



Full wwPDB EM Validation Report ⓘ

Oct 8, 2022 – 04:23 pm BST

PDB ID : 7PIC
EMDB ID : EMD-13436
Title : 70S ribosome with P/E-site tRNA in spectinomycin-treated *Mycoplasma pneumoniae* cells
Authors : Xue, L.; Lenz, S.; Rappsilber, J.; Mahamid, J.
Deposited on : 2021-08-19
Resolution : 9.10 Å (reported)
Based on initial models : 7OOD, 7OOC, 4V7C

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:

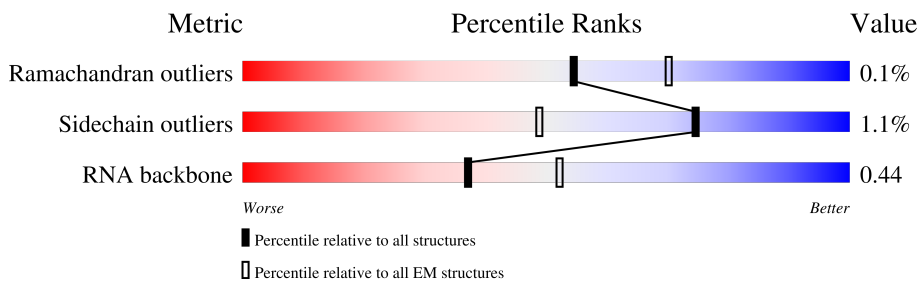
EMDB validation analysis : 0.0.1.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

1 Overall quality at a glance

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

The reported resolution of this entry is 9.10 Å.

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



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

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

Mol	Chain	Length	Quality of chain
1	0	48	
2	1	59	
3	2	37	
4	A	294	
5	B	273	
6	C	205	
7	D	219	
8	E	215	

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Mol	Chain	Length	Quality of chain
9	F	155	15% 99%
10	G	142	13% 99%
11	H	132	13% 96%
12	I	108	17% 94% 6%
13	J	121	11% 93% 6%
14	K	139	10% 95%
15	L	124	23% 94% 5%
16	M	61	11% 97%
17	N	86	97%
18	O	94	7% 85% 15%
19	P	85	7% 94%
20	Q	104	62% 38%
21	R	87	13% 97%
22	S	87	89% 11%
23	T	60	88% 12%
24	a	287	7% 99%
25	b	287	11% 80% 20%
26	c	212	5% 99%
27	d	180	16% 97%
28	e	184	16% 96%
29	f	149	45% 95%
30	g	161	16% 67% 9% 24%
31	h	137	42% 93% 7%
32	i	146	5% 98%
33	j	122	14% 99%

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Mol	Chain	Length	Quality of chain
34	k	151	7% 97%
35	l	139	7% 96%
36	m	124	8% 95%
37	n	116	11% 96%
38	o	119	7% 97%
39	p	127	90% 10%
40	q	100	97%
41	r	159	86% 13%
42	s	237	38% 61%
43	t	111	14% 100%
44	u	104	8% 83% 17%
45	v	65	6% 97%
46	w	111	89% 10%
47	x	97	45% 55%
48	y	57	5% 91% 7%
49	z	53	94% 6%
50	3	2907	66% 32%
51	4	108	58% 39%
52	5	1520	69% 29%
53	8	76	62% 37%

2 Entry composition

There are 53 unique types of molecules in this entry. The entry contains 144500 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 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	47	380	236	81	61	2	0	0

- Molecule 2 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	1	59	477	300	99	77	1	0	0

- Molecule 3 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	2	37	304	189	65	46	4	0	0

- Molecule 4 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	A	240	1921	1226	334	352	9	0	0

- Molecule 5 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	B	215	1698	1073	313	307	5	0	0

- Molecule 6 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	C	203	1660	1051	314	290	5	0	0

- Molecule 7 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	D	153	1173	742	226	202	3	0	0

- Molecule 8 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	E	167	1362	857	240	263	2	0	0

- Molecule 9 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	F	154	1246	785	239	216	6	0	0

- Molecule 10 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	G	141	1110	723	193	192	2	0	0

- Molecule 11 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	H	128	1028	655	191	181	1	0	0

- Molecule 12 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	I	101	809	523	142	143	1	0	0

- Molecule 13 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	J	114	829	514	153	156	6	0	0

- Molecule 14 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	K	136	1076	680	213	181	2	0	0

- Molecule 15 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	L	118	951	594	191	166		0	0

- Molecule 16 is a protein called 30S ribosomal protein S14 type Z.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	M	60	474	302	96	72	4	0	0

- Molecule 17 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	N	83	673	428	125	120		0	0

- Molecule 18 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	O	80	646	414	119	111	2	0	0

- Molecule 19 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	P	83	675	425	135	115		0	0

- Molecule 20 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	Q	65	535	342	103	86	4	0	0

- Molecule 21 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	R	84	Total	C	N	O	S	0	0
			682	435	127	118	2		

- Molecule 22 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	S	77	Total	C	N	O	S	0	0
			629	383	135	111			

- Molecule 23 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	T	53	Total	C	N	O	S	0	0
			471	295	103	72	1		

- Molecule 24 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	a	285	Total	C	N	O	S	0	0
			2225	1385	437	397	6		

- Molecule 25 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	b	229	Total	C	N	O	S	0	0
			1762	1119	318	318	7		

- Molecule 26 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	c	210	Total	C	N	O	S	0	0
			1644	1047	297	297	3		

- Molecule 27 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	d	175	Total	C	N	O	S	0	0
			1388	893	245	246	4		

- Molecule 28 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	e	176	Total	C	N	O	0	0
			1396	899	247	250		

- Molecule 29 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	f	145	Total	C	N	O	S	0	0
			1182	763	206	210	3		

- Molecule 30 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	g	123	Total	C	N	O	S	0	0
			936	599	160	174	3		

- Molecule 31 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	h	128	Total	C	N	O	S	0	0
			959	616	160	177	6		

- Molecule 32 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	i	144	Total	C	N	O	S	0	0
			1164	737	213	209	5		

- Molecule 33 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	j	122	Total	C	N	O	S	0	0
			944	595	178	167	4		

- Molecule 34 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms				AltConf	Trace
34	k	148	Total	C	N	O	0	0
			1153	731	226	196		

- Molecule 35 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	l	136	1079	694	196	182	7	0	0

- Molecule 36 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	m	119	958	609	175	171	3	0	0

- Molecule 37 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	n	112	889	557	175	155	2	0	0

- Molecule 38 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	o	115	938	592	180	165	1	0	0

- Molecule 39 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	p	114	947	603	188	154	2	0	0

- Molecule 40 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	q	99	811	525	148	134	4	0	0

- Molecule 41 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	r	139	1068	663	207	191	7	0	0

- Molecule 42 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	s	92	Total	C	N	O	S	0	0
			720	475	122	122	1		

- Molecule 43 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	t	111	Total	C	N	O	S	0	0
			872	550	166	153	3		

- Molecule 44 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	u	86	Total	C	N	O	S	0	0
			657	409	130	117	1		

- Molecule 45 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	v	63	Total	C	N	O	S	0	0
			513	317	108	87	1		

- Molecule 46 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms				AltConf	Trace
46	w	100	Total	C	N	O	0	0
			818	517	153	148		

- Molecule 47 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	x	44	Total	C	N	O	S	0	0
			344	221	55	64	4		

- Molecule 48 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	y	56	Total	C	N	O	S	0	0
			452	274	98	75	5		

- Molecule 49 is a protein called 50S ribosomal protein L33 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	z	50	Total	C	N	O	S	0	0
			408	255	81	68	4		

- Molecule 50 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	3	2878	Total	C	N	O	P	0	0
			61664	27558	11236	19995	2875		

- Molecule 51 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	4	105	Total	C	N	O	P	0	0
			2239	1003	409	724	103		

- Molecule 52 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	5	1493	Total	C	N	O	P	0	0
			31943	14279	5792	10382	1490		

- Molecule 53 is a RNA chain called tRNA-Phe.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	8	76	Total	C	N	O	P	0	0
			1618	723	289	531	75		

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.

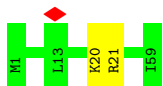
- Molecule 1: 50S ribosomal protein L34

Chain 0:  98%



- Molecule 2: 50S ribosomal protein L35

Chain 1:  97%




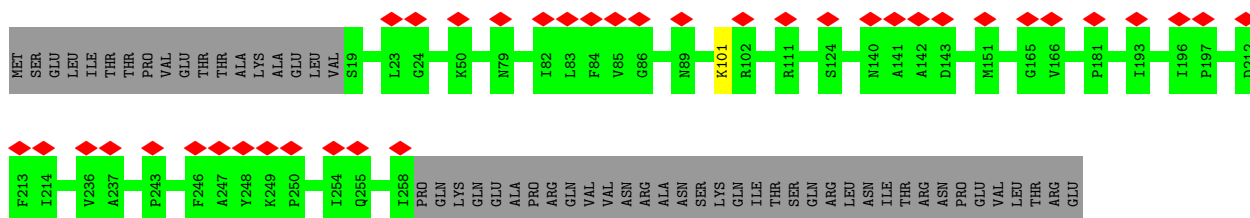
- Molecule 3: 50S ribosomal protein L36

Chain 2:  100%


There are no outlier residues recorded for this chain.

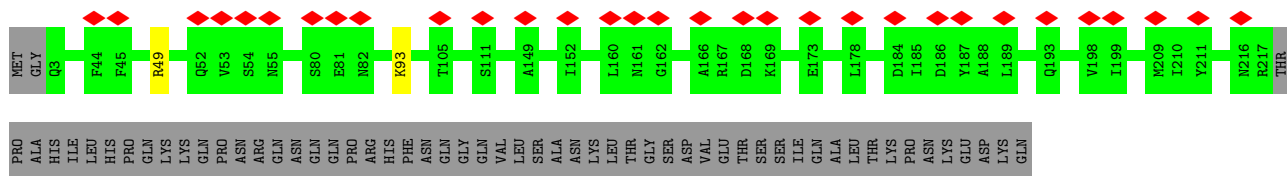
- Molecule 4: 30S ribosomal protein S2

Chain A:  13% 81% 18%

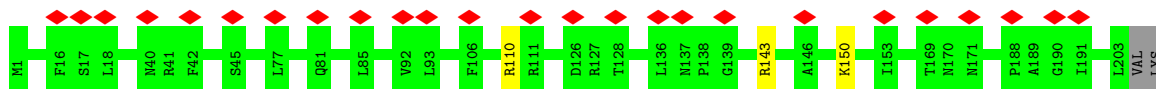


- Molecule 5: 30S ribosomal protein S3

Chain B:  11% 78% 21%



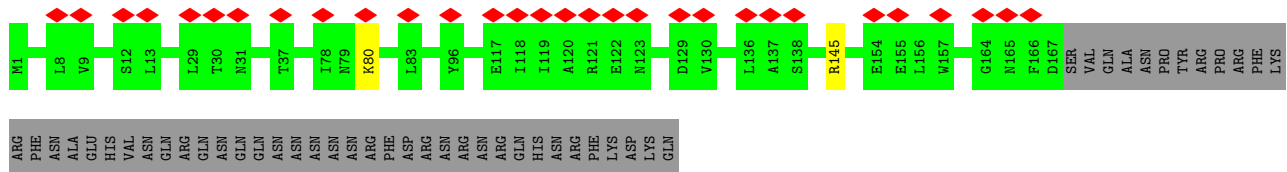
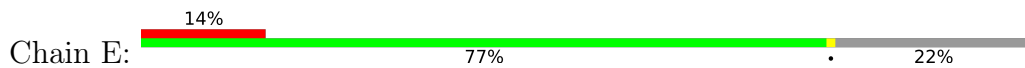
- Molecule 6: 30S ribosomal protein S4



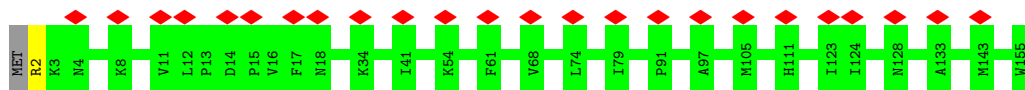
- Molecule 7: 30S ribosomal protein S5



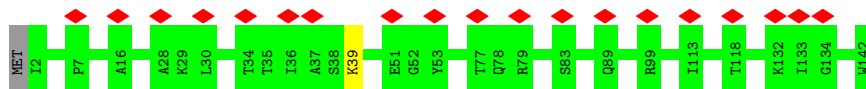
- Molecule 8: 30S ribosomal protein S6



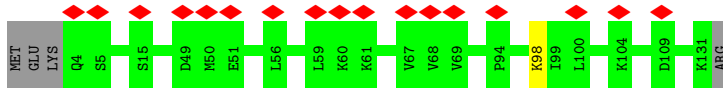
- Molecule 9: 30S ribosomal protein S7



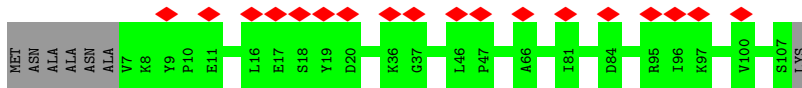
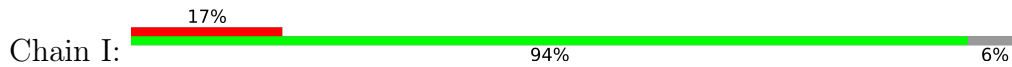
- Molecule 10: 30S ribosomal protein S8



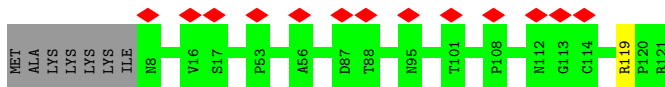
- Molecule 11: 30S ribosomal protein S9



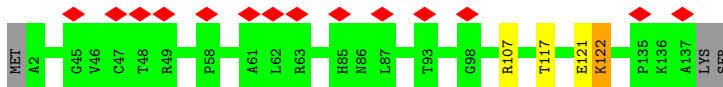
- Molecule 12: 30S ribosomal protein S10



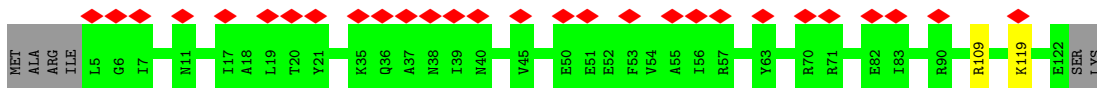
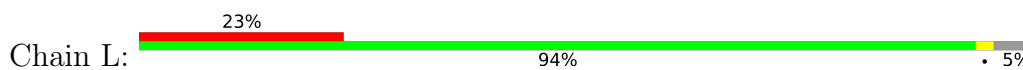
- Molecule 13: 30S ribosomal protein S11



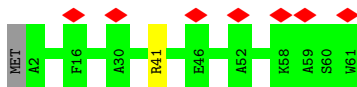
- Molecule 14: 30S ribosomal protein S12



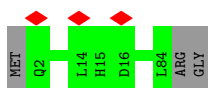
- Molecule 15: 30S ribosomal protein S13



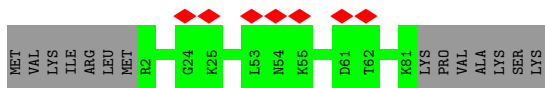
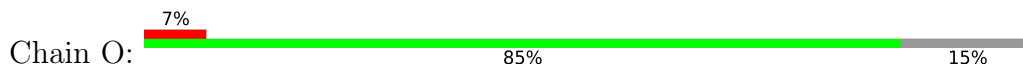
- Molecule 16: 30S ribosomal protein S14 type Z



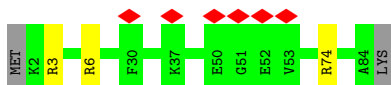
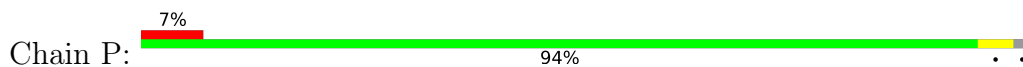
- Molecule 17: 30S ribosomal protein S15



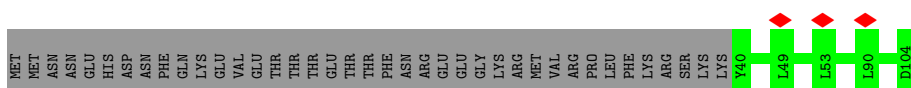
- Molecule 18: 30S ribosomal protein S16



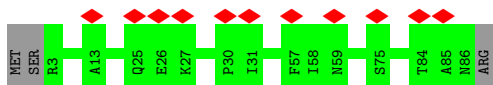
- Molecule 19: 30S ribosomal protein S17



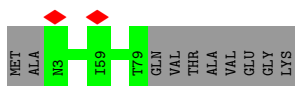
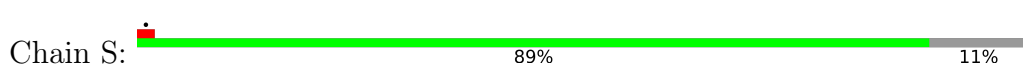
- Molecule 20: 30S ribosomal protein S18



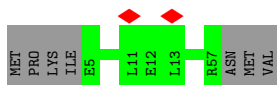
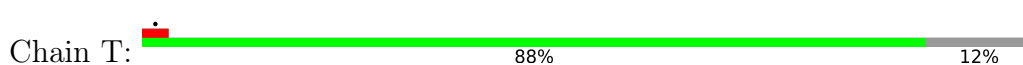
- Molecule 21: 30S ribosomal protein S19



