wwPDB EM Validation Summary Report (i)

Jun 29, 2024 – 10:03 am BST

PDB ID	:	8QPB
EMDB ID	:	EMD-18547
Title	:	Cryo-EM Structure of Pre-B+ATP Complex (core part)
Authors	:	Zhang, Z.; Kumar, V.; Dybkov, O.; Will, C.L.; Zhong, J.; Ludwig, S.; Urlaub, H.; Kastner, B.; Stark, H.; Luehrmann, R.
Deposited on	:	2023-10-01
Resolution	:	3.70 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (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:

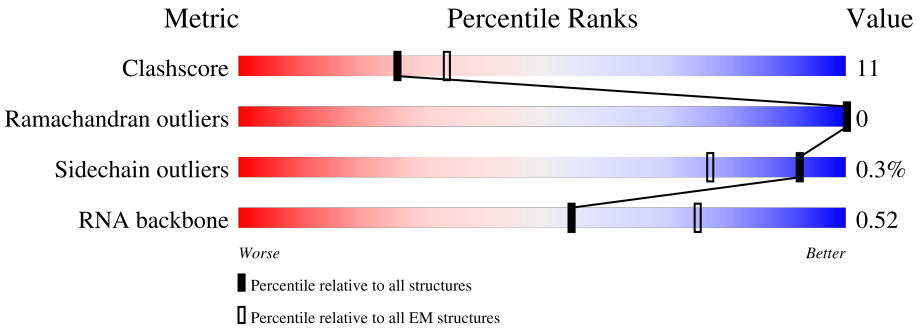
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 3.70 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	B	2136	99%
2	G	820	5% 93%
3	J	683	8% 88%
4	L	499	7% 55% 20% 25%
5	F	522	8% 88%
6	N	941	10% 36% 13% 51%
7	A	2335	61% 24% 15%

Continued on next page...

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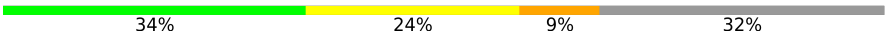
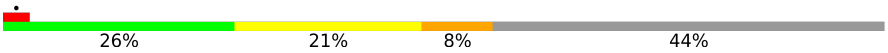
Mol	Chain	Length	Quality of chain
8	U	565	
9	S	800	
10	C	972	
11	M	128	
12	D	142	
13	5	117	
14	7	793	
15	4	144	
16	6	106	
17	z	13	

2 Entry composition (i)

There are 18 unique types of molecules in this entry. The entry contains 43804 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 U5 small nuclear ribonucleoprotein 200 kDa helicase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	B	22	158	97	28	32	1	0	0

- Molecule 2 is a protein called Probable ATP-dependent RNA helicase DDX23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	G	57	484	304	88	91	1	0	0

- Molecule 3 is a protein called U4/U6 small nuclear ribonucleoprotein Prp3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	J	84	679	419	138	119	3	0	0

- Molecule 4 is a protein called U4/U6 small nuclear ribonucleoprotein Prp31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	L	376	2886	1796	526	552	12	0	0

- Molecule 5 is a protein called U4/U6 small nuclear ribonucleoprotein Prp4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	61	488	297	97	93	1	0	0

- Molecule 6 is a protein called Pre-mRNA-processing factor 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	N	457	3502	2191	655	644	12	0	0

- Molecule 7 is a protein called Pre-mRNA-processing-splicing factor 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	A	1977	Total	C	N	O	S	0	0
			16409	10568	2864	2907	70		

- Molecule 8 is a protein called Ubiquitin carboxyl-terminal hydrolase 39.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	U	456	Total	C	N	O	S	0	0
			3749	2427	635	673	14		

- Molecule 9 is a protein called U4/U6.U5 tri-snRNP-associated protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	S	148	Total	C	N	O	S	0	0
			1164	724	216	222	2		

- Molecule 10 is a protein called 116 kDa U5 small nuclear ribonucleoprotein component.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	C	836	Total	C	N	O	S	0	0
			6592	4211	1110	1238	33		

- Molecule 11 is a protein called NHP2-like protein 1, N-terminally processed.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	M	124	Total	C	N	O	S	0	0
			962	608	171	178	5		

- Molecule 12 is a protein called Thioredoxin-like protein 4A.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	D	141	Total	C	N	O	S	0	0
			1170	751	194	215	10		

- Molecule 13 is a RNA chain called U5 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	5	79	Total	C	N	O	P	0	0
			1660	744	275	562	79		

- Molecule 14 is a protein called Splicing factor 3A subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	7	107	Total	C	N	O	S	0	0
			846	522	152	169	3		

- Molecule 15 is a RNA chain called U4 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	4	80	Total	C	N	O	P	0	0
			1699	760	297	562	80		

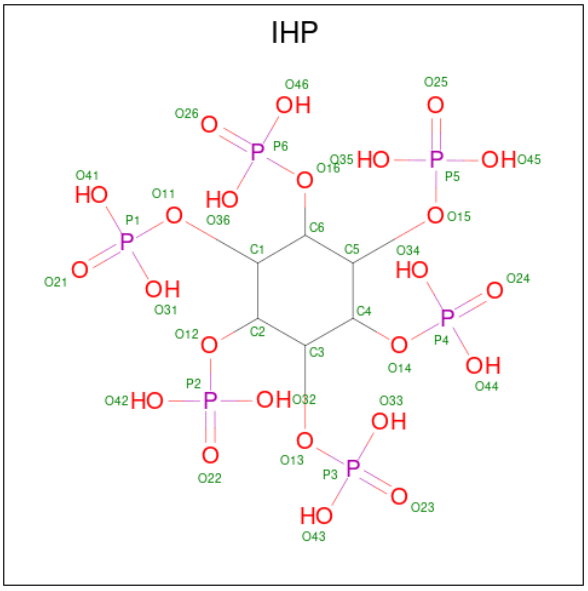
- Molecule 16 is a RNA chain called U6 snRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	6	48	Total	C	N	O	P	0	0
			1034	462	196	328	48		

- Molecule 17 is a RNA chain called 5'ss oligo.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	z	13	Total	C	N	O	P	0	0
			286	127	57	89	13		

- Molecule 18 is INOSITOL HEXAKISPHOSPHATE (three-letter code: IHP) (formula: $C_6H_{18}O_{24}P_6$) (labeled as "Ligand of Interest" by depositor).



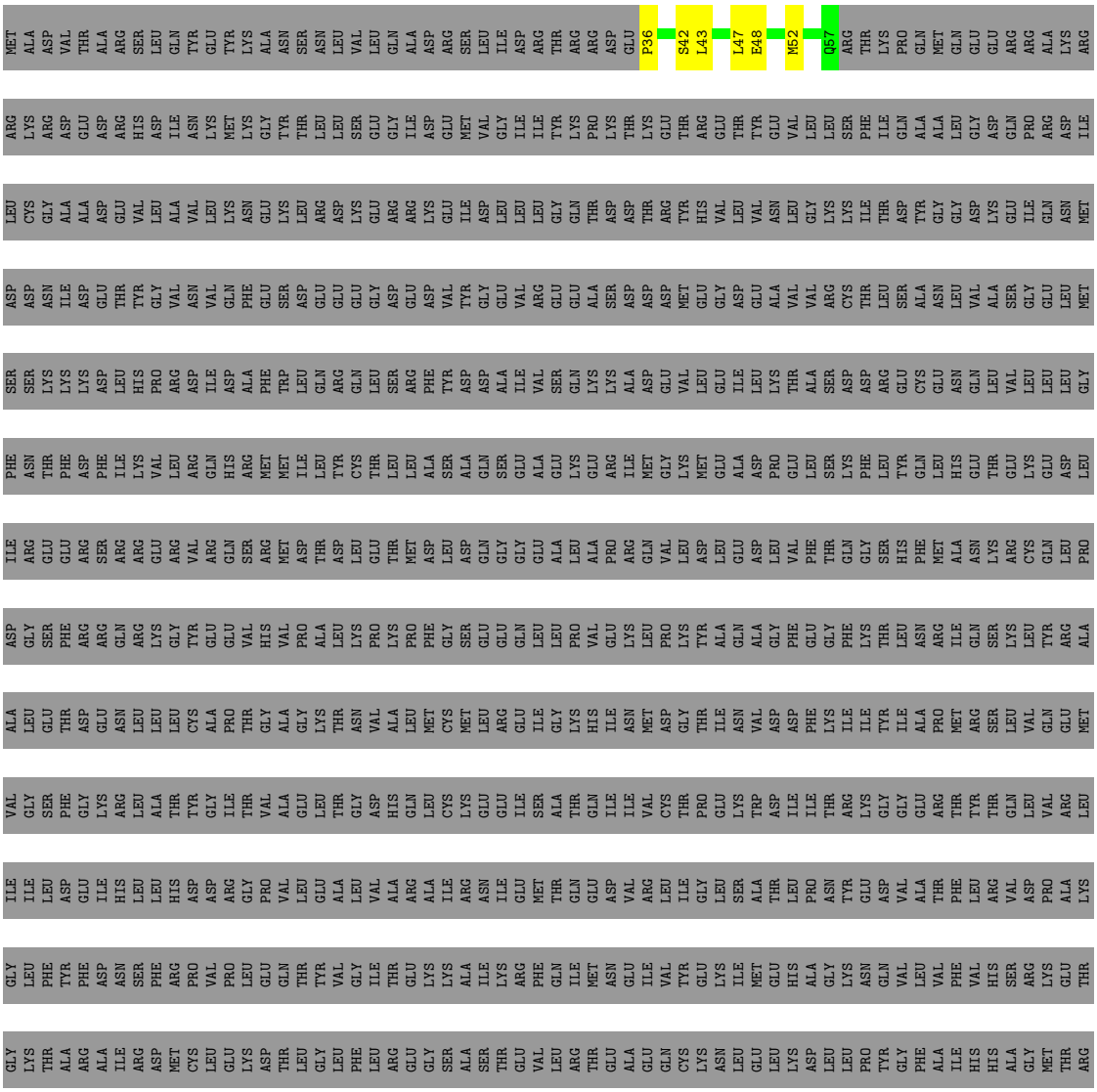
Mol	Chain	Residues	Atoms				AltConf
18	A	1	Total	C	O	P	0
			36	6	24	6	

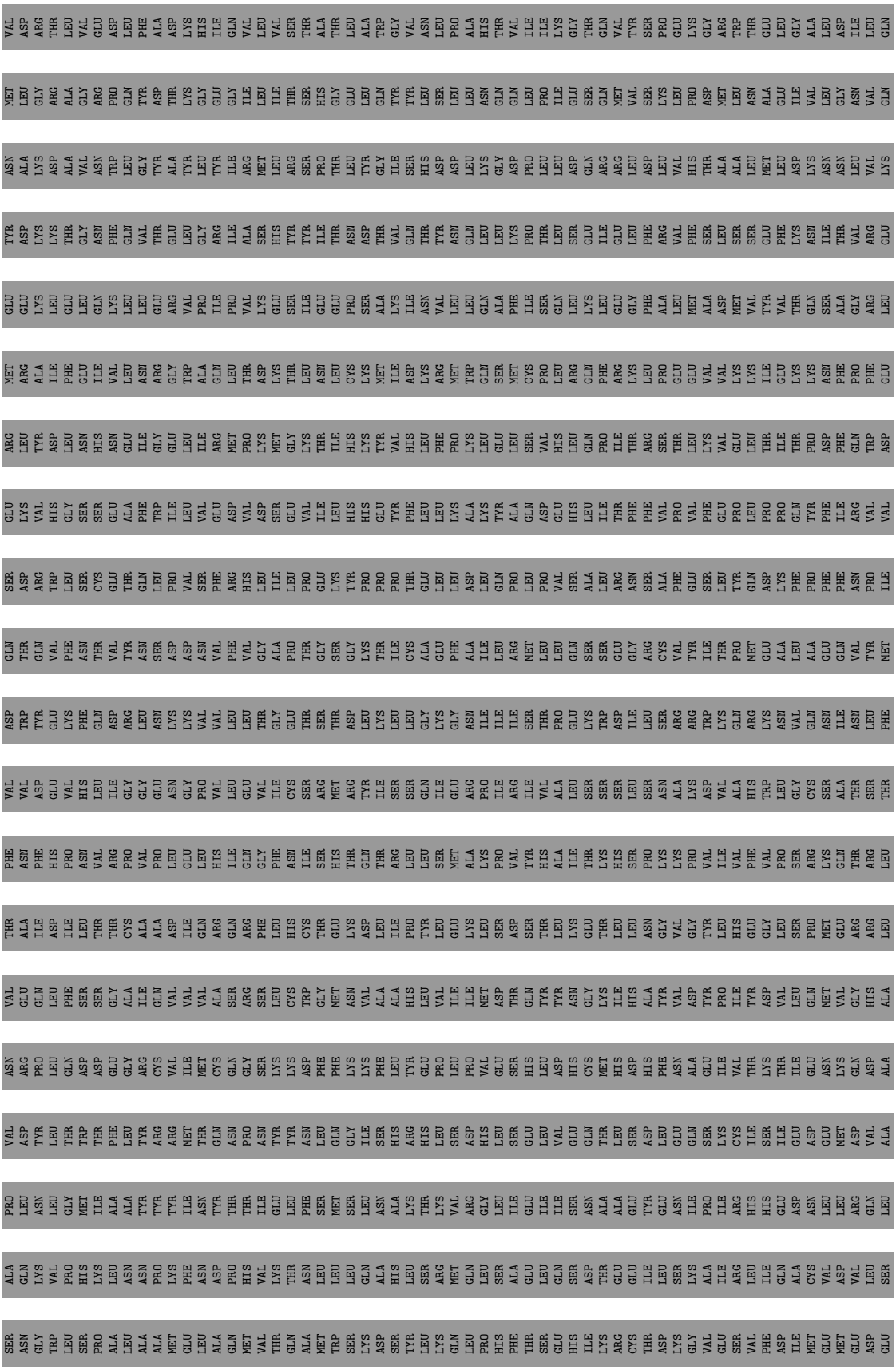
3 Residue-property plots (i)

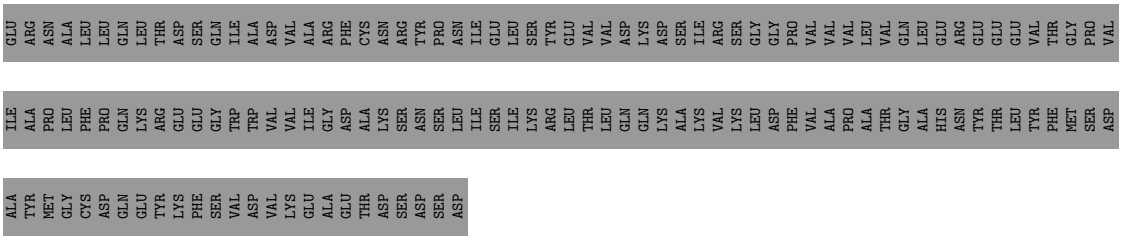
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: U5 small nuclear ribonucleoprotein 200 kDa helicase

