



wwPDB EM Validation Summary Report ⓘ

Nov 28, 2022 – 09:57 AM EST

PDB ID : 7LS1
EMDB ID : EMD-23500
Title : 80S ribosome from mouse bound to eEF2 (Class II)
Authors : Loerch, S.; Smith, P.R.; Kunder, N.; Stanowick, A.D.; Lou, T.-F.; Campbell, Z.T.
Deposited on : 2021-02-17
Resolution : 3.30 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

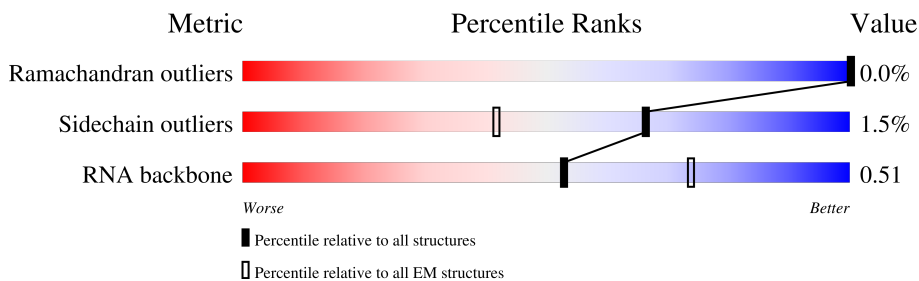
EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (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 3.30 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	A1	270	
2	B1	266	
3	C1	192	
4	D1	214	
5	E1	178	
6	F1	211	
7	G1	217	
8	H1	204	

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Mol	Chain	Length	Quality of chain
9	A2	4731	60% 18% 22%
10	B2	121	87% 12%
11	C2	174	71% 18% 10%
12	D2	257	5% 97%
13	E2	403	5% 99%
14	F2	419	86% 12%
15	G2	297	98%
16	H2	296	74% 25%
17	I2	203	99%
18	J2	184	82% 17%
19	K2	188	99%
20	L2	196	7% 93% 6%
21	M2	176	99%
22	N2	160	98%
23	O2	128	79% 21%
24	P2	140	5% 91% 8%
25	Q2	157	25% 75% 24%
26	R2	156	76% 24%
27	S2	145	91% 8%
28	T2	136	99%
29	U2	148	98%
30	V2	160	10% 71% 28%
31	W2	115	79% 18%
32	X2	125	5% 85% 14%
33	Y2	135	95% 5%

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Mol	Chain	Length	Quality of chain
34	Z2	110	98%
35	a2	117	96%
36	b2	123	97%
37	c2	105	94%
38	d2	97	89%
39	e2	70	97%
40	f2	51	98%
41	g2	128	41%
42	h2	25	96%
43	i2	106	94%
44	j2	92	96%
45	k2	137	91%
46	m2	1871	67%
47	n2	75	64%
48	p2	264	80%
49	q2	243	91%
50	r2	263	99%
51	w2	158	96%
52	z2	135	96%
53	o2	295	72%
54	s2	204	92%
55	v2	165	58%
56	x2	145	88%
57	y2	146	97%
58	A3	152	94%

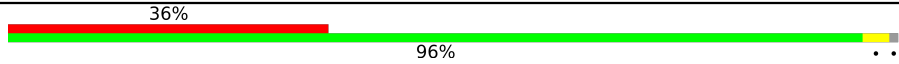
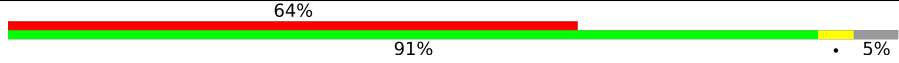
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Mol	Chain	Length	Quality of chain
59	B3	145	7% 97%
60	C3	119	10% 86% 14%
61	D3	83	13% 100%
62	E3	143	31% 97%
63	F3	115	11% 84% 13%
64	G3	69	23% 91% 7%
65	H3	56	9% 96%
66	I3	317	13% 97%
67	J3	293	10% 74% 24%
68	K3	249	24% 88% 9%
69	L3	194	27% 94% 5%
70	M3	132	45% 91% 8%
71	N3	151	32% 98%
72	O3	151	24% 87% 11%
73	P3	130	22% 99%
74	Q3	133	37% 95%
75	R3	125	7% 58% 40%
76	S3	84	33% 95%
77	T3	133	16% 41% 59%
78	U3	156	10% 38% 60%
79	m	858	26% 95%
80	j	317	6% 61% 38%
81	k	165	47% 90% 7%
82	A	386	15% 14% 84%
83	t	194	35% 93%

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Mol	Chain	Length	Quality of chain
84	u	208	
85	L1	217	

2 Entry composition [i](#)

There are 89 unique types of molecules in this entry. The entry contains 227065 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 60S ribosomal protein L7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A1	222	1851	1190	356	297	8	1	0

- Molecule 2 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B1	241	1934	1233	373	324	4	1	0

- Molecule 3 is a protein called 60S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C1	190	1519	956	284	273	6	0	0

- Molecule 4 is a protein called 60S ribosomal protein L10-like.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D1	208	1690	1073	327	278	12	0	0

- Molecule 5 is a protein called 60S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E1	174	1397	880	260	251	6	0	0

- Molecule 6 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F1	207	1676	1048	344	280	4	0	0

- Molecule 7 is a protein called 60S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G1	139	1143	732	221	183	7	0	0

- Molecule 8 is a protein called 60S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H1	203	1701	1072	359	266	4	0	0

- Molecule 9 is a RNA chain called 28S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
9	A2	3707	79546	35474	14505	25861	3706	0	0

- Molecule 10 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
10	B2	120	2558	1141	456	842	119	0	0

- Molecule 11 is a RNA chain called 5.8S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
11	C2	156	3315	1481	585	1094	155	0	0

- Molecule 12 is a protein called 60S ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	D2	251	1921	1204	393	318	6	0	0

- Molecule 13 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	E2	402	3238	2060	609	555	14	0	0

- Molecule 14 is a protein called 60S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	F2	367	2928	1842	583	488	15	0	0

- Molecule 15 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	G2	293	2385	1506	440	425	14	0	0

- Molecule 16 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	H2	221	1789	1145	342	298	4	0	0

- Molecule 17 is a protein called 60S ribosomal protein L13a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	I2	201	1640	1055	320	259	6	0	0

- Molecule 18 is a protein called 60S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	J2	153	1242	777	241	215	9	0	0

- Molecule 19 is a protein called 60S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	K2	186	1511	946	313	248	4	0	0

- Molecule 20 is a protein called 60S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	L2	184	1542	955	332	246	9	0	0

- Molecule 21 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	M2	175	1450	924	283	233	10	0	0

- Molecule 22 is a protein called 60S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	N2	159	1298	823	253	216	6	0	0

- Molecule 23 is a protein called 60S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	O2	101	825	529	144	150	2	0	0

- Molecule 24 is a protein called 60S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	P2	129	969	613	182	169	5	0	0

- Molecule 25 is a protein called 60S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	Q2	119	974	610	201	159	4	0	0

- Molecule 26 is a protein called 60S ribosomal protein L23a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	R2	118	967	618	181	167	1	0	0

- Molecule 27 is a protein called 60S ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	S2	134	1115	700	226	186	3	0	0

- Molecule 28 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	T2	135	1107	714	208	182	3	0	0

- Molecule 29 is a protein called 60S ribosomal protein L27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	U2	147	1164	736	239	185	4	0	0

- Molecule 30 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	V2	116	936	591	196	144	5	0	0

- Molecule 31 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	W2	94	732	465	130	131	6	0	0

- Molecule 32 is a protein called 60S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	X2	107	888	560	171	155	2	0	0

- Molecule 33 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	Y2	128	1053	667	216	165	5	0	0

- Molecule 34 is a protein called 60S ribosomal protein L35a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	Z2	109	876	555	174	143	4	0	0

- Molecule 35 is a protein called 60S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	a2	114	Total	C	N	O	S	0	0
			906	565	187	148	6		

- Molecule 36 is a protein called 60S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	b2	120	Total	C	N	O	S	0	0
			1001	634	201	165	1		

- Molecule 37 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	c2	102	Total	C	N	O	S	0	0
			829	517	173	134	5		

- Molecule 38 is a protein called 60S ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	d2	86	Total	C	N	O	S	0	0
			705	434	155	111	5		

- Molecule 39 is a protein called 60S ribosomal protein L38.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	e2	69	Total	C	N	O	S	0	0
			568	365	103	99	1		

- Molecule 40 is a protein called 60S ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	f2	50	Total	C	N	O	S	0	0
			444	281	98	64	1		

- Molecule 41 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	g2	52	Total	C	N	O	S	0	0
			430	267	90	67	6		

- Molecule 42 is a protein called 60S ribosomal protein L41.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	h2	24	Total	C	N	O	S	0	0
			230	139	62	26	3		

- Molecule 43 is a protein called 60S ribosomal protein L36a.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	i2	103	Total	C	N	O	S	0	0
			842	528	172	136	6		

- Molecule 44 is a protein called 60S ribosomal protein L37a.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	j2	89	Total	C	N	O	S	0	0
			694	436	133	118	7		

- Molecule 45 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	k2	125	Total	C	N	O	S	0	0
			1001	621	207	168	5		

- Molecule 46 is a RNA chain called 28S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	m2	1723	Total	C	N	O	P	0	0
			36795	16430	6601	12042	1722		

- Molecule 47 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	n2	75	Total	C	N	O	P	0	0
			1604	717	298	515	74		

- Molecule 48 is a protein called 40S ribosomal protein S3a.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	p2	214	Total	C	N	O	S	0	0
			1738	1103	310	311	14		

- Molecule 49 is a protein called 40S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	q2	226	1756	1119	316	314	7	0	0

- Molecule 50 is a protein called 40S ribosomal protein S4, X isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	r2	262	2076	1324	386	358	8	0	0

- Molecule 51 is a protein called 40S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	w2	153	1247	793	234	214	6	0	0

- Molecule 52 is a protein called 40S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	z2	134	1080	678	201	197	4	0	0

- Molecule 53 is a protein called 40S ribosomal protein SA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	o2	214	1694	1077	297	312	8	0	0

- Molecule 54 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
54	s2	189	1496	934	285	270	7	0	0

- Molecule 55 is a protein called 40S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	v2	96	811	528	146	132	5	0	0

- Molecule 56 is a protein called 40S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
56	x2	130	1073	681	205	180	7	0	0

- Molecule 57 is a protein called 40S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
57	y2	144	1143	726	216	198	3	0	0

- Molecule 58 is a protein called 40S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
58	A3	144	1190	746	241	202	1	0	0

- Molecule 59 is a protein called 40S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
59	B3	141	1104	691	215	196	2	0	0

- Molecule 60 is a protein called 40S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
60	C3	102	807	507	153	143	4	0	0

- Molecule 61 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
61	D3	83	638	392	119	122	5	0	0

- Molecule 62 is a protein called 40S ribosomal protein S23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
62	E3	141	1098	693	219	183	3	0	0

- Molecule 63 is a protein called 40S ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
63	F3	100	811	506	169	131	5	1	0

- Molecule 64 is a protein called 40S ribosomal protein S28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
64	G3	64	506	308	102	94	2	0	0

- Molecule 65 is a protein called 40S ribosomal protein S29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
65	H3	54	455	284	93	73	5	0	0

- Molecule 66 is a protein called Receptor of activated protein C kinase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
66	I3	313	2436	1535	424	465	12	0	0

- Molecule 67 is a protein called 40S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
67	J3	222	1725	1116	298	302	9	0	0

- Molecule 68 is a protein called 40S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
68	K3	227	1840	1149	367	317	7	0	0

- Molecule 69 is a protein called 40S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
69	L3	184	1518	964	305	247	2	0	0

- Molecule 70 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	M3	122	Total	C	N	O	S	0	0
			942	593	164	177	8		

- Molecule 71 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	N3	150	Total	C	N	O	S	0	0
			1208	773	229	205	1		

- Molecule 72 is a protein called 40S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	O3	134	Total	C	N	O	S	0	0
			1002	612	197	187	6		

- Molecule 73 is a protein called 40S ribosomal protein S15a.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	P3	129	Total	C	N	O	S	0	0
			1034	659	193	176	6		

- Molecule 74 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	Q3	129	Total	C	N	O	S	0	0
			1049	662	206	176	5		

- Molecule 75 is a protein called 40S ribosomal protein S25.

Mol	Chain	Residues	Atoms					AltConf	Trace
75	R3	75	Total	C	N	O	S	0	0
			598	382	111	104	1		

- Molecule 76 is a protein called 40S ribosomal protein S27-like.

Mol	Chain	Residues	Atoms					AltConf	Trace
76	S3	83	Total	C	N	O	S	0	0
			652	409	121	115	7		

- Molecule 77 is a protein called 40S ribosomal protein S30.

Mol	Chain	Residues	Atoms					AltConf	Trace
77	T3	55	Total	C	N	O	S	0	0
			438	271	95	71	1		

- Molecule 78 is a protein called Ubiquitin-40S ribosomal protein S27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
78	U3	62	Total	C	N	O	S	0	0
			505	317	96	85	7		

- Molecule 79 is a protein called Elongation factor 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	m	824	Total	C	N	O	S	0	0
			6433	4087	1104	1199	43		

- Molecule 80 is a protein called 60S acidic ribosomal protein P0.

Mol	Chain	Residues	Atoms					AltConf	Trace
80	j	196	Total	C	N	O	S	0	0
			1507	959	263	276	9		

- Molecule 81 is a protein called 60S ribosomal protein L12.

Mol	Chain	Residues	Atoms					AltConf	Trace
81	k	153	Total	C	N	O	S	0	0
			1159	721	218	217	3		

- Molecule 82 is a protein called Isoform 3 of Plasminogen activator inhibitor 1 RNA-binding protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
82	A	61	Total	C	N	O	0	0
			486	289	94	103		

- Molecule 83 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
83	t	186	Total	C	N	O	S	0	0
			1497	956	274	266	1		

- Molecule 84 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
84	u	206	1686	1058	332	291	5	0	0

- Molecule 85 is a protein called 60S ribosomal protein L10a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
85	L1	206	1660	1061	300	291	8	0	0

- Molecule 86 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
86	d2	1	Total 1	Zn 1	0
86	g2	1	Total 1	Zn 1	0
86	i2	1	Total 1	Zn 1	0
86	j2	1	Total 1	Zn 1	0
86	F3	1	Total 1	Zn 1	0
86	H3	1	Total 1	Zn 1	0
86	U3	1	Total 1	Zn 1	0

- Molecule 87 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
87	H3	1	Total 1	Mg 1	0

- Molecule 88 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C₁₀H₁₅N₅O₁₁P₂).



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

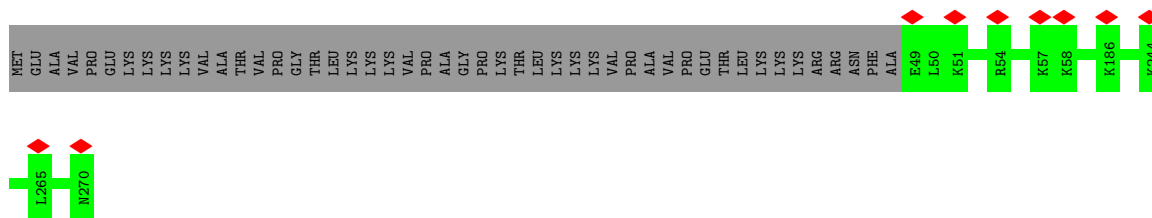
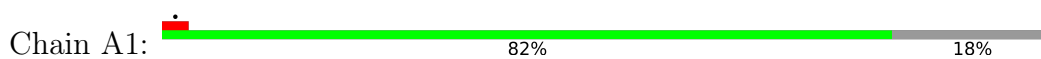
- Molecule 89 is water.

Mol	Chain	Residues	Atoms		AltConf
89	m2	1	Total	O	0
			1	1	
89	N3	1	Total	O	0
			1	1	

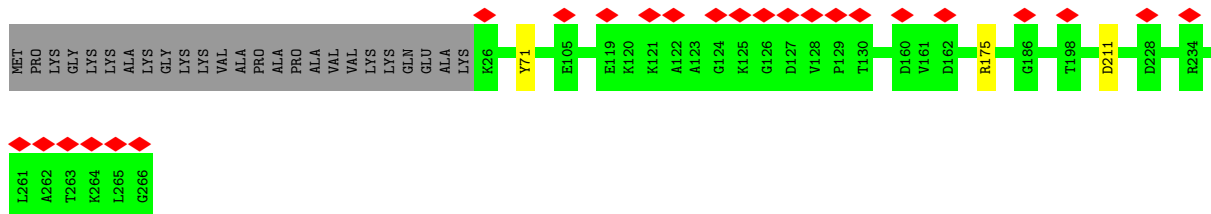
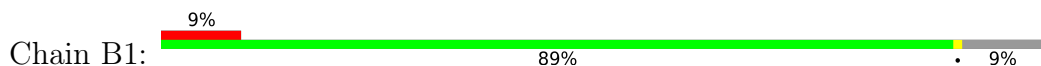
3 Residue-property plots [\(i\)](#)

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

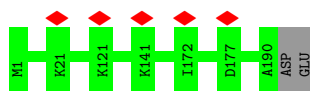
- Molecule 1: 60S ribosomal protein L7



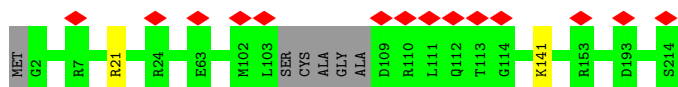
- Molecule 2: 60S ribosomal protein L7a



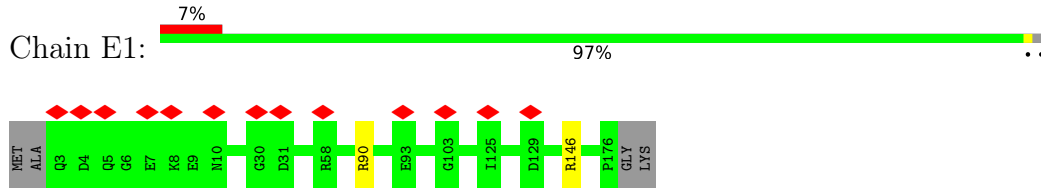
- Molecule 3: 60S ribosomal protein L9



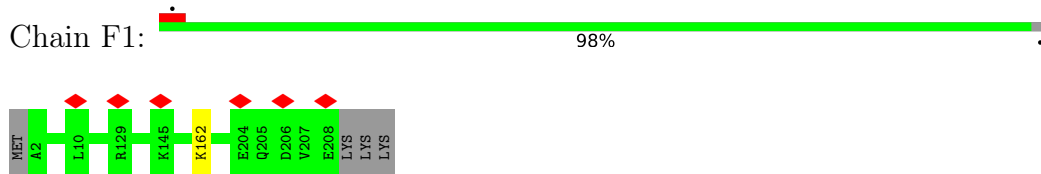
- Molecule 4: 60S ribosomal protein L10-like



