wwPDB EM Validation Summary Report

Jul 15, 2023 – 01:08 PM EDT

PDB ID	:	8EOG
EMDB ID	:	EMD-28375
Title	:	Structure of the human L-type voltage-gated calcium channel Cav1.2 complexed with L-leucine
Authors	:	Chen, Z.; Mondal, A.; Abderemane-Ali, F.; Minor, D.L.
Deposited on	:	2022-10-03
Resolution	:	3.30 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*
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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:

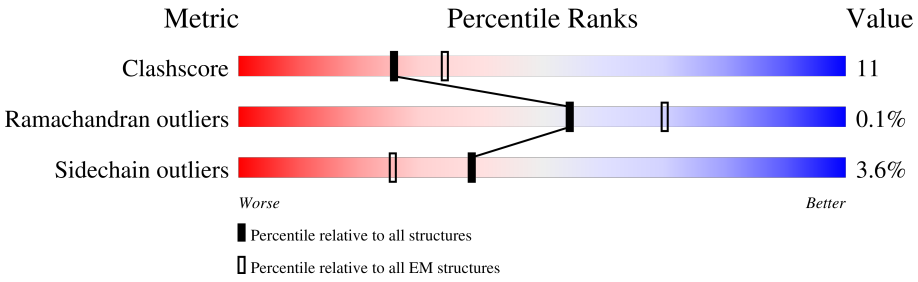
EMDB validation analysis	:	0.0.1.dev50
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.34

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 3.30 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

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	D	1050	75% 16% • 9%
2	K	1499	25% 57% 26% • 15%
3	C	191	100% 68% 31% •
4	A	3	33% 33% 33%
5	B	2	50% 50%
5	E	2	50% 50%

2 Entry composition

There are 13 unique types of molecules in this entry. The entry contains 19729 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 Voltage-dependent calcium channel subunit alpha-2/delta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	D	955	7630	4837	1282	1480	31	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	?	-	SER	deletion	UNP P13806

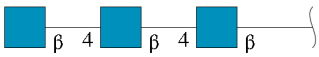
- Molecule 2 is a protein called Isoform 20 of Voltage-dependent L-type calcium channel subunit alpha-1C.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	K	1270	10230	6729	1673	1761	67	0	0

- Molecule 3 is a protein called Voltage-dependent L-type calcium channel subunit beta-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	191	1518	964	266	280	8	0	0

- Molecule 4 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

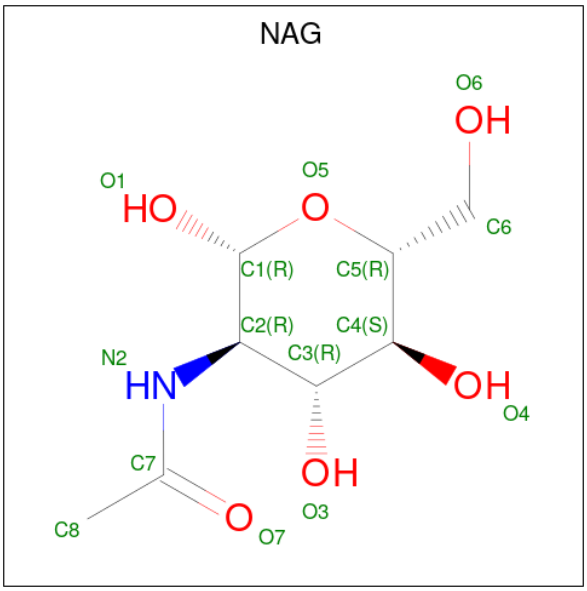


Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	A	3	42	24	3	15	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms	AltConf	Trace
5	B	2	Total C N O 28 16 2 10	0	0
5	E	2	Total C N O 28 16 2 10	0	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	AltConf
6	D	1	Total C N O 14 8 1 5	0
6	D	1	Total C N O 14 8 1 5	0
6	D	1	Total C N O 14 8 1 5	0
6	D	1	Total C N O 14 8 1 5	0
6	D	1	Total C N O 14 8 1 5	0

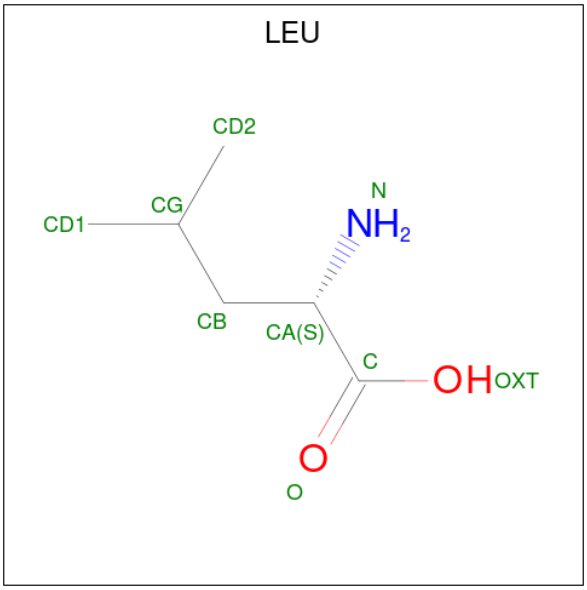
- Molecule 7 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	AltConf
7	D	1	Total Ca 1 1	0
7	K	2	Total Ca 2 2	0

- Molecule 8 is SODIUM ION (three-letter code: NA) (formula: Na).

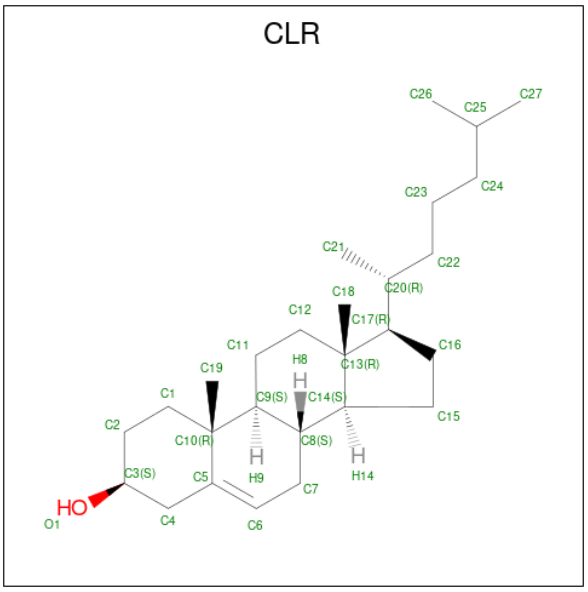
Mol	Chain	Residues	Atoms	AltConf
8	D	1	Total Na 1 1	0

- Molecule 9 is LEUCINE (three-letter code: LEU) (formula: $C_6H_{13}NO_2$).



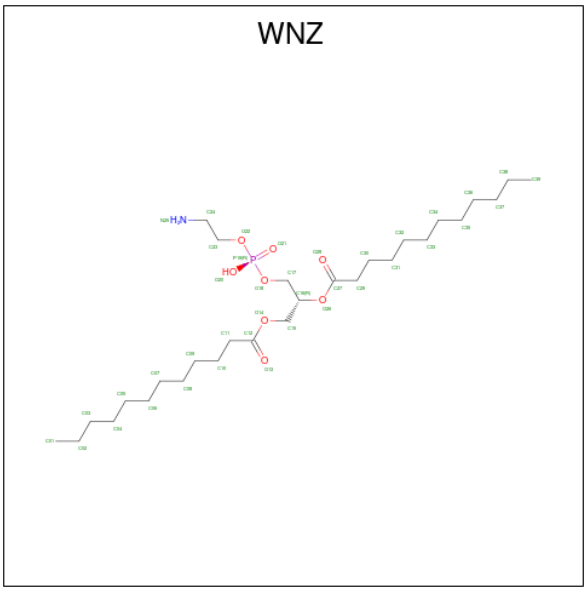
Mol	Chain	Residues	Atoms	AltConf
9	D	1	Total C N O 9 6 1 2	0

- Molecule 10 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).



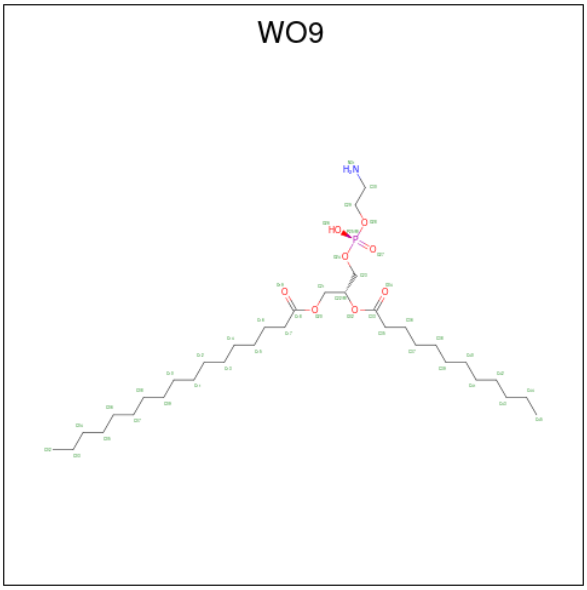
Mol	Chain	Residues	Atoms	AltConf
10	K	1	Total C O 28 27 1	0
10	K	1	Total C O 28 27 1	0
10	K	1	Total C O 28 27 1	0

- Molecule 11 is (2R)-3-{[(R)-(2-aminoethoxy)(hydroxy)phosphoryl]oxy}-2-(dodecanoyloxy)propyl dodecanoate (three-letter code: WNZ) (formula: $C_{29}H_{58}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
11	K	1	Total	C	N	O	P	0
			39	29	1	8	1	

- Molecule 12 is (2R)-3-{[(R)-(2-aminoethoxy)(hydroxy)phosphoryl]oxy}-2-(dodecanoyloxy)propyl heptadecanoate (three-letter code: WO9) (formula: $C_{34}H_{68}NO_8P$).



Mol	Chain	Residues	Atoms					AltConf
12	K	1	Total	C	N	O	P	0
			44	34	1	8	1	

- Molecule 13 is water.

