



wwPDB EM Validation Summary Report ⓘ

Jul 13, 2026 – 05:24 PM EDT

PDB ID : 9EHO / pdb_00009eho
EMDB ID : EMD-48061
Title : Octopus ribosome, hybrid 80S
Authors : Gao, J.; Yip, M.C.J.; Han, R.; Grearson, A.; Shao, S.; Lee, A.S.Y.
Deposited on : 2024-11-24
Resolution : 3.10 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:

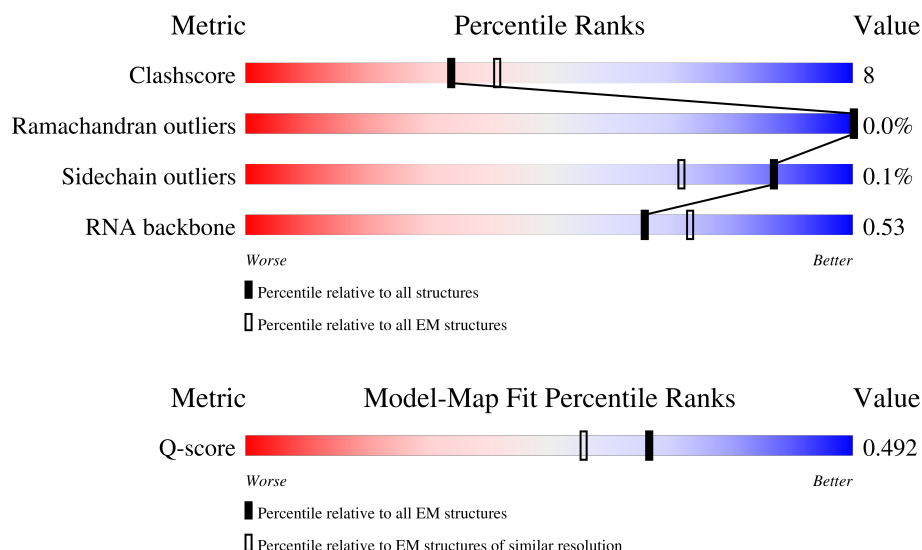
EMDB validation analysis : 0.0.1.dev133
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

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 3.10 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.



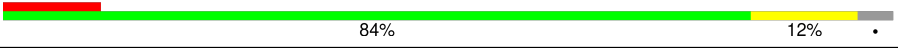
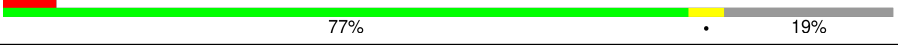
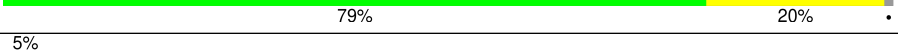
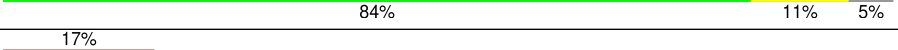
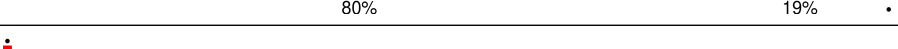
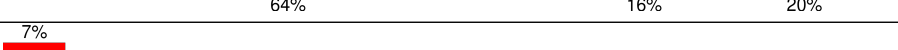
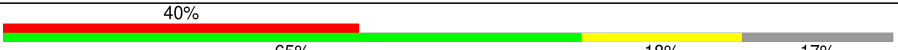
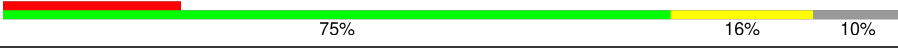
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	14724 (2.60 - 3.60)

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	5	5185	5% 38% 16% • 42%
2	7	119	75% 24% •
3	8	161	7% 65% 24% • 7%

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Mol	Chain	Length	Quality of chain
4	A	259	
5	B	402	
6	I	219	
7	P	186	
8	Q	187	
9	V	140	
10	a	149	
11	e	133	
12	g	113	
13	j	101	
14	m	128	
15	o	106	
16	p	92	
17	C	488	
18	D	296	
19	E	277	
20	F	343	
21	G	265	
22	H	187	
23	J	180	
24	L	211	
25	M	153	
26	N	204	
27	O	203	
28	R	196	

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Mol	Chain	Length	Quality of chain
29	S	176	
30	T	160	
31	U	136	
32	W	158	
33	X	201	
34	Y	143	
35	Z	136	
36	b	91	
37	c	116	
38	d	121	
39	f	132	
40	h	123	
41	i	114	
42	k	103	
43	l	51	
44	r	134	
45	n	25	
46	AA	2985	
47	aa	118	
48	bb	118	
49	BB	300	
50	ee	56	
51	CC	264	
52	cc	84	
53	DD	277	

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Mol	Chain	Length	Quality of chain
54	dd	67	
55	EE	241	
56	FF	263	
57	ff	176	
58	GG	204	
59	HH	808	
60	hh	317	
61	II	193	
62	JJ	208	
63	KK	191	
64	LL	156	
65	MM	157	
66	OO	151	
67	PP	151	
68	QQ	152	
69	RR	148	
70	SS	136	
71	TT	152	
72	UU	157	
73	VV	120	
74	WW	83	
75	XX	130	
76	YY	143	
77	ZZ	133	
78	2	76	

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Mol	Chain	Length	Quality of chain
79	3	76	38% 50% 36% 5% 9%
80	1	10	90% 10%

2 Entry composition

There are 83 unique types of molecules in this entry. The entry contains 195318 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 RNA chain called 28S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	5	3004	Total	C	N	O	P	0	0
			64325	28670	11766	20885	3004		

- Molecule 2 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	7	119	Total	C	N	O	P	0	0
			2528	1131	446	833	118		

- Molecule 3 is a RNA chain called 5.8S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	8	149	Total	C	N	O	P	0	0
			3185	1419	580	1037	149		

- Molecule 4 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	A	248	Total	C	N	O	S	0	0
			1905	1188	386	324	7		

- Molecule 5 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	394	Total	C	N	O	S	0	0
			3180	2018	613	535	14		

- Molecule 6 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	I	210	Total	C	N	O	S	0	0
			1709	1087	334	274	14		

- Molecule 7 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	P	151	Total	C	N	O	S	0	0
			1234	774	245	208	7		

- Molecule 8 is a protein called Large ribosomal subunit protein uL15/eL18 domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	Q	186	Total	C	N	O	S	0	0
			1509	948	307	246	8		

- Molecule 9 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	V	130	Total	C	N	O	S	0	0
			962	609	178	169	6		

- Molecule 10 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	a	148	Total	C	N	O	S	0	0
			1188	761	238	184	5		

- Molecule 11 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	e	127	Total	C	N	O	S	0	0
			1065	676	216	168	5		

- Molecule 12 is a protein called Large ribosomal subunit protein eL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	g	112	Total	C	N	O	S	0	0
			915	574	189	145	7		

- Molecule 13 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	j	81	Total	C	N	O	S	0	0
			675	408	154	108	5		

- Molecule 14 is a protein called Ubiquitin-ribosomal protein eL40 fusion protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	m	52	Total	C	N	O	S	0	0
			428	264	90	67	7		

- Molecule 15 is a protein called Large ribosomal subunit protein eL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	o	101	Total	C	N	O	S	0	0
			827	518	170	132	7		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
o	1	MET	-	initiating methionine	UNP A0A0L8H955

- Molecule 16 is a protein called Large ribosomal subunit protein eL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	p	91	Total	C	N	O	S	0	0
			704	439	138	120	7		

- Molecule 17 is a protein called Large ribosomal subunit protein uL4 C-terminal domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	C	375	Total	C	N	O	S	0	0
			3012	1905	590	502	15		

- Molecule 18 is a protein called Large ribosomal subunit protein uL18 C-terminal eukaryotes domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	D	293	Total	C	N	O	S	0	0
			2393	1523	438	424	8		

- Molecule 19 is a protein called Large ribosomal subunit protein eL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	E	230	Total	C	N	O	S	0	0
			1897	1205	381	306	5		

- Molecule 20 is a protein called 60S ribosomal protein L7 isoform X1.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	F	216	Total	C	N	O	S	0	0
			1807	1160	348	292	7		

- Molecule 21 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	G	232	Total	C	N	O	S	0	0
			1878	1189	363	320	6		

- Molecule 22 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	H	187	Total	C	N	O	S	0	0
			1494	953	268	268	5		

- Molecule 23 is a protein called 60S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	J	168	Total	C	N	O	S	0	0
			1363	863	257	238	5		

- Molecule 24 is a protein called Large ribosomal subunit protein eL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	L	210	Total	C	N	O	S	0	0
			1726	1081	352	284	9		

- Molecule 25 is a protein called Large ribosomal subunit protein eL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	M	138	Total	C	N	O	S	0	0
			1128	717	220	186	5		

- Molecule 26 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	N	203	Total	C	N	O	S	0	0
			1691	1068	355	261	7		

- Molecule 27 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	O	201	Total	C	N	O	S	0	0
			1640	1049	328	256	7		

- Molecule 28 is a protein called Ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	R	174	Total	C	N	O	S	0	0
			1461	909	315	232	5		

- Molecule 29 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	S	176	Total	C	N	O	S	0	0
			1471	935	287	239	10		

- Molecule 30 is a protein called 60S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	T	159	Total	C	N	O	S	0	0
			1288	814	261	207	6		

- Molecule 31 is a protein called Large ribosomal subunit protein eL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	U	97	Total	C	N	O	S	0	0
			807	523	136	146	2		

- Molecule 32 is a protein called Large ribosomal subunit protein eL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	W	63	Total	C	N	O	S	0	0
			527	337	103	82	5		

- Molecule 33 is a protein called Large ribosomal subunit protein uL23 N-terminal domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	X	118	Total	C	N	O	S	0	0
			972	617	177	177	1		

- Molecule 34 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	Y	123	Total	C	N	O	S	0	0
			1022	635	214	168	5		

- Molecule 35 is a protein called Large ribosomal subunit protein eL27.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	Z	135	Total	C	N	O	S	0	0
			1130	719	223	184	4		

- Molecule 36 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	b	76	Total	C	N	O	S	0	0
			647	396	147	101	3		

- Molecule 37 is a protein called Large ribosomal subunit protein eL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	c	98	Total	C	N	O	S	0	0
			758	480	135	139	4		

- Molecule 38 is a protein called Large ribosomal subunit protein eL31.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	d	107	Total	C	N	O	S	0	0
			888	564	172	147	5		

- Molecule 39 is a protein called Large ribosomal subunit protein eL33.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	f	110	Total	C	N	O	S	0	0
			889	572	175	140	2		

- Molecule 40 is a protein called 60S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	h	122	Total	C	N	O	S	0	0
			1019	645	208	163	3		

- Molecule 41 is a protein called Large ribosomal subunit protein eL36.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	i	103	Total	C	N	O	S	0	0
			853	535	176	135	7		

- Molecule 42 is a protein called eL38.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	k	66	Total	C	N	O	S	0	0
			543	347	101	94	1		

- Molecule 43 is a protein called Large ribosomal subunit protein eL39.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	l	50	Total	C	N	O	S	0	0
			432	270	95	63	4		

- Molecule 44 is a protein called Large ribosomal subunit protein eL28.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	r	124	Total	C	N	O	S	0	0
			1014	638	207	163	6		

- Molecule 45 is a protein called eS32.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	n	25	Total	C	N	O	S	0	0
			239	145	64	27	3		

- Molecule 46 is a RNA chain called 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	AA	1542	Total	C	N	O	P	0	0
			33027	14731	6037	10718	1541		

- Molecule 47 is a protein called 40S ribosomal protein S25.

Mol	Chain	Residues	Atoms				AltConf	Trace
47	aa	72	Total	C	N	O	0	0
			586	376	106	104		

- Molecule 48 is a protein called 40S ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	bb	96	Total	C	N	O	S	0	0
			766	476	156	129	5		

- Molecule 49 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	BB	216	Total	C	N	O	S	0	0
			1710	1087	299	315	9		

- Molecule 50 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	ee	55	Total	C	N	O	S	0	0
			459	288	92	74	5		

- Molecule 51 is a protein called Small ribosomal subunit protein eS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	CC	213	Total	C	N	O	S	0	0
			1711	1094	303	302	12		

- Molecule 52 is a protein called 40S ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	cc	82	Total	C	N	O	S	0	0
			638	401	118	111	8		

- Molecule 53 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	DD	221	Total	C	N	O	S	0	0
			1707	1102	296	302	7		

- Molecule 54 is a protein called Small ribosomal subunit protein eS28.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	dd	62	Total	C	N	O	S	0	0
			487	296	98	92	1		

- Molecule 55 is a protein called 40S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	EE	184	Total	C	N	O	S	0	0
			1448	920	265	254	9		

- Molecule 56 is a protein called 40S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	FF	261	Total	C	N	O	S	0	0
			2103	1347	399	351	6		

- Molecule 57 is a protein called eS30.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	ff	42	Total	C	N	O	S	0	0
			342	210	75	56	1		

- Molecule 58 is a protein called Ribosomal S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	GG	182	Total	C	N	O	S	0	0
			1451	910	273	260	8		

- Molecule 59 is a protein called Small ribosomal subunit protein eS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	HH	232	Total	C	N	O	S	0	0
			1885	1180	377	321	7		

- Molecule 60 is a protein called Small ribosomal subunit protein RACK1.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	hh	307	Total	C	N	O	S	0	0
			2394	1506	419	456	13		

- Molecule 61 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	II	184	Total	C	N	O	S	0	0
			1509	974	271	262	2		

- Molecule 62 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	JJ	206	Total	C	N	O	S	0	0
			1670	1045	333	287	5		

- Molecule 63 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	KK	184	Total	C	N	O	S	0	0
			1522	964	306	250	2		

- Molecule 64 is a protein called Plectin/eS10 N-terminal domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	LL	90	Total	C	N	O	S	0	0
			758	495	134	127	2		

- Molecule 65 is a protein called 40S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	MM	135	Total	C	N	O	S	0	0
			1106	701	208	189	8		

- Molecule 66 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	OO	149	Total	C	N	O	S	0	0
			1204	771	229	201	3		

- Molecule 67 is a protein called 40S ribosomal protein S14a.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	PP	136	Total	C	N	O	S	0	0
			1014	623	198	189	4		

- Molecule 68 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	QQ	122	Total	C	N	O	S	0	0
			983	629	182	165	7		

- Molecule 69 is a protein called 40S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	RR	142	Total	C	N	O	S	0	0
			1136	723	216	195	2		

- Molecule 70 is a protein called Small ribosomal subunit protein eS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	SS	121	Total	C	N	O	S	0	0
			970	611	175	180	4		

- Molecule 71 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	TT	144	Total	C	N	O	S	0	0
			1186	739	239	202	6		

- Molecule 72 is a protein called 40S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	UU	141	Total	C	N	O	S	0	0
			1120	710	212	195	3		

- Molecule 73 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	VV	100	Total	C	N	O	S	0	0
			798	501	151	142	4		

- Molecule 74 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	WW	83	Total	C	N	O	S	0	0
			629	383	114	125	7		

- Molecule 75 is a protein called 40S ribosomal protein S15a.

Mol	Chain	Residues	Atoms					AltConf	Trace
75	XX	129	Total	C	N	O	S	0	0
			1026	642	196	179	9		

- Molecule 76 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
76	YY	141	Total	C	N	O	S	0	0
			1109	700	222	185	2		

- Molecule 77 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
77	ZZ	124	Total	C	N	O	S	0	0
			1008	640	199	165	4		

- Molecule 78 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
78	2	76	Total	C	N	O	P	0	0
			1619	721	284	538	76		

- Molecule 79 is a RNA chain called tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
79	3	69	Total	C	N	O	P	0	0
			1475	657	266	483	69		

- Molecule 80 is a RNA chain called RNA (5'-R(P*AP*CP*CP*AP*AP*AP*AP*AP*CP*C)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
80	1	10	Total	C	N	O	P	0	0
			212	96	42	64	10		

- Molecule 81 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

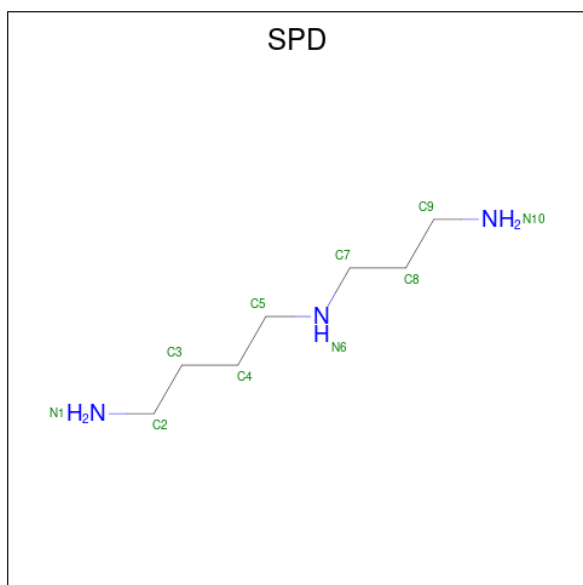
Mol	Chain	Residues	Atoms		AltConf
81	5	138	Total	Mg	0
			138	138	
81	7	4	Total	Mg	0
			4	4	
81	8	3	Total	Mg	0
			3	3	
81	B	1	Total	Mg	0
			1	1	
81	V	1	Total	Mg	0
			1	1	
81	e	1	Total	Mg	0
			1	1	

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Mol	Chain	Residues	Atoms		AltConf
81	AA	56	Total	Mg	0
			56	56	
81	2	1	Total	Mg	0
			1	1	

- Molecule 82 is SPERMIDINE (CCD ID: SPD) (formula: $C_7H_{19}N_3$).