Chain B:

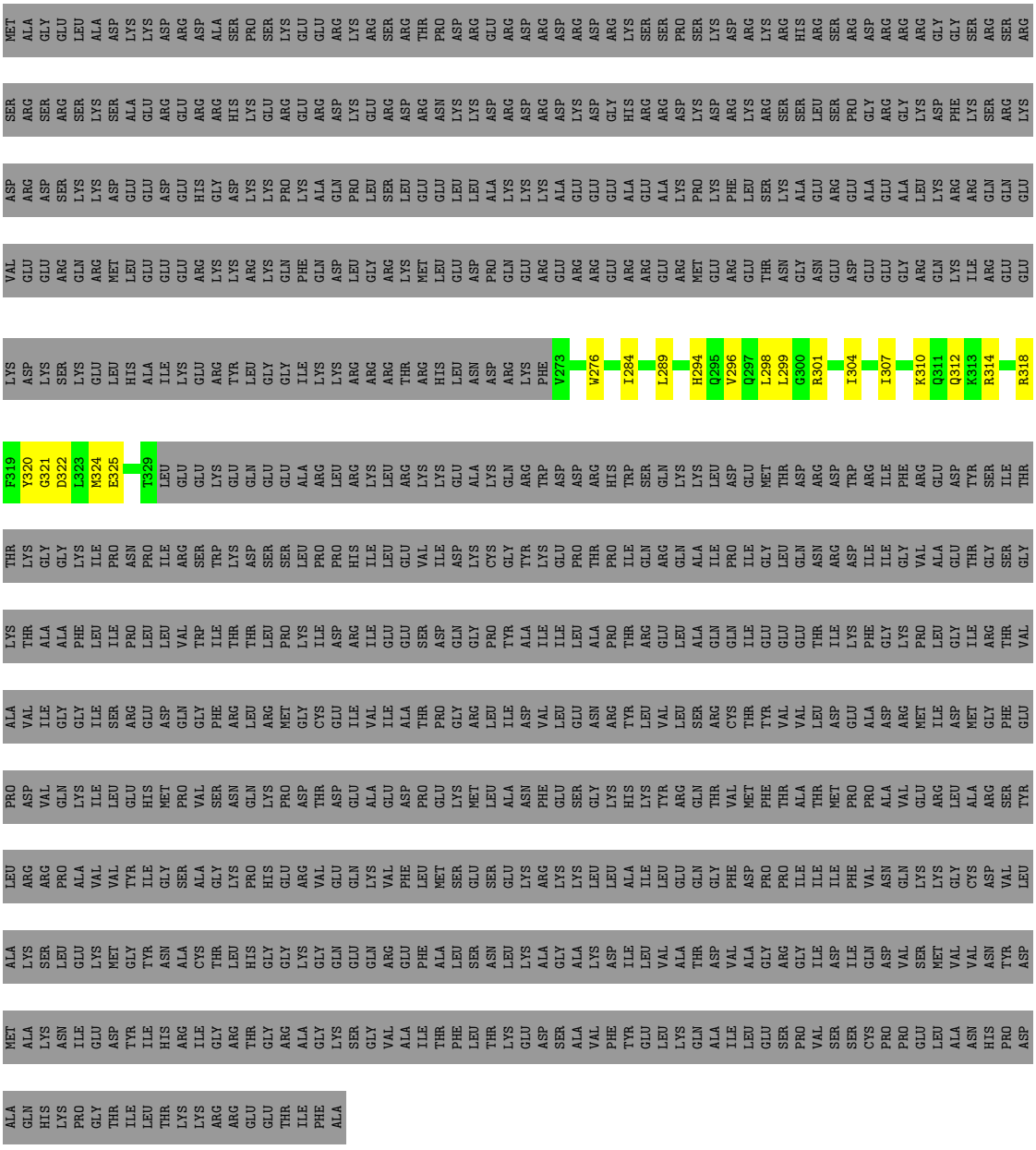






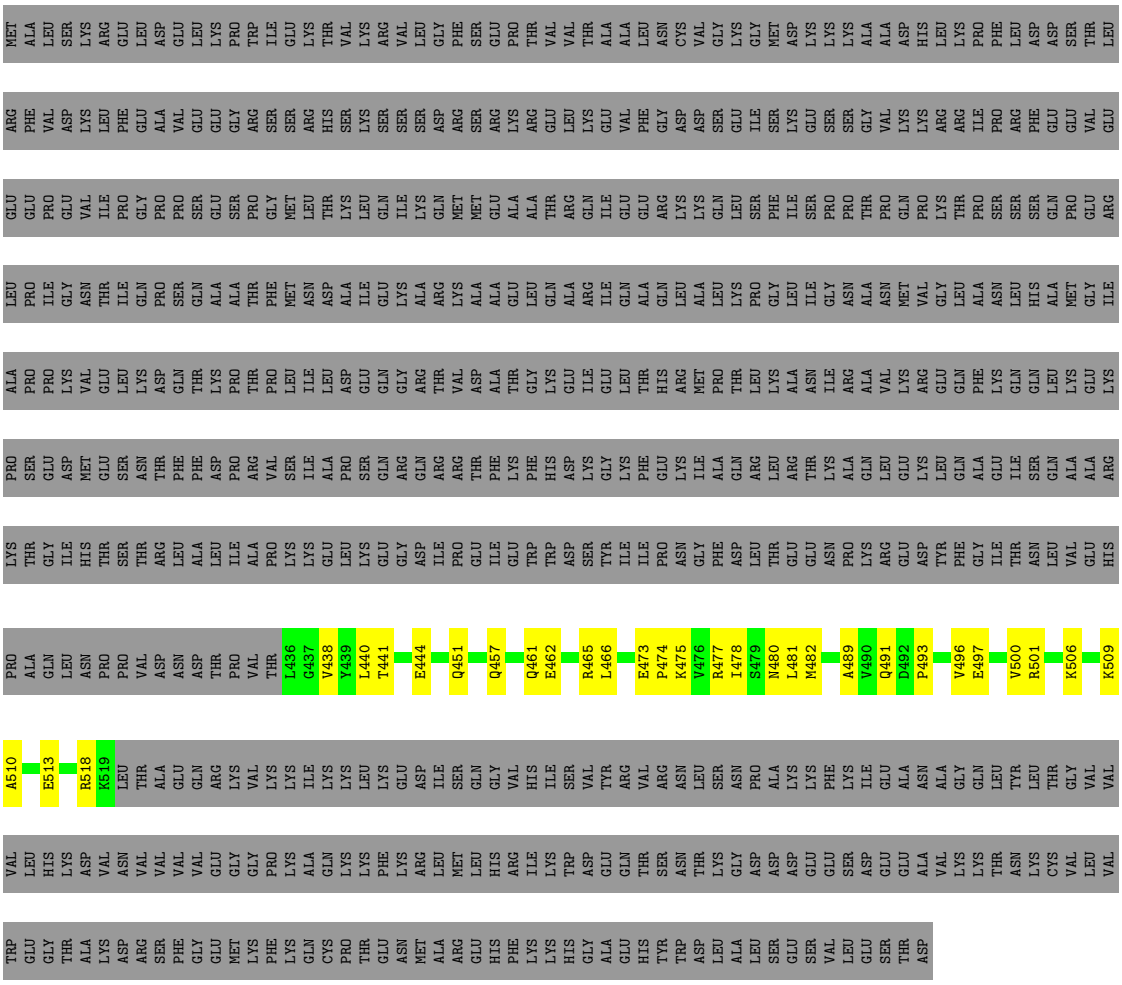
• Molecule 2: Probable ATP-dependent RNA helicase DDX23

Chain G: 5% • 93%



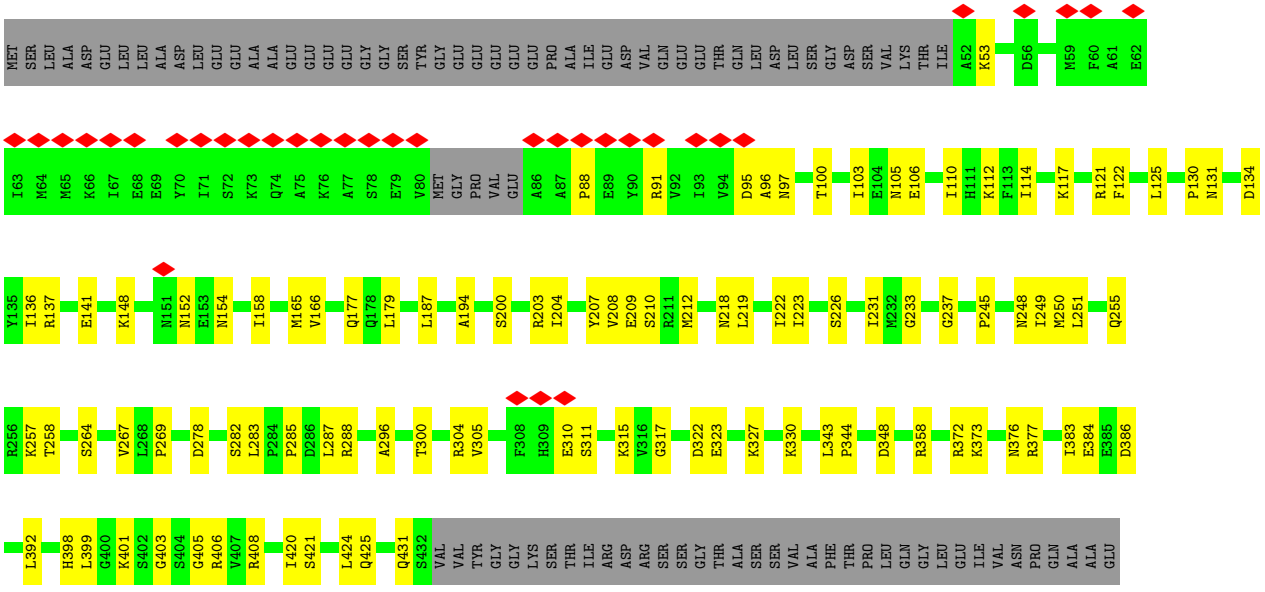
• Molecule 3: U4/U6 small nuclear ribonucleoprotein Prp3

Chain J: 8% • 88%



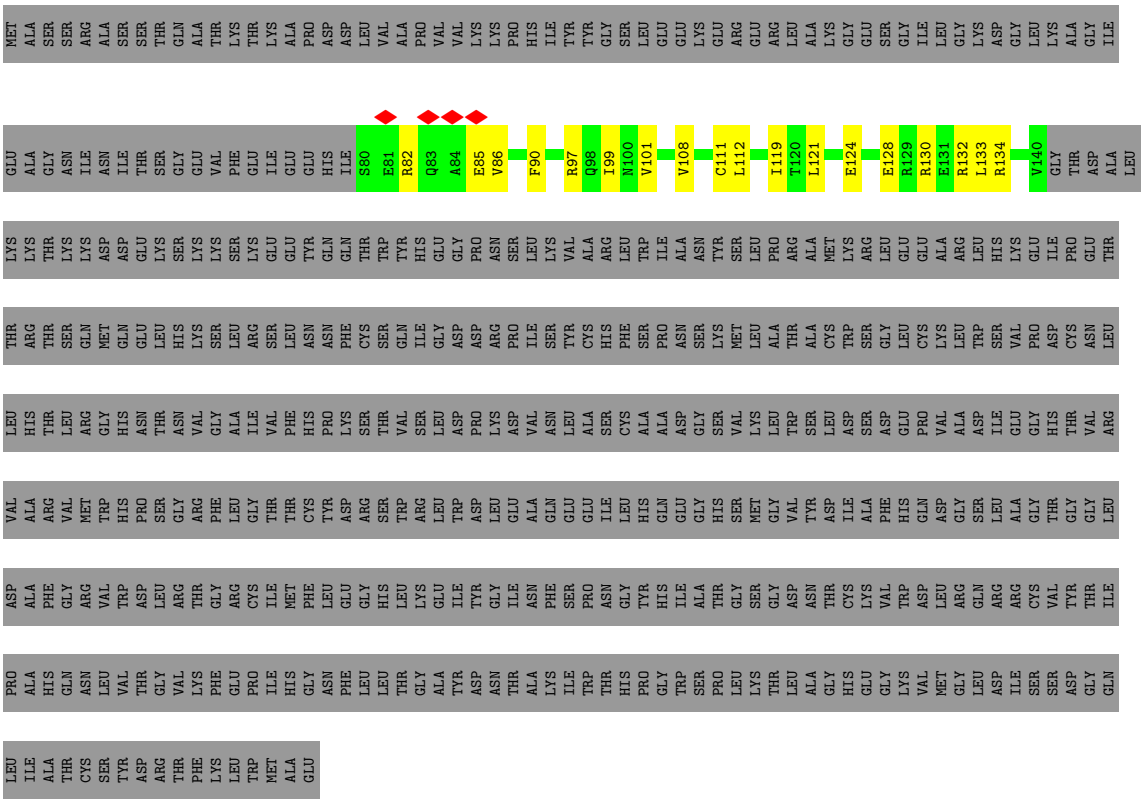
• Molecule 4: U4/U6 small nuclear ribonucleoprotein Prp31

Chain L:



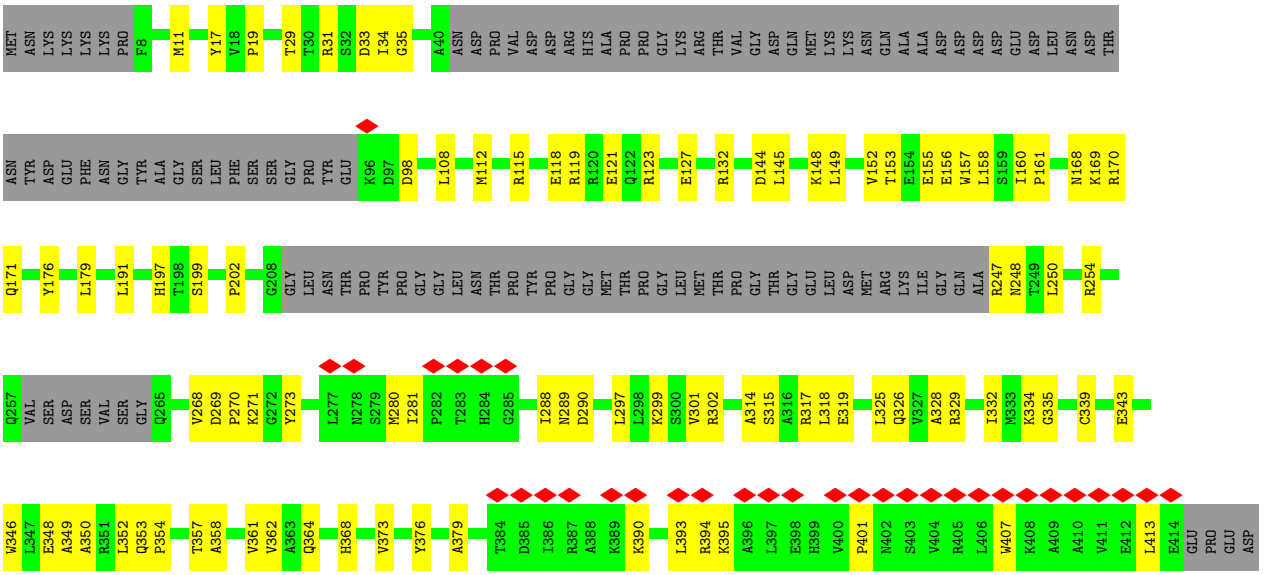
• Molecule 5: U4/U6 small nuclear ribonucleoprotein Prp4

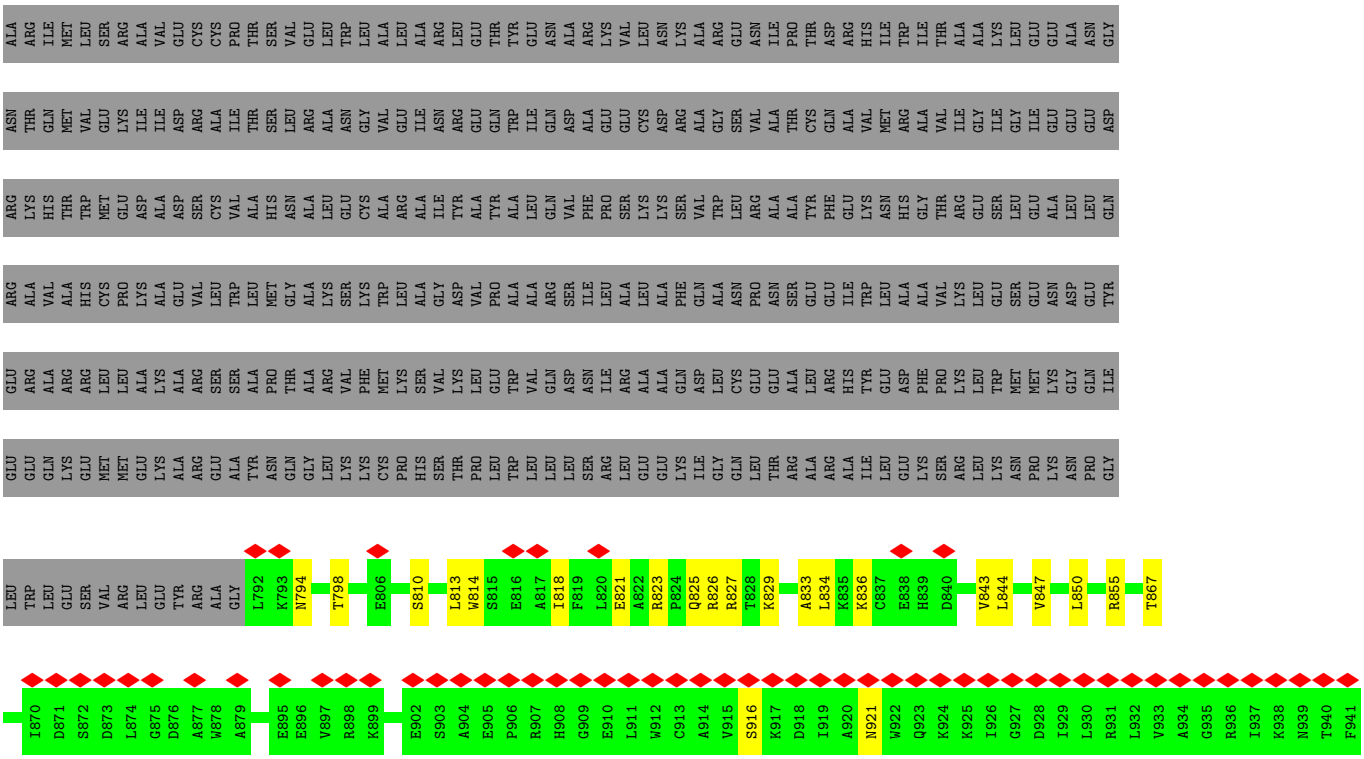
Chain F:



• Molecule 6: Pre-mRNA-processing factor 6

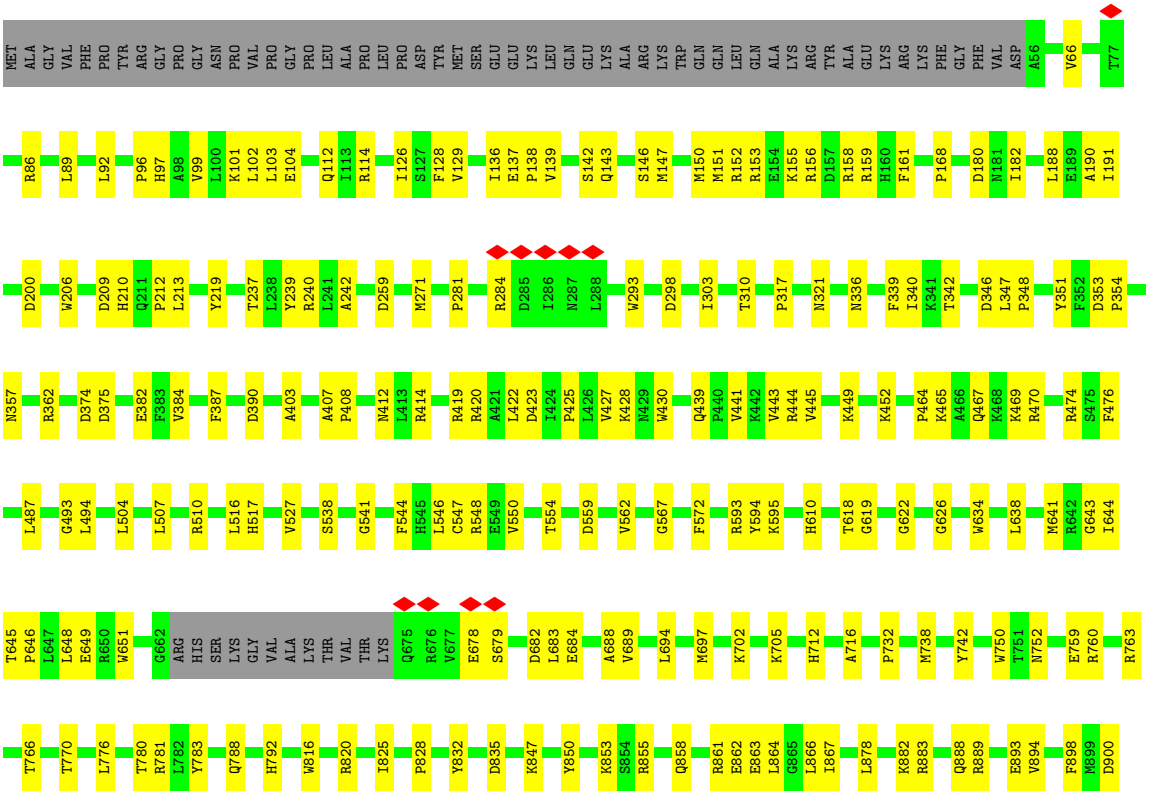
Chain N:

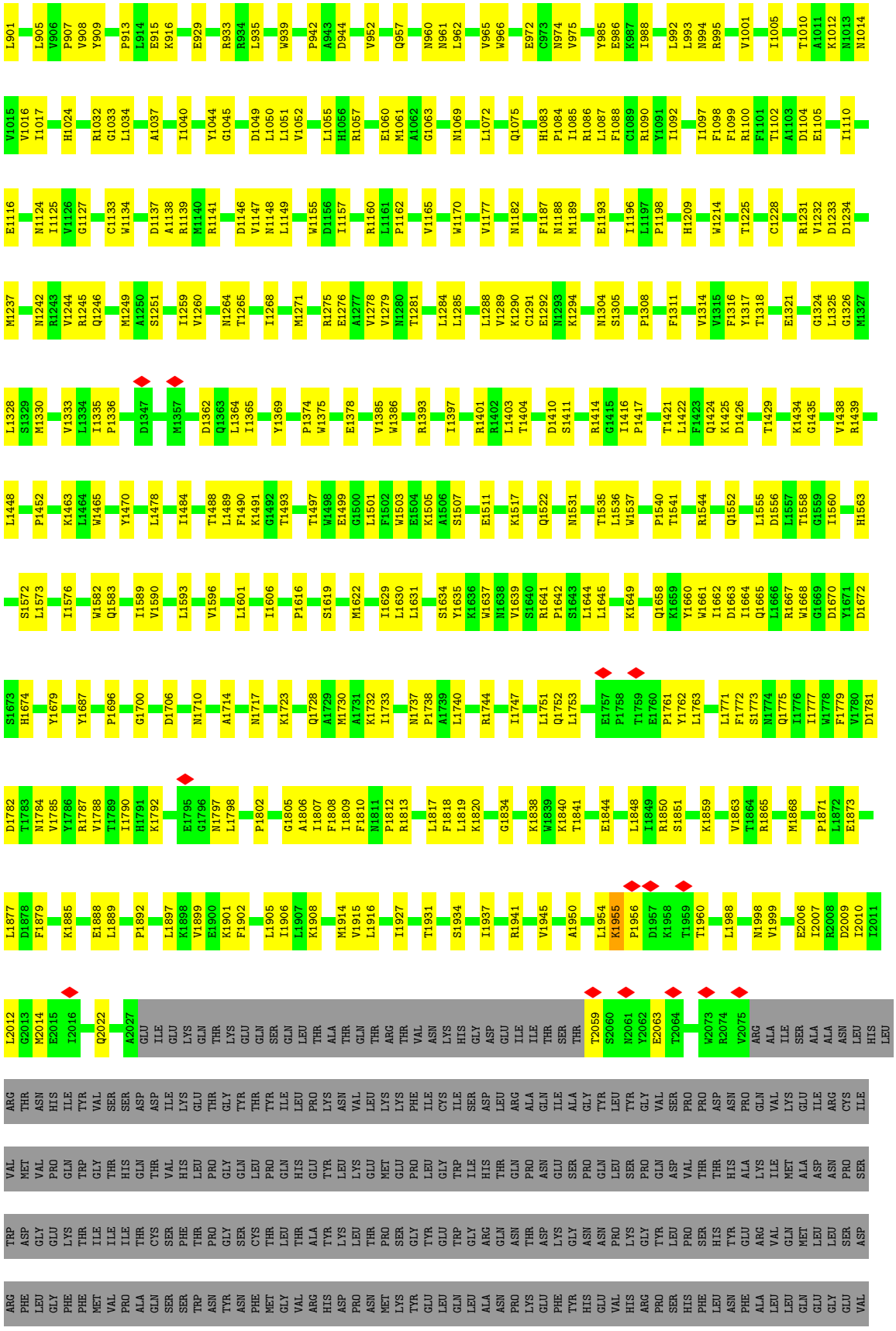




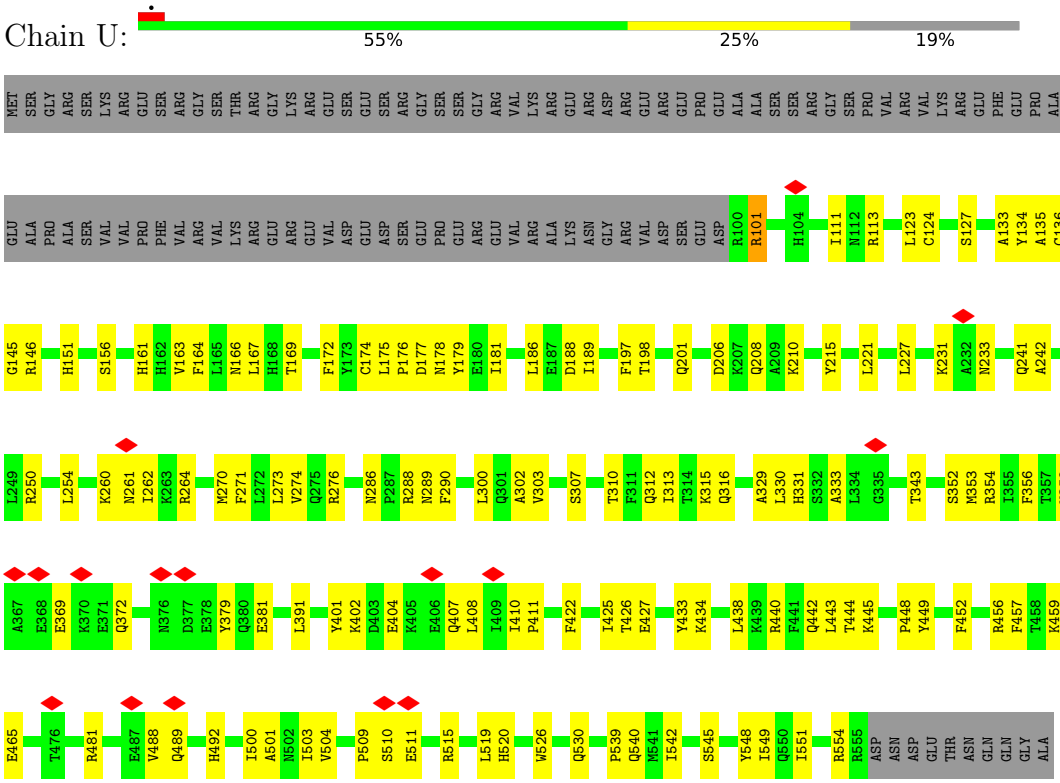
• Molecule 7: Pre-mRNA-processing-splicing factor 8

Chain A:

