Full wwPDB EM Validation Report ⓘ

Nov 4, 2024 – 04:13 AM JST

PDB ID	:	7DSQ
EMDB ID	:	EMD-30841
Title	:	Overall structure of the LAT1-4F2hc bound with 3,5-diiodo-L-tyrosine
Authors	:	Yan, R.H.; Li, Y.N.; Zhang, Y.Y.; Zhong, X.Y.; Zhou, Q.
Deposited on	:	2020-12-31
Resolution	:	3.40 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:

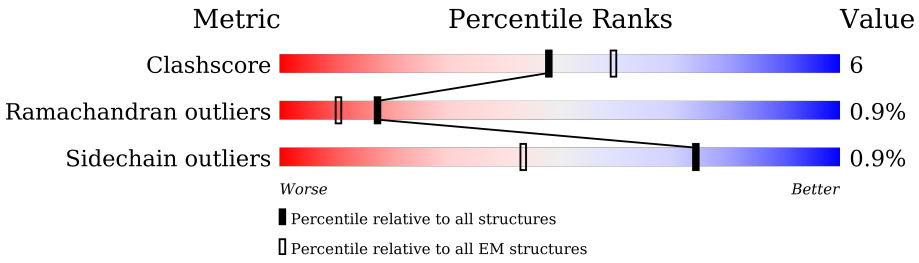
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance

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

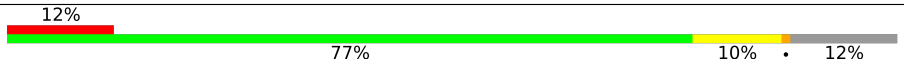
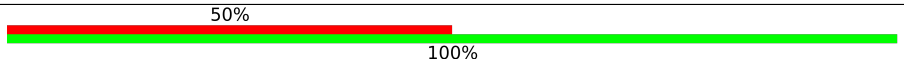
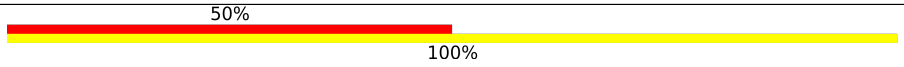
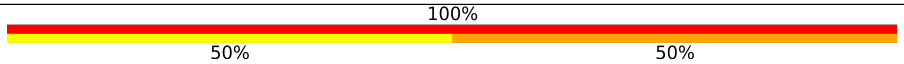
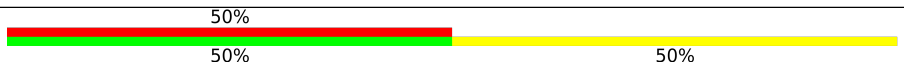
The reported resolution of this entry is 3.40 Å.

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	647	
2	B	527	
3	C	2	
3	D	2	
3	E	2	
3	F	2	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	TYI	B	601	-	-	X	-
5	Y01	B	602	X	-	-	-
5	Y01	B	603	X	-	-	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 7507 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 4F2 cell-surface antigen heavy chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	470	3661	2342	627	685	7	0	0

There are 17 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-13	MET	-	initiating methionine	UNP J3KPF3
A	-12	ALA	-	expression tag	UNP J3KPF3
A	-11	HIS	-	expression tag	UNP J3KPF3
A	-10	HIS	-	expression tag	UNP J3KPF3
A	-9	HIS	-	expression tag	UNP J3KPF3
A	-8	HIS	-	expression tag	UNP J3KPF3
A	-7	HIS	-	expression tag	UNP J3KPF3
A	-6	HIS	-	expression tag	UNP J3KPF3
A	-5	HIS	-	expression tag	UNP J3KPF3
A	-4	HIS	-	expression tag	UNP J3KPF3
A	-3	HIS	-	expression tag	UNP J3KPF3
A	-2	HIS	-	expression tag	UNP J3KPF3
A	-1	SER	-	expression tag	UNP J3KPF3
A	0	GLY	-	expression tag	UNP J3KPF3
A	1	ARG	-	expression tag	UNP J3KPF3
A	632	LEU	-	expression tag	UNP J3KPF3
A	633	GLU	-	expression tag	UNP J3KPF3

- Molecule 2 is a protein called Large neutral amino acids transporter small subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	464	3586	2401	553	612	20	0	0

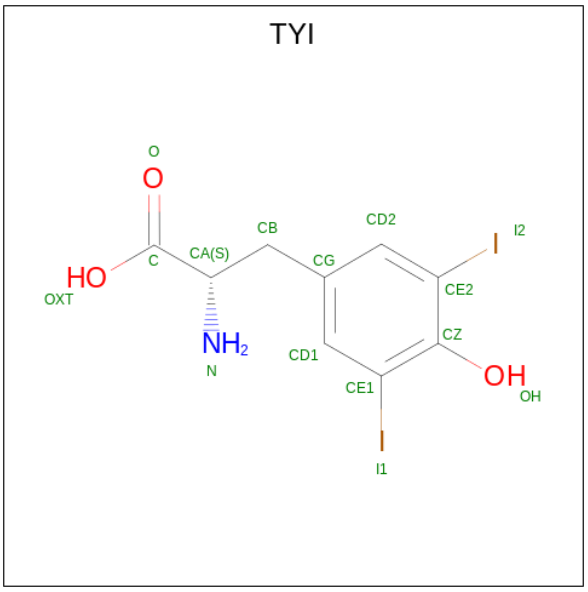
There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-19	MET	-	initiating methionine	UNP Q01650
B	-18	ALA	-	expression tag	UNP Q01650
B	-17	ASP	-	expression tag	UNP Q01650
B	-16	TYR	-	expression tag	UNP Q01650
B	-15	LYS	-	expression tag	UNP Q01650
B	-14	ASP	-	expression tag	UNP Q01650
B	-13	ASP	-	expression tag	UNP Q01650
B	-12	ASP	-	expression tag	UNP Q01650
B	-11	ASP	-	expression tag	UNP Q01650
B	-10	LYS	-	expression tag	UNP Q01650
B	-9	SER	-	expression tag	UNP Q01650
B	-8	GLY	-	expression tag	UNP Q01650
B	-7	PRO	-	expression tag	UNP Q01650
B	-6	ASP	-	expression tag	UNP Q01650
B	-5	GLU	-	expression tag	UNP Q01650
B	-4	VAL	-	expression tag	UNP Q01650
B	-3	ASP	-	expression tag	UNP Q01650
B	-2	ALA	-	expression tag	UNP Q01650
B	-1	SER	-	expression tag	UNP Q01650
B	0	GLY	-	expression tag	UNP Q01650
B	1	ARG	-	expression tag	UNP Q01650

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

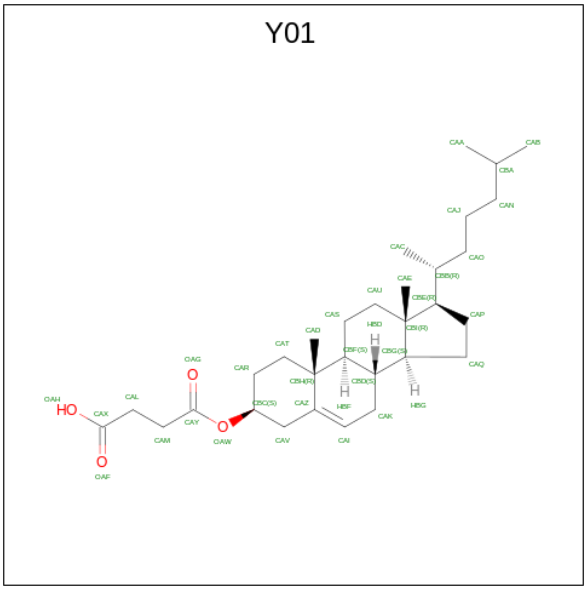
Mol	Chain	Residues	Atoms				AltConf	Trace
3	C	2	Total	C	N	O	0	0
			28	16	2	10		
3	D	2	Total	C	N	O	0	0
			28	16	2	10		
3	E	2	Total	C	N	O	0	0
			28	16	2	10		
3	F	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 4 is 3,5-DIIODOTYROSINE (three-letter code: TYI) (formula: $C_9H_9I_2NO_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
4	B	1	Total	C	I	N	O	0
			15	9	2	1	3	

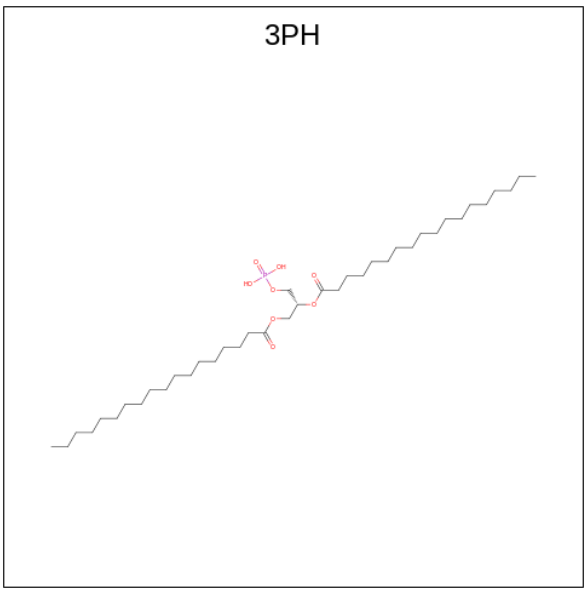
- Molecule 5 is CHOLESTEROL HEMISUCCINATE (three-letter code: Y01) (formula: $C_{31}H_{50}O_4$).



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

- Molecule 6 is 1,2-DIACYL-GLYCEROL-3-SN-PHOSPHATE (three-letter code: 3PH)

(formula: $C_{39}H_{77}O_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
6	B	1	48	39	8	1	0

- Molecule 7 is water.

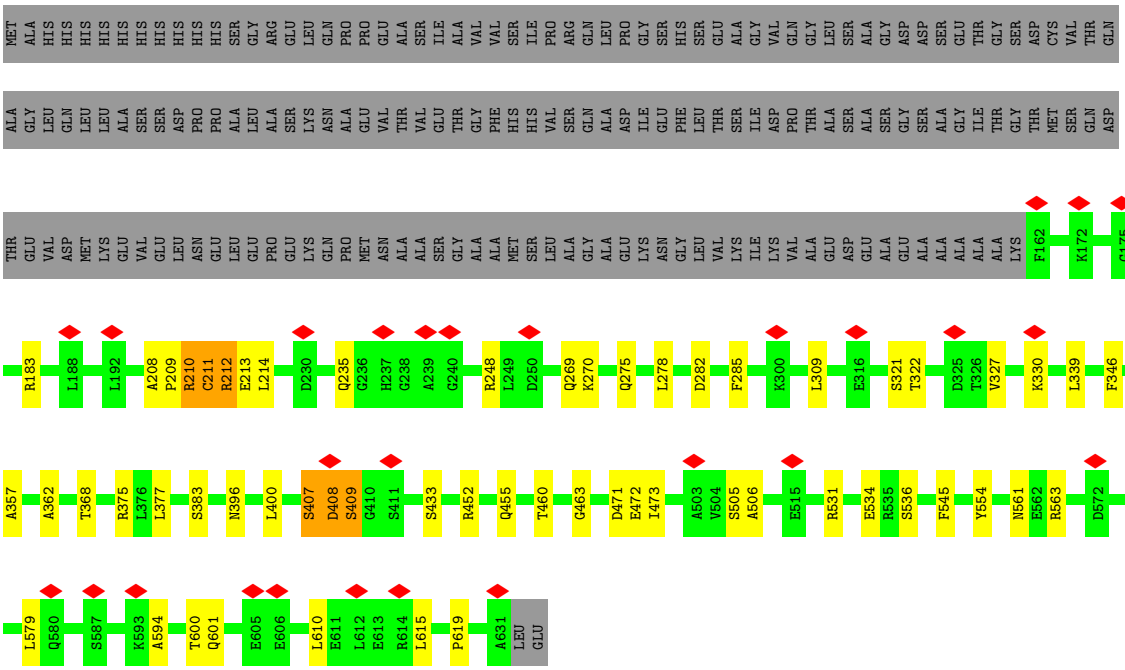
Mol	Chain	Residues	Atoms		AltConf
			Total	O	
7	B	15	15	15	0

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.