- Molecule 22: 30S ribosomal protein S20

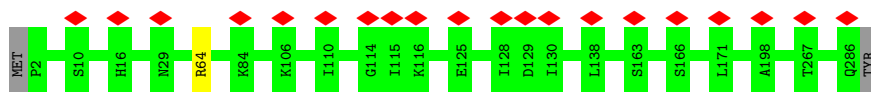


- Molecule 23: 30S ribosomal protein S21

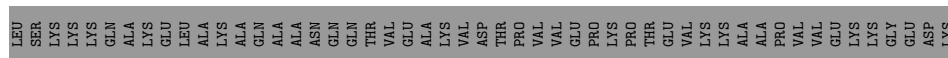
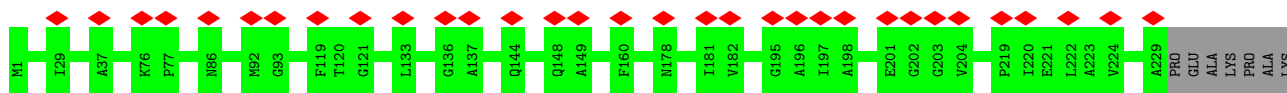
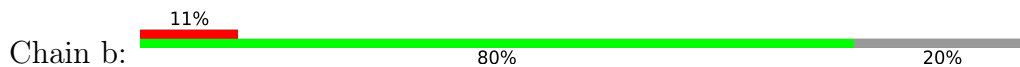


- Molecule 24: 50S ribosomal protein L2

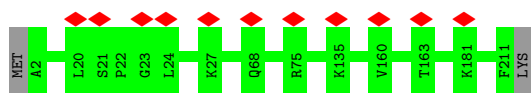




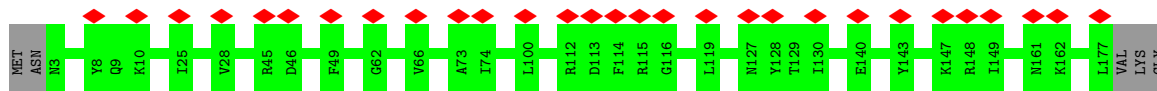
• Molecule 25: 50S ribosomal protein L3



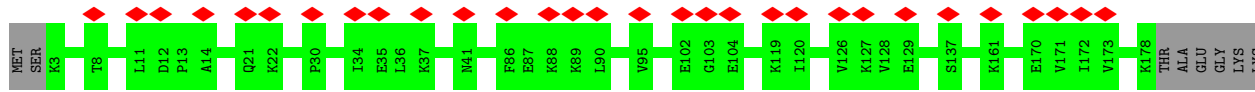
• Molecule 26: 50S ribosomal protein L4



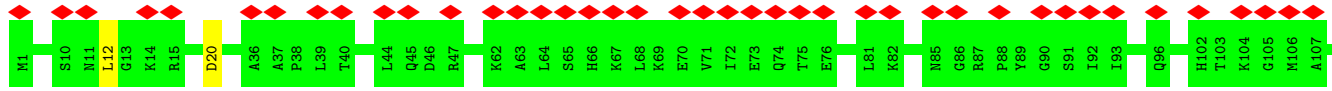
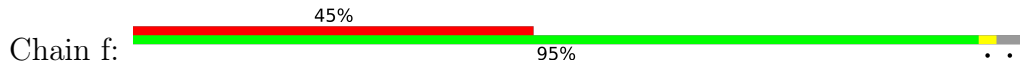
• Molecule 27: 50S ribosomal protein L5



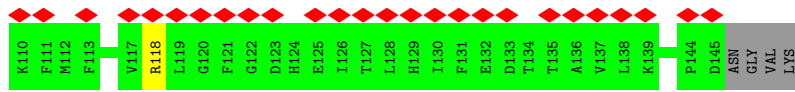
• Molecule 28: 50S ribosomal protein L6

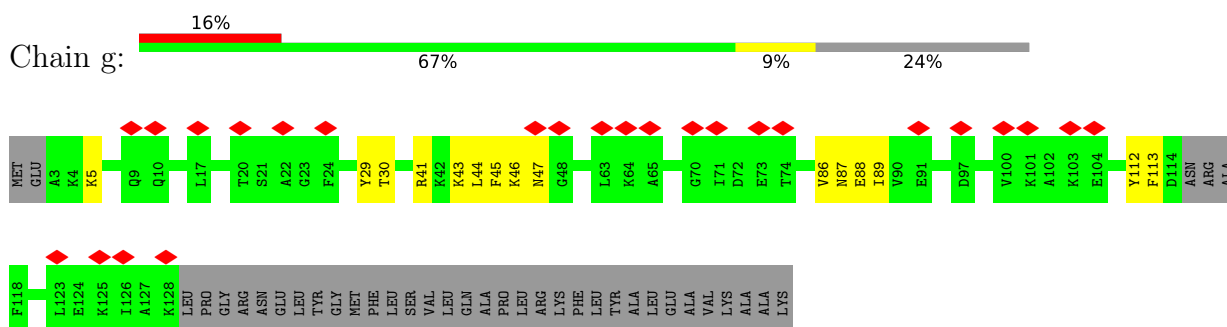


• Molecule 29: 50S ribosomal protein L9

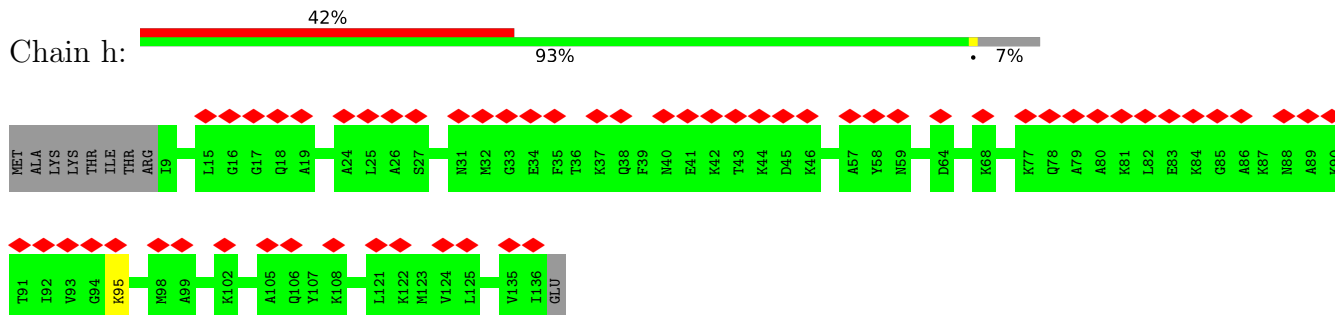


• Molecule 30: 50S ribosomal protein L10

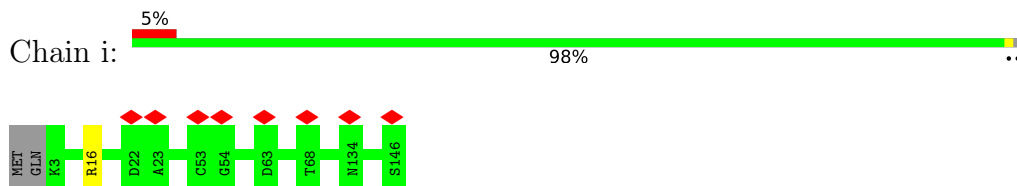




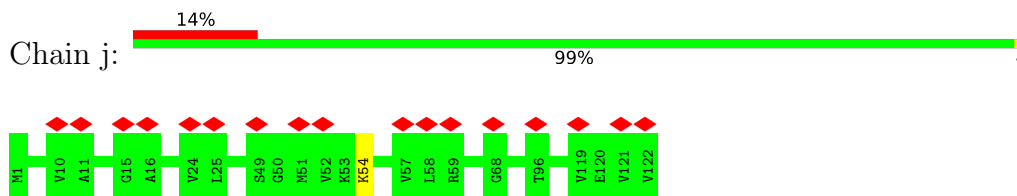
- Molecule 31: 50S ribosomal protein L11



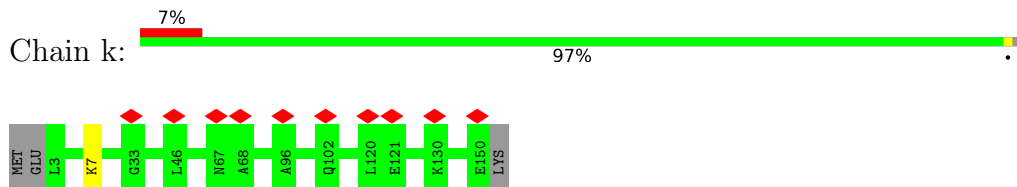
- Molecule 32: 50S ribosomal protein L13



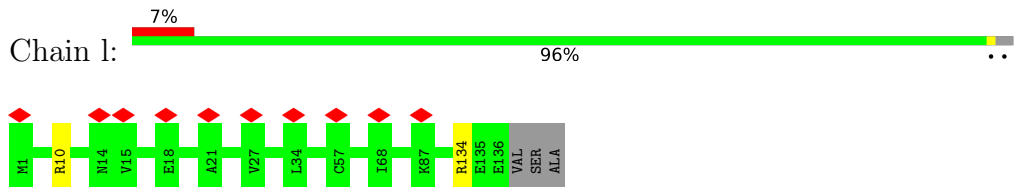
- Molecule 33: 50S ribosomal protein L14



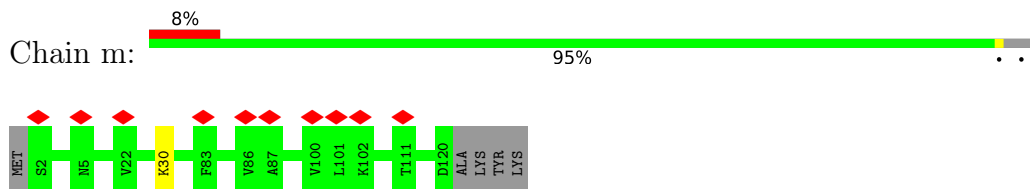
- Molecule 34: 50S ribosomal protein L15



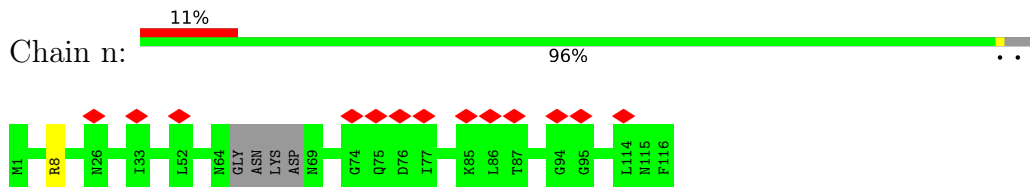
- Molecule 35: 50S ribosomal protein L16



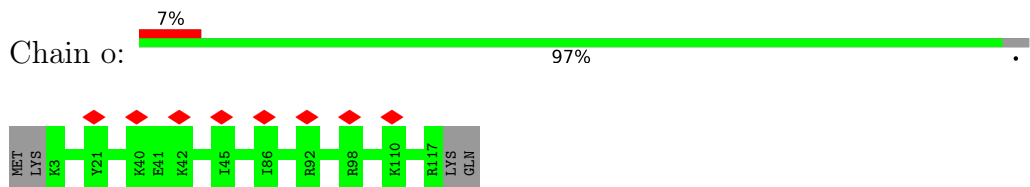
- Molecule 36: 50S ribosomal protein L17



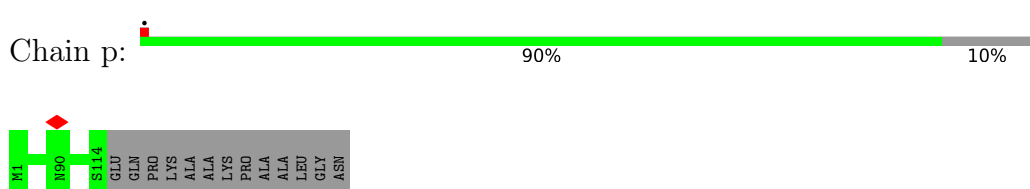
- Molecule 37: 50S ribosomal protein L18



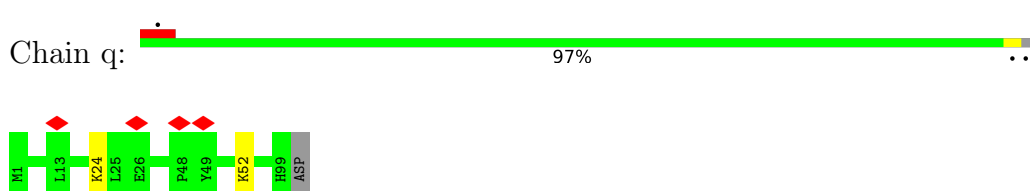
- Molecule 38: 50S ribosomal protein L19



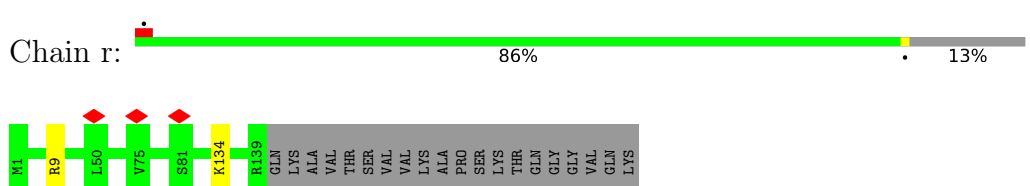
- Molecule 39: 50S ribosomal protein L20



- Molecule 40: 50S ribosomal protein L21

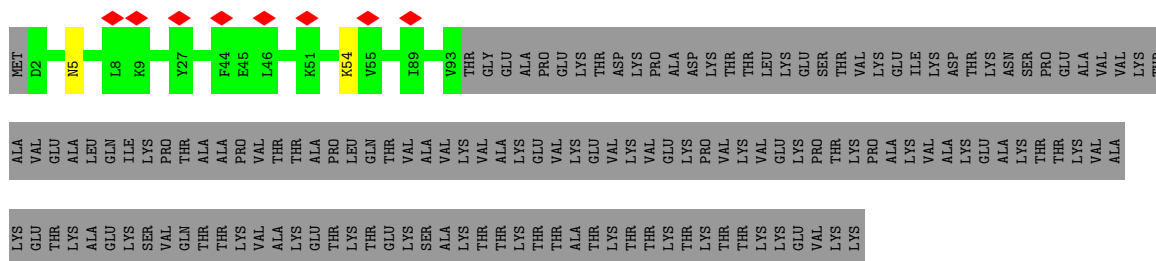


- Molecule 41: 50S ribosomal protein L22

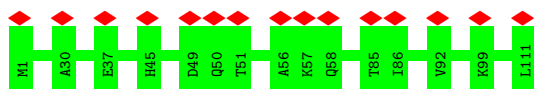


- Molecule 42: 50S ribosomal protein L23

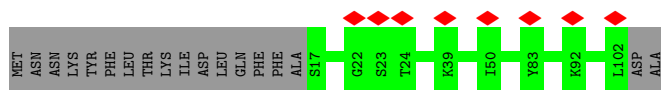
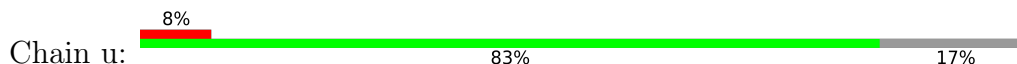




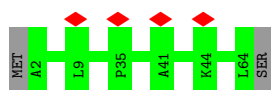
• Molecule 43: 50S ribosomal protein L24



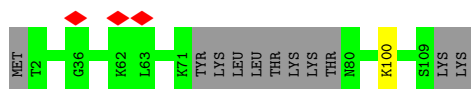
• Molecule 44: 50S ribosomal protein L27



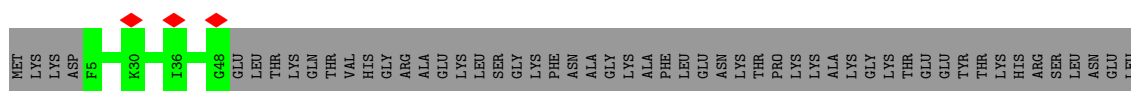
• Molecule 45: 50S ribosomal protein L28



• Molecule 46: 50S ribosomal protein L29

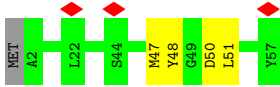


• Molecule 47: 50S ribosomal protein L31



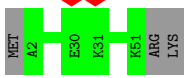
• Molecule 48: 50S ribosomal protein L32





