wwPDB EM Validation Summary Report (i)

Nov 7, 2026 – 01:26 pm GMT

PDB ID	:	32PB / pdb_000032pb
EMDB ID	:	EMD-59044
Title	:	Structural characterization of hibernating ribosomes in the Gram-negative pathogen Pseudomonas aeruginosa without bS21
Authors	:	Vasanthakrishnan, R.K.B.S.; Olivier, D.; Sophie, C.; Yann, L.C.; Sylvie, G.D.; Sassi, M.; Emmanuel, G.; Reynald, G.
Deposited on	:	2026-07-18
Resolution	:	2.80 Å(reported)
Based on initial model	:	7UNW

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 (i) 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 (i)) were used in the production of this report:

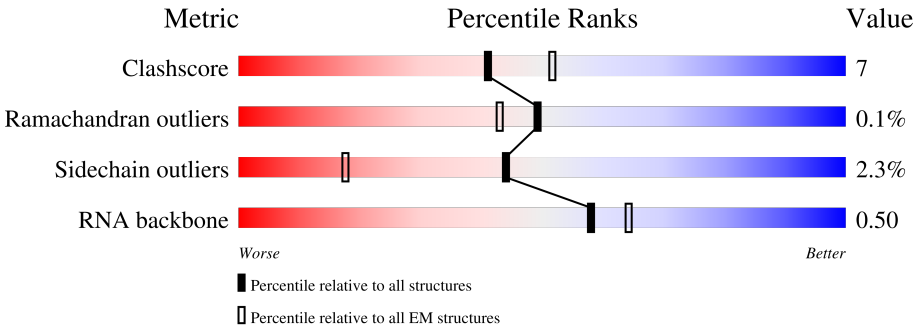
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.2
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

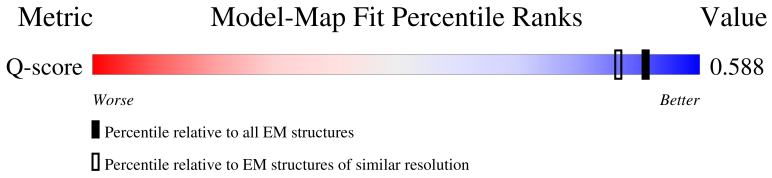
1 Overall quality at a glance

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

The reported resolution of this entry is 2.80 Å.

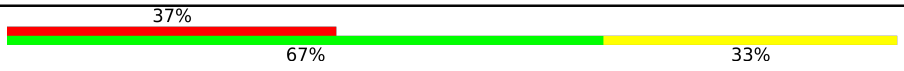
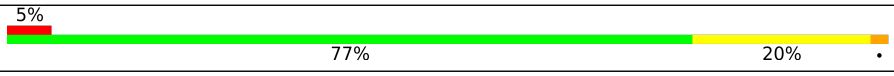
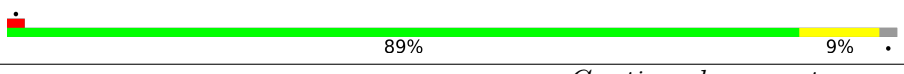
Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.





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	11806 (2.30 - 3.30)

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

Mol	Chain	Length	Quality of chain
1	0	51	
2	1	44	
3	2	64	

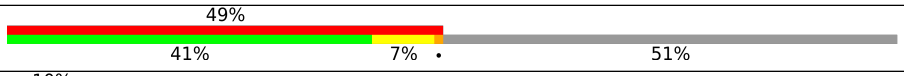
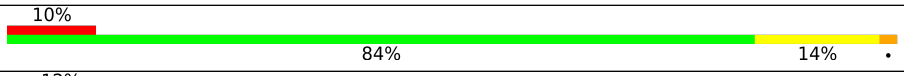
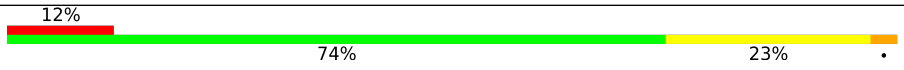
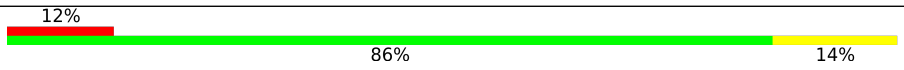
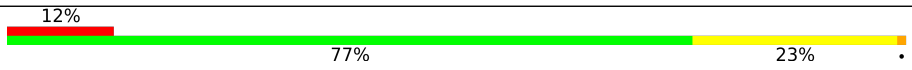
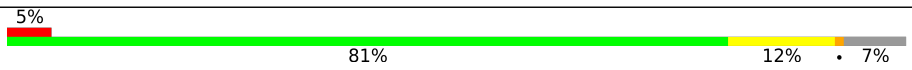
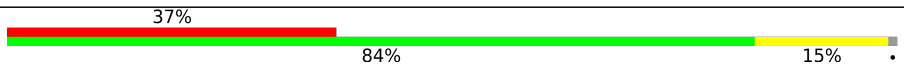
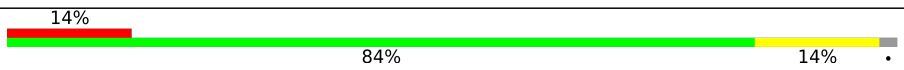
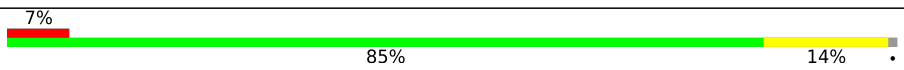
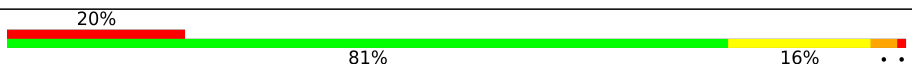
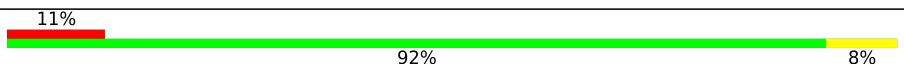
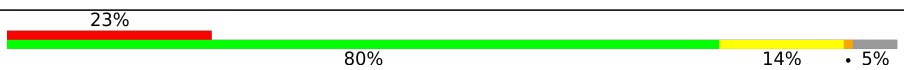
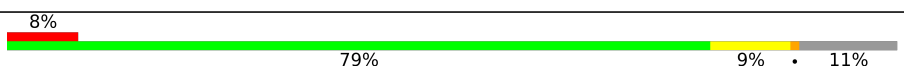
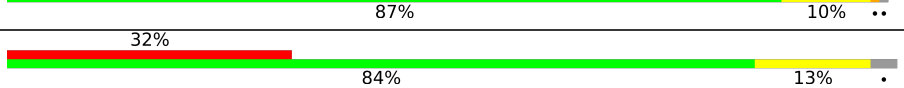
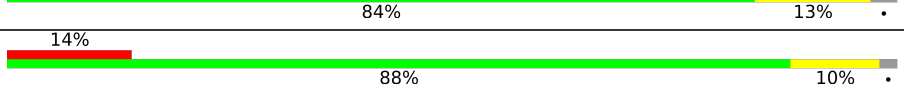
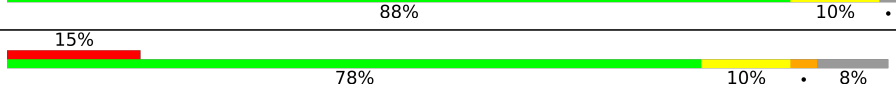
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Mol	Chain	Length	Quality of chain
4	3	38	11% 79% 21%
5	4	71	96% 56% 38%
6	A	1536	17% 54% 38% 8%
7	B	246	91% 60% 30% 9%
8	C	228	60% 70% 21% 9%
9	D	206	53% 79% 21%
10	E	166	19% 74% 19% 7%
11	F	139	50% 55% 21% 24%
12	G	156	92% 78% 19%
13	H	130	22% 82% 17%
14	I	130	73% 71% 25%
15	J	103	77% 60% 32%
16	K	129	44% 77% 15% 8%
17	L	123	22% 85% 13%
18	M	118	80% 76% 19%
19	N	101	58% 85% 13%
20	O	89	25% 88% 11%
21	P	83	13% 84% 13%
22	Q	88	23% 67% 23% 9%
23	R	76	37% 66% 16% 18%
24	S	91	80% 56% 35% 9%
25	T	91	20% 85% 11%
26	W	15	27% 47% 20% 33%
27	X	102	70% 74% 22%
28	a	2891	12% 60% 34% 6%

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Mol	Chain	Length	Quality of chain
29	b	120	
30	c	273	
31	d	211	
32	e	200	
33	f	179	
34	g	177	
35	h	148	
36	i	142	
37	j	122	
38	k	144	
39	l	137	
40	m	129	
41	n	116	
42	o	116	
43	p	118	
44	q	103	
45	r	110	
46	s	99	
47	t	104	
48	u	204	
49	v	85	
50	w	78	
51	x	63	
52	y	58	
53	z	60	

2 Entry composition (i)

There are 56 unique types of molecules in this entry. The entry contains 143097 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 Large ribosomal subunit protein bL33.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	0	51	Total	C	N	O	S	0	0
			426	272	78	75	1		

- Molecule 2 is a protein called Large ribosomal subunit protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	44	Total	C	N	O	S	0	0
			365	222	87	54	2		

- Molecule 3 is a protein called Large ribosomal subunit protein bL35.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	2	63	Total	C	N	O	S	0	0
			506	314	108	81	3		

- Molecule 4 is a protein called Large ribosomal subunit protein bL36.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	3	38	Total	C	N	O	S	0	0
			307	186	69	48	4		

- Molecule 5 is a protein called Large ribosomal subunit protein bL31.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	4	68	Total	C	N	O	S	0	0
			531	334	95	96	6		

- Molecule 6 is a RNA chain called 16S rRNA (1535-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
6	A	1535	Total	C	N	O	P	0	0
			32945	14701	6039	10670	1535		

- Molecule 7 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	B	224	Total	C	N	O	S	0	0
			1763	1112	322	319	10		

- Molecule 8 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	C	208	Total	C	N	O	S	0	0
			1664	1052	315	292	5		

- Molecule 9 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	D	205	Total	C	N	O	S	0	0
			1627	1003	316	303	5		

- Molecule 10 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	E	154	Total	C	N	O	S	0	0
			1134	711	210	207	6		

- Molecule 11 is a protein called Small ribosomal subunit protein bS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	F	106	Total	C	N	O	S	0	0
			868	539	159	164	6		

- Molecule 12 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	G	153	Total	C	N	O	S	0	0
			1199	752	232	210	5		

- Molecule 13 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	H	129	Total	C	N	O	S	0	0
			982	618	173	185	6		

- Molecule 14 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	I	127	Total	C	N	O	S	0	0
			1010	625	203	181	1		

- Molecule 15 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	J	99	Total	C	N	O	S	0	0
			793	496	150	146	1		

- Molecule 16 is a protein called Small ribosomal subunit protein uS11.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	K	119	Total	C	N	O	S	0	0
			882	546	171	163	2		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	119	IAS	ASN	conflict	UNP E2RXU4

- Molecule 17 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	L	122	Total	C	N	O	S	0	0
			961	589	198	169	5		

- Molecule 18 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	M	113	Total	C	N	O	S	0	0
			883	541	178	160	4		

- Molecule 19 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	N	100	Total	C	N	O	S	0	0
			804	496	167	138	3		

- Molecule 20 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	O	88	Total 703	C 434	N 139	O 129	S 1	0	0

- Molecule 21 is a protein called Small ribosomal subunit protein bS16.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	P	81	Total 637	C 398	N 125	O 113	S 1	0	0

- Molecule 22 is a protein called Small ribosomal subunit protein uS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	Q	80	Total 645	C 404	N 124	O 115	S 2	0	0

- Molecule 23 is a protein called Small ribosomal subunit protein bS18.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	R	62	Total 494	C 316	N 86	O 92	0	0

- Molecule 24 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	S	83	Total 663	C 422	N 129	O 109	S 3	0	0

- Molecule 25 is a protein called Small ribosomal subunit protein bS20.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	T	87	Total 671	C 414	N 138	O 117	S 2	0	0

- Molecule 26 is a RNA chain called non-STOP mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	W	10	Total 219	C 97	N 41	O 71	P 10	0	0

- Molecule 27 is a protein called Ribosome hibernation promoting factor.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	X	98	Total	C	N	O	S	0	0
			796	498	143	152	3		

- Molecule 28 is a RNA chain called 23S rRNA (2890-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
28	a	2890	Total	C	N	O	P	0	0
			62019	27677	11363	20089	2890		

- Molecule 29 is a RNA chain called 5S rRNA (117-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
29	b	117	Total	C	N	O	P	0	0
			2495	1114	448	816	117		

- Molecule 30 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	c	272	Total	C	N	O	S	0	0
			2072	1276	426	364	6		

- Molecule 31 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	d	211	Total	C	N	O	S	0	0
			1589	982	304	297	6		

- Molecule 32 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	e	200	Total	C	N	O	S	0	0
			1524	956	283	282	3		

- Molecule 33 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	f	177	Total	C	N	O	S	0	0
			1418	905	253	256	4		

- Molecule 34 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	g	175	Total	C	N	O	S	0	0
			1326	835	244	245	2		

- Molecule 35 is a protein called Large ribosomal subunit protein bL9.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	h	72	Total	C	N	O	S	0	0
			533	334	98	100	1		

- Molecule 36 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	i	142	Total	C	N	O	S	0	0
			1130	718	206	202	4		

- Molecule 37 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	j	122	Total	C	N	O	S	0	0
			938	587	180	165	6		

- Molecule 38 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	k	144	Total	C	N	O	S	0	0
			1066	654	215	194	3		

- Molecule 39 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	l	137	Total	C	N	O	S	0	0
			1086	689	211	181	5		

- Molecule 40 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	m	120	Total	C	N	O	S	0	0
			959	600	192	162	5		

- Molecule 41 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	n	115	Total 881	C 544	N 174	O 161	S 2	0	0

- Molecule 42 is a protein called Large ribosomal subunit protein bL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	o	114	Total 902	C 568	N 171	O 162	S 1	0	0

- Molecule 43 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues	Atoms				AltConf	Trace
43	p	117	Total 936	C 592	N 196	O 148	0	0

- Molecule 44 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	q	103	Total 822	C 521	N 156	O 143	S 2	0	0

- Molecule 45 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	r	110	Total 833	C 515	N 161	O 153	S 4	0	0

- Molecule 46 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	s	94	Total 739	C 472	N 134	O 132	S 1	0	0

- Molecule 47 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	t	103	Total 800	C 503	N 152	O 143	S 2	0	0

- Molecule 48 is a protein called Large ribosomal subunit protein bL25.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	u	190	Total	C	N	O	S	0	0
			1446	915	262	266	3		

- Molecule 49 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues	Atoms				AltConf	Trace
49	v	76	Total	C	N	O	0	0
			575	364	111	100		

- Molecule 50 is a protein called Large ribosomal subunit protein bL28.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	w	77	Total	C	N	O	S	0	0
			630	391	134	103	2		

- Molecule 51 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	x	61	Total	C	N	O	S	0	0
			490	301	96	91	2		

- Molecule 52 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	y	57	Total	C	N	O	S	0	0
			445	277	87	79	2		

- Molecule 53 is a protein called Large ribosomal subunit protein bL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	z	55	Total	C	N	O	S	0	0
			440	264	93	82	1		

- Molecule 54 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
54	3	1	Total	Zn	0
			1	1	
54	4	1	Total	Zn	0
			1	1	

- Molecule 55 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
55	A	93	Total Mg 93 93	0
55	Q	1	Total Mg 1 1	0
55	X	1	Total Mg 1 1	0
55	a	249	Total Mg 249 249	0
55	b	5	Total Mg 5 5	0
55	c	1	Total Mg 1 1	0
55	p	2	Total Mg 2 2	0
55	v	1	Total Mg 1 1	0
55	z	1	Total Mg 1 1	0

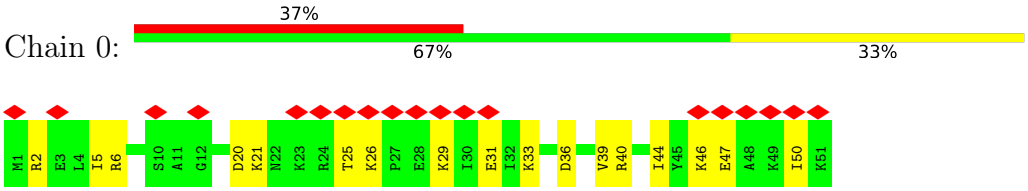
- Molecule 56 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms	AltConf
56	A	48	Total K 48 48	0
56	X	1	Total K 1 1	0
56	a	113	Total K 113 113	0
56	b	1	Total K 1 1	0
56	c	4	Total K 4 4	0
56	e	1	Total K 1 1	0
56	f	1	Total K 1 1	0

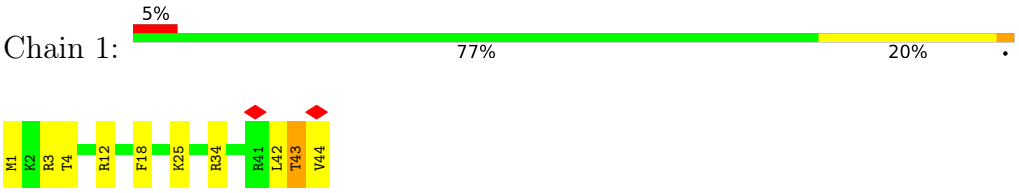
3 Residue-property plots (i)

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.