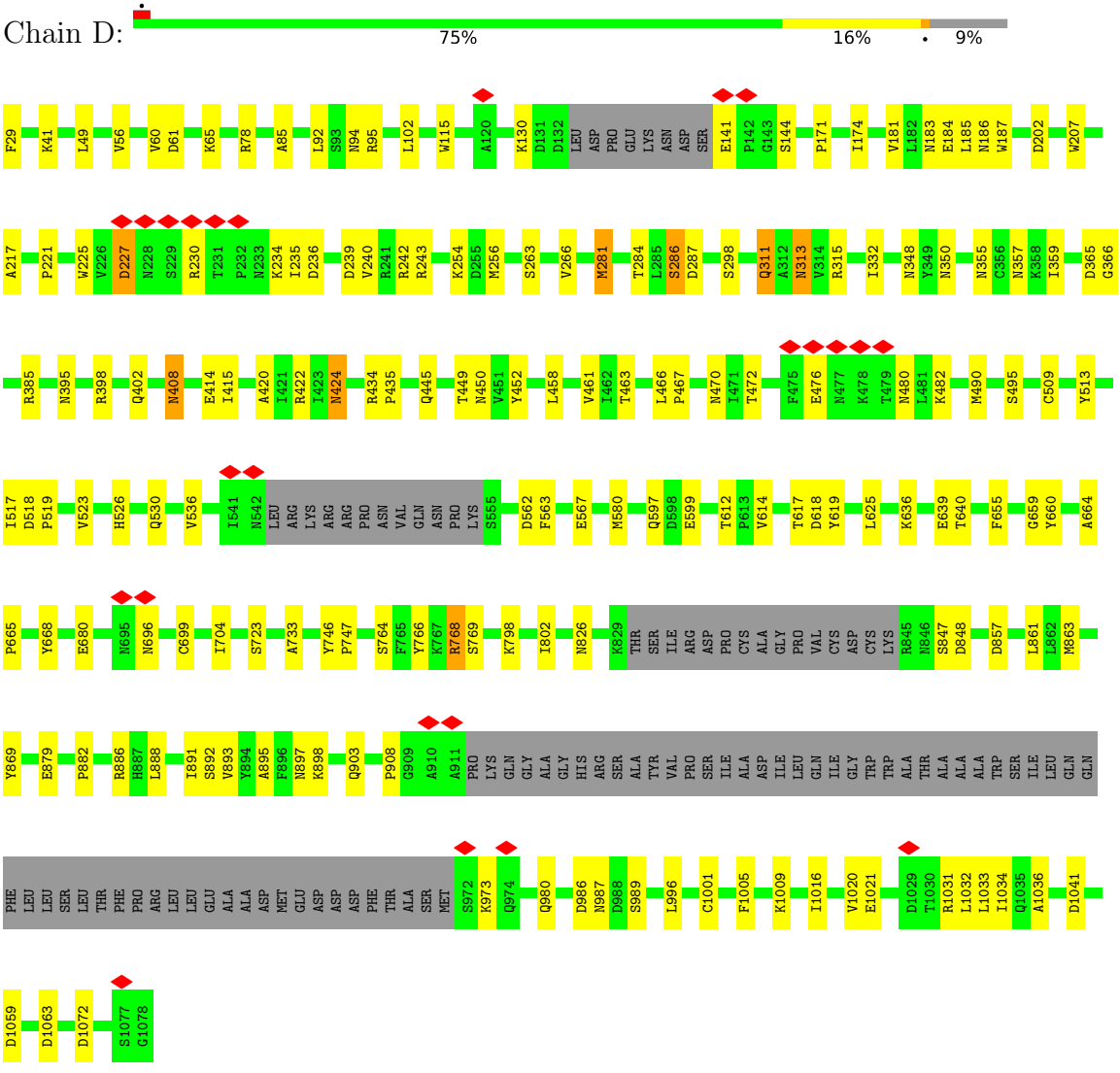
Mol	Chain	Residues	Atoms		AltConf
13	K	3	Total	O	0
			3	3	

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.

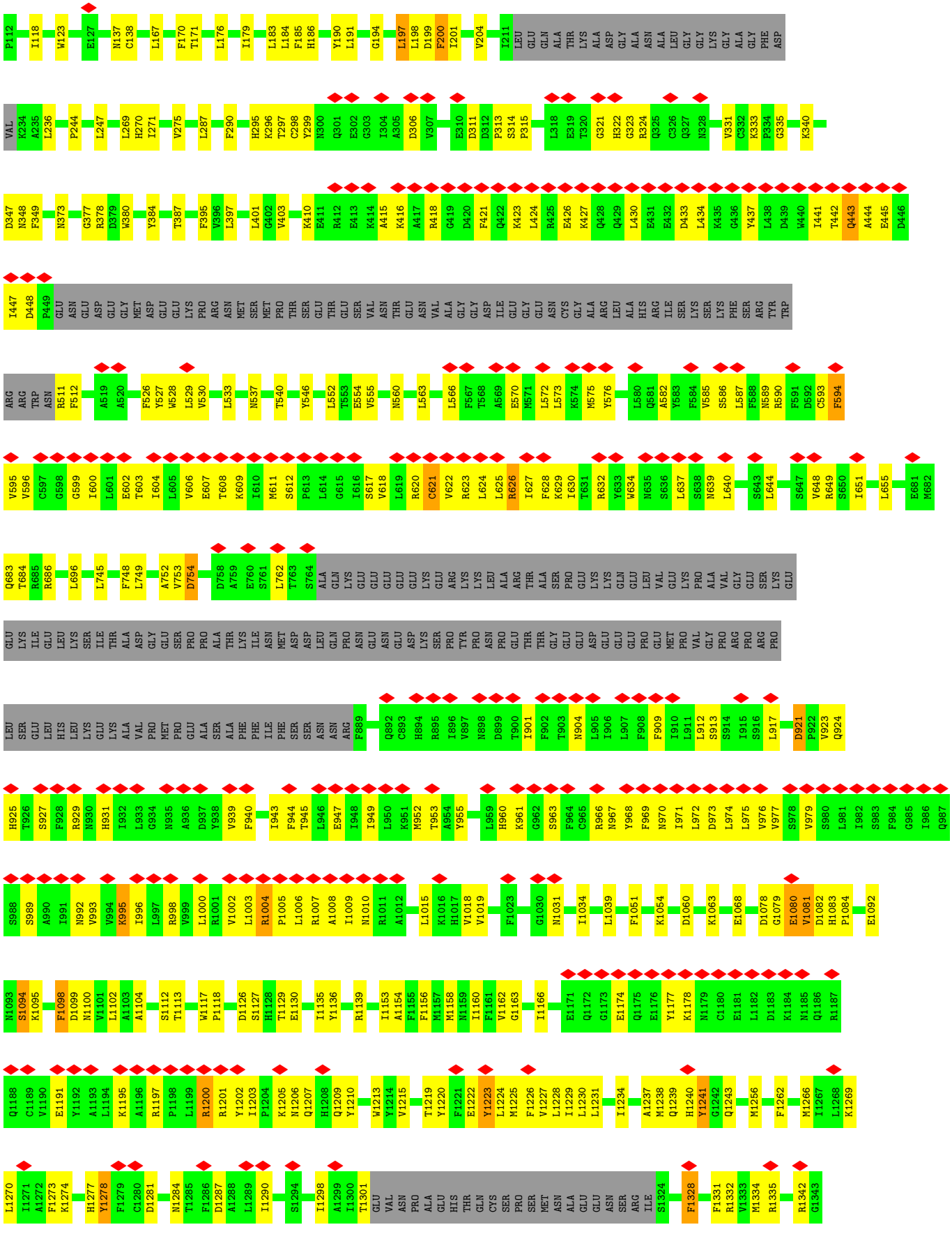
• Molecule 1: Voltage-dependent calcium channel subunit alpha-2/delta-1

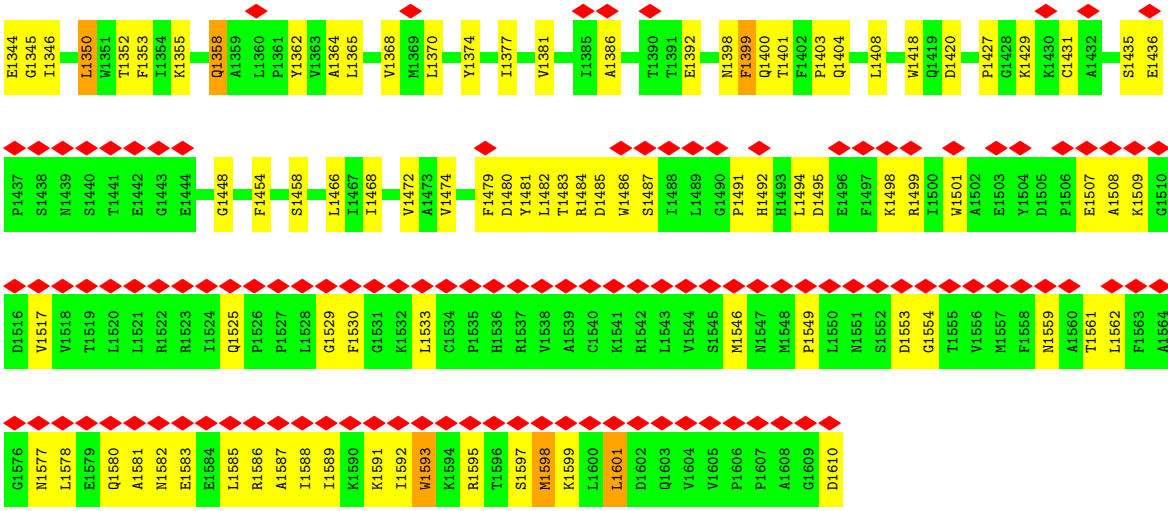
Chain D:



• Molecule 2: Isoform 20 of Voltage-dependent L-type calcium channel subunit alpha-1C

Chain K:


P112 I118 W123 E127 N137 C138 L167 F170 T171 L176 I179 L183 L184 F185 H186 Y190 L191 G194 L197 L198 D199 F200 I201 V204 I211 LEU GLU GLN ALA THR LYS ALA ASP GLY ALA ASN ALA LEU GLY GLY LYS GLY ALA GLY PHE ASP
VAL K234 A235 L236 P244 L247 L269 H270 I271 V275 L287 F290 H295 K296 T297 C298 Y299 N300 Q301 E302 G303 I304 A305 D306 V307 E310 D311 D312 P313 S314 P315 L318 E319 T320 G321 H322 G323 R324 Q325 C326 Q327 N328 V331 C332 K333 P334 G335 K340
D347 N348 F349 N373 G377 R378 D379 W380 Y384 T387 F395 V396 L397 L401 G402 V403 K410 E411 R412 E413 K414 A415 K416 A417 R418 G419 D420 F421 Q422 K423 L424 R425 E426 K427 Q428 Q429 L430 E431 E432 D433 L434 K435 G436 Y437 L438 D439 W440 I441 T442 Q443 A444 E445 D446
I447 D448 P449 GLU GLU ASN GLU ASP GLU GLY MET ASP GLU GLU LYS PRO ARG ASN MET SER MET PRO THR SER GLU THR GLU SER VAL ASN THR GLU ASN VAL ALA GLY GLY ASP ILE GLU GLY GLU ASN CYS GLY ALA ARG LEU ALA HIS ARG ILE SER LYS SER LYS PHE SER ARG TYR TRP
ARG ARG TRP ASN R511 F512 A519 A520 F526 Y527 W528 L529 V530 L533 N537 T540 Y546 L552 T553 E554 V555 N560 L563 L566 F567 T568 A569 E570 M571 L572 L573 K574 M575 Y576 L580 Q581 A582 Y583 F584 V585 S586 L587 F588 N589 R590 F591 D592 C593 F594
V595 V596 C597 G598 G599 I600 L601 E602 T603 I604 L605 V606 E607 T608 K609 I610 M611 S612 P613 L614 G615 I616 S617 V618 L619 R620 G621 V622 R623 L624 L625 R626 I627 F628 K629 I630 T631 R632 Y633 W634 N635 S636 L637 S638 N639 L640 S643 L644 S647 V648 R649 S650 I651 L655 E681 M682
Q683 T684 R685 R686 L696 L745 F748 L749 A752 V753 D754 D758 A759 E760 S761 L762 T763 S764 ALA GLN LYS GLU GLU GLU GLU GLU LYS GLU ARG LYS LYS LEU ALA ARG THR ALA SER PRO GLU LYS LYS GLN GLU LEU VAL GLU LYS PRO ALA VAL GLY GLU SER LYS GLU
GLU LYS ILE GLU LEU LYS SER ILE THR ALA ASP GLY GLU SER PRO PRO ALA THR LYS ILE ASN MET ASP ASP LEU GLN PRO ASN GLU GLU ASN GLU ASP LYS SER PRO PRO TYR PRO ASN PRO GLU THR THR GLY GLU GLU ASP GLU GLU GLU PRO GLU MET PRO PRO VAL GLY PRO ARG PRO ARG PRO
LEU SER GLU LEU HIS LEU LYS GLU LYS ALA VAL PRO MET PRO GLU ALA SER ALA PHE PHE ILE PHE SER SER ASN ASN ARG F689 Q892 C893 H894 R895 I896 V897 N898 D899 T900 I901 F902 T903 N904 L905 I906 L907 F908 F909 I910 L911 L912 S913 S914 I915 S916 L917 D921 P922 V923 Q924
H925 T926 S927 F928 R929 N930 H931 I932 L933 G934 N935 A936 D937 Y938 V939 F940 I943 F944 T945 L946 E947 I948 I949 L950 K951 M952 T953 A954 Y955 L959 H960 K961 G962 S963 F964 C965 R966 N967 Y968 F969 N970 I971 L972 D973 L974 L975 V976 V977 S978 V979 S980 L981 I982 S983 F984 G985 I986 Q987
S988 S989 A990 I991 N992 V993 V994 K995 I996 L997 R998 V999 L1000 R1001 V1002 L1003 R1004 P1005 L1006 R1007 A1008 I1009 N1010 R1011 A1012 L1015 K1016 H1017 V1018 V1019 F1023 G1030 N1031 I1034 L1039 F1051 K1054 D1060 K1063 E1068 D1078 G1079 E1080 V1081 D1082 H1083 P1084 E1092
N1093 S1094 K1095 F1098 D1099 N1100 V1101 L1102 A1103 A1104 S1112 T1113 W1117 P1118 D1126 S1127 H1128 T1129 E1130 I1135 Y1136 R1139 I1153 A1154 F1155 F1156 M1157 M1158 N1159 I1160 F1161 V1162 G1163 I1166 E1171 Q1172 G1173 E1174 Q1175 E1176 Y1177 K1178 N1179 C1180 E1181 L1182 D1183 K1184 N1185 Q1186 R1187
Q1188 C1189 V1190 E1191 Y1192 A1193 L1194 K1195 A1196 R1197 P1198 L1199 R1200 R1201 Y1202 I1203 P1204 K1205 N1206 Q1207 H1208 Q1209 Y1210 W1213 Y1214 V1215 T1219 Y1220 F1221 E1222 Y1223 L1224 M1225 F1226 V1227 L1228 I1229 L1230 L1231 I1234 A1237 M1238 Q1239 H1240 Y1241 G1242 Q1243 M1256 F1262 M1266 I1267 L1268 K1269
L1270 T1271 A1272 F1273 K1274 H1277 Y1278 F1279 C1280 D1281 N1284 T1285 F1286 D1287 A1288 L1289 I1290 S1294 I1298 A1299 I1300 T1301 GLU VAL ASN PRO ALA GLU HIS THR GLN CYS SER PRO SER MET ASN ALA GLU GLU ASN SER ARG ILE S1324 F1328 F1331 R1332 V1333 M1334 R1335 R1342 G1343

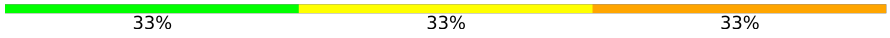


• Molecule 3: Voltage-dependent L-type calcium channel subunit beta-3

Chain C:

• Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain A:



• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain B:

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	269802	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 ($e^-/Å^2$)	46	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	1700	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	35.807	Depositor
Minimum map value	-13.173	Depositor
Average map value	-0.061	Depositor
Map value standard deviation	0.915	Depositor
Recommended contour level	6.4	Depositor
Map size (Å)	372.504, 372.504, 372.504	wwPDB
Map dimensions	440, 440, 440	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8466, 0.8466, 0.8466	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NA, CLR, WO9, CA, NAG, WNZ

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	D	0.26	0/7792	0.48	0/10569
2	K	0.25	0/10473	0.48	0/14203
3	C	0.23	0/1544	0.48	0/2088
All	All	0.25	0/19809	0.48	0/26860

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	D	7630	0	7428	114	0
2	K	10230	0	10445	293	0
3	C	1518	0	1567	42	0
4	A	42	0	37	7	0
5	B	28	0	25	3	0
5	E	28	0	25	6	0
6	D	70	0	65	5	0
7	D	1	0	0	0	0
7	K	2	0	0	0	0
8	D	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	D	9	0	10	0	0
10	K	84	0	138	7	0
11	K	39	0	0	0	0
12	K	44	0	0	0	0
13	K	3	0	0	0	0
All	All	19729	0	19740	451	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 451 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)
1:D:826:ASN:HD21	5:E:1:NAG:C1	1.48	1.26
1:D:826:ASN:ND2	5:E:1:NAG:C1	2.30	0.94
1:D:897:ASN:ND2	5:B:1:NAG:C1	2.32	0.92
1:D:49:LEU:HB2	5:E:2:NAG:O7	1.78	0.83
2:K:623:ARG:O	2:K:626:ARG:HB2	1.79	0.82

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	D	945/1050 (90%)	892 (94%)	53 (6%)	0	100 100
2	K	1260/1499 (84%)	1133 (90%)	124 (10%)	3 (0%)	47 77
3	C	189/191 (99%)	186 (98%)	3 (2%)	0	100 100
All	All	2394/2740 (87%)	2211 (92%)	180 (8%)	3 (0%)	54 81

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	K	1081	VAL
2	K	380	TRP
2	K	1095	LYS

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	D	846/926 (91%)	820 (97%)	26 (3%)	40	67
2	K	1123/1319 (85%)	1077 (96%)	46 (4%)	30	61
3	C	172/172 (100%)	168 (98%)	4 (2%)	50	73
All	All	2141/2417 (89%)	2065 (96%)	76 (4%)	38	64

5 of 76 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	K	1262	PHE
2	K	1601	LEU
2	K	1328	PHE
2	K	1374	TYR
3	C	320	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 11 such sidechains are listed below:

Mol	Chain	Res	Type
2	K	1380	GLN
2	K	1398	ASN
2	K	1580	GLN
2	K	1400	GLN
2	K	325	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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)

7 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	NAG	A	1	4	14,14,15	0.99	1 (7%)	17,19,21	0.57	0
4	NAG	A	2	4	14,14,15	0.21	0	17,19,21	0.44	0
4	NAG	A	3	4	14,14,15	0.26	0	17,19,21	0.44	0
5	NAG	B	1	5	14,14,15	0.49	0	17,19,21	0.72	1 (5%)
5	NAG	B	2	5	14,14,15	0.18	0	17,19,21	0.44	0
5	NAG	E	1	5	14,14,15	0.43	0	17,19,21	0.39	0
5	NAG	E	2	5	14,14,15	0.67	1 (7%)	17,19,21	0.60	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	A	1	4	-	2/6/23/26	0/1/1/1
4	NAG	A	2	4	-	2/6/23/26	0/1/1/1
4	NAG	A	3	4	-	4/6/23/26	0/1/1/1
5	NAG	B	1	5	-	4/6/23/26	0/1/1/1
5	NAG	B	2	5	-	4/6/23/26	0/1/1/1
5	NAG	E	1	5	-	3/6/23/26	0/1/1/1
5	NAG	E	2	5	-	4/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1	NAG	O5-C1	-3.43	1.38	1.43
5	E	2	NAG	C1-C2	2.23	1.55	1.52

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	B	1	NAG	C1-O5-C5	2.37	115.40	112.19

There are no chirality outliers.

5 of 23 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	3	NAG	C4-C5-C6-O6
5	E	2	NAG	O5-C5-C6-O6
4	A	3	NAG	O5-C5-C6-O6
5	E	2	NAG	C4-C5-C6-O6
5	B	1	NAG	O5-C5-C6-O6

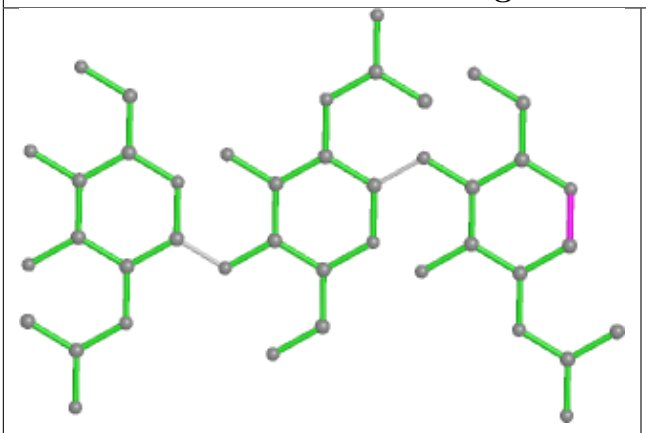
There are no ring outliers.

