



Full wwPDB EM Validation Report ⓘ

Dec 17, 2022 – 09:26 pm GMT

PDB ID : 6ZM6
EMDB ID : EMD-11279
Title : Human mitochondrial ribosome in complex with mRNA, A/A tRNA and P/P tRNA
Authors : Itoh, Y.; Andrell, J.; Amunts, A.
Deposited on : 2020-07-01
Resolution : 2.59 Å(reported)
Based on initial models : 5OOL, 3J9M, 6RW4

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

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

A user guide is available at

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

The types of validation reports are described at

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

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

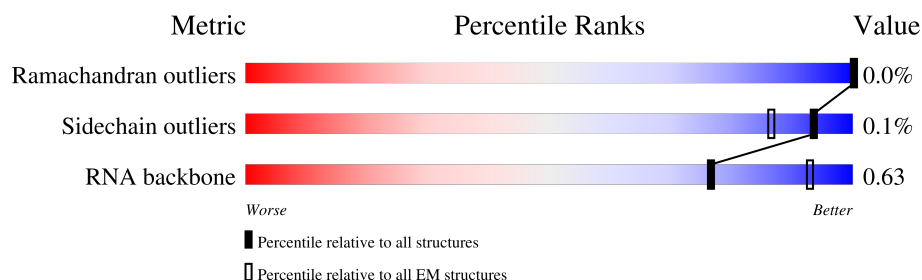
EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

1 Overall quality at a glance

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

The reported resolution of this entry is 2.59 Å.

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




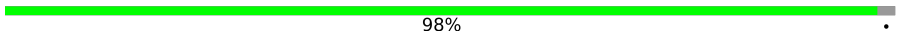



















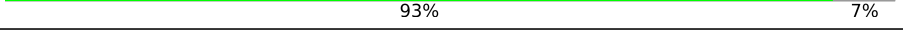



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	1561	
2	B	72	
3	D	305	
4	E	348	
5	F	311	
6	H	267	
7	I	261	
8	J	192	
9	K	177	














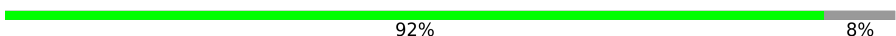











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Mol	Chain	Length	Quality of chain
10	L	145	
11	M	296	
12	N	251	
13	O	175	
14	P	180	
15	Q	292	
16	R	149	
17	S	205	
18	T	206	
19	U	152	
20	V	216	
21	W	148	
22	X	256	
23	Y	250	
24	Z	161	
25	0	188	
26	1	65	
27	2	92	
28	3	188	
29	4	103	
30	5	423	
31	6	380	
32	7	338	
33	8	206	
34	9	137	




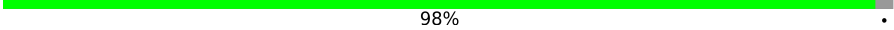







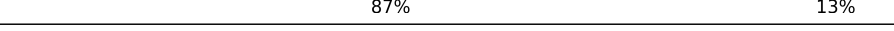



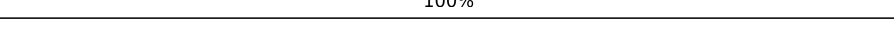


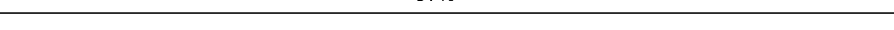
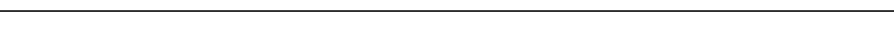

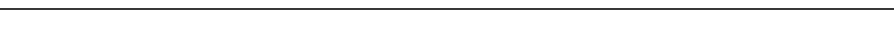
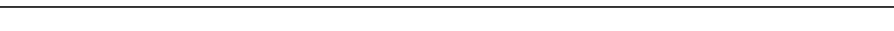


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Mol	Chain	Length	Quality of chain
35	a	142	 70%30%
36	b	214	 70%30%
37	c	332	 86%14%
38	d	306	 84%15%
39	e	279	 82%18%
40	f	212	 74%26%
41	g	166	 81%19%
42	h	158	 70%30%
43	i	128	 76%24%
44	j	123	 76%24%
45	k	111	 91%9%
46	l	138	 59%41%
47	m	128	 68%32%
48	o	102	 92%8%
49	p	206	 71%29%
50	q	222	 73%27%
51	r	196	 82%17%
52	s	439	 88%12%
53	t1	198	 23%77%
53	t2	198	 16%84%
53	t3	198	 16%84%
53	t4	198	 16%84%
53	t5	198	 16%84%
53	t6	198	 16%84%
54	AA	954	 87%13%

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Mol	Chain	Length	Quality of chain
55	AB	296	
56	AC	167	
57	AD	430	
58	AE	125	
59	AF	242	
60	AG	396	
61	AH	201	
62	AI	194	
63	AJ	138	
64	AK	128	
65	AL	257	
66	AM	137	
67	AN	130	
68	AO	258	
69	AP	142	
70	AQ	86	
71	AR	360	
72	AS	190	
73	AT	173	
74	AU	205	
75	AV	414	
76	AW	187	
77	AX	398	
78	AY	395	
79	AZ	106	

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Mol	Chain	Length	Quality of chain
80	A0	218	 99%
81	A1	323	 85% 15%
82	A2	117	 100%
83	A3	199	 35% 65%
84	A4	689	 85% 15%
85	w	68	 75% 25%
86	x	70	 86% 14%
87	y	19	 89% 11%

2 Entry composition

There are 94 unique types of molecules in this entry. The entry contains 326225 atoms, of which 149469 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 RNA chain called 16S mitochondrial rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	1531	Total	C	H	N	O	P	0	0
			48997	14583	16499	5859	10525	1531		

- Molecule 2 is a RNA chain called mitochondrial tRNAVal.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	B	72	Total	C	H	N	O	P	0	0
			2298	683	776	269	498	72		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1671	C	G	conflict	GB 1858624630
B	1673	A	U	conflict	GB 1858624630

- Molecule 3 is a protein called 39S ribosomal protein L2, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
3	D	238	Total	C	H	N	O	S	0	0
			3780	1157	1921	376	317	9		

- Molecule 4 is a protein called 39S ribosomal protein L3, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
4	E	305	Total	C	H	N	O	S	0	0
			4823	1545	2417	418	432	11		

- Molecule 5 is a protein called 39S ribosomal protein L4, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
5	F	252	Total	C	H	N	O	S	0	0
			4097	1305	2066	370	350	6		

- Molecule 6 is a protein called 39S ribosomal protein L9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	H	97	Total	C	H	N	O	0	0
			1649	508	847	155	139		

- Molecule 7 is a protein called 39S ribosomal protein L10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	I	212	Total	C	H	N	O S	0	0
			3481	1088	1786	304	292 11		

- Molecule 8 is a protein called 39S ribosomal protein L11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	J	175	Total	C	H	N	O S	0	0
			2739	847	1409	237	244 2		

- Molecule 9 is a protein called 39S ribosomal protein L13, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	K	177	Total	C	H	N	O S	0	0
			2909	936	1454	259	253 7		

- Molecule 10 is a protein called 39S ribosomal protein L14, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	L	115	Total	C	H	N	O S	0	0
			1832	559	942	171	155 5		

- Molecule 11 is a protein called 39S ribosomal protein L15, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	M	291	Total	C	H	N	O S	0	0
			4723	1483	2396	430	408 6		

- Molecule 12 is a protein called 39S ribosomal protein L16, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	N	222	Total	C	H	N	O S	0	0
			3605	1143	1819	326	307 10		

- Molecule 13 is a protein called 39S ribosomal protein L17, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
13	O	154	Total	C	H	N	O	S	0	0
			2554	792	1295	241	219	7		

- Molecule 14 is a protein called 39S ribosomal protein L18, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
14	P	144	Total	C	H	N	O	S	0	0
			2339	733	1166	224	211	5		

- Molecule 15 is a protein called 39S ribosomal protein L19, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
15	Q	238	Total	C	H	N	O	S	0	0
			4002	1268	2023	352	350	9		

- Molecule 16 is a protein called 39S ribosomal protein L20, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
16	R	140	Total	C	H	N	O	S	0	0
			2369	732	1215	231	187	4		

- Molecule 17 is a protein called 39S ribosomal protein L21, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
17	S	161	Total	C	H	N	O	S	0	0
			2659	835	1366	227	227	4		

- Molecule 18 is a protein called 39S ribosomal protein L22, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
18	T	166	Total	C	H	N	O	S	0	0
			2780	875	1411	254	233	7		

- Molecule 19 is a protein called 39S ribosomal protein L23, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
19	U	152	Total	C	H	N	O	S	0	0
			2483	788	1232	234	226	3		

- Molecule 20 is a protein called 39S ribosomal protein L24, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
20	V	205	Total	C	H	N	O	S	0	0
			3364	1068	1688	298	302	8		

- Molecule 21 is a protein called 39S ribosomal protein L27, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
21	W	116	Total	C	H	N	O	S	0	0
			1841	577	937	171	153	3		

- Molecule 22 is a protein called 39S ribosomal protein L28, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
22	X	244	Total	C	H	N	O	S	0	0
			4105	1322	2061	352	365	5		

- Molecule 23 is a protein called 39S ribosomal protein L47, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
23	Y	181	Total	C	H	N	O	S	0	0
			3154	995	1598	298	259	4		

- Molecule 24 is a protein called 39S ribosomal protein L30, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
24	Z	122	Total	C	H	N	O	S	0	0
			2041	636	1045	186	171	3		

- Molecule 25 is a protein called 39S ribosomal protein L32, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
25	0	110	Total	C	H	N	O	S	0	0
			1815	554	917	176	162	6		

- Molecule 26 is a protein called 39S ribosomal protein L33, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
26	1	55	Total	C	H	N	O	S	0	0
			954	290	499	87	76	2		

- Molecule 27 is a protein called 39S ribosomal protein L34, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
27	2	46	Total	C	H	N	O	S	0	0
			784	233	407	83	60	1		

- Molecule 28 is a protein called 39S ribosomal protein L35, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
28	3	95	Total	C	H	N	O	S	0	0
			1716	539	884	162	128	3		

- Molecule 29 is a protein called 39S ribosomal protein L36, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
29	4	38	Total	C	H	N	O	S	0	0
			704	217	362	72	49	4		

- Molecule 30 is a protein called 39S ribosomal protein L37, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
30	5	394	Total	C	H	N	O	S	0	0
			6418	2073	3208	560	566	11		

- Molecule 31 is a protein called 39S ribosomal protein L38, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
31	6	354	Total	C	H	N	O	S	0	0
			5792	1881	2844	525	533	9		

- Molecule 32 is a protein called 39S ribosomal protein L39, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
32	7	294	Total	C	H	N	O	S	0	0
			4789	1529	2399	405	438	18		

- Molecule 33 is a protein called 39S ribosomal protein L40, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
33	8	157	Total	C	H	N	O	S	0	0
			2696	844	1369	235	246	2		

- Molecule 34 is a protein called 39S ribosomal protein L41, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
34	9	124	Total	C	H	N	O	S	0	0
			1985	644	988	170	181	2		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
35	a	100	Total	C	H	N	O	S	0	0
			1652	529	812	152	154	5		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
36	b	150	Total	C	H	N	O	S	0	0
			2392	744	1196	231	218	3		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
37	c	286	Total	C	H	N	O	S	0	0
			4621	1470	2322	397	423	9		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
38	d	259	Total	C	H	N	O	S	0	0
			4253	1357	2129	369	384	14		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
39	e	228	Total	C	H	N	O	S	0	0
			3699	1174	1851	326	342	6		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
40	f	157	Total	C	H	N	O	S	0	0
			2523	799	1271	207	242	4		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
41	g	134	Total	C	H	N	O	S	0	0
			2210	719	1097	193	199	2		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
42	h	110	Total	C	H	N	O	S	0	0
			1777	568	882	156	168	3		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
43	i	97	Total	C	H	N	O	S	0	0
			1687	532	859	165	127	4		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
44	j	94	Total	C	H	N	O	S	0	0
			1492	463	747	144	136	2		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
45	k	101	Total	C	H	N	O	S	0	0
			1558	479	784	148	142	5		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
46	l	82	Total	C	H	N	O	S	0	0
			1363	437	675	120	128	3		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
47	m	87	Total	C	H	N	O	S	0	0
			1515	466	761	152	134	2		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
48	o	94	Total	C	H	N	O	S	0	0
			1605	501	807	165	129	3		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
49	p	147	Total	C	H	N	O	S	0	0
			2431	748	1226	228	225	4		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
50	q	161	Total	C	H	N	O	S	0	0
			2678	841	1328	260	244	5		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
51	r	162	Total	C	H	N	O	S	0	0
			2671	839	1349	252	223	8		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
52	s	386	Total	C	H	N	O	S	0	0
			6298	2023	3143	559	559	14		