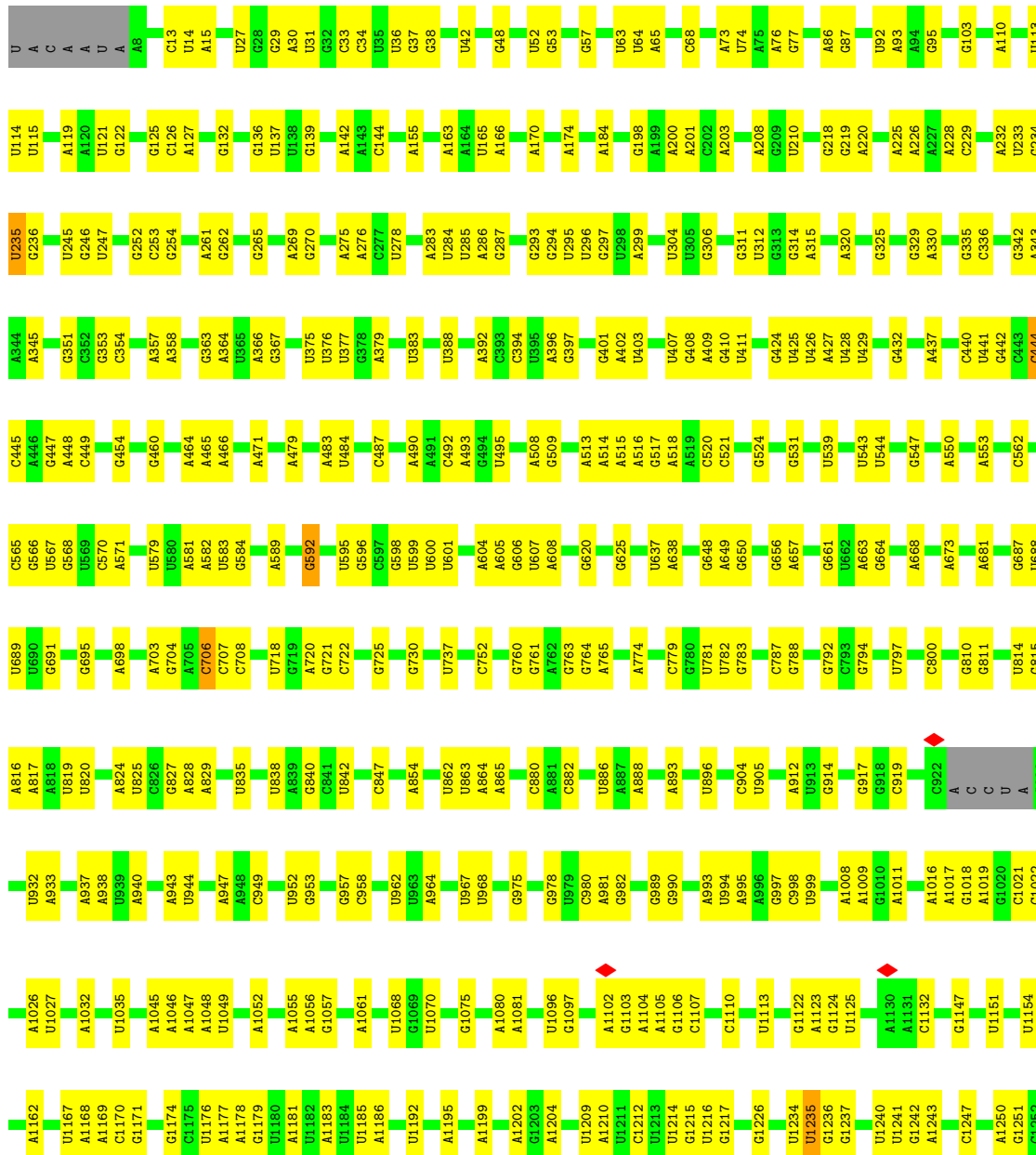
- Molecule 49: 50S ribosomal protein L33 1

Chain z: 94% 6%



- Molecule 50: 23S ribosomal RNA

Chain 3: 66% 32%



G1253	U1352	G1491	G1594	G1706	U1827	C1972	G2076	U2195	G2312	A2438	G2543	G2646	U2799
C1355	C1356	G1492	C1599	U1707	A1828	A1976	U2083	G2196	U2313	A2442	A2550	A2647	U2800
U1257	U1357	A1493	A1600	C1708	C1709	A1977	A2084	U2197	G2314	A2443	G2551	G2653	U2801
U1260	U1360	A1502	A1603	U1710	A1711	U1978	G2085	C2001	G2315	U2449	U2555	G2656	C2804
U1264	U1368	G1507	U1612	A1715	A1716	U1983	G2100	U2202	U2327	G2453	G2561	A2662	A2805
G1265	U1369	U1508	U1618	A1716	A1717	A1984	C2108	U2203	A2330	U2456	U2562	G2663	A2806
G1266	A1370	U1509	A1619	U1727	G1856	U1989	A2109	A2206	G2331	U2457	U2563	U2664	G2807
U1267	G1371	A1510	U1619	A1728	G1729	U1989	U2110	A2207	U2332	A2458	G2564	G2669	A2808
U1268	U1372	A1515	U1627	A1873	C1730	C1987	U2111	U2208	U2333	G2472	C2566	G2681	A2810
A1274	C1373	A1515	U1627	A1873	C1730	U1987	A2112	G2211	A2335	U2477	C2567	G2688	U2811
U1279	U1380	C1518	C1632	G1733	G1733	U1988	U2113	U2212	U2342	A2477	U2570	C2689	A2812
A1283	A1393	A1519	A1534	C1877	A1878	U1989	C2114	U2214	A2343	C2483	U2574	U2693	A2813
A1284	A1408	A1522	A1534	C1877	A1878	U1989	A2115	U2215	A2344	A2484	G2575	U2693	G2815
U1285	G1408	C1523	U1529	A1879	G1880	U1989	U2116	U2220	U2350	U2487	G2578	C2697	A2822
U1286	U1418	C1523	U1529	A1879	G1880	U1989	G2117	A2220	C2350	C2488	A2578	U2698	A2823
C1287	U1422	U1529	U1529	A1879	G1880	U1989	G2117	A2220	C2351	U2488	A2578	C2698	A2824
A1292	U1423	U1529	U1529	A1879	G1880	U1989	G2117	A2220	C2352	U2488	A2578	C2698	A2825
U1293	U1424	U1529	U1529	A1879	G1880	U1989	G2117	A2220	C2353	U2488	A2578	C2698	A2826
U1297	U1425	U1529	U1529	A1879	G1880	U1989	G2117	A2220	C2354	U2488	A2578	C2698	A2827
A1298	C1426	U1529	U1529	A1879	G1880	U1989	G2117	A2220	C2355	U2488	A2578	C2698	A2830
G1301	A1431	U1546	A1650	G1763	U1764	U2009	U2125	U2244	A2362	U2496	A2584	G2714	U2831
C1302	A1431	G1547	C1651	G1766	U1766	A2011	A2126	U2244	A2362	U2496	A2584	G2714	U2831
U1303	A1435	A1548	A1652	A1767	G1768	A2012	A2126	U2244	A2362	U2496	A2584	G2714	U2831
U1304	A1436	U1549	A1655	A1769	G1768	A2013	A2133	U2246	U2365	U2497	U2586	C2721	G2835
G1311	C1436	G1550	A1655	A1770	G1771	A2028	G2134	G2246	U2365	U2499	U2586	C2722	U2836
A1314	G1446	U1557	A1663	C1771	G1772	A2030	A2137	U2251	G2373	U2500	U2588	A2713	U2837
U1315	A1447	A1558	U1663	A1772	G1772	A2037	U2138	G2254	G2379	C2502	C2594	G2714	U2838
U1316	U1447	A1559	U1669	A1780	G1780	A2038	C2138	G2254	G2379	C2504	A2595	A2741	U2839
C1317	A1457	A1559	U1670	A1784	G1784	G2039	G2140	G2259	A2382	C2506	U2604	U2747	U2862
A1322	C1456	U1570	U1679	U1786	U1786	A2040	A2145	C2282	G2391	C2507	G2605	U2747	U2862
A1323	A1457	G1571	A1680	A1787	U1788	G2041	U2149	A2276	U2392	U2508	A2606	G2752	U2863
A1324	A1459	A1570	A1681	A1788	C1789	A2042	C2150	G2278	C2393	C2509	A2611	A2756	A2864
C1326	G1463	A1570	A1682	C1789	U1790	A2046	U2153	G2279	G2397	G2510	G2618	A2760	U2865
G1327	U1466	G1571	A1683	U1791	A1791	G2056	A2154	U2280	C2410	U2511	C2619	C2760	G2871
U1329	U1467	G1571	U1687	A1794	A1794	A2056	A2157	A2281	C2411	U2512	U2620	U2764	A2872
U1330	U1470	G1571	U1687	A1794	A1794	A2056	A2157	A2281	C2411	U2513	A2622	A2766	G2876
G1331	C1470	G1574	A1694	A1798	A1798	G2059	U2163	U2281	G2415	U2514	A2622	A2766	A2881
U1334	A1479	A1577	U1699	C1807	C1808	G2062	U2163	U2281	G2415	U2514	A2622	A2766	U2882
U1341	U1480	A1577	A1699	C1807	C1808	G2062	U2163	U2281	G2415	U2514	A2622	A2766	A2883
C1342	U1481	A1577	A1699	C1807	C1808	G2062	U2163	U2281	G2415	U2514	A2622	A2766	C2884
G1483	U1482	U1586	G1700	U1815	A1816	A2066	G2169	A2295	C2428	U2526	C2633	A2774	U2888
A1350	G1484	U1587	A1702	U1820	A1820	A2067	A2170	A2296	U2431	U2527	U2636	A2786	U2889
G1351	A1485	U1588	A1703	G1821	A1821	G2068	A2171	U2289	C2432	C2633	U2637	U2787	G2890
G1353	U1487	A1589	C1704	G1822	A1822	A2069	A2179	C2302	A2433	C2633	U2637	U2788	A2895
			U1705	U1823	A1823	C2070	U2180	C2302	C2436	C2633	U2637	U2789	G2896
						U2075	U2193	C2305	C2437	C2633	U2637	U2791	A2898

C2889
U2900
U A A
U U U G G A

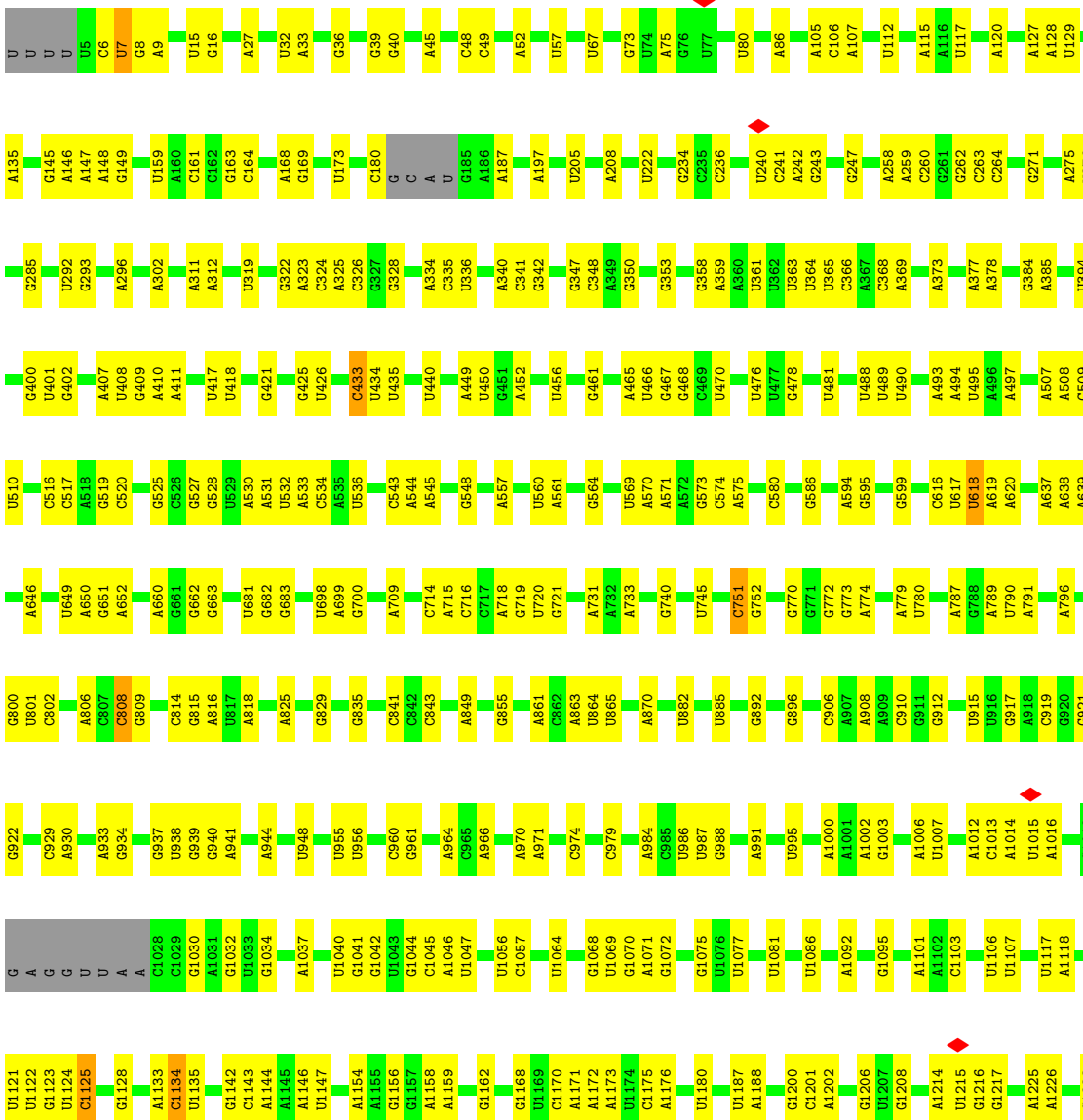
• Molecule 51: 5S ribosomal RNA

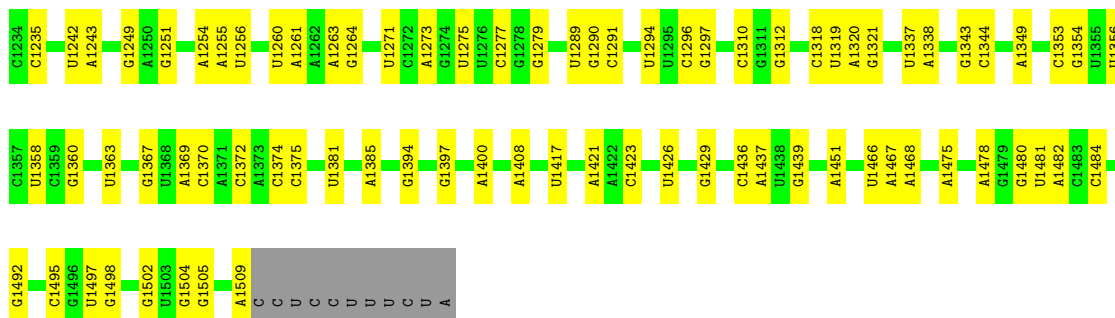
Chain 4: 58% 39%



• Molecule 52: 16S ribosomal RNA

Chain 5: 69% 29%





• Molecule 53: tRNA-Phe



4 Experimental information

Property	Value	Source
EM reconstruction method	SUBTOMOGRAM AVERAGING	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of subtomograms used	721	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 ($e^-/\text{\AA}^2$)	3.2	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	3750	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.735	Depositor
Minimum map value	-0.678	Depositor
Average map value	0.024	Depositor
Map value standard deviation	0.122	Depositor
Recommended contour level	0.37	Depositor
Map size (Å)	435.328, 435.328, 435.328	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.7005, 1.7005, 1.7005	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.23	0/383	0.38	0/504
2	1	0.24	0/484	0.43	0/637
3	2	0.22	0/306	0.46	0/401
4	A	0.24	0/1954	0.42	0/2642
5	B	0.24	0/1721	0.47	0/2323
6	C	0.24	0/1691	0.44	0/2267
7	D	0.24	0/1188	0.47	0/1593
8	E	0.25	0/1384	0.44	0/1867
9	F	0.23	0/1266	0.43	0/1700
10	G	0.24	0/1126	0.47	0/1517
11	H	0.24	0/1044	0.48	0/1395
12	I	0.23	0/820	0.49	0/1103
13	J	0.24	0/844	0.42	0/1136
14	K	0.28	0/1094	0.52	0/1468
15	L	0.23	0/962	0.44	0/1289
16	M	0.25	0/483	0.45	0/643
17	N	0.23	0/679	0.44	0/907
18	O	0.23	0/659	0.42	0/885
19	P	0.24	0/684	0.46	0/913
20	Q	0.24	0/545	0.44	0/730
21	R	0.24	0/698	0.45	0/936
22	S	0.23	0/631	0.38	0/838
23	T	0.23	0/475	0.41	0/621
24	a	0.23	0/2267	0.44	0/3044
25	b	0.26	0/1795	0.49	0/2412
26	c	0.25	0/1671	0.45	0/2246
27	d	0.24	0/1409	0.45	0/1894
28	e	0.25	0/1420	0.45	0/1912
29	f	0.25	0/1205	0.52	2/1616 (0.1%)
30	g	3.79	6/944 (0.6%)	0.62	0/1260
31	h	0.25	0/968	0.45	0/1298
32	i	0.23	0/1186	0.43	0/1592
33	j	0.24	0/953	0.46	0/1275
34	k	0.24	0/1170	0.46	0/1559

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	l	0.24	0/1104	0.46	0/1481
36	m	0.24	0/973	0.46	0/1309
37	n	0.23	0/897	0.45	0/1198
38	o	0.24	0/948	0.45	0/1262
39	p	0.23	0/961	0.37	0/1278
40	q	0.23	0/828	0.48	0/1111
41	r	0.25	0/1077	0.46	0/1441
42	s	0.24	0/732	0.50	0/988
43	t	0.24	0/879	0.45	0/1165
44	u	0.24	0/665	0.48	0/884
45	v	0.23	0/519	0.45	0/695
46	w	0.22	0/826	0.43	0/1104
47	x	0.26	0/353	0.43	0/474
48	y	0.28	0/457	0.50	0/601
49	z	0.24	0/412	0.44	0/547
50	3	0.20	0/69073	0.80	50/107710 (0.0%)
51	4	0.19	0/2505	0.80	2/3902 (0.1%)
52	5	0.19	0/35768	0.80	38/55764 (0.1%)
53	8	0.18	0/1808	0.78	1/2817 (0.0%)
All	All	0.36	6/156894 (0.0%)	0.72	93/234154 (0.0%)

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
30	g	112	TYR	CD2-CE2	65.91	2.38	1.39
30	g	112	TYR	CD1-CE1	65.03	2.36	1.39
30	g	112	TYR	CE1-CZ	39.32	1.89	1.38
30	g	112	TYR	CE2-CZ	38.36	1.88	1.38
30	g	112	TYR	CG-CD2	31.20	1.79	1.39
30	g	112	TYR	CG-CD1	29.53	1.77	1.39

