wwPDB EM Validation Summary Report (i)

Sep 18, 2025 – 05:31 PM EDT

PDB ID	:	9OU7 / pdb_00009ou7
EMDB ID	:	EMD-70864
Title	:	Methanosarcina acetivorans large (50S) subunit dimer
Authors	:	Ghosh, A.; Fordjour, G.N.R.; Armache, J.-P.; Ferry, J.G.; Murakami, K.S.; Bevilacqua, P.C.
Deposited on	:	2025-05-28
Resolution	:	3.51 Å(reported)
Based on initial model	:	6SKF

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:

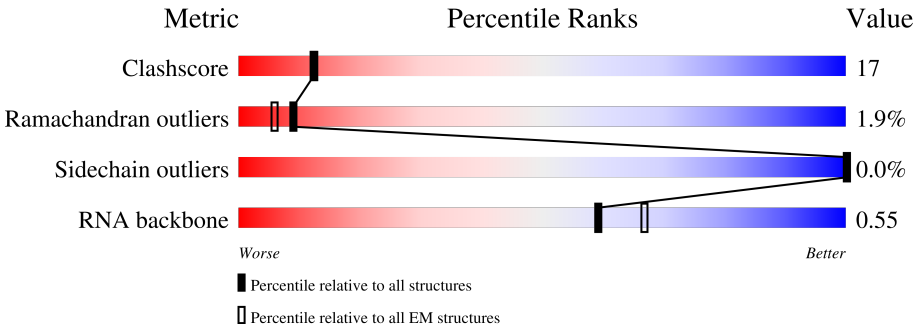
EMDB validation analysis	:	0.0.1.dev126
MolProbity	:	4-5-2 with Phenix2.0rc1
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.51 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	BA	2899	70% 26%
1	CA	2899	70% 26%
2	BB	129	28% 63% 9%
2	CB	129	29% 61% 9%
3	BC	238	60% 40%
3	CC	238	58% 42%
4	BD	337	5% 56% 44%

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Mol	Chain	Length	Quality of chain
4	CD	337	6% 56% 44%
5	BE	253	61% 38%
5	CE	253	62% 38%
6	BF	165	10% 47% 53%
6	CF	165	11% 47% 53%
7	BG	176	10% 59% 41%
7	CG	176	10% 60% 40%
8	BH	120	23% 51% 45%
8	CH	120	21% 50% 46%
9	BI	173	65% 27% 8%
9	CI	173	65% 27% 8%
10	BJ	143	59% 37%
10	CJ	143	59% 37%
11	BK	132	6% 63% 37%
11	CK	132	5% 61% 39%
12	BL	140	61% 39%
12	CL	140	63% 36%
13	BM	196	5% 59% 41%
13	CM	196	58% 42%
14	BN	174	51% 49%
14	CN	174	52% 48%
15	BO	126	55% 45%
15	CO	126	53% 47%
16	BP	151	68% 32%
16	CP	151	70% 30%

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Mol	Chain	Length	Quality of chain
17	BQ	61	61% 33% 7%
17	CQ	61	59% 34% 7%
18	BR	97	56% 43%
18	CR	97	56% 43%
19	BS	151	62% 38%
19	CS	151	62% 38%
20	BT	82	61% 39%
20	CT	82	60% 40%
21	BU	119	7% 44% 56%
21	CU	119	7% 41% 59%
22	BV	62	11% 47% 53%
22	CV	62	13% 42% 58%
23	BW	67	6% 54% 46%
23	CW	67	6% 54% 46%
24	BX	153	62% 38%
24	CX	153	62% 38%
25	BY	99	14% 48% 44% 7%
25	CY	99	13% 48% 44% 7%
26	BZ	89	57% 39%
26	CZ	89	57% 39%
27	Ba	161	52% 30% 18%
27	Ca	161	51% 31% 18%
28	Bb	94	12% 57% 43%
28	Cb	94	14% 61% 39%
29	Bc	56	73% 27%

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Mol	Chain	Length	Quality of chain
29	Cc	56	71% 29%
30	Bd	51	6% 65% 35%
30	Cd	51	6% 65% 35%
31	Be	52	13% 63% 21% 15%
31	Ce	52	15% 65% 19% 15%
32	Bf	92	64% 36%
32	Cf	92	63% 37%
33	DA	538	20% 24% 66% 10%
33	DB	538	19% 26% 63% 10%
34	DC	730	24% 31% 63% 6%
34	DD	730	23% 21% 68% 11%

2 Entry composition (i)

There are 34 unique types of molecules in this entry. The entry contains 272158 atoms, of which 62224 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 23S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
1	BA	2884	92834	27549	31112	11225	20065	2883	0	0
1	CA	2884	Total	C	H	N	O	P	0	0
			92834	27549	31112	11225	20065	2883		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	BB	128	2720	1214	481	897	128	0	0
2	CB	128	Total	C	N	O	P	0	0
			2720	1214	481	897	128		

- Molecule 3 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	BC	238	1808	1129	350	321	8	0	0
3	CC	238	Total	C	N	O	S	0	0
			1808	1129	350	321	8		

- Molecule 4 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	BD	337	2597	1639	474	476	8	0	0
4	CD	337	Total	C	N	O	S	0	0
			2597	1639	474	476	8		

- Molecule 5 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	BE	252	Total	C	N	O	S	0	0
			1930	1208	368	353	1		
5	CE	252	Total	C	N	O	S	0	0
			1930	1208	368	353	1		

- Molecule 6 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	BF	165	Total	C	N	O	S	0	0
			1289	812	234	235	8		
6	CF	165	Total	C	N	O	S	0	0
			1289	812	234	235	8		

- Molecule 7 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	BG	176	Total	C	N	O	S	0	0
			1371	876	235	254	6		
7	CG	176	Total	C	N	O	S	0	0
			1371	876	235	254	6		

- Molecule 8 is a protein called Large ribosomal subunit protein eL8.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	BH	115	Total	C	N	O	S	0	0
			857	541	144	170	2		
8	CH	115	Total	C	N	O	S	0	0
			857	541	144	170	2		

- Molecule 9 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	BI	159	Total	C	N	O	S	0	0
			1261	794	240	218	9		
9	CI	159	Total	C	N	O	S	0	0
			1261	794	240	218	9		

- Molecule 10 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	BJ	138	Total	C	N	O	S	0	0
			1086	683	200	199	4		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	CJ	138	Total	C	N	O	S	0	0
			1086	683	200	199	4		

- Molecule 11 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	BK	132	Total	C	N	O	S	0	0
			999	623	185	182	9		
11	CK	132	Total	C	N	O	S	0	0
			999	623	185	182	9		

- Molecule 12 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	BL	140	Total	C	N	O	S	0	0
			1058	643	204	205	6		
12	CL	140	Total	C	N	O	S	0	0
			1058	643	204	205	6		

- Molecule 13 is a protein called Large ribosomal subunit protein eL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	BM	196	Total	C	N	O	S	0	0
			1593	986	329	273	5		
13	CM	196	Total	C	N	O	S	0	0
			1593	986	329	273	5		

- Molecule 14 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	BN	174	Total	C	N	O	S	0	0
			1356	853	242	259	2		
14	CN	174	Total	C	N	O	S	0	0
			1356	853	242	259	2		

- Molecule 15 is a protein called Large ribosomal subunit protein eL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	BO	126	Total	C	N	O	S	0	0
			962	608	173	178	3		
15	CO	126	Total	C	N	O	S	0	0
			962	608	173	178	3		

- Molecule 16 is a protein called Large ribosomal subunit protein eL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	BP	151	Total	C	N	O	S	0	0
			1195	739	242	210	4		
16	CP	151	Total	C	N	O	S	0	0
			1195	739	242	210	4		

- Molecule 17 is a protein called Large ribosomal subunit protein eL20.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	BQ	57	Total	C	N	O	0	0
			457	289	79	89		
17	CQ	57	Total	C	N	O	0	0
			457	289	79	89		

- Molecule 18 is a protein called Large ribosomal subunit protein eL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	BR	96	Total	C	N	O	S	0	0
			766	475	146	141	4		
18	CR	96	Total	C	N	O	S	0	0
			766	475	146	141	4		

- Molecule 19 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	BS	151	Total	C	N	O	S	0	0
			1169	729	218	212	10		
19	CS	151	Total	C	N	O	S	0	0
			1169	729	218	212	10		

- Molecule 20 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	BT	82	Total	C	N	O	S	0	0
			656	418	108	122	8		
20	CT	82	Total	C	N	O	S	0	0
			656	418	108	122	8		

- Molecule 21 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	BU	119	Total	C	N	O	S	0	0
			910	564	170	169	7		
21	CU	119	Total	C	N	O	S	0	0
			910	564	170	169	7		

- Molecule 22 is a protein called Large ribosomal subunit protein eL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	BV	62	Total	C	N	O	S	0	0
			499	316	88	87	8		
22	CV	62	Total	C	N	O	S	0	0
			499	316	88	87	8		

- Molecule 23 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	BW	67	Total	C	N	O	S	0	0
			532	321	103	106	2		
23	CW	67	Total	C	N	O	S	0	0
			532	321	103	106	2		

- Molecule 24 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	BX	153	Total	C	N	O	S	0	0
			1237	779	230	222	6		
24	CX	153	Total	C	N	O	S	0	0
			1237	779	230	222	6		

- Molecule 25 is a protein called Large ribosomal subunit protein eL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	BY	92	Total	C	N	O	S	0	0
			658	415	108	131	4		
25	CY	92	Total	C	N	O	S	0	0
			658	415	108	131	4		

- Molecule 26 is a protein called Large ribosomal subunit protein eL31.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	BZ	86	Total	C	N	O	S	0	0
			703	446	131	123	3		

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Mol	Chain	Residues	Atoms					AltConf	Trace
26	CZ	86	Total	C	N	O	S	0	0
			703	446	131	123	3		

- Molecule 27 is a protein called Large ribosomal subunit protein eL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	Ba	132	Total	C	N	O	S	0	0
			1028	645	197	184	2		
27	Ca	132	Total	C	N	O	S	0	0
			1028	645	197	184	2		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Ba	-2	MET	-	initiating methionine	UNP A0A832W8Z7
Ba	-1	ILE	-	conflict	UNP A0A832W8Z7
Ba	0	MET	-	conflict	UNP A0A832W8Z7
Ca	-2	MET	-	initiating methionine	UNP A0A832W8Z7
Ca	-1	ILE	-	conflict	UNP A0A832W8Z7
Ca	0	MET	-	conflict	UNP A0A832W8Z7

- Molecule 28 is a protein called Large ribosomal subunit protein eL43.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	Bb	94	Total	C	N	O	S	0	0
			736	459	145	125	7		
28	Cb	94	Total	C	N	O	S	0	0
			736	459	145	125	7		

- Molecule 29 is a protein called Large ribosomal subunit protein eL37.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Bc	56	Total	C	N	O	S	0	0
			445	269	92	76	8		
29	Cc	56	Total	C	N	O	S	0	0
			445	269	92	76	8		

- Molecule 30 is a protein called Large ribosomal subunit protein eL39.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Bd	51	Total	C	N	O	S	0	0
			439	272	101	64	2		

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Mol	Chain	Residues	Atoms					AltConf	Trace
30	Cd	51	Total	C	N	O	S	0	0
			439	272	101	64	2		

- Molecule 31 is a protein called Large ribosomal subunit protein eL40.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Be	44	Total	C	N	O	S	0	0
			353	215	74	59	5		
31	Ce	44	Total	C	N	O	S	0	0
			353	215	74	59	5		

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
Be	-2	MET	-	initiating methionine	UNP Q8TJ19
Be	-1	THR	-	conflict	UNP Q8TJ19
Be	0	LYS	-	conflict	UNP Q8TJ19
Ce	-2	MET	-	initiating methionine	UNP Q8TJ19
Ce	-1	THR	-	conflict	UNP Q8TJ19
Ce	0	LYS	-	conflict	UNP Q8TJ19

- Molecule 32 is a protein called Large ribosomal subunit protein eL42.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Bf	92	Total	C	N	O	S	0	0
			760	480	151	122	7		
32	Cf	92	Total	C	N	O	S	0	0
			760	480	151	122	7		

- Molecule 33 is a protein called Bifunctional phosphoribosylaminoimidazolecarboxamide for myltransferase/IMP cyclohydrolase.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	DA	538	Total	C	N	O	S	0	0
			4172	2644	706	804	18		
33	DB	538	Total	C	N	O	S	0	0
			4172	2644	706	804	18		

- Molecule 34 is a protein called Elongation factor 2.

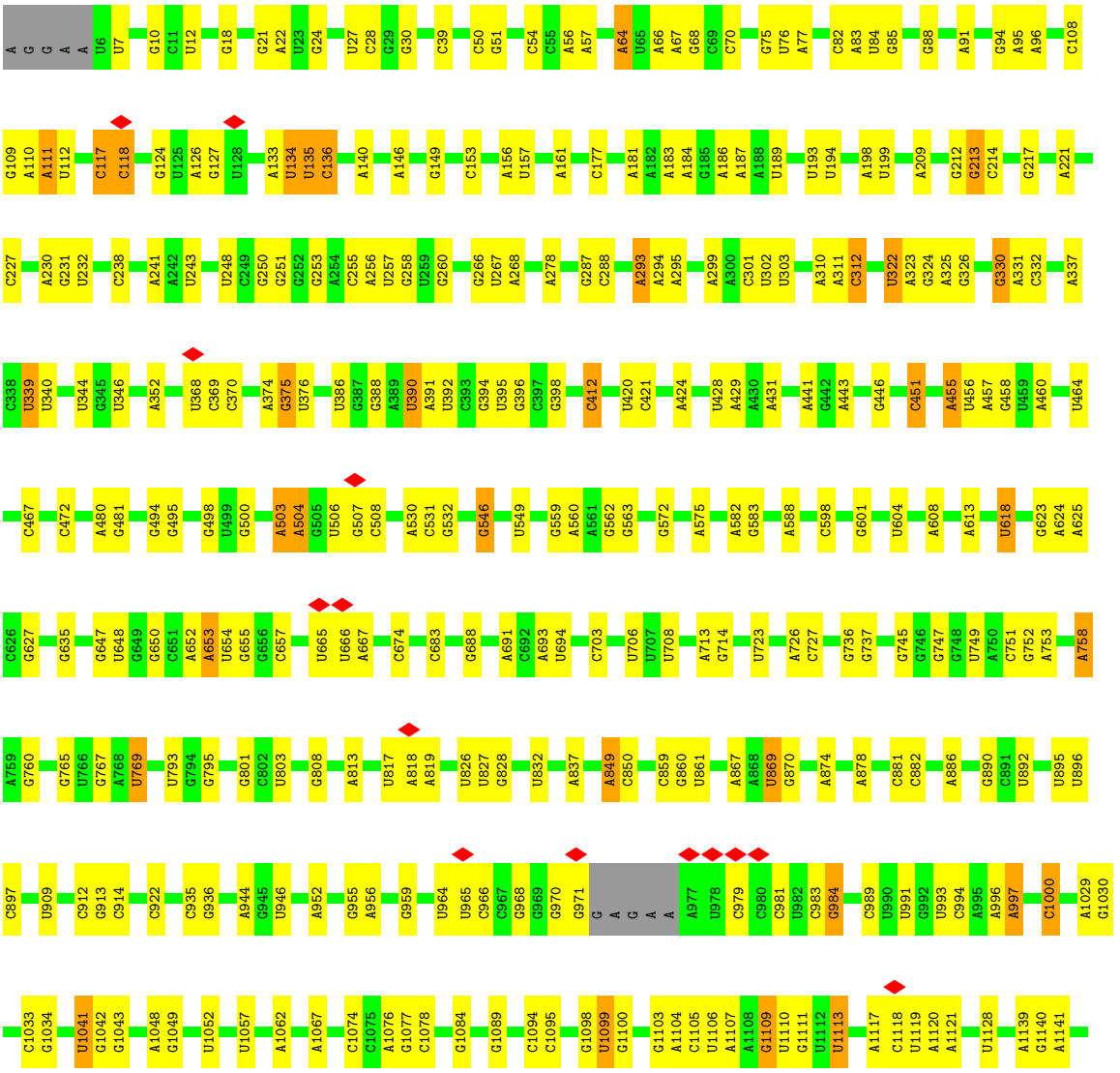
Mol	Chain	Residues	Atoms					AltConf	Trace
34	DC	730	Total 5643	C 3547	N 985	O 1075	S 36	0	0
34	DD	730	Total 5643	C 3547	N 985	O 1075	S 36	0	0

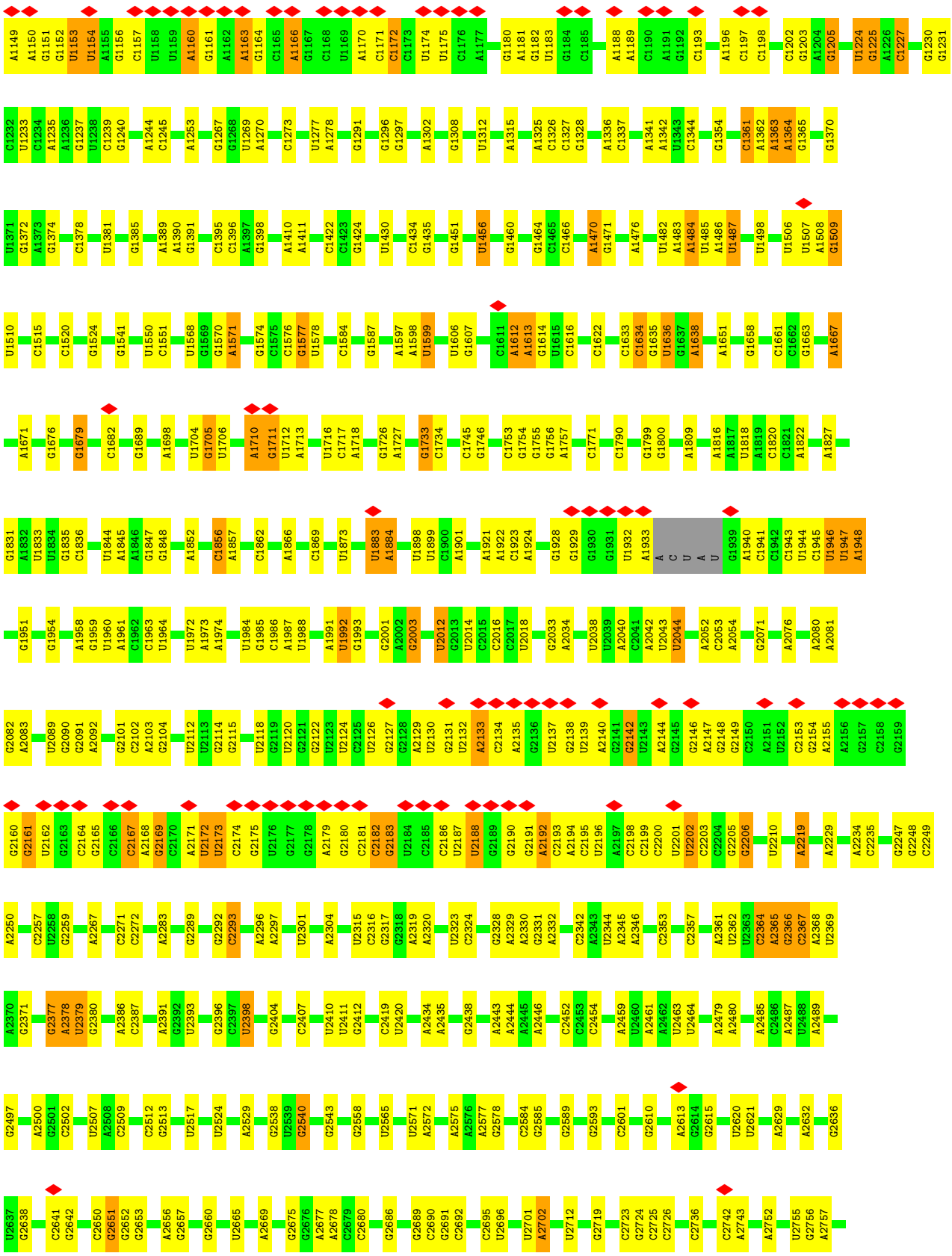
3 Residue-property plots (i)

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: 23S rRNA

Chain BA:




A1149 A1150 G1151 G1152 U1153 U1154 A1155 G1156 C1157 U1158 U1159 A1160 G1161 A1162 A1163 G1164 C1165 A1166 G1167 C1168 U1169 A1170 C1171 C1172 C1173 U1174 U1175 C1176 A1177 G1180 A1181 G1182 U1183 G1184 C1185 A1188 A1189 C1190 A1191 G1192 C1193 A1196 C1197 C1198 C1202 G1203 A1204 G1205 U1224 G1225 A1226 C1227 G1230 G1231
C1232 U1233 C1234 A1235 A1236 G1237 U1238 C1239 G1240 A1244 C1245 A1253 G1267 G1268 U1269 A1270 C1273 U1277 A1278 G1291 G1296 G1297 A1302 G1308 U1312 A1315 A1325 C1326 C1327 G1328 A1336 C1337 A1341 A1342 U1343 C1344 G1354 C1361 A1362 A1363 A1364 G1365 G1370
U1371 G1372 A1373 G1374 C1378 U1381 G1385 A1389 A1390 G1391 C1395 C1396 A1397 G1398 A1410 A1411 C1422 C1423 G1424 U1430 C1434 G1435 G1451 U1456 G1460 G1464 C1465 C1466 A1470 G1471 A1476 U1482 A1483 A1484 U1485 A1486 U1487 U1498 U1506 U1507 A1508 G1509
U1510 C1515 C1520 G1524 G1541 U1550 C1551 U1568 G1569 G1570 A1571 G1574 C1575 C1576 G1577 U1578 C1584 G1587 A1597 A1598 U1599 U1606 G1607 C1611 A1612 A1613 G1614 U1615 C1616 C1622 C1633 C1634 G1635 U1636 G1637 A1638 A1651 G1658 C1661 C1662 G1663 A1667
A1671 G1676 G1679 C1682 G1689 A1698 U1704 G1705 U1706 A1710 G1711 U1712 A1713 U1716 C1717 A1718 G1726 A1727 G1733 C1734 C1745 G1746 C1753 G1754 G1755 G1756 A1757 C1771 C1790 G1799 G1800 A1809 A1816 A1817 U1818 A1819 C1820 C1821 A1822 A1827
G1831 A1832 U1833 U1834 G1835 C1836 U1844 A1845 A1846 G1847 G1848 A1852 C1856 A1857 C1862 A1866 C1869 U1873 U1883 A1884 U1898 U1899 C1900 A1901 A1921 A1922 C1923 A1924 G1928 G1929 G1930 G1931 U1932 A1933 A C U A U G1939 A1940 C1941 C1942 C1943 U1944 C1945 U1946 U1947 A1948
G1951 G1954 A1958 G1959 U1960 A1961 C1962 C1963 U1964 U1972 A1973 A1974 U1984 G1985 C1986 A1987 U1988 A1991 U1992 G1993 G2001 A2002 G2003 U2012 G2013 U2014 C2015 C2016 C2017 U2018 G2033 A2034 U2038 U2039 A2040 C2041 A2042 U2043 U2044 A2052 C2053 A2054 G2071 A2076 A2080 A2081
G2082 A2083 U2089 G2090 G2091 A2092 G2101 C2102 A2103 G2104 U2112 U2113 G2114 G2115 U2118 G2119 U2120 G2121 G2122 U2123 U2124 C2125 U2126 G2127 A2002 G2128 A2129 U2130 G2131 U2132 A2133 C2134 A2135 G2136 U2137 G2138 U2139 A2140 G2141 G2142 U2143 A2144 G2145 C2146 A2147 G2148 G2149 C2150 A2151 U2152 C2153 G2154 A2155 A2156 G2157 C2158 G2159
G2160 G2161 U2162 G2163 C2164 G2165 C2166 C2167 A2168 G2169 C2170 A2171 U2172 U2173 C2174 G2175 U2176 G2177 G2178 A2179 G2180 C2181 C2182 G2183 U2184 C2185 C2186 U2187 U2188 G2189 G2190 G2191 A2192 C2193 A2194 C2195 U2196 A2197 C2198 C2199 C2200 U2201 U2202 C2203 C2204 G2205 G2206 U2210 A2219 A2229 A2234 C2235 G2247 G2248 C2249
A2250 C2257 U2258 G2259 A2267 C2271 C2272 A2283 G2289 G2292 C2293 A2296 A2297 U2301 A2304 U2315 C2316 G2317 G2318 A2319 A2320 U2323 C2324 G2328 A2329 A2330 G2331 A2332 C2342 A2343 U2344 A2345 A2346 C2353 C2357 A2361 U2362 U2363 C2364 A2365 G2366 C2367 A2368 U2369
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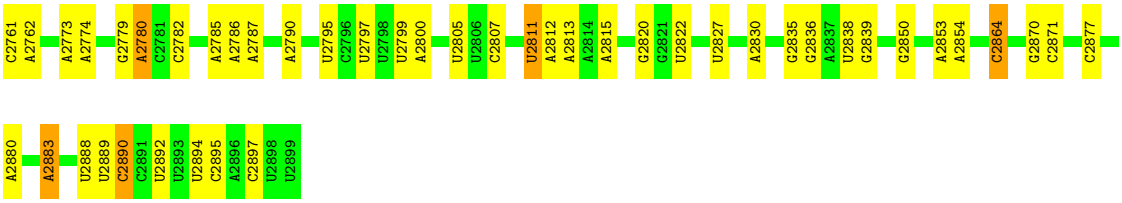
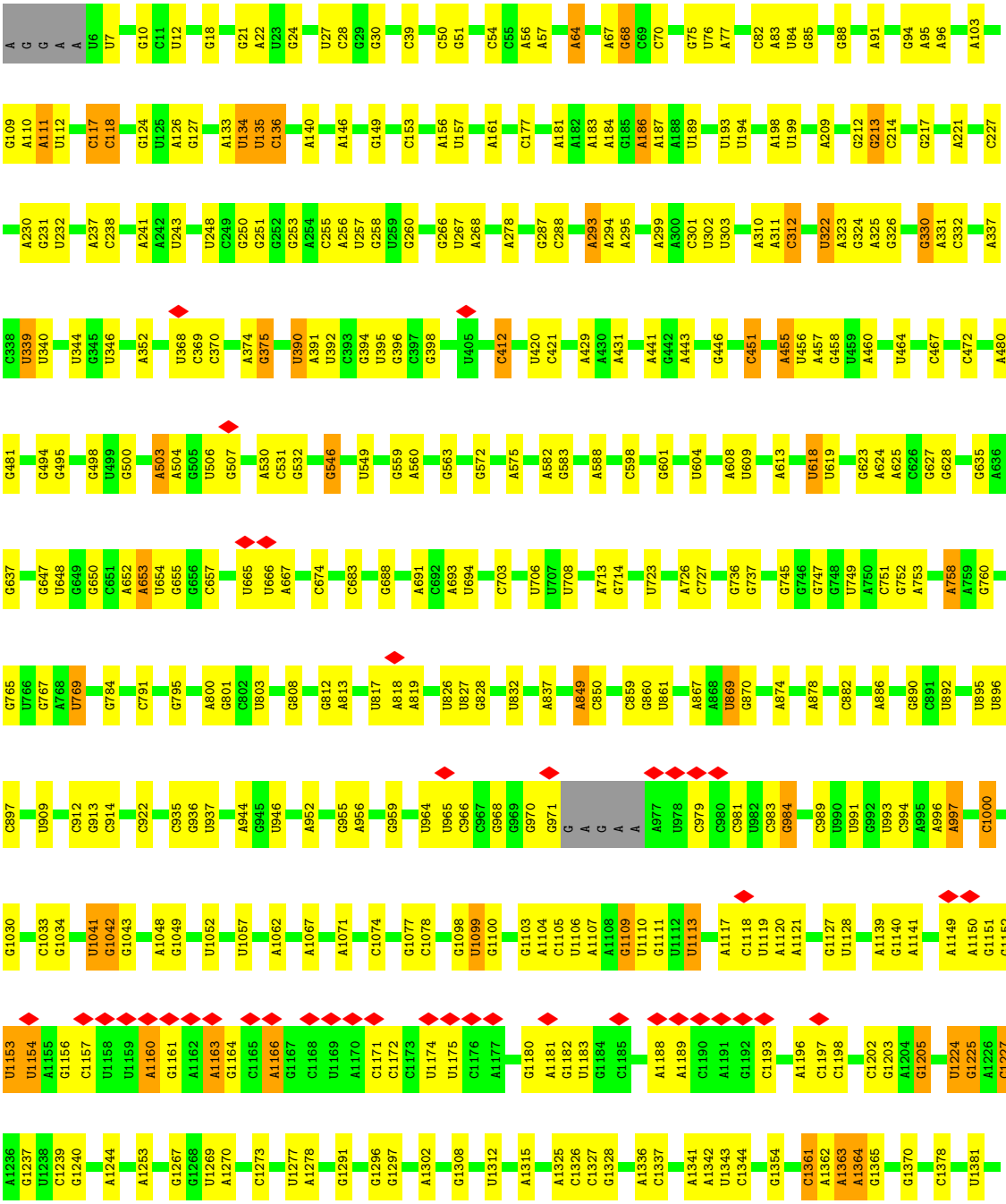
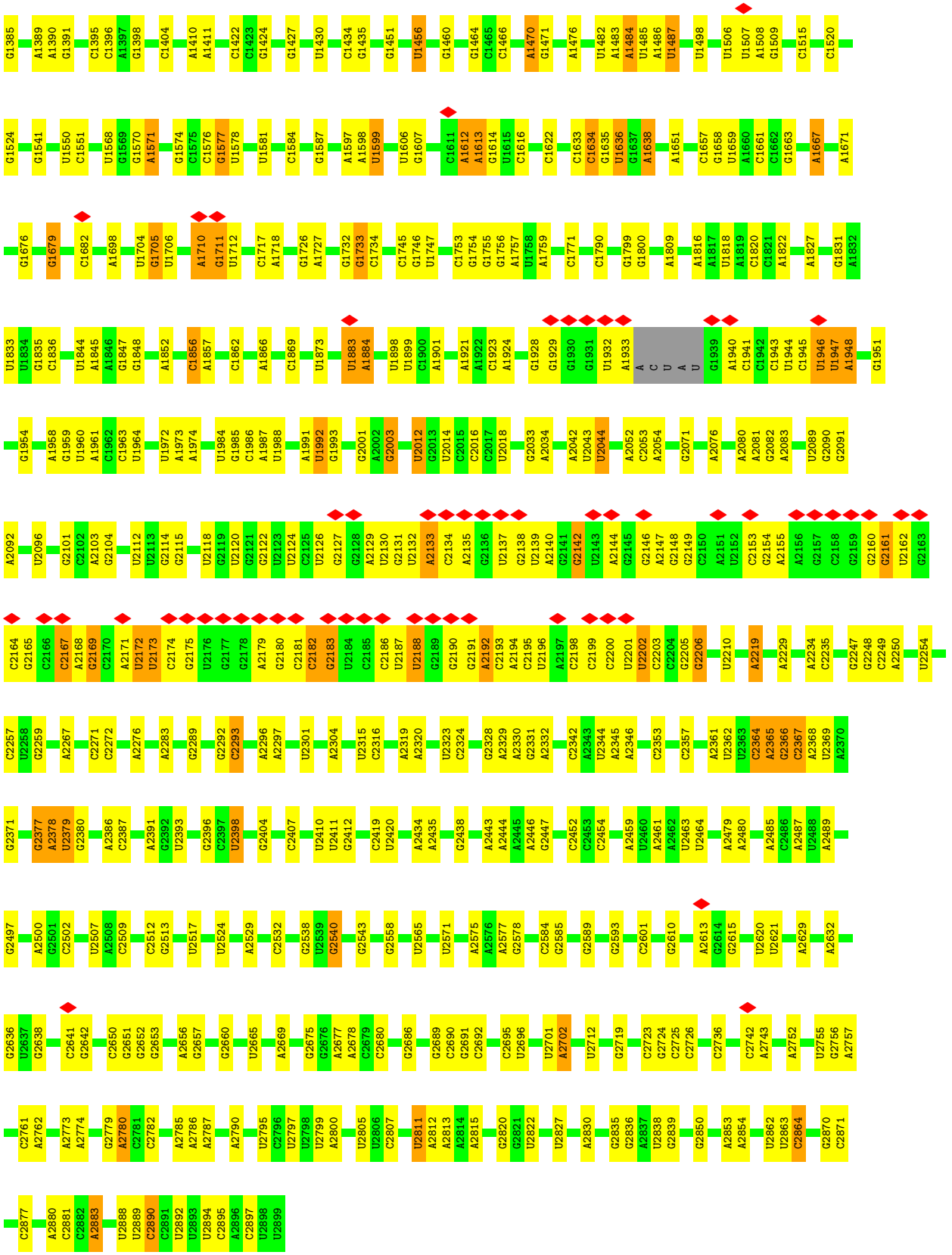


• Molecule 1: 23S rRNA

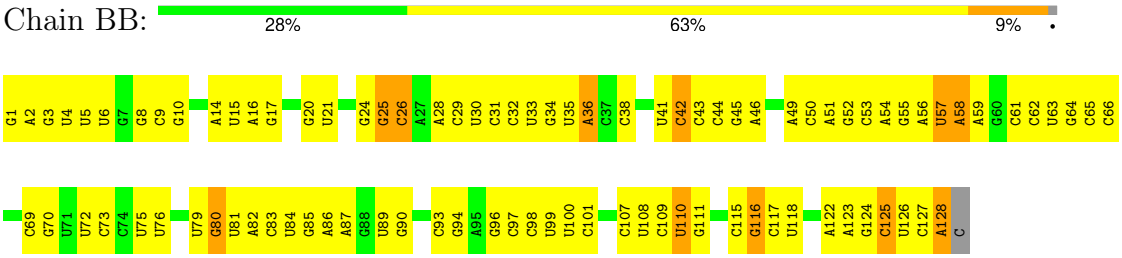
Chain CA:





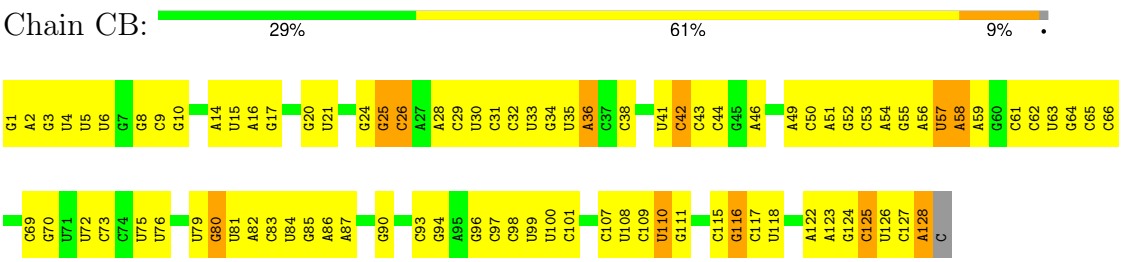
• Molecule 2: 5S rRNA

Chain BB:



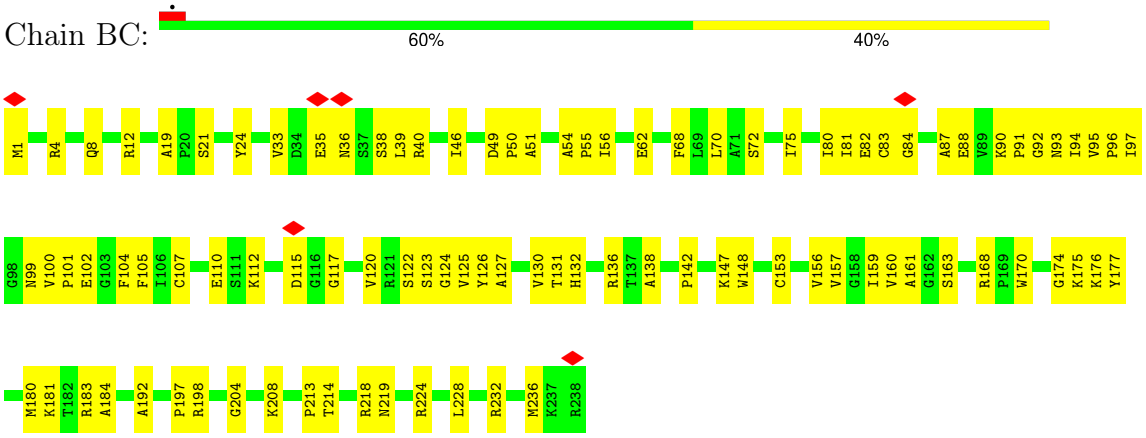
• Molecule 2: 5S rRNA

Chain CB:



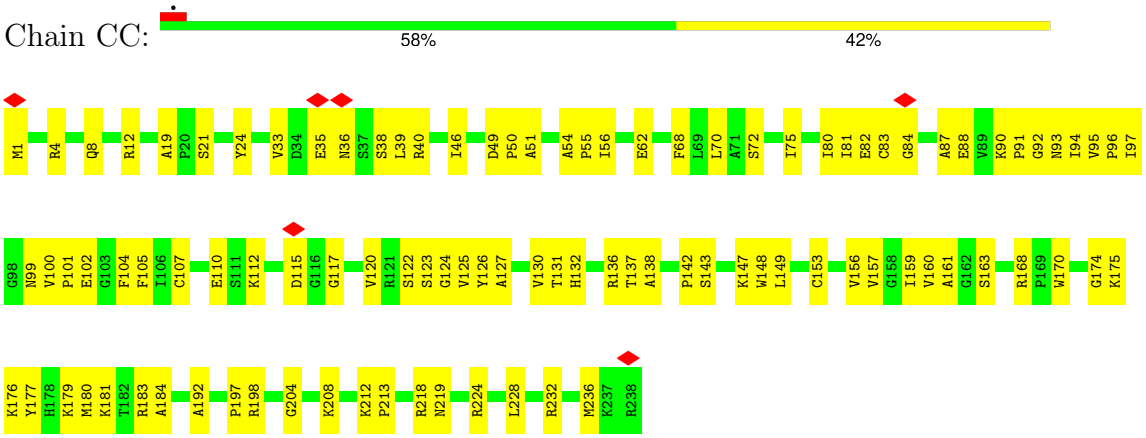
• Molecule 3: Large ribosomal subunit protein uL2

Chain BC:



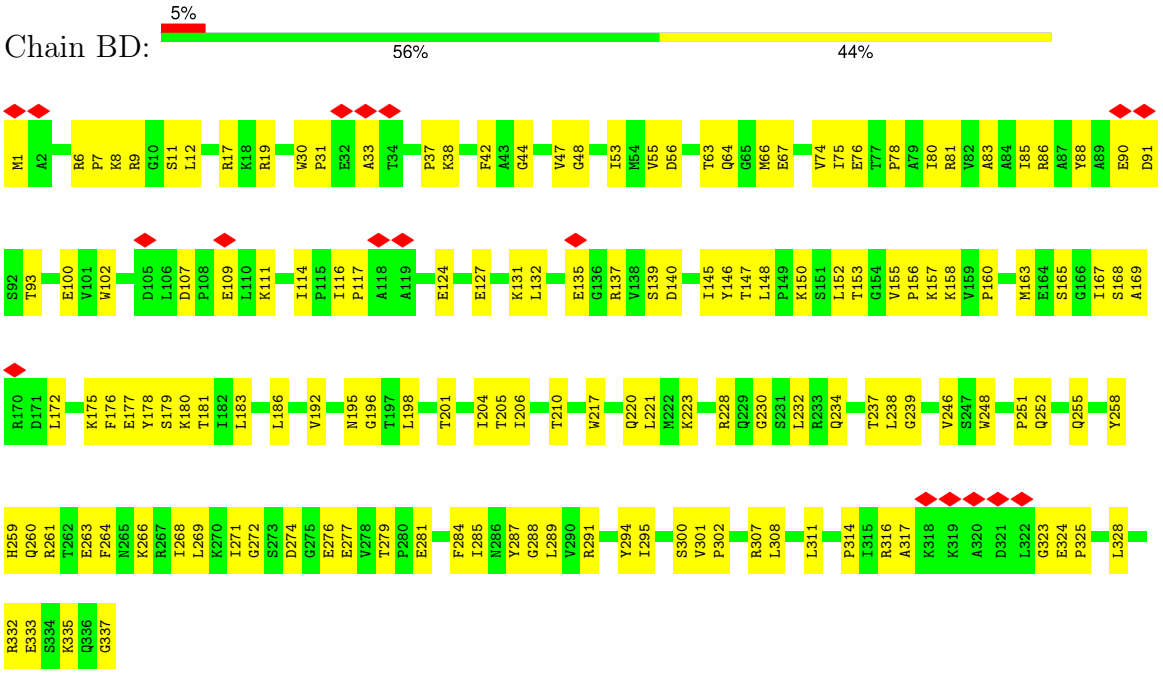
• Molecule 3: Large ribosomal subunit protein uL2

Chain CC:



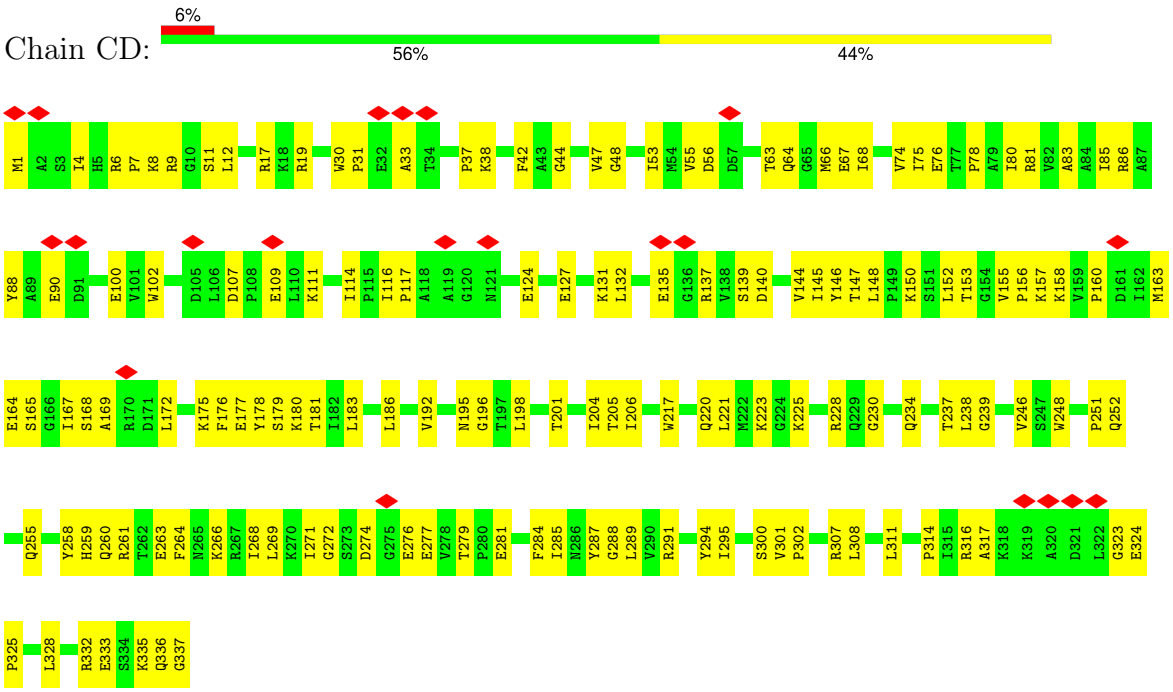
• Molecule 4: Large ribosomal subunit protein uL3

Chain BD:



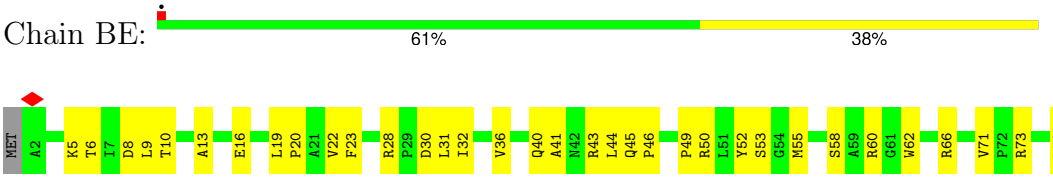
• Molecule 4: Large ribosomal subunit protein uL3

