1335
58	AF	0.19	0/1767	0.26	0/2373
59	AG	0.19	0/2746	0.28	0/3681
60	AH	0.22	0/1178	0.32	0/1598
61	AJ	0.22	0/855	0.30	0/1148
62	AK	0.22	0/880	0.28	0/1182
63	AL	0.22	0/1477	0.25	0/1974
64	AM	0.18	0/963	0.32	0/1295
65	AN	0.21	0/886	0.28	0/1199
66	AO	0.18	0/1648	0.33	0/2243
67	AP	0.24	0/798	0.28	0/1070
68	AR	0.15	0/2456	0.29	0/3317
69	AS	0.18	0/1138	0.23	0/1533
70	AT	0.20	0/1402	0.28	0/1883
71	AU	0.17	0/1510	0.27	0/2025
72	AV	0.16	0/3030	0.35	0/4093
73	AW	0.21	0/801	0.28	0/1079
74	AZ	0.20	0/857	0.32	0/1141

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
75	A0	0.15	0/1834	0.30	0/2484
76	A1	0.17	0/2313	0.28	0/3129
77	A3	0.27	0/636	0.31	0/839
78	Az	0.20	0/804	0.34	0/1248
79	AY	0.16	0/1040	0.26	0/1402
80	AA	0.28	0/22537	0.30	0/35085
81	AI	0.24	0/1039	0.37	2/1400 (0.1%)
82	OX	0.21	0/478	0.54	2/639 (0.3%)
83	a	0.27	0/891	0.36	0/1208
84	Ay	0.17	0/1655	0.28	0/2567
85	A4	0.17	0/4877	0.33	0/6598
86	AX	0.19	0/2921	0.34	0/3954
87	A2	0.22	0/947	0.30	0/1266
88	AQ	0.24	0/754	0.26	0/1003
89	Ah	0.18	0/1805	0.36	0/2809
90	Ag	0.19	0/3097	0.41	0/4190
91	Ax	0.24	0/1673	0.36	0/2602
92	B	0.22	0/1626	0.28	0/2523
All	All	0.28	0/193563	0.31	4/275034 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
81	AI	183	HIS	CA-C-N	6.13	133.25	121.54
81	AI	183	HIS	C-N-CA	6.13	133.25	121.54
82	OX	398	ARG	CA-C-N	5.63	131.40	122.61
82	OX	398	ARG	C-N-CA	5.63	131.40	122.61

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	898	0	916	2	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	1	464	0	511	5	0
3	2	377	0	406	0	0
4	3	832	0	883	3	0
5	4	342	0	361	1	0
6	5	3210	0	3206	9	0
7	6	2948	0	2841	8	0
8	7	2390	0	2397	8	0
9	8	1327	0	1368	15	0
10	9	997	0	987	3	0
11	A	33070	0	16795	143	0
12	D	1859	0	1920	5	0
13	E	2406	0	2415	3	0
14	F	2031	0	2065	5	0
15	H	1661	0	1734	13	0
16	I	1446	0	1532	9	0
17	J	1330	0	1407	12	0
18	K	1455	0	1452	7	0
19	L	890	0	941	1	0
20	M	2327	0	2394	3	0
21	N	1786	0	1817	9	0
22	O	1259	0	1294	2	0
23	P	1173	0	1165	3	0
24	Q	1990	0	2031	5	0
25	R	1154	0	1214	1	0
26	S	1293	0	1365	4	0
27	T	1369	0	1410	4	0
28	U	1248	0	1228	5	0
29	W	904	0	935	2	0
30	X	2044	0	2060	4	0
31	Y	1556	0	1597	2	0
32	Z	996	0	1044	3	0
33	g	1113	0	1097	1	0
34	z	2027	0	2076	36	0
35	V	1676	0	1687	5	0
36	b	1193	0	1191	3	0
37	d	2124	0	2125	26	0
38	e	1931	0	1916	22	0
39	h	895	0	881	0	0
40	i	828	0	857	0	0
41	j	745	0	746	1	0
42	k	774	0	784	5	0
43	l	688	0	673	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
44	m	791	0	796	5	0
45	n	215	0	52	0	0
46	o	798	0	804	0	0
47	q	1495	0	1492	16	0
48	r	1322	0	1348	7	0
49	t	354	0	377	4	0
49	u	257	0	283	8	0
50	c	2299	0	2320	4	0
51	f	1252	0	1269	12	0
52	p	1205	0	1223	2	0
53	s	3148	0	3131	11	0
54	AB	1828	0	1815	5	0
55	AC	1083	0	1088	9	0
56	AD	2731	0	2804	15	0
57	AE	972	0	1000	4	0
58	AF	1725	0	1769	8	0
59	AG	2688	0	2687	7	0
60	AH	1152	0	1183	20	0
61	AJ	839	0	887	7	0
62	AK	862	0	885	7	0
63	AL	1453	0	1540	7	0
64	AM	942	0	965	9	0
65	AN	868	0	928	4	0
66	AO	1592	0	1557	10	0
67	AP	781	0	806	2	0
68	AR	2409	0	2428	10	0
69	AS	1111	0	1115	6	0
70	AT	1371	0	1393	4	0
71	AU	1488	0	1499	7	0
72	AV	2969	0	2961	30	0
73	AW	789	0	802	6	0
74	AZ	839	0	858	5	0
75	A0	1787	0	1796	13	0
76	A1	2265	0	2294	18	0
77	A3	625	0	699	2	0
78	Az	719	0	359	2	0
79	AY	1010	0	957	4	0
80	AA	20260	0	10286	308	0
81	AI	1019	0	1059	7	0
82	OX	468	0	464	6	0
83	a	865	0	829	5	0
84	Ay	1483	0	754	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
85	A4	4768	0	4766	46	0
86	AX	2849	0	2844	21	0
87	A2	935	0	971	4	0
88	AQ	744	0	758	3	0
89	Ah	1616	0	824	51	0
90	Ag	3042	0	3112	150	0
91	Ax	1498	0	766	9	0
92	B	1524	0	779	13	0
93	0	1	0	0	0	0
93	4	1	0	0	0	0
93	AO	1	0	0	0	0
94	3	1	0	0	0	0
94	A	29	0	0	0	0
94	AA	17	0	0	1	0
94	Az	1	0	0	0	0
94	D	1	0	0	0	0
94	M	1	0	0	0	0
94	N	1	0	0	0	0
94	P	1	0	0	0	0
94	W	1	0	0	0	0
94	o	1	0	0	0	0
95	A	50	0	95	1	0
95	AA	20	0	38	3	0
96	A	6	0	12	0	0
97	A	137	0	0	0	0
97	A3	1	0	0	0	0
97	AA	59	0	0	0	0
97	AB	1	0	0	0	0
97	AK	1	0	0	0	0
97	AX	1	0	0	0	0
97	D	2	0	0	0	0
97	E	1	0	0	0	0
97	g	1	0	0	0	0
98	AP	4	0	0	0	0
98	AT	4	0	0	0	0
98	r	4	0	0	2	0
99	AA	44	0	26	1	0
100	AA	28	0	52	1	0
101	AX	31	0	12	0	0
102	AX	28	0	12	1	0
103	B	7	0	8	2	0
All	All	184618	0	156361	1155	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

The worst 5 of 1155 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:F:103:GLN:HE22	14:F:249:ASN:HD22	1.18	0.90
47:q:164:LEU:HB3	47:q:168:VAL:HG21	1.60	0.82
90:Ag:61:GLY:HA2	90:Ag:125:THR:H	1.44	0.81
8:7:204:LYS:HE2	83:a:92:LEU:HD22	1.61	0.81
90:Ag:63:ILE:HB	90:Ag:164:HIS:HB3	1.63	0.81

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	108/188 (57%)	108 (100%)	0	0	100	100
2	1	54/65 (83%)	54 (100%)	0	0	100	100
3	2	44/92 (48%)	43 (98%)	1 (2%)	0	100	100
4	3	93/188 (50%)	92 (99%)	1 (1%)	0	100	100
5	4	36/103 (35%)	36 (100%)	0	0	100	100
6	5	392/423 (93%)	382 (97%)	10 (3%)	0	100	100
7	6	352/380 (93%)	341 (97%)	11 (3%)	0	100	100
8	7	292/338 (86%)	283 (97%)	9 (3%)	0	100	100
9	8	155/206 (75%)	152 (98%)	3 (2%)	0	100	100
10	9	122/137 (89%)	118 (97%)	4 (3%)	0	100	100
12	D	236/305 (77%)	231 (98%)	5 (2%)	0	100	100
13	E	303/348 (87%)	296 (98%)	7 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
14	F	250/311 (80%)	246 (98%)	4 (2%)	0	100	100
15	H	200/267 (75%)	191 (96%)	9 (4%)	0	100	100
16	I	179/261 (69%)	177 (99%)	2 (1%)	0	100	100
17	J	173/192 (90%)	172 (99%)	1 (1%)	0	100	100
18	K	176/178 (99%)	172 (98%)	4 (2%)	0	100	100
19	L	113/145 (78%)	109 (96%)	4 (4%)	0	100	100
20	M	289/296 (98%)	279 (96%)	10 (4%)	0	100	100
21	N	220/251 (88%)	219 (100%)	1 (0%)	0	100	100
22	O	152/175 (87%)	148 (97%)	4 (3%)	0	100	100
23	P	142/180 (79%)	136 (96%)	6 (4%)	0	100	100
24	Q	237/292 (81%)	233 (98%)	4 (2%)	0	100	100
25	R	138/149 (93%)	136 (99%)	2 (1%)	0	100	100
26	S	159/205 (78%)	155 (98%)	4 (2%)	0	100	100
27	T	164/206 (80%)	163 (99%)	1 (1%)	0	100	100
28	U	150/153 (98%)	147 (98%)	3 (2%)	0	100	100
29	W	114/148 (77%)	113 (99%)	1 (1%)	0	100	100
30	X	242/256 (94%)	239 (99%)	3 (1%)	0	100	100
31	Y	179/250 (72%)	175 (98%)	4 (2%)	0	100	100
32	Z	120/161 (74%)	118 (98%)	2 (2%)	0	100	100
33	g	132/166 (80%)	129 (98%)	3 (2%)	0	100	100
34	z	250/325 (77%)	236 (94%)	14 (6%)	0	100	100
35	V	203/216 (94%)	201 (99%)	2 (1%)	0	100	100
36	b	148/215 (69%)	142 (96%)	6 (4%)	0	100	100
37	d	257/306 (84%)	237 (92%)	19 (7%)	1 (0%)	30	60
38	e	236/279 (85%)	228 (97%)	8 (3%)	0	100	100
39	h	108/158 (68%)	105 (97%)	3 (3%)	0	100	100
40	i	95/128 (74%)	93 (98%)	2 (2%)	0	100	100
41	j	92/123 (75%)	91 (99%)	1 (1%)	0	100	100
42	k	100/112 (89%)	99 (99%)	1 (1%)	0	100	100
43	l	80/138 (58%)	78 (98%)	2 (2%)	0	100	100
44	m	90/128 (70%)	87 (97%)	3 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
46	o	92/102 (90%)	92 (100%)	0	0	100	100
47	q	175/222 (79%)	174 (99%)	1 (1%)	0	100	100
48	r	160/196 (82%)	158 (99%)	2 (1%)	0	100	100
49	t	44/198 (22%)	44 (100%)	0	0	100	100
49	u	30/198 (15%)	30 (100%)	0	0	100	100
50	c	282/332 (85%)	276 (98%)	6 (2%)	0	100	100
51	f	153/212 (72%)	146 (95%)	7 (5%)	0	100	100
52	p	141/206 (68%)	137 (97%)	4 (3%)	0	100	100
53	s	381/439 (87%)	375 (98%)	6 (2%)	0	100	100
54	AB	223/296 (75%)	218 (98%)	5 (2%)	0	100	100
55	AC	130/167 (78%)	129 (99%)	1 (1%)	0	100	100
56	AD	341/430 (79%)	334 (98%)	7 (2%)	0	100	100
57	AE	120/125 (96%)	120 (100%)	0	0	100	100
58	AF	206/242 (85%)	204 (99%)	2 (1%)	0	100	100
59	AG	323/396 (82%)	314 (97%)	9 (3%)	0	100	100
60	AH	138/201 (69%)	132 (96%)	5 (4%)	1 (1%)	19	48
61	AJ	106/138 (77%)	105 (99%)	1 (1%)	0	100	100
62	AK	99/128 (77%)	99 (100%)	0	0	100	100
63	AL	172/257 (67%)	170 (99%)	2 (1%)	0	100	100
64	AM	117/137 (85%)	114 (97%)	3 (3%)	0	100	100
65	AN	108/130 (83%)	107 (99%)	1 (1%)	0	100	100
66	AO	191/258 (74%)	186 (97%)	5 (3%)	0	100	100
67	AP	95/142 (67%)	95 (100%)	0	0	100	100
68	AR	293/360 (81%)	285 (97%)	8 (3%)	0	100	100
69	AS	133/190 (70%)	130 (98%)	3 (2%)	0	100	100
70	AT	166/173 (96%)	165 (99%)	1 (1%)	0	100	100
71	AU	174/205 (85%)	173 (99%)	1 (1%)	0	100	100
72	AV	358/414 (86%)	346 (97%)	12 (3%)	0	100	100
73	AW	98/187 (52%)	96 (98%)	2 (2%)	0	100	100
74	AZ	98/106 (92%)	95 (97%)	3 (3%)	0	100	100
75	A0	213/217 (98%)	207 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
76	A1	277/323 (86%)	267 (96%)	10 (4%)	0	100	100
77	A3	68/199 (34%)	67 (98%)	1 (2%)	0	100	100
79	AY	117/395 (30%)	115 (98%)	2 (2%)	0	100	100
81	AI	135/194 (70%)	128 (95%)	6 (4%)	1 (1%)	19	48
82	OX	51/435 (12%)	46 (90%)	5 (10%)	0	100	100
83	a	99/142 (70%)	96 (97%)	3 (3%)	0	100	100
85	A4	584/689 (85%)	565 (97%)	19 (3%)	0	100	100
86	AX	350/398 (88%)	338 (97%)	12 (3%)	0	100	100
87	A2	116/118 (98%)	113 (97%)	3 (3%)	0	100	100
88	AQ	85/87 (98%)	81 (95%)	4 (5%)	0	100	100
90	Ag	392/455 (86%)	356 (91%)	35 (9%)	1 (0%)	37	66
All	All	15009/19582 (77%)	14618 (97%)	387 (3%)	4 (0%)	100	100