Mol	Chain	Residues	Atoms			AltConf
82	5	1	Total	C	N	0
			10	7	3	

- Molecule 83 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
83	g	1	Total	Zn	0
			1	1	
83	j	1	Total	Zn	0
			1	1	
83	m	1	Total	Zn	0
			1	1	
83	o	1	Total	Zn	0
			1	1	
83	p	1	Total	Zn	0
			1	1	
83	bb	1	Total	Zn	0
			1	1	

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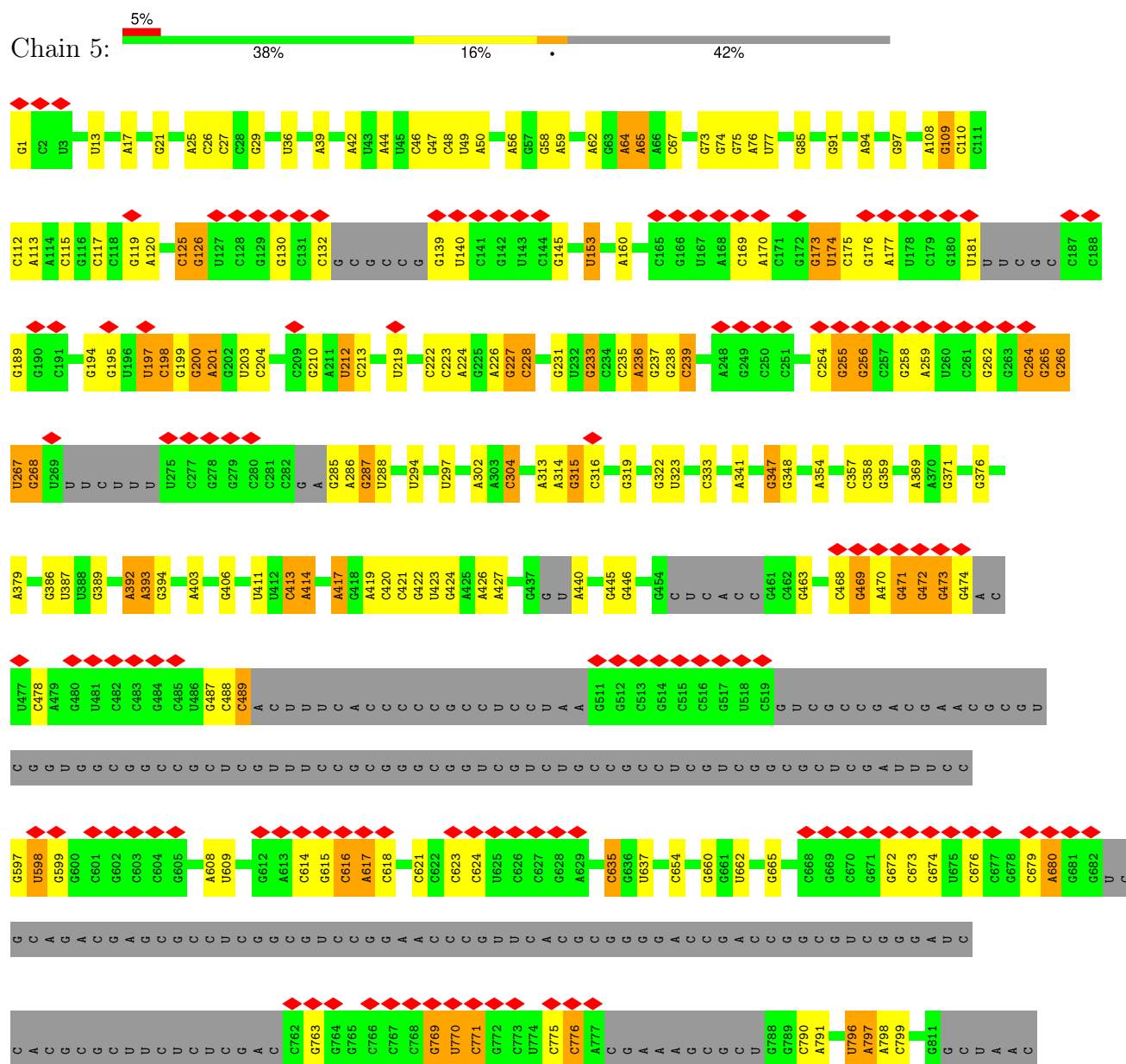
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Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
83	ee	1	1	1	0

3 Residue-property plots

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

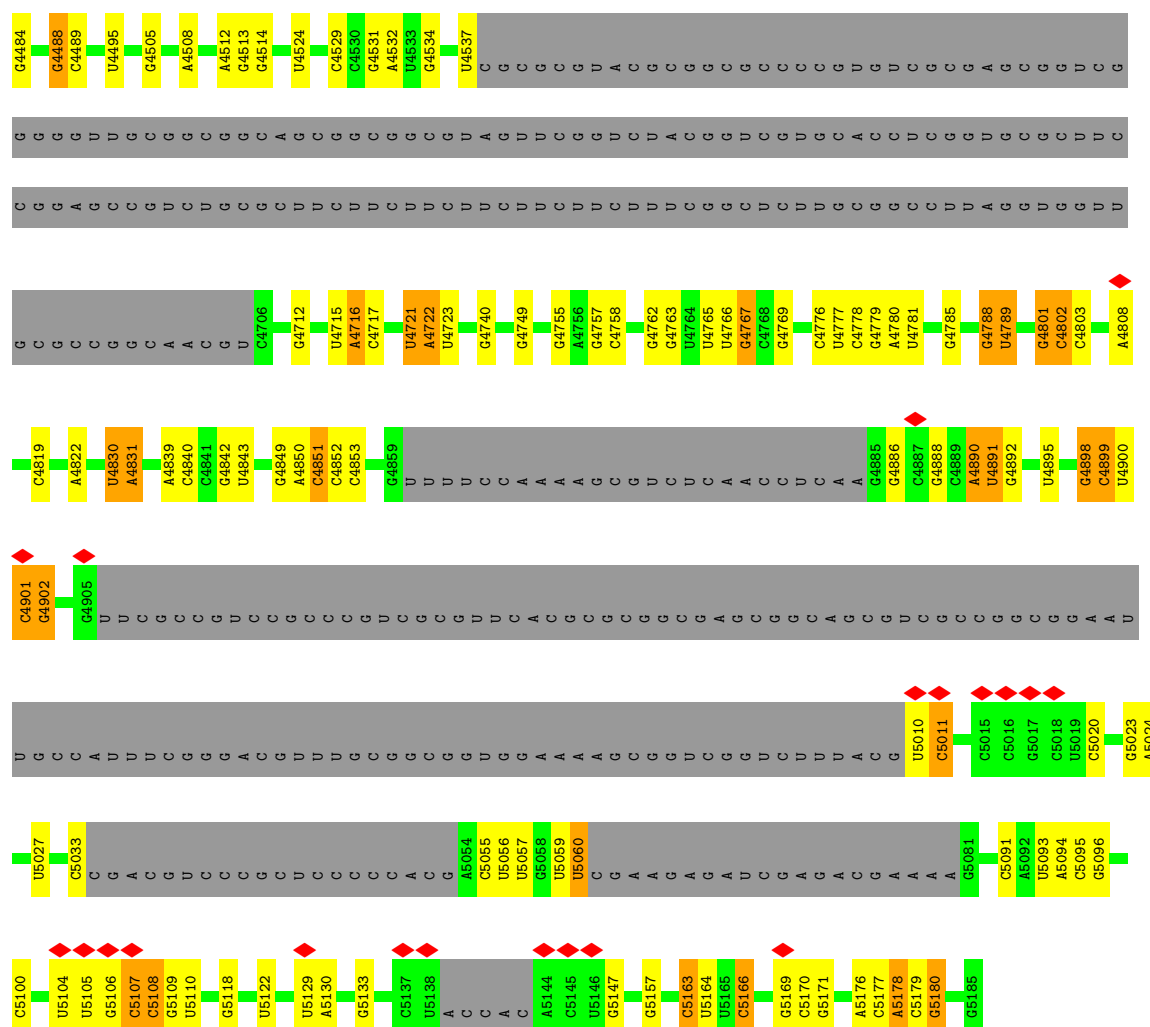
• Molecule 1: 28S rRNA











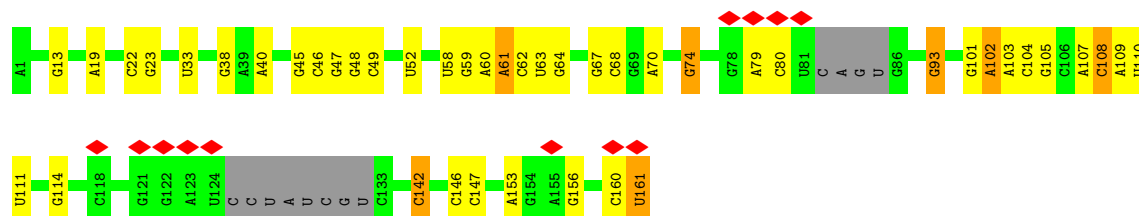
- Molecule 2: 5S rRNA

Chain 7: 75% 24% .



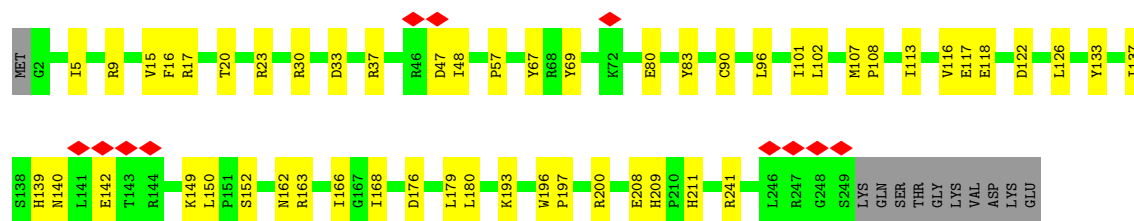
- Molecule 3: 5.8S rRNA

Chain 8: 7% 65% 24% 7% .



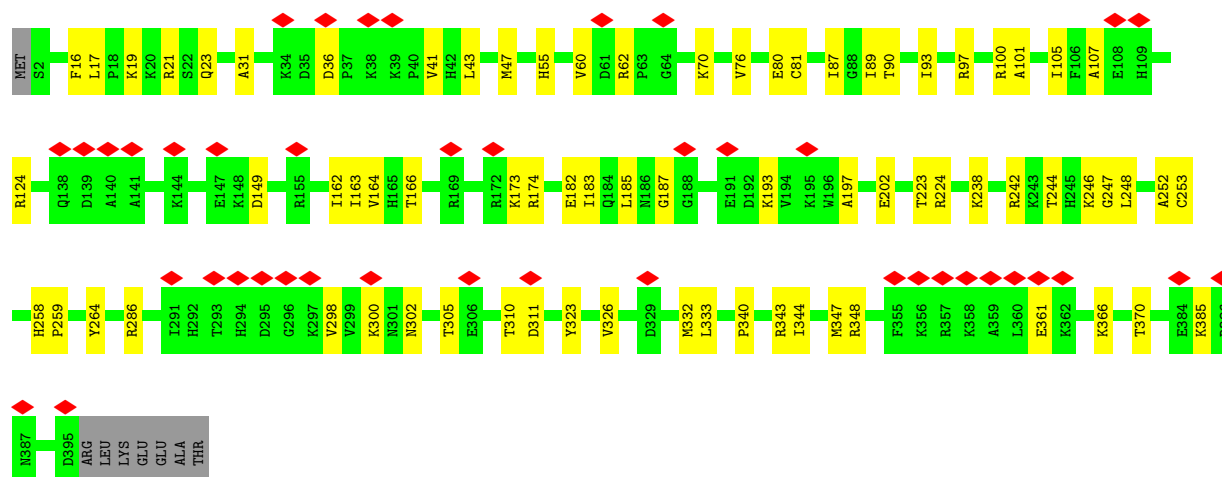
- Molecule 4: Large ribosomal subunit protein uL2

Chain A: 



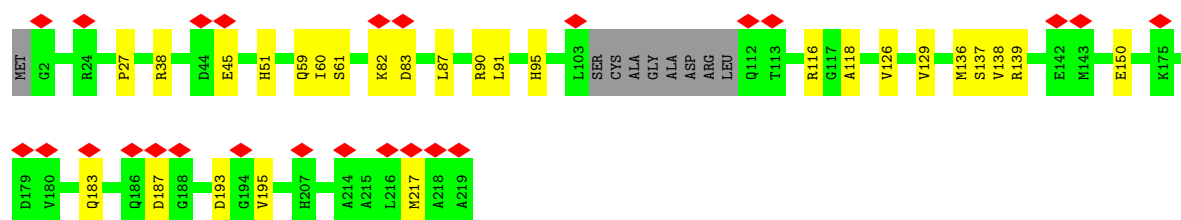
- Molecule 5: 60S ribosomal protein L3

Chain B: 



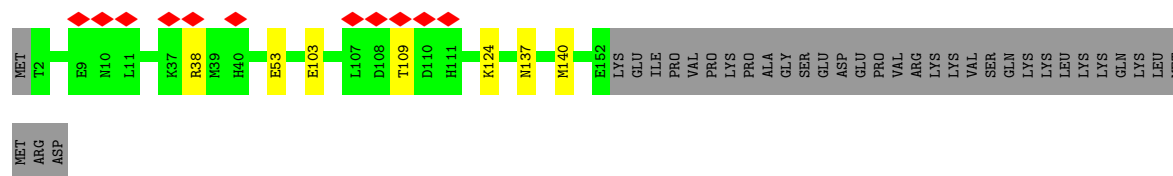
- Molecule 6: Large ribosomal subunit protein uL16

Chain I: 



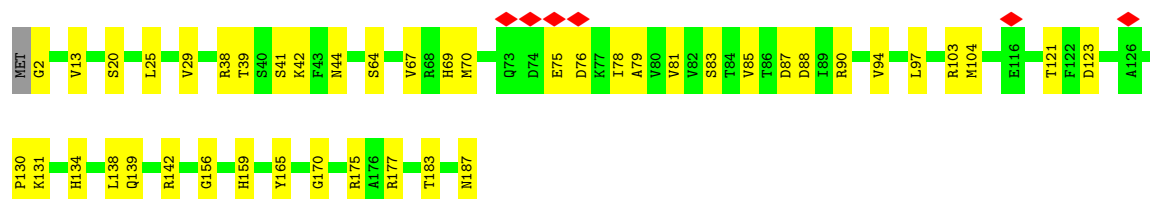
- Molecule 7: Large ribosomal subunit protein uL22

Chain P: 



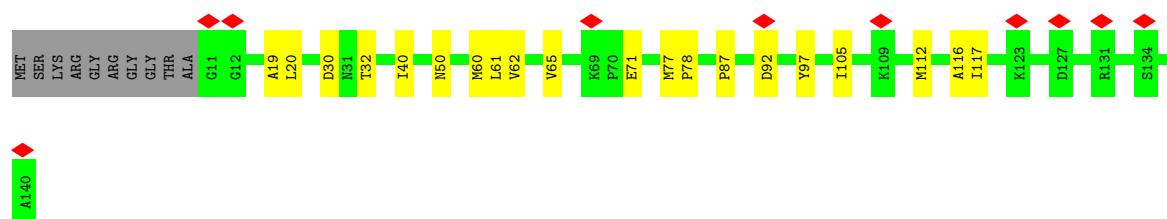
- Molecule 8: Large ribosomal subunit protein uL15/eL18 domain-containing protein

Chain Q: 



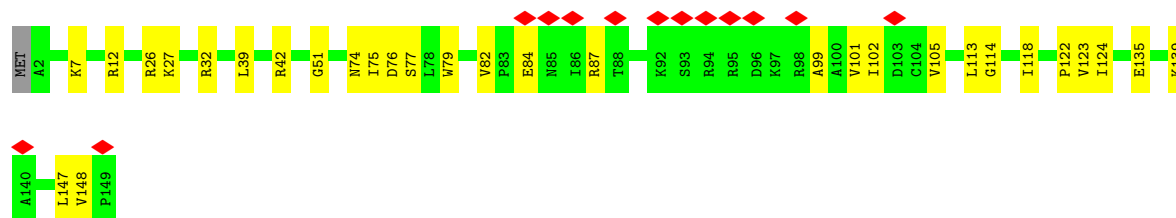
- Molecule 9: Large ribosomal subunit protein uL14

Chain V: 



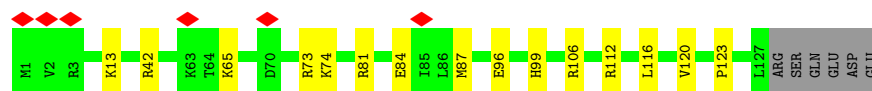
- Molecule 10: Large ribosomal subunit protein uL15

Chain a: 



- Molecule 11: 60S ribosomal protein L32

Chain e: 



- Molecule 12: Large ribosomal subunit protein eL34

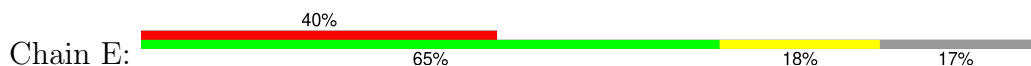
Chain g: 



- Molecule 13: Ribosomal protein L37

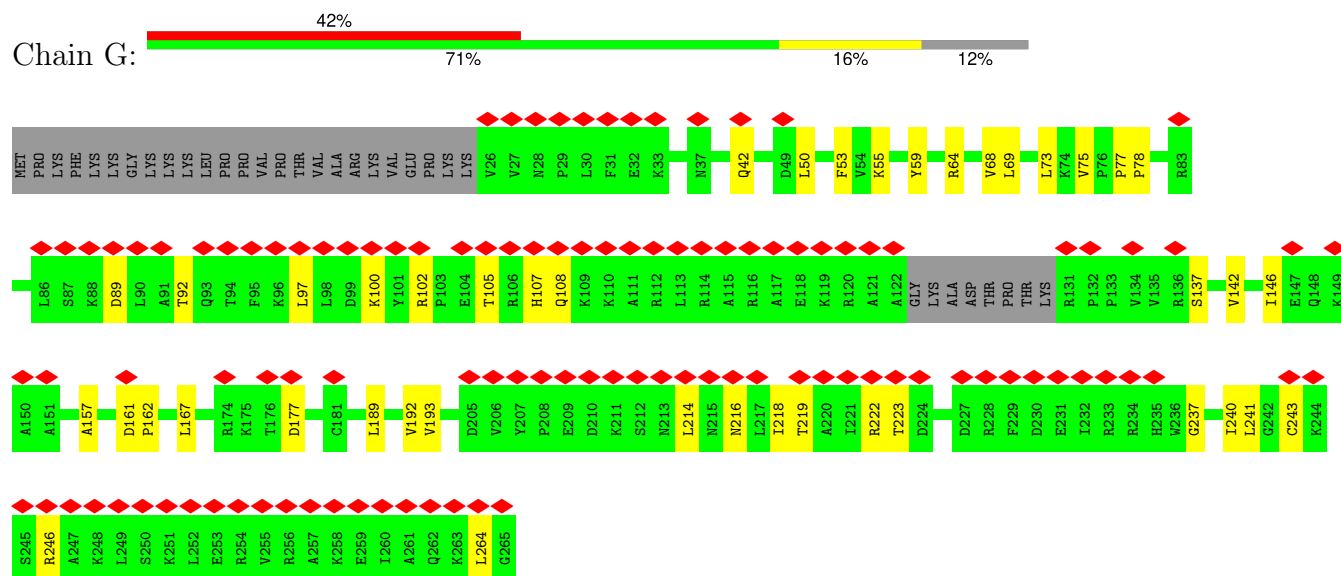
Chain j: 

- Chain D:  38% 83% 16%

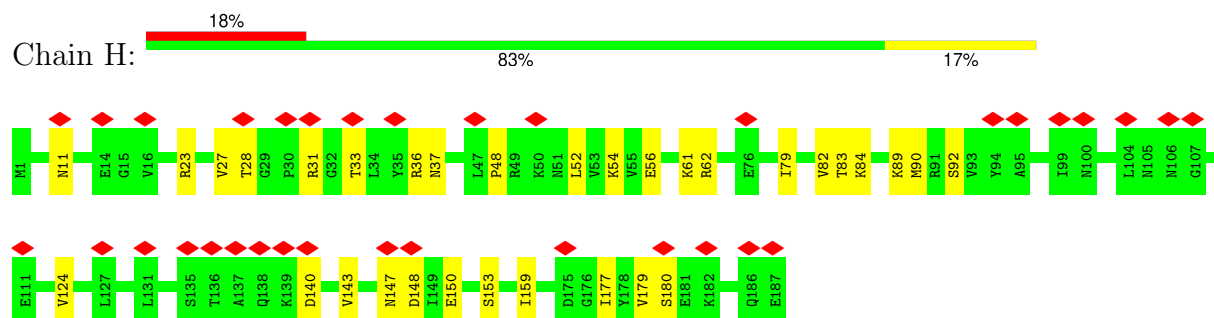




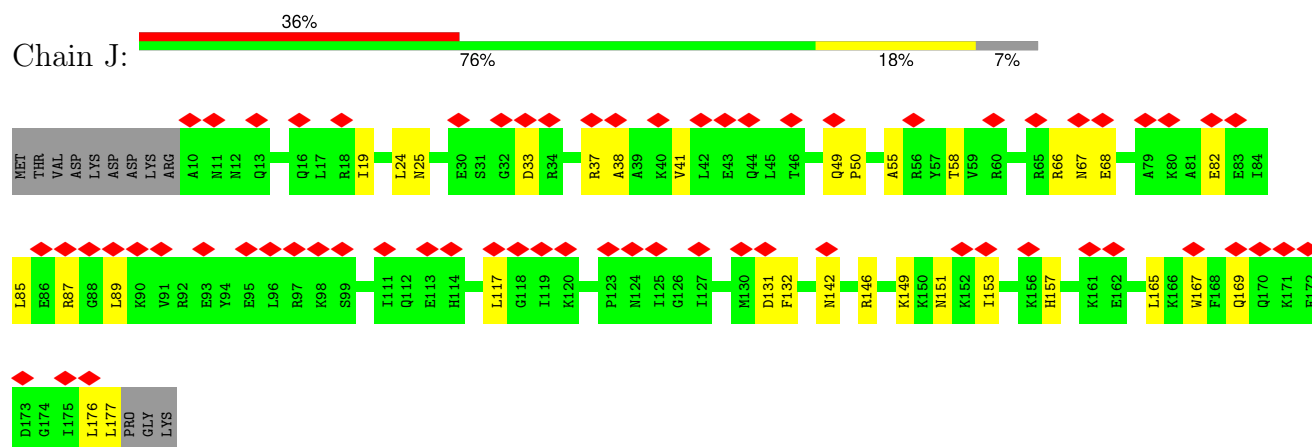
- Molecule 21: 60S ribosomal protein L7a



