



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 01:35 PM UTC

PDB ID : 1YF6 / pdb_00001yf6
Title : Structure of a quintuple mutant of photosynthetic reaction center from rhodobacter sphaeroides
Authors : Paddock, M.L.; Chang, C.; Xu, Q.; Abresch, E.C.; Axelrod, H.L.
Deposited on : 2004-12-30
Resolution : 2.25 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

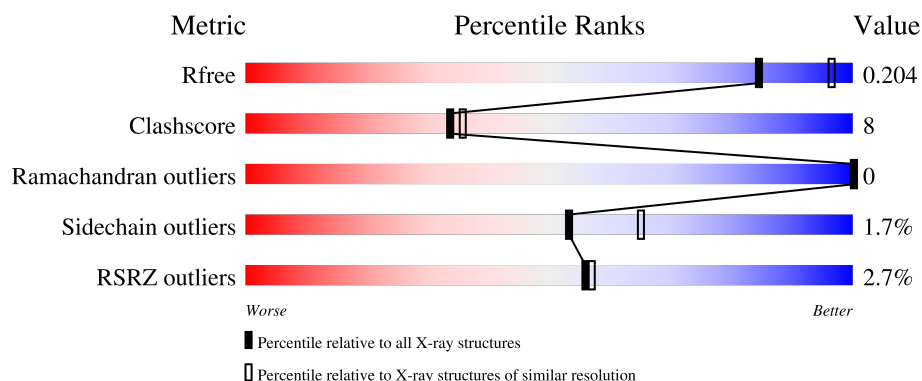
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

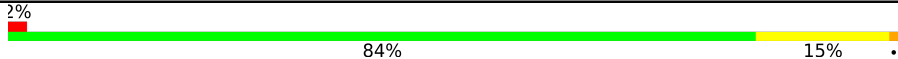
The reported resolution of this entry is 2.25 Å.

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}	180053	1898 (2.26-2.26)
Clashscore	190562	2005 (2.26-2.26)
Ramachandran outliers	187476	1965 (2.26-2.26)
Sidechain outliers	187428	1966 (2.26-2.26)
RSRZ outliers	180081	1898 (2.26-2.26)

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	L	281	
2	M	307	
3	H	260	

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	BCL	L	852	X	-	-	-
4	BCL	L	854	X	-	-	-
4	BCL	M	851	X	-	-	-
4	BCL	M	853	X	-	-	-
4	BCL	M	856	X	-	-	-
9	GOL	L	869	-	X	-	-

2 Entry composition

There are 15 unique types of molecules in this entry. The entry contains 7450 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 Reaction center protein L chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	281	Total	C	N	O	S	0	0	0
			2233	1507	355	363	8			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	181	TYR	PHE	engineered mutation	UNP P02954

- Molecule 2 is a protein called Reaction center protein M chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	M	301	Total	C	N	O	S	0	0	0
			2418	1615	396	397	10			

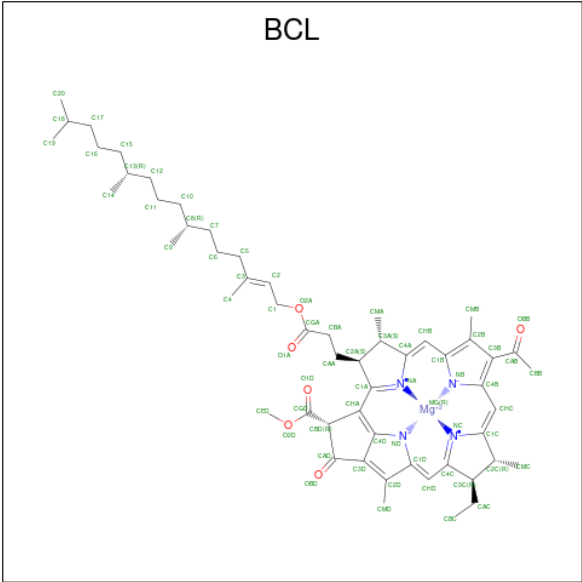
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	203	ASP	GLY	engineered mutation	UNP P02953
M	210	PHE	TYR	engineered mutation	UNP P02953
M	214	HIS	LEU	engineered mutation	UNP P02953
M	260	TRP	ALA	engineered mutation	UNP P02953

- Molecule 3 is a protein called Reaction center protein H chain.

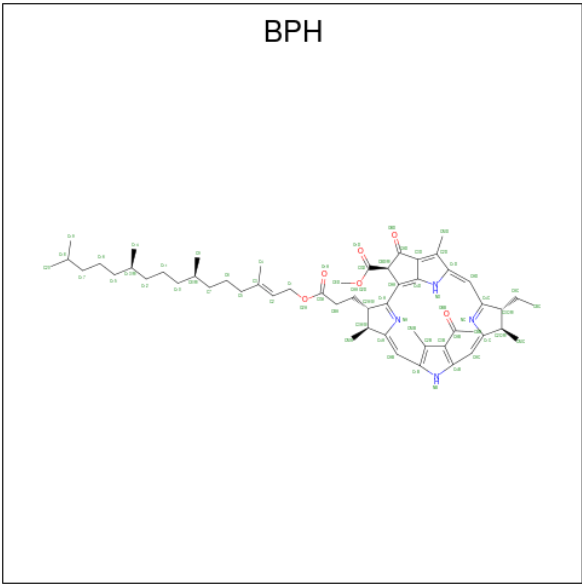
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	H	238	Total	C	N	O	S	0	0	0
			1814	1160	311	334	9			

- Molecule 4 is BACTERIOCHLOROPHYLL A (CCD ID: BCL) (formula: C₅₅H₇₄MgN₄O₆).



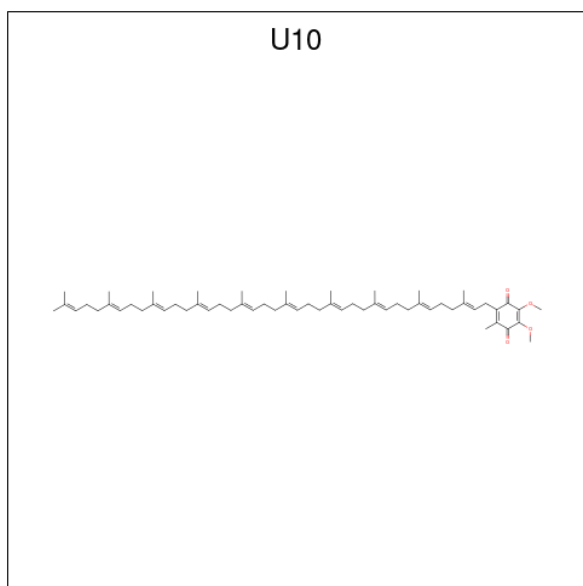
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	L	1	Total 66	C 55	Mg 1	N 4	O 6	0	0
4	L	1	Total 66	C 55	Mg 1	N 4	O 6	0	0
4	M	1	Total 66	C 55	Mg 1	N 4	O 6	0	0
4	M	1	Total 66	C 55	Mg 1	N 4	O 6	0	0
4	M	1	Total 66	C 55	Mg 1	N 4	O 6	0	0

- Molecule 5 is BACTERIOPHEOPHYTIN A (CCD ID: BPH) (formula: C₅₅H₇₆N₄O₆).



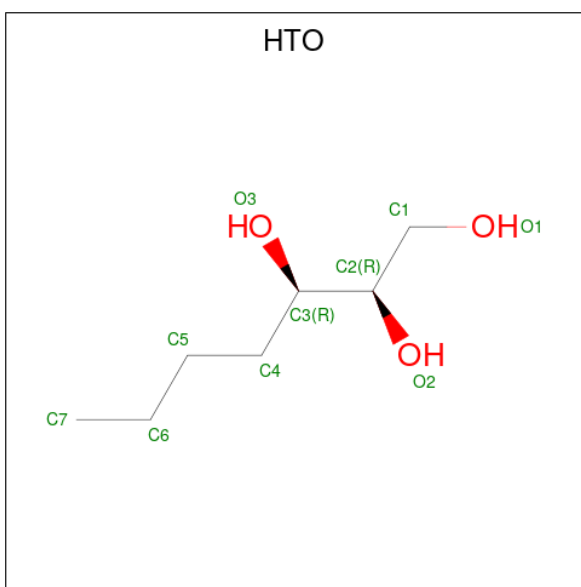
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	L	1	Total	C	N	O	0	0
			51	41	4	6		

- Molecule 6 is UBIQUINONE-10 (CCD ID: U10) (formula: $C_{59}H_{90}O_4$).