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
81	AI	184	ASN
60	AH	126	ILE
90	Ag	246	TYR
37	d	47	GLN

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	0	99/164 (60%)	99 (100%)	0	100	100
2	1	53/60 (88%)	53 (100%)	0	100	100
3	2	40/72 (56%)	40 (100%)	0	100	100
4	3	88/166 (53%)	88 (100%)	0	100	100
5	4	37/89 (42%)	37 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
6	5	353/368 (96%)	353 (100%)	0	100	100
7	6	313/332 (94%)	313 (100%)	0	100	100
8	7	270/303 (89%)	270 (100%)	0	100	100
9	8	146/190 (77%)	146 (100%)	0	100	100
10	9	104/112 (93%)	104 (100%)	0	100	100
12	D	192/245 (78%)	192 (100%)	0	100	100
13	E	260/290 (90%)	260 (100%)	0	100	100
14	F	219/262 (84%)	219 (100%)	0	100	100
15	H	182/228 (80%)	182 (100%)	0	100	100
16	I	165/232 (71%)	165 (100%)	0	100	100
17	J	138/150 (92%)	138 (100%)	0	100	100
18	K	155/155 (100%)	155 (100%)	0	100	100
19	L	98/124 (79%)	98 (100%)	0	100	100
20	M	246/249 (99%)	246 (100%)	0	100	100
21	N	189/211 (90%)	189 (100%)	0	100	100
22	O	134/150 (89%)	134 (100%)	0	100	100
23	P	126/155 (81%)	126 (100%)	0	100	100
24	Q	221/256 (86%)	221 (100%)	0	100	100
25	R	118/126 (94%)	118 (100%)	0	100	100
26	S	146/180 (81%)	146 (100%)	0	100	100
27	T	146/176 (83%)	146 (100%)	0	100	100
28	U	134/135 (99%)	134 (100%)	0	100	100
29	W	94/119 (79%)	94 (100%)	0	100	100
30	X	220/229 (96%)	220 (100%)	0	100	100
31	Y	163/223 (73%)	163 (100%)	0	100	100
32	Z	113/147 (77%)	113 (100%)	0	100	100
33	g	124/148 (84%)	124 (100%)	0	100	100
34	z	226/287 (79%)	226 (100%)	0	100	100
35	V	183/191 (96%)	183 (100%)	0	100	100
36	b	132/186 (71%)	132 (100%)	0	100	100
37	d	237/274 (86%)	237 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
38	e	207/236 (88%)	207 (100%)	0	100	100
39	h	104/148 (70%)	104 (100%)	0	100	100
40	i	86/110 (78%)	86 (100%)	0	100	100
41	j	74/97 (76%)	74 (100%)	0	100	100
42	k	83/89 (93%)	83 (100%)	0	100	100
43	l	76/116 (66%)	76 (100%)	0	100	100
44	m	85/113 (75%)	85 (100%)	0	100	100
46	o	80/87 (92%)	80 (100%)	0	100	100
47	q	153/178 (86%)	153 (100%)	0	100	100
48	r	147/169 (87%)	147 (100%)	0	100	100
49	t	40/158 (25%)	40 (100%)	0	100	100
49	u	31/158 (20%)	31 (100%)	0	100	100
50	c	251/288 (87%)	251 (100%)	0	100	100
51	f	139/188 (74%)	139 (100%)	0	100	100
52	p	135/181 (75%)	135 (100%)	0	100	100
53	s	339/381 (89%)	339 (100%)	0	100	100
54	AB	198/249 (80%)	198 (100%)	0	100	100
55	AC	115/143 (80%)	115 (100%)	0	100	100
56	AD	286/357 (80%)	286 (100%)	0	100	100
57	AE	104/107 (97%)	104 (100%)	0	100	100
58	AF	185/209 (88%)	185 (100%)	0	100	100
59	AG	285/342 (83%)	285 (100%)	0	100	100
60	AH	130/180 (72%)	130 (100%)	0	100	100
61	AJ	93/118 (79%)	93 (100%)	0	100	100
62	AK	91/113 (80%)	91 (100%)	0	100	100
63	AL	158/226 (70%)	158 (100%)	0	100	100
64	AM	97/113 (86%)	97 (100%)	0	100	100
65	AN	96/115 (84%)	96 (100%)	0	100	100
66	AO	174/230 (76%)	173 (99%)	1 (1%)	84	90
67	AP	88/123 (72%)	88 (100%)	0	100	100
68	AR	264/318 (83%)	264 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
69	AS	116/164 (71%)	116 (100%)	0	100	100
70	AT	153/157 (98%)	153 (100%)	0	100	100
71	AU	152/174 (87%)	152 (100%)	0	100	100
72	AV	325/364 (89%)	325 (100%)	0	100	100
73	AW	87/158 (55%)	87 (100%)	0	100	100
74	AZ	90/95 (95%)	90 (100%)	0	100	100
75	A0	188/189 (100%)	188 (100%)	0	100	100
76	A1	257/291 (88%)	257 (100%)	0	100	100
77	A3	65/166 (39%)	65 (100%)	0	100	100
79	AY	110/357 (31%)	110 (100%)	0	100	100
81	AI	105/147 (71%)	105 (100%)	0	100	100
82	OX	49/372 (13%)	49 (100%)	0	100	100
83	a	99/133 (74%)	99 (100%)	0	100	100
85	A4	526/609 (86%)	526 (100%)	0	100	100
86	AX	311/351 (89%)	311 (100%)	0	100	100
87	A2	100/100 (100%)	100 (100%)	0	100	100
88	AQ	78/78 (100%)	78 (100%)	0	100	100
90	Ag	328/374 (88%)	328 (100%)	0	100	100
All	All	13397/16903 (79%)	13396 (100%)	1 (0%)	100	100

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
66	AO	154	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 104 such sidechains are listed below:

Mol	Chain	Res	Type
54	AB	64	ASN
62	AK	124	GLN
90	Ag	57	HIS
55	AC	107	GLN
58	AF	113	GLN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
11	A	1556/1558 (99%)	257 (16%)	2 (0%)
78	Az	33/34 (97%)	13 (39%)	0
80	AA	953/954 (99%)	146 (15%)	0
84	Ay	67/76 (88%)	11 (16%)	0
89	Ah	74/77 (96%)	20 (27%)	0
91	Ax	70/71 (98%)	16 (22%)	0
92	B	70/72 (97%)	15 (21%)	0
All	All	2823/2842 (99%)	478 (16%)	2 (0%)

5 of 478 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
11	A	1681	G
11	A	1689	C
11	A	1692	A
11	A	1699	C
11	A	1700	U

All (2) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
11	A	2245	A
11	A	2484	C

5.4 Non-standard residues in protein, DNA, RNA chains

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
11	OMG	A	3040	11	19,26,27	1.07	3 (15%)	21,38,41	0.67	0
11	1MA	A	2617	11	17,25,26	0.88	1 (5%)	17,37,40	0.75	0
80	MA6	AA	1584	80	19,26,27	0.95	2 (10%)	18,38,41	0.77	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
11	PSU	A	3067	11	18,21,22	1.10	2 (11%)	21,30,33	0.80	1 (4%)
80	5MU	AA	1076	80	19,22,23	0.40	0	27,32,35	0.67	0
92	2MG	B	10	92	18,26,27	1.08	3 (16%)	16,38,41	0.80	0
80	MA6	AA	1583	80	19,26,27	0.95	2 (10%)	18,38,41	0.72	1 (5%)
92	PSU	B	39	92	18,21,22	1.06	1 (5%)	21,30,33	0.73	0
11	OMU	A	3039	94,11	19,22,23	0.30	0	25,31,34	0.68	1 (4%)
92	1MA	B	9	92	17,25,26	0.82	1 (5%)	17,37,40	0.92	0
80	B8T	AA	1486	97,80	19,22,23	0.42	0	25,31,34	0.31	0
11	OMG	A	2815	94,11,91	19,26,27	1.07	3 (15%)	21,38,41	0.72	0
80	5MC	AA	1488	80	19,22,23	0.90	1 (5%)	26,32,35	0.51	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
11	OMG	A	3040	11	-	0/5/27/28	0/3/3/3
11	1MA	A	2617	11	-	0/3/25/26	0/3/3/3
80	MA6	AA	1584	80	-	1/7/29/30	0/3/3/3
11	PSU	A	3067	11	-	0/7/25/26	0/2/2/2
80	5MU	AA	1076	80	-	5/7/25/26	0/2/2/2
92	2MG	B	10	92	-	0/5/27/28	0/3/3/3
80	MA6	AA	1583	80	-	0/7/29/30	0/3/3/3
92	PSU	B	39	92	-	0/7/25/26	0/2/2/2
11	OMU	A	3039	94,11	-	0/9/27/28	0/2/2/2
92	1MA	B	9	92	-	0/3/25/26	0/3/3/3
80	B8T	AA	1486	97,80	-	0/7/27/28	0/2/2/2
11	OMG	A	2815	94,11,91	-	0/5/27/28	0/3/3/3
80	5MC	AA	1488	80	-	0/7/25/26	0/2/2/2

The worst 5 of 19 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
80	AA	1488	5MC	C5-C4	-3.54	1.41	1.44
92	B	39	PSU	C6-C5	3.53	1.39	1.35
11	A	3067	PSU	C6-C5	3.42	1.39	1.35
11	A	2815	OMG	C5-C6	-2.88	1.41	1.47
11	A	3040	OMG	C5-C6	-2.87	1.41	1.47

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
11	A	3039	OMU	C2'-C1'-N1	-2.62	109.27	114.24
11	A	3067	PSU	O4'-C1'-C2'	2.34	108.39	105.15
80	AA	1584	MA6	C2-N1-C6	2.23	119.02	116.84
80	AA	1583	MA6	C2-N1-C6	2.10	118.90	116.84

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
80	AA	1076	5MU	O4'-C4'-C5'-O5'
80	AA	1076	5MU	C3'-C4'-C5'-O5'
80	AA	1584	MA6	C4'-C5'-O5'-P
80	AA	1076	5MU	C2'-C1'-N1-C2
80	AA	1076	5MU	C4'-C5'-O5'-P

There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	A	3067	PSU	1	0
80	AA	1076	5MU	1	0
80	AA	1583	MA6	2	0
11	A	2815	OMG	1	0
80	AA	1488	5MC	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 278 ligands modelled in this entry, 261 are monoatomic - leaving 17 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
95	SPD	AA	1703	-	9,9,9	0.16	0	8,8,8	0.24	0
100	SPM	AA	1702	-	13,13,13	0.17	0	12,12,12	0.27	0
98	FES	AT	201	64,70	0,4,4	-	-	-		
95	SPD	AA	1781	-	9,9,9	0.15	0	8,8,8	0.20	0
95	SPD	A	3472	-	9,9,9	0.18	0	8,8,8	0.22	0
101	ATP	AX	501	97	28,33,33	0.82	1 (3%)	34,52,52	0.62	1 (2%)
95	SPD	A	3471	-	9,9,9	0.15	0	8,8,8	0.32	0
102	GDP	AX	503	-	25,30,30	0.98	1 (4%)	30,47,47	1.08	2 (6%)
98	FES	r	201	16,48	0,4,4	-	-	-		
95	SPD	A	3302	-	9,9,9	0.16	0	8,8,8	0.24	0
98	FES	AP	201	67,57	0,4,4	-	-	-		
95	SPD	A	3301	-	9,9,9	0.17	0	8,8,8	0.23	0
96	PUT	A	3303	-	5,5,5	0.14	0	4,4,4	0.23	0
95	SPD	A	3470	-	9,9,9	0.15	0	8,8,8	0.18	0
99	NAD	AA	1701	97	42,48,48	1.36	6 (14%)	50,73,73	0.96	2 (4%)
100	SPM	AA	1779	-	13,13,13	0.16	0	12,12,12	0.32	0
103	VAL	B	101	92	4,6,7	0.73	0	6,7,9	0.96	1 (16%)

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
95	SPD	AA	1703	-	-	1/7/7/7	-
100	SPM	AA	1702	-	-	0/11/11/11	-
98	FES	AT	201	64,70	-	-	0/1/1/1
95	SPD	AA	1781	-	-	1/7/7/7	-
95	SPD	A	3472	-	-	1/7/7/7	-
101	ATP	AX	501	97	-	0/18/38/38	0/3/3/3
95	SPD	A	3471	-	-	1/7/7/7	-
102	GDP	AX	503	-	-	6/12/32/32	0/3/3/3
98	FES	r	201	16,48	-	-	0/1/1/1
95	SPD	A	3302	-	-	2/7/7/7	-
98	FES	AP	201	67,57	-	-	0/1/1/1
95	SPD	A	3301	-	-	0/7/7/7	-
96	PUT	A	3303	-	-	0/3/3/3	-
95	SPD	A	3470	-	-	0/7/7/7	-
99	NAD	AA	1701	97	-	6/26/62/62	0/5/5/5
100	SPM	AA	1779	-	-	0/11/11/11	-
103	VAL	B	101	92	-	0/5/6/8	-

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
99	AA	1701	NAD	PA-O3	4.70	1.64	1.59
99	AA	1701	NAD	O4D-C1D	-2.73	1.37	1.40
99	AA	1701	NAD	PN-O3	2.66	1.62	1.59
99	AA	1701	NAD	C8A-N7A	-2.65	1.29	1.34
99	AA	1701	NAD	C1B-N9A	-2.55	1.43	1.49

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
102	AX	503	GDP	C8-N7-C5	2.93	107.53	102.55
99	AA	1701	NAD	O3-PA-O1A	-2.57	102.96	110.70
101	AX	501	ATP	C5-C6-N6	2.27	123.77	120.31
99	AA	1701	NAD	O2A-PA-O1A	2.22	122.79	112.44
103	B	101	VAL	O-C-CA	-2.15	119.24	124.77

There are no chirality outliers.