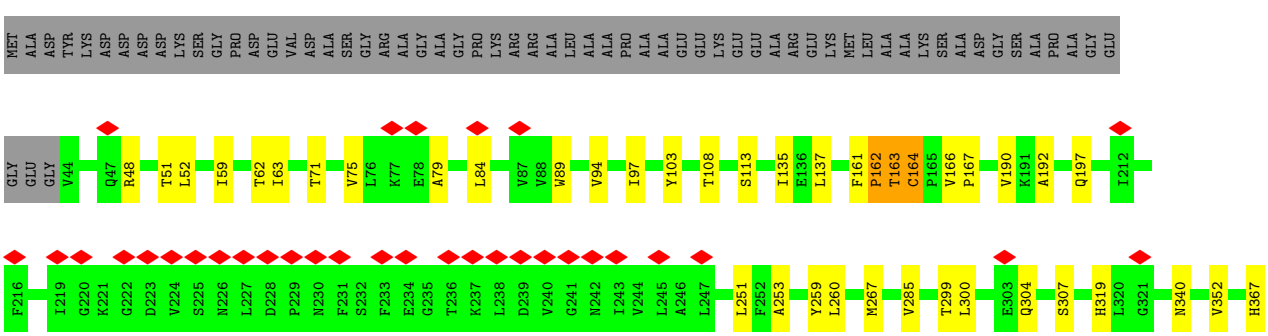
• Molecule 1: 4F2 cell-surface antigen heavy chain

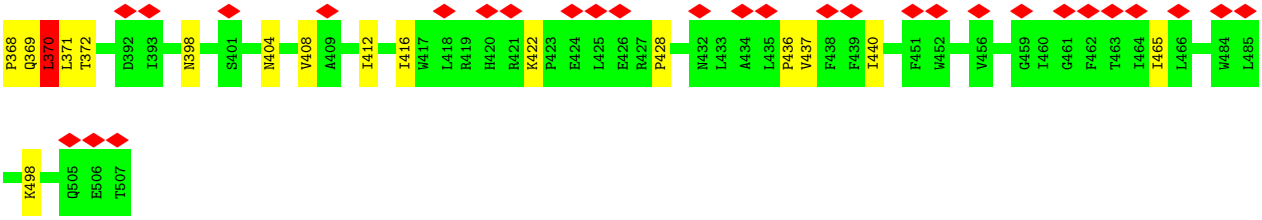
Chain A:



• Molecule 2: Large neutral amino acids transporter small subunit 1

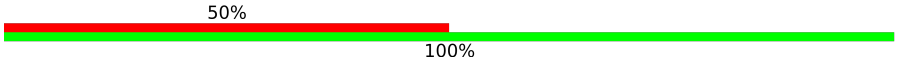
Chain B:





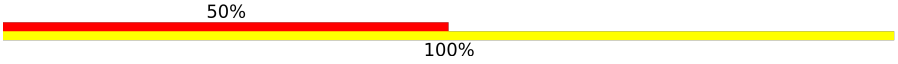
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:



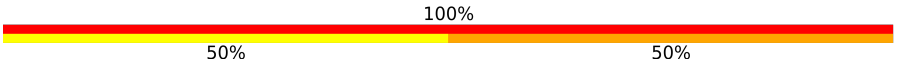
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:



• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:



• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	93151	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.186	Depositor
Minimum map value	-0.105	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	278.272, 278.272, 278.272	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.087, 1.087, 1.087	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, 3PH, Y01, TYI

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	0.36	0/3746	0.55	0/5084
2	B	0.38	0/3682	0.59	0/5033
All	All	0.37	0/7428	0.57	0/10117

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	3661	0	3646	45	0
2	B	3586	0	3726	52	0
3	C	28	0	25	0	0
3	D	28	0	25	0	0
3	E	28	0	25	1	0
3	F	28	0	25	0	0
4	B	15	0	8	9	0
5	B	70	0	98	3	0
6	B	48	0	75	0	0
7	B	15	0	0	1	0
All	All	7507	0	7653	87	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 6.

All (87) 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)
2:B:259:TYR:CE2	4:B:601:TYI:I2	2.55	1.28
2:B:62:THR:HG22	4:B:601:TYI:I2	2.13	1.19
2:B:62:THR:CG2	4:B:601:TYI:I2	2.72	1.08
2:B:404:ASN:ND2	4:B:601:TYI:I1	2.63	1.01
1:A:210:ARG:HA	2:B:161:PHE:CE1	1.96	1.00
2:B:259:TYR:HE2	4:B:601:TYI:I2	2.19	0.91
1:A:210:ARG:HA	2:B:161:PHE:HE1	1.35	0.87
4:B:601:TYI:I1	7:B:704:HOH:O	2.63	0.85
1:A:214:LEU:HD21	2:B:163:THR:CG2	2.07	0.84
2:B:259:TYR:CZ	4:B:601:TYI:I2	3.08	0.75
2:B:62:THR:HG21	4:B:601:TYI:I2	2.55	0.75
2:B:75:VAL:HG11	2:B:89:TRP:HE1	1.51	0.74
1:A:210:ARG:O	2:B:164:CYS:SG	2.49	0.71
1:A:211:CYS:SG	2:B:164:CYS:N	2.65	0.70
1:A:214:LEU:HD21	2:B:163:THR:HG23	1.74	0.68
1:A:210:ARG:O	2:B:161:PHE:HD1	1.80	0.65
1:A:214:LEU:CD2	2:B:163:THR:HG21	2.30	0.61
1:A:212:ARG:CG	1:A:213:GLU:N	2.62	0.60
2:B:367:HIS:HD2	2:B:370:LEU:HG	1.67	0.60
1:A:452:ARG:NH1	1:A:600:THR:O	2.36	0.59
1:A:214:LEU:HD21	2:B:163:THR:HG21	1.85	0.58
1:A:212:ARG:HG2	1:A:213:GLU:H	1.69	0.58
1:A:214:LEU:CD2	2:B:163:THR:CG2	2.80	0.58
1:A:212:ARG:CG	1:A:213:GLU:H	2.17	0.56
1:A:183:ARG:NH1	2:B:498:LYS:O	2.39	0.55
2:B:192:ALA:HB1	5:B:603:Y01:HAD1	1.87	0.55
1:A:210:ARG:HA	2:B:161:PHE:CD1	2.39	0.54
2:B:299:THR:OG1	2:B:319:HIS:NE2	2.39	0.54
2:B:416:ILE:HD11	2:B:436:PRO:HB2	1.90	0.54
2:B:368:PRO:O	2:B:369:GLN:HB2	2.07	0.54
1:A:278:LEU:HD12	1:A:309:LEU:HD22	1.91	0.53
1:A:455:GLN:NE2	1:A:471:ASP:O	2.43	0.52
1:A:505:SER:OG	1:A:506:ALA:N	2.43	0.51
2:B:103:TYR:HE1	2:B:408:VAL:HG13	1.75	0.51
2:B:197:GLN:OE1	2:B:340:ASN:ND2	2.44	0.51
2:B:113:SER:HB3	2:B:352:VAL:HG21	1.92	0.51
1:A:383:SER:HA	3:E:1:NAG:H82	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:79:ALA:HB1	2:B:84:LEU:HD23	1.94	0.49
2:B:412:ILE:HB	2:B:440:ILE:HD13	1.95	0.49
2:B:437:VAL:HA	2:B:440:ILE:HG22	1.96	0.48
1:A:269:GLN:OE1	1:A:275:GLN:NE2	2.44	0.48
1:A:368:THR:HG22	1:A:375:ARG:HB3	1.94	0.48
1:A:407:SER:O	1:A:409:SER:N	2.47	0.48
2:B:51:THR:OG1	2:B:52:LEU:N	2.47	0.48
2:B:367:HIS:CD2	2:B:370:LEU:HG	2.46	0.47
1:A:208:ALA:HB1	1:A:209:PRO:HD2	1.96	0.47
1:A:472:GLU:HG2	1:A:473:ILE:HG23	1.96	0.47
2:B:166:VAL:HG13	2:B:167:PRO:HD2	1.97	0.47
1:A:235:GLN:HB3	1:A:248:ARG:HH21	1.80	0.46
1:A:327:VAL:HA	1:A:330:LYS:HG2	1.96	0.46
2:B:398:ASN:OD1	2:B:398:ASN:N	2.47	0.46
2:B:259:TYR:CD2	4:B:601:TYI:I2	3.33	0.46
2:B:162:PRO:HG2	2:B:163:THR:H	1.81	0.46
1:A:346:PHE:HB2	1:A:377:LEU:HD12	1.98	0.45
1:A:354:LEU:HB3	1:A:357:ALA:HB2	1.97	0.45
1:A:534:GLU:HG3	1:A:536:SER:H	1.80	0.45
1:A:545:PHE:HE1	1:A:579:LEU:HD22	1.81	0.45
2:B:48:ARG:NH1	2:B:267:MET:O	2.43	0.44
1:A:282:ASP:HB3	1:A:285:PHE:HD2	1.82	0.44
1:A:400:LEU:HD22	1:A:433:SER:HB2	1.98	0.44
2:B:135:ILE:HG13	2:B:465:ILE:HG12	1.99	0.44
1:A:339:LEU:HD23	1:A:339:LEU:HA	1.90	0.44
2:B:63:ILE:HG21	2:B:285:VAL:HG11	2.00	0.43
2:B:300:LEU:HB3	2:B:304:GLN:HB2	1.99	0.43
1:A:362:ALA:HA	1:A:396:ASN:HD21	1.82	0.43
5:B:603:Y01:HAU1	5:B:603:Y01:HBB	1.79	0.43
1:A:460:THR:OG1	1:A:554:TYR:OH	2.30	0.43
2:B:422:LYS:HE3	2:B:422:LYS:HB2	1.85	0.43
1:A:463:GLY:O	1:A:531:ARG:NH2	2.51	0.43
2:B:94:VAL:HA	2:B:97:ILE:HD12	2.01	0.42
2:B:307:SER:O	2:B:307:SER:OG	2.35	0.42
1:A:601:GLN:NE2	1:A:619:PRO:O	2.49	0.42
1:A:594:ALA:O	1:A:610:LEU:N	2.47	0.42
2:B:251:LEU:HA	2:B:251:LEU:HD23	1.85	0.41
1:A:210:ARG:O	2:B:161:PHE:CD1	2.67	0.41
1:A:212:ARG:HG2	1:A:213:GLU:N	2.34	0.41
2:B:59:ILE:HD11	2:B:260:LEU:HD22	2.02	0.41
1:A:270:LYS:HD2	1:A:270:LYS:HA	1.76	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:407:SER:OG	1:A:408:ASP:N	2.52	0.41
2:B:190:VAL:HG23	2:B:372:THR:HG22	2.03	0.41
2:B:370:LEU:HG	2:B:370:LEU:O	2.20	0.41
5:B:603:Y01:HAC1	5:B:603:Y01:HAP1	1.92	0.41
2:B:71:THR:HG21	2:B:253:ALA:HB2	2.03	0.40
1:A:610:LEU:HD21	1:A:615:LEU:HD13	2.03	0.40
2:B:108:THR:HG22	2:B:428:PRO:HD2	2.02	0.40
1:A:561:ASN:O	1:A:563:ARG:NH1	2.53	0.40
2:B:370:LEU:O	2:B:370:LEU:CG	2.70	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	468/647 (72%)	419 (90%)	44 (9%)	5 (1%)	12	37
2	B	462/527 (88%)	421 (91%)	38 (8%)	3 (1%)	22	50
All	All	930/1174 (79%)	840 (90%)	82 (9%)	8 (1%)	17	41