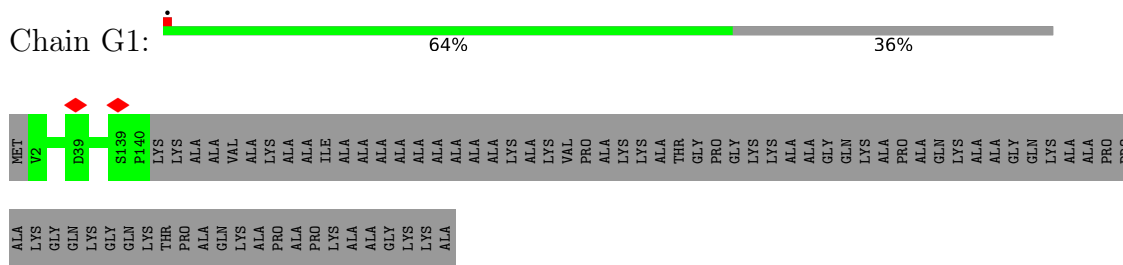
• Molecule 5: 60S ribosomal protein L11



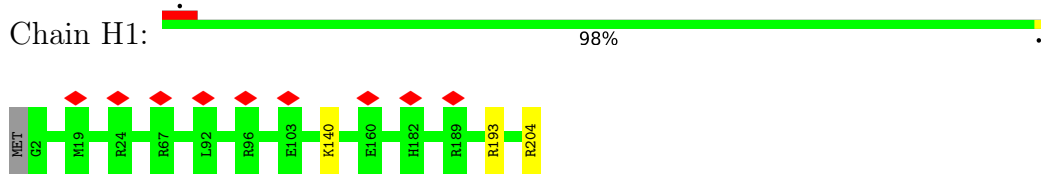
• Molecule 6: 60S ribosomal protein L13



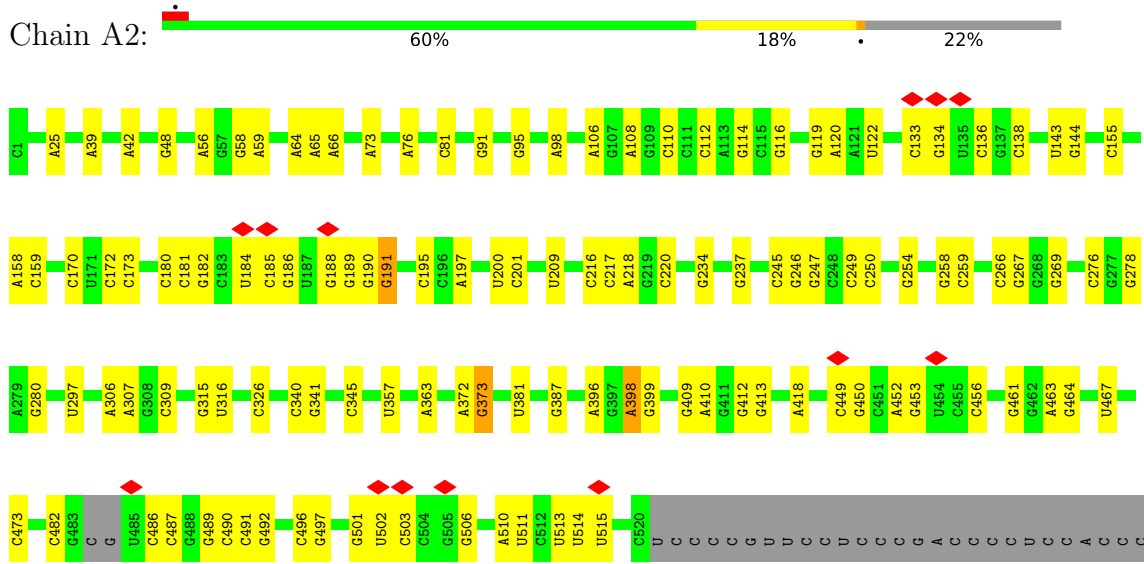
• Molecule 7: 60S ribosomal protein L14

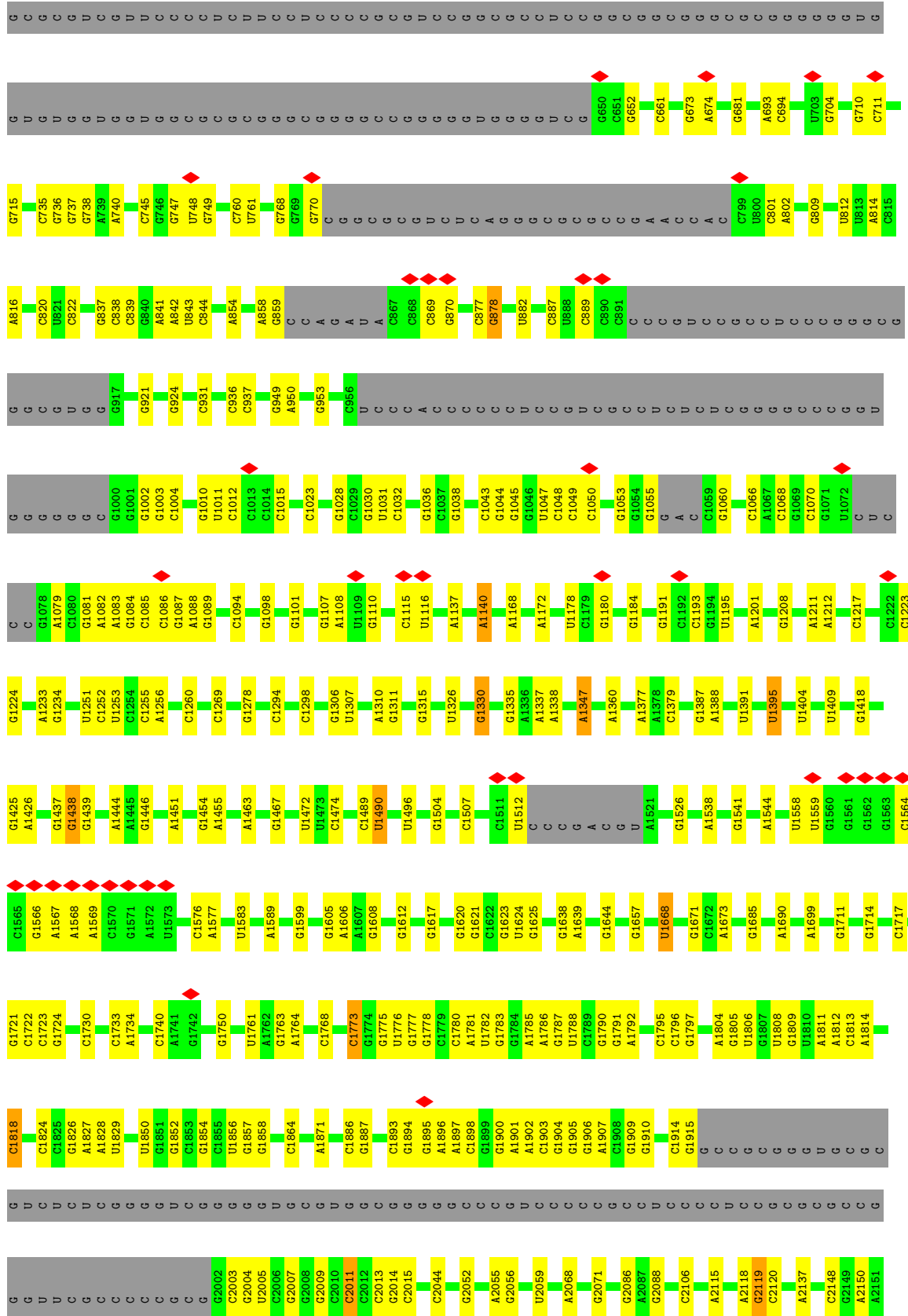


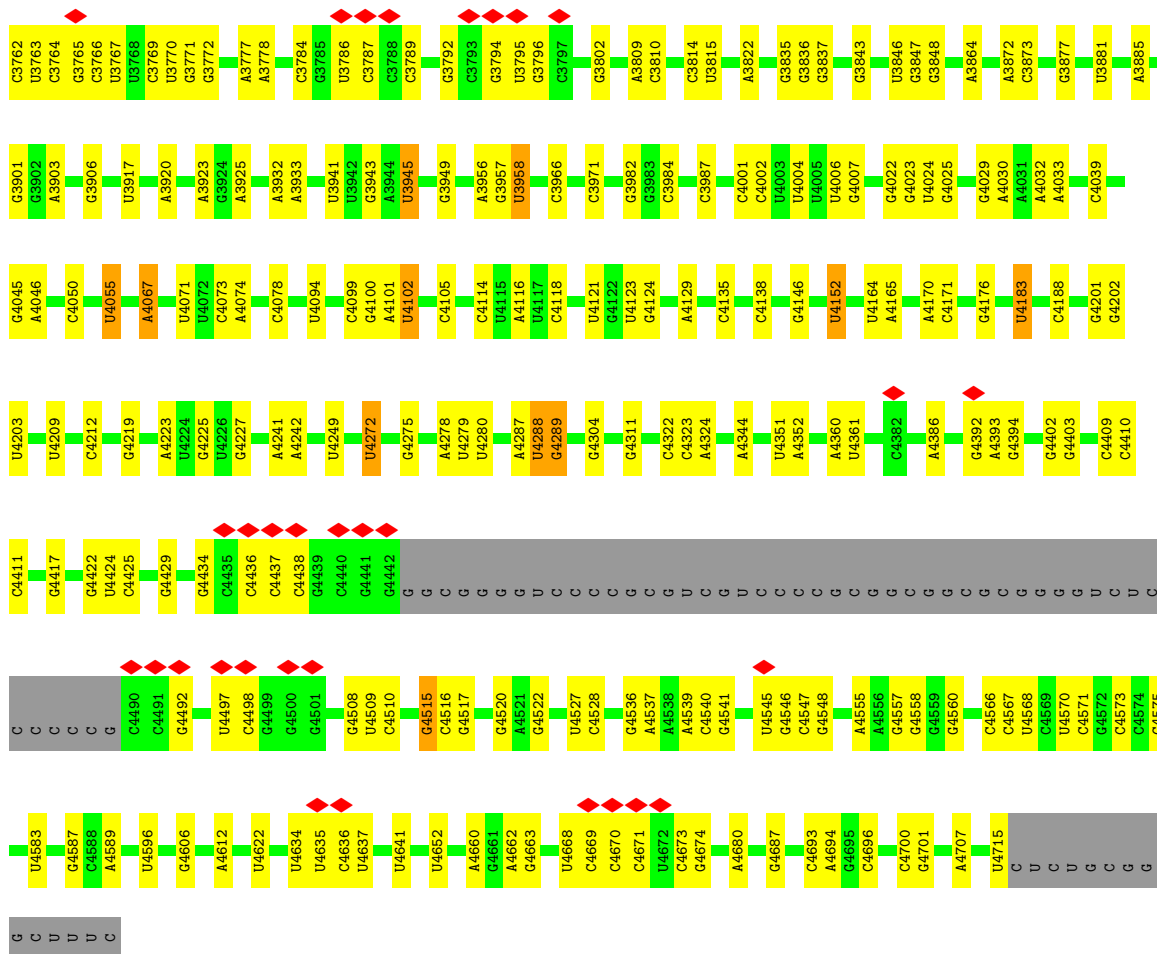
• Molecule 8: 60S ribosomal protein L15



• Molecule 9: 28S rRNA



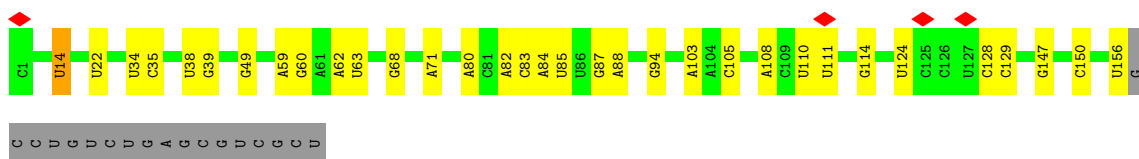




• Molecule 10: 5S rRNA



• Molecule 11: 5.8S rRNA

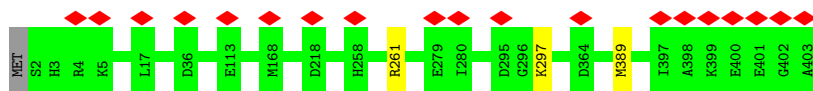


• Molecule 12: 60S ribosomal protein L8

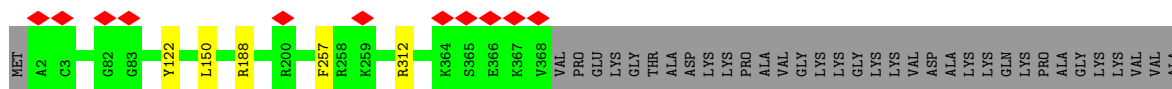
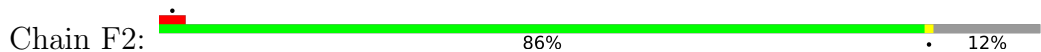




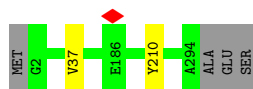
- Molecule 13: 60S ribosomal protein L3



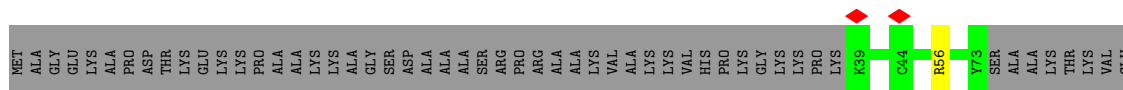
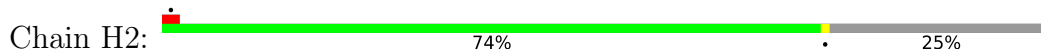
- Molecule 14: 60S ribosomal protein L4



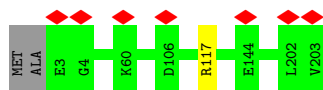
- Molecule 15: 60S ribosomal protein L5



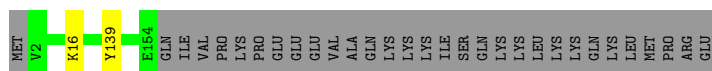
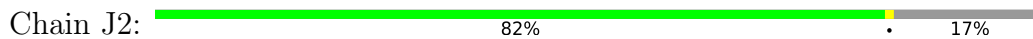
- Molecule 16: 60S ribosomal protein L6



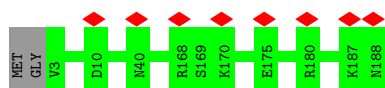
- Molecule 17: 60S ribosomal protein L13a



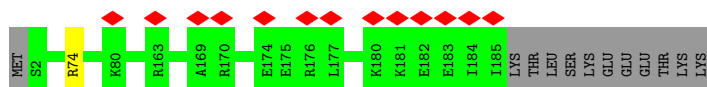
- Molecule 18: 60S ribosomal protein L17



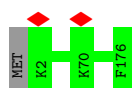
• Molecule 19: 60S ribosomal protein L18



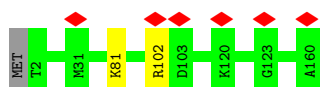
• Molecule 20: 60S ribosomal protein L19



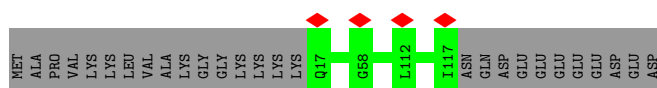
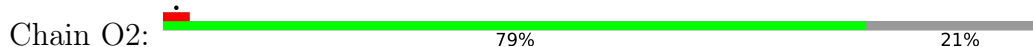
• Molecule 21: 60S ribosomal protein L18a



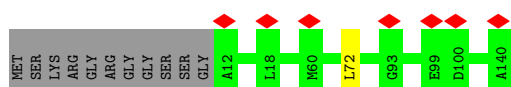
• Molecule 22: 60S ribosomal protein L21



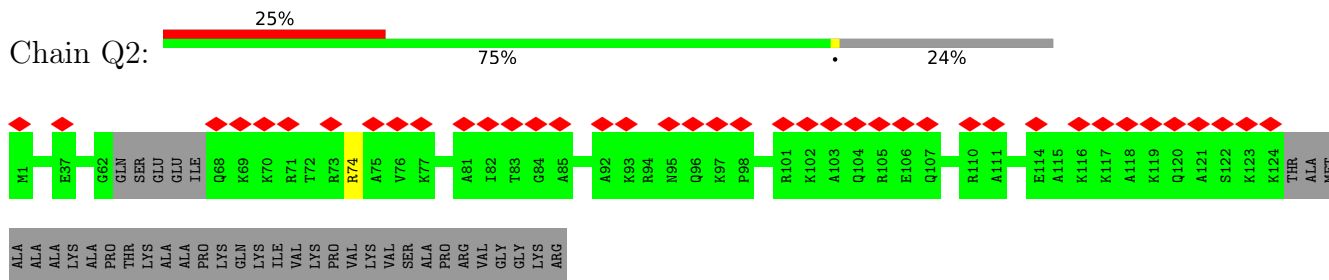
• Molecule 23: 60S ribosomal protein L22



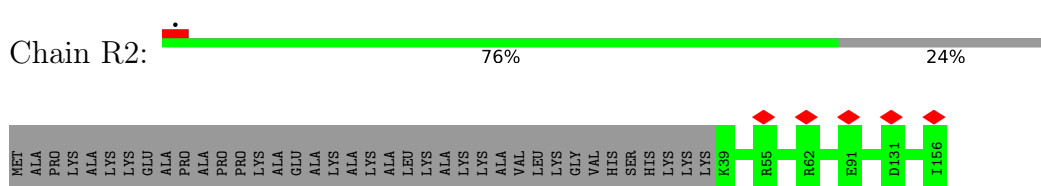
• Molecule 24: 60S ribosomal protein L23



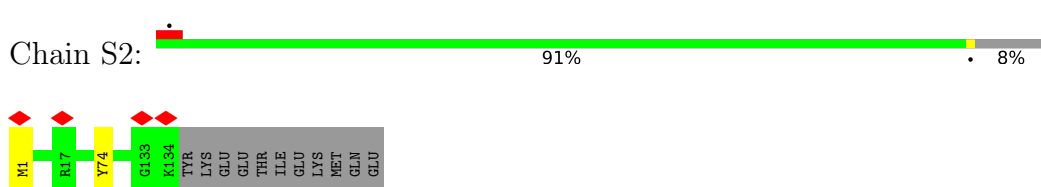
• Molecule 25: 60S ribosomal protein L24



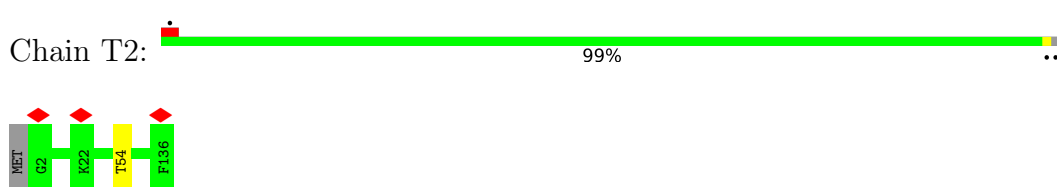
• Molecule 26: 60S ribosomal protein L23a



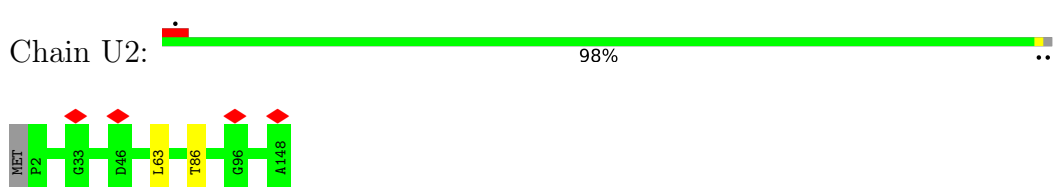
• Molecule 27: 60S ribosomal protein L26



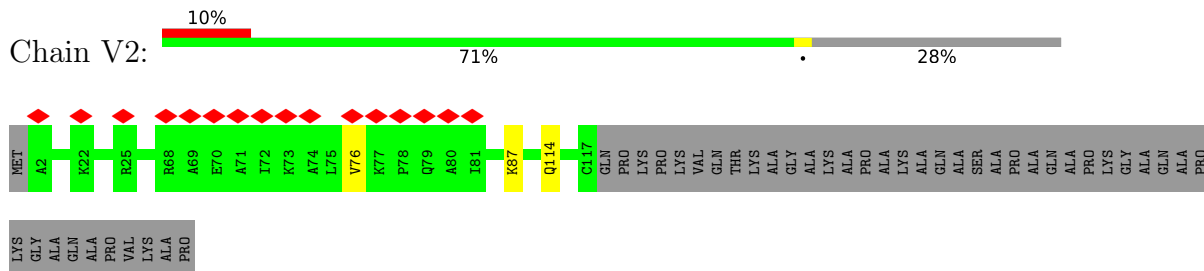
• Molecule 28: 60S ribosomal protein L27




• Molecule 29: 60S ribosomal protein L27a



• Molecule 30: 60S ribosomal protein L29




- Molecule 31: 60S ribosomal protein L30

Chain W2:  79% 18%



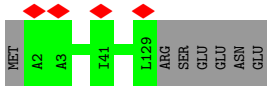
- Molecule 32: 60S ribosomal protein L31

