



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 17, 2024 – 06:11 PM EST

PDB ID : 3TJO
Title : HtrA1 catalytic domain, mutationally inactivated
Authors : Eigenbrot, C.; Ultsch, M.
Deposited on : 2011-08-24
Resolution : 2.30 Å(reported)

This is a Full wwPDB X-ray Structure 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/XrayValidationReportHelp>

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:

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

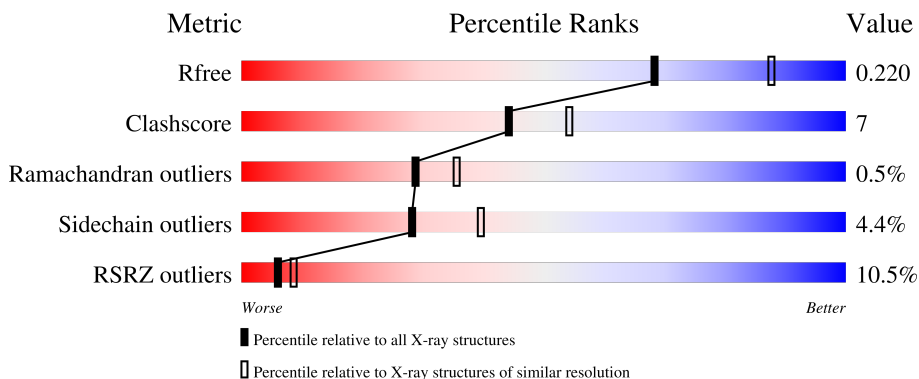
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 $\leq 5\%$. 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	231	 8% 74% 11% 14%
1	B	231	 7% 72% 13% 14%
1	D	231	 12% 68% 15% 15%

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
2	BOG	A	455	-	-	-	X
4	GOL	A	2	-	-	-	X
4	GOL	B	1	-	-	X	-
4	GOL	B	5	-	-	-	X

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 4923 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 Serine protease HTRA1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
1	A	198	1524	972	263	289	0	1	0
1	B	198	1524	972	263	289	0	1	0
1	D	197	1569	1001	273	295	0	8	0

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	140	MET	-	expression tag	UNP Q92743
A	141	GLY	-	expression tag	UNP Q92743
A	142	SER	-	expression tag	UNP Q92743
A	143	SER	-	expression tag	UNP Q92743
A	144	HIS	-	expression tag	UNP Q92743
A	145	HIS	-	expression tag	UNP Q92743
A	146	HIS	-	expression tag	UNP Q92743
A	147	HIS	-	expression tag	UNP Q92743
A	148	HIS	-	expression tag	UNP Q92743
A	149	HIS	-	expression tag	UNP Q92743
A	150	SER	-	expression tag	UNP Q92743
A	151	SER	-	expression tag	UNP Q92743
A	152	GLY	-	expression tag	UNP Q92743
A	153	LEU	-	expression tag	UNP Q92743
A	154	VAL	-	expression tag	UNP Q92743
A	155	PRO	-	expression tag	UNP Q92743
A	156	ARG	-	expression tag	UNP Q92743
A	157	GLY	-	expression tag	UNP Q92743
A	158	SER	-	expression tag	UNP Q92743
A	159	HIS	-	expression tag	UNP Q92743
A	160	MET	-	expression tag	UNP Q92743
A	328	ALA	SER	engineered mutation	UNP Q92743
B	140	MET	-	expression tag	UNP Q92743