5 monomers are involved in 16 short contacts:

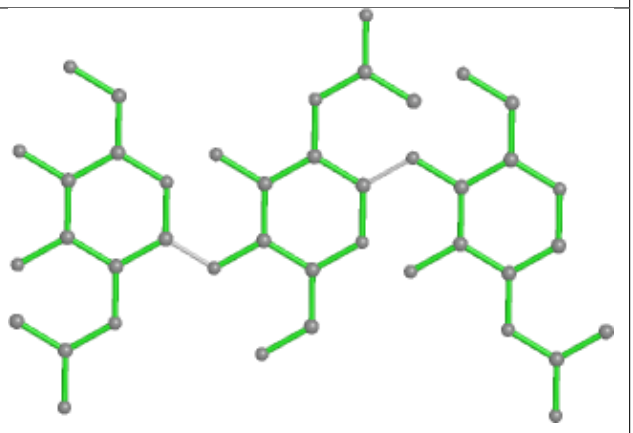
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	3	NAG	4	0
5	B	1	NAG	3	0
5	E	1	NAG	4	0
5	E	2	NAG	4	0
4	A	1	NAG	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

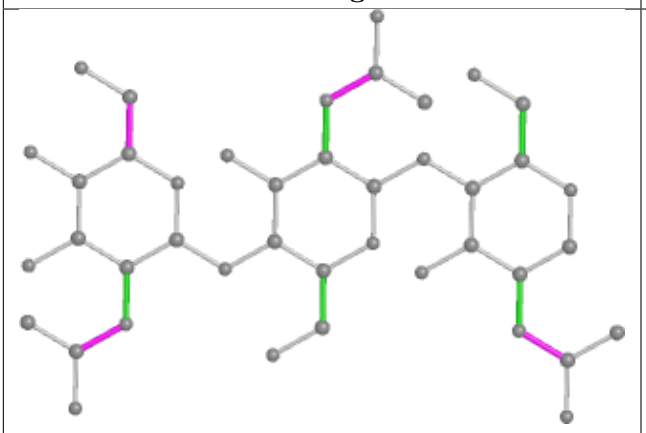
Oligosaccharide Chain A



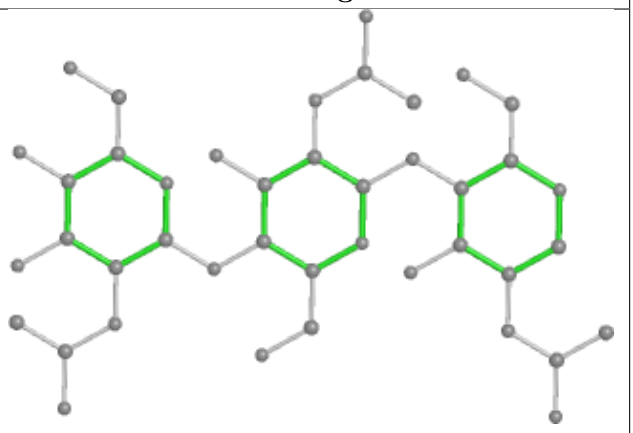
Bond lengths



Bond angles

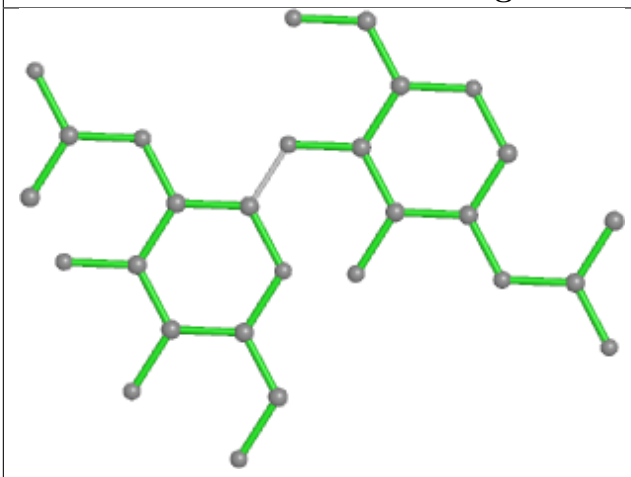


Torsions

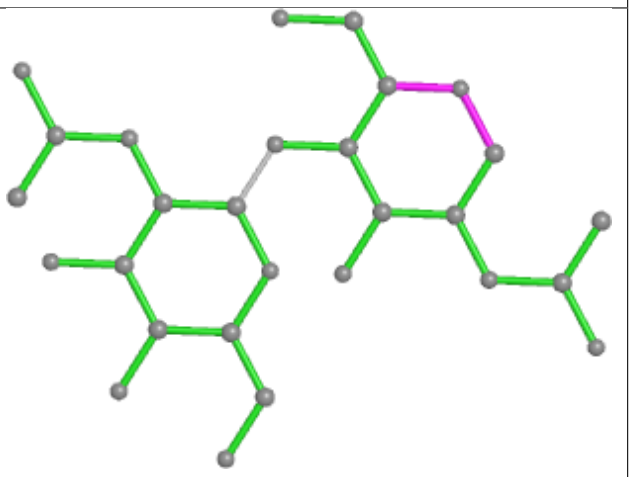


Rings

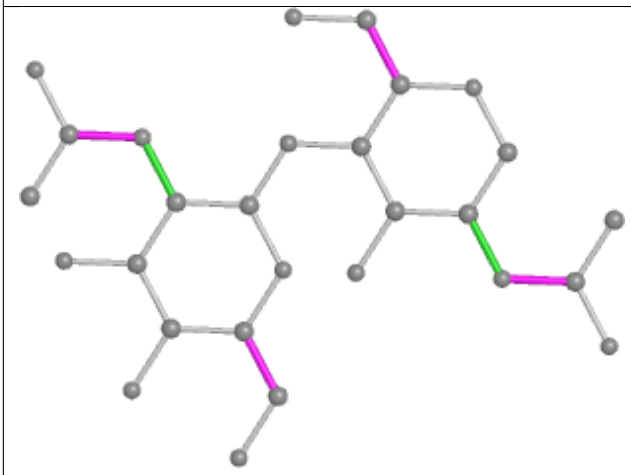
Oligosaccharide Chain B



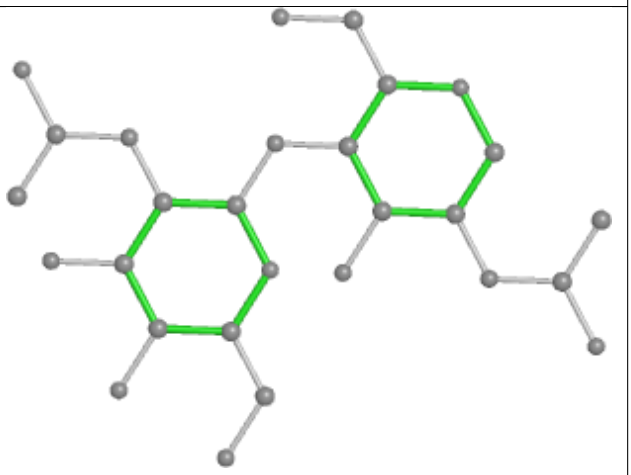
Bond lengths



Bond angles

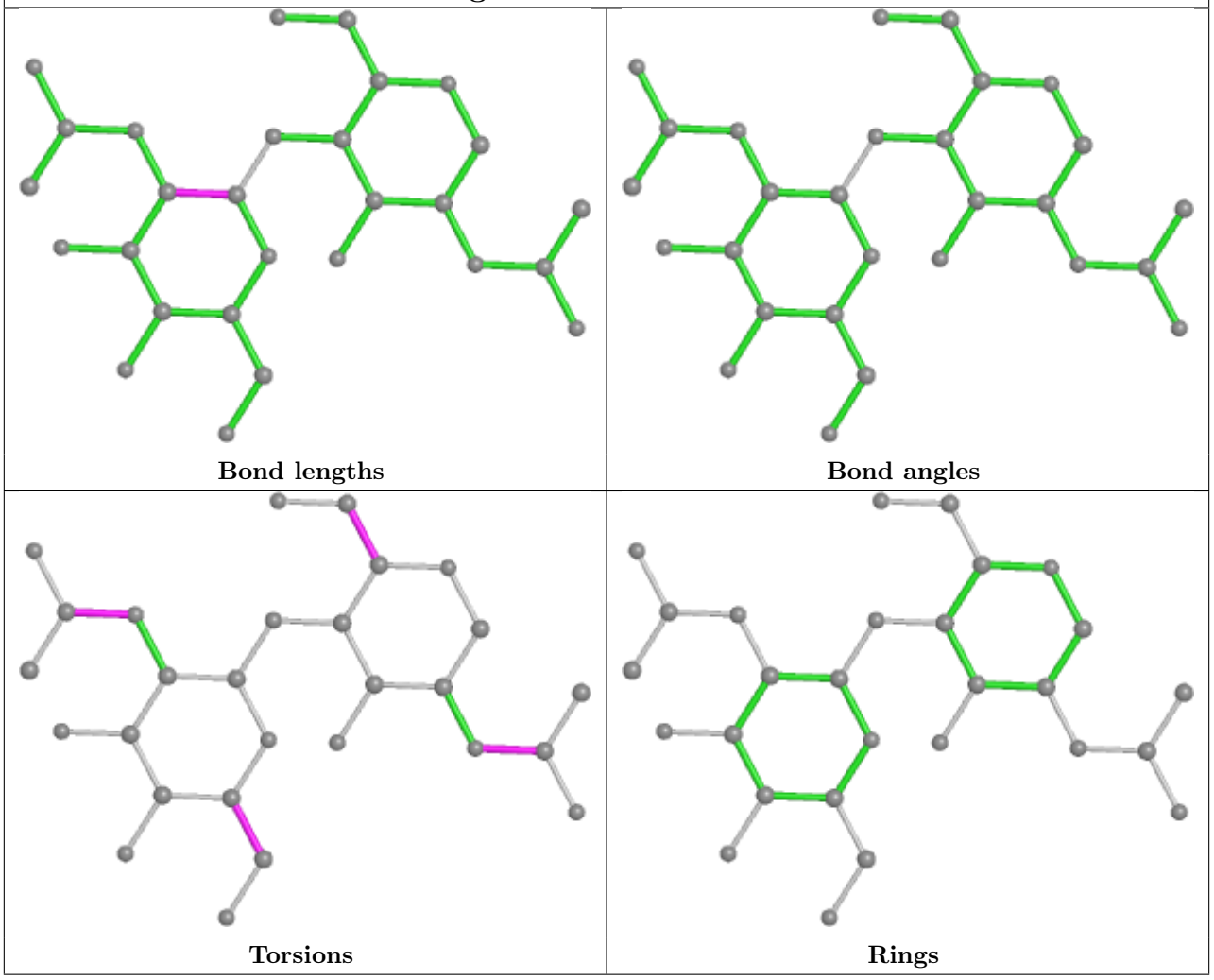


Torsions



Rings

Oligosaccharide Chain E



5.6 Ligand geometry (i)

Of 15 ligands modelled in this entry, 4 are monoatomic - leaving 11 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	LEU	D	1108	-	7,8,8	0.78	0	9,10,10	0.96	0
6	NAG	D	1101	-	14,14,15	0.24	0	17,19,21	0.56	0
6	NAG	D	1102	-	14,14,15	0.24	0	17,19,21	0.36	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
11	WNZ	K	1704	-	38,38,38	1.03	4 (10%)	41,43,43	1.18	3 (7%)
6	NAG	D	1105	-	14,14,15	0.83	1 (7%)	17,19,21	1.63	3 (17%)
6	NAG	D	1103	-	14,14,15	0.51	0	17,19,21	0.41	0
10	CLR	K	1701	-	31,31,31	1.01	0	48,48,48	0.69	0
10	CLR	K	1703	-	31,31,31	1.01	1 (3%)	48,48,48	0.55	0
10	CLR	K	1702	-	31,31,31	1.02	0	48,48,48	0.64	0
6	NAG	D	1104	-	14,14,15	0.31	0	17,19,21	0.37	0
12	WO9	K	1705	-	43,43,43	0.97	4 (9%)	46,48,48	1.17	3 (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	LEU	D	1108	-	-	6/8/8/8	-