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	210	ARG
2	B	162	PRO
2	B	371	LEU
1	A	408	ASP
1	A	321	SER
1	A	407	SER
2	B	370	LEU
1	A	409	SER

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	393/529 (74%)	390 (99%)	3 (1%)	79 87
2	B	395/435 (91%)	391 (99%)	4 (1%)	73 83
All	All	788/964 (82%)	781 (99%)	7 (1%)	74 86

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	211	CYS
1	A	212	ARG
1	A	322	THR
2	B	137	LEU
2	B	163	THR
2	B	164	CYS
2	B	370	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	269	GLN
1	A	275	GLN
1	A	353	ASN
1	A	396	ASN
1	A	539	HIS
2	B	273	ASN
2	B	293	ASN

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)

8 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	$\#\|Z\| > 2$
3	NAG	C	1	1,3	14,14,15	0.49	0	17,19,21	0.63	0
3	NAG	C	2	3	14,14,15	0.46	0	17,19,21	0.37	0
3	NAG	D	1	1,3	14,14,15	1.14	1 (7%)	17,19,21	0.98	0
3	NAG	D	2	3	14,14,15	1.06	2 (14%)	17,19,21	0.84	1 (5%)
3	NAG	E	1	1,3	14,14,15	0.36	0	17,19,21	1.12	1 (5%)
3	NAG	E	2	3	14,14,15	0.38	0	17,19,21	0.60	1 (5%)
3	NAG	F	1	1,3	14,14,15	0.60	0	17,19,21	1.06	1 (5%)
3	NAG	F	2	3	14,14,15	0.31	0	17,19,21	0.43	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
3	NAG	C	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	2/6/23/26	0/1/1/1
3	NAG	D	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	D	2	3	-	4/6/23/26	0/1/1/1
3	NAG	E	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	E	2	3	-	0/6/23/26	0/1/1/1
3	NAG	F	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	F	2	3	-	2/6/23/26	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	1	NAG	O5-C1	-4.04	1.37	1.43
3	D	2	NAG	O5-C1	3.15	1.48	1.43
3	D	2	NAG	C1-C2	2.30	1.55	1.52

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	E	1	NAG	C1-O5-C5	3.72	117.24	112.19
3	F	1	NAG	C1-O5-C5	3.42	116.82	112.19
3	D	2	NAG	C1-O5-C5	2.64	115.77	112.19
3	E	2	NAG	C1-O5-C5	2.06	114.98	112.19

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	F	1	NAG	O5-C5-C6-O6
3	D	1	NAG	O5-C5-C6-O6
3	F	2	NAG	O5-C5-C6-O6
3	D	1	NAG	C4-C5-C6-O6
3	F	1	NAG	C4-C5-C6-O6
3	F	2	NAG	C4-C5-C6-O6
3	D	2	NAG	C8-C7-N2-C2
3	D	2	NAG	O7-C7-N2-C2
3	C	2	NAG	O5-C5-C6-O6
3	D	2	NAG	O5-C5-C6-O6
3	D	2	NAG	C4-C5-C6-O6
3	C	2	NAG	C4-C5-C6-O6

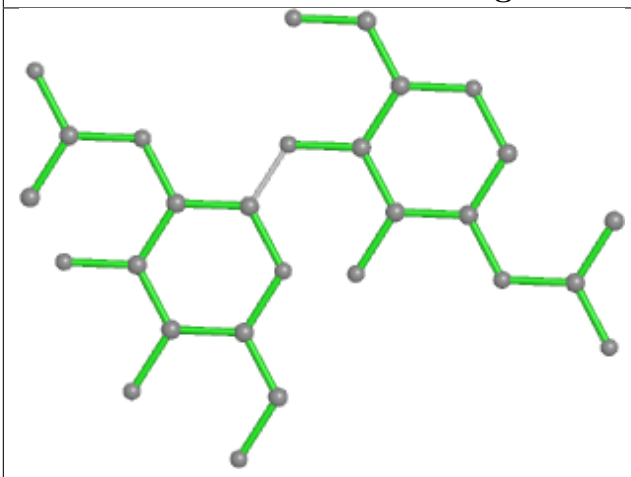
There are no ring outliers.

1 monomer is involved in 1 short contact:

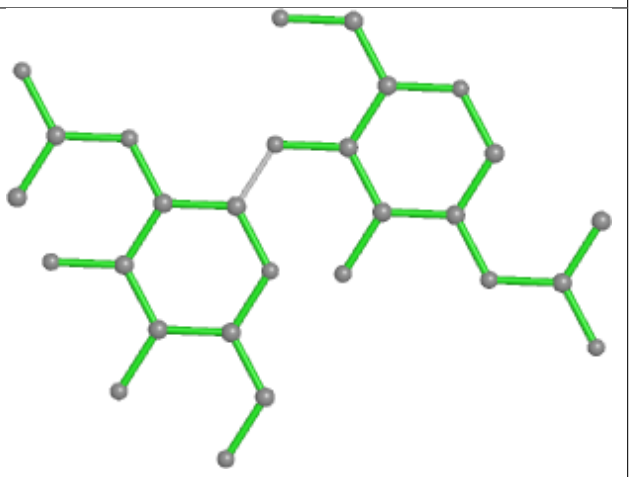
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	E	1	NAG	1	0