All (93) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
52	5	808	C	C2-N1-C1'	9.02	128.73	118.80
52	5	264	C	N3-C2-O2	-8.70	115.81	121.90
50	3	2567	C	N3-C2-O2	-8.66	115.84	121.90
52	5	843	C	N3-C2-O2	-8.29	116.09	121.90
50	3	2428	C	N3-C2-O2	-8.06	116.26	121.90
50	3	1786	U	C2-N1-C1'	7.94	127.23	117.70
52	5	808	C	N1-C2-O2	7.89	123.63	118.90
52	5	7	U	C2-N1-C1'	7.77	127.02	117.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	3	2633	C	N3-C2-O2	-7.43	116.70	121.90
52	5	1484	C	N3-C2-O2	-7.39	116.73	121.90
52	5	906	C	N3-C2-O2	-7.38	116.73	121.90
50	3	34	C	N3-C2-O2	-7.35	116.76	121.90
29	f	12	LEU	CA-CB-CG	7.32	132.13	115.30
50	3	394	C	N3-C2-O2	-7.31	116.78	121.90
50	3	445	C	N3-C2-O2	-7.18	116.88	121.90
50	3	2302	C	N3-C2-O2	-7.15	116.90	121.90
52	5	714	C	N3-C2-O2	-7.11	116.92	121.90
50	3	706	C	N1-C2-O2	6.99	123.09	118.90
50	3	1341	U	C2-N1-C1'	6.99	126.09	117.70
52	5	1134	C	C2-N1-C1'	6.99	126.49	118.80
50	3	2199	C	N3-C2-O2	-6.88	117.08	121.90
50	3	144	C	N3-C2-O2	-6.87	117.09	121.90
50	3	1341	U	N1-C2-O2	6.86	127.60	122.80
50	3	235	U	C2-N1-C1'	6.83	125.90	117.70
50	3	1235	U	C2-N1-C1'	6.81	125.88	117.70
50	3	2428	C	N1-C2-O2	6.81	122.99	118.90
50	3	1507	G	O4'-C1'-N9	6.74	113.59	108.20
50	3	1786	U	N1-C2-O2	6.69	127.48	122.80
52	5	164	C	N3-C2-O2	-6.69	117.22	121.90
52	5	1134	C	N1-C2-O2	6.68	122.91	118.90
50	3	1697	C	N3-C2-O2	-6.64	117.25	121.90
50	3	1931	C	N3-C2-O2	-6.64	117.25	121.90
50	3	1786	U	N3-C2-O2	-6.58	117.59	122.20
52	5	808	C	N3-C2-O2	-6.56	117.31	121.90
52	5	7	U	N1-C2-O2	6.53	127.37	122.80
52	5	263	C	N1-C2-O2	6.52	122.81	118.90
51	4	58	C	N3-C2-O2	-6.38	117.44	121.90
50	3	521	C	N3-C2-O2	-6.37	117.44	121.90
50	3	2567	C	N1-C2-O2	6.34	122.70	118.90
52	5	808	C	C6-N1-C1'	-6.34	113.19	120.80
52	5	906	C	N1-C2-O2	6.30	122.68	118.90
50	3	1235	U	N1-C2-O2	6.24	127.17	122.80
50	3	1341	U	N3-C2-O2	-6.23	117.84	122.20
50	3	2199	C	N1-C2-O2	6.23	122.64	118.90
52	5	751	C	C2-N1-C1'	6.18	125.60	118.80
50	3	1235	U	N3-C2-O2	-6.16	117.89	122.20
50	3	1956	G	N1-C6-O6	-6.15	116.21	119.90
50	3	707	C	N3-C2-O2	-6.13	117.61	121.90
52	5	161	C	N3-C2-O2	-6.07	117.65	121.90
52	5	164	C	N1-C2-O2	6.07	122.54	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
52	5	263	C	C2-N1-C1'	6.05	125.46	118.80
50	3	592	G	C5-C6-O6	6.00	132.20	128.60
52	5	714	C	N1-C2-O2	6.00	122.50	118.90
52	5	7	U	N3-C2-O2	-5.98	118.02	122.20
52	5	335	C	N3-C2-O2	-5.96	117.73	121.90
50	3	706	C	C2-N1-C1'	5.83	125.21	118.80
50	3	394	C	N1-C2-O2	5.79	122.37	118.90
50	3	592	G	N1-C6-O6	-5.73	116.46	119.90
52	5	618	U	N1-C2-O2	5.73	126.81	122.80
50	3	1316	U	N1-C2-O2	5.68	126.78	122.80
52	5	1162	G	N1-C6-O6	-5.65	116.51	119.90
52	5	808	C	C6-N1-C2	-5.63	118.05	120.30
50	3	444	C	N1-C2-O2	5.58	122.25	118.90
50	3	707	C	C6-N1-C2	-5.58	118.07	120.30
52	5	1125	C	N3-C2-O2	-5.58	117.99	121.90
50	3	454	G	N3-C4-N9	5.56	129.33	126.00
52	5	618	U	C2-N1-C1'	5.55	124.36	117.70
52	5	1277	C	C2-N1-C1'	5.55	124.91	118.80
52	5	618	U	N3-C2-O2	-5.55	118.31	122.20
51	4	58	C	N1-C2-O2	5.51	122.20	118.90
50	3	1247	C	N3-C2-O2	-5.49	118.06	121.90
50	3	1316	U	C2-N1-C1'	5.48	124.28	117.70
50	3	144	C	N1-C2-O2	5.48	122.19	118.90
50	3	2493	G	N1-C6-O6	-5.40	116.66	119.90
50	3	2632	C	N1-C2-O2	5.35	122.11	118.90
52	5	264	C	C6-N1-C2	-5.28	118.19	120.30
50	3	919	C	C2-N1-C1'	5.27	124.60	118.80
52	5	433	C	N3-C2-O2	-5.27	118.21	121.90
52	5	1436	C	N3-C2-O2	-5.27	118.21	121.90
52	5	335	C	N1-C2-O2	5.24	122.04	118.90
29	f	20	ASP	CB-CG-OD2	5.17	122.96	118.30
50	3	2566	C	N1-C2-O2	5.12	121.97	118.90
52	5	7	U	C6-N1-C1'	-5.12	114.04	121.20
50	3	2632	C	C2-N1-C1'	5.11	124.42	118.80
52	5	1502	G	N1-C6-O6	-5.10	116.84	119.90
50	3	1786	U	C6-N1-C1'	-5.08	114.08	121.20
53	8	20	G	O4'-C1'-N9	5.07	112.25	108.20
50	3	2531	C	N1-C2-O2	5.06	121.94	118.90
50	3	235	U	C6-N1-C1'	-5.04	114.14	121.20
52	5	263	C	C6-N1-C1'	-5.03	114.77	120.80
50	3	2005	G	N3-C2-N2	5.02	123.41	119.90
52	5	843	C	C6-N1-C2	-5.02	118.29	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	3	1956	G	C5-C6-O6	5.01	131.61	128.60

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 [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	45/48 (94%)	43 (96%)	2 (4%)	0	100	100
2	1	57/59 (97%)	52 (91%)	5 (9%)	0	100	100
3	2	35/37 (95%)	33 (94%)	2 (6%)	0	100	100
4	A	238/294 (81%)	225 (94%)	13 (6%)	0	100	100
5	B	213/273 (78%)	200 (94%)	13 (6%)	0	100	100
6	C	201/205 (98%)	188 (94%)	13 (6%)	0	100	100
7	D	151/219 (69%)	150 (99%)	1 (1%)	0	100	100
8	E	165/215 (77%)	148 (90%)	17 (10%)	0	100	100
9	F	152/155 (98%)	136 (90%)	16 (10%)	0	100	100
10	G	139/142 (98%)	126 (91%)	13 (9%)	0	100	100
11	H	126/132 (96%)	111 (88%)	15 (12%)	0	100	100
12	I	99/108 (92%)	90 (91%)	9 (9%)	0	100	100
13	J	112/121 (93%)	109 (97%)	3 (3%)	0	100	100
14	K	134/139 (96%)	124 (92%)	9 (7%)	1 (1%)	22	63
15	L	116/124 (94%)	102 (88%)	14 (12%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
16	M	58/61 (95%)	55 (95%)	3 (5%)	0	100	100
17	N	81/86 (94%)	80 (99%)	1 (1%)	0	100	100
18	O	78/94 (83%)	76 (97%)	2 (3%)	0	100	100
19	P	81/85 (95%)	79 (98%)	2 (2%)	0	100	100
20	Q	63/104 (61%)	55 (87%)	8 (13%)	0	100	100
21	R	82/87 (94%)	74 (90%)	8 (10%)	0	100	100
22	S	75/87 (86%)	74 (99%)	1 (1%)	0	100	100
23	T	51/60 (85%)	50 (98%)	1 (2%)	0	100	100
24	a	283/287 (99%)	264 (93%)	19 (7%)	0	100	100
25	b	227/287 (79%)	208 (92%)	19 (8%)	0	100	100
26	c	208/212 (98%)	192 (92%)	16 (8%)	0	100	100
27	d	173/180 (96%)	159 (92%)	14 (8%)	0	100	100
28	e	174/184 (95%)	161 (92%)	13 (8%)	0	100	100
29	f	143/149 (96%)	130 (91%)	13 (9%)	0	100	100
30	g	119/161 (74%)	100 (84%)	16 (13%)	3 (2%)	5	32
31	h	126/137 (92%)	120 (95%)	6 (5%)	0	100	100
32	i	142/146 (97%)	133 (94%)	9 (6%)	0	100	100
33	j	120/122 (98%)	114 (95%)	6 (5%)	0	100	100
34	k	146/151 (97%)	140 (96%)	6 (4%)	0	100	100
35	l	134/139 (96%)	127 (95%)	7 (5%)	0	100	100
36	m	117/124 (94%)	115 (98%)	2 (2%)	0	100	100
37	n	108/116 (93%)	102 (94%)	6 (6%)	0	100	100
38	o	113/119 (95%)	110 (97%)	3 (3%)	0	100	100
39	p	112/127 (88%)	110 (98%)	2 (2%)	0	100	100
40	q	97/100 (97%)	85 (88%)	12 (12%)	0	100	100
41	r	137/159 (86%)	128 (93%)	9 (7%)	0	100	100
42	s	90/237 (38%)	88 (98%)	2 (2%)	0	100	100
43	t	109/111 (98%)	101 (93%)	8 (7%)	0	100	100
44	u	84/104 (81%)	78 (93%)	6 (7%)	0	100	100
45	v	61/65 (94%)	56 (92%)	5 (8%)	0	100	100
46	w	96/111 (86%)	92 (96%)	4 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
47	x	42/97 (43%)	42 (100%)	0	0	100	100
48	y	54/57 (95%)	50 (93%)	3 (6%)	1 (2%)	8	38
49	z	48/53 (91%)	45 (94%)	3 (6%)	0	100	100
All	All	5815/6670 (87%)	5430 (93%)	380 (6%)	5 (0%)	54	86

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
14	K	122	LYS
30	g	86	VAL
30	g	30	THR
48	y	51	LEU
30	g	88	GLU

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	40/41 (98%)	40 (100%)	0	100	100
2	1	51/51 (100%)	49 (96%)	2 (4%)	32	56
3	2	35/35 (100%)	35 (100%)	0	100	100
4	A	212/262 (81%)	211 (100%)	1 (0%)	88	93
5	B	180/232 (78%)	178 (99%)	2 (1%)	73	84
6	C	181/183 (99%)	178 (98%)	3 (2%)	60	78
7	D	123/178 (69%)	121 (98%)	2 (2%)	62	79
8	E	150/196 (76%)	148 (99%)	2 (1%)	69	81
9	F	131/132 (99%)	130 (99%)	1 (1%)	81	89
10	G	123/124 (99%)	122 (99%)	1 (1%)	81	89
11	H	111/115 (96%)	110 (99%)	1 (1%)	78	87
12	I	95/99 (96%)	95 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
13	J	91/97 (94%)	90 (99%)	1 (1%)	73	84
14	K	117/120 (98%)	113 (97%)	4 (3%)	37	60
15	L	100/105 (95%)	98 (98%)	2 (2%)	55	74
16	M	47/48 (98%)	46 (98%)	1 (2%)	53	72
17	N	76/78 (97%)	76 (100%)	0	100	100
18	O	69/82 (84%)	69 (100%)	0	100	100
19	P	73/75 (97%)	70 (96%)	3 (4%)	30	55
20	Q	56/94 (60%)	56 (100%)	0	100	100
21	R	74/77 (96%)	74 (100%)	0	100	100
22	S	70/77 (91%)	70 (100%)	0	100	100
23	T	49/56 (88%)	49 (100%)	0	100	100
24	a	241/243 (99%)	240 (100%)	1 (0%)	91	94
25	b	186/233 (80%)	186 (100%)	0	100	100
26	c	182/184 (99%)	182 (100%)	0	100	100
27	d	150/154 (97%)	150 (100%)	0	100	100
28	e	153/159 (96%)	153 (100%)	0	100	100
29	f	131/134 (98%)	130 (99%)	1 (1%)	81	89
30	g	99/129 (77%)	88 (89%)	11 (11%)	6	22
31	h	102/110 (93%)	101 (99%)	1 (1%)	76	86
32	i	126/128 (98%)	125 (99%)	1 (1%)	81	89
33	j	103/103 (100%)	102 (99%)	1 (1%)	76	86
34	k	123/126 (98%)	122 (99%)	1 (1%)	81	89
35	l	113/115 (98%)	111 (98%)	2 (2%)	59	77
36	m	105/109 (96%)	104 (99%)	1 (1%)	76	86
37	n	96/99 (97%)	95 (99%)	1 (1%)	76	86
38	o	101/105 (96%)	101 (100%)	0	100	100
39	p	100/108 (93%)	100 (100%)	0	100	100
40	q	90/91 (99%)	88 (98%)	2 (2%)	52	71
41	r	116/132 (88%)	114 (98%)	2 (2%)	60	78
42	s	82/208 (39%)	80 (98%)	2 (2%)	49	69
43	t	96/96 (100%)	96 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
44	u	69/85 (81%)	69 (100%)	0	100	100
45	v	58/60 (97%)	58 (100%)	0	100	100
46	w	87/98 (89%)	86 (99%)	1 (1%)	73	84
47	x	41/86 (48%)	41 (100%)	0	100	100
48	y	48/49 (98%)	45 (94%)	3 (6%)	18	43
49	z	47/50 (94%)	47 (100%)	0	100	100
All	All	5099/5751 (89%)	5042 (99%)	57 (1%)	74	84

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	1	20	LYS
2	1	21	ARG
4	A	101	LYS
5	B	49	ARG
5	B	93	LYS
6	C	110	ARG
6	C	143	ARG
6	C	150	LYS
7	D	148	ARG
7	D	206	ARG
8	E	80	LYS
8	E	145	ARG
9	F	2	ARG
10	G	39	LYS
11	H	98	LYS
13	J	119	ARG
14	K	107	ARG
14	K	117	THR
14	K	121	GLU
14	K	122	LYS
15	L	109	ARG
15	L	119	LYS
16	M	41	ARG
19	P	3	ARG
19	P	6	ARG
19	P	74	ARG
24	a	64	ARG
29	f	118	ARG
30	g	5	LYS

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Mol	Chain	Res	Type
30	g	29	TYR
30	g	41	ARG
30	g	43	LYS
30	g	44	LEU
30	g	45	PHE
30	g	46	LYS
30	g	47	ASN
30	g	87	ASN
30	g	89	ILE
30	g	113	PHE
31	h	95	LYS
32	i	16	ARG
33	j	54	LYS
34	k	7	LYS
35	l	10	ARG
35	l	134	ARG
36	m	30	LYS
37	n	8	ARG
40	q	24	LYS
40	q	52	LYS
41	r	9	ARG
41	r	134	LYS
42	s	5	ASN
42	s	54	LYS
46	w	100	LYS
48	y	47	MET
48	y	48	TYR
48	y	50	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
4	A	70	ASN
4	A	77	GLN
5	B	3	GLN
6	C	37	GLN
8	E	20	GLN
11	H	62	ASN
11	H	77	GLN
13	J	21	ASN
13	J	22	ASN
22	S	7	ASN

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Mol	Chain	Res	Type
22	S	13	GLN
24	a	159	GLN
27	d	63	GLN
28	e	72	ASN
29	f	61	ASN
30	g	47	ASN
36	m	59	ASN
40	q	62	HIS
42	s	19	ASN
42	s	56	ASN
45	v	62	ASN
46	w	9	GLN
46	w	89	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
50	3	2875/2907 (98%)	910 (31%)	32 (1%)
51	4	103/108 (95%)	40 (38%)	3 (2%)
52	5	1490/1520 (98%)	432 (28%)	7 (0%)
53	8	75/76 (98%)	29 (38%)	1 (1%)
All	All	4543/4611 (98%)	1411 (31%)	43 (0%)

All (1411) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
50	3	13	C
50	3	14	U
50	3	15	A
50	3	27	U
50	3	29	G
50	3	30	A
50	3	31	U
50	3	33	C
50	3	36	U
50	3	37	G
50	3	38	G
50	3	42	U
50	3	48	G
50	3	52	U
50	3	53	G

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Mol	Chain	Res	Type
50	3	57	G
50	3	63	U
50	3	64	U
50	3	65	A
50	3	68	C
50	3	73	A
50	3	74	U
50	3	76	A
50	3	77	G
50	3	86	A
50	3	87	G
50	3	92	U
50	3	93	A
50	3	95	G
50	3	103	G
50	3	110	A
50	3	113	U
50	3	114	U
50	3	115	U
50	3	119	A
50	3	121	U
50	3	122	G
50	3	125	G
50	3	126	C
50	3	127	A
50	3	132	G
50	3	136	G
50	3	137	U
50	3	139	G
50	3	142	A
50	3	155	A
50	3	163	A
50	3	165	U
50	3	166	A
50	3	170	A
50	3	174	A
50	3	184	A
50	3	198	G
50	3	200	A
50	3	201	A
50	3	203	A
50	3	208	A

