wwPDB X-ray Structure Validation Summary Report (i)

Feb 22, 2024 – 03:56 AM EST

PDB ID	:	4QVH
Title	:	Crystal structure of the essential Mycobacterium tuberculosis phosphopantetheinyl transferase PptT, solved as a fusion protein with maltose binding protein
Authors	:	Jung, J.; Bashiri, G.; Johnston, J.M.; Baker, E.N.
Deposited on	:	2014-07-15
Resolution	:	1.75 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

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

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

The following versions of software and data (see references (1)) were used in the production of this report:

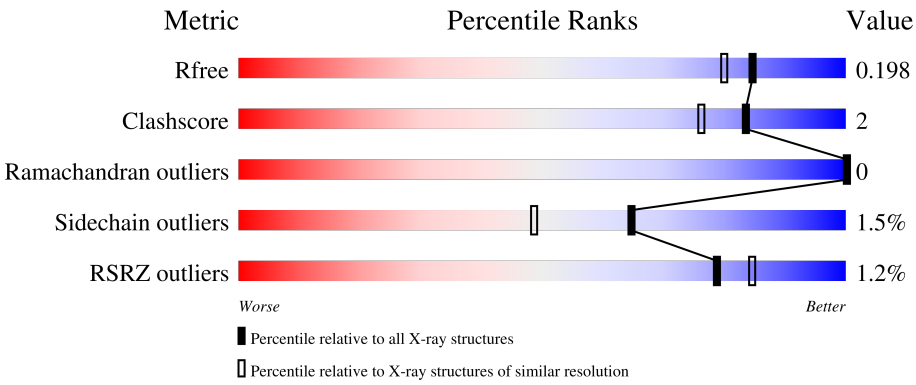
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.75 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2340 (1.76-1.76)
Clashscore	141614	2466 (1.76-1.76)
Ramachandran outliers	138981	2437 (1.76-1.76)
Sidechain outliers	138945	2437 (1.76-1.76)
RSRZ outliers	127900	2298 (1.76-1.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	598	% 92% 8%
1	B	598	% 92% 7% ••
2	C	2	100%
2	D	2	100%

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
5	GOL	A	607	-	X	-	-
6	FLC	B	607	-	X	-	-

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 10181 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Maltose-binding periplasmic protein, 4'-phosphopantetheinyl transferase chimera.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	596	4591	2950	767	860	14	0	5	0
1	B	595	4600	2959	768	859	14	0	7	0

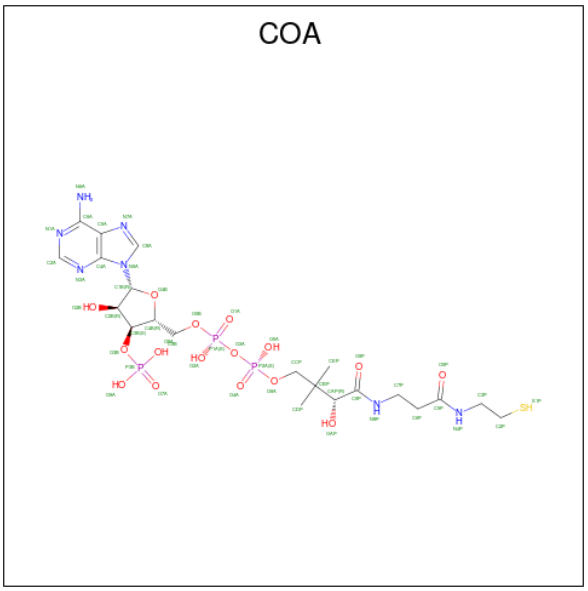
There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	expression tag	UNP P0AEX9
A	173	ALA	GLU	conflict	UNP P0AEX9
A	174	ALA	ASN	conflict	UNP P0AEX9
A	360	ALA	GLU	conflict	UNP P0AEX9
A	363	ALA	LYS	conflict	UNP P0AEX9
A	364	ALA	ASP	conflict	UNP P0AEX9
A	368	ASN	-	expression tag	UNP P0AEX9
A	369	ALA	-	expression tag	UNP P0AEX9
A	370	ALA	-	expression tag	UNP P0AEX9
A	371	ALA	-	expression tag	UNP P0AEX9
B	1	MET	-	expression tag	UNP P0AEX9
B	173	ALA	GLU	conflict	UNP P0AEX9
B	174	ALA	ASN	conflict	UNP P0AEX9
B	360	ALA	GLU	conflict	UNP P0AEX9
B	363	ALA	LYS	conflict	UNP P0AEX9
B	364	ALA	ASP	conflict	UNP P0AEX9
B	368	ASN	-	expression tag	UNP P0AEX9
B	369	ALA	-	expression tag	UNP P0AEX9
B	370	ALA	-	expression tag	UNP P0AEX9
B	371	ALA	-	expression tag	UNP P0AEX9

- Molecule 2 is an oligosaccharide called alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	C	2	Total	C	O	0	0	0
			23	12	11			
2	D	2	Total	C	O	0	0	0
			23	12	11			

- Molecule 3 is COENZYME A (three-letter code: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$).