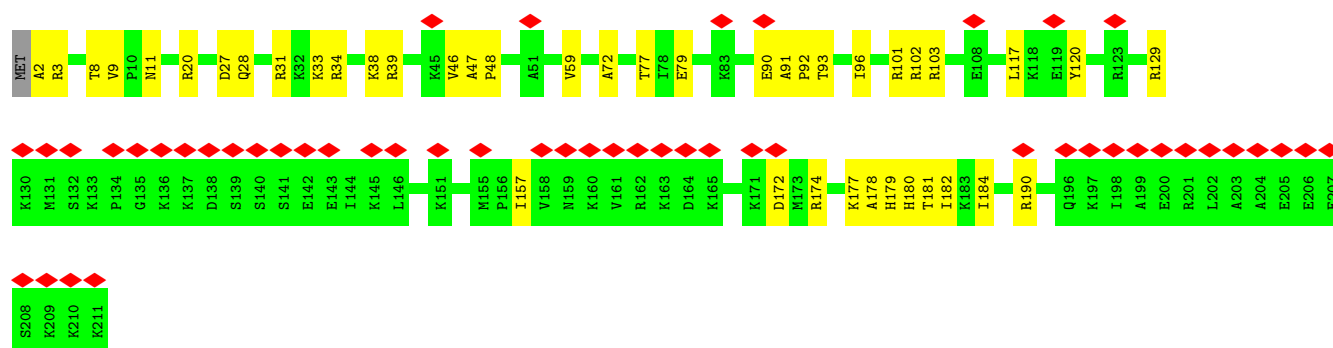
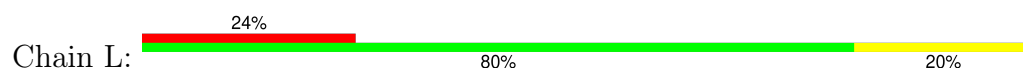
- Molecule 22: Large ribosomal subunit protein uL6



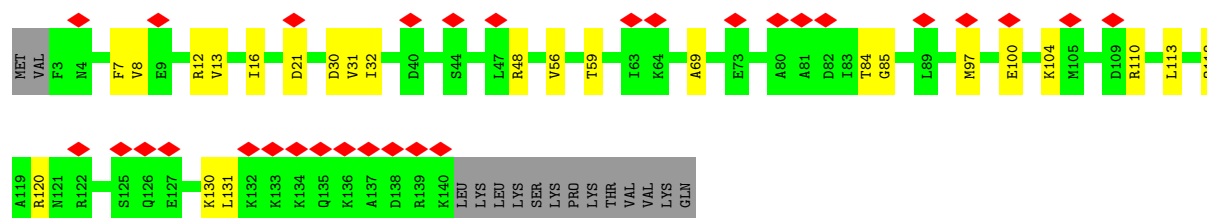
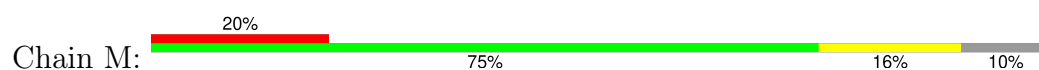
- Molecule 23: 60S ribosomal protein L11



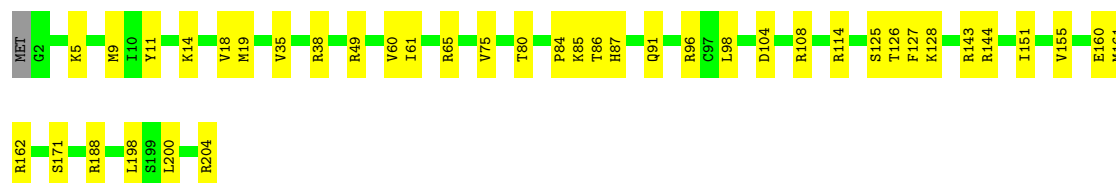
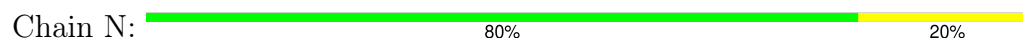
- Molecule 24: Large ribosomal subunit protein eL13



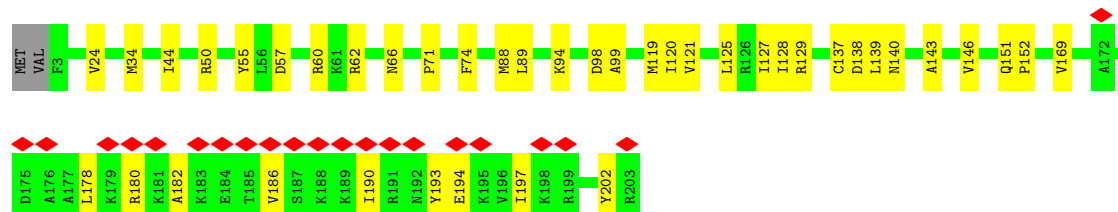
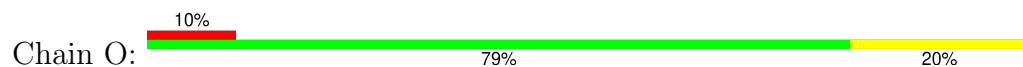
- Molecule 25: Large ribosomal subunit protein eL14



- Molecule 26: Ribosomal protein L15

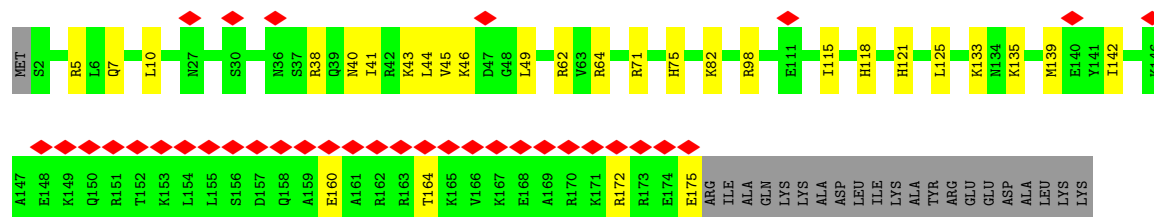


- Molecule 27: Large ribosomal subunit protein uL13

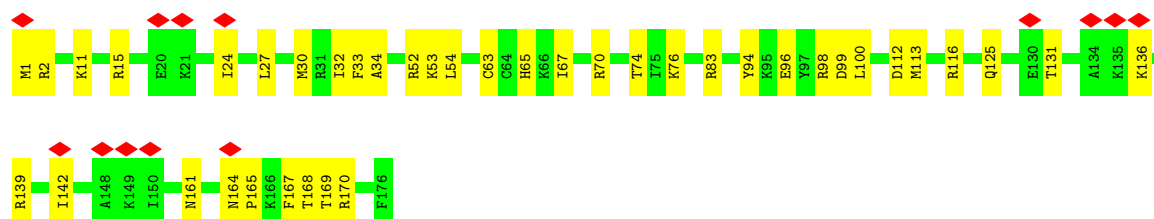
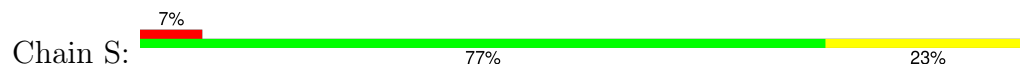


- Molecule 28: Ribosomal protein L19

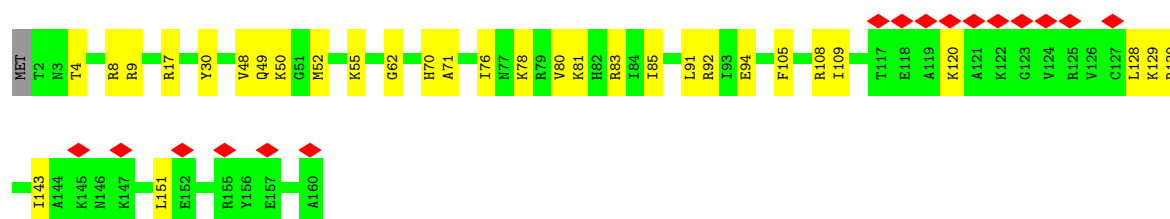
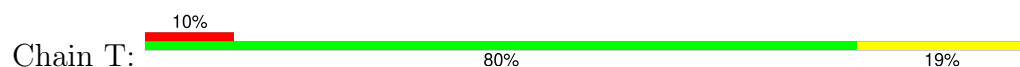




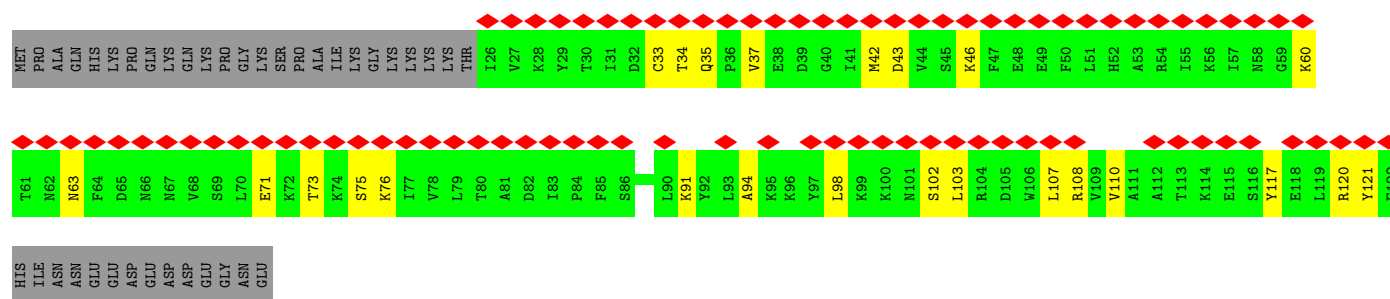
- Molecule 29: 60S ribosomal protein L18a



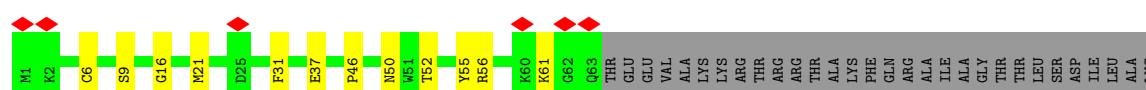
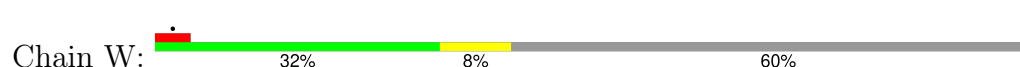
- Molecule 30: 60S ribosomal protein L21

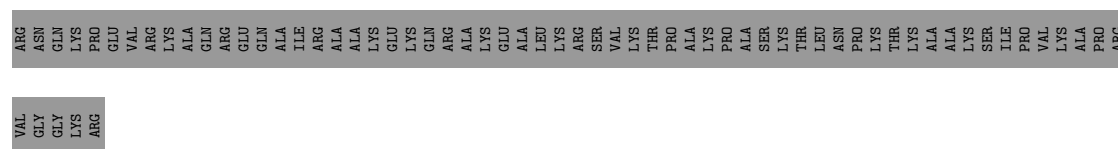


- Molecule 31: Large ribosomal subunit protein eL22

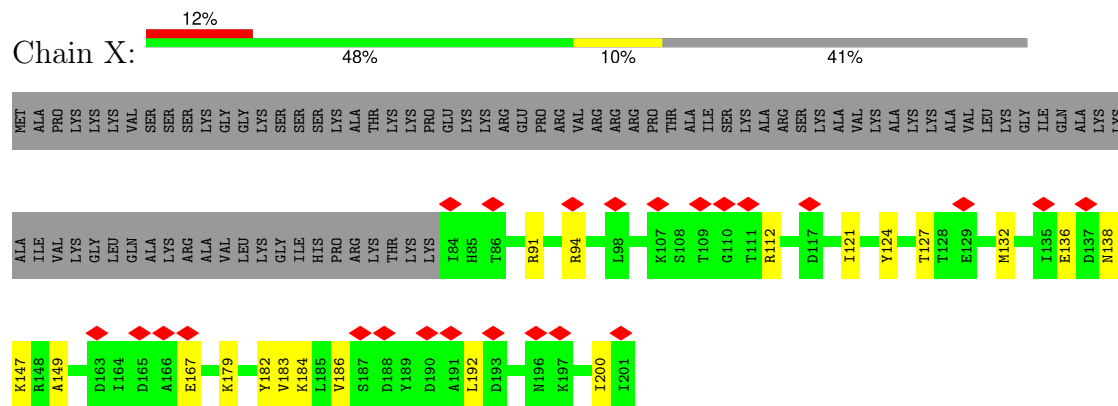


- Molecule 32: Large ribosomal subunit protein eL24

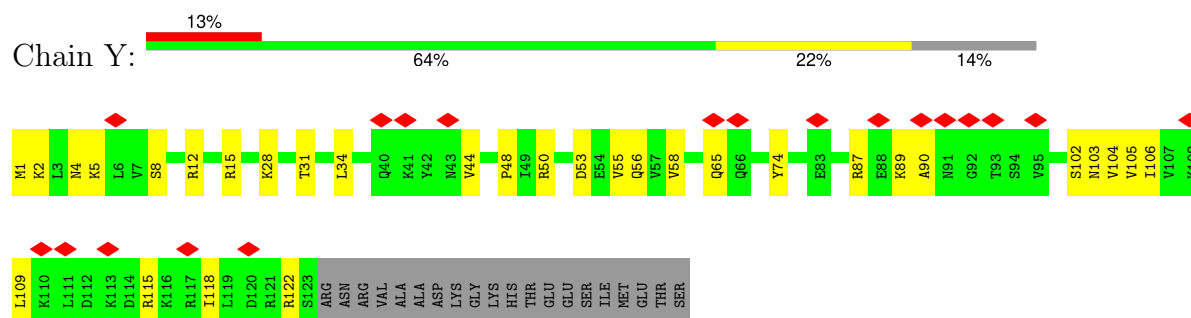




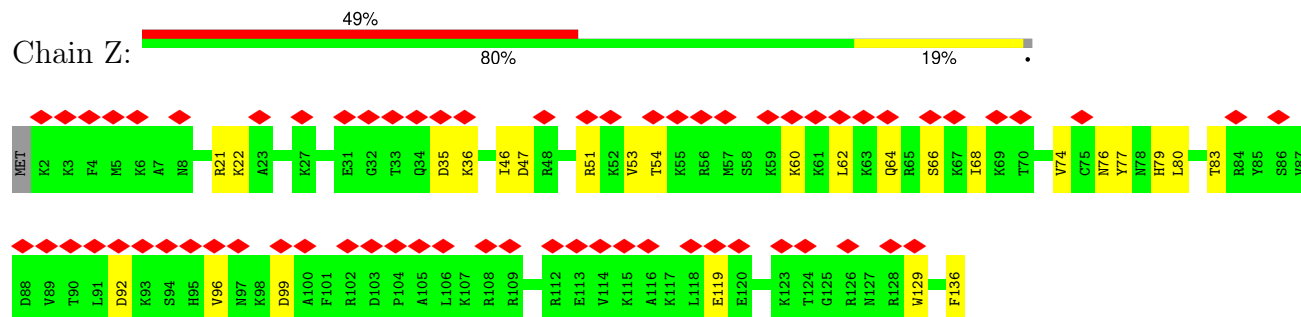
- Molecule 33: Large ribosomal subunit protein uL23 N-terminal domain-containing protein



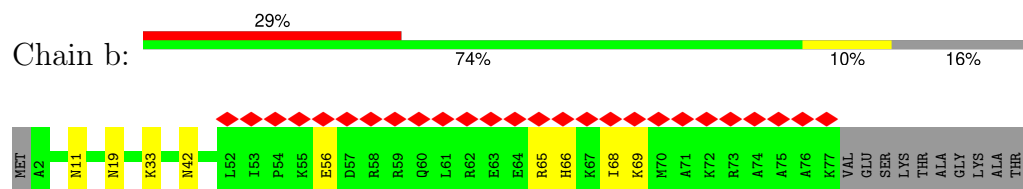
- Molecule 34: Large ribosomal subunit protein uL24



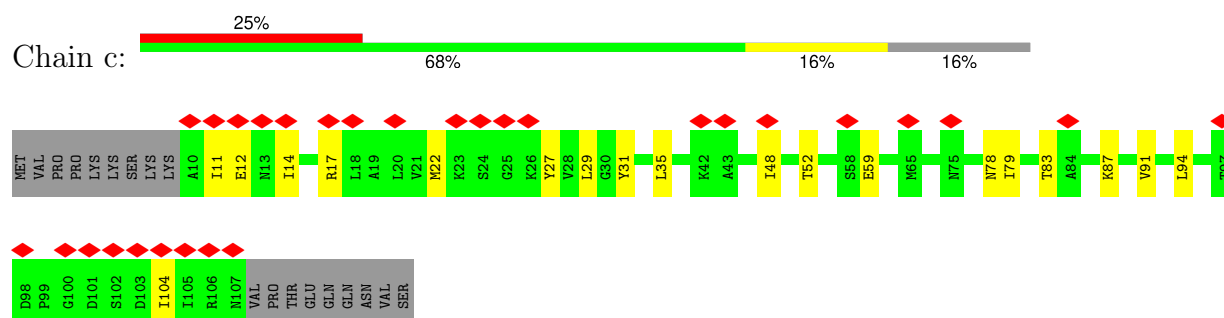
- Molecule 35: Large ribosomal subunit protein eL27



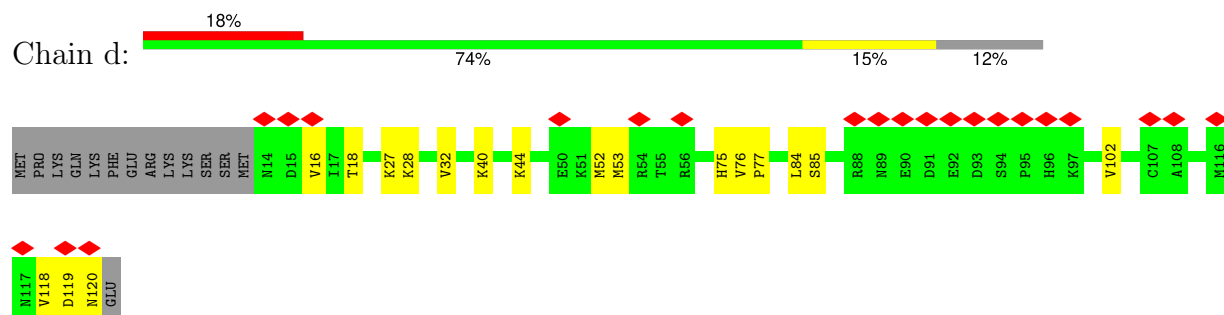
- Molecule 36: 60S ribosomal protein L29



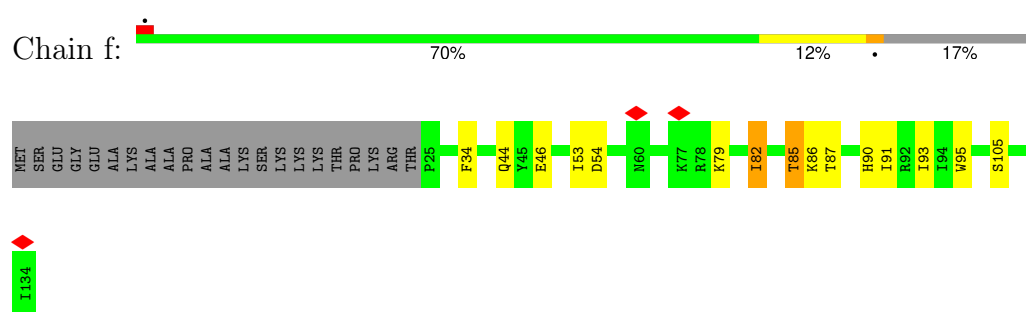
- Molecule 37: Large ribosomal subunit protein eL30



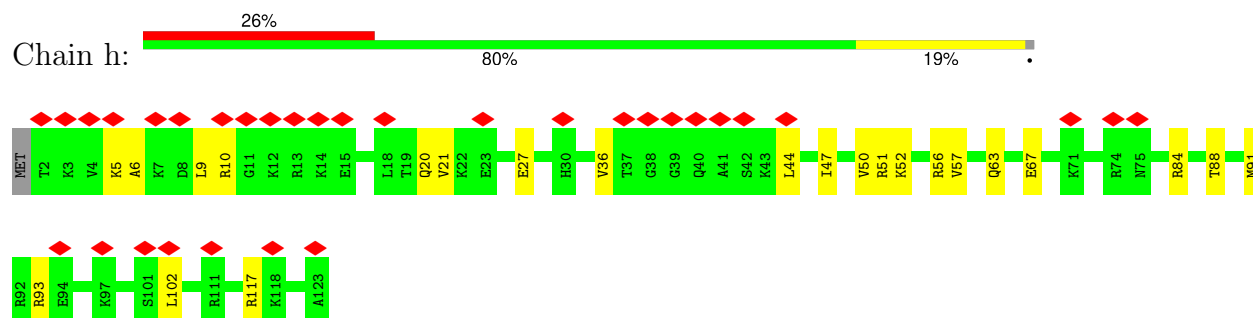
- Molecule 38: Large ribosomal subunit protein eL31



