Full wwPDB EM Validation Report ⓘ

Jun 9, 2025 – 10:56 AM EDT

PDB ID	:	9CAC / pdb_00009cac
EMDB ID	:	EMD-45386
Title	:	Cryo-EM structure of the RuvBL lobe of the native human TIP60 complex (composite structure)
Authors	:	Louder, R.K.; Park, G.; Patel, A.B.
Deposited on	:	2024-06-17
Resolution	:	3.43 Å(reported)

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

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

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

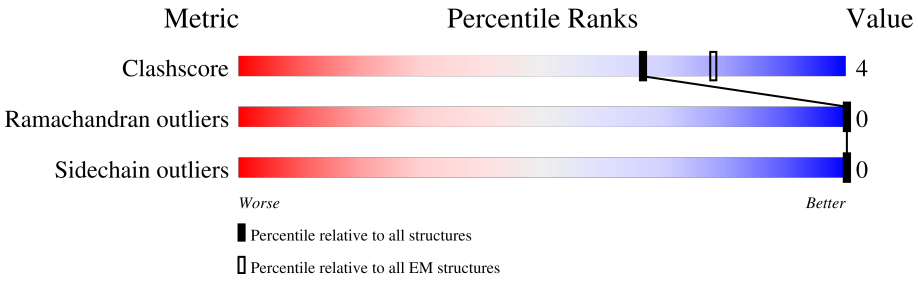
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance

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

The reported resolution of this entry is 3.43 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.



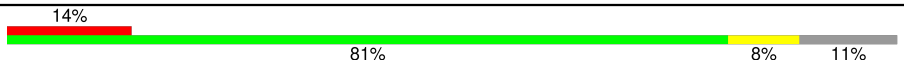
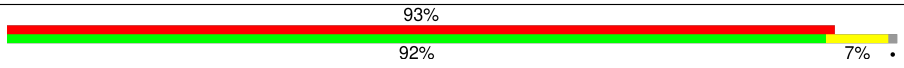
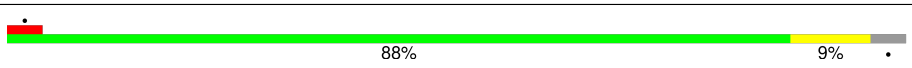
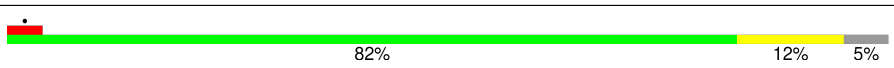
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	A	3159	9% 28% 68%
2	B	364	9% 31% 5% 63%
3	C	836	12% 87%
4	E	456	5% 81% 12% 7%
4	G	456	7% 85% 9% 6%
4	I	456	7% 84% 9% 7%
5	F	463	82% 12% 6%
5	H	463	6% 84% 8% 8%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
5	J	463	
6	K	375	
6	L	375	
7	M	429	
8	N	467	

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 40858 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 E1A-binding protein p400.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1005	8242	5250	1467	1491	34	0	0

- Molecule 2 is a protein called Vacuolar protein sorting-associated protein 72 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	133	1084	695	193	193	3	0	0

- Molecule 3 is a protein called Enhancer of polycomb homolog 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	112	918	577	180	157	4	0	0

- Molecule 4 is a protein called RuvB-like 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	E	422	3249	2050	559	625	15	0	0
4	G	429	3308	2086	567	639	16	0	0
4	I	425	3269	2060	562	631	16	0	0

- Molecule 5 is a protein called RuvB-like 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	435	3381	2113	593	659	16	0	0
5	H	428	3327	2082	582	647	16	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					AltConf	Trace
5	J	412	Total	C	N	O	S	0	0
			3198	1999	558	626	15		

- Molecule 6 is a protein called Actin, cytoplasmic 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	K	370	Total	C	N	O	S	0	0
			2884	1827	486	549	22		
6	L	361	Total	C	N	O	S	0	0
			2824	1791	475	538	20		

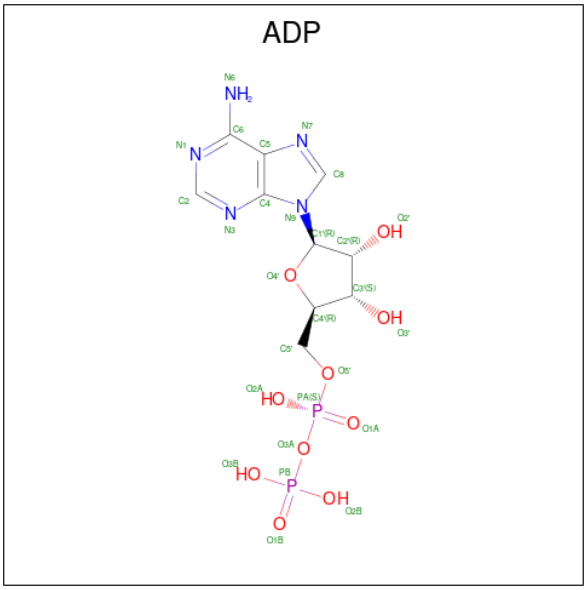
- Molecule 7 is a protein called Actin-like protein 6A.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	M	406	Total	C	N	O	S	0	0
			3163	2001	538	600	24		

- Molecule 8 is a protein called DNA methyltransferase 1-associated protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	N	208	Total	C	N	O	S	0	0
			1783	1135	331	313	4		

- Molecule 9 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).

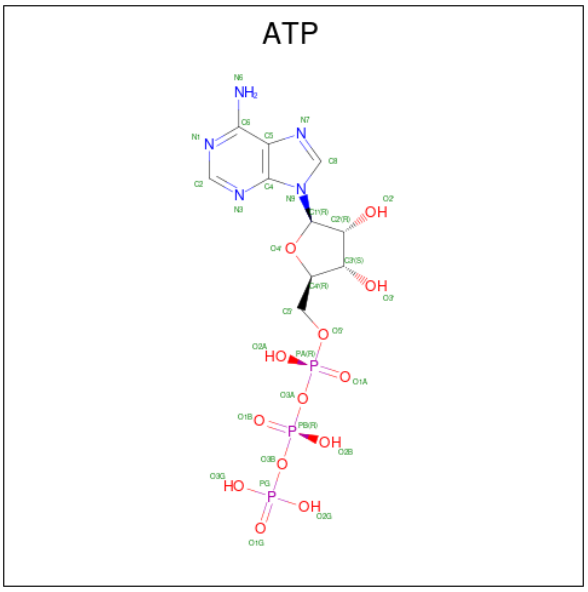


Mol	Chain	Residues	Atoms					AltConf
9	E	1	Total	C	N	O	P	0
			27	10	5	10	2	
9	F	1	Total	C	N	O	P	0
			27	10	5	10	2	
9	G	1	Total	C	N	O	P	0
			27	10	5	10	2	
9	H	1	Total	C	N	O	P	0
			27	10	5	10	2	
9	I	1	Total	C	N	O	P	0
			27	10	5	10	2	
9	J	1	Total	C	N	O	P	0
			27	10	5	10	2	
9	L	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 10 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
10	E	1	Total	Mg	0
			1	1	
10	F	1	Total	Mg	0
			1	1	
10	G	1	Total	Mg	0
			1	1	
10	H	1	Total	Mg	0
			1	1	
10	I	1	Total	Mg	0
			1	1	
10	J	1	Total	Mg	0
			1	1	
10	L	1	Total	Mg	0
			1	1	
10	M	1	Total	Mg	0
			1	1	

- Molecule 11 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



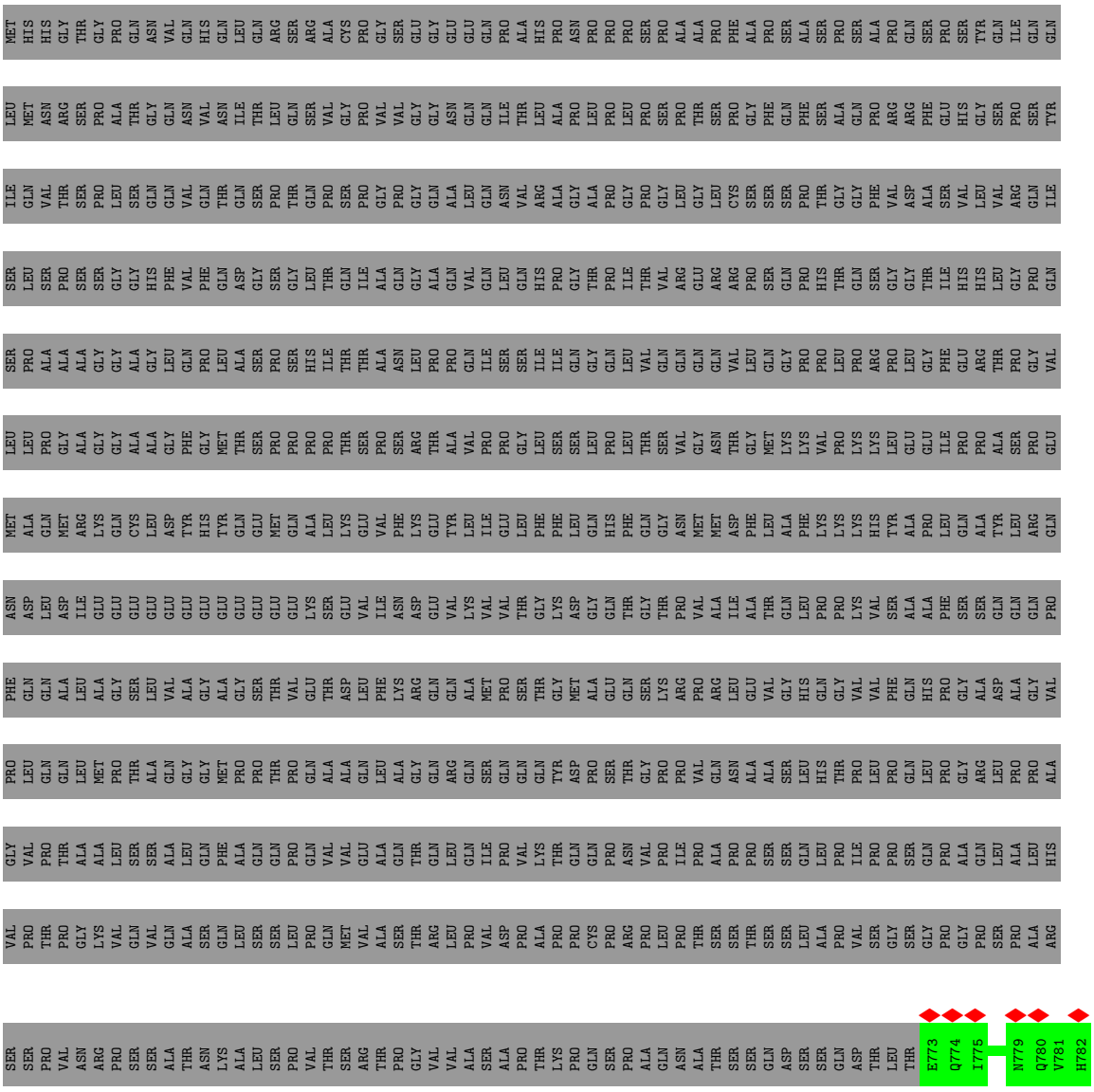
Mol	Chain	Residues	Atoms					AltConf
11	M	1	Total	C	N	O	P	0
			31	10	5	13	3	

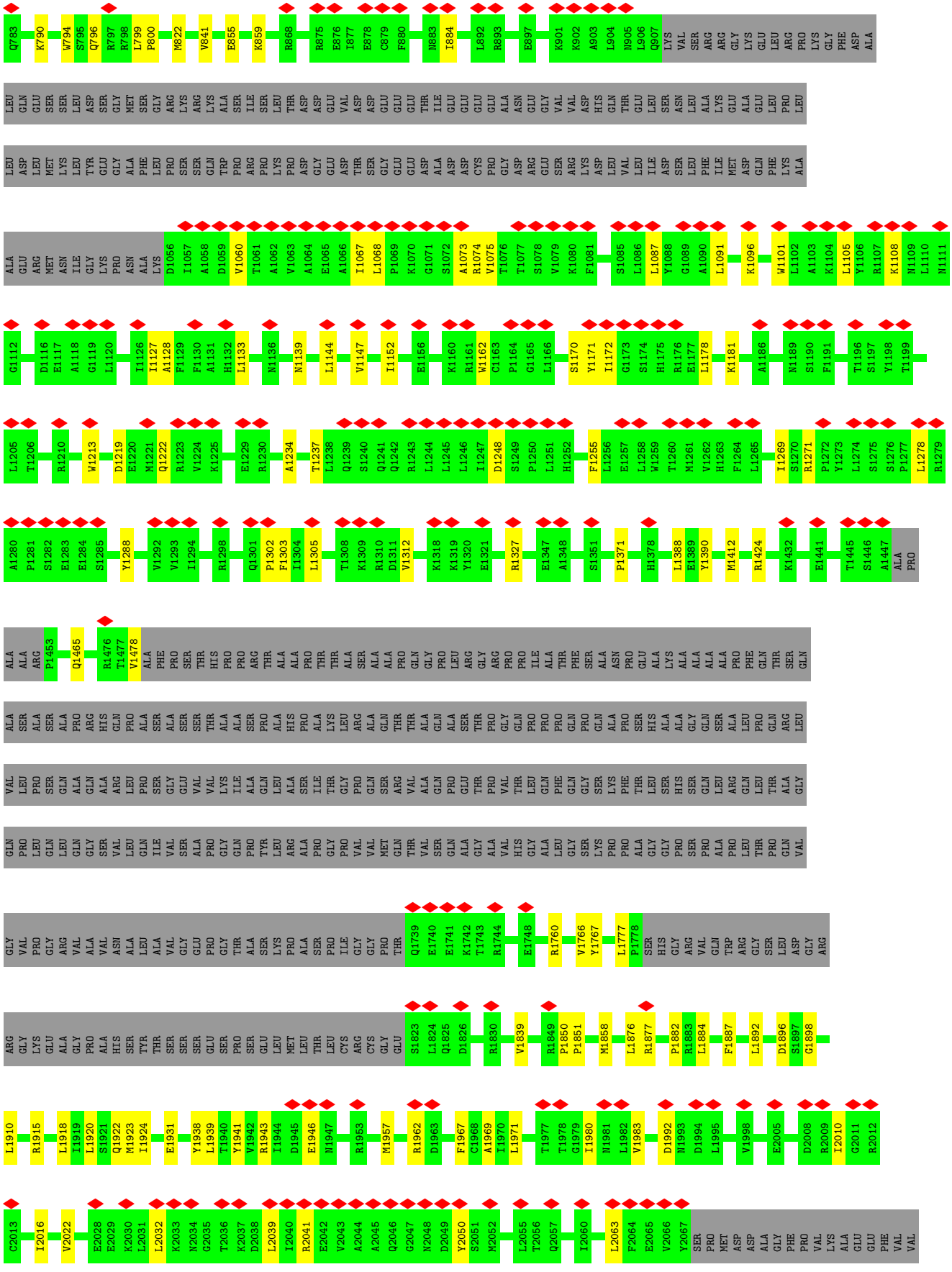
3 Residue-property plots (i)

