Full wwPDB EM Validation Report ⓘ

Nov 9, 2024 – 04:00 PM EST

PDB ID	:	6V3H
EMDB ID	:	EMD-21037
Title	:	Structure of NPC1-like intracellular cholesterol transporter 1 (NPC1L1) in complex with an ezetimibe analog
Authors	:	Huang, C.S.; Yu, X.; Min, X.; Wang, Z.
Deposited on	:	2019-11-25
Resolution	:	3.50 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:

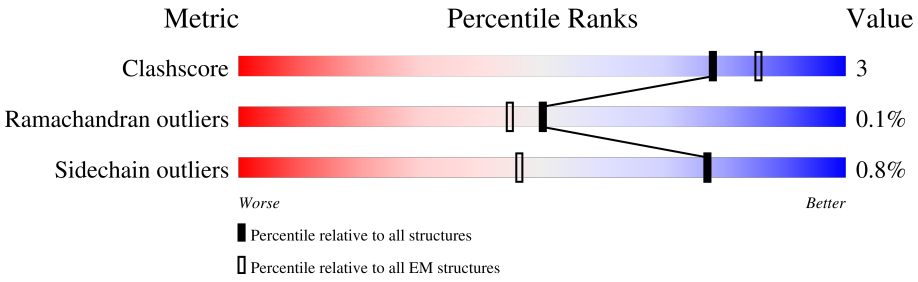
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 3.50 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	1336	84% 8% 8%
2	B	2	50% 50%
2	C	2	100%
2	D	2	50% 50%
2	E	2	50% 100%
2	F	2	100%
2	G	2	50% 50%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 9926 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 NPC1-like intracellular cholesterol transporter 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1232	9555	6166	1582	1743	64	0	0

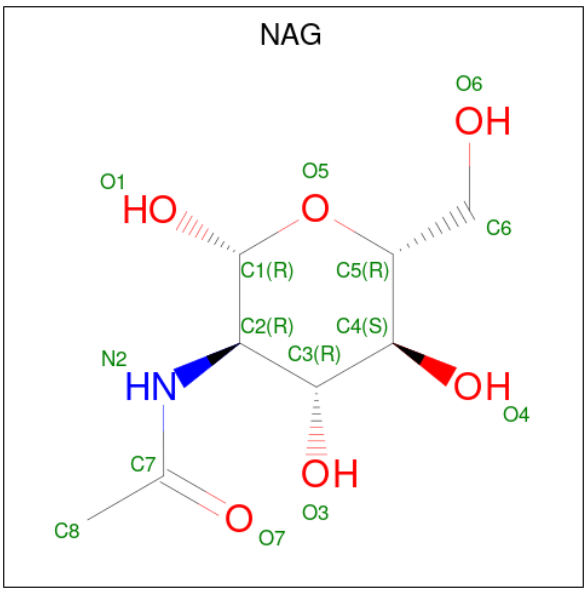
There are 25 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1332	GLU	-	expression tag	UNP Q6T3U3
A	1333	ASN	-	expression tag	UNP Q6T3U3
A	1334	LEU	-	expression tag	UNP Q6T3U3
A	1335	TYR	-	expression tag	UNP Q6T3U3
A	1336	PHE	-	expression tag	UNP Q6T3U3
A	1337	GLN	-	expression tag	UNP Q6T3U3
A	1338	GLY	-	expression tag	UNP Q6T3U3
A	1339	ASP	-	expression tag	UNP Q6T3U3
A	1340	TYR	-	expression tag	UNP Q6T3U3
A	1341	LYS	-	expression tag	UNP Q6T3U3
A	1342	ASP	-	expression tag	UNP Q6T3U3
A	1343	ASP	-	expression tag	UNP Q6T3U3
A	1344	ASP	-	expression tag	UNP Q6T3U3
A	1345	ASP	-	expression tag	UNP Q6T3U3
A	1346	LYS	-	expression tag	UNP Q6T3U3
A	1347	HIS	-	expression tag	UNP Q6T3U3
A	1348	HIS	-	expression tag	UNP Q6T3U3
A	1349	HIS	-	expression tag	UNP Q6T3U3
A	1350	HIS	-	expression tag	UNP Q6T3U3
A	1351	HIS	-	expression tag	UNP Q6T3U3
A	1352	HIS	-	expression tag	UNP Q6T3U3
A	1353	HIS	-	expression tag	UNP Q6T3U3
A	1354	HIS	-	expression tag	UNP Q6T3U3
A	1355	HIS	-	expression tag	UNP Q6T3U3
A	1356	HIS	-	expression tag	UNP Q6T3U3

- Molecule 2 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
2	B	2	Total C N O 28 16 2 10	0	0
2	C	2	Total C N O 28 16 2 10	0	0
2	D	2	Total C N O 28 16 2 10	0	0
2	E	2	Total C N O 28 16 2 10	0	0
2	F	2	Total C N O 28 16 2 10	0	0
2	G	2	Total C N O 28 16 2 10	0	0

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	AltConf
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0

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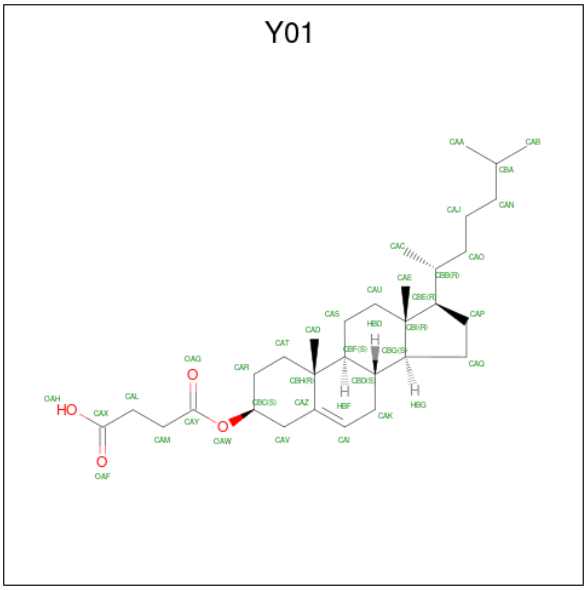
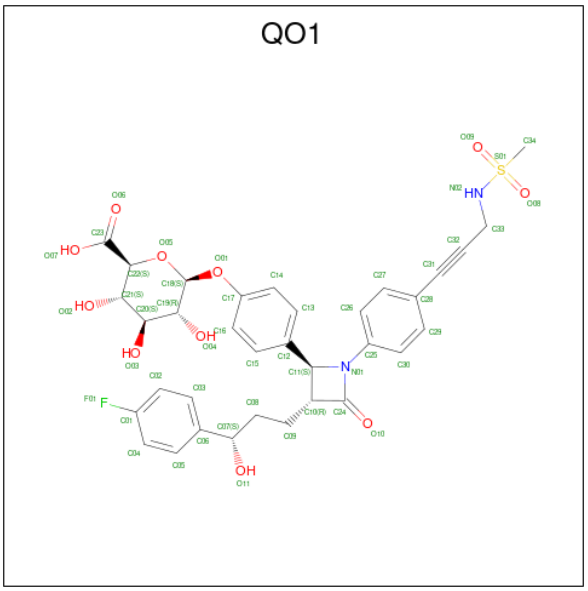
Mol	Chain	Residues	Atoms	AltConf
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0

- Molecule 4 is CHOLESTEROL HEMISUCCINATE (three-letter code: Y01) (formula: $C_{31}H_{50}O_4$).



Mol	Chain	Residues	Atoms	AltConf
4	A	1	Total C O 35 31 4	0
4	A	1	Total C O 35 31 4	0

- Molecule 5 is 4-[(2S,3R)-3-[(3S)-3-(4-fluorophenyl)-3-hydroxypropyl]-1-(4-{3-[(methylsulfonyl)amino]prop-1-yn-1-yl}phenyl)-4-oxoazetidin-2-yl]phenyl beta-D-glucopyranosiduronic acid (three-letter code: QO1) (formula: $C_{34}H_{35}FN_2O_{11}S$) (labeled as "Ligand of Interest" by depositor).



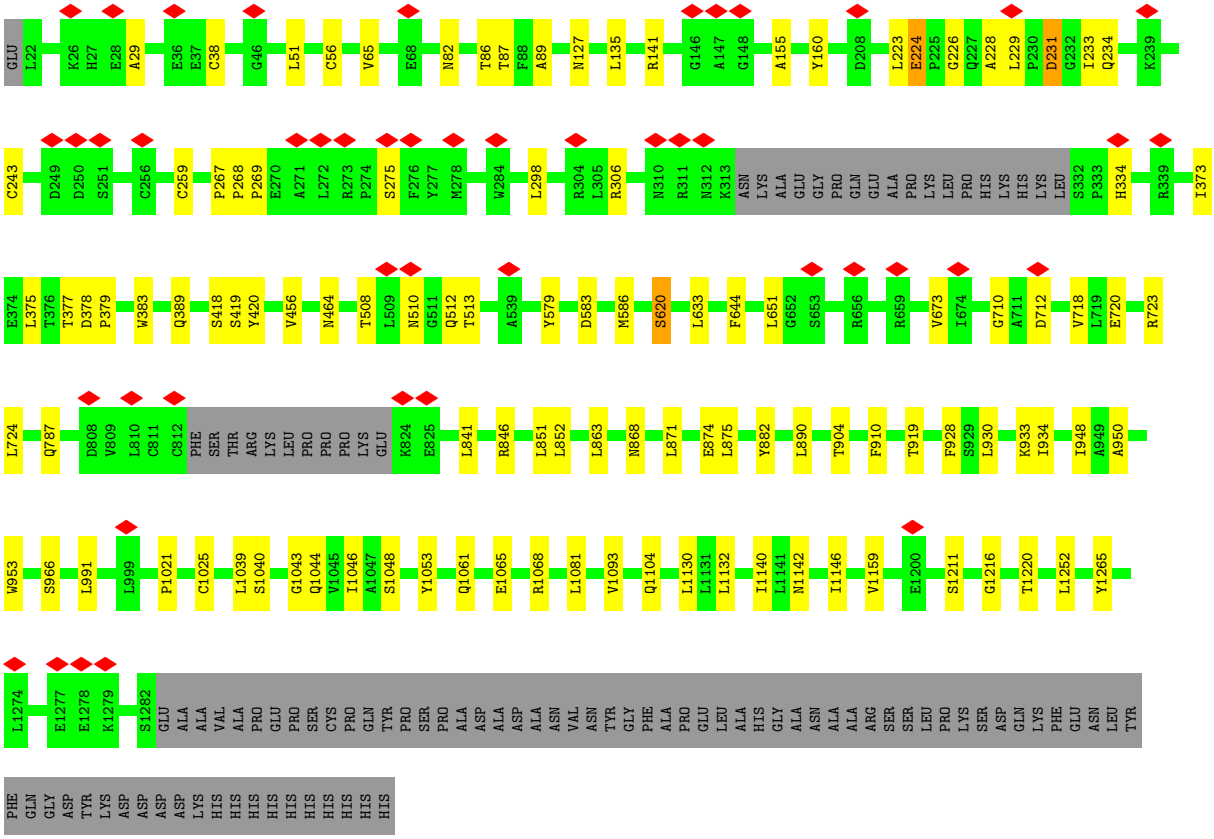
Mol	Chain	Residues	Atoms						AltConf
			Total	C	F	N	O	S	
5	A	1	49	34	1	2	11	1	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: NPC1-like intracellular cholesterol transporter 1

Chain A:

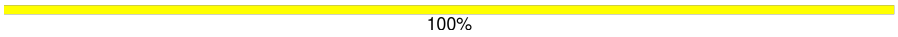


• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain B:

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

Chain C:

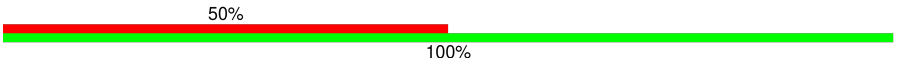


• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:

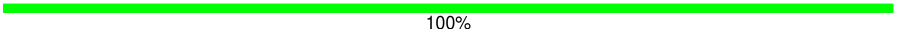
• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:



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

Chain F:



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

Chain G:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	252262	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 ($e^-/Å^2$)	48.61	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.166	Depositor
Minimum map value	-0.086	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.022	Depositor
Map size (Å)	271.04767, 271.04767, 271.04767	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.05878, 1.05878, 1.05878	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: QO1, Y01, NAG

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	0.40	1/9783 (0.0%)	0.66	16/13320 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	228	ALA	C-N	-5.73	1.20	1.34

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	228	ALA	C-N-CA	7.75	141.07	121.70
1	A	890	LEU	CA-CB-CG	6.98	131.35	115.30
1	A	871	LEU	CA-CB-CG	6.11	129.34	115.30
1	A	851	LEU	CA-CB-CG	6.06	129.24	115.30
1	A	231	ASP	N-CA-CB	-5.88	100.02	110.60
1	A	1252	LEU	CA-CB-CG	5.68	128.37	115.30
1	A	583	ASP	CB-CG-OD1	5.64	123.38	118.30
1	A	991	LEU	CA-CB-CG	5.59	128.15	115.30
1	A	1025	CYS	CA-CB-SG	5.52	123.93	114.00
1	A	1130	LEU	CA-CB-CG	5.19	127.25	115.30
1	A	852	LEU	CA-CB-CG	5.15	127.14	115.30
1	A	38	CYS	CA-CB-SG	5.14	123.25	114.00
1	A	224	GLU	CA-CB-CG	5.13	124.69	113.40
1	A	375	LEU	CA-CB-CG	5.05	126.92	115.30
1	A	275	SER	C-N-CA	5.03	134.28	121.70
1	A	229	LEU	CB-CG-CD1	-5.03	102.45	111.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	9555	0	9531	54	0
2	B	28	0	25	0	0
2	C	28	0	25	0	0
2	D	28	0	25	0	0
2	E	28	0	25	0	0
2	F	28	0	25	0	0
2	G	28	0	25	0	0
3	A	84	0	78	0	0
4	A	70	0	98	1	0
5	A	49	0	0	1	0
All	All	9926	0	9857	54	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 3.

All (54) 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:A:953:TRP:HE1	1:A:1048:SER:HG	1.36	0.70
1:A:82:ASN:H	1:A:87:THR:HG22	1.62	0.64
1:A:389:GLN:HB3	1:A:1104:GLN:HE22	1.64	0.63
1:A:510:ASN:O	1:A:512:GLN:NE2	2.39	0.55
1:A:1040:SER:O	1:A:1043:GLY:N	2.37	0.55
1:A:930:LEU:HD12	1:A:1081:LEU:HD11	1.89	0.55
1:A:928:PHE:O	1:A:933:LYS:NZ	2.37	0.53
1:A:633:LEU:HD21	4:A:1419:Y01:HAP2	1.92	0.52
1:A:948:ILE:HB	1:A:1053:TYR:HB2	1.92	0.52
1:A:298:LEU:HD22	1:A:1140:ILE:HD12	1.91	0.51
1:A:904:THR:HG22	1:A:1093:VAL:HG22	1.93	0.51
1:A:1216:GLY:O	1:A:1220:THR:OG1	2.28	0.51
1:A:620:SER:HG	1:A:882:TYR:HH	1.56	0.50
1:A:868:ASN:OD1	1:A:1061:GLN:NE2	2.44	0.50
1:A:1065:GLU:OE1	1:A:1068:ARG:NH2	2.42	0.50
1:A:135:LEU:HB3	1:A:234:GLN:HE21	1.77	0.49
1:A:86:THR:OG1	1:A:87:THR:N	2.43	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:710:GLY:O	1:A:787:GLN:NE2	2.46	0.49
1:A:1021:PRO:O	5:A:1421:QO1:O04	2.31	0.48
1:A:141:ARG:HB3	1:A:155:ALA:HB3	1.94	0.48
1:A:456:VAL:O	1:A:464:ASN:HA	2.14	0.47
1:A:723:ARG:NH2	1:A:1211:SER:OG	2.42	0.47
1:A:379:PRO:O	1:A:383:TRP:HB2	2.14	0.47
1:A:378:ASP:OD1	1:A:378:ASP:N	2.42	0.47
1:A:579:TYR:HB2	1:A:586:MET:HG2	1.97	0.46
1:A:268:PRO:HA	1:A:269:PRO:HD3	1.84	0.46
1:A:223:LEU:HA	1:A:223:LEU:HD23	1.71	0.46
1:A:651:LEU:HD13	1:A:718:VAL:HG11	1.97	0.46
1:A:1040:SER:HB3	1:A:1046:ILE:HD11	2.00	0.44
1:A:29:ALA:HA	1:A:135:LEU:HD21	1.99	0.44
1:A:65:VAL:HG21	1:A:89:ALA:HB3	1.99	0.44
1:A:712:ASP:OD2	1:A:1220:THR:OG1	2.29	0.44
1:A:841:LEU:O	1:A:846:ARG:NH1	2.51	0.44
1:A:418:SER:OG	1:A:419:SER:N	2.50	0.43
1:A:863:LEU:HD13	1:A:1159:VAL:HG21	2.00	0.43
1:A:267:PRO:HA	1:A:268:PRO:HD3	1.93	0.43
1:A:127:ASN:OD1	1:A:160:TYR:OH	2.34	0.42
1:A:934:ILE:HG21	1:A:950:ALA:HB2	2.00	0.42
1:A:508:THR:HA	1:A:513:THR:HA	2.02	0.42
1:A:224:GLU:OE1	1:A:226:GLY:N	2.52	0.42
1:A:910:PHE:HE1	1:A:919:THR:HG21	1.85	0.42
1:A:953:TRP:NE1	1:A:1048:SER:OG	2.36	0.42
1:A:1039:LEU:HA	1:A:1044:GLN:O	2.20	0.41
1:A:419:SER:OG	1:A:420:TYR:N	2.53	0.41
1:A:874:GLU:H	1:A:874:GLU:HG3	1.71	0.41
1:A:644:PHE:HB2	1:A:673:VAL:HG21	2.02	0.41
1:A:720:GLU:HG3	1:A:724:LEU:HD13	2.02	0.40
1:A:1142:ASN:O	1:A:1146:ILE:HG12	2.20	0.40
1:A:51:LEU:HA	1:A:51:LEU:HD23	1.87	0.40
1:A:334:HIS:NE2	1:A:1132:LEU:O	2.52	0.40
1:A:620:SER:OG	1:A:882:TYR:OH	2.28	0.40
1:A:82:ASN:O	1:A:86:THR:OG1	2.39	0.40
1:A:306:ARG:NE	1:A:1265:TYR:O	2.52	0.40
1:A:966:SER:O	1:A:966:SER:OG	2.34	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	1226/1336 (92%)	1189 (97%)	36 (3%)	1 (0%)	48 79

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	231	ASP

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	1055/1142 (92%)	1047 (99%)	8 (1%)	79 88

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	56	CYS
1	A	233	ILE
1	A	243	CYS
1	A	259	CYS
1	A	373	ILE
1	A	377	THR
1	A	620	SER
1	A	875	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	200	GLN
1	A	234	GLN
1	A	312	ASN
1	A	495	GLN
1	A	512	GLN
1	A	1104	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)

12 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	$\#\|Z\|>2$
2	NAG	B	1	2,1	14,14,15	0.26	0	17,19,21	0.69	0
2	NAG	B	2	2	14,14,15	0.86	1 (7%)	17,19,21	2.43	3 (17%)
2	NAG	C	1	2,1	14,14,15	0.37	0	17,19,21	1.12	2 (11%)
2	NAG	C	2	2	14,14,15	0.38	0	17,19,21	1.21	2 (11%)
2	NAG	D	1	2,1	14,14,15	0.18	0	17,19,21	0.68	1 (5%)
2	NAG	D	2	2	14,14,15	0.43	0	17,19,21	0.52	0
2	NAG	E	1	2,1	14,14,15	0.22	0	17,19,21	0.55	0
2	NAG	E	2	2	14,14,15	0.40	0	17,19,21	0.51	0
2	NAG	F	1	2,1	14,14,15	0.18	0	17,19,21	0.59	0
2	NAG	F	2	2	14,14,15	0.29	0	17,19,21	0.49	0
2	NAG	G	1	2,1	14,14,15	0.37	0	17,19,21	0.59	0
2	NAG	G	2	2	14,14,15	0.40	0	17,19,21	1.05	1 (5%)

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
2	NAG	B	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	B	2	2	-	6/6/23/26	0/1/1/1
2	NAG	C	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	2/6/23/26	0/1/1/1
2	NAG	D	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	NAG	E	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	E	2	2	-	2/6/23/26	0/1/1/1
2	NAG	F	1	2,1	-	1/6/23/26	0/1/1/1
2	NAG	F	2	2	-	0/6/23/26	0/1/1/1
2	NAG	G	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	G	2	2	-	2/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	2	NAG	C1-C2	2.29	1.55	1.52

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	2	NAG	C2-N2-C7	8.53	134.34	122.90
2	B	2	NAG	C1-C2-N2	4.02	116.78	110.43
2	G	2	NAG	C2-N2-C7	3.30	127.32	122.90
2	C	2	NAG	C2-N2-C7	3.29	127.30	122.90
2	C	1	NAG	O4-C4-C5	3.23	117.28	109.32
2	C	2	NAG	C1-O5-C5	2.71	115.82	112.19
2	C	1	NAG	C1-O5-C5	2.27	115.23	112.19
2	D	1	NAG	C1-O5-C5	2.19	115.11	112.19
2	B	2	NAG	C8-C7-N2	2.13	119.65	116.12

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	2	NAG	C4-C5-C6-O6

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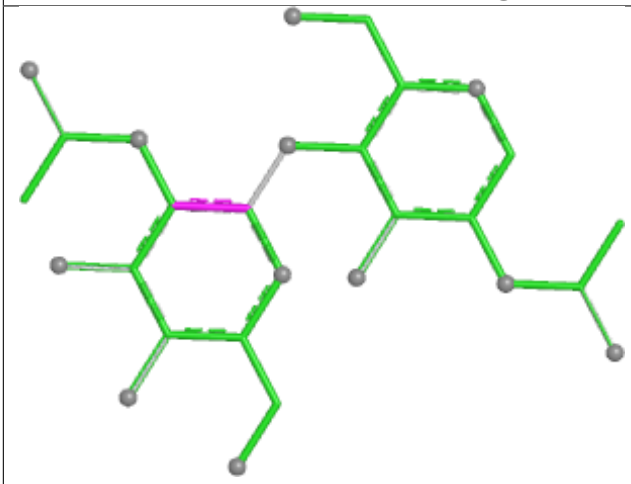
Mol	Chain	Res	Type	Atoms
2	E	2	NAG	O5-C5-C6-O6
2	D	1	NAG	O5-C5-C6-O6
2	D	1	NAG	C4-C5-C6-O6
2	B	2	NAG	O5-C5-C6-O6
2	B	2	NAG	C4-C5-C6-O6
2	B	2	NAG	C8-C7-N2-C2
2	B	2	NAG	O7-C7-N2-C2
2	E	1	NAG	O5-C5-C6-O6
2	G	1	NAG	O5-C5-C6-O6
2	G	1	NAG	C4-C5-C6-O6
2	B	1	NAG	C4-C5-C6-O6
2	B	1	NAG	O5-C5-C6-O6
2	G	2	NAG	C1-C2-N2-C7
2	E	1	NAG	C4-C5-C6-O6
2	C	2	NAG	C3-C2-N2-C7
2	F	1	NAG	O5-C5-C6-O6
2	B	2	NAG	C1-C2-N2-C7
2	C	2	NAG	C1-C2-N2-C7
2	B	2	NAG	C3-C2-N2-C7
2	G	2	NAG	C3-C2-N2-C7

There are no ring outliers.