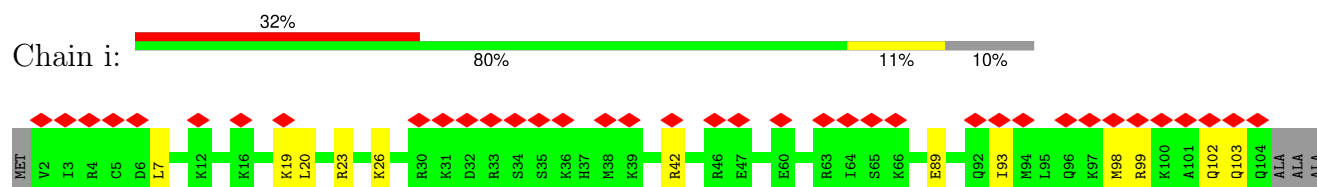
- Molecule 39: Large ribosomal subunit protein eL33



- Molecule 40: 60S ribosomal protein L35

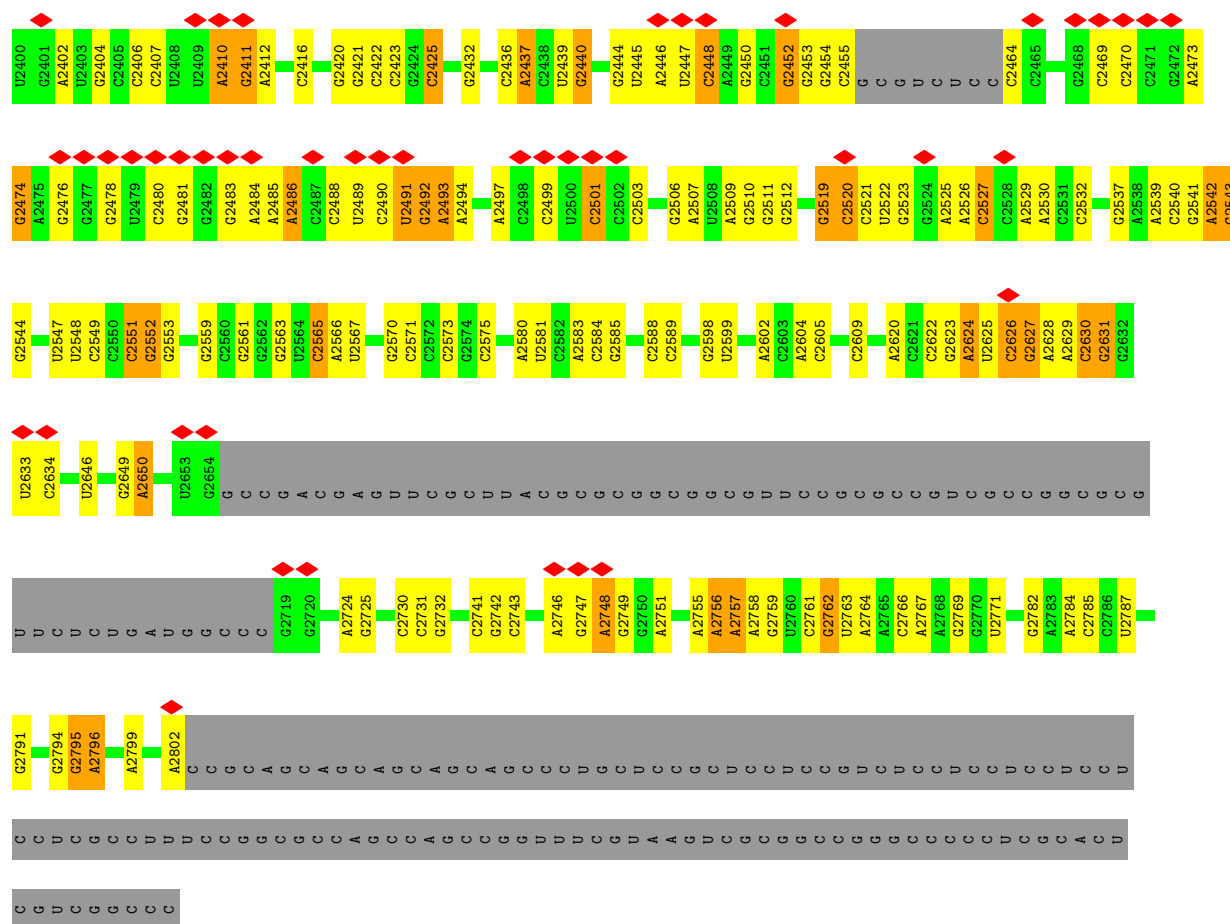


- Molecule 41: Large ribosomal subunit protein eL36

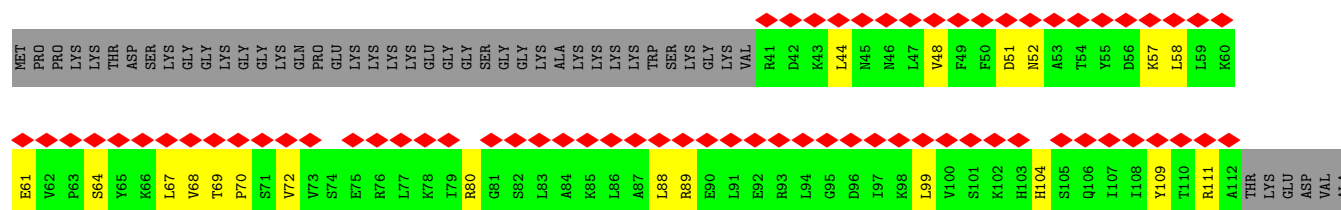




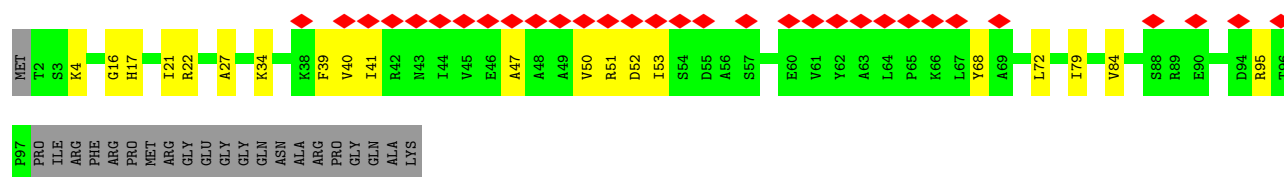




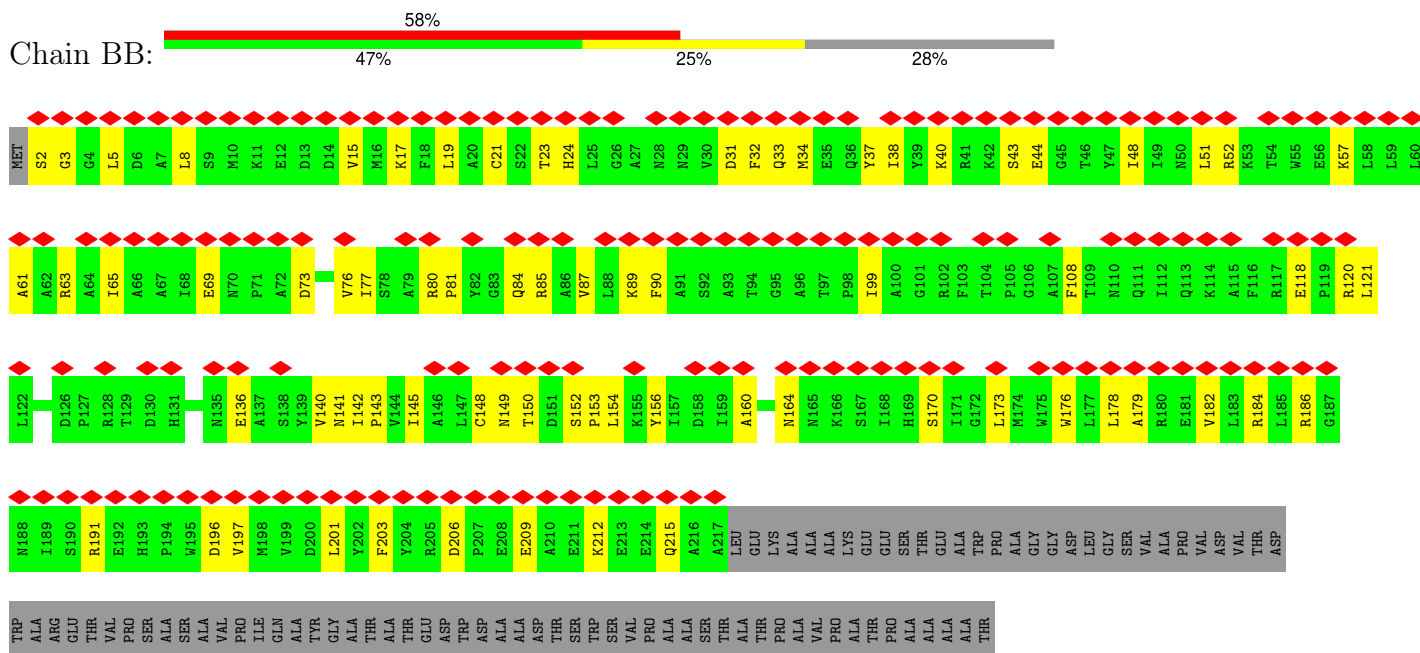
• Molecule 47: 40S ribosomal protein S25



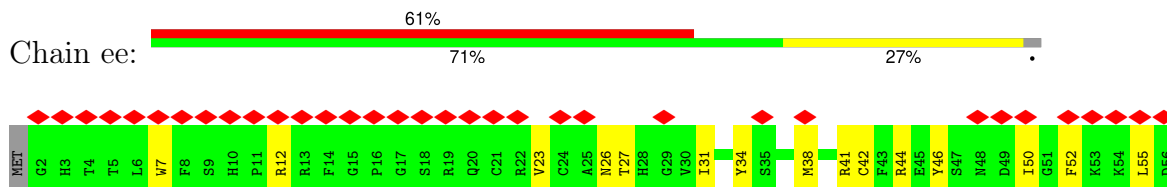
• Molecule 48: 40S ribosomal protein S26



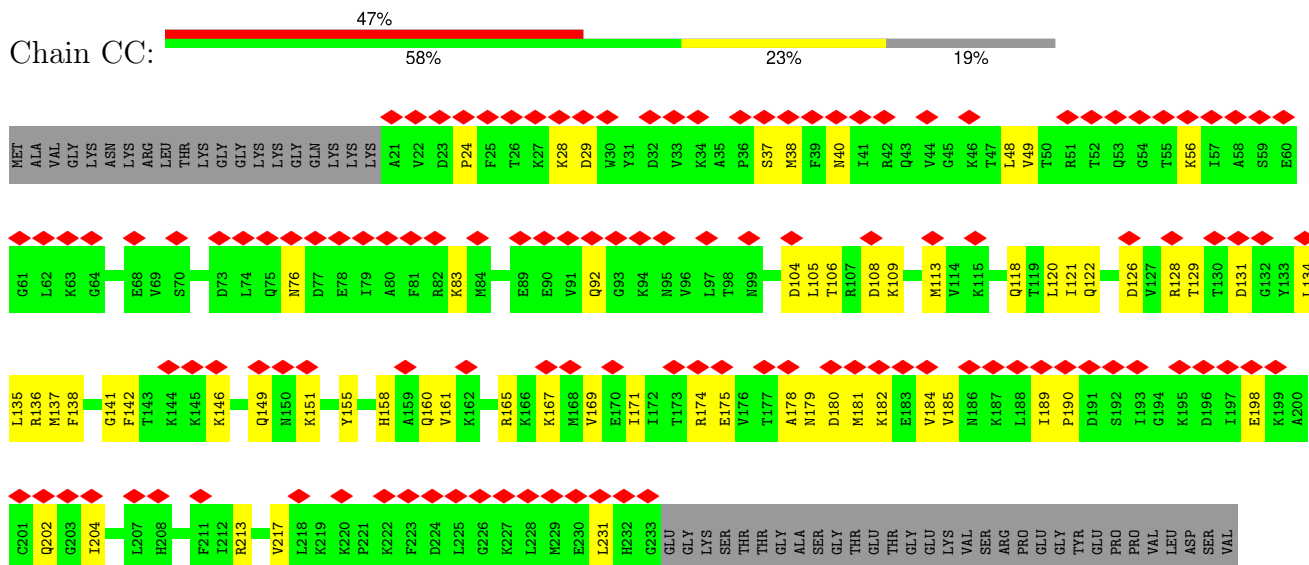
• Molecule 49: Small ribosomal subunit protein uS2



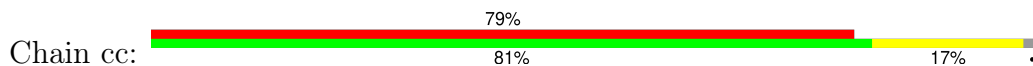
- Molecule 50: Small ribosomal subunit protein uS14

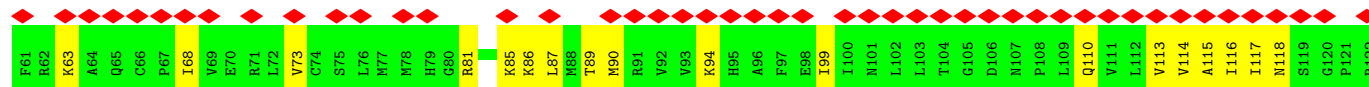


- Molecule 51: Small ribosomal subunit protein eS1

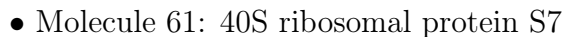


- Molecule 52: 40S ribosomal protein S27

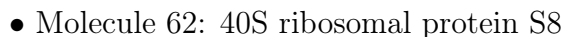




Chain hh:

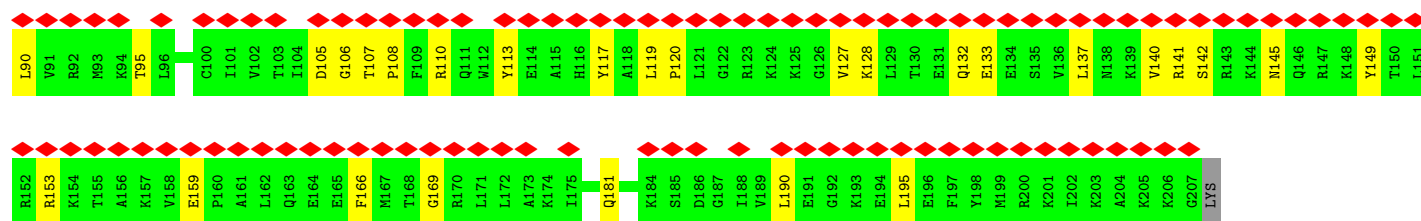


Chain II:

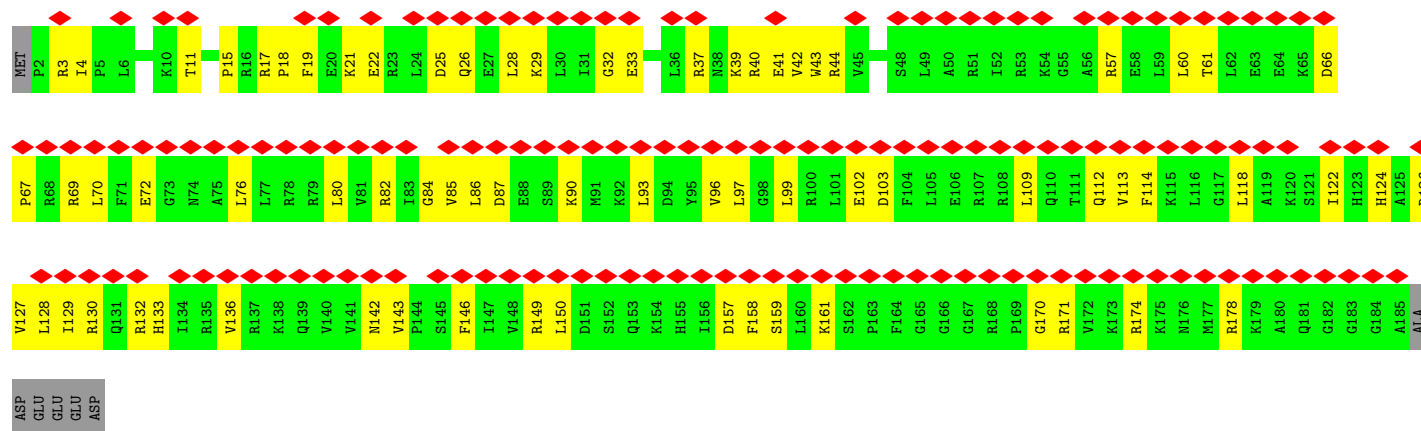
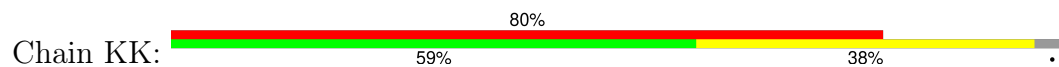


Chain JJ:

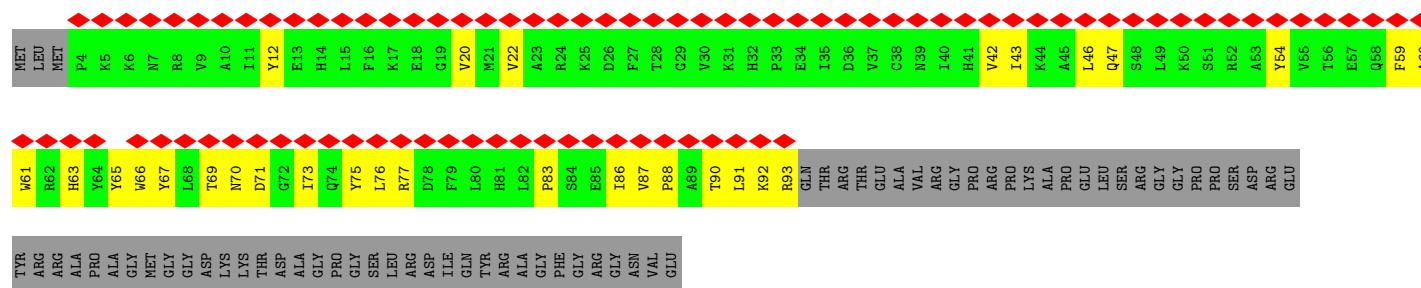




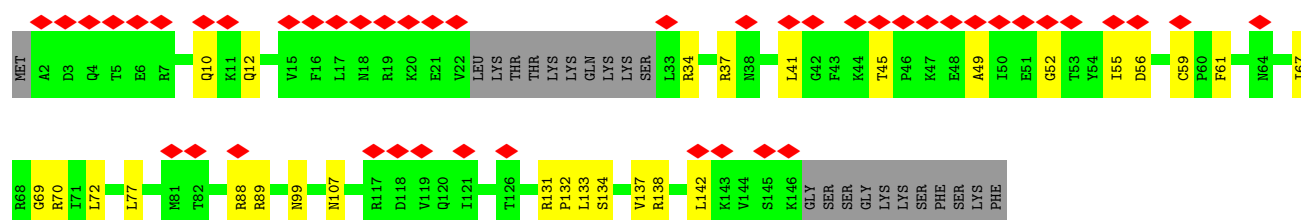
• Molecule 63: Small ribosomal subunit protein uS4