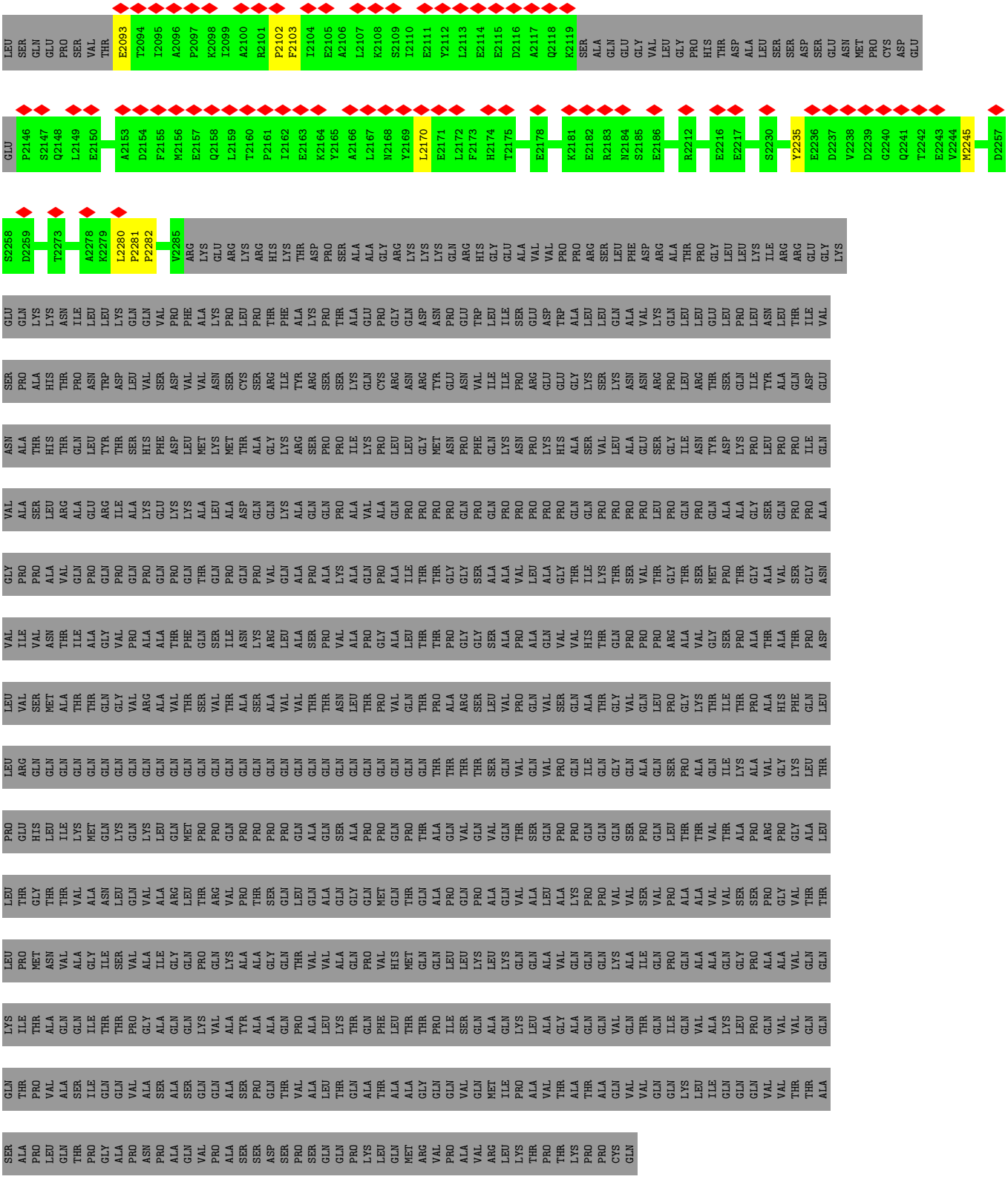
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: E1A-binding protein p400

Chain A:

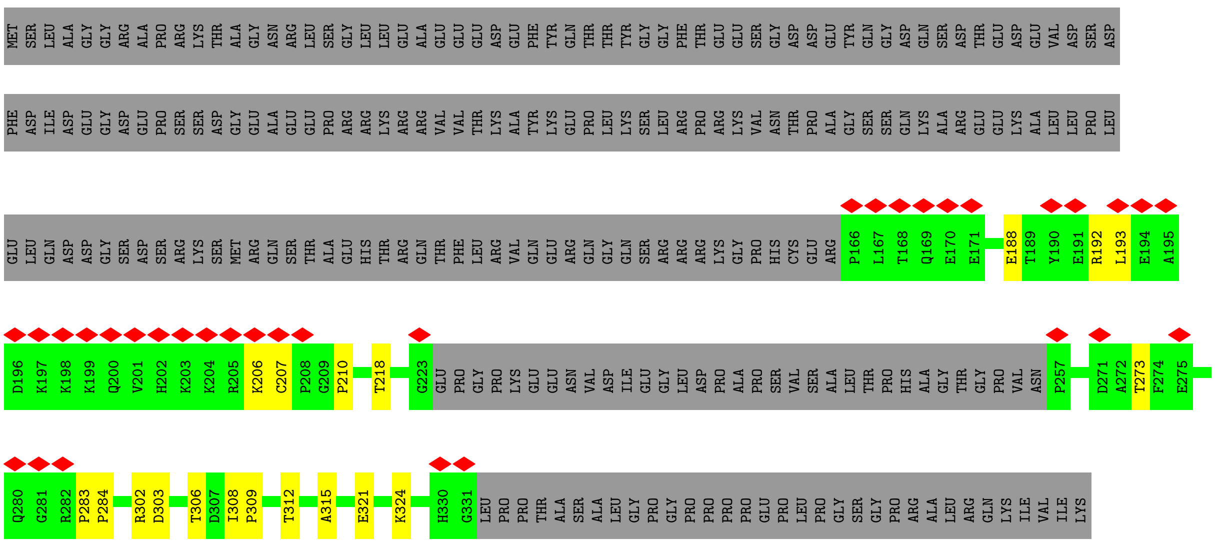



Q783 K790 W794 S795 Q796 R797 R798 L799 P800 M822 V841 E855 K859 R868 R875 E876 I877 E878 C879 F880 N883 I884 L892 R893 E897 K901 K902 A903 L904 N905 L906 Q907 LYS VAL SER ARG ARG GLY LYS GLU LEU ARG PRO LYS GLY PHE ASP ALA
LEU GLN GLU SER SER LEU ASP SER GLY MET SER GLY ARG LYS ARG LYS ALA SER ILE SER LEU THR ASP ASP GLU VAL ASP ASP GLU GLU GLU THR ILE GLU GLU GLU GLU ALA ASN GLU GLY VAL VAL ASP HIS GLN THR GLU LEU SER ASN LEU ALA LYS GLU ALA GLU LEU PRO LEU
LEU ASP LEU MET LYS LEU TYR GLU GLY GLY ALA PHE LEU PRO SER SER GLN TRP PRO ARG PRO LYS PRO ASP GLY GLU ASP THR SER GLY GLU GLU ASP ALA ASP ASP CYS PRO GLY ASP ARG GLU SER ARG LYS ASP LEU VAL LEU ILE ASP SER LEU PHE ILE MET ASP GLN PHE LYS ALA
ALA GLU ARG MET ASN ILE GLY LYS PRO ASN ALA LYS D1056 I1057 A1058 D1059 V1060 T1061 A1062 V1063 A1064 E1065 A1066 I1067 L1068 P1069 K1070 G1071 S1072 A1073 R1074 V1075 T1076 T1077 S1078 V1079 K1080 F1081 S1085 L1086 L1087 Y1088 G1089 A1090 L1091 K1096 W1101 L1102 A1103 K1104 L1105 Y1106 R1107 K1108 N1109 L1110 N1111
G1112 D1116 E1117 A1118 G1119 L1120 I1126 I1127 A1128 F1129 F1130 A1131 H1132 L1133 N1136 N1139 L1144 V1147 I1152 E1156 K1160 R1161 W1162 C1163 P1164 G1165 L1166 S1170 Y1171 I1172 G1173 S1174 H1175 R1176 E1177 L1178 K1181 A1186 N1189 S1190 F1191 T1196 S1197 Y1198 T1199
L1205 T1206 R1210 W1213 D1219 E1220 M1221 Q1222 R1223 V1224 K1225 E1229 R1230 A1234 T1237 L1238 Q1239 S1240 Q1241 Q1242 R1243 L1244 L1245 L1246 I1247 D1248 S1249 P1250 L1251 H1252 F1255 L1256 E1257 L1258 W1259 T1260 M1261 V1262 H1263 F1264 L1265 I1269 S1270 R1271 P1272 Y1273 L1274 S1275 S1276 P1277 L1278 R1279
A1280 P1281 S1282 E1283 E1284 S1285 Y1288 V1292 V1293 I1294 R1298 Q1301 P1302 F1303 I1304 L1305 T1308 K1309 R1310 D1311 V1312 K1318 K1319 Y1320 E1321 R1327 E1347 A1348 S1351 P1371 H1378 L1388 E1389 Y1390 M1412 R1424 K1432 E1441 T1445 S1446 A1447 ALA PRO
ALA ALA ARG P1453 Q1465 R1476 T1477 V1478 ALA PHE PRO SER THR HIS PRO PRO ARG THR ALA ALA PRO THR THR ALA SER ALA ALA PRO GLN GLY PRO LEU ARG GLY ARG PRO PRO ILE ALA THR PHE SER ALA ASN PRO GLU ALA LYS ALA ALA ALA ALA PRO PHE GLN THR SER GLN
ALA SER ALA SER ALA PRO ARG HIS GLN PRO ALA SER ALA SER SER THR ALA ALA SER PRO ALA HIS PRO ALA LYS LEU ARG ALA GLN GLN THR THR ALA GLN ALA SER THR PRO GLY GLN PRO PRO PRO GLN PRO GLN ALA PRO SER HIS ALA ALA GLY GLN SER ALA LEU PRO GLN ARG LEU
VAL LEU PRO SER GLN ALA GLN LEU PRO SER GLY GLU VAL VAL LYS ILE ALA GLN LEU LEU ALA ARG LEU PRO SER ARG VAL ALA GLN PRO GLU THR PRO VAL THR LEU GLN PHE GLN GLY SER LYS PHE THR LEU SER HIS SER GLN GLU ARG GLN LEU THR ALA GLY
GLN PRO LEU GLN LEU GLN GLY SER VAL LEU GLN ILE VAL SER ALA PRO GLY GLN PRO TYR LEU ARG ALA PRO GLY PRO VAL VAL MET GLN THR VAL SER GLN ALA ALA VAL HIS GLY ALA LEU GLY SER LYS PRO PRO ALA GLY GLY PRO SER PRO ALA PRO LEU THR PRO GLN VAL
GLY VAL PRO GLY ARG VAL ALA VAL ASN ALA LEU LEU ALA VAL GLY GLU PRO GLY THR ALA SER PRO ILE GLY GLY PRO THR Q1739 E1740 E1741 K1742 T1743 R1744 E1748 R1760 V1766 Y1767 L1777 P1778 SER HIS GLY ARG VAL GLN TRP ARG GLY SER LEU ASP GLY ARG
ARG GLY LYS GLU ALA GLY PRO ALA HIS SER TYR THR SER SER SER GLU SER PRO SER GLU LEU MET LEU THR LEU CYS ARG CYS GLY GLU S1823 L1824 Q1825 D1826 R1830 V1839 R1849 P1850 P1851 M1858 L1876 R1877 P1882 R1883 L1884 F1887 L1892 D1896 S1897 G1898
L1910 R1915 L1918 T1919 L1920 S1921 Q1922 M1923 I1924 E1931 Y1938 L1939 T1940 Y1941 V1942 R1943 I1944 D1945 E1946 N1947 R1953 M1957 R1962 D1963 F1967 C1968 A1969 I1970 L1971 T1977 T1978 G1979 I1980 N1981 L1982 V1983 D1992 N1993 D1994 L1995 V1998 E2005 D2008 R2009 I2010 G2011 R2012
C2013 I2016 V2022 E2028 E2029 K2030 L2031 L2032 K2033 N2034 G2035 T2036 K2037 D2038 L2039 T2040 R2041 E2042 V2043 A2044 A2045 Q2046 G2047 N2048 D2049 Y2050 S2051 M2052 L2055 T2056 Q2057 I2060 L2063 F2064 E2065 V2066 Y2067 SER PRO MET ASP ASP ALA GLY PHE PRO VAL LYS ALA GLU GLU PHE VAL VAL

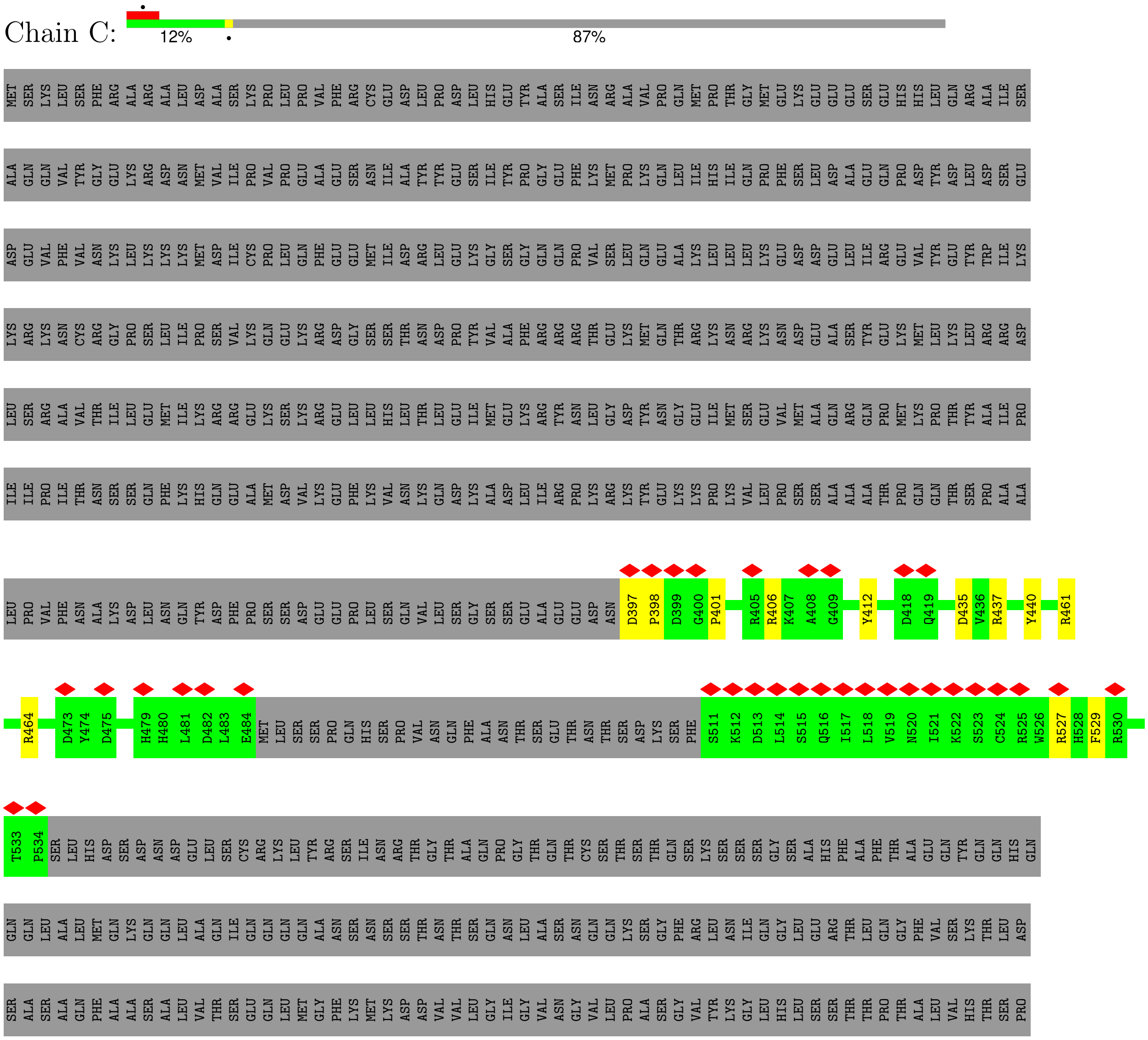


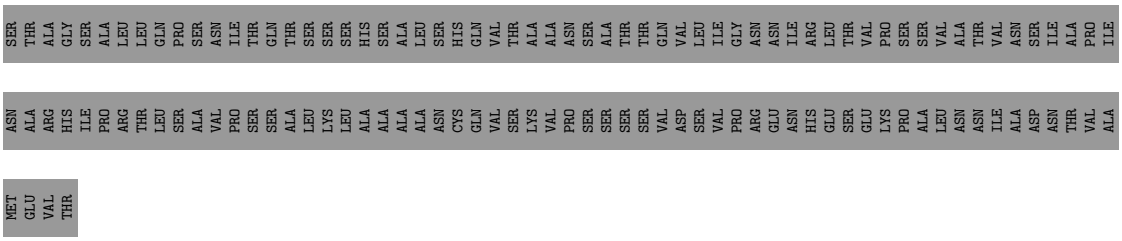
• Molecule 2: Vacuolar protein sorting-associated protein 72 homolog

Chain B:



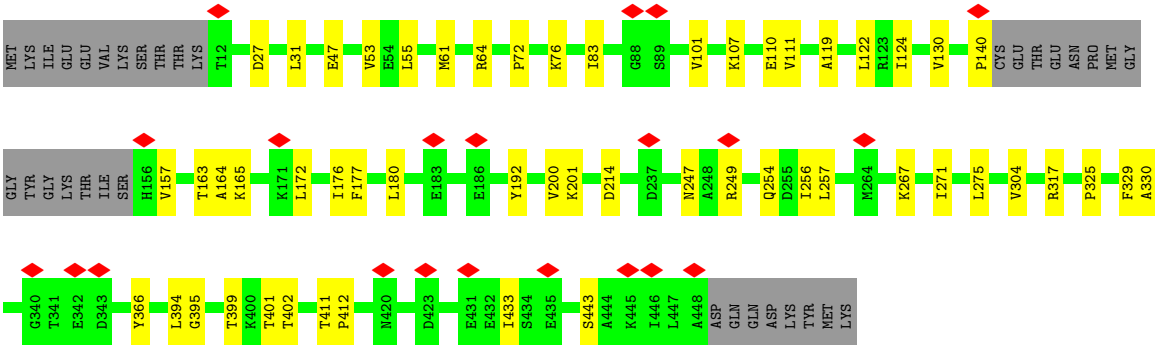
- Molecule 3: Enhancer of polycomb homolog 1