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Mol	Chain	Res	Type
50	3	210	U
50	3	218	G
50	3	219	G
50	3	220	A
50	3	225	A
50	3	226	A
50	3	228	A
50	3	229	C
50	3	232	A
50	3	233	U
50	3	234	G
50	3	235	U
50	3	236	G
50	3	245	U
50	3	246	G
50	3	247	U
50	3	252	G
50	3	253	C
50	3	254	G
50	3	261	A
50	3	262	G
50	3	265	G
50	3	269	A
50	3	270	G
50	3	275	A
50	3	276	A
50	3	278	U
50	3	283	A
50	3	284	U
50	3	285	U
50	3	286	A
50	3	287	G
50	3	293	G
50	3	294	G
50	3	295	U
50	3	296	U
50	3	297	G
50	3	299	A
50	3	304	U
50	3	306	G
50	3	312	U
50	3	314	G

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Mol	Chain	Res	Type
50	3	315	A
50	3	320	A
50	3	325	G
50	3	329	G
50	3	330	A
50	3	335	G
50	3	336	C
50	3	342	G
50	3	343	A
50	3	345	A
50	3	351	G
50	3	354	C
50	3	357	A
50	3	358	A
50	3	363	G
50	3	364	A
50	3	366	A
50	3	367	G
50	3	375	U
50	3	376	U
50	3	377	U
50	3	379	A
50	3	383	U
50	3	388	U
50	3	392	A
50	3	396	A
50	3	397	G
50	3	401	G
50	3	402	A
50	3	403	U
50	3	407	U
50	3	408	G
50	3	409	A
50	3	410	G
50	3	411	U
50	3	424	G
50	3	425	U
50	3	426	U
50	3	428	U
50	3	429	U
50	3	432	G
50	3	437	A

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Mol	Chain	Res	Type
50	3	440	C
50	3	441	U
50	3	442	G
50	3	444	C
50	3	447	G
50	3	448	A
50	3	449	C
50	3	460	G
50	3	464	A
50	3	465	A
50	3	466	A
50	3	471	A
50	3	479	A
50	3	483	A
50	3	484	U
50	3	487	C
50	3	490	A
50	3	492	C
50	3	493	A
50	3	495	U
50	3	509	G
50	3	514	A
50	3	515	A
50	3	516	A
50	3	517	G
50	3	518	A
50	3	520	C
50	3	524	G
50	3	531	G
50	3	539	U
50	3	543	U
50	3	544	U
50	3	547	G
50	3	550	A
50	3	553	A
50	3	562	C
50	3	565	C
50	3	566	G
50	3	567	U
50	3	568	G
50	3	570	C
50	3	571	A

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Mol	Chain	Res	Type
50	3	579	U
50	3	581	A
50	3	582	A
50	3	583	U
50	3	584	G
50	3	589	A
50	3	592	G
50	3	595	U
50	3	596	G
50	3	598	G
50	3	599	U
50	3	600	U
50	3	601	U
50	3	604	A
50	3	606	G
50	3	607	U
50	3	608	A
50	3	620	G
50	3	625	G
50	3	637	U
50	3	638	A
50	3	648	G
50	3	649	A
50	3	650	G
50	3	656	G
50	3	657	A
50	3	661	G
50	3	663	A
50	3	664	G
50	3	668	A
50	3	673	A
50	3	681	A
50	3	687	G
50	3	689	U
50	3	691	G
50	3	695	G
50	3	698	A
50	3	703	A
50	3	704	G
50	3	706	C
50	3	708	C
50	3	718	U

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Mol	Chain	Res	Type
50	3	720	A
50	3	721	G
50	3	722	C
50	3	725	G
50	3	730	G
50	3	737	U
50	3	752	C
50	3	760	G
50	3	761	G
50	3	763	G
50	3	764	G
50	3	765	A
50	3	774	A
50	3	779	C
50	3	781	U
50	3	782	U
50	3	783	G
50	3	787	C
50	3	788	G
50	3	792	G
50	3	794	G
50	3	797	U
50	3	800	C
50	3	810	G
50	3	811	G
50	3	814	U
50	3	815	G
50	3	816	A
50	3	817	A
50	3	819	U
50	3	820	U
50	3	824	A
50	3	825	U
50	3	827	G
50	3	828	A
50	3	829	A
50	3	835	U
50	3	838	U
50	3	840	G
50	3	842	U
50	3	847	C
50	3	854	A

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Mol	Chain	Res	Type
50	3	862	U
50	3	863	U
50	3	864	A
50	3	865	A
50	3	880	C
50	3	882	C
50	3	886	U
50	3	888	A
50	3	893	A
50	3	896	U
50	3	904	C
50	3	905	U
50	3	912	A
50	3	914	G
50	3	917	G
50	3	932	U
50	3	933	A
50	3	937	A
50	3	938	A
50	3	940	A
50	3	943	A
50	3	944	U
50	3	947	A
50	3	949	C
50	3	952	U
50	3	953	G
50	3	957	G
50	3	958	C
50	3	962	U
50	3	964	A
50	3	967	U
50	3	968	U
50	3	975	G
50	3	978	G
50	3	980	C
50	3	981	A
50	3	982	G
50	3	989	G
50	3	990	G
50	3	993	A
50	3	994	U
50	3	995	A

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Mol	Chain	Res	Type
50	3	997	G
50	3	998	C
50	3	999	U
50	3	1008	A
50	3	1009	A
50	3	1011	A
50	3	1016	A
50	3	1017	A
50	3	1018	G
50	3	1019	A
50	3	1021	C
50	3	1022	C
50	3	1026	A
50	3	1027	U
50	3	1032	A
50	3	1035	U
50	3	1045	A
50	3	1046	A
50	3	1047	A
50	3	1049	U
50	3	1052	A
50	3	1055	A
50	3	1056	A
50	3	1057	G
50	3	1061	A
50	3	1068	U
50	3	1070	U
50	3	1075	G
50	3	1080	A
50	3	1081	A
50	3	1096	U
50	3	1097	G
50	3	1102	A
50	3	1103	G
50	3	1104	A
50	3	1105	A
50	3	1106	G
50	3	1107	C
50	3	1110	C
50	3	1113	U
50	3	1122	G
50	3	1123	A

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Mol	Chain	Res	Type
50	3	1124	G
50	3	1125	U
50	3	1132	C
50	3	1147	G
50	3	1151	U
50	3	1154	U
50	3	1155	G
50	3	1162	A
50	3	1167	U
50	3	1168	A
50	3	1169	A
50	3	1170	C
50	3	1171	G
50	3	1174	G
50	3	1176	U
50	3	1177	A
50	3	1178	A
50	3	1179	G
50	3	1181	A
50	3	1183	A
50	3	1185	U
50	3	1186	A
50	3	1192	U
50	3	1195	A
50	3	1199	A
50	3	1202	A
50	3	1204	A
50	3	1209	U
50	3	1210	A
50	3	1212	C
50	3	1214	U
50	3	1215	G
50	3	1216	U
50	3	1217	G
50	3	1226	G
50	3	1234	U
50	3	1235	U
50	3	1236	G
50	3	1237	G
50	3	1240	U
50	3	1241	U
50	3	1242	G

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Mol	Chain	Res	Type
50	3	1243	A
50	3	1250	A
50	3	1251	G
50	3	1253	G
50	3	1257	G
50	3	1260	U
50	3	1264	U
50	3	1265	G
50	3	1266	G
50	3	1267	A
50	3	1268	U
50	3	1274	A
50	3	1279	U
50	3	1283	A
50	3	1284	A
50	3	1285	U
50	3	1286	G
50	3	1287	C
50	3	1292	A
50	3	1293	U
50	3	1298	A
50	3	1301	G
50	3	1303	U
50	3	1304	U
50	3	1311	G
50	3	1314	A
50	3	1317	C
50	3	1322	A
50	3	1324	A
50	3	1326	C
50	3	1327	G
50	3	1328	A
50	3	1329	U
50	3	1330	U
50	3	1331	G
50	3	1334	U
50	3	1342	C
50	3	1350	A
50	3	1351	G
50	3	1353	G
50	3	1355	C
50	3	1356	G

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Mol	Chain	Res	Type
50	3	1357	U
50	3	1360	U
50	3	1368	U
50	3	1369	U
50	3	1370	A
50	3	1372	U
50	3	1373	C
50	3	1380	U
50	3	1393	A
50	3	1408	G
50	3	1418	U
50	3	1422	U
50	3	1423	A
50	3	1424	U
50	3	1425	U
50	3	1426	C
50	3	1431	A
50	3	1435	A
50	3	1436	C
50	3	1437	A
50	3	1444	C
50	3	1445	U
50	3	1447	A
50	3	1456	C
50	3	1457	A
50	3	1459	A
50	3	1463	G
50	3	1466	U
50	3	1467	U
50	3	1470	C
50	3	1479	A
50	3	1480	A
50	3	1481	U
50	3	1482	U
50	3	1483	G
50	3	1484	G
50	3	1486	U
50	3	1487	U
50	3	1491	G
50	3	1493	A
50	3	1502	A
50	3	1507	G

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Mol	Chain	Res	Type
50	3	1508	G
50	3	1510	A
50	3	1515	A
50	3	1518	C
50	3	1519	A
50	3	1522	U
50	3	1523	C
50	3	1529	U
50	3	1534	A
50	3	1541	A
50	3	1542	G
50	3	1546	U
50	3	1548	A
50	3	1549	U
50	3	1550	G
50	3	1557	G
50	3	1558	A
50	3	1559	A
50	3	1571	G
50	3	1574	G
50	3	1577	A
50	3	1584	U
50	3	1585	A
50	3	1588	A
50	3	1589	A
50	3	1594	G
50	3	1599	C
50	3	1600	A
50	3	1603	A
50	3	1612	U
50	3	1618	U
50	3	1619	A
50	3	1627	U
50	3	1632	C
50	3	1634	A
50	3	1640	G
50	3	1641	A
50	3	1642	G
50	3	1644	A
50	3	1646	G
50	3	1650	A
50	3	1651	C

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Mol	Chain	Res	Type
50	3	1652	A
50	3	1654	G
50	3	1655	U
50	3	1656	A
50	3	1663	G
50	3	1669	A
50	3	1670	U
50	3	1679	U
50	3	1680	A
50	3	1681	G
50	3	1682	C
50	3	1683	G
50	3	1687	G
50	3	1692	A
50	3	1694	A
50	3	1698	A
50	3	1699	A
50	3	1701	G
50	3	1702	A
50	3	1703	A
50	3	1704	C
50	3	1705	U
50	3	1707	U
50	3	1708	G
50	3	1709	C
50	3	1711	A
50	3	1715	A
50	3	1716	A
50	3	1727	U
50	3	1728	A
50	3	1729	G
50	3	1730	C
50	3	1733	G
50	3	1741	G
50	3	1748	U
50	3	1749	A
50	3	1752	A
50	3	1763	G
50	3	1764	U
50	3	1765	G
50	3	1767	A
50	3	1768	G

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Mol	Chain	Res	Type
50	3	1769	A
50	3	1770	A
50	3	1771	C
50	3	1772	G
50	3	1780	A
50	3	1784	U
50	3	1786	U
50	3	1787	A
50	3	1788	A
50	3	1789	C
50	3	1791	A
50	3	1794	A
50	3	1798	A
50	3	1807	C
50	3	1808	C
50	3	1815	U
50	3	1816	A
50	3	1821	G
50	3	1823	U
50	3	1827	U
50	3	1828	A
50	3	1835	G
50	3	1836	A
50	3	1842	G
50	3	1855	A
50	3	1856	G
50	3	1873	A
50	3	1876	G
50	3	1877	C
50	3	1879	A
50	3	1880	G
50	3	1890	U
50	3	1891	A
50	3	1907	A
50	3	1908	A
50	3	1913	G
50	3	1914	G
50	3	1920	A
50	3	1922	U
50	3	1926	A
50	3	1934	A
50	3	1935	A

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Mol	Chain	Res	Type
50	3	1936	G
50	3	1937	G
50	3	1943	A
50	3	1944	A
50	3	1945	A
50	3	1947	U
50	3	1950	U
50	3	1951	A
50	3	1952	G
50	3	1961	A
50	3	1962	U
50	3	1963	U
50	3	1970	C
50	3	1971	G
50	3	1972	C
50	3	1976	A
50	3	1977	A
50	3	1978	U
50	3	1979	G
50	3	1982	G
50	3	1984	A
50	3	1989	U
50	3	1997	C
50	3	1998	U
50	3	1999	G
50	3	2000	U
50	3	2003	C
50	3	2007	U
50	3	2009	U
50	3	2010	A
50	3	2012	A
50	3	2013	C
50	3	2028	G
50	3	2029	U
50	3	2030	A
50	3	2037	A
50	3	2038	A
50	3	2039	G
50	3	2040	A
50	3	2041	C
50	3	2046	G
50	3	2047	U

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Mol	Chain	Res	Type
50	3	2050	G
50	3	2055	A
50	3	2056	A
50	3	2059	G
50	3	2062	C
50	3	2063	G
50	3	2066	A
50	3	2067	A
50	3	2068	G
50	3	2069	A
50	3	2070	C
50	3	2075	U
50	3	2076	G
50	3	2083	U
50	3	2084	A
50	3	2086	U
50	3	2100	G
50	3	2108	C
50	3	2109	A
50	3	2110	U
50	3	2111	U
50	3	2112	A
50	3	2114	C
50	3	2115	A
50	3	2116	U
50	3	2118	U
50	3	2119	A
50	3	2122	G
50	3	2123	A
50	3	2124	A
50	3	2125	U
50	3	2126	A
50	3	2133	A
50	3	2134	G
50	3	2140	G
50	3	2145	A
50	3	2149	U
50	3	2150	C
50	3	2153	U
50	3	2154	A
50	3	2157	A
50	3	2163	U

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Mol	Chain	Res	Type
50	3	2166	U
50	3	2169	G
50	3	2170	A
50	3	2171	A
50	3	2179	A
50	3	2180	U
50	3	2193	U
50	3	2194	G
50	3	2195	U
50	3	2196	G
50	3	2198	G
50	3	2200	U
50	3	2202	U
50	3	2203	U
50	3	2206	A
50	3	2208	U
50	3	2211	G
50	3	2212	U
50	3	2219	U
50	3	2220	A
50	3	2231	A
50	3	2232	G
50	3	2233	A
50	3	2234	C
50	3	2238	G
50	3	2244	U
50	3	2246	G
50	3	2247	G
50	3	2251	U
50	3	2254	G
50	3	2259	G
50	3	2262	C
50	3	2276	A
50	3	2278	G
50	3	2279	G
50	3	2281	A
50	3	2286	A
50	3	2291	U
50	3	2294	A
50	3	2295	A
50	3	2296	A
50	3	2299	U

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Mol	Chain	Res	Type
50	3	2305	C
50	3	2312	G
50	3	2313	U
50	3	2315	G
50	3	2327	U
50	3	2330	A
50	3	2332	U
50	3	2333	G
50	3	2335	A
50	3	2342	U
50	3	2343	A
50	3	2344	A
50	3	2350	C
50	3	2352	U
50	3	2353	G
50	3	2355	C
50	3	2362	A
50	3	2365	U
50	3	2370	G
50	3	2373	G
50	3	2379	G
50	3	2382	A
50	3	2391	G
50	3	2393	C
50	3	2397	G
50	3	2410	C
50	3	2411	C
50	3	2415	A
50	3	2418	G
50	3	2431	U
50	3	2432	C
50	3	2433	A
50	3	2434	A
50	3	2436	G
50	3	2437	G
50	3	2438	A
50	3	2442	A
50	3	2443	A
50	3	2449	U
50	3	2453	G
50	3	2456	A
50	3	2458	A

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Mol	Chain	Res	Type
50	3	2472	G
50	3	2477	A
50	3	2483	C
50	3	2484	A
50	3	2487	U
50	3	2488	C
50	3	2492	G
50	3	2495	A
50	3	2498	G
50	3	2499	U
50	3	2500	U
50	3	2502	G
50	3	2504	C
50	3	2505	A
50	3	2507	C
50	3	2509	C
50	3	2511	A
50	3	2512	U
50	3	2513	G
50	3	2514	U
50	3	2516	G
50	3	2517	A
50	3	2521	A
50	3	2526	A
50	3	2527	U
50	3	2531	C
50	3	2537	G
50	3	2539	A
50	3	2543	G
50	3	2550	A
50	3	2551	G
50	3	2555	U
50	3	2561	G
50	3	2562	U
50	3	2563	U
50	3	2565	G
50	3	2570	U
50	3	2574	A
50	3	2575	G
50	3	2578	A
50	3	2581	C
50	3	2582	G

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Mol	Chain	Res	Type
50	3	2583	U
50	3	2584	G
50	3	2586	G
50	3	2590	G
50	3	2593	U
50	3	2594	C
50	3	2595	A
50	3	2604	U
50	3	2606	A
50	3	2610	A
50	3	2611	G
50	3	2618	C
50	3	2619	C
50	3	2621	U
50	3	2622	A
50	3	2629	G
50	3	2632	C
50	3	2636	U
50	3	2637	A
50	3	2638	G
50	3	2644	U
50	3	2645	U
50	3	2646	G
50	3	2647	A
50	3	2653	G
50	3	2656	G
50	3	2662	A
50	3	2664	U
50	3	2669	G
50	3	2681	G
50	3	2689	C
50	3	2693	U
50	3	2697	C
50	3	2698	U
50	3	2710	G
50	3	2712	C
50	3	2714	G
50	3	2721	C
50	3	2722	G
50	3	2734	C
50	3	2737	G
50	3	2741	A