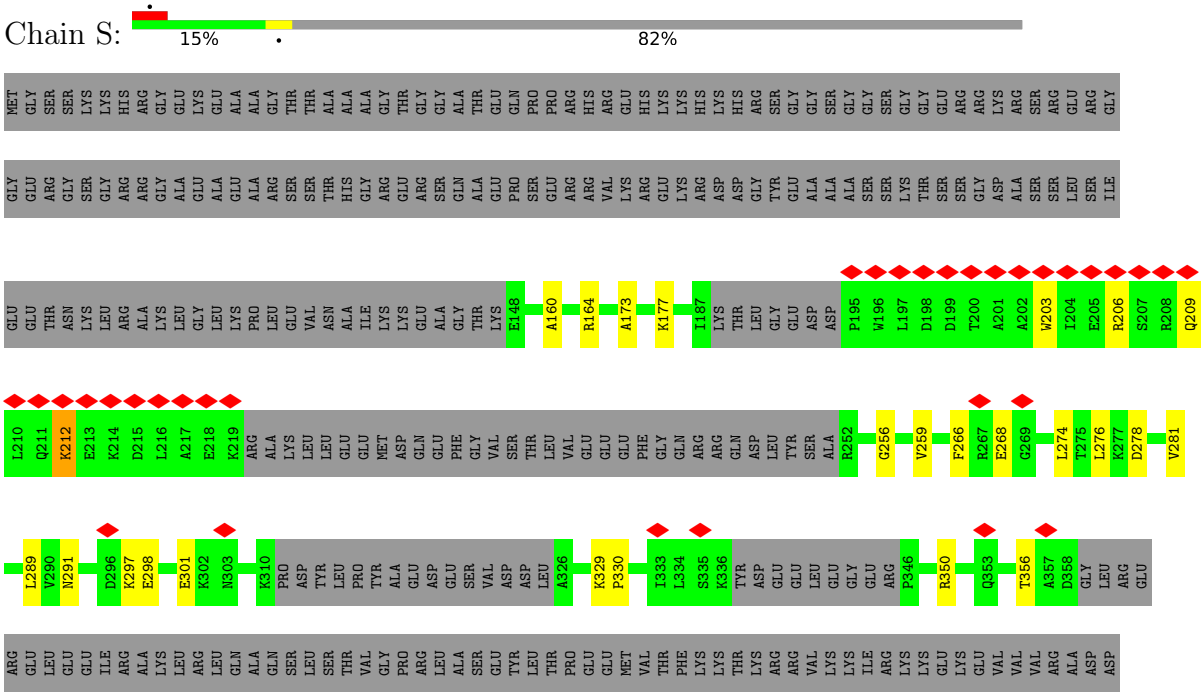


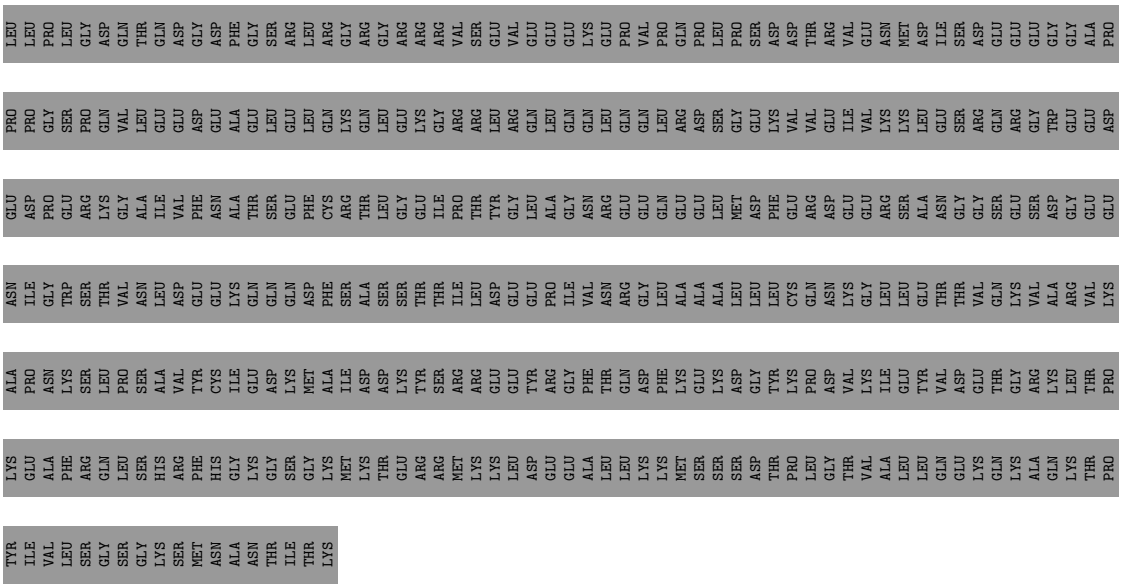

L901 L905 V906 P907 V908 Y909 P913 L914 E915 K916 E929 R933 R934 L935 W939 P942 A943 D944 V952 Q957 N960 N961 L962 V965 W966 E972 C973 N974 V975 Y985 E986 K987 I988 L992 L993 N994 R995 V1001 I1005 T1010 A1011 K1012 N1013 N1014
V1015 V1016 I1017 H1024 R1032 G1033 L1034 A1037 I1040 Y1044 G1045 D1049 L1050 L1051 V1052 L1055 H1056 R1057 E1060 M1061 A1062 G1063 N1069 L1072 Q1075 H1083 P1084 I1085 R1086 L1087 F1088 C1089 R1090 Y1091 I1092 I1097 F1098 F1099 R1100 F1101 T1102 A1103 D1104 E1105 I1110
E1116 N1124 I1125 V1126 G1127 C1133 W1134 D1137 A1138 R1139 M1140 R1141 D1146 V1147 N1148 L1149 W1155 D1156 I1157 R1160 L1161 P1162 V1165 W1170 V1177 N1182 F1187 N1188 M1189 E1193 I1196 L1197 P1198 H1209 W1214 T1225 C1228 R1231 V1232 D1233 D1234
M1237 N1242 R1243 V1244 R1245 Q1246 M1249 A1250 S1251 I1259 V1260 N1264 T1265 I1268 M1271 R1275 E1276 A1277 V1278 V1279 N1280 T1281 L1284 L1285 L1288 V1289 K1290 C1291 E1292 N1293 K1294 N1304 S1305 P1308 F1311 V1314 V1315 F1316 Y1317 T1318 E1321 G1324 L1325 G1326 M1327
L1328 S1329 M1330 V1333 L1334 I1335 P1336 D1347 M1357 D1362 Q1363 L1364 I1365 Y1369 P1374 W1375 E1378 V1385 W1386 R1393 I1397 R1401 R1402 L1403 T1404 D1410 S1411 R1414 G1415 I1416 P1417 T1421 L1422 F1423 Q1424 K1425 D1426 T1429 K1434 G1435 V1438 R1439
L1448 P1452 K1463 L1464 W1465 Y1470 L1478 I1484 T1488 L1489 F1490 K1491 G1492 T1493 T1497 W1498 E1499 G1500 L1501 F1502 W1503 E1504 K1505 A1506 S1507 E1511 K1517 Q1522 N1531 T1535 L1536 W1537 P1540 T1541 R1544 Q1552 L1555 D1556 L1557 T1558 G1559 I1560 H1563
S1572 L1573 I1576 W1582 Q1583 I1589 V1590 L1593 V1596 L1601 I1606 P1616 S1619 M1622 I1629 L1630 L1631 S1634 Y1635 K1636 W1637 N1638 V1639 S1640 R1641 P1642 S1643 L1644 L1645 K1649 Q1658 K1659 Y1660 W1661 I1662 D1663 I1664 Q1665 L1666 R1667 W1668 G1669 D1670 Y1671 D1672
S1673 H1674 Y1679 Y1687 P1696 G1700 D1706 N1710 A1714 N1717 K1723 Q1728 A1729 M1730 A1731 K1732 I1733 N1737 P1738 A1739 L1740 R1744 I1747 L1751 Q1752 L1753 E1757 P1758 T1759 E1760 P1761 Y1762 L1763 L1771 F1772 S1773 N1774 Q1775 I1776 I1777 W1778 F1779 V1780 D1781
D1782 T1783 N1784 V1785 Y1786 R1787 V1788 T1789 I1790 H1791 K1792 E1795 G1796 N1797 L1798 P1802 G1805 A1806 I1807 F1808 I1809 F1810 N1811 P1812 R1813 L1817 F1818 L1819 K1820 G1834 K1838 W1839 K1840 T1841 E1844 L1848 I1849 R1850 S1851 K1859 V1863 T1864 R1865 M1868 P1871 L1872 E1873
L1877 D1878 F1879 K1885 E1888 L1889 P1892 L1897 K1898 V1899 E1900 K1901 F1902 L1905 I1906 L1907 K1908 M1914 V1915 L1916 I1927 T1931 S1934 I1937 R1941 V1945 A1950 L1954 K1955 P1956 D1957 K1958 T1959 T1960 L1988 N1998 V1999 E2006 I2007 R2008 D2009 I2010 I2011
L2012 G2013 M2014 E2015 I2016 Q2022 A2027 T2059 S2060 N2061 Y2062 E2063 T2064 W2073 R2074 V2075
GLU ILE GLU LYS GLN THR LYS GLU GLN SER GLN LEU THR ALA THR GLN THR ARG THR VAL ASN LYS HIS GLY ASP GLU ILE ILE THR SER THR
ARG THR ASN HIS ILE TYR VAL SER SER ASP ASP ILE LYS GLU THR GLY TYR THR TYR ILE LEU PRO LYS ASN VAL LEU LYS LYS PHE ILE CYS ILE SER ASP LEU ARG ALA ILE GLN ILE ALA GLY TYR LEU TYR GLY VAL SER PRO PRO ASP ASN PRO GLN VAL LYS GLU ILE ARG CYS ILE
VAL MET VAL PRO GLN TRP GLY THR HIS GLN THR VAL HIS LEU PRO GLY GLN LEU PRO GLN HIS GLU TYR LEU LYS GLU MET GLU PRO LEU GLY TRP ILE HIS THR GLN PRO ASN GLU SER PRO GLN LEU PRO SER GLY VAL THR THR HIS ALA LYS ILE MET ALA ASP ASN PRO SER
TRP ASP GLY GLU LYS THR ILE ILE ILE THR CYS SER PHE THR PRO GLY SER CYS THR LEU THR ALA TYR LYS LEU THR PRO SER GLY TYR GLU TRP GLY ARG GLN ASN ASN THR ASP LYS GLY ASN PRO GLY TYR LEU PRO SER HIS TYR GLU ARG VAL GLN MET LEU LEU GLU ASP
ARG PHE LEU GLY PHE PHE MET VAL PRO ALA GLN SER SER TRP ASN TYR ASN PHE MET GLY VAL ARG HIS ASP PRO ASN MET LYS TYR GLU LEU GLN LEU ALA ASN PRO LYS GLU PHE TYR HIS GLU VAL HIS ARG PRO SER HIS PHE LEU ASN PHE ALA LEU LEU GLN GLU GLY GLU VAL

• Molecule 8: Ubiquitin carboxyl-terminal hydrolase 39



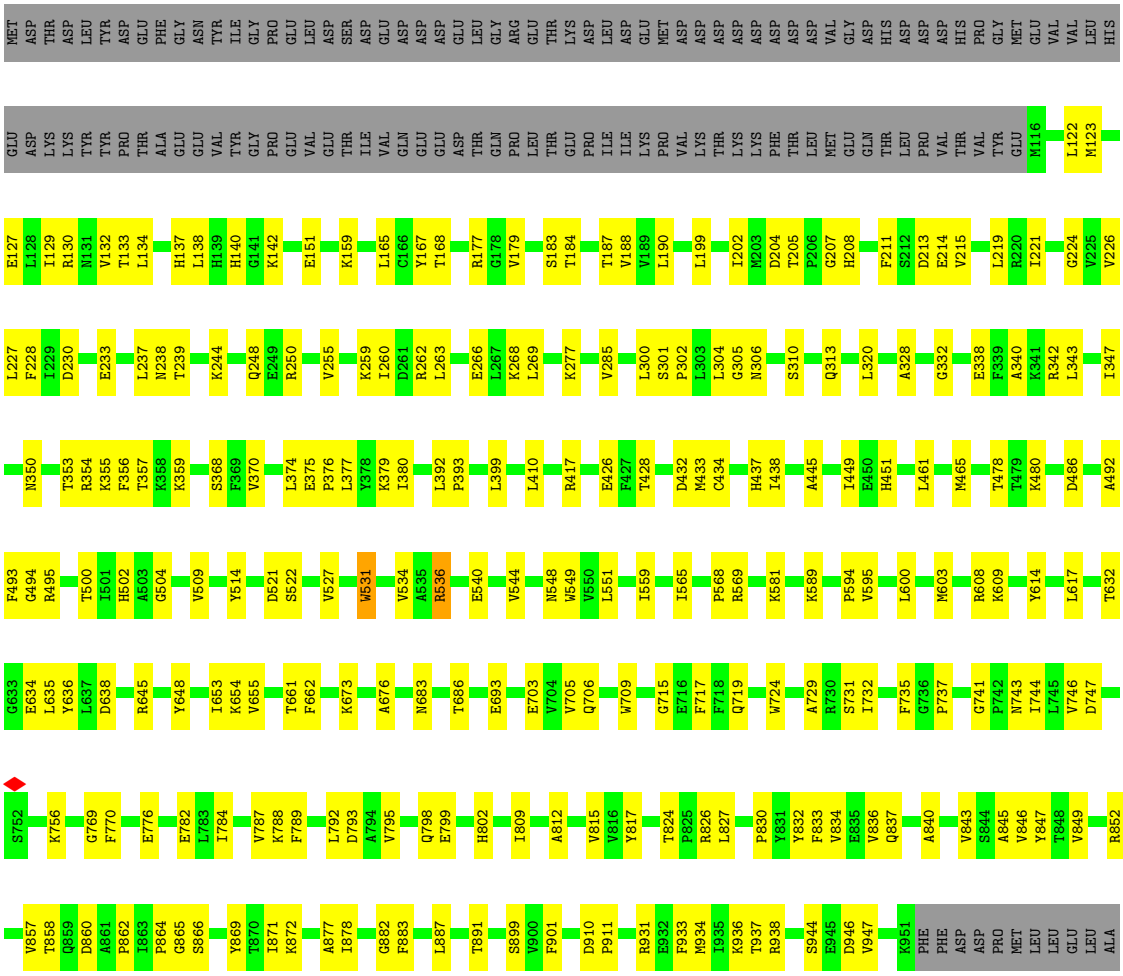
• Molecule 9: U4/U6.U5 tri-snRNP-associated protein 1