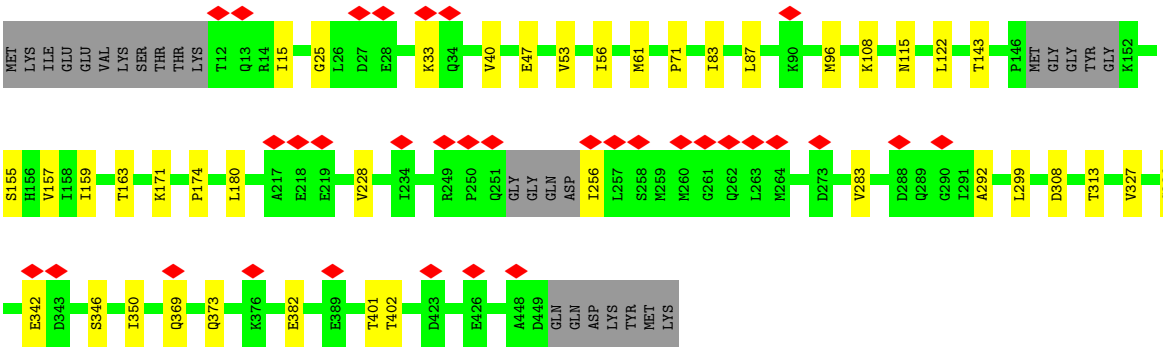
• Molecule 4: RuvB-like 1

Chain E:



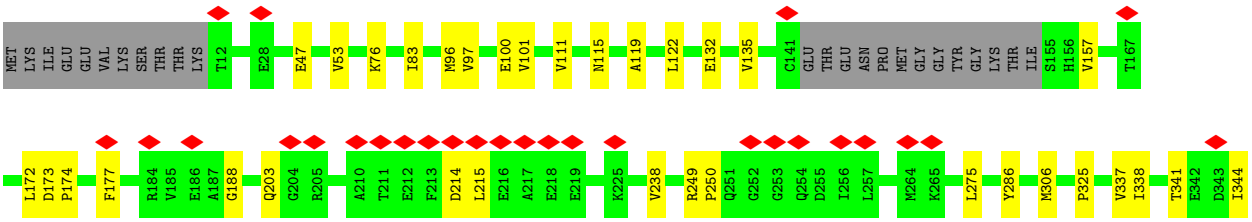
• Molecule 4: RuvB-like 1

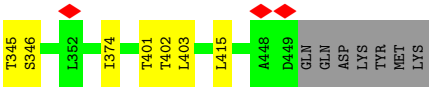
Chain G:



• Molecule 4: RuvB-like 1

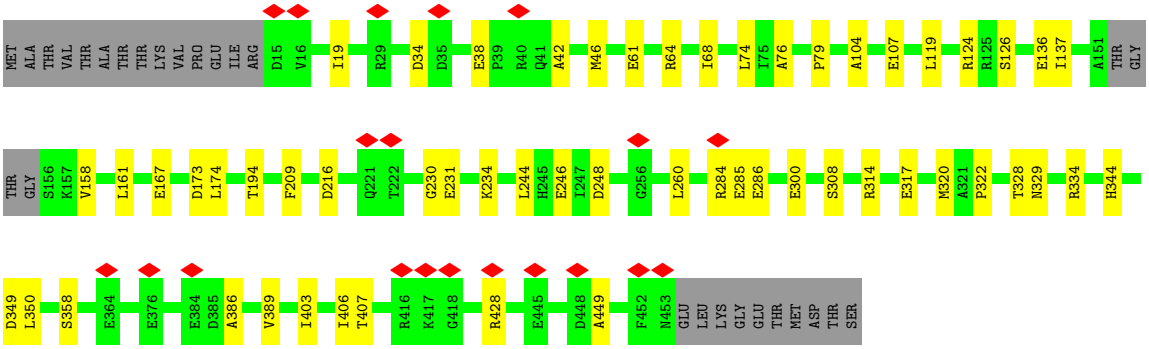
Chain I:





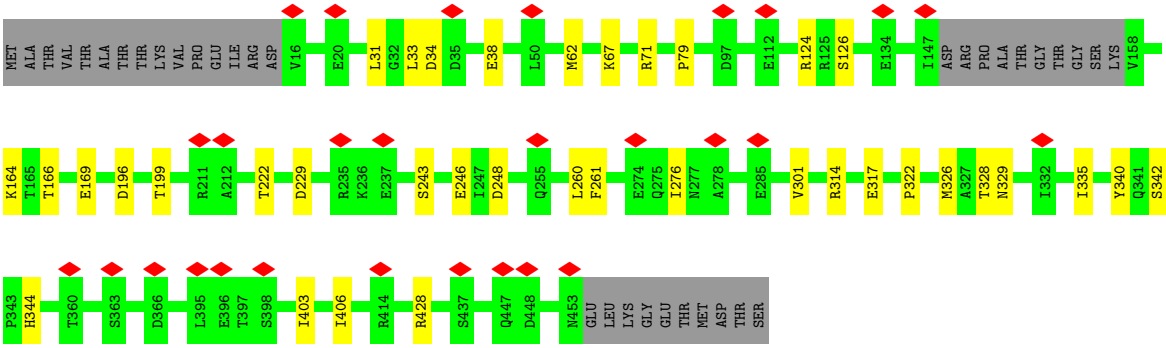
• Molecule 5: RuvB-like 2

Chain F:



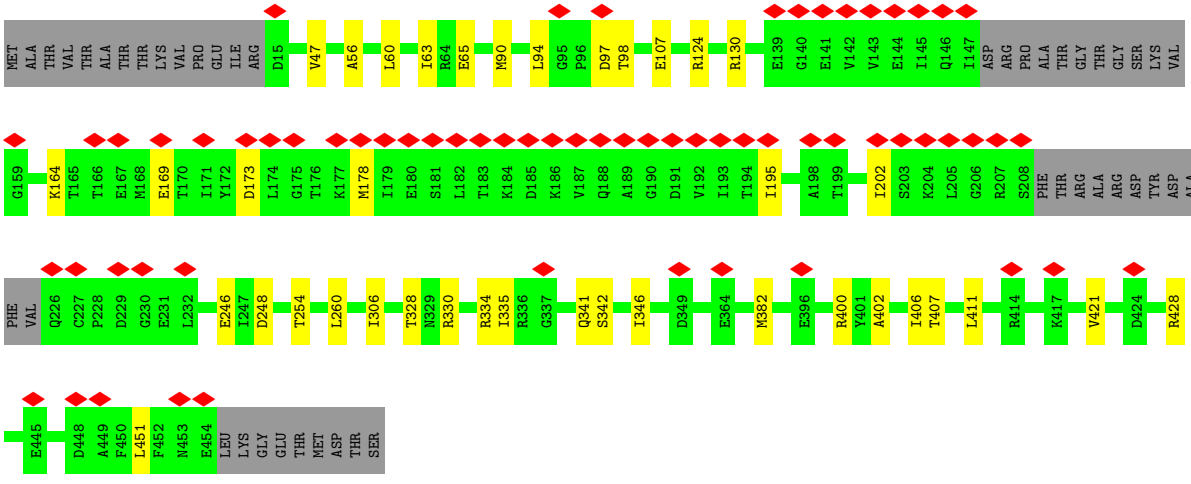
• Molecule 5: RuvB-like 2

Chain H:



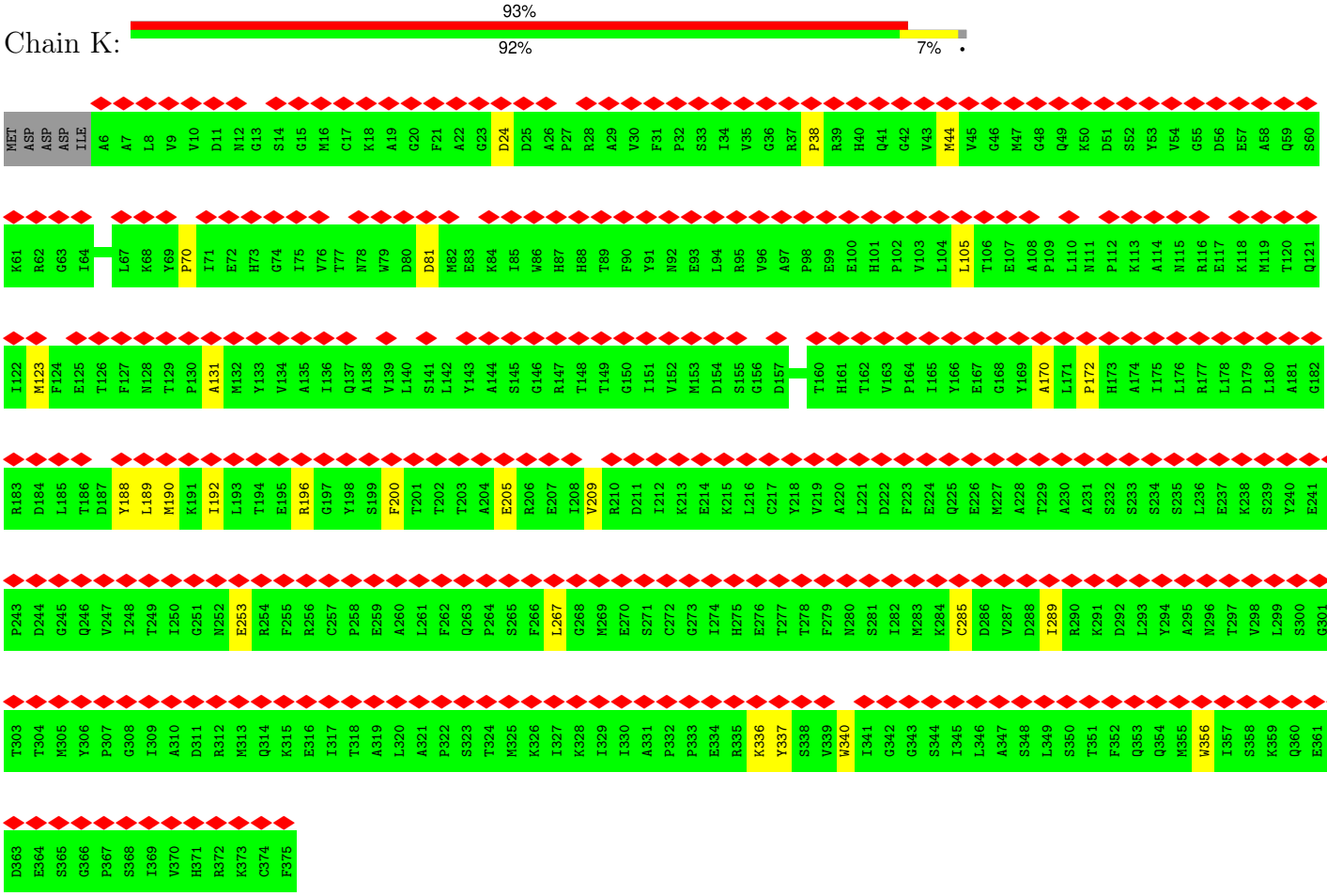
• Molecule 5: RuvB-like 2

Chain J:



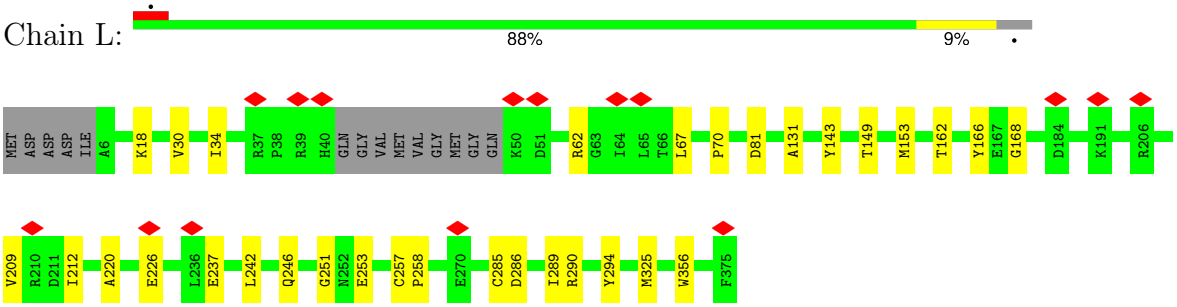
• Molecule 6: Actin, cytoplasmic 1

Chain K:



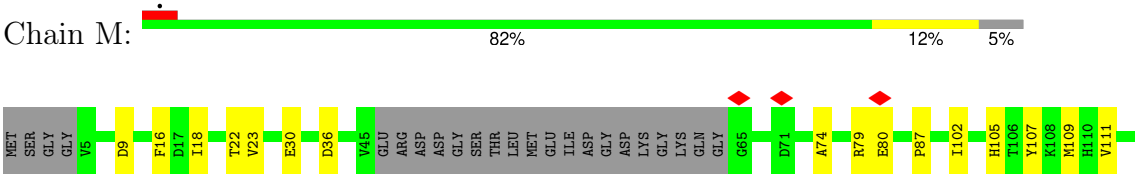
• Molecule 6: Actin, cytoplasmic 1

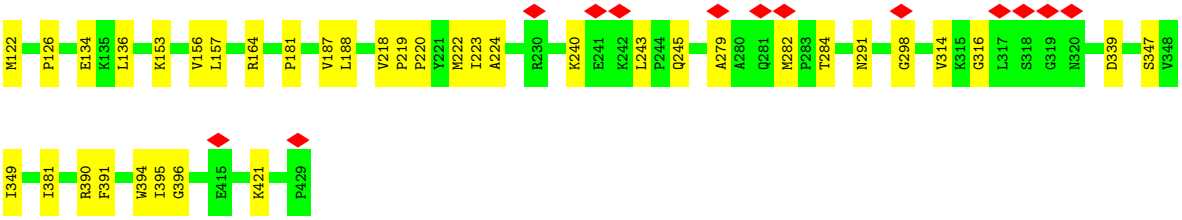
Chain L:



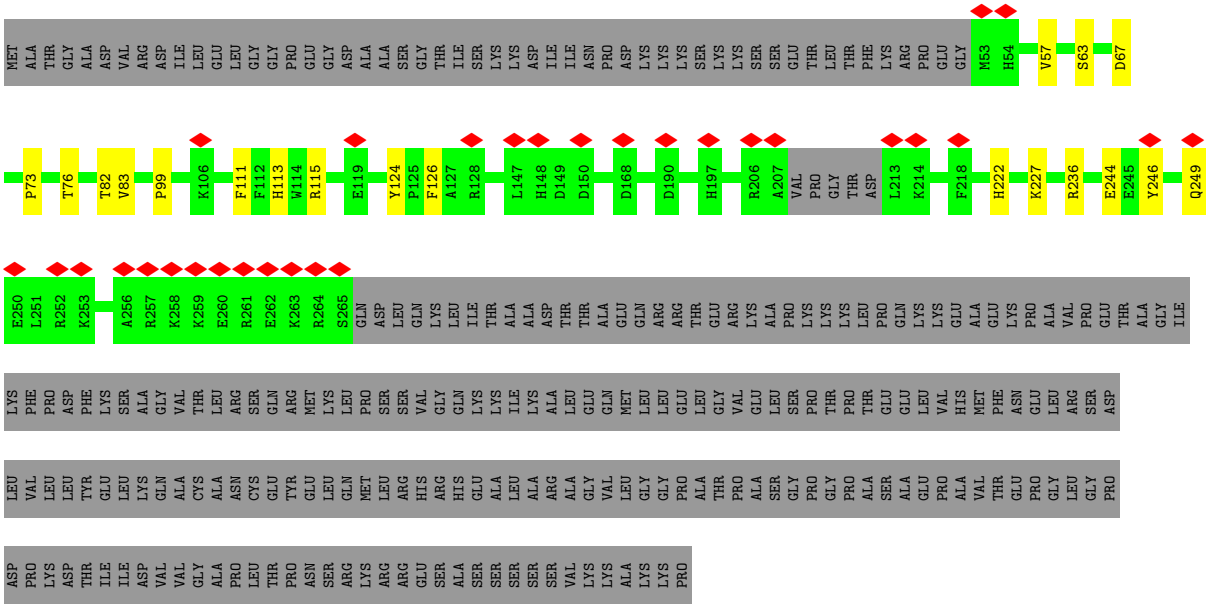
• Molecule 7: Actin-like protein 6A

Chain M:





• Molecule 8: DNA methyltransferase 1-associated protein 1



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	61163	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	TFS FALCON 4i (4k x 4k)	Depositor
Maximum map value	3.011	Depositor
Minimum map value	-0.098	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.028	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	355.2, 355.2, 355.2	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.925, 0.925, 0.925	Depositor

5 Model quality

5.1 Standard geometry

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

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	A	0.12	0/8412	0.28	0/11369
2	B	0.11	0/1113	0.28	0/1509
3	C	0.11	0/945	0.31	0/1278
4	E	0.12	0/3291	0.27	0/4436
4	G	0.13	0/3350	0.30	0/4516
4	I	0.13	0/3311	0.27	0/4463
5	F	0.13	0/3420	0.29	0/4603
5	H	0.13	0/3365	0.29	0/4529
5	J	0.12	0/3232	0.28	0/4349
6	K	0.08	0/2947	0.25	0/3991
6	L	0.12	0/2886	0.29	0/3909
7	M	0.11	0/3235	0.27	0/4388
8	N	0.10	0/1829	0.27	0/2457
All	All	0.12	0/41336	0.28	0/55797

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	A	8242	0	8368	77	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	1084	0	1105	12	0
3	C	918	0	890	11	0
4	E	3249	0	3361	38	0
4	G	3308	0	3418	30	0
4	I	3269	0	3374	25	0
5	F	3381	0	3450	35	0
5	H	3327	0	3399	23	0
5	J	3198	0	3267	28	0
6	K	2884	0	2856	14	0
6	L	2824	0	2794	20	0
7	M	3163	0	3104	31	0
8	N	1783	0	1764	13	0
9	E	27	0	12	2	0
9	F	27	0	12	0	0
9	G	27	0	12	3	0
9	H	27	0	12	0	0
9	I	27	0	12	2	0
9	J	27	0	12	2	0
9	L	27	0	12	0	0
10	E	1	0	0	0	0
10	F	1	0	0	0	0
10	G	1	0	0	0	0
10	H	1	0	0	0	0
10	I	1	0	0	0	0
10	J	1	0	0	0	0
10	L	1	0	0	0	0
10	M	1	0	0	0	0
11	M	31	0	12	0	0
All	All	40858	0	41246	306	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 4.