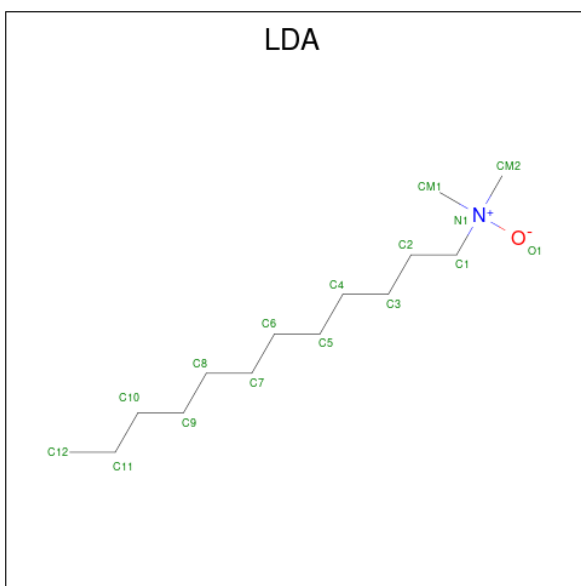
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	L	1	Total	C	O	0	0
			16	12	4		
6	L	1	Total	C	O	0	0
			15	11	4		
6	M	1	Total	C	O	0	0
			15	11	4		

- Molecule 7 is HEPTANE-1,2,3-TRIOL (CCD ID: HTO) (formula: $C_7H_{16}O_3$).



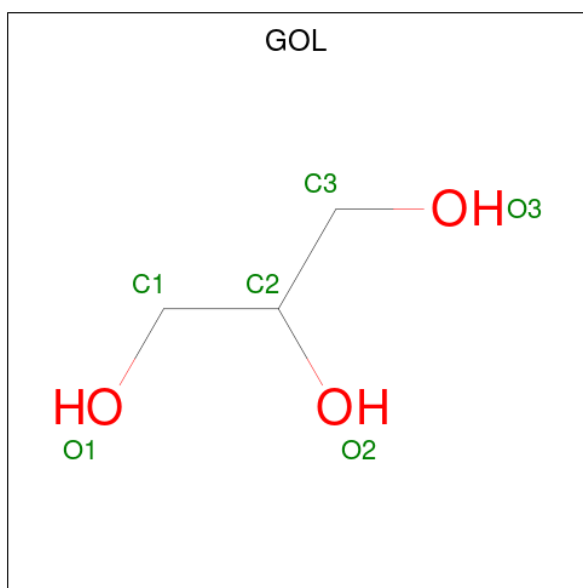
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	L	1	Total	C	O	0	0
			10	7	3		

- Molecule 8 is LAURYL DIMETHYLAMINE-N-OXIDE (CCD ID: LDA) (formula: $C_{14}H_{31}NO$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	L	1	Total	C	N	O	0	0
			16	14	1	1		
8	L	1	Total	C	N	O	0	0
			16	14	1	1		
8	M	1	Total	C	N	O	0	0
			11	9	1	1		

- Molecule 9 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	L	1	Total	C	O	0	0
			6	3	3		

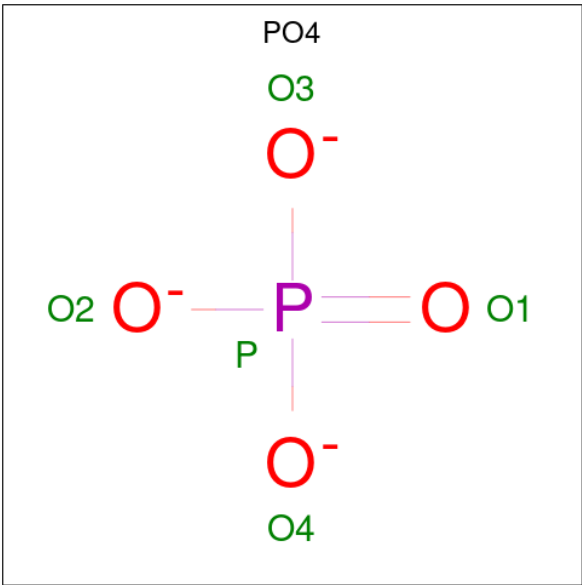
- Molecule 10 is FE (II) ION (CCD ID: FE2) (formula: Fe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	M	1	Total	Fe	0	0
			1	1		

- Molecule 11 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

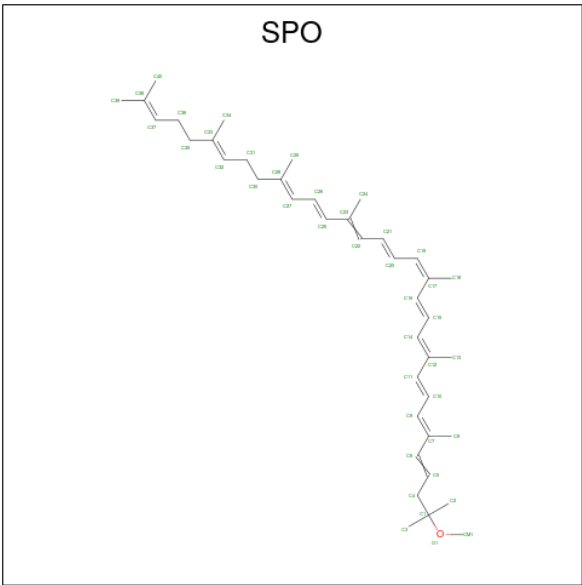
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	M	1	Total	Cl	0	0
			1	1		

- Molecule 12 is PHOSPHATE ION (CCD ID: PO4) (formula: O_4P).



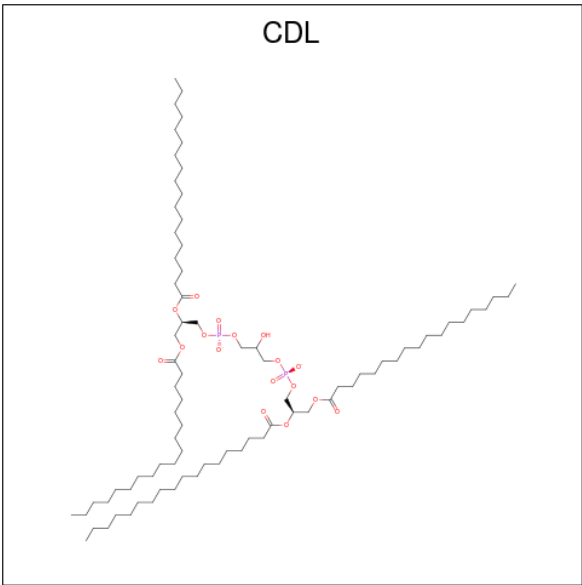
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
12	M	1	Total	O	P	0	0
			5	4	1		
12	M	1	Total	O	P	0	0
			5	4	1		

- Molecule 13 is SPHEROIDENE (CCD ID: SPO) (formula: $C_{41}H_{60}O$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
13	M	1	Total	C	O	0	0
			42	41	1		

- Molecule 14 is CARDIOLIPIN (CCD ID: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
14	M	1	Total	C	O	P	0	0
			81	62	17	2		

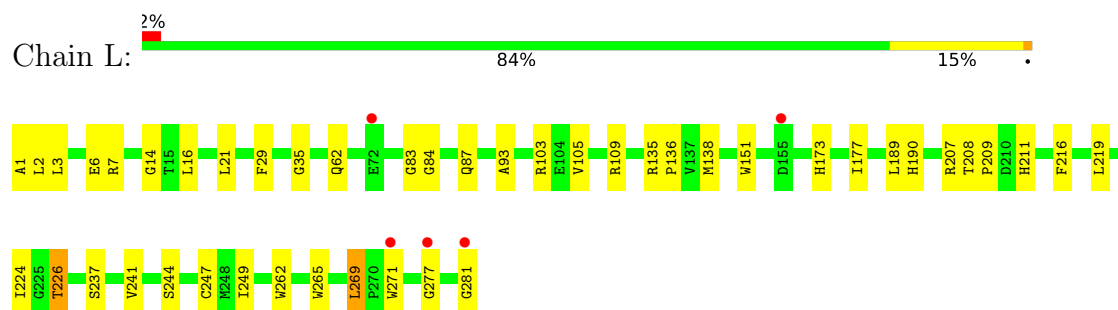
- Molecule 15 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	L	109	Total	O	0	0
			109	109		
15	M	108	Total	O	0	0
			108	108		
15	H	147	Total	O	0	0
			147	147		