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

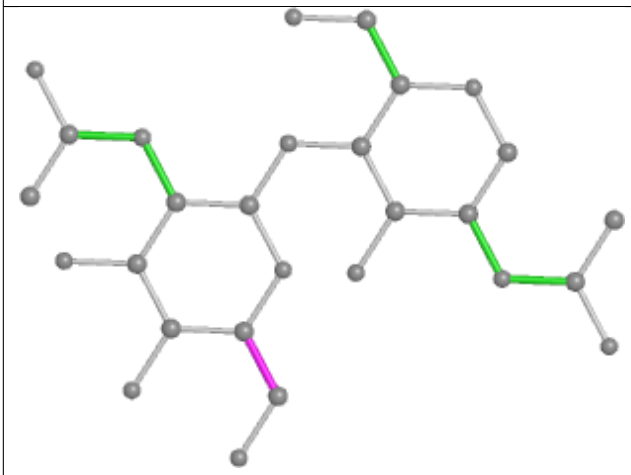
Oligosaccharide Chain C



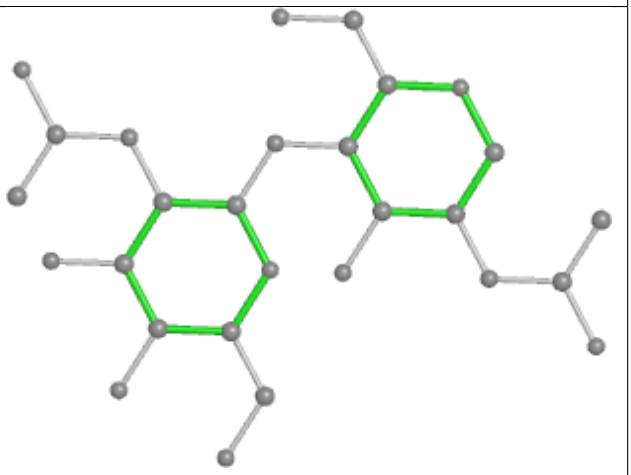
Bond lengths



Bond angles

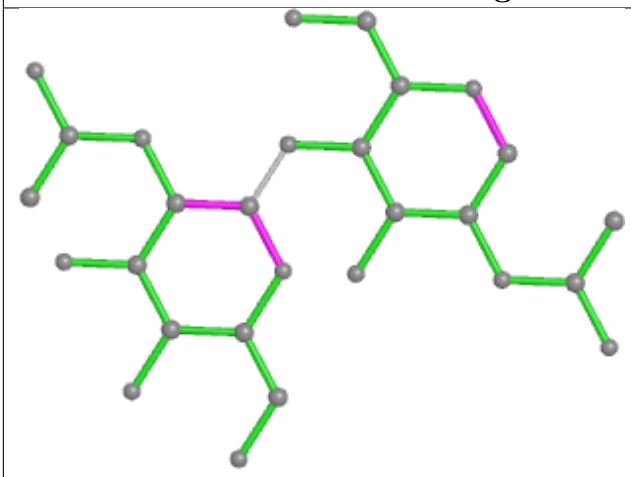


Torsions

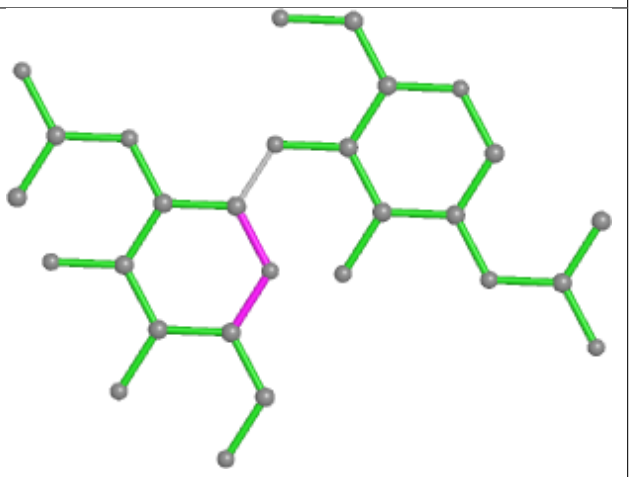


Rings

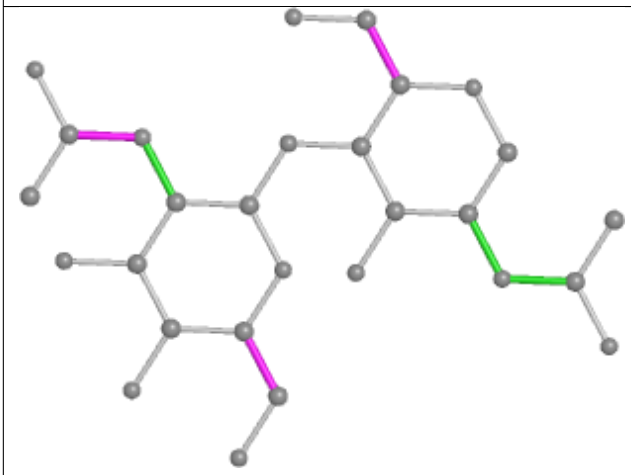
Oligosaccharide Chain D



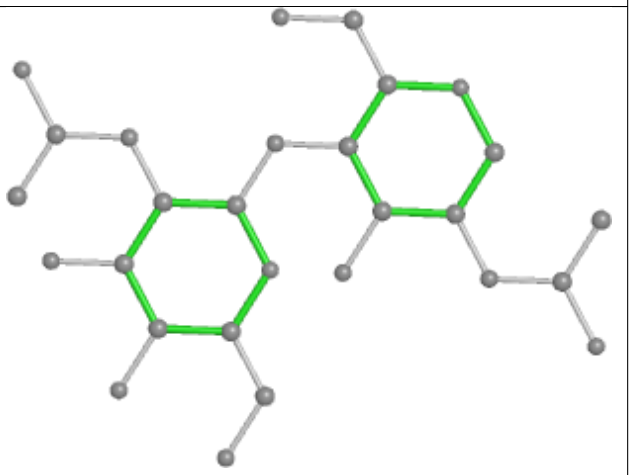
Bond lengths



Bond angles

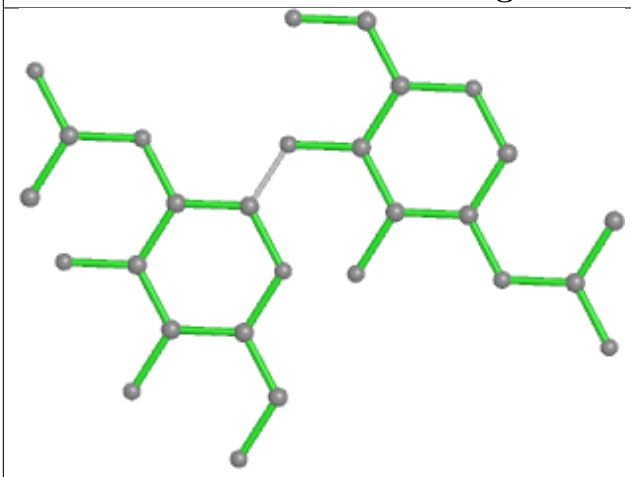


Torsions

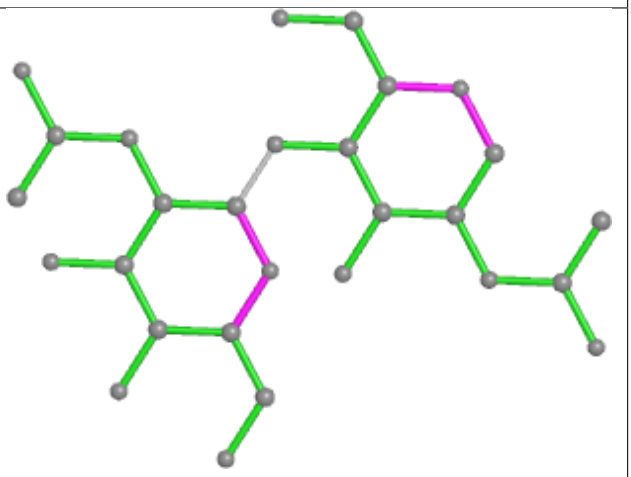


Rings

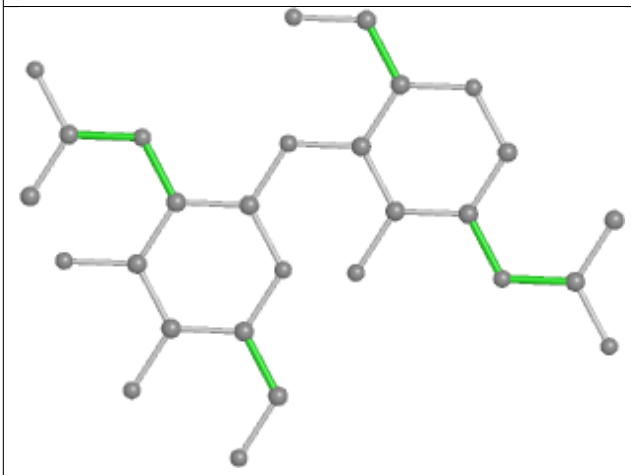
Oligosaccharide Chain E



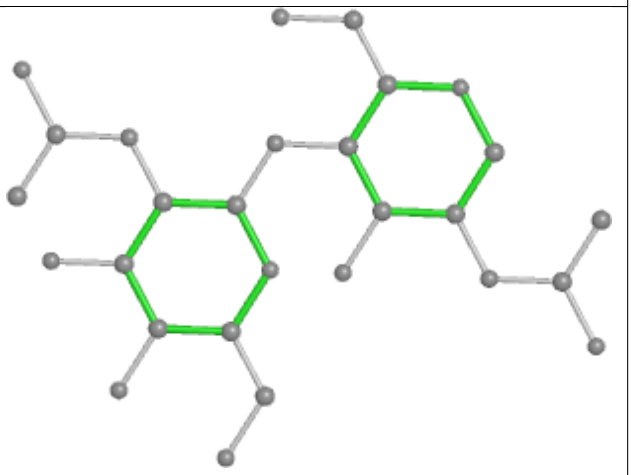
Bond lengths



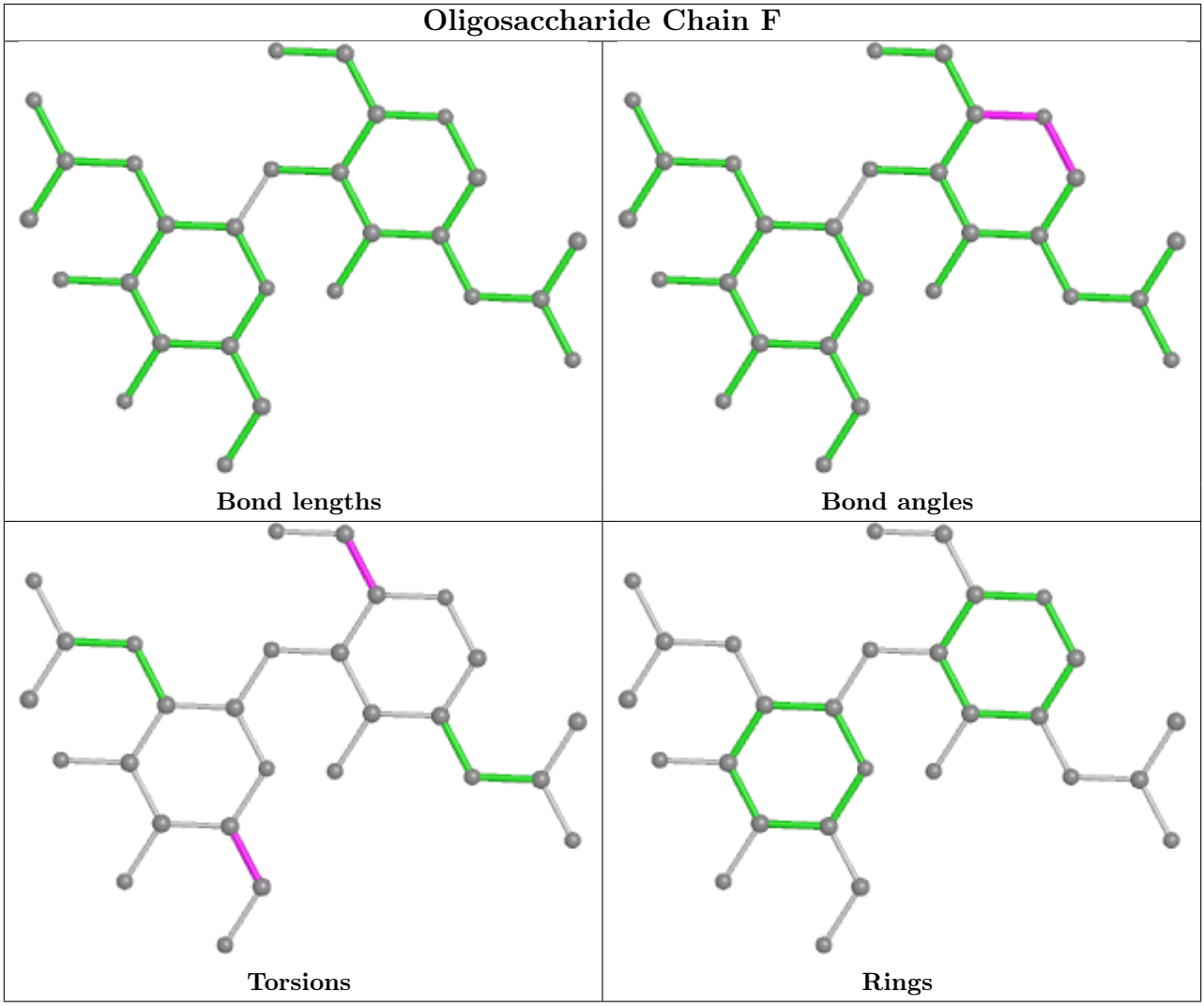
Bond angles



Torsions



Rings



5.6 Ligand geometry (i)

4 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	$\#\|Z\| > 2$
5	Y01	B	602	-	38,38,38	3.25	16 (42%)	57,57,57	2.28	18 (31%)
5	Y01	B	603	-	38,38,38	3.26	15 (39%)	57,57,57	2.54	16 (28%)
4	TYI	B	601	-	14,15,15	1.37	2 (14%)	20,21,21	1.03	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
6	3PH	B	604	-	47,47,47	0.94	2 (4%)	51,52,52	1.14	2 (3%)

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
5	Y01	B	602	-	5/5/12/13	11/19/77/77	0/4/4/4
5	Y01	B	603	-	5/5/12/13	12/19/77/77	0/4/4/4
4	TYI	B	601	-	-	2/8/8/8	0/1/1/1
6	3PH	B	604	-	-	17/49/49/49	-

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	602	Y01	CAI-CAZ	10.26	1.55	1.33
5	B	603	Y01	CAI-CAZ	10.22	1.55	1.33
5	B	602	Y01	CBI-CBG	-8.37	1.39	1.55
5	B	603	Y01	CBI-CBG	-7.77	1.40	1.55
5	B	603	Y01	CAK-CAI	6.47	1.64	1.50
5	B	603	Y01	CBD-CBG	6.23	1.65	1.53
5	B	602	Y01	CAK-CAI	5.94	1.63	1.50
5	B	602	Y01	CBD-CBG	5.86	1.64	1.53
5	B	602	Y01	CBH-CBF	5.38	1.65	1.56
5	B	603	Y01	CAU-CBI	5.10	1.63	1.54
5	B	603	Y01	CBH-CBF	4.88	1.64	1.56
5	B	602	Y01	CAU-CBI	4.42	1.62	1.54
6	B	604	3PH	O31-C31	4.34	1.46	1.33
6	B	604	3PH	O21-C21	3.94	1.45	1.34
5	B	602	Y01	CAQ-CBG	3.83	1.62	1.54
5	B	603	Y01	CAQ-CBG	3.80	1.62	1.54
4	B	601	TYI	OH-CZ	3.71	1.45	1.37
5	B	602	Y01	CAP-CBE	-3.51	1.47	1.54
5	B	602	Y01	CAV-CAZ	3.51	1.59	1.51
5	B	603	Y01	CAV-CAZ	3.47	1.59	1.51
5	B	603	Y01	CAT-CBH	3.26	1.60	1.54
5	B	603	Y01	CAP-CBE	-3.18	1.47	1.54
5	B	603	Y01	OAW-CAY	3.07	1.43	1.34
5	B	602	Y01	OAW-CAY	3.02	1.42	1.34
5	B	603	Y01	CAS-CBF	-2.94	1.48	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	603	Y01	CBI-CBE	2.94	1.60	1.55
5	B	602	Y01	CAT-CBH	2.91	1.59	1.54
5	B	603	Y01	CAR-CBC	2.81	1.58	1.51
5	B	602	Y01	CAR-CBC	2.72	1.58	1.51
5	B	602	Y01	OAW-CBC	-2.67	1.39	1.46
5	B	603	Y01	OAW-CBC	-2.60	1.40	1.46
5	B	602	Y01	CAS-CBF	-2.43	1.49	1.53
5	B	602	Y01	CBI-CBE	2.37	1.59	1.55
5	B	602	Y01	CBD-CBF	-2.31	1.49	1.53
4	B	601	TYI	O-C	2.08	1.28	1.22