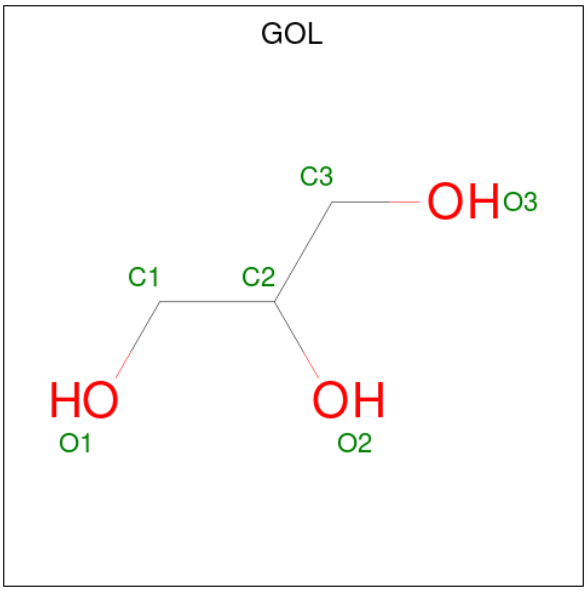


Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		
3	B	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

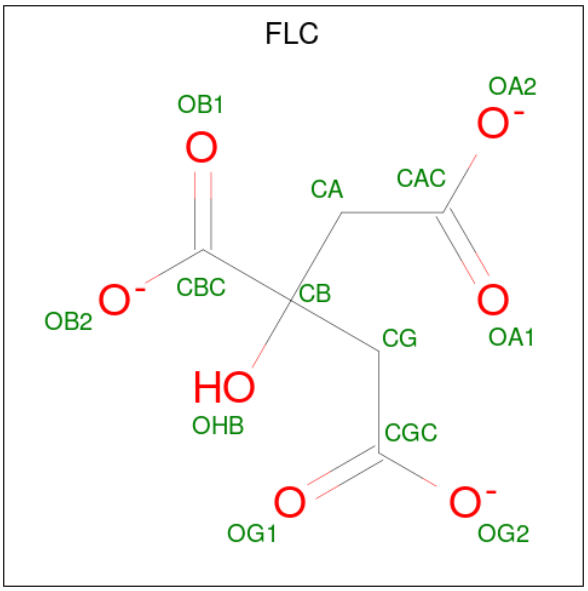
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Mg	0	0
			1	1		
4	B	1	Total	Mg	0	0
			1	1		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
5	A	1	6	3	3	0	0
5	A	1	6	3	3	0	0
5	A	1	6	3	3	0	0
5	A	1	6	3	3	0	0
5	B	1	6	3	3	0	0
5	B	1	6	3	3	0	0
5	B	1	6	3	3	0	0

- Molecule 6 is CITRATE ANION (three-letter code: FLC) (formula: $C_6H_5O_7$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 13 6 7	0	0
6	B	1	Total C O 13 6 7	0	0

- Molecule 7 is water.

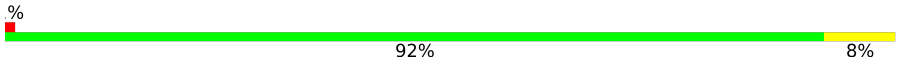
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	416	Total O 416 416	0	0
7	B	362	Total O 362 362	0	0

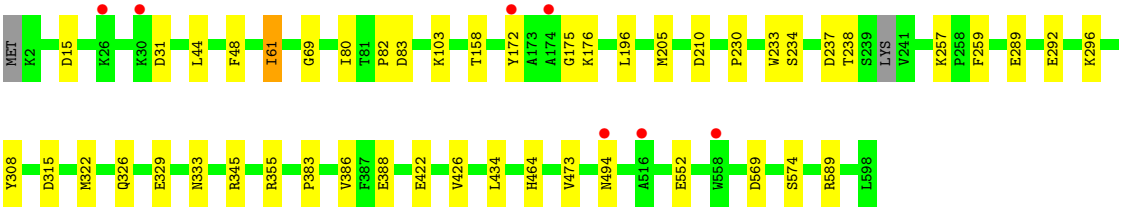
3 Residue-property plots (i)

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 electron 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 dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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: Maltose-binding periplasmic protein, 4'-phosphopantetheinyl transferase chimera

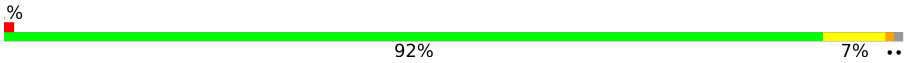
Chain A:

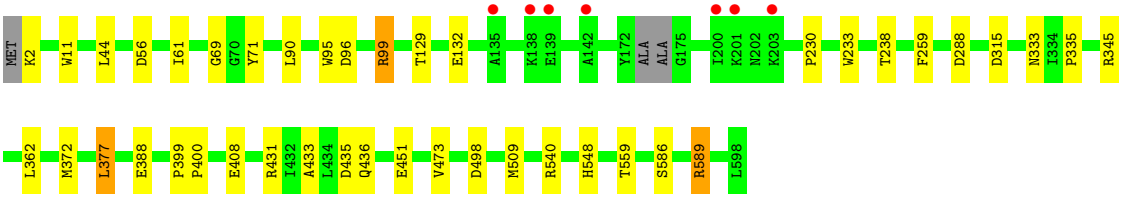




• Molecule 1: Maltose-binding periplasmic protein, 4'-phosphopantetheinyl transferase chimera