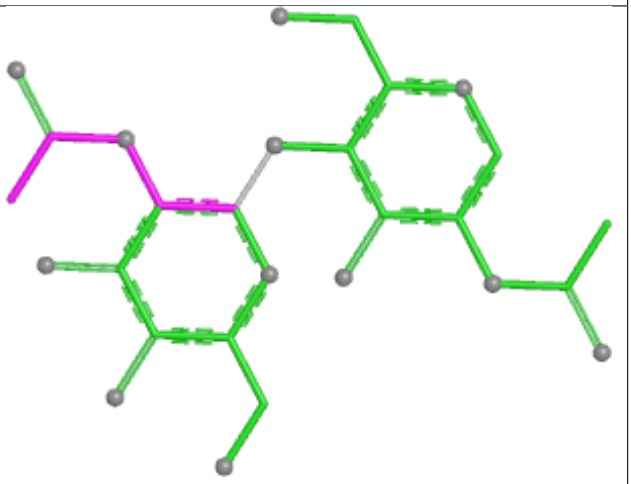
No monomer is involved in short contacts.

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

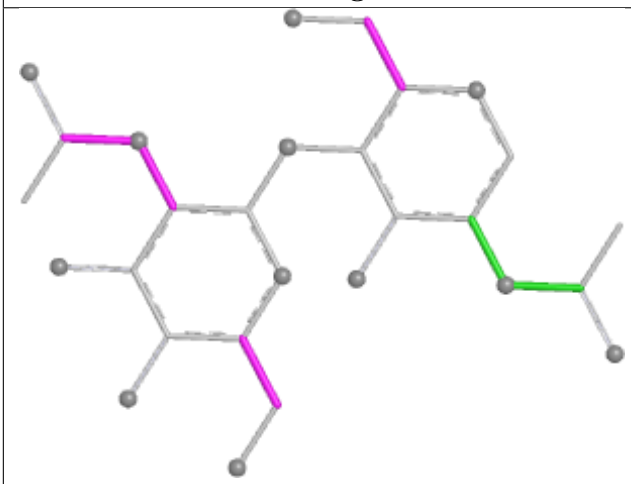
Oligosaccharide Chain B



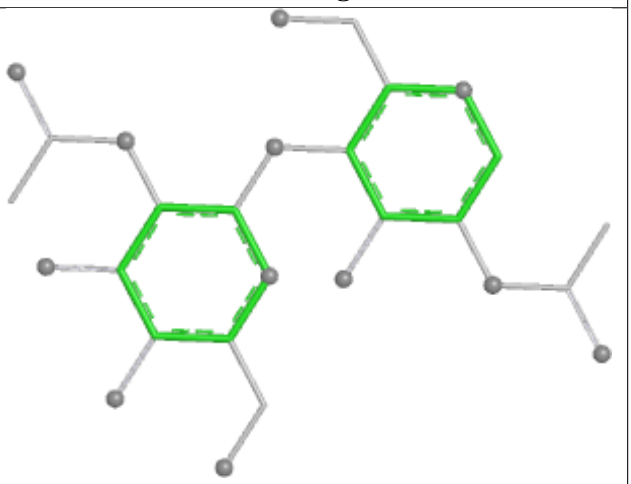
Bond lengths



Bond angles

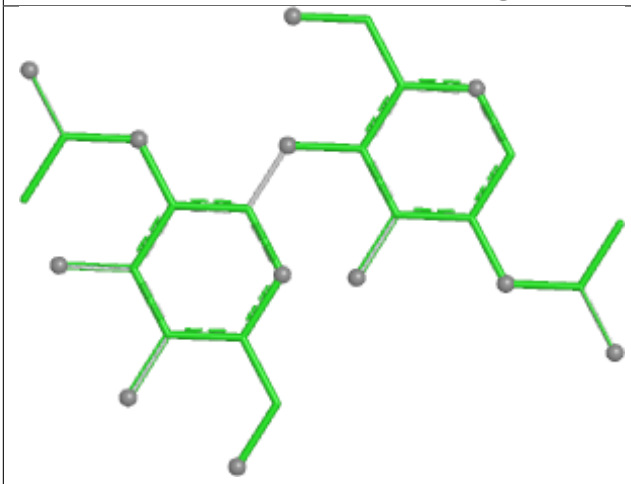


Torsions

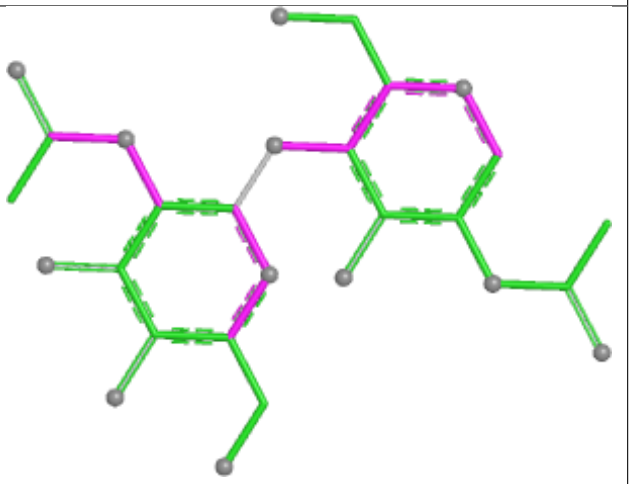


Rings

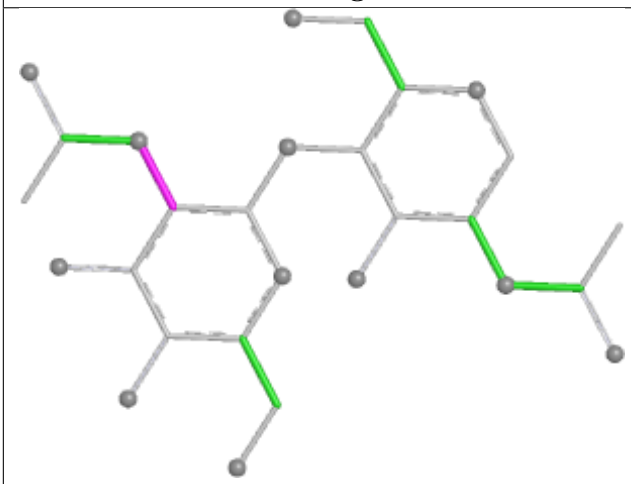
Oligosaccharide Chain C



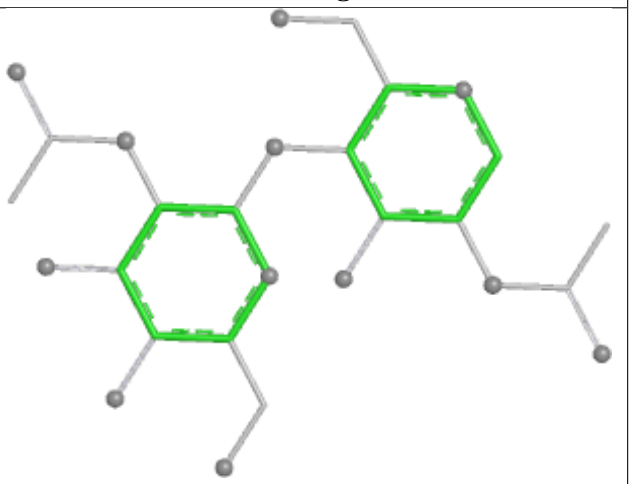
Bond lengths



Bond angles

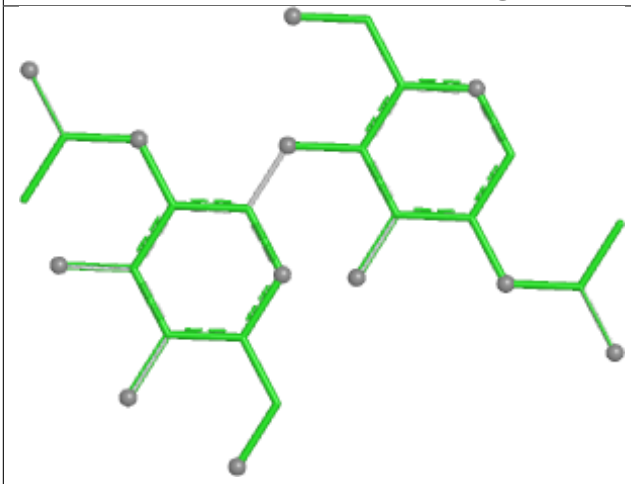


Torsions

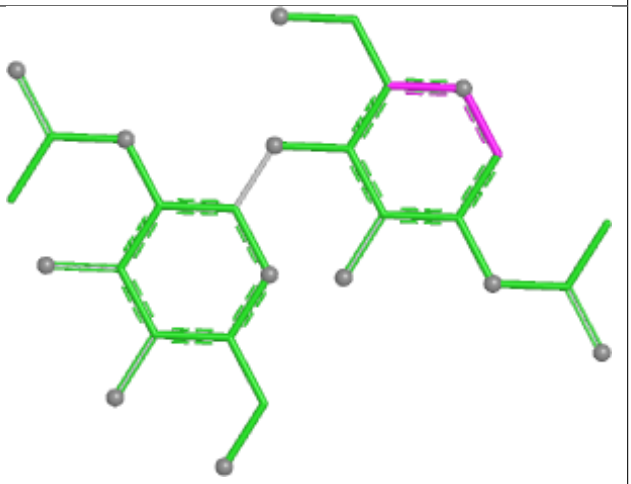


Rings

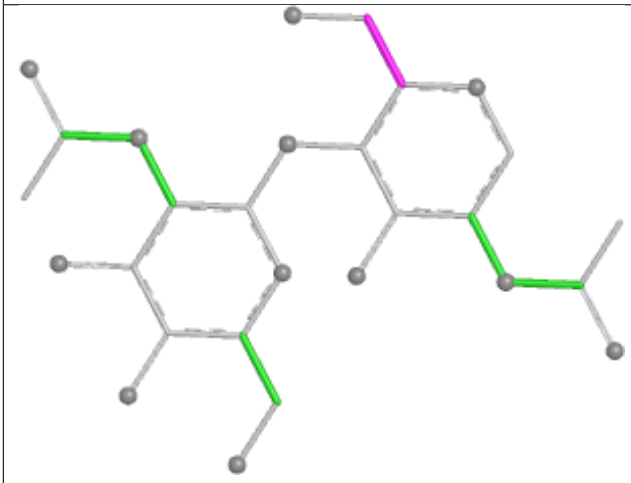
Oligosaccharide Chain D



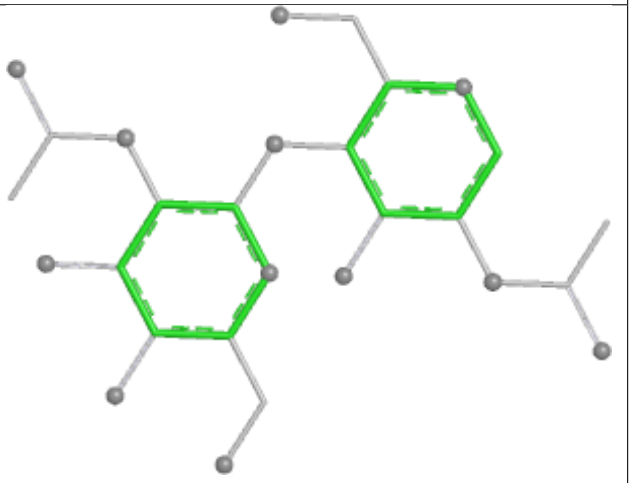
Bond lengths



Bond angles

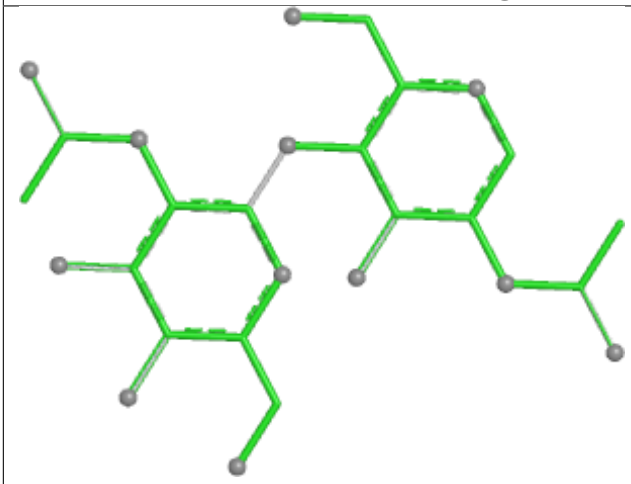


Torsions

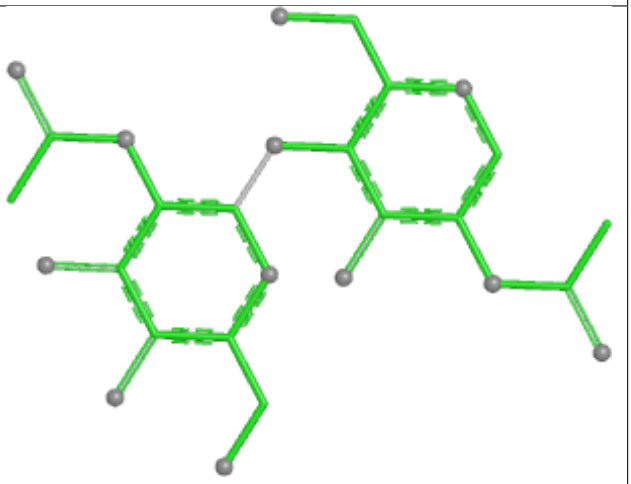


Rings

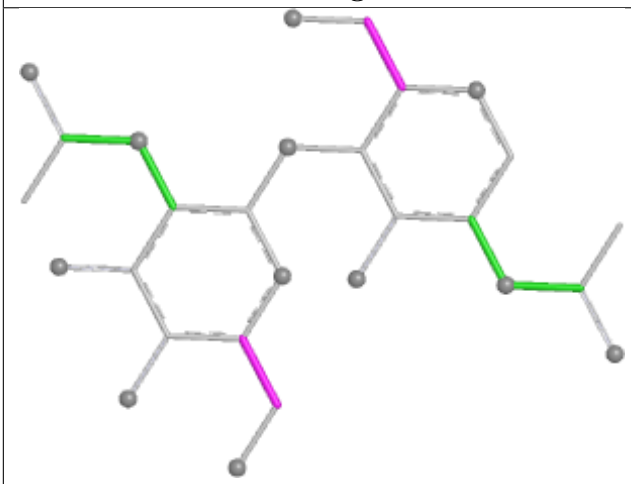
Oligosaccharide Chain E



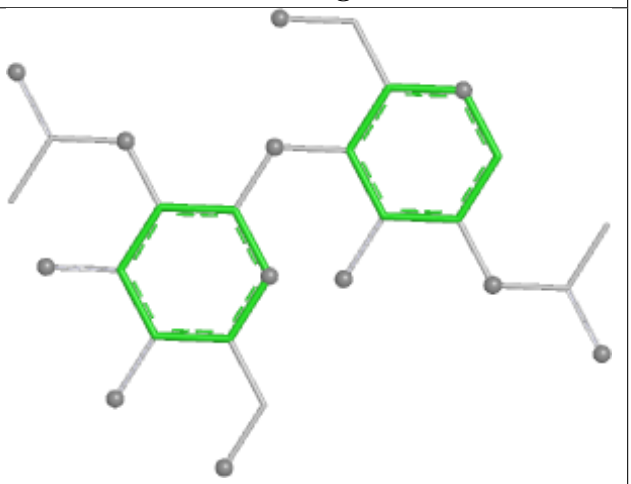
Bond lengths



Bond angles

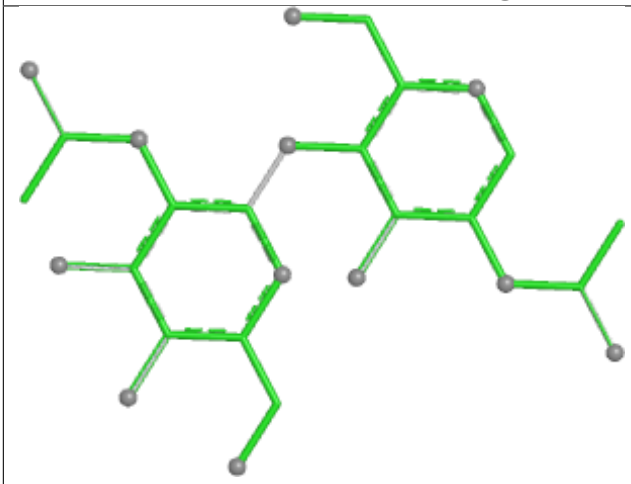


Torsions

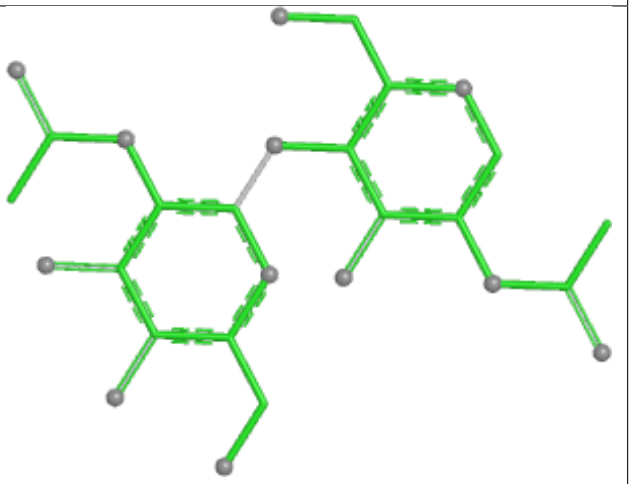


Rings

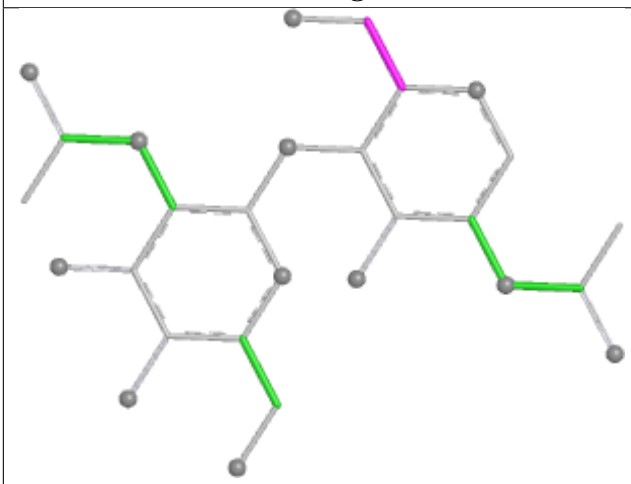
Oligosaccharide Chain F



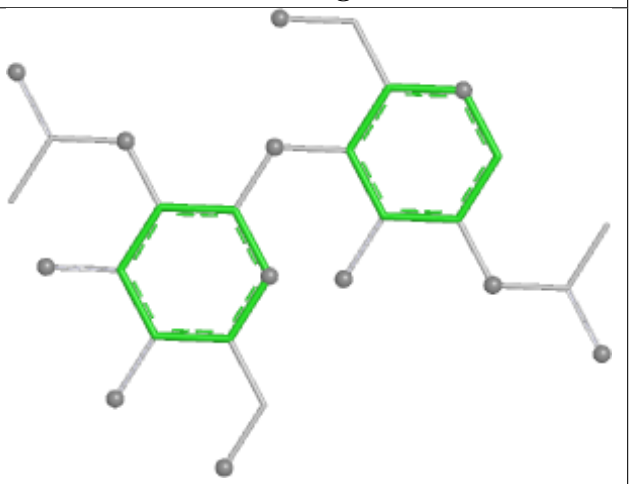
Bond lengths



Bond angles

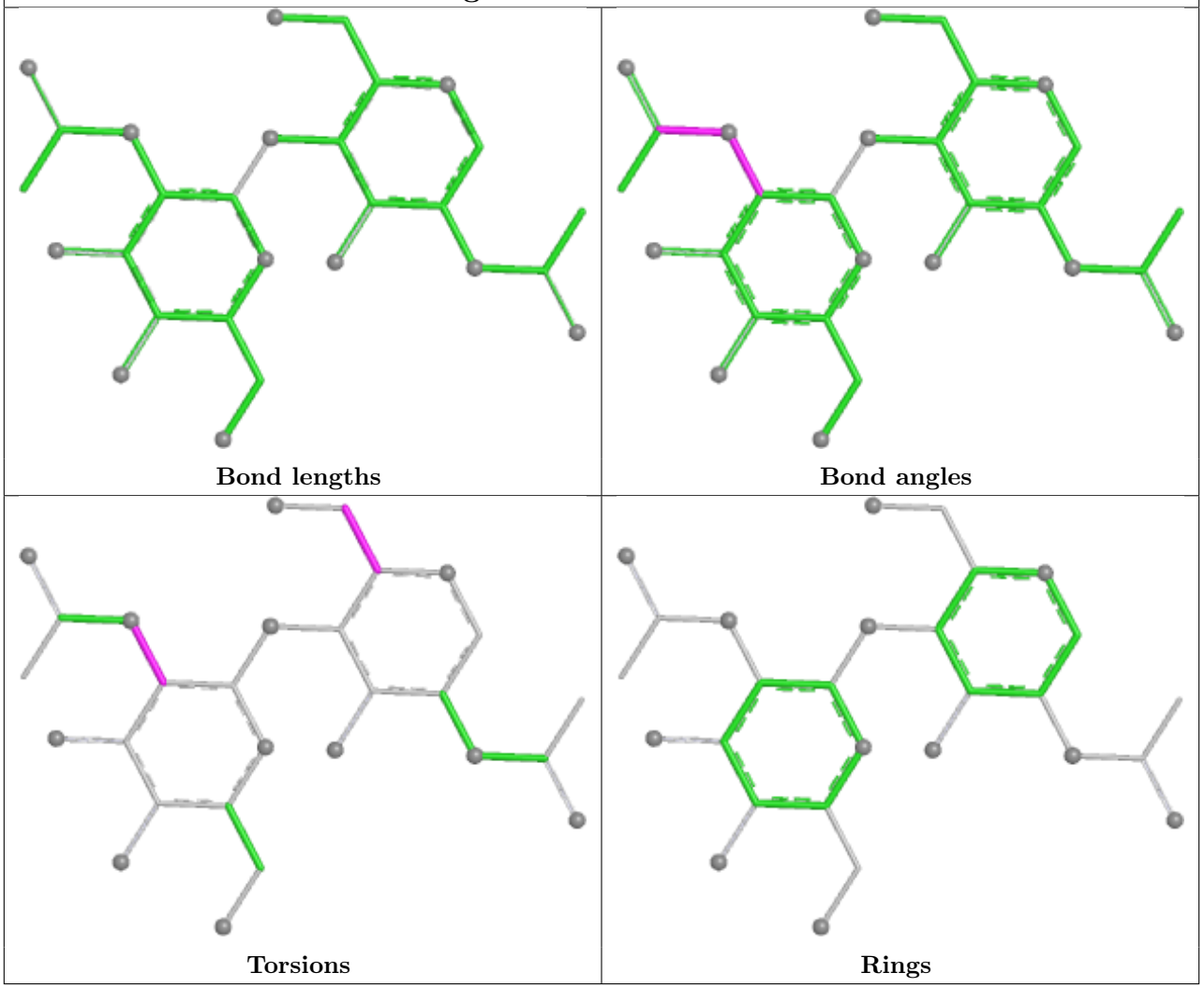


Torsions



Rings

Oligosaccharide Chain G



5.6 Ligand geometry (i)

9 ligands 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	$\#\|Z\| > 2$
3	NAG	A	1406	1	14,14,15	0.37	0	17,19,21	0.50	0
4	Y01	A	1420	-	38,38,38	0.88	0	57,57,57	1.40	8 (14%)
3	NAG	A	1413	1	14,14,15	0.37	0	17,19,21	0.57	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	NAG	A	1410	1	14,14,15	0.42	0	17,19,21	1.03	1 (5%)
4	Y01	A	1419	-	38,38,38	1.09	2 (5%)	57,57,57	1.53	9 (15%)
5	QO1	A	1421	-	53,53,53	5.11	12 (22%)	70,77,77	3.72	12 (17%)
3	NAG	A	1409	1	14,14,15	0.29	0	17,19,21	0.58	1 (5%)
3	NAG	A	1401	1	14,14,15	0.31	0	17,19,21	0.73	1 (5%)
3	NAG	A	1414	1	14,14,15	0.50	0	17,19,21	1.10	2 (11%)