Chain X2:  5% 85% 14%



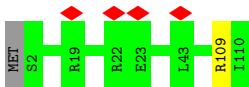
- Molecule 33: 60S ribosomal protein L32

Chain Y2:  95% 5%



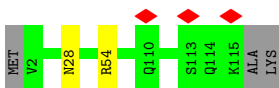
- Molecule 34: 60S ribosomal protein L35a

Chain Z2:  98%



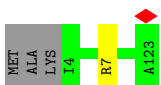
- Molecule 35: 60S ribosomal protein L34

Chain a2:  96%



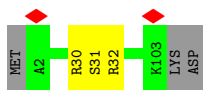
- Molecule 36: 60S ribosomal protein L35

Chain b2:  97%

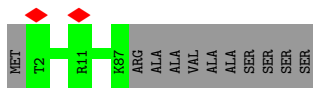


- Molecule 37: 60S ribosomal protein L36

Chain c2:  94%



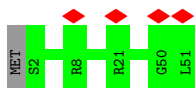
- Molecule 38: 60S ribosomal protein L37



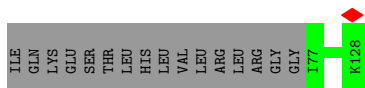
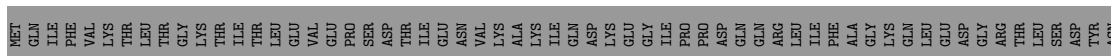
- Molecule 39: 60S ribosomal protein L38



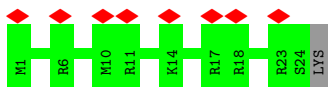
- Molecule 40: 60S ribosomal protein L39



- Molecule 41: Ubiquitin-60S ribosomal protein L40

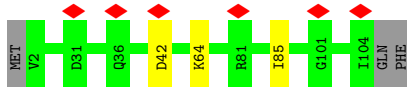


- Molecule 42: 60S ribosomal protein L41

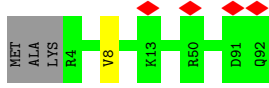


- Molecule 43: 60S ribosomal protein L36a

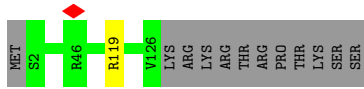
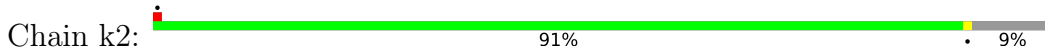




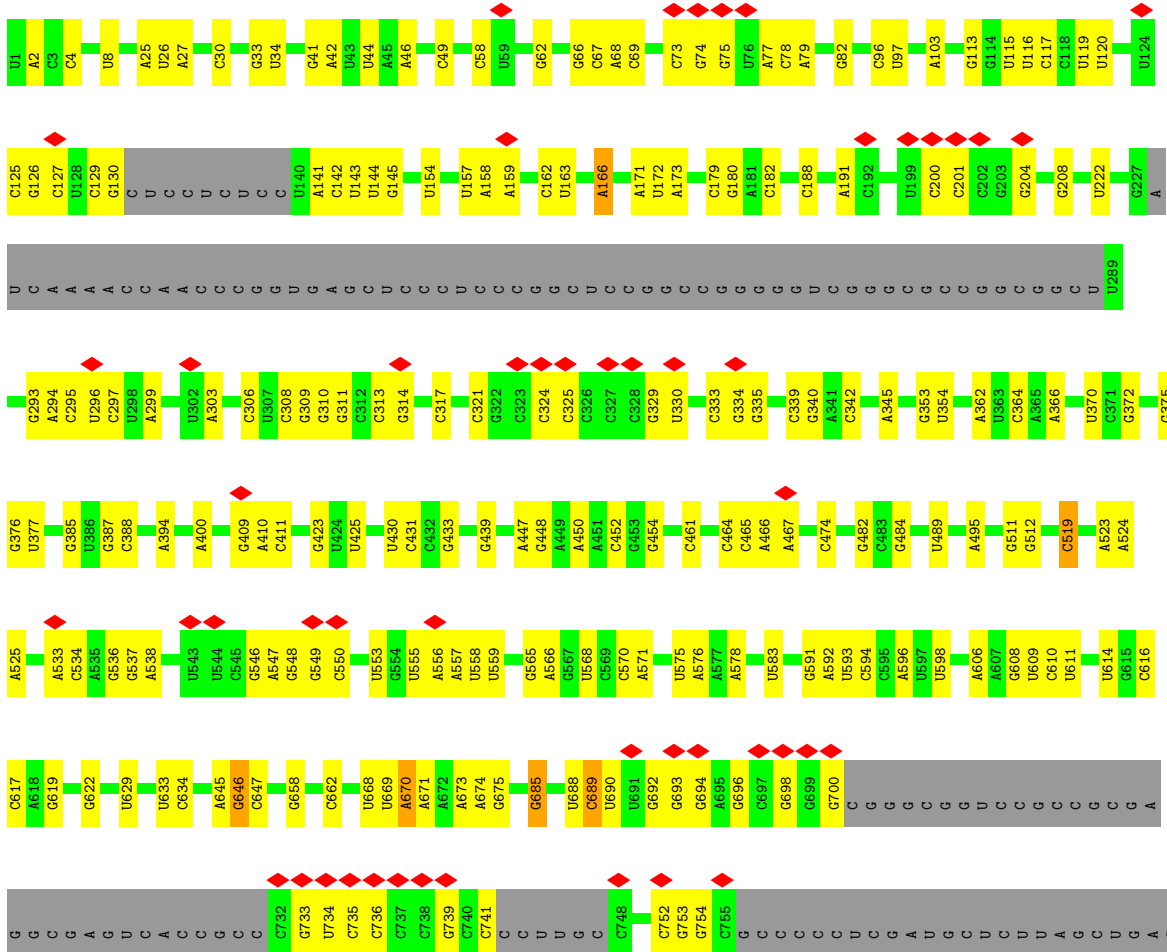
- Molecule 44: 60S ribosomal protein L37a

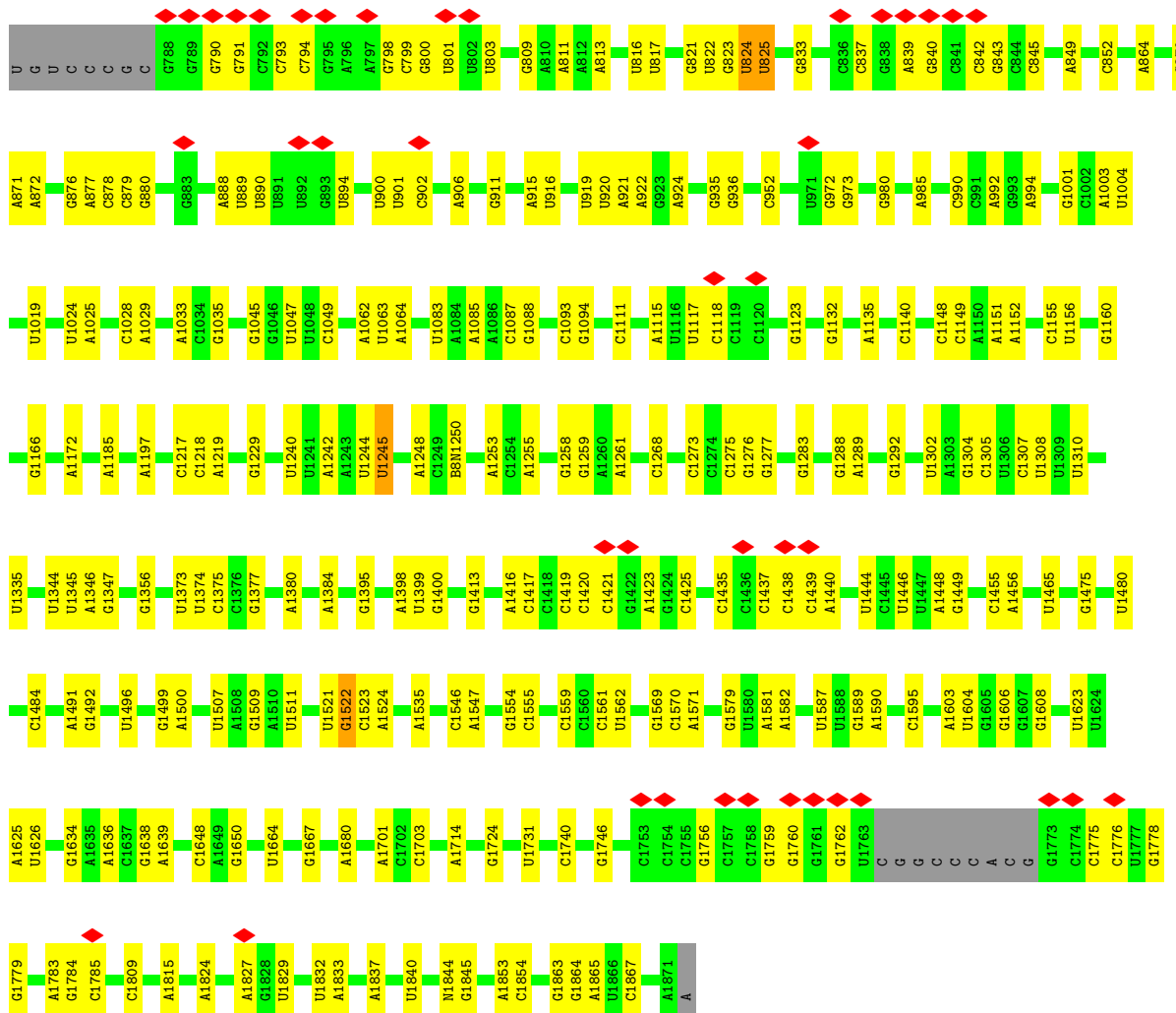


- Molecule 45: 60S ribosomal protein L28

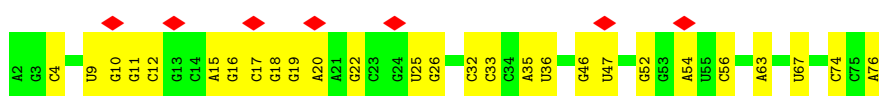


- Molecule 46: 28S rRNA

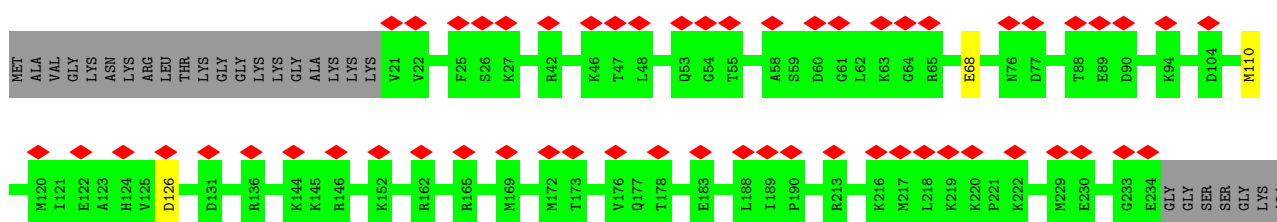
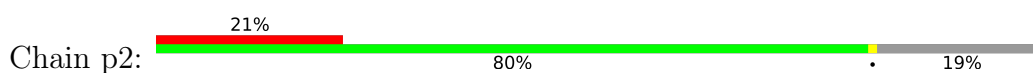




• Molecule 47: tRNA



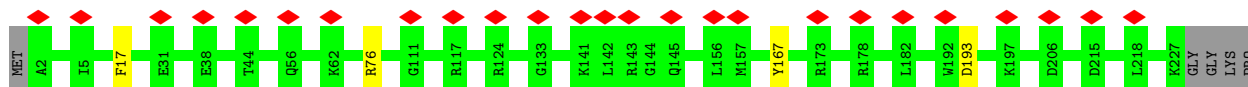
• Molecule 48: 40S ribosomal protein S3a



ALA
GLY
ASP
GLU
THR
GLY
ALA
LYS
VAL
GLU
ARG
ALA
ASP
GLY
TYR
GLU
PRO
PRO
VAL
GLN
GLU
SER
VAL

- Molecule 49: 40S ribosomal protein S3

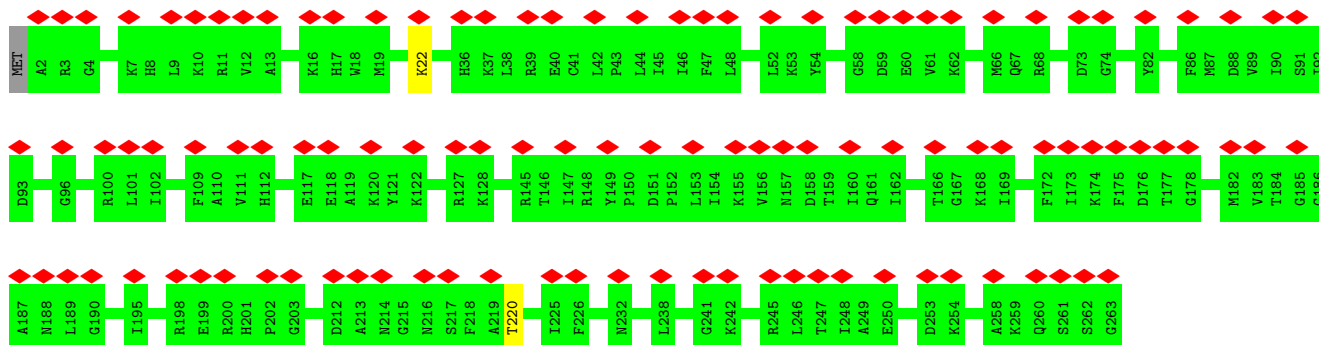
Chain q2: 10% 91% 7%



GLU
PRO
PRO
ALA
MET
PRO
GLN
PRO
VAL
PRO
THR
ALA

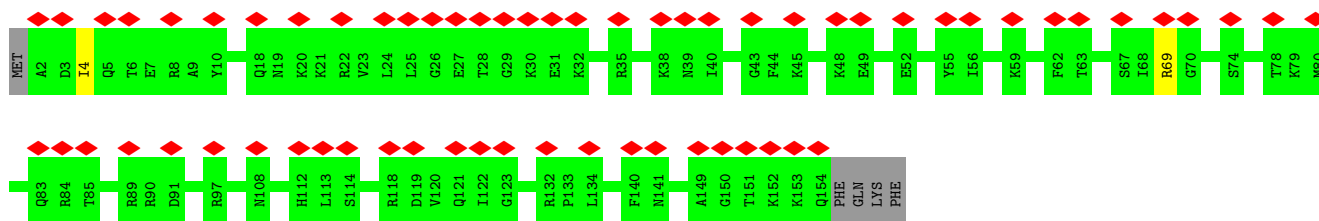
- Molecule 50: 40S ribosomal protein S4, X isoform

Chain r2: 42% 99%



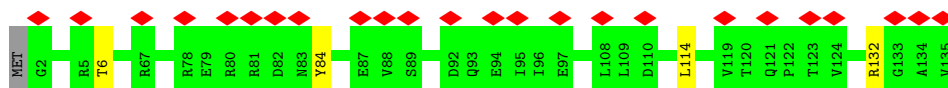
- Molecule 51: 40S ribosomal protein S11

Chain w2: 40% 96%



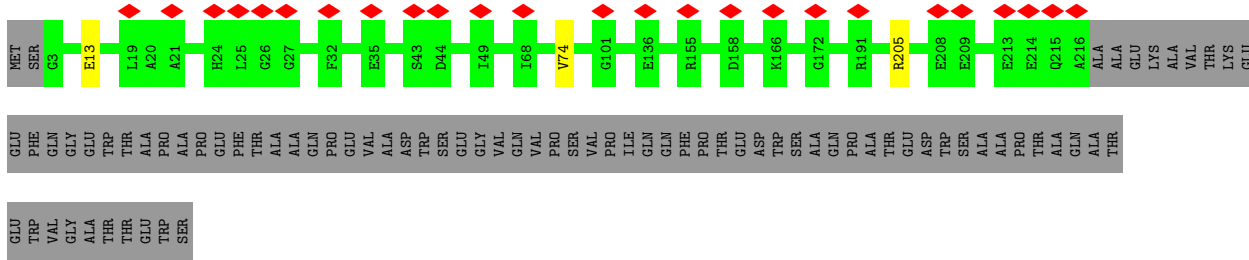
- Molecule 52: 40S ribosomal protein S17

Chain z2: 18% 96%

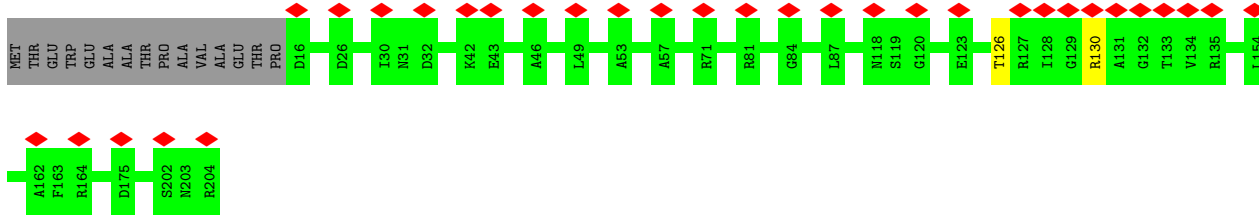


- Molecule 53: 40S ribosomal protein SA

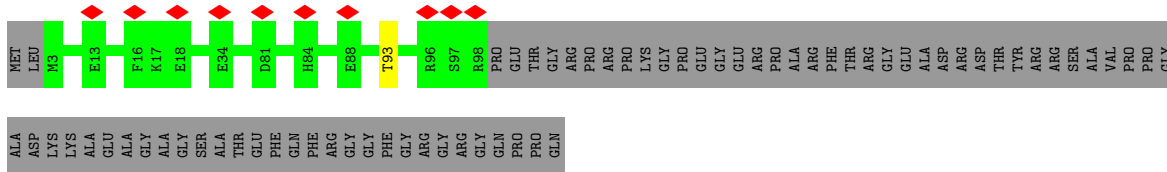
Chain o2: 8% 72% 27%



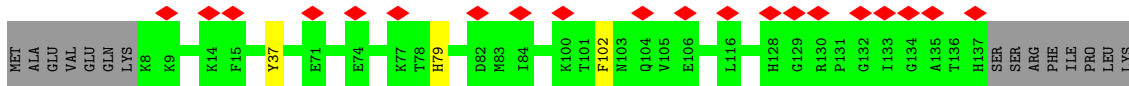
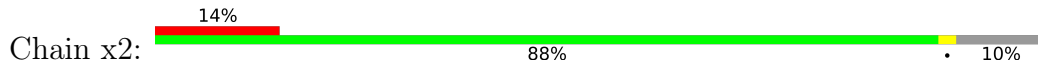
- Molecule 54: 40S ribosomal protein S5



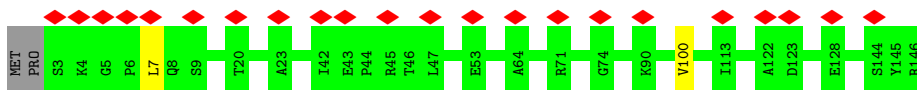
- Molecule 55: 40S ribosomal protein S10



- Molecule 56: 40S ribosomal protein S15

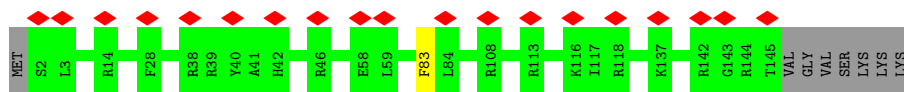


- Molecule 57: 40S ribosomal protein S16

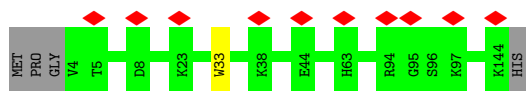


- Molecule 58: 40S ribosomal protein S18

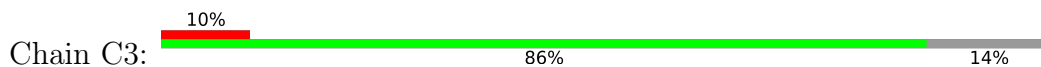




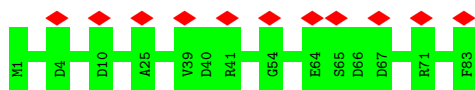
• Molecule 59: 40S ribosomal protein S19