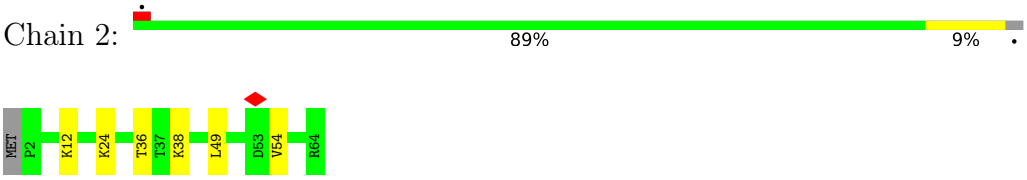
• Molecule 1: Large ribosomal subunit protein bL33



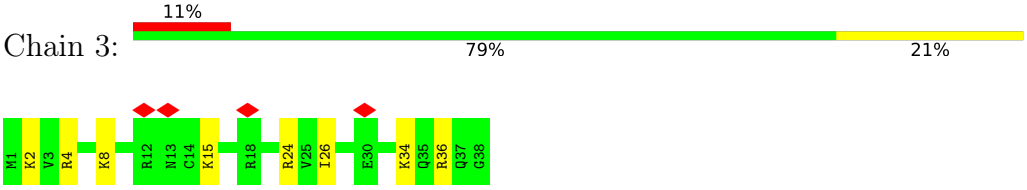
• Molecule 2: Large ribosomal subunit protein bL34



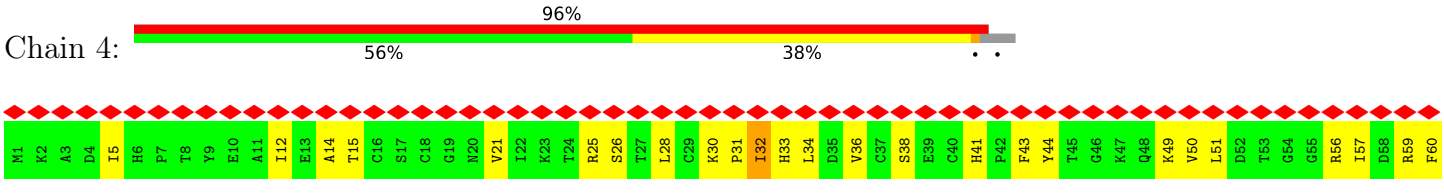
• Molecule 3: Large ribosomal subunit protein bL35

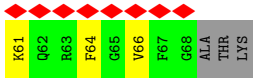


• Molecule 4: Large ribosomal subunit protein bL36



• Molecule 5: Large ribosomal subunit protein bL31

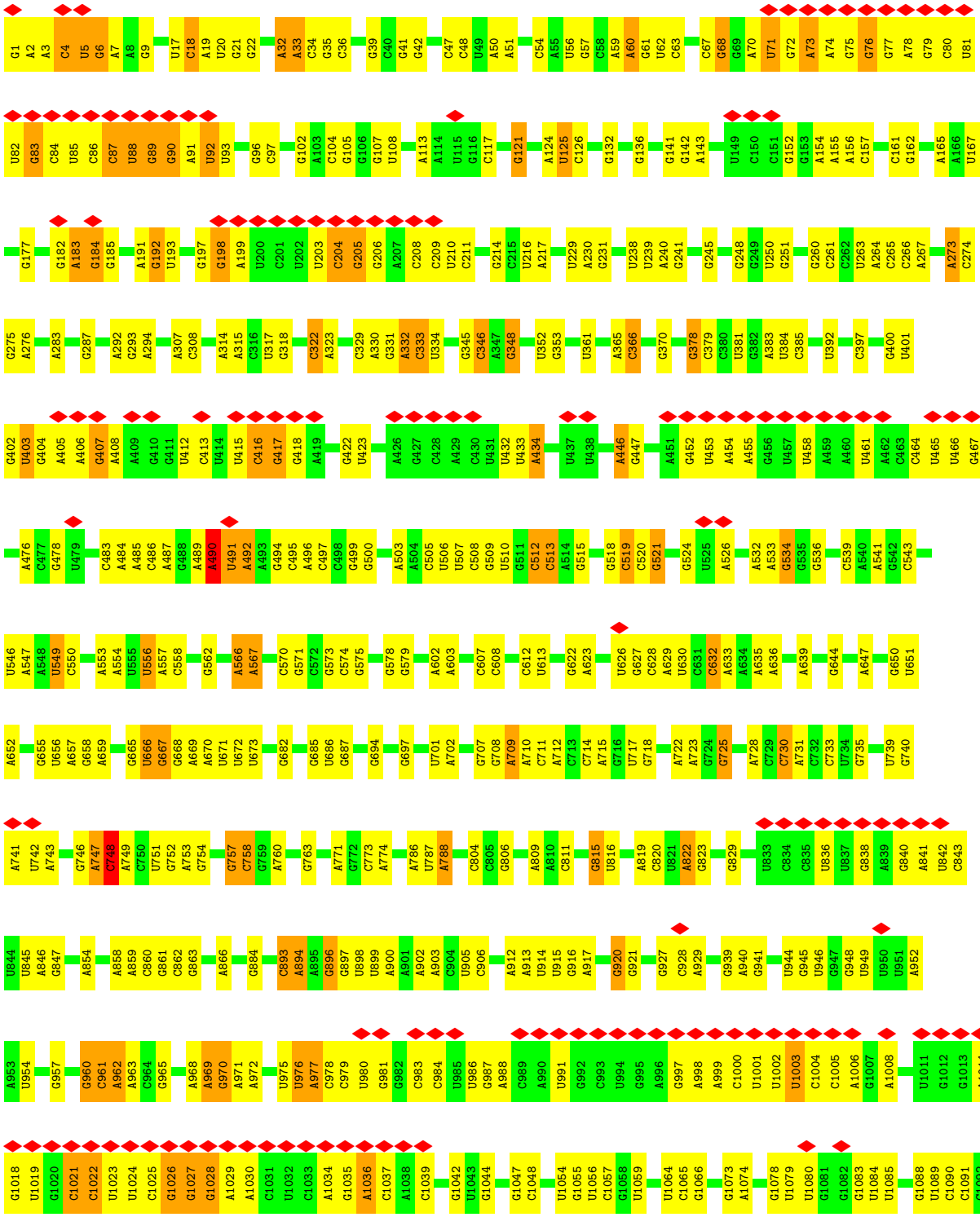


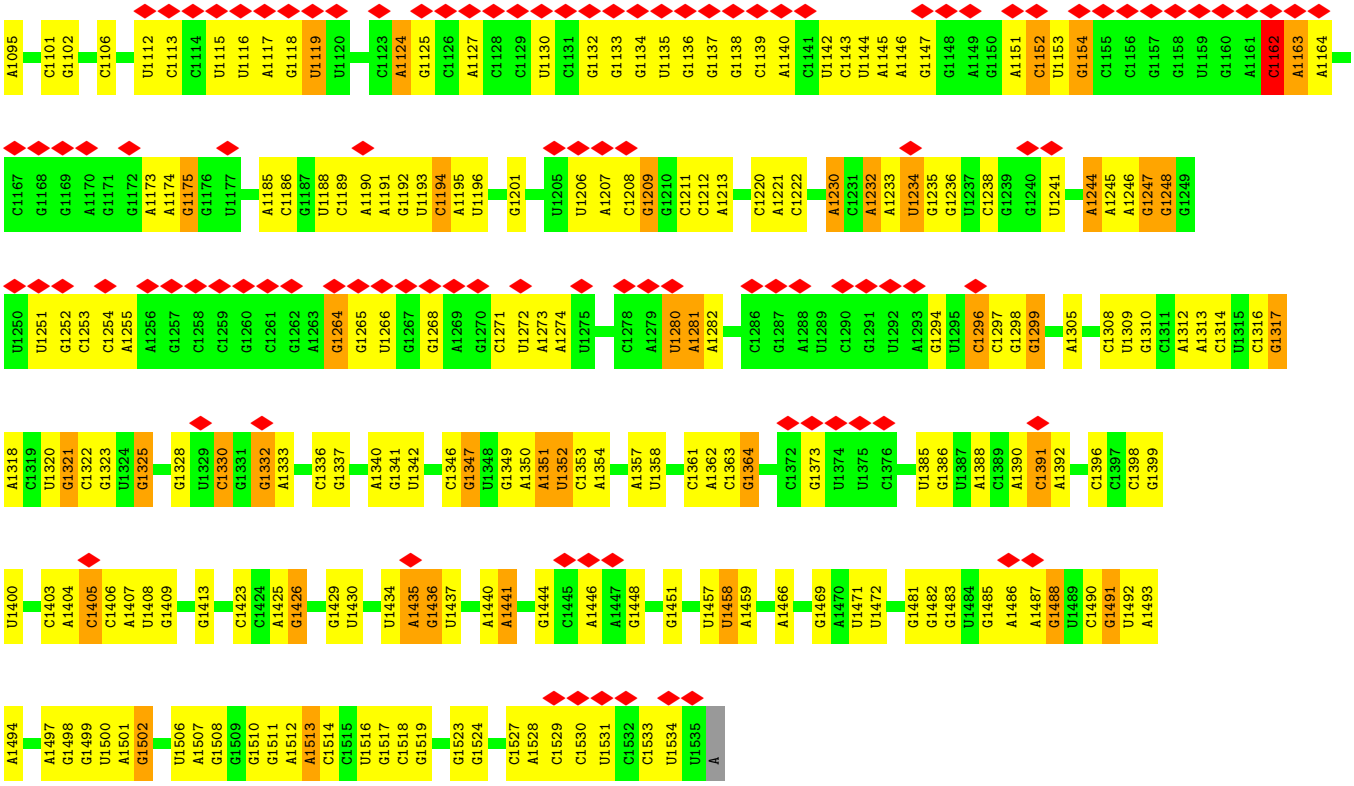


• Molecule 6: 16S rRNA (1535-MER)

Chain A:

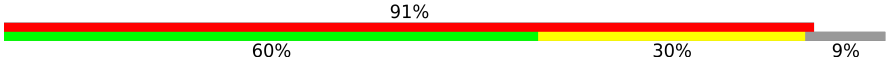






• Molecule 7: Small ribosomal subunit protein uS2

Chain B:

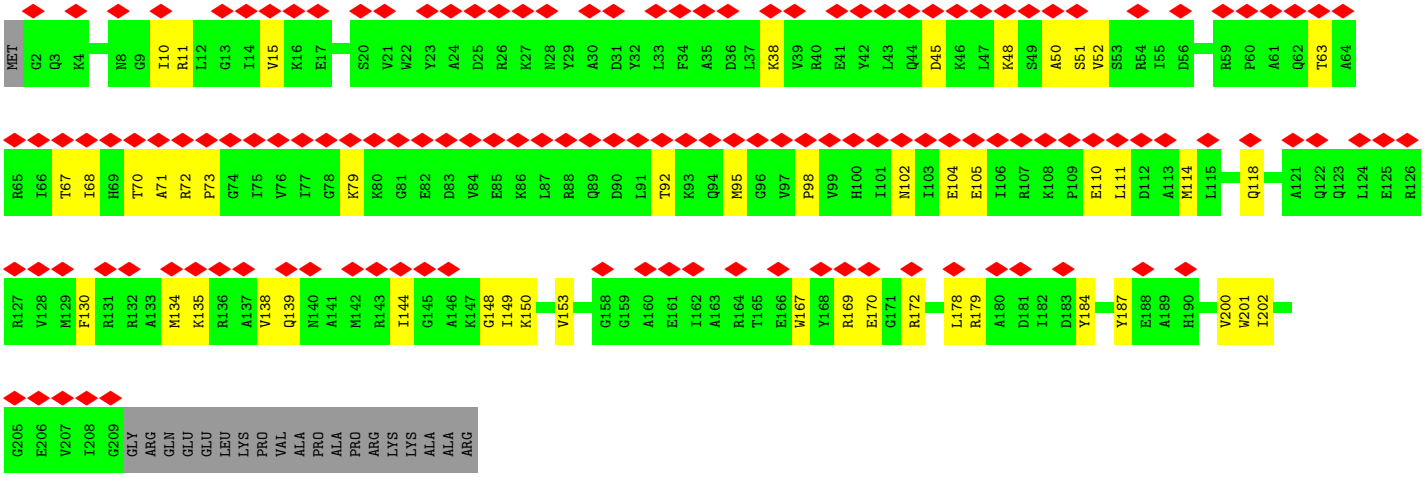




• Molecule 8: Small ribosomal subunit protein uS3

Chain C:

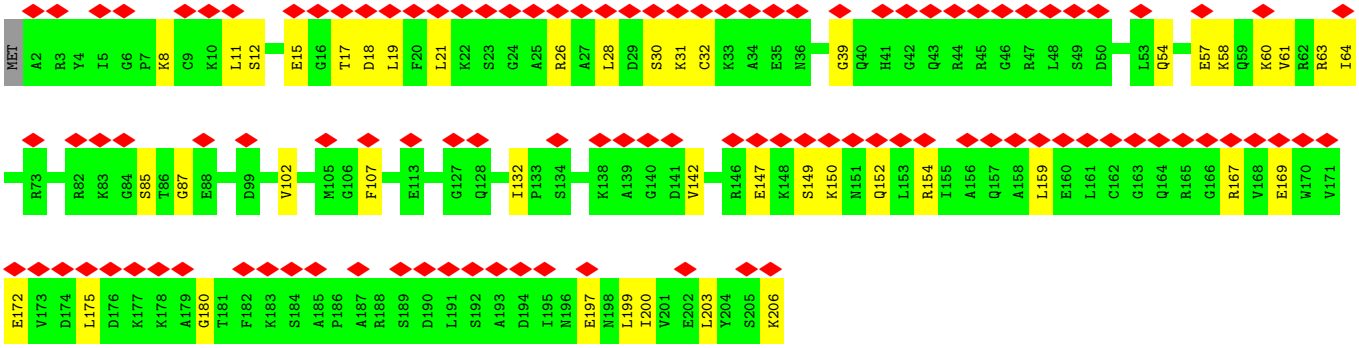




• Molecule 9: Small ribosomal subunit protein uS4

Chain D:

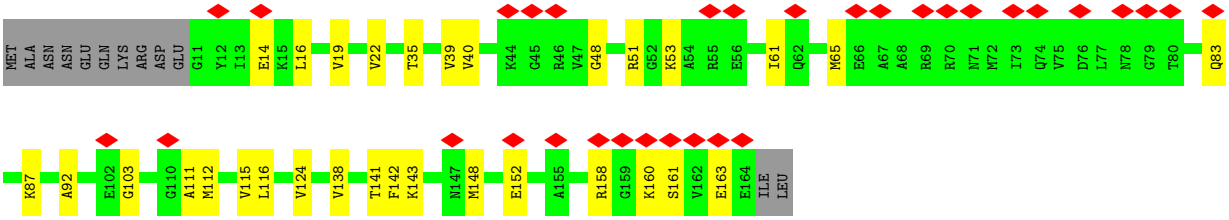




• Molecule 10: Small ribosomal subunit protein uS5

Chain E:

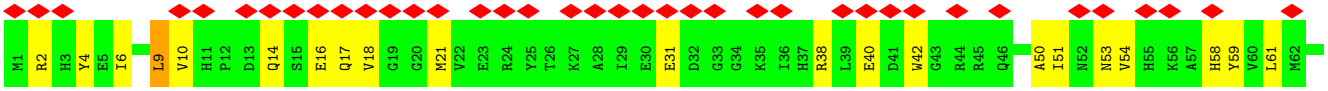


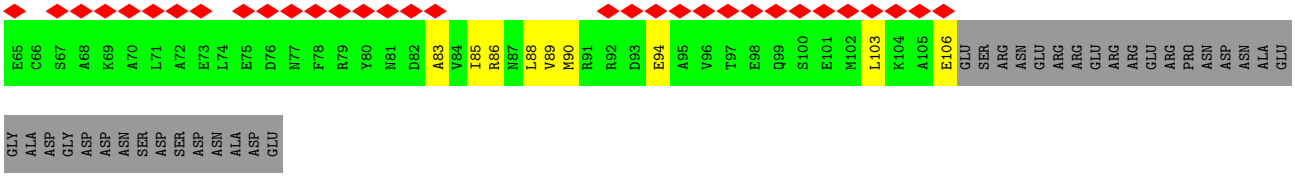


• Molecule 11: Small ribosomal subunit protein bS6

Chain F:

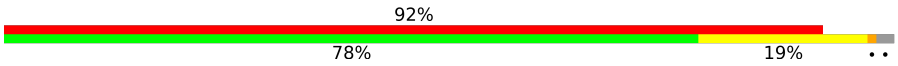


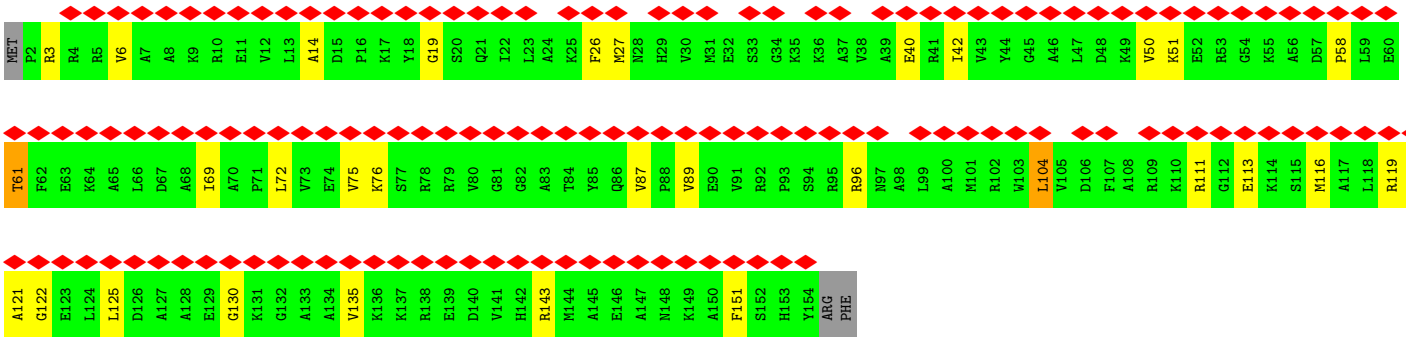




• Molecule 12: Small ribosomal subunit protein uS7

Chain G:

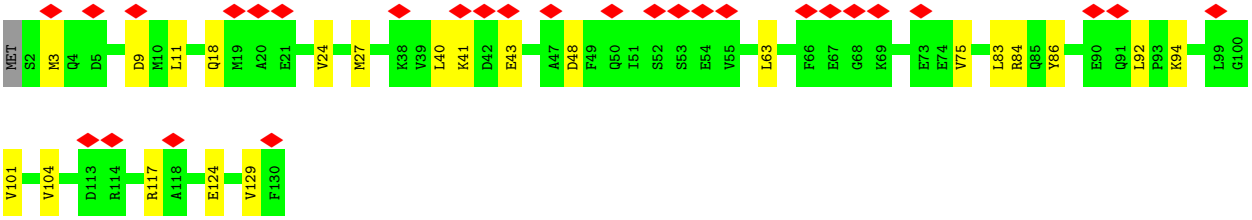




• Molecule 13: Small ribosomal subunit protein uS8

Chain H:

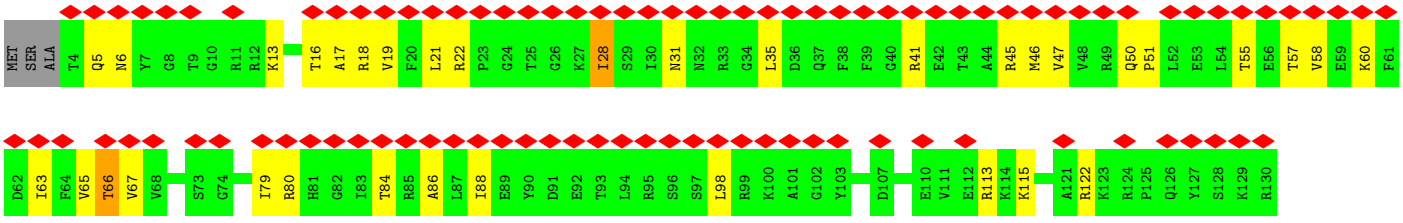




• Molecule 14: Small ribosomal subunit protein uS9

Chain I:

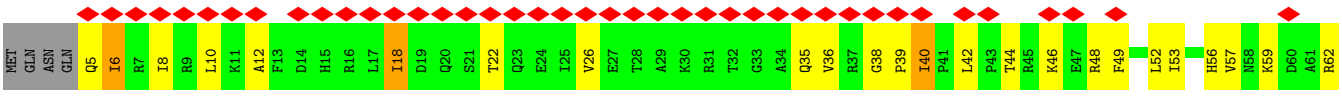


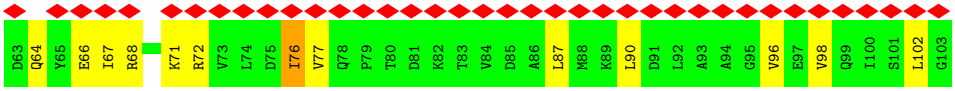


• Molecule 15: Small ribosomal subunit protein uS10

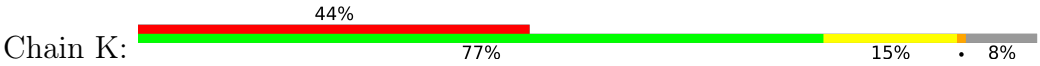
Chain J:

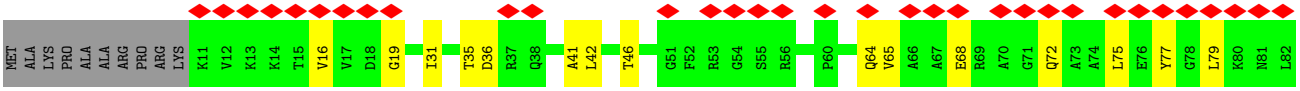






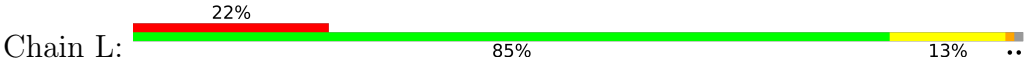
• Molecule 16: Small ribosomal subunit protein uS11

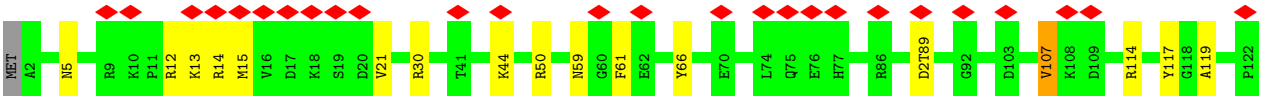






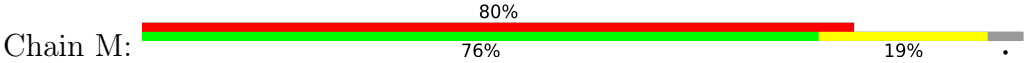
• Molecule 17: Small ribosomal subunit protein uS12

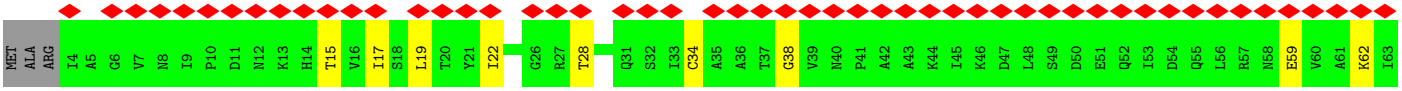


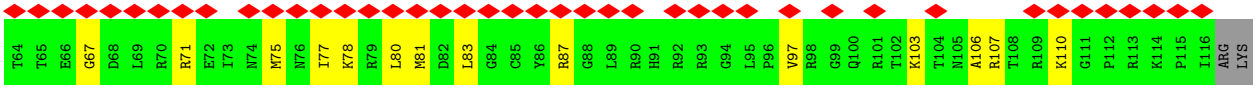




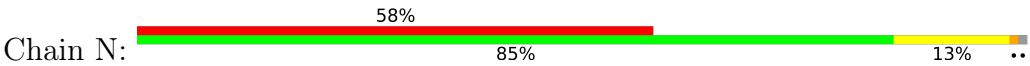
• Molecule 18: Small ribosomal subunit protein uS13

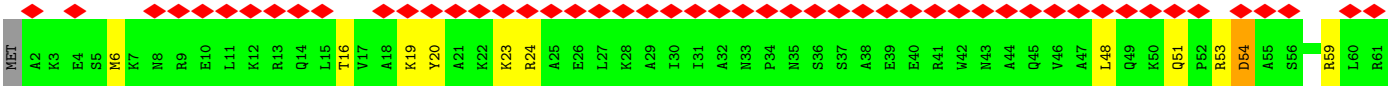


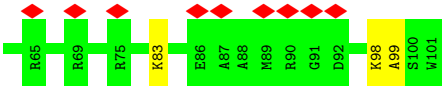




• Molecule 19: Small ribosomal subunit protein uS14

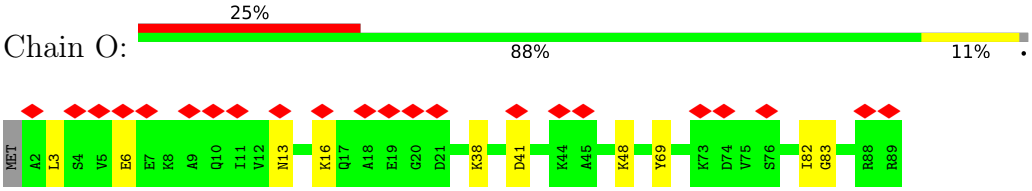






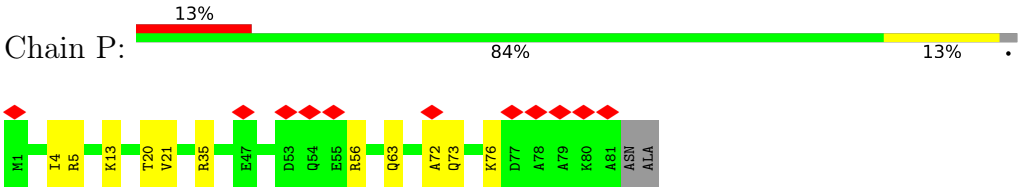
• Molecule 20: Small ribosomal subunit protein uS15

Chain O:



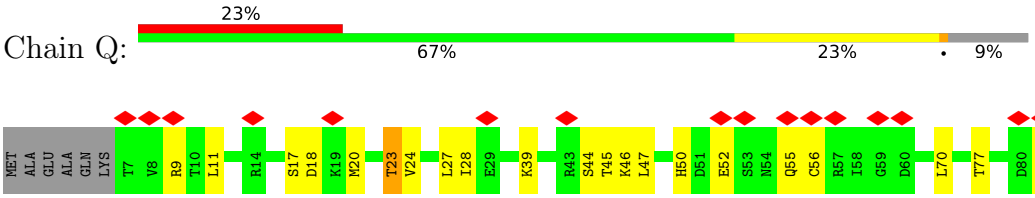
• Molecule 21: Small ribosomal subunit protein bS16

Chain P:



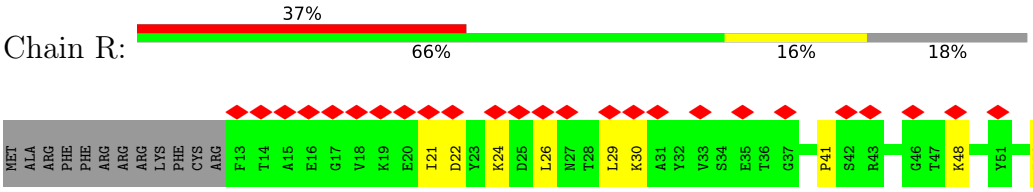
• Molecule 22: Small ribosomal subunit protein uS17

Chain Q:



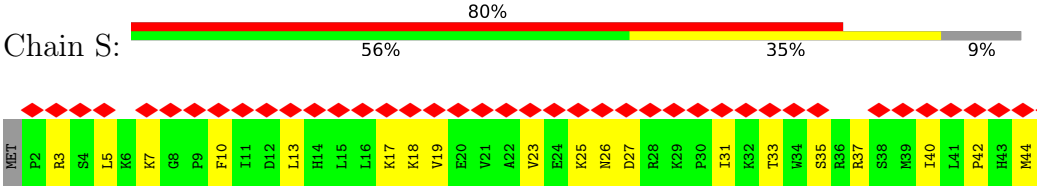
• Molecule 23: Small ribosomal subunit protein bS18

Chain R:



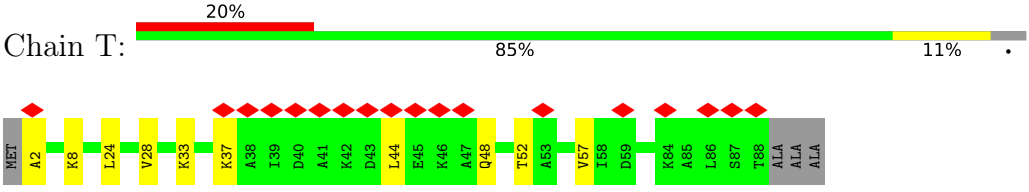
• Molecule 24: Small ribosomal subunit protein uS19

Chain S:



• Molecule 25: Small ribosomal subunit protein bS20

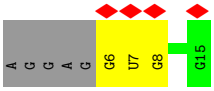
Chain T:



• Molecule 26: non-STOP mRNA

Chain W:

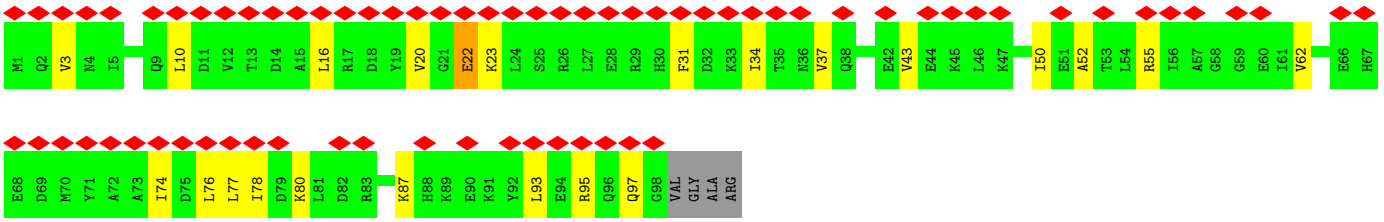




• Molecule 27: Ribosome hibernation promoting factor

Chain X:

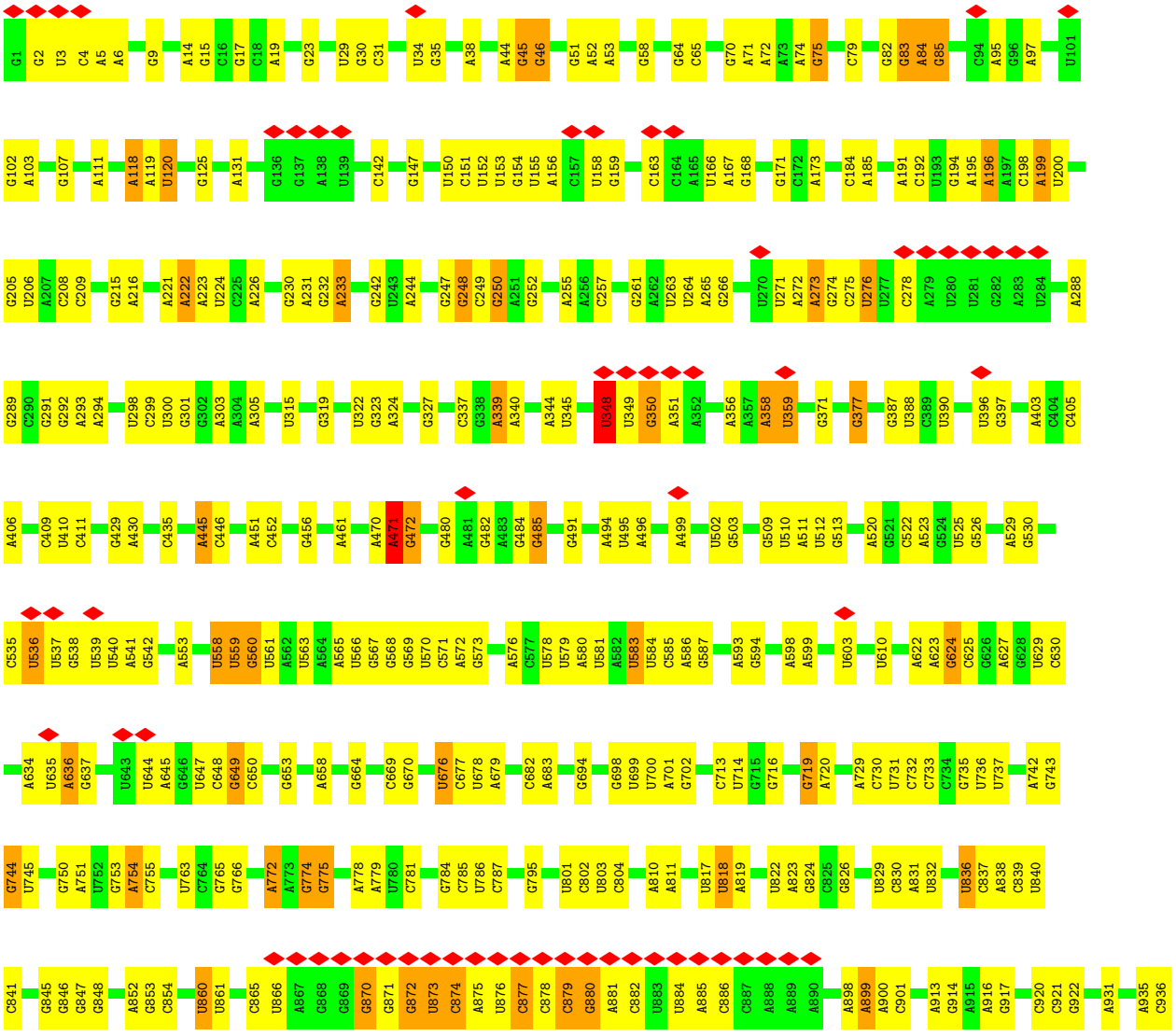


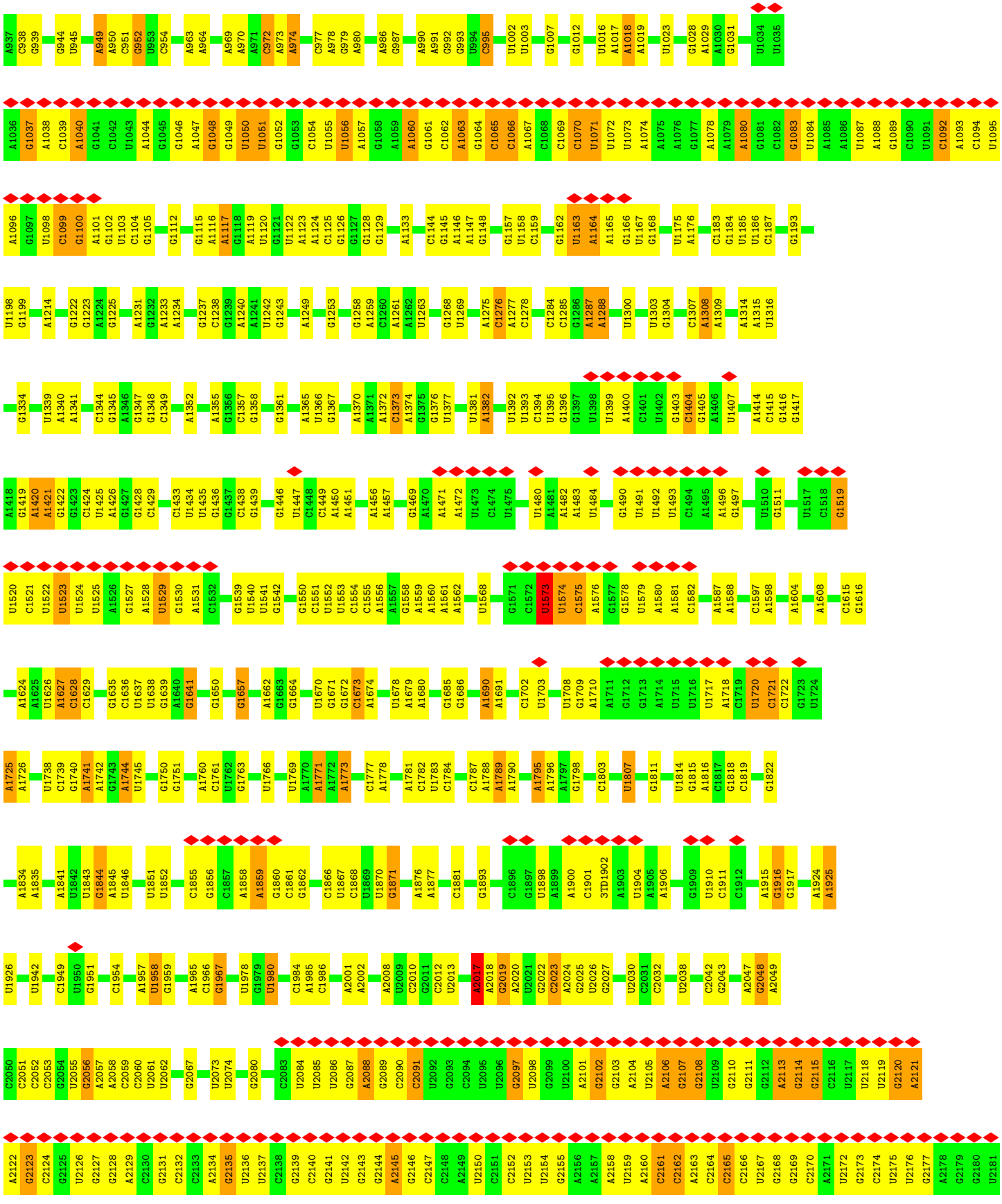


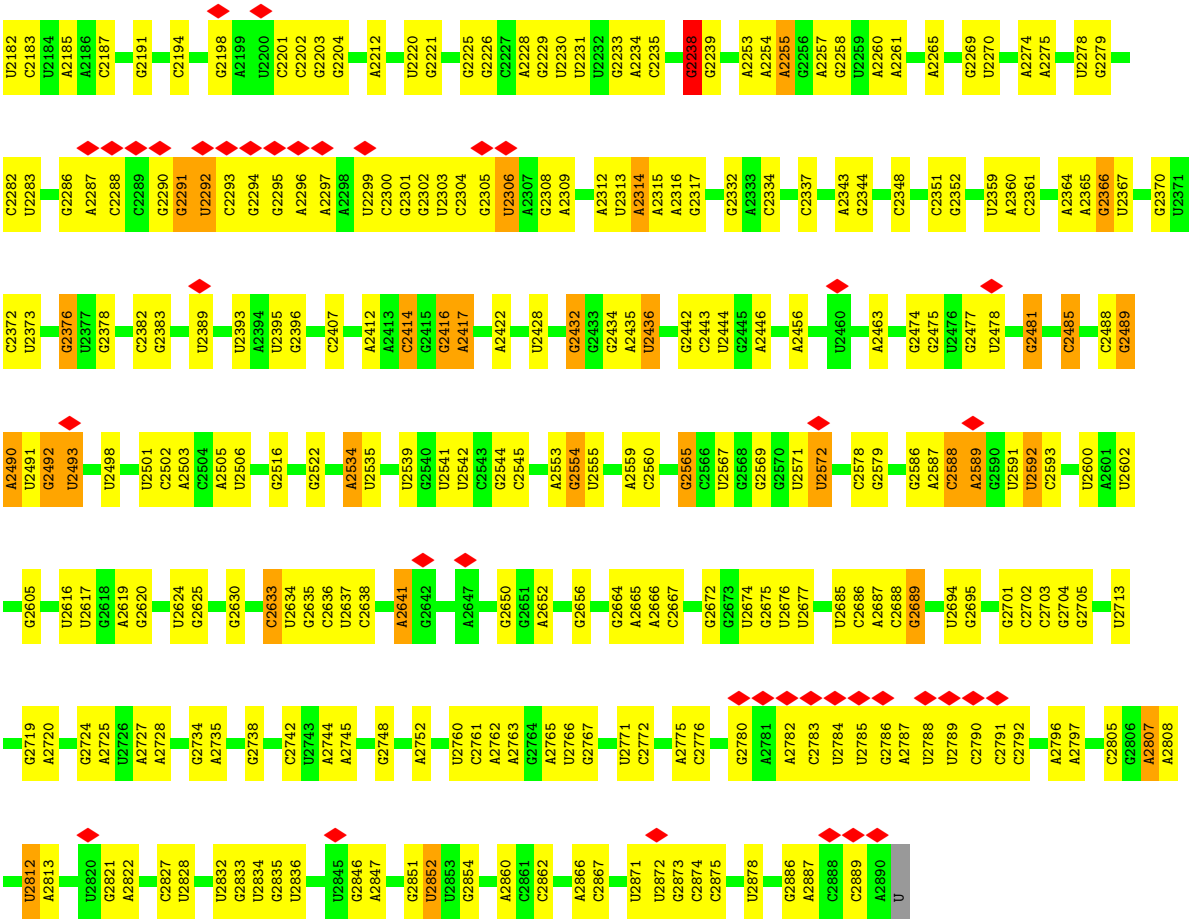
• Molecule 28: 23S rRNA (2890-MER)

Chain a:





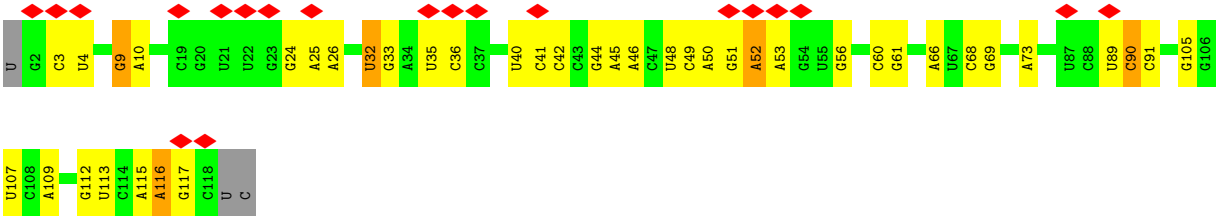

A937 C938 G939 G944 U945 A949 A950 C951 G952 U953 C954 A963 A964 A969 A970 A971 C972 A973 A974 C977 A978 G979 A980 A986 G987 A990 A991 G992 G993 U994 C995 U1002 U1003 G1007 G1012 U1016 A1017 A1018 A1019 U1023 G1028 A1029 A1030 G1031 U1034 U1035
A1036 G1037 A1038 C1039 A1040 A1041 C1042 U1043 A1044 G1045 G1046 A1047 G1048 G1049 U1050 U1051 G1052 G1053 C1054 U1055 U1056 A1057 G1058 A1059 A1060 G1061 C1062 A1063 G1064 C1065 C1066 A1067 C1068 C1069 C1070 U1071 U1072 U1073 A1074 A1075 A1076 G1077 A1078 A1079 A1080 G1081 C1082 G1083 U1084 A1085 A1086 U1087 A1088 G1089 C1090 U1091 C1092 A1093 C1094 U1095
A1096 G1097 U1098 C1099 G1100 A1101 G1102 U1103 C1104 G1105 G1112 G1115 A1116 A1117 C1118 A1119 U1120 C1121 U1122 A1123 A1124 C1125 G1126 C1127 G1128 G1129 A1133 C1144 G1145 A1146 A1147 G1148 G1157 U1158 C1159 G1162 U1163 A1164 A1165 G1166 U1167 G1168 U1175 A1176 C1183 G1184 U1185 U1186 C1187 G1193
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G1334 U1339 A1340 A1341 C1344 C1345 A1346 G1347 G1348 C1349 A1352 A1355 G1356 C1357 G1358 G1361 A1365 U1366 G1367 A1370 A1371 A1372 C1373 A1374 G1375 G1376 U1377 U1381 A1382 U1392 U1393 C1394 U1395 G1396 G1397 U1398 U1399 A1400 C1401 U1402 G1403 C1404 G1405 A1406 U1407 A1414 C1415 G1416 G1417
A1418 G1419 A1420 A1421 G1422 G1423 C1424 U1425 A1426 G1427 G1428 C1429 C1433 U1434 U1435 G1436 G1437 C1438 G1439 G1446 U1447 C1448 C1449 A1450 A1451 A1456 A1457 G1469 A1470 A1471 A1472 U1473 C1474 U1475 U1480 A1481 A1482 A1483 U1484 G1490 U1491 U1492 U1493 C1494 A1495 A1496 G1497 U1510 G1511 U1517 C1518 G1519
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A1624 A1625 U1626 A1627 C1628 C1629 G1635 C1636 U1637 U1638 G1639 A1640 G1641 G1650 G1657 A1662 G1663 G1664 U1670 G1671 G1672 C1673 A1674 U1678 A1679 A1680 G1685 G1686 A1690 A1691 C1702 U1703 U1708 G1709 A1710 A1711 G1712 G1713 A1714 U1715 U1716 U1717 A1718 C1719 U1720 C1721 C1722 G1723 U1724
A1725 A1726 U1738 C1739 G1740 A1741 A1742 G1743 A1744 U1745 G1750 G1751 A1760 C1761 U1762 G1763 U1766 U1769 A1770 A1771 A1772 A1773 C1777 A1778 A1781 C1782 U1783 C1784 C1787 A1788 A1789 A1790 A1795 A1796 A1797 G1798 C1803 U1807 G1811 U1814 G1815 A1816 C1817 G1818 C1819 G1822
A1834 A1835 A1841 U1842 U1843 G1844 A1845 U1846 U1851 U1852 C1855 G1856 C1857 A1858 A1859 G1860 C1861 G1862 C1866 U1867 C1868 U1869 U1870 G1871 A1876 A1877 C1881 G1893 C1896 G1897 U1898 A1899 A1900 C1901 3TD1902 A1903 U1904 A1905 A1906 G1909 U1910 C1911 C1912 A1915 G1916 G1917 A1924 A1925
U1926 U1942 C1949 U1950 G1951 C1954 A1957 U1958 G1959 A1965 C1966 G1967 U1978 G1979 U1980 C1984 A1985 C1986 A2001 A2002 A2008 U2009 C2010 G2011 C2012 U2013 A2017 A2018 G2019 A2020 U2021 G2022 C2023 A2024 G2025 U2026 G2027 U2030 C2031 C2032 U2038 C2042 G2043 A2047 G2048 A2049
C2050 C2051 C2052 C2053 G2054 U2055 G2056 A2057 A2058 C2059 C2060 U2061 U2062 G2067 U2073 U2074 G2080 C2083 U2084 U2085 U2086 G2087 A2088 G2089 C2090 C2091 U2092 G2093 C2094 U2095 U2096 G2097 U2098 G2099 U2100 A2101 G2102 G2103 A2104 U2105 A2106 G2107 G2108 U2109 G2110 G2111 G2112 A2113 G2114 G2115 C2116 U2117 U2118 U2119 G2120 A2121
A2122 G2123 C2124 G2125 U2126 G2127 G2128 A2129 C2130 G2131 C2132 C2133 A2134 G2135 U2136 U2137 C2138 G2139 C2140 G2141 U2142 G2143 G2144 A2145 G2146 C2147 C2148 A2149 U2150 C2151 C2152 U2153 U2154 G2155 A2156 A2157 A2158 U2159 A2160 C2161 C2162 A2163 C2164 C2165 C2166 U2167 G2168 G2169 C2170 A2171 U2172 G2173 C2174 U2175 U2176 G2177 A2178 G2179 G2180 U2181



• Molecule 29: 5S rRNA (117-MER)

Chain b:

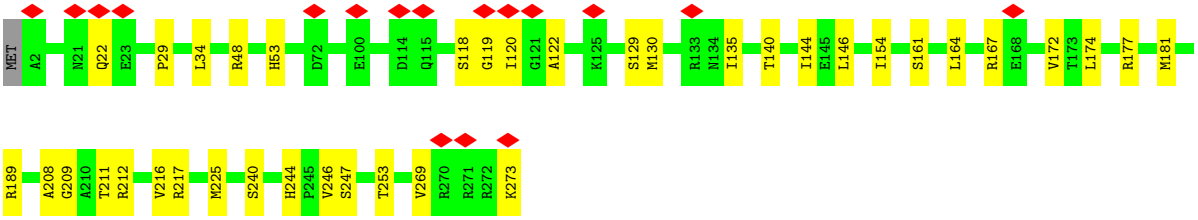




• Molecule 30: Large ribosomal subunit protein uL2

Chain c:

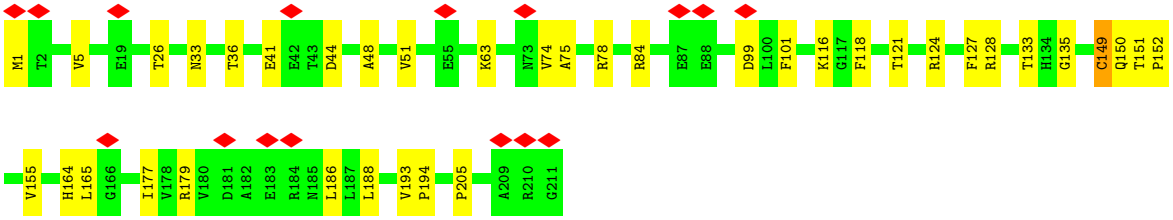




• Molecule 31: Large ribosomal subunit protein uL3

Chain d:

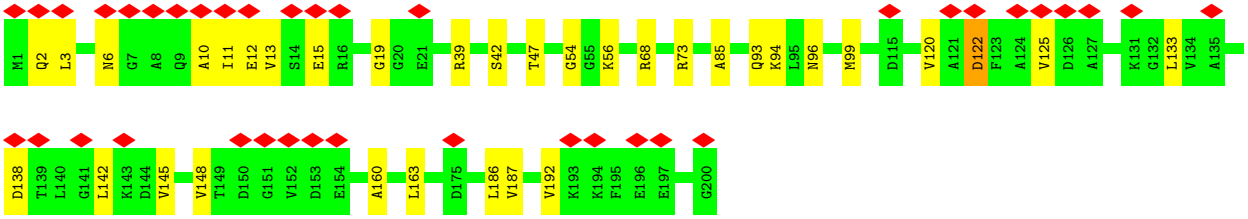




• Molecule 32: Large ribosomal subunit protein uL4

Chain e:

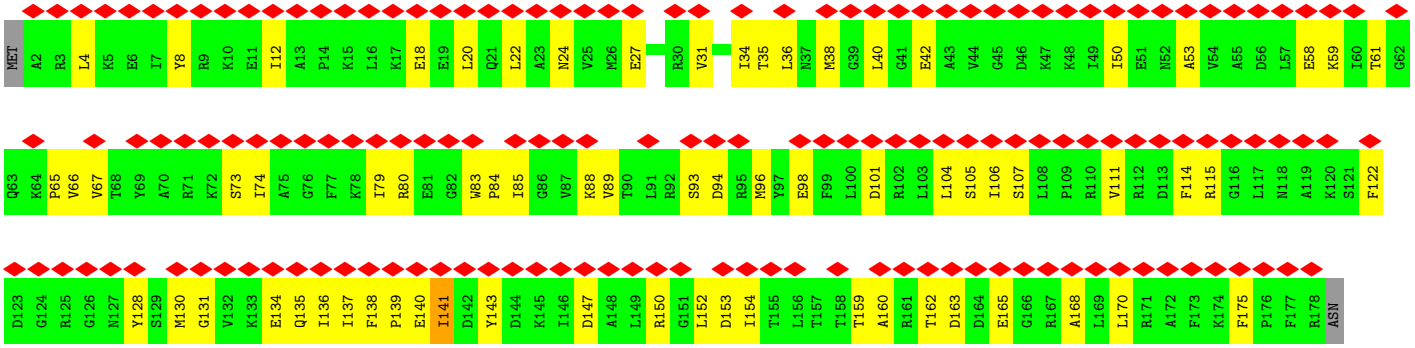




• Molecule 33: Large ribosomal subunit protein uL5

Chain f:

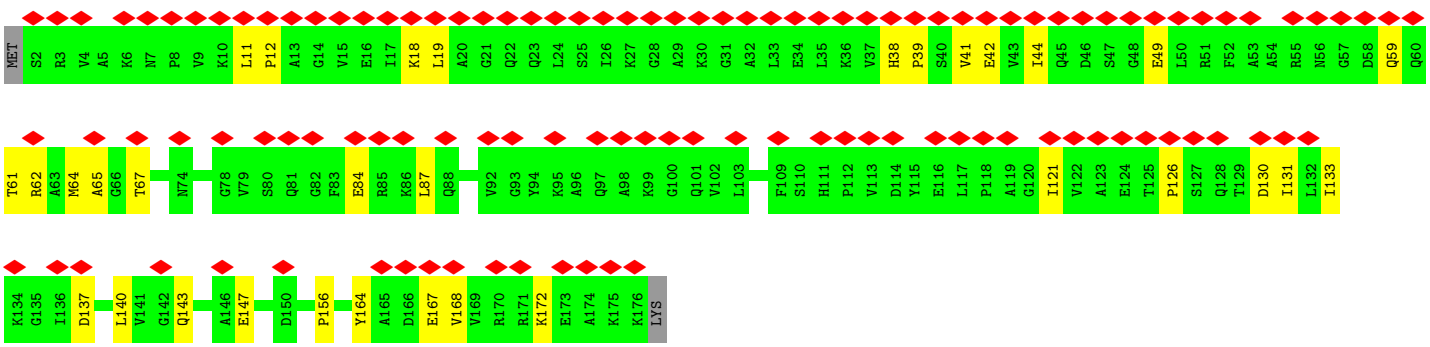




• Molecule 34: Large ribosomal subunit protein uL6

Chain g:

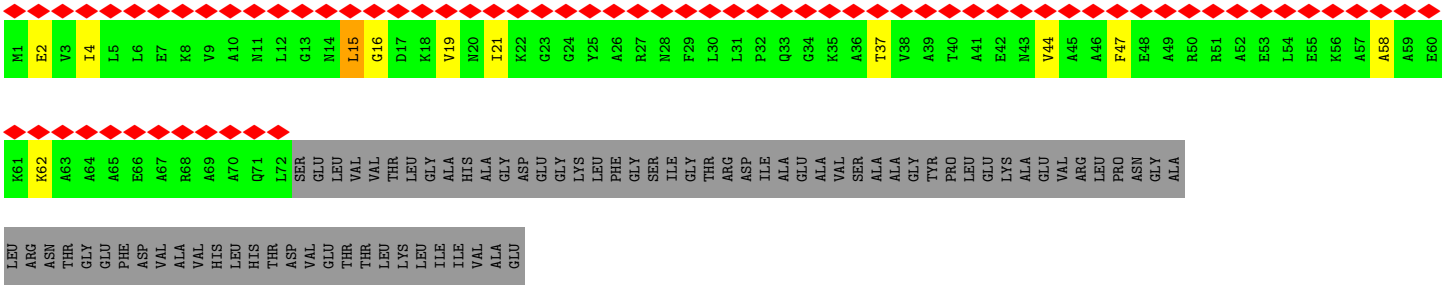




• Molecule 35: Large ribosomal subunit protein bL9

Chain h:

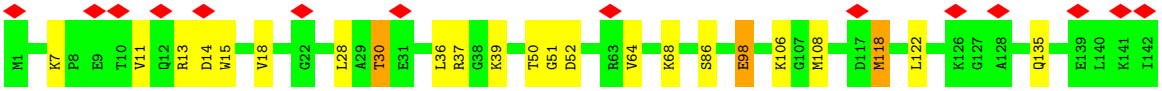




• Molecule 36: Large ribosomal subunit protein uL13

Chain i:

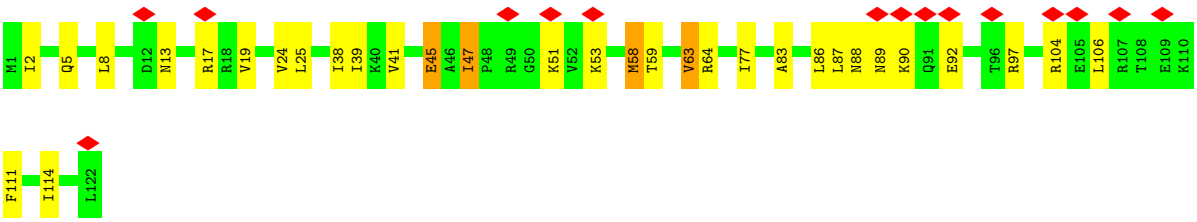




• Molecule 37: Large ribosomal subunit protein uL14

Chain j:

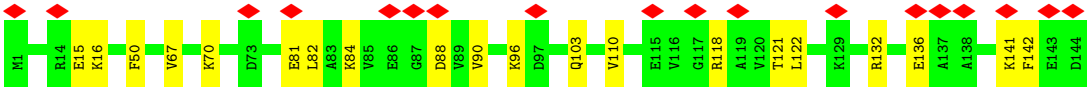




• Molecule 38: Large ribosomal subunit protein uL15

Chain k:

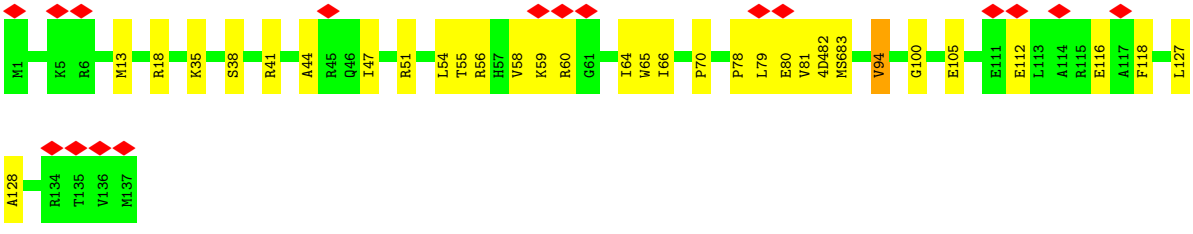




• Molecule 39: Large ribosomal subunit protein uL16

Chain l:

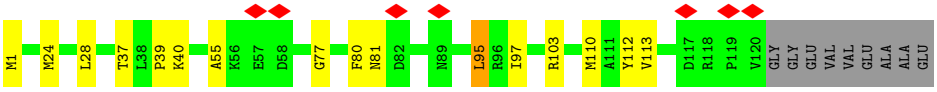




• Molecule 40: Large ribosomal subunit protein bL17

Chain m:

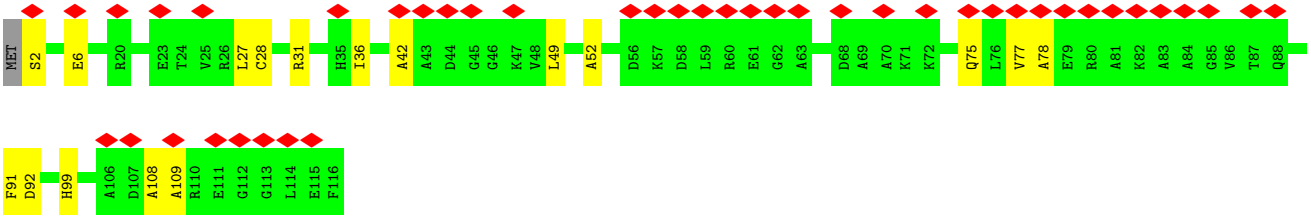




• Molecule 41: Large ribosomal subunit protein uL18

Chain n:

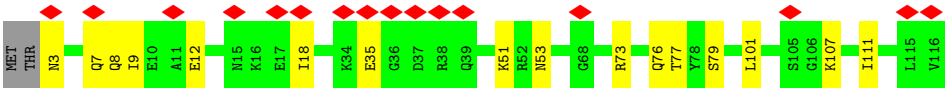




• Molecule 42: Large ribosomal subunit protein bL19

Chain o:

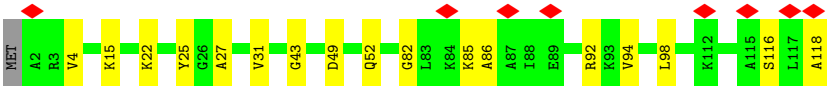




• Molecule 43: Large ribosomal subunit protein bL20

Chain p:

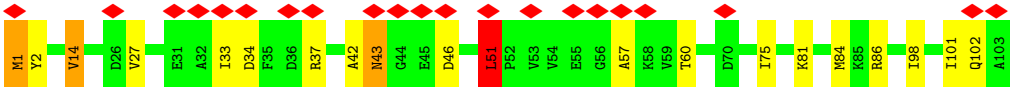




• Molecule 44: Large ribosomal subunit protein bL21

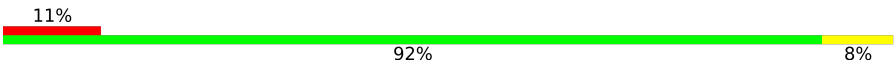
Chain q:

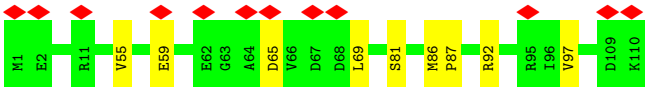




• Molecule 45: Large ribosomal subunit protein uL22

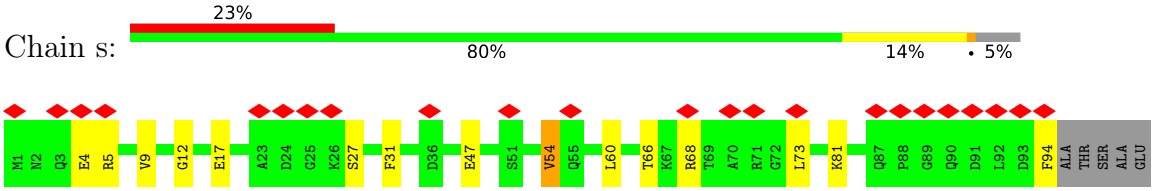
Chain r:





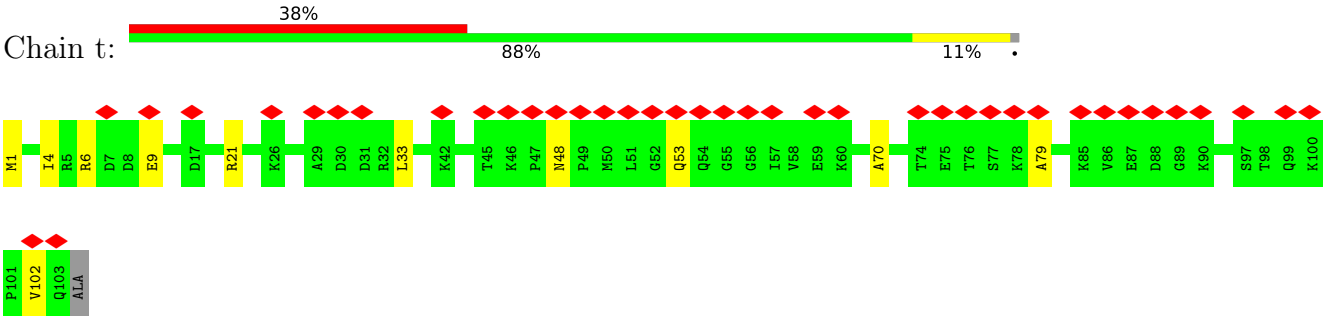
• Molecule 46: Large ribosomal subunit protein uL23

Chain s:



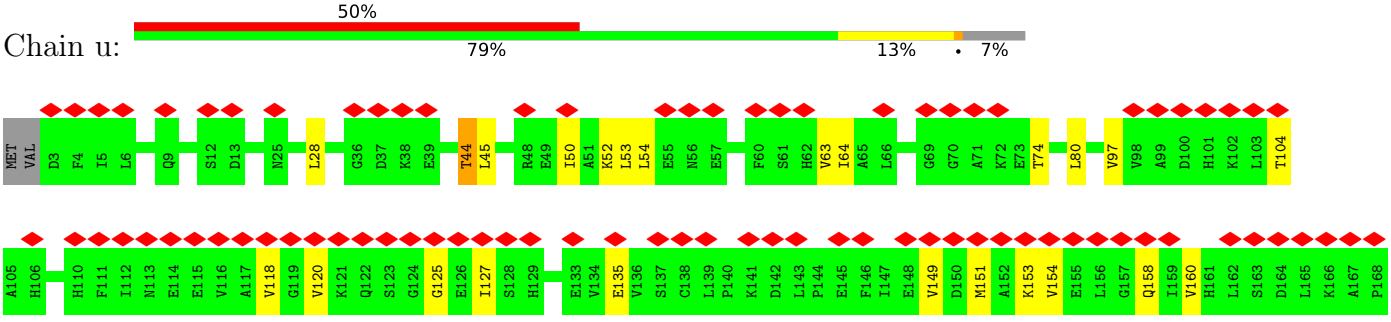
• Molecule 47: Large ribosomal subunit protein uL24

Chain t:



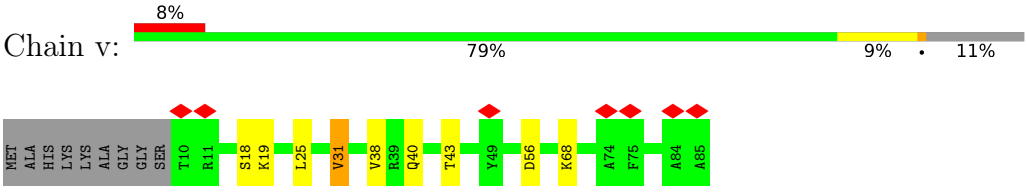
• Molecule 48: Large ribosomal subunit protein bL25

Chain u:



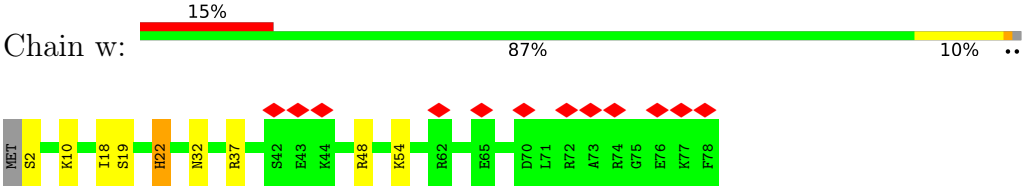
• Molecule 49: Large ribosomal subunit protein bL27

Chain v:



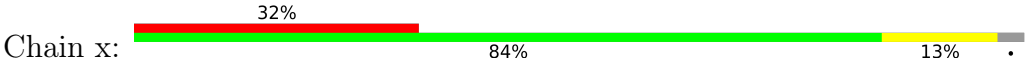
• Molecule 50: Large ribosomal subunit protein bL28

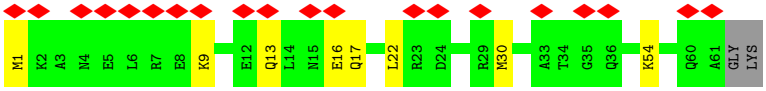
Chain w:



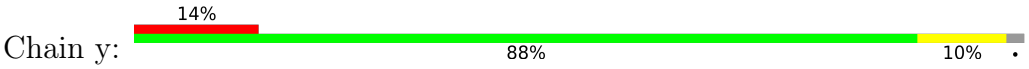
• Molecule 51: Large ribosomal subunit protein uL29

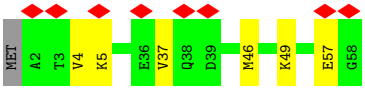
Chain x:



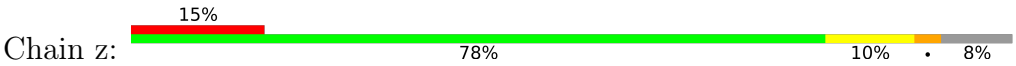


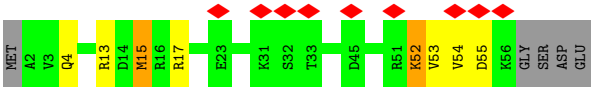
• Molecule 52: Large ribosomal subunit protein uL30





• Molecule 53: Large ribosomal subunit protein bL32





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	81011	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	35	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.591	Depositor
Minimum map value	-1.126	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.075	Depositor
Recommended contour level	0.5	Depositor
Map size (Å)	542.72, 542.72, 542.72	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, PSU, MS6, MA6, OMC, G7M, 3TD, H2U, K, 5MC, 4D4, 1MG, 6MZ, 7MG, IAS, MEQ, 5MU, UR3, 2MA, OMG, ZN, 4OC, D2T, OMU, 2MG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	0	0.17	0/433	0.42	0/576
2	1	0.19	0/368	0.34	0/482
3	2	0.17	0/511	0.28	0/668
4	3	0.20	0/308	0.33	0/404
5	4	0.16	0/542	0.45	0/728
6	A	0.39	0/36632	0.75	12/57140 (0.0%)
7	B	0.16	0/1791	0.43	0/2405
8	C	0.15	0/1693	0.31	0/2279
9	D	0.15	0/1646	0.35	0/2201
10	E	0.17	0/1148	0.35	0/1544
11	F	0.17	0/882	0.40	0/1186
12	G	0.13	0/1217	0.29	0/1627
13	H	0.17	0/993	0.35	0/1332
14	I	0.14	0/1022	0.34	0/1365
15	J	0.17	0/803	0.41	0/1083
16	K	0.15	0/889	0.28	0/1199
17	L	0.17	0/964	0.33	0/1289
18	M	0.13	0/892	0.40	0/1199
19	N	0.15	0/816	0.30	0/1087
20	O	0.18	0/710	0.36	0/947
21	P	0.17	0/648	0.30	0/872
22	Q	0.16	0/653	0.34	0/881
23	R	0.14	0/502	0.30	0/677
24	S	0.13	0/678	0.29	0/912
25	T	0.19	0/678	0.27	0/904
26	W	0.31	0/245	0.74	0/381
27	X	0.14	0/803	0.35	0/1075
28	a	0.45	0/68901	0.75	19/107478 (0.0%)
29	b	0.35	0/2789	0.70	2/4345 (0.0%)
30	c	0.20	0/2108	0.33	0/2831
31	d	0.21	0/1601	0.39	0/2152

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	e	0.18	0/1544	0.30	0/2079
33	f	0.17	0/1439	0.38	0/1932
34	g	0.15	0/1344	0.35	0/1809
35	h	0.11	0/536	0.29	0/719
36	i	0.19	0/1156	0.33	0/1559
37	j	0.18	0/947	0.32	0/1268
38	k	0.18	0/1078	0.34	0/1436
39	l	0.20	0/1085	0.39	0/1449
40	m	0.19	0/975	0.33	0/1304
41	n	0.16	0/888	0.33	0/1183
42	o	0.18	0/911	0.32	0/1218
43	p	0.20	0/946	0.29	0/1257
44	q	0.18	0/835	0.33	0/1117
45	r	0.18	0/837	0.33	0/1114
46	s	0.18	0/749	0.36	0/1002
47	t	0.16	0/808	0.36	0/1079
48	u	0.14	0/1469	0.30	0/1988
49	v	0.20	0/583	0.33	0/774
50	w	0.18	0/641	0.28	0/854
51	x	0.14	0/491	0.22	0/654
52	y	0.17	0/449	0.31	0/602
53	z	0.19	0/446	0.35	0/594
All	All	0.37	0/154023	0.67	33/230240 (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
31	d	0	1
44	q	0	1
All	All	0	2

There are no bond length outliers.

The worst 5 of 33 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
28	a	2087	G	OP1-P-O3'	-10.94	75.17	108.00
28	a	2087	G	OP2-P-O3'	-10.36	76.91	108.00
28	a	879	C	O4'-C1'-N1	9.20	114.94	108.50
6	A	1022	C	N3-C2-O2	-7.24	116.83	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
28	a	1300	U	C2-N1-C1'	7.05	126.16	117.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
31	d	151	THR	Peptide
44	q	51	LEU	Peptide

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	426	0	457	12	0
2	1	365	0	409	8	0
3	2	506	0	569	3	0
4	3	307	0	342	6	0
5	4	531	0	528	22	0
6	A	32945	0	16590	406	0
7	B	1763	0	1811	44	0
8	C	1664	0	1723	29	0
9	D	1627	0	1665	30	0
10	E	1134	0	1181	21	0
11	F	868	0	846	21	0
12	G	1199	0	1253	19	0
13	H	982	0	1036	13	0
14	I	1010	0	1052	23	0
15	J	793	0	833	26	0
16	K	882	0	897	13	0
17	L	961	0	1010	15	0
18	M	883	0	929	18	0
19	N	804	0	841	9	0
20	O	703	0	727	6	0
21	P	637	0	648	7	0
22	Q	645	0	689	16	0
23	R	494	0	514	9	0
24	S	663	0	697	24	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
25	T	671	0	722	5	0
26	W	219	0	108	4	0
27	X	796	0	818	17	0
28	a	62019	0	31186	592	0
29	b	2495	0	1263	20	0
30	c	2072	0	2152	26	0
31	d	1589	0	1605	21	0
32	e	1524	0	1582	24	0
33	f	1418	0	1486	54	0
34	g	1326	0	1388	18	0
35	h	533	0	560	6	0
36	i	1130	0	1160	15	0
37	j	938	0	1012	20	0
38	k	1066	0	1112	11	0
39	l	1086	0	1145	21	0
40	m	959	0	1005	11	0
41	n	881	0	920	10	0
42	o	902	0	960	13	0
43	p	936	0	1025	12	0
44	q	822	0	858	13	0
45	r	833	0	897	5	0
46	s	739	0	788	9	0
47	t	800	0	863	6	0
48	u	1446	0	1486	17	0
49	v	575	0	598	6	0
50	w	630	0	653	6	0
51	x	490	0	520	7	0
52	y	445	0	472	4	0
53	z	440	0	437	6	0
54	3	1	0	0	0	0
54	4	1	0	0	0	0
55	A	93	0	0	0	0
55	Q	1	0	0	0	0
55	X	1	0	0	0	0
55	a	249	0	0	0	0
55	b	5	0	0	0	0
55	c	1	0	0	0	0
55	p	2	0	0	0	0
55	v	1	0	0	0	0
55	z	1	0	0	0	0
56	A	48	0	0	0	0
56	X	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
56	a	113	0	0	0	0
56	b	1	0	0	0	0
56	c	4	0	0	0	0
56	e	1	0	0	0	0
56	f	1	0	0	0	0
All	All	143097	0	96028	1645	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 7.