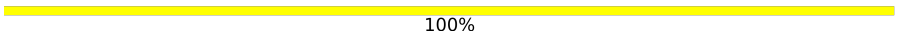
Chain B:





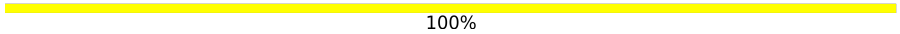
• Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain C:



• Molecule 2: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	77.70Å 126.03Å 143.96Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	94.83 – 1.75 48.70 – 1.75	Depositor EDS
% Data completeness (in resolution range)	99.3 (94.83-1.75) 99.3 (48.70-1.75)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.30 (at 1.75Å)	Xtriage
Refinement program	REFMAC 5.8.0071	Depositor
R, R_{free}	0.154 , 0.191 0.166 , 0.198	Depositor DCC
R_{free} test set	7157 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	23.2	Xtriage
Anisotropy	0.026	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.41 , 44.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	10181	wwPDB-VP
Average B, all atoms (Å^2)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.50% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: GLC, MG, FLC, COA, GOL

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	0.97	5/4721 (0.1%)	0.95	11/6430 (0.2%)
1	B	0.93	3/4736 (0.1%)	0.94	13/6449 (0.2%)
All	All	0.95	8/9457 (0.1%)	0.94	24/12879 (0.2%)

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	388	GLU	CD-OE1	8.06	1.34	1.25
1	A	289	GLU	CD-OE1	6.39	1.32	1.25
1	A	15	ASP	CB-CG	6.30	1.65	1.51
1	B	71	TYR	CE1-CZ	6.16	1.46	1.38
1	A	388	GLU	CG-CD	6.00	1.60	1.51

The worst 5 of 24 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	237	ASP	CB-CG-OD1	9.70	127.03	118.30
1	A	83	ASP	CB-CG-OD2	-8.57	110.58	118.30
1	A	345	ARG	NE-CZ-NH1	8.19	124.39	120.30
1	A	83	ASP	CB-CG-OD1	8.16	125.64	118.30
1	B	99	ARG	NE-CZ-NH1	7.76	124.18	120.30

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	4591	0	4580	22	0
1	B	4600	0	4602	22	0
2	C	23	0	20	0	0
2	D	23	0	21	0	0
3	A	48	0	32	0	0
3	B	48	0	32	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	24	0	32	1	0
5	B	18	0	24	2	0
6	A	13	0	5	0	0
6	B	13	0	5	1	0
7	A	416	0	0	2	0
7	B	362	0	0	4	0
All	All	10181	0	9353	45	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 2.

The worst 5 of 45 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:172:TYR:OH	1:A:175:GLY:HA2	1.88	0.74
1:A:158[A]:THR:HG23	7:A:1096:HOH:O	1.88	0.72
1:A:80:ILE:HG22	1:A:82:PRO:HD3	1.71	0.70
1:B:436:GLN:OE1	7:B:867:HOH:O	2.10	0.69
1:B:2:LYS:N	7:B:1021:HOH:O	2.25	0.69

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 X-ray entries followed by that with respect to entries of similar resolution.

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	597/598 (100%)	590 (99%)	7 (1%)	0	100	100
1	B	598/598 (100%)	590 (99%)	8 (1%)	0	100	100
All	All	1195/1196 (100%)	1180 (99%)	15 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	476/474 (100%)	466 (98%)	10 (2%)	53	31
1	B	478/474 (101%)	474 (99%)	4 (1%)	81	72
All	All	954/948 (101%)	940 (98%)	14 (2%)	65	49

5 of 14 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	494	ASN
1	A	552	GLU
1	B	509	MET
1	B	377	LEU
1	B	451	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	235	ASN
1	B	13	ASN
1	B	50	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)

4 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	GLC	C	1	2	12,12,12	0.81	0	17,17,17	1.76	3 (17%)
2	GLC	C	2	2	11,11,12	1.15	1 (9%)	15,15,17	0.82	0
2	GLC	D	1	2	12,12,12	0.76	0	17,17,17	0.99	1 (5%)
2	GLC	D	2	2	11,11,12	0.81	0	15,15,17	1.08	1 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	C	1	2	-	0/2/22/22	0/1/1/1
2	GLC	C	2	2	-	0/2/19/22	0/1/1/1
2	GLC	D	1	2	-	0/2/22/22	0/1/1/1
2	GLC	D	2	2	-	0/2/19/22	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	2	GLC	O5-C1	-2.51	1.39	1.43

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	1	GLC	C1-O5-C5	4.11	121.43	113.66
2	C	1	GLC	O5-C1-C2	4.02	117.45	110.28
2	C	1	GLC	O1-C1-O5	-2.76	102.10	110.38
2	D	2	GLC	C2-C3-C4	-2.59	106.42	110.89
2	D	1	GLC	O1-C1-O5	-2.26	103.61	110.38

There are no chirality outliers.