6	NAG	D	1101	-	-	2/6/23/26	0/1/1/1
6	NAG	D	1102	-	-	2/6/23/26	0/1/1/1
11	WNZ	K	1704	-	-	20/42/42/42	-
6	NAG	D	1105	-	-	5/6/23/26	0/1/1/1
6	NAG	D	1103	-	-	4/6/23/26	0/1/1/1
10	CLR	K	1701	-	-	5/10/68/68	0/4/4/4
10	CLR	K	1703	-	-	5/10/68/68	0/4/4/4
10	CLR	K	1702	-	-	8/10/68/68	0/4/4/4
6	NAG	D	1104	-	-	3/6/23/26	0/1/1/1
12	WO9	K	1705	-	-	26/47/47/47	-

The worst 5 of 10 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
12	K	1705	WO9	O32-C22	-2.54	1.40	1.46
11	K	1704	WNZ	O14-C12	2.39	1.40	1.33
6	D	1105	NAG	O5-C1	2.37	1.47	1.43
12	K	1705	WO9	O20-C18	2.36	1.40	1.33
11	K	1704	WNZ	O26-C27	2.30	1.40	1.34

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	D	1105	NAG	C2-N2-C7	4.38	129.15	122.90
6	D	1105	NAG	C1-O5-C5	4.19	117.87	112.19
12	K	1705	WO9	O32-C33-C35	4.00	120.11	111.50
11	K	1704	WNZ	O26-C27-C29	3.95	120.02	111.50
11	K	1704	WNZ	O14-C12-C11	2.63	120.17	111.91

There are no chirality outliers.

5 of 86 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	D	1108	LEU	N-CA-CB-CG
9	D	1108	LEU	C-CA-CB-CG
10	K	1701	CLR	C13-C17-C20-C21
10	K	1701	CLR	C13-C17-C20-C22
10	K	1701	CLR	C16-C17-C20-C22

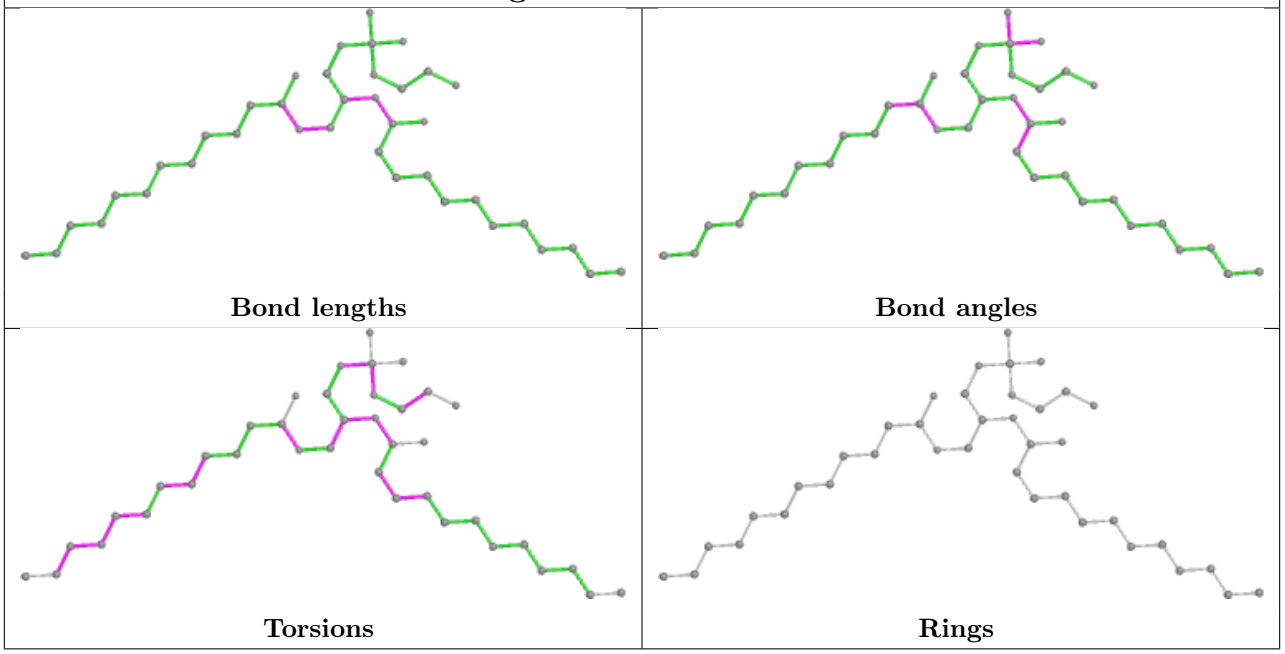
There are no ring outliers.

6 monomers are involved in 12 short contacts:

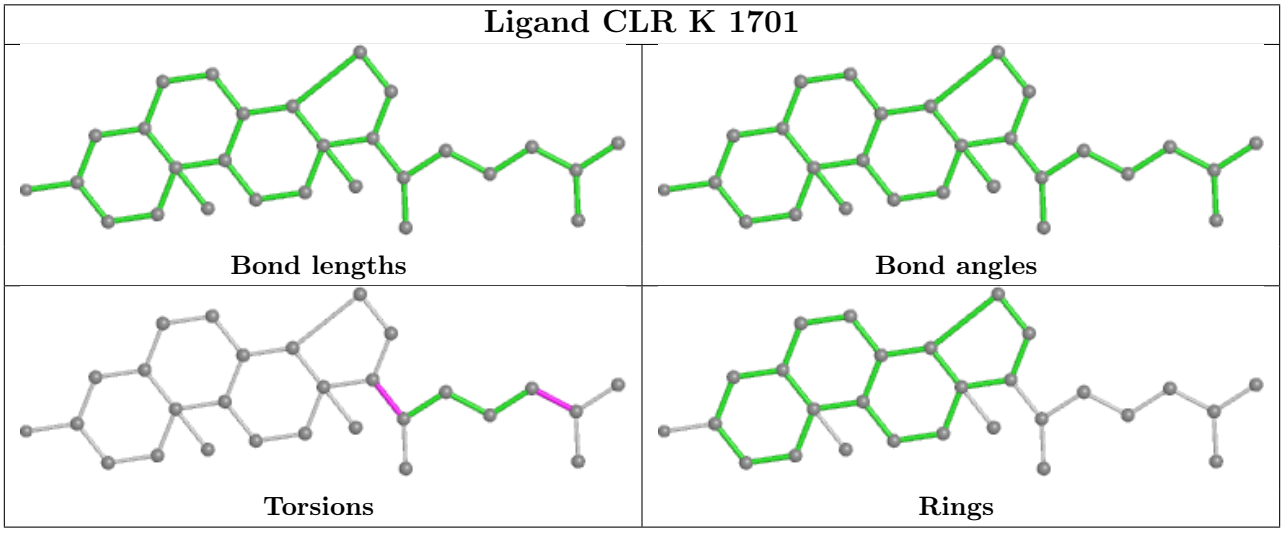
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	1101	NAG	3	0
6	D	1105	NAG	1	0
6	D	1103	NAG	1	0
10	K	1701	CLR	4	0
10	K	1703	CLR	1	0
10	K	1702	CLR	2	0

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.