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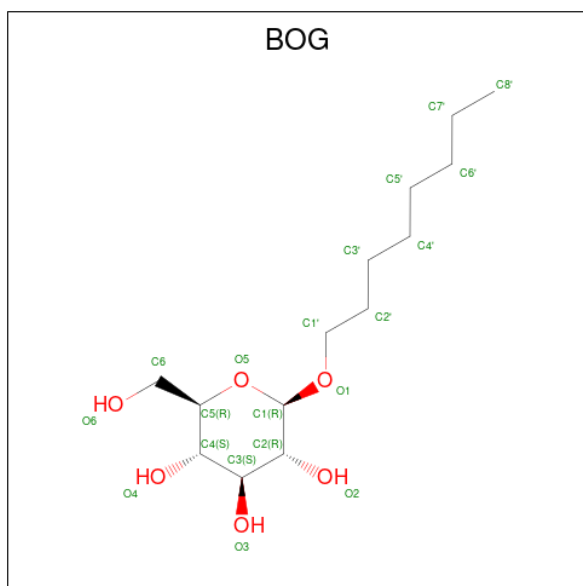
Chain	Residue	Modelled	Actual	Comment	Reference
B	141	GLY	-	expression tag	UNP Q92743
B	142	SER	-	expression tag	UNP Q92743
B	143	SER	-	expression tag	UNP Q92743
B	144	HIS	-	expression tag	UNP Q92743
B	145	HIS	-	expression tag	UNP Q92743
B	146	HIS	-	expression tag	UNP Q92743
B	147	HIS	-	expression tag	UNP Q92743
B	148	HIS	-	expression tag	UNP Q92743
B	149	HIS	-	expression tag	UNP Q92743
B	150	SER	-	expression tag	UNP Q92743
B	151	SER	-	expression tag	UNP Q92743
B	152	GLY	-	expression tag	UNP Q92743
B	153	LEU	-	expression tag	UNP Q92743
B	154	VAL	-	expression tag	UNP Q92743
B	155	PRO	-	expression tag	UNP Q92743
B	156	ARG	-	expression tag	UNP Q92743
B	157	GLY	-	expression tag	UNP Q92743
B	158	SER	-	expression tag	UNP Q92743
B	159	HIS	-	expression tag	UNP Q92743
B	160	MET	-	expression tag	UNP Q92743
B	328	ALA	SER	engineered mutation	UNP Q92743
D	140	MET	-	expression tag	UNP Q92743
D	141	GLY	-	expression tag	UNP Q92743
D	142	SER	-	expression tag	UNP Q92743
D	143	SER	-	expression tag	UNP Q92743
D	144	HIS	-	expression tag	UNP Q92743
D	145	HIS	-	expression tag	UNP Q92743
D	146	HIS	-	expression tag	UNP Q92743
D	147	HIS	-	expression tag	UNP Q92743
D	148	HIS	-	expression tag	UNP Q92743
D	149	HIS	-	expression tag	UNP Q92743
D	150	SER	-	expression tag	UNP Q92743
D	151	SER	-	expression tag	UNP Q92743
D	152	GLY	-	expression tag	UNP Q92743
D	153	LEU	-	expression tag	UNP Q92743
D	154	VAL	-	expression tag	UNP Q92743
D	155	PRO	-	expression tag	UNP Q92743
D	156	ARG	-	expression tag	UNP Q92743
D	157	GLY	-	expression tag	UNP Q92743
D	158	SER	-	expression tag	UNP Q92743
D	159	HIS	-	expression tag	UNP Q92743
D	160	MET	-	expression tag	UNP Q92743

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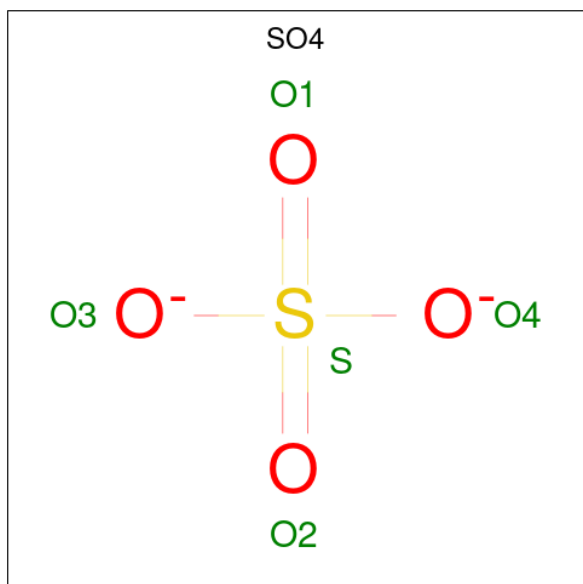
Chain	Residue	Modelled	Actual	Comment	Reference
D	328	ALA	SER	engineered mutation	UNP Q92743

- Molecule 2 is octyl beta-D-glucopyranoside (three-letter code: BOG) (formula: $C_{14}H_{28}O_6$).



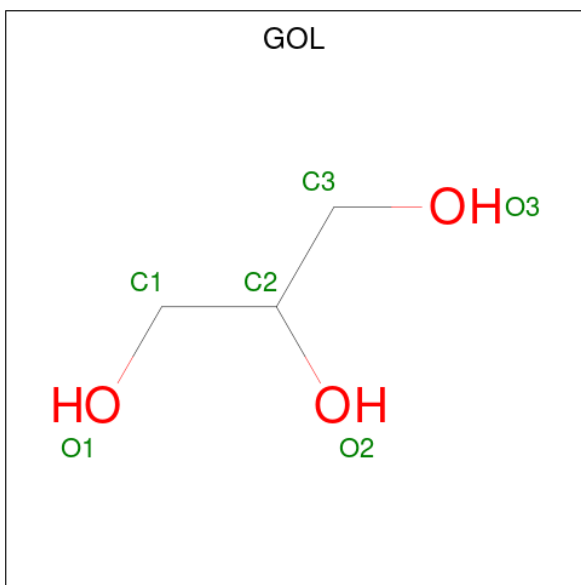
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	
2	A	1	Total	C	O	0	0
				20	14		
2	B	1	Total	C	O	0	0
				20	14		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	81	Total O 81 81	0	0