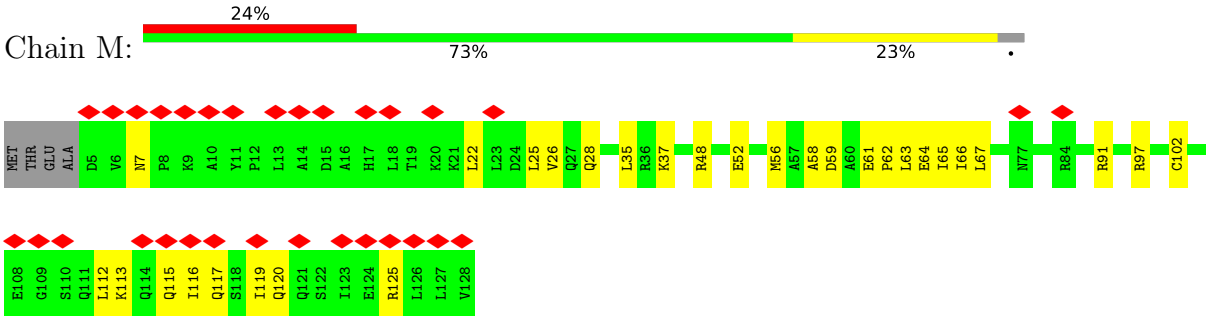
• Molecule 10: 116 kDa U5 small nuclear ribonucleoprotein component

Chain C:



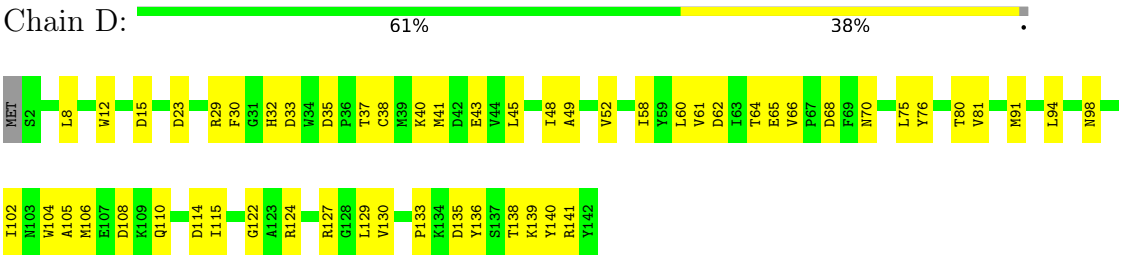
• Molecule 11: NHP2-like protein 1, N-terminally processed

Chain M:



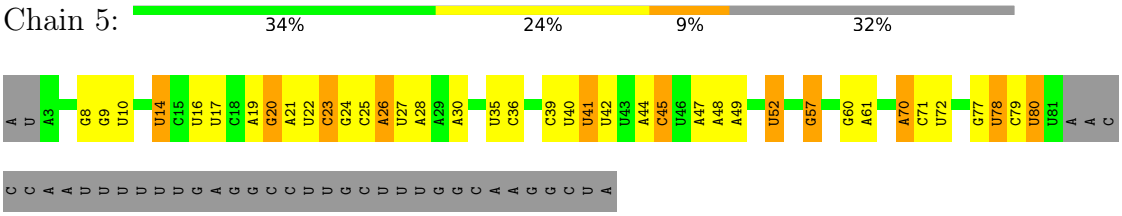
• Molecule 12: Thioredoxin-like protein 4A

Chain D:



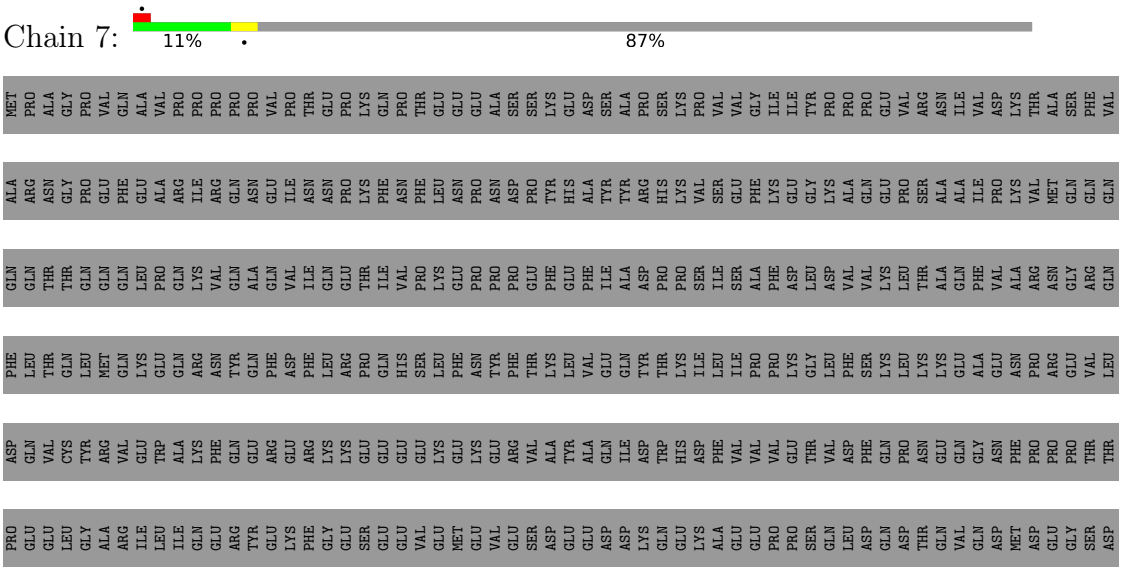
• Molecule 13: U5 snRNA

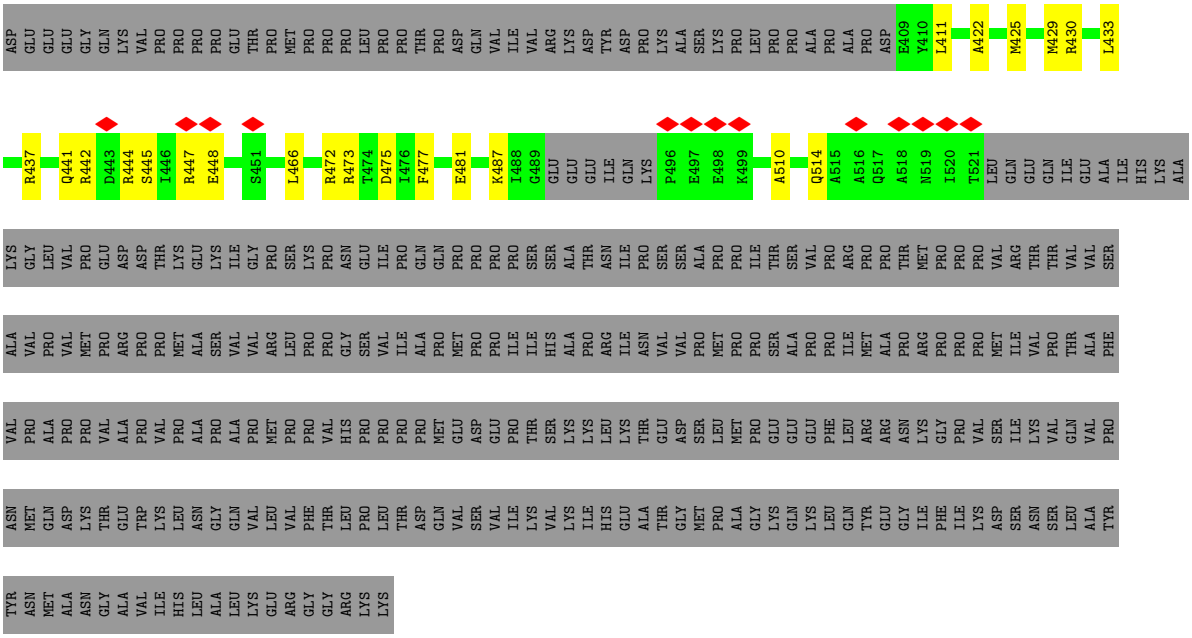
Chain 5:



• Molecule 14: Splicing factor 3A subunit 1

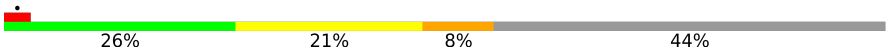
Chain 7:

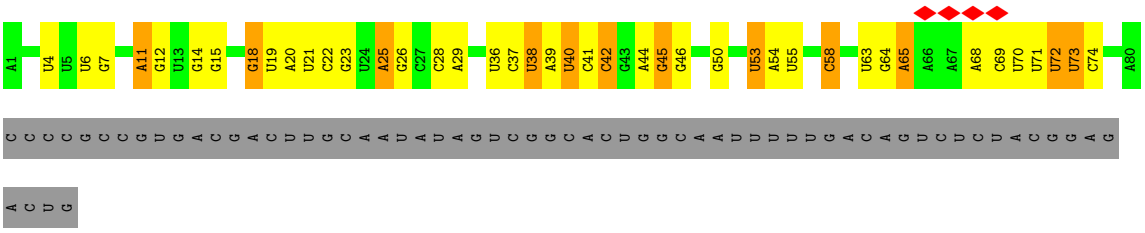




• Molecule 15: U4 snRNA

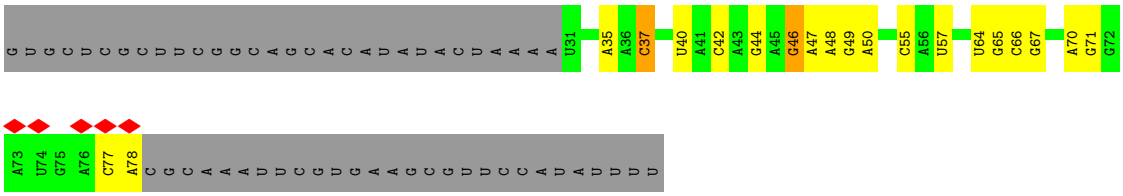
Chain 4:





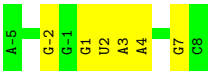
• Molecule 16: U6 snRNA

Chain 6:



• Molecule 17: 5'ss oligo

Chain z:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	94460	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	45	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	5000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.130	Depositor
Minimum map value	-0.030	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.027	Depositor
Map size (Å)	556.8, 556.8, 556.8	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.16, 1.16, 1.16	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: IHP

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	B	0.26	0/158	0.63	0/209
2	G	0.24	0/493	0.48	0/659
3	J	0.25	0/686	0.52	0/914
4	L	0.25	0/2924	0.48	0/3938
5	F	0.25	0/491	0.55	0/657
6	N	0.24	0/3565	0.48	0/4818
7	A	0.26	0/16856	0.48	0/22865
8	U	0.25	0/3845	0.46	0/5208
9	S	0.24	0/1172	0.49	0/1567
10	C	0.26	0/6739	0.48	0/9151
11	M	0.25	0/974	0.50	0/1316
12	D	0.27	0/1199	0.45	0/1620
13	5	0.22	0/1850	0.73	0/2875
14	7	0.24	0/858	0.50	0/1152
15	4	0.21	0/1898	0.67	0/2954
16	6	0.21	0/1159	0.72	0/1806
17	z	0.24	0/321	0.67	0/500
All	All	0.25	0/45188	0.51	0/62209

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	158	0	166	8	0
2	G	484	0	469	18	0
3	J	679	0	728	31	0
4	L	2886	0	2885	73	0
5	F	488	0	499	13	0
6	N	3502	0	3379	105	0
7	A	16409	0	16326	395	0
8	U	3749	0	3769	97	0
9	S	1164	0	1173	22	0
10	C	6592	0	6615	163	0
11	M	962	0	1012	26	0
12	D	1170	0	1141	37	0
13	5	1660	0	842	24	0
14	7	846	0	837	21	0
15	4	1699	0	858	28	0
16	6	1034	0	521	19	0
17	z	286	0	142	0	0
18	A	36	0	6	1	0
All	All	43804	0	41368	927	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 11.

The worst 5 of 927 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)
10:C:168:THR:H	10:C:536:ARG:HH22	1.03	0.98
3:J:489:ALA:HA	3:J:496:VAL:HG21	1.60	0.82
4:L:88:PRO:HD2	4:L:91:ARG:HE	1.44	0.82
7:A:152:ARG:HH22	7:A:619:GLY:H	1.29	0.81
8:U:174:CYS:O	8:U:178:ASN:HA	1.82	0.79

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	B	20/2136 (1%)	20 (100%)	0	0	100	100
2	G	55/820 (7%)	53 (96%)	2 (4%)	0	100	100
3	J	82/683 (12%)	82 (100%)	0	0	100	100
4	L	372/499 (74%)	366 (98%)	6 (2%)	0	100	100
5	F	59/522 (11%)	59 (100%)	0	0	100	100
6	N	447/941 (48%)	437 (98%)	10 (2%)	0	100	100
7	A	1971/2335 (84%)	1890 (96%)	81 (4%)	0	100	100
8	U	454/565 (80%)	441 (97%)	13 (3%)	0	100	100
9	S	138/800 (17%)	136 (99%)	2 (1%)	0	100	100
10	C	834/972 (86%)	817 (98%)	17 (2%)	0	100	100
11	M	122/128 (95%)	114 (93%)	8 (7%)	0	100	100
12	D	139/142 (98%)	138 (99%)	1 (1%)	0	100	100
14	7	103/793 (13%)	98 (95%)	5 (5%)	0	100	100
All	All	4796/11336 (42%)	4651 (97%)	145 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	B	17/1908 (1%)	17 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	G	51/721 (7%)	51 (100%)	0	100 100
3	J	72/599 (12%)	72 (100%)	0	100 100
4	L	303/424 (72%)	303 (100%)	0	100 100
5	F	52/442 (12%)	51 (98%)	1 (2%)	57 76
6	N	341/792 (43%)	340 (100%)	1 (0%)	92 96
7	A	1786/2108 (85%)	1781 (100%)	5 (0%)	92 96
8	U	418/511 (82%)	416 (100%)	2 (0%)	88 94
9	S	120/681 (18%)	119 (99%)	1 (1%)	81 89
10	C	738/866 (85%)	736 (100%)	2 (0%)	92 96
11	M	108/111 (97%)	108 (100%)	0	100 100
12	D	129/130 (99%)	128 (99%)	1 (1%)	81 89
14	7	91/709 (13%)	91 (100%)	0	100 100
All	All	4226/10002 (42%)	4213 (100%)	13 (0%)	92 96

5 of 13 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
8	U	101	ARG
8	U	288	ARG
12	D	98	ASN
10	C	531	TRP
10	C	536	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
8	U	166	ASN
8	U	208	GLN
10	C	548	ASN
8	U	316	GLN
7	A	112	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
13	5	78/117 (66%)	24 (30%)	2 (2%)

Continued on next page...