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Mol	Chain	Res	Type
50	3	2747	U
50	3	2752	G
50	3	2756	A
50	3	2760	C
50	3	2765	A
50	3	2766	A
50	3	2771	G
50	3	2772	A
50	3	2774	A
50	3	2786	A
50	3	2788	U
50	3	2790	A
50	3	2791	U
50	3	2799	U
50	3	2801	U
50	3	2804	C
50	3	2805	A
50	3	2806	A
50	3	2807	G
50	3	2808	A
50	3	2809	A
50	3	2810	A
50	3	2811	G
50	3	2812	U
50	3	2813	A
50	3	2815	G
50	3	2822	C
50	3	2823	A
50	3	2824	A
50	3	2825	A
50	3	2827	A
50	3	2830	A
50	3	2831	U
50	3	2835	G
50	3	2837	U
50	3	2838	G
50	3	2839	A
50	3	2853	U
50	3	2854	A
50	3	2862	U
50	3	2863	G
50	3	2865	U

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Mol	Chain	Res	Type
50	3	2871	G
50	3	2872	A
50	3	2876	G
50	3	2881	A
50	3	2883	A
50	3	2884	C
50	3	2888	U
50	3	2889	U
50	3	2890	G
50	3	2895	A
50	3	2897	G
50	3	2898	A
50	3	2899	C
51	4	4	G
51	4	8	C
51	4	10	C
51	4	11	A
51	4	19	G
51	4	22	G
51	4	23	A
51	4	24	A
51	4	28	C
51	4	31	G
51	4	32	G
51	4	33	U
51	4	35	C
51	4	39	U
51	4	40	U
51	4	41	C
51	4	42	G
51	4	43	A
51	4	47	C
51	4	48	A
51	4	49	G
51	4	51	A
51	4	54	U
51	4	55	A
51	4	60	C
51	4	66	A
51	4	71	A
51	4	72	A
51	4	73	U

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Mol	Chain	Res	Type
51	4	74	G
51	4	77	G
51	4	78	C
51	4	80	G
51	4	86	G
51	4	88	G
51	4	89	A
51	4	99	A
51	4	102	A
51	4	105	A
51	4	108	C
52	5	6	C
52	5	7	U
52	5	8	G
52	5	9	A
52	5	15	U
52	5	16	G
52	5	27	A
52	5	32	U
52	5	33	A
52	5	36	G
52	5	39	G
52	5	40	G
52	5	45	A
52	5	48	C
52	5	49	C
52	5	52	A
52	5	57	U
52	5	67	U
52	5	73	G
52	5	75	A
52	5	80	U
52	5	86	A
52	5	105	A
52	5	106	C
52	5	107	A
52	5	112	U
52	5	115	A
52	5	117	U
52	5	120	A
52	5	127	A
52	5	128	A

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Mol	Chain	Res	Type
52	5	129	U
52	5	135	A
52	5	145	G
52	5	146	A
52	5	147	A
52	5	148	A
52	5	149	G
52	5	159	U
52	5	163	G
52	5	168	A
52	5	169	G
52	5	173	U
52	5	180	C
52	5	187	A
52	5	197	A
52	5	205	U
52	5	208	A
52	5	222	U
52	5	234	G
52	5	236	C
52	5	240	U
52	5	241	C
52	5	242	A
52	5	243	G
52	5	247	G
52	5	258	A
52	5	259	A
52	5	260	C
52	5	262	G
52	5	271	G
52	5	275	A
52	5	276	U
52	5	285	G
52	5	292	U
52	5	293	G
52	5	296	A
52	5	302	A
52	5	311	A
52	5	312	A
52	5	319	U
52	5	322	G
52	5	323	A

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Mol	Chain	Res	Type
52	5	324	C
52	5	325	A
52	5	326	C
52	5	328	G
52	5	334	A
52	5	336	U
52	5	340	A
52	5	341	C
52	5	342	G
52	5	347	G
52	5	348	C
52	5	350	G
52	5	353	G
52	5	358	G
52	5	359	A
52	5	361	U
52	5	363	U
52	5	364	U
52	5	365	U
52	5	366	C
52	5	368	C
52	5	369	A
52	5	373	A
52	5	377	A
52	5	378	A
52	5	384	G
52	5	385	A
52	5	394	U
52	5	400	G
52	5	401	U
52	5	402	G
52	5	407	A
52	5	408	U
52	5	409	G
52	5	410	A
52	5	411	A
52	5	417	U
52	5	418	U
52	5	421	G
52	5	425	G
52	5	426	U
52	5	433	C

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Mol	Chain	Res	Type
52	5	434	U
52	5	435	U
52	5	440	U
52	5	449	A
52	5	450	U
52	5	452	A
52	5	456	U
52	5	461	G
52	5	465	A
52	5	466	U
52	5	467	G
52	5	468	G
52	5	470	U
52	5	476	U
52	5	478	G
52	5	481	U
52	5	488	U
52	5	489	U
52	5	490	U
52	5	493	A
52	5	494	A
52	5	495	U
52	5	497	A
52	5	507	A
52	5	508	A
52	5	509	C
52	5	510	U
52	5	516	C
52	5	517	C
52	5	519	G
52	5	520	C
52	5	525	G
52	5	528	G
52	5	530	A
52	5	531	A
52	5	532	U
52	5	533	A
52	5	534	C
52	5	536	U
52	5	543	C
52	5	544	A
52	5	545	A

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Mol	Chain	Res	Type
52	5	548	G
52	5	557	A
52	5	560	U
52	5	561	A
52	5	564	G
52	5	569	U
52	5	570	A
52	5	571	A
52	5	573	G
52	5	574	C
52	5	575	A
52	5	580	C
52	5	586	G
52	5	594	A
52	5	595	G
52	5	599	G
52	5	616	C
52	5	617	U
52	5	618	U
52	5	619	A
52	5	620	A
52	5	638	A
52	5	639	A
52	5	646	A
52	5	649	U
52	5	650	A
52	5	651	G
52	5	652	A
52	5	660	A
52	5	662	G
52	5	663	G
52	5	681	U
52	5	682	G
52	5	683	G
52	5	698	U
52	5	699	A
52	5	700	G
52	5	709	A
52	5	715	A
52	5	716	C
52	5	718	A
52	5	719	G

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Mol	Chain	Res	Type
52	5	720	U
52	5	721	G
52	5	731	A
52	5	733	A
52	5	740	G
52	5	745	U
52	5	751	C
52	5	752	G
52	5	770	G
52	5	772	G
52	5	773	G
52	5	774	A
52	5	779	A
52	5	780	U
52	5	787	A
52	5	789	A
52	5	790	U
52	5	791	A
52	5	796	A
52	5	801	U
52	5	802	C
52	5	806	A
52	5	808	C
52	5	809	G
52	5	814	C
52	5	815	G
52	5	816	A
52	5	818	A
52	5	825	A
52	5	829	G
52	5	835	G
52	5	841	C
52	5	849	A
52	5	855	G
52	5	861	A
52	5	863	A
52	5	864	U
52	5	865	U
52	5	870	A
52	5	882	U
52	5	885	U
52	5	892	G

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Mol	Chain	Res	Type
52	5	896	G
52	5	908	A
52	5	910	C
52	5	912	G
52	5	915	U
52	5	917	G
52	5	919	C
52	5	921	G
52	5	922	G
52	5	929	C
52	5	930	A
52	5	933	A
52	5	934	G
52	5	937	G
52	5	938	U
52	5	939	G
52	5	940	G
52	5	941	A
52	5	944	A
52	5	948	U
52	5	955	U
52	5	956	U
52	5	960	C
52	5	961	G
52	5	964	A
52	5	966	A
52	5	970	A
52	5	971	A
52	5	974	C
52	5	979	C
52	5	984	A
52	5	986	U
52	5	987	U
52	5	988	G
52	5	991	A
52	5	995	U
52	5	1000	A
52	5	1002	A
52	5	1003	G
52	5	1006	A
52	5	1007	U
52	5	1012	A

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Mol	Chain	Res	Type
52	5	1013	C
52	5	1014	A
52	5	1015	U
52	5	1016	A
52	5	1030	G
52	5	1032	G
52	5	1034	G
52	5	1037	A
52	5	1040	U
52	5	1041	G
52	5	1042	G
52	5	1044	G
52	5	1045	C
52	5	1046	A
52	5	1047	U
52	5	1056	U
52	5	1057	C
52	5	1064	U
52	5	1068	G
52	5	1069	U
52	5	1070	G
52	5	1071	A
52	5	1072	G
52	5	1075	G
52	5	1077	U
52	5	1081	U
52	5	1086	U
52	5	1092	A
52	5	1095	G
52	5	1101	A
52	5	1103	C
52	5	1106	U
52	5	1107	U
52	5	1117	U
52	5	1118	A
52	5	1121	U
52	5	1122	U
52	5	1123	G
52	5	1124	U
52	5	1125	C
52	5	1128	G
52	5	1133	A

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Mol	Chain	Res	Type
52	5	1134	C
52	5	1135	U
52	5	1142	G
52	5	1143	C
52	5	1144	A
52	5	1146	A
52	5	1147	U
52	5	1154	A
52	5	1156	G
52	5	1158	A
52	5	1159	A
52	5	1168	G
52	5	1170	C
52	5	1171	A
52	5	1172	A
52	5	1173	A
52	5	1175	C
52	5	1176	A
52	5	1180	U
52	5	1187	U
52	5	1188	A
52	5	1200	G
52	5	1201	C
52	5	1202	A
52	5	1206	G
52	5	1208	G
52	5	1214	A
52	5	1215	U
52	5	1216	G
52	5	1217	G
52	5	1225	A
52	5	1226	A
52	5	1233	G
52	5	1235	C
52	5	1242	U
52	5	1243	A
52	5	1249	G
52	5	1251	G
52	5	1254	A
52	5	1255	A
52	5	1256	U
52	5	1260	U

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Mol	Chain	Res	Type
52	5	1261	A
52	5	1263	A
52	5	1264	G
52	5	1271	U
52	5	1273	A
52	5	1275	U
52	5	1279	G
52	5	1289	U
52	5	1290	G
52	5	1291	C
52	5	1294	U
52	5	1296	C
52	5	1297	G
52	5	1310	C
52	5	1312	G
52	5	1318	C
52	5	1319	U
52	5	1320	A
52	5	1321	G
52	5	1337	U
52	5	1338	A
52	5	1343	G
52	5	1344	C
52	5	1349	A
52	5	1353	C
52	5	1354	G
52	5	1356	U
52	5	1358	U
52	5	1360	G
52	5	1363	U
52	5	1367	G
52	5	1369	A
52	5	1370	C
52	5	1372	C
52	5	1374	C
52	5	1375	C
52	5	1381	U
52	5	1385	A
52	5	1394	G
52	5	1397	G
52	5	1400	A
52	5	1408	A

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Mol	Chain	Res	Type
52	5	1417	U
52	5	1421	A
52	5	1423	C
52	5	1426	U
52	5	1429	G
52	5	1437	A
52	5	1439	G
52	5	1451	A
52	5	1466	U
52	5	1467	A
52	5	1468	A
52	5	1475	A
52	5	1478	A
52	5	1480	G
52	5	1481	U
52	5	1482	A
52	5	1492	G
52	5	1495	C
52	5	1497	U
52	5	1498	G
52	5	1504	G
52	5	1505	G
52	5	1509	A
53	8	3	G
53	8	5	C
53	8	10	A
53	8	16	G
53	8	17	U
53	8	19	G
53	8	20	G
53	8	21	U
53	8	22	A
53	8	23	G
53	8	24	A
53	8	37	A
53	8	42	C
53	8	43	G
53	8	44	U
53	8	47	G
53	8	48	U
53	8	49	C
53	8	50	G

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Mol	Chain	Res	Type
53	8	53	A
53	8	57	C
53	8	58	G
53	8	60	U
53	8	61	U
53	8	62	C
53	8	71	A
53	8	72	C
53	8	75	C
53	8	76	C

All (43) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
50	3	311	G
50	3	353	G
50	3	410	G
50	3	425	U
50	3	427	A
50	3	508	A
50	3	513	A
50	3	514	A
50	3	515	A
50	3	605	A
50	3	688	U
50	3	952	U
50	3	1048	A
50	3	1209	U
50	3	1216	U
50	3	1297	U
50	3	1481	U
50	3	1507	G
50	3	1587	U
50	3	1654	G
50	3	1820	U
50	3	2331	G
50	3	2483	C
50	3	2497	U
50	3	2499	U
50	3	2504	C
50	3	2506	C
50	3	2645	U

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Mol	Chain	Res	Type
50	3	2764	U
50	3	2800	U
50	3	2823	A
50	3	2897	G
51	4	10	C
51	4	54	U
51	4	59	A
52	5	425	G
52	5	527	G
52	5	533	A
52	5	637	A
52	5	772	G
52	5	800	G
52	5	1133	A
53	8	71	A

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

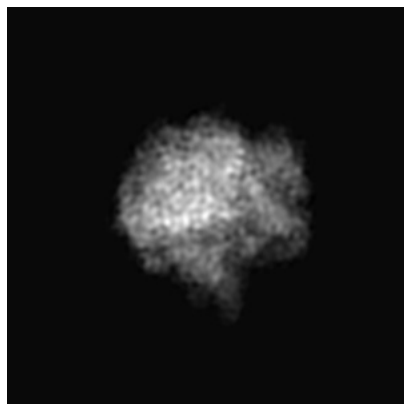
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13436. These allow visual inspection of the internal detail of the map and identification of artifacts.

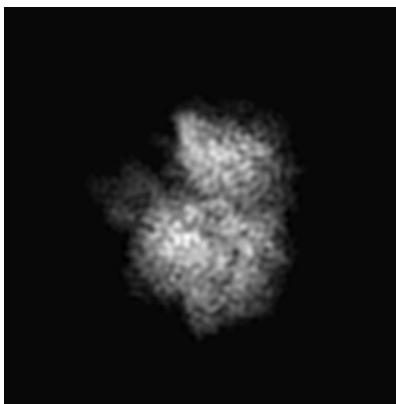
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

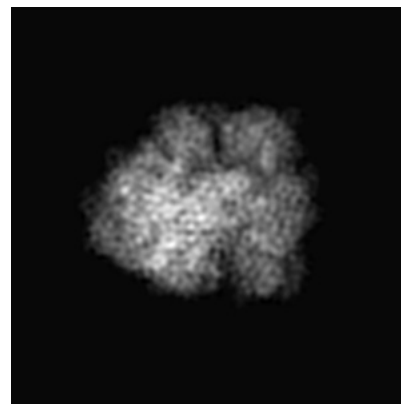
6.1.1 Primary map



X

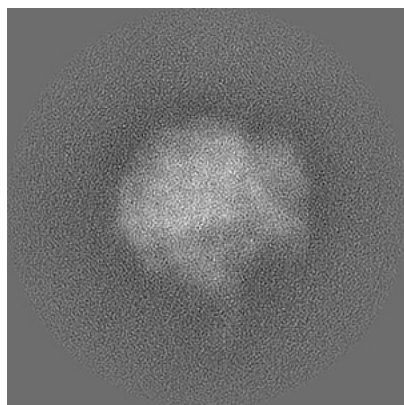


Y

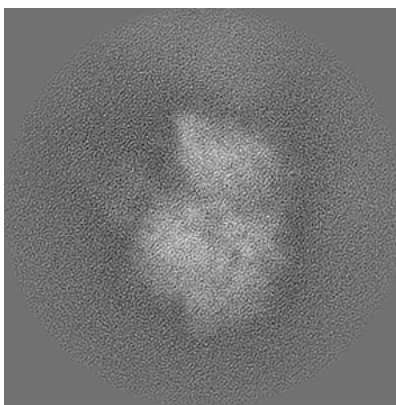


Z

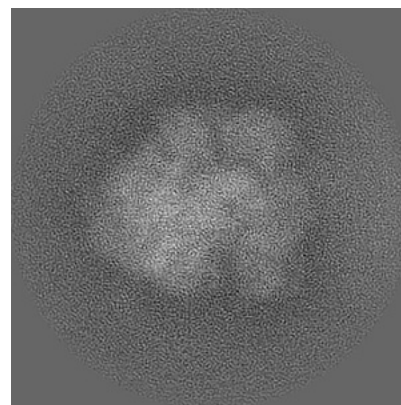
6.1.2 Raw map



X



Y

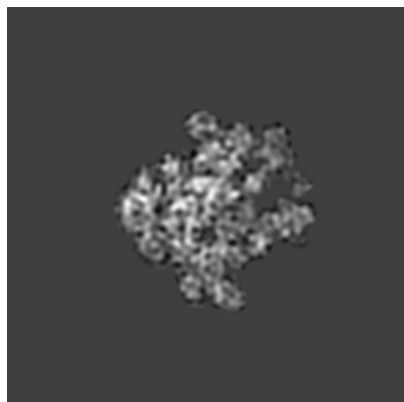


Z

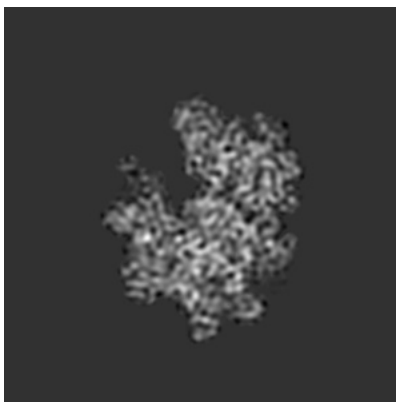
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