- Molecule 53 is a protein called 39S ribosomal protein L12, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	t1	46	Total	C	H	N	O	0	0
			732	228	378	56	70		
53	t2	32	Total	C	H	N	O	0	0
			541	168	284	40	49		
53	t3	32	Total	C	H	N	O	0	0
			541	168	284	40	49		
53	t4	31	Total	C	H	N	O	0	0
			520	159	275	39	47		
53	t5	31	Total	C	H	N	O	0	0
			520	159	275	39	47		
53	t6	31	Total	C	H	N	O	0	0
			520	159	275	39	47		

- Molecule 54 is a RNA chain called 12S mitochondrial rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
54	AA	954	Total	C	H	N	O	P	0	0
			30542	9081	10289	3647	6571	954		

- Molecule 55 is a protein called 28S ribosomal protein S2, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
55	AB	225	Total	C	H	N	O	S	0	0
			3644	1164	1816	331	323	10		

- Molecule 56 is a protein called 28S ribosomal protein S24, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
56	AC	132	Total	C	H	N	O	S	0	0
			2172	699	1089	195	185	4		

- Molecule 57 is a protein called 28S ribosomal protein S5, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
57	AD	343	Total	C	H	N	O	S	0	0
			5536	1713	2805	518	487	13		

- Molecule 58 is a protein called 28S ribosomal protein S6, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
58	AE	122	Total	C	H	N	O	S	0	0
			1973	614	1001	177	177	4		

- Molecule 59 is a protein called 28S ribosomal protein S7, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
59	AF	208	Total	C	H	N	O	S	0	0
			3495	1104	1770	312	298	11		

- Molecule 60 is a protein called 28S ribosomal protein S9, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
60	AG	312	Total	C	H	N	O	S	0	0
			5126	1632	2558	455	467	14		

- Molecule 61 is a protein called 28S ribosomal protein S10, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
61	AH	140	Total	C	H	N	O	S	0	0
			2336	745	1184	194	210	3		

- Molecule 62 is a protein called 28S ribosomal protein S11, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
62	AI	137	Total	C	H	N	O	S	0	0
			2076	641	1058	192	181	4		

There is a discrepancy between the modelled and reference sequences:

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

- Molecule 63 is a protein called 28S ribosomal protein S12, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
63	AJ	108	Total	C	H	N	O	S	0	0
			1727	521	888	169	143	6		

- Molecule 64 is a protein called 28S ribosomal protein S14, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
64	AK	101	Total	C	H	N	O	S	0	0
			1748	537	886	179	141	5		

- Molecule 65 is a protein called 28S ribosomal protein S15, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
65	AL	174	Total	C	H	N	O	S	0	0
			2994	925	1541	270	251	7		

- Molecule 66 is a protein called 28S ribosomal protein S16, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
66	AM	119	Total	C	H	N	O	S	0	0
			1908	594	966	185	157	6		

- Molecule 67 is a protein called 28S ribosomal protein S17, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
67	AN	110	Total	C	H	N	O	S	0	0
			1797	562	929	156	147	3		

- Molecule 68 is a protein called 28S ribosomal protein S18b, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
68	AO	193	Total	C	H	N	O	S	0	0
			3149	1014	1557	294	277	7		

- Molecule 69 is a protein called 28S ribosomal protein S18c, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
69	AP	97	Total	C	H	N	O	S	0	0
			1588	501	807	134	138	8		

- Molecule 70 is a protein called 28S ribosomal protein S21, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
70	AQ	86	Total	C	H	N	O	S	0	0
			1502	460	758	150	126	8		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AQ	50	ARG	CYS	conflict	UNP P82921

- Molecule 71 is a protein called 28S ribosomal protein S22, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
71	AR	295	Total	C	H	N	O	S	0	0
			4838	1533	2429	413	455	8		

- Molecule 72 is a protein called 28S ribosomal protein S23, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
72	AS	135	Total	C	H	N	O	S	0	0
			2227	716	1116	198	196	1		

- Molecule 73 is a protein called 28S ribosomal protein S25, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
73	AT	168	Total	C	H	N	O	S	0	0
			2765	877	1394	239	244	11		

- Molecule 74 is a protein called 28S ribosomal protein S26, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
74	AU	176	Total	C	H	N	O	S	0	0
			2988	916	1500	301	267	4		

- Molecule 75 is a protein called 28S ribosomal protein S27, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
75	AV	362	Total	C	H	N	O	S	0	0
			5933	1904	2964	495	558	12		

- Molecule 76 is a protein called 28S ribosomal protein S28, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
76	AW	100	Total	C	H	N	O	S	0	0
			1592	498	803	141	146	4		

- Molecule 77 is a protein called 28S ribosomal protein S29, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
77	AX	352	Total	C	H	N	O	S	0	0
			5694	1822	2845	499	517	11		

- Molecule 78 is a protein called 28S ribosomal protein S31, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
78	AY	149	Total	C	H	N	O	S	0	0
			2444	801	1198	207	234	4		

- Molecule 79 is a protein called 28S ribosomal protein S33, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
79	AZ	100	Total	C	H	N	O	S	0	0
			1699	534	860	153	148	4		

- Molecule 80 is a protein called 28S ribosomal protein S34, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
80	A0	215	Total	C	H	N	O	S	0	0
			3584	1130	1797	339	313	5		

- Molecule 81 is a protein called 28S ribosomal protein S35, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
81	A1	276	Total	C	H	N	O	S	0	0
			4507	1419	2269	381	427	11		

- Molecule 82 is a protein called Coiled-coil-helix-coiled-coil-helix domain-containing protein 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
82	A2	117	Total	C	H	N	O	S	0	0
			1904	579	969	182	166	8		

- Molecule 83 is a protein called Aurora kinase A-interacting protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
83	A3	70	Total	C	H	N	O	S	0	0
			1325	401	700	134	89	1		

- Molecule 84 is a protein called Pentatricopeptide repeat domain-containing protein 3, mitochondrial.

Mol	Chain	Residues	Atoms						AltConf	Trace
84	A4	588	Total	C	H	N	O	S	0	0
			9536	3053	4768	808	879	28		

- Molecule 85 is a RNA chain called A-site tRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
85	w	68	Total	C	H	N	O	P	0	0
			2163	647	725	251	472	68		

- Molecule 86 is a RNA chain called P-site tRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
86	x	70	Total	C	H	N	O	P	0	0
			2234	665	751	261	487	70		

- Molecule 87 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
87	y	19	Total	C	H	N	O	P	0	0
			598	179	199	63	138	19		

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

Mol	Chain	Residues	Atoms		AltConf
88	A	127	Total	Mg	0
			127	127	
88	D	3	Total	Mg	0
			3	3	
88	E	1	Total	Mg	0
			1	1	
88	g	1	Total	Mg	0
			1	1	
88	o	1	Total	Mg	0
			1	1	
88	AA	53	Total	Mg	0
			53	53	
88	AB	1	Total	Mg	0
			1	1	
88	AX	1	Total	Mg	0
			1	1	
88	A3	1	Total	Mg	0
			1	1	

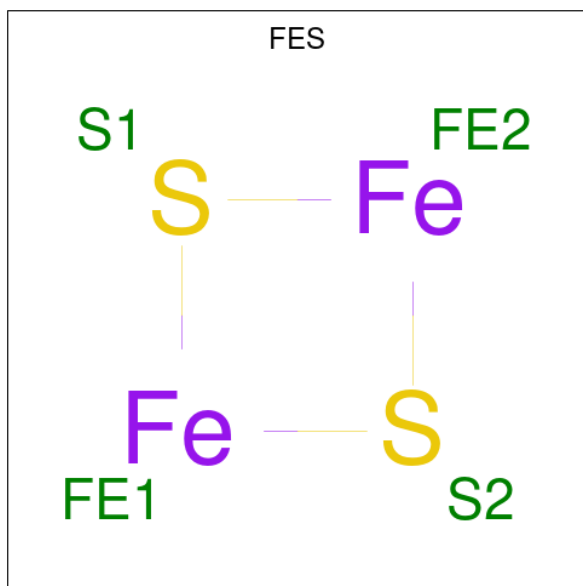
- Molecule 89 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		AltConf
89	A	31	Total	K	0
			31	31	
89	M	1	Total	K	0
			1	1	
89	P	1	Total	K	0
			1	1	
89	i	1	Total	K	0
			1	1	
89	o	1	Total	K	0
			1	1	
89	AA	9	Total	K	0
			9	9	

- Molecule 90 is ZINC ION (three-letter code: ZN) (formula: Zn).

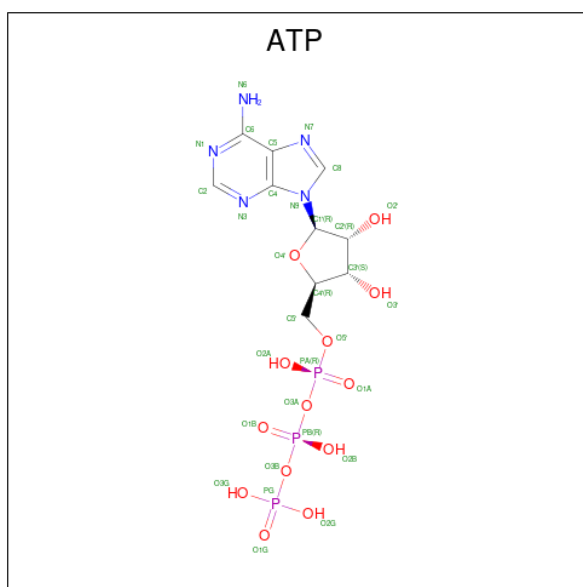
Mol	Chain	Residues	Atoms		AltConf
90	0	1	Total 1	Zn 1	0
90	4	1	Total 1	Zn 1	0
90	AO	1	Total 1	Zn 1	0

- Molecule 91 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2).



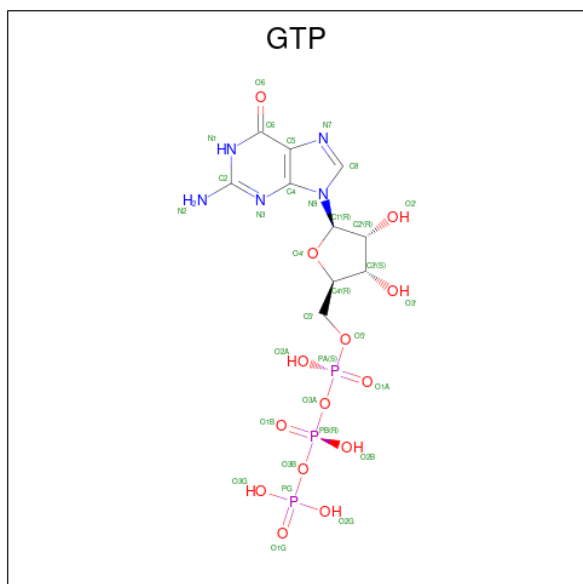
Mol	Chain	Residues	Atoms			AltConf
91	r	1	Total 4	Fe 2	S 2	0
91	AP	1	Total 4	Fe 2	S 2	0
91	AT	1	Total 4	Fe 2	S 2	0

- Molecule 92 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $\text{C}_{10}\text{H}_{16}\text{N}_5\text{O}_{13}\text{P}_3$).