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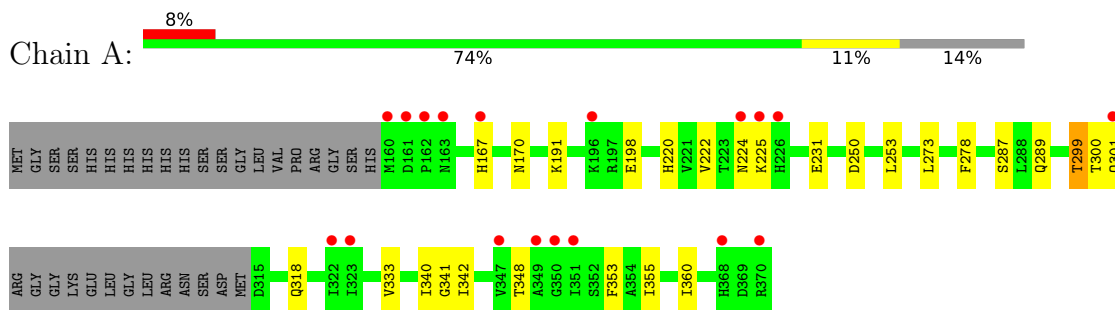
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	67	Total O 67 67	0	0
5	D	68	Total O 68 68	0	0

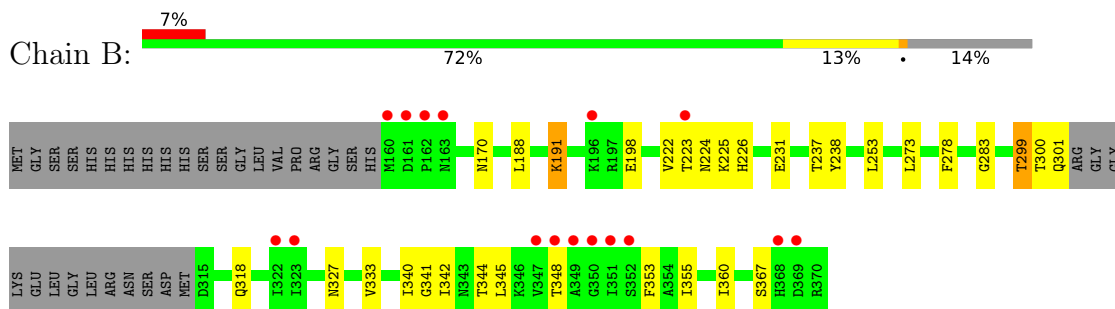
3 Residue-property plots [i](#)

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.

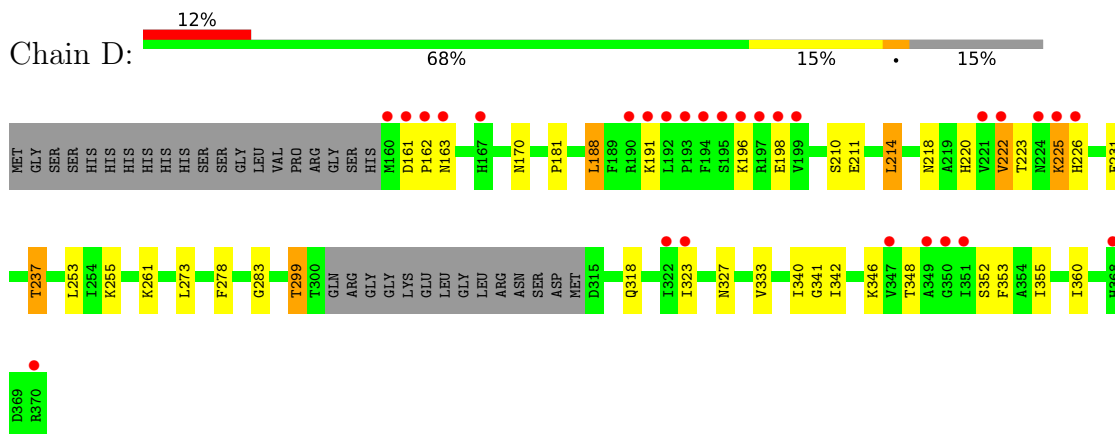
- Molecule 1: Serine protease HTRA1



- Molecule 1: Serine protease HTRA1



- Molecule 1: Serine protease HTRA1



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	151.92Å 151.92Å 87.54Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.30 48.04 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.8 (50.00-2.30) 99.8 (48.04-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.64 (at 2.29Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.185 , 0.216 0.184 , 0.220	Depositor DCC
R_{free} test set	1052 reflections (2.29%)	wwPDB-VP
Wilson B-factor (Å ²)	35.5	Xtrriage
Anisotropy	0.006	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 45.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	4923	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.42% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: SO4, GOL, BOG