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
3	NAG	A	1406	1	-	1/6/23/26	0/1/1/1
4	Y01	A	1420	-	-	11/19/77/77	0/4/4/4
3	NAG	A	1413	1	-	1/6/23/26	0/1/1/1
3	NAG	A	1410	1	-	3/6/23/26	0/1/1/1
4	Y01	A	1419	-	-	6/19/77/77	0/4/4/4
5	QO1	A	1421	-	-	8/31/69/69	0/5/5/5
3	NAG	A	1409	1	-	2/6/23/26	0/1/1/1
3	NAG	A	1401	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1414	1	-	4/6/23/26	0/1/1/1

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1421	QO1	C11-N01	-20.68	1.31	1.48
5	A	1421	QO1	C10-C11	-19.00	1.37	1.57
5	A	1421	QO1	C24-N01	14.24	1.57	1.37
5	A	1421	QO1	C10-C24	12.64	1.70	1.53
5	A	1421	QO1	C12-C11	9.82	1.66	1.51
5	A	1421	QO1	S01-N02	5.27	1.71	1.60
5	A	1421	QO1	C09-C10	-4.70	1.45	1.54
5	A	1421	QO1	C33-C32	4.07	1.53	1.47
5	A	1421	QO1	C28-C31	3.87	1.53	1.44
5	A	1421	QO1	O01-C17	2.85	1.43	1.38
4	A	1419	Y01	CBB-CBE	2.84	1.59	1.54
5	A	1421	QO1	C34-S01	2.75	1.81	1.75
5	A	1421	QO1	C25-N01	2.67	1.47	1.43
4	A	1419	Y01	CBI-CBE	2.18	1.59	1.55

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	A	1421	QO1	C10-C24-N01	-21.06	71.83	93.08
5	A	1421	QO1	O09-S01-O08	-12.27	102.42	118.87
5	A	1421	QO1	O10-C24-N01	9.68	144.65	131.85
5	A	1421	QO1	C11-N01-C24	8.42	102.68	95.30
5	A	1421	QO1	O10-C24-C10	7.63	143.51	135.44
5	A	1421	QO1	C11-C10-C24	6.36	94.08	85.08
4	A	1419	Y01	CAC-CBB-CAO	-5.49	101.84	110.34
5	A	1421	QO1	C10-C11-N01	5.26	91.40	86.56
4	A	1419	Y01	CAK-CBD-CBF	4.16	114.53	109.72
4	A	1420	Y01	CAC-CBB-CAO	-3.51	104.90	110.34
4	A	1419	Y01	CAS-CBF-CBD	-3.39	107.05	111.78
3	A	1410	NAG	C2-N2-C7	3.34	127.38	122.90
5	A	1421	QO1	O09-S01-N02	3.29	111.91	107.33
3	A	1414	NAG	C2-N2-C7	3.23	127.23	122.90
5	A	1421	QO1	C25-N01-C24	-3.14	128.02	132.98
4	A	1420	Y01	OAW-CBC-CAV	2.99	114.19	108.04
5	A	1421	QO1	O08-S01-N02	2.96	111.45	107.33
4	A	1420	Y01	OAW-CAY-OAG	-2.61	117.61	123.70
4	A	1420	Y01	CBF-CBD-CBG	-2.59	105.71	109.09
4	A	1419	Y01	CBI-CBG-CBD	-2.55	110.79	114.41
3	A	1401	NAG	C1-O5-C5	2.54	115.59	112.19