Mol	Chain	Residues	Atoms						AltConf
92	AX	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	

- Molecule 93 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).



Mol	Chain	Residues	Atoms						AltConf
93	AX	1	Total	C	H	N	O	P	0
			44	10	12	5	14	3	

- Molecule 94 is water.

Mol	Chain	Residues	Atoms		AltConf
94	A	349	Total 349	O 349	0
94	B	1	Total 1	O 1	0
94	D	3	Total 3	O 3	0
94	E	3	Total 3	O 3	0
94	F	4	Total 4	O 4	0
94	K	3	Total 3	O 3	0
94	L	1	Total 1	O 1	0
94	M	5	Total 5	O 5	0
94	N	1	Total 1	O 1	0
94	O	3	Total 3	O 3	0
94	R	1	Total 1	O 1	0
94	S	1	Total 1	O 1	0
94	U	1	Total 1	O 1	0
94	W	1	Total 1	O 1	0
94	6	1	Total 1	O 1	0
94	c	1	Total 1	O 1	0
94	d	1	Total 1	O 1	0
94	f	1	Total 1	O 1	0
94	i	1	Total 1	O 1	0
94	o	2	Total 2	O 2	0
94	r	2	Total 2	O 2	0
94	s	2	Total 2	O 2	0

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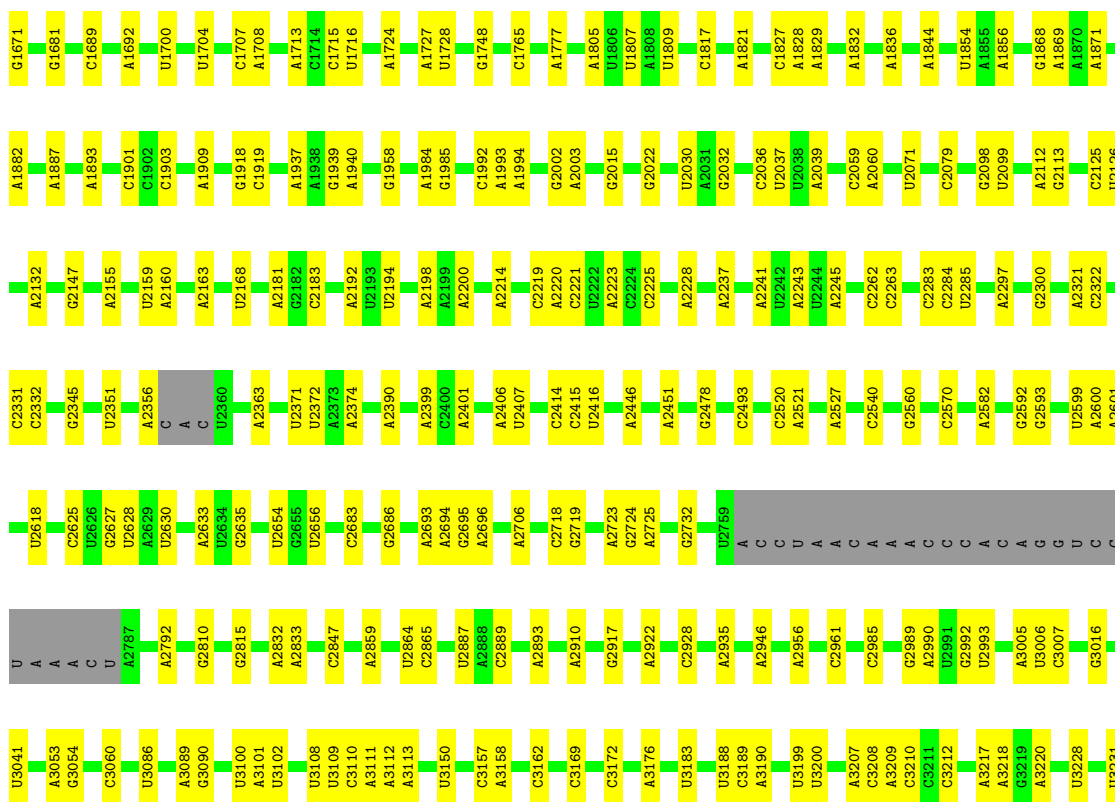
Mol	Chain	Residues	Atoms		AltConf
94	AA	70	Total 70	O 70	0
94	AC	1	Total 1	O 1	0
94	AG	1	Total 1	O 1	0
94	AH	2	Total 2	O 2	0
94	AK	2	Total 2	O 2	0
94	AX	2	Total 2	O 2	0
94	A0	1	Total 1	O 1	0
94	A3	3	Total 3	O 3	0

3 Residue-property plots


These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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: 16S mitochondrial rRNA

Chain A:  84% 14%




• Molecule 2: mitochondrial tRNA^{Val}

Chain B:  81% 19%




• Molecule 3: 39S ribosomal protein L2, mitochondrial

Chain D:  78% 22%

MET ALA LEU CYS ALA LEU THR ARG ALA LEU ARG SER SER LEU ASN LEU ALA PRO PRO THR VAL ALA ALA PRO SER LEU PHE PRO ALA ALA GLN MET MET MET ASN GLY LEU LEU GLN GLN GLN PRO PRO GLY SER ALA LEU MET LEU LEU PRO CYS ARG PRO VAL LEU THR SER VAL ALA ALA ASN


461
1298
PRO SER ALA SER ALA GLN SER

- Molecule 4: 39S ribosomal protein L3, mitochondrial

Chain E:  88% 12%

MET PRO GLY TRP ARG LEU LEU THR GLN VAL GLN ALA GLN VAL LEU GLY ARG LEU GLY ALA ALA LEU LEU GLY PRO GLY ASN ARG THR HIS ILE TRP LEU PHE VAL ARG GLY HIS GLY K44 A348

- Molecule 5: 39S ribosomal protein L4, mitochondrial

Chain F:  81% 19%

MET LEU GLN PHE VAL ARG ALA GLY ALA ARG TRP ALA ARG PRO THR GLY SER GLY GLY LEU SER SER LEU ALA GLU GLU ALA ALA ARG ALA THR GLU ASN PRO GLU GLN VAL ALA SER SER LEU GLY LEU P44 R295 PRO PRO PRO HIS ALA THR GLN GLY PRO ALA ALA THR TYR

HIS
CYS

- Molecule 6: 39S ribosomal protein L9, mitochondrial


Chain H:  36% 64%

MET ALA ALA PRO VAL THR ALA PRO GLY ARG ALA LEU LEU ARG ALA ALA GLY GLY ARG LEU LEU ARG MET LYS ASN VAL VAL GLN GLU LEU LEU ARG PRO GLU ARG HIS VAL ASN ALA ALA ASP LEU CYS ASN PHE SER LEU SER GLN ASN ARG GLY T53 E149 GLY LYS LEU LEU THR

ILE GLN THR LYS ALA VAL GLY ALA THR VAL VAL PHE LEU LYS CYS THR ARG LEU GLY VAL MET LYS ASN VAL VAL LYS TRP GLU LEU LEU ASN PRO GLU ARG HIS VAL ASN ALA ALA ASP LEU CYS ASN PHE SER LEU SER GLN ASN ARG GLY T53 E149 GLY LYS LEU LEU THR


ARG TRP GLY GLY THR VAL VAL ASN GLY LEU LEU ASP THR VAL ARG VAL PRO MET SER VAL VAL ASN PHE GLY LYS TRP GLU LEU LEU ASN PRO GLU ARG HIS VAL ASN ALA ALA ASP LEU CYS ASN PHE SER LEU SER GLN ASN ARG GLY T53 E149 GLY LYS LEU LEU THR

- Molecule 7: 39S ribosomal protein L10, mitochondrial

Chain I:  81% 19%

MET ALA ALA LYS VAL ALA GLY MET LEU ARG GLY GLY LEU LEU PRO GLN ALA GLY ARG LEU LEU PRO THR THR LEU GLN THR VAL ARG TYR G29 Q240 ARG GLU LYS ASP SER VAL MET SER ALA ALA GLN GLN LYS PRO ASP PRO ASP THR VAL PRO ASP SER

- Molecule 8: 39S ribosomal protein L11, mitochondrial

Chain J:  91% 9%


MET SER LYS LEU GLY ARG ALA ALA ARG GLY LEU ARG PRO GLN VAL GLY G18 K192

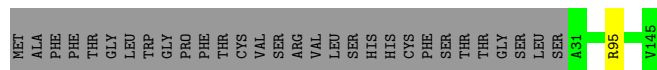
- Molecule 9: 39S ribosomal protein L13, mitochondrial

Chain K:  100%

There are no outlier residues recorded for this chain.

- Molecule 10: 39S ribosomal protein L14, mitochondrial

Chain L:  79% 21%




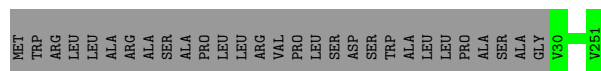
- Molecule 11: 39S ribosomal protein L15, mitochondrial

Chain M:  98%




- Molecule 12: 39S ribosomal protein L16, mitochondrial

Chain N:  88% 12%




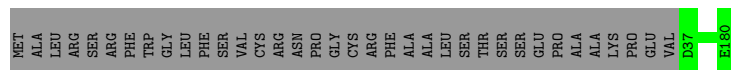
- Molecule 13: 39S ribosomal protein L17, mitochondrial

Chain O:  88% 12%




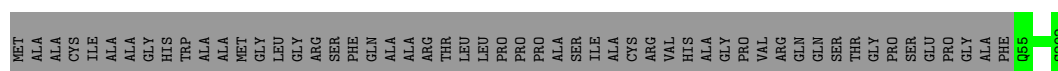
- Molecule 14: 39S ribosomal protein L18, mitochondrial

Chain P:  80% 20%



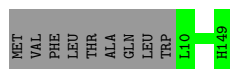
- Molecule 15: 39S ribosomal protein L19, mitochondrial

Chain Q:  82% 18%



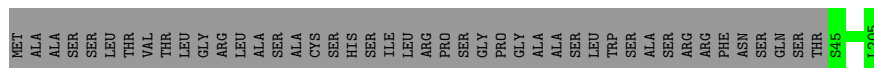
- Molecule 16: 39S ribosomal protein L20, mitochondrial

Chain R:  94% 6%



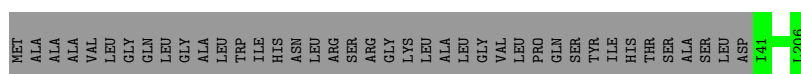
- Molecule 17: 39S ribosomal protein L21, mitochondrial

Chain S: 79% 21%



- Molecule 18: 39S ribosomal protein L22, mitochondrial

Chain T: 81% 19%



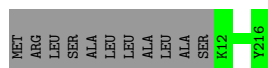
- Molecule 19: 39S ribosomal protein L23, mitochondrial

Chain U: 100%

There are no outlier residues recorded for this chain.