All (306) 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)
4:G:96:MET:SD	4:G:115:ASN:ND2	2.51	0.83
6:L:34:ILE:HD11	6:L:67:LEU:HB3	1.69	0.75
7:M:16:PHE:HB2	7:M:122:MET:HG2	1.69	0.74
5:H:301:VAL:HG21	5:H:326:MET:HE3	1.73	0.71
1:A:1839:VAL:HG21	1:A:1884:LEU:HD22	1.73	0.70

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:H:124:ARG:NE	5:H:248:ASP:OD2	2.25	0.70
5:F:124:ARG:NE	5:F:248:ASP:OD2	2.24	0.69
1:A:841:VAL:HG21	6:L:168:GLY:HA3	1.75	0.68
1:A:2039:LEU:HD21	1:A:2063:LEU:HD11	1.76	0.68
5:F:428:ARG:NH2	4:G:47:GLU:OE1	2.26	0.68
4:I:215:LEU:HG	5:J:178:MET:HE3	1.76	0.68
5:H:314:ARG:NH1	5:H:317:GLU:OE1	2.25	0.67
5:F:314:ARG:NH1	5:F:317:GLU:OE1	2.26	0.67
5:F:246:GLU:HA	5:F:260:LEU:HD21	1.77	0.67
4:E:47:GLU:OE1	5:J:428:ARG:NH2	2.25	0.66
1:A:1269:ILE:HG22	1:A:1271:ARG:H	1.61	0.66
5:J:124:ARG:NE	5:J:248:ASP:OD2	2.27	0.65
4:I:96:MET:SD	4:I:115:ASN:ND2	2.70	0.64
6:L:285:CYS:HB3	6:L:289:ILE:HD11	1.79	0.64
7:M:18:ILE:HG23	7:M:23:VAL:HG22	1.80	0.63
9:G:501:ADP:H5'1	9:G:501:ADP:H8	1.64	0.62
4:E:107:LYS:HE2	4:E:110:GLU:HG2	1.80	0.62
4:I:401:THR:OG1	4:I:402:THR:N	2.33	0.61
4:E:411:THR:HG21	5:F:68:ILE:HG13	1.82	0.61
1:A:1918:LEU:HD11	1:A:1983:VAL:HG11	1.82	0.60
7:M:349:ILE:HG12	7:M:381:ILE:HD12	1.83	0.60
1:A:1152:ILE:HG21	1:A:1172:ILE:HD11	1.82	0.60
4:G:15:ILE:HD13	4:G:382:GLU:HA	1.83	0.60
1:A:1068:LEU:HD11	1:A:1302:PRO:HA	1.83	0.59
2:B:321:GLU:HG2	2:B:324:LYS:HE3	1.85	0.59
4:E:271:ILE:HG23	4:E:275:LEU:HD23	1.84	0.59
3:C:435:ASP:OD2	3:C:437:ARG:NH1	2.37	0.58
1:A:1858:MET:HE1	5:J:254:THR:HG23	1.86	0.57
4:E:55:LEU:HB2	5:J:411:LEU:HD11	1.86	0.57
7:M:87:PRO:HG3	7:M:102:ILE:HD12	1.85	0.57
2:B:306:THR:HG23	2:B:308:ILE:H	1.69	0.57
6:K:131:ALA:HB1	6:K:356:TRP:HB3	1.85	0.57
7:M:80:GLU:OE2	7:M:245:GLN:NE2	2.35	0.57
5:H:428:ARG:NH2	4:I:47:GLU:OE1	2.29	0.57
5:F:79:PRO:HG3	5:F:329:ASN:HD22	1.70	0.57
5:H:328:THR:HG21	5:H:344:HIS:HB3	1.85	0.57
4:E:180:LEU:HD23	4:E:200:VAL:HG11	1.87	0.57
1:A:1957:MET:HG2	1:A:1980:ILE:HG23	1.87	0.56
1:A:2280:LEU:HD23	3:C:406:ARG:HE	1.71	0.56
2:B:188:GLU:OE2	2:B:192:ARG:NH1	2.36	0.56
4:E:163:THR:HG23	4:E:165:LYS:H	1.71	0.56

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:G:56:ILE:HD13	4:G:87:LEU:HD11	1.85	0.56
7:M:314:VAL:HG12	7:M:316:GLY:H	1.70	0.56
4:G:157:VAL:HG23	4:G:174:PRO:HA	1.86	0.56
6:K:188:TYR:HB2	6:K:267:LEU:HD21	1.87	0.56
1:A:1920:LEU:HD23	1:A:1971:LEU:HB2	1.88	0.56
5:H:34:ASP:OD1	5:H:38:GLU:N	2.39	0.56
2:B:206:LYS:HG2	2:B:207:CYS:H	1.71	0.55
5:H:79:PRO:HG3	5:H:329:ASN:HD22	1.70	0.55
1:A:1133:LEU:HB3	1:A:1139:ASN:HB3	1.89	0.55
3:C:464:ARG:NH2	8:N:73:PRO:O	2.40	0.55
6:L:153:MET:HG2	6:L:162:THR:HG22	1.89	0.55
6:L:237:GLU:HG2	6:L:251:GLY:HA3	1.88	0.55
7:M:122:MET:HE1	7:M:136:LEU:HD11	1.87	0.55
1:A:841:VAL:HG21	6:L:168:GLY:CA	2.36	0.54
1:A:1876:LEU:HB2	4:G:256:ILE:HD12	1.88	0.54
2:B:312:THR:HG23	2:B:315:ALA:H	1.73	0.54
5:F:74:LEU:HD11	5:F:328:THR:HG22	1.88	0.54
4:I:337:VAL:HG22	4:I:345:THR:HG22	1.90	0.54
7:M:284:THR:HG22	7:M:298:GLY:HA2	1.89	0.54
5:H:62:MET:HE1	5:H:71:ARG:HG2	1.89	0.54
5:J:246:GLU:HA	5:J:260:LEU:HD21	1.88	0.54
4:E:61:MET:HG3	5:J:407:THR:HG21	1.90	0.54
1:A:1924:ILE:HG23	1:A:1943:ARG:HH22	1.73	0.53
1:A:1957:MET:HE3	1:A:1980:ILE:HG21	1.89	0.53
7:M:134:GLU:OE1	7:M:421:LYS:NZ	2.37	0.53
7:M:18:ILE:HG12	7:M:23:VAL:HG13	1.90	0.53
4:E:304:VAL:HG22	4:E:330:ALA:O	2.09	0.53
1:A:822:MET:HE1	3:C:461:ARG:HD3	1.91	0.53
7:M:339:ASP:OD2	8:N:227:LYS:NZ	2.37	0.52
7:M:9:ASP:OD1	8:N:115:ARG:NH2	2.42	0.52
4:G:53:VAL:HG22	4:G:83:ILE:HG23	1.90	0.52
5:F:167:GLU:OE1	5:F:230:GLY:N	2.36	0.52
7:M:9:ASP:HB3	8:N:113:HIS:CE1	2.45	0.52
5:F:403:ILE:HA	5:F:406:ILE:HD12	1.92	0.51
4:E:76:LYS:N	9:E:501:ADP:O2B	2.43	0.51
6:K:200:PHE:HB3	6:K:205:GLU:HB3	1.93	0.51
5:F:161:LEU:HB2	5:F:174:LEU:HD11	1.92	0.51
8:N:76:THR:HG22	8:N:83:VAL:HG21	1.92	0.51
5:F:137:ILE:HG23	5:F:194:THR:HG23	1.93	0.51
5:J:328:THR:HG22	5:J:330:ARG:H	1.76	0.51
4:E:119:ALA:HB3	4:E:325:PRO:HG3	1.92	0.50