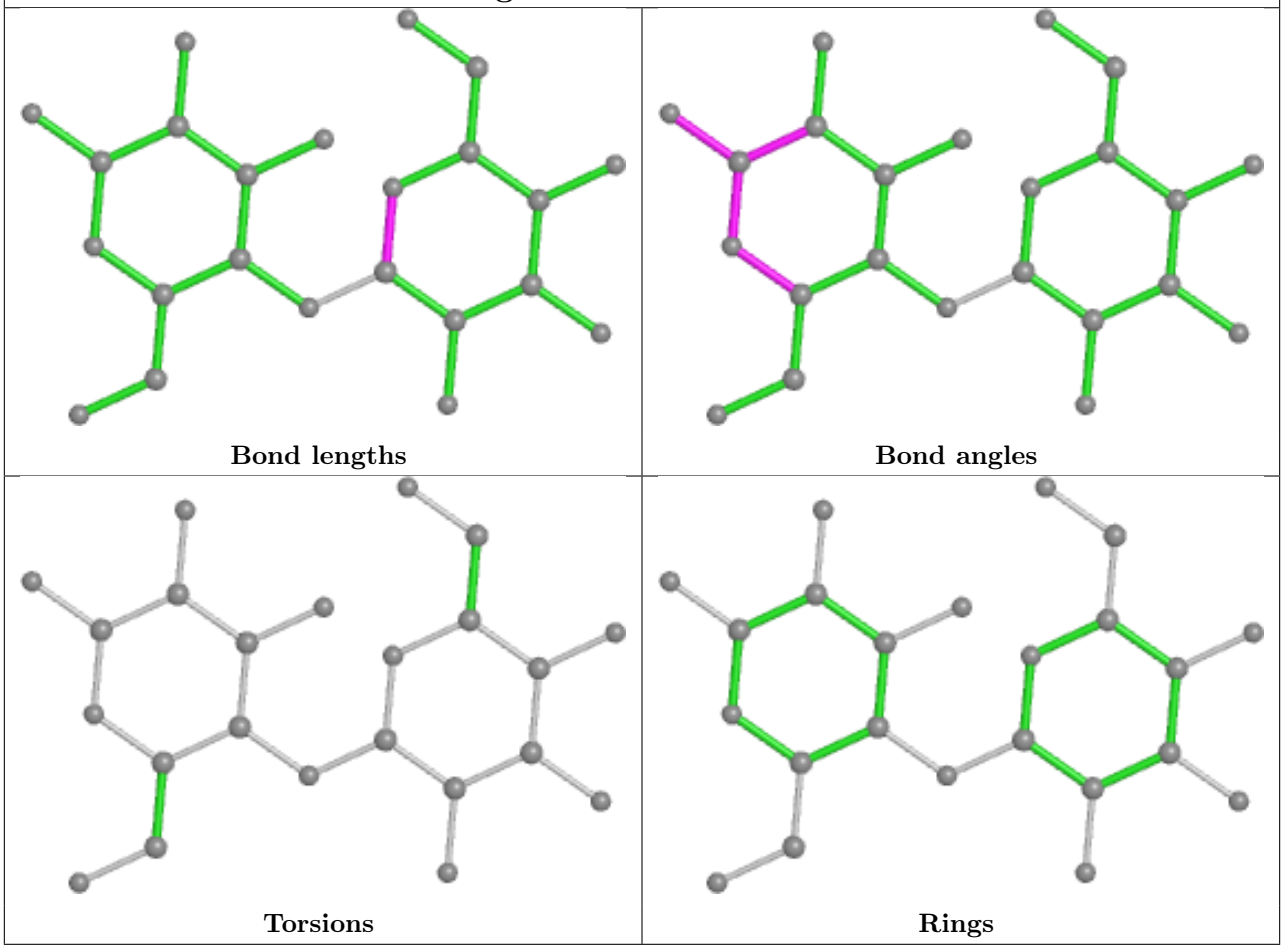
There are no torsion outliers.

There are no ring outliers.