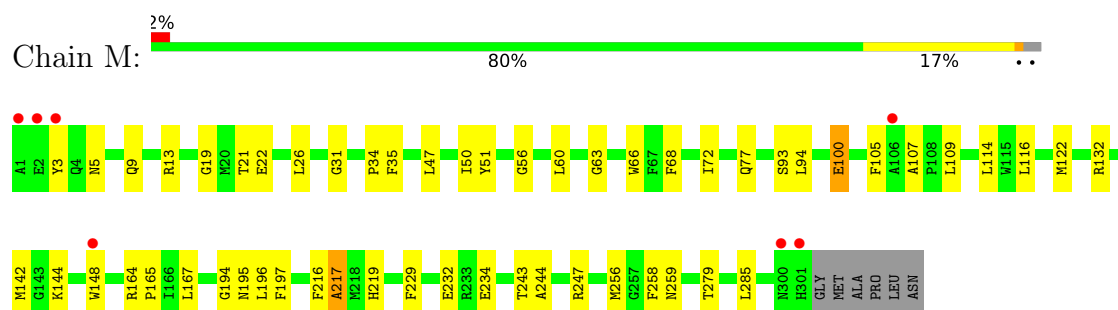
3 Residue-property plots [i](#)

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.

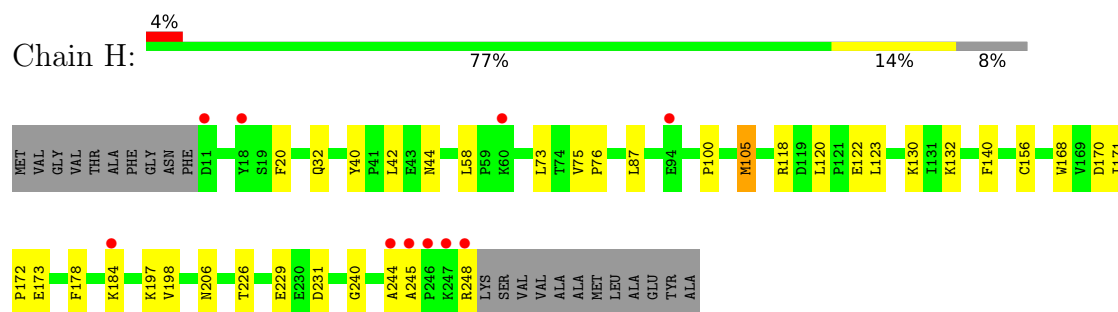
- Molecule 1: Reaction center protein L chain



- Molecule 2: Reaction center protein M chain



- Molecule 3: Reaction center protein H chain



4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	139.44Å 139.44Å 185.46Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	39.34 – 2.25 39.34 – 2.25	Depositor EDS
% Data completeness (in resolution range)	84.8 (39.34-2.25) 84.9 (39.34-2.25)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.97 (at 2.24Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.197 , 0.216 0.184 , 0.204	Depositor DCC
R_{free} test set	4275 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	29.7	Xtriage
Anisotropy	0.327	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 46.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.023 for -h,-k,l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7450	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.79% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: U10, PO4, LDA, GOL, BPH, SPO, FE2, CDL, CL, BCL, HTO

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	L	0.42	0/2321	0.89	6/3177 (0.2%)
2	M	0.43	0/2513	0.87	5/3432 (0.1%)
3	H	0.40	0/1862	0.85	2/2534 (0.1%)
All	All	0.41	0/6696	0.87	13/9143 (0.1%)

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	6	GLU	N-CA-C	8.66	122.35	111.69
2	M	259	ASN	N-CA-C	-6.48	99.07	109.96
2	M	234	GLU	N-CA-C	5.89	117.70	111.28
2	M	217	ALA	N-CA-C	-5.80	105.03	111.36
1	L	244	SER	N-CA-C	-5.50	105.20	111.14
3	H	44	ASN	N-CA-C	-5.48	103.46	110.53
1	L	271	TRP	N-CA-C	5.43	119.53	113.01
1	L	3	LEU	N-CA-C	-5.37	103.44	110.53
2	M	31	GLY	N-CA-C	-5.29	104.52	112.89
2	M	19	GLY	N-CA-C	5.23	120.98	112.61
3	H	122	GLU	N-CA-C	-5.07	103.35	110.50
1	L	7	ARG	N-CA-C	5.04	117.44	111.33
1	L	29	PHE	N-CA-C	5.04	117.77	109.76

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	L	2233	0	2187	34	0
2	M	2418	0	2320	48	0
3	H	1814	0	1818	27	0
4	L	132	0	146	4	0
4	M	198	0	222	8	0
5	L	51	0	45	6	0
6	L	31	0	23	4	0
6	M	15	0	11	2	0
7	L	10	0	16	0	0
8	L	32	0	62	0	0
8	M	11	0	18	1	0
9	L	6	0	4	0	0
10	M	1	0	0	0	0
11	M	1	0	0	1	0
12	M	10	0	0	0	0
13	M	42	0	60	1	0
14	M	81	0	106	1	0
15	H	147	0	0	1	0
15	L	109	0	0	0	0
15	M	108	0	0	0	0
All	All	7450	0	7038	108	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 8.