• Molecule 64: Plectin/eS10 N-terminal domain-containing protein

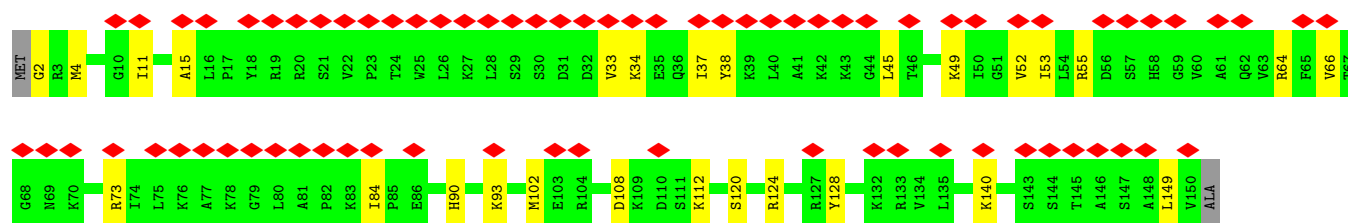


• Molecule 65: 40S ribosomal protein S11



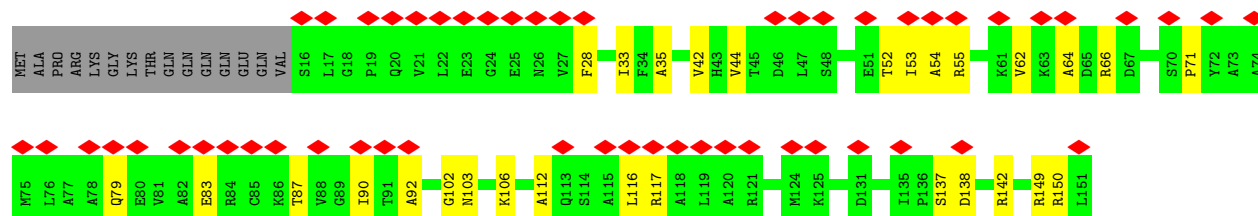
• Molecule 66: Small ribosomal subunit protein uS15

Chain OO: 



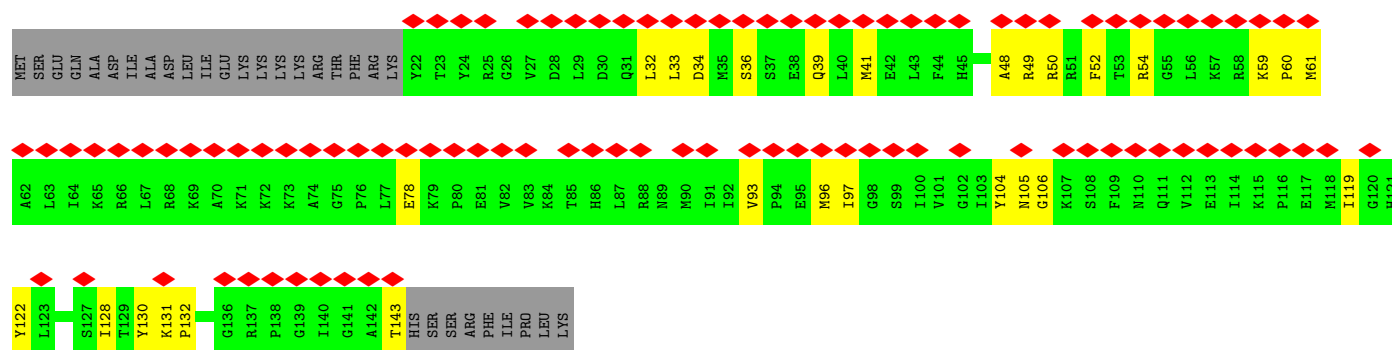
- Molecule 67: 40S ribosomal protein S14a

Chain PP: 



- Molecule 68: Small ribosomal subunit protein uS19

Chain QQ: 

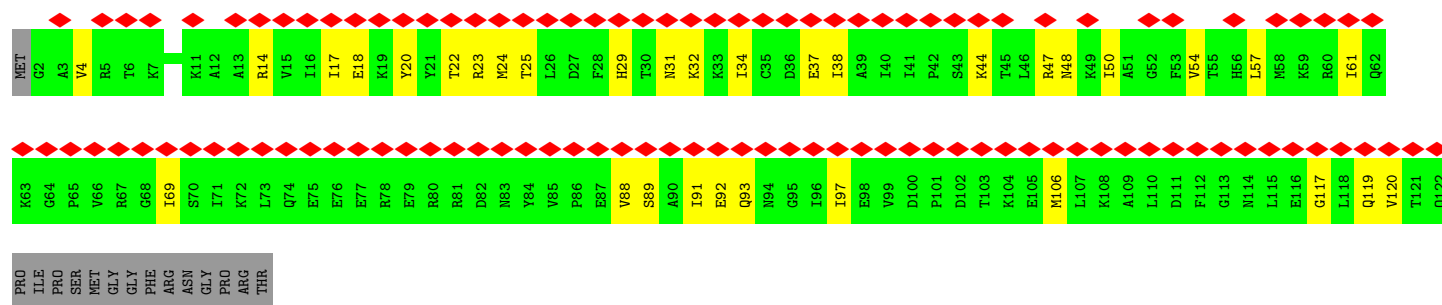
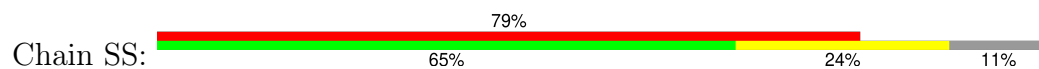


- Molecule 69: 40S ribosomal protein S16

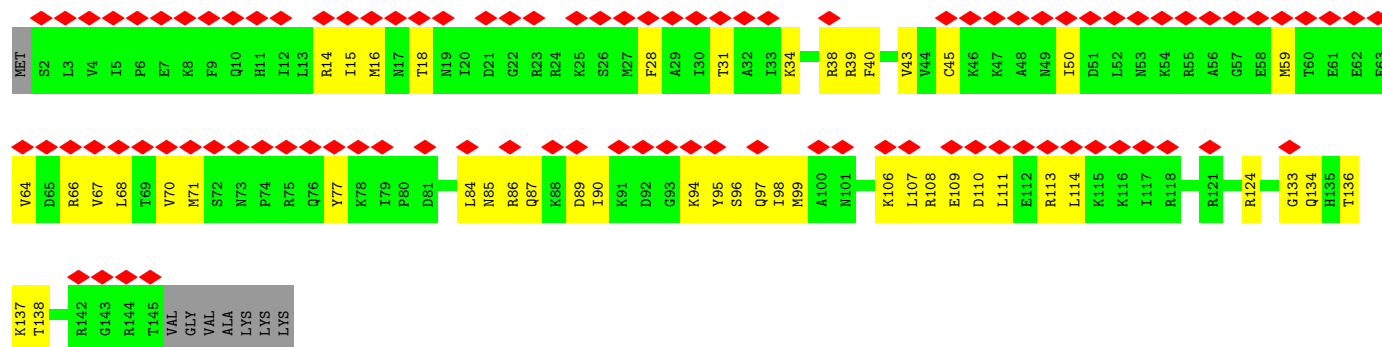
Chain RR: 



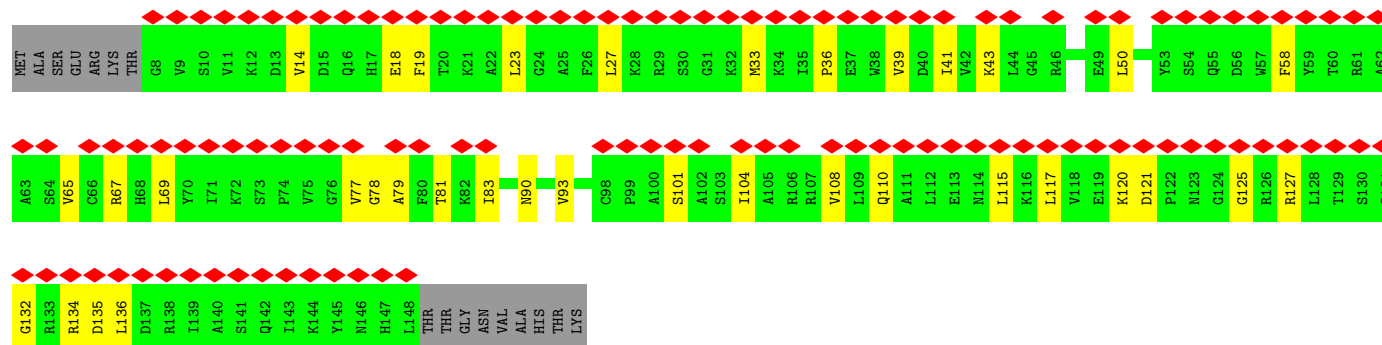
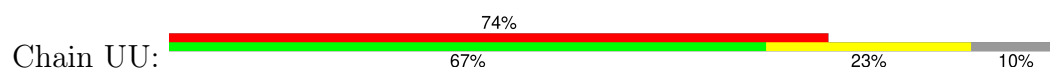
- Molecule 70: Small ribosomal subunit protein eS17



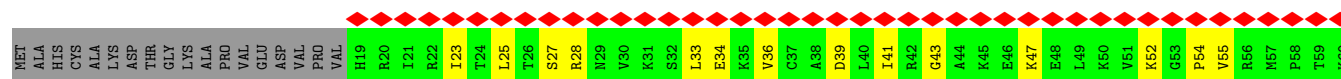
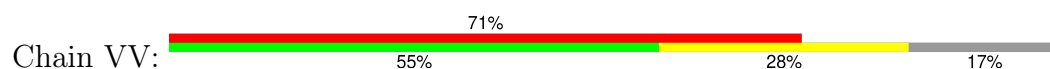
- Molecule 71: Small ribosomal subunit protein uS13

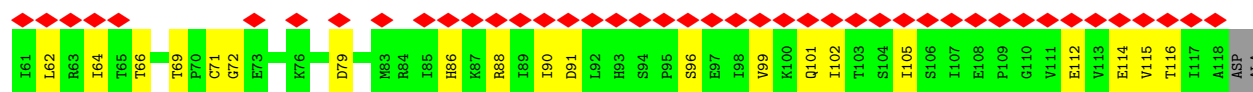


- Molecule 72: 40S ribosomal protein S19

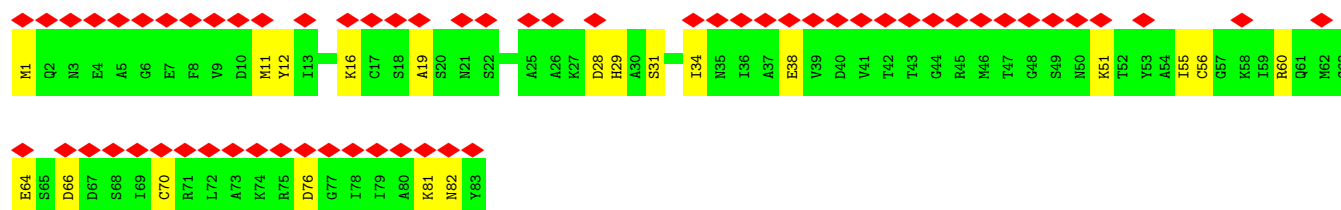
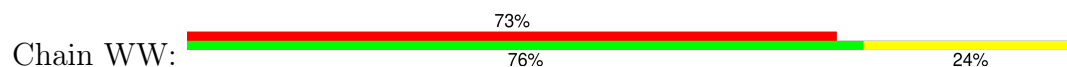


- Molecule 73: Small ribosomal subunit protein uS10

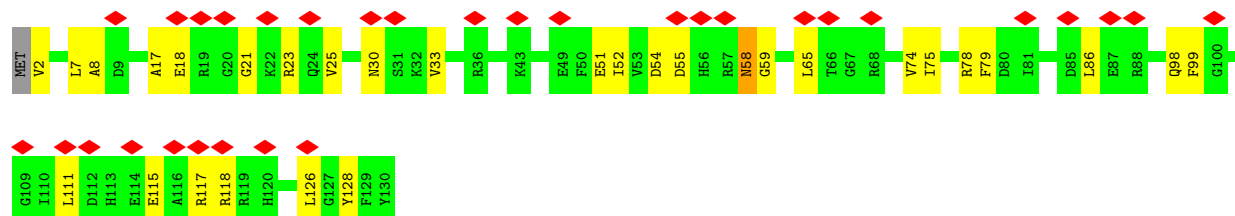
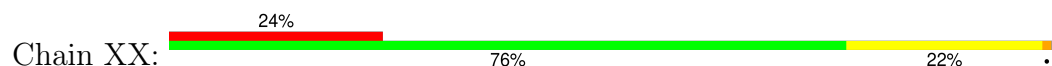




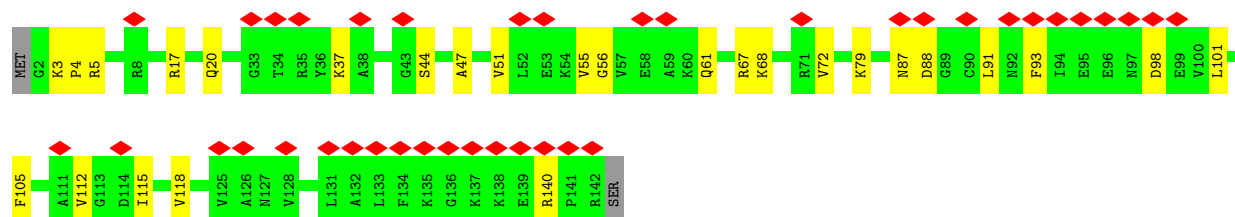
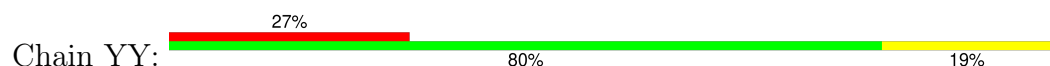
- Molecule 74: 40S ribosomal protein S21



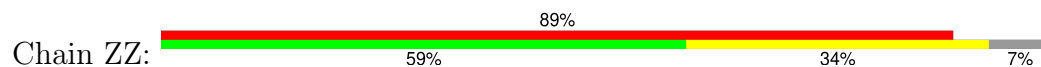
- Molecule 75: 40S ribosomal protein S15a

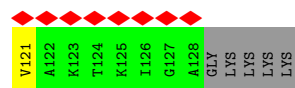


- Molecule 76: Small ribosomal subunit protein uS12

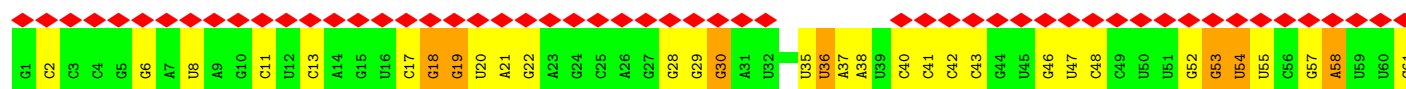
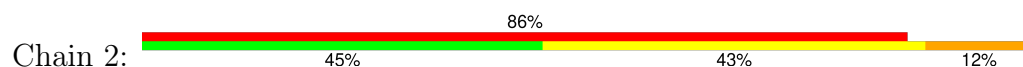


- Molecule 77: 40S ribosomal protein S24

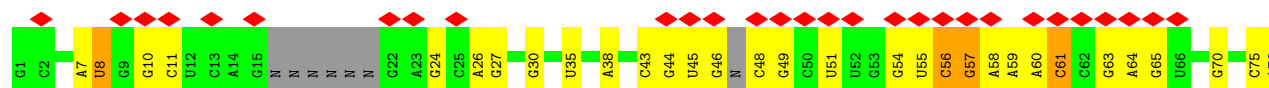
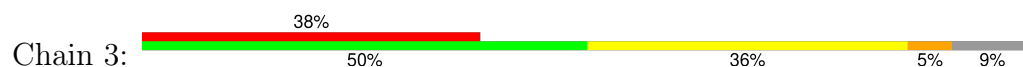




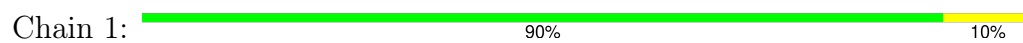
• Molecule 78: tRNA



• Molecule 79: tRNA



• Molecule 80: RNA (5'-R(P*AP*CP*CP*AP*AP*AP*AP*AP*CP*C)-3')



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	15061	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	53	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.343	Depositor
Minimum map value	-0.125	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.013	Depositor
Recommended contour level	0.06	Depositor
Map size (Å)	440.0, 440.0, 440.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1, 1.1, 1.1	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, MG, SPD

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	5	0.22	0/71923	0.30	1/112084 (0.0%)
2	7	0.20	0/2825	0.25	0/4400
3	8	0.26	0/3558	0.36	0/5542
4	A	0.23	0/1940	0.37	0/2598
5	B	0.21	0/3250	0.35	0/4347
6	I	0.18	0/1748	0.29	0/2340
7	P	0.20	0/1259	0.32	0/1684
8	Q	0.22	0/1536	0.34	0/2049
9	V	0.20	0/975	0.35	0/1310
10	a	0.21	0/1221	0.28	0/1632
11	e	0.22	0/1086	0.34	0/1446
12	g	0.19	0/929	0.34	0/1235
13	j	0.20	0/688	0.31	0/906
14	m	0.17	0/434	0.35	0/572
15	o	0.22	0/840	0.37	0/1105
16	p	0.23	0/713	0.39	0/945
17	C	0.23	0/3072	0.38	0/4120
18	D	0.17	0/2440	0.30	0/3268
19	E	0.17	0/1930	0.37	0/2569
20	F	0.21	0/1847	0.34	0/2471
21	G	0.18	0/1910	0.38	0/2569
22	H	0.20	0/1518	0.36	0/2044
23	J	0.22	0/1384	0.41	0/1849
24	L	0.20	0/1755	0.34	0/2333
25	M	0.18	0/1144	0.32	0/1524
26	N	0.24	0/1730	0.39	0/2307
27	O	0.20	0/1673	0.32	0/2231
28	R	0.17	0/1478	0.32	0/1957
29	S	0.23	0/1509	0.40	0/2024
30	T	0.20	0/1314	0.33	0/1755
31	U	0.17	0/822	0.39	0/1104
32	W	0.20	0/538	0.36	0/710

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	X	0.18	0/988	0.30	0/1327
34	Y	0.20	0/1035	0.34	0/1376
35	Z	0.17	0/1150	0.33	0/1526
36	b	0.17	0/658	0.27	0/868
37	c	0.18	0/769	0.33	0/1036
38	d	0.18	0/904	0.33	0/1209
39	f	0.38	0/909	0.45	0/1215
40	h	0.19	0/1028	0.33	0/1355
41	i	0.18	0/862	0.35	0/1134
42	k	0.22	0/550	0.33	0/731
43	l	0.31	0/441	0.44	0/581
44	r	0.25	0/1030	0.42	0/1374
45	n	0.21	0/240	0.33	0/305
46	AA	0.19	0/36945	0.30	0/57581
47	aa	0.17	0/594	0.35	0/798
48	bb	0.17	0/776	0.31	0/1037
49	BB	0.22	0/1748	0.38	0/2374
50	ee	0.16	0/472	0.33	0/629
51	CC	0.19	0/1738	0.37	0/2329
52	cc	0.16	0/649	0.33	0/870
53	DD	0.30	0/1745	0.47	0/2363
54	dd	0.21	0/489	0.39	0/655
55	EE	0.20	0/1466	0.41	0/1963
56	FF	0.19	0/2147	0.37	0/2887
57	ff	0.21	0/344	0.45	0/450
58	GG	0.19	0/1471	0.37	0/1976
59	HH	0.22	0/1910	0.43	0/2543
60	hh	0.18	0/2452	0.36	0/3331
61	II	0.21	0/1533	0.34	0/2055
62	JJ	0.17	0/1695	0.34	0/2260
63	KK	0.22	0/1546	0.43	0/2063
64	LL	0.20	0/780	0.38	0/1055
65	MM	0.20	0/1124	0.35	0/1503
66	OO	0.18	0/1228	0.36	0/1647
67	PP	0.21	0/1027	0.39	1/1379 (0.1%)
68	QQ	0.15	0/1002	0.36	0/1339
69	RR	0.21	0/1155	0.41	0/1548
70	SS	0.17	0/981	0.37	0/1316
71	TT	0.18	0/1203	0.39	0/1605
72	UU	0.26	0/1144	0.46	0/1539
73	VV	0.17	0/808	0.39	0/1085
74	WW	0.18	0/634	0.33	0/849
75	XX	0.19	0/1042	0.33	0/1398