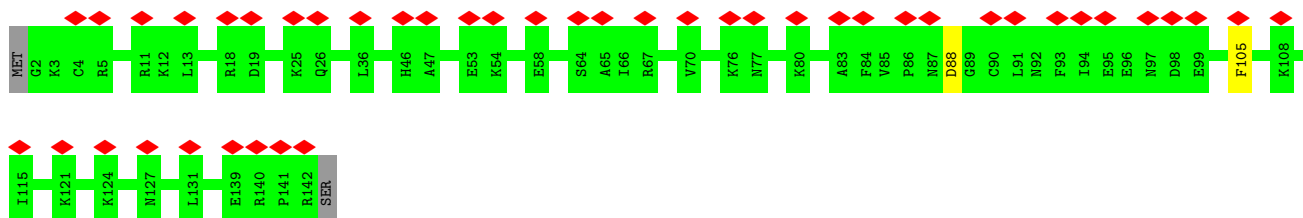
• Molecule 60: 40S ribosomal protein S20



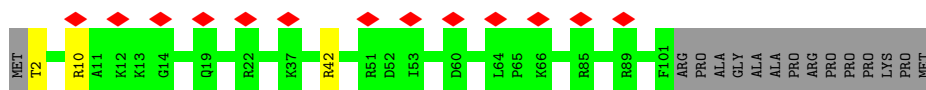
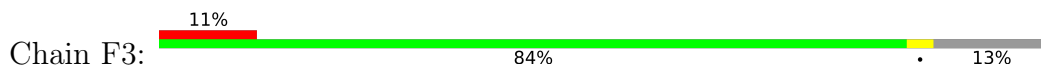
• Molecule 61: 40S ribosomal protein S21



• Molecule 62: 40S ribosomal protein S23



• Molecule 63: 40S ribosomal protein S26

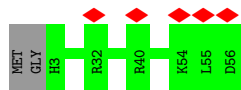


• Molecule 64: 40S ribosomal protein S28

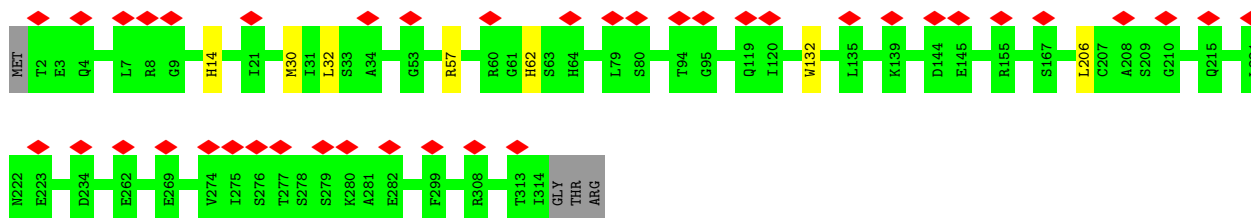




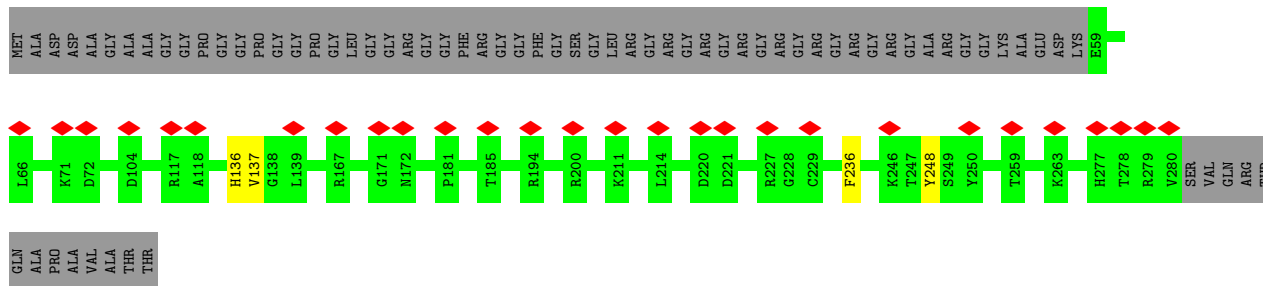
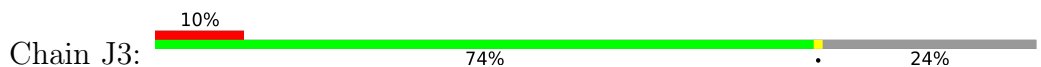
- Molecule 65: 40S ribosomal protein S29



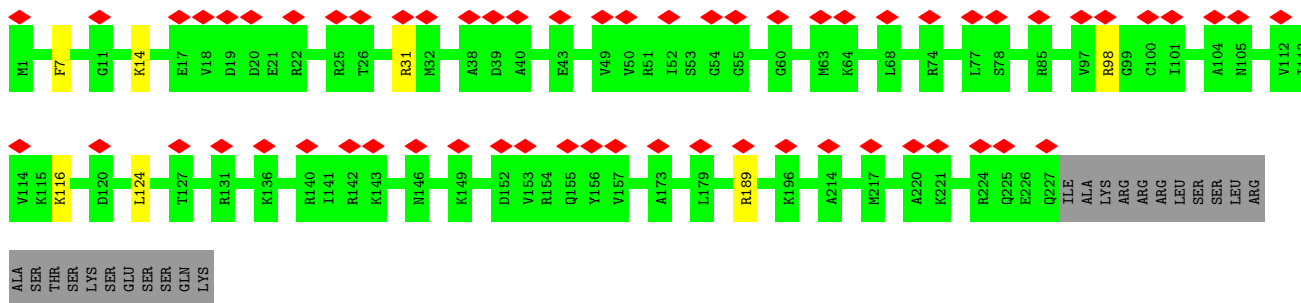
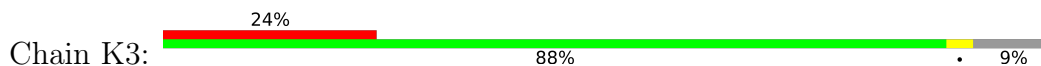
- Molecule 66: Receptor of activated protein C kinase 1



- Molecule 67: 40S ribosomal protein S2

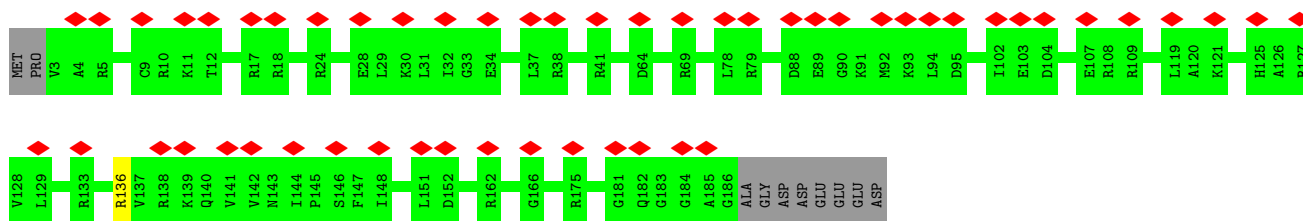


- Molecule 68: 40S ribosomal protein S6



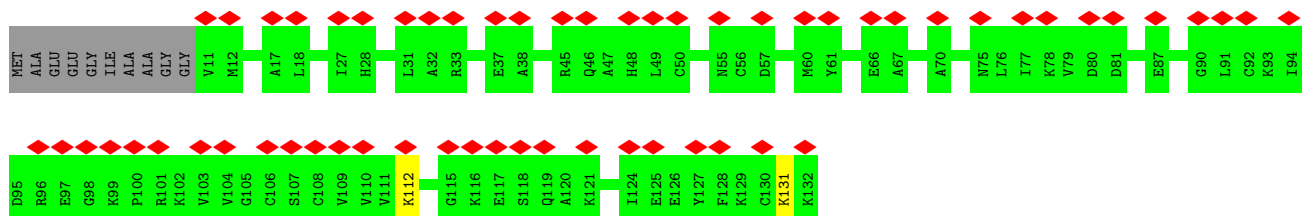
- Molecule 69: 40S ribosomal protein S9

Chain L3: 27% 94% 5%



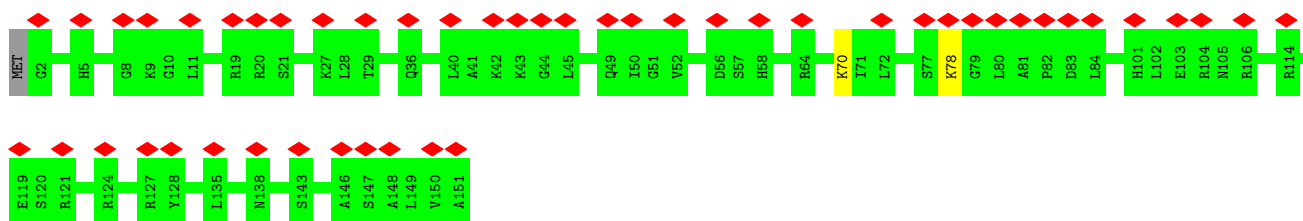
- Molecule 70: 40S ribosomal protein S12

Chain M3: 45% 91% 8%



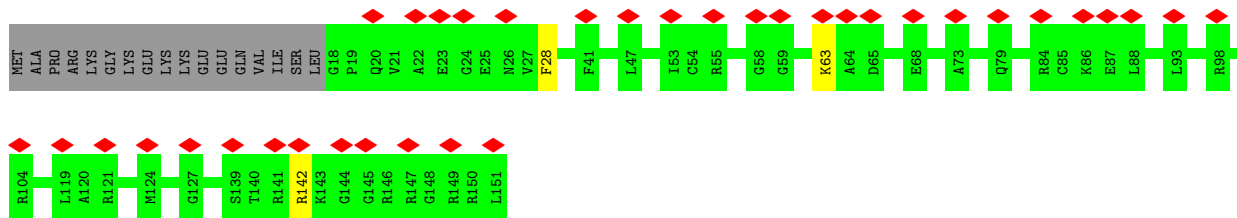
- Molecule 71: 40S ribosomal protein S13

Chain N3: 32% 98% 2%



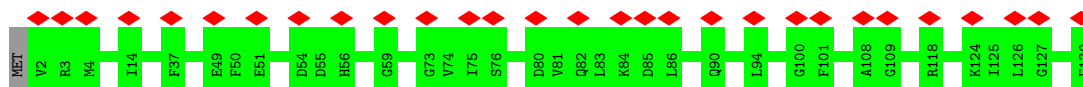
- Molecule 72: 40S ribosomal protein S14

Chain O3: 24% 87% 11%



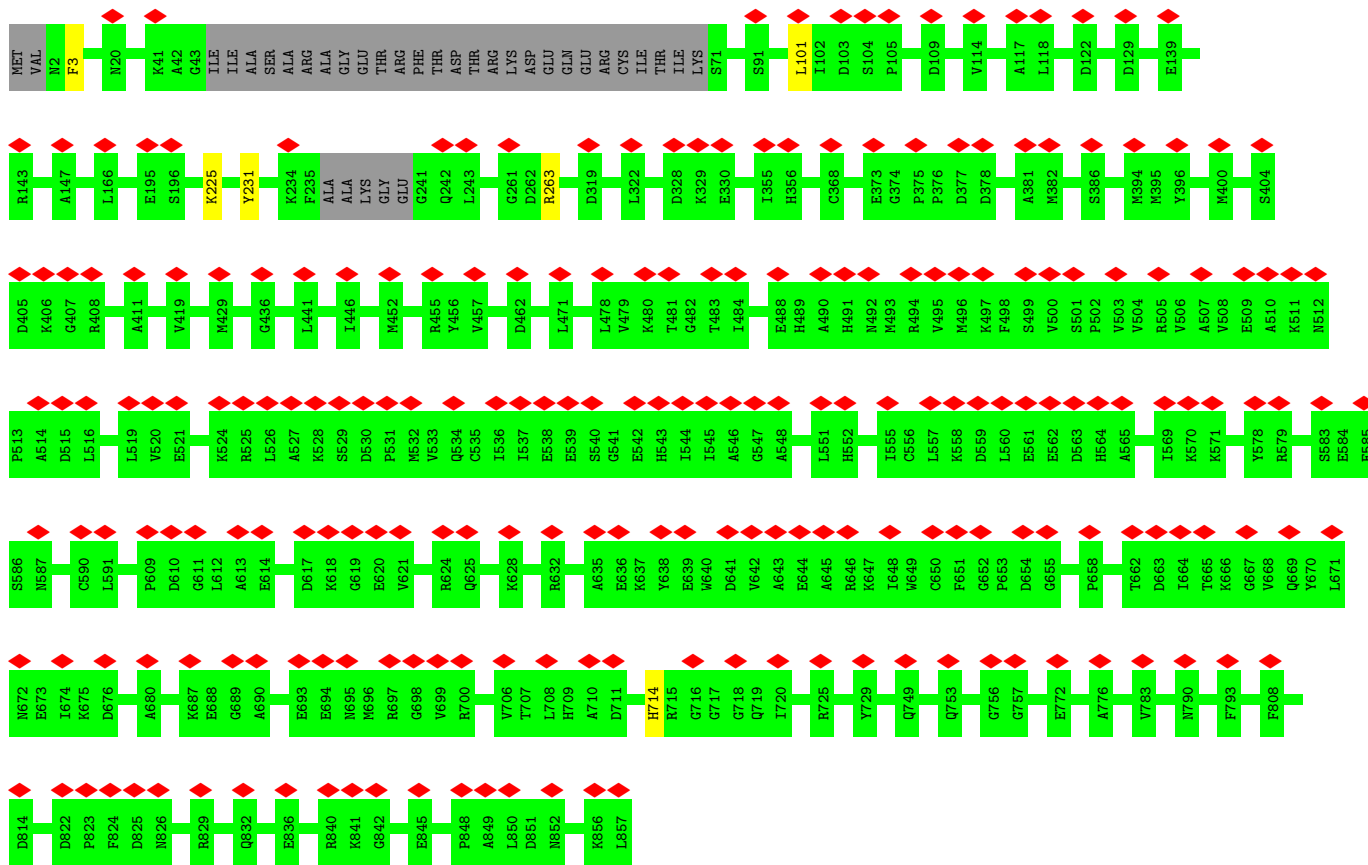
- Molecule 73: 40S ribosomal protein S15a

Chain P3: 22% 99% 1%

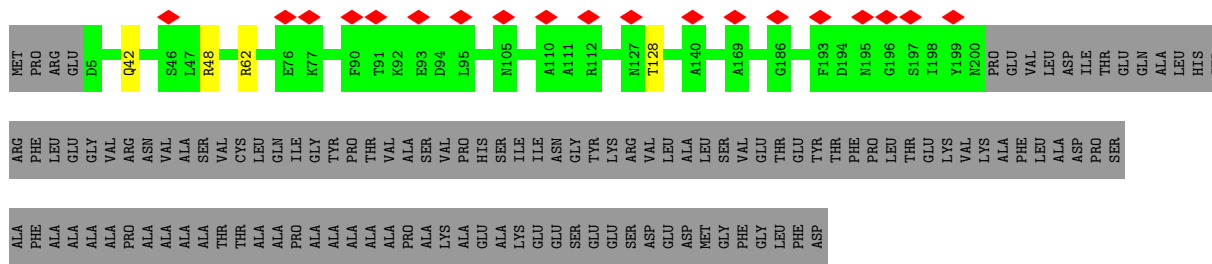


7LS1
 LYS
 PRO
 GLU
 ASP
 LYS

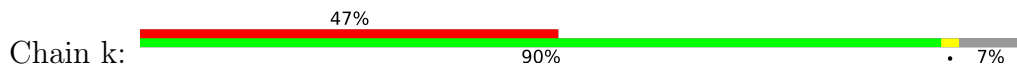
• Molecule 79: Elongation factor 2

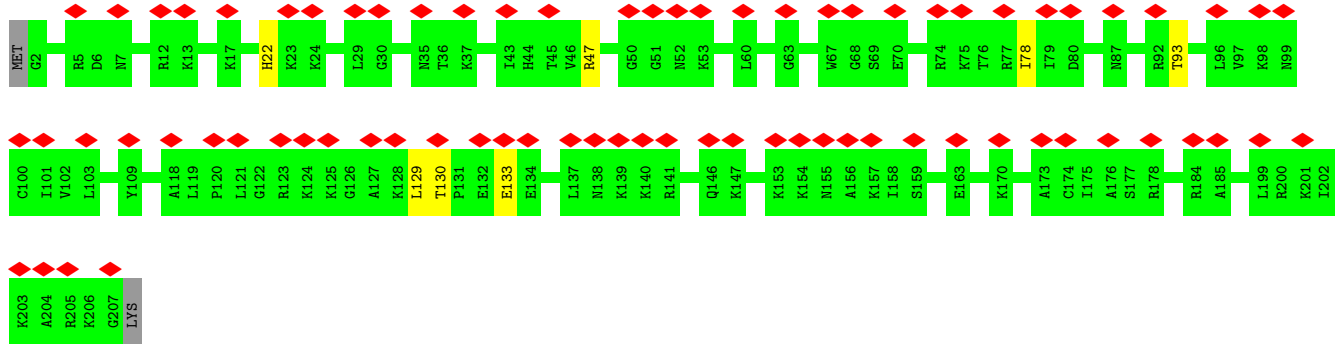


• Molecule 80: 60S acidic ribosomal protein P0

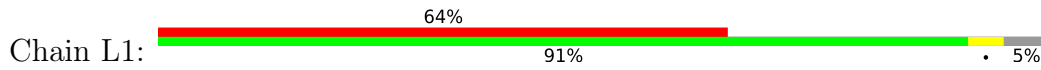


• Molecule 81: 60S ribosomal protein L12





• Molecule 85: 60S ribosomal protein L10a



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	11878	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	1.0	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	27.769	Depositor
Minimum map value	-16.146	Depositor
Average map value	-0.003	Depositor
Map value standard deviation	1.100	Depositor
Recommended contour level	4.8	Depositor
Map size (Å)	814.07996, 814.07996, 814.07996	wwPDB
Map dimensions	768, 768, 768	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GDP, 5MC, 1MA, B8T, P7G, B9B, G7M, E7G, OMU, OMC, B8W, UR3, OMG, B8Q, I4U, MHG, DDE, B8N, A2M, MG, B9H, 6MZ, PSU, ZN, 2MG, MLZ, 4AC

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	A1	0.26	0/1888	0.51	0/2516
2	B1	0.25	0/1971	0.48	0/2652
3	C1	0.25	0/1537	0.51	0/2065
4	D1	0.25	0/1728	0.51	0/2306
5	E1	0.25	0/1420	0.54	0/1899
6	F1	0.25	0/1707	0.54	0/2286
7	G1	0.25	0/1165	0.51	0/1558
8	H1	0.25	0/1746	0.55	0/2338
9	A2	0.22	0/86915	0.80	45/135538 (0.0%)
10	B2	0.22	0/2858	0.77	0/4455
11	C2	0.23	0/3679	0.81	2/5732 (0.0%)
12	D2	0.25	0/1959	0.55	0/2627
13	E2	0.25	0/3305	0.50	0/4422
14	F2	0.24	0/2971	0.51	0/3987
15	G2	0.25	0/2431	0.49	0/3256
16	H2	0.25	0/1822	0.51	0/2443
17	I2	0.26	0/1670	0.50	0/2232
18	J2	0.24	0/1268	0.50	0/1700
19	K2	0.24	0/1535	0.56	0/2048
20	L2	0.24	0/1558	0.53	0/2059
21	M2	0.25	0/1490	0.54	0/2000
22	N2	0.25	0/1326	0.49	0/1769
23	O2	0.25	0/839	0.47	0/1126
24	P2	0.26	0/983	0.49	0/1319
25	Q2	0.26	0/988	0.53	0/1306
26	R2	0.25	0/984	0.51	0/1323
27	S2	0.24	0/1132	0.52	0/1504
28	T2	0.26	0/1130	0.49	0/1507
29	U2	0.25	0/1193	0.51	0/1593
30	V2	0.25	0/954	0.49	0/1263
31	W2	0.25	0/742	0.47	0/996