The worst 5 of 1645 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)
28:a:1834:A:HO2'	28:a:1835:A:H8	1.00	0.98
9:D:28:LEU:O	9:D:32:CYS:HB3	1.66	0.95
28:a:2126:U:H3	28:a:2139:G:H1	0.97	0.93
33:f:4:LEU:HG	33:f:101:ASP:HB3	1.55	0.86
28:a:2122:A:H62	28:a:2143:G:H21	1.23	0.84

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	49/51 (96%)	49 (100%)	0	0	100	100
2	1	42/44 (96%)	40 (95%)	2 (5%)	0	100	100
3	2	61/64 (95%)	60 (98%)	1 (2%)	0	100	100
4	3	36/38 (95%)	34 (94%)	2 (6%)	0	100	100
5	4	66/71 (93%)	56 (85%)	9 (14%)	1 (2%)	8	28

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
7	B	222/246 (90%)	197 (89%)	24 (11%)	1 (0%)	24 55
8	C	206/228 (90%)	192 (93%)	14 (7%)	0	100 100
9	D	203/206 (98%)	188 (93%)	15 (7%)	0	100 100
10	E	152/166 (92%)	145 (95%)	7 (5%)	0	100 100
11	F	104/139 (75%)	100 (96%)	4 (4%)	0	100 100
12	G	151/156 (97%)	143 (95%)	8 (5%)	0	100 100
13	H	127/130 (98%)	118 (93%)	9 (7%)	0	100 100
14	I	125/130 (96%)	115 (92%)	9 (7%)	1 (1%)	16 44
15	J	97/103 (94%)	87 (90%)	10 (10%)	0	100 100
16	K	115/129 (89%)	110 (96%)	5 (4%)	0	100 100
17	L	119/123 (97%)	111 (93%)	8 (7%)	0	100 100
18	M	111/118 (94%)	101 (91%)	10 (9%)	0	100 100
19	N	98/101 (97%)	97 (99%)	1 (1%)	0	100 100
20	O	86/89 (97%)	85 (99%)	1 (1%)	0	100 100
21	P	79/83 (95%)	79 (100%)	0	0	100 100
22	Q	78/88 (89%)	78 (100%)	0	0	100 100
23	R	60/76 (79%)	55 (92%)	5 (8%)	0	100 100
24	S	81/91 (89%)	78 (96%)	3 (4%)	0	100 100
25	T	85/91 (93%)	85 (100%)	0	0	100 100
27	X	96/102 (94%)	93 (97%)	3 (3%)	0	100 100
30	c	270/273 (99%)	260 (96%)	10 (4%)	0	100 100
31	d	208/211 (99%)	196 (94%)	9 (4%)	3 (1%)	9 30
32	e	198/200 (99%)	188 (95%)	9 (4%)	1 (0%)	24 55
33	f	175/179 (98%)	151 (86%)	23 (13%)	1 (1%)	21 51
34	g	173/177 (98%)	160 (92%)	13 (8%)	0	100 100
35	h	70/148 (47%)	63 (90%)	7 (10%)	0	100 100
36	i	140/142 (99%)	137 (98%)	3 (2%)	0	100 100
37	j	120/122 (98%)	118 (98%)	2 (2%)	0	100 100
38	k	142/144 (99%)	133 (94%)	9 (6%)	0	100 100
39	l	133/137 (97%)	130 (98%)	3 (2%)	0	100 100
40	m	118/129 (92%)	113 (96%)	5 (4%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
41	n	113/116 (97%)	102 (90%)	11 (10%)	0	100	100
42	o	112/116 (97%)	103 (92%)	9 (8%)	0	100	100
43	p	115/118 (98%)	114 (99%)	1 (1%)	0	100	100
44	q	101/103 (98%)	100 (99%)	1 (1%)	0	100	100
45	r	108/110 (98%)	107 (99%)	1 (1%)	0	100	100
46	s	92/99 (93%)	87 (95%)	5 (5%)	0	100	100
47	t	101/104 (97%)	94 (93%)	7 (7%)	0	100	100
48	u	188/204 (92%)	186 (99%)	2 (1%)	0	100	100
49	v	74/85 (87%)	72 (97%)	2 (3%)	0	100	100
50	w	75/78 (96%)	74 (99%)	1 (1%)	0	100	100
51	x	59/63 (94%)	59 (100%)	0	0	100	100
52	y	55/58 (95%)	55 (100%)	0	0	100	100
53	z	53/60 (88%)	51 (96%)	2 (4%)	0	100	100
All	All	5642/6039 (93%)	5349 (95%)	285 (5%)	8 (0%)	49	77

5 of 8 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
31	d	149	CYS
7	B	126	PHE
31	d	152	PRO
32	e	122	ASP
33	f	74	ILE

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	0	47/47 (100%)	47 (100%)	0	100	100
2	1	37/37 (100%)	36 (97%)	1 (3%)	39	74
3	2	54/55 (98%)	53 (98%)	1 (2%)	50	81

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	3	34/34 (100%)	34 (100%)	0	100	100
5	4	59/61 (97%)	54 (92%)	5 (8%)	10	31
7	B	187/202 (93%)	180 (96%)	7 (4%)	30	65
8	C	172/187 (92%)	170 (99%)	2 (1%)	63	87
9	D	173/174 (99%)	171 (99%)	2 (1%)	63	87
10	E	113/124 (91%)	113 (100%)	0	100	100
11	F	91/119 (76%)	88 (97%)	3 (3%)	33	69
12	G	119/122 (98%)	114 (96%)	5 (4%)	26	61
13	H	108/109 (99%)	107 (99%)	1 (1%)	70	89
14	I	104/106 (98%)	101 (97%)	3 (3%)	37	73
15	J	88/92 (96%)	82 (93%)	6 (7%)	14	42
16	K	90/97 (93%)	90 (100%)	0	100	100
17	L	105/106 (99%)	104 (99%)	1 (1%)	68	88
18	M	95/99 (96%)	95 (100%)	0	100	100
19	N	81/82 (99%)	80 (99%)	1 (1%)	63	87
20	O	74/75 (99%)	73 (99%)	1 (1%)	59	85
21	P	64/65 (98%)	63 (98%)	1 (2%)	55	83
22	Q	73/79 (92%)	70 (96%)	3 (4%)	27	62
23	R	52/64 (81%)	51 (98%)	1 (2%)	50	81
24	S	72/78 (92%)	71 (99%)	1 (1%)	59	85
25	T	69/70 (99%)	68 (99%)	1 (1%)	59	85
27	X	86/88 (98%)	85 (99%)	1 (1%)	63	87
30	c	212/213 (100%)	212 (100%)	0	100	100
31	d	161/161 (100%)	154 (96%)	7 (4%)	26	60
32	e	158/158 (100%)	154 (98%)	4 (2%)	42	76
33	f	151/153 (99%)	143 (95%)	8 (5%)	20	52
34	g	139/141 (99%)	136 (98%)	3 (2%)	45	78
35	h	49/107 (46%)	46 (94%)	3 (6%)	17	46
36	i	119/119 (100%)	115 (97%)	4 (3%)	32	68
37	j	102/102 (100%)	96 (94%)	6 (6%)	18	48
38	k	106/106 (100%)	105 (99%)	1 (1%)	70	89

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
39	l	108/108 (100%)	106 (98%)	2 (2%)	50 81
40	m	99/104 (95%)	98 (99%)	1 (1%)	68 88
41	n	86/87 (99%)	86 (100%)	0	100 100
42	o	96/98 (98%)	95 (99%)	1 (1%)	68 88
43	p	87/88 (99%)	87 (100%)	0	100 100
44	q	86/86 (100%)	80 (93%)	6 (7%)	14 40
45	r	87/87 (100%)	86 (99%)	1 (1%)	65 87
46	s	79/82 (96%)	76 (96%)	3 (4%)	29 64
47	t	88/88 (100%)	87 (99%)	1 (1%)	65 87
48	u	155/165 (94%)	151 (97%)	4 (3%)	40 75
49	v	56/61 (92%)	54 (96%)	2 (4%)	31 66
50	w	66/67 (98%)	64 (97%)	2 (3%)	36 72
51	x	54/55 (98%)	54 (100%)	0	100 100
52	y	48/49 (98%)	48 (100%)	0	100 100
53	z	48/52 (92%)	46 (96%)	2 (4%)	26 61
All	All	4687/4909 (96%)	4579 (98%)	108 (2%)	44 78

5 of 108 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
32	e	192	VAL
35	h	21	ILE
48	u	63	VAL
33	f	22	LEU
33	f	163	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
43	p	72	ASN
50	w	36	HIS
47	t	48	ASN
48	u	110	HIS
19	N	8	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
26	W	9/15 (60%)	0	0
28	a	2889/2891 (99%)	550 (19%)	0
29	b	116/120 (96%)	21 (18%)	0
6	A	1534/1536 (99%)	302 (19%)	21 (1%)
All	All	4548/4562 (99%)	873 (19%)	21 (0%)

5 of 873 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
6	A	2	A
6	A	4	C
6	A	5	U
6	A	6	G
6	A	7	A

5 of 21 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
6	A	976	U
6	A	1164	A
6	A	1247	G
6	A	1195	A
6	A	1162	C

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

38 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	$\#\|Z\| > 2$
28	2MG	a	1822	28	23,26,27	2.57	6 (26%)	32,38,41	2.07	11 (34%)
28	7MG	a	2056	56,28	22,26,27	1.21	1 (4%)	29,39,42	0.90	1 (3%)
28	OMC	a	2485	55,28	19,22,23	1.78	4 (21%)	26,31,34	1.02	2 (7%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
6	MA6	A	1513	6	23,26,27	1.18	3 (13%)	34,38,41	2.26	9 (26%)
28	6MZ	a	1608	28	22,25,26	2.41	3 (13%)	30,36,39	2.25	10 (33%)
16	IAS	K	119	16	6,7,8	1.74	1 (16%)	6,8,10	2.52	1 (16%)
28	PSU	a	2444	28	18,21,22	2.09	7 (38%)	22,30,33	1.85	5 (22%)
28	PSU	a	2491	56,28	18,21,22	2.03	7 (38%)	22,30,33	1.79	3 (13%)
28	PSU	a	2592	28	18,21,22	2.02	7 (38%)	22,30,33	1.84	3 (13%)
39	MS6	l	83	39	5,7,8	0.53	0	2,7,9	1.84	1 (50%)
28	PSU	a	1904	28	18,21,22	1.97	7 (38%)	22,30,33	1.78	4 (18%)
17	D2T	L	89	17	7,9,10	1.30	1 (14%)	6,11,13	1.51	1 (16%)
6	PSU	A	510	55,6	18,21,22	1.99	7 (38%)	22,30,33	1.78	5 (22%)
6	MA6	A	1512	6	23,26,27	1.18	3 (13%)	34,38,41	2.26	9 (26%)
28	OMG	a	2238	56,28	23,26,27	2.35	6 (26%)	33,38,41	1.83	10 (30%)
28	2MA	a	2490	56,55,28	22,25,26	1.31	1 (4%)	33,37,40	2.01	7 (21%)
28	5MU	a	1926	56,28	19,22,23	2.49	7 (36%)	28,32,35	3.85	10 (35%)
6	2MG	A	1510	56,6	23,26,27	2.57	5 (21%)	32,38,41	2.09	10 (31%)
28	PSU	a	2591	28	18,21,22	2.03	7 (38%)	22,30,33	1.76	3 (13%)
28	PSU	a	2567	56,28	18,21,22	2.09	8 (44%)	22,30,33	1.92	5 (22%)
28	PSU	a	736	55,28	18,21,22	2.02	7 (38%)	22,30,33	1.84	3 (13%)
28	H2U	a	2436	28	18,21,22	4.20	5 (27%)	21,30,33	4.77	6 (28%)
28	PSU	a	1898	28	18,21,22	1.94	7 (38%)	22,30,33	1.84	3 (13%)
28	1MG	a	735	28	22,26,27	2.51	5 (22%)	33,39,42	1.99	7 (21%)
28	3TD	a	1902	28	18,22,23	2.71	7 (38%)	22,32,35	1.72	2 (9%)
6	2MG	A	960	6	23,26,27	2.57	4 (17%)	32,38,41	2.11	9 (28%)
6	5MC	A	961	6	18,22,23	1.86	5 (27%)	26,32,35	1.31	2 (7%)
6	4OC	A	1396	6	20,23,24	2.22	3 (15%)	26,32,35	1.04	2 (7%)
28	6MZ	a	2017	28	22,25,26	2.40	3 (13%)	30,36,39	2.33	9 (30%)
6	UR3	A	1492	6	19,22,23	2.53	6 (31%)	26,32,35	1.32	2 (7%)
28	PSU	a	945	28	18,21,22	2.05	7 (38%)	22,30,33	1.88	4 (18%)
28	2MG	a	2432	28	23,26,27	2.58	6 (26%)	32,38,41	2.08	11 (34%)
31	MEQ	d	150	31	8,9,10	0.85	0	5,10,12	0.36	0
6	G7M	A	521	56,6	23,26,27	2.16	5 (21%)	35,39,42	1.84	7 (20%)
39	4D4	l	82	39	9,11,12	0.81	0	8,13,15	1.61	2 (25%)
6	2MG	A	1201	56,6	23,26,27	2.55	4 (17%)	32,38,41	2.12	11 (34%)
28	5MC	a	1949	56,28	18,22,23	1.87	5 (27%)	26,32,35	1.28	2 (7%)
28	OMU	a	2539	56,28	19,22,23	2.60	7 (36%)	26,31,34	1.73	5 (19%)

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
28	2MG	a	1822	28	-	1/9/27/28	0/3/3/3
28	7MG	a	2056	56,28	-	2/7/37/38	0/3/3/3
28	OMC	a	2485	55,28	-	1/9/27/28	0/2/2/2
6	MA6	A	1513	6	-	4/11/29/30	0/3/3/3
28	6MZ	a	1608	28	-	0/9/27/28	0/3/3/3
16	IAS	K	119	16	-	3/7/7/8	-
28	PSU	a	2444	28	-	0/7/25/26	0/2/2/2
28	PSU	a	2491	56,28	-	2/7/25/26	0/2/2/2
28	PSU	a	2592	28	-	0/7/25/26	0/2/2/2
39	MS6	l	83	39	-	3/4/6/8	-
28	PSU	a	1904	28	-	0/7/25/26	0/2/2/2
17	D2T	L	89	17	-	4/7/12/14	-
6	PSU	A	510	55,6	-	0/7/25/26	0/2/2/2
6	MA6	A	1512	6	-	3/11/29/30	0/3/3/3
28	OMG	a	2238	56,28	-	3/9/27/28	0/3/3/3
28	2MA	a	2490	56,55,28	-	2/7/25/26	0/3/3/3
28	5MU	a	1926	56,28	-	0/7/25/26	0/2/2/2
6	2MG	A	1510	56,6	-	0/9/27/28	0/3/3/3
28	PSU	a	2591	28	-	0/7/25/26	0/2/2/2
28	PSU	a	2567	56,28	-	0/7/25/26	0/2/2/2
28	PSU	a	736	55,28	-	1/7/25/26	0/2/2/2
28	H2U	a	2436	28	-	1/7/38/39	0/2/2/2
28	PSU	a	1898	28	-	0/7/25/26	0/2/2/2
28	1MG	a	735	28	-	0/7/25/26	0/3/3/3
28	3TD	a	1902	28	-	3/7/25/26	0/2/2/2
6	2MG	A	960	6	-	0/9/27/28	0/3/3/3
6	5MC	A	961	6	-	0/7/25/26	0/2/2/2
6	4OC	A	1396	6	-	1/9/29/30	0/2/2/2
28	6MZ	a	2017	28	-	2/9/27/28	0/3/3/3
6	UR3	A	1492	6	-	0/7/25/26	0/2/2/2
28	PSU	a	945	28	-	0/7/25/26	0/2/2/2
28	2MG	a	2432	28	-	2/9/27/28	0/3/3/3
31	MEQ	d	150	31	-	4/8/9/11	-
6	G7M	A	521	56,6	-	3/7/25/26	0/3/3/3
39	4D4	l	82	39	-	1/11/12/14	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	2MG	A	1201	56,6	-	2/9/27/28	0/3/3/3
28	5MC	a	1949	56,28	-	0/7/25/26	0/2/2/2
28	OMU	a	2539	56,28	-	0/9/27/28	0/2/2/2

The worst 5 of 177 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
28	a	1608	6MZ	C6-N6	10.20	1.45	1.34
28	a	2017	6MZ	C6-N6	10.07	1.45	1.34
28	a	2436	H2U	O4-C4	10.02	1.43	1.23
6	A	1201	2MG	O6-C6	9.14	1.41	1.23
6	A	1510	2MG	O6-C6	9.12	1.40	1.23

The worst 5 of 197 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
28	a	2436	H2U	C4-N3-C2	-13.50	114.59	125.79
28	a	2436	H2U	O2-C2-N1	-11.14	109.12	123.11
28	a	1926	5MU	C4-N3-C2	-8.60	116.22	127.35
28	a	1926	5MU	C5M-C5-C4	8.57	128.20	118.77
28	a	1926	5MU	N3-C2-N1	8.34	125.97	114.89

There are no chirality outliers.

5 of 48 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	521	G7M	C3'-C4'-C5'-O5'
6	A	1201	2MG	N1-C2-N2-CM2
6	A	1201	2MG	N3-C2-N2-CM2
6	A	1512	MA6	C5-C6-N6-C9
6	A	1512	MA6	C5-C6-N6-C10

There are no ring outliers.

8 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
16	K	119	IAS	1	0
28	a	2592	PSU	1	0
28	a	2238	OMG	1	0
28	a	2490	2MA	1	0
6	A	960	2MG	4	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	961	5MC	2	0
28	a	2017	6MZ	2	0
31	d	150	MEQ	2	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 525 ligands modelled in this entry, 525 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.

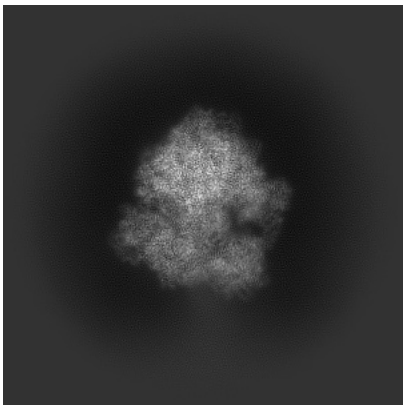
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-59044. These allow visual inspection of the internal detail of the map and identification of artifacts.