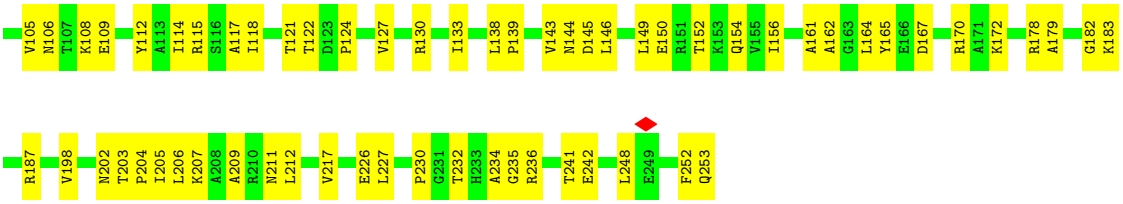
Chain CD:



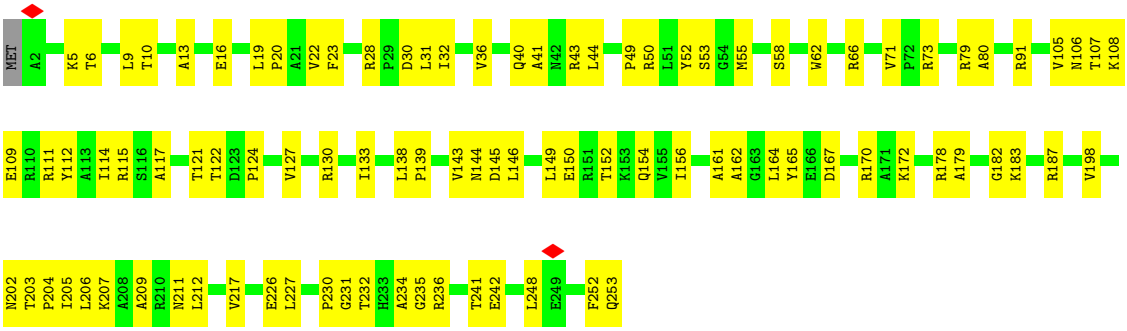
• Molecule 5: Large ribosomal subunit protein uL4

Chain BE:

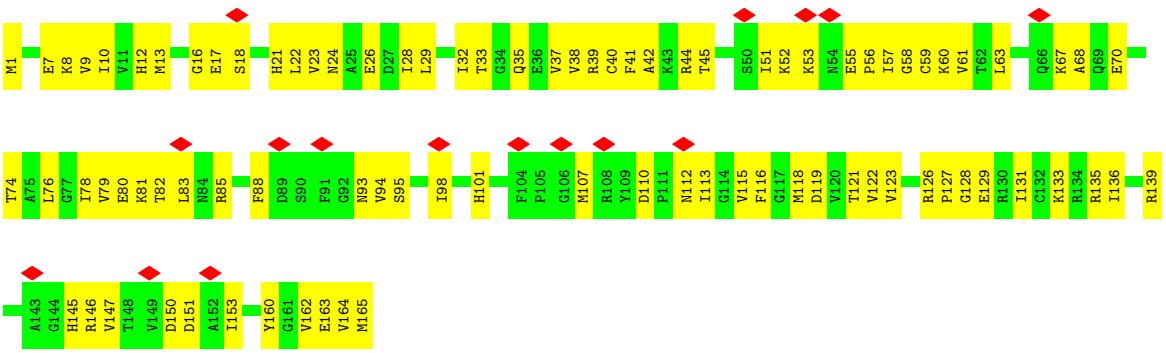




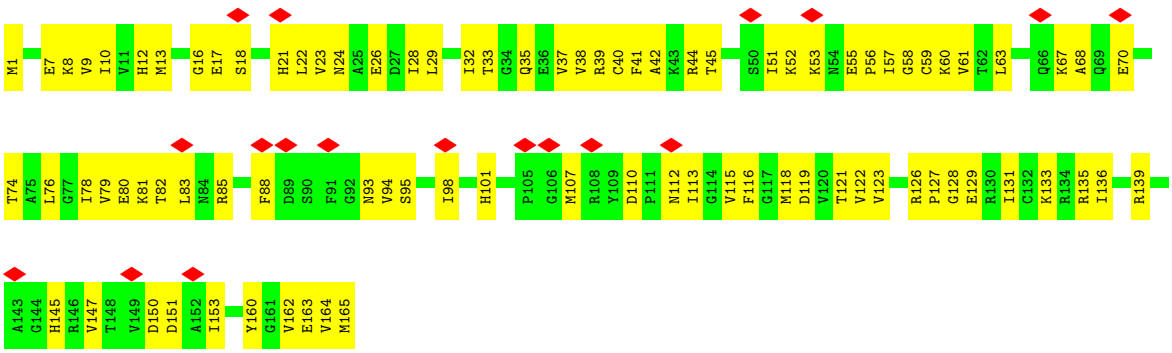
• Molecule 5: Large ribosomal subunit protein uL4



• Molecule 6: Large ribosomal subunit protein uL5

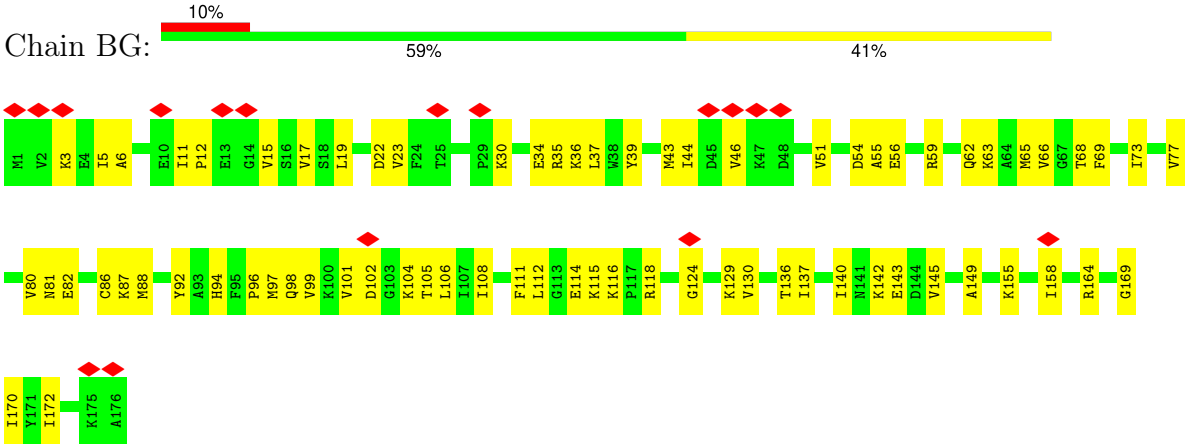


• Molecule 6: Large ribosomal subunit protein uL5



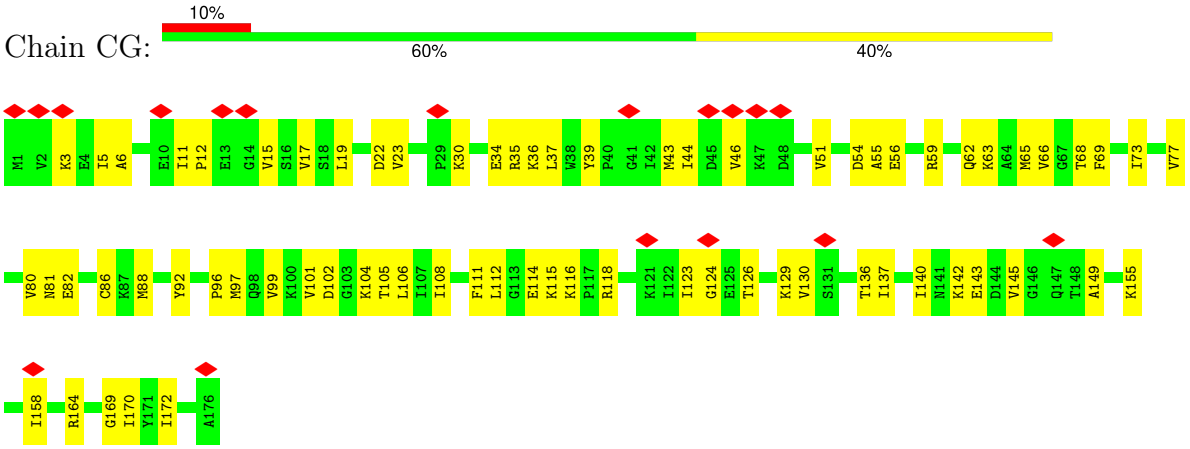
• Molecule 7: Large ribosomal subunit protein uL6

Chain BG:



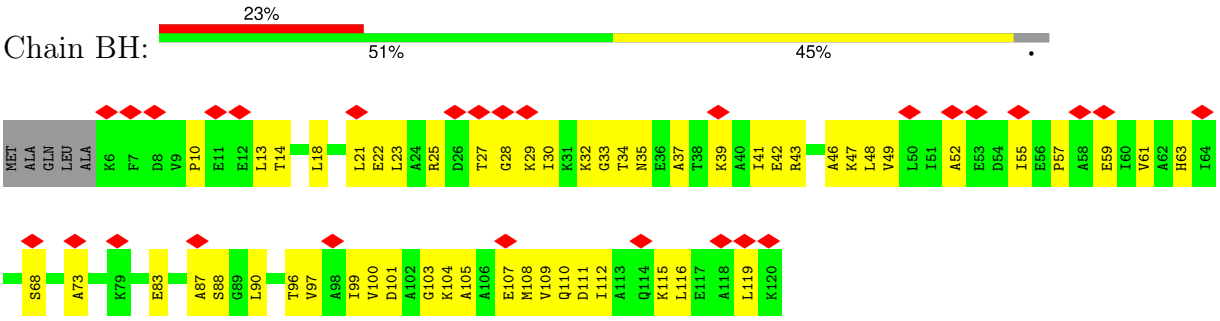
• Molecule 7: Large ribosomal subunit protein uL6

Chain CG:



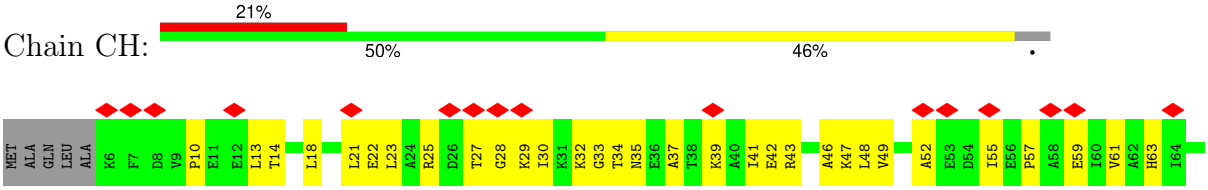
• Molecule 8: Large ribosomal subunit protein eL8

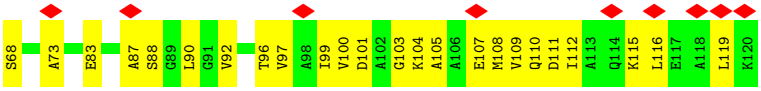
Chain BH:



• Molecule 8: Large ribosomal subunit protein eL8

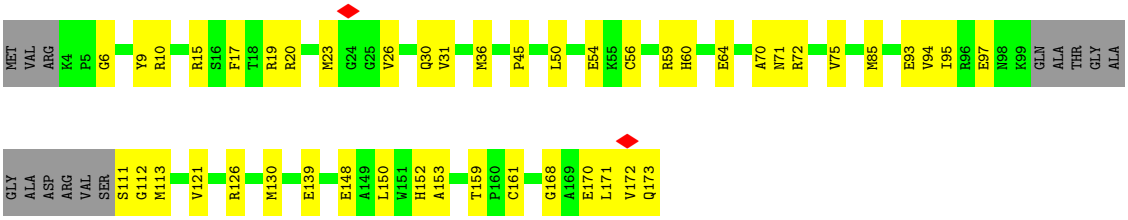
Chain CH:





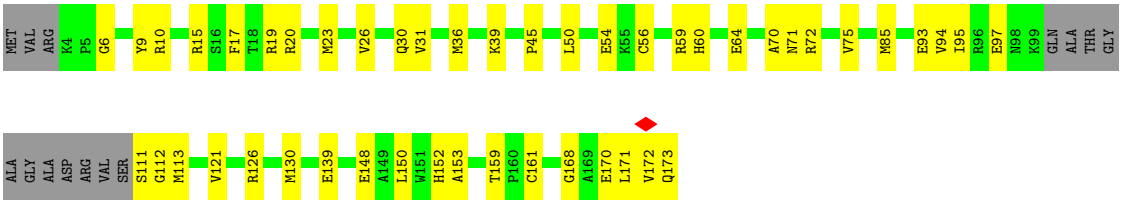
• Molecule 9: Large ribosomal subunit protein uL16

Chain BI:



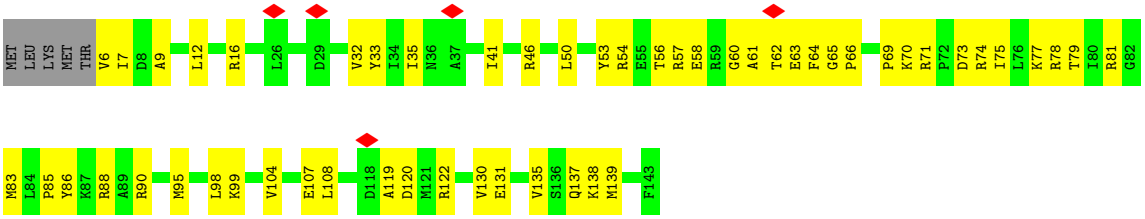
• Molecule 9: Large ribosomal subunit protein uL16

Chain CI:



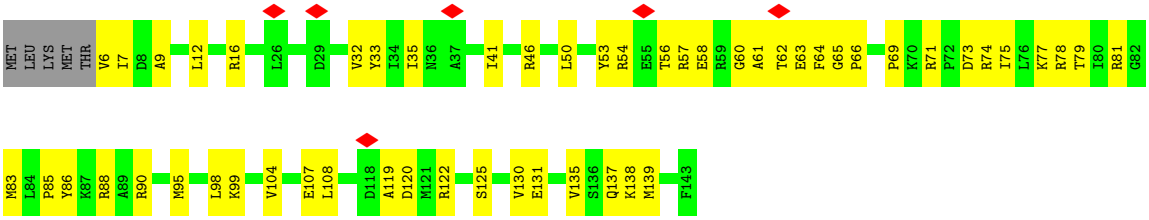
• Molecule 10: Large ribosomal subunit protein uL13

Chain BJ:



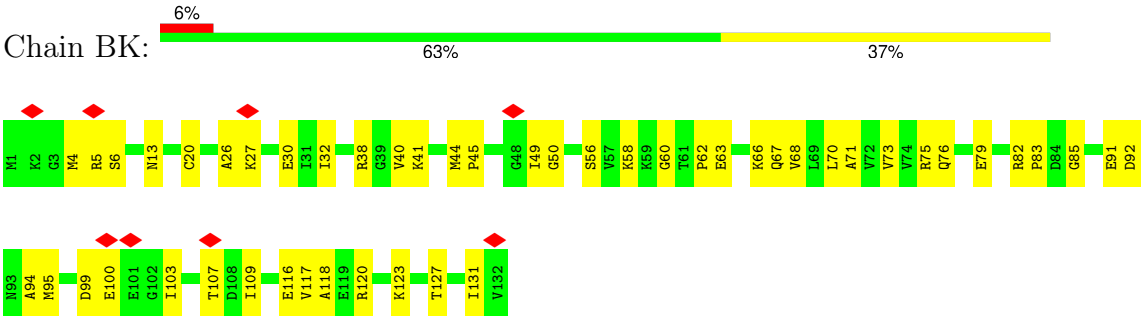
• Molecule 10: Large ribosomal subunit protein uL13

Chain CJ:



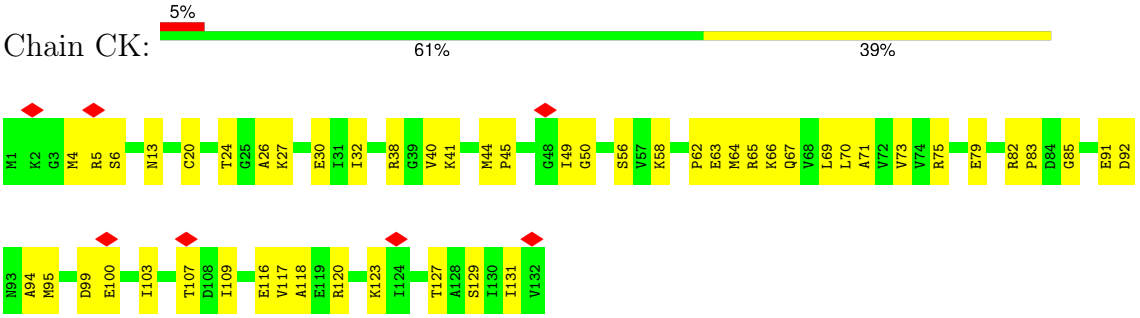
• Molecule 11: Large ribosomal subunit protein uL14

Chain BK:



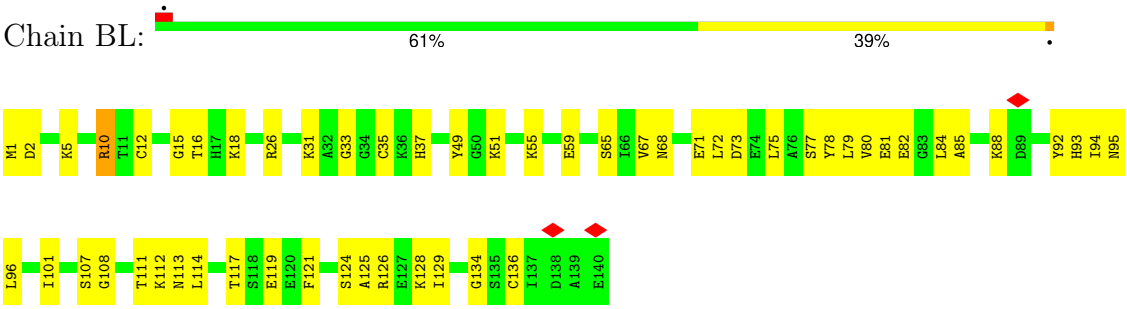
• Molecule 11: Large ribosomal subunit protein uL14

Chain CK:



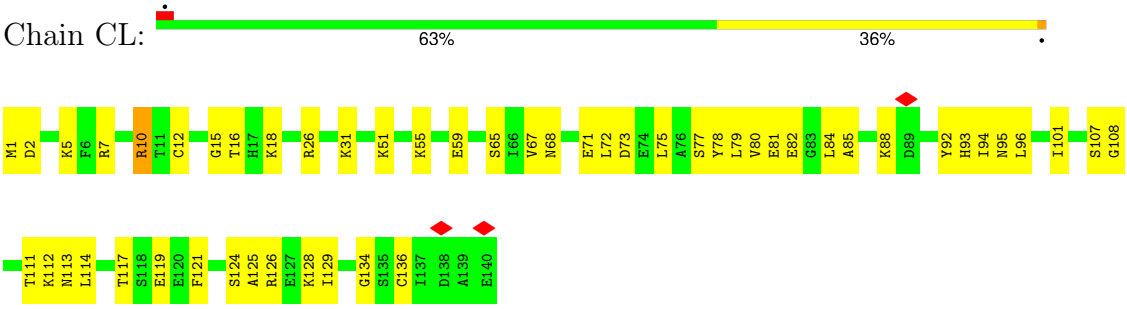
• Molecule 12: Large ribosomal subunit protein uL15

Chain BL:



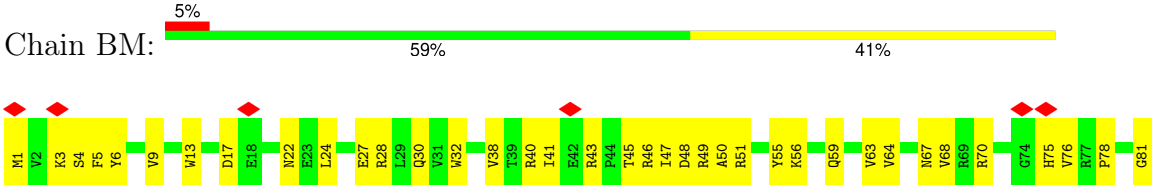
• Molecule 12: Large ribosomal subunit protein uL15

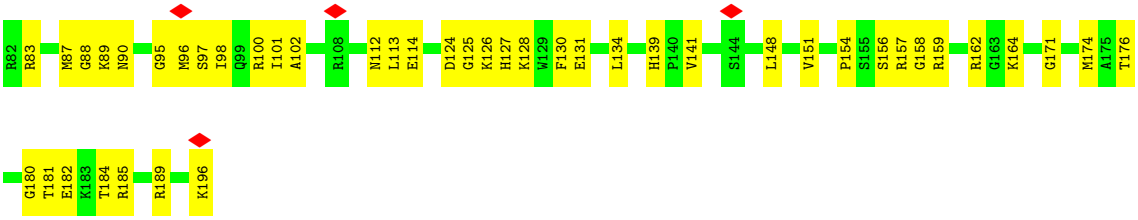
Chain CL:



• Molecule 13: Large ribosomal subunit protein eL15

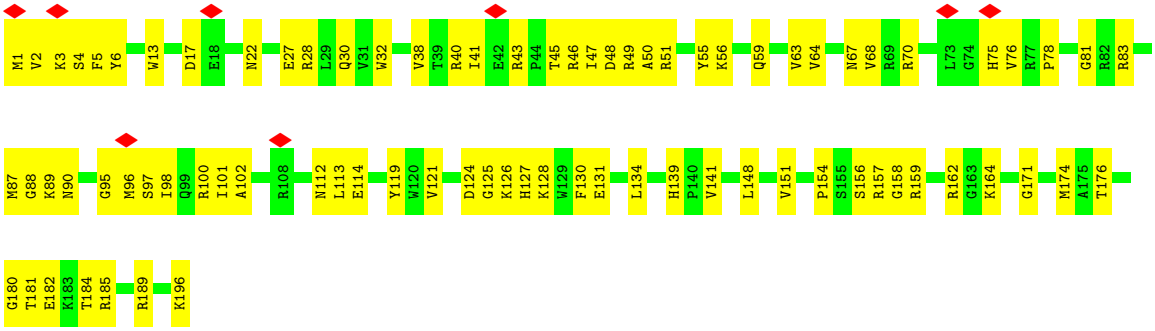
Chain BM:





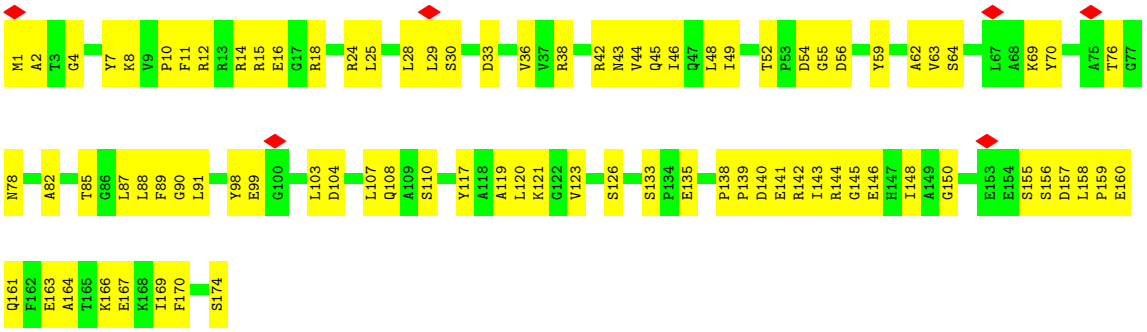
• Molecule 13: Large ribosomal subunit protein eL15

Chain CM:



• Molecule 14: Large ribosomal subunit protein uL18

Chain BN:

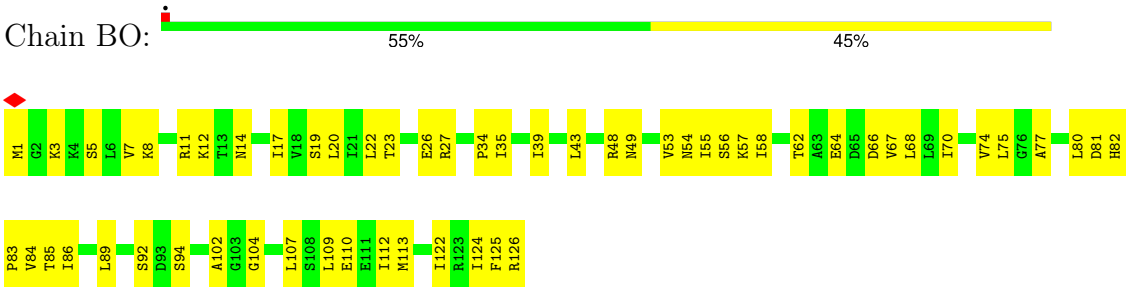


• Molecule 14: Large ribosomal subunit protein uL18

Chain CN:

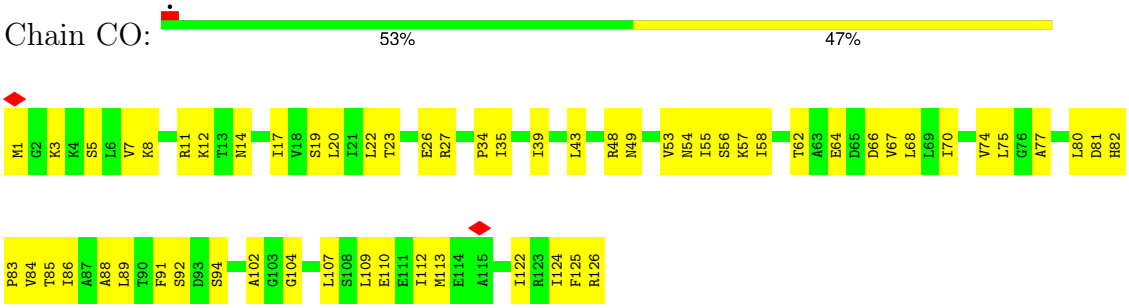
• Molecule 15: Large ribosomal subunit protein eL18

Chain BO:



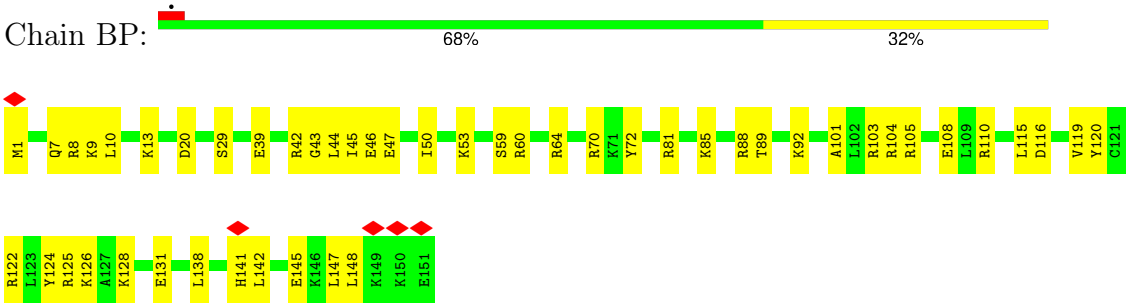
• Molecule 15: Large ribosomal subunit protein eL18

Chain CO:



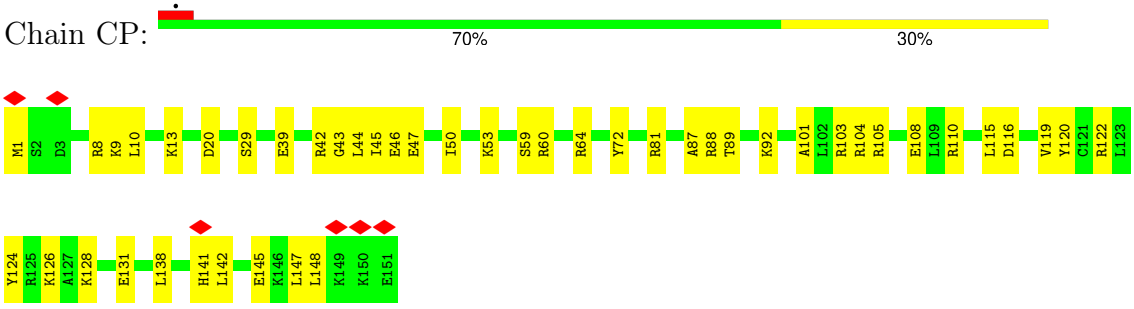
• Molecule 16: Large ribosomal subunit protein eL19

Chain BP:



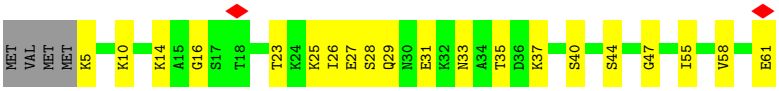
• Molecule 16: Large ribosomal subunit protein eL19

Chain CP:



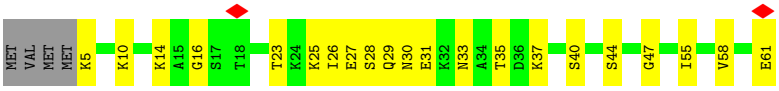
• Molecule 17: Large ribosomal subunit protein eL20

Chain BQ:



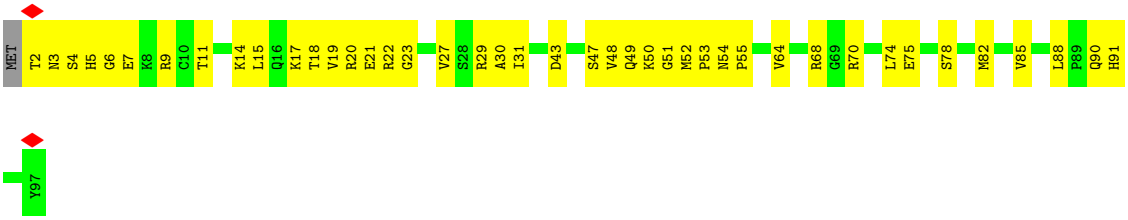
• Molecule 17: Large ribosomal subunit protein eL20

Chain CQ:



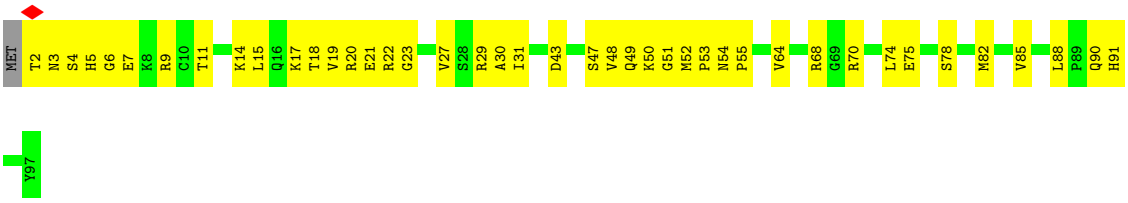
• Molecule 18: Large ribosomal subunit protein eL21

Chain BR:



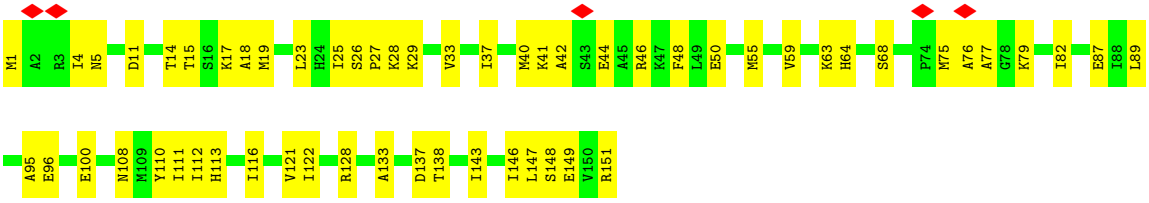
• Molecule 18: Large ribosomal subunit protein eL21

Chain CR:



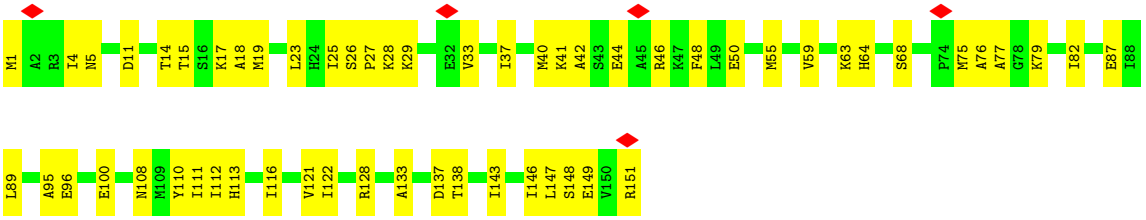
• Molecule 19: Large ribosomal subunit protein uL22

Chain BS:



• Molecule 19: Large ribosomal subunit protein uL22

Chain CS:

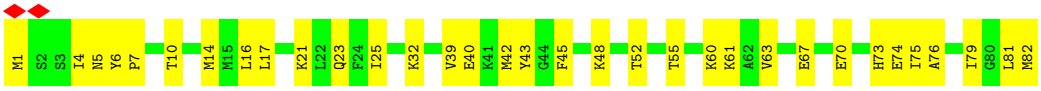


• Molecule 20: Large ribosomal subunit protein uL23

Chain BT:

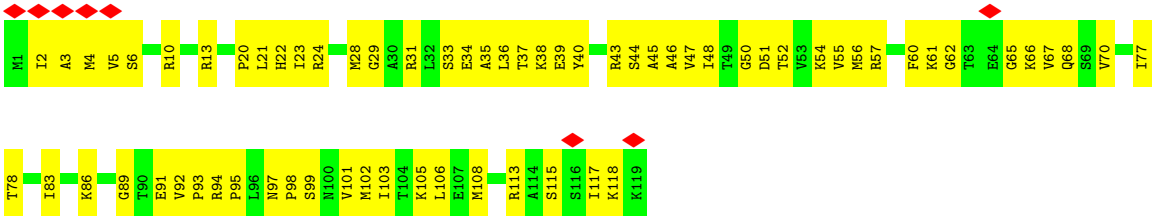
• Molecule 20: Large ribosomal subunit protein uL23

Chain CT:



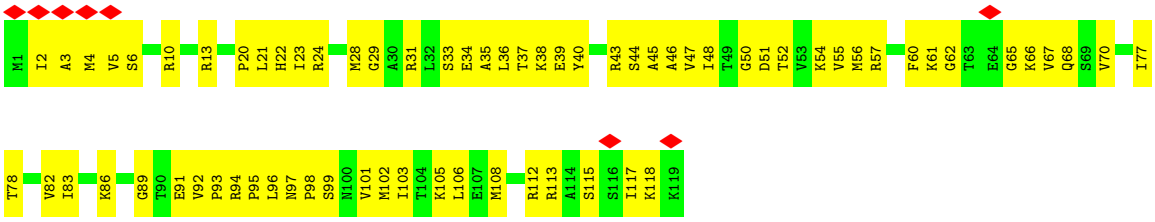
• Molecule 21: Large ribosomal subunit protein uL24

Chain BU:



• Molecule 21: Large ribosomal subunit protein uL24

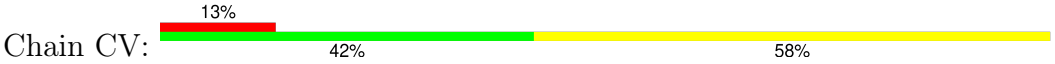
Chain CU:

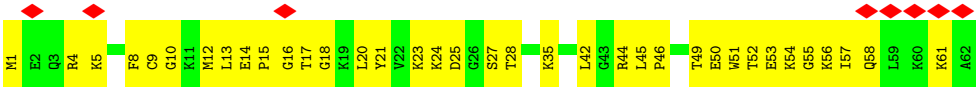


• Molecule 22: Large ribosomal subunit protein eL24

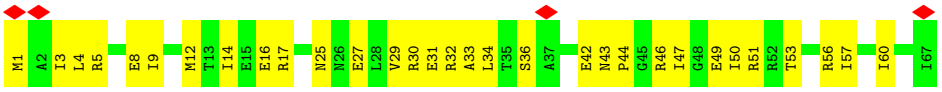
Chain BV:

• Molecule 22: Large ribosomal subunit protein eL24

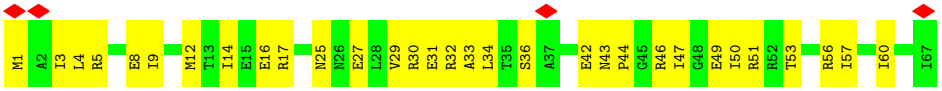




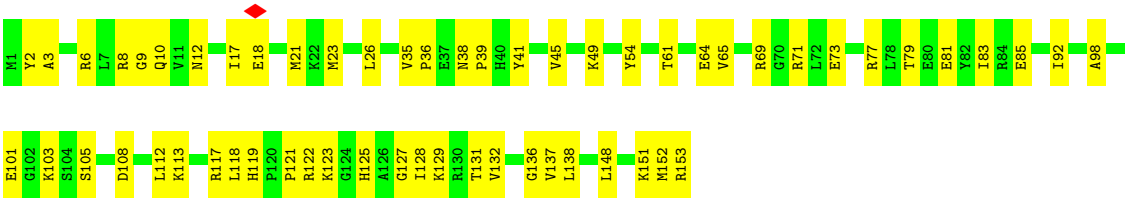
• Molecule 23: Large ribosomal subunit protein uL29



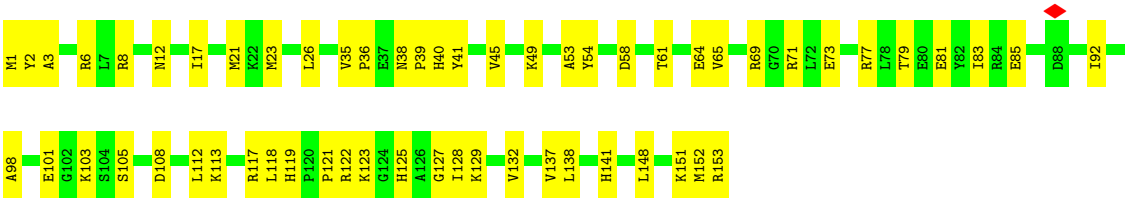
• Molecule 23: Large ribosomal subunit protein uL29



• Molecule 24: Large ribosomal subunit protein uL30

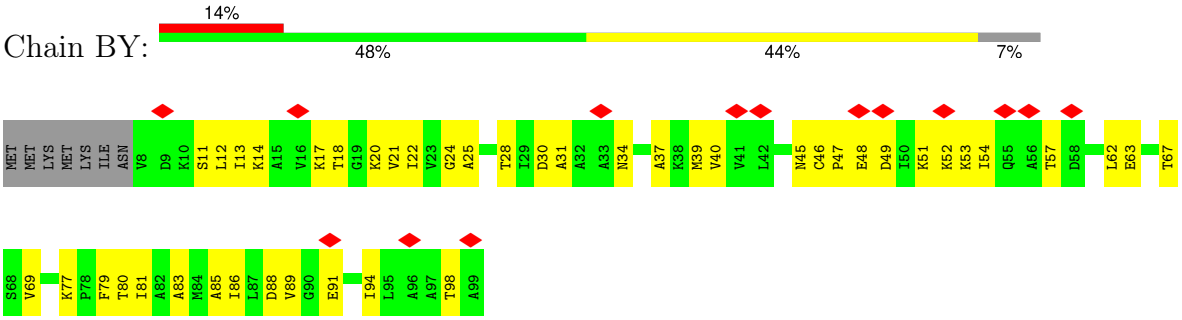


• Molecule 24: Large ribosomal subunit protein uL30



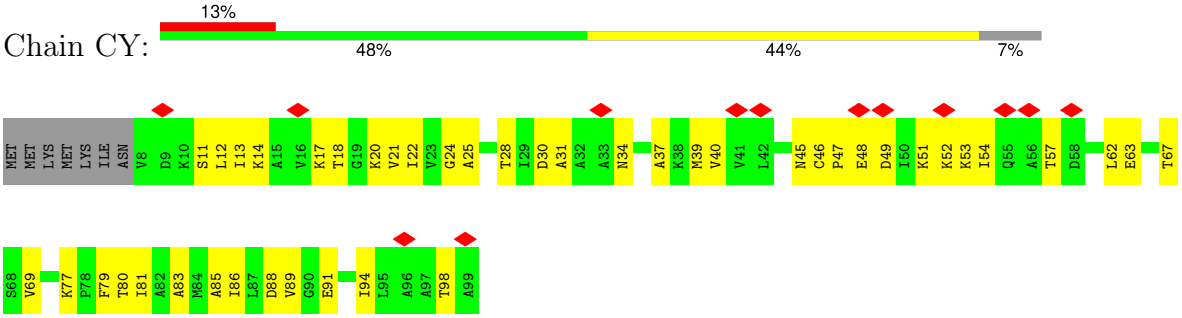
• Molecule 25: Large ribosomal subunit protein eL30

Chain BY:



• Molecule 25: Large ribosomal subunit protein eL30

Chain CY:

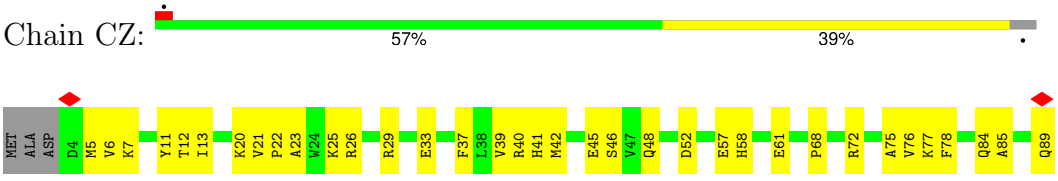


• Molecule 26: Large ribosomal subunit protein eL31

Chain BZ:

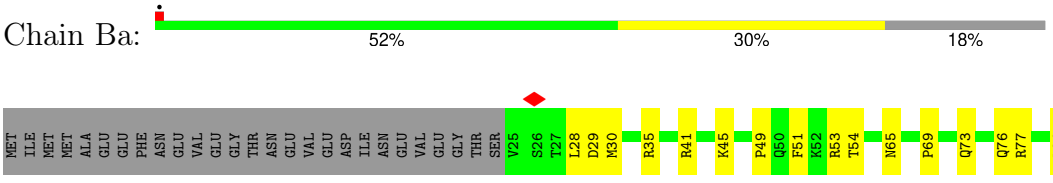
• Molecule 26: Large ribosomal subunit protein eL31

Chain CZ:



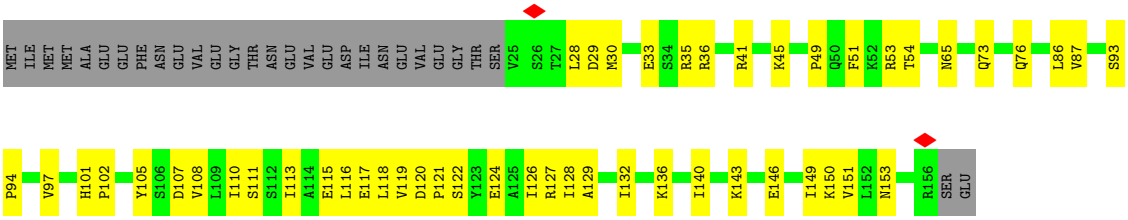
• Molecule 27: Large ribosomal subunit protein eL32

Chain Ba:



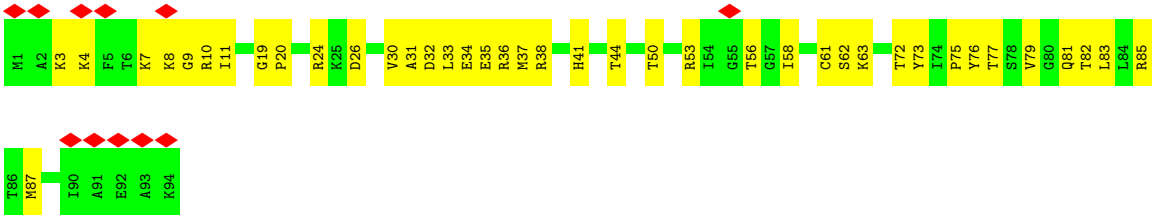
• Molecule 27: Large ribosomal subunit protein eL32

Chain Ca:



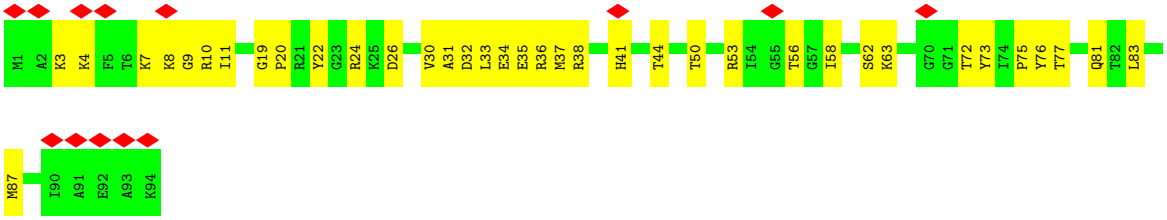
• Molecule 28: Large ribosomal subunit protein eL43

Chain Bb:



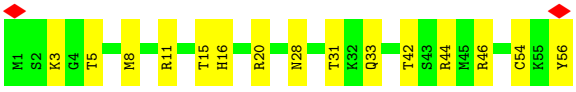
• Molecule 28: Large ribosomal subunit protein eL43

Chain Cb:



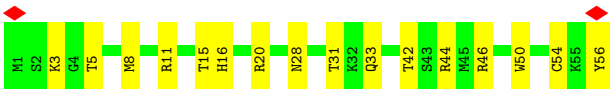
• Molecule 29: Large ribosomal subunit protein eL37

Chain Bc:



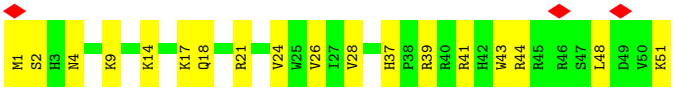
• Molecule 29: Large ribosomal subunit protein eL37

Chain Cc:



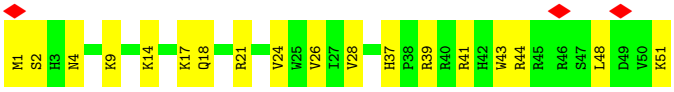
• Molecule 30: Large ribosomal subunit protein eL39

Chain Bd:



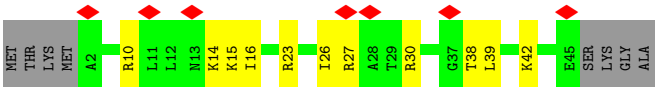
• Molecule 30: Large ribosomal subunit protein eL39

Chain Cd:



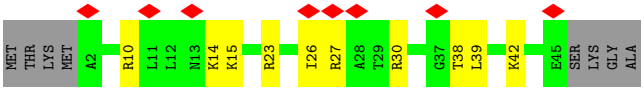
• Molecule 31: Large ribosomal subunit protein eL40

Chain Be:



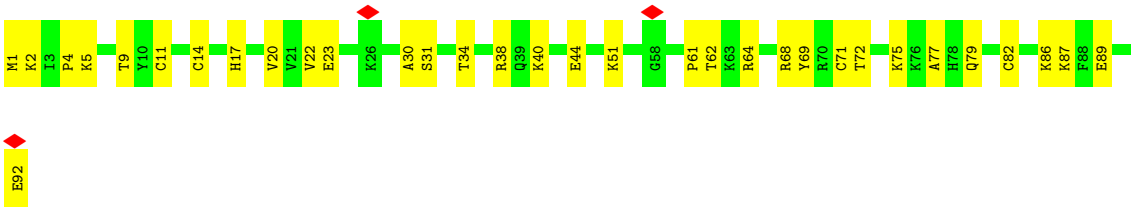
• Molecule 31: Large ribosomal subunit protein eL40

Chain Ce:



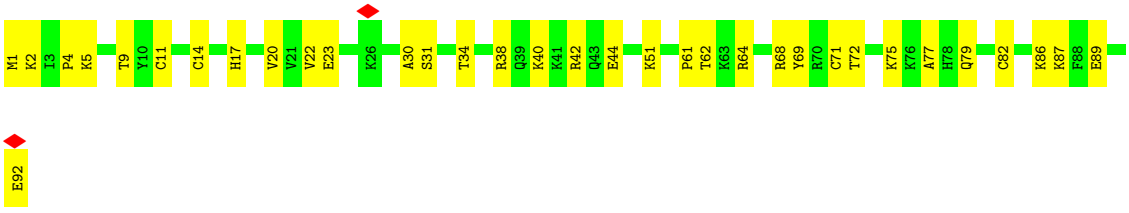
• Molecule 32: Large ribosomal subunit protein eL42

Chain Bf:



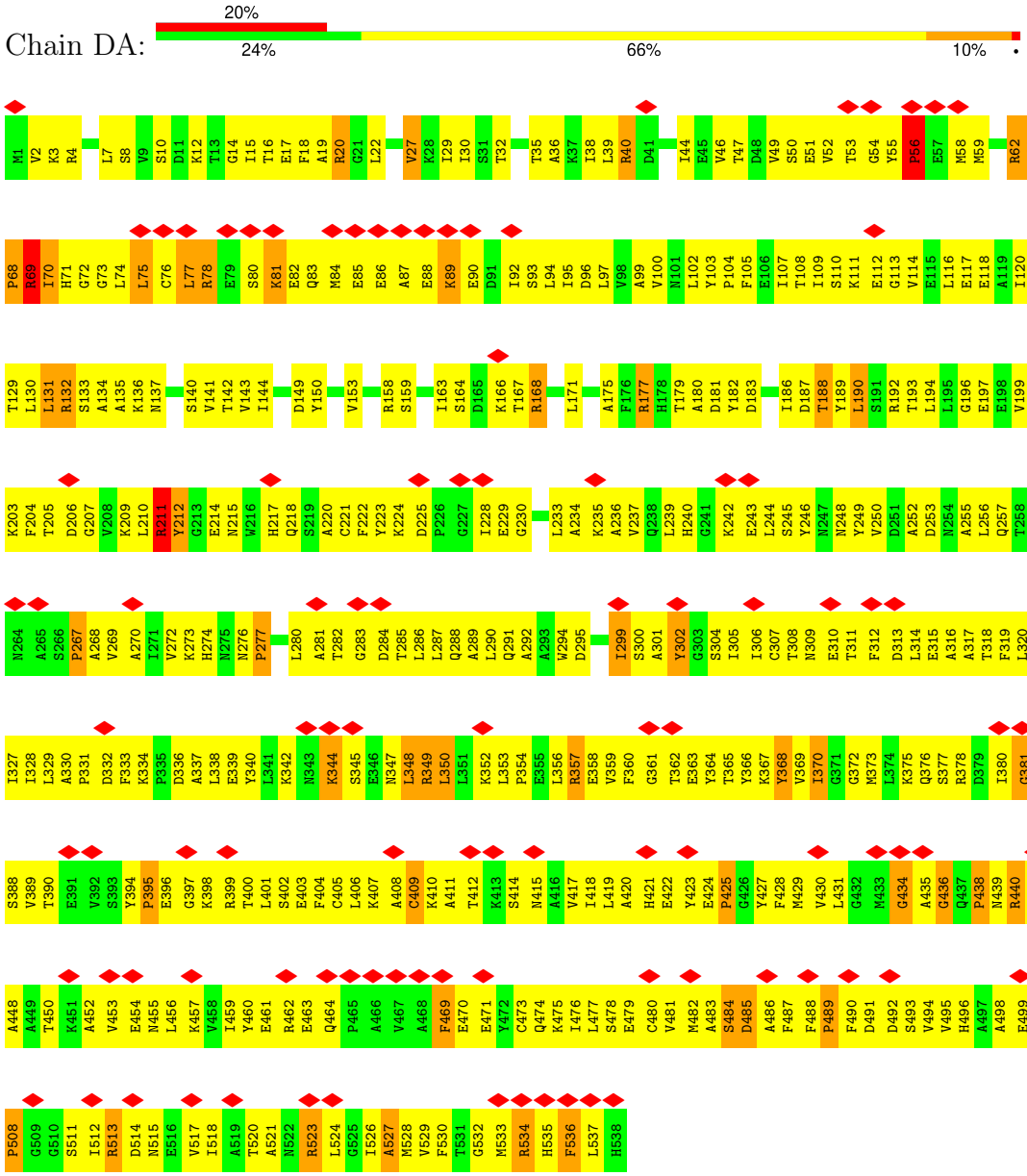
• Molecule 32: Large ribosomal subunit protein eL42

Chain Cf:



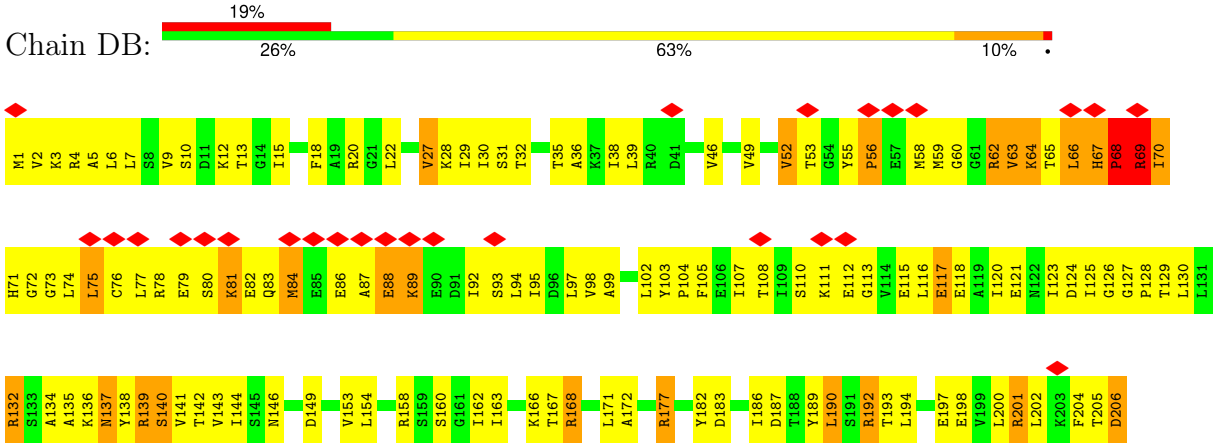
• Molecule 33: Bifunctional phosphoribosylaminoimidazolecarboxamide formyltransferase/IMP cyclohydrolase

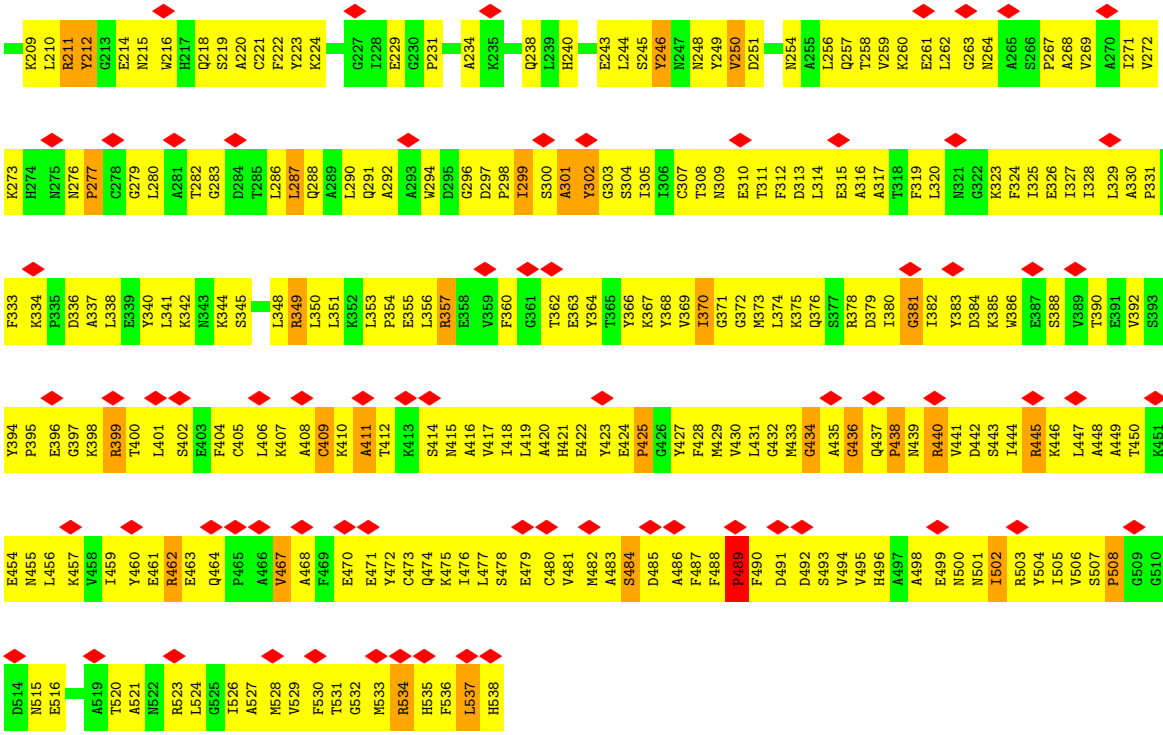
Chain DA:



• Molecule 33: Bifunctional phosphoribosylaminoimidazolecarboxamide formyltransferase/IMP cyclohydrolase

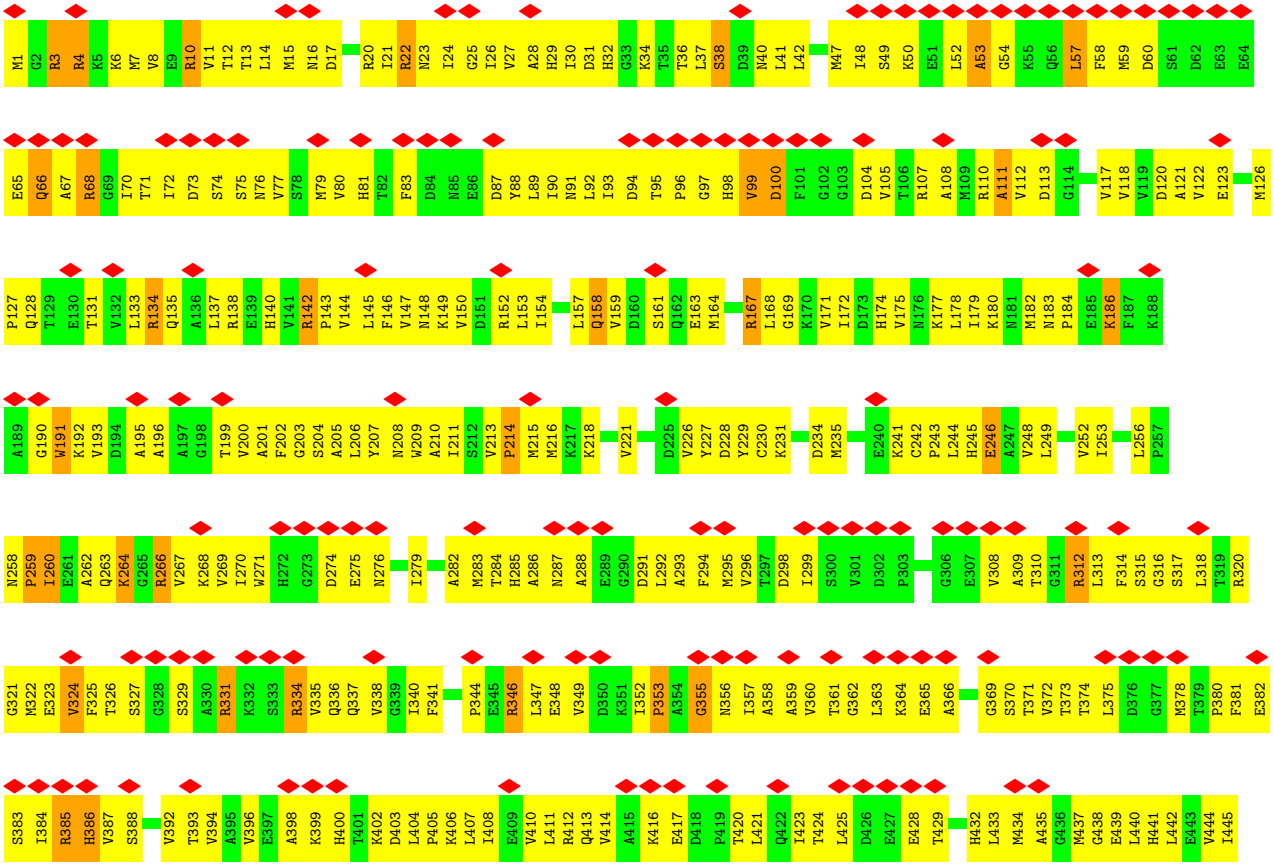
Chain DB:

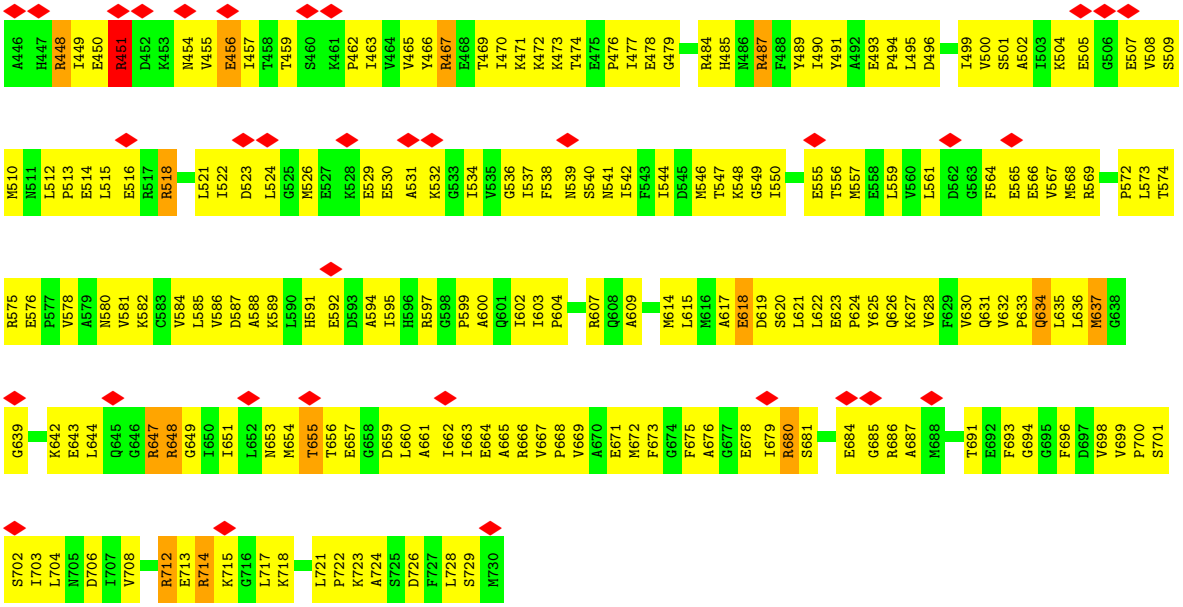




• Molecule 34: Elongation factor 2

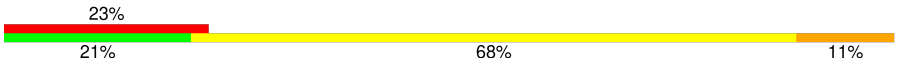
Chain DC:

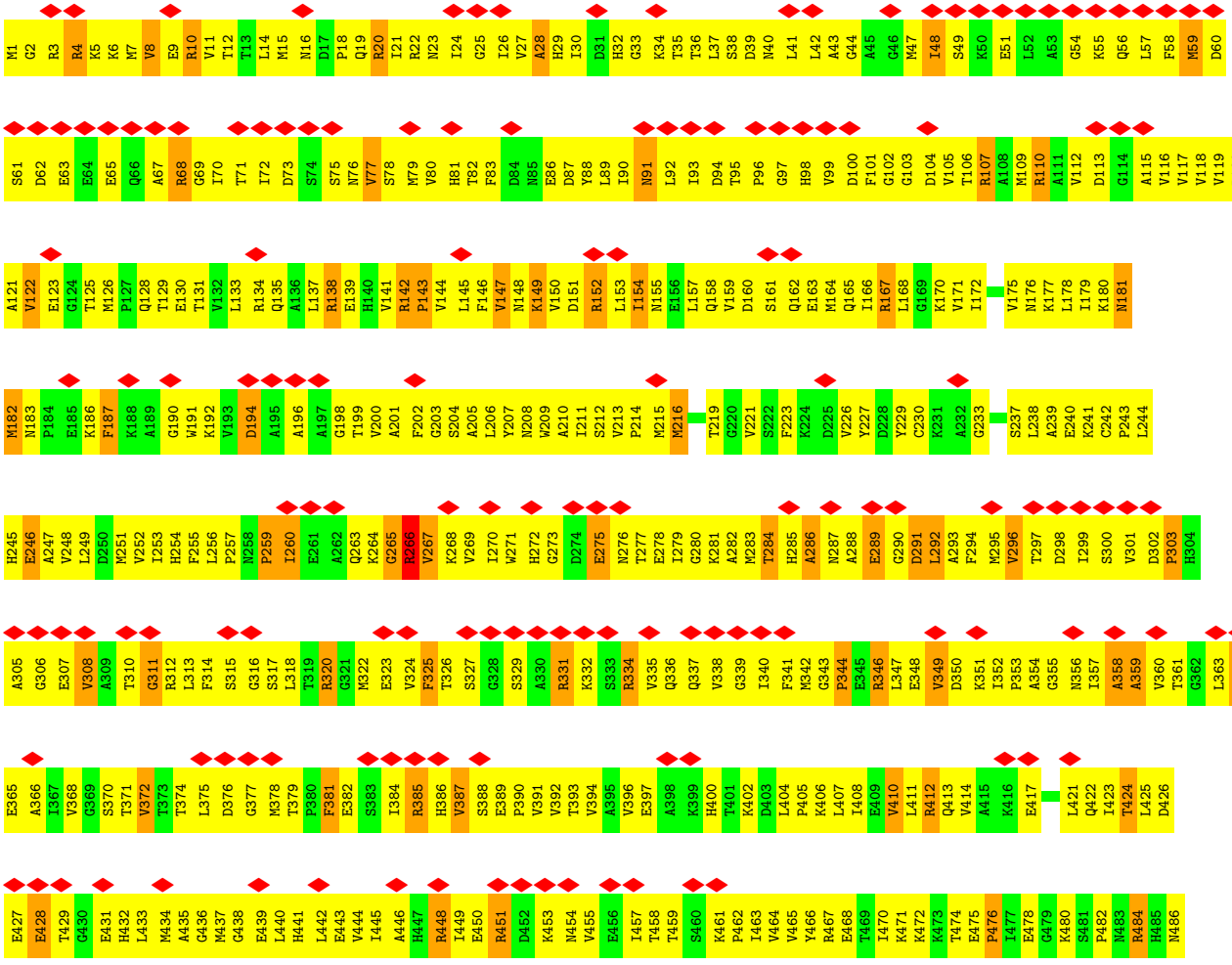


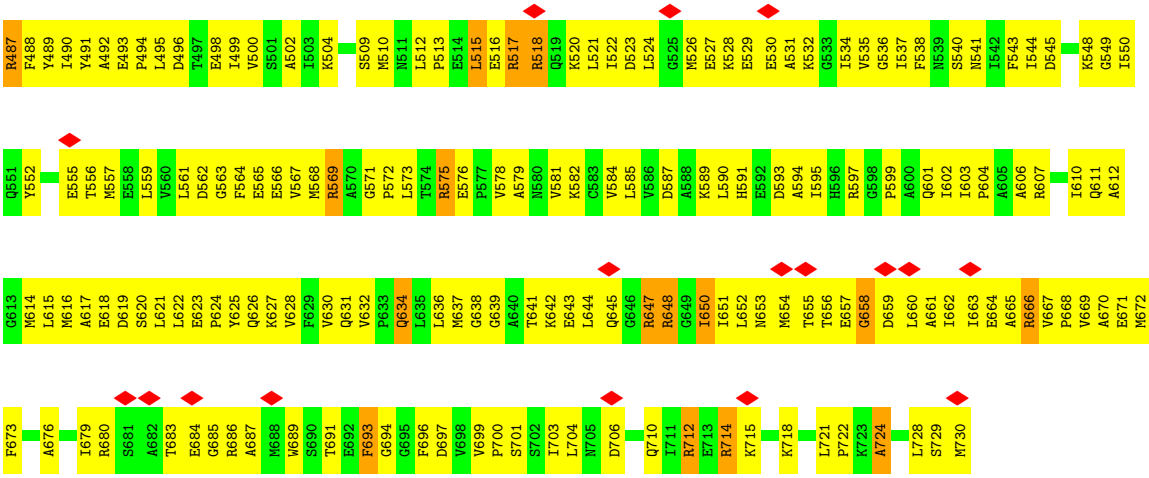


• Molecule 34: Elongation factor 2

Chain DD:






R487 F488 Y489 I490 Y491 A492 E493 P494 L495 D496 T497 E498 I499 V500 S501 A502 I503 K504 S509 M510 N511 L512 P513 E514 L515 E516 R517 R518 Q519 K520 L521 I522 D523 L524 G525 M526 E527 K528 E529 E530 A531 K532 G533 I534 V535 G536 I537 F538 N539 S540 N541 I542 F543 I544 D545 K548 G549 I550
Q551 Y552 E555 T556 M557 E558 L559 V560 L561 D562 G563 F564 E565 E566 V567 M568 R569 A570 G571 P572 L573 T574 R575 E576 P577 V578 A579 N580 V581 K582 C583 V584 L585 V586 D587 A588 K589 L590 H591 E592 D593 A594 I595 H596 R597 G598 P599 A600 Q601 I602 I603 P604 A605 A606 R607 I610 Q611 A612
G613 M614 L615 M616 A617 E618 D619 S620 L621 L622 E623 P624 Y625 Q626 K627 V628 F629 V630 Q631 V632 P633 Q634 L635 L636 M637 G638 G639 A640 T641 K642 E643 L644 Q645 G646 R647 R648 G649 I650 I651 L652 N653 M654 T655 T656 E657 G658 D659 L660 A661 I662 I663 E664 A665 R666 V667 P668 V669 A670 E671 M672
F673 A676 I679 R680 S681 A682 T683 E684 G685 R686 A687 M688 W689 S690 T691 E692 F693 G694 G695 F696 D697 V698 V699 P700 S701 S702 I703 L704 N705 D706 Q710 I711 R712 E713 R714 K715 K718 L721 P722 K723 A724 L728 S729 M730

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	15110	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	2.041	Depositor
Minimum map value	-0.964	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.089	Depositor
Recommended contour level	0.311	Depositor
Map size (Å)	586.2, 586.2, 586.2	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.977, 0.977, 0.977	Depositor

5 Model quality

5.1 Standard geometry

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	BA	0.16	0/69080	0.37	0/107723
1	CA	0.16	0/69080	0.37	0/107723
2	BB	0.12	0/3037	0.28	0/4728
2	CB	0.12	0/3037	0.28	0/4728
3	BC	0.12	0/1850	0.33	0/2497
3	CC	0.12	0/1850	0.33	0/2497
4	BD	0.12	0/2646	0.32	0/3569
4	CD	0.12	0/2646	0.32	0/3569
5	BE	0.12	0/1964	0.33	0/2654
5	CE	0.12	0/1964	0.33	0/2654
6	BF	0.11	0/1310	0.30	0/1762
6	CF	0.11	0/1310	0.30	0/1762
7	BG	0.10	0/1392	0.28	0/1870
7	CG	0.10	0/1392	0.28	0/1870
8	BH	0.11	0/864	0.30	0/1161
8	CH	0.11	0/864	0.30	0/1161
9	BI	0.12	0/1284	0.30	0/1719
9	CI	0.12	0/1284	0.32	0/1719
10	BJ	0.11	0/1101	0.31	0/1474
10	CJ	0.11	0/1101	0.31	0/1474
11	BK	0.12	0/1010	0.33	0/1355
11	CK	0.13	0/1010	0.34	0/1355
12	BL	0.12	0/1071	0.36	0/1425
12	CL	0.12	0/1071	0.36	0/1425
13	BM	0.12	0/1625	0.34	0/2176
13	CM	0.12	0/1625	0.34	0/2176
14	BN	0.09	0/1382	0.28	0/1863
14	CN	0.09	0/1382	0.28	0/1863
15	BO	0.12	0/975	0.32	0/1312
15	CO	0.12	0/975	0.32	0/1312
16	BP	0.12	0/1209	0.32	0/1602
16	CP	0.12	0/1209	0.32	0/1602
17	BQ	0.12	0/464	0.30	0/614
17	CQ	0.11	0/464	0.30	0/614

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
18	BR	0.12	0/780	0.32	0/1042
18	CR	0.12	0/780	0.32	0/1042
19	BS	0.12	0/1189	0.32	0/1588
19	CS	0.12	0/1189	0.32	0/1588
20	BT	0.12	0/664	0.32	0/884
20	CT	0.12	0/664	0.32	0/884
21	BU	0.11	0/919	0.33	0/1227
21	CU	0.11	0/919	0.34	0/1227
22	BV	0.09	0/508	0.26	0/670
22	CV	0.09	0/508	0.26	0/670
23	BW	0.11	0/534	0.29	0/716
23	CW	0.10	0/534	0.29	0/716
24	BX	0.11	0/1259	0.28	0/1692
24	CX	0.12	0/1259	0.28	0/1692
25	BY	0.10	0/663	0.28	0/897
25	CY	0.10	0/663	0.28	0/897
26	BZ	0.13	0/715	0.31	0/960
26	CZ	0.12	0/715	0.31	0/960
27	Ba	0.11	0/1044	0.28	0/1397
27	Ca	0.11	0/1044	0.28	0/1397
28	Bb	0.12	0/749	0.34	0/997
28	Cb	0.12	0/749	0.34	0/997
29	Bc	0.16	0/452	0.34	0/593
29	Cc	0.15	0/452	0.34	0/593
30	Bd	0.14	0/448	0.34	0/595
30	Cd	0.14	0/448	0.34	0/595
31	Be	0.09	0/355	0.29	0/468
31	Ce	0.09	0/355	0.29	0/468
32	Bf	0.10	0/777	0.30	0/1029
32	Cf	0.11	0/777	0.30	0/1029
33	DA	0.34	0/4247	0.97	5/5744 (0.1%)
33	DB	0.34	0/4247	0.97	7/5744 (0.1%)
34	DC	1.29	7/5731 (0.1%)	0.81	2/7735 (0.0%)
34	DD	0.32	0/5731	0.88	3/7735 (0.0%)
All	All	0.26	7/226596 (0.0%)	0.42	17/335476 (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
33	DA	0	20

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Mol	Chain	#Chirality outliers	#Planarity outliers
33	DB	0	21
34	DC	0	31
34	DD	0	30
All	All	0	102

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
34	DC	186	LYS	CE-NZ	85.26	4.05	1.49
34	DC	191	TRP	CE3-CZ3	23.80	2.10	1.38
34	DC	191	TRP	CE2-CZ2	18.51	1.78	1.39
34	DC	191	TRP	CZ3-CH2	18.05	1.85	1.40
34	DC	191	TRP	CZ2-CH2	14.57	1.65	1.37

The worst 5 of 17 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
33	DA	70	ILE	N-CA-C	-11.87	102.15	112.12
33	DB	68	PRO	CA-N-CD	-9.90	98.14	112.00
33	DA	409	CYS	CA-CB-SG	6.72	129.86	114.40
34	DD	48	ILE	N-CA-C	-6.46	100.64	108.53
34	DC	186	LYS	CD-CE-NZ	6.44	132.52	111.90

There are no chirality outliers.

5 of 102 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
33	DA	132	ARG	Sidechain
33	DA	20	ARG	Sidechain
33	DA	40	ARG	Sidechain
33	DA	69	ARG	Sidechain
33	DA	78	ARG	Sidechain

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	BA	61722	31112	31115	453	0
1	CA	61722	31112	31115	464	0
2	BB	2720	0	1382	88	0
2	CB	2720	0	1382	82	0
3	BC	1808	0	1842	91	0
3	CC	1808	0	1842	93	0
4	BD	2597	0	2692	124	0
4	CD	2597	0	2692	127	0
5	BE	1930	0	1989	89	0
5	CE	1930	0	1989	87	0
6	BF	1289	0	1317	108	0
6	CF	1289	0	1317	101	0
7	BG	1371	0	1426	56	0
7	CG	1371	0	1426	60	0
8	BH	857	0	898	52	0
8	CH	857	0	898	54	0
9	BI	1261	0	1300	36	0
9	CI	1261	0	1300	37	0
10	BJ	1086	0	1135	46	0
10	CJ	1086	0	1135	47	0
11	BK	999	0	1059	56	0
11	CK	999	0	1059	61	0
12	BL	1058	0	1044	51	0
12	CL	1058	0	1044	50	0
13	BM	1593	0	1637	70	0
13	CM	1593	0	1637	71	0
14	BN	1356	0	1358	85	0
14	CN	1356	0	1358	82	0
15	BO	962	0	1021	53	0
15	CO	962	0	1021	52	0
16	BP	1195	0	1277	44	0
16	CP	1195	0	1277	40	0
17	BQ	457	0	463	18	0
17	CQ	457	0	463	18	0
18	BR	766	0	777	47	0
18	CR	766	0	777	46	0
19	BS	1169	0	1211	52	0
19	CS	1169	0	1211	52	0
20	BT	656	0	688	33	0
20	CT	656	0	688	32	0
21	BU	910	0	972	57	0
21	CU	910	0	972	59	0
22	BV	499	0	519	28	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
22	CV	499	0	519	30	0
23	BW	532	0	547	38	0
23	CW	532	0	547	36	0
24	BX	1237	0	1269	41	0
24	CX	1237	0	1269	42	0
25	BY	658	0	696	44	0
25	CY	658	0	696	46	0
26	BZ	703	0	735	30	0
26	CZ	703	0	735	32	0
27	Ba	1028	0	1079	38	0
27	Ca	1028	0	1079	40	0
28	Bb	736	0	775	39	0
28	Cb	736	0	775	37	0
29	Bc	445	0	459	19	0
29	Cc	445	0	459	19	0
30	Bd	439	0	479	19	0
30	Cd	439	0	479	20	0
31	Be	353	0	378	9	0
31	Ce	353	0	378	9	0
32	Bf	760	0	801	23	0
32	Cf	760	0	801	24	0
33	DA	4172	0	4180	602	0
33	DB	4172	0	4180	645	0
34	DC	5643	0	5735	636	0
34	DD	5643	0	5735	838	0
All	All	209934	62224	148510	5940	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 17.

The worst 5 of 5940 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)
34:DC:191:TRP:CZ2	34:DC:191:TRP:CE2	1.78	1.70
34:DC:191:TRP:CH2	34:DC:191:TRP:CZ3	1.85	1.63
34:DC:191:TRP:CZ3	34:DC:191:TRP:CE3	2.10	1.38
33:DA:434:GLY:HA2	33:DA:447:LEU:HG	1.26	1.12
33:DA:215:ASN:HB2	33:DA:218:GLN:HG3	1.35	1.08

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	
3	BC	236/238 (99%)	228 (97%)	8 (3%)	0	100	100
3	CC	236/238 (99%)	228 (97%)	8 (3%)	0	100	100
4	BD	335/337 (99%)	328 (98%)	7 (2%)	0	100	100
4	CD	335/337 (99%)	328 (98%)	7 (2%)	0	100	100
5	BE	250/253 (99%)	244 (98%)	6 (2%)	0	100	100
5	CE	250/253 (99%)	244 (98%)	6 (2%)	0	100	100
6	BF	163/165 (99%)	155 (95%)	8 (5%)	0	100	100
6	CF	163/165 (99%)	156 (96%)	7 (4%)	0	100	100
7	BG	174/176 (99%)	167 (96%)	7 (4%)	0	100	100
7	CG	174/176 (99%)	167 (96%)	7 (4%)	0	100	100
8	BH	113/120 (94%)	111 (98%)	2 (2%)	0	100	100
8	CH	113/120 (94%)	111 (98%)	2 (2%)	0	100	100
9	BI	155/173 (90%)	148 (96%)	7 (4%)	0	100	100
9	CI	155/173 (90%)	148 (96%)	7 (4%)	0	100	100
10	BJ	136/143 (95%)	134 (98%)	2 (2%)	0	100	100
10	CJ	136/143 (95%)	134 (98%)	2 (2%)	0	100	100
11	BK	130/132 (98%)	126 (97%)	4 (3%)	0	100	100
11	CK	130/132 (98%)	126 (97%)	4 (3%)	0	100	100
12	BL	138/140 (99%)	132 (96%)	5 (4%)	1 (1%)	19	53
12	CL	138/140 (99%)	132 (96%)	5 (4%)	1 (1%)	19	53
13	BM	194/196 (99%)	189 (97%)	5 (3%)	0	100	100
13	CM	194/196 (99%)	189 (97%)	5 (3%)	0	100	100
14	BN	172/174 (99%)	167 (97%)	5 (3%)	0	100	100
14	CN	172/174 (99%)	167 (97%)	5 (3%)	0	100	100
15	BO	124/126 (98%)	123 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
15	CO	124/126 (98%)	123 (99%)	1 (1%)	0	100	100
16	BP	149/151 (99%)	146 (98%)	3 (2%)	0	100	100
16	CP	149/151 (99%)	145 (97%)	4 (3%)	0	100	100
17	BQ	55/61 (90%)	55 (100%)	0	0	100	100
17	CQ	55/61 (90%)	55 (100%)	0	0	100	100
18	BR	94/97 (97%)	89 (95%)	5 (5%)	0	100	100
18	CR	94/97 (97%)	89 (95%)	5 (5%)	0	100	100
19	BS	149/151 (99%)	142 (95%)	7 (5%)	0	100	100
19	CS	149/151 (99%)	142 (95%)	7 (5%)	0	100	100
20	BT	80/82 (98%)	78 (98%)	2 (2%)	0	100	100
20	CT	80/82 (98%)	78 (98%)	2 (2%)	0	100	100
21	BU	117/119 (98%)	114 (97%)	3 (3%)	0	100	100
21	CU	117/119 (98%)	114 (97%)	3 (3%)	0	100	100
22	BV	60/62 (97%)	59 (98%)	1 (2%)	0	100	100
22	CV	60/62 (97%)	59 (98%)	1 (2%)	0	100	100
23	BW	65/67 (97%)	64 (98%)	1 (2%)	0	100	100
23	CW	65/67 (97%)	64 (98%)	1 (2%)	0	100	100
24	BX	151/153 (99%)	147 (97%)	4 (3%)	0	100	100
24	CX	151/153 (99%)	147 (97%)	4 (3%)	0	100	100
25	BY	90/99 (91%)	87 (97%)	3 (3%)	0	100	100
25	CY	90/99 (91%)	87 (97%)	3 (3%)	0	100	100
26	BZ	84/89 (94%)	82 (98%)	2 (2%)	0	100	100
26	CZ	84/89 (94%)	82 (98%)	2 (2%)	0	100	100
27	Ba	130/161 (81%)	129 (99%)	1 (1%)	0	100	100
27	Ca	130/161 (81%)	129 (99%)	1 (1%)	0	100	100
28	Bb	92/94 (98%)	85 (92%)	7 (8%)	0	100	100
28	Cb	92/94 (98%)	85 (92%)	7 (8%)	0	100	100
29	Bc	54/56 (96%)	50 (93%)	4 (7%)	0	100	100
29	Cc	54/56 (96%)	50 (93%)	4 (7%)	0	100	100
30	Bd	49/51 (96%)	41 (84%)	8 (16%)	0	100	100
30	Cd	49/51 (96%)	41 (84%)	8 (16%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
31	Be	42/52 (81%)	41 (98%)	1 (2%)	0	100 100
31	Ce	42/52 (81%)	41 (98%)	1 (2%)	0	100 100
32	Bf	90/92 (98%)	87 (97%)	3 (3%)	0	100 100
32	Cf	90/92 (98%)	87 (97%)	3 (3%)	0	100 100
33	DA	536/538 (100%)	336 (63%)	151 (28%)	49 (9%)	0 6
33	DB	536/538 (100%)	345 (64%)	146 (27%)	45 (8%)	0 7
34	DC	728/730 (100%)	535 (74%)	157 (22%)	36 (5%)	2 16
34	DD	728/730 (100%)	449 (62%)	217 (30%)	62 (8%)	0 7
All	All	10270/10556 (97%)	9161 (89%)	915 (9%)	194 (2%)	9 33

5 of 194 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
33	DA	56	PRO
33	DA	59	MET
33	DA	63	VAL
33	DA	66	LEU
33	DA	75	LEU

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
3	BC	188/188 (100%)	188 (100%)	0	100 100
3	CC	188/188 (100%)	188 (100%)	0	100 100
4	BD	277/277 (100%)	277 (100%)	0	100 100
4	CD	277/277 (100%)	277 (100%)	0	100 100
5	BE	197/198 (100%)	197 (100%)	0	100 100
5	CE	197/198 (100%)	197 (100%)	0	100 100
6	BF	140/140 (100%)	140 (100%)	0	100 100
6	CF	140/140 (100%)	140 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	BG	148/148 (100%)	148 (100%)	0	100	100
7	CG	148/148 (100%)	148 (100%)	0	100	100
8	BH	88/91 (97%)	88 (100%)	0	100	100
8	CH	88/91 (97%)	88 (100%)	0	100	100
9	BI	132/141 (94%)	132 (100%)	0	100	100
9	CI	132/141 (94%)	132 (100%)	0	100	100
10	BJ	114/119 (96%)	114 (100%)	0	100	100
10	CJ	114/119 (96%)	114 (100%)	0	100	100
11	BK	109/109 (100%)	109 (100%)	0	100	100
11	CK	109/109 (100%)	109 (100%)	0	100	100
12	BL	108/108 (100%)	108 (100%)	0	100	100
12	CL	108/108 (100%)	108 (100%)	0	100	100
13	BM	166/166 (100%)	166 (100%)	0	100	100
13	CM	166/166 (100%)	166 (100%)	0	100	100
14	BN	143/143 (100%)	143 (100%)	0	100	100
14	CN	143/143 (100%)	143 (100%)	0	100	100
15	BO	104/104 (100%)	104 (100%)	0	100	100
15	CO	104/104 (100%)	104 (100%)	0	100	100
16	BP	123/123 (100%)	123 (100%)	0	100	100
16	CP	123/123 (100%)	123 (100%)	0	100	100
17	BQ	50/54 (93%)	50 (100%)	0	100	100
17	CQ	50/54 (93%)	50 (100%)	0	100	100
18	BR	85/86 (99%)	85 (100%)	0	100	100
18	CR	85/86 (99%)	85 (100%)	0	100	100
19	BS	124/124 (100%)	124 (100%)	0	100	100
19	CS	124/124 (100%)	124 (100%)	0	100	100
20	BT	73/73 (100%)	73 (100%)	0	100	100
20	CT	73/73 (100%)	73 (100%)	0	100	100
21	BU	100/100 (100%)	100 (100%)	0	100	100
21	CU	100/100 (100%)	100 (100%)	0	100	100
22	BV	54/54 (100%)	54 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
22	CV	54/54 (100%)	54 (100%)	0	100	100
23	BW	57/57 (100%)	57 (100%)	0	100	100
23	CW	57/57 (100%)	57 (100%)	0	100	100
24	BX	134/134 (100%)	134 (100%)	0	100	100
24	CX	134/134 (100%)	134 (100%)	0	100	100
25	BY	71/78 (91%)	71 (100%)	0	100	100
25	CY	71/78 (91%)	71 (100%)	0	100	100
26	BZ	76/78 (97%)	76 (100%)	0	100	100
26	CZ	76/78 (97%)	76 (100%)	0	100	100
27	Ba	109/135 (81%)	109 (100%)	0	100	100
27	Ca	109/135 (81%)	109 (100%)	0	100	100
28	Bb	76/76 (100%)	76 (100%)	0	100	100
28	Cb	76/76 (100%)	76 (100%)	0	100	100
29	Bc	49/49 (100%)	49 (100%)	0	100	100
29	Cc	49/49 (100%)	49 (100%)	0	100	100
30	Bd	48/48 (100%)	48 (100%)	0	100	100
30	Cd	48/48 (100%)	48 (100%)	0	100	100
31	Be	37/43 (86%)	37 (100%)	0	100	100
31	Ce	37/43 (86%)	37 (100%)	0	100	100
32	Bf	82/82 (100%)	82 (100%)	0	100	100
32	Cf	82/82 (100%)	82 (100%)	0	100	100
33	DA	447/447 (100%)	447 (100%)	0	100	100
33	DB	447/447 (100%)	446 (100%)	1 (0%)	92	97
34	DC	614/614 (100%)	614 (100%)	0	100	100
34	DD	614/614 (100%)	614 (100%)	0	100	100
All	All	8646/8774 (98%)	8645 (100%)	1 (0%)	100	100

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
33	DB	425	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 72

such sidechains are listed below:

Mol	Chain	Res	Type
33	DB	496	HIS
34	DD	591	HIS
34	DC	174	HIS
34	DC	653	ASN
6	CF	24	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	BA	2881/2899 (99%)	466 (16%)	13 (0%)
1	CA	2881/2899 (99%)	466 (16%)	13 (0%)
2	BB	127/129 (98%)	15 (11%)	0
2	CB	127/129 (98%)	15 (11%)	0
All	All	6016/6056 (99%)	962 (15%)	26 (0%)

5 of 962 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	BA	7	U
1	BA	39	C
1	BA	56	A
1	BA	64	A
1	BA	67	A

5 of 26 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	CA	455	A
1	CA	869	U
1	CA	2365	A
1	CA	826	U
1	CA	1160	A

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

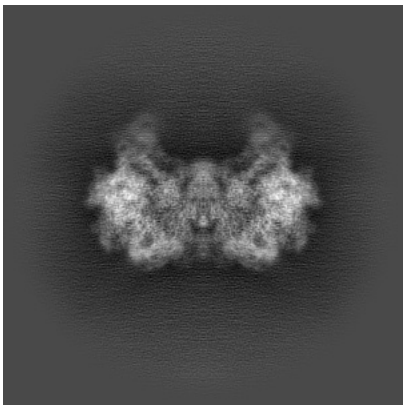
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-70864. These allow visual inspection of the internal detail of the map and identification of artifacts.