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	0.46	0/1549	0.58	0/2099
1	B	0.45	0/1549	0.57	0/2099
1	D	0.45	0/1596	0.57	0/2164
All	All	0.45	0/4694	0.57	0/6362

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 [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	1524	0	1563	15	0
1	B	1524	0	1563	25	0
1	D	1569	0	1610	30	0
2	A	20	0	10	0	0
2	B	20	0	10	0	0
3	A	15	0	0	0	0
3	B	5	0	0	0	0
4	A	6	0	8	2	0
4	B	18	0	24	9	0
4	D	6	0	8	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	81	0	0	0	0
5	B	67	0	0	1	0
5	D	68	0	0	3	0
All	All	4923	0	4796	63	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 7.

All (63) 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:B:344:THR:HB	4:B:1:GOL:H11	1.50	0.94
1:A:300:THR:O	1:A:301:GLN:HB2	1.95	0.66
1:B:170:ASN:HD21	1:D:278:PHE:H	1.43	0.66
1:D:223[B]:THR:H	1:D:226[B]:HIS:HD2	1.43	0.66
1:A:220:HIS:HD2	1:A:250:ASP:OD2	1.79	0.64
1:D:214:LEU:HD13	1:D:255:LYS:HD3	1.81	0.61
1:D:220[B]:HIS:O	1:D:222[B]:VAL:HG22	2.01	0.59
1:B:342:ILE:HG13	1:B:360:ILE:HD11	1.85	0.58
1:B:223:THR:H	1:B:226:HIS:HD2	1.51	0.58
1:D:231:GLU:HG3	1:D:237:THR:HB	1.85	0.57
1:B:170:ASN:ND2	1:D:278:PHE:H	2.02	0.56
1:D:223[A]:THR:HG23	1:D:225[A]:LYS:HE2	1.86	0.56
1:D:237:THR:HG22	5:D:41:HOH:O	2.04	0.56
1:B:344:THR:HA	4:B:1:GOL:H32	1.87	0.56
1:B:345:LEU:H	4:B:1:GOL:H2	1.70	0.56
1:A:278:PHE:H	1:D:170:ASN:HD21	1.54	0.56
1:A:231:GLU:OE1	1:A:287:SER:HB3	2.07	0.55
1:B:223:THR:HG23	1:B:225:LYS:H	1.73	0.54
1:D:223[A]:THR:O	1:D:225[A]:LYS:N	2.40	0.54
1:B:191:LYS:HG3	1:B:198:GLU:HG2	1.90	0.53
1:A:170:ASN:HD21	1:B:278:PHE:H	1.55	0.53
1:D:341:GLY:HA2	1:D:355:ILE:O	2.08	0.53
1:A:191:LYS:HA	1:A:198:GLU:HG2	1.91	0.53
1:D:191:LYS:HD2	1:D:196:LYS:HG2	1.90	0.52
1:A:278:PHE:H	1:D:170:ASN:ND2	2.07	0.52
1:D:188:LEU:HD21	1:D:225[A]:LYS:HG3	1.91	0.51
1:D:346:LYS:NZ	5:D:391:HOH:O	2.32	0.51
1:A:299:THR:HG23	1:A:318:GLN:HB2	1.91	0.51
1:A:341:GLY:HA2	1:A:355:ILE:O	2.10	0.51
1:D:210:SER:OG	1:D:214:LEU:HB2	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:283:GLY:HA3	1:B:327:ASN:HA	1.92	0.51
1:D:223[B]:THR:H	1:D:226[B]:HIS:CD2	2.25	0.50
1:B:345:LEU:H	4:B:1:GOL:C2	2.24	0.50
1:D:237:THR:CG2	5:D:41:HOH:O	2.59	0.50
1:A:170:ASN:ND2	1:B:278:PHE:H	2.10	0.50
1:D:299:THR:HG23	1:D:318:GLN:HB2	1.93	0.50
1:B:348:THR:HG22	1:B:353:PHE:HE2	1.76	0.49
1:D:218:ASN:HB3	1:D:220[A]:HIS:H	1.77	0.49
1:B:273:LEU:HD11	1:B:340:ILE:HD13	1.94	0.48
1:B:223:THR:HG22	1:B:226:HIS:CD2	2.49	0.48
1:D:342:ILE:HG13	1:D:360:ILE:HD11	1.94	0.47
4:B:5:GOL:O2	1:D:348:THR:HG23	2.14	0.47
1:B:300:THR:O	1:B:301:GLN:HB2	2.15	0.47
1:A:273:LEU:HD11	1:A:340:ILE:HD13	1.97	0.46
4:B:5:GOL:O2	1:D:348:THR:CG2	2.65	0.45
4:A:2:GOL:H11	1:B:318:GLN:OE1	2.16	0.45
1:B:238:TYR:HE2	4:B:3:GOL:H32	1.80	0.45
1:D:181:PRO:HB3	4:D:4:GOL:H2	1.99	0.45
1:D:283:GLY:HA3	1:D:327:ASN:HA	1.98	0.45
1:D:273:LEU:HD11	1:D:340:ILE:HD13	2.00	0.44
1:B:341:GLY:HA2	1:B:355:ILE:O	2.17	0.43
1:D:161:ASP:HB3	1:D:162:PRO:HD3	2.01	0.43
1:A:289[B]:GLN:NE2	1:B:299:THR:HG21	2.35	0.42
1:D:348:THR:HG22	1:D:353:PHE:HE2	1.85	0.42
1:B:299:THR:CG2	5:B:129:HOH:O	2.67	0.41
1:D:211:GLU:OE2	1:D:261:LYS:HE3	2.21	0.41
1:A:342:ILE:HG13	1:A:360:ILE:HD11	2.03	0.41
1:D:323:ILE:HD12	1:D:352:SER:HB3	2.02	0.41
1:A:348:THR:HG22	1:A:353:PHE:HE2	1.85	0.41
1:B:345:LEU:H	4:B:1:GOL:C1	2.34	0.41
1:B:345:LEU:HB2	4:B:1:GOL:H2	2.03	0.41
1:A:289[B]:GLN:HE22	4:A:2:GOL:C1	2.34	0.40
1:B:231:GLU:HG2	1:B:237:THR:HG22	2.04	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 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	195/231 (84%)	191 (98%)	3 (2%)	1 (0%)	29	35
1	B	195/231 (84%)	193 (99%)	2 (1%)	0	100	100
1	D	201/231 (87%)	192 (96%)	7 (4%)	2 (1%)	15	17
All	All	591/693 (85%)	576 (98%)	12 (2%)	3 (0%)	29	35