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:401:THR:OG1	4:E:402:THR:N	2.42	0.50
7:M:107:TYR:HA	7:M:111:VAL:HB	1.93	0.50
1:A:1390:TYR:OH	5:J:246:GLU:OE2	2.24	0.50
5:F:334:ARG:NH2	4:G:342:GLU:OE1	2.33	0.50
1:A:1074:ARG:HH11	1:A:1305:LEU:HD12	1.75	0.50
1:A:1777:LEU:HD11	5:H:276:ILE:HG13	1.92	0.50
4:I:415:LEU:HD11	5:J:65:GLU:OE1	2.12	0.50
6:L:220:ALA:HB1	6:L:226:GLU:HG3	1.94	0.50
7:M:156:VAL:HG23	7:M:187:VAL:HG23	1.94	0.50
4:G:401:THR:OG1	4:G:402:THR:N	2.45	0.50
3:C:440:TYR:HB2	8:N:57:VAL:HB	1.93	0.49
5:F:349:ASP:OD1	5:F:350:LEU:N	2.45	0.49
5:H:164:LYS:HB2	5:H:169:GLU:HG2	1.93	0.49
5:F:284:ARG:NH1	5:F:285:GLU:OE2	2.40	0.49
4:E:411:THR:OG1	4:E:412:PRO:HD3	2.12	0.49
1:A:1918:LEU:HD23	1:A:1969:ALA:HB3	1.94	0.49
4:I:53:VAL:HG22	4:I:83:ILE:HG23	1.94	0.49
6:K:285:CYS:HB3	6:K:289:ILE:HD11	1.94	0.49
4:E:249:ARG:NH1	4:E:267:LYS:O	2.46	0.49
5:F:244:LEU:HD11	5:F:320:MET:HE3	1.95	0.49
5:J:335:ILE:HD11	5:J:342:SER:HB2	1.95	0.49
7:M:220:PRO:HA	7:M:223:ILE:HD12	1.94	0.49
1:A:2050:TYR:CD1	1:A:2102:PRO:HB2	2.48	0.49
7:M:30:GLU:HB2	7:M:394:TRP:HH2	1.78	0.49
4:E:366:TYR:OH	9:E:501:ADP:N6	2.46	0.48
4:G:336:CYS:SG	5:H:340:TYR:OH	2.58	0.48
5:J:97:ASP:HB3	5:J:130:ARG:HH22	1.79	0.48
5:J:195:ILE:HG12	5:J:202:ILE:HG12	1.95	0.48
1:A:1882:PRO:HG2	1:A:1884:LEU:HD21	1.96	0.48
2:B:206:LYS:HD2	5:F:158:VAL:HG11	1.96	0.48
6:K:105:LEU:HD11	6:K:123:MET:HE3	1.96	0.48
1:A:1234:ALA:O	1:A:1237:THR:HG22	2.13	0.48
1:A:841:VAL:HG22	6:L:143:TYR:HE1	1.79	0.48
4:G:15:ILE:HD12	5:H:67:LYS:HG2	1.95	0.48
4:G:338:ILE:HD11	4:G:346:SER:HB2	1.96	0.48
4:G:122:LEU:HD11	4:G:292:ALA:HB1	1.95	0.48
4:I:122:LEU:N	4:I:238:VAL:O	2.47	0.48
1:A:1760:ARG:NH1	5:H:222:THR:O	2.43	0.48
1:A:1877:ARG:HH22	4:E:254:GLN:HA	1.79	0.48
5:F:34:ASP:OD1	5:F:38:GLU:N	2.44	0.47
9:G:501:ADP:H5'1	9:G:501:ADP:C8	2.47	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:L:18:LYS:HG3	6:L:30:VAL:HG22	1.95	0.47
1:A:1222:GLN:NE2	1:A:1248:ASP:OD1	2.47	0.47
4:I:119:ALA:HB3	4:I:325:PRO:HG3	1.95	0.47
1:A:1892:LEU:HD21	5:F:286:GLU:CD	2.40	0.47
4:E:101:VAL:HA	4:E:111:VAL:HG11	1.96	0.47
5:H:403:ILE:HA	5:H:406:ILE:HD12	1.95	0.47
5:J:60:LEU:HA	5:J:63:ILE:HD12	1.95	0.47
1:A:1924:ILE:HD11	1:A:1946:GLU:OE2	2.14	0.47
5:F:216:ASP:OD2	4:G:171:LYS:N	2.26	0.47
1:A:2280:LEU:HD12	1:A:2281:PRO:HD2	1.97	0.47
1:A:1327:ARG:O	1:A:1898:GLY:HA3	2.15	0.47
5:J:47:VAL:O	9:J:501:ADP:N6	2.48	0.47
5:J:56:ALA:HB1	5:J:90:MET:HE2	1.96	0.47
6:L:62:ARG:HG2	6:L:67:LEU:HD11	1.96	0.47
1:A:841:VAL:HG22	6:L:143:TYR:CE1	2.49	0.47
4:I:338:ILE:HD11	4:I:346:SER:HB2	1.97	0.47
1:A:1101:TRP:CZ2	1:A:1105:LEU:HD11	2.50	0.47
1:A:1147:VAL:HG12	1:A:1219:ASP:HB3	1.95	0.47
7:M:126:PRO:HA	7:M:153:LYS:HD2	1.95	0.47
1:A:2245:MET:HE3	3:C:529:PHE:CD2	2.49	0.46
6:L:251:GLY:C	6:L:253:GLU:H	2.23	0.46
8:N:124:TYR:CE2	8:N:126:PHE:HB2	2.51	0.46
5:J:94:LEU:HD21	5:J:98:THR:HB	1.98	0.46
6:K:190:MET:HG3	6:K:209:VAL:HG11	1.97	0.46
1:A:1371:PRO:HG2	1:A:1896:ASP:HB3	1.97	0.46
2:B:302:ARG:HA	2:B:309:PRO:HA	1.97	0.46
8:N:82:THR:HG23	8:N:83:VAL:HG13	1.96	0.46
6:K:336:LYS:HE3	6:K:337:TYR:CE2	2.51	0.45
7:M:105:HIS:CE1	7:M:109:MET:HG3	2.50	0.45
4:E:317:ARG:NH1	5:J:107:GLU:OE2	2.50	0.45
1:A:1312:VAL:HG12	1:A:1312:VAL:O	2.17	0.45
4:I:306:MET:HE1	5:J:306:ILE:HG23	1.98	0.45
4:E:172:LEU:HD13	4:E:176:ILE:HG21	1.98	0.45
4:G:163:THR:HG23	4:G:228:VAL:HG22	1.97	0.45
7:M:157:LEU:O	7:M:396:GLY:HA3	2.16	0.45
4:G:53:VAL:HA	4:G:56:ILE:HD12	1.98	0.45
6:K:24:ASP:HB2	6:K:340:TRP:HH2	1.82	0.45
1:A:1922:GLN:HG2	1:A:1992:ASP:OD2	2.17	0.45
4:I:374:ILE:HG21	4:I:403:LEU:HD21	1.99	0.45
4:E:304:VAL:HG11	4:E:329:PHE:HB3	1.99	0.45
1:A:1127:ILE:HG21	1:A:1162:TRP:HB2	1.99	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:527:ARG:HD3	3:C:529:PHE:CZ	2.52	0.45
5:F:231:GLU:O	5:F:234:LYS:NZ	2.42	0.45
5:H:261:PHE:HD1	4:I:275:LEU:HD13	1.82	0.45
6:K:170:ALA:O	6:K:172:PRO:HD3	2.18	0.44
1:A:1073:ALA:O	1:A:1075:VAL:HG23	2.18	0.44
4:G:155:SER:C	4:G:174:PRO:HG3	2.41	0.44
5:H:126:SER:HB2	5:H:322:PRO:HG3	1.99	0.44
7:M:240:LYS:HB2	7:M:243:LEU:HD11	2.00	0.44
1:A:1939:LEU:HD22	1:A:1967:PHE:CD2	2.52	0.44
5:F:104:ALA:HB3	5:F:107:GLU:HG3	1.98	0.44
8:N:246:TYR:O	8:N:249:GLN:HG3	2.17	0.44
4:E:27:ASP:OD1	4:E:31:LEU:N	2.50	0.44
4:G:108:LYS:NZ	4:G:308:ASP:OD2	2.34	0.44
4:I:76:LYS:NZ	9:I:501:ADP:O2B	2.26	0.44
7:M:22:THR:OG1	7:M:390:ARG:NH2	2.50	0.44
4:I:97:VAL:HG12	4:I:100:GLU:HG3	1.99	0.44
6:L:294:TYR:CD2	6:L:325:MET:HG2	2.53	0.44
6:K:38:PRO:HB3	6:K:44:MET:HE3	1.99	0.44
6:L:149:THR:HG23	6:L:166:TYR:HA	2.00	0.43
4:I:157:VAL:HG21	4:I:177:PHE:HB2	2.00	0.43
9:I:501:ADP:O5'	9:I:501:ADP:H8	2.00	0.43
5:H:243:SER:N	5:H:246:GLU:OE1	2.51	0.43
1:A:1091:LEU:O	1:A:1096:LYS:HE3	2.18	0.43
1:A:1767:TYR:CZ	5:H:260:LEU:HD13	2.53	0.43
4:G:143:THR:HG21	4:G:155:SER:HB2	1.99	0.43
5:H:62:MET:HE2	5:H:62:MET:HB3	1.84	0.43
1:A:1170:SER:O	1:A:1181:LYS:NZ	2.39	0.43
5:F:300:GLU:CD	4:G:313:THR:HB	2.44	0.43
5:J:402:ALA:O	5:J:406:ILE:HG13	2.18	0.43
6:L:257:CYS:HB3	6:L:258:PRO:HD3	1.99	0.43
4:I:101:VAL:HA	4:I:111:VAL:HG11	2.01	0.43
1:A:2041:ARG:NH2	1:A:2093:GLU:O	2.45	0.43
1:A:884:ILE:HG22	1:A:2170:LEU:HD12	2.01	0.43
1:A:1931:GLU:HG2	1:A:1941:TYR:CE1	2.54	0.43
4:E:214:ASP:HB3	5:F:173:ASP:H	1.83	0.43
5:F:386:ALA:HA	5:F:389:VAL:HG12	2.01	0.42
4:G:346:SER:OG	4:G:350:ILE:O	2.24	0.42
7:M:164:ARG:HG2	7:M:347:SER:OG	2.19	0.42
8:N:236:ARG:NH1	8:N:244:GLU:OE1	2.36	0.42
1:A:1887:PHE:CE1	4:E:201:LYS:HG2	2.54	0.42
3:C:397:ASP:HB3	3:C:398:PRO:HD3	2.00	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:256:ILE:HG23	4:E:257:LEU:HD12	2.01	0.42
1:A:1144:LEU:HB2	1:A:1213:TRP:CE3	2.54	0.42
6:K:190:MET:HG2	6:K:209:VAL:HG21	2.00	0.42
1:A:794:TRP:NE1	1:A:796:GLN:HB3	2.34	0.42
1:A:1938:TYR:CD2	5:F:136:GLU:HG3	2.54	0.42
1:A:2022:VAL:HG21	1:A:2032:LEU:HD22	2.00	0.42
5:F:407:THR:HG21	4:G:61:MET:HG3	2.02	0.42
5:J:60:LEU:HD13	5:J:90:MET:HG2	2.00	0.42
8:N:63:SER:N	8:N:67:ASP:OD2	2.50	0.42
4:G:159:ILE:HD11	4:G:180:LEU:HD11	2.00	0.42
4:I:249:ARG:HG2	4:I:250:PRO:HD2	2.00	0.42
1:A:1962:ARG:HE	2:B:193:LEU:HD22	1.85	0.42
5:J:382:MET:HG2	5:J:421:VAL:HB	2.01	0.42
7:M:219:PRO:HD2	7:M:222:MET:HE2	1.99	0.42
4:E:53:VAL:HG22	4:E:83:ILE:HG23	2.02	0.42
4:E:433:ILE:HD13	4:E:433:ILE:HA	1.90	0.42
1:A:790:LYS:HD3	3:C:401:PRO:HG2	2.00	0.42
1:A:800:PRO:HB2	3:C:412:TYR:HB3	2.01	0.42
1:A:1255:PHE:CZ	1:A:1278:LEU:HB2	2.54	0.42
4:E:394:LEU:HD12	4:E:394:LEU:HA	1.88	0.42
5:F:76:ALA:O	5:F:358:SER:HA	2.20	0.42
5:F:119:LEU:HD11	5:F:308:SER:HB3	2.02	0.42
5:H:166:THR:HG22	5:H:229:ASP:HA	2.01	0.42
5:H:196:ASP:HB3	5:H:199:THR:HG22	2.01	0.42
7:M:279:ALA:O	7:M:282:MET:HG2	2.19	0.42
4:E:157:VAL:HG11	4:E:177:PHE:CD1	2.55	0.42
4:G:40:VAL:O	9:G:501:ADP:N6	2.46	0.42
1:A:1060:VAL:HG12	1:A:1303:PHE:HZ	1.85	0.42
1:A:1087:LEU:HD13	1:A:1128:ALA:HA	2.02	0.42
1:A:1412:MET:HB2	4:I:286:TYR:CZ	2.55	0.42
5:F:42:ALA:HA	5:F:46:MET:O	2.20	0.41
6:L:242:LEU:N	6:L:246:GLN:O	2.42	0.41
7:M:181:PRO:HG2	7:M:188:LEU:HB2	2.01	0.41
4:E:122:LEU:HD23	4:E:124:ILE:HD11	2.02	0.41
4:G:369:GLN:O	4:G:373:GLN:HG3	2.20	0.41
5:H:335:ILE:HD11	5:H:342:SER:HB2	2.02	0.41
1:A:855:GLU:HG2	1:A:859:LYS:HE3	2.03	0.41
1:A:1910:LEU:HD22	1:A:1915:ARG:HD2	2.02	0.41
6:L:209:VAL:HA	6:L:212:ILE:HG22	2.02	0.41
2:B:303:ASP:HB3	2:B:306:THR:HG22	2.02	0.41
1:A:1067:ILE:HD11	1:A:1108:LYS:HG3	2.02	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:M:23:VAL:O	7:M:36:ASP:HA	2.21	0.41
8:N:99:PRO:HA	8:N:111:PHE:O	2.21	0.41
1:A:794:TRP:CE2	1:A:796:GLN:HB3	2.55	0.41
1:A:1278:LEU:HD21	1:A:1288:TYR:CD2	2.55	0.41
1:A:2050:TYR:CE2	1:A:2103:PHE:HB2	2.56	0.41
4:E:304:VAL:HG11	4:E:329:PHE:CD1	2.55	0.41
4:E:395:GLY:O	4:E:399:THR:HG23	2.20	0.41
5:F:126:SER:HB2	5:F:322:PRO:HG3	2.01	0.41
7:M:74:ALA:O	7:M:79:ARG:NH2	2.40	0.41
1:A:1850:PRO:HA	1:A:1851:PRO:HD3	1.92	0.41
4:G:25:GLY:O	4:G:33:LYS:HG3	2.20	0.41
7:M:218:VAL:HB	7:M:291:ASN:HB3	2.01	0.41
1:A:1922:GLN:HG3	1:A:1923:MET:HG3	2.01	0.41
1:A:2010:ILE:HG22	1:A:2016:ILE:HD11	2.03	0.41
1:A:2235:TYR:CD2	3:C:527:ARG:HG3	2.55	0.41
4:E:64:ARG:HA	4:E:64:ARG:HD3	1.82	0.41
4:E:140:PRO:HA	4:E:157:VAL:HG12	2.03	0.41
4:G:299:LEU:O	4:G:327:VAL:HA	2.21	0.41
5:H:31:LEU:HB3	5:H:33:LEU:HD13	2.02	0.41
4:I:132:GLU:OE2	4:I:203:GLN:NE2	2.43	0.41
4:I:341:THR:HG21	4:I:344:ILE:HD12	2.02	0.41
6:L:131:ALA:HB1	6:L:356:TRP:HB3	2.03	0.41
5:F:449:ALA:HB1	4:G:71:PRO:HB3	2.02	0.41
4:G:96:MET:HE2	4:G:299:LEU:HD11	2.02	0.41
4:I:135:VAL:O	4:I:188:GLY:N	2.34	0.41
5:J:400:ARG:NH2	9:J:501:ADP:O1B	2.53	0.41
6:L:70:PRO:HB3	6:L:81:ASP:HB2	2.02	0.41
6:L:286:ASP:O	6:L:290:ARG:HG3	2.20	0.41
1:A:1424:ARG:NH2	1:A:1766:VAL:O	2.53	0.40
2:B:218:THR:HG22	5:F:209:PHE:HZ	1.86	0.40
4:I:173:ASP:OD1	4:I:174:PRO:HD2	2.21	0.40
5:J:334:ARG:HA	5:J:341:GLN:HA	2.03	0.40
6:K:196:ARG:HD2	6:K:253:GLU:OE2	2.21	0.40
1:A:1171:TYR:CE2	1:A:1178:LEU:HD22	2.56	0.40
1:A:2280:LEU:HD12	1:A:2280:LEU:HA	1.95	0.40
1:A:2281:PRO:HA	1:A:2282:PRO:HD3	1.98	0.40
4:E:72:PRO:HG2	5:J:451:LEU:HD21	2.03	0.40
4:E:443:SER:HG	5:F:344:HIS:CE1	2.39	0.40
4:I:157:VAL:HB	4:I:172:LEU:HB2	2.02	0.40
1:A:1388:LEU:HD13	4:E:247:ASN:OD1	2.21	0.40
1:A:1465:GLN:NE2	1:A:1478:VAL:HA	2.36	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:E:130:VAL:HG21	4:E:192:TYR:CZ	2.57	0.40
5:F:19:ILE:HD11	4:G:283:VAL:HG11	2.02	0.40
5:J:164:LYS:HA	5:J:169:GLU:HA	2.03	0.40
1:A:799:LEU:HD22	8:N:222:HIS:HE1	1.87	0.40
2:B:210:PRO:HB3	2:B:273:THR:HG21	2.03	0.40
5:F:61:GLU:OE1	5:F:64:ARG:NH2	2.48	0.40
2:B:283:PRO:HA	2:B:284:PRO:HD3	1.93	0.40
4:E:163:THR:OG1	4:E:164:ALA:N	2.54	0.40
4:I:214:ASP:HB2	5:J:173:ASP:H	1.87	0.40
5:J:342:SER:OG	5:J:346:ILE:O	2.22	0.40
6:K:70:PRO:HB3	6:K:81:ASP:HB2	2.04	0.40
6:K:189:LEU:HA	6:K:192:ILE:HG12	2.02	0.40
7:M:224:ALA:HA	7:M:240:LYS:HE3	2.03	0.40
7:M:391:PHE:O	7:M:395:ILE:HG12	2.21	0.40

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	A	991/3159 (31%)	978 (99%)	13 (1%)	0	100	100
2	B	129/364 (35%)	126 (98%)	3 (2%)	0	100	100
3	C	108/836 (13%)	106 (98%)	2 (2%)	0	100	100
4	E	418/456 (92%)	412 (99%)	6 (1%)	0	100	100
4	G	423/456 (93%)	415 (98%)	8 (2%)	0	100	100
4	I	421/456 (92%)	416 (99%)	5 (1%)	0	100	100
5	F	431/463 (93%)	419 (97%)	12 (3%)	0	100	100
5	H	424/463 (92%)	418 (99%)	6 (1%)	0	100	100
5	J	406/463 (88%)	397 (98%)	9 (2%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	K	368/375 (98%)	361 (98%)	7 (2%)	0	100	100
6	L	357/375 (95%)	353 (99%)	4 (1%)	0	100	100
7	M	402/429 (94%)	398 (99%)	4 (1%)	0	100	100
8	N	204/467 (44%)	200 (98%)	4 (2%)	0	100	100
All	All	5082/8762 (58%)	4999 (98%)	83 (2%)	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	A	898/2663 (34%)	898 (100%)	0	100	100
2	B	119/312 (38%)	119 (100%)	0	100	100
3	C	97/738 (13%)	97 (100%)	0	100	100
4	E	356/387 (92%)	356 (100%)	0	100	100
4	G	365/387 (94%)	365 (100%)	0	100	100
4	I	359/387 (93%)	359 (100%)	0	100	100
5	F	367/390 (94%)	367 (100%)	0	100	100
5	H	361/390 (93%)	361 (100%)	0	100	100
5	J	348/390 (89%)	348 (100%)	0	100	100
6	K	313/318 (98%)	313 (100%)	0	100	100
6	L	307/318 (96%)	307 (100%)	0	100	100
7	M	347/364 (95%)	347 (100%)	0	100	100
8	N	186/400 (46%)	186 (100%)	0	100	100
All	All	4423/7444 (59%)	4423 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1125	GLN
1	A	1353	HIS
1	A	1365	GLN
1	A	1425	HIS
1	A	1875	GLN
1	A	1974	HIS
1	A	2017	HIS
1	A	2057	GLN
4	E	34	GLN
4	E	262	GLN
4	E	348	HIS
4	E	373	GLN
4	E	408	GLN
5	F	146	GLN
4	G	44	ASN
4	G	393	HIS
4	G	408	GLN
5	H	233	GLN
5	H	369	GLN
4	I	156	HIS
4	I	408	GLN
5	J	302	HIS
5	J	422	GLN
6	K	88	HIS
6	K	92	ASN
6	L	92	ASN
7	M	176	HIS
7	M	408	GLN
8	N	130	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
9	ADP	I	501	10	24,29,29	0.86	0	29,45,45	1.08	1 (3%)
9	ADP	J	501	10	24,29,29	0.86	1 (4%)	29,45,45	1.15	2 (6%)
11	ATP	M	501	10	28,33,33	0.65	0	34,52,52	0.97	2 (5%)
9	ADP	E	501	10	24,29,29	0.88	1 (4%)	29,45,45	1.15	2 (6%)
9	ADP	H	501	10	24,29,29	0.90	1 (4%)	29,45,45	1.34	4 (13%)
9	ADP	G	501	10	24,29,29	0.90	1 (4%)	29,45,45	1.08	2 (6%)
9	ADP	L	401	10	24,29,29	0.86	0	29,45,45	1.36	4 (13%)
9	ADP	F	501	10	24,29,29	0.90	0	29,45,45	1.14	2 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	ADP	I	501	10	-	3/12/32/32	0/3/3/3
9	ADP	J	501	10	-	2/12/32/32	0/3/3/3
11	ATP	M	501	10	-	2/18/38/38	0/3/3/3
9	ADP	E	501	10	-	7/12/32/32	0/3/3/3
9	ADP	H	501	10	-	1/12/32/32	0/3/3/3
9	ADP	G	501	10	-	2/12/32/32	0/3/3/3
9	ADP	L	401	10	-	0/12/32/32	0/3/3/3
9	ADP	F	501	10	-	5/12/32/32	0/3/3/3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	H	501	ADP	O4'-C1'	2.25	1.43	1.40

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	E	501	ADP	O4'-C1'	2.15	1.43	1.40
9	G	501	ADP	O4'-C1'	2.10	1.43	1.40
9	J	501	ADP	O4'-C1'	2.07	1.43	1.40

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
11	M	501	ATP	C4'-O4'-C1'	-4.35	105.94	109.92
9	L	401	ADP	N3-C2-N1	-3.68	123.68	128.67
9	H	501	ADP	N3-C2-N1	-3.63	123.74	128.67
9	E	501	ADP	N3-C2-N1	-3.57	123.82	128.67
9	L	401	ADP	C4'-O4'-C1'	-3.57	106.65	109.92
9	F	501	ADP	N3-C2-N1	-3.49	123.93	128.67
9	J	501	ADP	N3-C2-N1	-3.45	123.99	128.67
9	G	501	ADP	N3-C2-N1	-3.33	124.15	128.67
9	I	501	ADP	N3-C2-N1	-3.26	124.24	128.67
9	H	501	ADP	O4'-C1'-N9	2.82	112.49	108.75
9	F	501	ADP	C4-C5-N7	-2.77	106.41	109.34
9	H	501	ADP	C4-C5-N7	-2.75	106.43	109.34
9	J	501	ADP	C4-C5-N7	-2.68	106.51	109.34
9	L	401	ADP	C4-C5-N7	-2.58	106.61	109.34
9	G	501	ADP	C4-C5-N7	-2.56	106.63	109.34
9	E	501	ADP	C4-C5-N7	-2.54	106.65	109.34
9	H	501	ADP	C5'-C4'-C3'	-2.36	106.72	115.21
11	M	501	ATP	C5-C6-N6	2.32	123.85	120.31
9	L	401	ADP	O4'-C1'-N9	2.20	111.67	108.75

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	E	501	ADP	PA-O3A-PB-O2B
9	E	501	ADP	C5'-O5'-PA-O1A
9	E	501	ADP	C5'-O5'-PA-O3A
9	E	501	ADP	O4'-C4'-C5'-O5'
9	G	501	ADP	PA-O3A-PB-O3B
9	H	501	ADP	PA-O3A-PB-O2B
9	I	501	ADP	C5'-O5'-PA-O2A
9	I	501	ADP	C5'-O5'-PA-O3A
9	J	501	ADP	PA-O3A-PB-O2B
11	M	501	ATP	PB-O3B-PG-O2G
9	E	501	ADP	C3'-C4'-C5'-O5'

Continued on next page...