5 of 18 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
99	AA	1701	NAD	C2N-C3N-C7N-N7N
102	AX	503	GDP	PA-O3A-PB-O3B
102	AX	503	GDP	C5'-O5'-PA-O3A
102	AX	503	GDP	C5'-O5'-PA-O1A
102	AX	503	GDP	C5'-O5'-PA-O2A

There are no ring outliers.

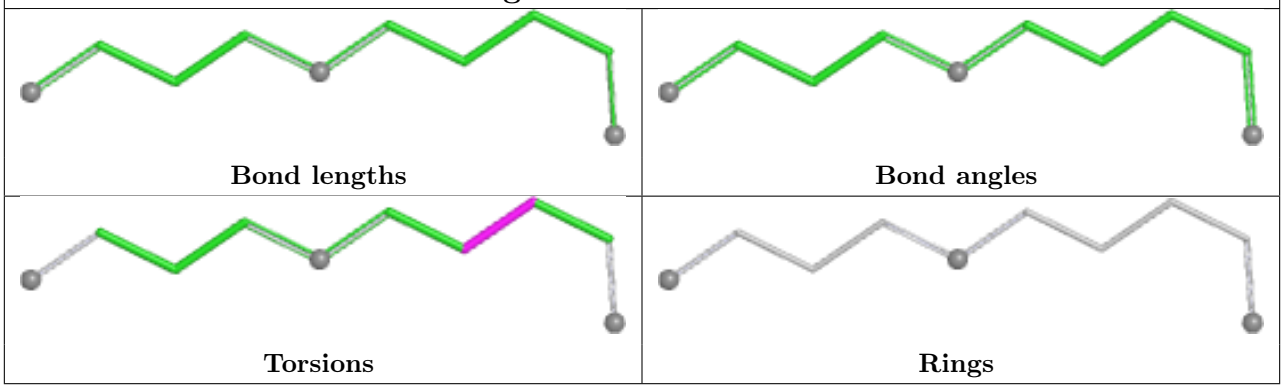
7 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
95	AA	1703	SPD	3	0
100	AA	1702	SPM	1	0
102	AX	503	GDP	1	0
98	r	201	FES	2	0
95	A	3302	SPD	1	0
99	AA	1701	NAD	1	0
103	B	101	VAL	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is

within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand SPD AA 1703



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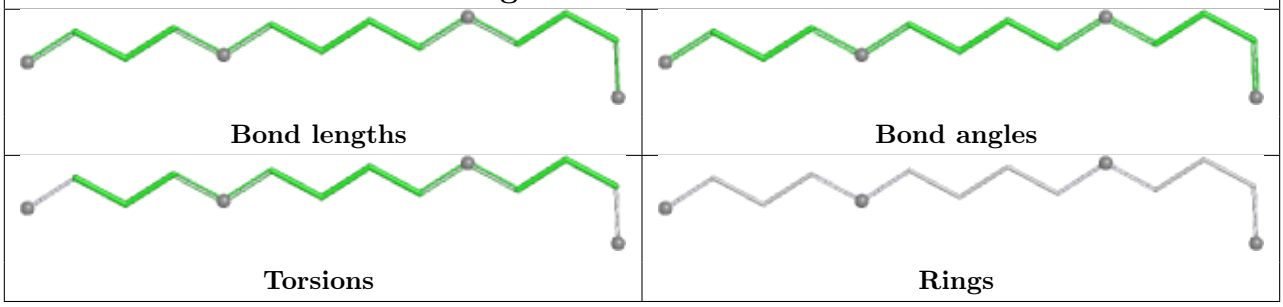
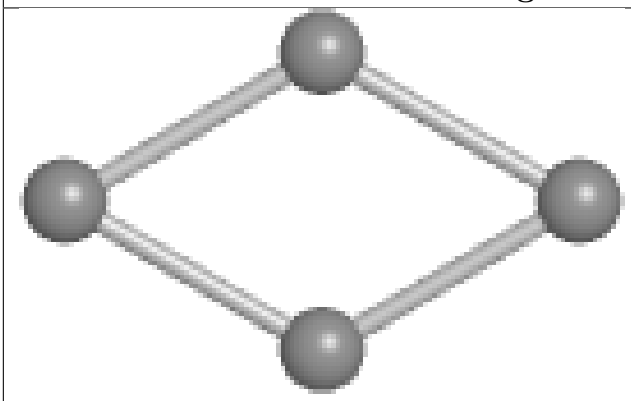


Ligand FES AT 201



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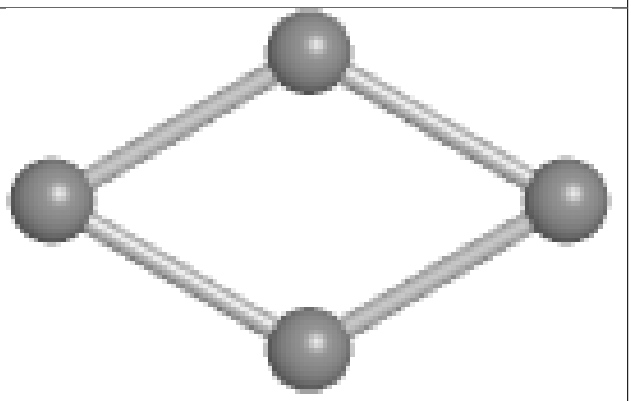
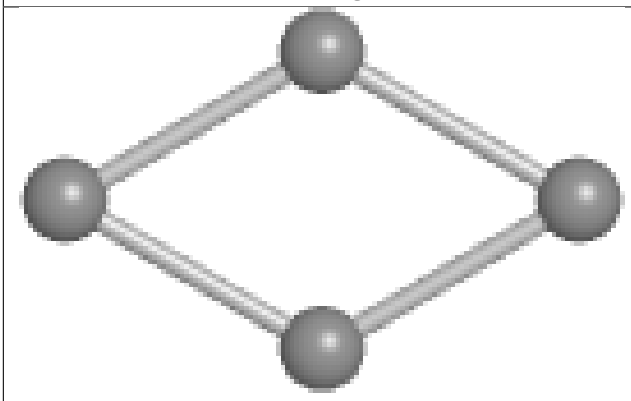
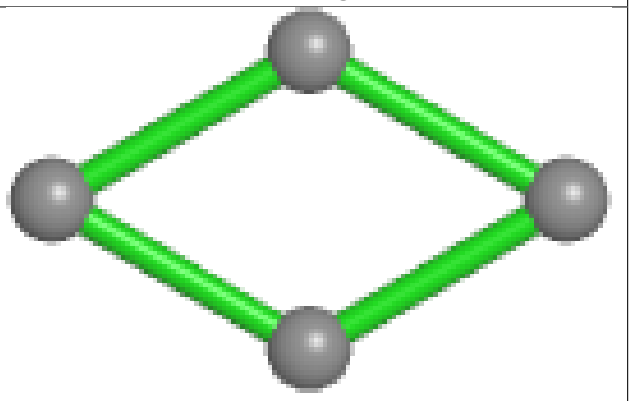


Bond angles

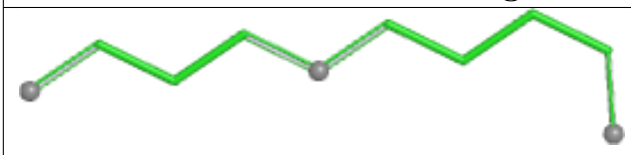


Torsions



Rings

Ligand SPD AA 1781



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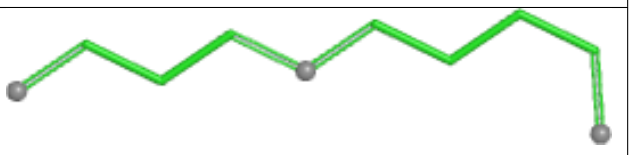

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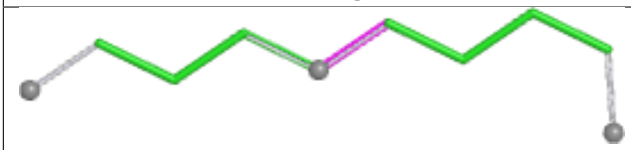

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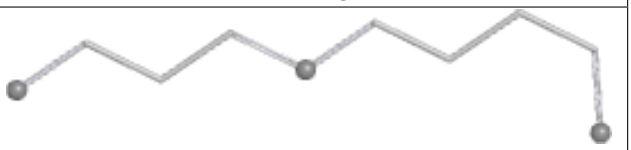
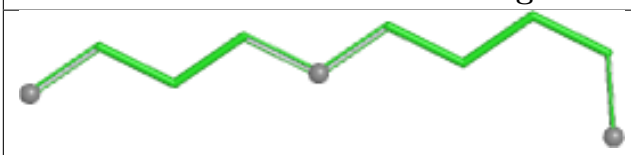


Rings

Ligand SPD A 3472



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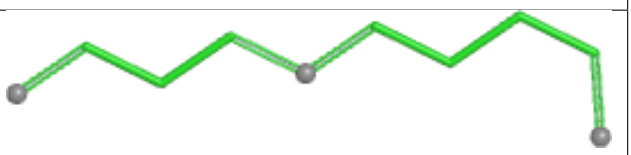

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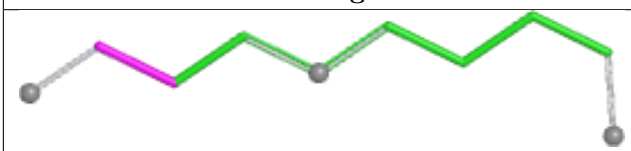

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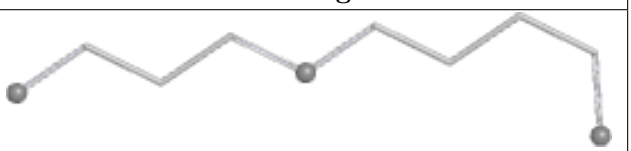
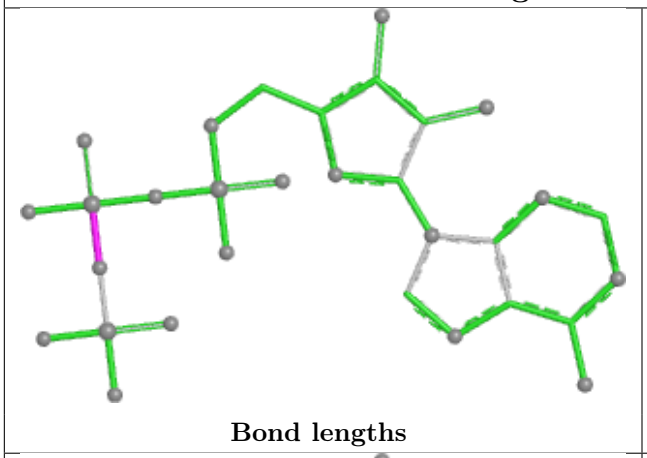


Rings

Ligand ATP AX 501



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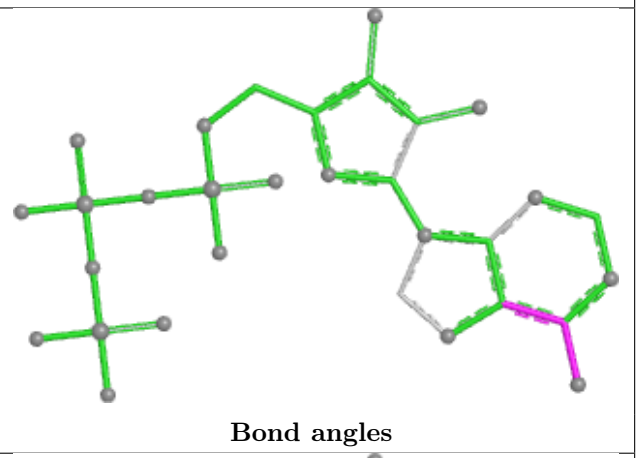