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
76	YY	0.18	0/1128	0.35	0/1506
77	ZZ	0.21	0/1025	0.44	0/1362
78	2	0.12	0/1807	0.29	0/2813
79	3	0.14	0/1646	0.25	0/2560
80	1	0.16	0/237	0.23	0/366
All	All	0.21	0/209244	0.33	2/306101 (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
29	S	0	1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	5	1971	A	O3'-P-O5'	-5.84	95.25	104.00
67	PP	71	PRO	CA-N-CD	-5.10	104.87	112.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
29	S	2	ARG	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	5	64325	0	32573	679	0
2	7	2528	0	1280	20	0
3	8	3185	0	1619	34	0
4	A	1905	0	1994	46	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	3180	0	3330	60	0
6	I	1709	0	1768	23	0
7	P	1234	0	1276	5	0
8	Q	1509	0	1620	34	0
9	V	962	0	1030	18	0
10	a	1188	0	1236	26	0
11	e	1065	0	1148	14	0
12	g	915	0	997	19	0
13	j	675	0	688	15	0
14	m	428	0	463	5	0
15	o	827	0	898	14	0
16	p	704	0	751	22	0
17	C	3012	0	3193	64	0
18	D	2393	0	2451	41	0
19	E	1897	0	2076	42	0
20	F	1807	0	1892	20	0
21	G	1878	0	1994	30	0
22	H	1494	0	1558	26	0
23	J	1363	0	1411	27	0
24	L	1726	0	1857	40	0
25	M	1128	0	1209	21	0
26	N	1691	0	1778	32	0
27	O	1640	0	1769	38	0
28	R	1461	0	1609	24	0
29	S	1471	0	1514	35	0
30	T	1288	0	1371	29	0
31	U	807	0	836	16	0
32	W	527	0	564	10	0
33	X	972	0	1018	18	0
34	Y	1022	0	1109	26	0
35	Z	1130	0	1208	18	0
36	b	647	0	685	9	0
37	c	758	0	789	14	0
38	d	888	0	954	16	0
39	f	889	0	950	12	0
40	h	1019	0	1160	19	0
41	i	853	0	949	9	0
42	k	543	0	596	10	0
43	l	432	0	470	11	0
44	r	1014	0	1101	22	0
45	n	239	0	289	2	0
46	AA	33027	0	16686	521	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
47	aa	586	0	627	18	0
48	bb	766	0	813	23	0
49	BB	1710	0	1707	57	0
50	ee	459	0	443	16	0
51	CC	1711	0	1806	46	0
52	cc	638	0	672	13	0
53	DD	1707	0	1771	49	0
54	dd	487	0	511	21	0
55	EE	1448	0	1530	63	0
56	FF	2103	0	2223	65	0
57	ff	342	0	377	13	0
58	GG	1451	0	1511	41	0
59	HH	1885	0	2031	57	0
60	hh	2394	0	2332	70	0
61	II	1509	0	1621	36	0
62	JJ	1670	0	1768	33	0
63	KK	1522	0	1634	59	0
64	LL	758	0	765	27	0
65	MM	1106	0	1162	24	0
66	OO	1204	0	1299	21	0
67	PP	1014	0	1044	27	0
68	QQ	983	0	1042	23	0
69	RR	1136	0	1205	38	0
70	SS	970	0	1019	28	0
71	TT	1186	0	1240	38	0
72	UU	1120	0	1144	31	0
73	VV	798	0	866	25	0
74	WW	629	0	631	20	0
75	XX	1026	0	1048	27	0
76	YY	1109	0	1175	20	0
77	ZZ	1008	0	1080	39	0
78	2	1619	0	819	21	0
79	3	1475	0	749	22	0
80	1	212	0	111	1	0
81	2	1	0	0	0	0
81	5	138	0	0	0	0
81	7	4	0	0	0	0
81	8	3	0	0	0	0
81	AA	56	0	0	0	0
81	B	1	0	0	0	0
81	V	1	0	0	0	0
81	e	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
82	5	10	0	19	1	0
83	bb	1	0	0	0	0
83	ee	1	0	0	0	0
83	g	1	0	0	0	0
83	j	1	0	0	0	0
83	m	1	0	0	0	0
83	o	1	0	0	0	0
83	p	1	0	0	0	0
All	All	195318	0	147512	2785	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

The worst 5 of 2785 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
46:AA:1560:G:N2	67:PP:138:ASP:OD1	1.92	1.01
67:PP:53:ILE:HD13	67:PP:90:ILE:HD11	1.43	1.00
74:WW:51:LYS:NZ	74:WW:76:ASP:OD2	1.93	1.00
1:5:4765:U:O2'	1:5:4767:G:OP1	1.77	0.99
27:O:24:VAL:HG13	27:O:34:MET:HE1	1.43	0.99

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	A	246/259 (95%)	225 (92%)	21 (8%)	0	100	100
5	B	392/402 (98%)	369 (94%)	23 (6%)	0	100	100
6	I	206/219 (94%)	201 (98%)	5 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	P	149/186 (80%)	143 (96%)	6 (4%)	0	100	100
8	Q	184/187 (98%)	174 (95%)	10 (5%)	0	100	100
9	V	128/140 (91%)	125 (98%)	3 (2%)	0	100	100
10	a	146/149 (98%)	137 (94%)	9 (6%)	0	100	100
11	e	125/133 (94%)	120 (96%)	5 (4%)	0	100	100
12	g	110/113 (97%)	105 (96%)	5 (4%)	0	100	100
13	j	79/101 (78%)	75 (95%)	4 (5%)	0	100	100
14	m	50/128 (39%)	49 (98%)	1 (2%)	0	100	100
15	o	99/106 (93%)	95 (96%)	4 (4%)	0	100	100
16	p	89/92 (97%)	76 (85%)	13 (15%)	0	100	100
17	C	371/488 (76%)	338 (91%)	33 (9%)	0	100	100
18	D	291/296 (98%)	281 (97%)	10 (3%)	0	100	100
19	E	226/277 (82%)	207 (92%)	19 (8%)	0	100	100
20	F	214/343 (62%)	207 (97%)	7 (3%)	0	100	100
21	G	228/265 (86%)	217 (95%)	11 (5%)	0	100	100
22	H	185/187 (99%)	178 (96%)	7 (4%)	0	100	100
23	J	166/180 (92%)	160 (96%)	6 (4%)	0	100	100
24	L	208/211 (99%)	201 (97%)	7 (3%)	0	100	100
25	M	136/153 (89%)	134 (98%)	2 (2%)	0	100	100
26	N	201/204 (98%)	186 (92%)	15 (8%)	0	100	100
27	O	199/203 (98%)	189 (95%)	10 (5%)	0	100	100
28	R	172/196 (88%)	163 (95%)	9 (5%)	0	100	100
29	S	174/176 (99%)	163 (94%)	11 (6%)	0	100	100
30	T	157/160 (98%)	146 (93%)	11 (7%)	0	100	100
31	U	95/136 (70%)	90 (95%)	5 (5%)	0	100	100
32	W	61/158 (39%)	60 (98%)	1 (2%)	0	100	100
33	X	116/201 (58%)	114 (98%)	2 (2%)	0	100	100
34	Y	121/143 (85%)	116 (96%)	5 (4%)	0	100	100
35	Z	133/136 (98%)	123 (92%)	10 (8%)	0	100	100
36	b	74/91 (81%)	71 (96%)	3 (4%)	0	100	100
37	c	96/116 (83%)	94 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
38	d	105/121 (87%)	102 (97%)	3 (3%)	0	100	100
39	f	108/132 (82%)	105 (97%)	3 (3%)	0	100	100
40	h	120/123 (98%)	117 (98%)	3 (2%)	0	100	100
41	i	101/114 (89%)	95 (94%)	6 (6%)	0	100	100
42	k	64/103 (62%)	58 (91%)	6 (9%)	0	100	100
43	l	48/51 (94%)	43 (90%)	5 (10%)	0	100	100
44	r	122/134 (91%)	117 (96%)	5 (4%)	0	100	100
45	n	23/25 (92%)	23 (100%)	0	0	100	100
47	aa	70/118 (59%)	64 (91%)	6 (9%)	0	100	100
48	bb	94/118 (80%)	87 (93%)	7 (7%)	0	100	100
49	BB	214/300 (71%)	202 (94%)	12 (6%)	0	100	100
50	ee	53/56 (95%)	52 (98%)	1 (2%)	0	100	100
51	CC	211/264 (80%)	204 (97%)	7 (3%)	0	100	100
52	cc	80/84 (95%)	76 (95%)	4 (5%)	0	100	100
53	DD	219/277 (79%)	213 (97%)	6 (3%)	0	100	100
54	dd	60/67 (90%)	58 (97%)	2 (3%)	0	100	100
55	EE	180/241 (75%)	166 (92%)	14 (8%)	0	100	100
56	FF	259/263 (98%)	246 (95%)	12 (5%)	1 (0%)	30	61
57	ff	40/176 (23%)	32 (80%)	8 (20%)	0	100	100
58	GG	178/204 (87%)	171 (96%)	7 (4%)	0	100	100
59	HH	228/808 (28%)	213 (93%)	15 (7%)	0	100	100
60	hh	305/317 (96%)	273 (90%)	32 (10%)	0	100	100
61	II	180/193 (93%)	167 (93%)	13 (7%)	0	100	100
62	JJ	204/208 (98%)	190 (93%)	14 (7%)	0	100	100
63	KK	182/191 (95%)	164 (90%)	18 (10%)	0	100	100
64	LL	88/156 (56%)	84 (96%)	4 (4%)	0	100	100
65	MM	131/157 (83%)	130 (99%)	1 (1%)	0	100	100
66	OO	147/151 (97%)	143 (97%)	4 (3%)	0	100	100
67	PP	134/151 (89%)	126 (94%)	8 (6%)	0	100	100
68	QQ	120/152 (79%)	115 (96%)	5 (4%)	0	100	100
69	RR	140/148 (95%)	133 (95%)	7 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
70	SS	119/136 (88%)	115 (97%)	4 (3%)	0	100	100
71	TT	142/152 (93%)	126 (89%)	16 (11%)	0	100	100
72	UU	139/157 (88%)	132 (95%)	7 (5%)	0	100	100
73	VV	98/120 (82%)	92 (94%)	6 (6%)	0	100	100
74	WW	81/83 (98%)	77 (95%)	4 (5%)	0	100	100
75	XX	127/130 (98%)	122 (96%)	5 (4%)	0	100	100
76	YY	139/143 (97%)	130 (94%)	9 (6%)	0	100	100
77	ZZ	122/133 (92%)	109 (89%)	13 (11%)	0	100	100
All	All	10802/13192 (82%)	10204 (94%)	597 (6%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
56	FF	172	GLU

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	A	192/202 (95%)	192 (100%)	0	100	100
5	B	338/345 (98%)	338 (100%)	0	100	100
6	I	179/185 (97%)	179 (100%)	0	100	100
7	P	131/164 (80%)	131 (100%)	0	100	100
8	Q	165/166 (99%)	165 (100%)	0	100	100
9	V	100/106 (94%)	100 (100%)	0	100	100
10	a	121/122 (99%)	121 (100%)	0	100	100
11	e	116/122 (95%)	116 (100%)	0	100	100
12	g	100/101 (99%)	100 (100%)	0	100	100
13	j	71/85 (84%)	71 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
14	m	48/112 (43%)	48 (100%)	0	100	100
15	o	88/93 (95%)	88 (100%)	0	100	100
16	p	73/74 (99%)	73 (100%)	0	100	100
17	C	325/413 (79%)	325 (100%)	0	100	100
18	D	251/254 (99%)	251 (100%)	0	100	100
19	E	208/251 (83%)	208 (100%)	0	100	100
20	F	188/286 (66%)	188 (100%)	0	100	100
21	G	204/233 (88%)	204 (100%)	0	100	100
22	H	166/166 (100%)	166 (100%)	0	100	100
23	J	144/155 (93%)	144 (100%)	0	100	100
24	L	181/182 (100%)	181 (100%)	0	100	100
25	M	119/134 (89%)	119 (100%)	0	100	100
26	N	173/174 (99%)	173 (100%)	0	100	100
27	O	171/173 (99%)	171 (100%)	0	100	100
28	R	154/172 (90%)	154 (100%)	0	100	100
29	S	155/155 (100%)	155 (100%)	0	100	100
30	T	138/139 (99%)	138 (100%)	0	100	100
31	U	90/124 (73%)	90 (100%)	0	100	100
32	W	57/133 (43%)	57 (100%)	0	100	100
33	X	108/175 (62%)	108 (100%)	0	100	100
34	Y	116/133 (87%)	116 (100%)	0	100	100
35	Z	120/121 (99%)	120 (100%)	0	100	100
36	b	67/79 (85%)	67 (100%)	0	100	100
37	c	82/100 (82%)	82 (100%)	0	100	100
38	d	101/115 (88%)	101 (100%)	0	100	100
39	f	89/106 (84%)	85 (96%)	4 (4%)	24	56
40	h	110/111 (99%)	110 (100%)	0	100	100
41	i	93/98 (95%)	93 (100%)	0	100	100
42	k	62/97 (64%)	62 (100%)	0	100	100
43	l	45/46 (98%)	45 (100%)	0	100	100
44	r	110/118 (93%)	110 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
45	n	24/24 (100%)	24 (100%)	0	100	100
47	aa	66/101 (65%)	66 (100%)	0	100	100
48	bb	82/98 (84%)	82 (100%)	0	100	100
49	BB	182/239 (76%)	182 (100%)	0	100	100
50	ee	49/50 (98%)	49 (100%)	0	100	100
51	CC	190/230 (83%)	190 (100%)	0	100	100
52	cc	74/76 (97%)	74 (100%)	0	100	100
53	DD	181/212 (85%)	181 (100%)	0	100	100
54	dd	54/59 (92%)	54 (100%)	0	100	100
55	EE	157/207 (76%)	157 (100%)	0	100	100
56	FF	227/228 (100%)	227 (100%)	0	100	100
57	ff	35/151 (23%)	35 (100%)	0	100	100
58	GG	159/174 (91%)	159 (100%)	0	100	100
59	HH	203/605 (34%)	203 (100%)	0	100	100
60	hh	267/275 (97%)	267 (100%)	0	100	100
61	II	169/178 (95%)	169 (100%)	0	100	100
62	JJ	175/177 (99%)	175 (100%)	0	100	100
63	KK	162/168 (96%)	162 (100%)	0	100	100
64	LL	81/130 (62%)	81 (100%)	0	100	100
65	MM	125/145 (86%)	125 (100%)	0	100	100
66	OO	132/133 (99%)	132 (100%)	0	100	100
67	PP	104/117 (89%)	104 (100%)	0	100	100
68	QQ	106/134 (79%)	106 (100%)	0	100	100
69	RR	117/122 (96%)	117 (100%)	0	100	100
70	SS	107/119 (90%)	107 (100%)	0	100	100
71	TT	126/132 (96%)	126 (100%)	0	100	100
72	UU	118/131 (90%)	118 (100%)	0	100	100
73	VV	92/107 (86%)	92 (100%)	0	100	100
74	WW	68/68 (100%)	68 (100%)	0	100	100
75	XX	111/112 (99%)	110 (99%)	1 (1%)	70	80
76	YY	115/117 (98%)	115 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
77	ZZ	105/112 (94%)	105 (100%)	0	100	100
All	All	9512/11251 (84%)	9507 (100%)	5 (0%)	87	90

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
39	f	82	ILE
39	f	85	THR
39	f	86	LYS
39	f	91	ILE
75	XX	58	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 87 such sidechains are listed below:

Mol	Chain	Res	Type
57	ff	154	GLN
64	LL	81	HIS
58	GG	118	ASN
62	JJ	84	ASN
68	QQ	89	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	5	2961/5185 (57%)	457 (15%)	50 (1%)
2	7	118/119 (99%)	8 (6%)	0
3	8	146/161 (90%)	19 (13%)	2 (1%)
46	AA	1523/2985 (51%)	268 (17%)	27 (1%)
78	2	75/76 (98%)	26 (34%)	1 (1%)
79	3	66/76 (86%)	7 (10%)	0
80	1	9/10 (90%)	0	0
All	All	4898/8612 (56%)	785 (16%)	80 (1%)

5 of 785 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	5	13	U
1	5	39	A
1	5	42	A

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Mol	Chain	Res	Type
1	5	48	C
1	5	58	G

5 of 80 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
46	AA	710	A
46	AA	1932	U
46	AA	793	C
46	AA	1469	U
46	AA	2519	G

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 213 ligands modelled in this entry, 212 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	$\# Z > 2$
82	SPD	5	5334	-	9,9,9	0.32	0	8,8,8	0.60	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
82	SPD	5	5334	-	-	2/7/7/7	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
82	5	5334	SPD	C2-C3-C4-C5
82	5	5334	SPD	C3-C4-C5-N6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
82	5	5334	SPD	1	0

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.

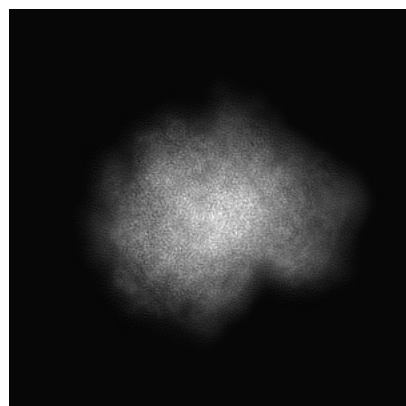
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-48061. These allow visual inspection of the internal detail of the map and identification of artifacts.

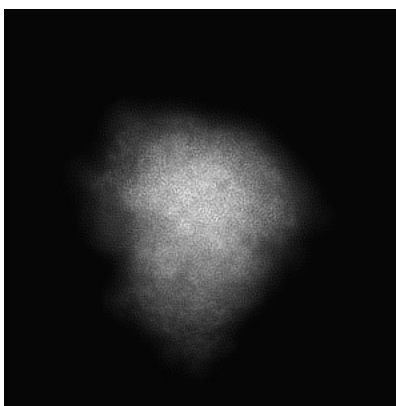
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

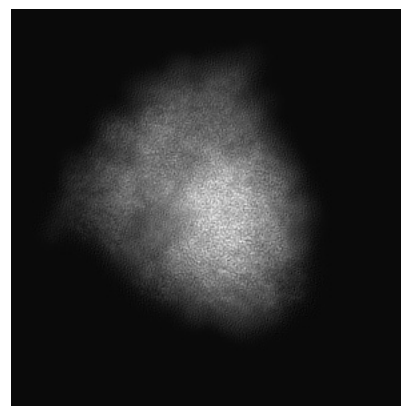
6.1.1 Primary map



X

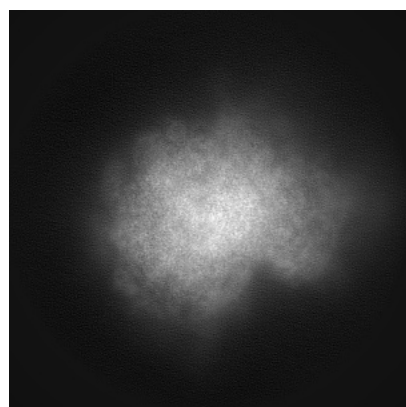


Y

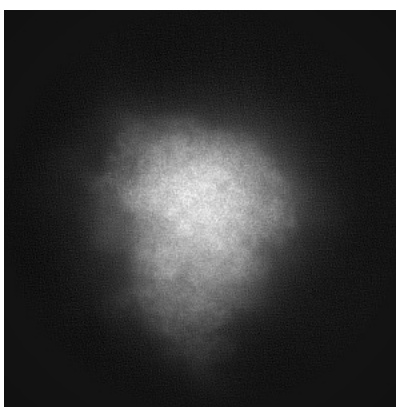


Z

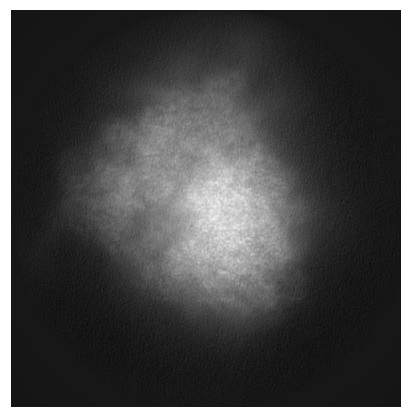
6.1.2 Raw map



X



Y

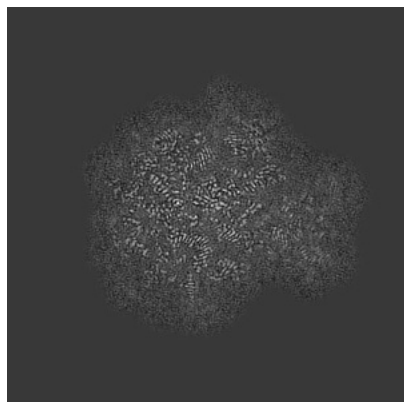


Z

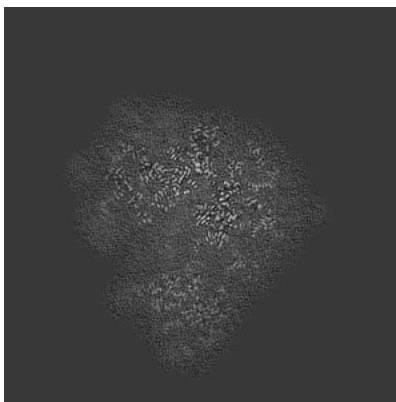
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