4	A	1419	Y01	CAR-CBC-CAV	-2.53	107.45	110.97
4	A	1419	Y01	OAW-CAY-CAM	2.49	116.86	111.48
5	A	1421	QO1	C08-C07-C06	-2.41	106.19	112.72
4	A	1420	Y01	OAW-CAY-CAM	2.35	116.56	111.48
4	A	1420	Y01	CAR-CBC-CAV	-2.29	107.80	110.97
4	A	1420	Y01	CAS-CBF-CBD	-2.25	108.64	111.78
5	A	1421	QO1	C34-S01-N02	2.18	109.24	107.82
4	A	1419	Y01	OAW-CAY-OAG	-2.18	118.62	123.70
4	A	1419	Y01	CAQ-CAP-CBE	2.11	109.28	105.14
4	A	1420	Y01	CAJ-CAO-CBB	-2.08	109.27	115.08
3	A	1414	NAG	C1-O5-C5	2.06	114.94	112.19
4	A	1419	Y01	CAL-CAM-CAY	-2.05	107.35	113.44
3	A	1409	NAG	C1-O5-C5	2.01	114.89	112.19

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1420	Y01	CAV-CBC-OAW-CAY
4	A	1420	Y01	CAM-CAY-OAW-CBC

Continued on next page...

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Mol	Chain	Res	Type	Atoms
5	A	1421	QO1	C06-C07-C08-C09
5	A	1421	QO1	C07-C08-C09-C10
5	A	1421	QO1	C33-N02-S01-C34
5	A	1421	QO1	C33-N02-S01-O08
5	A	1421	QO1	C33-N02-S01-O09
4	A	1420	Y01	OAG-CAY-OAW-CBC
4	A	1420	Y01	CAX-CAL-CAM-CAY
4	A	1419	Y01	CAJ-CAO-CBB-CBE
4	A	1420	Y01	CAJ-CAO-CBB-CAC
4	A	1420	Y01	CAJ-CAO-CBB-CBE
3	A	1414	NAG	O5-C5-C6-O6
4	A	1420	Y01	CAN-CAJ-CAO-CBB
4	A	1419	Y01	CAN-CAJ-CAO-CBB
3	A	1414	NAG	C4-C5-C6-O6
4	A	1419	Y01	CAJ-CAO-CBB-CAC
4	A	1419	Y01	CAO-CAJ-CAN-CBA
3	A	1406	NAG	O5-C5-C6-O6
4	A	1419	Y01	CAM-CAY-OAW-CBC
3	A	1413	NAG	O5-C5-C6-O6
4	A	1419	Y01	OAG-CAY-OAW-CBC
3	A	1410	NAG	C1-C2-N2-C7
5	A	1421	QO1	O11-C07-C08-C09
3	A	1410	NAG	O5-C5-C6-O6
3	A	1409	NAG	C4-C5-C6-O6
5	A	1421	QO1	C26-C25-N01-C11
4	A	1420	Y01	CAJ-CAN-CBA-CAA
5	A	1421	QO1	C30-C25-N01-C11
3	A	1414	NAG	C1-C2-N2-C7
3	A	1410	NAG	C3-C2-N2-C7
3	A	1414	NAG	C3-C2-N2-C7
4	A	1420	Y01	CAM-CAL-CAX-OAH
4	A	1420	Y01	CAM-CAL-CAX-OAF
4	A	1420	Y01	CAO-CAJ-CAN-CBA
3	A	1409	NAG	O5-C5-C6-O6

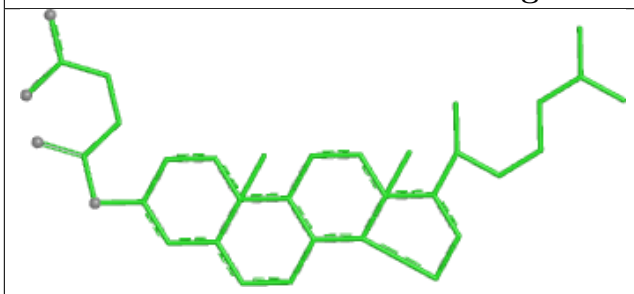
There are no ring outliers.

2 monomers are involved in 2 short contacts:

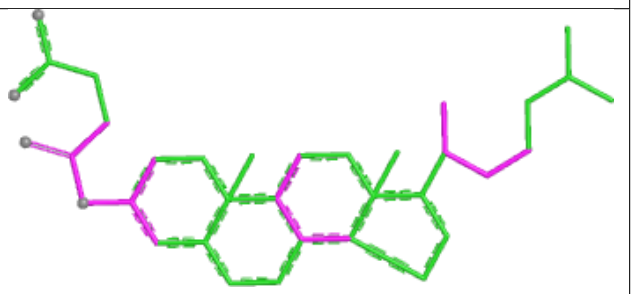
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1419	Y01	1	0
5	A	1421	QO1	1	0