Continued from previous page...

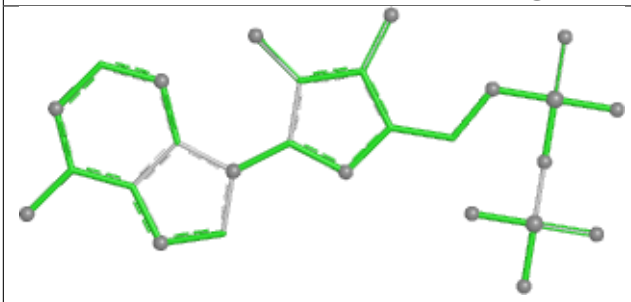
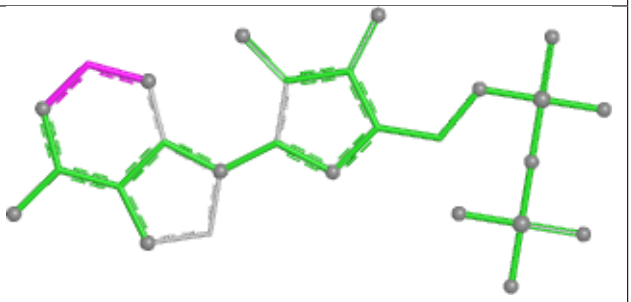
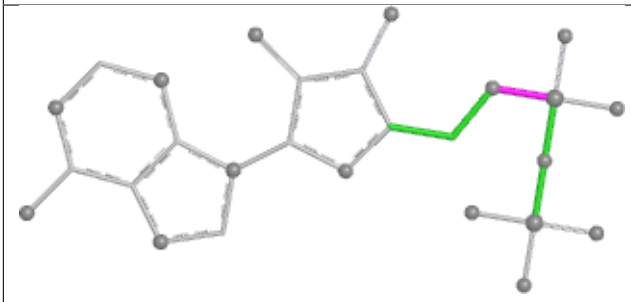
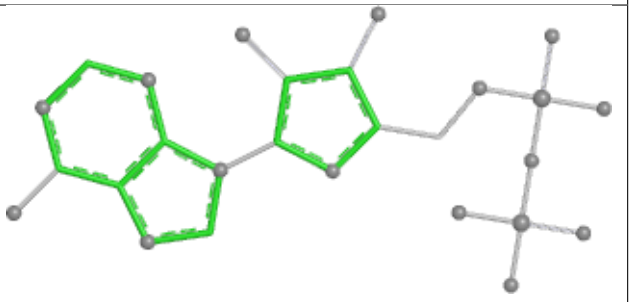
Mol	Chain	Res	Type	Atoms
9	F	501	ADP	O4'-C4'-C5'-O5'
9	F	501	ADP	PA-O3A-PB-O1B
9	J	501	ADP	PA-O3A-PB-O1B
9	G	501	ADP	O4'-C4'-C5'-O5'
9	F	501	ADP	PA-O3A-PB-O2B
9	E	501	ADP	C5'-O5'-PA-O2A
9	I	501	ADP	C5'-O5'-PA-O1A
9	E	501	ADP	PA-O3A-PB-O3B
9	F	501	ADP	PB-O3A-PA-O1A
9	F	501	ADP	PB-O3A-PA-O2A
11	M	501	ATP	PG-O3B-PB-O2B

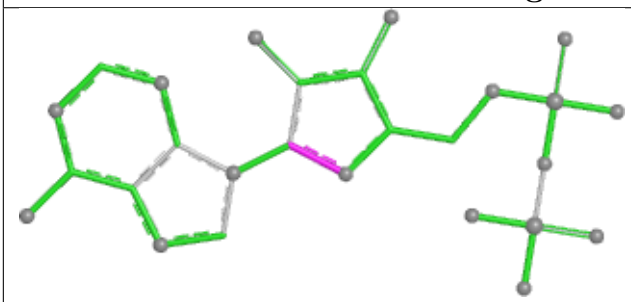
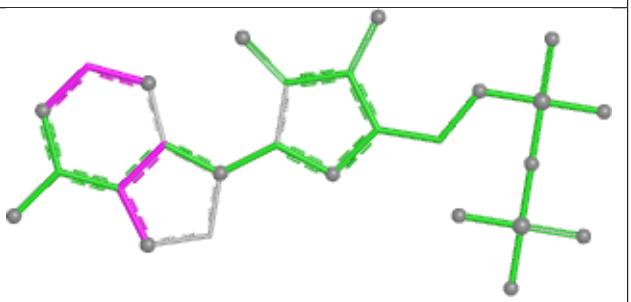
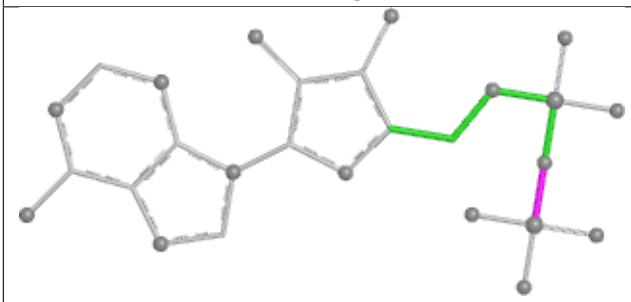
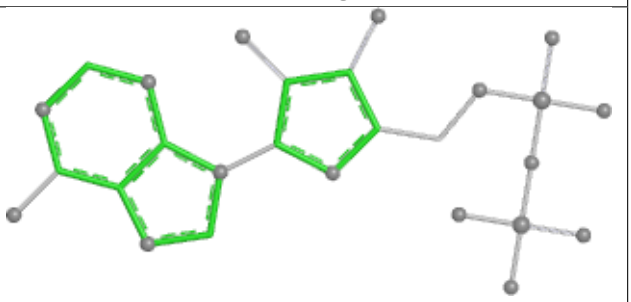
There are no ring outliers.

4 monomers are involved in 9 short contacts:

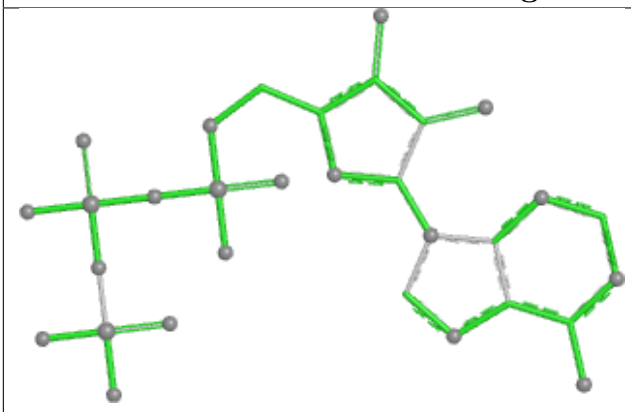
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	I	501	ADP	2	0
9	J	501	ADP	2	0
9	E	501	ADP	2	0
9	G	501	ADP	3	0

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.