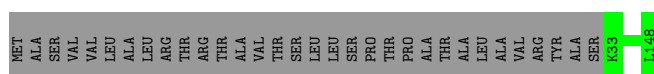
- Molecule 20: 39S ribosomal protein L24, mitochondrial

Chain V: 95% 5%



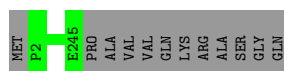
- Molecule 21: 39S ribosomal protein L27, mitochondrial

Chain W: 78% 22%



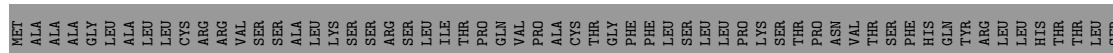
- Molecule 22: 39S ribosomal protein L28, mitochondrial

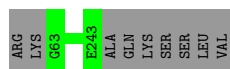
Chain X: 95% 5%




- Molecule 23: 39S ribosomal protein L47, mitochondrial

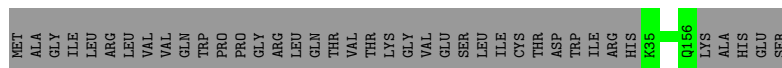
Chain Y: 72% 28%





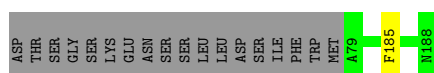
- Molecule 24: 39S ribosomal protein L30, mitochondrial

Chain Z:  76% 24%




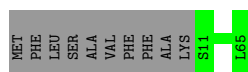
- Molecule 25: 39S ribosomal protein L32, mitochondrial

Chain 0:  58% . 41%



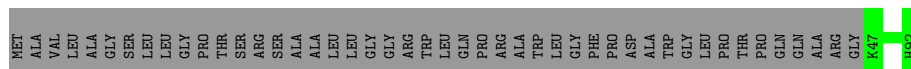
- Molecule 26: 39S ribosomal protein L33, mitochondrial

Chain 1:  85% 15%



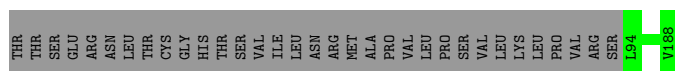
- Molecule 27: 39S ribosomal protein L34, mitochondrial

Chain 2:  50% 50%



- Molecule 28: 39S ribosomal protein L35, mitochondrial

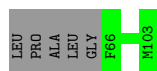
Chain 3:  51% 49%



- Molecule 29: 39S ribosomal protein L36, mitochondrial

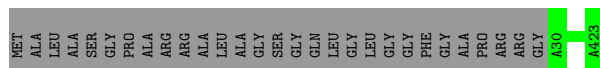
Chain 4:  37% 63%





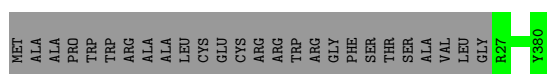
- Molecule 30: 39S ribosomal protein L37, mitochondrial

Chain 5: 93% 7%



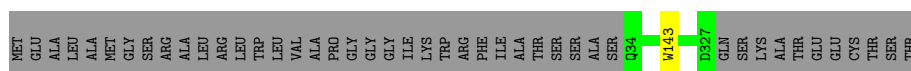
- Molecule 31: 39S ribosomal protein L38, mitochondrial

Chain 6: 93% 7%



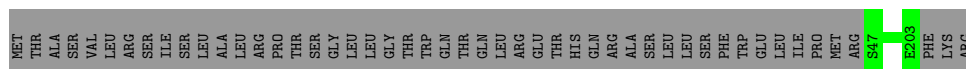
- Molecule 32: 39S ribosomal protein L39, mitochondrial

Chain 7: 87% 13%



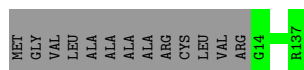
- Molecule 33: 39S ribosomal protein L40, mitochondrial

Chain 8: 76% 24%



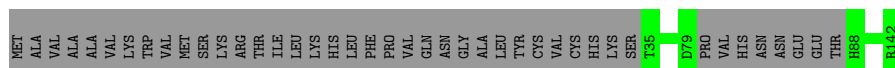
- Molecule 34: 39S ribosomal protein L41, mitochondrial

Chain 9: 91% 9%



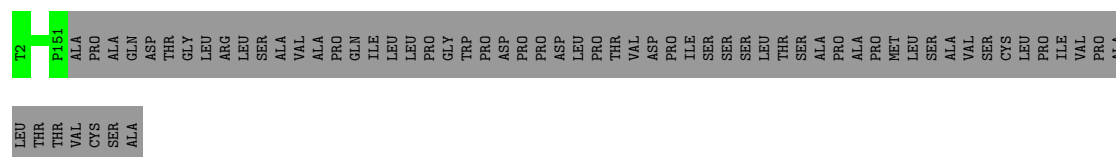
- Molecule 35: 39S ribosomal protein L42, mitochondrial

Chain a: 70% 30%

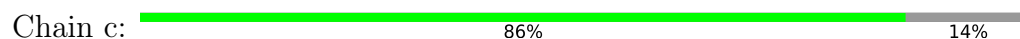


- Molecule 36: 39S ribosomal protein L43, mitochondrial

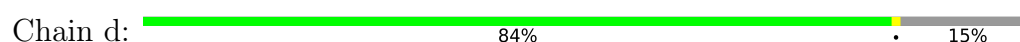
Chain b: 70% 30%



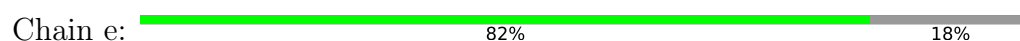
- Molecule 37: 39S ribosomal protein L44, mitochondrial



- Molecule 38: 39S ribosomal protein L45, mitochondrial



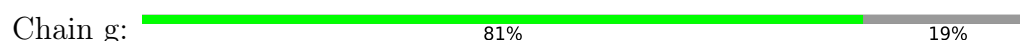
- Molecule 39: 39S ribosomal protein L46, mitochondrial



- Molecule 40: 39S ribosomal protein L48, mitochondrial



- Molecule 41: 39S ribosomal protein L49, mitochondrial

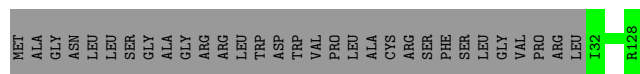


- Molecule 42: 39S ribosomal protein L50, mitochondrial




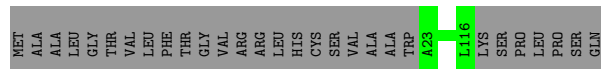
- Molecule 43: 39S ribosomal protein L51, mitochondrial

Chain i:  76% 24%



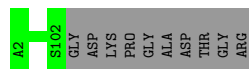
- Molecule 44: 39S ribosomal protein L52, mitochondrial

Chain j:  76% 24%



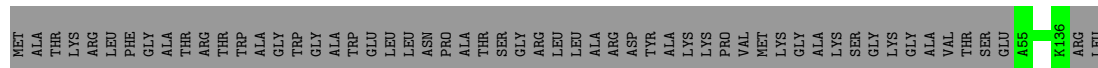
- Molecule 45: 39S ribosomal protein L53, mitochondrial

Chain k:  91% 9%



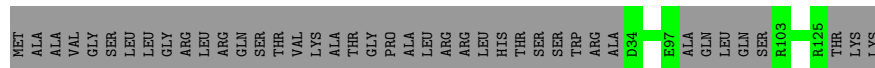
- Molecule 46: 39S ribosomal protein L54, mitochondrial

Chain l:  59% 41%



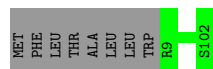
- Molecule 47: 39S ribosomal protein L55, mitochondrial

Chain m:  68% 32%



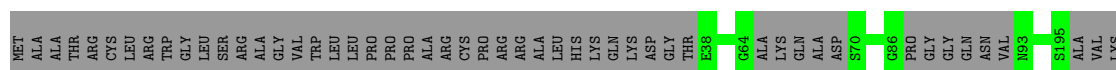
- Molecule 48: Ribosomal protein 63, mitochondrial

Chain o:  92% 8%

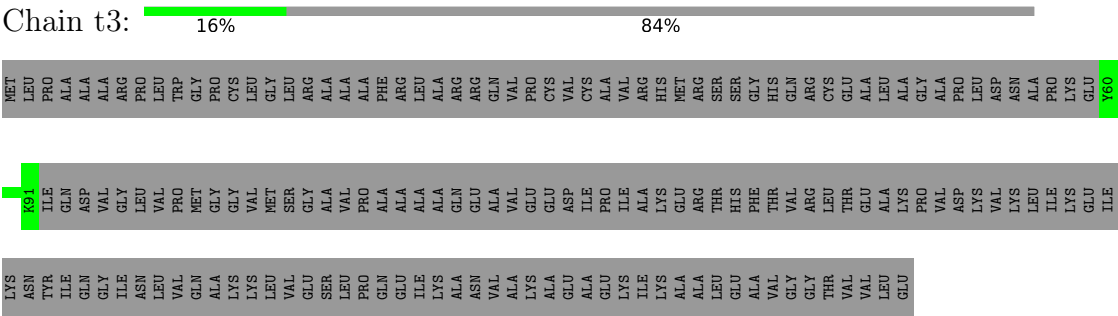


- Molecule 49: Peptidyl-tRNA hydrolase ICT1, mitochondrial

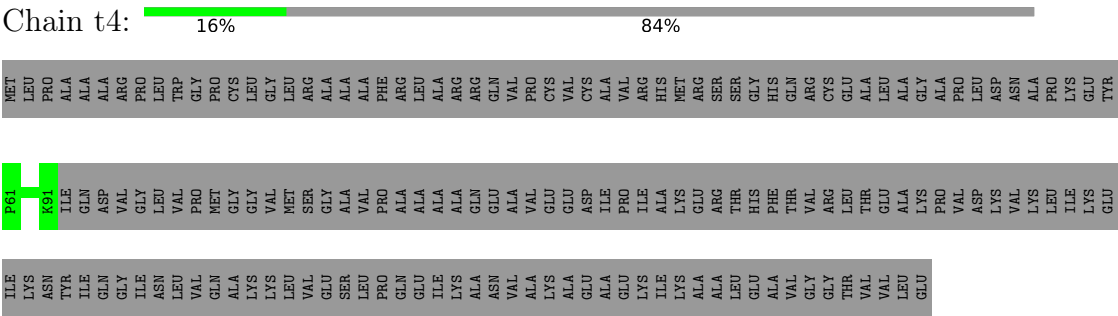
Chain p:  71% 29%



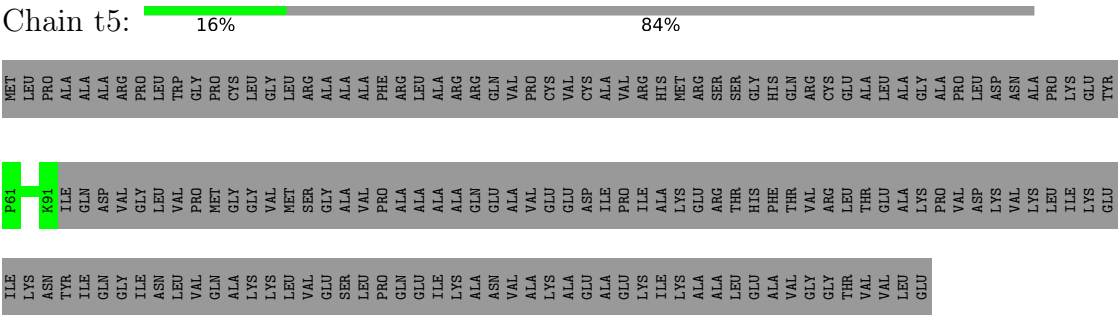
- Molecule 53: 39S ribosomal protein L12, mitochondrial



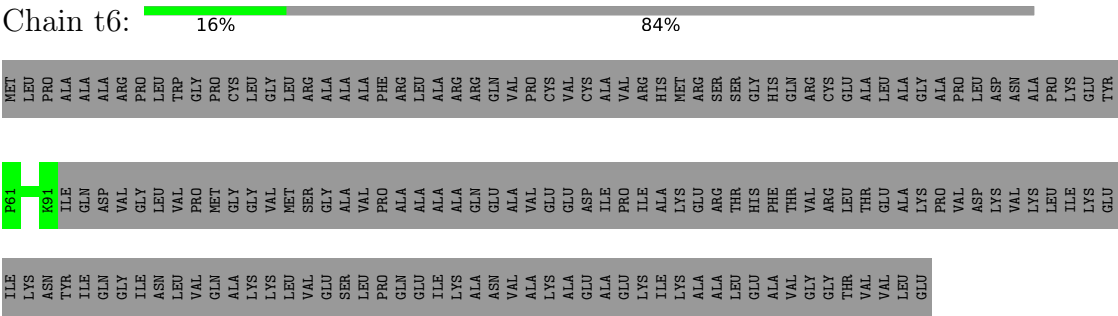
- Molecule 53: 39S ribosomal protein L12, mitochondrial