All (108) 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:L:224:ILE:H	6:L:858:U10:H4M3	1.41	0.84
2:M:9:GLN:NE2	3:H:198:VAL:H	1.83	0.76
2:M:77:GLN:HE22	2:M:93:SER:H	1.32	0.76
2:M:256:MET:HE2	4:M:856:BCL:HE2	1.69	0.74
2:M:9:GLN:HE22	3:H:198:VAL:H	1.33	0.73
1:L:224:ILE:N	6:L:858:U10:H4M3	2.03	0.72
3:H:171:ILE:HB	3:H:172:PRO:HD3	1.73	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:245:ALA:HA	3:H:248:ARG:NH2	2.07	0.68
2:M:105:PHE:HD1	2:M:116:LEU:HD13	1.59	0.68
2:M:100:GLU:H	2:M:100:GLU:CD	2.03	0.67
2:M:256:MET:HG2	2:M:258:PHE:CE1	2.30	0.67
4:L:854:BCL:HMB1	4:L:854:BCL:HBB2	1.80	0.63
5:L:855:BPH:HMB3	5:L:855:BPH:HBB3	1.79	0.63
2:M:13:ARG:HD2	2:M:35:PHE:CD2	2.33	0.63
1:L:135:ARG:HB3	1:L:136:PRO:HD3	1.83	0.61
1:L:237:SER:OG	2:M:217:ALA:HB2	2.02	0.58
1:L:105:VAL:O	1:L:109:ARG:HG3	2.04	0.58
2:M:256:MET:HG2	2:M:258:PHE:CZ	2.40	0.56
2:M:195:ASN:ND2	2:M:197:PHE:H	2.03	0.56
2:M:195:ASN:HD22	2:M:195:ASN:C	2.14	0.56
1:L:226:THR:HB	3:H:173:GLU:OE1	2.06	0.56
2:M:13:ARG:O	3:H:140:PHE:HA	2.05	0.56
1:L:208:THR:H	1:L:211:HIS:CD2	2.26	0.53
3:H:206:ASN:HD21	3:H:248:ARG:HD3	1.71	0.53
4:M:851:BCL:HMB1	4:M:851:BCL:CBB	2.38	0.53
1:L:138:MET:SD	1:L:249:ILE:HD11	2.48	0.53
2:M:148:TRP:HA	2:M:148:TRP:CE3	2.44	0.52
5:L:855:BPH:H5C2	2:M:63:GLY:HA3	1.91	0.52
1:L:207:ARG:HG2	2:M:142:MET:HG2	1.92	0.52
13:M:860:SPO:H5	13:M:860:SPO:HM13	1.92	0.52
1:L:173:HIS:CE1	1:L:177:ILE:HD11	2.45	0.52
1:L:208:THR:HB	1:L:209:PRO:HD2	1.92	0.52
1:L:1:ALA:C	1:L:2:LEU:HD12	2.35	0.51
4:L:854:BCL:HMB1	4:L:854:BCL:CBB	2.39	0.51
1:L:226:THR:HG22	2:M:232:GLU:HG3	1.94	0.50
1:L:265:TRP:O	1:L:269:LEU:HD13	2.12	0.50
3:H:226:THR:OG1	3:H:229:GLU:HG3	2.12	0.50
2:M:194:GLY:O	2:M:195:ASN:HB3	2.11	0.50
1:L:226:THR:HG22	2:M:232:GLU:CG	2.42	0.50
1:L:241:VAL:HG21	4:M:856:BCL:HBC3	1.94	0.50
4:M:853:BCL:HMB3	4:M:853:BCL:CBB	2.42	0.49
1:L:62:GLN:NE2	1:L:151:TRP:HE1	2.11	0.49
1:L:84:GLY:HA2	1:L:87:GLN:HE21	1.78	0.49
2:M:243:THR:O	2:M:247:ARG:HG3	2.13	0.49
4:M:853:BCL:HMB3	4:M:853:BCL:HBB2	1.94	0.49
2:M:56:GLY:HA2	2:M:132:ARG:HD2	1.94	0.48
4:M:851:BCL:HMB1	4:M:851:BCL:HBB3	1.95	0.48
3:H:75:VAL:HA	3:H:76:PRO:C	2.37	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:195:ASN:HD22	2:M:196:LEU:N	2.11	0.48
1:L:93:ALA:HA	4:M:856:BCL:H92	1.96	0.47
1:L:208:THR:H	1:L:211:HIS:HD2	1.62	0.47
1:L:189:LEU:HB3	6:L:858:U10:H3M3	1.95	0.47
2:M:258:PHE:HB3	6:M:857:U10:H3M2	1.96	0.47
1:L:14:GLY:O	1:L:109:ARG:HD3	2.14	0.47
3:H:132:LYS:HG2	15:H:1302:HOH:O	2.14	0.47
6:M:857:U10:H4M3	3:H:32:GLN:OE1	2.15	0.47
3:H:118:ARG:HD2	3:H:120:LEU:HB2	1.97	0.47
3:H:170:ASP:OD1	3:H:172:PRO:HD2	2.15	0.47
1:L:1:ALA:HB1	3:H:42:LEU:HB3	1.96	0.46
1:L:16:LEU:HD23	1:L:109:ARG:NH1	2.30	0.46
2:M:144:LYS:N	14:M:862:CDL:OB3	2.36	0.46
2:M:3:TYR:CZ	2:M:5:ASN:HA	2.51	0.46
2:M:164:ARG:HB3	2:M:165:PRO:HD3	1.98	0.46
3:H:156:CYS:HB2	3:H:248:ARG:HG3	1.97	0.46
3:H:118:ARG:HD3	3:H:120:LEU:HD12	1.97	0.46
1:L:83:GLY:O	1:L:87:GLN:HG3	2.16	0.46
3:H:130:LYS:HE3	3:H:170:ASP:OD2	2.16	0.46
2:M:256:MET:O	2:M:256:MET:HG3	2.15	0.46
4:M:856:BCL:HMB1	4:M:856:BCL:HBB3	1.98	0.46
1:L:219:LEU:O	2:M:132:ARG:NH2	2.46	0.45
2:M:21:THR:HG23	2:M:26:LEU:HD11	1.99	0.45
2:M:107:ALA:O	8:M:866:LDA:HM11	2.17	0.45
2:M:279:THR:HG22	3:H:20:PHE:CZ	2.51	0.45
1:L:211:HIS:HE1	2:M:22:GLU:OE1	2.00	0.45
1:L:226:THR:HG23	2:M:232:GLU:O	2.18	0.44
2:M:219:HIS:HA	11:M:861:CL:CL	2.55	0.44
3:H:240:GLY:O	3:H:244:ALA:HB3	2.17	0.44
2:M:100:GLU:OE1	2:M:100:GLU:N	2.49	0.43
5:L:855:BPH:HHD	5:L:855:BPH:HBC3	1.99	0.43
3:H:87:LEU:HD23	3:H:100:PRO:HA	2.00	0.43
3:H:40:TYR:HB3	3:H:58:LEU:HD21	2.01	0.43
1:L:21:LEU:HD23	1:L:21:LEU:O	2.18	0.42
5:L:855:BPH:HBC3	5:L:855:BPH:CHD	2.49	0.42
2:M:50:ILE:HG12	2:M:51:TYR:N	2.34	0.42
2:M:229:PHE:HB2	2:M:244:ALA:HB2	2.01	0.42
3:H:105:MET:HA	3:H:105:MET:HE2	1.99	0.42
5:L:855:BPH:H4C1	2:M:60:LEU:HD23	2.00	0.42
1:L:35:GLY:HA2	1:L:103:ARG:HD2	2.02	0.42
1:L:190:HIS:HA	6:L:858:U10:H3M1	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:269:LEU:HD12	1:L:269:LEU:HA	1.87	0.42
2:M:148:TRP:HA	2:M:148:TRP:HE3	1.82	0.42
5:L:855:BPH:HHD	5:L:855:BPH:CBC	2.50	0.42
2:M:9:GLN:HE22	3:H:197:LYS:HA	1.85	0.41
2:M:109:LEU:O	2:M:114:LEU:HB2	2.20	0.41
4:L:854:BCL:HBB2	4:L:854:BCL:CMB	2.50	0.41
2:M:167:LEU:HD12	2:M:285:LEU:HD11	2.02	0.41
3:H:168:TRP:HB2	3:H:178:PHE:HB2	2.01	0.41
3:H:184:LYS:N	3:H:184:LYS:HD2	2.35	0.41
4:L:852:BCL:H142	4:L:854:BCL:CMB	2.51	0.41
1:L:262:TRP:O	1:L:265:TRP:HD1	2.04	0.41
2:M:66:TRP:CD1	2:M:122:MET:HB2	2.56	0.41
2:M:68:PHE:O	2:M:72:ILE:HG12	2.21	0.41
2:M:105:PHE:CD1	2:M:116:LEU:HD13	2.46	0.41
3:H:32:GLN:OE1	3:H:32:GLN:HA	2.21	0.40
1:L:277:GLY:N	1:L:281:GLY:O	2.50	0.40
2:M:9:GLN:HE22	3:H:198:VAL:N	2.10	0.40
2:M:34:PRO:O	2:M:47:LEU:HB2	2.22	0.40
2:M:194:GLY:O	2:M:195:ASN:CB	2.69	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	L	279/281 (99%)	272 (98%)	7 (2%)	0	100	100
2	M	299/307 (97%)	289 (97%)	10 (3%)	0	100	100
3	H	236/260 (91%)	232 (98%)	4 (2%)	0	100	100
All	All	814/848 (96%)	793 (97%)	21 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	L	220/220 (100%)	216 (98%)	4 (2%)	51	63
2	M	238/242 (98%)	235 (99%)	3 (1%)	61	72
3	H	193/208 (93%)	189 (98%)	4 (2%)	47	58
All	All	651/670 (97%)	640 (98%)	11 (2%)	53	65

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	216	PHE
1	L	226	THR
1	L	247	CYS
1	L	269	LEU
2	M	94	LEU
2	M	100	GLU
2	M	216	PHE
3	H	73	LEU
3	H	105	MET
3	H	123	LEU
3	H	231	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	L	62	GLN
1	L	87	GLN
1	L	211	HIS
1	L	258	GLN
2	M	4	GLN
2	M	9	GLN
2	M	77	GLN
2	M	195	ASN
2	M	299	GLN
3	H	126	HIS