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
15	4	79/144 (54%)	24 (30%)	0
16	6	47/106 (44%)	8 (17%)	1 (2%)
17	z	12/13 (92%)	6 (50%)	0
All	All	216/380 (56%)	62 (28%)	3 (1%)

5 of 62 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
13	5	10	U
13	5	14	U
13	5	20	G
13	5	21	A
13	5	22	U

All (3) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
13	5	77	G
13	5	78	U
16	6	77	C

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

1 ligand is 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	$\#\|Z\|>2$
18	IHP	A	2401	-	36,36,36	0.70	0	54,60,60	1.01	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
18	IHP	A	2401	-	-	5/30/54/54	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
18	A	2401	IHP	C1-C6-O16-P6
18	A	2401	IHP	C5-C6-O16-P6
18	A	2401	IHP	C4-O14-P4-O44
18	A	2401	IHP	C5-O15-P5-O35
18	A	2401	IHP	C6-O16-P6-O36

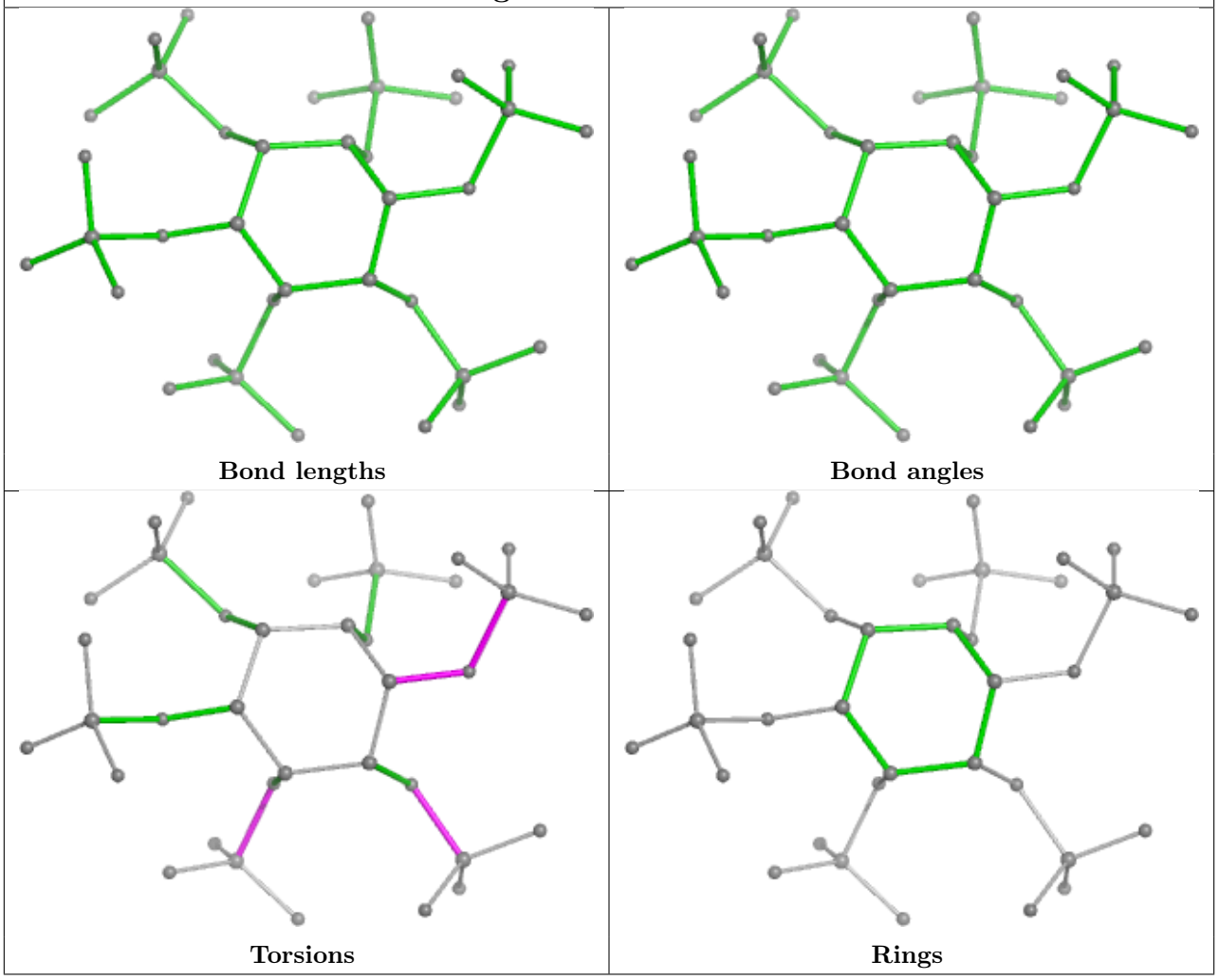
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
18	A	2401	IHP	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand IHP A 2401



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.

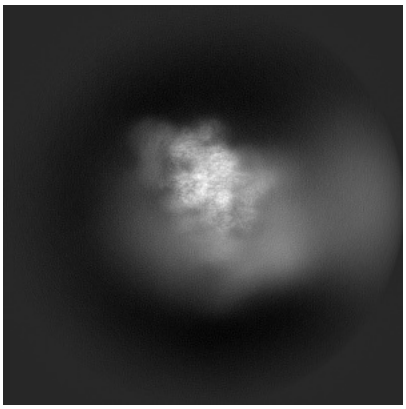
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-18547. These allow visual inspection of the internal detail of the map and identification of artifacts.

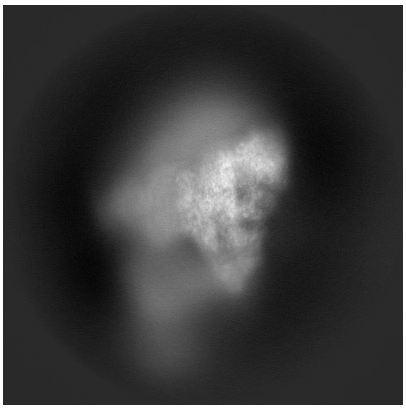
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

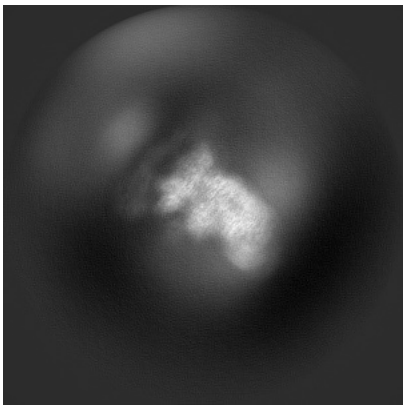
6.1.1 Primary map



X

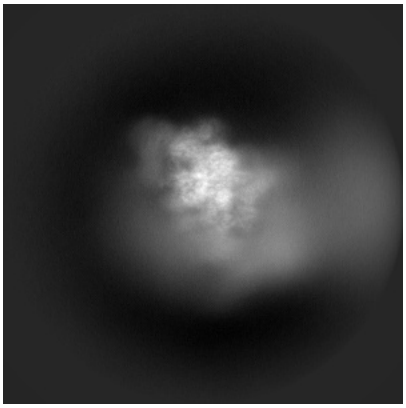


Y

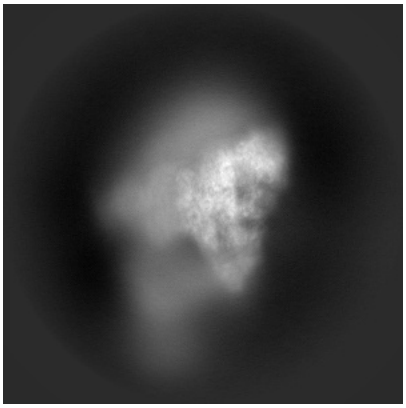


Z

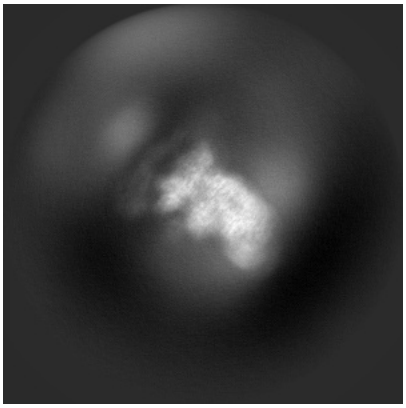
6.1.2 Raw map



X



Y

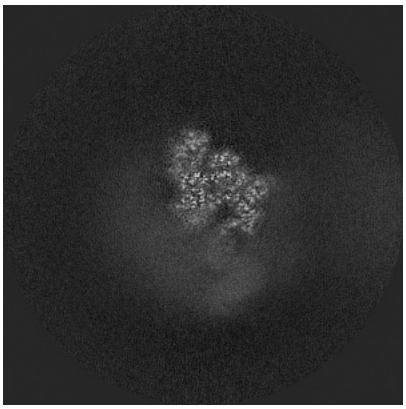


Z

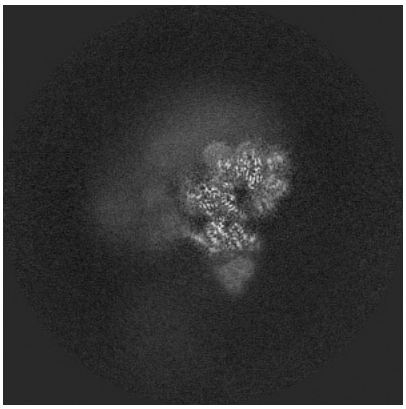
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

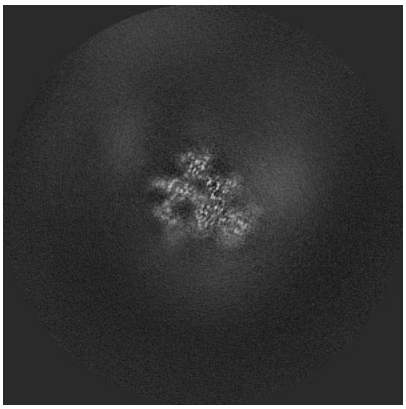
6.2.1 Primary map



X Index: 240

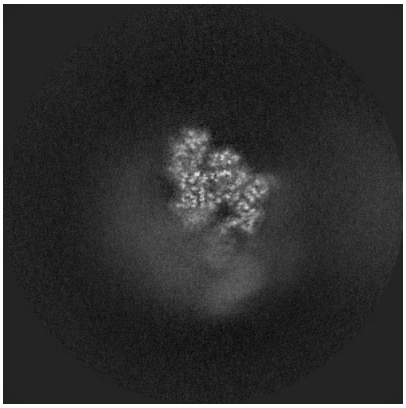


Y Index: 240

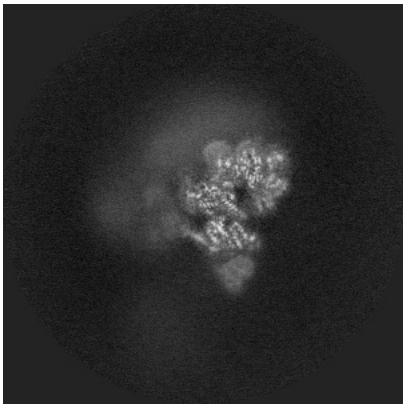


Z Index: 240

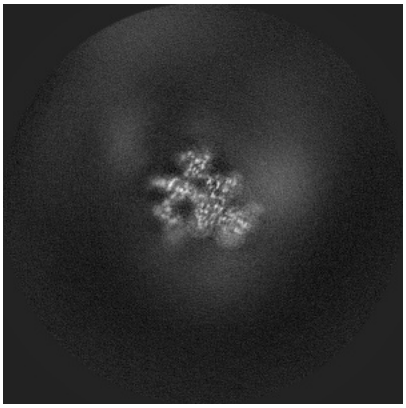
6.2.2 Raw map



X Index: 240



Y Index: 240

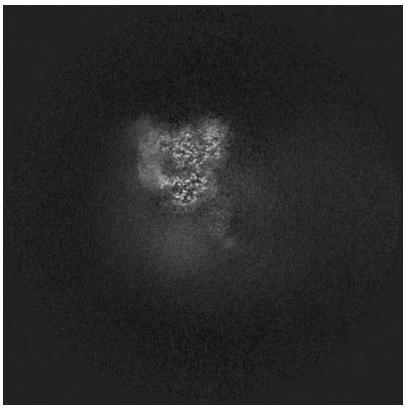


Z Index: 240

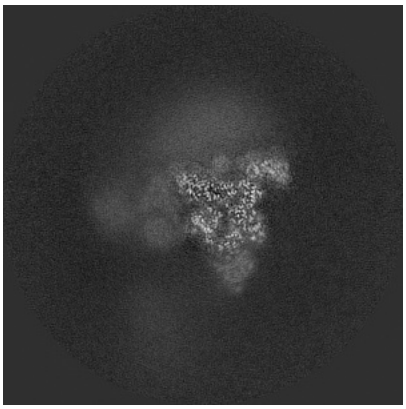
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

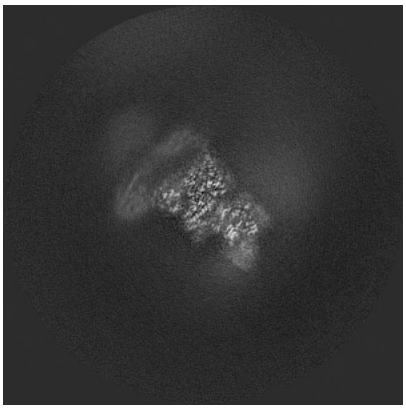
6.3.1 Primary map



X Index: 287

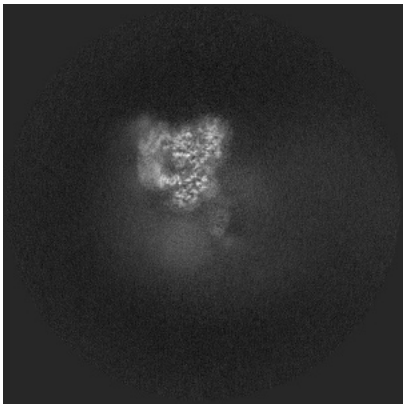


Y Index: 255

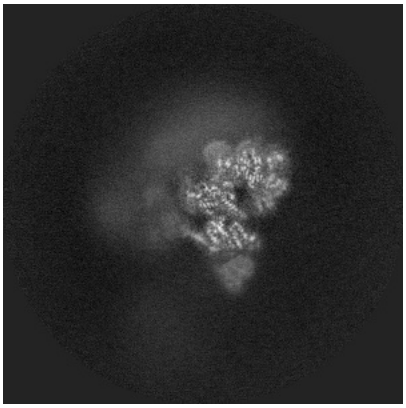


Z Index: 274

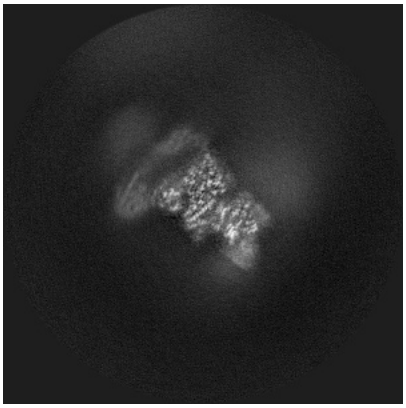
6.3.2 Raw map



X Index: 288



Y Index: 240

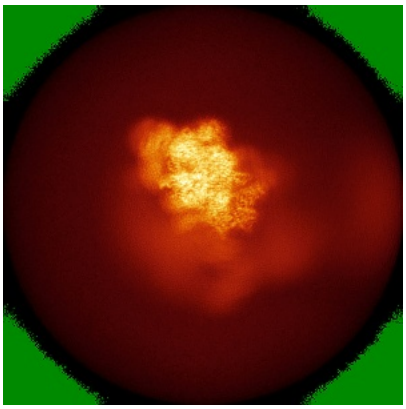


Z Index: 274

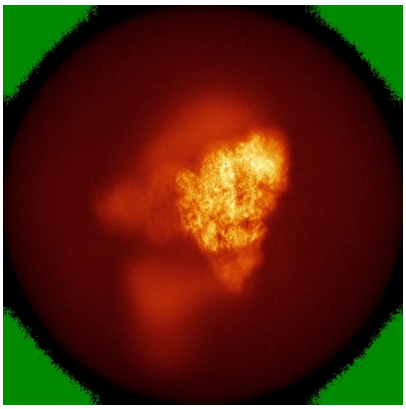
The images above show the largest variance slices of the map in three orthogonal directions.