- Molecule 53: 39S ribosomal protein L12, mitochondrial



- Molecule 53: 39S ribosomal protein L12, mitochondrial



- Molecule 54: 12S mitochondrial rRNA

A1392	A1152	G933	A949
C1405	C1153	A938	G950
U1420	A1160	A939	A951
A1430	A1167	A942	U980
G1447	U1187	C954	A988
A1478	A1188	A955	U989
C1481	U1189	C956	A995
A1514	G1200	C960	U704
A1519	A1220	U961	U721
U1520	C1223	C965	C737
U1521	C1224	A966	A753
U1522	C1225	A967	A761
C1525	U1229	C1001	A766
U1526	A1237	C1011	G766
A1527	G1247	A1015	G777
C1533	C1248	G1028	G791
A1536	A1251	U1042	G796
C1537	C1261	C1048	C908
U1538	C1271	A1049	A814
C1539	A1272	C1065	C915
A1557	G1273	A1069	U830
U1568	U1284	A1081	U831
U1571	G1285	A1082	U832
G1582	C1290	A1082	C835
A1583	U1291	A1103	A836
A1584	A1292	A1104	A860
G1594	A1295	C1105	U961
G1595	C1312	C1106	C968
A1599	C1326	C1108	A871
C1602	G1327	A1109	A907
		A1118	A919
	A1343	U1119	C990
	U1344	C1120	A929
	A1353	A1121	G930
	A1354	A1126	C931
	C1378	A1137	C932
	A1387	G1138	
	A1390	U1144	
	U1391	C1151	

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|
| GLY | PRO | ALA | HIS | PRO | GLY | ASP | MET | SER | HIS | SER | LEU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MET | ALA | THR | SER | SER | ALA | LEU | PRO | ARG | TLE | GLY | ALA | ARG | ALA | PRO | SER | ARG | TRP | GLY | PHE | GLY | LYS | ALA | THR | PRO | ARG | PRO | ALA | ARG | PRO | SER | ARG | ARG | THR | LEU | GLY | SER | ALA | THR | ALA | LEU | MET | TLE | ARG | GLU | SER | ES3 | K277 | GLU | PRO | GLY | ASP | GLN |

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| MET | ALA | ALA | ALA | SER | VAL | CYS | SER | GLY | LEU | LEU | GLY | PRO | ARG | VAL | LEU | SER | TRP | SER | ARG | GLU | LEU | PRO | CYS | ALA | TRP | ARG | ALA | LEU | HIS | THR | SER | PRO | VAL | CYS | ALA | K36 | L167 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|

- [illegible]

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| MET | | | |
| P2 | | | |
| | | | |
| R123 | | | |
| LYS | | | |
| LYS | | | |

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MET	ALA	PRO	ALA	LYS	VAL	ALA	ARG	GLY	TRP	SER	GLY	LEU	ALA	LEU	GLY	VAL	ARG	ARG	ALA	VAL	LEU	LEU	GLN	LEU	PRO	GLY	LEU	THR	GLN	VAL	ARG	TRP	S35	T242
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------

- [illegible]

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|-----|-----|-----|-----|
| LYS | GLU | GLU | SER | LYS | SER | MET | ALA | ARG | THR | ALA | PHE | GLY | VAL | CYS | ARG | LEU | TRP | GLN | GLY | LEU | GLY | ASN | PHE | SER | VAL | ASN | THR | SER | LYS | GLY | ASN | THR | LYS | ASN | GLY | LEU | LEU | LEU | SER | THR | ASN | MET | LYS | TRP | VAL | GLN | PHE | SER | ASN | LEU | 1126 | 1189 | GLU | THR | LEU | SER | GLU |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|-----|-----|-----|-----|

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| 1181 | 1194 | <div> <div> MET</div> <div>GLN</div> <div>ALA</div> <div>VAL</div> <div>ARG</div> <div>ASN</div> <div>GLY</div> <div>SER</div> <div>ARG</div> <div>PRO</div> <div>THR</div> <div>THR</div> <div>PRO</div> <div>GLN</div> <div>THR</div> <div>ALA</div> <div>GLY</div> <div>ARG</div> <div>VAL</div> <div>VAL</div> <div>ALA</div> <div>ALA</div> <div>ARG</div> <div>THR</div> <div>PRO</div> <div>ALA</div> <div>GLY</div> <div>ILE</div> <div>CYS</div> <div>THR</div> <div>GLY</div> <div>ALA</div> <div>ARG</div> <div>GLN</div> <div>LEU</div> <div>GLN</div> <div>ASP</div> <div>ALA</div> <div>ALA</div> <div>ALA</div> <div>LYS</div> <div>GLN</div> <div>LYS</div> <div>VAL</div> <div>GLU</div> <div>GLN</div> <div>ASN</div> <div>ALA</div> <div>ALA</div> <div>PRO</div> <div>SER</div> <div>HIS</div> <div>TER</div> </div> |
|------|------|--|

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| MET | SER | TRP | SER | GLY | LEU | LEU | HIS | GLY | LEU | ASN | THR | SER | SER | LEU | THR | CYS | GLY | PRO | ALA | LEU | VAL | PRO | ARG | LEU | THR | THR | SER | MET | A31 | K138 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| MET | ALA | ALA | PHE | MET | MET | LEU | GLY | SER | SER | LEU | LEU | ARG | THR | PHE | LYS | GLN | MET | VAL | PRO | SER | SER | SER | GLY | GLN | VAL | ARG | SER | H28 | H128 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|


- WORLDWIDE
PDB
PROTEIN DATA BANK

Chain AL:  68% 32%

MET LEU ARG VAL ALA TRP ARG THR LEU SER SER ILE ARG THR ALA ARG VAL THR GLN VAL LEU VAL PRO GLY LEU PRO GLY GLY SER SER ALA LYS PHE PHE PRO PHE ASN GLN TRP GLY LEU GLN PRO ARG SER LEU LEU GLN ALA ALA ARG GLY TYR VAL VAL ARG LYS PRO ALA GLN


SER ARG L33 Q236 ALA LYS ARG ARG ASN PRO ASP SER PRO ALA LYS ALA ILE PRO LYS THR LEU LYS ASP SER GLN

- Molecule 66: 28S ribosomal protein S16, mitochondrial

Chain AM:  87% 13%


MET VAL HIS LEU THR THR LEU LEU CYS K10 E128 ALA THR ASP THR GLU ALA THR GLU THR

- Molecule 67: 28S ribosomal protein S17, mitochondrial

Chain AN:  85% 15%

MET SER VAL V4 E113 THR GLN LEU SER LYS ASN LEU GLU THR LEU ASN ILE SER SER ALA GLN

- Molecule 68: 28S ribosomal protein S18b, mitochondrial

Chain AO:  75% 25%

MET ALA ALA SER VAL LEU ASN THR VAL LEU ARG ARG LEU PRO MET LEU SER LEU PHE ARG GLY HIS HIS ARG VAL VAL GLN VAL PRO LEU GLN THR LEU CYS THR LYS ALA PRO SER GLU ASP SER LEU SER SER VAL P47 P239 PRO ARG THR PRO ALA ALA SER SER THR GLY

GLN THR GLY PRO GLN SER ALA LEU

- Molecule 69: 28S ribosomal protein S18c, mitochondrial

Chain AP:  68% 32%


MET ALA VAL VAL VAL CYS GLY GLY LEU LEU ARG LYS LYS LEU THR THR LEU VAL THR ALA ALA VAL SER SER LEU THR HIS VAL TRP ARG ARG CYS SER GLN VAL SER S46 E142

- Molecule 70: 28S ribosomal protein S21, mitochondrial

Chain AQ:  100%

There are no outlier residues recorded for this chain.

- Molecule 71: 28S ribosomal protein S22, mitochondrial

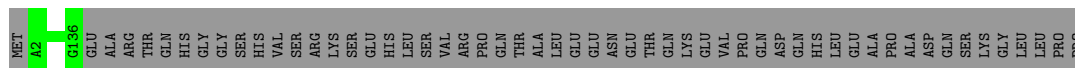
Chain AR:  82% 18%

MET PRO LEU GLY THR VAL LEU LEU TRP SER SER LEU LEU ARG SER SER PRO PRO GLY VAL GLU ARG VAL VAL CYS PHE ARG ARG ALA ARG ILE GLN PRO TRP HIS GLY GLY LEU LEU GLN PRO LEU PRO CYS SER PHE GLU MET GLY LEU PRO ARG ARG ARG PHE SER SER GLU ALA ALA GLU SER



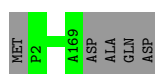
- Molecule 72: 28S ribosomal protein S23, mitochondrial

Chain AS: 71% 29%



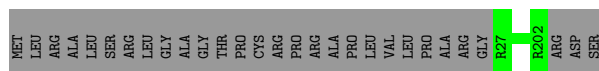
- Molecule 73: 28S ribosomal protein S25, mitochondrial

Chain AT: 97% .



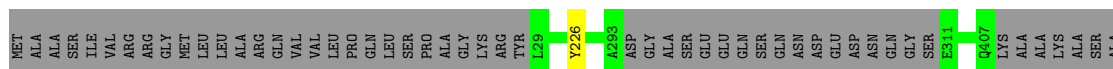
- Molecule 74: 28S ribosomal protein S26, mitochondrial

Chain AU: 86% 14%



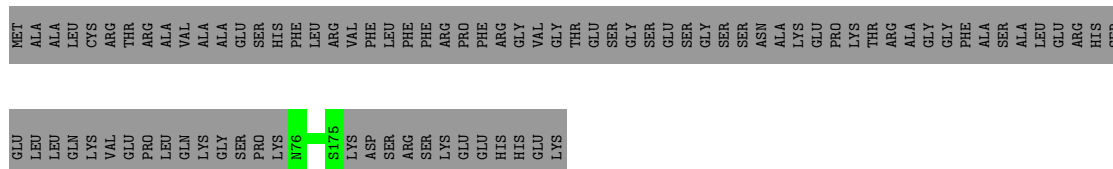
- Molecule 75: 28S ribosomal protein S27, mitochondrial

Chain AV: 87% 13%



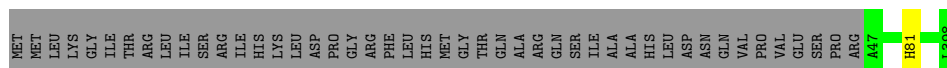
- Molecule 76: 28S ribosomal protein S28, mitochondrial

Chain AW: 53% 47%

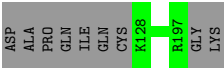


- Molecule 77: 28S ribosomal protein S29, mitochondrial

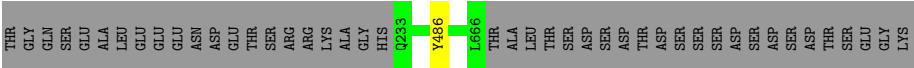
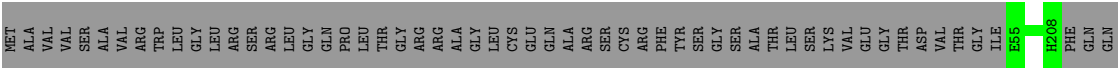
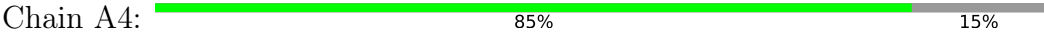
Chain AX: 88% 12%



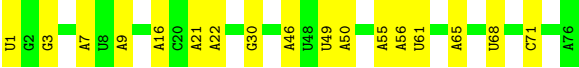
- Molecule 78: 28S ribosomal protein S31, mitochondrial



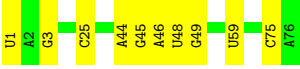
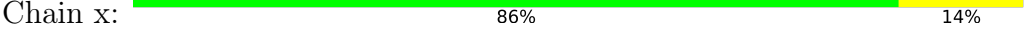
- Molecule 84: Pentatricopeptide repeat domain-containing protein 3, mitochondrial