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

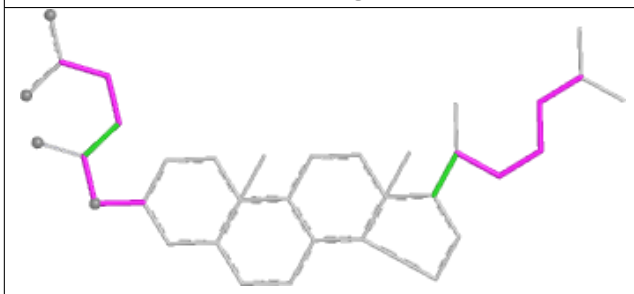
Ligand Y01 A 1420



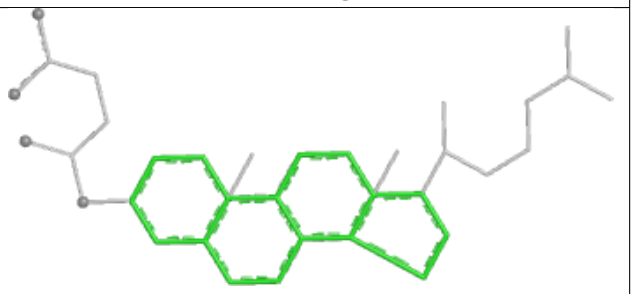
Bond lengths



Bond angles

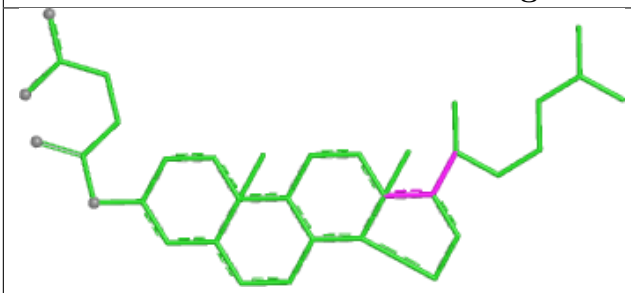


Torsions

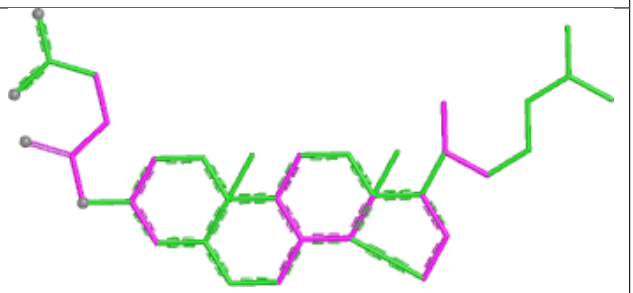


Rings

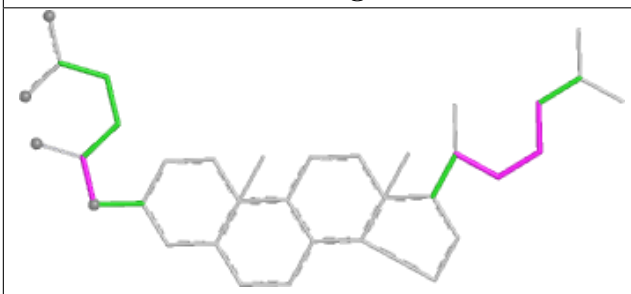
Ligand Y01 A 1419



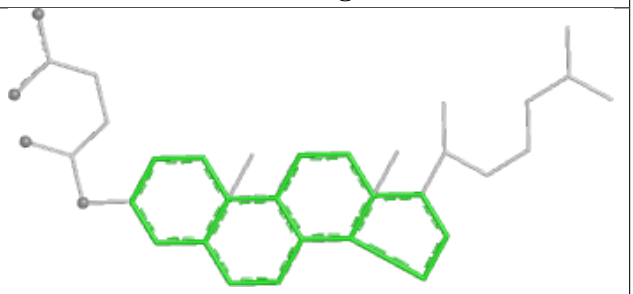
Bond lengths



Bond angles

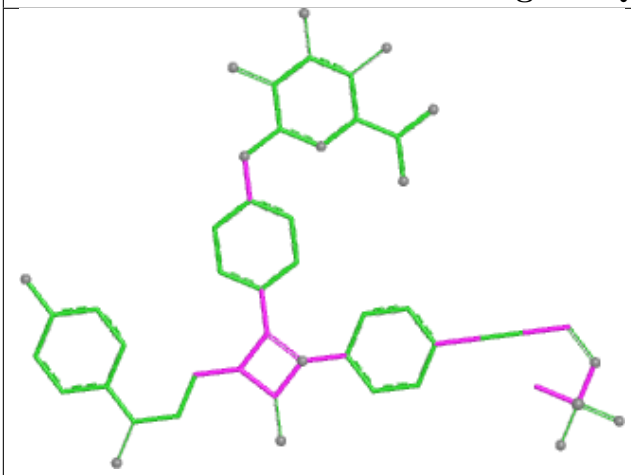


Torsions

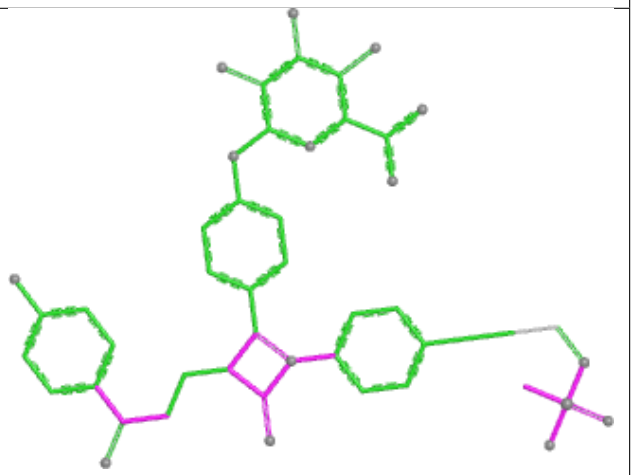


Rings

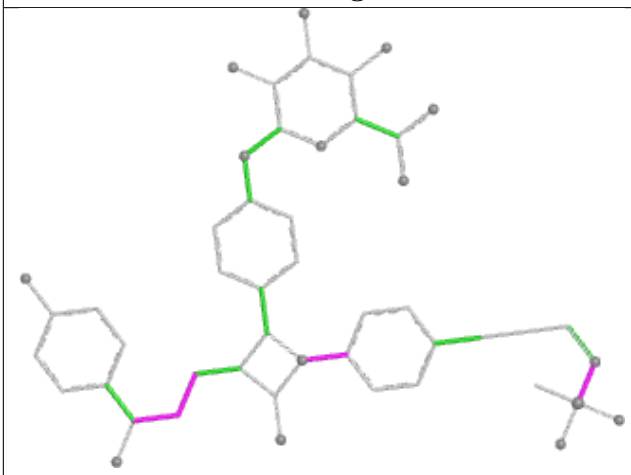
Ligand QO1 A 1421



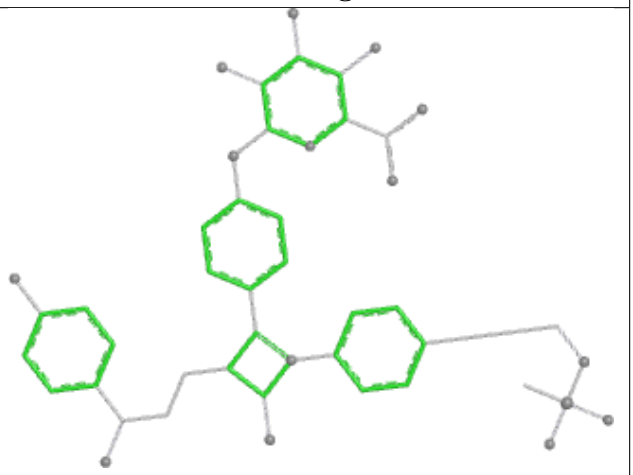
Bond lengths



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.

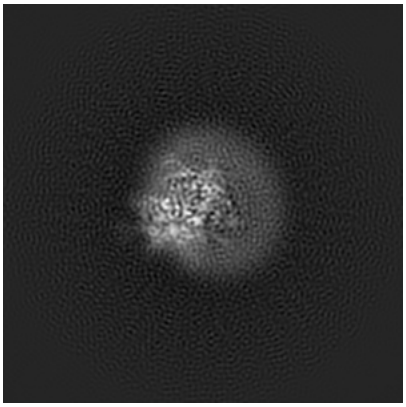
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-21037. These allow visual inspection of the internal detail of the map and identification of artifacts.

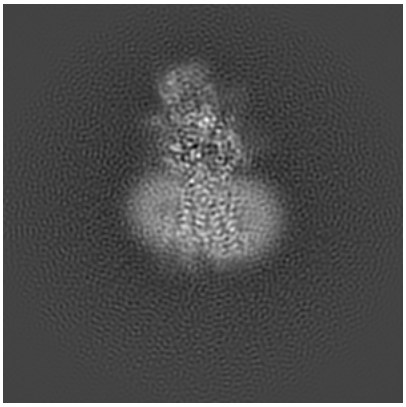
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

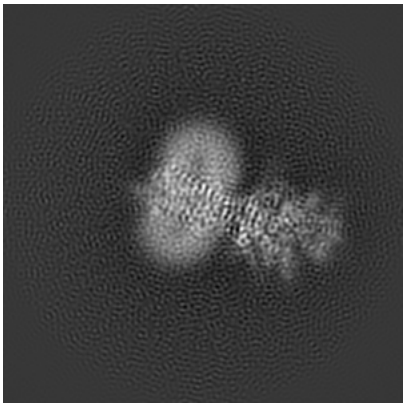
6.1.1 Primary map



X



Y

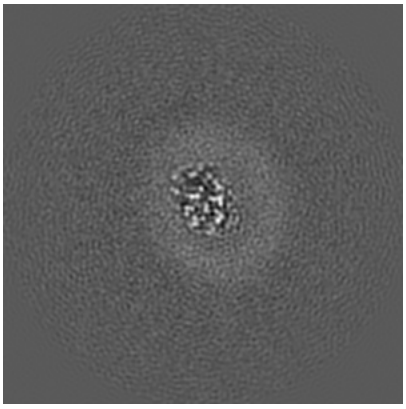


Z

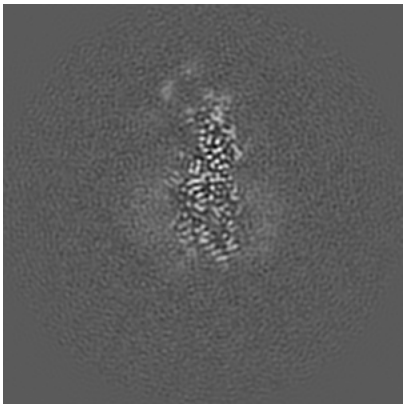
The images above show the map projected in three orthogonal directions.

6.2 Central slices

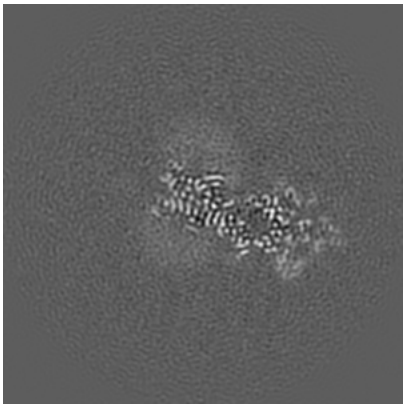
6.2.1 Primary map



X Index: 128



Y Index: 128

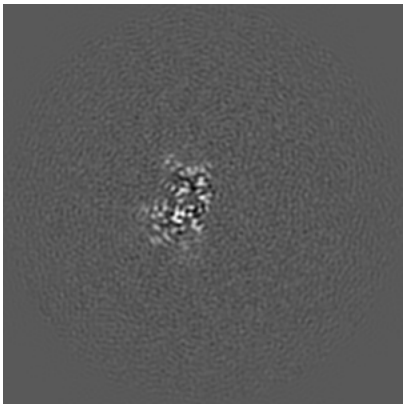


Z Index: 128

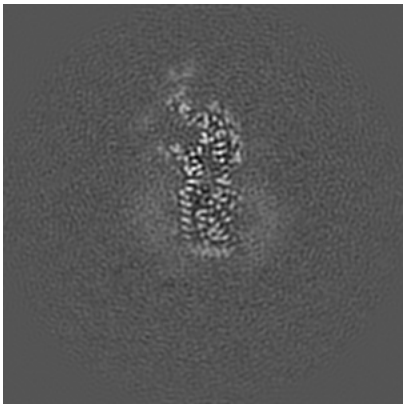
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

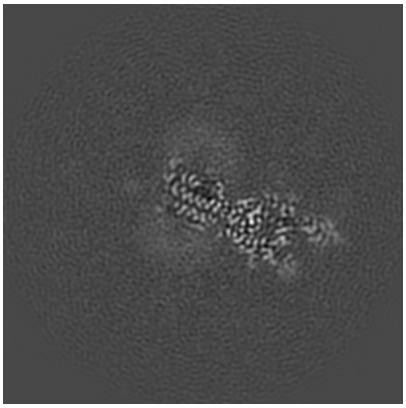
6.3.1 Primary map



X Index: 157



Y Index: 123

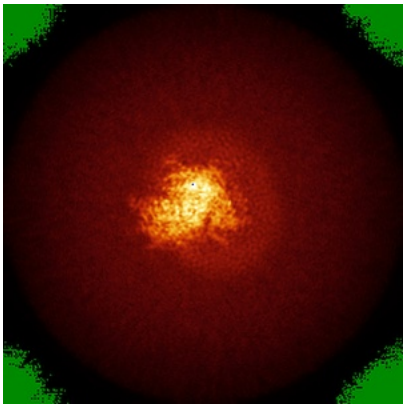


Z Index: 125

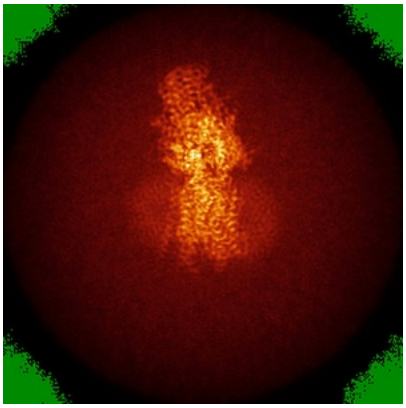
The images above show the largest variance slices of the map in three orthogonal directions.