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	B	603	Y01	CAU-CBI-CBE	-7.04	106.04	116.57
5	B	603	Y01	CAD-CBH-CBF	-6.80	103.58	111.68
5	B	603	Y01	CBH-CAZ-CAI	-6.40	113.10	122.90
5	B	603	Y01	CAK-CAI-CAZ	-6.32	113.41	125.06
5	B	602	Y01	CAK-CAI-CAZ	-6.22	113.59	125.06
5	B	602	Y01	CAU-CBI-CBE	-5.38	108.52	116.57
5	B	602	Y01	CBF-CBD-CBG	5.04	115.84	109.09
5	B	602	Y01	CBH-CAZ-CAI	-4.81	115.54	122.90
5	B	603	Y01	CAT-CBH-CBF	4.62	115.19	108.73
5	B	602	Y01	CAV-CAZ-CAI	-4.50	114.12	120.61
5	B	603	Y01	CBI-CBE-CBB	-4.39	112.60	119.49
5	B	602	Y01	OAW-CAY-CAM	4.12	120.38	111.50
5	B	603	Y01	OAW-CAY-CAM	4.02	120.17	111.50
5	B	603	Y01	CBG-CBI-CBE	3.93	104.73	100.07
5	B	602	Y01	CBI-CBE-CBB	-3.91	113.36	119.49
5	B	602	Y01	CAD-CBH-CBF	-3.85	107.10	111.68
5	B	603	Y01	CBF-CBD-CBG	3.69	114.03	109.09
6	B	604	3PH	O21-C21-C22	3.66	119.39	111.50
5	B	603	Y01	CAT-CBH-CAZ	3.65	115.43	108.75
6	B	604	3PH	O31-C31-C32	3.38	122.52	111.91
5	B	602	Y01	CAD-CBH-CAZ	-3.07	103.38	108.34
5	B	603	Y01	CAV-CAZ-CAI	-3.04	116.22	120.61
5	B	602	Y01	CAP-CBE-CBB	3.00	116.78	112.15
5	B	602	Y01	CBH-CBF-CBD	-2.98	108.27	112.73
5	B	602	Y01	CAT-CBH-CBF	2.97	112.88	108.73
5	B	603	Y01	CAU-CBI-CBG	2.93	111.82	107.27
5	B	603	Y01	CAD-CBH-CAT	-2.76	105.06	109.43
5	B	603	Y01	CBC-CAV-CAZ	2.65	115.63	111.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	B	602	Y01	CBF-CBH-CAZ	2.60	113.73	109.65
5	B	602	Y01	CBD-CAK-CAI	-2.45	109.21	112.73
5	B	603	Y01	CAK-CBD-CBF	2.36	112.58	109.71
5	B	603	Y01	CAT-CAR-CBC	2.36	114.35	110.33
4	B	601	TYI	CZ-CE1-I1	2.13	122.70	119.42
5	B	602	Y01	CBC-OAW-CAY	-2.05	112.75	117.79
5	B	602	Y01	CAU-CBI-CBG	2.03	110.42	107.27
5	B	602	Y01	CAO-CBB-CBE	-2.02	106.12	110.28
5	B	602	Y01	CAM-CAL-CAX	-2.01	109.27	113.60

All (10) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
5	B	602	Y01	CBD
5	B	602	Y01	CBH
5	B	602	Y01	CBB
5	B	602	Y01	CBI
5	B	602	Y01	CBF
5	B	603	Y01	CBD
5	B	603	Y01	CBH
5	B	603	Y01	CBB
5	B	603	Y01	CBI
5	B	603	Y01	CBF

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	602	Y01	CAO-CBB-CBE-CAP
5	B	602	Y01	CAO-CBB-CBE-CBI
5	B	602	Y01	CAC-CBB-CBE-CAP
5	B	602	Y01	CAC-CBB-CBE-CBI
5	B	603	Y01	CAO-CBB-CBE-CAP
5	B	603	Y01	CAC-CBB-CBE-CAP
6	B	604	3PH	C1-O11-P-O13
6	B	604	3PH	C1-O11-P-O14
6	B	604	3PH	C1-O11-P-O12
5	B	603	Y01	CAC-CBB-CBE-CBI
5	B	603	Y01	CAO-CBB-CBE-CBI
6	B	604	3PH	C32-C31-O31-C3
5	B	603	Y01	CAM-CAY-OAW-CBC
5	B	602	Y01	CAX-CAL-CAM-CAY
6	B	604	3PH	O32-C31-O31-C3

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Continued from previous page...

Mol	Chain	Res	Type	Atoms
5	B	603	Y01	OAG-CAY-OAW-CBC
5	B	602	Y01	CAN-CAJ-CAO-CBB
5	B	603	Y01	CAN-CAJ-CAO-CBB
5	B	603	Y01	CAJ-CAN-CBA-CAB
6	B	604	3PH	C21-C22-C23-C24
6	B	604	3PH	C3D-C3E-C3F-C3G
6	B	604	3PH	C31-C32-C33-C34
6	B	604	3PH	C3E-C3F-C3G-C3H
6	B	604	3PH	C32-C33-C34-C35
5	B	603	Y01	CAJ-CAN-CBA-CAA
5	B	603	Y01	CAX-CAL-CAM-CAY
6	B	604	3PH	O11-C1-C2-O21
6	B	604	3PH	C1-C2-C3-O31
5	B	602	Y01	CAM-CAY-OAW-CBC
6	B	604	3PH	O11-C1-C2-C3
6	B	604	3PH	O21-C2-C3-O31
5	B	602	Y01	OAG-CAY-OAW-CBC
4	B	601	TYI	OXT-C-CA-CB
6	B	604	3PH	C33-C34-C35-C36
4	B	601	TYI	O-C-CA-CB
6	B	604	3PH	C25-C26-C27-C28
5	B	603	Y01	CAM-CAL-CAX-OAH
5	B	603	Y01	CAM-CAL-CAX-OAF
5	B	602	Y01	CAM-CAL-CAX-OAH
5	B	602	Y01	CAM-CAL-CAX-OAF
5	B	602	Y01	CAJ-CAN-CBA-CAB
6	B	604	3PH	C39-C3A-C3B-C3C

There are no ring outliers.

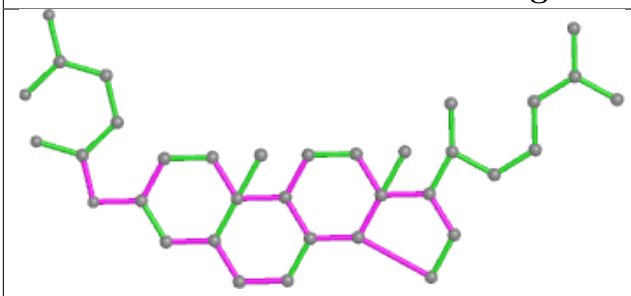
2 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	603	Y01	3	0
4	B	601	TYI	9	0

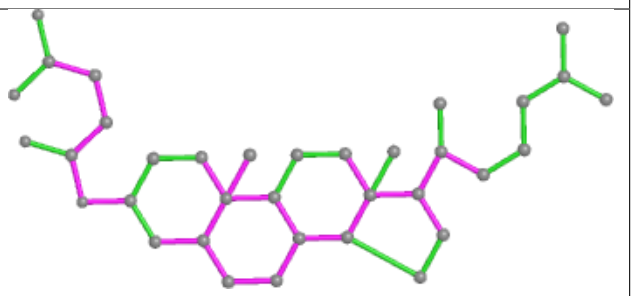
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