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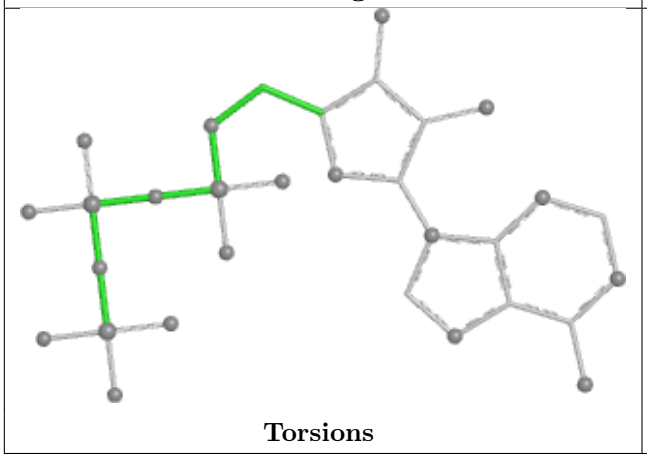

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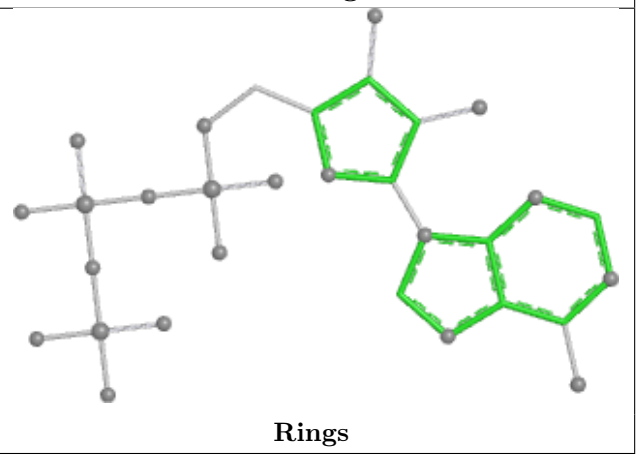

Rings

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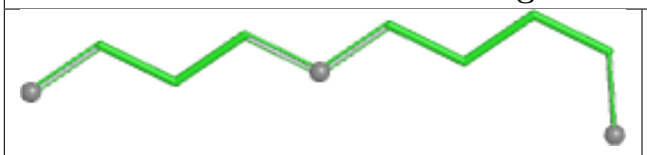

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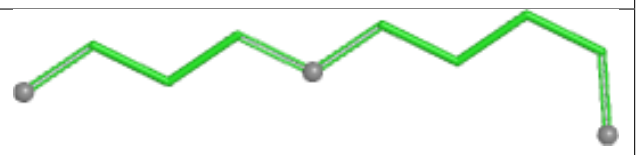

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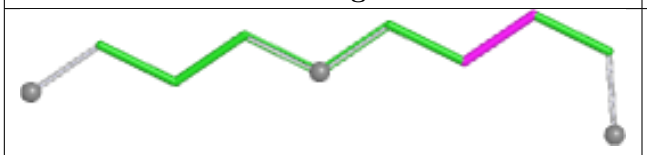

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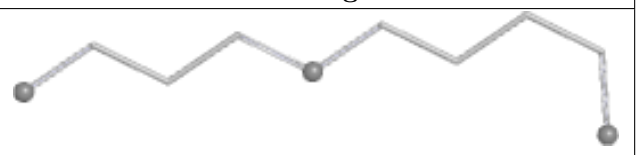
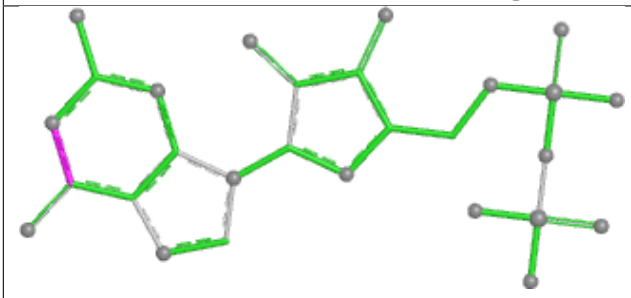


Rings

Ligand GDP AX 503



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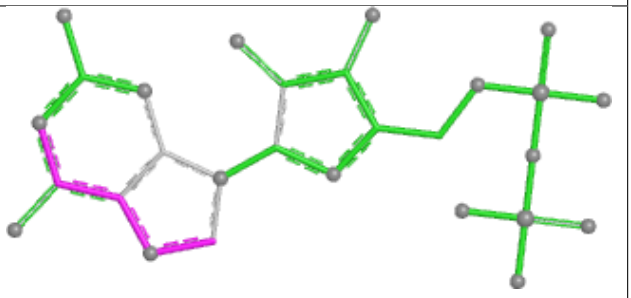
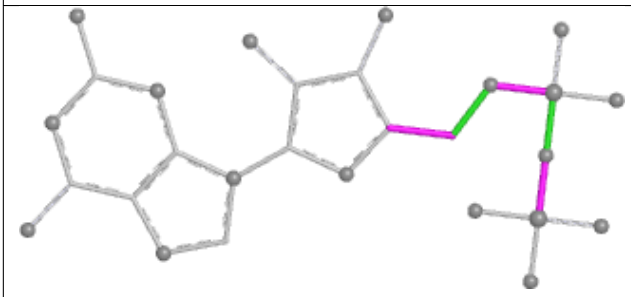


Bond angles



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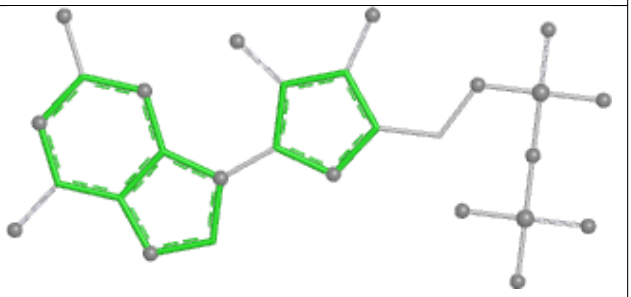
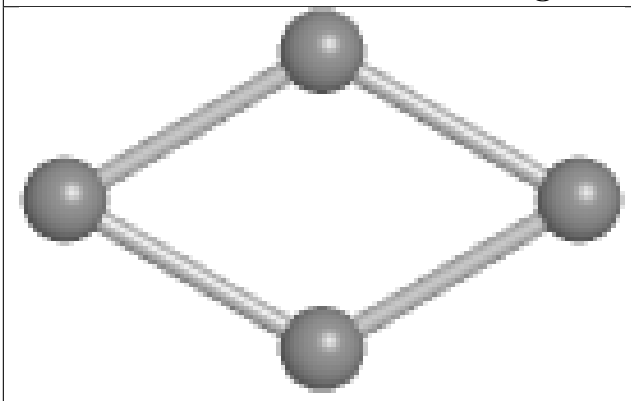


Rings

Ligand FES r 201



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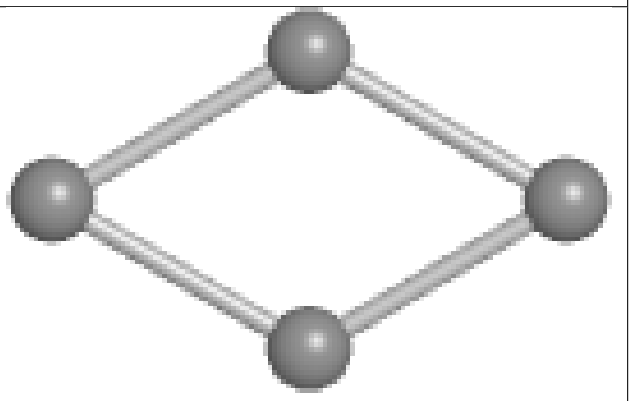
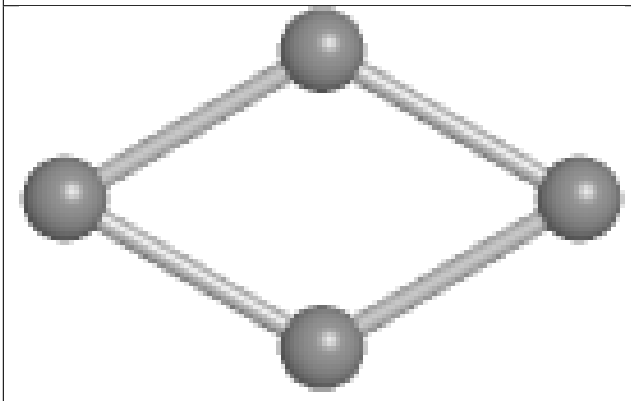


Bond angles



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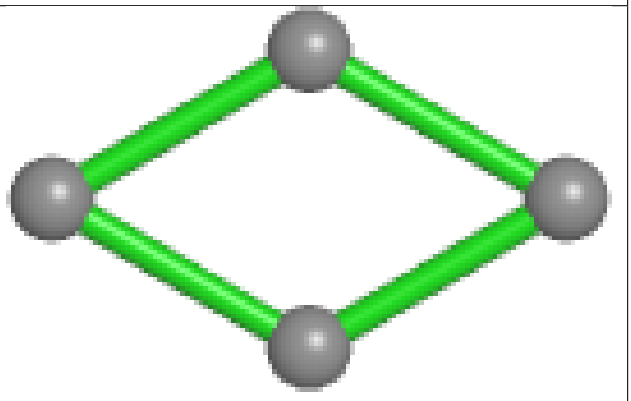
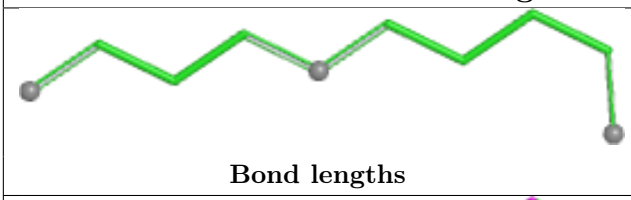
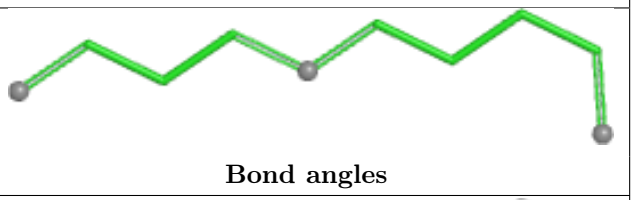