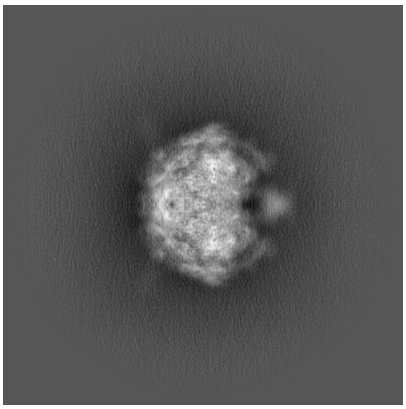
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

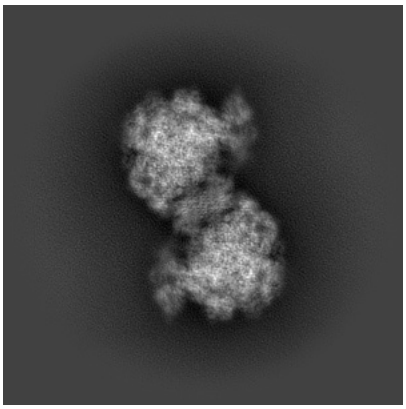
6.1.1 Primary map



X

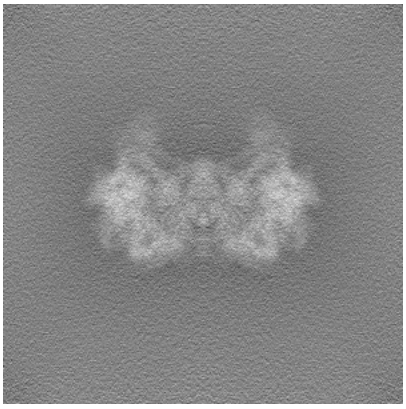


Y

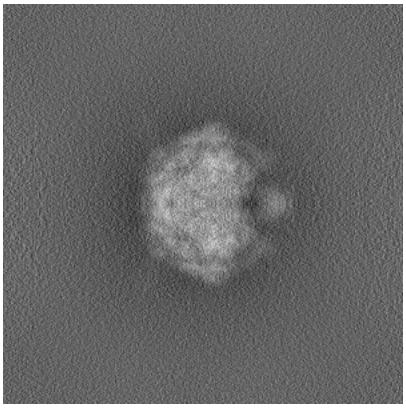


Z

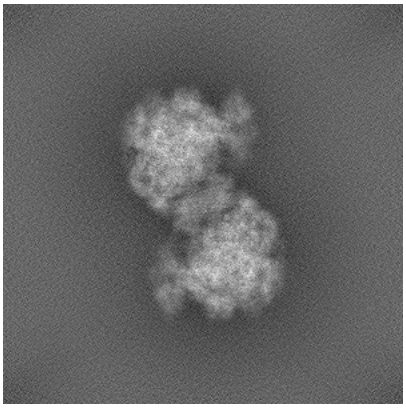
6.1.2 Raw map



X



Y

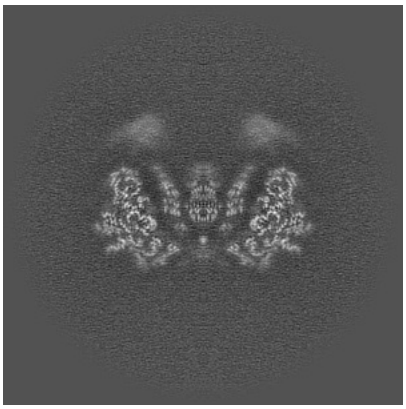


Z

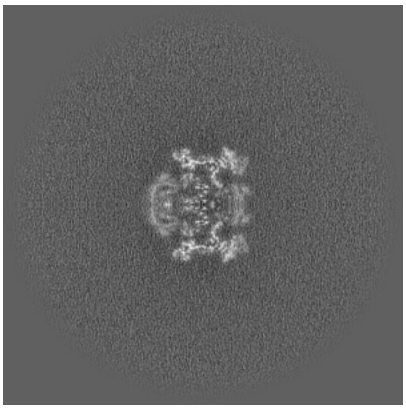
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

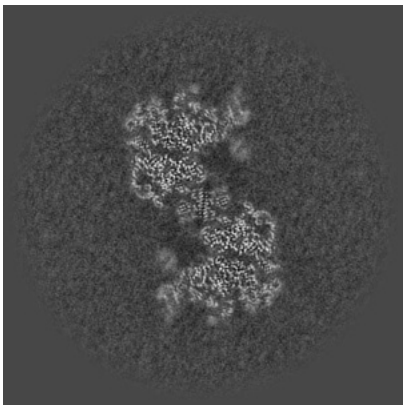
6.2.1 Primary map



X Index: 300

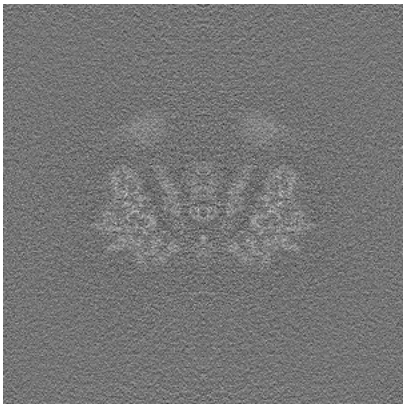


Y Index: 300

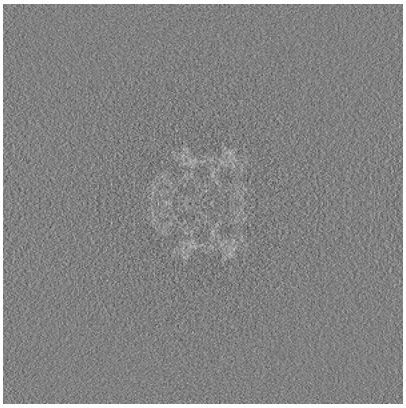


Z Index: 300

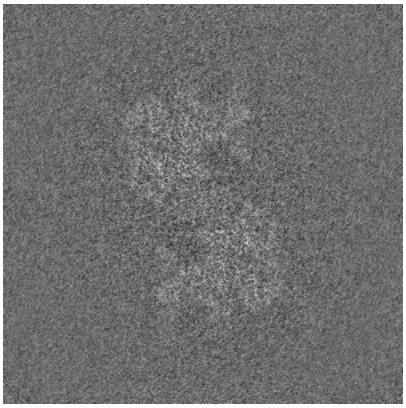
6.2.2 Raw map



X Index: 300



Y Index: 300

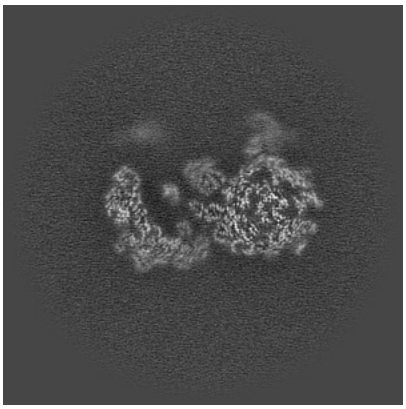


Z Index: 300

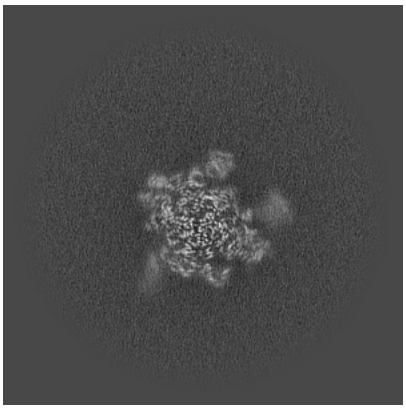
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

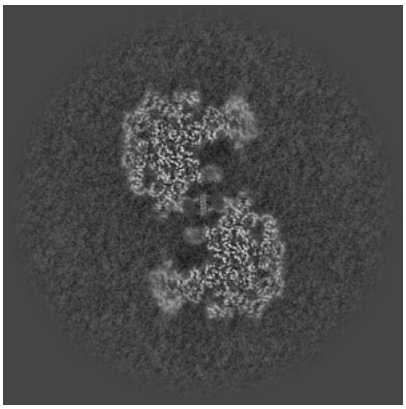
6.3.1 Primary map



X Index: 285

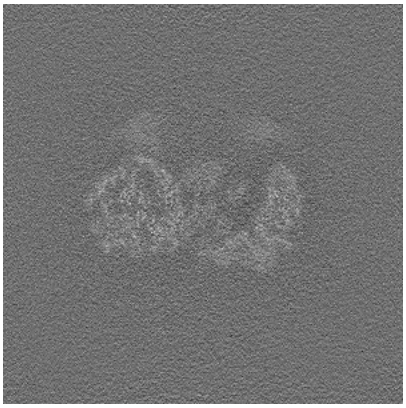


Y Index: 400

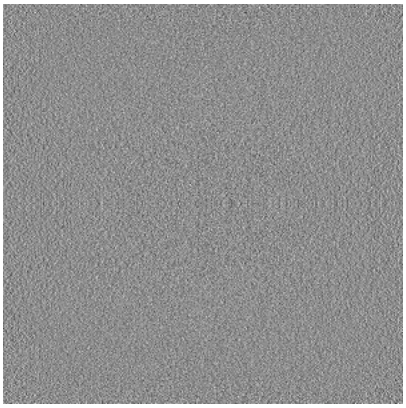


Z Index: 313

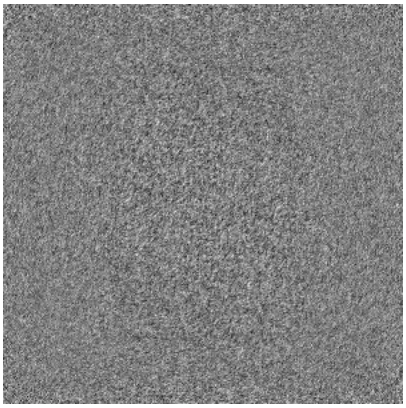
6.3.2 Raw map



X Index: 310



Y Index: 0

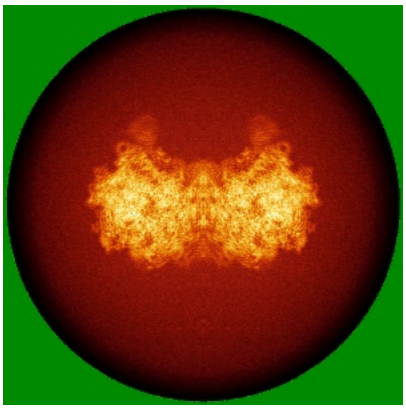


Z Index: 0

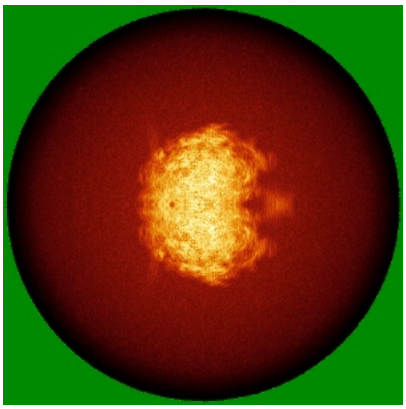
The images above show the largest variance slices of the map in three orthogonal directions.

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

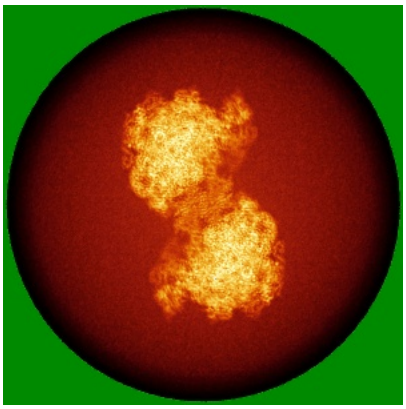
6.4.1 Primary map



X

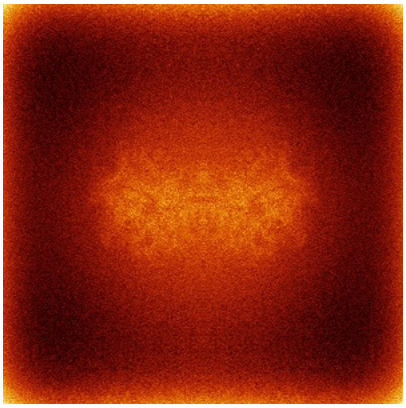


Y

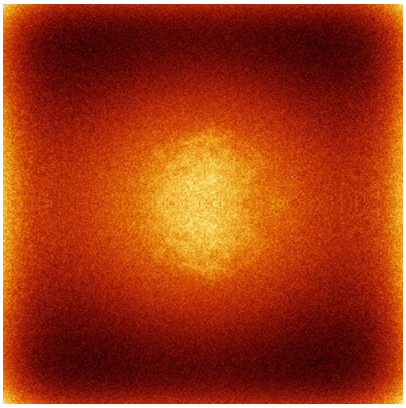


Z

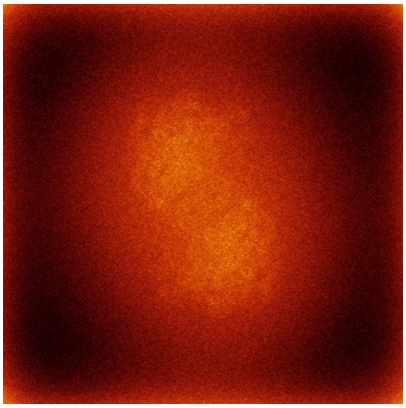
6.4.2 Raw map



X



Y

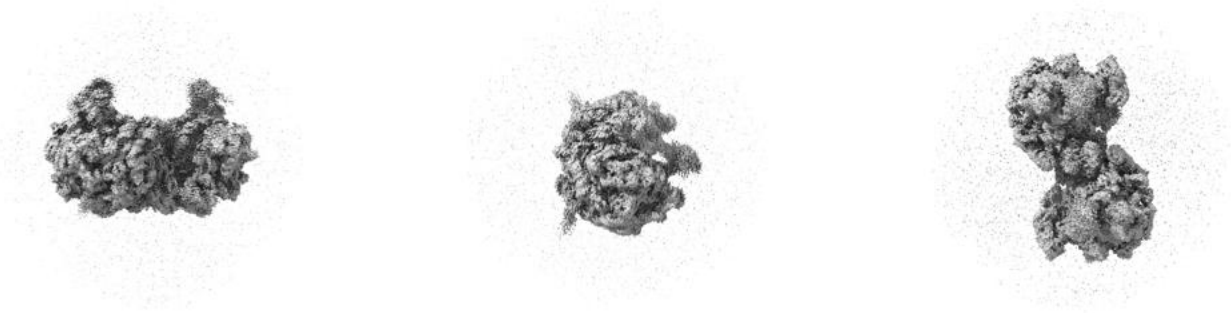


Z

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)

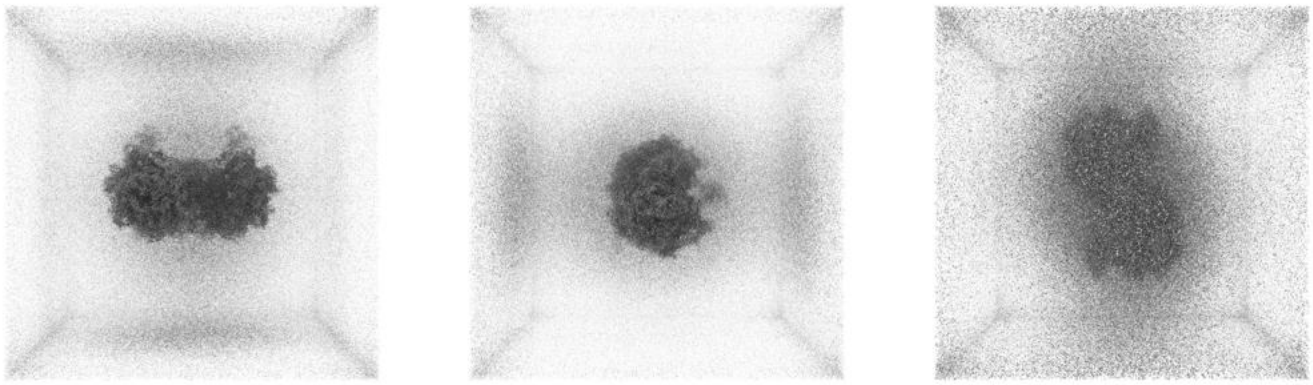
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.311. 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.

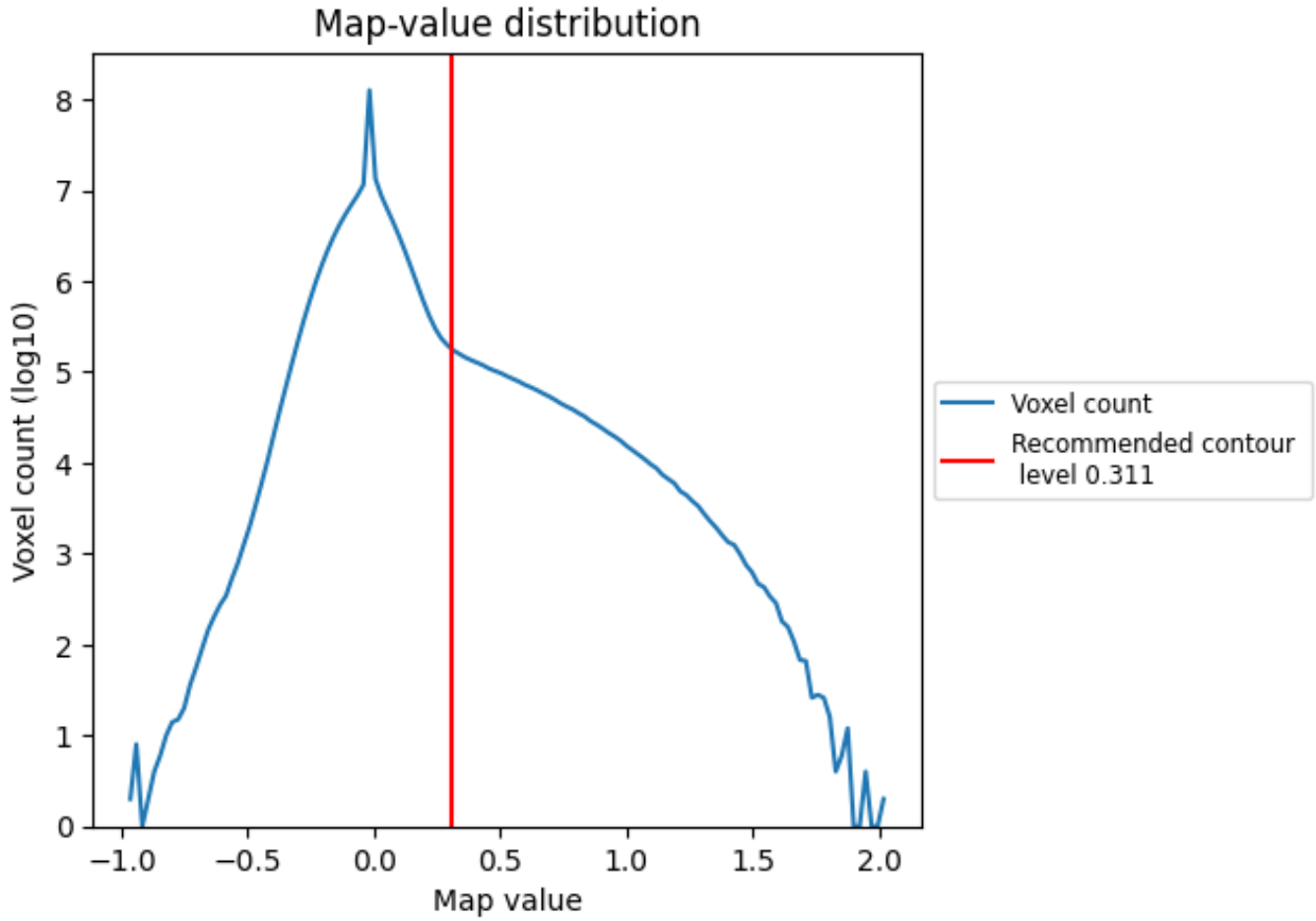
6.6 Mask visualisation (i)

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

7 Map analysis

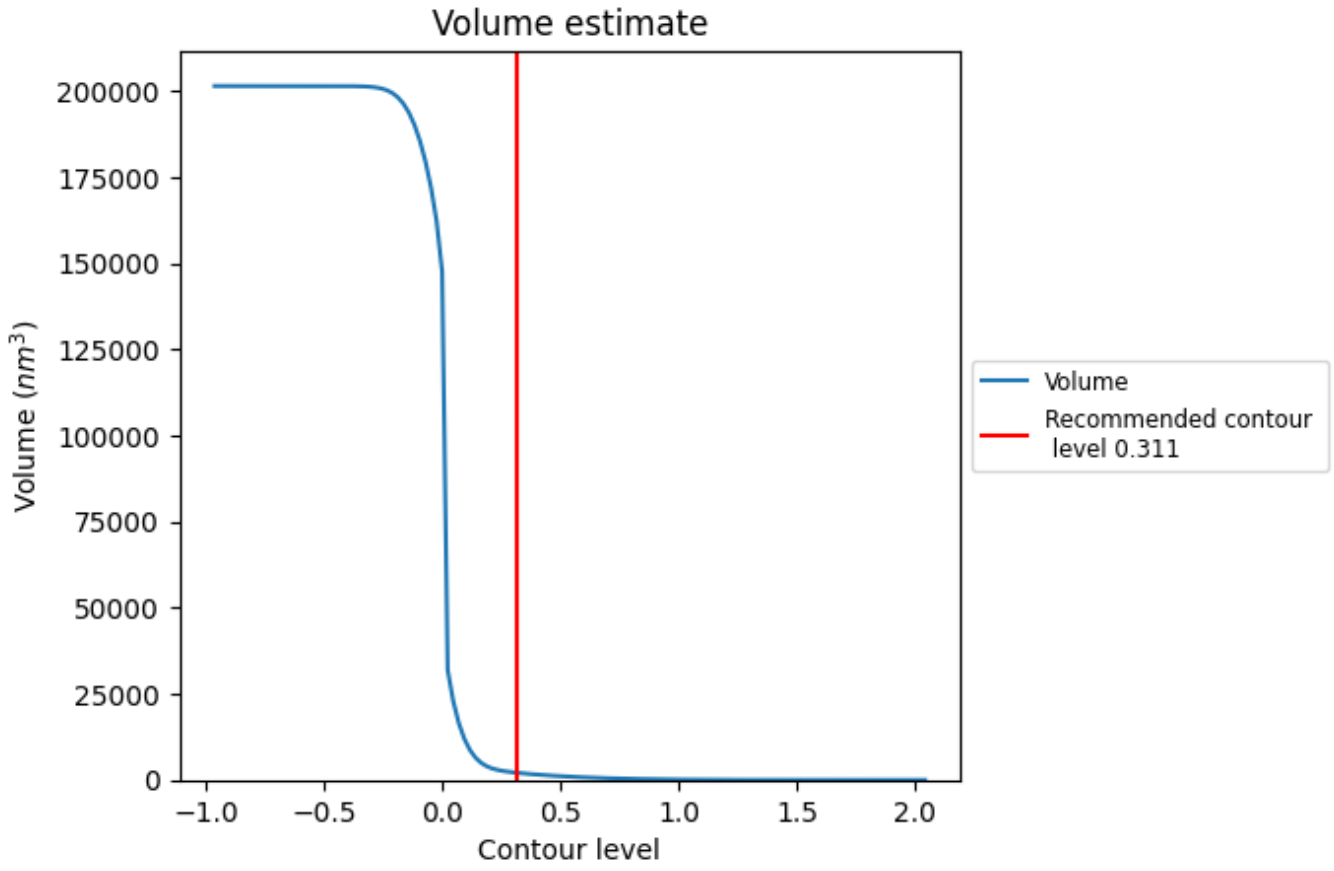
This section contains the results of statistical analysis of the map.