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

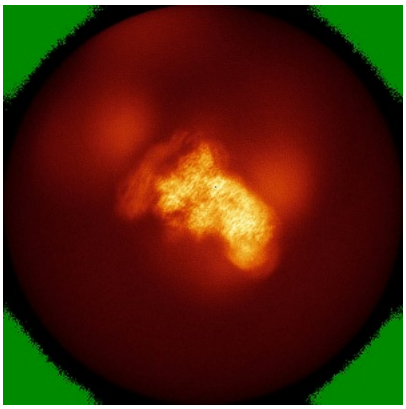
6.4.1 Primary map



X

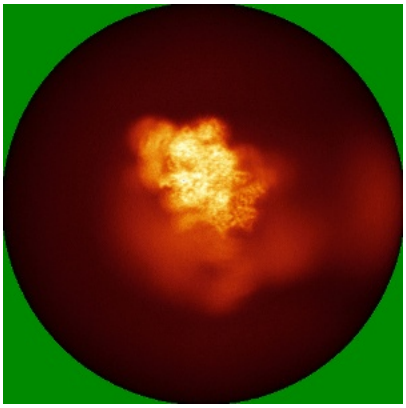


Y

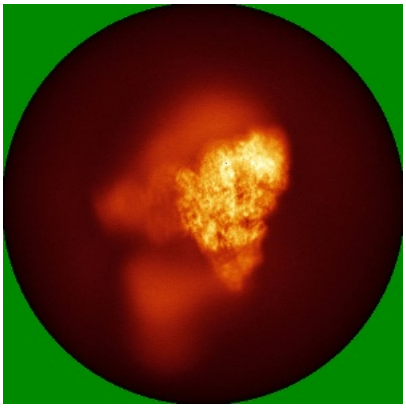


Z

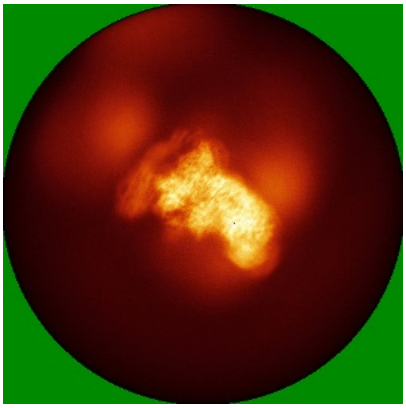
6.4.2 Raw map



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 0.027. 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.

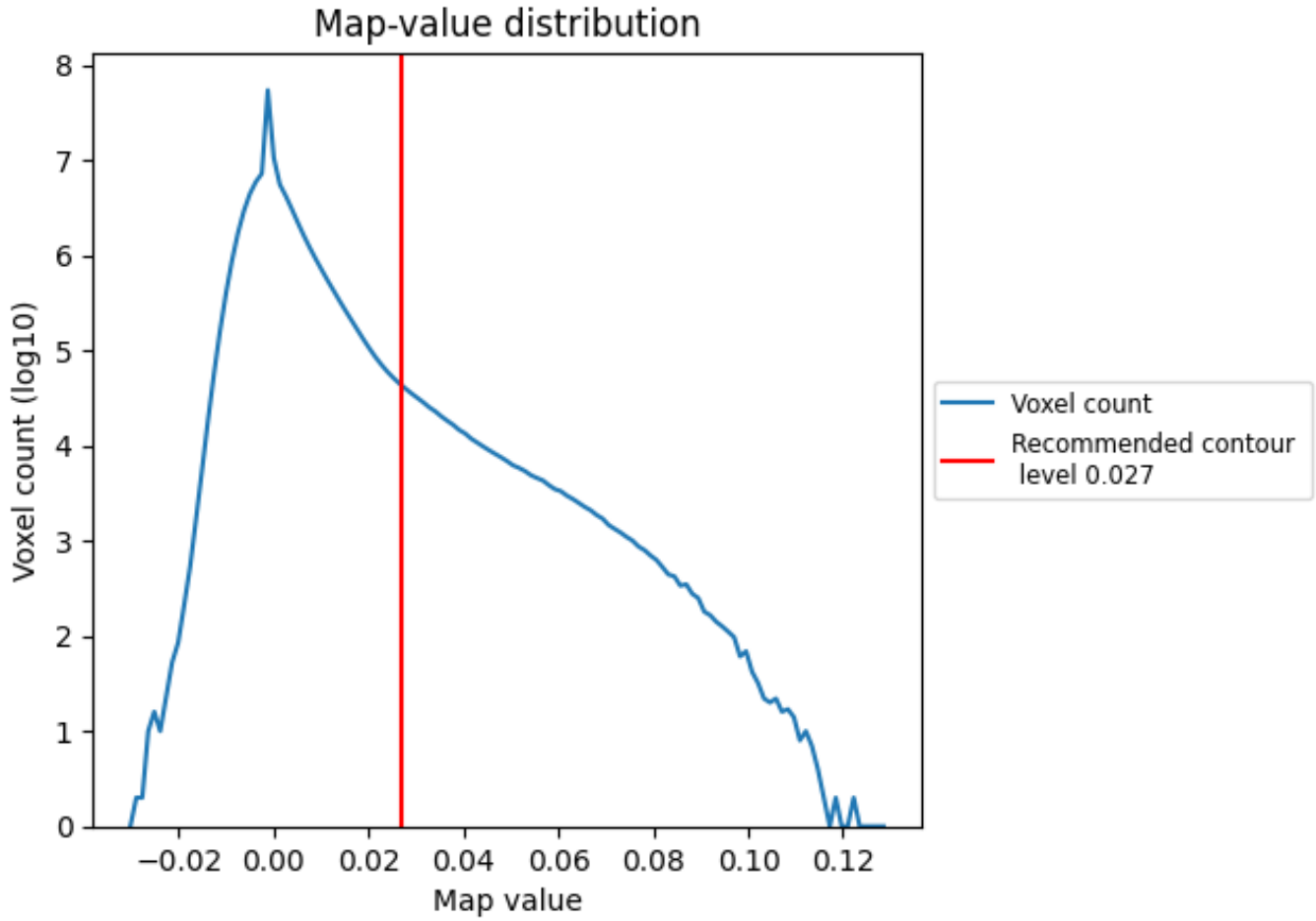
6.6 Mask visualisation (i)

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

7 Map analysis

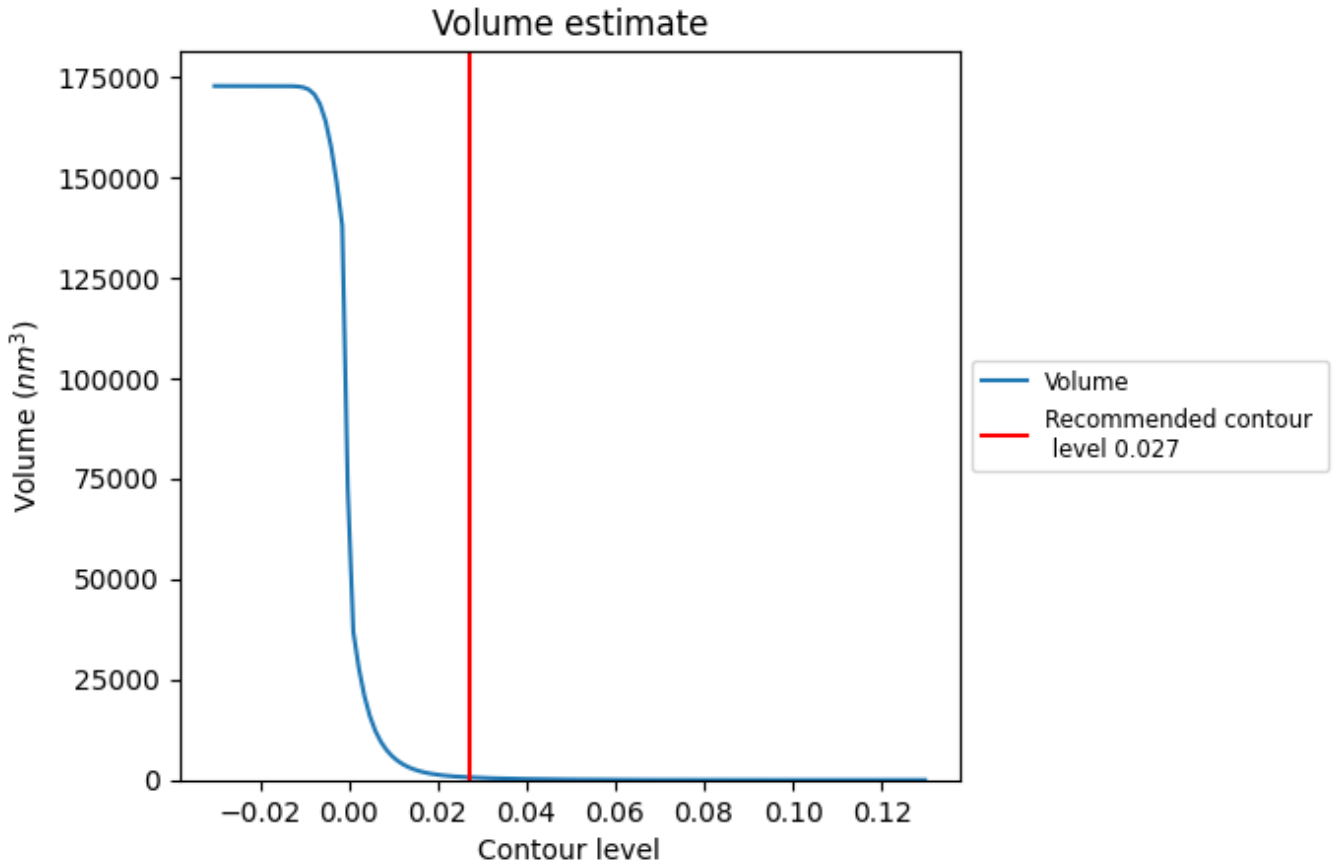
This section contains the results of statistical analysis of the map.

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.

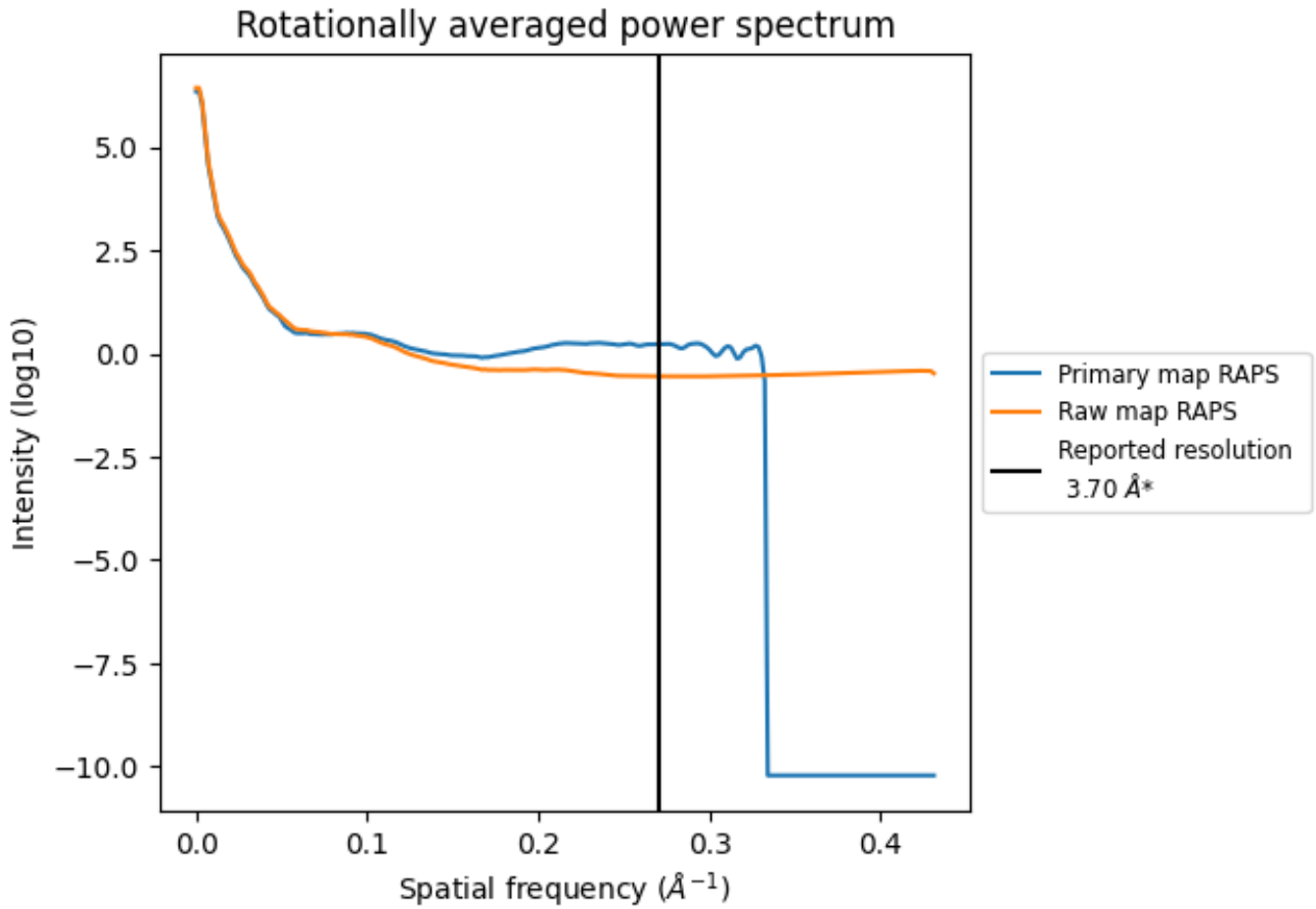
7.2 Volume estimate (i)