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
32	X2	0.24	0/903	0.53	0/1216
33	Y2	0.24	0/1071	0.51	0/1429
34	Z2	0.25	0/895	0.55	0/1198
35	a2	0.24	0/916	0.56	0/1221
36	b2	0.24	0/1009	0.51	0/1332
37	c2	0.24	0/840	0.55	0/1114
38	d2	0.24	0/720	0.57	0/952
39	e2	0.24	0/574	0.47	0/760
40	f2	0.24	0/454	0.54	0/599
41	g2	0.23	0/425	0.50	0/561
42	h2	0.23	0/231	0.67	0/294
43	i2	0.25	0/855	0.52	0/1128
44	j2	0.25	0/704	0.49	0/935
45	k2	0.24	0/1016	0.54	0/1363
46	m2	0.21	0/40747	0.81	24/63507 (0.0%)
47	n2	0.18	0/1795	0.75	0/2798
48	p2	0.24	0/1765	0.46	0/2362
49	q2	0.25	0/1784	0.51	0/2402
50	r2	0.24	0/2118	0.50	0/2849
51	w2	0.24	0/1268	0.52	0/1696
52	z2	0.23	0/1094	0.51	0/1469
53	o2	0.25	0/1731	0.48	0/2352
54	s2	0.24	0/1517	0.50	0/2038
55	v2	0.24	0/835	0.45	0/1126
56	x2	0.24	0/1094	0.51	0/1460
57	y2	0.25	0/1161	0.53	0/1553
58	A3	0.24	0/1208	0.55	0/1618
59	B3	0.24	0/1122	0.48	0/1503
60	C3	0.23	0/817	0.53	0/1097
61	D3	0.25	0/645	0.51	0/863
62	E3	0.25	0/1116	0.51	0/1490
63	F3	0.24	0/828	0.53	0/1109
64	G3	0.24	0/508	0.59	0/680
65	H3	0.24	0/466	0.51	0/618
66	I3	0.24	0/2493	0.49	0/3394
67	J3	0.25	0/1762	0.47	0/2382
68	K3	0.24	0/1863	0.54	0/2481
69	L3	0.24	0/1542	0.53	0/2058
70	M3	0.24	0/952	0.42	0/1278
71	N3	0.24	0/1232	0.49	0/1656
72	O3	0.25	0/1015	0.54	0/1361
73	P3	0.25	0/1051	0.51	0/1406
74	Q3	0.24	0/1066	0.52	0/1415

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
75	R3	0.24	0/604	0.49	0/810
76	S3	0.23	0/665	0.50	0/890
77	T3	0.24	0/443	0.54	0/582
78	U3	0.25	0/515	0.52	0/682
79	m	0.25	0/6538	0.47	0/8829
80	j	0.25	0/1530	0.48	0/2064
81	k	0.24	0/1173	0.51	0/1581
82	A	0.35	0/493	0.80	2/655 (0.3%)
83	t	0.25	0/1519	0.48	0/2033
84	u	0.24	0/1715	0.52	0/2287
85	L1	0.25	0/1686	0.51	0/2262
All	All	0.23	0/240983	0.70	73/352623 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
82	A	0	1

There are no bond length outliers.

The worst 5 of 73 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
82	A	223	ASP	CB-CA-C	-10.06	90.28	110.40
9	A2	4575	C	N3-C2-O2	-9.34	115.36	121.90
9	A2	4575	C	N1-C2-O2	8.31	123.89	118.90
9	A2	1824	C	N3-C2-O2	-8.21	116.15	121.90
9	A2	250	C	N3-C2-O2	-8.06	116.26	121.90

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
82	A	222	LYS	Mainchain

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A1	221/270 (82%)	216 (98%)	5 (2%)	0	100	100
2	B1	240/266 (90%)	232 (97%)	8 (3%)	0	100	100
3	C1	188/192 (98%)	185 (98%)	3 (2%)	0	100	100
4	D1	204/214 (95%)	198 (97%)	6 (3%)	0	100	100
5	E1	172/178 (97%)	170 (99%)	2 (1%)	0	100	100
6	F1	205/211 (97%)	196 (96%)	9 (4%)	0	100	100
7	G1	137/217 (63%)	134 (98%)	3 (2%)	0	100	100
8	H1	201/204 (98%)	199 (99%)	2 (1%)	0	100	100
12	D2	249/257 (97%)	235 (94%)	14 (6%)	0	100	100
13	E2	400/403 (99%)	393 (98%)	7 (2%)	0	100	100
14	F2	364/419 (87%)	355 (98%)	9 (2%)	0	100	100
15	G2	291/297 (98%)	287 (99%)	4 (1%)	0	100	100
16	H2	215/296 (73%)	208 (97%)	7 (3%)	0	100	100
17	I2	199/203 (98%)	196 (98%)	3 (2%)	0	100	100
18	J2	151/184 (82%)	144 (95%)	7 (5%)	0	100	100
19	K2	184/188 (98%)	181 (98%)	3 (2%)	0	100	100
20	L2	182/196 (93%)	182 (100%)	0	0	100	100
21	M2	173/176 (98%)	166 (96%)	7 (4%)	0	100	100
22	N2	157/160 (98%)	156 (99%)	1 (1%)	0	100	100
23	O2	99/128 (77%)	99 (100%)	0	0	100	100
24	P2	127/140 (91%)	125 (98%)	2 (2%)	0	100	100
25	Q2	115/157 (73%)	109 (95%)	6 (5%)	0	100	100
26	R2	116/156 (74%)	113 (97%)	3 (3%)	0	100	100
27	S2	132/145 (91%)	131 (99%)	1 (1%)	0	100	100
28	T2	133/136 (98%)	133 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
29	U2	145/148 (98%)	140 (97%)	5 (3%)	0	100	100
30	V2	114/160 (71%)	107 (94%)	7 (6%)	0	100	100
31	W2	92/115 (80%)	89 (97%)	3 (3%)	0	100	100
32	X2	105/125 (84%)	104 (99%)	1 (1%)	0	100	100
33	Y2	126/135 (93%)	123 (98%)	3 (2%)	0	100	100
34	Z2	107/110 (97%)	105 (98%)	2 (2%)	0	100	100
35	a2	112/117 (96%)	111 (99%)	1 (1%)	0	100	100
36	b2	118/123 (96%)	115 (98%)	3 (2%)	0	100	100
37	c2	100/105 (95%)	94 (94%)	5 (5%)	1 (1%)	15	46
38	d2	84/97 (87%)	84 (100%)	0	0	100	100
39	e2	67/70 (96%)	67 (100%)	0	0	100	100
40	f2	48/51 (94%)	47 (98%)	1 (2%)	0	100	100
41	g2	49/128 (38%)	49 (100%)	0	0	100	100
42	h2	22/25 (88%)	22 (100%)	0	0	100	100
43	i2	101/106 (95%)	96 (95%)	5 (5%)	0	100	100
44	j2	87/92 (95%)	84 (97%)	3 (3%)	0	100	100
45	k2	123/137 (90%)	119 (97%)	4 (3%)	0	100	100
48	p2	212/264 (80%)	205 (97%)	7 (3%)	0	100	100
49	q2	224/243 (92%)	221 (99%)	3 (1%)	0	100	100
50	r2	260/263 (99%)	254 (98%)	6 (2%)	0	100	100
51	w2	151/158 (96%)	144 (95%)	7 (5%)	0	100	100
52	z2	132/135 (98%)	130 (98%)	2 (2%)	0	100	100
53	o2	212/295 (72%)	208 (98%)	4 (2%)	0	100	100
54	s2	187/204 (92%)	181 (97%)	6 (3%)	0	100	100
55	v2	94/165 (57%)	92 (98%)	2 (2%)	0	100	100
56	x2	128/145 (88%)	125 (98%)	3 (2%)	0	100	100
57	y2	142/146 (97%)	139 (98%)	3 (2%)	0	100	100
58	A3	142/152 (93%)	136 (96%)	6 (4%)	0	100	100
59	B3	139/145 (96%)	138 (99%)	1 (1%)	0	100	100
60	C3	100/119 (84%)	98 (98%)	2 (2%)	0	100	100
61	D3	81/83 (98%)	78 (96%)	3 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
62	E3	139/143 (97%)	137 (99%)	2 (1%)	0	100	100
63	F3	99/115 (86%)	97 (98%)	2 (2%)	0	100	100
64	G3	62/69 (90%)	60 (97%)	2 (3%)	0	100	100
65	H3	52/56 (93%)	49 (94%)	3 (6%)	0	100	100
66	I3	311/317 (98%)	297 (96%)	14 (4%)	0	100	100
67	J3	220/293 (75%)	215 (98%)	5 (2%)	0	100	100
68	K3	225/249 (90%)	219 (97%)	6 (3%)	0	100	100
69	L3	182/194 (94%)	175 (96%)	7 (4%)	0	100	100
70	M3	120/132 (91%)	119 (99%)	1 (1%)	0	100	100
71	N3	148/151 (98%)	142 (96%)	6 (4%)	0	100	100
72	O3	132/151 (87%)	129 (98%)	3 (2%)	0	100	100
73	P3	127/130 (98%)	122 (96%)	5 (4%)	0	100	100
74	Q3	127/133 (96%)	124 (98%)	3 (2%)	0	100	100
75	R3	73/125 (58%)	71 (97%)	2 (3%)	0	100	100
76	S3	81/84 (96%)	74 (91%)	7 (9%)	0	100	100
77	T3	53/133 (40%)	53 (100%)	0	0	100	100
78	U3	60/156 (38%)	58 (97%)	2 (3%)	0	100	100
79	m	817/858 (95%)	796 (97%)	21 (3%)	0	100	100
80	j	194/317 (61%)	191 (98%)	3 (2%)	0	100	100
81	k	151/165 (92%)	143 (95%)	7 (5%)	1 (1%)	22	54
82	A	57/386 (15%)	56 (98%)	1 (2%)	0	100	100
83	t	182/194 (94%)	176 (97%)	6 (3%)	0	100	100
84	u	204/208 (98%)	196 (96%)	8 (4%)	0	100	100
85	L1	204/217 (94%)	187 (92%)	16 (8%)	1 (0%)	29	61
All	All	12679/14730 (86%)	12334 (97%)	342 (3%)	3 (0%)	100	100

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
37	c2	31	SER
81	k	86	LYS
85	L1	97	LYS

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	A1	194/234 (83%)	194 (100%)	0	100	100
2	B1	204/223 (92%)	201 (98%)	3 (2%)	65	81
3	C1	169/171 (99%)	169 (100%)	0	100	100
4	D1	177/180 (98%)	175 (99%)	2 (1%)	73	85
5	E1	147/149 (99%)	145 (99%)	2 (1%)	67	82
6	F1	174/178 (98%)	173 (99%)	1 (1%)	86	91
7	G1	118/157 (75%)	118 (100%)	0	100	100
8	H1	171/172 (99%)	168 (98%)	3 (2%)	59	78
12	D2	193/199 (97%)	191 (99%)	2 (1%)	76	86
13	E2	347/348 (100%)	344 (99%)	3 (1%)	78	87
14	F2	307/347 (88%)	302 (98%)	5 (2%)	62	79
15	G2	245/249 (98%)	243 (99%)	2 (1%)	81	89
16	H2	198/256 (77%)	195 (98%)	3 (2%)	65	81
17	I2	172/173 (99%)	171 (99%)	1 (1%)	86	91
18	J2	134/164 (82%)	132 (98%)	2 (2%)	65	81
19	K2	164/165 (99%)	164 (100%)	0	100	100
20	L2	163/175 (93%)	162 (99%)	1 (1%)	86	91
21	M2	155/156 (99%)	155 (100%)	0	100	100
22	N2	138/139 (99%)	136 (99%)	2 (1%)	67	82
23	O2	91/114 (80%)	91 (100%)	0	100	100
24	P2	100/107 (94%)	99 (99%)	1 (1%)	76	86
25	Q2	98/126 (78%)	97 (99%)	1 (1%)	76	86
26	R2	106/133 (80%)	106 (100%)	0	100	100
27	S2	124/135 (92%)	122 (98%)	2 (2%)	62	79
28	T2	117/118 (99%)	116 (99%)	1 (1%)	78	87
29	U2	120/121 (99%)	118 (98%)	2 (2%)	60	78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
30	V2	97/124 (78%)	94 (97%)	3 (3%)	40	67
31	W2	79/97 (81%)	76 (96%)	3 (4%)	33	62
32	X2	98/110 (89%)	97 (99%)	1 (1%)	76	86
33	Y2	114/121 (94%)	114 (100%)	0	100	100
34	Z2	88/89 (99%)	87 (99%)	1 (1%)	73	85
35	a2	98/100 (98%)	96 (98%)	2 (2%)	55	76
36	b2	108/110 (98%)	107 (99%)	1 (1%)	78	87
37	c2	87/90 (97%)	85 (98%)	2 (2%)	50	73
38	d2	73/80 (91%)	73 (100%)	0	100	100
39	e2	64/65 (98%)	63 (98%)	1 (2%)	62	79
40	f2	47/48 (98%)	47 (100%)	0	100	100
41	g2	47/115 (41%)	47 (100%)	0	100	100
42	h2	23/24 (96%)	23 (100%)	0	100	100
43	i2	91/94 (97%)	88 (97%)	3 (3%)	38	66
44	j2	73/75 (97%)	72 (99%)	1 (1%)	67	82
45	k2	109/121 (90%)	108 (99%)	1 (1%)	78	87
48	p2	195/229 (85%)	192 (98%)	3 (2%)	65	81
49	q2	189/202 (94%)	185 (98%)	4 (2%)	53	75
50	r2	224/225 (100%)	222 (99%)	2 (1%)	78	87
51	w2	137/142 (96%)	135 (98%)	2 (2%)	65	81
52	z2	120/121 (99%)	116 (97%)	4 (3%)	38	66
53	o2	179/242 (74%)	176 (98%)	3 (2%)	60	78
54	s2	159/170 (94%)	157 (99%)	2 (1%)	69	82
55	v2	87/136 (64%)	86 (99%)	1 (1%)	73	85
56	x2	116/130 (89%)	113 (97%)	3 (3%)	46	71
57	y2	119/121 (98%)	117 (98%)	2 (2%)	60	78
58	A3	125/132 (95%)	124 (99%)	1 (1%)	81	89
59	B3	112/115 (97%)	111 (99%)	1 (1%)	78	87
60	C3	93/107 (87%)	93 (100%)	0	100	100
61	D3	67/67 (100%)	67 (100%)	0	100	100
62	E3	113/115 (98%)	111 (98%)	2 (2%)	59	78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
63	F3	88/98 (90%)	85 (97%)	3 (3%)	37	65
64	G3	57/62 (92%)	56 (98%)	1 (2%)	59	78
65	H3	48/49 (98%)	48 (100%)	0	100	100
66	I3	272/275 (99%)	265 (97%)	7 (3%)	46	71
67	J3	188/224 (84%)	184 (98%)	4 (2%)	53	75
68	K3	198/218 (91%)	191 (96%)	7 (4%)	36	64
69	L3	160/168 (95%)	159 (99%)	1 (1%)	86	91
70	M3	102/108 (94%)	100 (98%)	2 (2%)	55	76
71	N3	130/131 (99%)	128 (98%)	2 (2%)	65	81
72	O3	104/119 (87%)	101 (97%)	3 (3%)	42	69
73	P3	112/113 (99%)	112 (100%)	0	100	100
74	Q3	111/115 (96%)	108 (97%)	3 (3%)	44	71
75	R3	66/103 (64%)	64 (97%)	2 (3%)	41	68
76	S3	75/76 (99%)	72 (96%)	3 (4%)	31	61
77	T3	45/106 (42%)	44 (98%)	1 (2%)	52	74
78	U3	55/140 (39%)	53 (96%)	2 (4%)	35	63
79	m	702/729 (96%)	697 (99%)	5 (1%)	84	90
80	j	164/255 (64%)	160 (98%)	4 (2%)	49	73
81	k	126/137 (92%)	123 (98%)	3 (2%)	49	73
82	A	52/304 (17%)	47 (90%)	5 (10%)	8	29
83	t	166/174 (95%)	160 (96%)	6 (4%)	35	63
84	u	178/180 (99%)	171 (96%)	7 (4%)	32	62
85	L1	187/197 (95%)	180 (96%)	7 (4%)	34	63
All	All	11043/12487 (88%)	10877 (98%)	166 (2%)	66	81

5 of 166 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
72	O3	28	PHE
82	A	226	THR
74	Q3	100	LYS
79	m	101	LEU
83	t	87	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
67	J3	113	GLN
73	P3	91	ASN
83	t	44	ASN
82	A	217	ASN
83	t	12	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
10	B2	119/121 (98%)	15 (12%)	0
11	C2	155/174 (89%)	32 (20%)	1 (0%)
46	m2	1714/1871 (91%)	447 (26%)	0
47	n2	74/75 (98%)	27 (36%)	0
9	A2	3678/4731 (77%)	811 (22%)	6 (0%)
All	All	5740/6972 (82%)	1332 (23%)	7 (0%)

5 of 1332 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
9	A2	25	A
9	A2	39	A
9	A2	42	A
9	A2	48	G
9	A2	56	A

5 of 7 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
9	A2	2430	G
9	A2	3771	G
11	C2	59	A
9	A2	4351	U
9	A2	1804	A