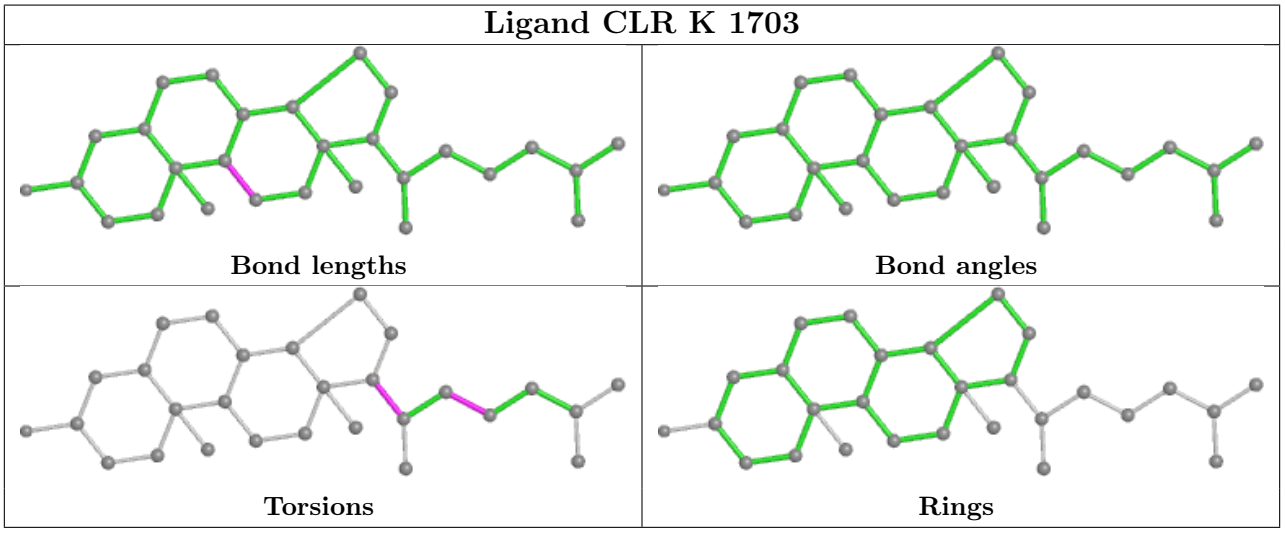
Ligand WNZ K 1704



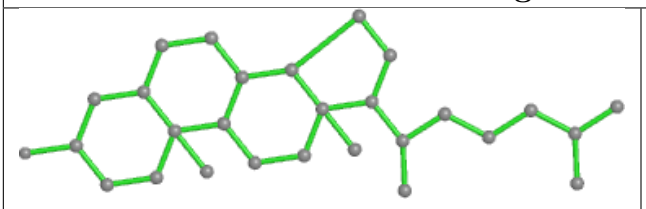
Ligand CLR K 1701



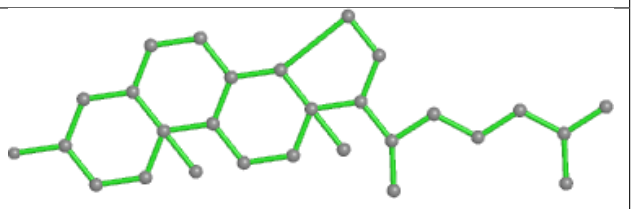
Ligand CLR K 1703



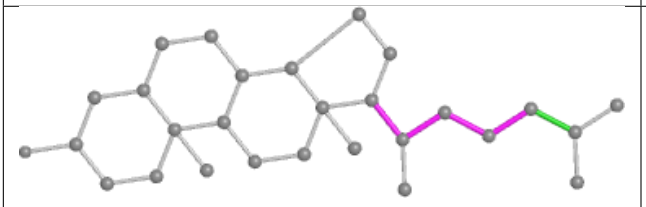
Ligand CLR K 1702



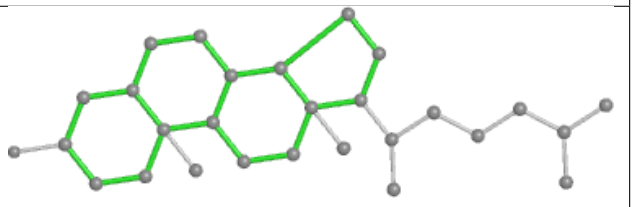
Bond lengths



Bond angles

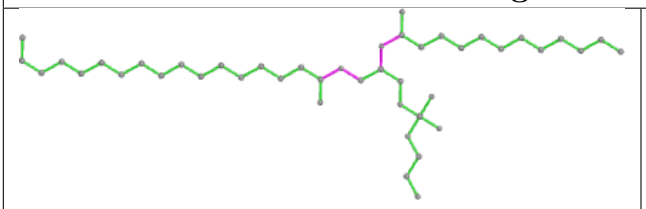


Torsions

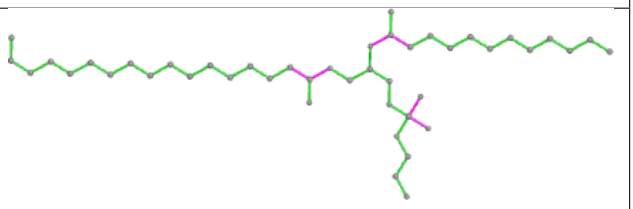


Rings

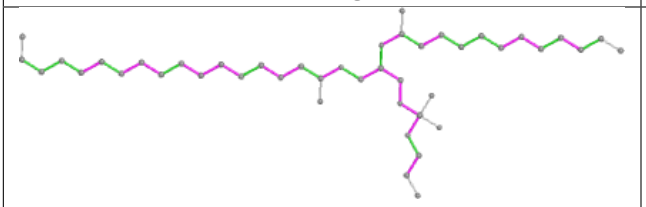
Ligand WO9 K 1705



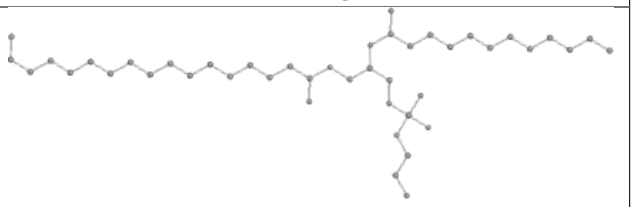
Bond lengths



Bond angles



Torsions



Rings

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.

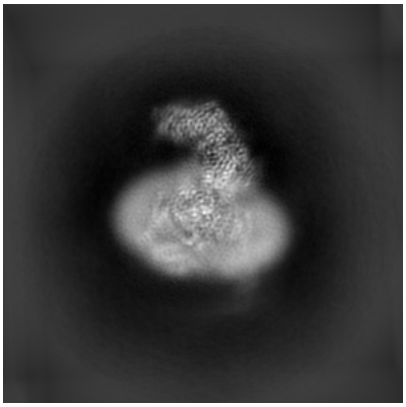
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-28375. These allow visual inspection of the internal detail of the map and identification of artifacts.

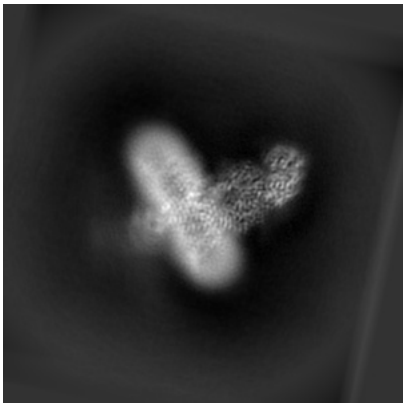
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

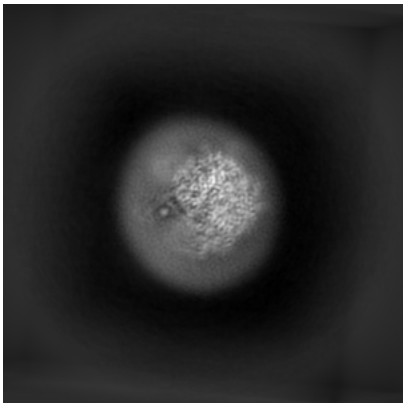
6.1.1 Primary map



X



Y

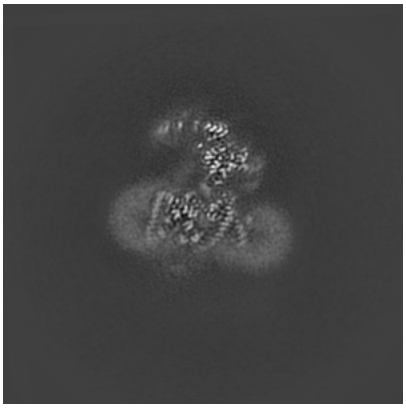


Z

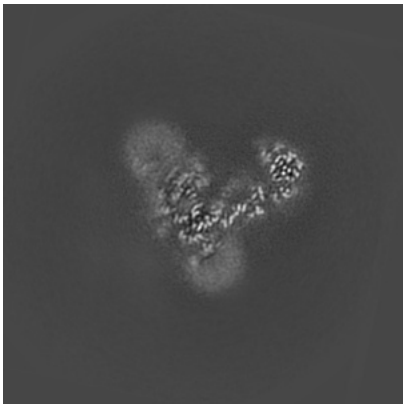
The images above show the map projected in three orthogonal directions.

6.2 Central slices

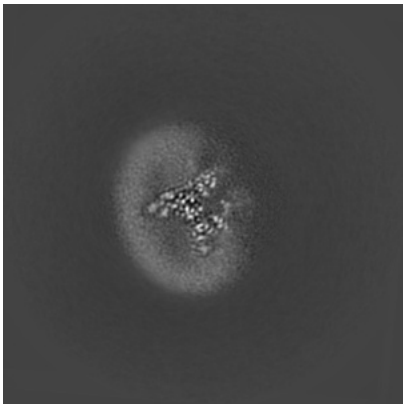
6.2.1 Primary map



X Index: 220



Y Index: 220

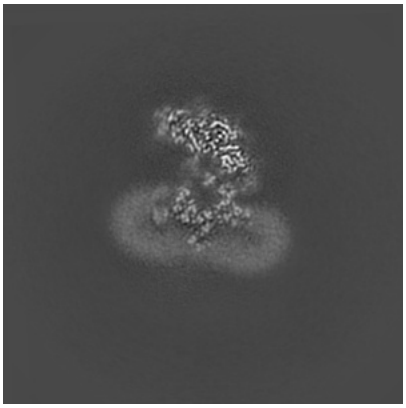


Z Index: 220

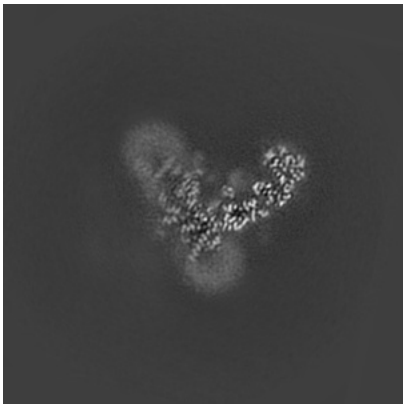
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

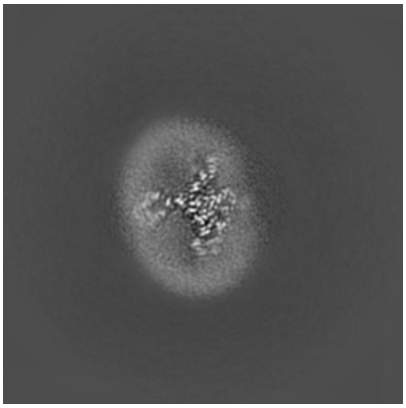
6.3.1 Primary map



X Index: 231



Y Index: 226

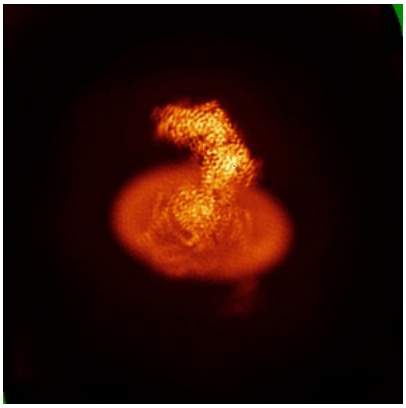


Z Index: 210

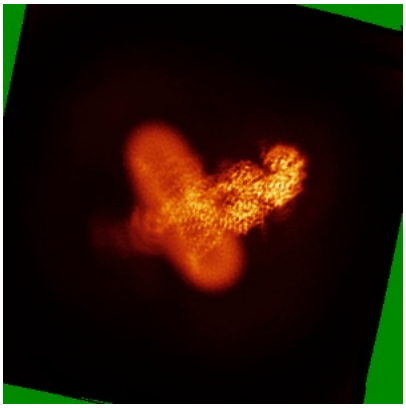
The images above show the largest variance slices of the map in three orthogonal directions.