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Mol	Chain	Res	Type
3	H	206	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 20 ligands modelled in this entry, 2 are monoatomic - leaving 18 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
9	GOL	L	869	-	5,5,5	4.85	5 (100%)	5,5,5	6.10	3 (60%)
4	BCL	L	852	1	69,74,74	1.69	13 (18%)	79,115,115	2.10	23 (29%)
4	BCL	L	854	1	69,74,74	1.74	13 (18%)	79,115,115	1.93	20 (25%)
14	CDL	M	862	-	80,80,99	1.51	7 (8%)	86,92,111	1.61	13 (15%)
8	LDA	M	866	-	8,10,15	2.56	1 (12%)	9,12,17	1.05	0
6	U10	M	857	-	15,15,63	2.22	4 (26%)	20,21,79	2.29	7 (35%)
6	U10	L	859	-	15,15,63	2.04	4 (26%)	20,21,79	2.29	7 (35%)
8	LDA	L	865	-	13,15,15	2.26	1 (7%)	14,17,17	1.06	2 (14%)
6	U10	L	858	-	16,16,63	2.17	4 (25%)	21,22,79	2.23	7 (33%)
12	PO4	M	867	-	4,4,4	1.16	0	6,6,6	1.53	1 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	HTO	L	863	-	9,9,9	0.90	0	10,10,10	2.02	2 (20%)
5	BPH	L	855	-	45,56,70	2.75	15 (33%)	41,84,101	3.50	18 (43%)
4	BCL	M	853	2	69,74,74	1.81	8 (11%)	79,115,115	2.16	26 (32%)
12	PO4	M	868	-	4,4,4	1.03	0	6,6,6	0.87	0
13	SPO	M	860	-	41,41,41	1.38	6 (14%)	47,50,50	3.77	15 (31%)
8	LDA	L	864	-	13,15,15	2.40	1 (7%)	14,17,17	1.53	1 (7%)
4	BCL	M	856	2	69,74,74	1.85	13 (18%)	79,115,115	1.98	27 (34%)
4	BCL	M	851	2	69,74,74	1.71	9 (13%)	79,115,115	2.04	27 (34%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	GOL	L	869	-	-	2/4/4/4	-
4	BCL	L	852	1	2/2/21/25	12/41/137/137	-
4	BCL	L	854	1	2/2/21/25	4/41/137/137	-
14	CDL	M	862	-	-	35/91/91/110	-
8	LDA	M	866	-	-	3/8/8/13	-
6	U10	M	857	-	-	1/6/30/87	0/1/1/1
6	U10	L	859	-	-	1/6/30/87	0/1/1/1
8	LDA	L	865	-	-	5/13/13/13	-
6	U10	L	858	-	-	1/7/31/87	0/1/1/1
7	HTO	L	863	-	-	7/10/10/10	-
5	BPH	L	855	-	-	2/21/89/105	0/5/6/6
4	BCL	M	853	2	2/2/21/25	10/41/137/137	-
13	SPO	M	860	-	-	5/47/47/47	-
8	LDA	L	864	-	-	11/13/13/13	-
4	BCL	M	856	2	2/2/21/25	12/41/137/137	-
4	BCL	M	851	2	2/2/21/25	10/41/137/137	-

All (104) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	L	855	BPH	OBD-CAD	10.25	1.35	1.22
4	M	853	BCL	OBD-CAD	9.12	1.38	1.22
4	M	856	BCL	OBD-CAD	8.78	1.37	1.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	L	869	GOL	C3-C2	-8.38	1.19	1.51
4	L	854	BCL	OBD-CAD	8.37	1.36	1.22
8	L	865	LDA	O1-N1	-7.48	1.23	1.42
4	M	851	BCL	OBD-CAD	7.27	1.35	1.22
8	L	864	LDA	O1-N1	-7.19	1.24	1.42
4	L	852	BCL	OBD-CAD	6.87	1.34	1.22
8	M	866	LDA	O1-N1	-6.58	1.26	1.42
4	M	856	BCL	O1A-CGA	6.20	1.41	1.22
5	L	855	BPH	C2-C3	6.04	1.47	1.33
14	M	862	CDL	OB6-CB5	5.98	1.51	1.34
14	M	862	CDL	OA6-CA5	5.70	1.50	1.34
6	M	857	U10	O4-C4	5.53	1.50	1.36
14	M	862	CDL	OA8-CA7	5.32	1.48	1.33
4	M	851	BCL	O1A-CGA	5.27	1.38	1.22
6	L	858	U10	O4-C4	5.14	1.49	1.36
4	M	853	BCL	O1A-CGA	5.10	1.37	1.22
4	L	852	BCL	O1A-CGA	5.06	1.37	1.22
6	L	859	U10	O4-C4	4.99	1.48	1.36
5	L	855	BPH	C3D-C2D	4.93	1.48	1.39
4	M	853	BCL	C3D-C4D	-4.91	1.33	1.44
5	L	855	BPH	O1D-CGD	4.74	1.33	1.21
4	L	854	BCL	O1A-CGA	4.73	1.36	1.22
5	L	855	BPH	C3D-CAD	-4.70	1.38	1.47
9	L	869	GOL	O1-C1	4.36	1.60	1.42
5	L	855	BPH	O1A-CGA	4.27	1.35	1.22
5	L	855	BPH	C3D-C4D	-4.27	1.35	1.41
14	M	862	CDL	OB8-CB7	4.05	1.45	1.33
6	M	857	U10	O3-C3	3.87	1.46	1.36
4	L	854	BCL	O2A-CGA	-3.85	1.22	1.33
5	L	855	BPH	OBB-CAB	3.79	1.33	1.22
5	L	855	BPH	CBD-CGD	-3.76	1.47	1.52
4	M	856	BCL	O2D-CGD	-3.72	1.24	1.33
4	L	854	BCL	C1B-NB	3.61	1.42	1.37
4	L	852	BCL	C1B-NB	3.61	1.42	1.37
4	L	852	BCL	C2-C3	3.52	1.41	1.33
6	L	858	U10	O3-C3M	-3.48	1.37	1.45
6	L	858	U10	O3-C3	3.43	1.45	1.36
6	L	859	U10	O3-C3	3.40	1.45	1.36
9	L	869	GOL	C1-C2	-3.36	1.39	1.51
5	L	855	BPH	C3A-C2A	-3.28	1.51	1.54
5	L	855	BPH	O2A-CGA	-3.22	1.24	1.33
4	L	852	BCL	MG-NC	3.22	2.13	2.06

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	L	858	U10	C6-C1	3.19	1.40	1.35
4	M	856	BCL	C3D-C4D	-3.15	1.37	1.44
4	L	852	BCL	C3C-C4C	-3.05	1.47	1.51
6	M	857	U10	O3-C3M	-3.03	1.38	1.45
9	L	869	GOL	O3-C3	3.01	1.55	1.42
13	M	860	SPO	C37-C38	2.95	1.41	1.32
4	M	856	BCL	C3B-CAB	2.93	1.55	1.46
6	L	859	U10	C6-C1	2.91	1.40	1.35
6	M	857	U10	C6-C1	2.86	1.40	1.35
9	L	869	GOL	O2-C2	-2.86	1.35	1.43
4	L	854	BCL	CHD-C4C	2.82	1.47	1.39
4	M	853	BCL	C2-C3	2.82	1.39	1.33
4	M	856	BCL	C3B-C2B	-2.81	1.32	1.42
4	M	851	BCL	CMD-C2D	2.81	1.56	1.50
4	L	854	BCL	MG-NB	2.80	2.11	2.05
6	L	859	U10	O3-C3M	-2.76	1.39	1.45
4	M	851	BCL	C3D-C4D	-2.71	1.38	1.44
13	M	860	SPO	C20-C19	-2.70	1.34	1.43
14	M	862	CDL	C71-CB7	2.70	1.58	1.50
4	L	852	BCL	O2A-CGA	-2.67	1.25	1.33
4	M	851	BCL	C6-C7	2.61	1.63	1.52
4	M	851	BCL	O1D-CGD	2.60	1.27	1.21
4	M	853	BCL	CAC-C3C	-2.55	1.49	1.54
4	M	851	BCL	CBD-CGD	-2.54	1.44	1.52
13	M	860	SPO	C24-C23	-2.52	1.45	1.50
4	M	853	BCL	CHC-C4B	2.50	1.45	1.39
4	M	851	BCL	O2D-CGD	-2.48	1.27	1.33
4	L	854	BCL	O2D-CED	-2.46	1.39	1.45
4	L	854	BCL	C2-C3	2.44	1.38	1.33
5	L	855	BPH	CAC-C3C	-2.42	1.48	1.53
4	L	852	BCL	O1D-CGD	2.42	1.27	1.21
4	L	854	BCL	O2D-CGD	-2.37	1.27	1.33
4	L	854	BCL	C3C-C4C	-2.34	1.48	1.51
4	L	852	BCL	CHD-C4C	2.33	1.45	1.39
4	M	856	BCL	O2A-CGA	-2.32	1.26	1.33
5	L	855	BPH	O2D-CGD	-2.31	1.27	1.33
4	M	853	BCL	O2D-CGD	-2.30	1.27	1.33
4	M	853	BCL	O1D-CGD	2.25	1.26	1.21
5	L	855	BPH	O2D-CED	-2.24	1.40	1.45
4	M	856	BCL	C16-C15	-2.23	1.42	1.52
4	L	852	BCL	CMD-C2D	2.23	1.55	1.50
4	M	856	BCL	OB-B-CAB	-2.23	1.18	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	852	BCL	CBB-CAB	2.22	1.54	1.50
4	M	856	BCL	C1D-ND	-2.21	1.35	1.37
5	L	855	BPH	C1D-ND	-2.18	1.34	1.38
13	M	860	SPO	C25-C23	2.16	1.50	1.46
13	M	860	SPO	C32-C33	2.14	1.38	1.33
4	M	856	BCL	CBD-CGD	-2.14	1.46	1.52
4	L	852	BCL	O2A-C1	-2.14	1.40	1.46
4	M	856	BCL	C4B-NB	2.13	1.40	1.37
13	M	860	SPO	C10-C9	2.13	1.49	1.43
14	M	862	CDL	PB2-OB5	2.12	1.67	1.59
4	L	854	BCL	C1-C2	2.12	1.55	1.49
4	L	852	BCL	O2D-CGD	-2.10	1.28	1.33
4	M	851	BCL	MG-ND	-2.06	2.01	2.05
14	M	862	CDL	PB2-OB2	2.05	1.67	1.59
4	L	854	BCL	C2C-C3C	-2.04	1.49	1.54
4	M	856	BCL	O1D-CGD	2.02	1.26	1.21
4	L	854	BCL	CHB-C4A	2.00	1.42	1.37