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

101 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
9	OMG	A2	2528	9	18,26,27	2.64	8 (44%)	19,38,41	1.55	4 (21%)
9	B9B	A2	1387	9	21,28,29	2.01	3 (14%)	23,40,43	1.77	4 (17%)
9	OMG	A2	2179	9	18,26,27	2.61	8 (44%)	19,38,41	1.51	4 (21%)
9	MHG	A2	4023	9	29,32,33	3.99	9 (31%)	34,46,49	2.45	9 (26%)
46	PSU	m2	1245	46	18,21,22	4.36	6 (33%)	22,30,33	2.77	5 (22%)
9	G7M	A2	1418	9	20,26,27	3.98	9 (45%)	17,39,42	1.13	1 (5%)
46	UR3	m2	1832	46	19,22,23	3.19	7 (36%)	26,32,35	1.43	3 (11%)
9	OMG	A2	1685	9	18,26,27	2.59	8 (44%)	19,38,41	1.55	4 (21%)
9	PSU	A2	3371	9	18,21,22	4.34	6 (33%)	22,30,33	2.76	6 (27%)
9	OMG	A2	4146	9	18,26,27	2.59	8 (44%)	19,38,41	1.51	4 (21%)
9	A2M	A2	3481	9	18,25,26	2.65	9 (50%)	18,36,39	1.89	4 (22%)
9	OMC	A2	4188	9	19,22,23	3.05	8 (42%)	26,31,34	0.78	0
9	2MG	A2	878	9	18,26,27	2.17	6 (33%)	16,38,41	1.37	3 (18%)
9	E7G	A2	2052	9	24,27,28	3.68	10 (41%)	30,40,43	2.18	9 (30%)
9	P7G	A2	1711	9	24,28,29	4.05	10 (41%)	27,41,44	1.45	3 (11%)
9	I4U	A2	1472	9	21,24,25	3.61	9 (42%)	27,34,37	0.97	1 (3%)
9	OMC	A2	3565	9	19,22,23	3.03	8 (42%)	26,31,34	0.75	0
9	OMG	A2	1335	9	18,26,27	2.61	8 (44%)	19,38,41	1.53	4 (21%)
9	PSU	A2	4280	9	18,21,22	4.36	6 (33%)	22,30,33	2.77	5 (22%)
9	UR3	A2	4249	9	19,22,23	3.17	7 (36%)	26,32,35	1.28	3 (11%)
46	PSU	m2	1083	46	18,21,22	4.37	6 (33%)	22,30,33	2.75	6 (27%)
46	OMG	m2	685	46	18,26,27	2.62	8 (44%)	19,38,41	1.52	4 (21%)
79	DDE	m	714	79	14,20,21	2.00	3 (21%)	14,28,30	1.56	2 (14%)
9	5MC	A2	3987	9	18,22,23	3.61	7 (38%)	26,32,35	1.03	2 (7%)
9	A2M	A2	3374	9	18,25,26	2.65	9 (50%)	18,36,39	1.84	4 (22%)
9	OMG	A2	4022	9	18,26,27	2.58	8 (44%)	19,38,41	1.49	4 (21%)
9	OMG	A2	2119	9	18,26,27	2.60	8 (44%)	19,38,41	1.50	4 (21%)
9	B8T	A2	4135	9	19,22,23	3.27	8 (42%)	26,31,34	0.85	1 (3%)
9	B8W	A2	3837	9	18,26,27	1.45	2 (11%)	21,38,41	3.32	8 (38%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	OMG	A2	4289	9	18,26,27	2.60	8 (44%)	19,38,41	1.49	4 (21%)
46	A2M	m2	27	46	18,25,26	2.63	9 (50%)	18,36,39	1.71	3 (16%)
9	2MG	A2	1330	9	18,26,27	2.16	6 (33%)	16,38,41	1.40	3 (18%)
9	A2M	A2	398	9	18,25,26	2.63	9 (50%)	18,36,39	1.85	4 (22%)
9	PSU	A2	3945	9	18,21,22	4.34	7 (38%)	22,30,33	2.74	5 (22%)
46	OMG	m2	646	46	18,26,27	2.62	8 (44%)	19,38,41	1.61	4 (21%)
9	A2M	A2	2118	9	18,25,26	2.64	10 (55%)	18,36,39	1.78	4 (22%)
41	MLZ	g2	98	41	8,9,10	0.70	0	4,9,11	0.85	0
9	OMC	A2	2120	9	19,22,23	3.03	8 (42%)	26,31,34	0.75	0
9	OMG	A2	1852	9	18,26,27	2.58	8 (44%)	19,38,41	1.49	4 (21%)
9	I4U	A2	3846	9	21,24,25	3.58	9 (42%)	27,34,37	0.94	1 (3%)
9	OMC	A2	2177	9	19,22,23	3.03	8 (42%)	26,31,34	0.92	1 (3%)
9	PSU	A2	1496	9	18,21,22	4.35	6 (33%)	22,30,33	2.78	5 (22%)
9	UR3	A2	1668	9	19,22,23	3.21	7 (36%)	26,32,35	1.38	3 (11%)
9	B9B	A2	4007	9	20,27,29	2.03	3 (15%)	22,39,43	1.94	5 (22%)
9	1MA	A2	4067	9	16,25,26	3.96	3 (18%)	18,37,40	1.67	3 (16%)
9	PSU	A2	4102	9	18,21,22	4.36	6 (33%)	22,30,33	2.72	5 (22%)
9	P7G	A2	3536	9	24,28,29	4.03	10 (41%)	27,41,44	1.51	2 (7%)
9	A2M	A2	2156	9	18,25,26	2.65	9 (50%)	18,36,39	1.84	4 (22%)
9	OMG	A2	3448	9	18,26,27	2.61	8 (44%)	19,38,41	1.51	4 (21%)
9	A2M	A2	1673	9	18,25,26	2.62	9 (50%)	18,36,39	1.85	4 (22%)
9	PSU	A2	4152	9	18,21,22	4.39	7 (38%)	22,30,33	2.79	5 (22%)
9	5MC	A2	4099	9	18,22,23	3.58	7 (38%)	26,32,35	1.02	1 (3%)
9	OMG	A2	3848	9	18,26,27	2.60	8 (44%)	19,38,41	1.50	4 (21%)
9	A2M	A2	3379	9	18,25,26	2.64	9 (50%)	18,36,39	1.88	4 (22%)
46	B8N	m2	1250	46	24,29,30	2.47	5 (20%)	29,42,45	1.87	6 (20%)
9	PSU	A2	1395	9	18,21,22	4.37	6 (33%)	22,30,33	2.66	5 (22%)
9	OMC	A2	3525	9	19,22,23	3.02	8 (42%)	26,31,34	0.70	0
46	4AC	m2	1844	46	21,24,25	3.65	9 (42%)	29,34,37	1.08	3 (10%)
9	A2M	A2	1347	9	18,25,26	2.72	9 (50%)	18,36,39	1.86	3 (16%)
9	B9H	A2	2541	9	20,25,26	2.96	4 (20%)	22,35,38	1.66	4 (18%)
46	OMU	m2	116	46	19,22,23	3.06	8 (42%)	26,31,34	1.81	5 (19%)
9	A2M	A2	4223	9	18,25,26	2.65	9 (50%)	18,36,39	1.83	4 (22%)
46	PSU	m2	824	46	18,21,22	4.37	6 (33%)	22,30,33	2.78	5 (22%)
9	PSU	A2	4183	9	18,21,22	4.39	6 (33%)	22,30,33	2.64	5 (22%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
46	PSU	m2	825	46	18,21,22	4.38	6 (33%)	22,30,33	2.79	5 (22%)
9	OMG	A2	4515	9	18,26,27	2.60	8 (44%)	19,38,41	1.51	4 (21%)
9	A2M	A2	1337	9	18,25,26	2.64	9 (50%)	18,36,39	1.81	4 (22%)
9	PSU	A2	4094	9	18,21,22	4.38	7 (38%)	22,30,33	2.76	5 (22%)
46	PSU	m2	614	46	18,21,22	4.39	6 (33%)	22,30,33	2.77	6 (27%)
9	PSU	A2	2263	9	18,21,22	4.36	6 (33%)	22,30,33	2.74	5 (22%)
9	E7G	A2	1599	9	24,27,28	3.73	10 (41%)	30,40,43	2.27	10 (33%)
9	PSU	A2	3420	9	18,21,22	4.35	6 (33%)	22,30,33	2.61	5 (22%)
14	MLZ	F2	333	14	8,9,10	0.71	0	4,9,11	0.98	0
9	6MZ	A2	3872	9	18,25,26	1.82	3 (16%)	16,36,39	1.95	3 (18%)
9	OMC	A2	3543	9	19,22,23	3.04	8 (42%)	26,31,34	0.75	0
9	OMC	A2	2616	9	19,22,23	3.06	8 (42%)	26,31,34	0.95	2 (7%)
9	A2M	A2	3523	9	18,25,26	2.68	10 (55%)	18,36,39	1.84	4 (22%)
9	PSU	A2	4055	9	18,21,22	4.33	6 (33%)	22,30,33	2.71	5 (22%)
9	OMC	A2	2559	9	19,22,23	3.03	8 (42%)	26,31,34	0.78	0
46	OMC	m2	519	46	19,22,23	3.04	8 (42%)	26,31,34	0.72	0
9	5MC	A2	3438	9	18,22,23	3.60	7 (38%)	26,32,35	1.04	1 (3%)
9	A2M	A2	1140	9	18,25,26	2.65	9 (50%)	18,36,39	1.90	4 (22%)
9	PSU	A2	4288	9	18,21,22	4.37	6 (33%)	22,30,33	2.78	6 (27%)
9	2MG	A2	4517	9	18,26,27	2.15	6 (33%)	16,38,41	1.41	4 (25%)
9	OMU	A2	4272	9	19,22,23	3.03	8 (42%)	26,31,34	1.70	4 (15%)
9	G7M	A2	4202	9	20,26,27	3.97	9 (45%)	17,39,42	1.12	1 (5%)
9	OMG	A2	373	9	18,26,27	2.59	8 (44%)	19,38,41	1.50	4 (21%)
9	OMC	A2	3357	9	19,22,23	3.03	8 (42%)	26,31,34	0.73	0
11	OMU	C2	14	11	19,22,23	3.01	8 (42%)	26,31,34	1.71	4 (15%)
9	A2M	A2	3441	9	18,25,26	2.77	9 (50%)	18,36,39	1.82	4 (22%)
9	OMU	A2	3958	9	19,22,23	3.00	8 (42%)	26,31,34	1.71	5 (19%)
9	B8Q	A2	1269	9	17,22,23	3.10	4 (23%)	22,32,35	2.00	6 (27%)
9	G7M	A2	2277	9	20,26,27	3.97	9 (45%)	17,39,42	1.11	1 (5%)
46	A2M	m2	166	46	18,25,26	2.61	9 (50%)	18,36,39	1.87	4 (22%)
9	PSU	A2	1490	9	18,21,22	4.39	6 (33%)	22,30,33	2.77	6 (27%)
9	OMG	A2	1438	9	18,26,27	2.61	8 (44%)	19,38,41	1.54	4 (21%)
46	A2M	m2	1033	46	18,25,26	2.64	9 (50%)	18,36,39	1.86	4 (22%)
46	A2M	m2	670	46	18,25,26	2.73	10 (55%)	18,36,39	1.91	4 (22%)
9	B9B	A2	237	9	21,28,29	2.03	3 (14%)	23,40,43	1.76	5 (21%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	PSU	A2	3385	9	18,21,22	4.37	6 (33%)	22,30,33	2.70	5 (22%)
9	OMG	A2	4275	9	18,26,27	2.60	8 (44%)	19,38,41	1.53	4 (21%)

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
9	OMG	A2	2528	9	-	0/5/27/28	0/3/3/3
9	B9B	A2	1387	9	-	4/7/29/30	0/3/3/3
9	OMG	A2	2179	9	-	3/5/27/28	0/3/3/3
9	MHG	A2	4023	9	-	3/16/46/47	0/3/3/3
46	PSU	m2	1245	46	-	2/7/25/26	0/2/2/2
9	G7M	A2	1418	9	-	0/3/25/26	0/3/3/3
46	UR3	m2	1832	46	-	4/7/25/26	0/2/2/2
9	OMG	A2	1685	9	-	1/5/27/28	0/3/3/3
9	PSU	A2	3371	9	-	0/7/25/26	0/2/2/2
9	OMG	A2	4146	9	-	0/5/27/28	0/3/3/3
9	A2M	A2	3481	9	-	1/5/27/28	0/3/3/3
9	OMC	A2	4188	9	-	0/9/27/28	0/2/2/2
9	2MG	A2	878	9	-	3/5/27/28	0/3/3/3
9	E7G	A2	2052	9	-	3/9/39/40	0/3/3/3
9	P7G	A2	1711	9	-	3/10/40/41	0/3/3/3
9	I4U	A2	1472	9	-	0/9/29/30	0/2/2/2
9	OMC	A2	3565	9	-	2/9/27/28	0/2/2/2
9	OMG	A2	1335	9	-	0/5/27/28	0/3/3/3
9	PSU	A2	4280	9	-	0/7/25/26	0/2/2/2
9	UR3	A2	4249	9	-	0/7/25/26	0/2/2/2
46	PSU	m2	1083	46	-	1/7/25/26	0/2/2/2
46	OMG	m2	685	46	-	2/5/27/28	0/3/3/3
79	DDE	m	714	79	-	2/20/21/23	0/1/1/1
9	5MC	A2	3987	9	-	2/7/25/26	0/2/2/2
9	A2M	A2	3374	9	-	1/5/27/28	0/3/3/3
9	OMG	A2	4022	9	-	0/5/27/28	0/3/3/3
9	OMG	A2	2119	9	-	3/5/27/28	0/3/3/3
9	B8T	A2	4135	9	-	0/7/27/28	0/2/2/2
9	B8W	A2	3837	9	-	2/5/27/28	0/3/3/3
9	OMG	A2	4289	9	-	2/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
46	A2M	m2	27	46	-	1/5/27/28	0/3/3/3
9	2MG	A2	1330	9	-	2/5/27/28	0/3/3/3
9	A2M	A2	398	9	-	3/5/27/28	0/3/3/3
9	PSU	A2	3945	9	-	2/7/25/26	0/2/2/2
46	OMG	m2	646	46	-	4/5/27/28	0/3/3/3
9	A2M	A2	2118	9	-	0/5/27/28	0/3/3/3
41	MLZ	g2	98	41	-	0/7/8/10	-
9	OMC	A2	2120	9	-	0/9/27/28	0/2/2/2
9	OMG	A2	1852	9	-	0/5/27/28	0/3/3/3
9	I4U	A2	3846	9	-	6/9/29/30	0/2/2/2
9	OMC	A2	2177	9	-	3/9/27/28	0/2/2/2
9	PSU	A2	1496	9	-	0/7/25/26	0/2/2/2
9	UR3	A2	1668	9	-	2/7/25/26	0/2/2/2
9	B9B	A2	4007	9	-	4/6/28/30	0/3/3/3
9	1MA	A2	4067	9	-	2/3/25/26	0/3/3/3
9	PSU	A2	4102	9	-	3/7/25/26	0/2/2/2
9	P7G	A2	3536	9	-	2/10/40/41	0/3/3/3
9	A2M	A2	2156	9	-	2/5/27/28	0/3/3/3
9	OMG	A2	3448	9	-	0/5/27/28	0/3/3/3
9	A2M	A2	1673	9	-	1/5/27/28	0/3/3/3
9	PSU	A2	4152	9	-	4/7/25/26	0/2/2/2
9	5MC	A2	4099	9	-	4/7/25/26	0/2/2/2
9	OMG	A2	3848	9	-	1/5/27/28	0/3/3/3
9	A2M	A2	3379	9	-	1/5/27/28	0/3/3/3
46	B8N	m2	1250	46	-	5/16/34/35	0/2/2/2
9	PSU	A2	1395	9	-	2/7/25/26	0/2/2/2
9	OMC	A2	3525	9	-	0/9/27/28	0/2/2/2
46	4AC	m2	1844	46	-	3/11/29/30	0/2/2/2
9	A2M	A2	1347	9	-	2/5/27/28	0/3/3/3
9	B9H	A2	2541	9	-	0/12/47/48	0/2/2/2
46	OMU	m2	116	46	-	1/9/27/28	0/2/2/2
9	A2M	A2	4223	9	-	1/5/27/28	0/3/3/3
46	PSU	m2	824	46	-	4/7/25/26	0/2/2/2
9	PSU	A2	4183	9	-	3/7/25/26	0/2/2/2
46	PSU	m2	825	46	-	1/7/25/26	0/2/2/2
9	OMG	A2	4515	9	-	3/5/27/28	0/3/3/3
9	A2M	A2	1337	9	-	0/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	PSU	A2	4094	9	-	0/7/25/26	0/2/2/2
46	PSU	m2	614	46	-	2/7/25/26	0/2/2/2
9	PSU	A2	2263	9	-	0/7/25/26	0/2/2/2
9	E7G	A2	1599	9	-	2/9/39/40	0/3/3/3
9	PSU	A2	3420	9	-	2/7/25/26	0/2/2/2
14	MLZ	F2	333	14	-	0/7/8/10	-
9	6MZ	A2	3872	9	-	4/5/27/28	0/3/3/3
9	OMC	A2	3543	9	-	2/9/27/28	0/2/2/2
9	OMC	A2	2616	9	-	1/9/27/28	0/2/2/2
9	A2M	A2	3523	9	-	3/5/27/28	0/3/3/3
9	PSU	A2	4055	9	-	2/7/25/26	0/2/2/2
9	OMC	A2	2559	9	-	0/9/27/28	0/2/2/2
46	OMC	m2	519	46	-	3/9/27/28	0/2/2/2
9	5MC	A2	3438	9	-	2/7/25/26	0/2/2/2
9	A2M	A2	1140	9	-	1/5/27/28	0/3/3/3
9	PSU	A2	4288	9	-	5/7/25/26	0/2/2/2
9	2MG	A2	4517	9	-	0/5/27/28	0/3/3/3
9	OMU	A2	4272	9	-	3/9/27/28	0/2/2/2
9	G7M	A2	4202	9	-	0/3/25/26	0/3/3/3
9	OMG	A2	373	9	-	2/5/27/28	0/3/3/3
9	OMC	A2	3357	9	-	2/9/27/28	0/2/2/2
11	OMU	C2	14	11	-	3/9/27/28	0/2/2/2
9	A2M	A2	3441	9	-	2/5/27/28	0/3/3/3
9	OMU	A2	3958	9	-	2/9/27/28	0/2/2/2
9	B8Q	A2	1269	9	-	0/7/42/43	0/2/2/2
9	G7M	A2	2277	9	-	0/3/25/26	0/3/3/3
46	A2M	m2	166	46	-	3/5/27/28	0/3/3/3
9	PSU	A2	1490	9	-	1/7/25/26	0/2/2/2
9	OMG	A2	1438	9	-	3/5/27/28	0/3/3/3
46	A2M	m2	1033	46	-	1/5/27/28	0/3/3/3
46	A2M	m2	670	46	-	3/5/27/28	0/3/3/3
9	B9B	A2	237	9	-	2/7/29/30	0/3/3/3
9	PSU	A2	3385	9	-	0/7/25/26	0/2/2/2
9	OMG	A2	4275	9	-	0/5/27/28	0/3/3/3

The worst 5 of 731 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A2	4067	1MA	C2-N3	14.86	1.47	1.29
46	m2	614	PSU	C6-C5	12.05	1.49	1.35
46	m2	824	PSU	C6-C5	12.01	1.49	1.35
9	A2	4094	PSU	C6-C5	11.98	1.49	1.35
9	A2	4183	PSU	C6-C5	11.96	1.49	1.35

The worst 5 of 371 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	A2	3837	B8W	O6-C6-N1	8.21	130.42	119.03
9	A2	4023	MHG	C2-N3-C4	8.00	121.96	112.04
9	A2	3837	B8W	N2-C2-N3	7.53	130.06	117.79
9	A2	4094	PSU	N1-C2-N3	7.42	123.54	115.13
9	A2	3371	PSU	N1-C2-N3	7.38	123.49	115.13

There are no chirality outliers.

5 of 172 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
79	m	714	DDE	NAD-CBI-CBW-NCB
9	A2	237	B9B	C5-C6-O6-C61
9	A2	237	B9B	N1-C6-O6-C61
9	A2	878	2MG	C3'-C4'-C5'-O5'
9	A2	1140	A2M	C1'-C2'-O2'-CM'

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 9 ligands modelled in this entry, 8 are monoatomic - leaving 1 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	$\# Z > 2$
88	GDP	m	900	-	24,30,30	3.44	14 (58%)	30,47,47	1.42	5 (16%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
88	GDP	m	900	-	-	2/12/32/32	0/3/3/3

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
88	m	900	GDP	O4'-C1'	7.34	1.51	1.41
88	m	900	GDP	O4'-C4'	-6.30	1.30	1.45
88	m	900	GDP	C2-N3	5.47	1.46	1.33
88	m	900	GDP	C3'-C4'	5.43	1.66	1.53
88	m	900	GDP	C4-N3	4.77	1.48	1.37

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
88	m	900	GDP	C5-C6-N1	3.34	119.85	113.95
88	m	900	GDP	C8-N7-C5	3.30	109.27	102.99
88	m	900	GDP	C2-N1-C6	-2.86	119.84	125.10
88	m	900	GDP	PA-O3A-PB	-2.80	123.21	132.83
88	m	900	GDP	O6-C6-C5	-2.21	120.06	124.37

There are no chirality outliers.