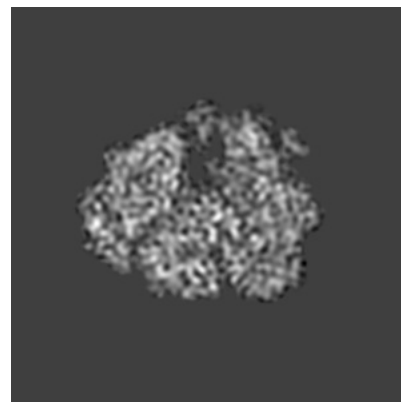
6.2.1 Primary map



X Index: 128

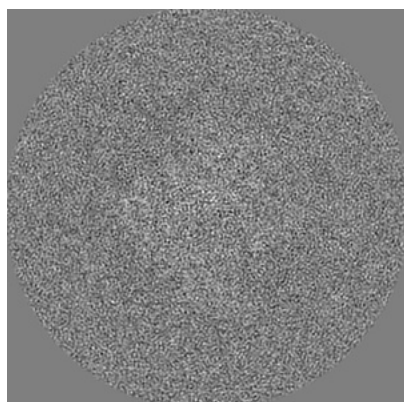


Y Index: 128

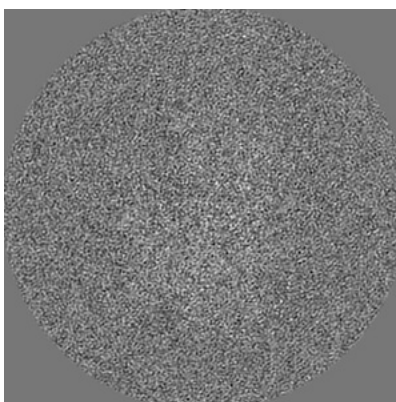


Z Index: 128

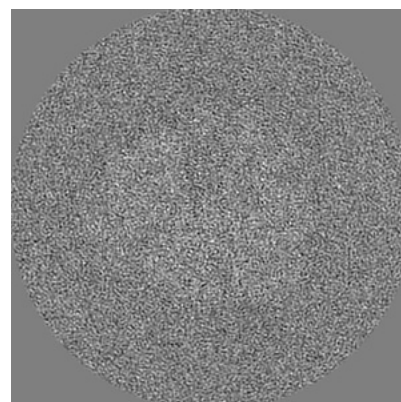
6.2.2 Raw map



X Index: 128



Y Index: 128

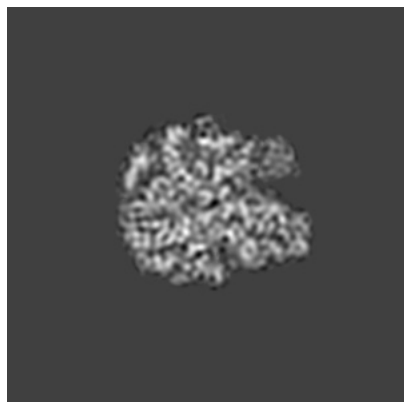


Z Index: 128

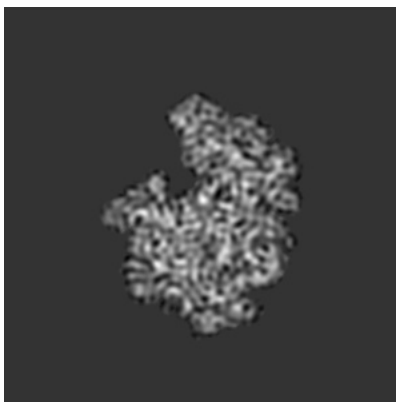
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

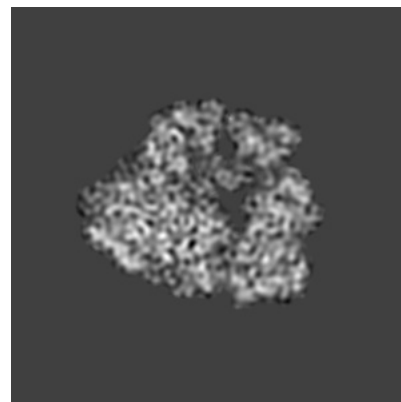
6.3.1 Primary map



X Index: 104

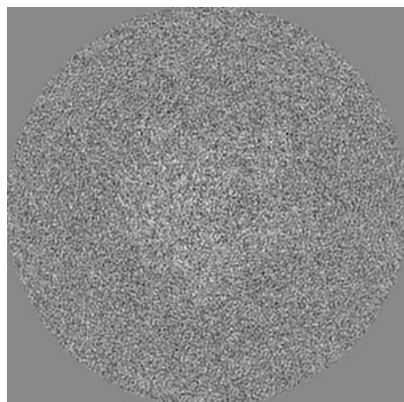


Y Index: 121

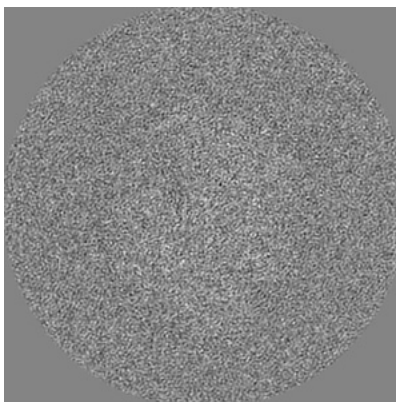


Z Index: 120

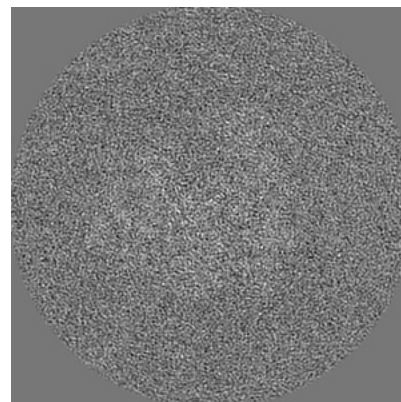
6.3.2 Raw map



X Index: 119



Y Index: 123



Z Index: 135

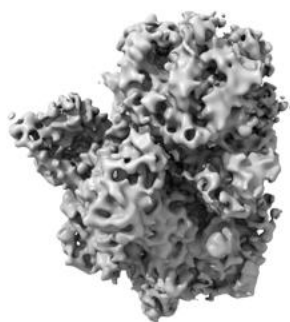
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

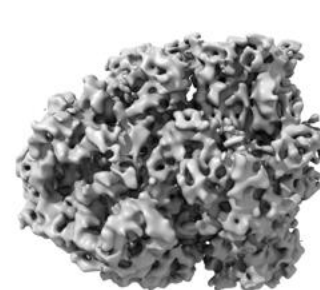
6.4.1 Primary map



X



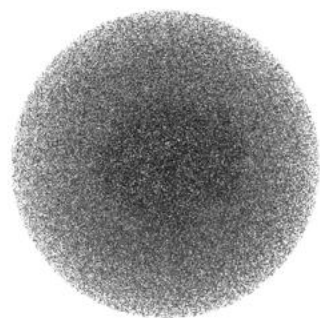
Y



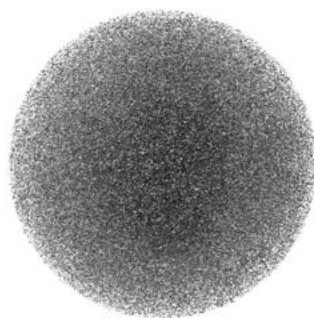
Z

The images above show the 3D surface view of the map at the recommended contour level 0.37. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

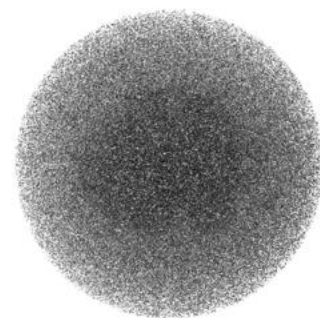
6.4.2 Raw map



X



Y



Z

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

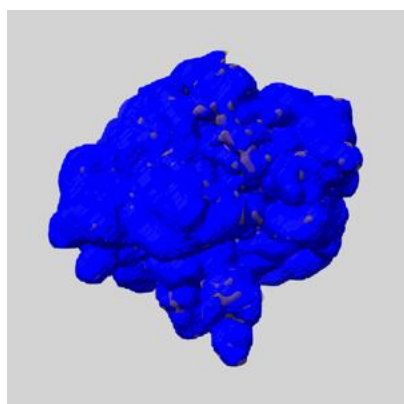
6.5 Mask visualisation [i](#)

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

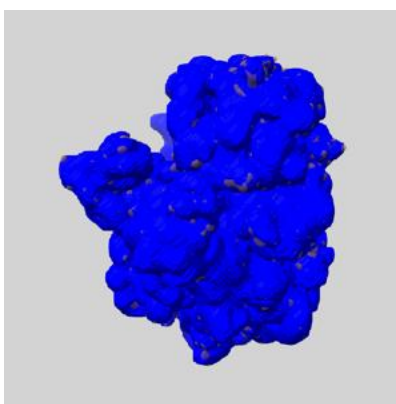
A mask typically either:

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

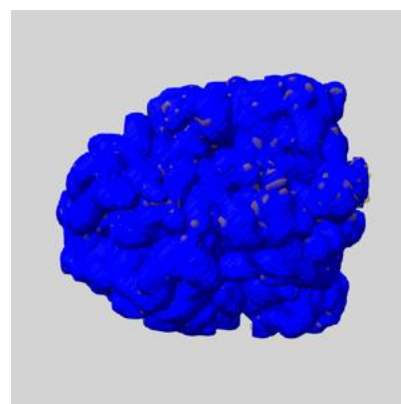
6.5.1 emd_13436_msk_1.map [i](#)



X



Y

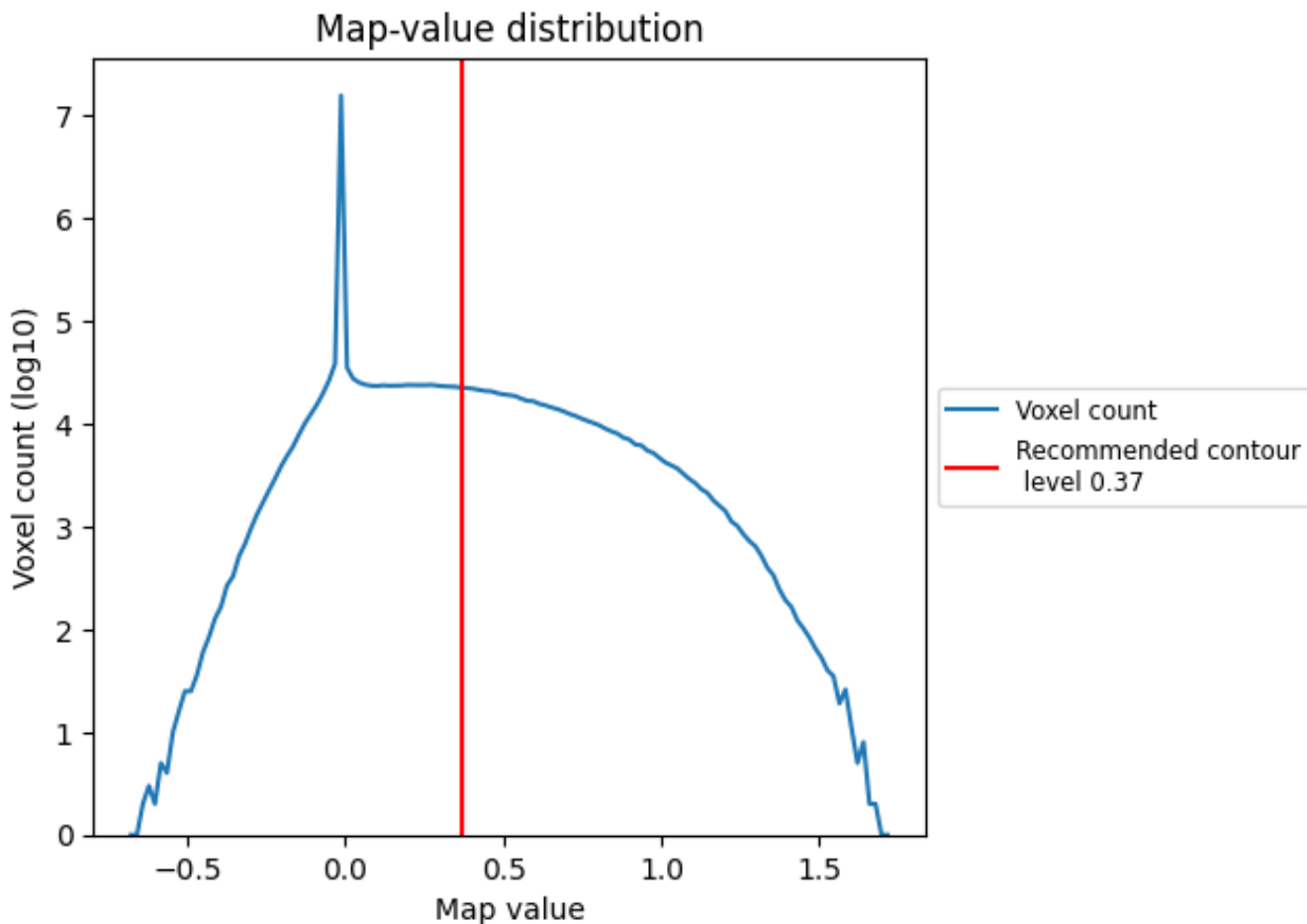


Z

7 Map analysis [i](#)

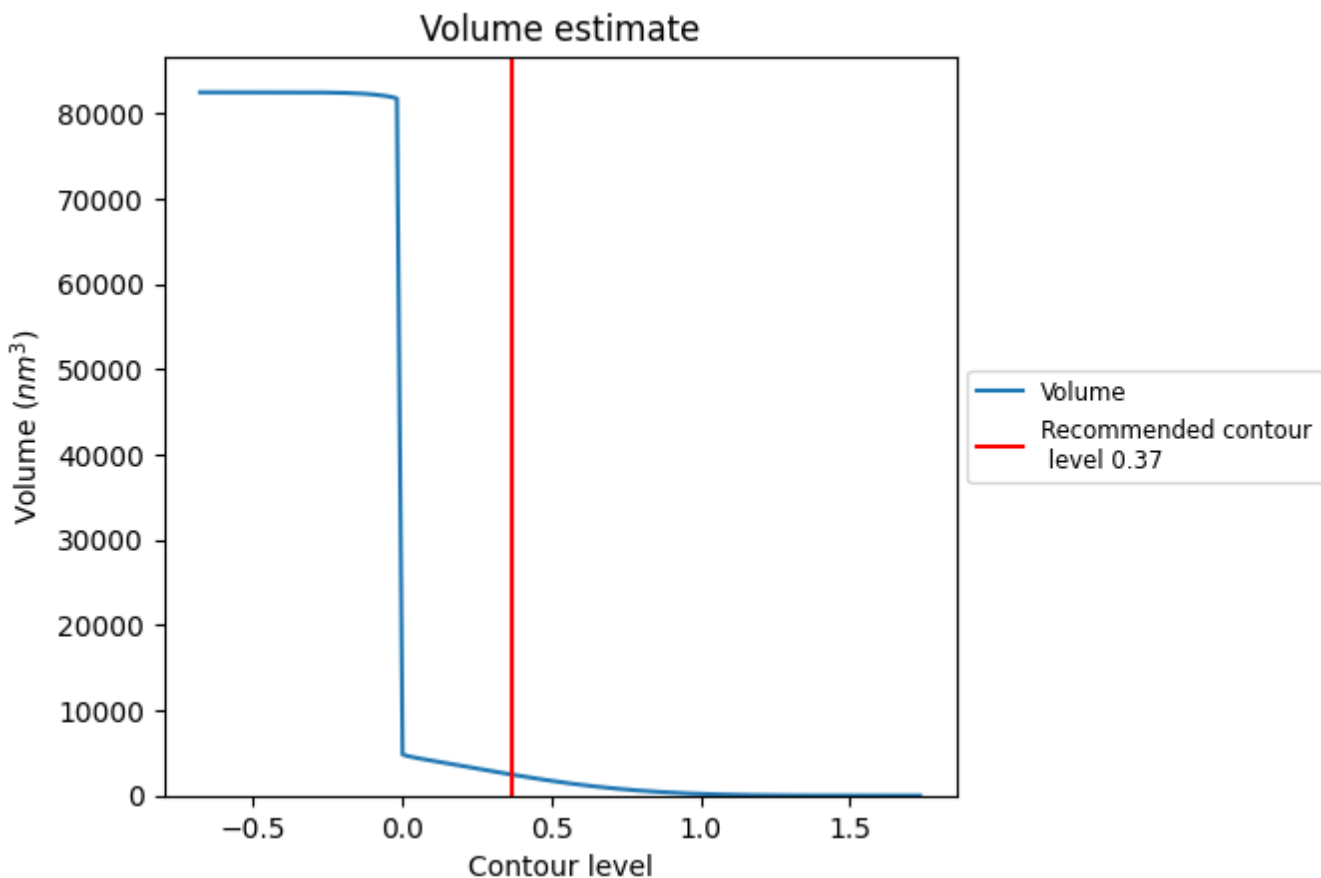
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