Rings

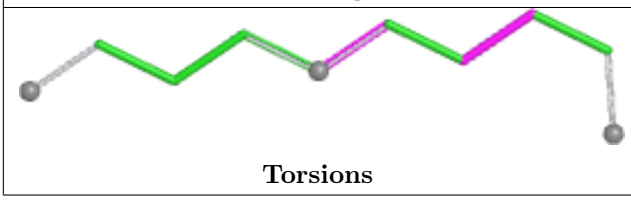
Ligand SPD A 3302



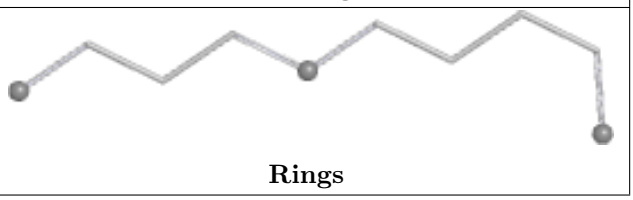
Bond lengths



Bond angles

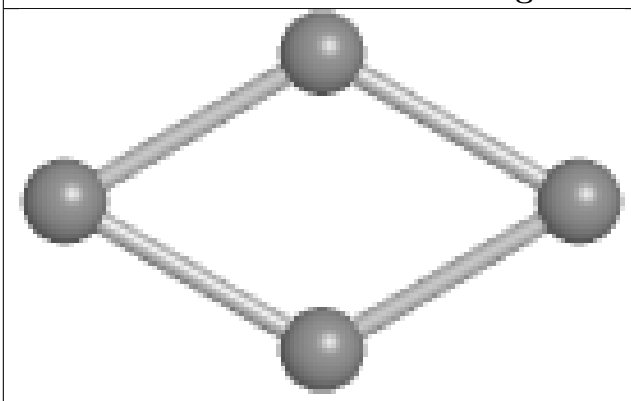


Torsions

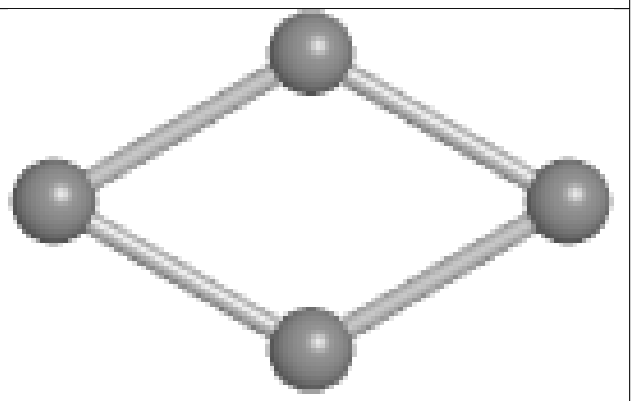


Rings

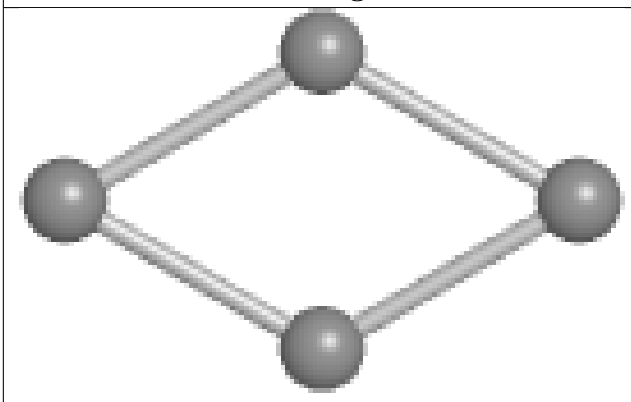
Ligand FES AP 201



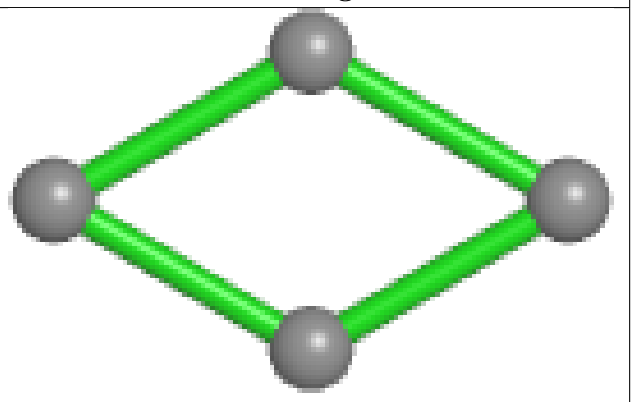
Bond lengths



Bond angles

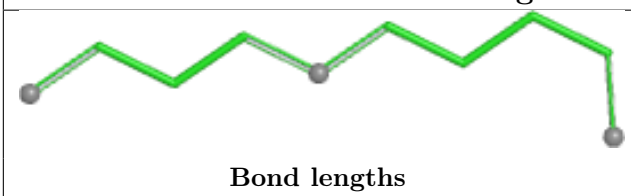


Torsions

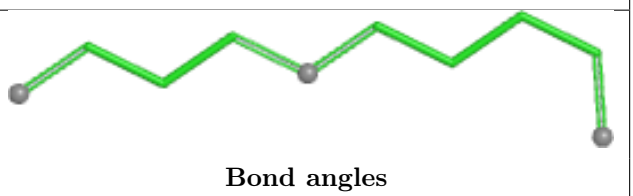


Rings

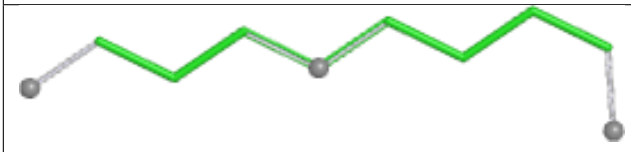
Ligand SPD A 3301



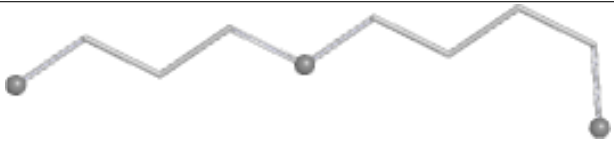
Bond lengths



Bond angles

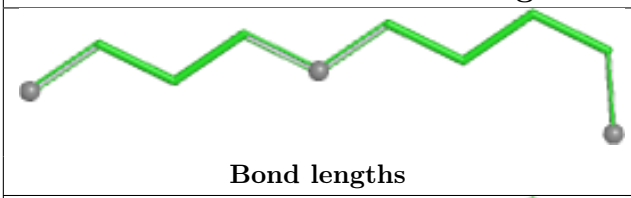


Torsions

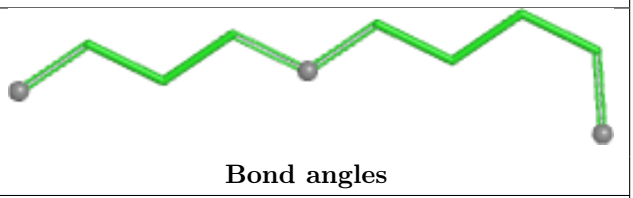


Rings

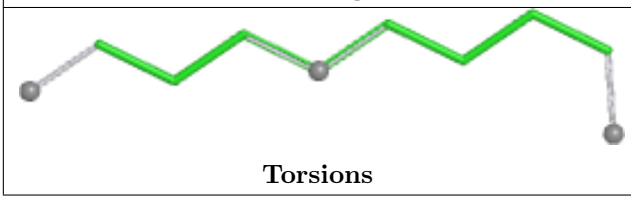
Ligand SPD A 3470



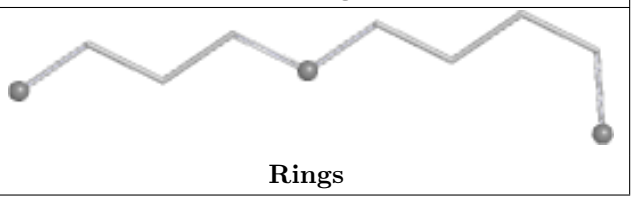
Bond lengths



Bond angles

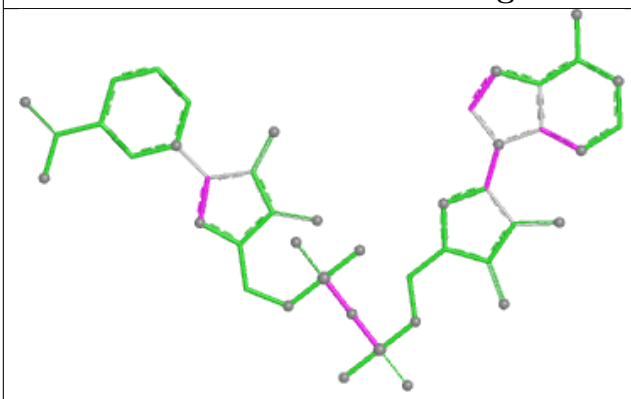


Torsions

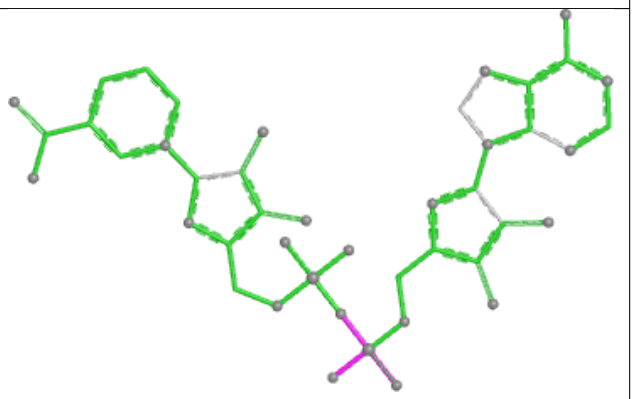


Rings

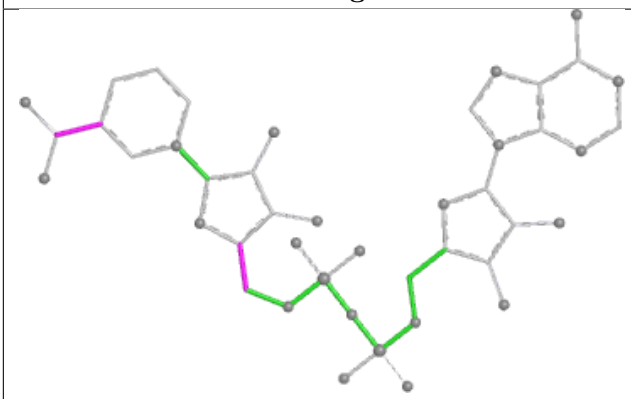
Ligand NAD AA 1701



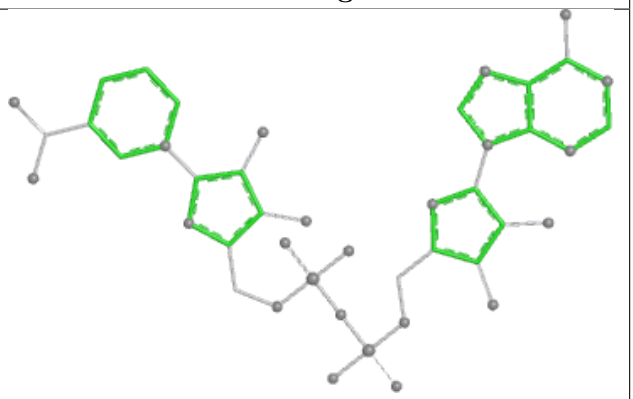
Bond lengths



Bond angles

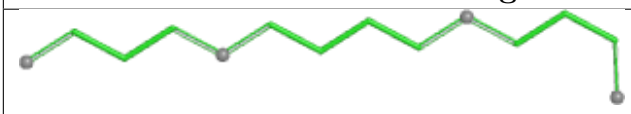


Torsions

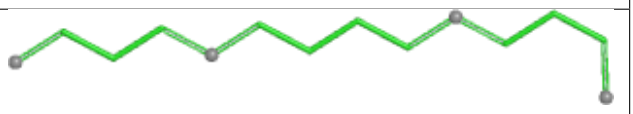


Rings

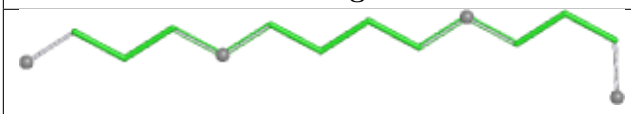
Ligand SPM AA 1779



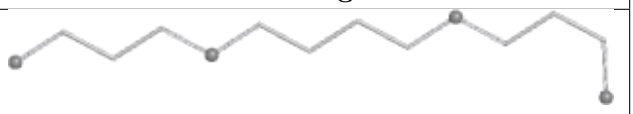
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
11	A	1
92	B	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	2357:C	O3’	2361:G	P	9.36
1	B	46:A	O3’	48:U	P	4.52

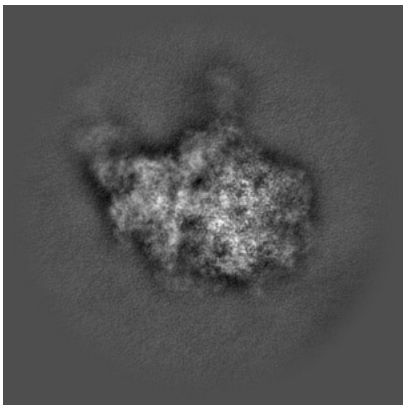
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-71825. These allow visual inspection of the internal detail of the map and identification of artifacts.

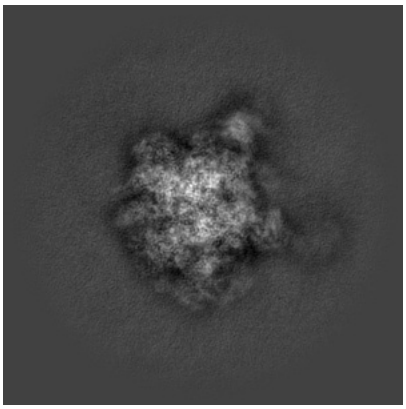
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

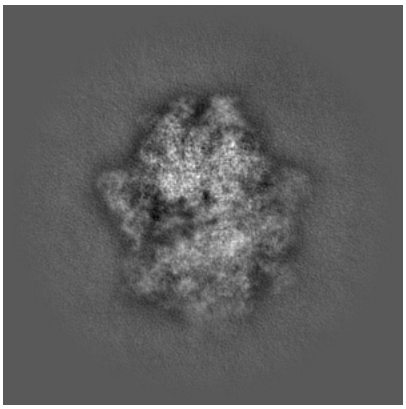
6.1.1 Primary map



X

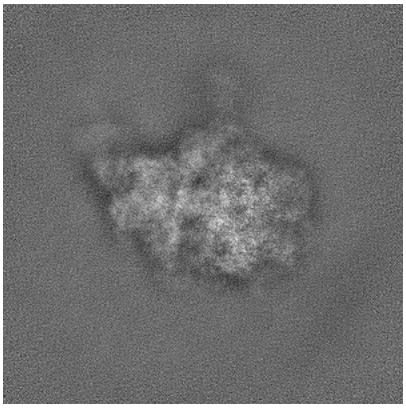


Y

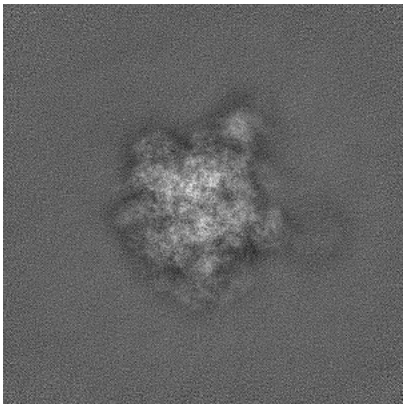


Z

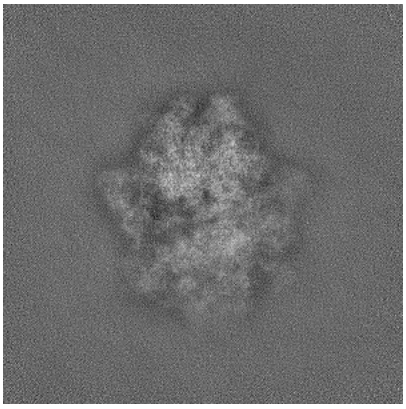
6.1.2 Raw map



X



Y

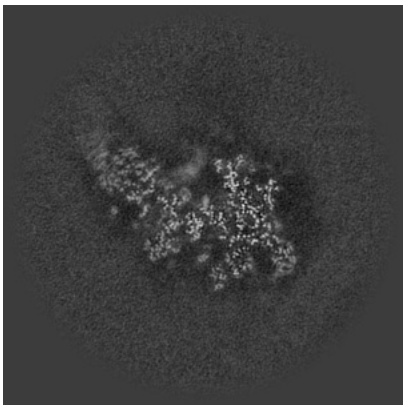


Z

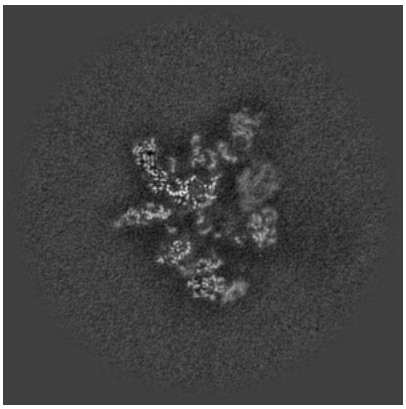
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