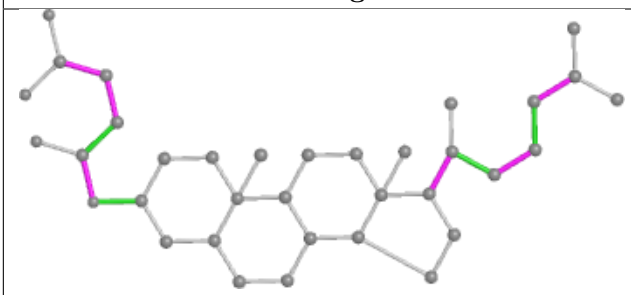
Ligand Y01 B 602



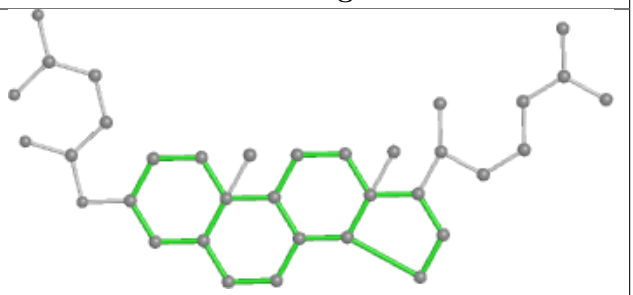
Bond lengths



Bond angles

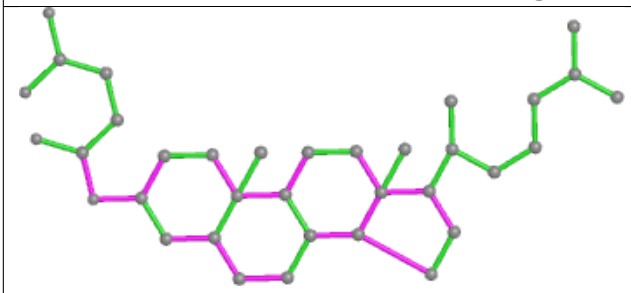


Torsions

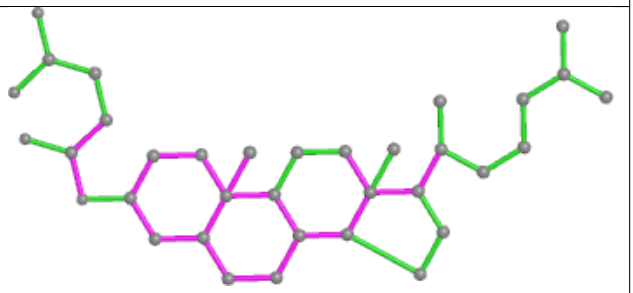


Rings

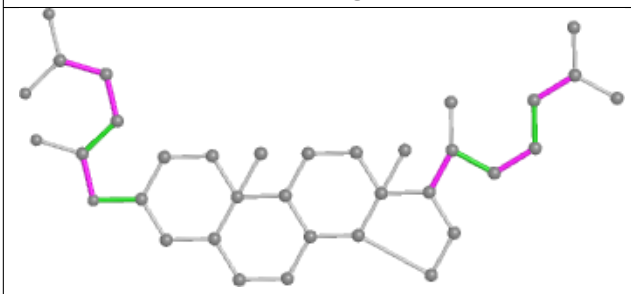
Ligand Y01 B 603



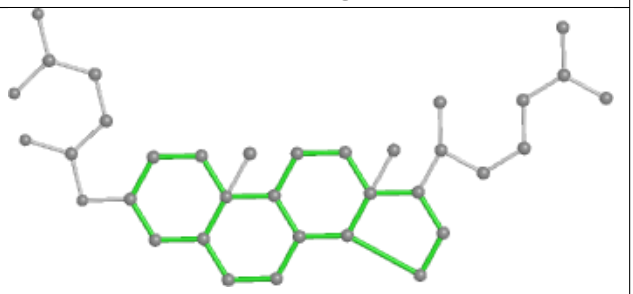
Bond lengths



Bond angles

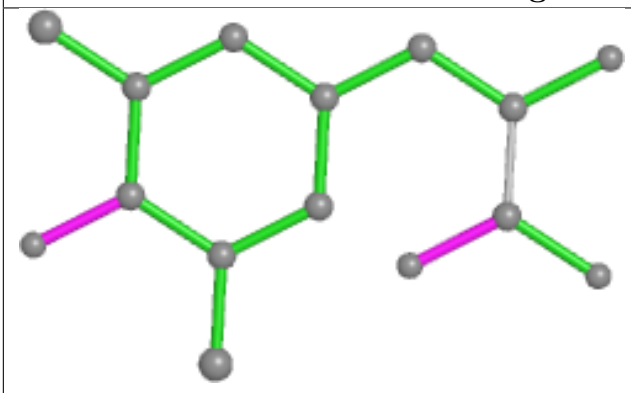


Torsions

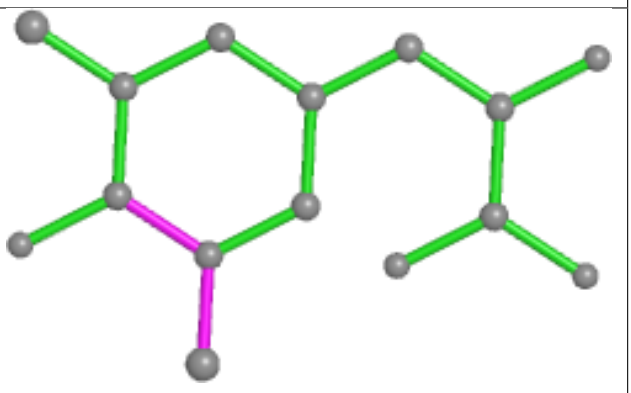


Rings

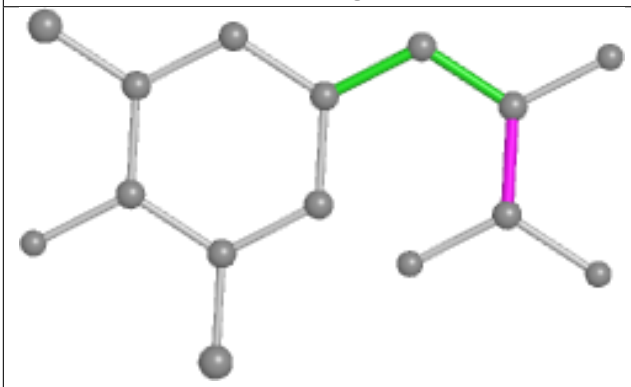
Ligand TYI B 601



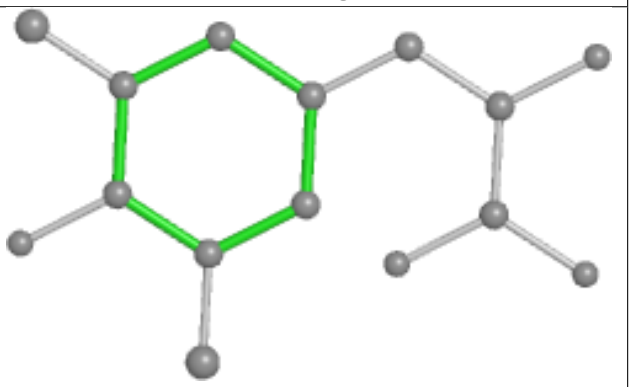
Bond lengths



Bond angles

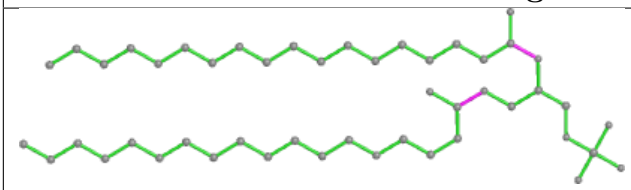


Torsions

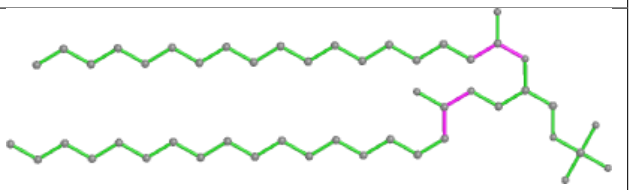


Rings

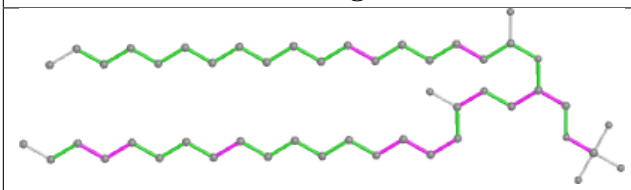
Ligand 3PH B 604



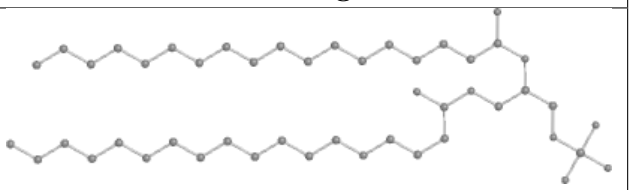
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

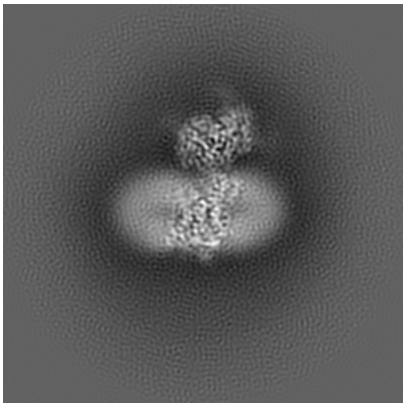
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-30841. These allow visual inspection of the internal detail of the map and identification of artifacts.

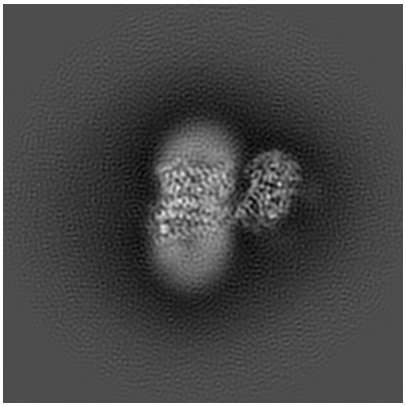
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

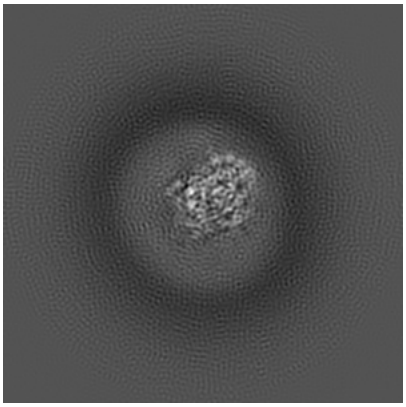
6.1.1 Primary map



X



Y

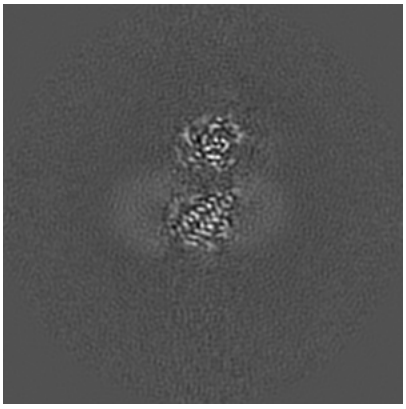


Z

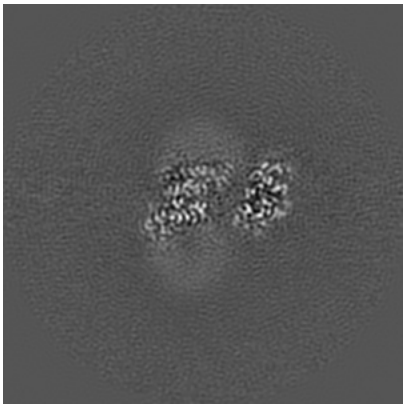
The images above show the map projected in three orthogonal directions.

6.2 Central slices

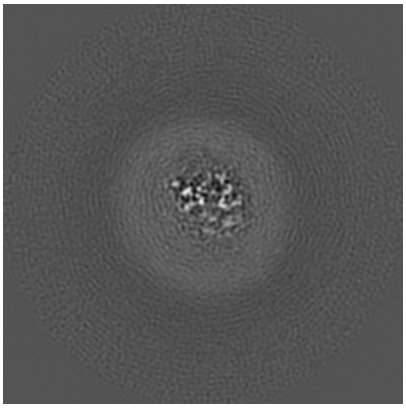
6.2.1 Primary map



X Index: 128



Y Index: 128

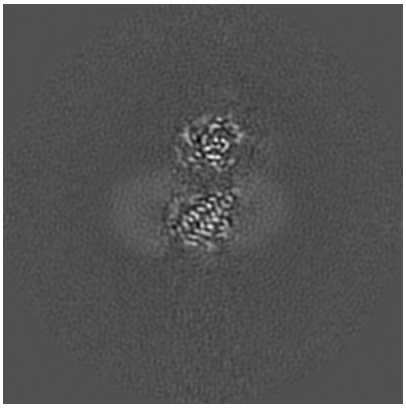


Z Index: 128

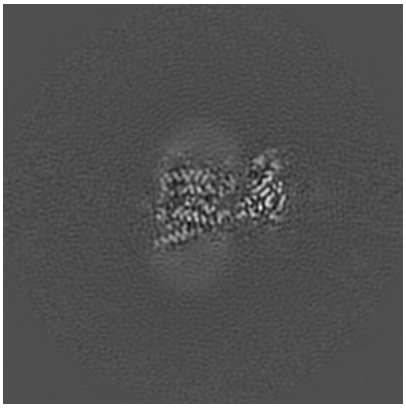
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

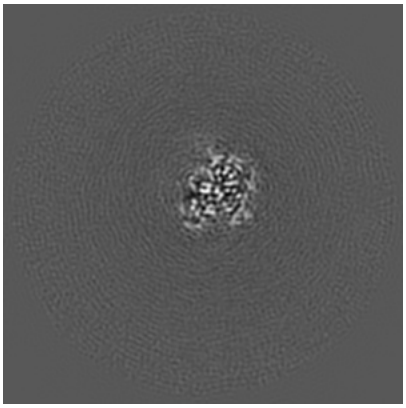
6.3.1 Primary map



X Index: 128



Y Index: 136

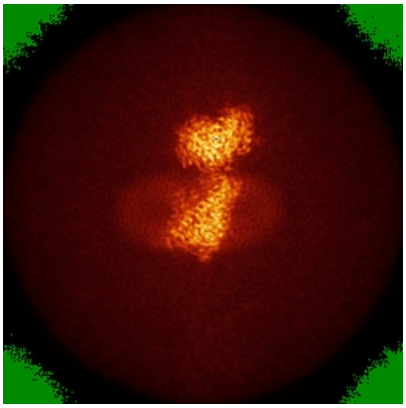


Z Index: 169

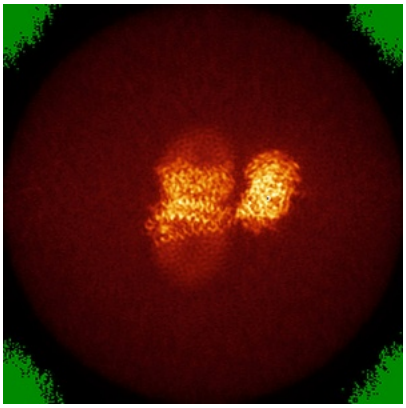
The images above show the largest variance slices of the map in three orthogonal directions.