All (199) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	M	860	SPO	C16-C17-C19	14.17	141.30	119.01
13	M	860	SPO	C18-C17-C19	-13.73	100.57	122.82
5	L	855	BPH	O2D-CGD-CBD	13.38	125.65	110.95
9	L	869	GOL	O3-C3-C2	11.15	160.59	110.38
13	M	860	SPO	C20-C21-C22	-10.93	101.16	123.52
5	L	855	BPH	OBD-CAD-CBD	-7.94	114.18	125.82
5	L	855	BPH	C4-C3-C5	7.26	124.67	116.13
9	L	869	GOL	O2-C2-C3	7.16	138.80	109.18
6	M	857	U10	C3M-O3-C3	6.55	139.50	116.47
6	L	859	U10	C3M-O3-C3	6.33	138.73	116.47
6	L	858	U10	C3M-O3-C3	6.33	138.72	116.47
4	L	854	BCL	O2D-CGD-CBD	6.22	122.10	111.23
5	L	855	BPH	O1D-CGD-CBD	-6.18	115.36	124.72
14	M	862	CDL	OA6-CA5-C11	6.10	124.69	111.48
13	M	860	SPO	C20-C19-C17	6.10	135.83	127.28
4	M	853	BCL	C1D-ND-C4D	5.87	110.43	106.31
4	M	853	BCL	C2D-C1D-ND	-5.70	104.48	110.13
14	M	862	CDL	OB6-CB5-C51	5.59	123.58	111.48
4	M	851	BCL	C1D-ND-C4D	5.57	110.22	106.31
4	M	856	BCL	C1D-ND-C4D	5.56	110.21	106.31
4	M	853	BCL	CMB-C2B-C1B	-5.50	117.05	125.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	852	BCL	C1C-NC-C4C	-5.45	104.19	106.68
5	L	855	BPH	C2B-C1B-NB	5.42	113.34	109.43
13	M	860	SPO	C4-C5-C6	-5.21	117.59	124.91
4	L	852	BCL	C1-O2A-CGA	5.16	129.15	116.65
4	L	854	BCL	O2A-CGA-O1A	-5.11	110.85	123.63
4	M	856	BCL	C1-O2A-CGA	5.09	128.98	116.65
4	L	852	BCL	C11-C12-C13	5.07	132.83	115.97
13	M	860	SPO	C21-C22-C23	4.81	134.02	127.28
14	M	862	CDL	OB8-CB7-OB9	-4.76	111.73	123.63
8	L	864	LDA	CM2-N1-C1	4.70	120.10	110.23
4	L	852	BCL	O2D-CGD-CBD	4.56	119.20	111.23
5	L	855	BPH	C3D-C4D-ND	4.56	113.55	107.71
4	L	852	BCL	CMA-C3A-C4A	-4.52	99.61	111.77
4	L	852	BCL	C1D-ND-C4D	4.47	109.45	106.31
4	M	853	BCL	C4A-NA-C1A	4.46	108.72	106.68
7	L	863	HTO	O3-C3-C4	-4.44	99.06	109.14
4	M	853	BCL	O2D-CGD-CBD	4.42	118.95	111.23
4	M	851	BCL	CMB-C2B-C1B	-4.32	118.84	125.42
4	M	851	BCL	C1-O2A-CGA	4.30	127.07	116.65
4	M	856	BCL	C2D-C1D-ND	-4.28	105.89	110.13
4	M	856	BCL	CBC-CAC-C3C	4.20	122.32	113.41
4	L	854	BCL	CAA-CBA-CGA	4.18	125.07	113.21
4	M	853	BCL	C1C-NC-C4C	-4.11	104.80	106.68
4	L	852	BCL	CMD-C2D-C1D	4.11	131.96	124.73
5	L	855	BPH	OBD-CAD-C3D	-3.98	121.69	127.89
4	L	854	BCL	C1-O2A-CGA	3.94	126.18	116.65
4	M	856	BCL	C1-C2-C3	-3.91	119.79	126.20
4	L	852	BCL	CMB-C2B-C1B	-3.88	119.51	125.42
4	M	853	BCL	O2A-CGA-CBA	3.84	123.55	111.83
4	L	852	BCL	C2B-C1B-NB	-3.78	106.41	110.33
5	L	855	BPH	C1B-NB-C4B	-3.78	103.31	108.82
6	L	858	U10	O5-C5-C6	-3.74	114.56	121.79
4	M	851	BCL	C2A-C3A-C4A	3.68	107.81	101.87
4	L	854	BCL	C1C-NC-C4C	-3.60	105.03	106.68
6	L	859	U10	O5-C5-C6	-3.59	114.84	121.79
6	M	857	U10	O5-C5-C6	-3.59	114.85	121.79
4	L	852	BCL	C9-C8-C7	3.52	123.83	111.27
4	M	853	BCL	CHB-C4A-NA	3.51	129.47	124.40
4	M	853	BCL	O2D-CGD-O1D	-3.50	117.04	123.85
7	L	863	HTO	C4-C3-C2	3.48	122.11	113.73
4	L	852	BCL	C4D-CHA-C1A	3.44	125.34	121.24
4	M	856	BCL	C2C-C3C-C4C	3.42	106.47	101.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	854	BCL	CMB-C2B-C1B	-3.41	120.23	125.42
4	M	853	BCL	CAA-CBA-CGA	-3.37	103.63	113.21
5	L	855	BPH	CED-O2D-CGD	3.34	123.50	115.92
4	L	854	BCL	C2A-C3A-C4A	3.32	107.24	101.87
13	M	860	SPO	C21-C20-C19	3.32	130.31	123.52
4	L	852	BCL	O2A-CGA-CBA	3.30	121.90	111.83
4	M	851	BCL	C1-C2-C3	-3.30	120.79	126.20
4	M	851	BCL	C6-C7-C8	3.29	126.92	115.97
4	M	856	BCL	CMB-C2B-C1B	-3.29	120.41	125.42
14	M	862	CDL	CB6-CB4-CB3	-3.29	104.11	111.78
14	M	862	CDL	OB8-CB7-C71	3.26	121.79	111.83
4	M	853	BCL	C16-C15-C13	-3.24	105.20	115.97
4	L	854	BCL	C4A-NA-C1A	3.23	108.15	106.68
4	M	851	BCL	C6-C5-C3	-3.22	105.63	113.47
6	L	859	U10	O2-C2-C3	-3.21	114.23	121.03
6	L	858	U10	O2-C2-C3	-3.21	114.23	121.03
4	M	856	BCL	C7-C6-C5	-3.21	104.72	113.26
4	M	851	BCL	OBB-CAB-C3B	3.15	126.01	120.43
9	L	869	GOL	O1-C1-C2	3.13	124.49	110.38
4	L	854	BCL	CED-O2D-CGD	3.12	122.99	115.92
14	M	862	CDL	OA8-CA7-C31	3.12	121.34	111.83
4	M	851	BCL	C2B-C1B-NB	-3.09	107.12	110.33
6	M	857	U10	O2-C2-C3	-3.08	114.51	121.03
4	M	853	BCL	C7-C6-C5	-3.07	105.08	113.26
4	M	851	BCL	C4-C3-C2	-3.06	115.76	123.63
4	M	856	BCL	C9-C8-C10	3.06	122.18	111.27
5	L	855	BPH	C4-C3-C2	-3.05	115.79	123.63
4	L	854	BCL	O2D-CGD-O1D	-3.04	117.94	123.85
4	M	851	BCL	O2A-CGA-CBA	3.02	121.03	111.83
4	L	852	BCL	O2D-CGD-O1D	-3.01	118.00	123.85
4	M	851	BCL	CAA-C2A-C3A	-2.99	104.91	113.00
4	L	854	BCL	C2D-C1D-ND	-2.99	107.17	110.13
4	L	852	BCL	C3C-C4C-CHD	-2.97	117.13	123.39
4	M	851	BCL	CHA-C1A-NA	-2.96	119.69	126.39
4	M	853	BCL	C2B-C1B-NB	-2.96	107.26	110.33
4	M	853	BCL	O2A-CGA-O1A	-2.92	116.33	123.63
4	M	851	BCL	C2D-C1D-ND	-2.89	107.26	110.13
4	M	851	BCL	C4-C3-C5	2.88	120.23	115.23
4	M	856	BCL	C1C-NC-C4C	2.88	107.99	106.68
4	M	853	BCL	C6-C7-C8	2.86	125.47	115.97
4	M	856	BCL	CAA-C2A-C3A	-2.86	105.27	113.00
6	L	859	U10	C1-C6-C5	-2.85	116.85	119.62