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	198	GLU
1	D	163	ASN
1	A	224	ASN

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	169/196 (86%)	163 (96%)	6 (4%)	35	49
1	B	169/196 (86%)	161 (95%)	8 (5%)	26	37
1	D	174/196 (89%)	164 (94%)	10 (6%)	20	28
All	All	512/588 (87%)	488 (95%)	24 (5%)	28	37

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	167	HIS
1	A	222	VAL
1	A	225	LYS
1	A	253	LEU
1	A	299	THR
1	A	333	VAL
1	B	188	LEU
1	B	191	LYS
1	B	222	VAL
1	B	224	ASN
1	B	253	LEU
1	B	299	THR
1	B	333	VAL
1	B	367	SER
1	D	188	LEU
1	D	214	LEU
1	D	222[A]	VAL
1	D	222[B]	VAL
1	D	225[A]	LYS
1	D	225[B]	LYS
1	D	237	THR
1	D	253	LEU
1	D	299	THR
1	D	333	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	170	ASN
1	A	220	HIS
1	B	170	ASN
1	B	218	ASN
1	B	220	HIS
1	B	224	ASN
1	B	226	HIS
1	D	170	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](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

11 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
4	GOL	B	1	-	5,5,5	0.44	0	5,5,5	0.35	0
4	GOL	A	2	-	5,5,5	0.39	0	5,5,5	0.15	0
2	BOG	B	455	-	20,20,20	3.42	12 (60%)	25,25,25	1.69	3 (12%)
3	SO4	A	3	-	4,4,4	0.14	0	6,6,6	0.07	0
3	SO4	A	1	-	4,4,4	0.14	0	6,6,6	0.53	0
3	SO4	B	2	-	4,4,4	0.15	0	6,6,6	0.15	0
2	BOG	A	455	-	20,20,20	3.46	12 (60%)	25,25,25	1.87	5 (20%)
3	SO4	A	4	-	4,4,4	0.17	0	6,6,6	0.12	0
4	GOL	B	5	-	5,5,5	0.46	0	5,5,5	0.41	0
4	GOL	D	4	-	5,5,5	0.37	0	5,5,5	0.15	0
4	GOL	B	3	-	5,5,5	0.41	0	5,5,5	0.23	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	B	1	-	-	2/4/4/4	-
4	GOL	A	2	-	-	0/4/4/4	-
2	BOG	B	455	-	-	1/11/31/31	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	B	5	-	-	2/4/4/4	-
2	BOG	A	455	-	-	4/11/31/31	0/1/1/1
4	GOL	D	4	-	-	2/4/4/4	-
4	GOL	B	3	-	-	2/4/4/4	-