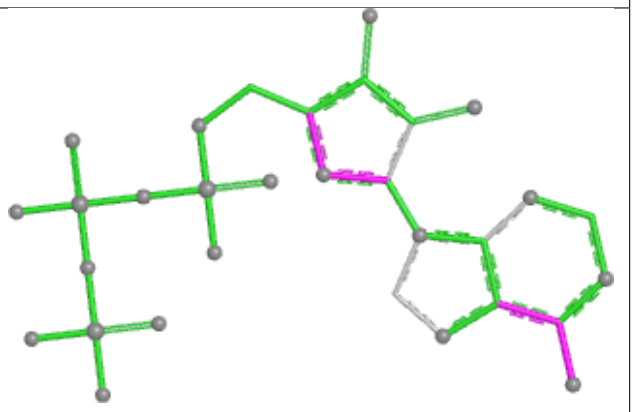
Ligand ADP I 501	
	
Bond lengths	Bond angles
	
Torsions	Rings

Ligand ADP J 501	
	
Bond lengths	Bond angles
	
Torsions	Rings

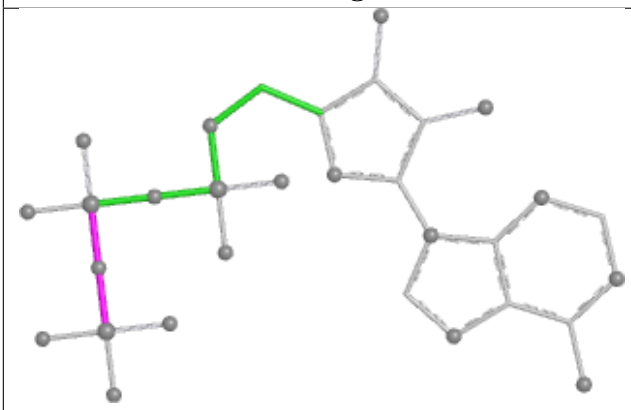
Ligand ATP M 501



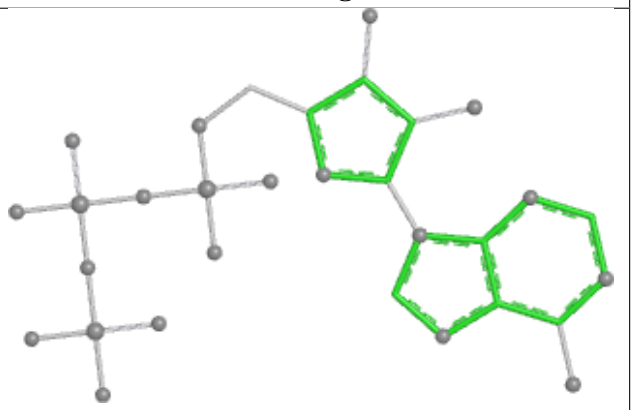
Bond lengths



Bond angles

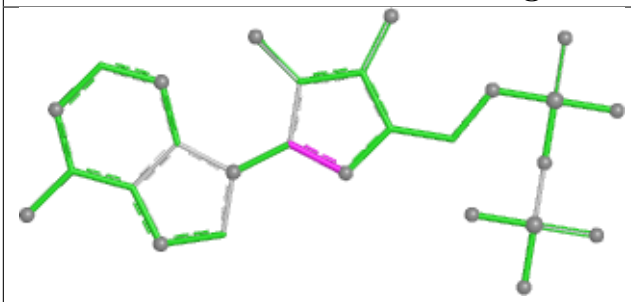


Torsions

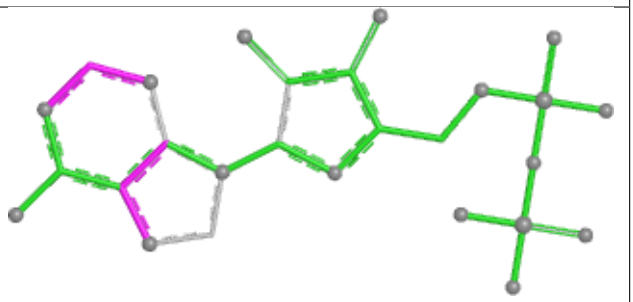


Rings

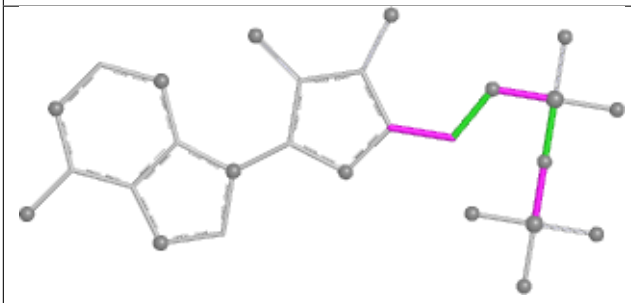
Ligand ADP E 501



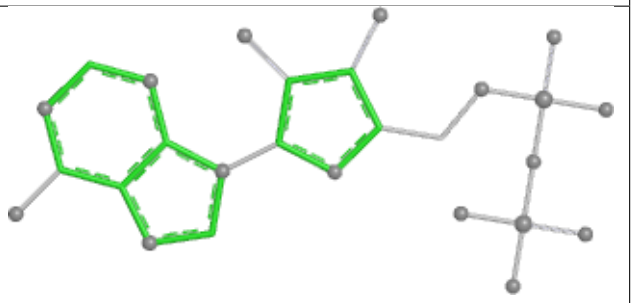
Bond lengths



Bond angles

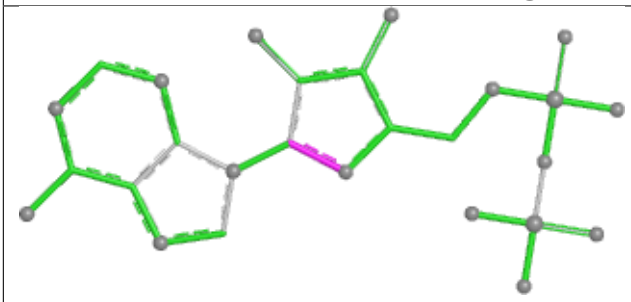


Torsions

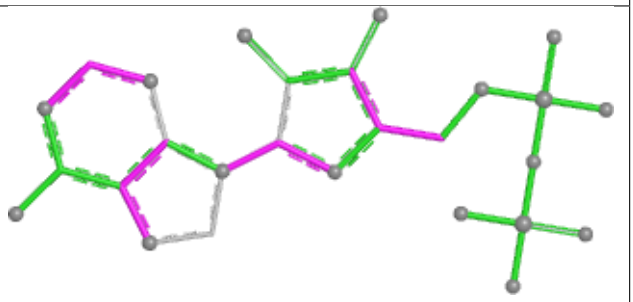


Rings

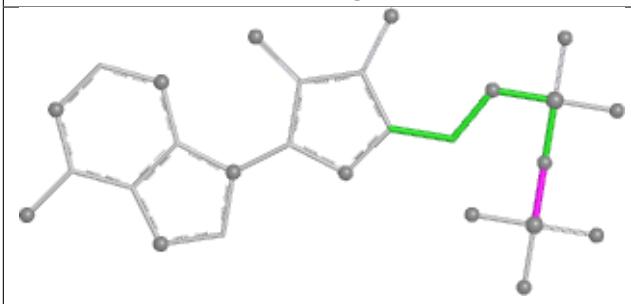
Ligand ADP H 501



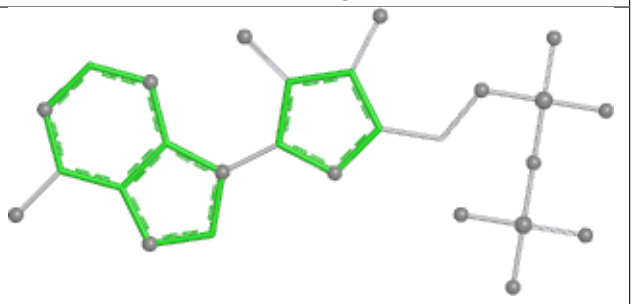
Bond lengths



Bond angles

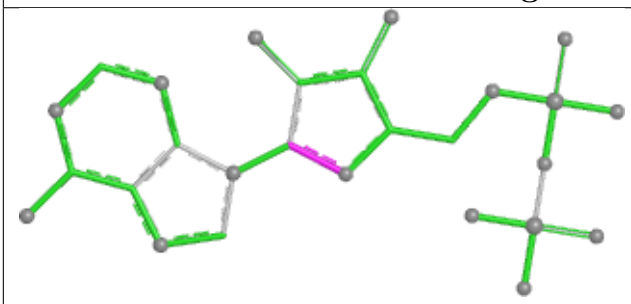


Torsions

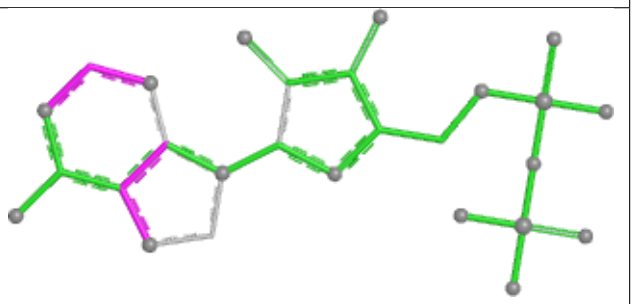


Rings

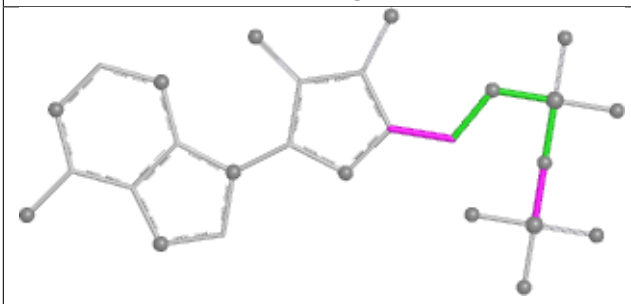
Ligand ADP G 501



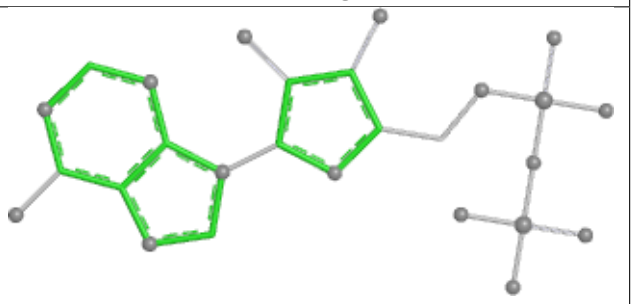
Bond lengths



Bond angles

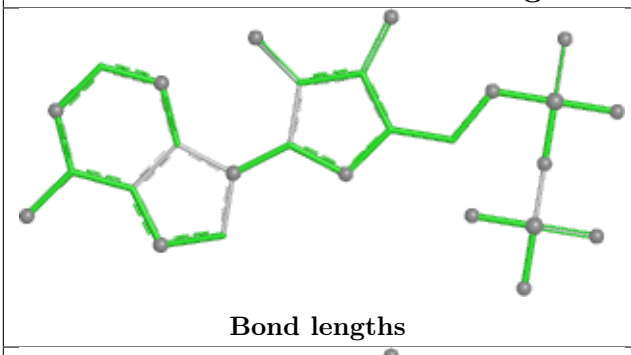


Torsions

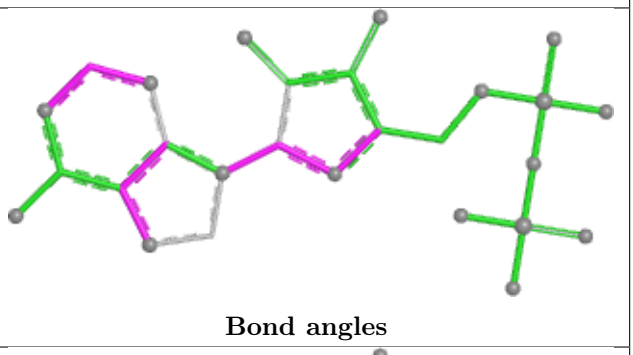


Rings

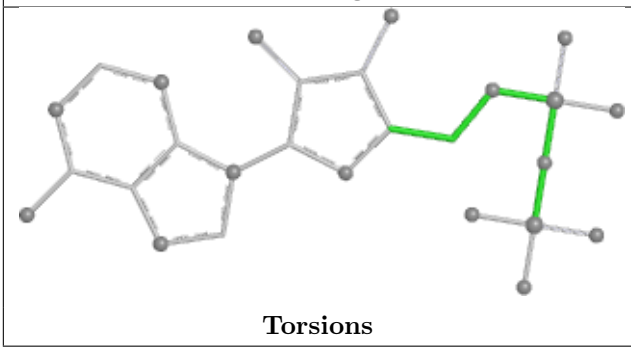
Ligand ADP L 401



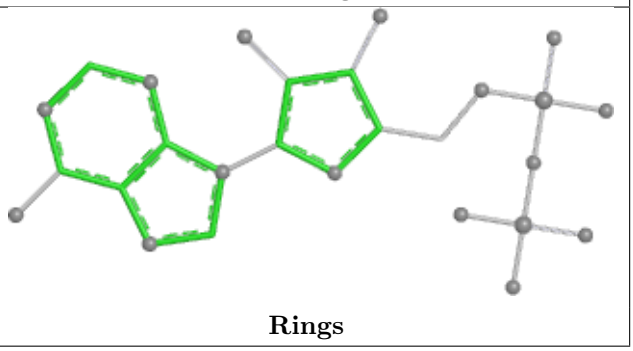
Bond lengths



Bond angles

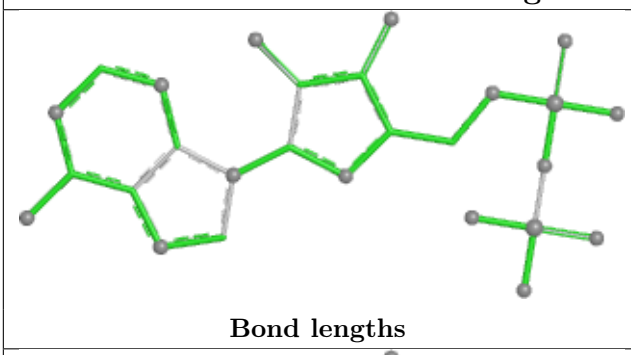


Torsions

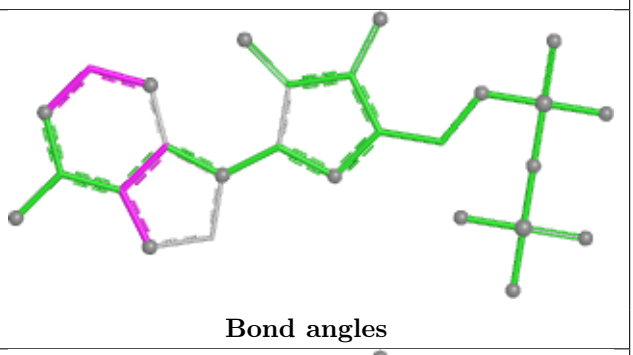


Rings

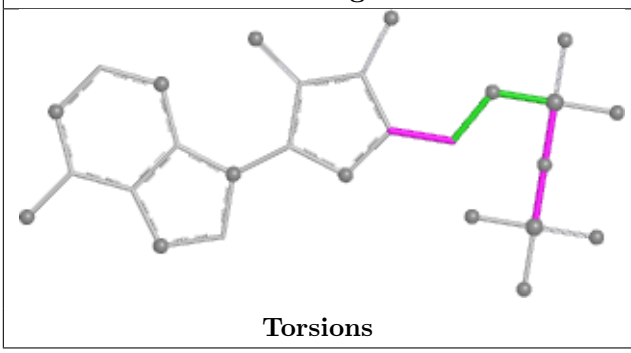
Ligand ADP F 501



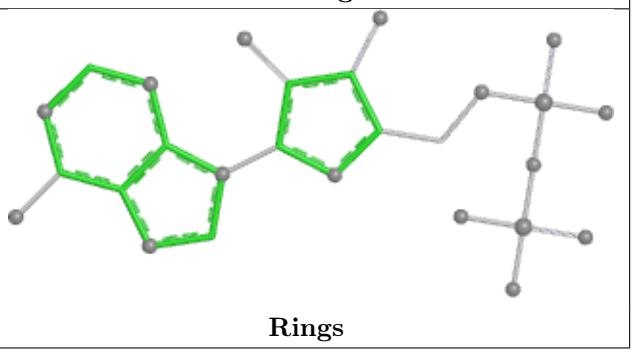
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

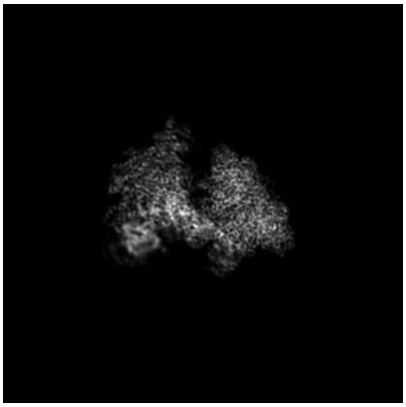
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-45386. These allow visual inspection of the internal detail of the map and identification of artifacts.

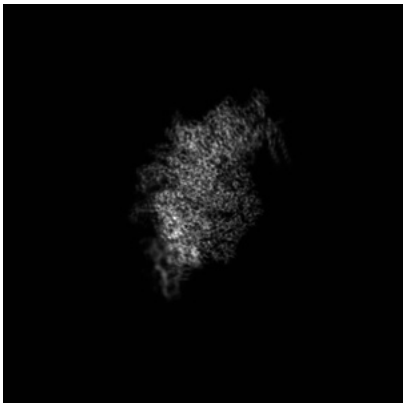
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

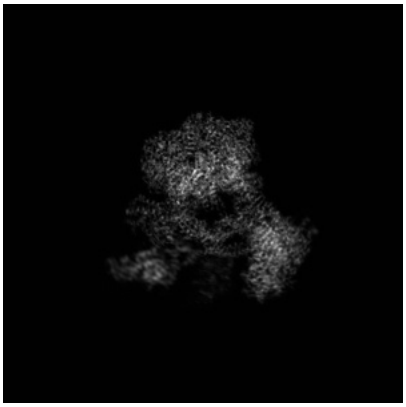
6.1.1 Primary map



X



Y



Z

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

6.2 Central slices

6.2.1 Primary map

X Index: 192

Y Index: 192

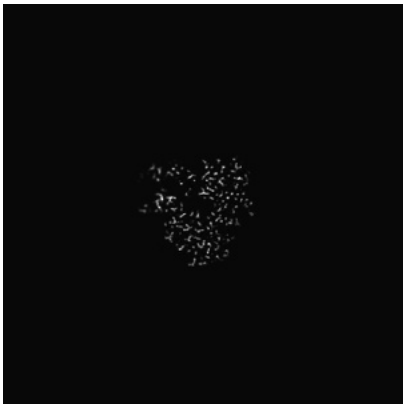
Z Index: 192

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: 173



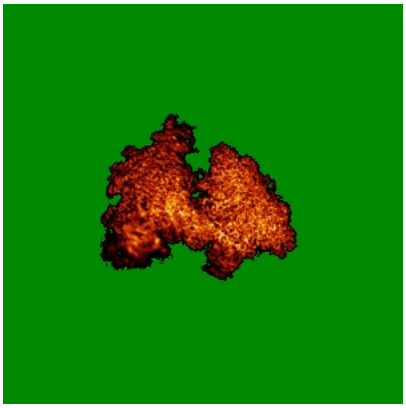
Y Index: 225

Z Index: 171

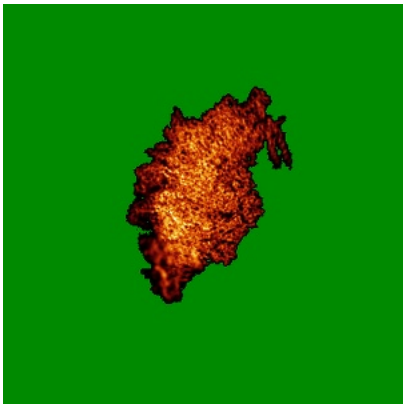
The images above show the largest variance slices of the map in three orthogonal directions.

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

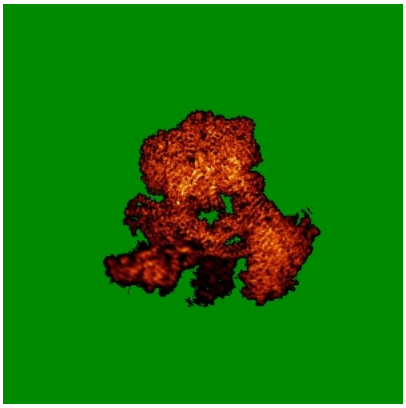
6.4.1 Primary map



X



Y

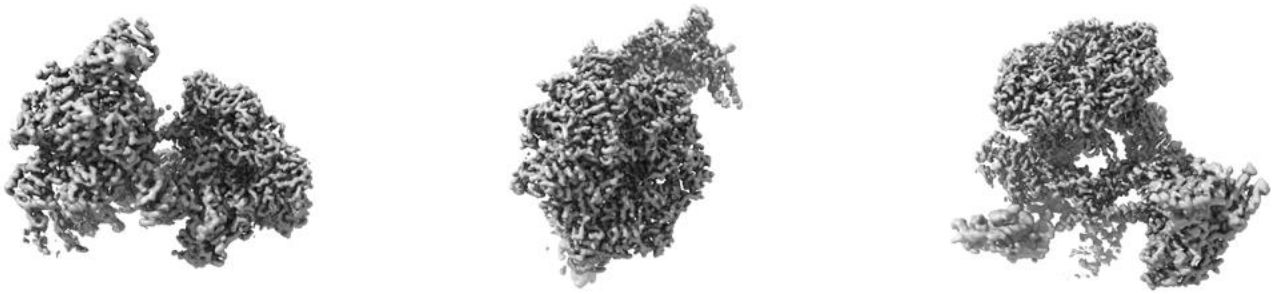


Z

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 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

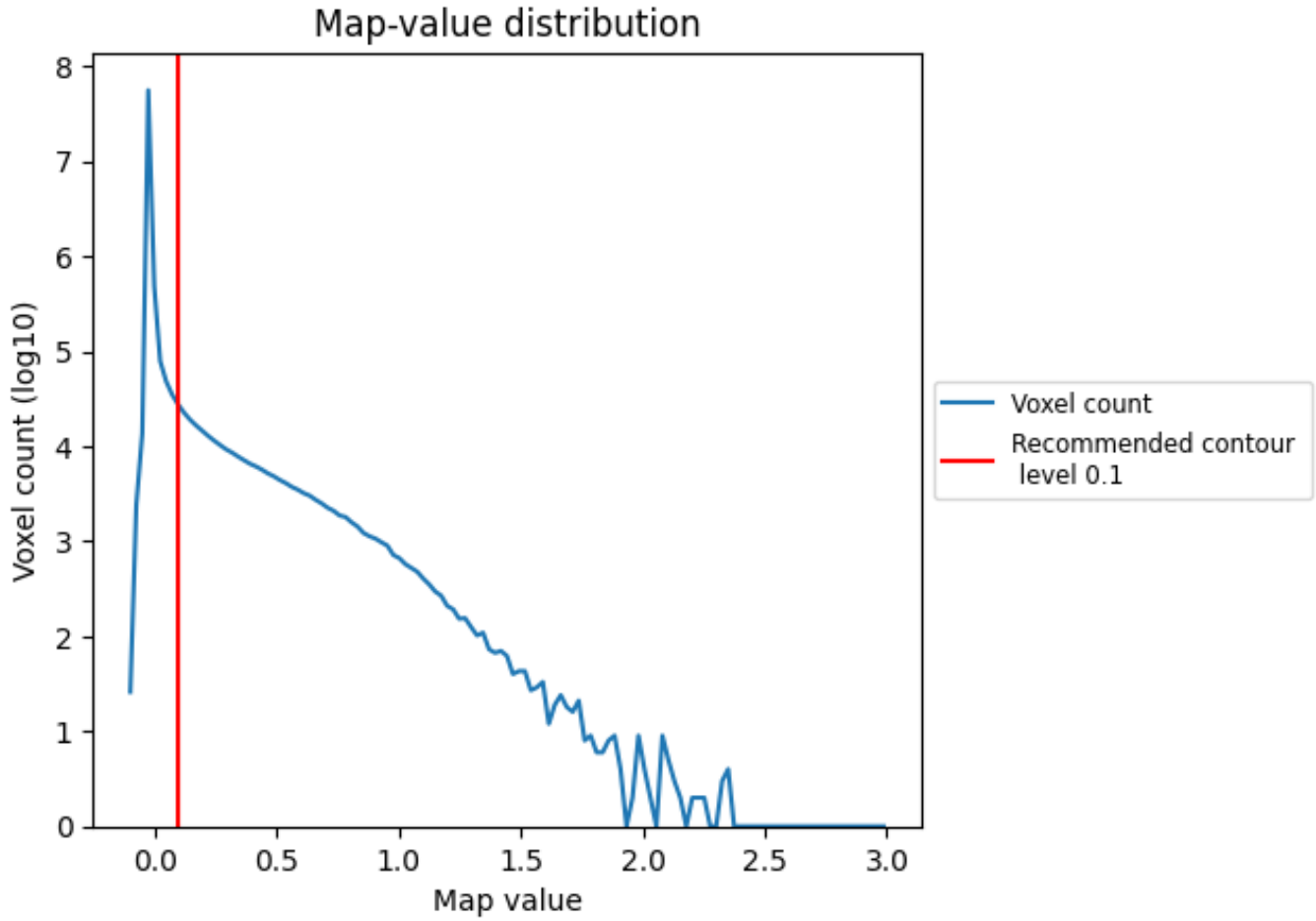
6.6 Mask visualisation (i)