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	M	851	BCL	C4D-CHA-C1A	2.84	124.63	121.24
14	M	862	CDL	OA5-PA1-OA3	2.80	120.04	108.94
12	M	867	PO4	O4-P-O1	2.76	120.70	110.95
4	M	851	BCL	C1C-NC-C4C	-2.75	105.42	106.68
4	L	854	BCL	OBB-CAB-C3B	2.75	125.29	120.43
4	M	851	BCL	CMA-C3A-C2A	-2.74	103.39	113.98
4	L	852	BCL	C14-C13-C12	2.74	121.04	111.27
4	M	853	BCL	C2A-C3A-C4A	2.74	106.29	101.87
4	M	856	BCL	O2D-CGD-O1D	-2.71	118.57	123.85
5	L	855	BPH	C3B-C4B-NB	2.69	111.96	108.05
14	M	862	CDL	OA6-CA5-OA7	-2.69	117.42	123.70
4	M	851	BCL	O2D-CGD-CBD	2.69	115.92	111.23
4	L	854	BCL	CHB-C4A-NA	2.68	128.27	124.40
6	L	858	U10	C1-C6-C5	-2.67	117.03	119.62
4	M	856	BCL	C1D-CHD-C4C	-2.66	120.21	126.62
4	M	851	BCL	C4D-C3D-CAD	-2.64	105.23	108.11
4	M	856	BCL	C6-C5-C3	2.63	119.88	113.47
4	M	853	BCL	C1-C2-C3	-2.58	121.97	126.20
13	M	860	SPO	C25-C23-C22	-2.58	114.95	119.01
4	M	853	BCL	C3C-C4C-CHD	-2.58	117.96	123.39
5	L	855	BPH	C1C-C2C-C3C	-2.57	100.40	102.84
4	M	856	BCL	O2A-CGA-CBA	2.57	119.66	111.83
13	M	860	SPO	C3-C1-C2	-2.56	105.74	110.43
4	M	856	BCL	CHA-C4D-ND	2.56	137.84	132.55
4	M	853	BCL	C4-C3-C5	2.56	119.67	115.23
5	L	855	BPH	CMB-C2B-C3B	2.56	129.79	124.68
4	M	851	BCL	C3C-C4C-CHD	-2.53	118.06	123.39
6	M	857	U10	C1-C6-C5	-2.52	117.17	119.62
5	L	855	BPH	O2D-CGD-O1D	-2.51	118.97	123.85
4	L	854	BCL	O1D-CGD-CBD	-2.50	119.58	124.52
14	M	862	CDL	C72-C71-CB7	2.47	122.75	113.69
4	M	853	BCL	C4D-C3D-CAD	-2.46	105.43	108.11
8	L	865	LDA	CM1-N1-C1	2.46	115.41	110.23
4	M	851	BCL	C7-C6-C5	2.46	119.82	113.26
13	M	860	SPO	C24-C23-C25	2.46	121.85	118.09
4	L	854	BCL	C2B-C1B-NB	-2.44	107.80	110.33
4	L	854	BCL	C4D-CHA-C1A	2.44	124.15	121.24
4	M	851	BCL	C1D-CHD-C4C	-2.43	120.75	126.62
6	M	857	U10	C6-C1-C2	2.43	121.09	119.17
5	L	855	BPH	O2A-CGA-CBA	2.42	119.22	111.83
6	M	857	U10	C4-C3-C2	-2.42	116.26	120.69
4	L	852	BCL	CAC-C3C-C4C	-2.41	107.23	112.58

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	852	BCL	CHA-C1A-NA	-2.40	120.94	126.39
4	M	856	BCL	CBB-CAB-C3B	2.40	125.46	120.40
4	M	853	BCL	C3C-C2C-C1C	-2.39	98.01	101.87
4	M	851	BCL	CMD-C2D-C1D	2.38	128.93	124.73
4	M	856	BCL	CAC-C3C-C4C	2.34	117.78	112.58
4	M	851	BCL	CHC-C1C-NC	2.34	127.78	124.40
4	M	856	BCL	CMD-C2D-C1D	2.34	128.84	124.73
13	M	860	SPO	C34-C33-C35	2.33	119.28	115.23
4	L	852	BCL	C11-C10-C8	2.32	123.69	115.97
4	M	851	BCL	CMC-C2C-C1C	-2.32	105.53	111.77
4	M	856	BCL	O2D-CGD-CBD	2.32	115.29	111.23
14	M	862	CDL	CA4-OA6-CA5	-2.31	112.27	117.80
5	L	855	BPH	C1-O2A-CGA	2.31	122.23	116.65
13	M	860	SPO	CM1-O1-C1	2.30	131.78	117.25
6	L	859	U10	C6-C1-C2	2.29	120.97	119.17
4	M	856	BCL	CMD-C2D-C3D	-2.28	122.45	127.69
4	M	853	BCL	CED-O2D-CGD	2.28	121.08	115.92
13	M	860	SPO	C15-C16-C17	-2.28	120.12	126.36
4	M	853	BCL	C12-C11-C10	-2.27	103.10	113.28
4	L	852	BCL	C14-C13-C15	2.27	119.36	111.27
5	L	855	BPH	O2A-CGA-O1A	-2.25	117.99	123.63
4	L	854	BCL	C1D-ND-C4D	2.24	107.88	106.31
6	L	859	U10	C4-C3-C2	-2.23	116.59	120.69
4	M	856	BCL	CMA-C3A-C2A	-2.22	105.39	113.98
8	L	865	LDA	CM2-N1-C1	2.22	114.90	110.23
14	M	862	CDL	OA8-CA7-OA9	-2.22	118.08	123.63
4	L	852	BCL	CMC-C2C-C1C	2.21	117.71	111.77
14	M	862	CDL	OA6-CA4-CA3	2.19	116.21	108.34
4	M	856	BCL	C16-C17-C18	2.19	125.71	115.94
4	M	856	BCL	C3C-C2C-C1C	-2.16	98.38	101.87
4	M	856	BCL	CHA-C1A-NA	-2.16	121.50	126.39
4	M	851	BCL	C4A-NA-C1A	2.16	107.66	106.68
4	L	852	BCL	CBC-CAC-C3C	-2.15	108.86	113.41
6	L	858	U10	C6-C1-C2	2.15	120.86	119.17
6	L	859	U10	C1M-C1-C6	-2.14	120.93	124.45
4	M	853	BCL	C16-C17-C18	-2.14	106.41	115.94
14	M	862	CDL	OB6-CB5-OB7	-2.12	118.75	123.70
4	L	852	BCL	CMD-C2D-C3D	-2.12	122.83	127.69
6	M	857	U10	C1M-C1-C6	-2.12	120.97	124.45
4	M	856	BCL	C3A-C2A-C1A	2.06	104.43	101.34
4	M	856	BCL	C3D-C2D-C1D	2.06	108.64	105.83
13	M	860	SPO	C36-C35-C33	2.06	120.00	113.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	854	BCL	O1A-CGA-CBA	2.04	131.75	123.78
4	M	853	BCL	CHC-C4B-NB	-2.03	121.00	124.05
4	L	852	BCL	C2D-C1D-ND	-2.03	108.12	110.13
5	L	855	BPH	CGD-CBD-CAD	-2.02	104.30	110.85
6	L	858	U10	C1M-C1-C6	-2.02	121.13	124.45
4	L	854	BCL	C3C-C4C-CHD	-2.02	119.14	123.39
4	L	854	BCL	CHC-C4B-C3B	-2.01	123.72	131.72
13	M	860	SPO	C27-C26-C25	-2.01	117.38	123.20
6	L	858	U10	C4-C3-C2	-2.01	117.01	120.69
4	M	853	BCL	CHA-C1A-NA	-2.00	121.86	126.39