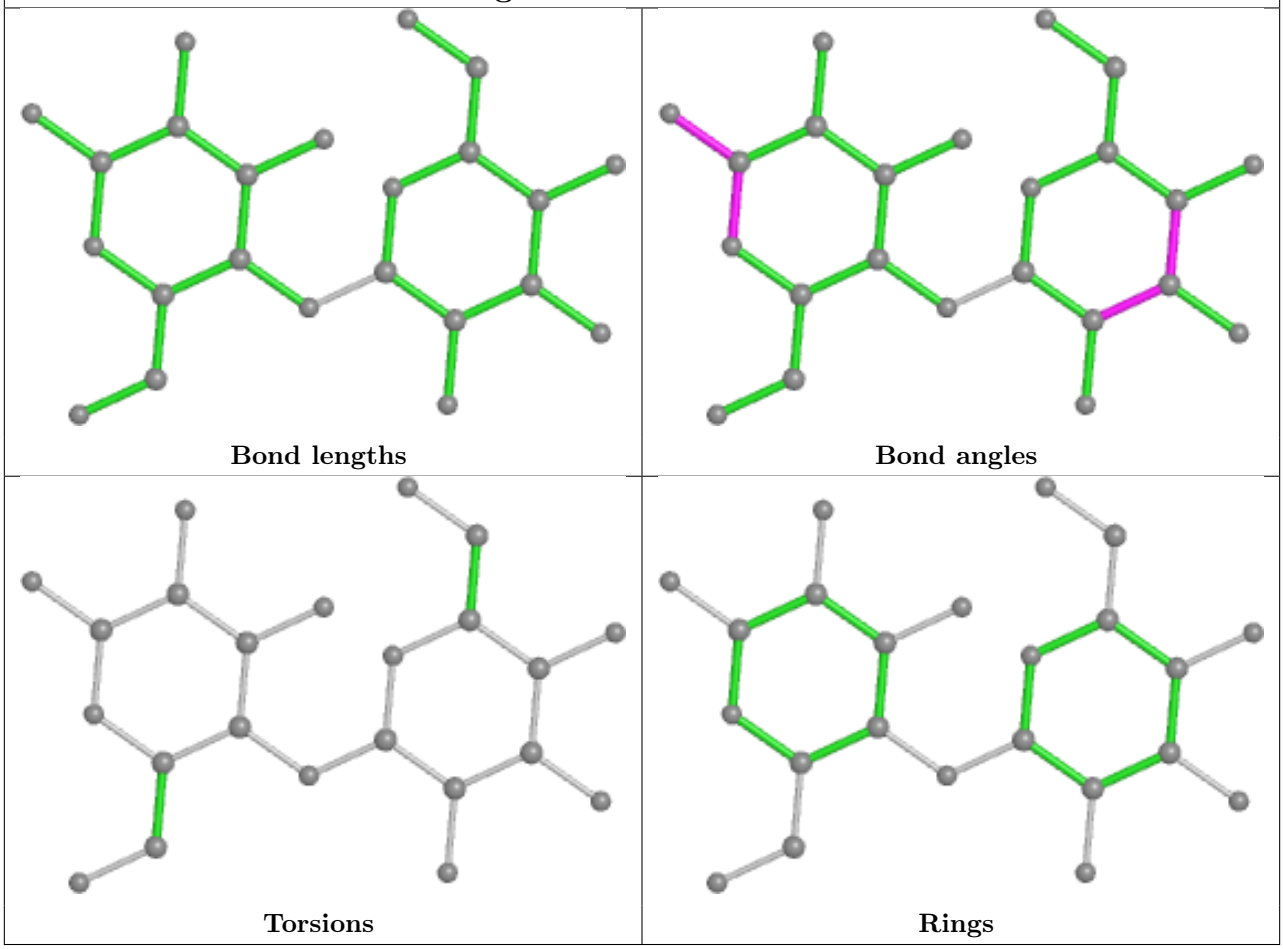
No monomer is involved in short contacts.

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 C



Oligosaccharide Chain D



5.6 Ligand geometry (i)

Of 13 ligands modelled in this entry, 2 are monoatomic - leaving 11 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
5	GOL	A	607	-	5,5,5	1.42	0	5,5,5	1.63	2 (40%)
5	GOL	B	604	-	5,5,5	0.55	0	5,5,5	1.45	1 (20%)
6	FLC	A	608	-	12,12,12	1.30	2 (16%)	17,17,17	2.12	4 (23%)
5	GOL	B	605	-	5,5,5	0.52	0	5,5,5	2.01	2 (40%)
5	GOL	A	605	-	5,5,5	0.26	0	5,5,5	1.01	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
5	GOL	B	606	-	5,5,5	0.93	0	5,5,5	1.04	0
5	GOL	A	604	-	5,5,5	0.60	0	5,5,5	1.01	1 (20%)
3	COA	B	602	4	41,50,50	1.09	3 (7%)	52,75,75	1.09	3 (5%)
3	COA	A	602	4	41,50,50	1.20	4 (9%)	52,75,75	1.35	7 (13%)
6	FLC	B	607	-	12,12,12	1.69	5 (41%)	17,17,17	5.29	8 (47%)
5	GOL	A	606	-	5,5,5	0.58	0	5,5,5	0.55	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
5	GOL	A	607	-	-	4/4/4/4	-
5	GOL	B	604	-	-	0/4/4/4	-
6	FLC	A	608	-	-	0/16/16/16	-
5	GOL	B	605	-	-	0/4/4/4	-
5	GOL	A	605	-	-	3/4/4/4	-
5	GOL	B	606	-	-	0/4/4/4	-
5	GOL	A	604	-	-	0/4/4/4	-
3	COA	B	602	4	-	3/44/64/64	0/3/3/3
3	COA	A	602	4	-	3/44/64/64	0/3/3/3
6	FLC	B	607	-	-	9/16/16/16	-
5	GOL	A	606	-	-	0/4/4/4	-

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	602	COA	C2A-N3A	3.32	1.37	1.32
6	B	607	FLC	OA1-CAC	2.94	1.31	1.22
6	A	608	FLC	OA2-CAC	-2.74	1.21	1.30
3	B	602	COA	C4A-N3A	2.56	1.39	1.35
6	B	607	FLC	OHB-CB	2.46	1.48	1.43

The worst 5 of 28 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	B	607	FLC	OHB-CB-CBC	-11.62	92.55	108.86
6	B	607	FLC	OHB-CB-CA	-8.41	89.73	109.40
6	B	607	FLC	OHB-CB-CG	-8.40	89.74	109.40

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	B	607	FLC	OB1-CBC-CB	-7.27	111.96	122.25
6	B	607	FLC	CA-CB-CBC	7.04	125.24	110.11

There are no chirality outliers.