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	455	BOG	C2'-C1'	-6.65	1.22	1.51
2	B	455	BOG	C2'-C1'	-6.47	1.23	1.51
2	B	455	BOG	C4-C5	-6.00	1.40	1.53
2	A	455	BOG	C4-C5	-5.69	1.41	1.53
2	B	455	BOG	C6'-C5'	-5.33	1.21	1.51
2	A	455	BOG	C6'-C5'	-5.30	1.21	1.51
2	A	455	BOG	C4'-C3'	-5.24	1.22	1.51
2	B	455	BOG	C4'-C3'	-5.10	1.22	1.51
2	A	455	BOG	O6-C6	-4.93	1.21	1.42
2	B	455	BOG	C4-C3	-4.79	1.40	1.52
2	B	455	BOG	O6-C6	-4.76	1.22	1.42
2	A	455	BOG	C4-C3	-4.73	1.40	1.52
2	A	455	BOG	O2-C2	3.90	1.52	1.43
2	B	455	BOG	O2-C2	3.36	1.50	1.43
2	A	455	BOG	C8'-C7'	-3.26	1.23	1.49
2	B	455	BOG	C8'-C7'	-3.25	1.23	1.49
2	A	455	BOG	O5-C1	3.16	1.49	1.41
2	B	455	BOG	O5-C1	3.11	1.49	1.41
2	B	455	BOG	O1-C1	-3.01	1.35	1.40
2	A	455	BOG	C6-C5	-2.48	1.43	1.51
2	A	455	BOG	O1-C1	-2.36	1.36	1.40
2	A	455	BOG	C3-C2	-2.30	1.46	1.52
2	B	455	BOG	C6-C5	-2.29	1.44	1.51
2	B	455	BOG	C3-C2	-2.21	1.46	1.52

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	455	BOG	O1-C1-C2	5.21	116.44	108.30
2	A	455	BOG	O1-C1-C2	4.93	116.01	108.30
2	B	455	BOG	C1'-O1-C1	4.21	120.83	113.84
2	A	455	BOG	C1'-O1-C1	4.14	120.71	113.84
2	A	455	BOG	O5-C5-C4	3.48	116.01	109.69

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	455	BOG	C3-C4-C5	3.43	116.36	110.24
2	A	455	BOG	O2-C2-C1	2.46	116.02	110.05
2	B	455	BOG	O2-C2-C1	2.35	115.75	110.05

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	455	BOG	C2'-C1'-O1-C1
4	B	1	GOL	O1-C1-C2-C3
4	B	3	GOL	C1-C2-C3-O3
4	B	3	GOL	O2-C2-C3-O3
4	B	5	GOL	C1-C2-C3-O3
2	A	455	BOG	O1-C1'-C2'-C3'
2	A	455	BOG	C2'-C3'-C4'-C5'
4	D	4	GOL	C1-C2-C3-O3
4	B	5	GOL	O2-C2-C3-O3
2	B	455	BOG	C2'-C3'-C4'-C5'
2	A	455	BOG	C5'-C6'-C7'-C8'
4	B	1	GOL	O1-C1-C2-O2
4	D	4	GOL	O2-C2-C3-O3