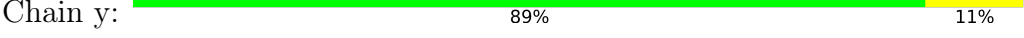
- Molecule 85: A-site tRNA



- Molecule 86: P-site tRNA



- Molecule 87: mRNA



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	93615	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	30	Depositor
Minimum defocus (nm)	200	Depositor
Maximum defocus (nm)	3600	Depositor
Magnification	165000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: THC, FES, IAS, ATP, ZN, K, SAC, MG, GTP, AYA

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	A	0.30	1/36361 (0.0%)	0.69	0/56600
2	B	0.38	1/1700 (0.1%)	0.68	0/2641
3	D	0.27	0/1896	0.45	0/2549
4	E	0.27	0/2475	0.41	0/3355
5	F	0.26	0/2090	0.42	0/2842
6	H	0.25	0/816	0.41	0/1097
7	I	0.29	0/1731	0.41	0/2345
8	J	0.29	0/1348	0.39	0/1813
9	K	0.31	0/1490	0.41	0/2021
10	L	0.26	0/905	0.45	0/1218
11	M	0.28	0/2381	0.43	0/3212
12	N	0.31	0/1833	0.43	0/2468
13	O	0.25	0/1283	0.40	0/1727
14	P	0.33	0/1199	0.44	0/1623
15	Q	0.26	0/2027	0.41	0/2734
16	R	0.27	0/1175	0.40	0/1572
17	S	0.27	0/1320	0.44	0/1789
18	T	0.28	0/1403	0.41	0/1886
19	U	0.28	0/1274	0.41	0/1723
20	V	0.26	0/1721	0.42	0/2333
21	W	0.35	0/926	0.44	0/1244
22	X	0.26	0/2099	0.38	0/2837
23	Y	0.25	0/1593	0.39	0/2136
24	Z	0.26	0/1021	0.42	0/1378
25	0	0.26	0/913	0.41	0/1224
26	1	0.28	0/460	0.45	0/610
27	2	0.25	0/383	0.42	0/507
28	3	0.29	0/853	0.42	0/1136
29	4	0.32	0/350	0.46	0/461
30	5	0.26	0/3305	0.40	0/4502
31	6	0.35	0/3043	0.43	0/4140
32	7	0.26	0/2447	0.39	0/3310

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	8	0.28	0/1354	0.38	0/1819
34	9	0.28	0/1025	0.40	0/1379
35	a	0.26	0/866	0.42	0/1174
36	b	0.28	0/1211	0.43	0/1639
37	c	0.26	0/2347	0.39	0/3171
38	d	0.26	0/2181	0.41	0/2949
39	e	0.28	0/1885	0.40	0/2542
40	f	0.32	0/1273	0.43	0/1716
41	g	0.27	0/1151	0.42	0/1569
42	h	0.24	0/918	0.37	0/1249
43	i	0.26	0/850	0.39	0/1135
44	j	0.26	0/760	0.38	0/1023
45	k	0.28	0/777	0.42	0/1048
46	l	0.27	0/707	0.40	0/960
47	m	0.27	0/767	0.42	0/1028
48	o	0.27	0/819	0.41	0/1097
49	p	0.25	0/1223	0.40	0/1641
50	q	0.25	0/1384	0.34	0/1869
51	r	0.33	0/1362	0.44	0/1846
52	s	0.26	0/3239	0.42	0/4400
53	t1	0.23	0/358	0.34	0/486
53	t2	0.22	0/259	0.33	0/350
53	t3	0.22	0/259	0.33	0/350
53	t4	0.22	0/246	0.34	0/331
53	t5	0.22	0/246	0.33	0/331
53	t6	0.22	0/246	0.34	0/331
54	AA	0.25	0/22655	0.67	0/35273
55	AB	0.27	0/1871	0.41	0/2531
56	AC	0.32	0/1113	0.42	0/1505
57	AD	0.26	0/2783	0.43	0/3724
58	AE	0.25	0/989	0.42	0/1335
59	AF	0.24	0/1767	0.38	0/2373
60	AG	0.27	0/2623	0.40	0/3515
61	AH	0.31	0/1178	0.44	0/1598
62	AI	0.26	0/1030	0.43	0/1386
63	AJ	0.26	0/855	0.45	0/1148
64	AK	0.26	0/880	0.42	0/1182
65	AL	0.25	0/1477	0.36	0/1974
66	AM	0.26	0/963	0.42	0/1295
67	AN	0.26	0/886	0.42	0/1199
68	AO	0.26	0/1648	0.40	0/2243
69	AP	0.26	0/798	0.40	0/1070
70	AQ	0.26	0/748	0.40	0/994

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
71	AR	0.26	0/2456	0.39	0/3317
72	AS	0.27	0/1138	0.40	0/1533
73	AT	0.27	0/1402	0.40	0/1883
74	AU	0.24	0/1510	0.37	0/2025
75	AV	0.24	0/3030	0.36	0/4093
76	AW	0.27	0/801	0.44	0/1079
77	AX	0.24	0/2921	0.38	0/3954
78	AY	0.27	0/1280	0.36	0/1725
79	AZ	0.27	0/857	0.39	0/1141
80	A0	0.25	0/1834	0.41	0/2484
81	A1	0.28	0/2285	0.40	0/3090
82	A2	0.24	0/941	0.39	0/1257
83	A3	0.26	0/636	0.42	0/839
84	A4	0.25	0/4877	0.36	0/6598
85	w	0.30	1/1608 (0.1%)	0.65	0/2497
86	x	0.30	1/1656 (0.1%)	0.65	0/2571
87	y	0.19	0/443	0.67	0/684
All	All	0.27	4/185473 (0.0%)	0.53	0/263581

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1671	G	OP3-P	-10.72	1.48	1.61
2	B	1602	C	OP3-P	-10.64	1.48	1.61
85	w	1	U	OP3-P	-10.61	1.48	1.61
86	x	1	U	OP3-P	-10.52	1.48	1.61

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	D	236/305 (77%)	234 (99%)	2 (1%)	0	100	100
4	E	303/348 (87%)	296 (98%)	7 (2%)	0	100	100
5	F	250/311 (80%)	249 (100%)	1 (0%)	0	100	100
6	H	95/267 (36%)	94 (99%)	1 (1%)	0	100	100
7	I	210/261 (80%)	205 (98%)	5 (2%)	0	100	100
8	J	173/192 (90%)	172 (99%)	1 (1%)	0	100	100
9	K	175/177 (99%)	173 (99%)	2 (1%)	0	100	100
10	L	113/145 (78%)	111 (98%)	2 (2%)	0	100	100
11	M	289/296 (98%)	287 (99%)	2 (1%)	0	100	100
12	N	220/251 (88%)	219 (100%)	1 (0%)	0	100	100
13	O	152/175 (87%)	151 (99%)	1 (1%)	0	100	100
14	P	142/180 (79%)	141 (99%)	1 (1%)	0	100	100
15	Q	236/292 (81%)	235 (100%)	1 (0%)	0	100	100
16	R	138/149 (93%)	135 (98%)	3 (2%)	0	100	100
17	S	159/205 (78%)	159 (100%)	0	0	100	100
18	T	164/206 (80%)	162 (99%)	2 (1%)	0	100	100
19	U	150/152 (99%)	147 (98%)	3 (2%)	0	100	100
20	V	203/216 (94%)	203 (100%)	0	0	100	100
21	W	114/148 (77%)	114 (100%)	0	0	100	100
22	X	242/256 (94%)	241 (100%)	1 (0%)	0	100	100
23	Y	179/250 (72%)	178 (99%)	1 (1%)	0	100	100
24	Z	120/161 (74%)	117 (98%)	3 (2%)	0	100	100
25	0	108/188 (57%)	108 (100%)	0	0	100	100
26	1	53/65 (82%)	53 (100%)	0	0	100	100
27	2	44/92 (48%)	43 (98%)	1 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
28	3	93/188 (50%)	92 (99%)	1 (1%)	0	100	100
29	4	36/103 (35%)	35 (97%)	1 (3%)	0	100	100
30	5	392/423 (93%)	387 (99%)	5 (1%)	0	100	100
31	6	352/380 (93%)	339 (96%)	13 (4%)	0	100	100
32	7	292/338 (86%)	287 (98%)	5 (2%)	0	100	100
33	8	155/206 (75%)	154 (99%)	1 (1%)	0	100	100
34	9	122/137 (89%)	122 (100%)	0	0	100	100
35	a	96/142 (68%)	94 (98%)	2 (2%)	0	100	100
36	b	148/214 (69%)	144 (97%)	4 (3%)	0	100	100
37	c	282/332 (85%)	276 (98%)	6 (2%)	0	100	100
38	d	257/306 (84%)	252 (98%)	5 (2%)	0	100	100
39	e	224/279 (80%)	220 (98%)	4 (2%)	0	100	100
40	f	153/212 (72%)	151 (99%)	2 (1%)	0	100	100
41	g	132/166 (80%)	129 (98%)	3 (2%)	0	100	100
42	h	108/158 (68%)	105 (97%)	3 (3%)	0	100	100
43	i	95/128 (74%)	94 (99%)	1 (1%)	0	100	100
44	j	92/123 (75%)	91 (99%)	1 (1%)	0	100	100
45	k	99/111 (89%)	99 (100%)	0	0	100	100
46	l	80/138 (58%)	80 (100%)	0	0	100	100
47	m	83/128 (65%)	81 (98%)	2 (2%)	0	100	100
48	o	92/102 (90%)	92 (100%)	0	0	100	100
49	p	141/206 (68%)	140 (99%)	1 (1%)	0	100	100
50	q	159/222 (72%)	159 (100%)	0	0	100	100
51	r	160/196 (82%)	160 (100%)	0	0	100	100
52	s	382/439 (87%)	379 (99%)	3 (1%)	0	100	100
53	t1	44/198 (22%)	43 (98%)	1 (2%)	0	100	100
53	t2	30/198 (15%)	30 (100%)	0	0	100	100
53	t3	30/198 (15%)	30 (100%)	0	0	100	100
53	t4	29/198 (15%)	29 (100%)	0	0	100	100
53	t5	29/198 (15%)	29 (100%)	0	0	100	100
53	t6	29/198 (15%)	29 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
55	AB	223/296 (75%)	221 (99%)	2 (1%)	0	100	100
56	AC	130/167 (78%)	127 (98%)	3 (2%)	0	100	100
57	AD	341/430 (79%)	335 (98%)	6 (2%)	0	100	100
58	AE	120/125 (96%)	118 (98%)	2 (2%)	0	100	100
59	AF	206/242 (85%)	206 (100%)	0	0	100	100
60	AG	308/396 (78%)	305 (99%)	3 (1%)	0	100	100
61	AH	138/201 (69%)	135 (98%)	2 (1%)	1 (1%)	22	43
62	AI	133/194 (69%)	131 (98%)	2 (2%)	0	100	100
63	AJ	106/138 (77%)	104 (98%)	2 (2%)	0	100	100
64	AK	99/128 (77%)	98 (99%)	1 (1%)	0	100	100
65	AL	172/257 (67%)	171 (99%)	1 (1%)	0	100	100
66	AM	117/137 (85%)	117 (100%)	0	0	100	100
67	AN	108/130 (83%)	107 (99%)	1 (1%)	0	100	100
68	AO	191/258 (74%)	187 (98%)	4 (2%)	0	100	100
69	AP	95/142 (67%)	95 (100%)	0	0	100	100
70	AQ	84/86 (98%)	84 (100%)	0	0	100	100
71	AR	293/360 (81%)	290 (99%)	3 (1%)	0	100	100
72	AS	133/190 (70%)	133 (100%)	0	0	100	100
73	AT	166/173 (96%)	166 (100%)	0	0	100	100
74	AU	174/205 (85%)	174 (100%)	0	0	100	100
75	AV	358/414 (86%)	357 (100%)	1 (0%)	0	100	100
76	AW	98/187 (52%)	98 (100%)	0	0	100	100
77	AX	350/398 (88%)	346 (99%)	4 (1%)	0	100	100
78	AY	147/395 (37%)	146 (99%)	1 (1%)	0	100	100
79	AZ	98/106 (92%)	98 (100%)	0	0	100	100
80	A0	213/218 (98%)	210 (99%)	3 (1%)	0	100	100
81	A1	274/323 (85%)	268 (98%)	6 (2%)	0	100	100
82	A2	115/117 (98%)	114 (99%)	1 (1%)	0	100	100
83	A3	68/199 (34%)	67 (98%)	1 (2%)	0	100	100
84	A4	584/689 (85%)	575 (98%)	9 (2%)	0	100	100
All	All	14326/19154 (75%)	14162 (99%)	163 (1%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
61	AH	126	ILE