5 of 22 torsion outliers are listed below:

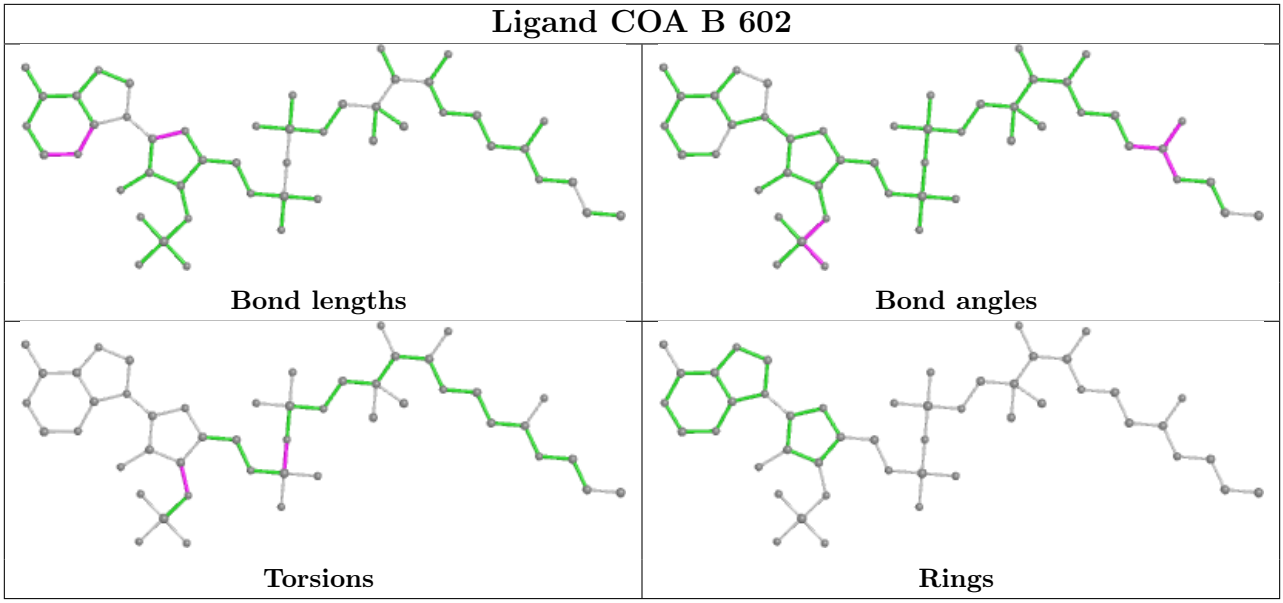
Mol	Chain	Res	Type	Atoms
5	A	607	GOL	O1-C1-C2-O2
5	A	607	GOL	O1-C1-C2-C3
5	A	607	GOL	C1-C2-C3-O3
6	B	607	FLC	CBC-CB-CG-CGC
3	A	602	COA	C2B-C3B-O3B-P3B

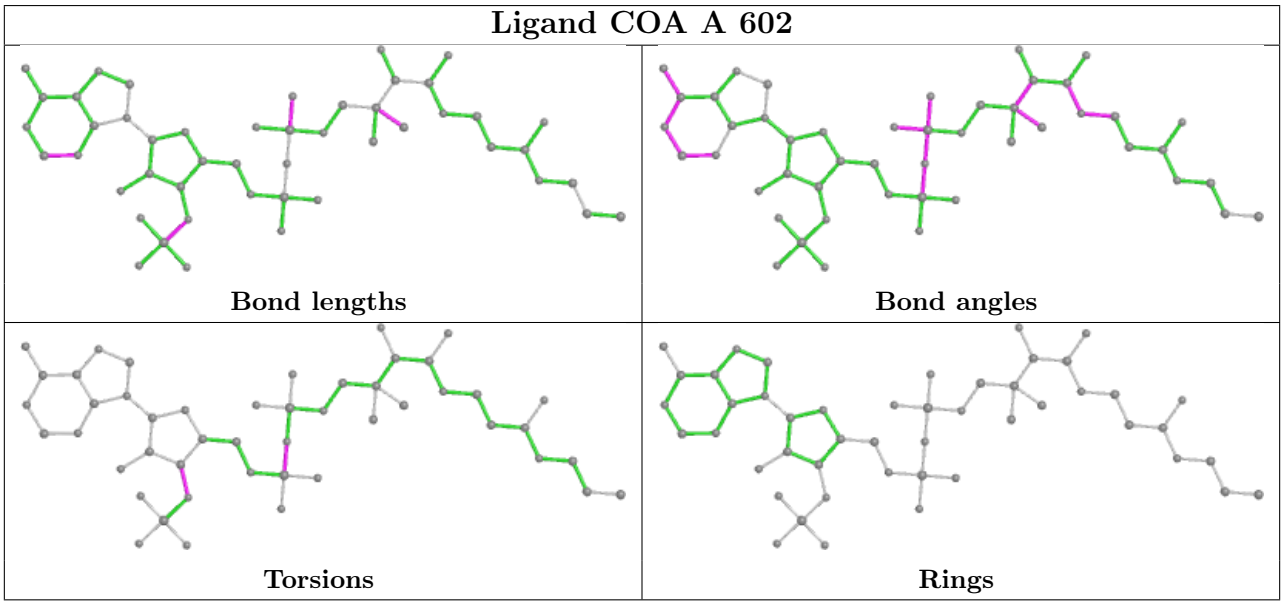
There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	607	GOL	1	0
5	B	605	GOL	2	0
6	B	607	FLC	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.