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

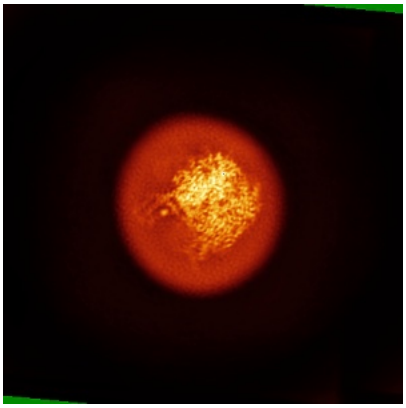
6.4.1 Primary map



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

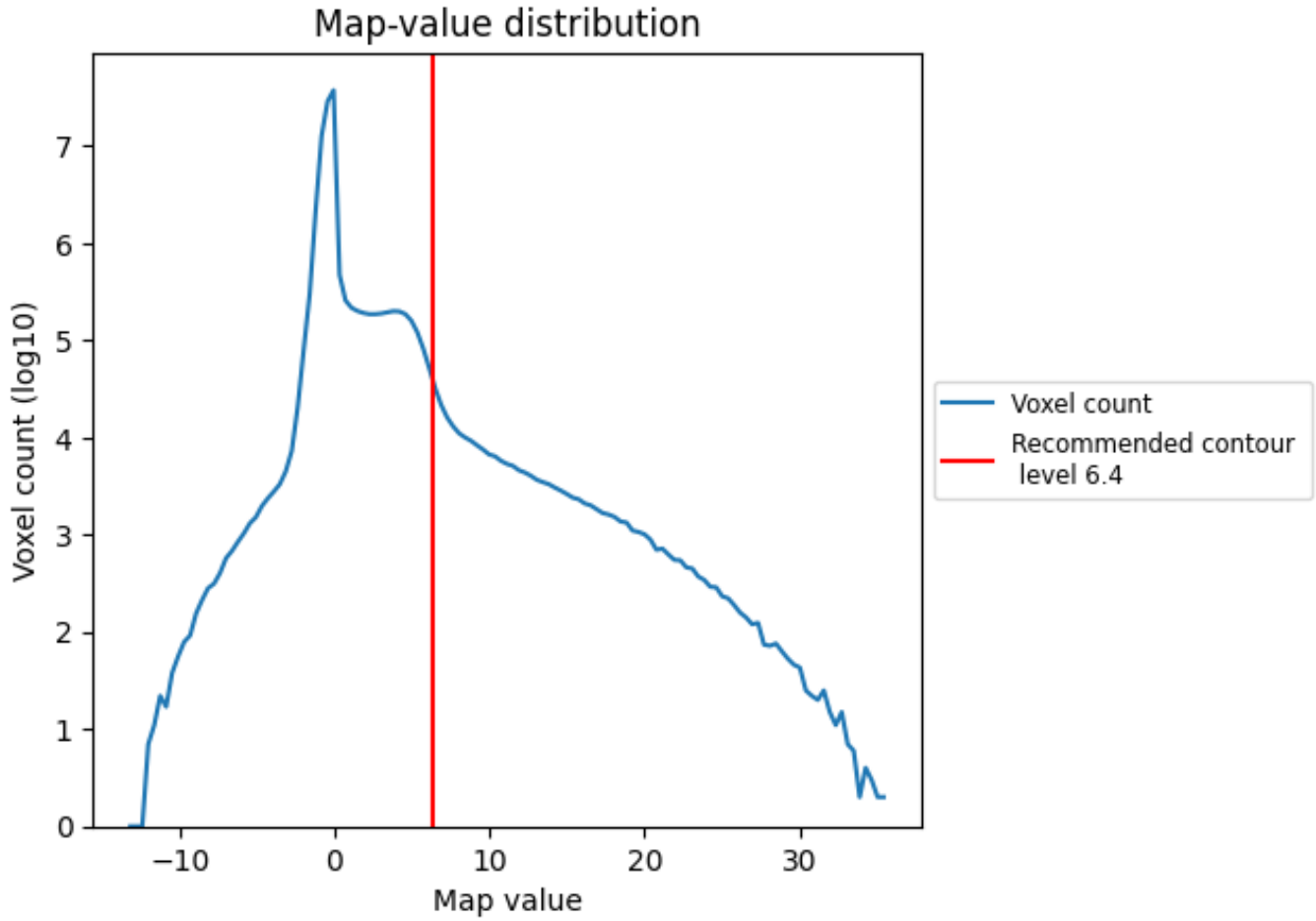
6.6 Mask visualisation (i)

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

7 Map analysis

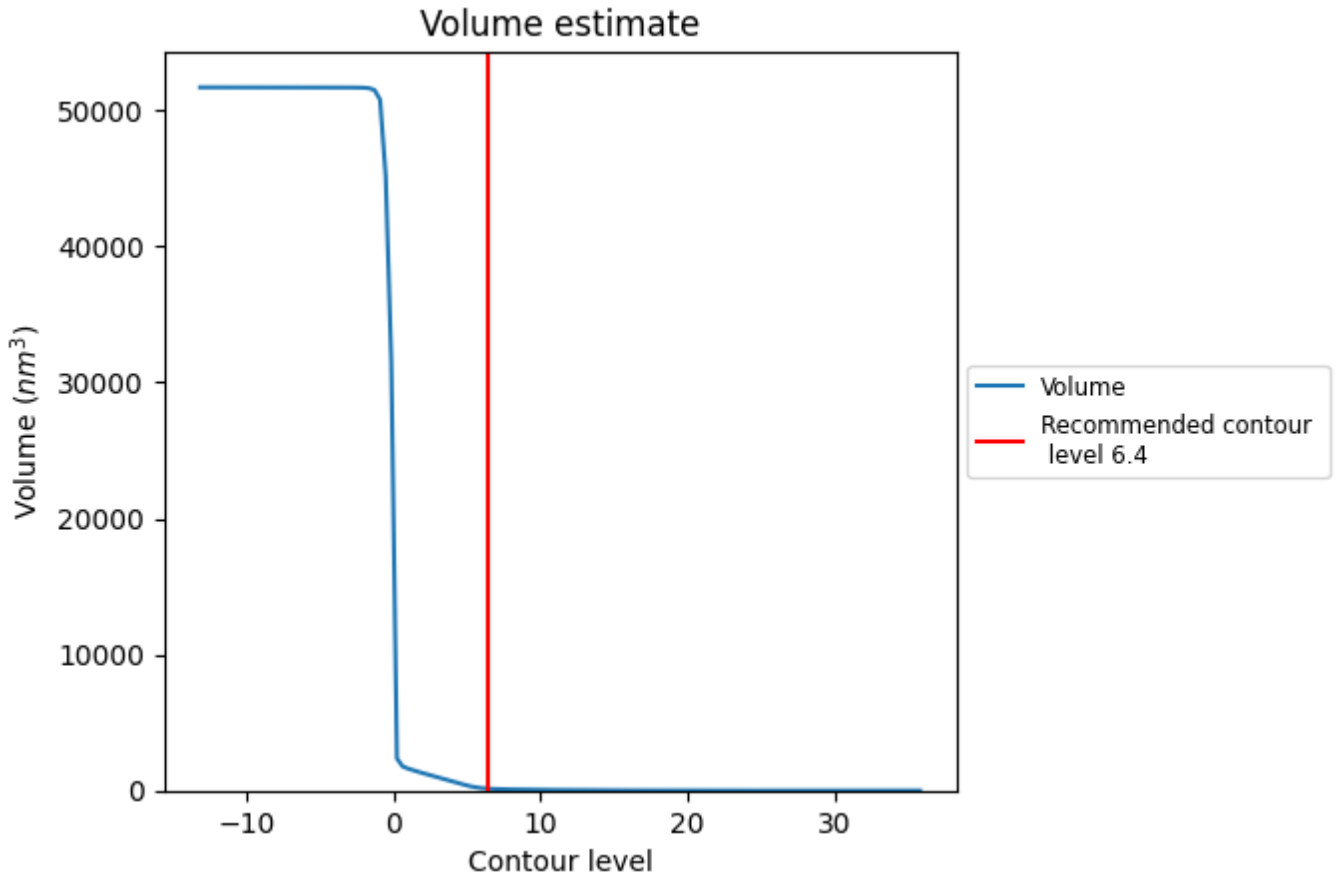
This section contains the results of statistical analysis of the map.

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.

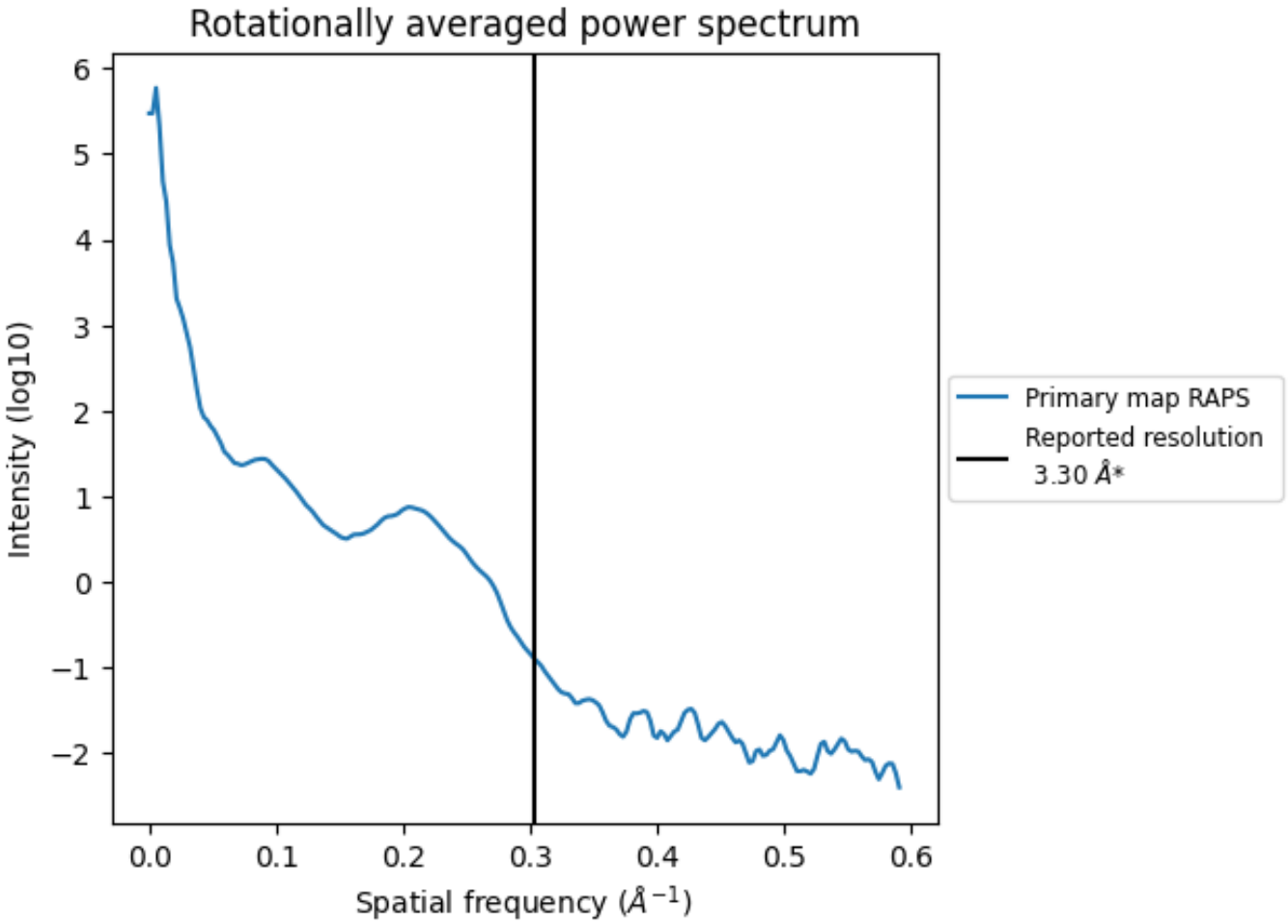
7.2 Volume estimate (i)