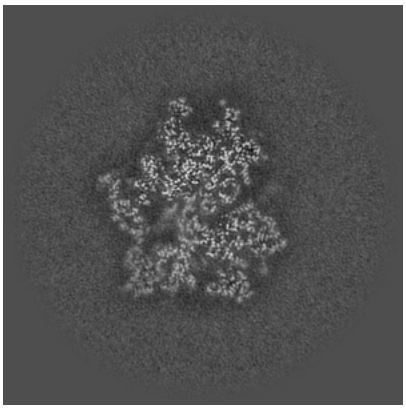
6.2.1 Primary map



X Index: 240

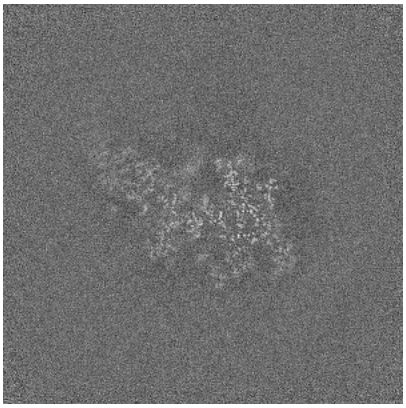


Y Index: 240

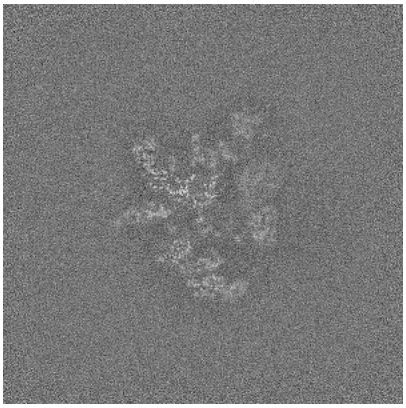


Z Index: 240

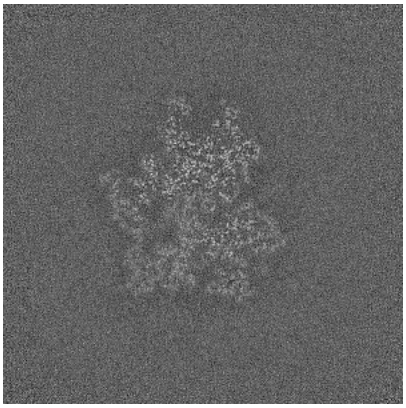
6.2.2 Raw map



X Index: 240



Y Index: 240

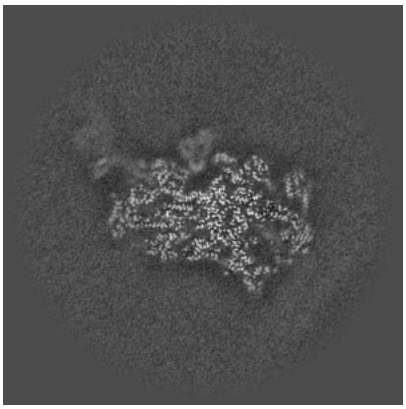


Z Index: 240

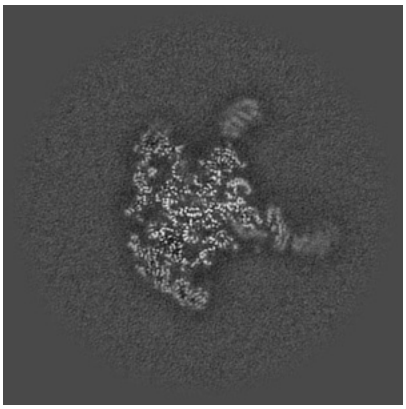
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

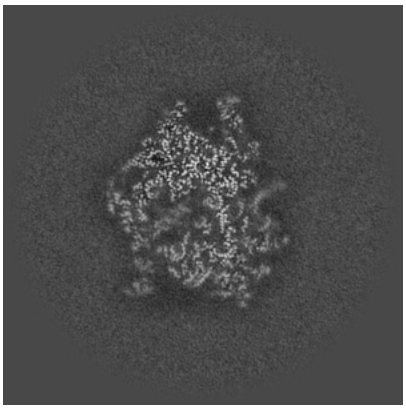
6.3.1 Primary map



X Index: 261

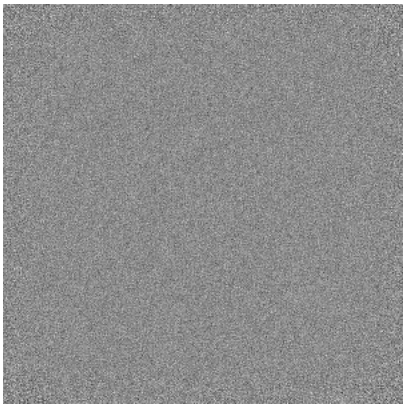


Y Index: 274

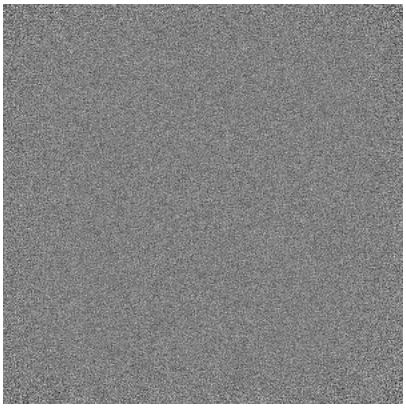


Z Index: 249

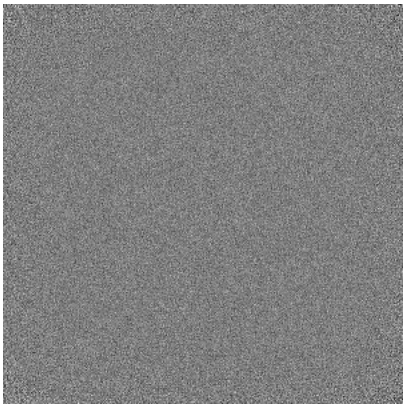
6.3.2 Raw map



X Index: 0



Y Index: 0

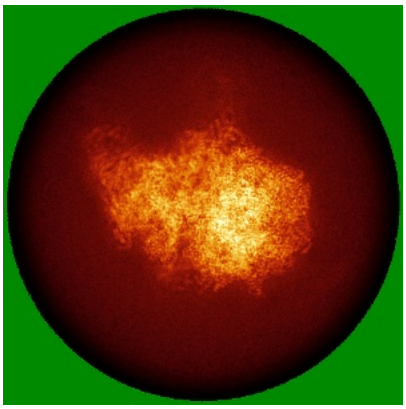


Z Index: 0

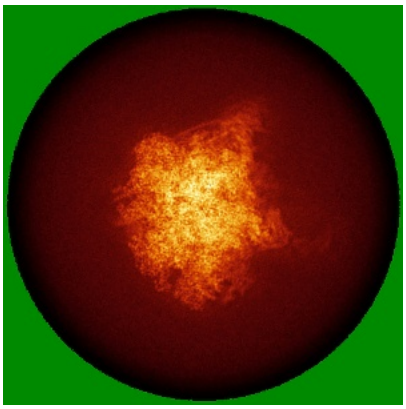
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

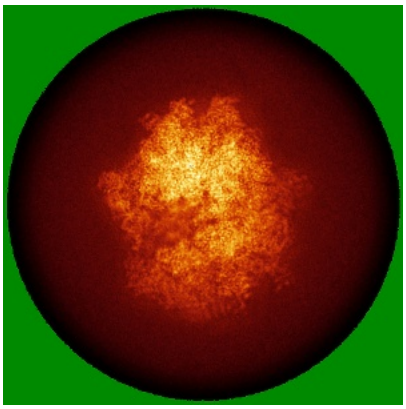
6.4.1 Primary map



X

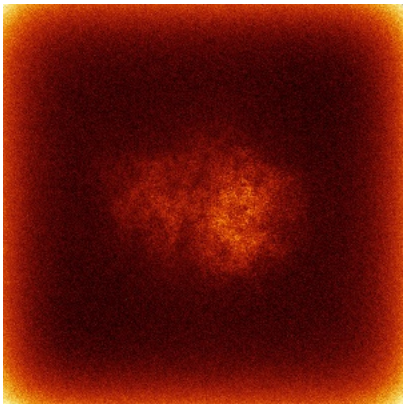


Y

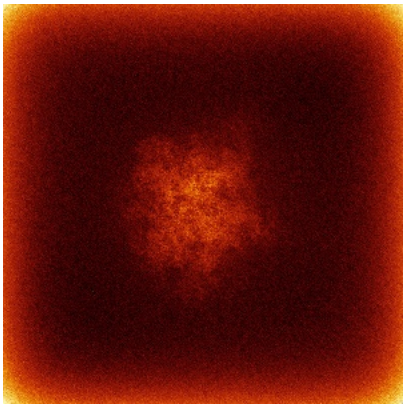


Z

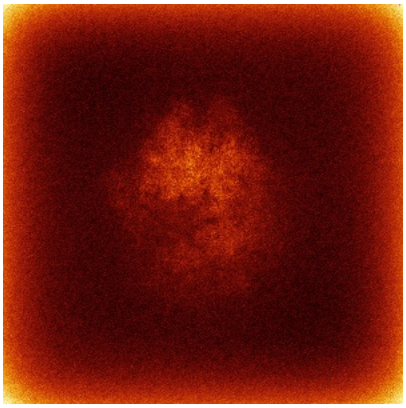
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.027. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X Y Z

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

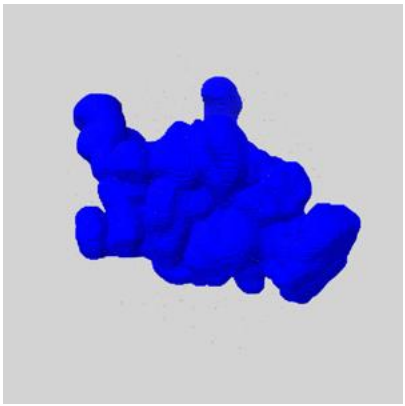
6.6 Mask visualisation (i)

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

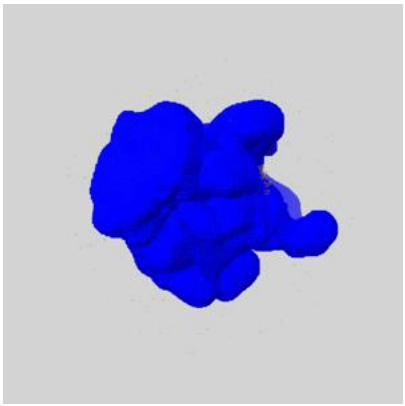
A mask typically either:

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

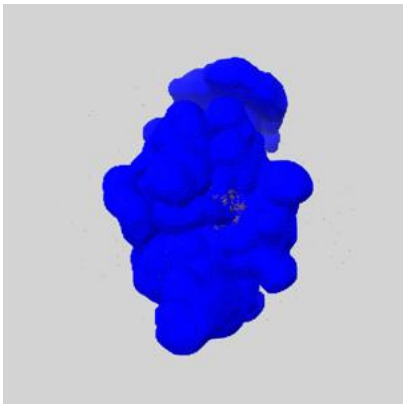
6.6.1 emd_71825_msk_1.map (i)