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 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	596/598 (99%)	-0.22	7 (1%)	79	84	16, 24, 42, 68	0
1	B	595/598 (99%)	-0.23	7 (1%)	79	84	16, 26, 44, 64	0
All	All	1191/1196 (99%)	-0.23	14 (1%)	79	84	16, 25, 43, 68	0

The worst 5 of 14 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	494	ASN	4.1
1	B	142	ALA	3.8
1	B	203	LYS	3.6
1	A	558	TRP	3.6
1	B	135	ALA	3.4

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

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

6.3 Carbohydrates (i)

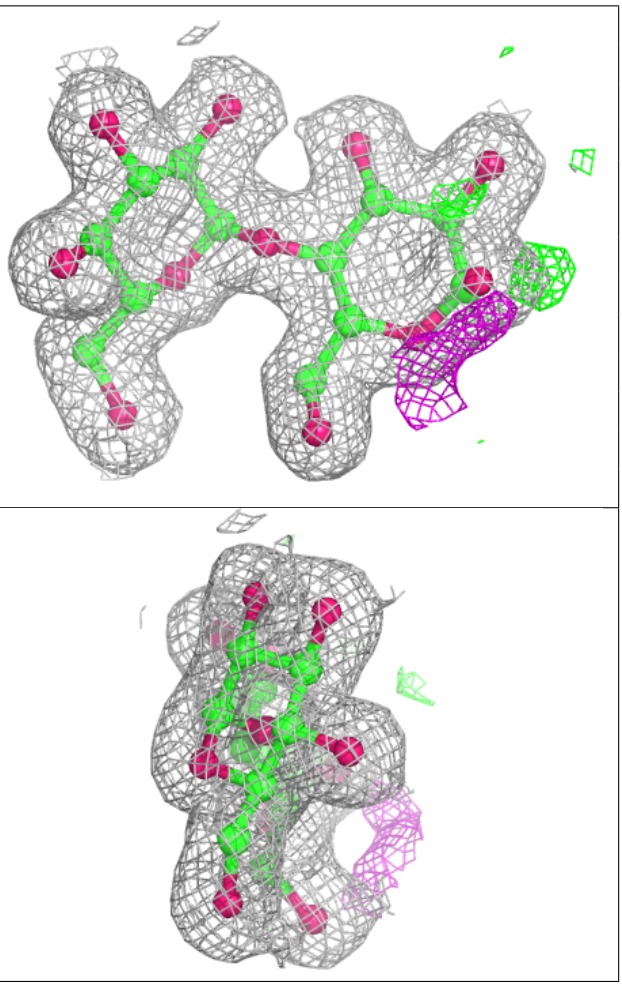
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	GLC	D	1	12/12	0.97	0.08	20,24,28,33	0
2	GLC	C	2	11/12	0.98	0.10	15,17,17,19	0
2	GLC	C	1	12/12	0.98	0.09	17,20,25,27	0
2	GLC	D	2	11/12	0.99	0.07	18,21,21,22	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

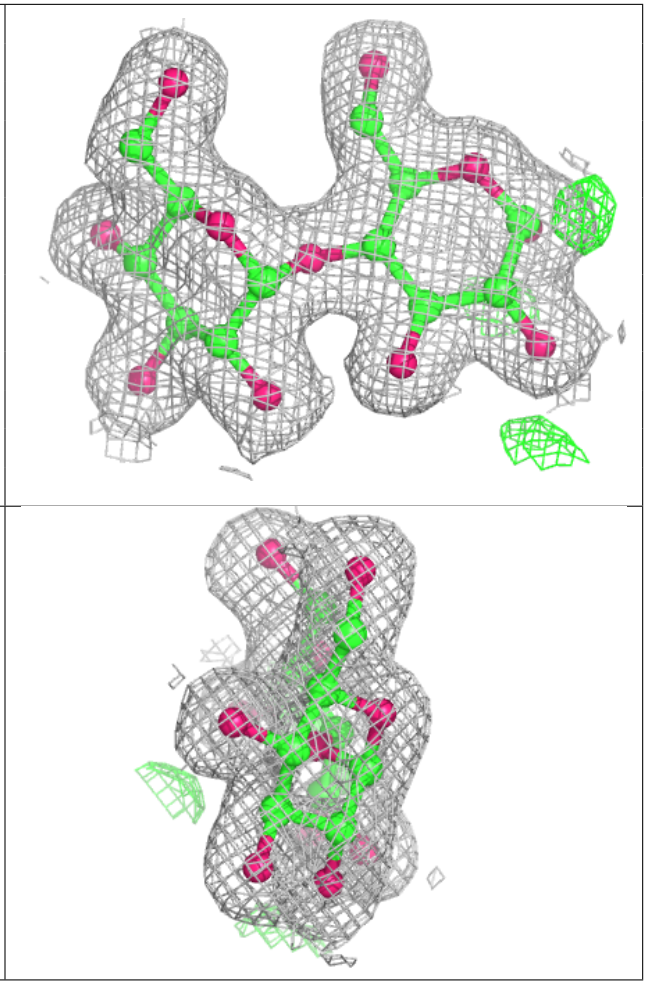
Electron density around Chain C:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