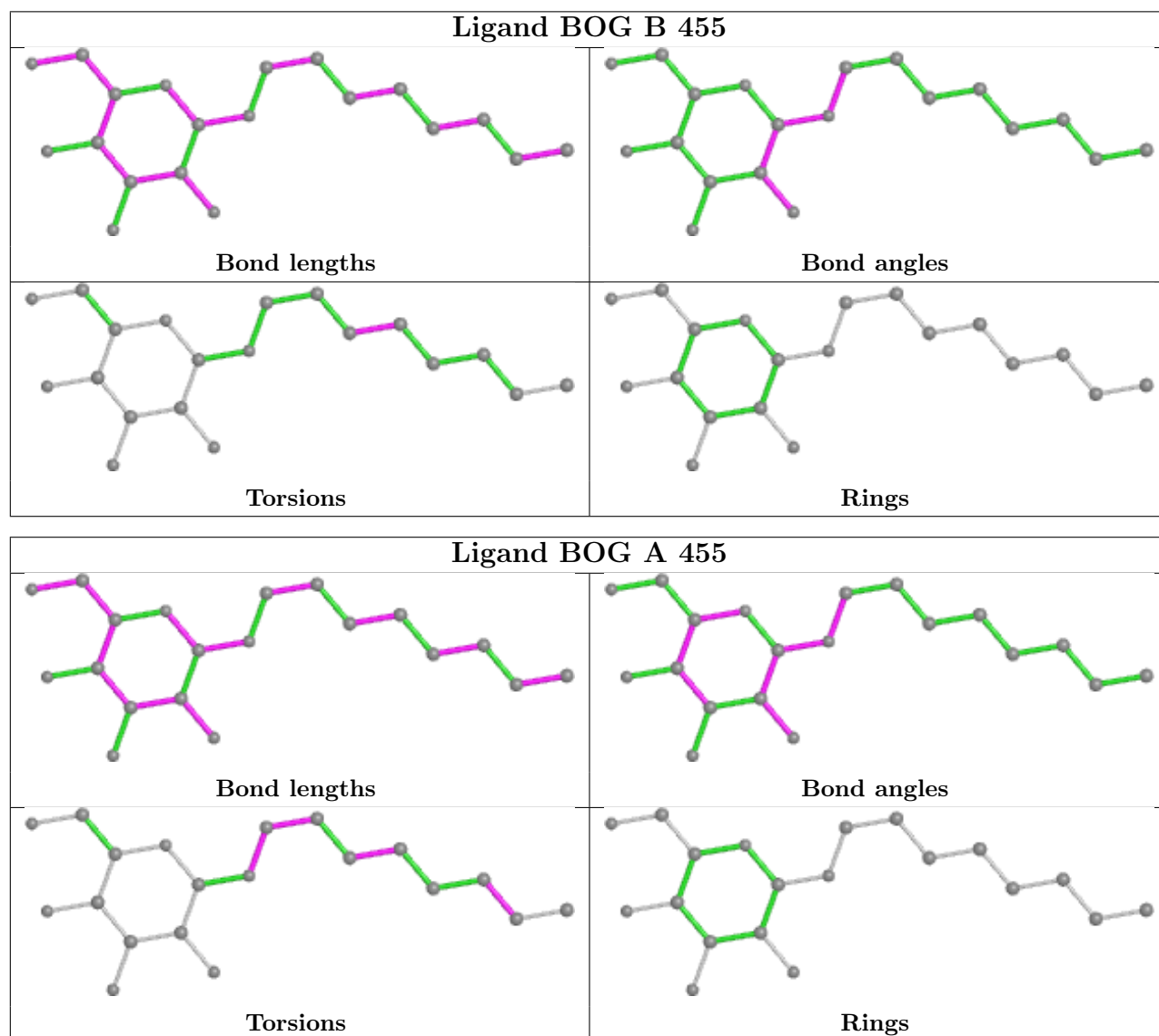
There are no ring outliers.

5 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	1	GOL	6	0
4	A	2	GOL	2	0
4	B	5	GOL	2	0
4	D	4	GOL	1	0
4	B	3	GOL	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 than 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

6.1 Protein, DNA and RNA chains

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	198/231 (85%)	0.29	18 (9%) 9 12	17, 32, 89, 120	0
1	B	198/231 (85%)	0.21	16 (8%) 12 16	18, 34, 73, 121	0
1	D	197/231 (85%)	0.54	28 (14%) 2 3	18, 34, 108, 151	0
All	All	593/693 (85%)	0.35	62 (10%) 6 8	17, 33, 93, 151	0

All (62) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	192	LEU	8.3
1	D	194	PHE	8.2
1	B	160	MET	7.3
1	D	193	PRO	6.7
1	D	196	LYS	6.5
1	D	195	SER	6.1
1	A	160	MET	5.7
1	D	162	PRO	5.5
1	D	197	ARG	5.2
1	D	226[A]	HIS	5.0
1	B	162	PRO	5.0
1	D	163	ASN	4.5
1	D	221[A]	VAL	4.5
1	D	368	HIS	4.5
1	D	190	ARG	4.1
1	A	163	ASN	4.0
1	D	160	MET	3.8
1	A	162	PRO	3.8
1	A	226	HIS	3.6
1	D	347	VAL	3.6
1	A	368	HIS	3.6
1	A	161	ASP	3.5
1	D	191	LYS	3.3

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Mol	Chain	Res	Type	RSRZ
1	B	347	VAL	3.3
1	A	322	ILE	3.1
1	A	351	ILE	3.0
1	D	225[A]	LYS	2.9
1	A	347	VAL	2.9
1	B	349	ALA	2.9
1	B	369	ASP	2.9
1	A	167	HIS	2.8
1	D	198	GLU	2.8
1	B	322	ILE	2.8
1	B	196	LYS	2.8
1	A	224	ASN	2.8
1	D	351	ILE	2.8
1	B	161	ASP	2.7
1	B	348	THR	2.7
1	D	323	ILE	2.7
1	A	196	LYS	2.7
1	D	222[A]	VAL	2.7
1	B	163	ASN	2.6
1	A	323	ILE	2.6
1	D	322	ILE	2.6
1	D	161	ASP	2.6
1	B	223	THR	2.6
1	D	350	GLY	2.6
1	A	349	ALA	2.5
1	B	323	ILE	2.5
1	B	350	GLY	2.5
1	D	370	ARG	2.4
1	A	225	LYS	2.4
1	B	351	ILE	2.3
1	B	368	HIS	2.3
1	D	167	HIS	2.3
1	D	349	ALA	2.3
1	A	350	GLY	2.2
1	A	301	GLN	2.2
1	D	224[A]	ASN	2.1
1	D	199	VAL	2.1
1	B	352	SER	2.1
1	A	370	ARG	2.0