The volume at the recommended contour level is 141 nm^3; this corresponds to an approximate mass of 127 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 0.303 Å^{-1}

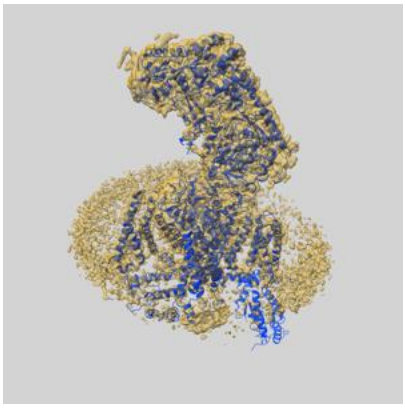
8 Fourier-Shell correlation (i)

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

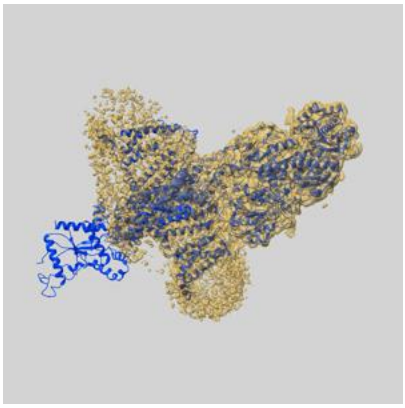
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-28375 and PDB model 8EOG. Per-residue inclusion information can be found in section 3 on page 8.

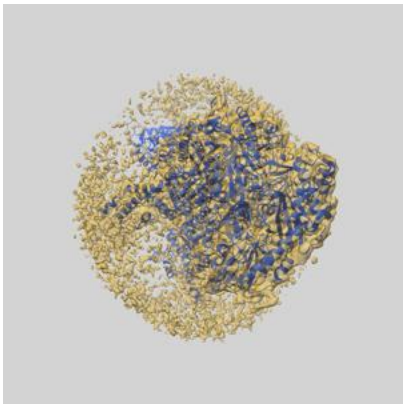
9.1 Map-model overlay



X



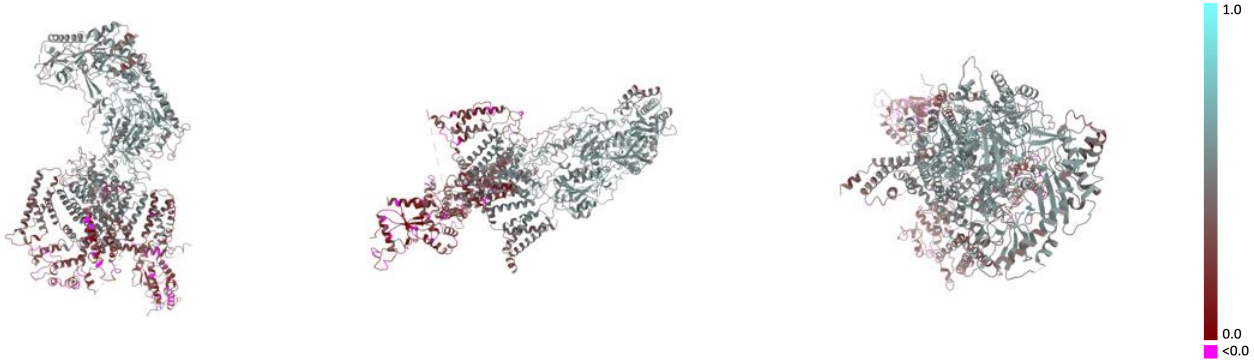
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 6.4 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.

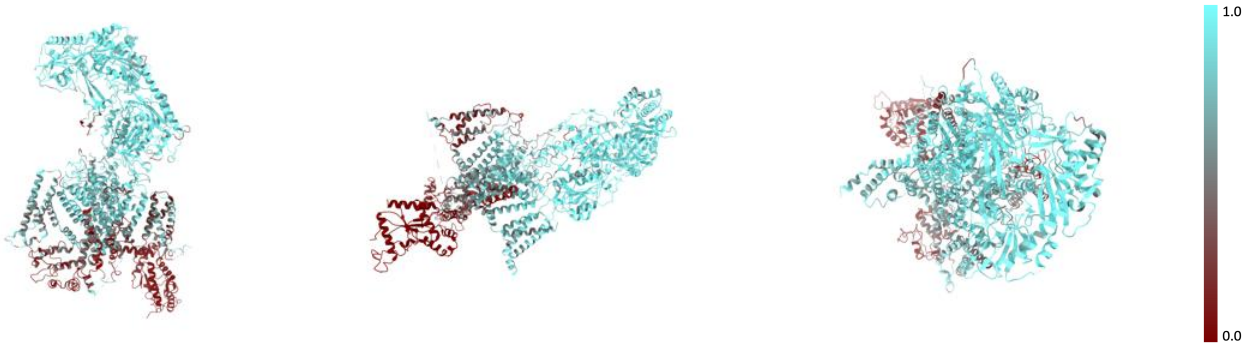
9.2 Q-score mapped to coordinate model



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.

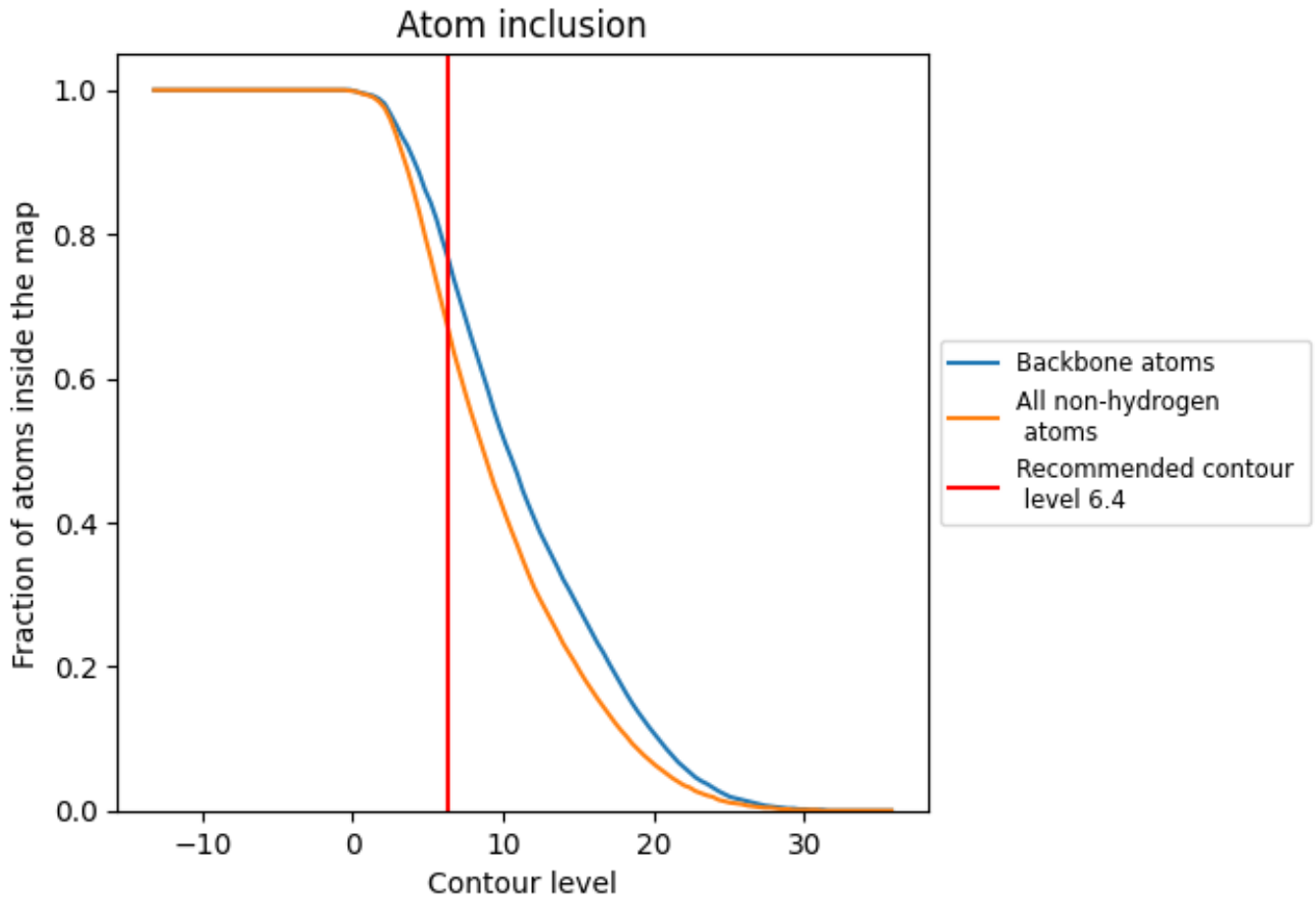
9.3 Atom inclusion mapped to coordinate model



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 (6.4).

9.4 Atom inclusion (i)



At the recommended contour level, 76% of all backbone atoms, 66% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (6.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6650	0.4120
A	0.7620	0.4120
B	0.7860	0.4420
C	0.0010	0.1510
D	0.9020	0.5240
E	0.7860	0.3570
K	0.5850	0.3680