Electron density around Chain D:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	GOL	B	605	6/6	0.66	0.18	49,52,57,61	0
5	GOL	A	607	6/6	0.84	0.18	36,41,46,55	0
5	GOL	B	606	6/6	0.91	0.13	33,47,59,61	0
6	FLC	A	608	13/13	0.91	0.17	30,39,42,44	0
5	GOL	A	605	6/6	0.93	0.12	29,35,41,50	0
6	FLC	B	607	13/13	0.93	0.15	28,41,45,49	0
5	GOL	A	604	6/6	0.96	0.09	23,24,26,34	0
5	GOL	B	604	6/6	0.96	0.13	28,35,43,48	0
3	COA	A	602	48/48	0.98	0.08	16,20,25,28	0
4	MG	A	603	1/1	0.98	0.10	29,29,29,29	0
5	GOL	A	606	6/6	0.98	0.07	21,24,28,34	0

Continued on next page...

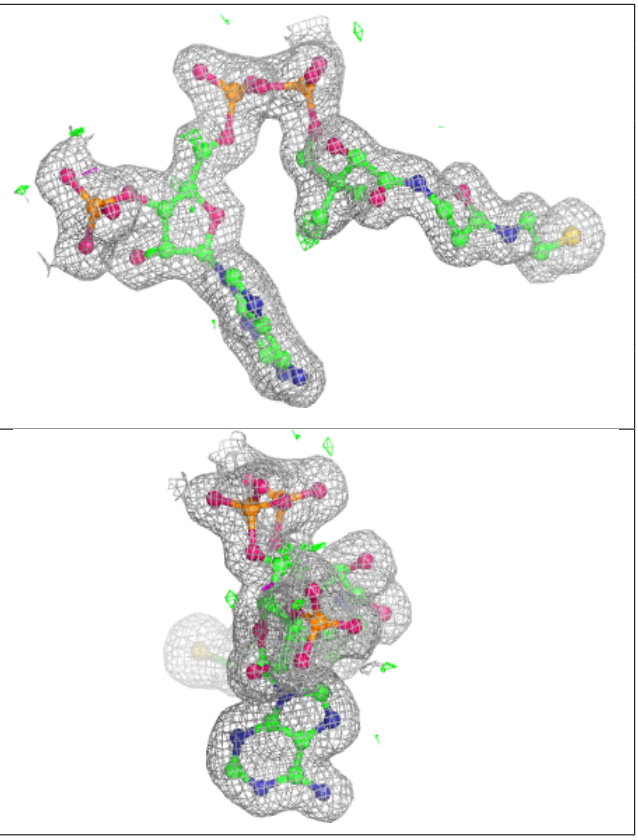
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	MG	B	603	1/1	0.99	0.04	22,22,22,22	0
3	COA	B	602	48/48	0.99	0.08	16,19,24,29	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

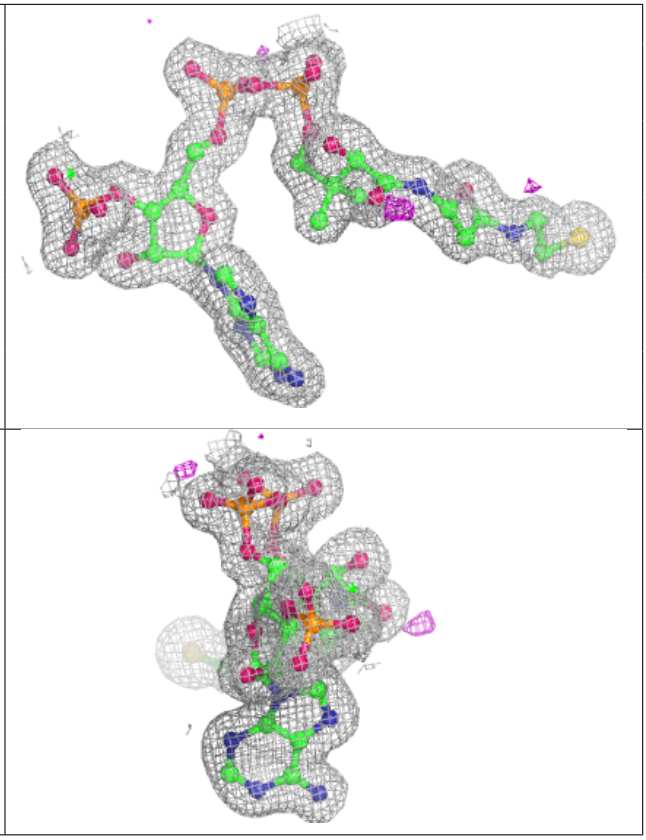
Electron density around COA A 602:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around COA B 602:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.