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	D	192/245 (78%)	192 (100%)	0	100	100
4	E	260/290 (90%)	260 (100%)	0	100	100
5	F	219/262 (84%)	219 (100%)	0	100	100
6	H	88/228 (39%)	88 (100%)	0	100	100
7	I	194/232 (84%)	194 (100%)	0	100	100
8	J	138/150 (92%)	138 (100%)	0	100	100
9	K	154/154 (100%)	154 (100%)	0	100	100
10	L	98/124 (79%)	97 (99%)	1 (1%)	76	90
11	M	246/249 (99%)	245 (100%)	1 (0%)	91	97
12	N	189/211 (90%)	189 (100%)	0	100	100
13	O	134/150 (89%)	134 (100%)	0	100	100
14	P	126/155 (81%)	126 (100%)	0	100	100
15	Q	220/256 (86%)	220 (100%)	0	100	100
16	R	118/126 (94%)	118 (100%)	0	100	100
17	S	146/180 (81%)	146 (100%)	0	100	100
18	T	146/176 (83%)	146 (100%)	0	100	100
19	U	134/134 (100%)	134 (100%)	0	100	100
20	V	183/191 (96%)	183 (100%)	0	100	100
21	W	94/119 (79%)	94 (100%)	0	100	100
22	X	220/229 (96%)	220 (100%)	0	100	100
23	Y	163/223 (73%)	163 (100%)	0	100	100
24	Z	113/147 (77%)	113 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	0	99/164 (60%)	98 (99%)	1 (1%)	76	90
26	1	52/60 (87%)	52 (100%)	0	100	100
27	2	40/72 (56%)	40 (100%)	0	100	100
28	3	88/166 (53%)	88 (100%)	0	100	100
29	4	37/89 (42%)	37 (100%)	0	100	100
30	5	353/368 (96%)	353 (100%)	0	100	100
31	6	313/332 (94%)	313 (100%)	0	100	100
32	7	270/303 (89%)	269 (100%)	1 (0%)	91	97
33	8	146/190 (77%)	146 (100%)	0	100	100
34	9	104/112 (93%)	104 (100%)	0	100	100
35	a	96/133 (72%)	96 (100%)	0	100	100
36	b	131/184 (71%)	131 (100%)	0	100	100
37	c	251/288 (87%)	251 (100%)	0	100	100
38	d	237/274 (86%)	235 (99%)	2 (1%)	81	92
39	e	198/236 (84%)	198 (100%)	0	100	100
40	f	139/188 (74%)	139 (100%)	0	100	100
41	g	124/148 (84%)	124 (100%)	0	100	100
42	h	104/148 (70%)	104 (100%)	0	100	100
43	i	86/110 (78%)	86 (100%)	0	100	100
44	j	74/97 (76%)	74 (100%)	0	100	100
45	k	83/89 (93%)	83 (100%)	0	100	100
46	l	76/116 (66%)	76 (100%)	0	100	100
47	m	81/113 (72%)	81 (100%)	0	100	100
48	o	80/87 (92%)	80 (100%)	0	100	100
49	p	135/181 (75%)	135 (100%)	0	100	100
50	q	138/178 (78%)	138 (100%)	0	100	100
51	r	147/169 (87%)	146 (99%)	1 (1%)	84	94
52	s	340/381 (89%)	340 (100%)	0	100	100
53	t1	40/158 (25%)	40 (100%)	0	100	100
53	t2	31/158 (20%)	31 (100%)	0	100	100
53	t3	31/158 (20%)	31 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
53	t4	30/158 (19%)	30 (100%)	0	100	100
53	t5	30/158 (19%)	30 (100%)	0	100	100
53	t6	30/158 (19%)	30 (100%)	0	100	100
55	AB	198/249 (80%)	198 (100%)	0	100	100
56	AC	115/143 (80%)	115 (100%)	0	100	100
57	AD	286/357 (80%)	286 (100%)	0	100	100
58	AE	104/107 (97%)	104 (100%)	0	100	100
59	AF	185/209 (88%)	185 (100%)	0	100	100
60	AG	271/342 (79%)	271 (100%)	0	100	100
61	AH	130/180 (72%)	130 (100%)	0	100	100
62	AI	104/146 (71%)	102 (98%)	2 (2%)	57	79
63	AJ	93/118 (79%)	93 (100%)	0	100	100
64	AK	91/113 (80%)	91 (100%)	0	100	100
65	AL	158/226 (70%)	158 (100%)	0	100	100
66	AM	97/113 (86%)	97 (100%)	0	100	100
67	AN	96/115 (84%)	96 (100%)	0	100	100
68	AO	174/230 (76%)	174 (100%)	0	100	100
69	AP	88/123 (72%)	88 (100%)	0	100	100
70	AQ	78/78 (100%)	78 (100%)	0	100	100
71	AR	264/318 (83%)	264 (100%)	0	100	100
72	AS	116/164 (71%)	116 (100%)	0	100	100
73	AT	153/157 (98%)	153 (100%)	0	100	100
74	AU	152/174 (87%)	152 (100%)	0	100	100
75	AV	325/364 (89%)	324 (100%)	1 (0%)	92	98
76	AW	87/158 (55%)	87 (100%)	0	100	100
77	AX	311/351 (89%)	310 (100%)	1 (0%)	92	98
78	AY	137/357 (38%)	137 (100%)	0	100	100
79	AZ	90/95 (95%)	90 (100%)	0	100	100
80	A0	188/190 (99%)	188 (100%)	0	100	100
81	A1	254/291 (87%)	254 (100%)	0	100	100
82	A2	100/100 (100%)	100 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
83	A3	65/166 (39%)	65 (100%)	0	100	100
84	A4	526/609 (86%)	525 (100%)	1 (0%)	93	98
All	All	12825/16498 (78%)	12813 (100%)	12 (0%)	93	98

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
10	L	95	ARG
11	M	222	TYR
25	0	185	PHE
32	7	143	TRP
38	d	108	ARG
38	d	280	VAL
51	r	73	CYS
62	AI	73	LEU
62	AI	181	ILE
75	AV	226	TYR
77	AX	81	HIS
84	A4	486	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
5	F	103	GLN
7	I	189	GLN
7	I	193	ASN
8	J	178	GLN
10	L	142	GLN
12	N	237	HIS
14	P	79	HIS
16	R	149	HIS
17	S	118	ASN
18	T	204	HIS
24	Z	64	HIS
30	5	165	GLN
32	7	255	HIS
35	a	46	ASN
35	a	90	GLN
38	d	262	HIS
42	h	110	HIS

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Mol	Chain	Res	Type
46	l	67	GLN
46	l	82	GLN
48	o	94	HIS
52	s	240	GLN
52	s	387	ASN
61	AH	109	HIS
75	AV	145	ASN
75	AV	224	GLN
75	AV	380	GLN
75	AV	391	GLN
77	AX	159	HIS
77	AX	291	HIS
78	AY	290	ASN
79	AZ	56	HIS

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1528/1561 (97%)	223 (14%)	1 (0%)
2	B	71/72 (98%)	13 (18%)	0
54	AA	953/954 (99%)	126 (13%)	0
85	w	67/68 (98%)	16 (23%)	0
86	x	68/70 (97%)	9 (13%)	0
87	y	17/19 (89%)	2 (11%)	0
All	All	2704/2744 (98%)	389 (14%)	1 (0%)

All (389) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	1681	G
1	A	1689	C
1	A	1692	A
1	A	1700	U
1	A	1704	U
1	A	1707	C
1	A	1708	A
1	A	1713	A
1	A	1715	C
1	A	1716	U
1	A	1724	A
1	A	1727	A

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Mol	Chain	Res	Type
1	A	1728	U
1	A	1748	G
1	A	1765	C
1	A	1777	A
1	A	1805	A
1	A	1807	U
1	A	1809	U
1	A	1817	C
1	A	1821	A
1	A	1827	C
1	A	1828	A
1	A	1829	A
1	A	1832	A
1	A	1836	A
1	A	1844	A
1	A	1854	U
1	A	1856	A
1	A	1868	G
1	A	1869	A
1	A	1871	A
1	A	1882	A
1	A	1887	A
1	A	1893	A
1	A	1901	C
1	A	1903	C
1	A	1909	A
1	A	1918	G
1	A	1919	C
1	A	1937	A
1	A	1939	G
1	A	1940	A
1	A	1958	G
1	A	1984	A
1	A	1985	G
1	A	1992	C
1	A	1993	A
1	A	1994	A
1	A	2002	G
1	A	2003	A
1	A	2015	G
1	A	2022	G
1	A	2030	U

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Mol	Chain	Res	Type
1	A	2032	G
1	A	2036	C
1	A	2037	U
1	A	2039	A
1	A	2059	C
1	A	2060	A
1	A	2071	U
1	A	2079	C
1	A	2098	G
1	A	2099	U
1	A	2113	G
1	A	2125	C
1	A	2126	U
1	A	2132	A
1	A	2147	G
1	A	2155	A
1	A	2159	U
1	A	2160	A
1	A	2163	A
1	A	2168	U
1	A	2181	A
1	A	2183	C
1	A	2192	A
1	A	2194	U
1	A	2198	A
1	A	2200	A
1	A	2214	A
1	A	2219	C
1	A	2220	A
1	A	2221	C
1	A	2223	A
1	A	2225	C
1	A	2228	A
1	A	2237	A
1	A	2241	A
1	A	2243	A
1	A	2245	A
1	A	2262	C
1	A	2263	C
1	A	2283	C
1	A	2284	C
1	A	2285	U

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Mol	Chain	Res	Type
1	A	2297	A
1	A	2300	G
1	A	2321	A
1	A	2322	C
1	A	2331	C
1	A	2332	C
1	A	2345	G
1	A	2351	U
1	A	2356	A
1	A	2363	A
1	A	2371	U
1	A	2372	U
1	A	2374	A
1	A	2390	A
1	A	2399	A
1	A	2401	A
1	A	2406	A
1	A	2407	U
1	A	2414	C
1	A	2415	C
1	A	2416	U
1	A	2446	A
1	A	2451	A
1	A	2478	G
1	A	2493	C
1	A	2520	C
1	A	2521	A
1	A	2527	A
1	A	2540	C
1	A	2560	G
1	A	2570	C
1	A	2582	A
1	A	2592	G
1	A	2593	G
1	A	2599	U
1	A	2600	A
1	A	2601	A
1	A	2618	U
1	A	2625	C
1	A	2627	G
1	A	2628	U
1	A	2630	U

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Mol	Chain	Res	Type
1	A	2633	A
1	A	2635	G
1	A	2654	U
1	A	2656	U
1	A	2683	C
1	A	2686	G
1	A	2693	A
1	A	2694	A
1	A	2695	G
1	A	2696	A
1	A	2706	A
1	A	2718	C
1	A	2719	G
1	A	2723	A
1	A	2724	G
1	A	2725	A
1	A	2732	G
1	A	2792	A
1	A	2810	G
1	A	2815	G
1	A	2832	A
1	A	2833	A
1	A	2847	C
1	A	2859	A
1	A	2864	U
1	A	2865	C
1	A	2887	U
1	A	2889	C
1	A	2893	A
1	A	2910	A
1	A	2917	G
1	A	2922	A
1	A	2928	C
1	A	2935	A
1	A	2946	A
1	A	2956	A
1	A	2961	C
1	A	2985	C
1	A	2989	G
1	A	2990	A
1	A	2992	G
1	A	2993	U