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

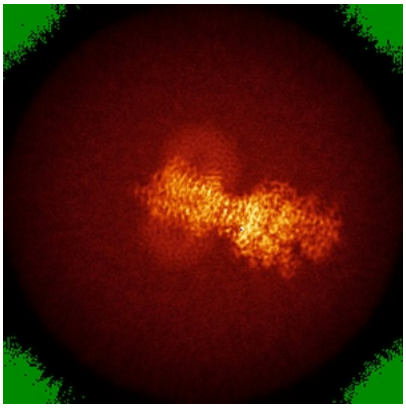
6.4.1 Primary map



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

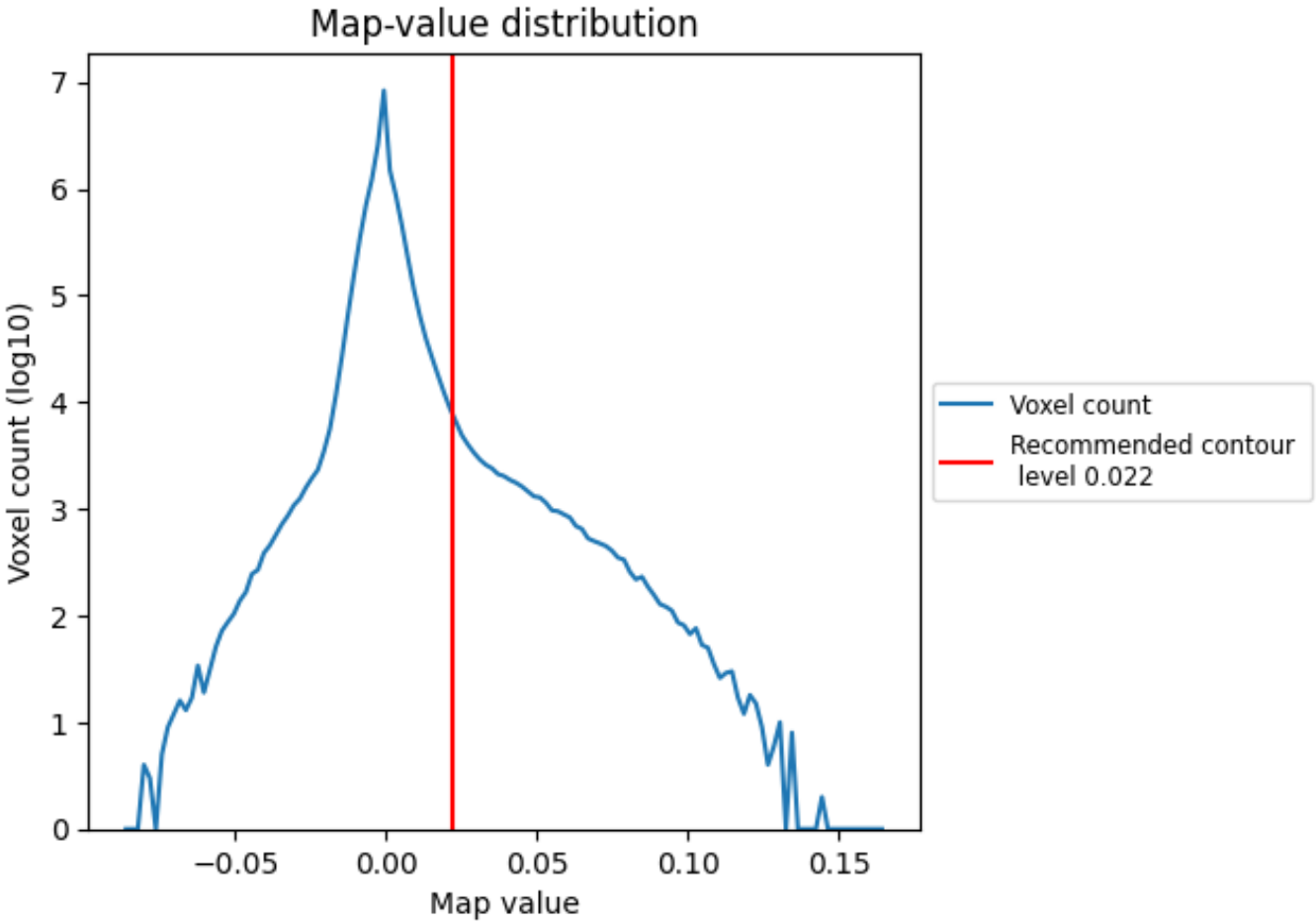
6.6 Mask visualisation (i)

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

7 Map analysis

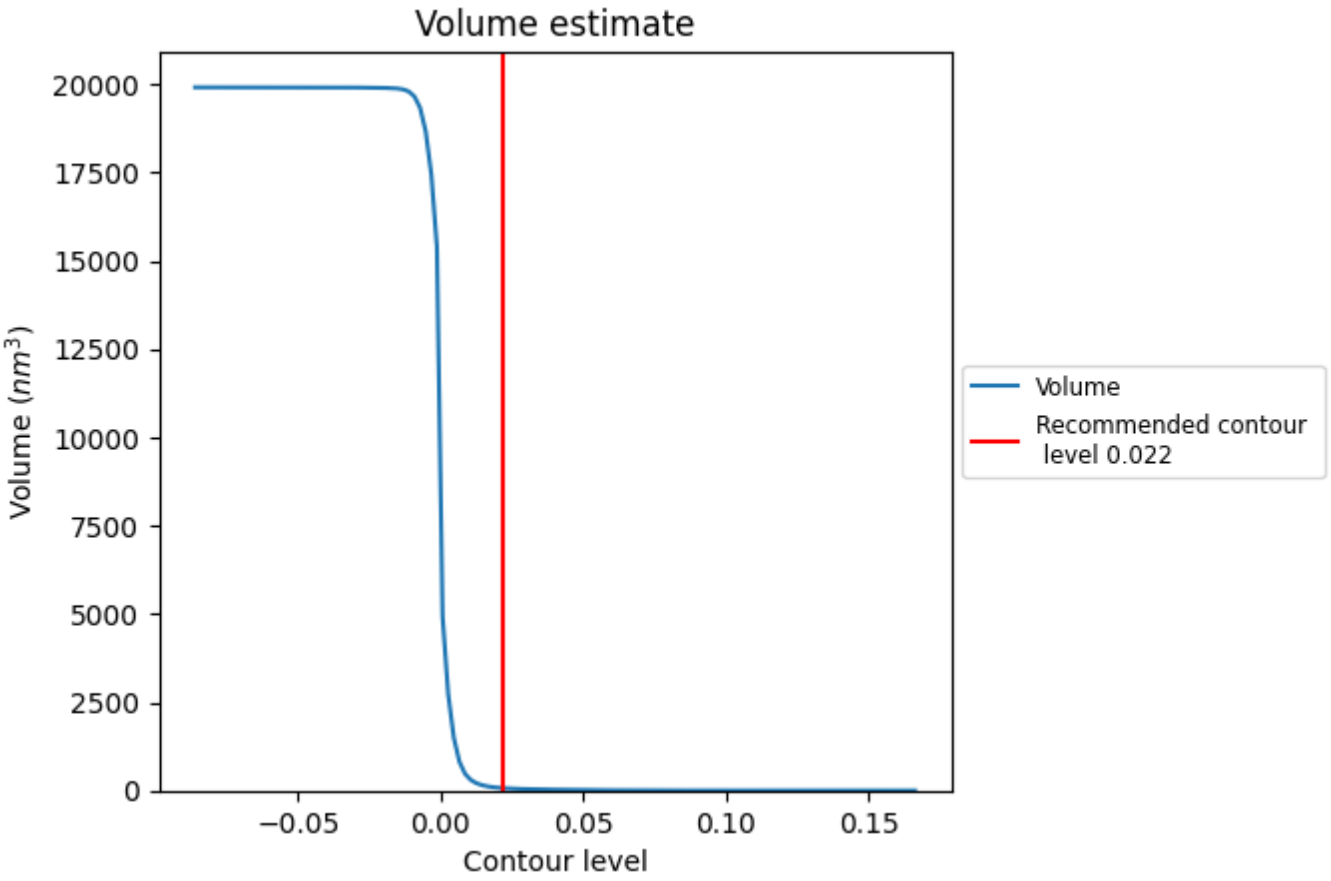
This section contains the results of statistical analysis of the map.

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.