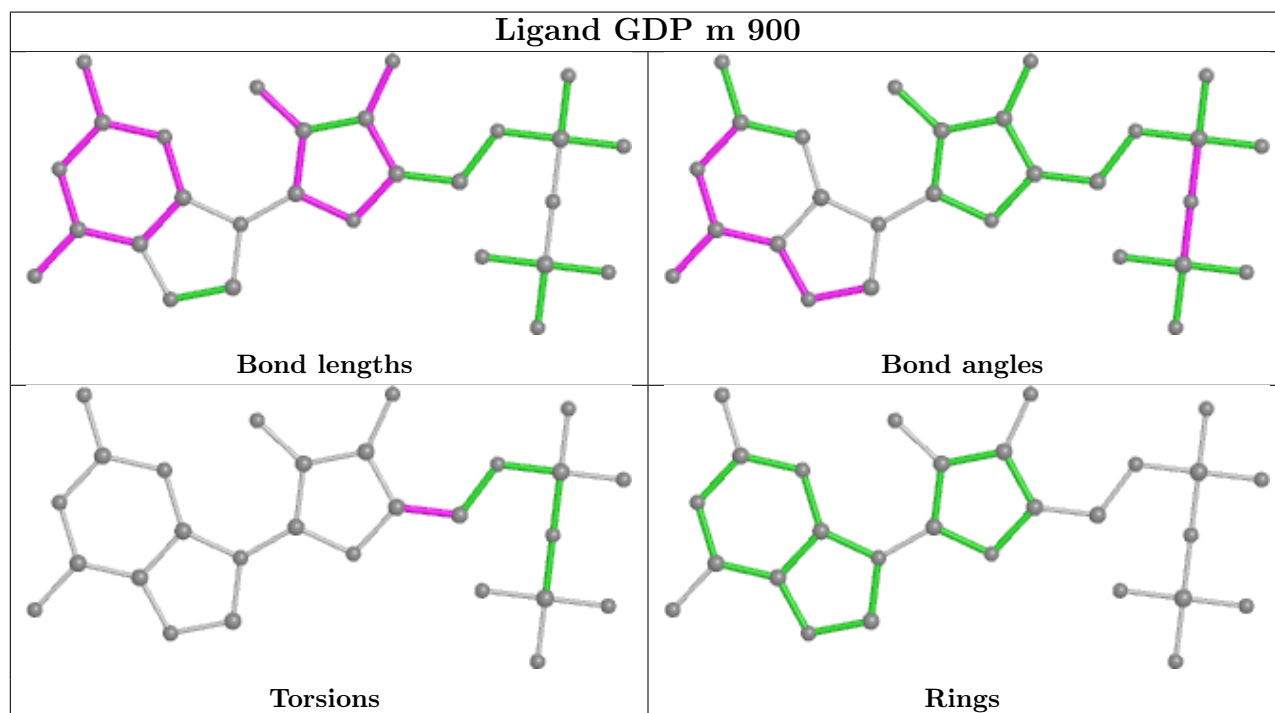
All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
88	m	900	GDP	O4'-C4'-C5'-O5'
88	m	900	GDP	C3'-C4'-C5'-O5'

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](#)

There are no chain breaks in this entry.

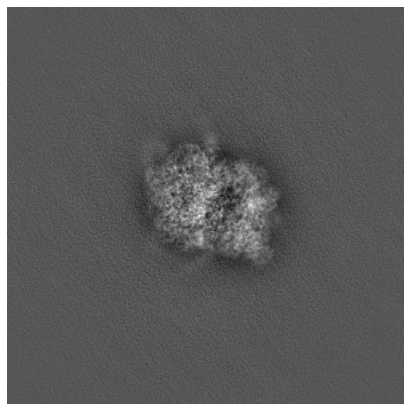
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-23500. These allow visual inspection of the internal detail of the map and identification of artifacts.

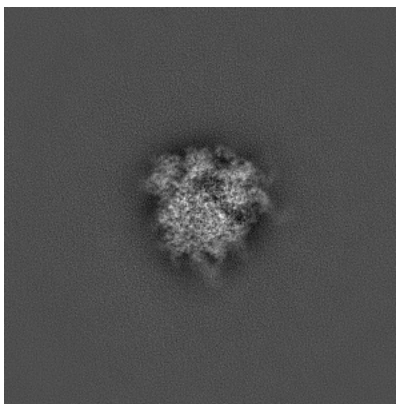
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

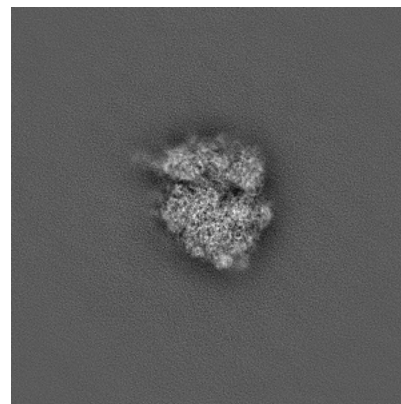
6.1.1 Primary map



X

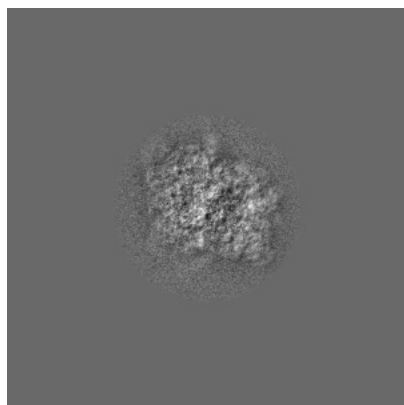


Y

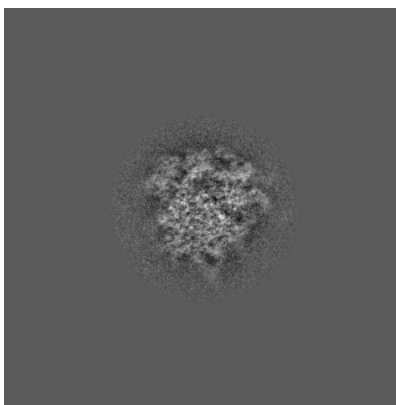


Z

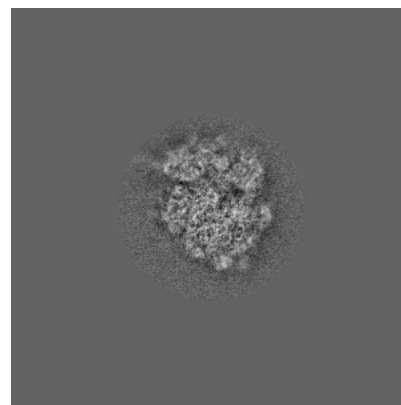
6.1.2 Raw map



X



Y

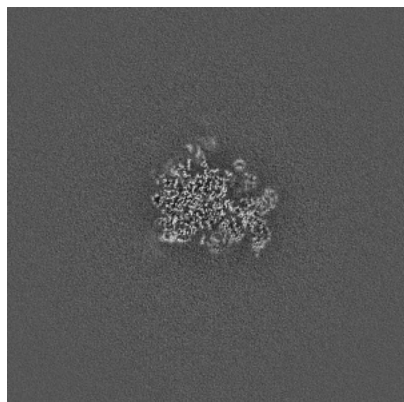


Z

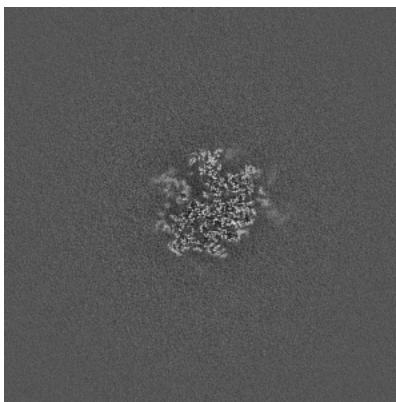
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

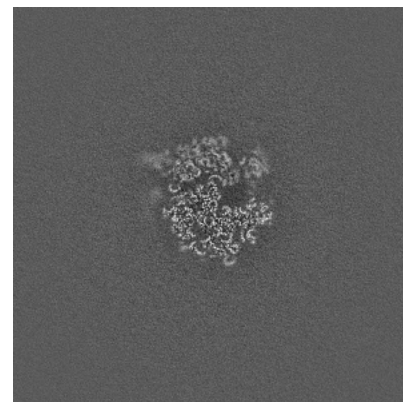
6.2.1 Primary map



X Index: 384

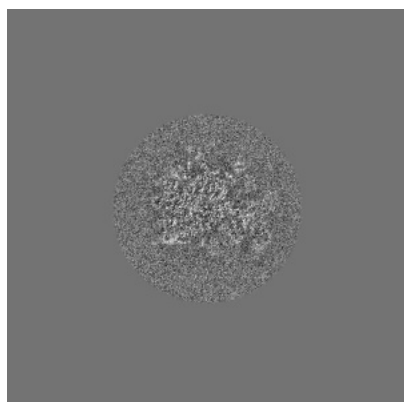


Y Index: 384

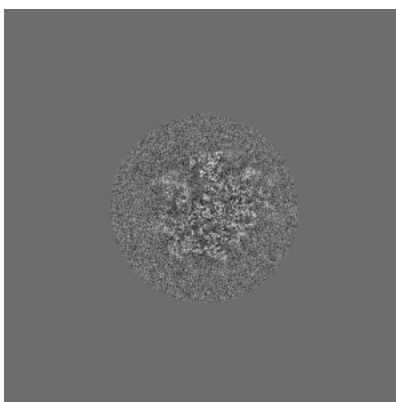


Z Index: 384

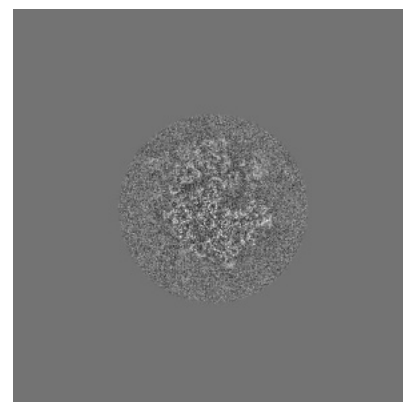
6.2.2 Raw map



X Index: 384



Y Index: 384

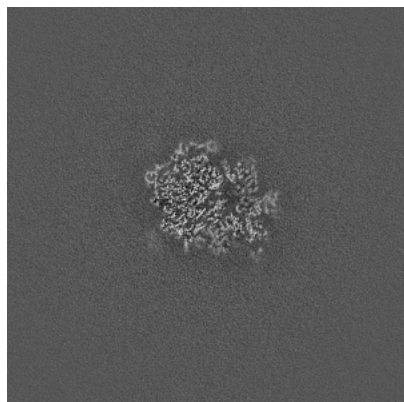


Z Index: 384

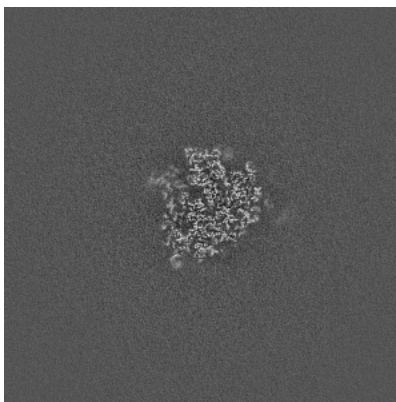
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

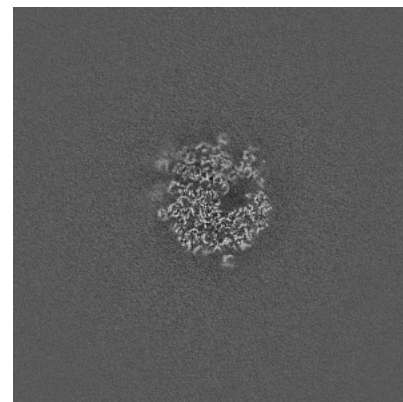
6.3.1 Primary map



X Index: 394

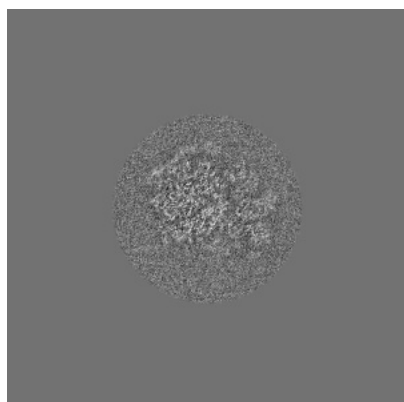


Y Index: 376

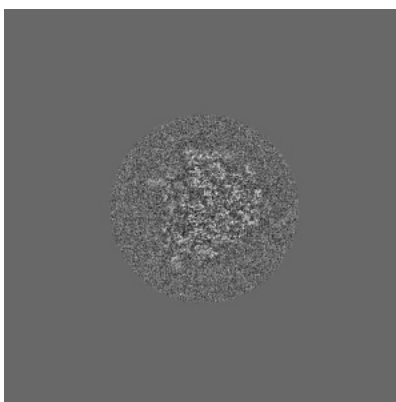


Z Index: 375

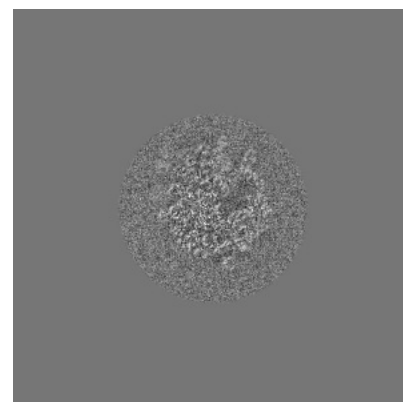
6.3.2 Raw map



X Index: 390



Y Index: 376

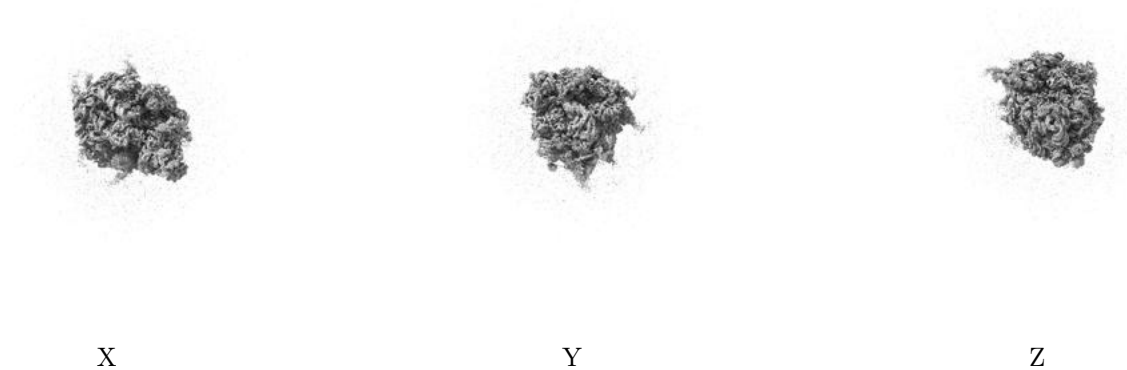


Z Index: 375

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

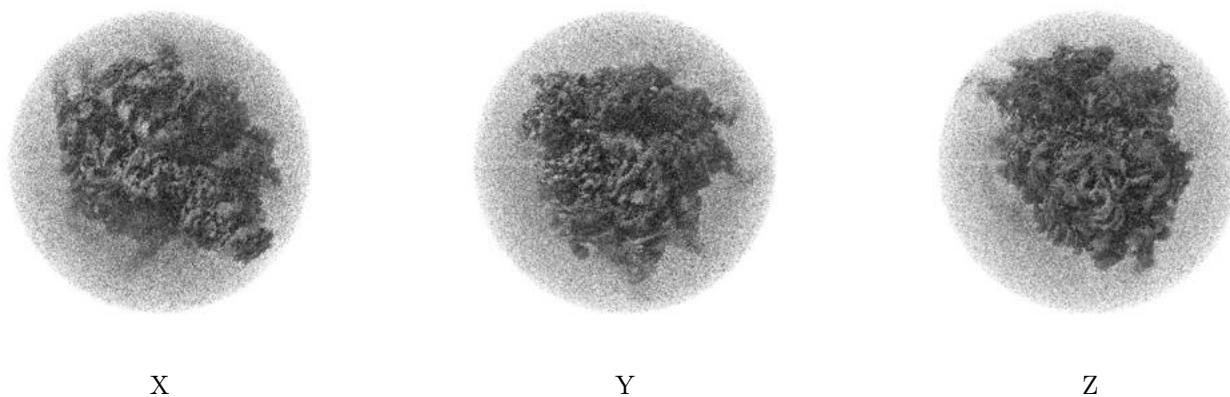
6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 4.8. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.4.2 Raw map



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

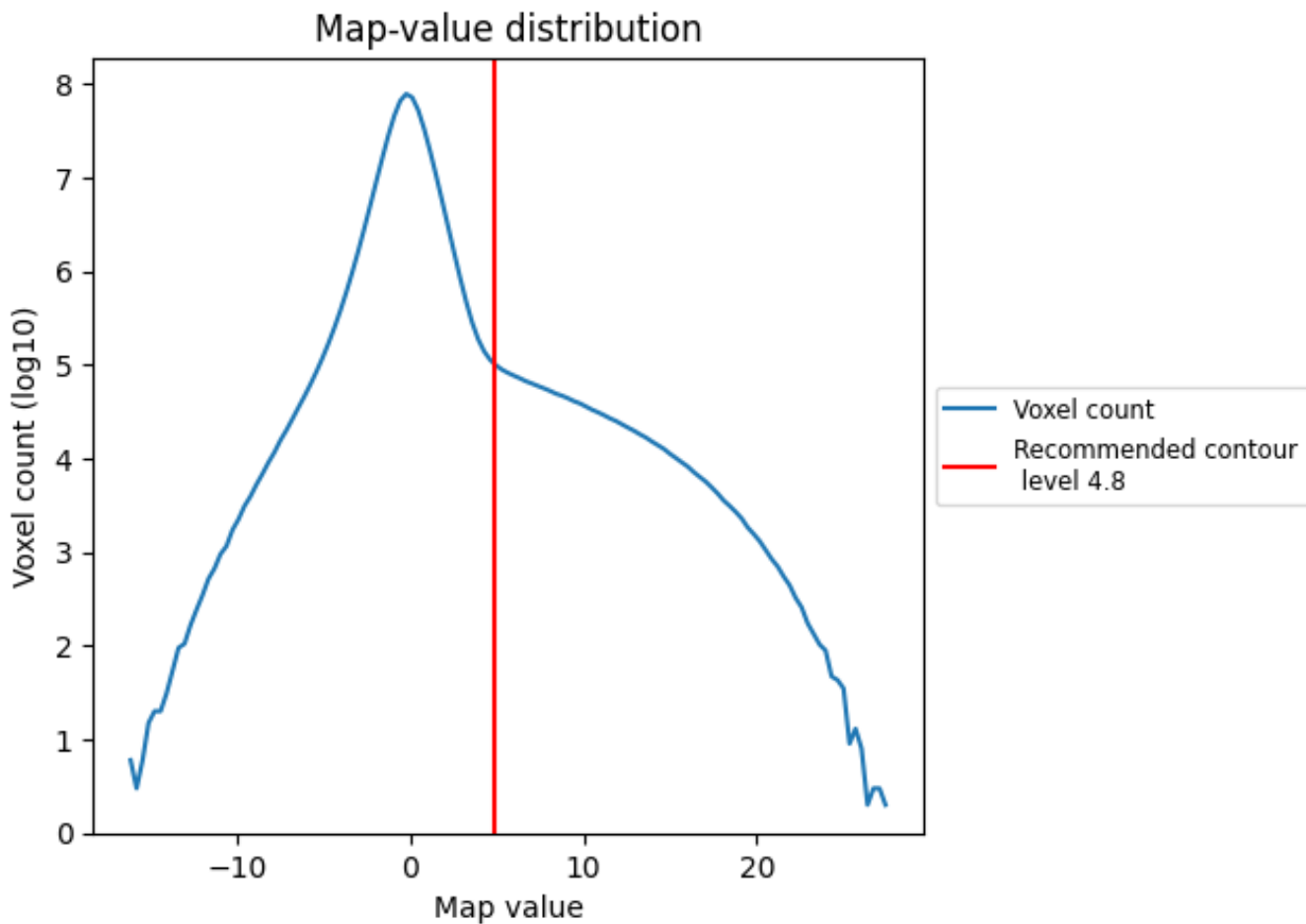
6.5 Mask visualisation [i](#)

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

7 Map analysis [i](#)

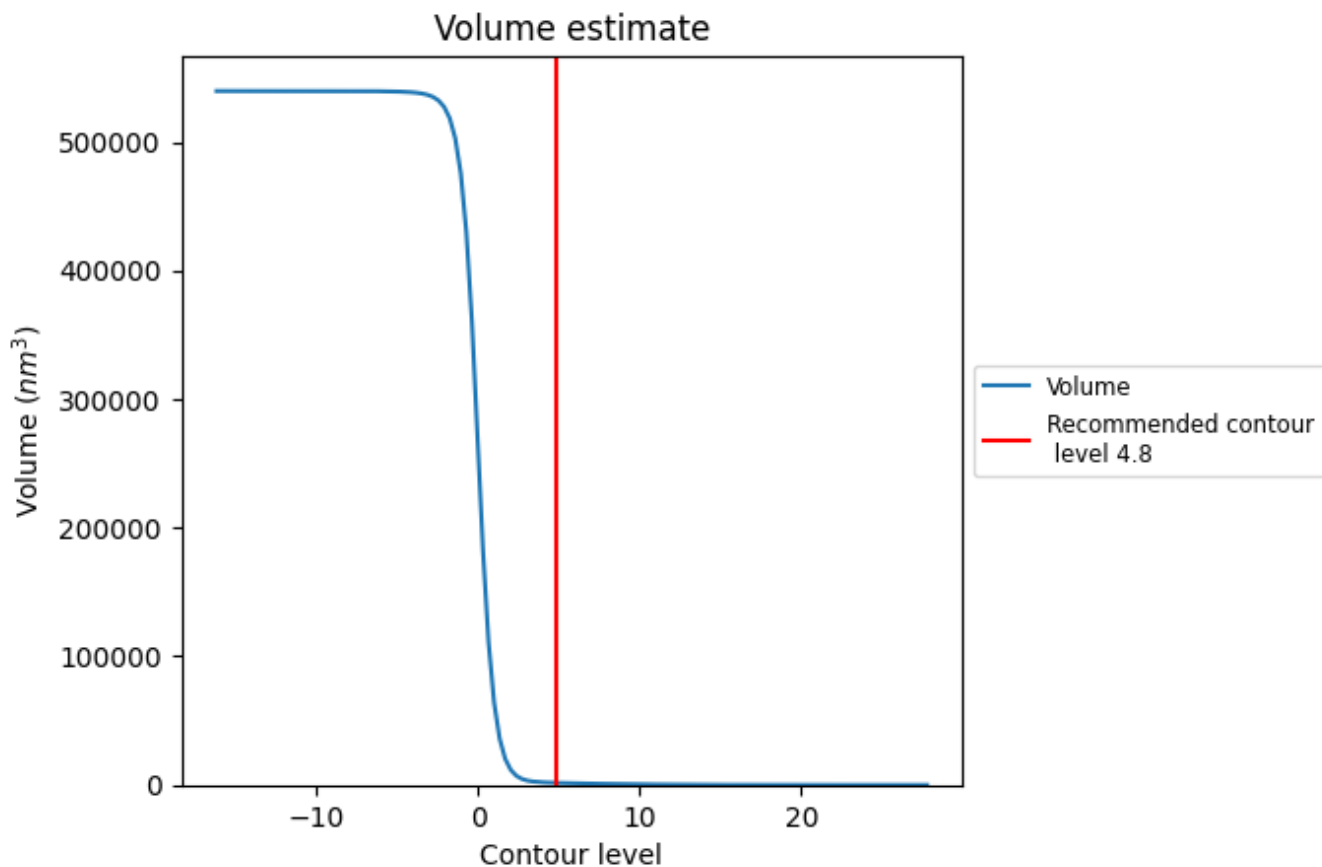
This section contains the results of statistical analysis of the map.