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Mol	Chain	Res	Type
1	A	3005	A
1	A	3006	U
1	A	3007	C
1	A	3016	G
1	A	3041	U
1	A	3053	A
1	A	3054	G
1	A	3060	C
1	A	3086	U
1	A	3089	A
1	A	3090	G
1	A	3100	U
1	A	3101	A
1	A	3102	U
1	A	3108	U
1	A	3109	U
1	A	3110	C
1	A	3111	A
1	A	3112	A
1	A	3113	A
1	A	3150	U
1	A	3157	C
1	A	3158	A
1	A	3162	C
1	A	3169	C
1	A	3172	C
1	A	3176	A
1	A	3183	U
1	A	3188	U
1	A	3189	C
1	A	3190	A
1	A	3199	U
1	A	3200	U
1	A	3207	A
1	A	3208	C
1	A	3209	A
1	A	3210	C
1	A	3212	C
1	A	3217	A
1	A	3218	A
1	A	3220	A
1	A	3228	U

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Mol	Chain	Res	Type
1	A	3231	U
2	B	1603	A
2	B	1605	A
2	B	1609	U
2	B	1611	G
2	B	1617	C
2	B	1621	A
2	B	1646	U
2	B	1650	A
2	B	1652	C
2	B	1653	U
2	B	1654	U
2	B	1661	A
2	B	1664	G
54	AA	651	A
54	AA	680	U
54	AA	688	A
54	AA	689	U
54	AA	695	A
54	AA	704	U
54	AA	721	U
54	AA	737	C
54	AA	753	A
54	AA	761	A
54	AA	766	G
54	AA	777	G
54	AA	791	G
54	AA	796	G
54	AA	808	C
54	AA	814	A
54	AA	815	C
54	AA	830	U
54	AA	832	U
54	AA	835	C
54	AA	836	A
54	AA	860	A
54	AA	861	U
54	AA	868	C
54	AA	871	A
54	AA	890	C
54	AA	903	U
54	AA	907	A

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Mol	Chain	Res	Type
54	AA	919	A
54	AA	929	A
54	AA	930	G
54	AA	931	C
54	AA	932	C
54	AA	933	G
54	AA	938	A
54	AA	939	A
54	AA	942	A
54	AA	954	C
54	AA	956	C
54	AA	960	C
54	AA	962	C
54	AA	965	C
54	AA	966	A
54	AA	967	A
54	AA	1001	C
54	AA	1011	C
54	AA	1015	A
54	AA	1028	G
54	AA	1042	U
54	AA	1048	C
54	AA	1049	A
54	AA	1065	C
54	AA	1069	A
54	AA	1081	U
54	AA	1082	A
54	AA	1103	A
54	AA	1105	C
54	AA	1106	C
54	AA	1107	U
54	AA	1109	A
54	AA	1118	A
54	AA	1119	U
54	AA	1121	A
54	AA	1126	A
54	AA	1137	A
54	AA	1138	G
54	AA	1144	U
54	AA	1151	C
54	AA	1153	C
54	AA	1160	A

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Mol	Chain	Res	Type
54	AA	1167	A
54	AA	1187	U
54	AA	1189	U
54	AA	1200	G
54	AA	1220	A
54	AA	1223	C
54	AA	1225	C
54	AA	1229	U
54	AA	1237	A
54	AA	1247	G
54	AA	1248	C
54	AA	1251	A
54	AA	1261	C
54	AA	1271	C
54	AA	1273	G
54	AA	1284	U
54	AA	1285	G
54	AA	1290	C
54	AA	1291	U
54	AA	1292	A
54	AA	1295	A
54	AA	1312	C
54	AA	1326	A
54	AA	1327	G
54	AA	1343	A
54	AA	1344	U
54	AA	1353	A
54	AA	1354	A
54	AA	1378	C
54	AA	1387	A
54	AA	1390	A
54	AA	1392	A
54	AA	1405	C
54	AA	1420	U
54	AA	1430	A
54	AA	1447	G
54	AA	1478	A
54	AA	1481	C
54	AA	1514	A
54	AA	1519	A
54	AA	1520	U
54	AA	1522	U

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Mol	Chain	Res	Type
54	AA	1525	C
54	AA	1527	A
54	AA	1533	C
54	AA	1536	A
54	AA	1537	C
54	AA	1539	C
54	AA	1557	A
54	AA	1568	U
54	AA	1571	U
54	AA	1582	G
54	AA	1584	A
54	AA	1594	G
54	AA	1595	G
54	AA	1599	A
85	w	3	G
85	w	7	A
85	w	9	A
85	w	16	A
85	w	21	A
85	w	22	A
85	w	30	G
85	w	46	A
85	w	49	U
85	w	50	A
85	w	55	A
85	w	56	A
85	w	61	U
85	w	65	A
85	w	68	U
85	w	71	C
86	x	3	G
86	x	25	C
86	x	44	A
86	x	45	G
86	x	46	A
86	x	48	U
86	x	49	G
86	x	59	U
86	x	75	C
87	y	24	U
87	y	25	U

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	2112	A

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

7 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	$\# Z > 2$
45	AYA	k	2	45	6,7,8	0.79	0	5,8,10	0.68	0
62	IAS	AI	184	62	5,6,8	0.78	0	3,6,10	1.28	0
9	SAC	K	2	9	7,8,9	0.84	0	8,9,11	0.41	0
36	THC	b	2	36	8,9,10	0.73	0	9,11,13	0.67	0
82	AYA	A2	2	82	6,7,8	0.79	0	5,8,10	0.65	0
70	AYA	AQ	2	70	6,7,8	0.79	0	5,8,10	0.61	0
19	AYA	U	2	19	6,7,8	0.78	0	5,8,10	0.56	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
45	AYA	k	2	45	-	0/4/6/8	-
62	IAS	AI	184	62	-	1/3/5/8	-
9	SAC	K	2	9	-	0/7/8/10	-
36	THC	b	2	36	-	0/8/10/12	-
82	AYA	A2	2	82	-	0/4/6/8	-
70	AYA	AQ	2	70	-	0/4/6/8	-
19	AYA	U	2	19	-	1/4/6/8	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
62	AI	184	IAS	O-C-CA-CB
19	U	2	AYA	C-CA-N-CT

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 241 ligands modelled in this entry, 236 are monoatomic - leaving 5 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	$\# Z > 2$
92	ATP	AX	501	88	26,33,33	0.76	0	31,52,52	0.94	0
91	FES	r	201	7,51	0,4,4	-	-	-		
91	FES	AT	201	73,66	0,4,4	-	-	-		
91	FES	AP	201	58,69	0,4,4	-	-	-		
93	GTP	AX	503	-	26,34,34	1.27	3 (11%)	32,54,54	1.52	4 (12%)

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
92	ATP	AX	501	88	-	0/18/38/38	0/3/3/3
91	FES	r	201	7,51	-	-	0/1/1/1
91	FES	AT	201	73,66	-	-	0/1/1/1
91	FES	AP	201	58,69	-	-	0/1/1/1
93	GTP	AX	503	-	-	0/18/38/38	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
93	AX	503	GTP	C5-C6	-4.05	1.39	1.47
93	AX	503	GTP	C6-N1	-2.93	1.33	1.37
93	AX	503	GTP	C2-N3	2.23	1.38	1.33

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
93	AX	503	GTP	C2-N1-C6	-4.87	116.14	125.10
93	AX	503	GTP	C5-C6-N1	4.50	121.90	113.95
93	AX	503	GTP	C8-N7-C5	3.01	108.72	102.99
93	AX	503	GTP	O6-C6-C5	-2.74	119.01	124.37

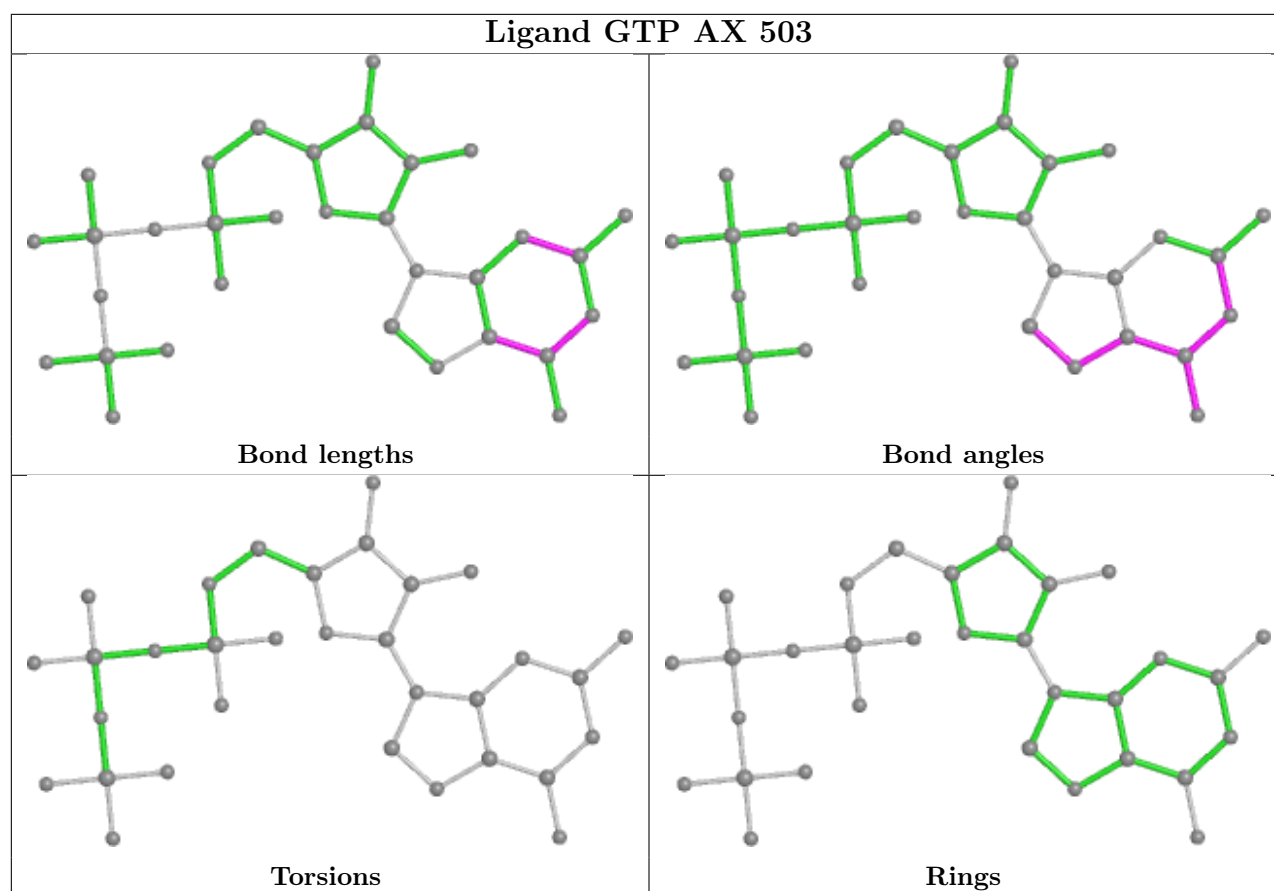
There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
87	y	1
86	x	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	y	26:A	O3'	46:U	P	66.86
1	x	15:A	O3'	21:A	P	10.04

6 Map visualisation

This section contains visualisations of the EMDB entry EMD-11279. 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

This section was not generated.

6.2 Central slices

This section was not generated.

6.3 Largest variance slices

This section was not generated.

6.4 Orthogonal surface views

This section was not generated.

6.5 Mask visualisation

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

7 Map analysis ⓘ

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

7.1 Map-value distribution ⓘ

This section was not generated.

7.2 Volume estimate versus contour level ⓘ

This section was not generated.

7.3 Rotationally averaged power spectrum ⓘ

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

8 Fourier-Shell correlation ⓘ

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit

This section was not generated.