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

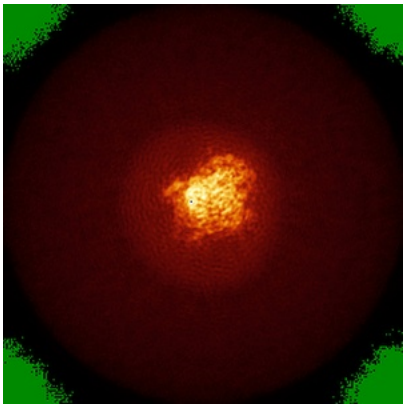
6.4.1 Primary map



X



Y

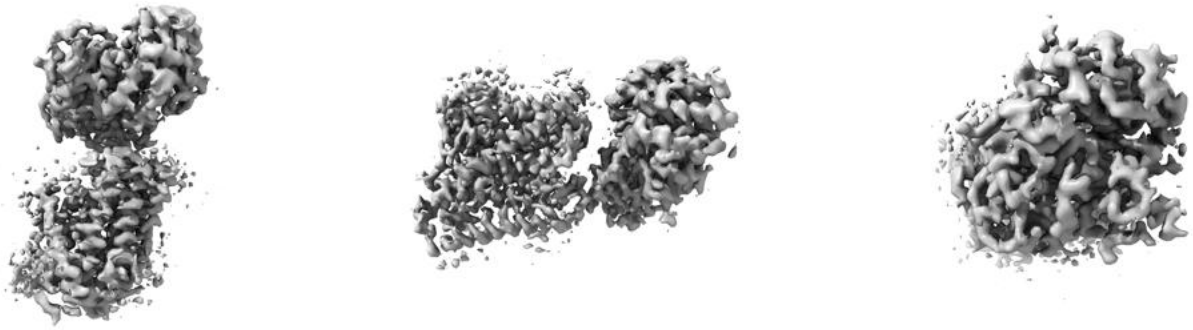


Z

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

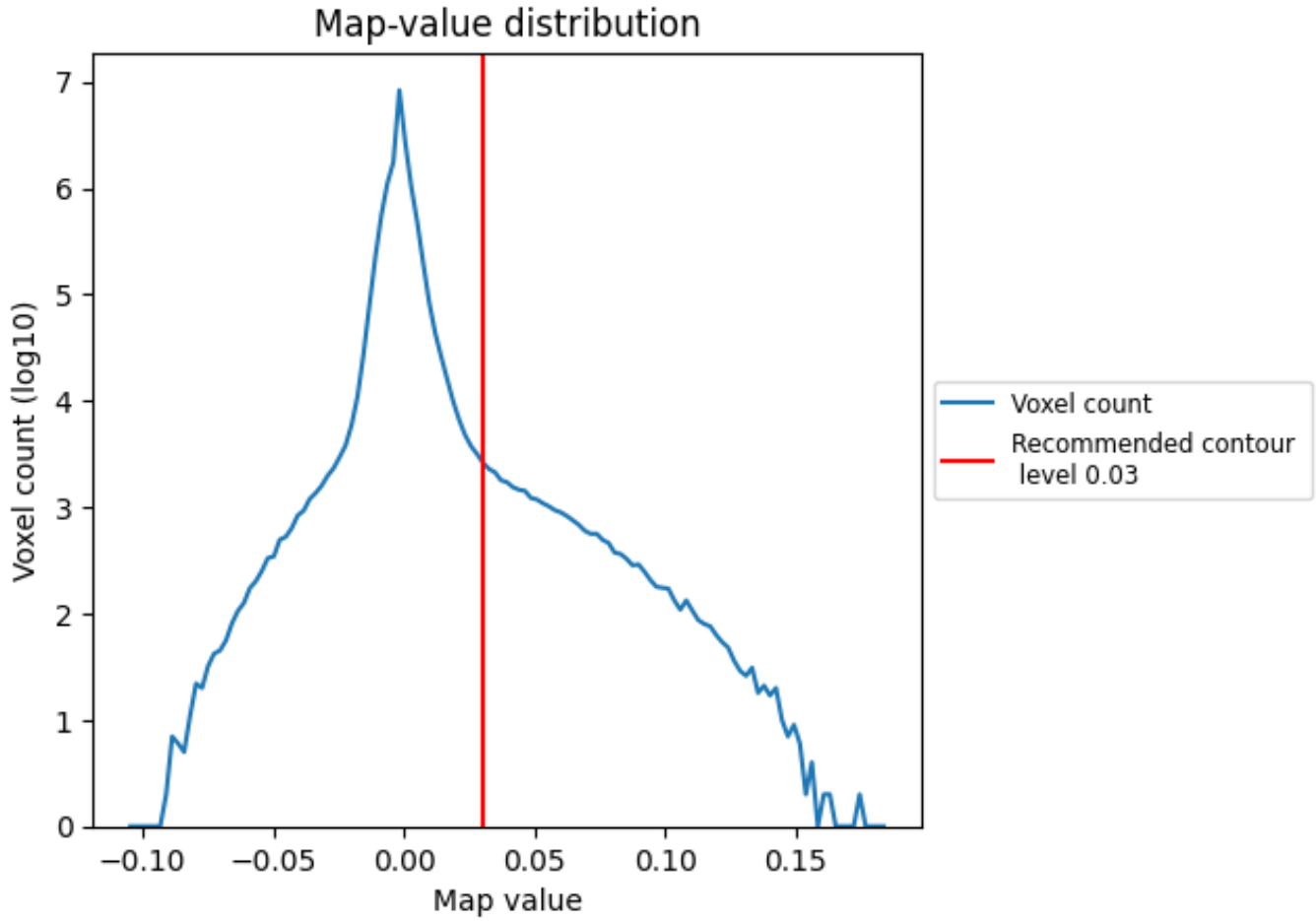
6.6 Mask visualisation (i)

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

7 Map analysis

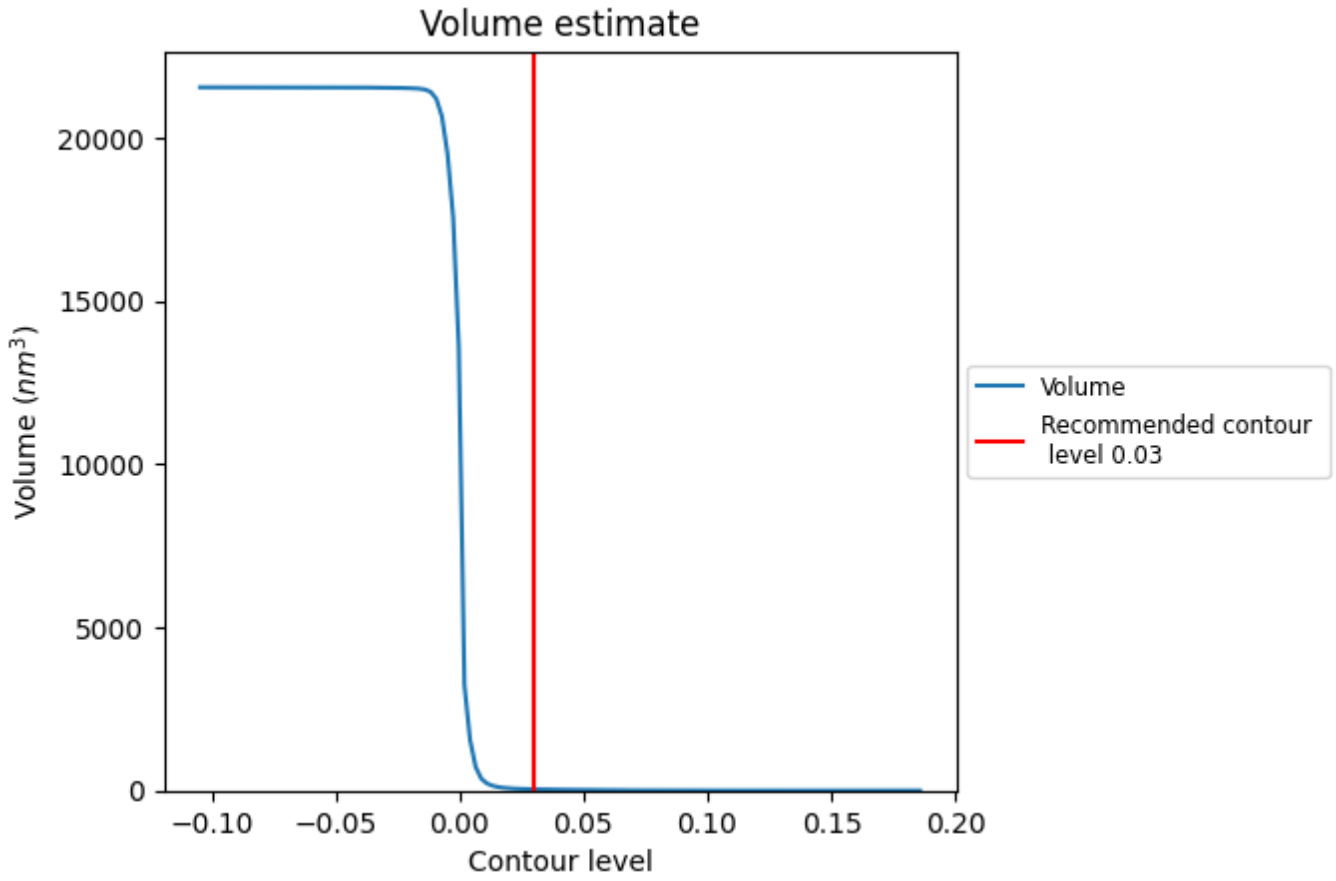
This section contains the results of statistical analysis of the map.

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.