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.

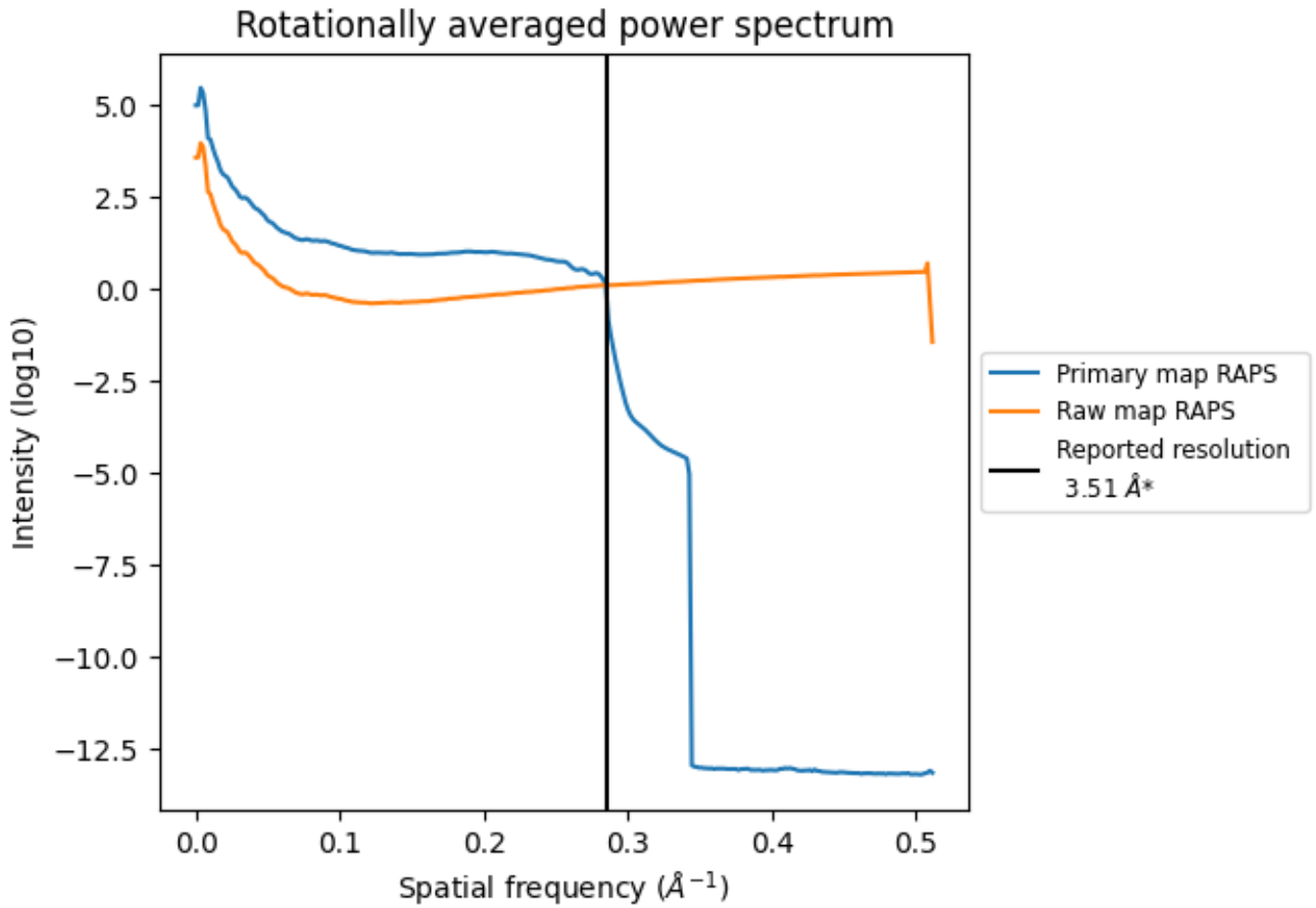
7.2 Volume estimate (i)



The volume at the recommended contour level is 2105 nm^3; this corresponds to an approximate mass of 1902 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)

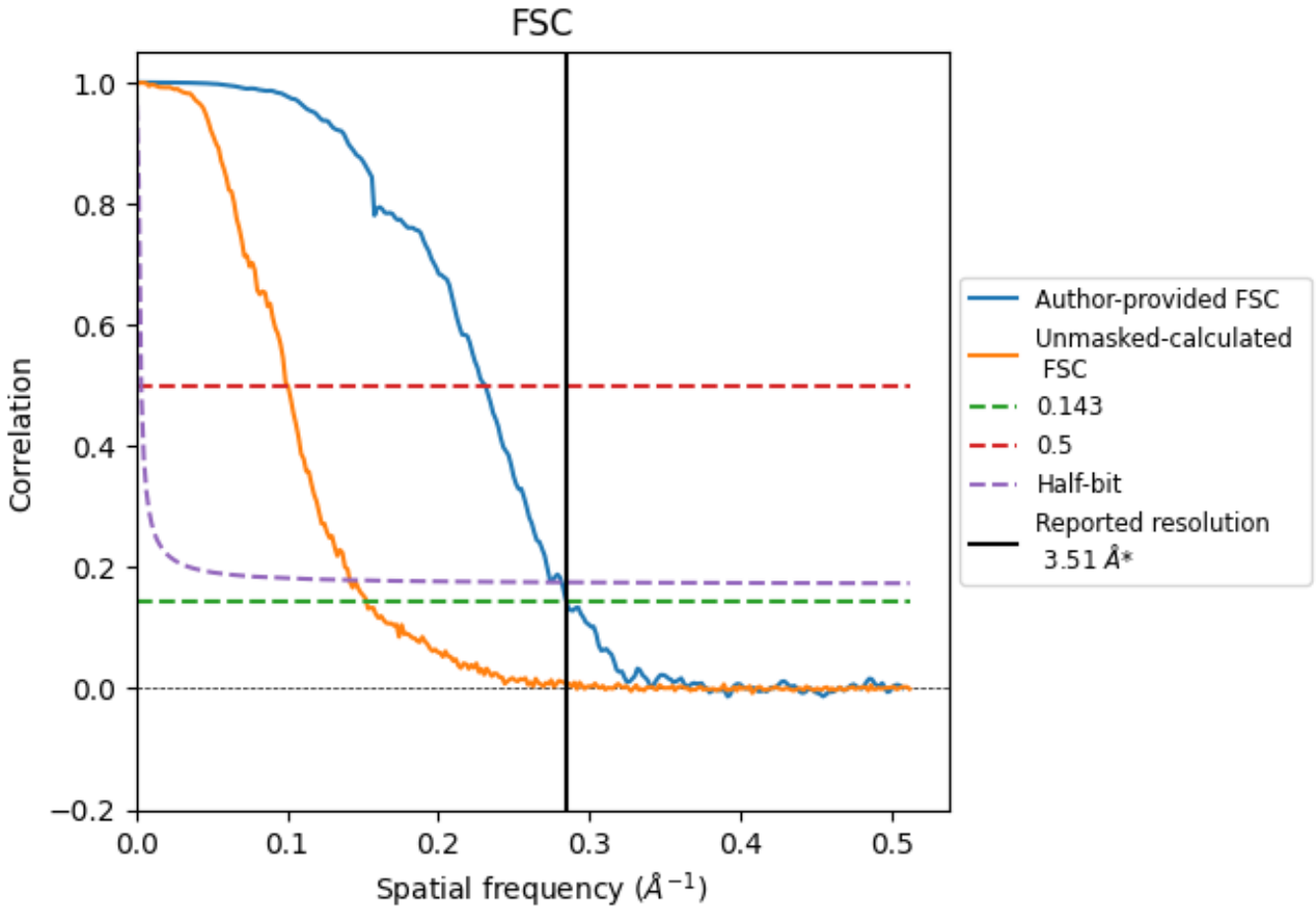


*Reported resolution corresponds to spatial frequency of 0.285 $Å^{-1}$

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 0.285 Å^{-1}

8.2 Resolution estimates (i)

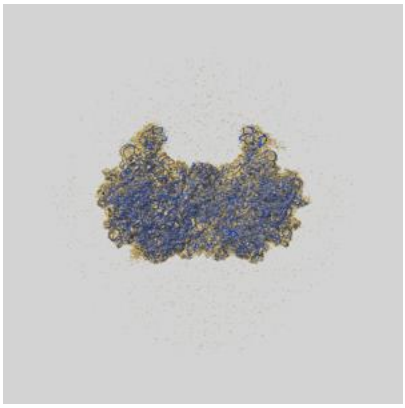
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.51	-	-
Author-provided FSC curve	3.51	4.33	3.55
Unmasked-calculated*	6.56	9.98	7.08

*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 6.56 differs from the reported value 3.51 by more than 10 %

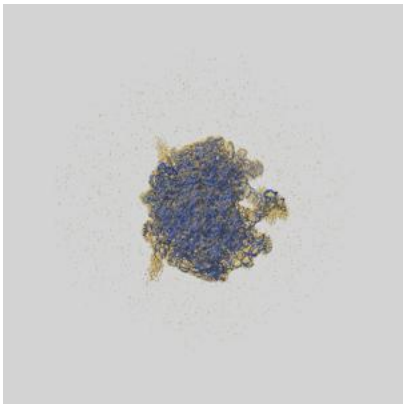
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-70864 and PDB model 9OU7. Per-residue inclusion information can be found in section 3 on page 14.

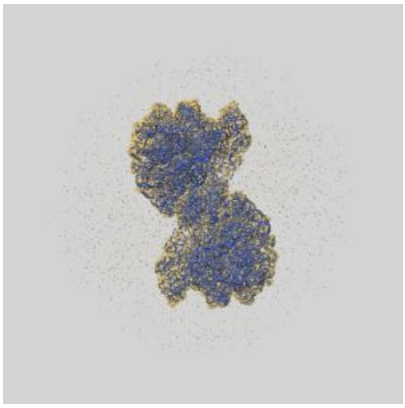
9.1 Map-model overlay



X



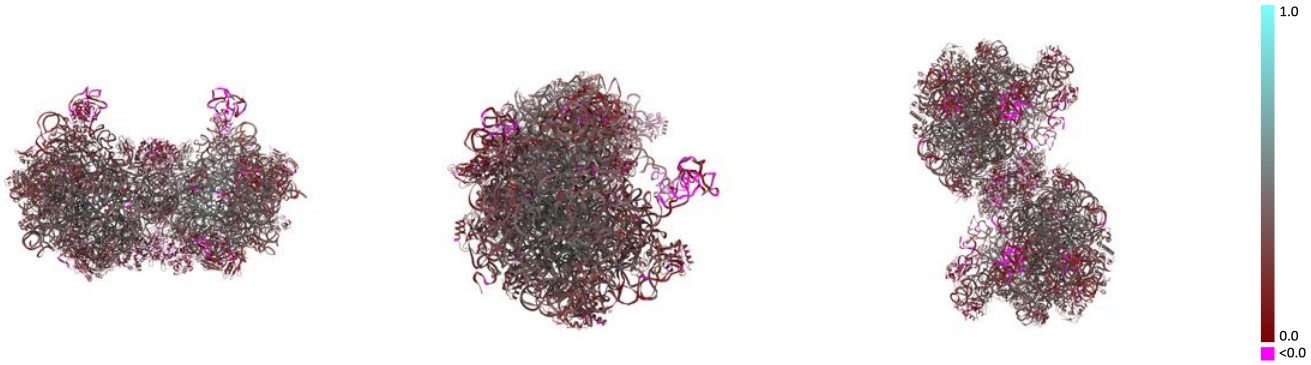
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.311 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.

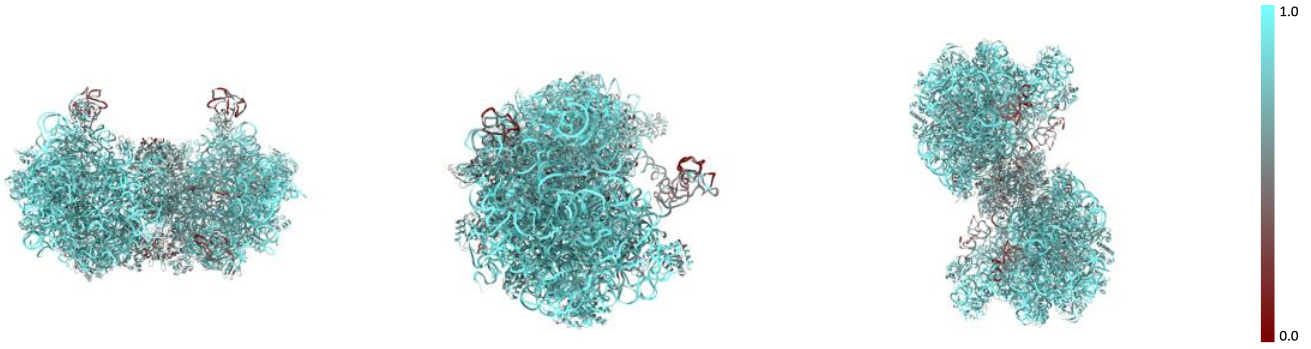
9.2 Q-score mapped to coordinate model



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.

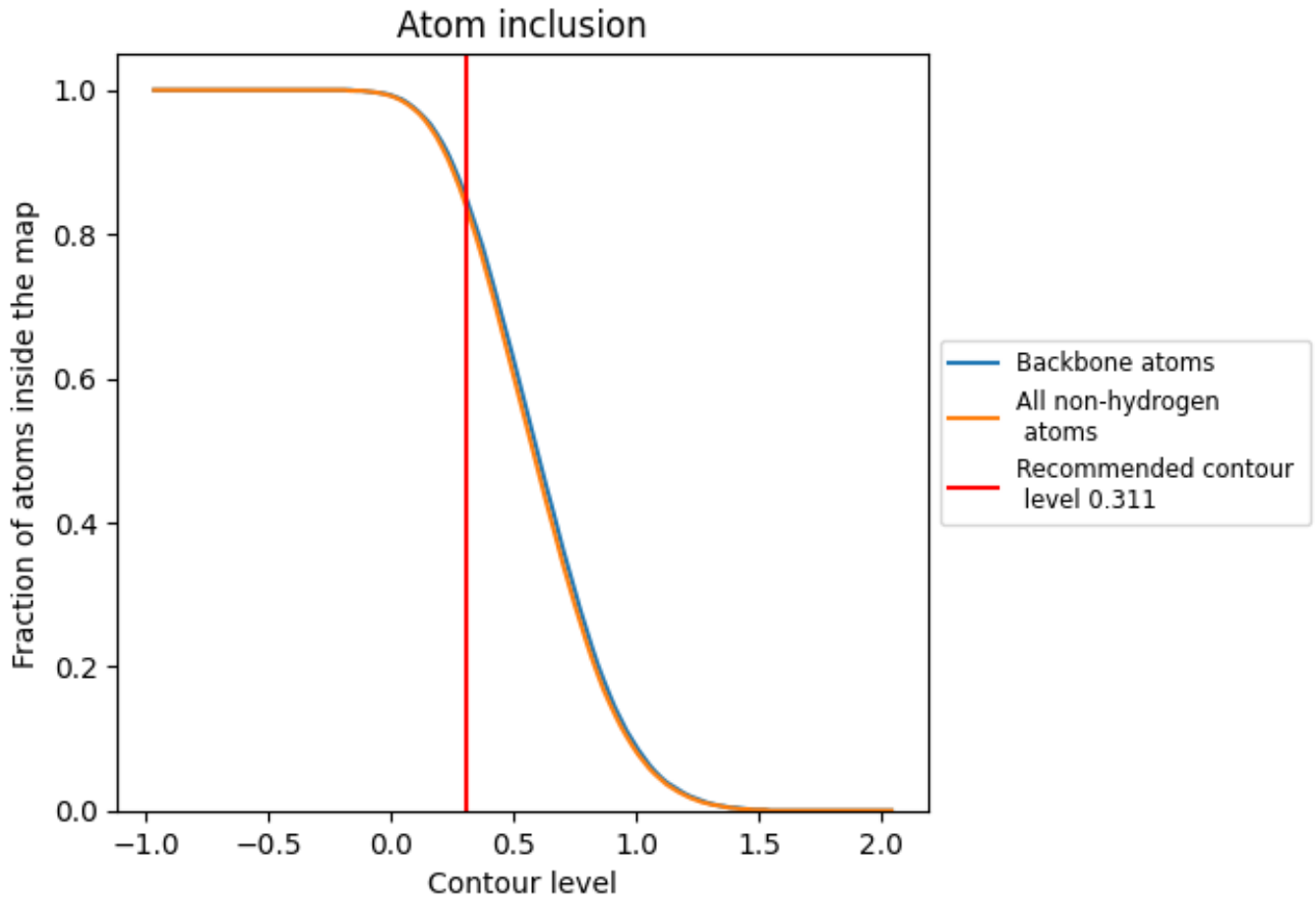
9.3 Atom inclusion mapped to coordinate model



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 (0.311).

9.4 Atom inclusion (i)



At the recommended contour level, 85% of all backbone atoms, 84% 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 (0.311) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8350	0.3340
BA	0.9080	0.3570
BB	0.9530	0.3130
BC	0.7780	0.3710
BD	0.7370	0.3260
BE	0.8060	0.3590
BF	0.6710	0.1710
BG	0.6570	0.2440
BH	0.5940	0.1630
BI	0.7770	0.3720
BJ	0.7410	0.3250
BK	0.6940	0.3840
BL	0.8090	0.3460
BM	0.7500	0.3340
BN	0.7960	0.2580
BO	0.8150	0.3520
BP	0.7980	0.3740
BQ	0.7260	0.3040
BR	0.7830	0.3960
BS	0.7610	0.3610
BT	0.7470	0.3060
BU	0.7750	0.2700
BV	0.6920	0.3300
BW	0.7550	0.2690
BX	0.8120	0.3640
BY	0.6560	0.1930
BZ	0.7860	0.3640
Ba	0.8080	0.3770
Bb	0.7280	0.3130
Bc	0.8210	0.4500
Bd	0.8160	0.3980
Be	0.6600	0.2650
Bf	0.7540	0.3160
CA	0.9060	0.3560
CB	0.9520	0.3090

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Chain	Atom inclusion	Q-score
CC	0.7860	0.3730
CD	0.7330	0.3260
CE	0.8120	0.3580
CF	0.6760	0.1750
CG	0.6520	0.2370
CH	0.6000	0.1620
CI	0.7730	0.3650
CJ	0.7390	0.3240
CK	0.7040	0.3780
CL	0.8020	0.3470
CM	0.7500	0.3330
CN	0.7800	0.2580
CO	0.8150	0.3460
CP	0.7920	0.3740
CQ	0.7000	0.3000
CR	0.7950	0.3900
CS	0.7550	0.3630
CT	0.7500	0.3030
CU	0.7750	0.2660
CV	0.6900	0.3270
CW	0.7490	0.2680
CX	0.8110	0.3640
CY	0.6560	0.1960
CZ	0.7720	0.3670
Ca	0.8040	0.3780
Cb	0.7110	0.3160
Cc	0.8260	0.4500
Cd	0.8070	0.3980
Ce	0.6570	0.2570
Cf	0.7560	0.3190
DA	0.5900	0.2490
DB	0.5920	0.2570
DC	0.5700	0.2200
DD	0.5680	0.2210