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](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

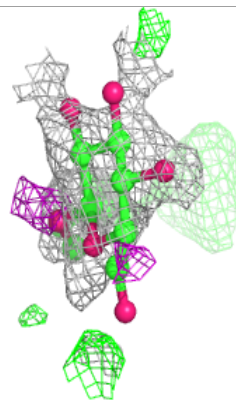
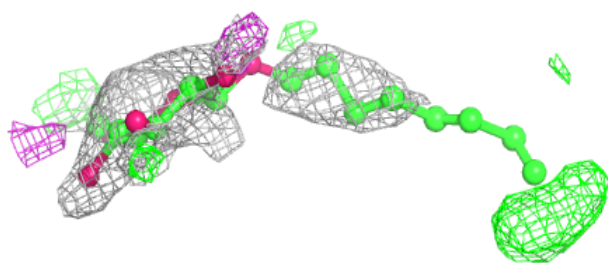
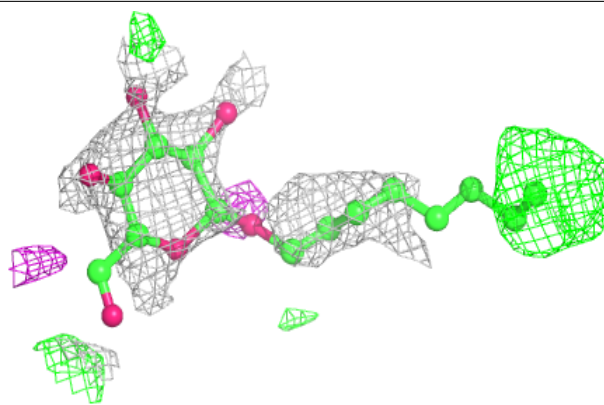
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	BOG	A	455	20/20	0.59	0.46	128,131,135,135	0
4	GOL	B	5	6/6	0.67	0.88	58,61,70,72	6
4	GOL	A	2	6/6	0.79	0.41	66,81,85,88	0
4	GOL	B	3	6/6	0.80	0.27	58,76,81,83	0
4	GOL	D	4	6/6	0.83	0.33	66,71,74,81	0
3	SO4	B	2	5/5	0.86	0.26	99,102,103,103	0
3	SO4	A	4	5/5	0.87	0.16	50,55,58,62	5
4	GOL	B	1	6/6	0.91	0.30	22,39,54,59	0
3	SO4	A	3	5/5	0.92	0.27	94,96,97,98	0
2	BOG	B	455	20/20	0.93	0.13	40,45,54,58	0
3	SO4	A	1	5/5	0.97	0.10	41,42,49,54	0

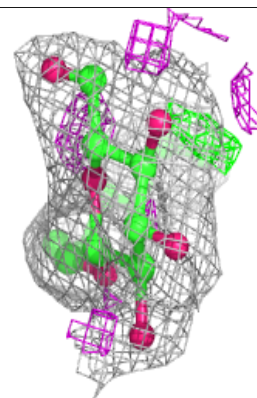
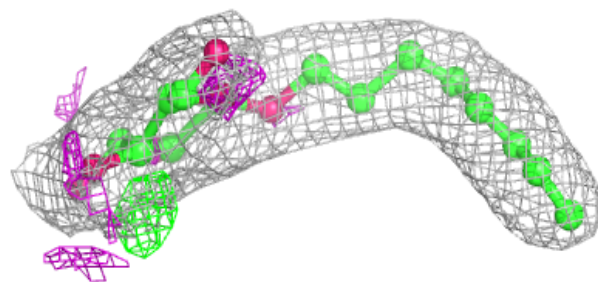
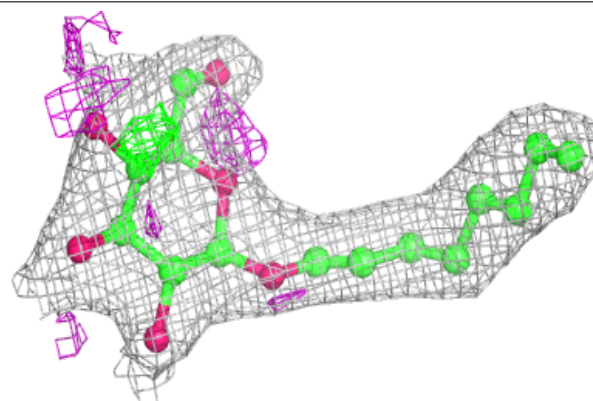
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around BOG A 455:

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

**Electron density around BOG B 455:**

$2mF_o-DF_c$ (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.