The volume at the recommended contour level is 667 nm^3; this corresponds to an approximate mass of 602 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)

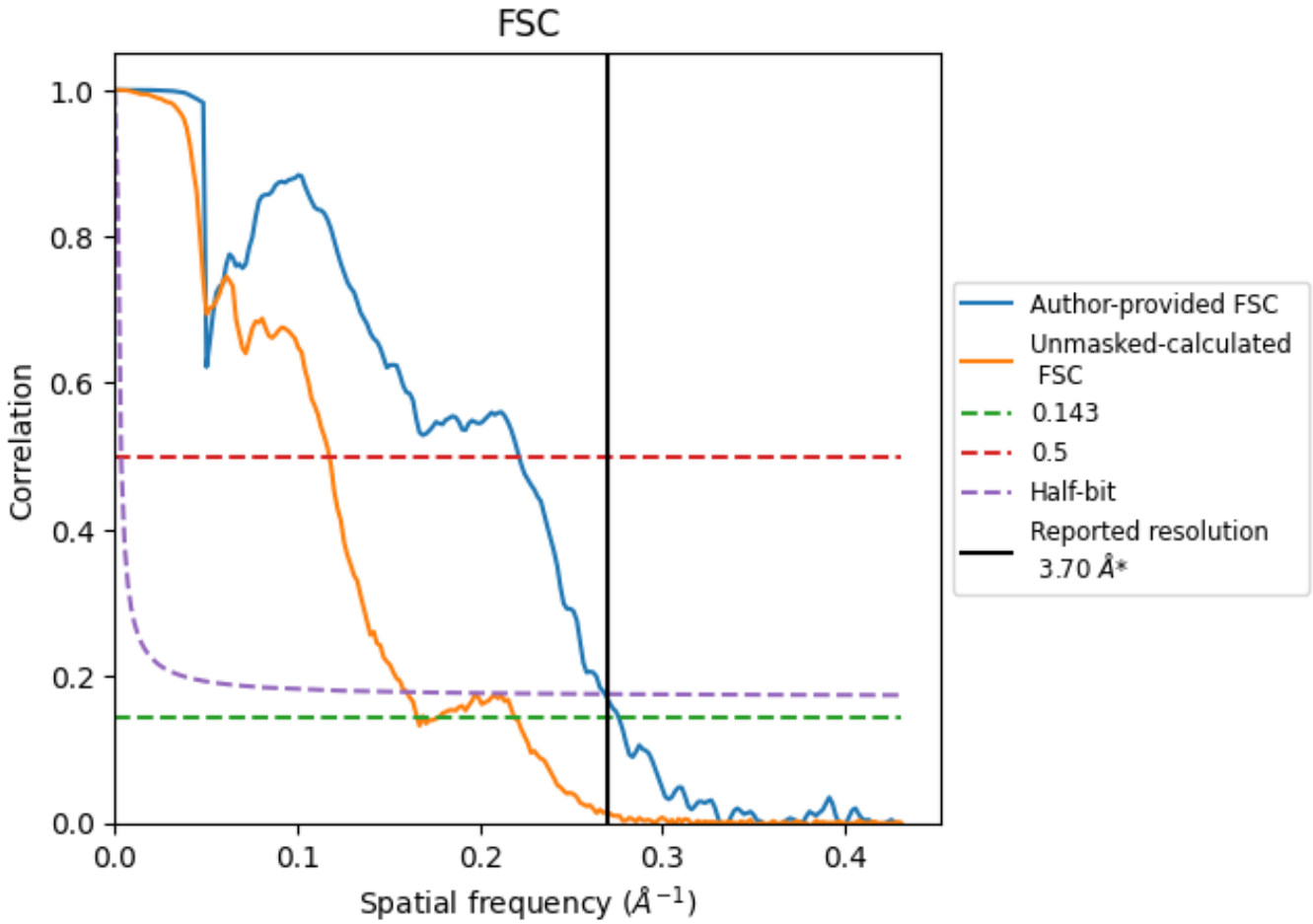


*Reported resolution corresponds to spatial frequency of 0.270 $Å^{-1}$

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 0.270 Å^{-1}

8.2 Resolution estimates (i)

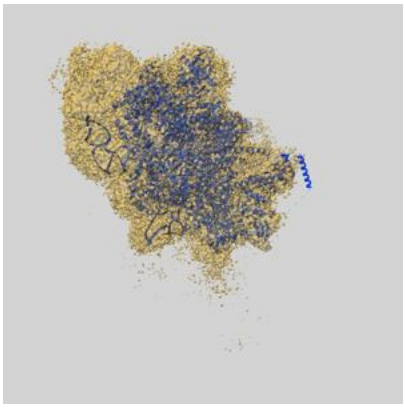
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.62	4.51	3.72
Unmasked-calculated*	6.03	8.50	6.25

*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 6.03 differs from the reported value 3.7 by more than 10 %

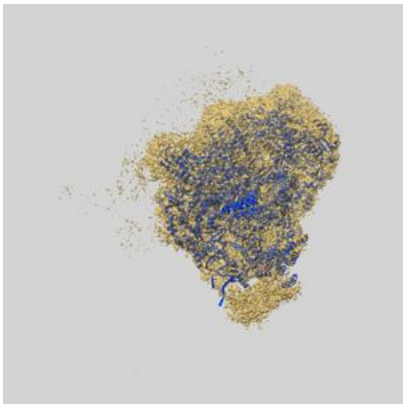
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-18547 and PDB model 8QPB. Per-residue inclusion information can be found in section 3 on page 7.

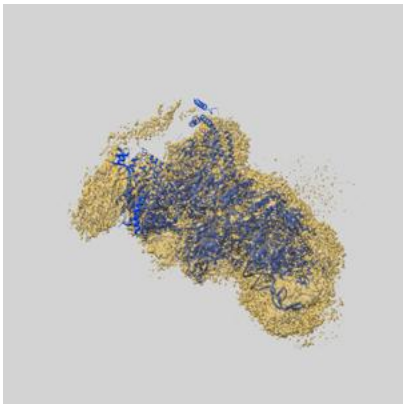
9.1 Map-model overlay



X



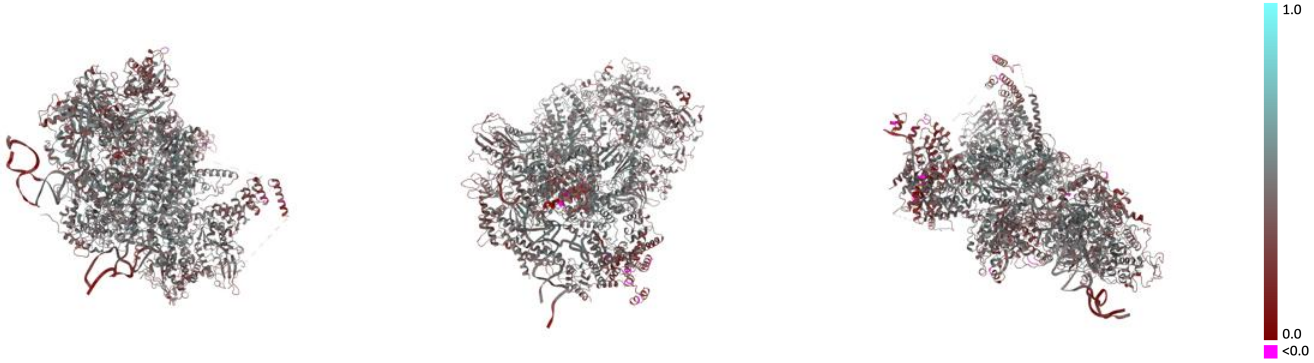
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.027 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.

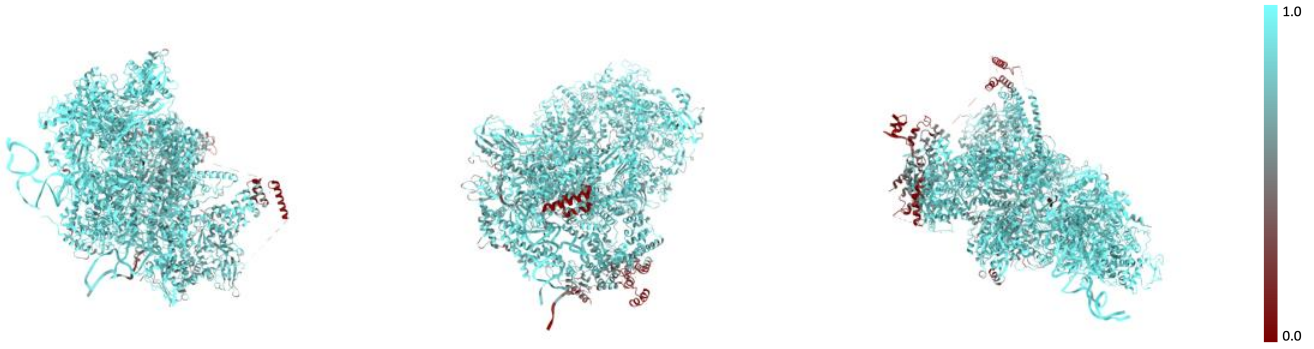
9.2 Q-score mapped to coordinate model



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.

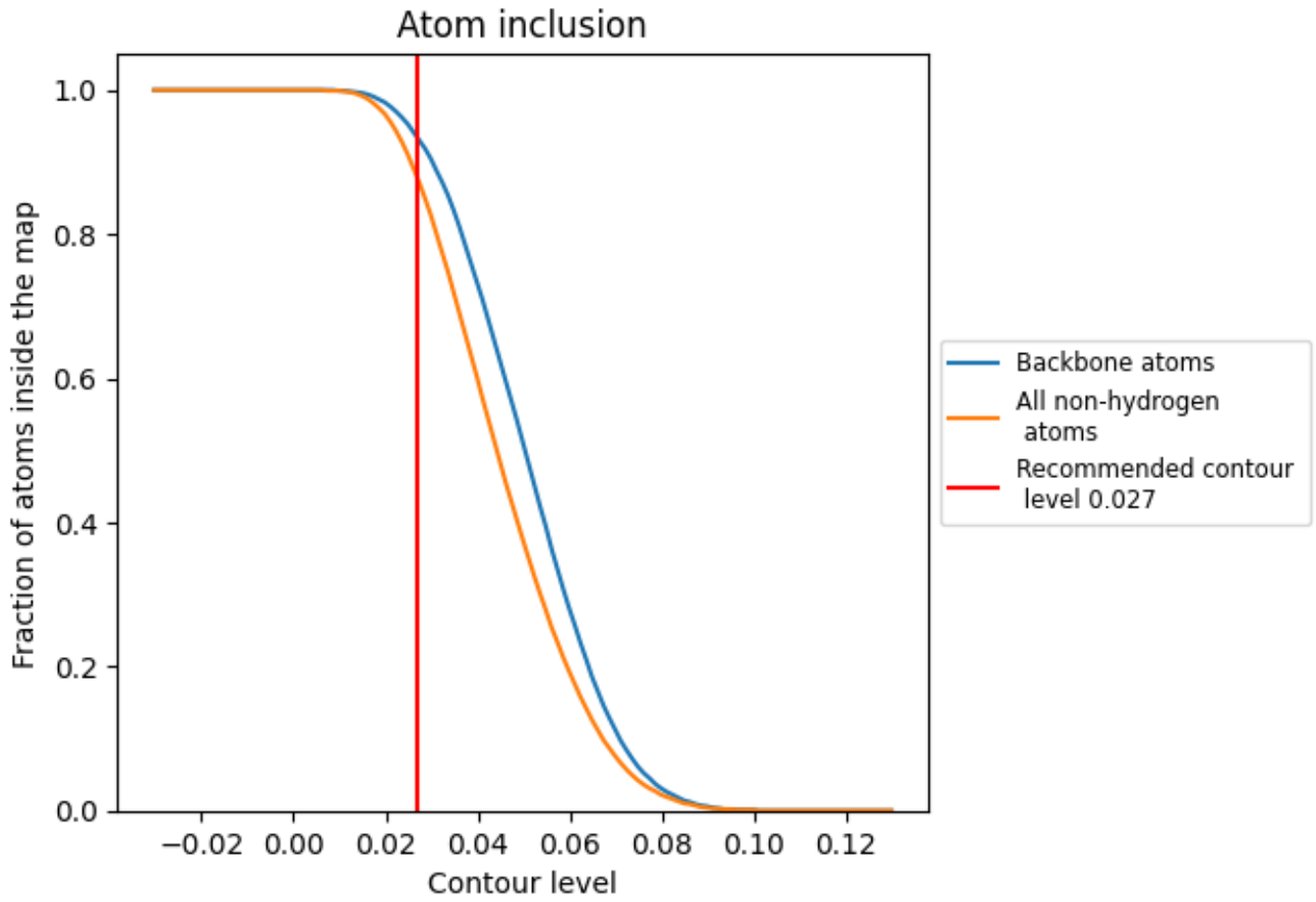
9.3 Atom inclusion mapped to coordinate model



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 (0.027).

9.4 Atom inclusion (i)



At the recommended contour level, 93% of all backbone atoms, 88% 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 (0.027) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8770	0.4230
4	0.8890	0.3960
5	0.9860	0.4040
6	0.8720	0.3990
7	0.7700	0.3800
A	0.9090	0.4570
B	0.8530	0.4010
C	0.9590	0.4230
D	0.9340	0.5000
F	0.8120	0.3510
G	0.9000	0.3210
J	0.9150	0.4390
L	0.8180	0.4070
M	0.6360	0.4180
N	0.7370	0.3710
S	0.6410	0.3590
U	0.8440	0.3830
z	0.9790	0.4300