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.

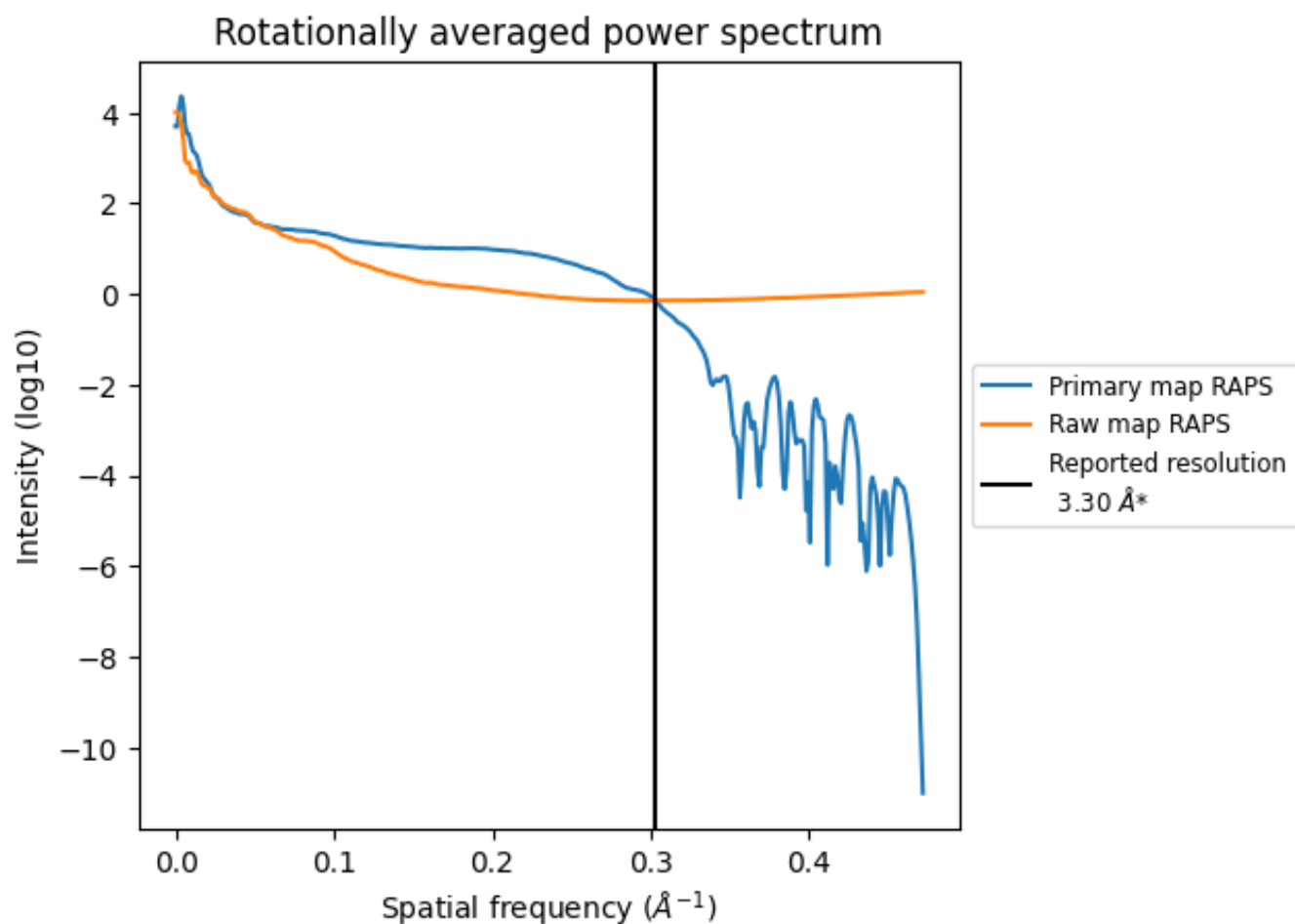
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1653 nm^3 ; this corresponds to an approximate mass of 1493 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](#)

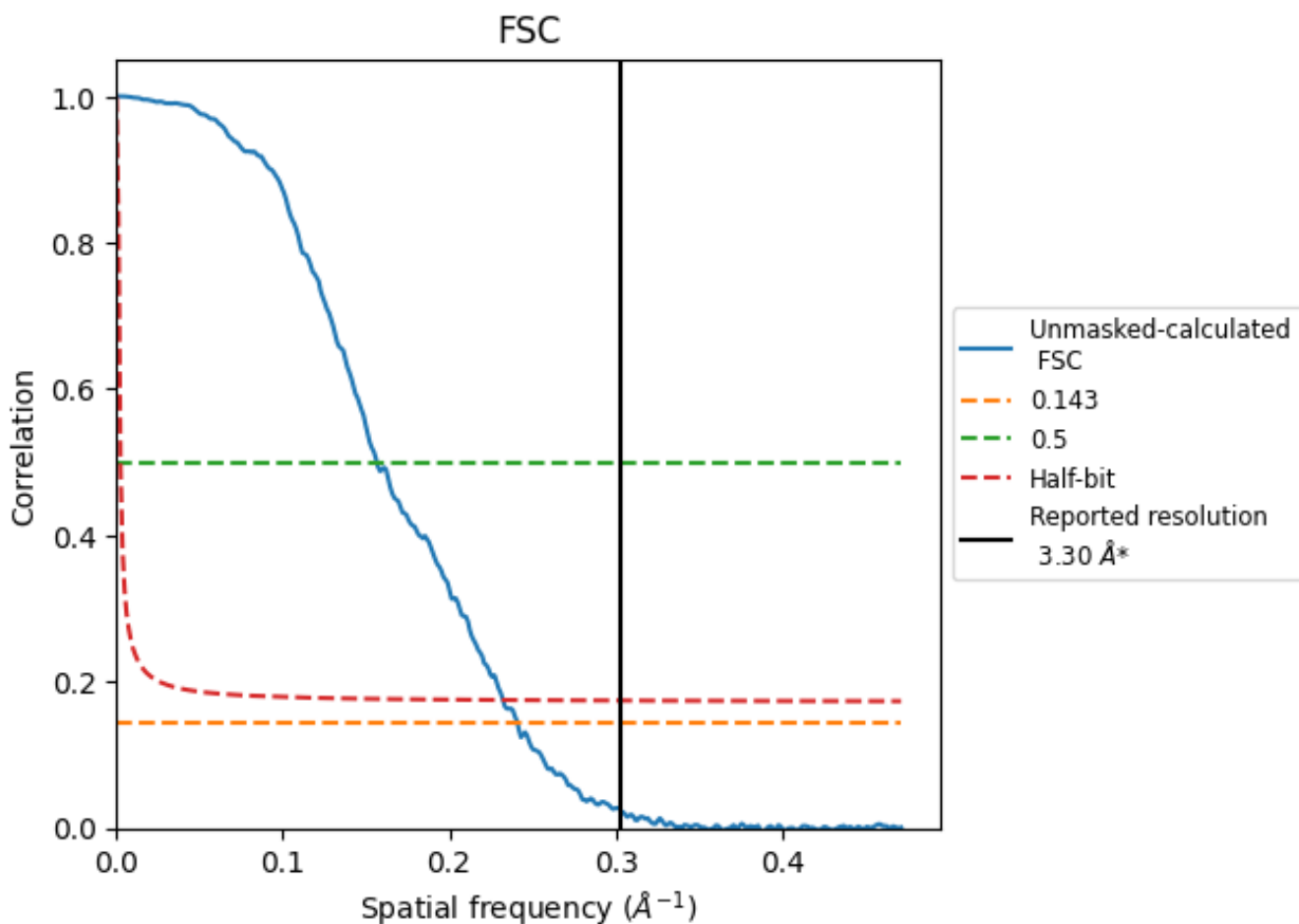


*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

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 0.303 \AA^{-1}

8.2 Resolution estimates [i](#)

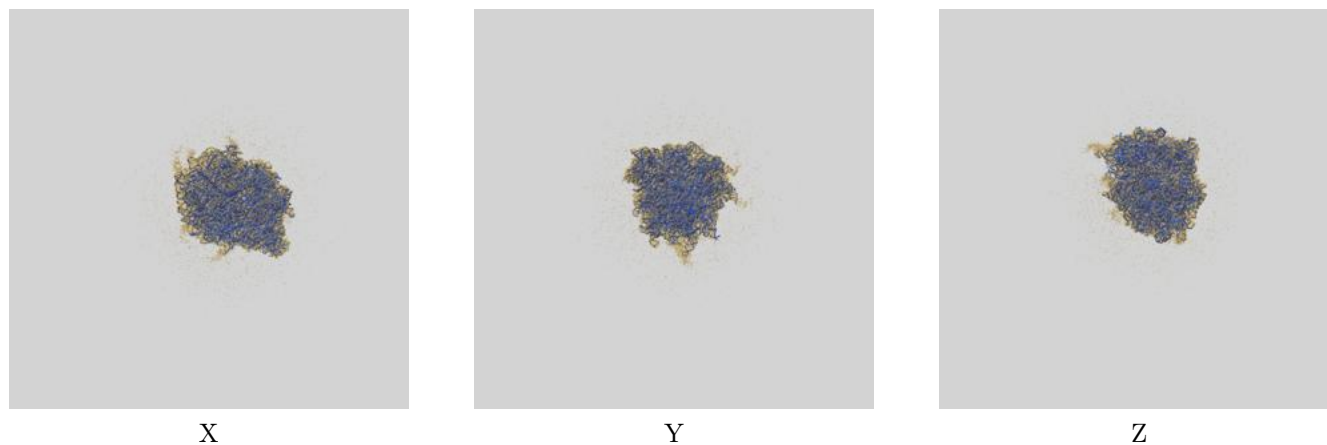
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.15	6.39	4.30

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.15 differs from the reported value 3.3 by more than 10 %

9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-23500 and PDB model 7LS1. Per-residue inclusion information can be found in section 3 on page 21.

9.1 Map-model overlay [i](#)

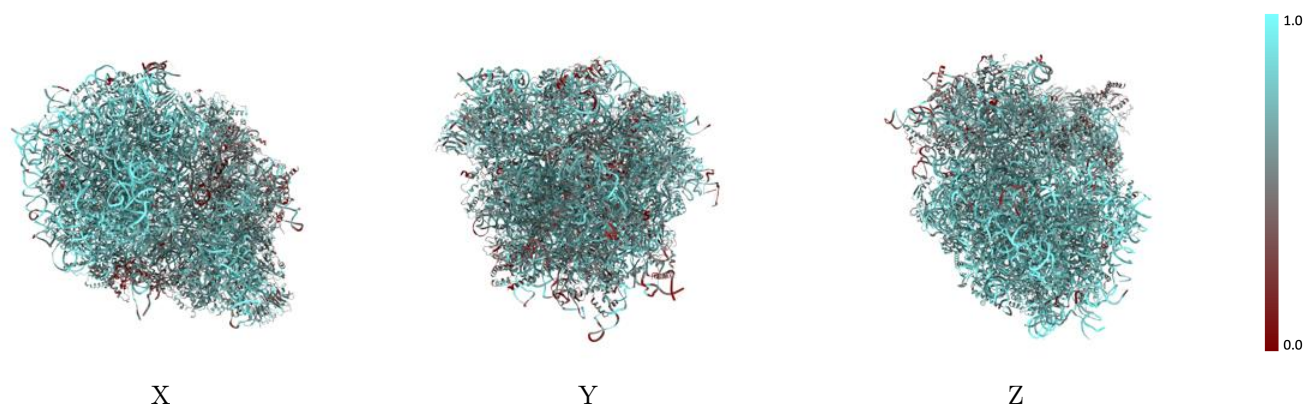


The images above show the 3D surface view of the map at the recommended contour level 4.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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

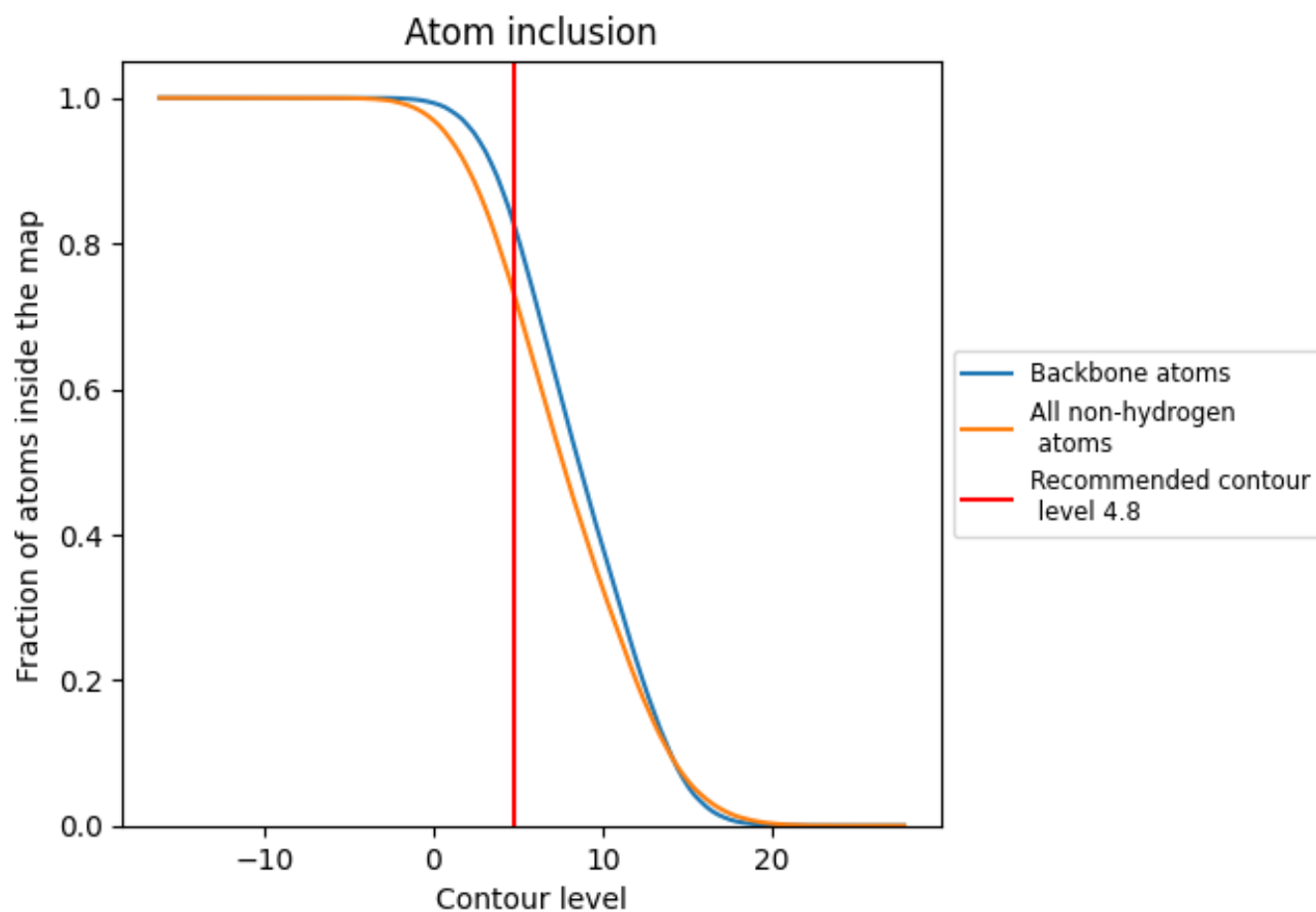
This section was not generated.

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 (4.8).




































9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 73% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary











































The table lists the average atom inclusion at the recommended contour level (4.8) and Q-score for the entire model and for each chain.

Chain	Atom inclusion
All	 0.7272
A	 0.1181
A1	 0.7007
A2	 0.8363
A3	 0.6122
B1	 0.6852
B2	 0.9140
B3	 0.6614
C1	 0.7103
C2	 0.8522
C3	 0.5903
D1	 0.6801
D2	 0.6706
D3	 0.6029
E1	 0.6748
E2	 0.7018
E3	 0.5098
F1	 0.7306
F2	 0.7022
F3	 0.6016
G1	 0.7312
G2	 0.7668
G3	 0.5288
H1	 0.7117
H2	 0.7187
H3	 0.6674
I2	 0.7227
I3	 0.6202
J2	 0.7123
J3	 0.6050
K2	 0.7019
K3	 0.5247
L1	 0.3107
L2	 0.6725
L3	 0.5281












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Chain	Atom inclusion
M2	 0.7332
M3	 0.4011
N2	 0.7086
N3	 0.5179
O2	 0.6716
O3	 0.5252
P2	 0.6600
P3	 0.5257
Q2	 0.5176
Q3	 0.4897
R2	 0.7011
R3	 0.5986
S2	 0.7291
S3	 0.4938
T2	 0.7260
T3	 0.4704
U2	 0.7389
U3	 0.5427
V2	 0.6575
W2	 0.7119
X2	 0.7106
Y2	 0.6834
Z2	 0.7185
a2	 0.6904
b2	 0.7218
c2	 0.7252
d2	 0.7444
e2	 0.6475
f2	 0.6596
g2	 0.7266
h2	 0.5311
i2	 0.6867
j	 0.6263
j2	 0.6607
k	 0.4186
k2	 0.7536
m	 0.5357
m2	 0.7755
n2	 0.6590
o2	 0.6195
p2	 0.5222
q2	 0.6176

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Chain	Atom inclusion
r2	 0.4647
s2	 0.5883
t	 0.4884
u	 0.4892
v2	 0.6185
w2	 0.4579
x2	 0.6006
y2	 0.6179
z2	 0.5800