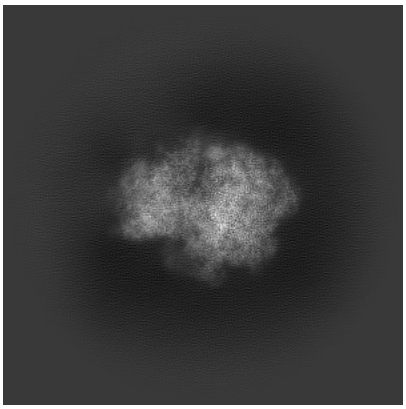
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

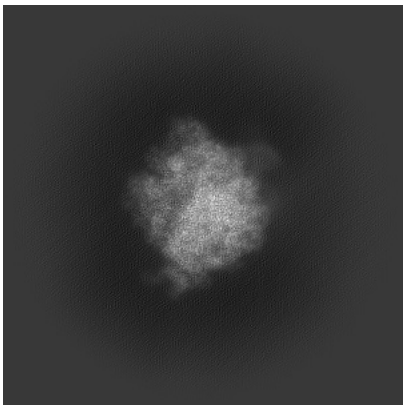
6.1.1 Primary map



X

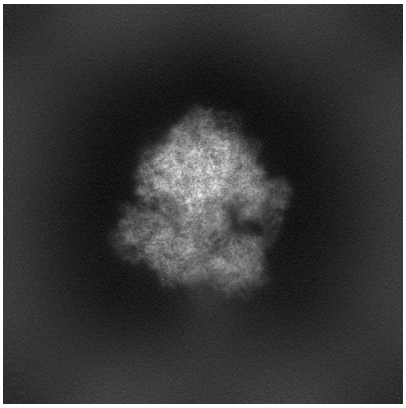


Y

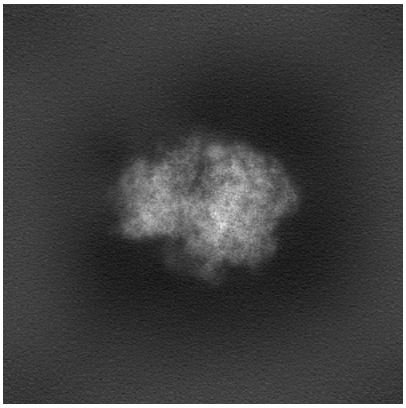


Z

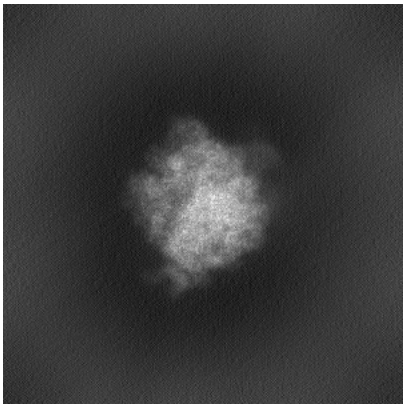
6.1.2 Raw map



X



Y

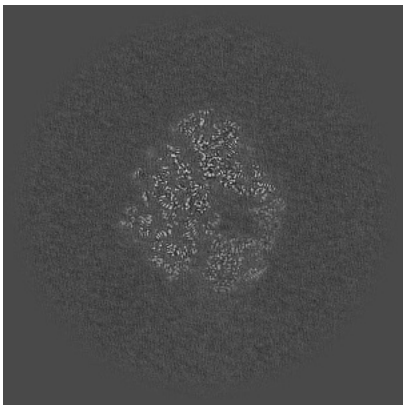


Z

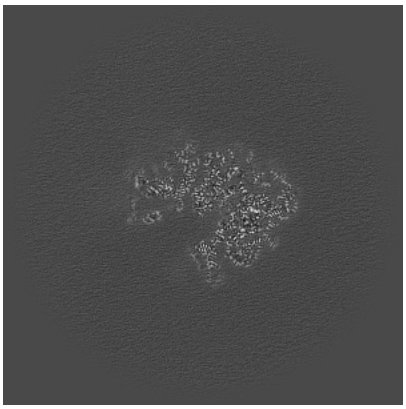
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

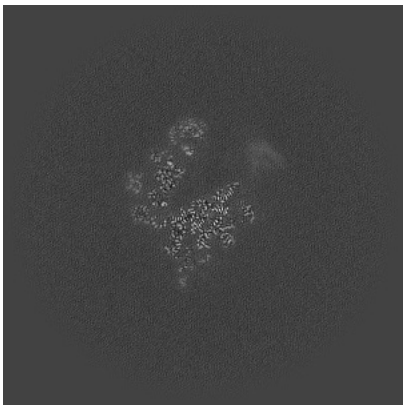
6.2.1 Primary map



X Index: 256

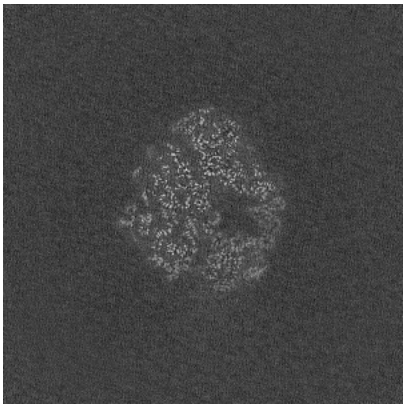


Y Index: 256

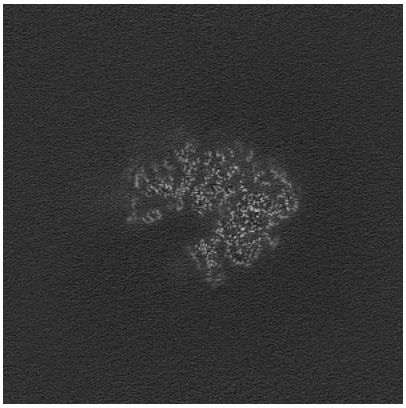


Z Index: 256

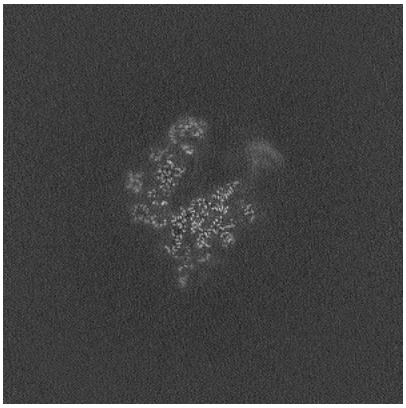
6.2.2 Raw map



X Index: 256



Y Index: 256

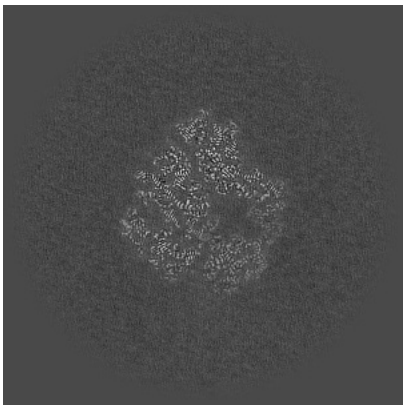


Z Index: 256

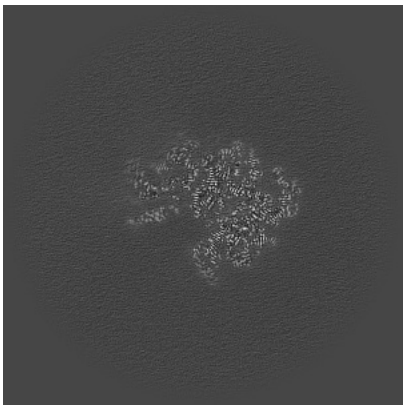
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

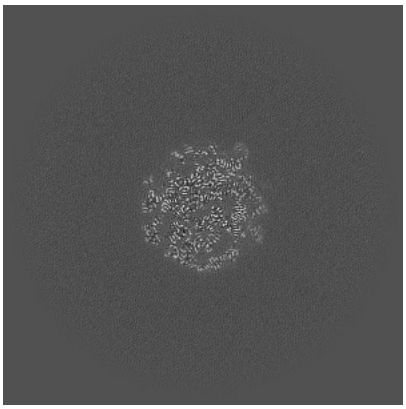
6.3.1 Primary map



X Index: 252

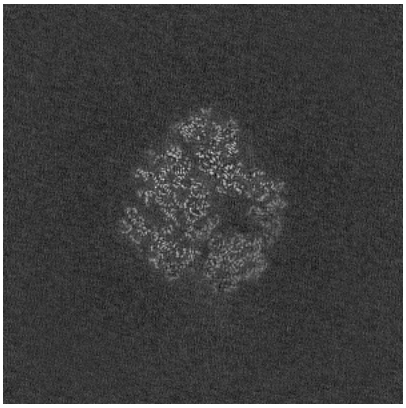


Y Index: 252

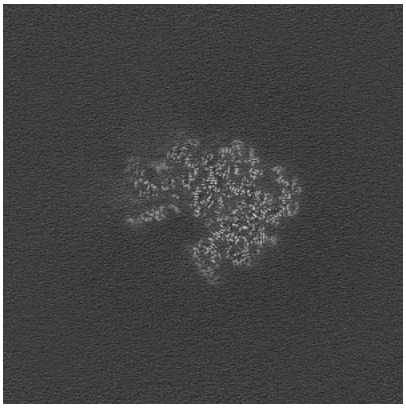


Z Index: 299

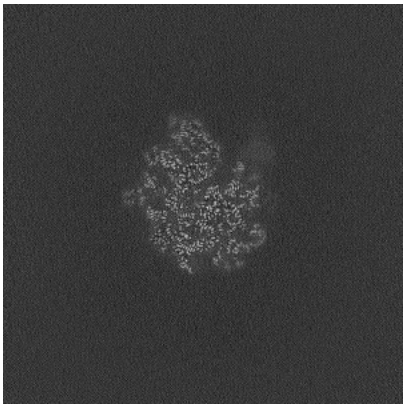
6.3.2 Raw map



X Index: 253



Y Index: 252

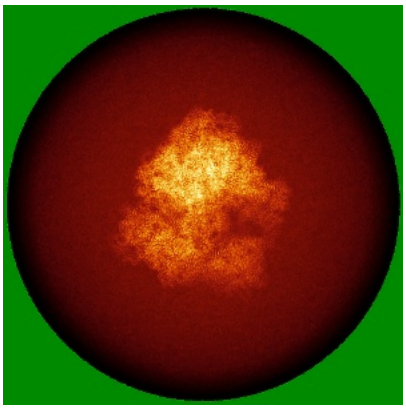


Z Index: 278

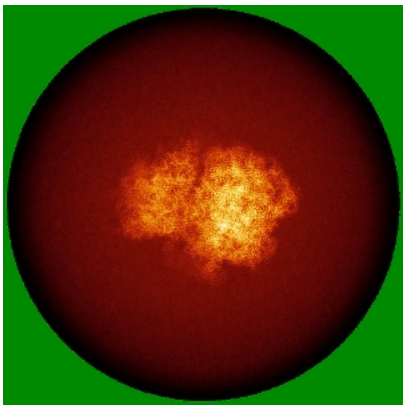
The images above show the largest variance slices of the map in three orthogonal directions.

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

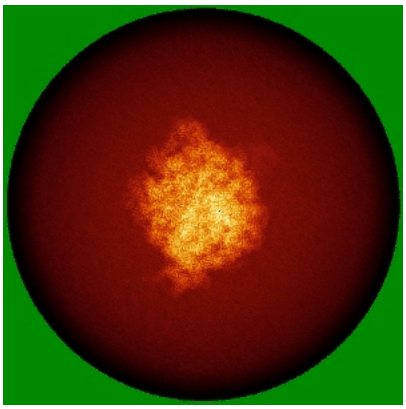
6.4.1 Primary map



X

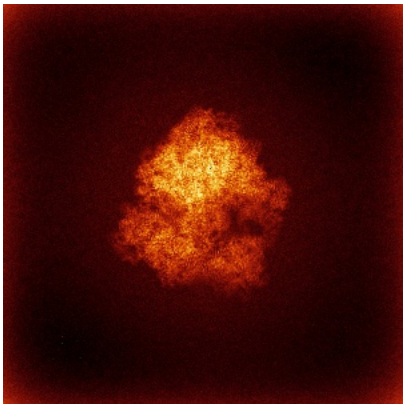


Y

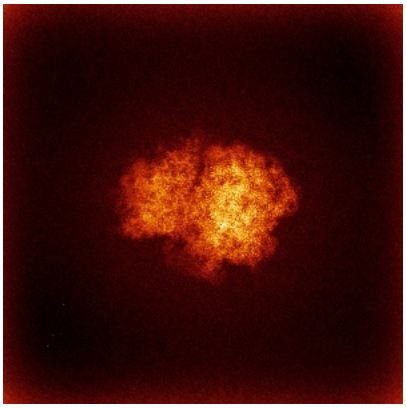


Z

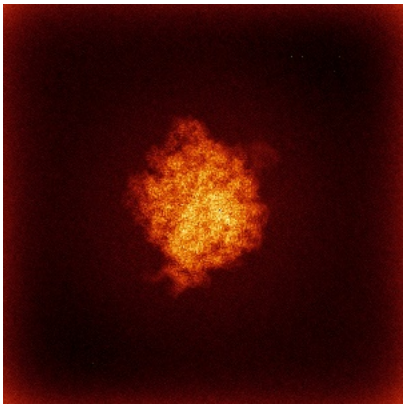
6.4.2 Raw map



X



Y



Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.5. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

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

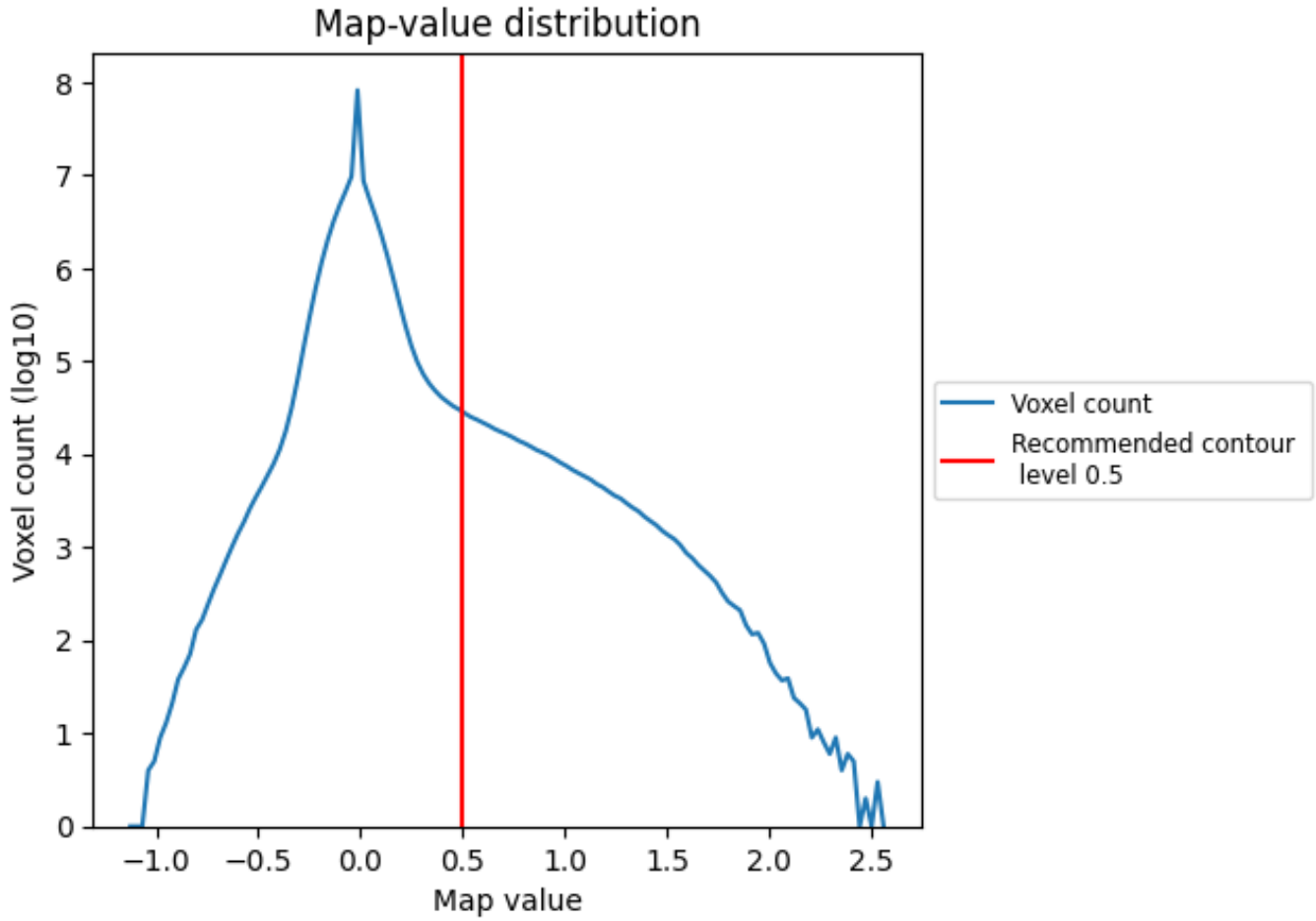
6.6 Mask visualisation (i)

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

7 Map analysis

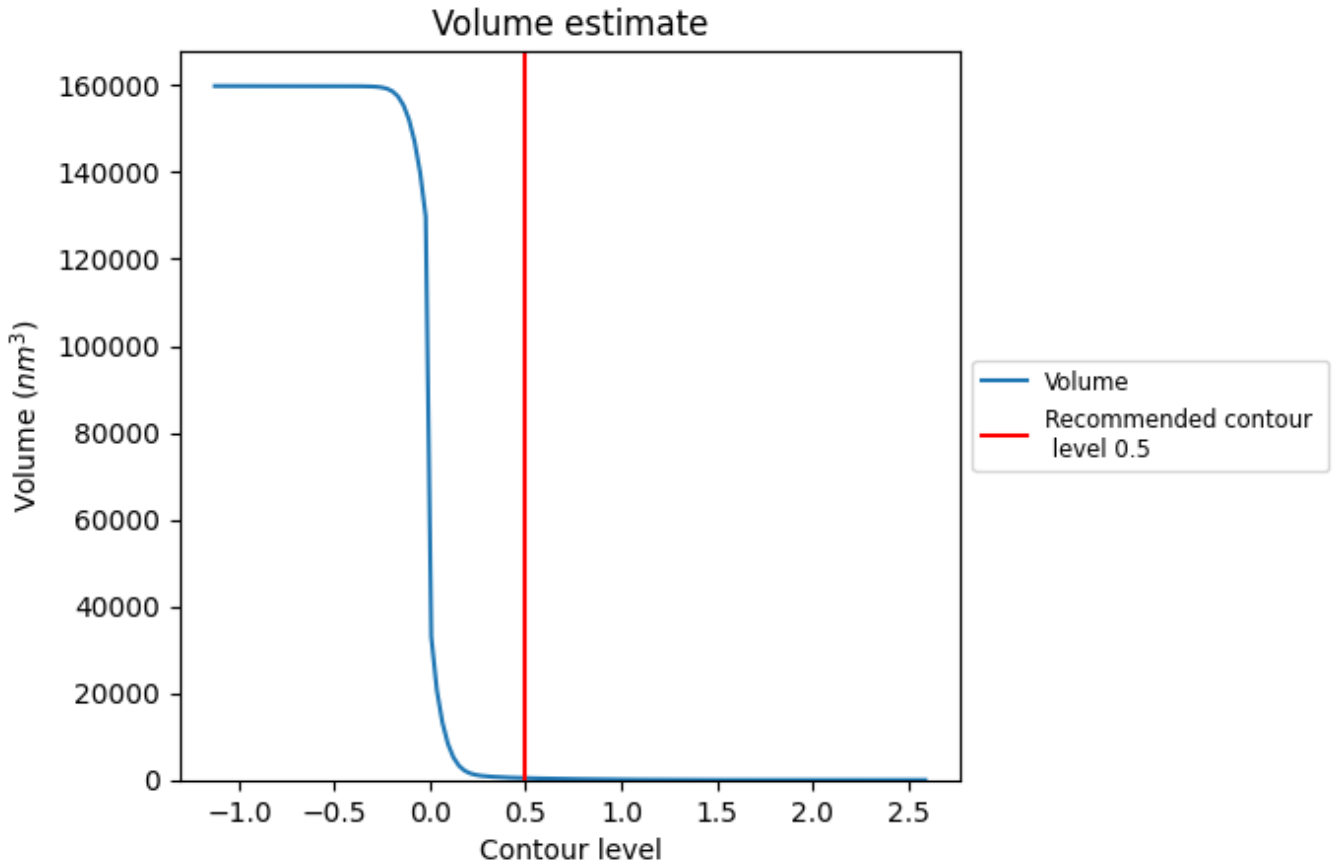
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