X



Y

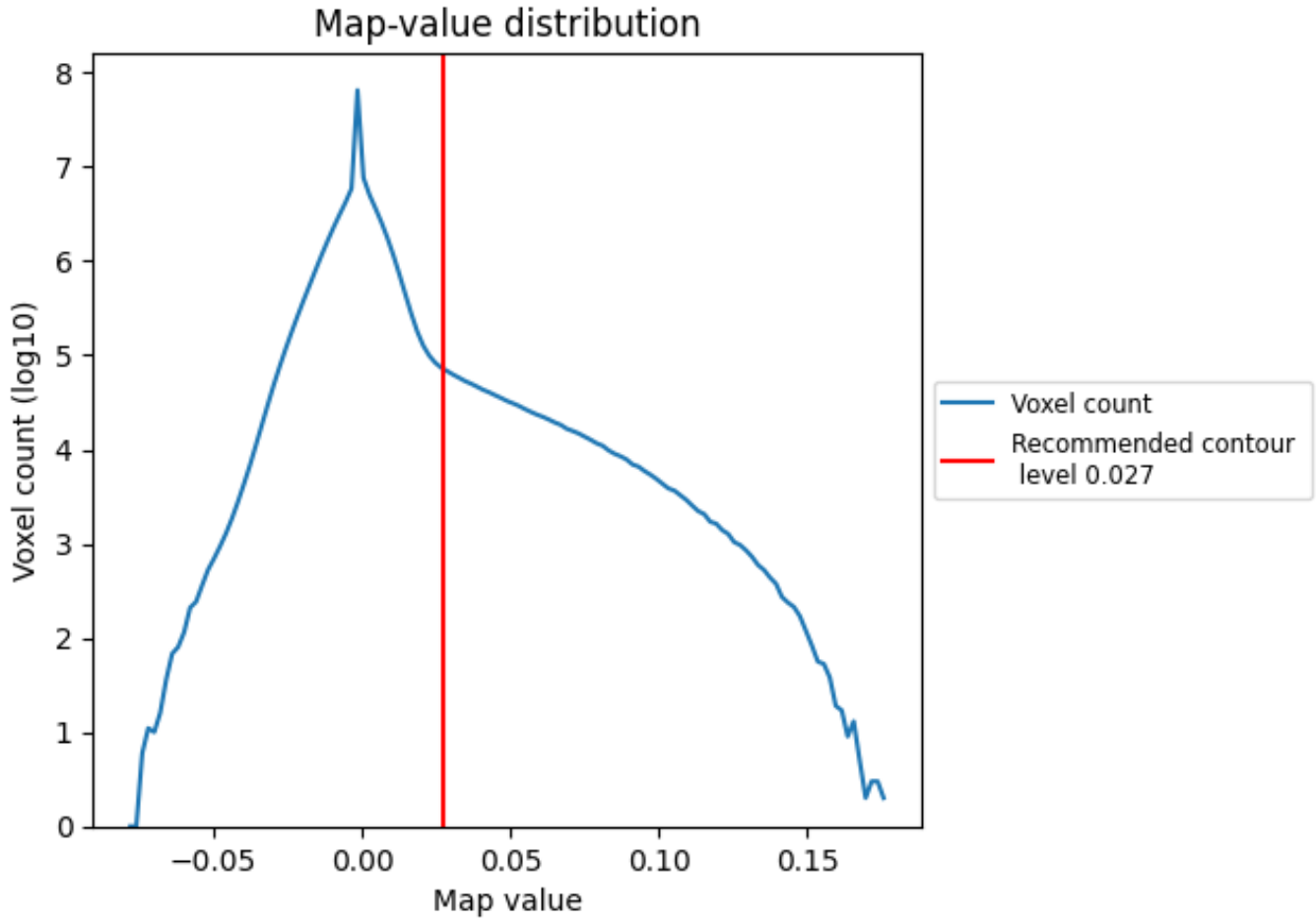


Z

7 Map analysis

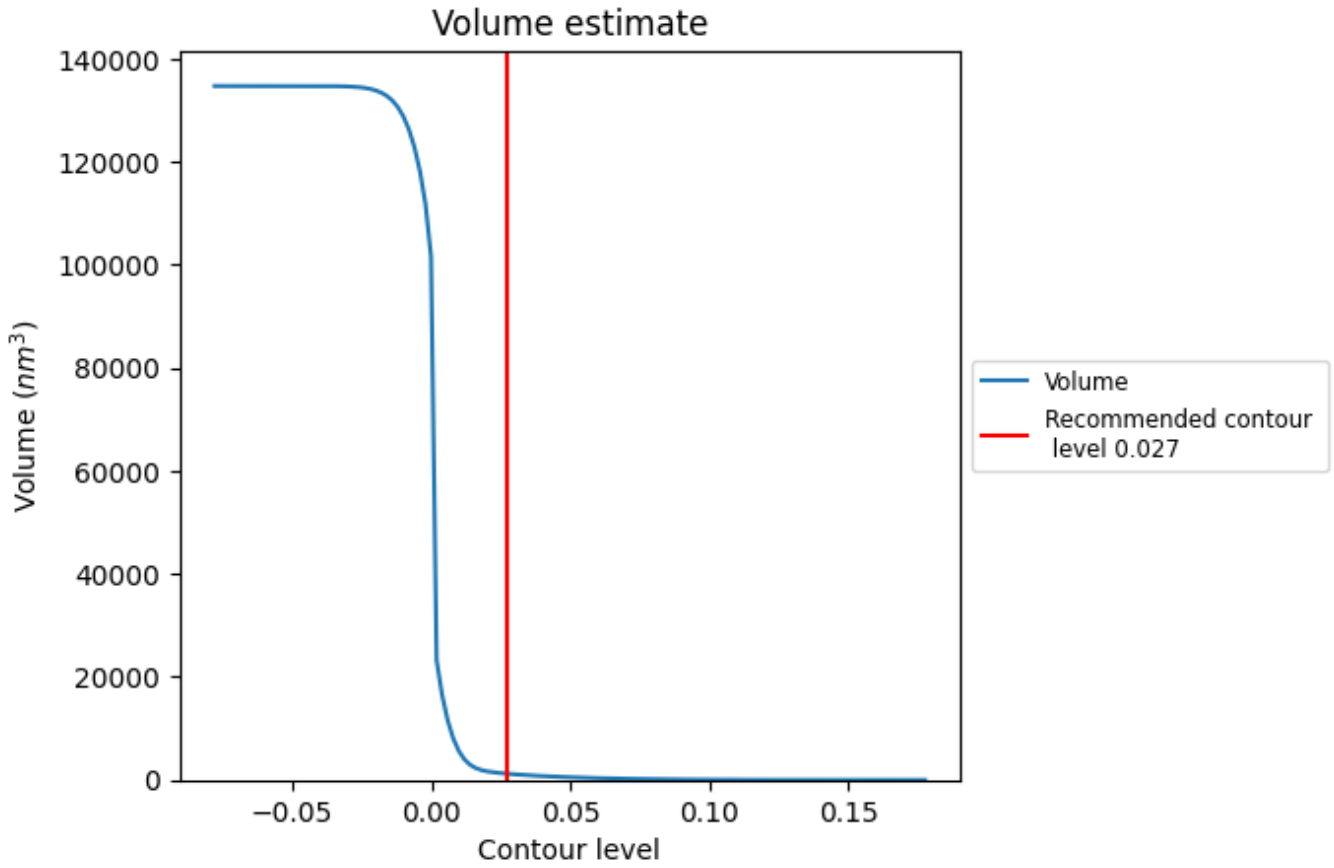
This section contains the results of statistical analysis of the map.

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.

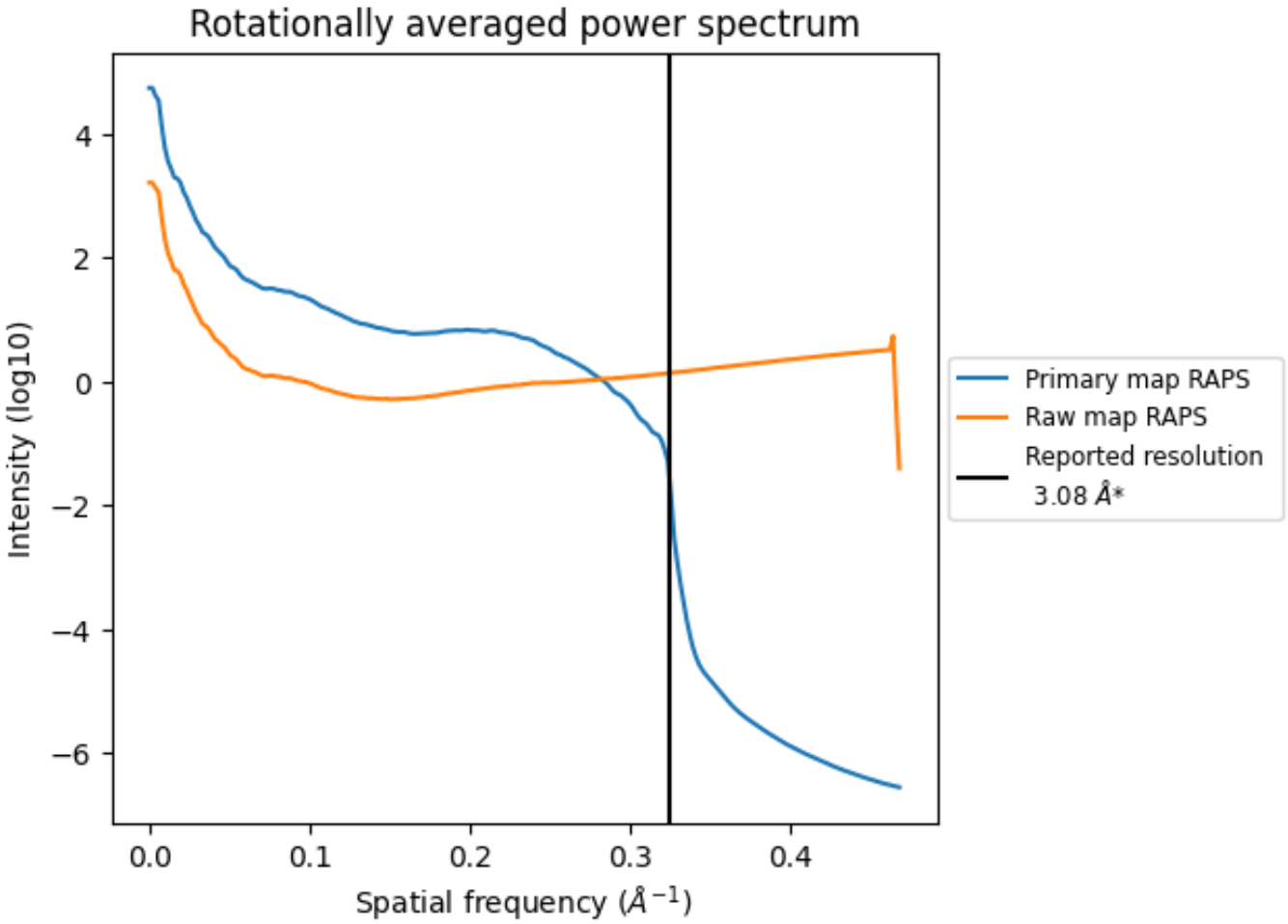
7.2 Volume estimate (i)



The volume at the recommended contour level is 1221 nm^3; this corresponds to an approximate mass of 1103 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)

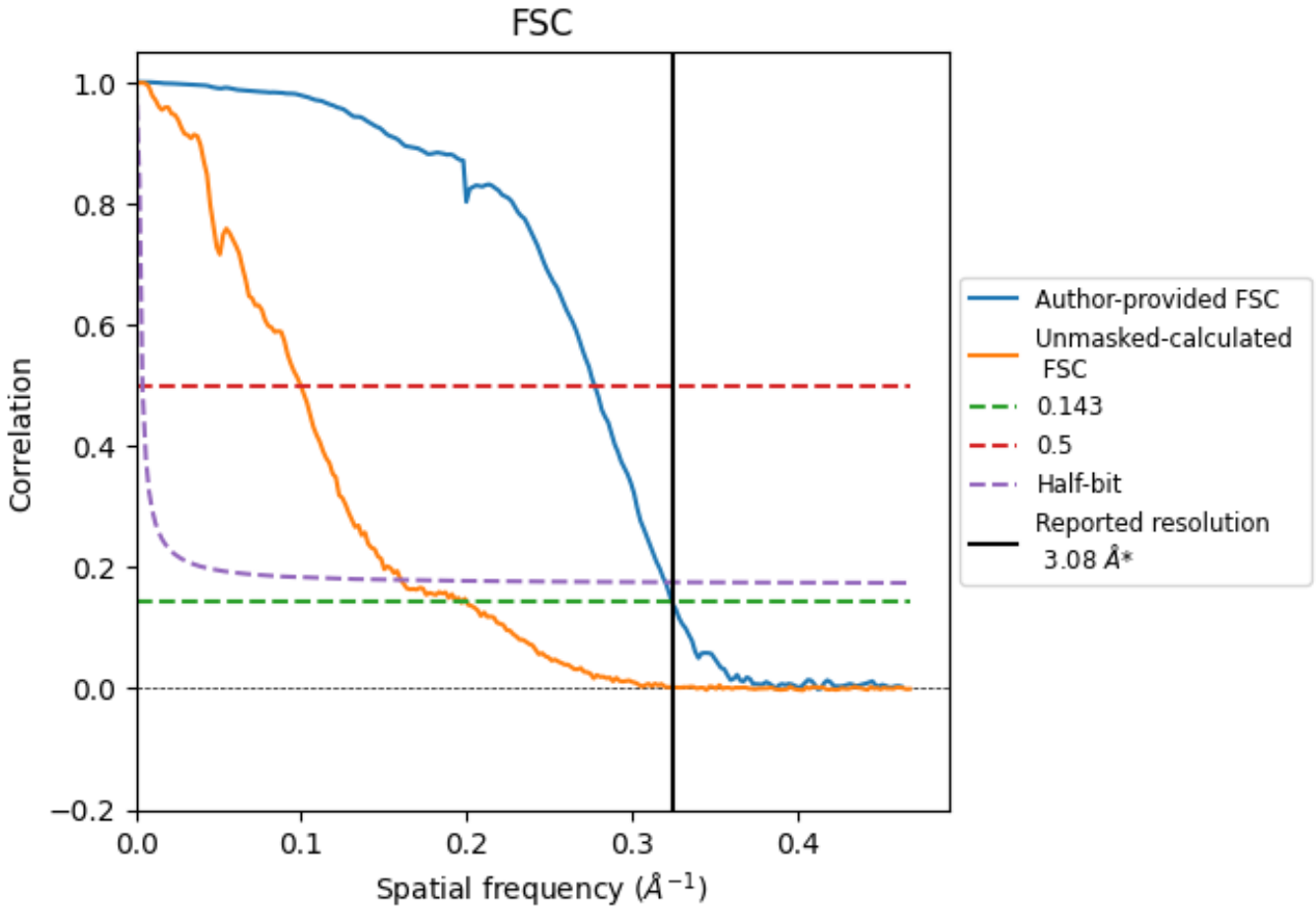


*Reported resolution corresponds to spatial frequency of 0.325 Å^{-1}

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 0.325 Å^{-1}

8.2 Resolution estimates (i)

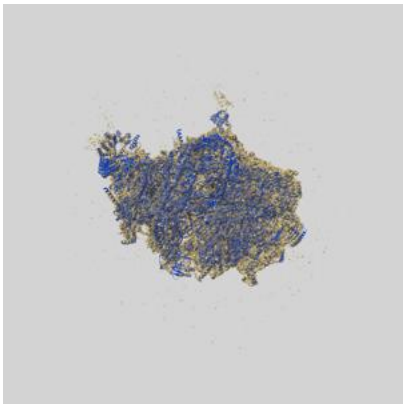
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.08	-	-
Author-provided FSC curve	3.08	3.60	3.12
Unmasked-calculated*	5.09	10.05	6.24