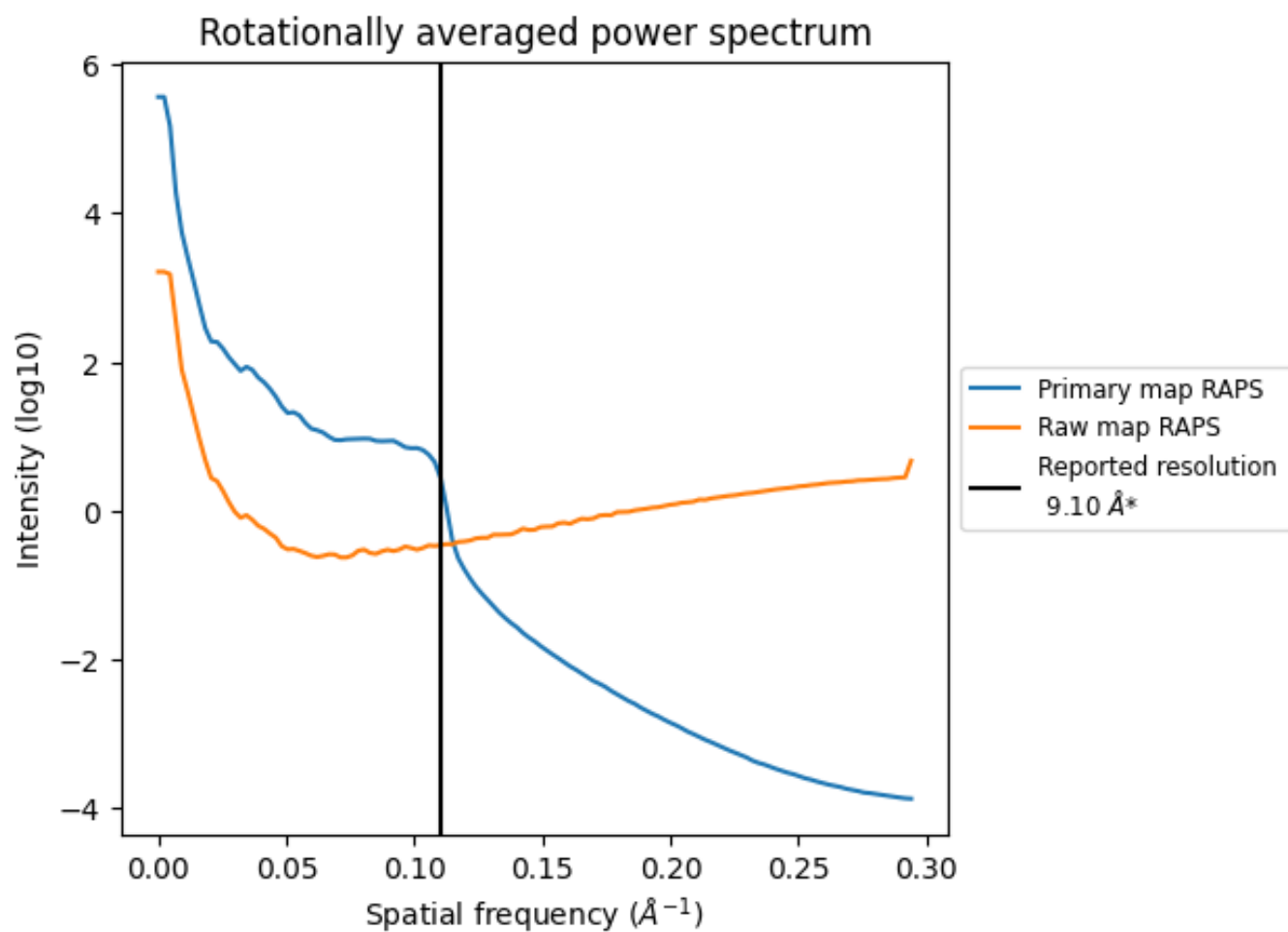
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2444 nm³; this corresponds to an approximate mass of 2208 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

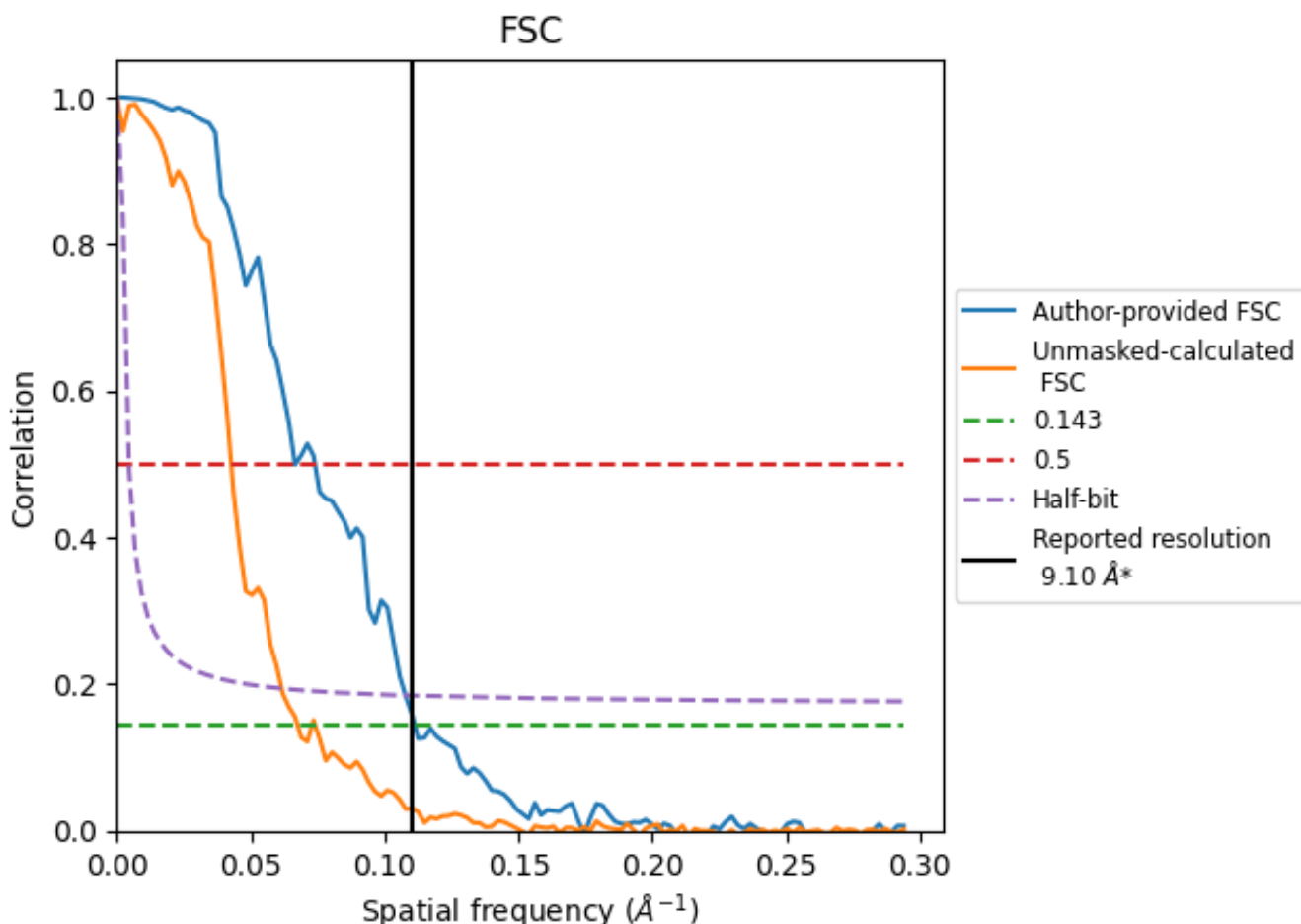


*Reported resolution corresponds to spatial frequency of 0.110 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.110 Å⁻¹

8.2 Resolution estimates [i](#)

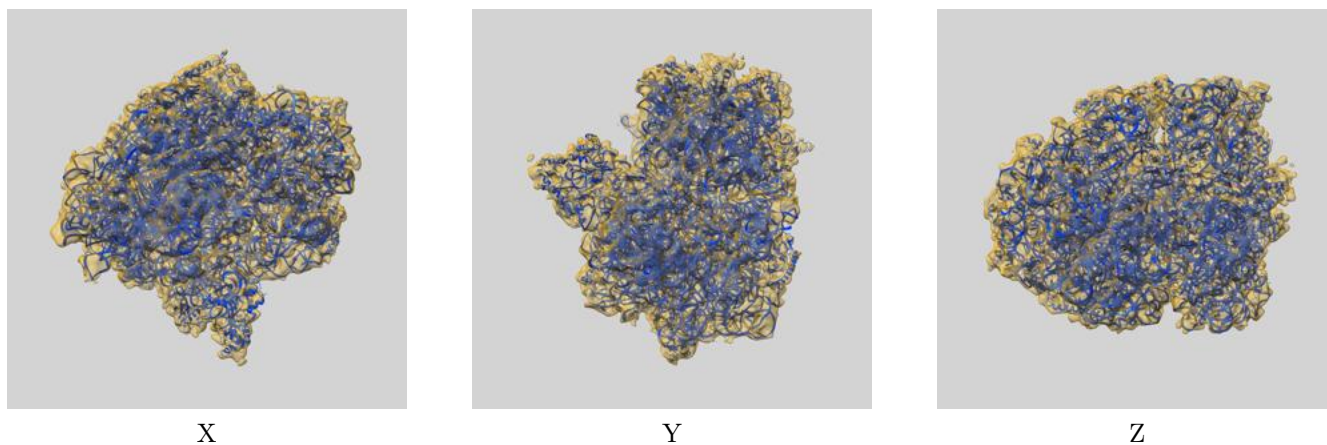
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	9.10	-	-
Author-provided FSC curve	8.98	15.02	9.28
Unmasked-calculated*	14.79	23.36	16.23

*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 14.79 differs from the reported value 9.1 by more than 10 %

9 Map-model fit [i](#)

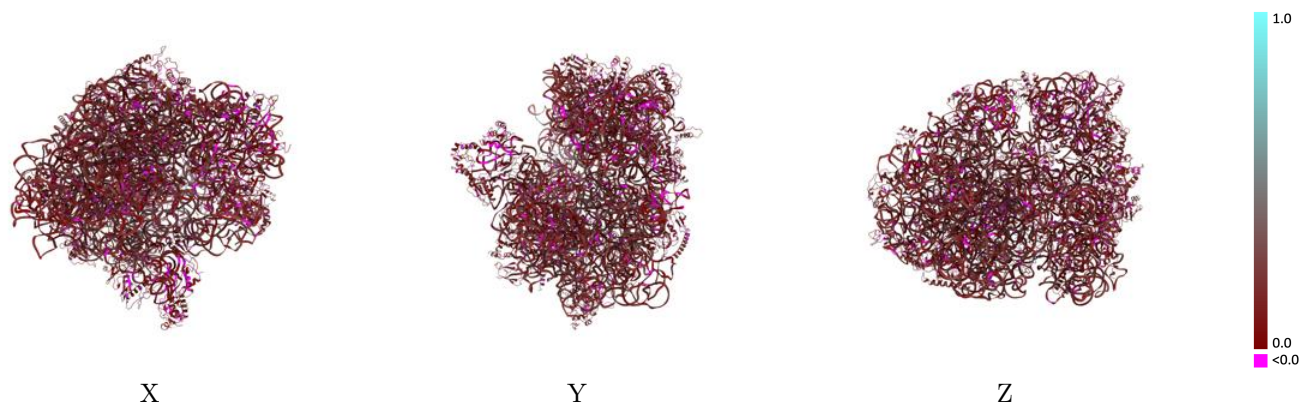
This section contains information regarding the fit between EMDB map EMD-13436 and PDB model 7PIC. Per-residue inclusion information can be found in section 3 on page 13.

9.1 Map-model overlay [i](#)



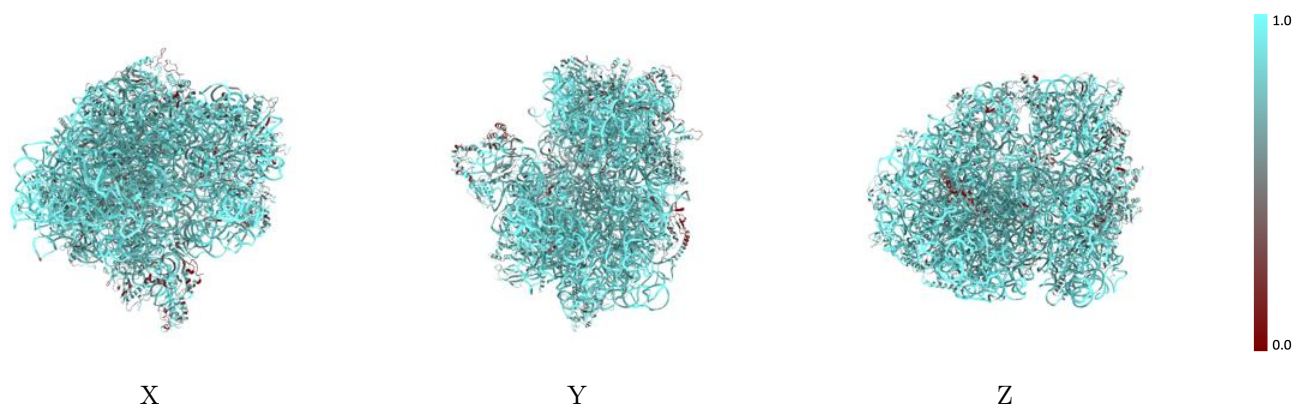
The images above show the 3D surface view of the map at the recommended contour level 0.37 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



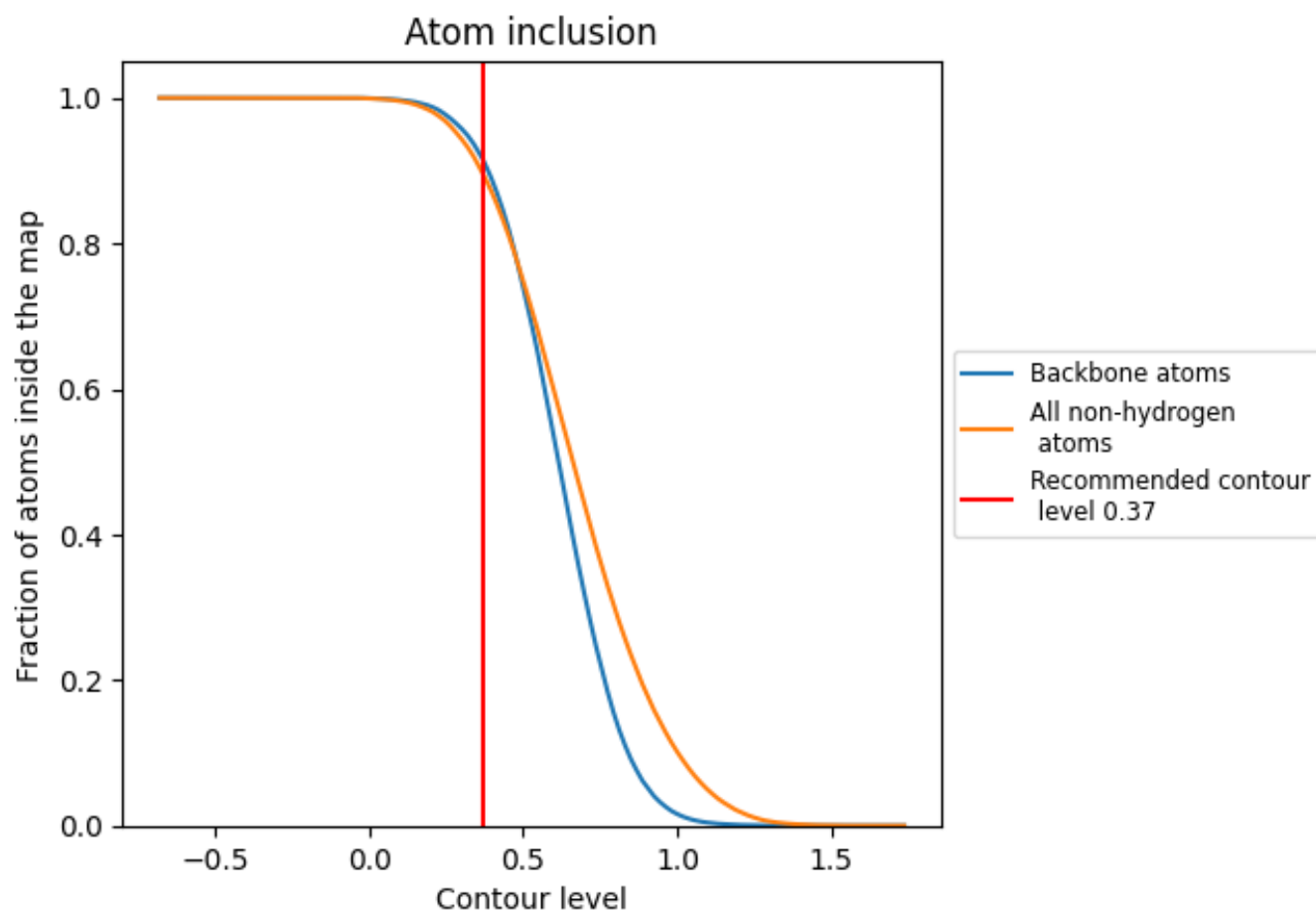
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.37).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 90% 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 (0.37) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8956	 0.1540
0	 0.8877	 0.1410
1	 0.8798	 0.1460
2	 0.8615	 0.1380
3	 0.9624	 0.1630
4	 0.9594	 0.1660
5	 0.9594	 0.1600
8	 0.9258	 0.1540
A	 0.7232	 0.1560
B	 0.7192	 0.1470
C	 0.7548	 0.1380
D	 0.7197	 0.1320
E	 0.6549	 0.1600
F	 0.7165	 0.1250
G	 0.7076	 0.1340
H	 0.7512	 0.1090
I	 0.6918	 0.1070
J	 0.8103	 0.1200
K	 0.7797	 0.1290
L	 0.6590	 0.1230
M	 0.7319	 0.0930
N	 0.8082	 0.1760
O	 0.8156	 0.1390
P	 0.8311	 0.1370
Q	 0.7888	 0.1510
R	 0.7493	 0.1180
S	 0.8541	 0.1650
T	 0.7946	 0.1630
a	 0.8220	 0.1250
b	 0.7788	 0.1260
c	 0.8145	 0.1580
d	 0.6959	 0.1340
e	 0.7035	 0.1430
f	 0.4629	 0.1430
g	 0.6562	 0.1110



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Chain	Atom inclusion	Q-score
h	 0.4995	 0.1010
i	 0.8256	 0.1460
j	 0.7000	 0.1400
k	 0.8447	 0.1380
l	 0.8180	 0.1290
m	 0.8130	 0.1330
n	 0.7774	 0.1330
o	 0.7936	 0.1460
p	 0.8667	 0.1470
q	 0.8160	 0.1510
r	 0.8627	 0.1420
s	 0.7870	 0.1480
t	 0.7305	 0.1420
u	 0.8313	 0.1130
v	 0.8545	 0.1390
w	 0.8365	 0.1880
x	 0.7434	 0.1860
y	 0.7972	 0.1160
z	 0.8589	 0.1700