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

7 Map analysis

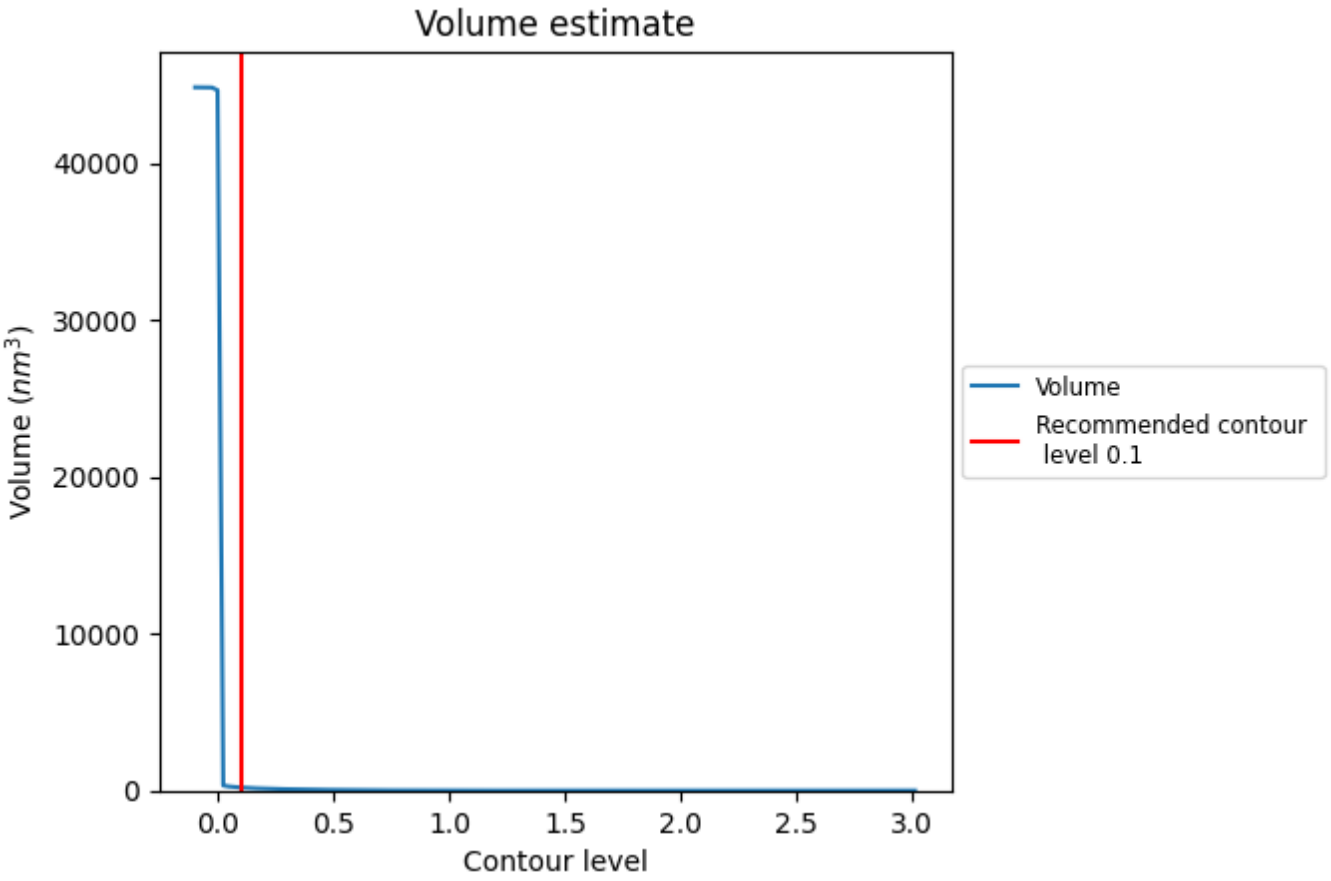
This section contains the results of statistical analysis of the map.

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.

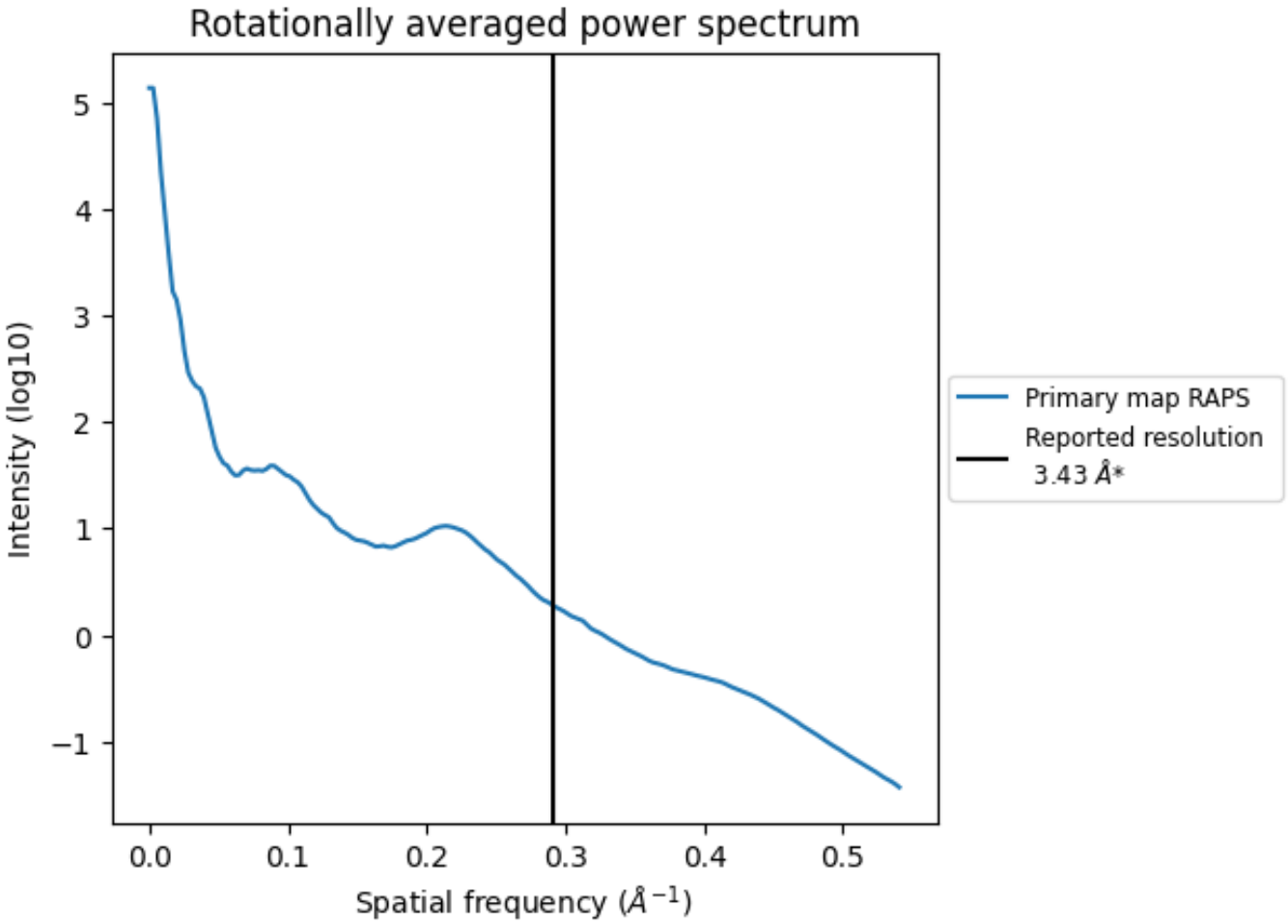
7.2 Volume estimate



The volume at the recommended contour level is 193 nm^3; this corresponds to an approximate mass of 174 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 0.292 $Å^{-1}$

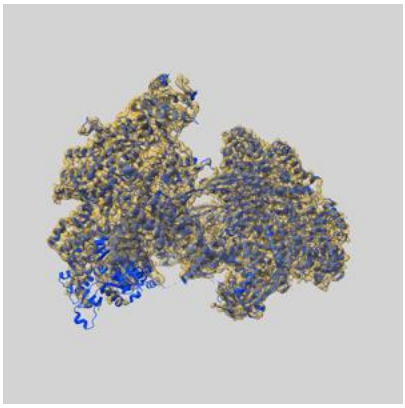
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

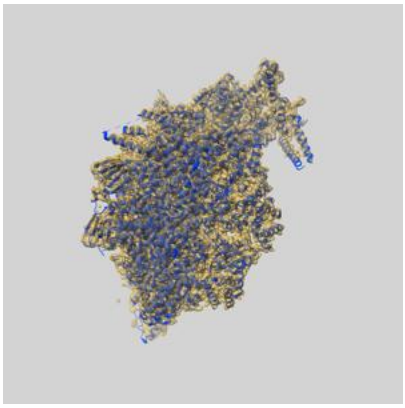
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-45386 and PDB model 9CAC. Per-residue inclusion information can be found in section 3 on page 8.

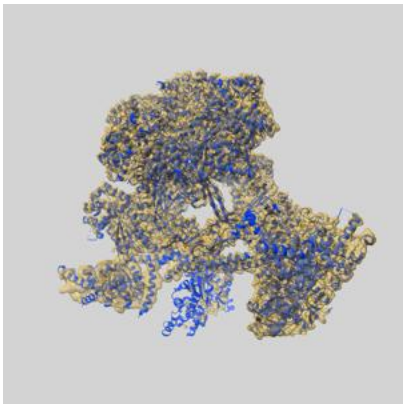
9.1 Map-model overlay



X



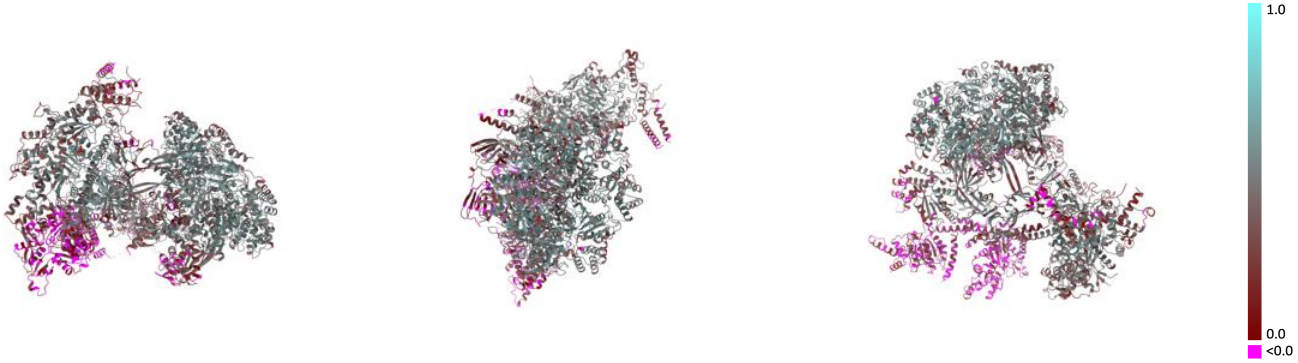
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

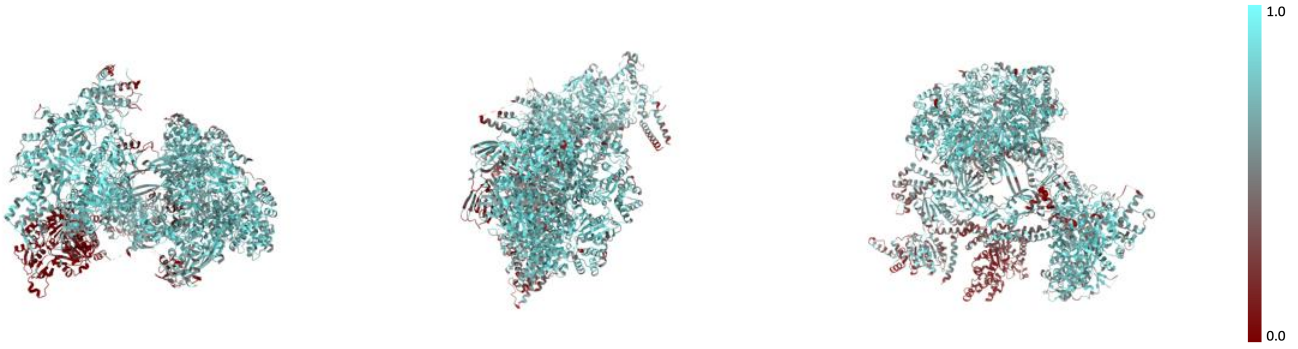
9.2 Q-score mapped to coordinate model (i)



X Y Z

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

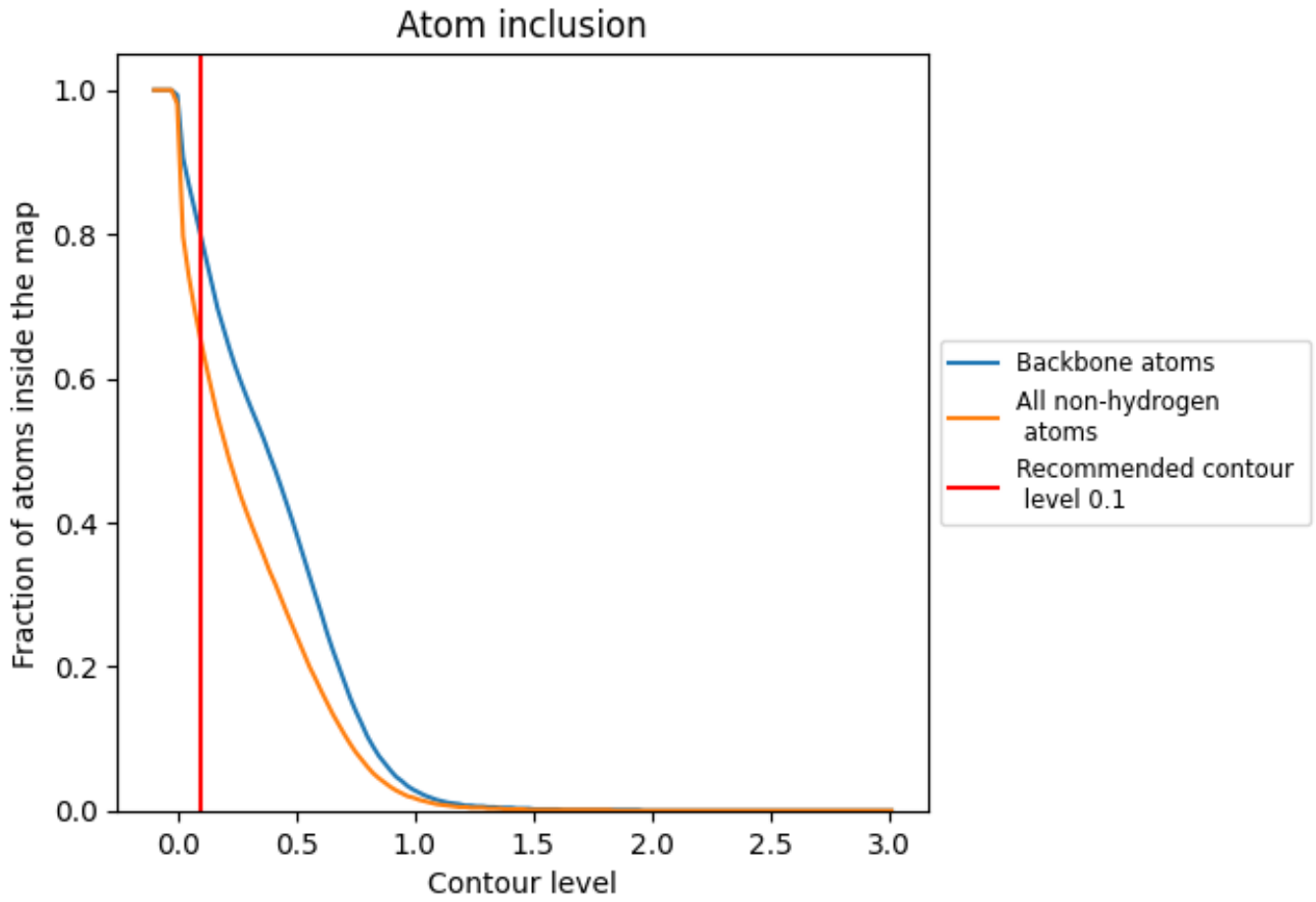
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).

9.4 Atom inclusion (i)



At the recommended contour level, 80% of all backbone atoms, 65% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6500	0.3620
A	0.5650	0.2310
B	0.6090	0.2850
C	0.6310	0.3580
E	0.7540	0.4700
F	0.7530	0.4690
G	0.7410	0.4580
H	0.7480	0.4600
I	0.7380	0.4450
J	0.6890	0.4160
K	0.0650	-0.0100
L	0.7630	0.4300
M	0.7600	0.4350
N	0.6680	0.3540