*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 5.09 differs from the reported value 3.08 by more than 10 %

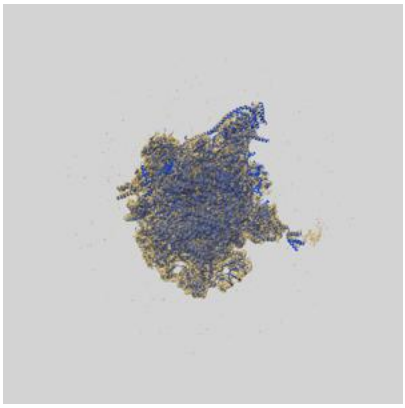
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-71825 and PDB model 9PS7. Per-residue inclusion information can be found in section 3 on page 28.

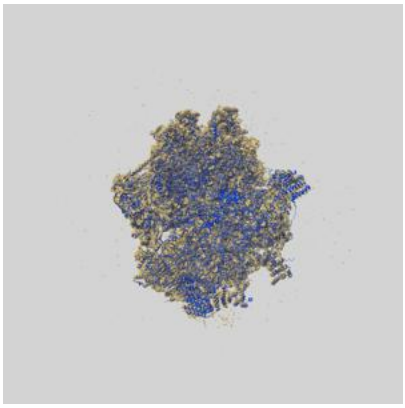
9.1 Map-model overlay



X



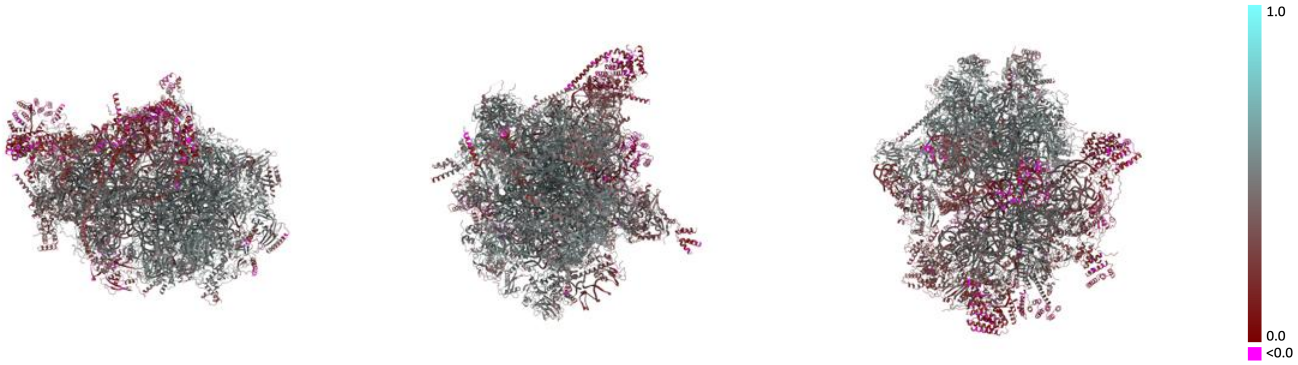
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.027 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

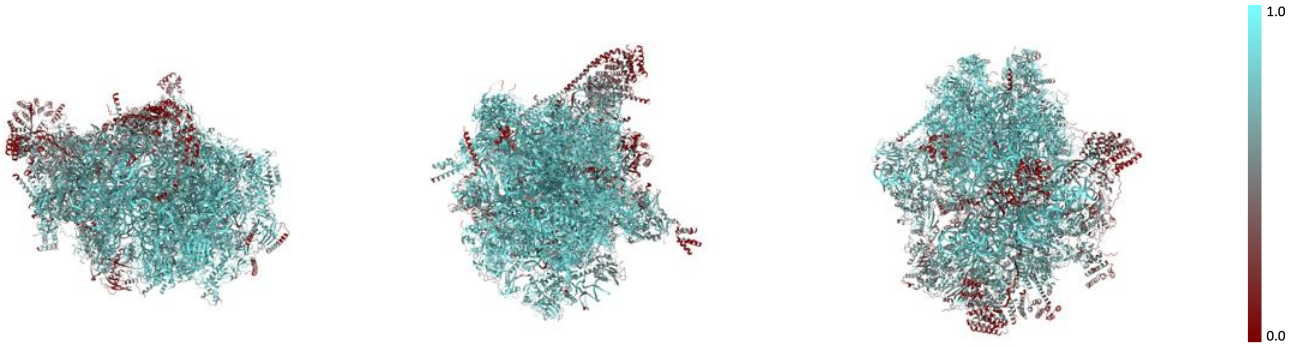
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

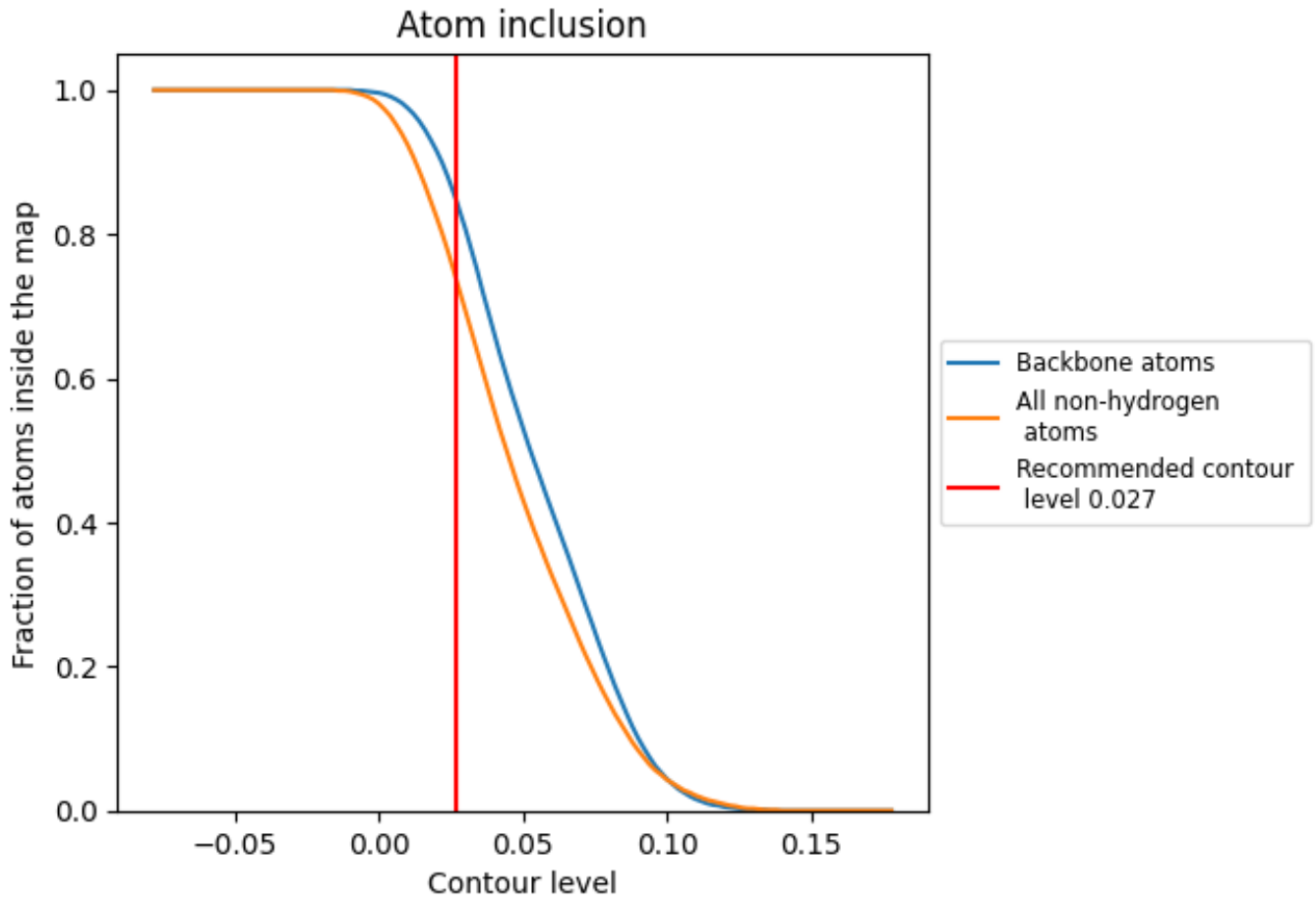
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.027).

9.4 Atom inclusion (i)



At the recommended contour level, 84% of all backbone atoms, 73% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.027) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7340	0.4120
0	0.8180	0.5060
1	0.7690	0.4840
2	0.9090	0.5400
3	0.8800	0.5400
4	0.8780	0.5340
5	0.8100	0.4900
6	0.7700	0.4530
7	0.7490	0.4480
8	0.5560	0.3400
9	0.8010	0.4810
A	0.9300	0.4870
A0	0.4300	0.2240
A1	0.5300	0.3090
A2	0.5930	0.3830
A3	0.7450	0.4750
A4	0.3240	0.1850
AA	0.9200	0.4440
AB	0.7110	0.4200
AC	0.6590	0.4250
AD	0.6380	0.4010
AE	0.7240	0.4630
AF	0.6530	0.3880
AG	0.6220	0.3670
AH	0.5870	0.3670
AI	0.7240	0.4500
AJ	0.6740	0.4290
AK	0.7480	0.4160
AL	0.6890	0.4150
AM	0.5230	0.2680
AN	0.6950	0.4330
AO	0.5360	0.3100
AP	0.7370	0.4550
AQ	0.7710	0.4670
AR	0.4350	0.2070

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Chain	Atom inclusion	Q-score
AS	0.6270	0.3500
AT	0.6620	0.3880
AU	0.5610	0.2740
AV	0.2660	0.1390
AW	0.6420	0.3960
AX	0.5620	0.3000
AY	0.5030	0.3030
AZ	0.5990	0.3410
Ag	0.1760	0.1110
Ah	0.4440	0.1410
Ax	0.8300	0.3690
Ay	0.6590	0.2260
Az	0.3830	0.2510
B	0.8080	0.3420
D	0.8550	0.5280
E	0.8210	0.5110
F	0.8500	0.5220
H	0.4630	0.2930
I	0.6130	0.3760
J	0.5370	0.2910
K	0.8660	0.5170
L	0.8300	0.5220
M	0.8350	0.5150
N	0.8240	0.5120
O	0.8210	0.5070
OX	0.3770	0.2410
P	0.8050	0.4880
Q	0.7400	0.4690
R	0.8510	0.5190
S	0.8190	0.5140
T	0.8410	0.5310
U	0.7300	0.4570
V	0.7750	0.4590
W	0.8640	0.5330
X	0.7960	0.4880
Y	0.8330	0.4940
Z	0.8340	0.5220
a	0.6950	0.4390
b	0.8420	0.5170
c	0.7720	0.4750
d	0.6260	0.4190
e	0.5400	0.3060

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Chain	Atom inclusion	Q-score
f	0.6680	0.4010
g	0.8150	0.5050
h	0.7470	0.4480
i	0.8780	0.5290
j	0.7920	0.4600
k	0.6430	0.3970
l	0.5680	0.3350
m	0.5300	0.3160
n	0.3810	0.2780
o	0.8740	0.5320
p	0.6590	0.4160
q	0.5960	0.3460
r	0.8280	0.5040
s	0.8120	0.4900
t	0.2410	0.1860
u	0.2190	0.1780
z	0.1080	0.0950