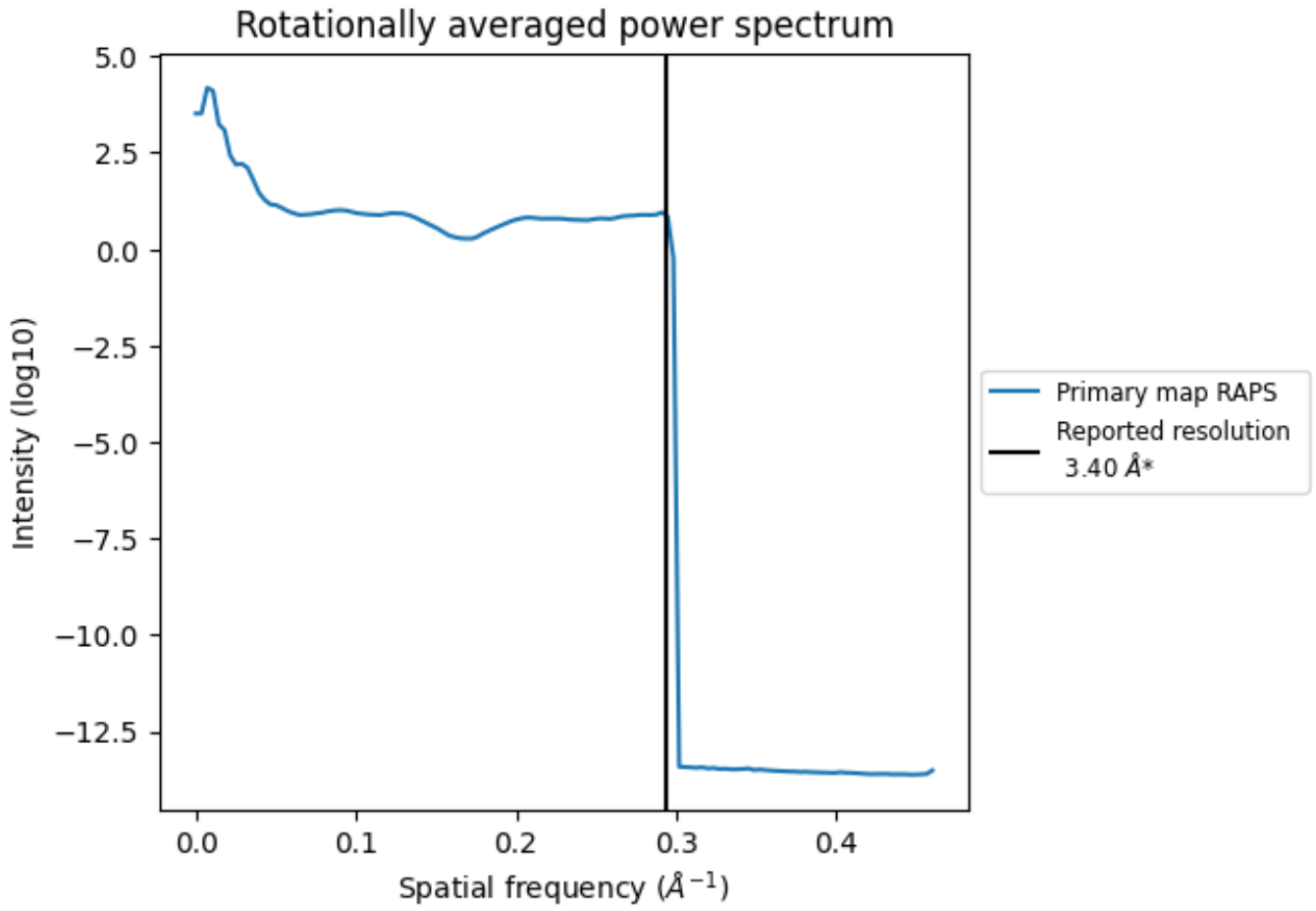
7.2 Volume estimate



The volume at the recommended contour level is 39 nm^3; this corresponds to an approximate mass of 35 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 0.294 $Å^{-1}$

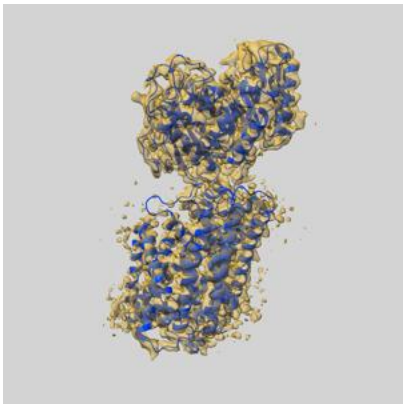
8 Fourier-Shell correlation (i)

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

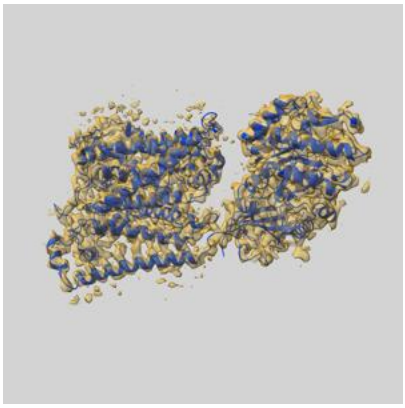
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-30841 and PDB model 7DSQ. Per-residue inclusion information can be found in section 3 on page 8.

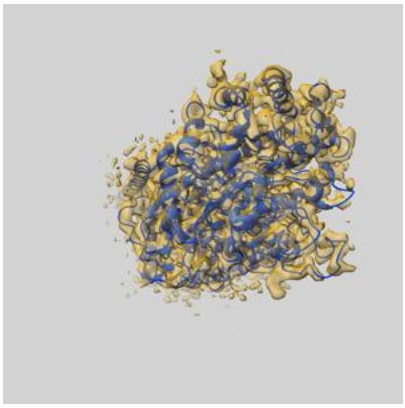
9.1 Map-model overlay



X



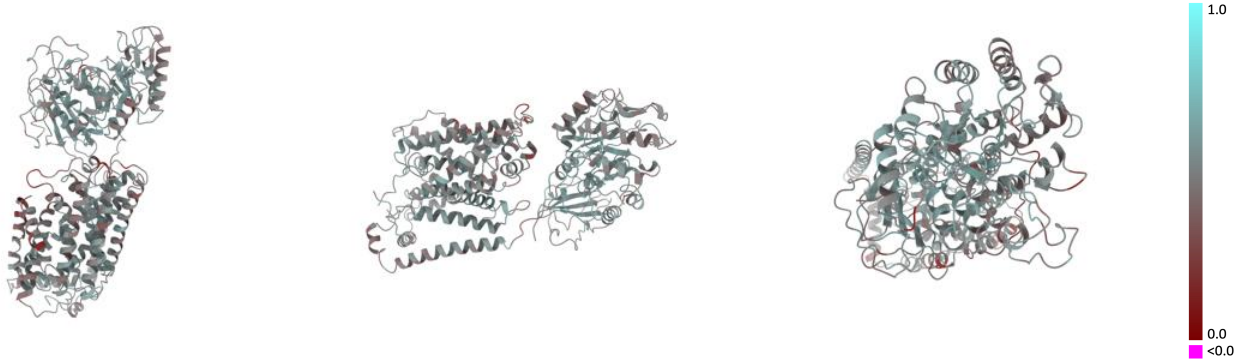
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

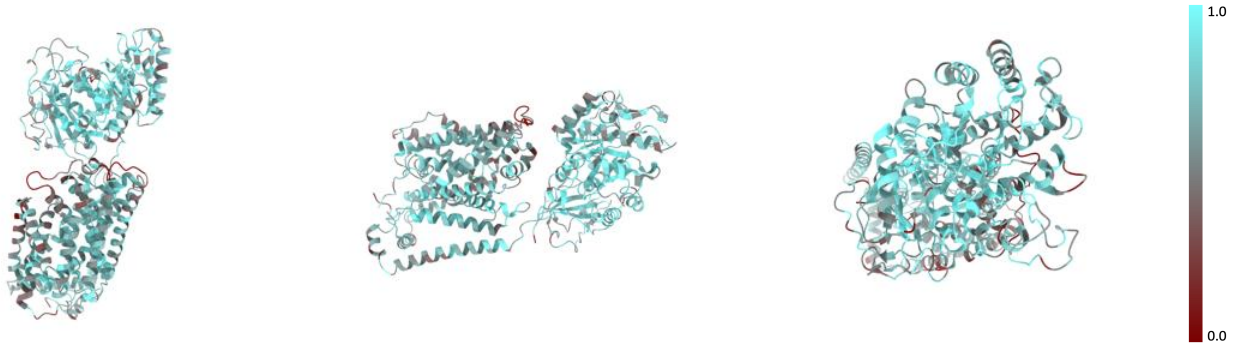
9.2 Q-score mapped to coordinate model



X Y Z

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

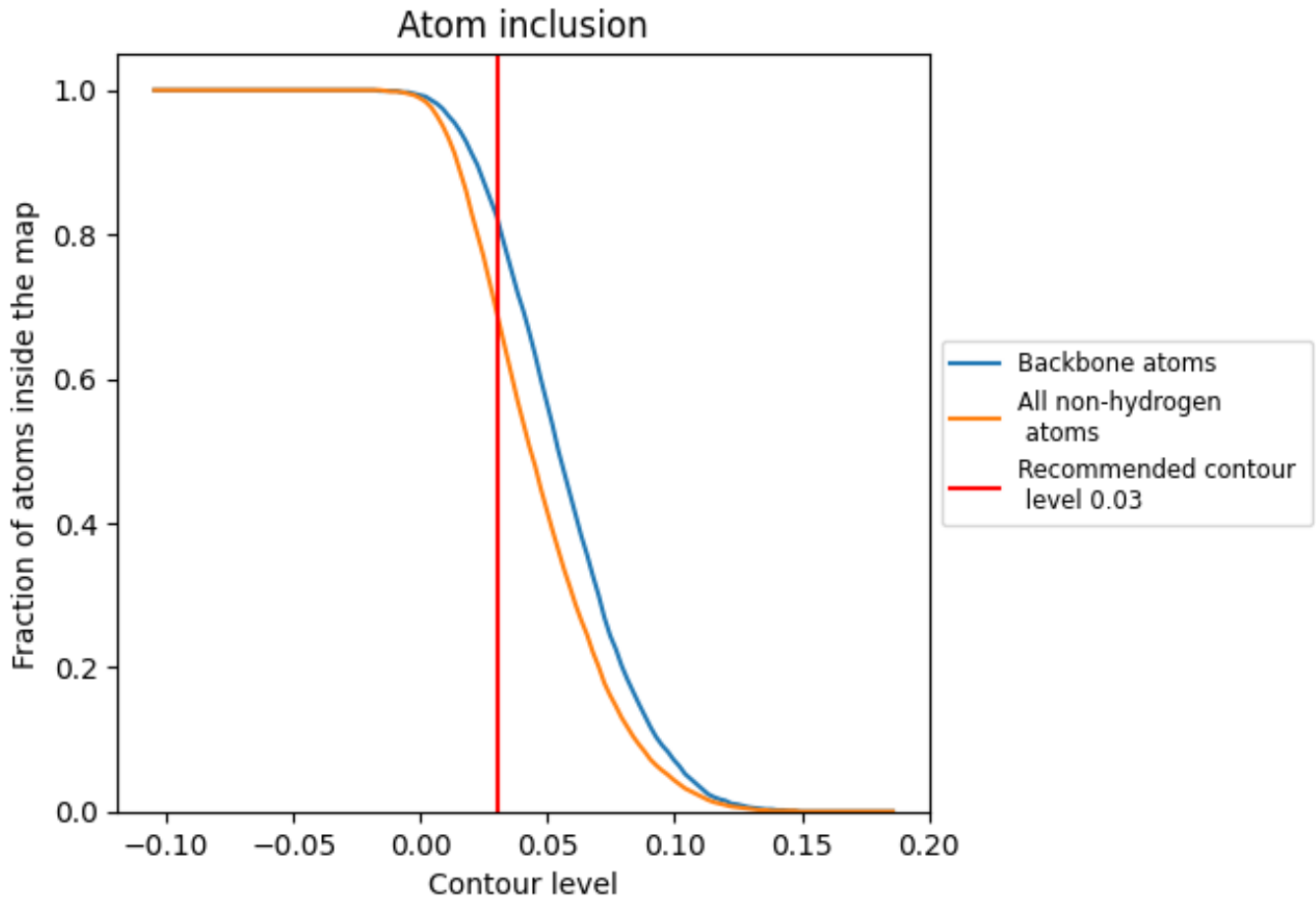
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.03).

9.4 Atom inclusion (i)



At the recommended contour level, 82% of all backbone atoms, 69% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6920	0.4950
A	0.7430	0.5120
B	0.6560	0.4840
C	0.2860	0.3310
D	0.3210	0.2990
E	0.2140	0.3630
F	0.2500	0.2640