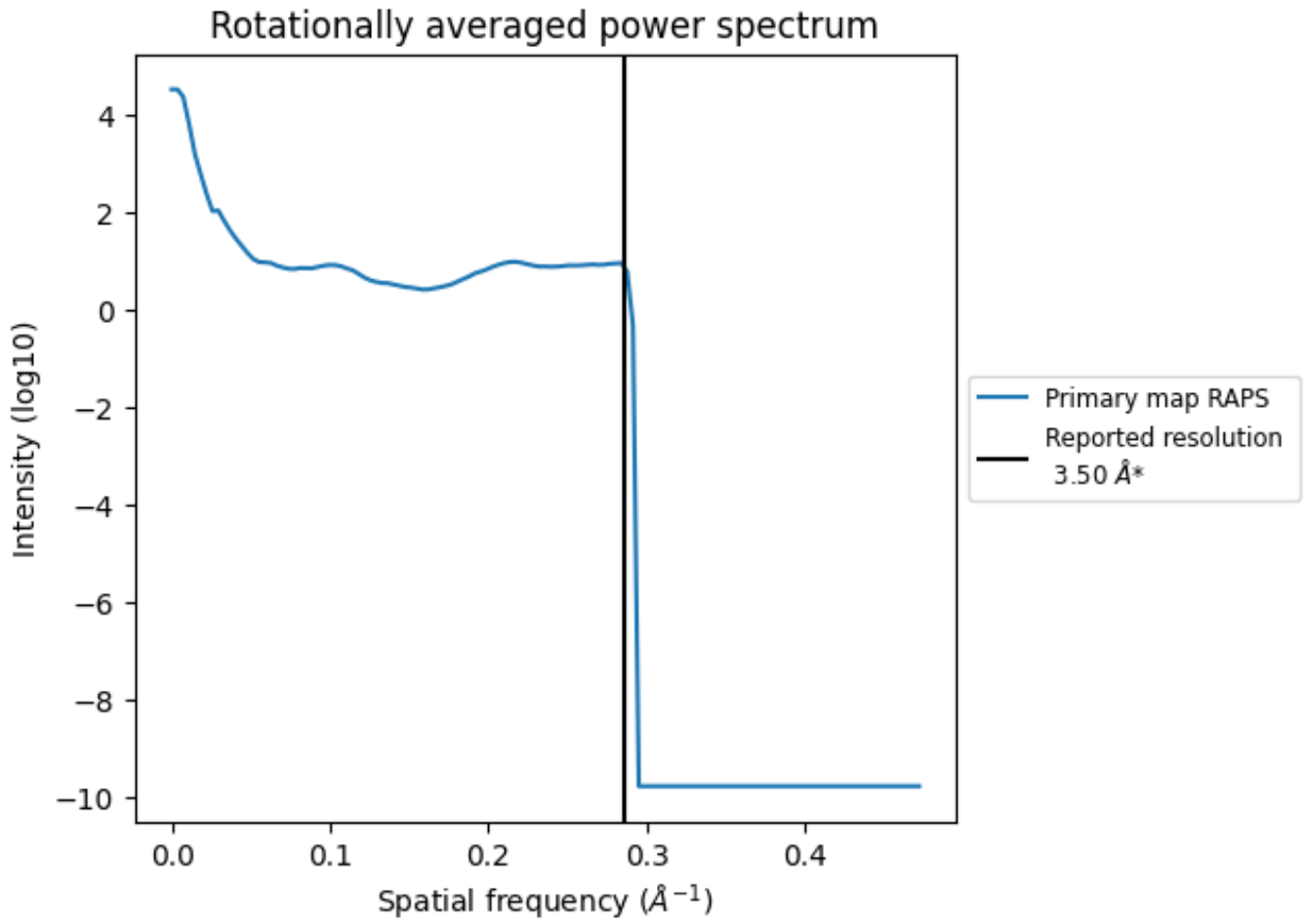
7.2 Volume estimate



The volume at the recommended contour level is 67 nm^3; this corresponds to an approximate mass of 61 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 0.286 Å^{-1}

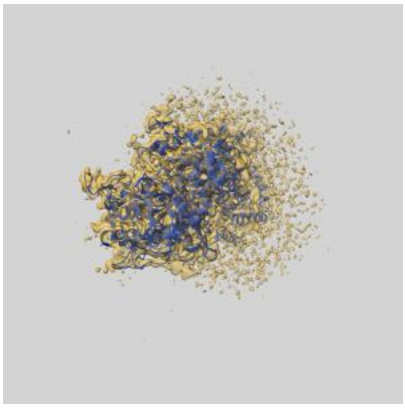
8 Fourier-Shell correlation (i)

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

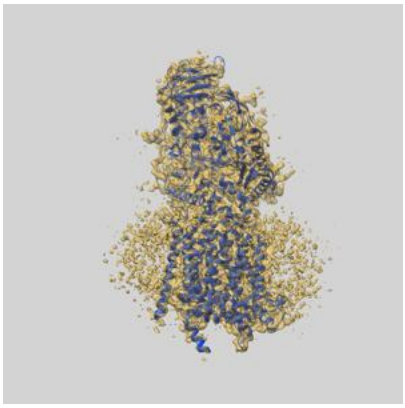
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-21037 and PDB model 6V3H. Per-residue inclusion information can be found in section 3 on page 7.

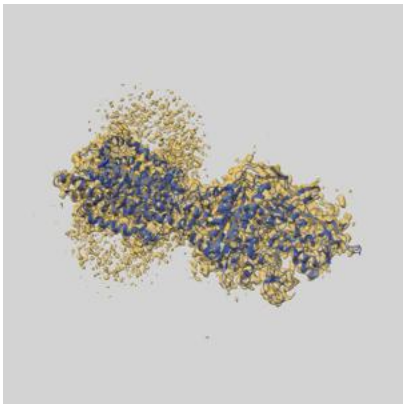
9.1 Map-model overlay



X



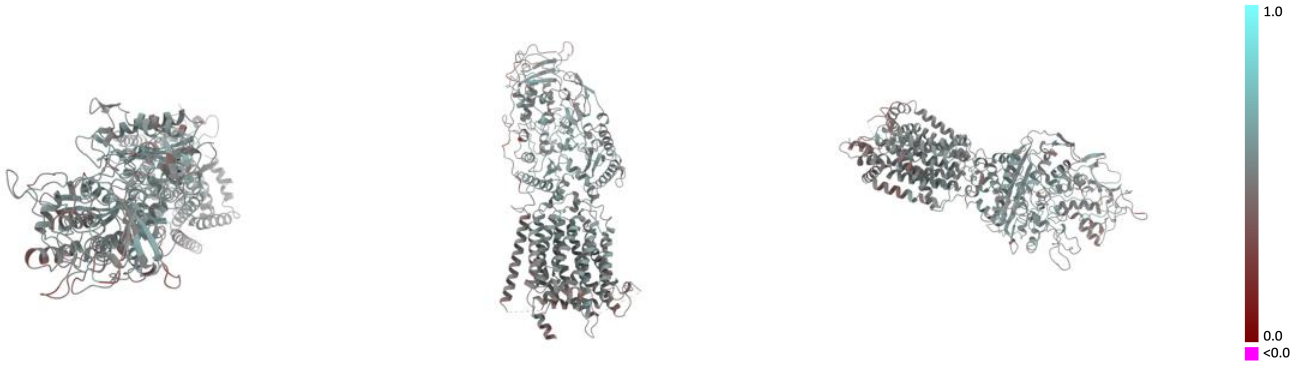
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.022 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.

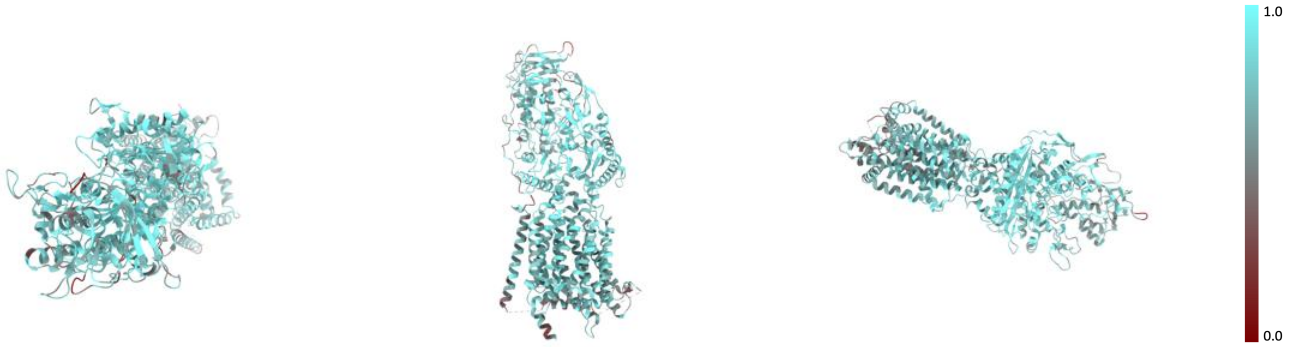
9.2 Q-score mapped to coordinate model (i)



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.

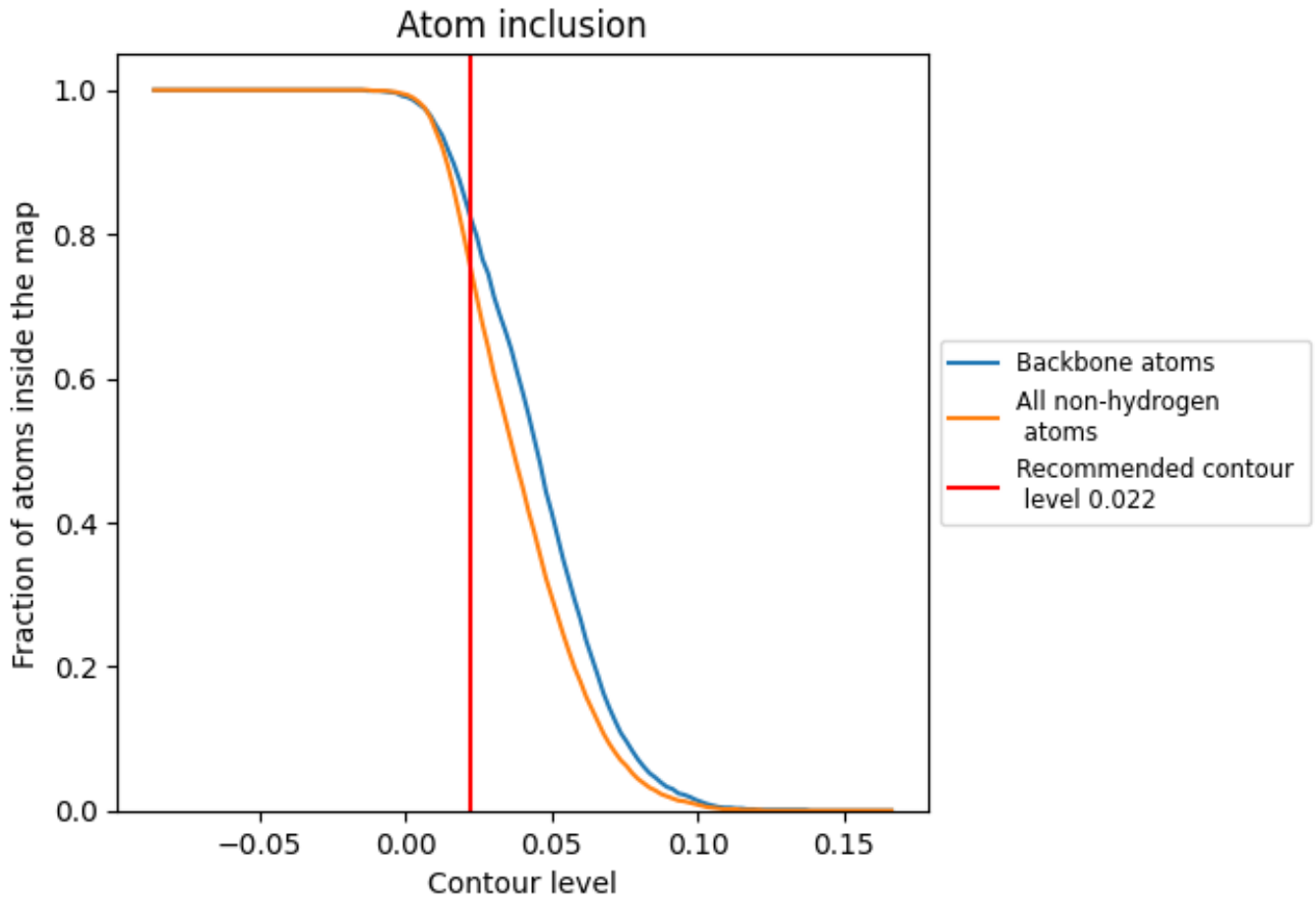
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.022).

9.4 Atom inclusion (i)



At the recommended contour level, 83% of all backbone atoms, 76% 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 (0.022) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7570	0.5000
A	0.7600	0.5010
B	0.5710	0.3630
C	0.5000	0.4070
D	0.6070	0.5200
E	0.5710	0.4440
F	0.7860	0.4970
G	0.5710	0.4690