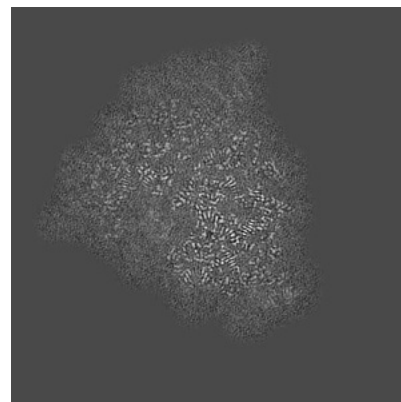
6.2.1 Primary map



X Index: 200

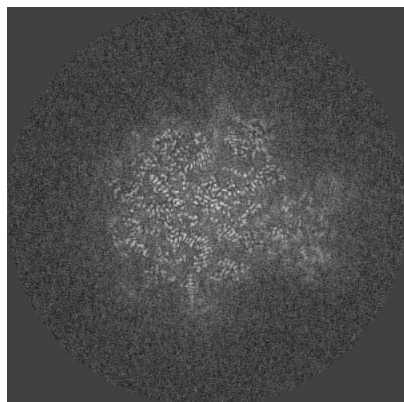


Y Index: 200

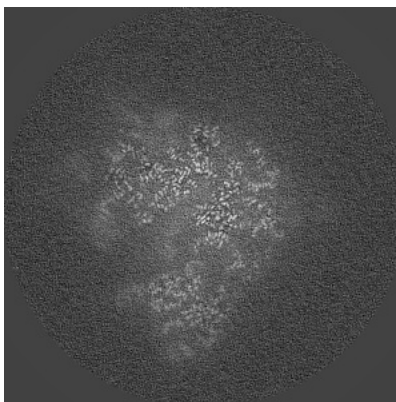


Z Index: 200

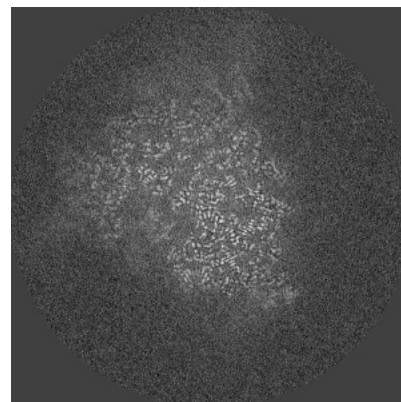
6.2.2 Raw map



X Index: 200



Y Index: 200

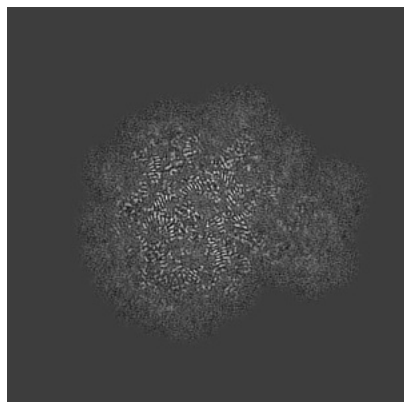


Z Index: 200

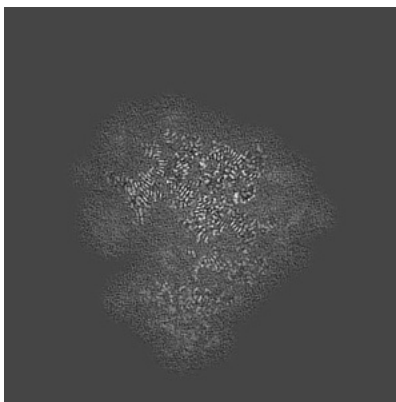
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

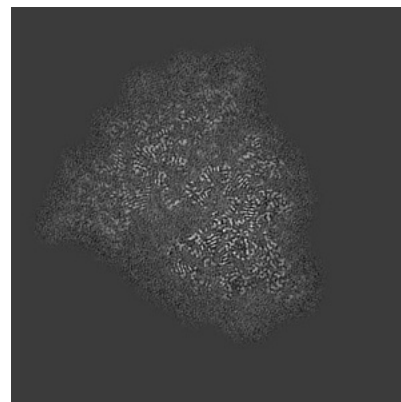
6.3.1 Primary map



X Index: 214

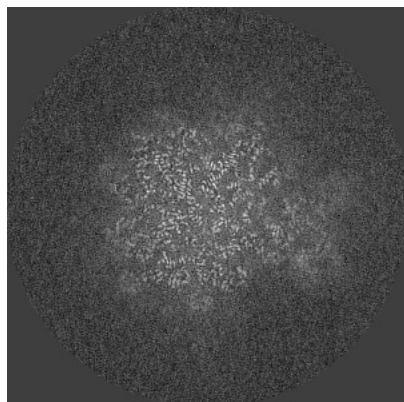


Y Index: 212

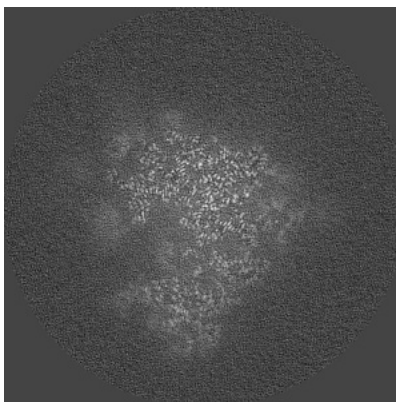


Z Index: 191

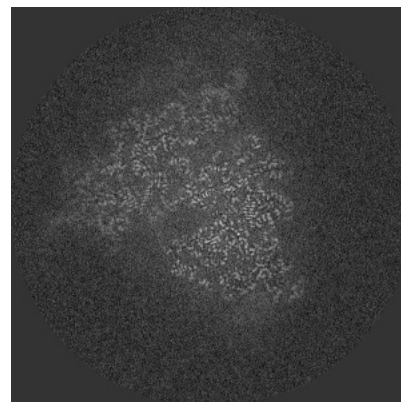
6.3.2 Raw map



X Index: 207



Y Index: 209

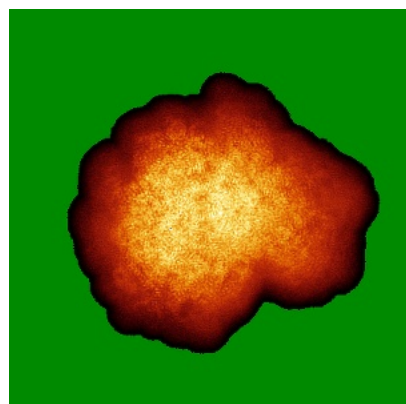


Z Index: 192

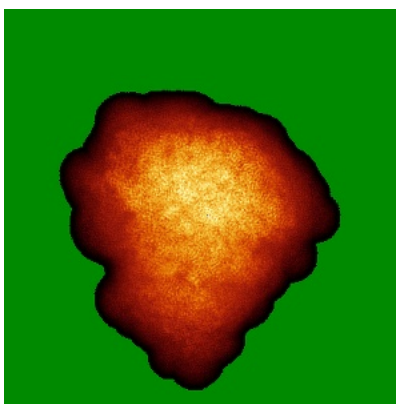
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

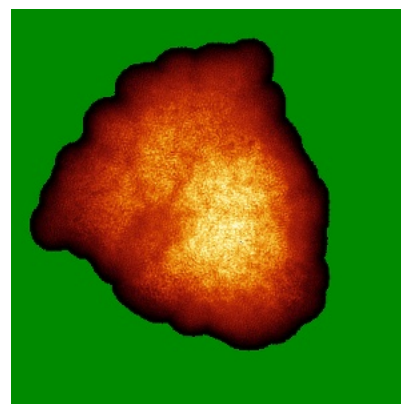
6.4.1 Primary map



X

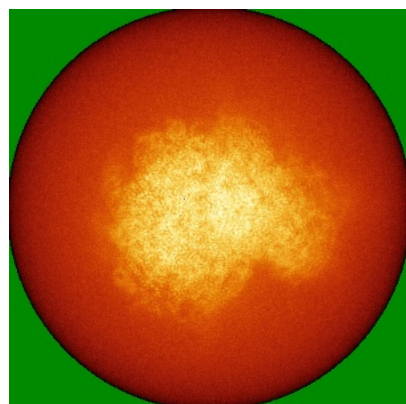


Y

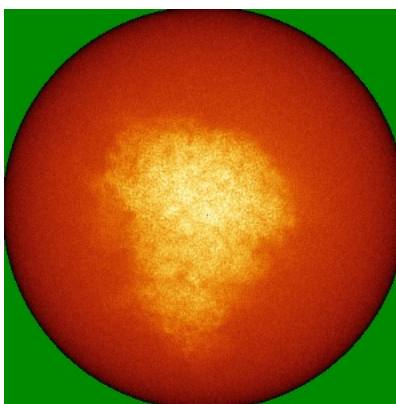


Z

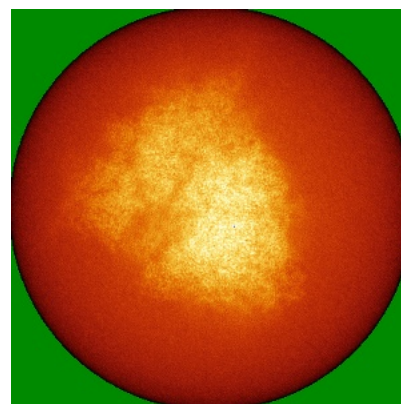
6.4.2 Raw map



X



Y

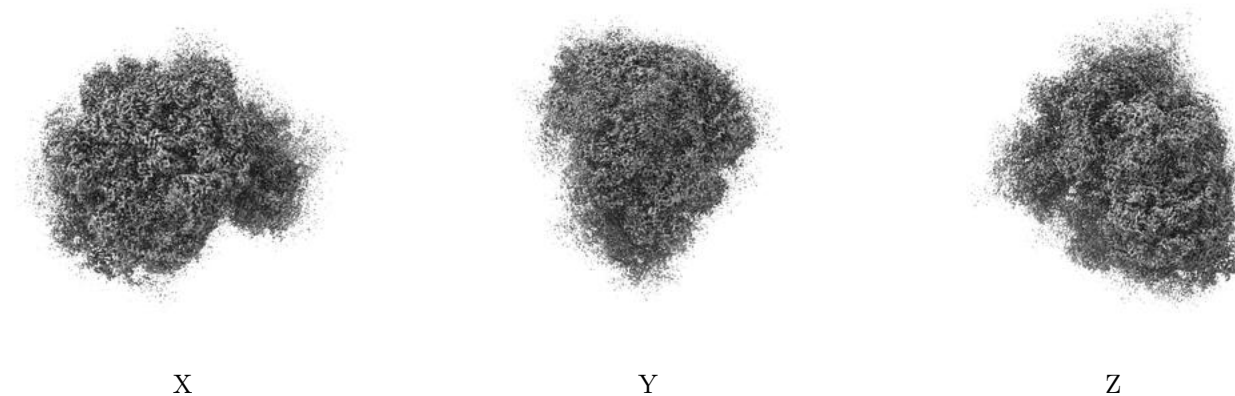


Z

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

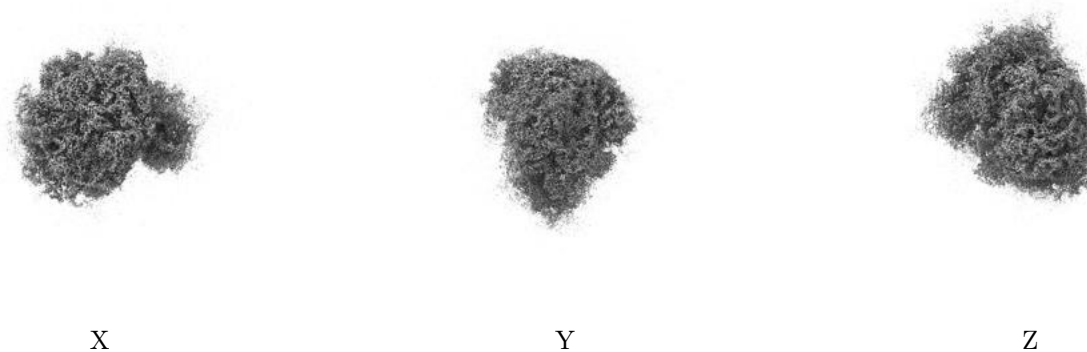
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.06. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

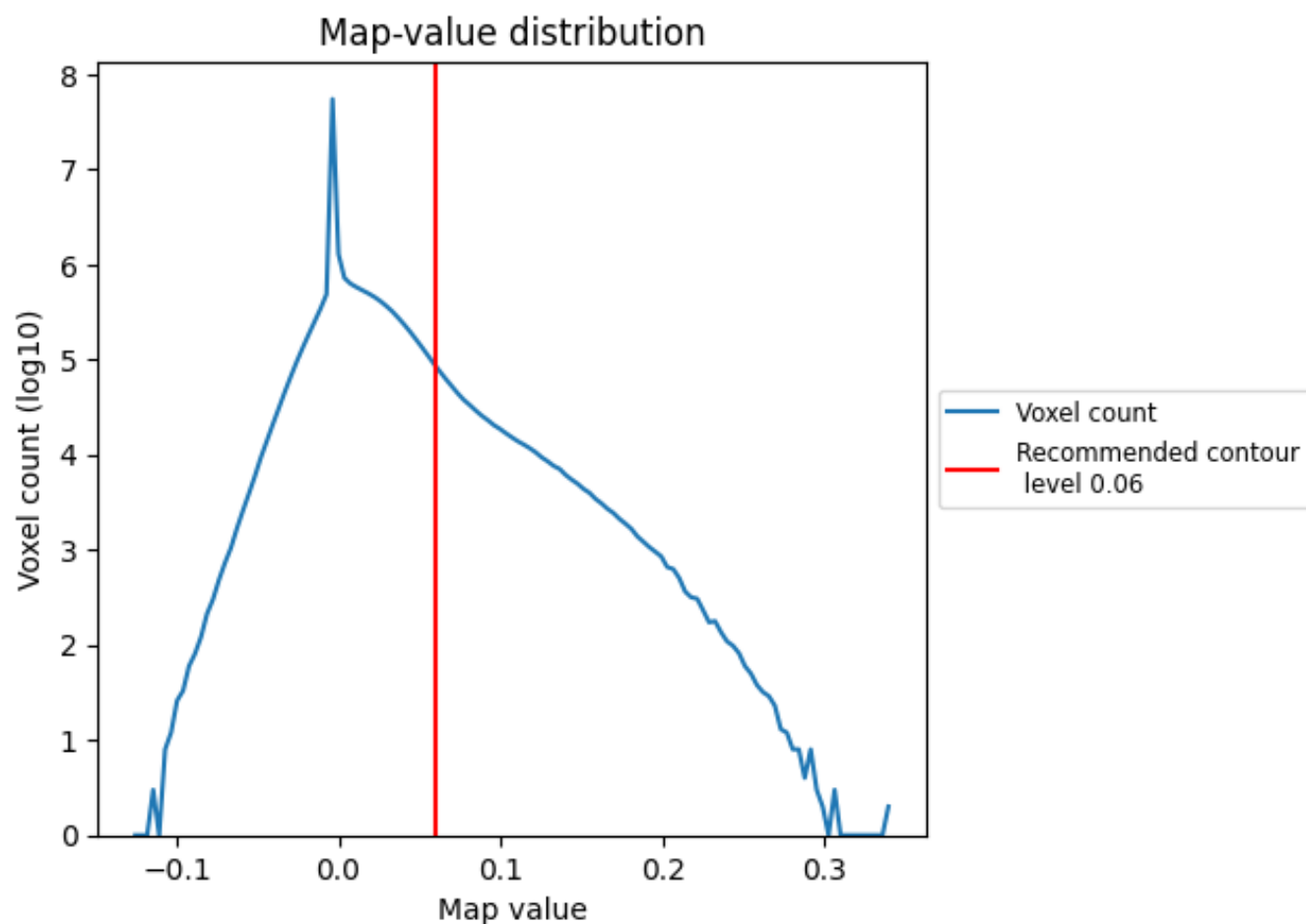
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

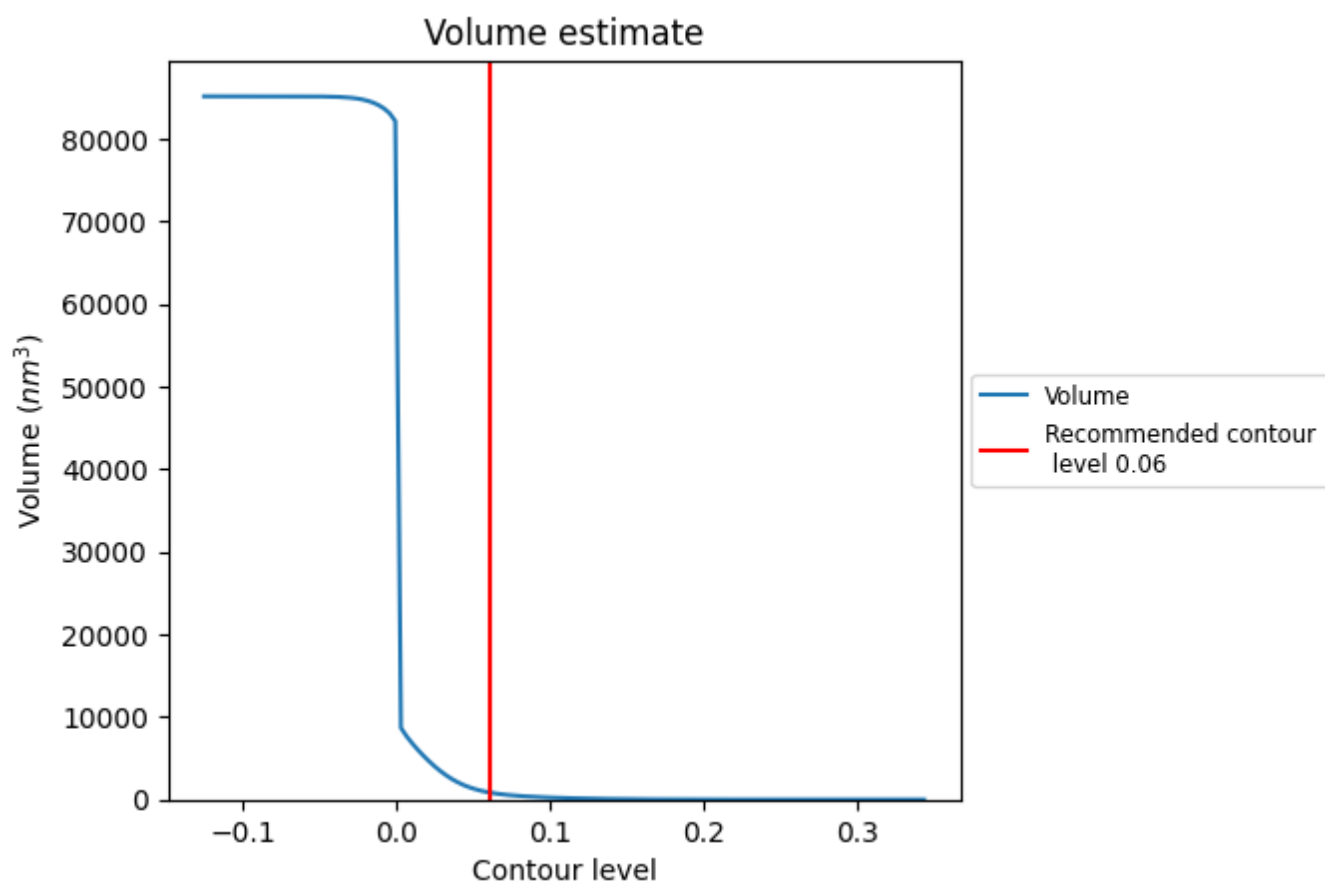
This section contains the results of statistical analysis of the map.