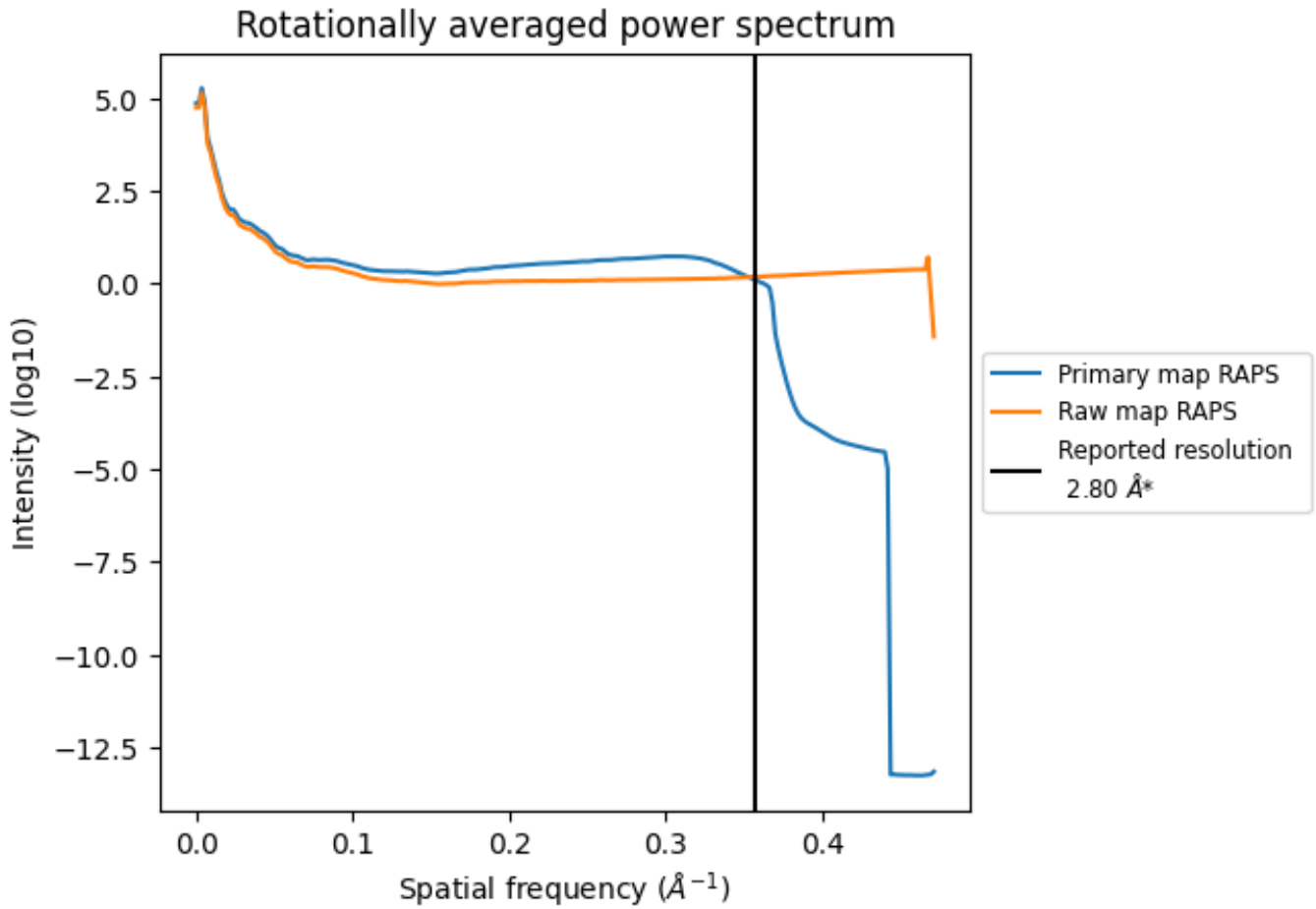
7.2 Volume estimate (i)



The volume at the recommended contour level is 431 nm^3; this corresponds to an approximate mass of 389 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)

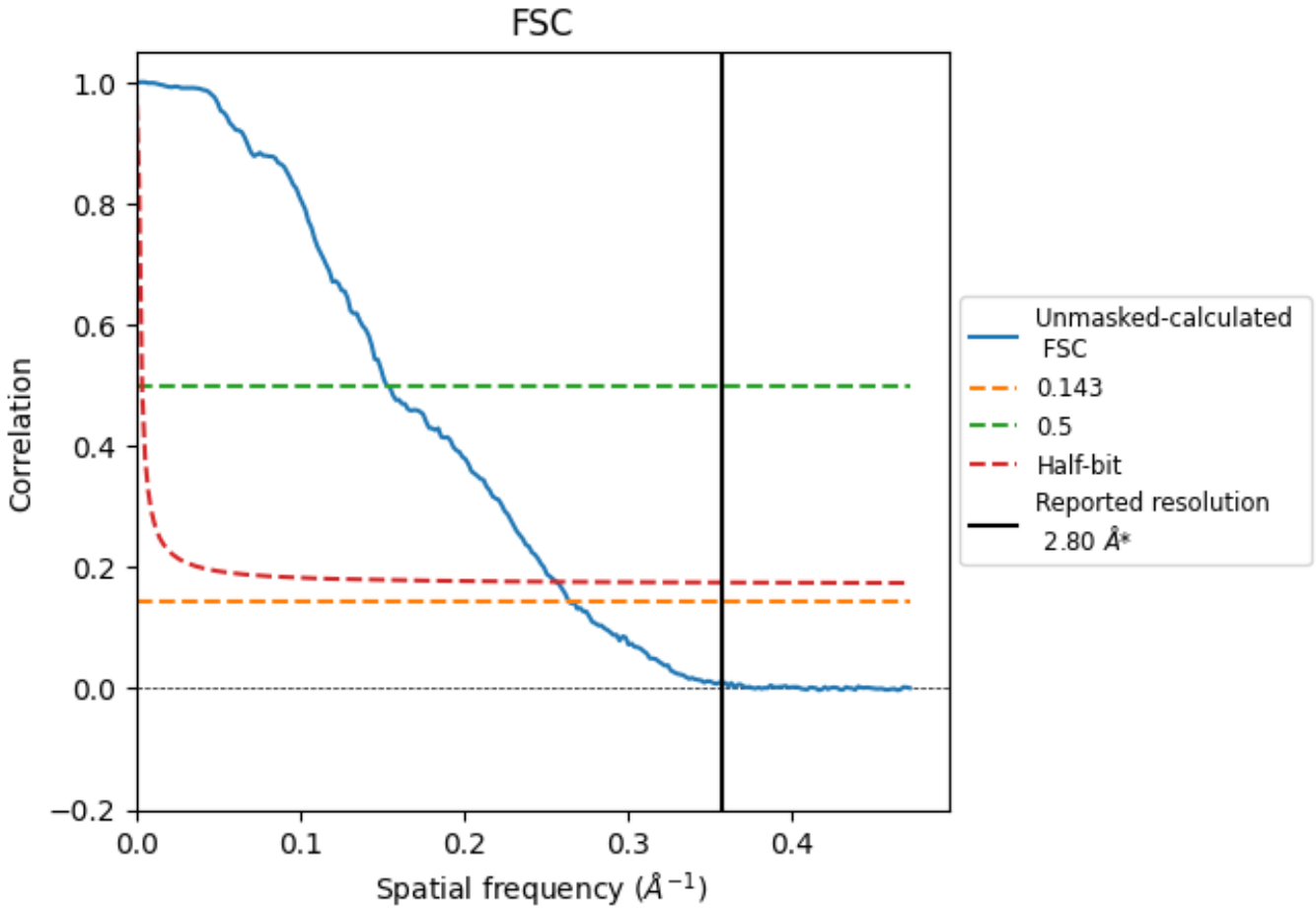


*Reported resolution corresponds to spatial frequency of 0.357 $Å^{-1}$

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.357 Å^{-1}

8.2 Resolution estimates (i)

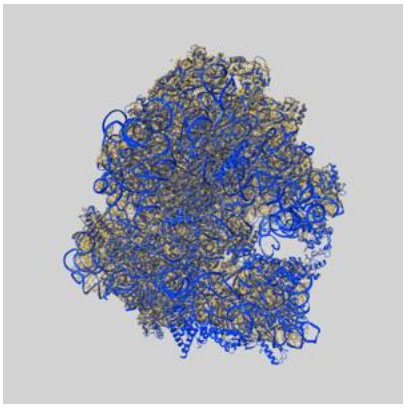
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.80	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.78	6.55	3.90

*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 3.78 differs from the reported value 2.8 by more than 10 %

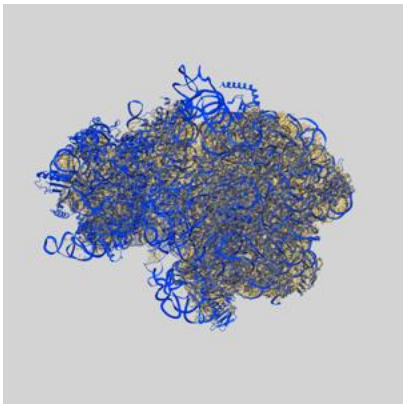
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-59044 and PDB model 32PB. Per-residue inclusion information can be found in section 3 on page 14.

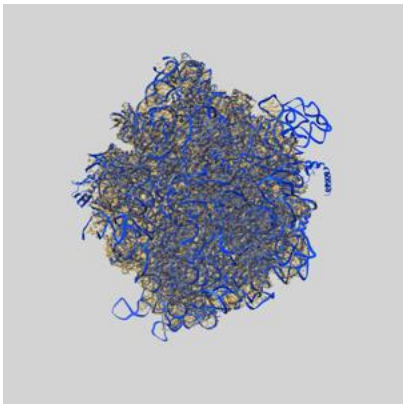
9.1 Map-model overlay



X



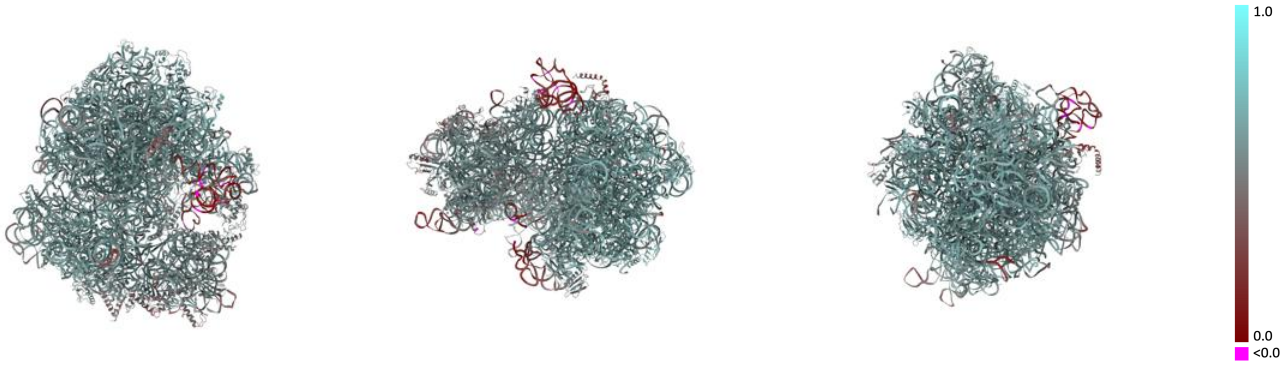
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.5 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

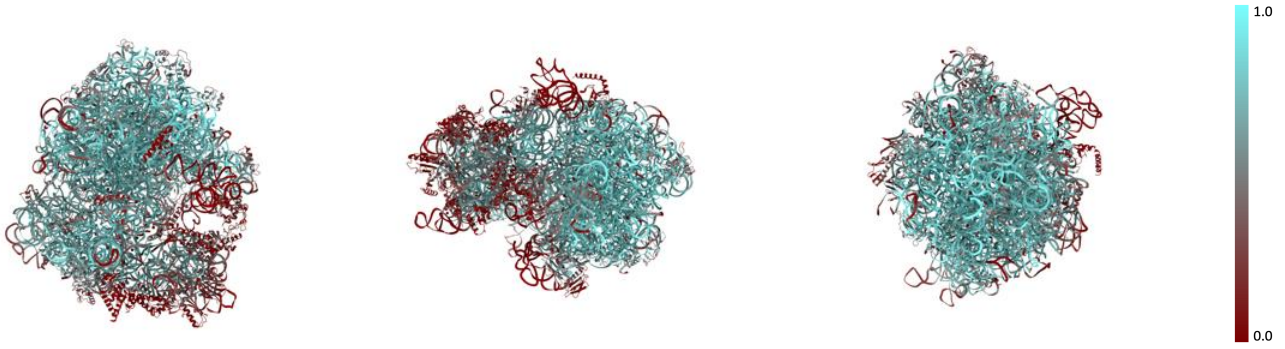
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

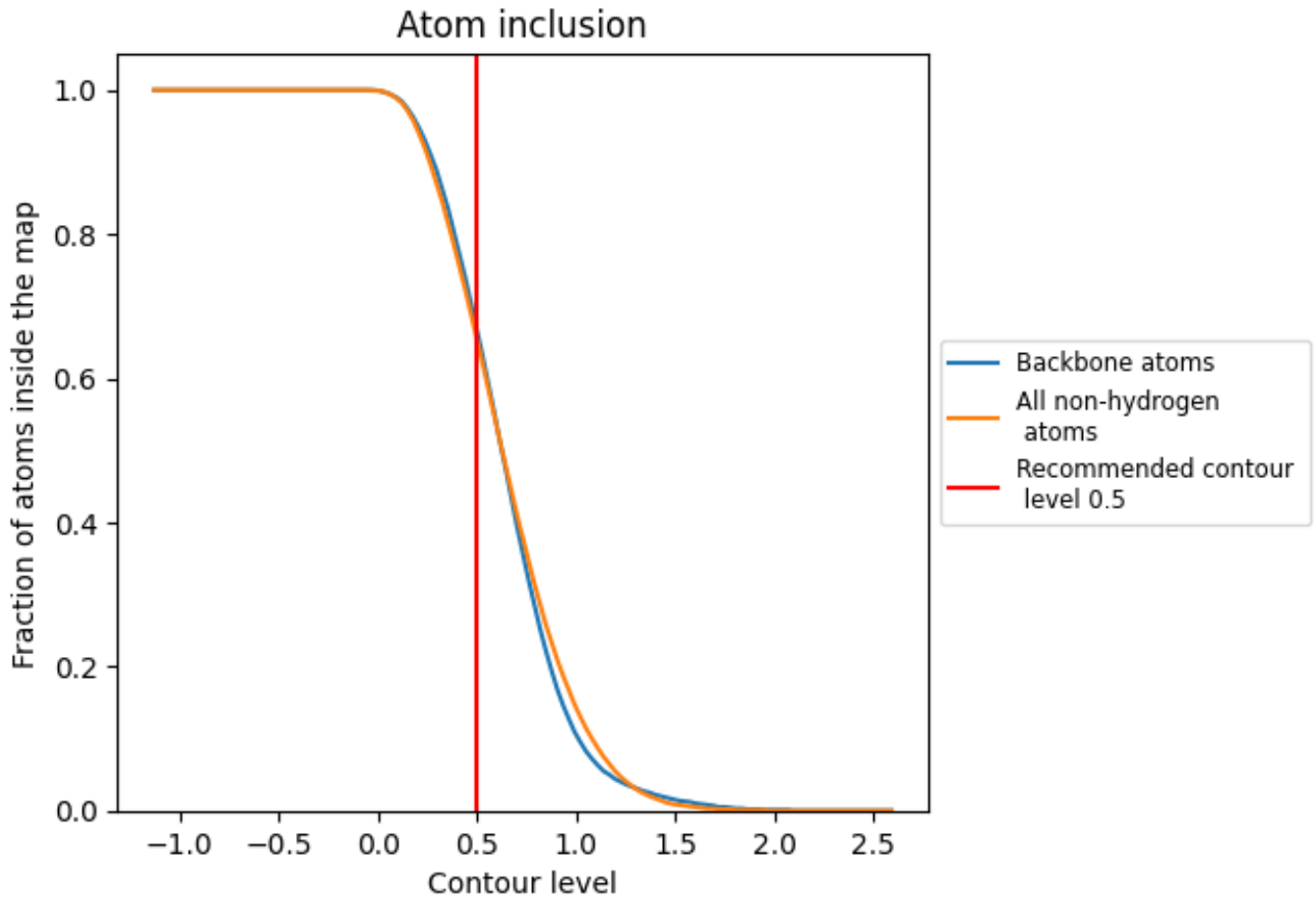
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.5).

9.4 Atom inclusion (i)



At the recommended contour level, 67% of all backbone atoms, 66% 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 (0.5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6560	0.5880
0	0.4840	0.5930
1	0.8130	0.6440
2	0.7710	0.6390
3	0.6800	0.6310
4	0.0380	0.4430
A	0.6590	0.5830
B	0.0210	0.4650
C	0.3290	0.5560
D	0.4030	0.5770
E	0.5600	0.6000
F	0.3130	0.5460
G	0.1290	0.5180
H	0.5620	0.6100
I	0.2480	0.5360
J	0.2010	0.4780
K	0.4080	0.5690
L	0.5810	0.6130
M	0.2040	0.5360
N	0.3420	0.5530
O	0.5660	0.6120
P	0.6380	0.6140
Q	0.5250	0.5990
R	0.4140	0.5680
S	0.1720	0.5110
T	0.5810	0.6040
W	0.4020	0.5370
X	0.2750	0.5690
a	0.7760	0.5950
b	0.6500	0.5870
c	0.7450	0.6380
d	0.7380	0.6300
e	0.6570	0.6220
f	0.1780	0.5280
g	0.3120	0.5540



Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
h	0.0020	0.3650
i	0.7230	0.6330
j	0.6660	0.6250
k	0.6940	0.6280
l	0.6550	0.6240
m	0.7720	0.6320
n	0.4930	0.5810
o	0.6410	0.6250
p	0.7610	0.6400
q	0.6210	0.6280
r	0.6910	0.6270
s	0.5930	0.6040
t	0.4760	0.5740
u	0.3940	0.5870
v	0.7260	0.6340
w	0.6910	0.6280
x	0.5370	0.5980
y	0.6740	0.6290
z	0.6880	0.6150