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.

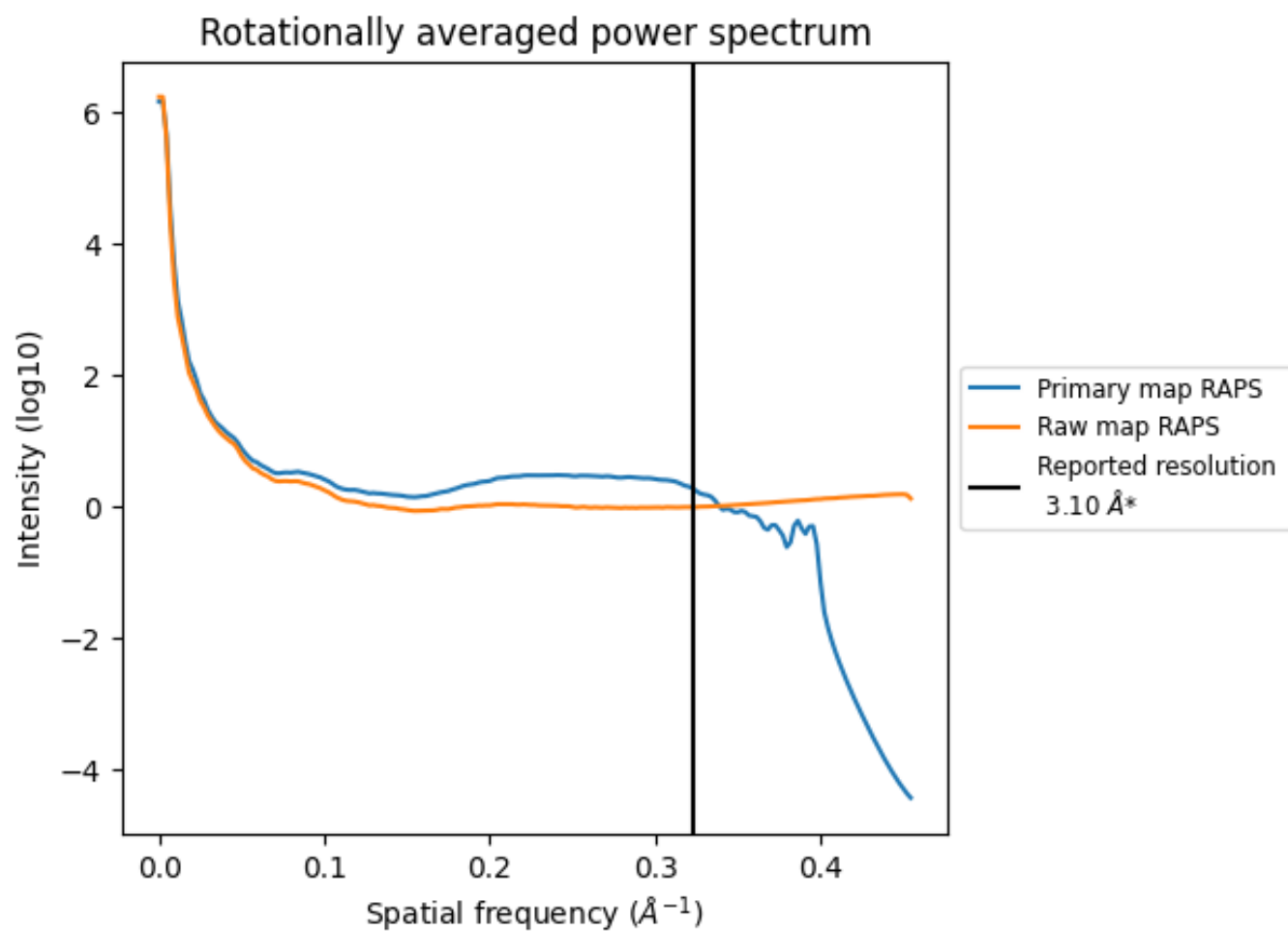
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 867 nm^3 ; this corresponds to an approximate mass of 783 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 ⓘ

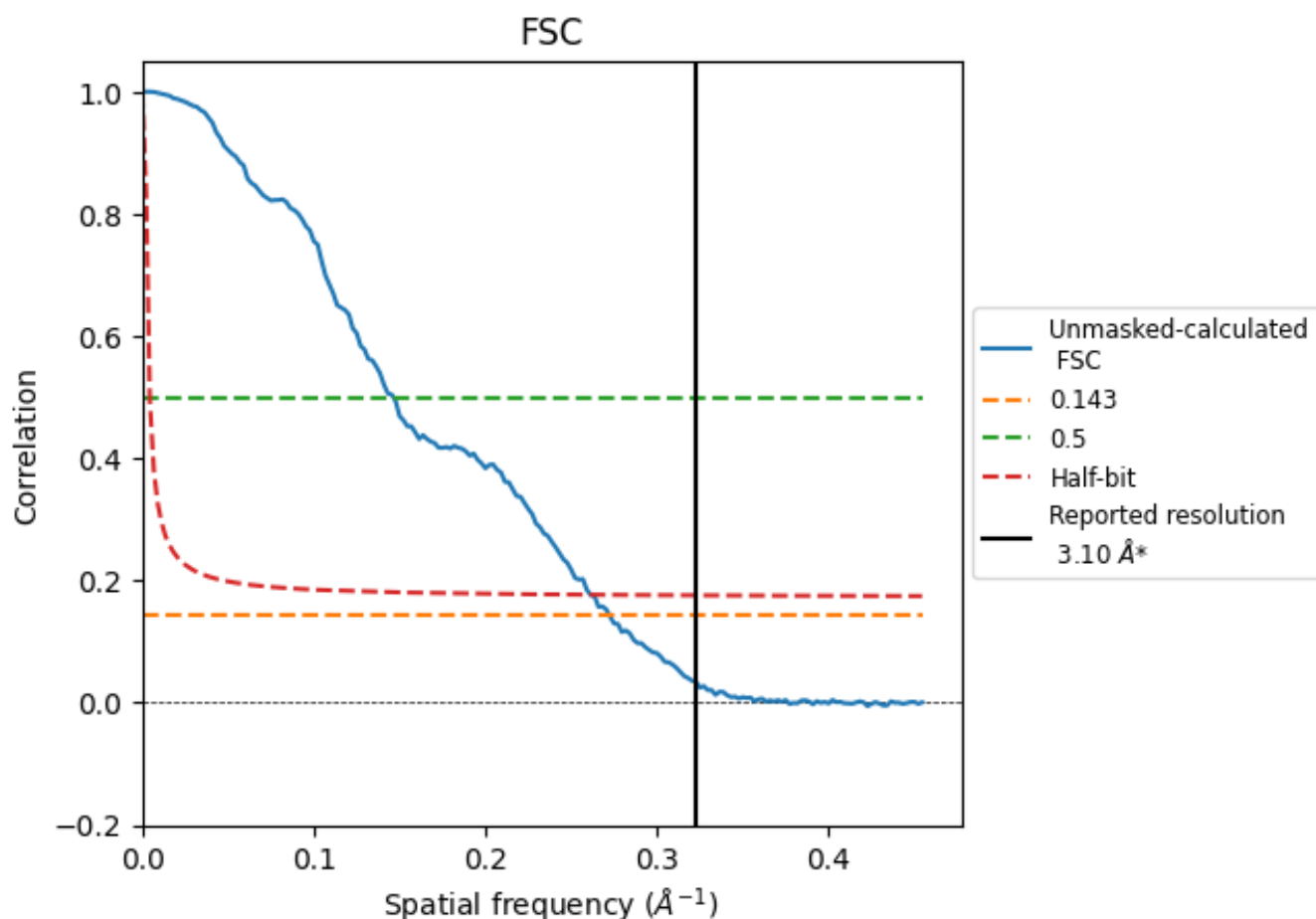


*Reported resolution corresponds to spatial frequency of $0.323 \text{ \AA}^{-1}$

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 0.323 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

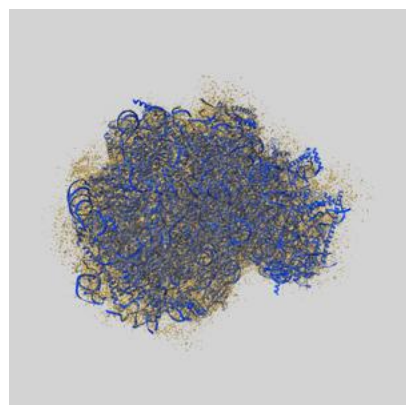
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.10	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.67	6.84	3.83

*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 3.67 differs from the reported value 3.1 by more than 10 %

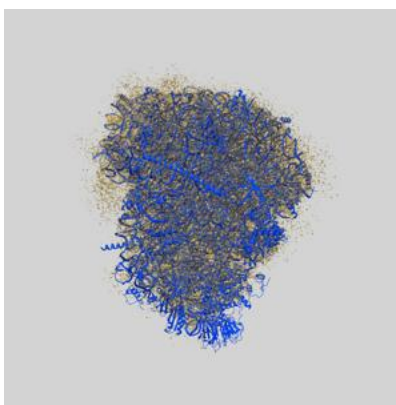
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-48061 and PDB model 9EHO. Per-residue inclusion information can be found in [section 3](#) on [page 21](#).

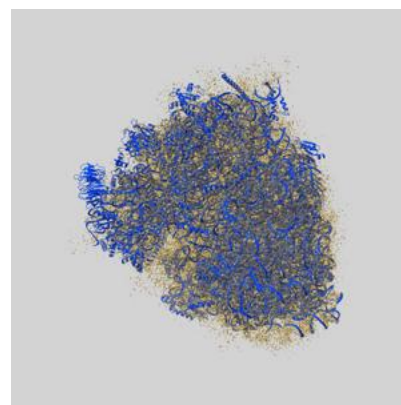
9.1 Map-model overlay [i](#)



X



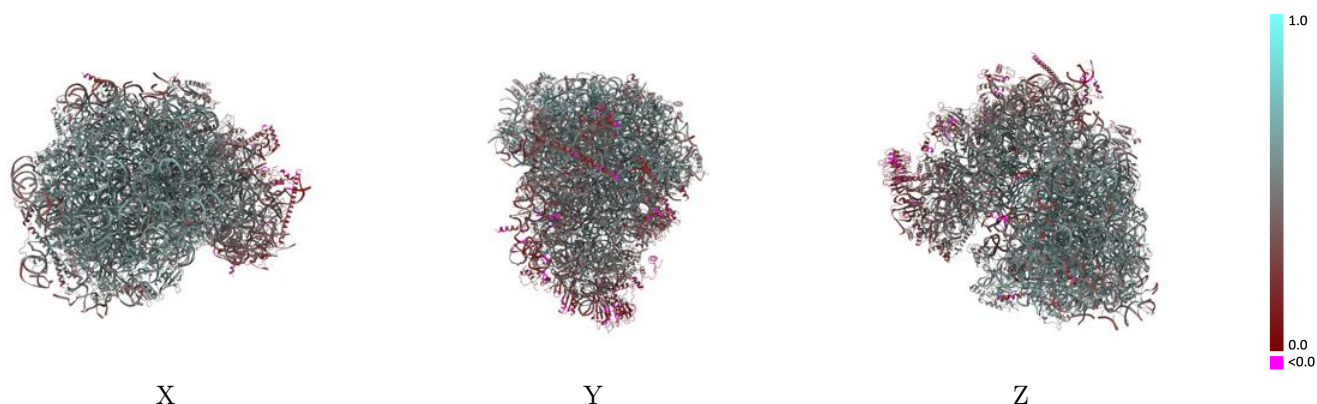
Y



Z

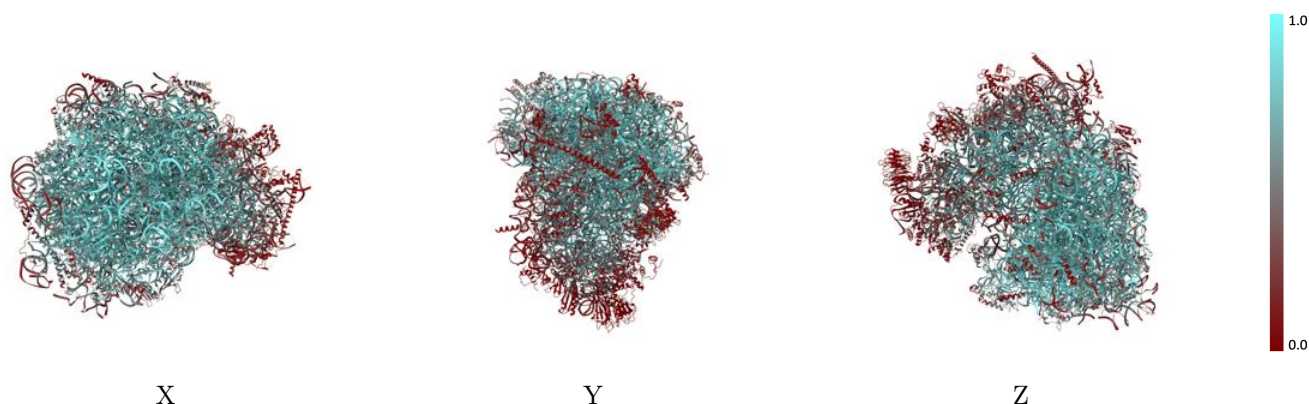
The images above show the 3D surface view of the map at the recommended contour level 0.06 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



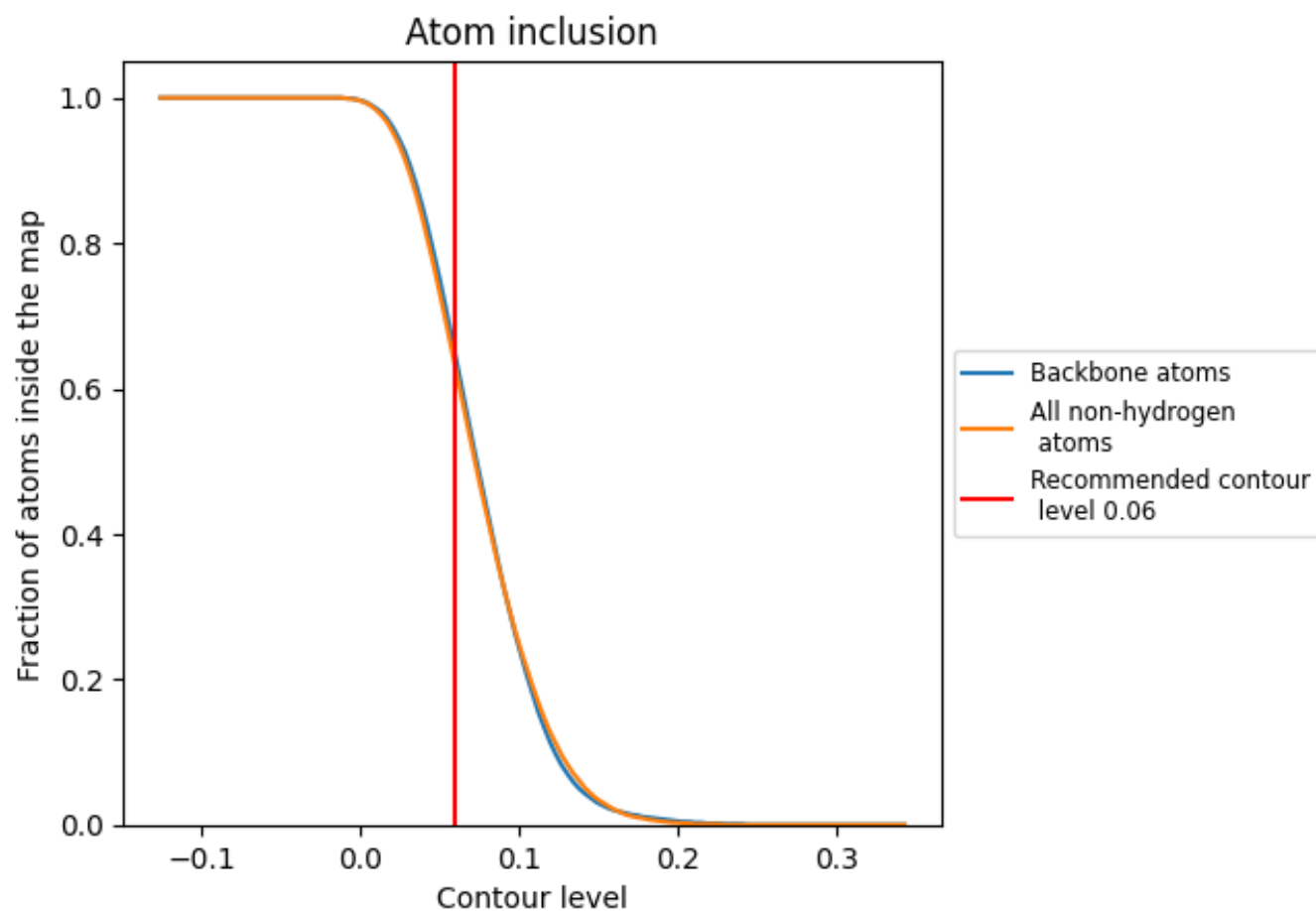
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.06).

9.4 Atom inclusion [i](#)



At the recommended contour level, 65% of all backbone atoms, 63% 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 (0.06) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6310	 0.4920
1	 0.7920	 0.5080
2	 0.2380	 0.2840
3	 0.5100	 0.3850
5	 0.8220	 0.5570
7	 0.8050	 0.5730
8	 0.7890	 0.5370
A	 0.8180	 0.5670
AA	 0.6010	 0.4540
B	 0.7270	 0.5610
BB	 0.2350	 0.3900
C	 0.7070	 0.5390
CC	 0.3800	 0.4440
D	 0.4980	 0.4960
DD	 0.4430	 0.4550
E	 0.4230	 0.4600
EE	 0.1870	 0.3270
F	 0.7820	 0.5710
FF	 0.2640	 0.3780
G	 0.4280	 0.4450
GG	 0.2770	 0.3880
H	 0.5640	 0.5220
HH	 0.1500	 0.3020
I	 0.7230	 0.5520
II	 0.1140	 0.2910
J	 0.4550	 0.4660
JJ	 0.3170	 0.3530
KK	 0.2300	 0.3430
L	 0.6120	 0.4980
LL	 0.0720	 0.2830
M	 0.5630	 0.5040
MM	 0.5050	 0.4570
N	 0.8660	 0.5790
O	 0.7180	 0.5410
OO	 0.4560	 0.4500



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Chain	Atom inclusion	Q-score
P	 0.7730	 0.5670
PP	 0.4960	 0.4420
Q	 0.7890	 0.5720
QQ	 0.2290	 0.3720
R	 0.6570	 0.5150
RR	 0.2090	 0.3470
S	 0.7240	 0.5560
SS	 0.1360	 0.2790
T	 0.7450	 0.5580
TT	 0.3190	 0.4070
U	 0.1700	 0.3790
UU	 0.2150	 0.3520
V	 0.7290	 0.5550
VV	 0.1650	 0.2890
W	 0.6850	 0.5370
WW	 0.2970	 0.4010
X	 0.6180	 0.5120
XX	 0.5360	 0.4730
Y	 0.6320	 0.5180
YY	 0.5730	 0.4760
Z	 0.4480	 0.4720
ZZ	 0.1170	 0.2890
a	 0.7910	 0.5740
aa	 0.1520	 0.3490
b	 0.5700	 0.4980
bb	 0.5860	 0.4810
c	 0.5130	 0.4720
cc	 0.2280	 0.3880
d	 0.6390	 0.5220
dd	 0.1920	 0.3300
e	 0.7870	 0.5700
ee	 0.3510	 0.4180
f	 0.7920	 0.5670
ff	 0.2520	 0.3460
g	 0.6930	 0.5150
h	 0.5690	 0.5100
hh	 0.0050	 0.1670
i	 0.5300	 0.4580
j	 0.8750	 0.5850
k	 0.3160	 0.4210
l	 0.7750	 0.5410
m	 0.6780	 0.5330

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Chain	Atom inclusion	Q-score
n	 0.8170	 0.5310
o	 0.7660	 0.5680
p	 0.7680	 0.5560
r	 0.6530	 0.5300