All (10) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	L	852	BCL	C13
4	L	852	BCL	C8
4	L	854	BCL	C13
4	L	854	BCL	C8
4	M	851	BCL	C13
4	M	851	BCL	C8
4	M	853	BCL	C13
4	M	853	BCL	C8
4	M	856	BCL	C13
4	M	856	BCL	C8

All (121) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	L	852	BCL	C11-C12-C13-C14
4	M	851	BCL	C12-C13-C15-C16
5	L	855	BPH	C2-C3-C5-C6
5	L	855	BPH	C4-C3-C5-C6
7	L	863	HTO	O1-C1-C2-O2
7	L	863	HTO	C1-C2-C3-O3
7	L	863	HTO	C1-C2-C3-C4
7	L	863	HTO	O2-C2-C3-C4
7	L	863	HTO	O3-C3-C4-C5
8	L	864	LDA	C2-C1-N1-CM2
8	L	865	LDA	C2-C1-N1-CM1
8	L	865	LDA	C2-C1-N1-CM2
8	M	866	LDA	C2-C1-N1-CM1
9	L	869	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
13	M	860	SPO	C4-C1-O1-CM1
14	M	862	CDL	CA3-OA5-PA1-OA2
14	M	862	CDL	CA3-OA5-PA1-OA3
14	M	862	CDL	CA3-OA5-PA1-OA4
14	M	862	CDL	CB2-OB2-PB2-OB3
14	M	862	CDL	CB2-OB2-PB2-OB5
7	L	863	HTO	O1-C1-C2-C3
14	M	862	CDL	C71-CB7-OB8-CB6
4	L	852	BCL	C6-C7-C8-C9
4	L	854	BCL	C6-C7-C8-C9
4	M	853	BCL	C11-C10-C8-C9
4	M	856	BCL	C6-C7-C8-C9
4	M	856	BCL	C11-C12-C13-C14
4	L	852	BCL	C11-C10-C8-C7
4	M	853	BCL	C6-C7-C8-C10
4	M	851	BCL	C5-C6-C7-C8
14	M	862	CDL	CA7-C31-C32-C33
4	M	851	BCL	C15-C16-C17-C18
14	M	862	CDL	OB9-CB7-OB8-CB6
4	L	852	BCL	C13-C15-C16-C17
14	M	862	CDL	C11-CA5-OA6-CA4
14	M	862	CDL	OA7-CA5-OA6-CA4
4	M	856	BCL	C16-C17-C18-C20
4	M	856	BCL	C13-C15-C16-C17
14	M	862	CDL	C31-C32-C33-C34
14	M	862	CDL	C78-C79-C80-C81
8	L	865	LDA	C6-C7-C8-C9
9	L	869	GOL	O1-C1-C2-O2
4	M	856	BCL	C16-C17-C18-C19
14	M	862	CDL	CA5-C11-C12-C13
4	M	853	BCL	C16-C17-C18-C20
8	L	865	LDA	C11-C10-C9-C8
8	L	864	LDA	C11-C10-C9-C8
8	L	864	LDA	C2-C3-C4-C5
14	M	862	CDL	C11-C12-C13-C14
4	M	856	BCL	C4-C3-C5-C6
8	L	864	LDA	C1-C2-C3-C4
14	M	862	CDL	C38-C39-C40-C41
4	M	856	BCL	C2-C3-C5-C6
8	L	864	LDA	C3-C4-C5-C6
4	L	854	BCL	C5-C6-C7-C8
14	M	862	CDL	C72-C73-C74-C75

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Mol	Chain	Res	Type	Atoms
14	M	862	CDL	C77-C78-C79-C80
14	M	862	CDL	C40-C41-C42-C43
4	M	851	BCL	C13-C15-C16-C17
4	L	852	BCL	C16-C17-C18-C20
7	L	863	HTO	C4-C5-C6-C7
6	L	858	U10	C6-C7-C8-C9
4	L	854	BCL	C3-C5-C6-C7
4	L	852	BCL	C15-C16-C17-C18
8	L	864	LDA	C6-C7-C8-C9
4	M	853	BCL	C16-C17-C18-C19
14	M	862	CDL	OA5-CA3-CA4-CA6
4	L	852	BCL	C11-C12-C13-C15
4	M	853	BCL	C12-C13-C15-C16
4	M	851	BCL	C8-C10-C11-C12
13	M	860	SPO	C33-C35-C36-C37
14	M	862	CDL	CA3-CA4-CA6-OA8
14	M	862	CDL	C20-C21-C22-C23
4	M	856	BCL	C8-C10-C11-C12
4	M	851	BCL	C6-C7-C8-C10
4	L	852	BCL	C16-C17-C18-C19
14	M	862	CDL	C19-C20-C21-C22
14	M	862	CDL	C55-C56-C57-C58
14	M	862	CDL	OA6-CA4-CA6-OA8
14	M	862	CDL	C13-C14-C15-C16
14	M	862	CDL	C32-C33-C34-C35
8	L	864	LDA	C2-C1-N1-CM1
8	M	866	LDA	C4-C5-C6-C7
8	L	864	LDA	C7-C8-C9-C10
8	M	866	LDA	C2-C3-C4-C5
14	M	862	CDL	C73-C74-C75-C76
14	M	862	CDL	OA5-CA3-CA4-OA6
4	M	856	BCL	CHA-CBD-CGD-O2D
14	M	862	CDL	CB2-OB2-PB2-OB4
4	L	852	BCL	C10-C11-C12-C13
13	M	860	SPO	C2-C1-O1-CM1
4	M	851	BCL	C6-C7-C8-C9
4	L	854	BCL	C3A-C2A-CAA-CBA
13	M	860	SPO	C18-C17-C19-C20
4	L	852	BCL	C14-C13-C15-C16
4	M	853	BCL	C6-C7-C8-C9
4	M	853	BCL	C11-C12-C13-C14
14	M	862	CDL	C14-C15-C16-C17

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Mol	Chain	Res	Type	Atoms
4	L	852	BCL	C2A-CAA-CBA-CGA
14	M	862	CDL	C80-C81-C82-C83
14	M	862	CDL	C18-C19-C20-C21
4	M	853	BCL	CAA-CBA-CGA-O2A
4	L	852	BCL	C11-C10-C8-C9
4	M	851	BCL	C14-C13-C15-C16
13	M	860	SPO	C16-C17-C19-C20
4	M	853	BCL	C13-C15-C16-C17
8	L	864	LDA	C5-C6-C7-C8
14	M	862	CDL	C76-C77-C78-C79
4	M	856	BCL	C11-C12-C13-C15
14	M	862	CDL	C81-C82-C83-C84
4	M	853	BCL	C14-C13-C15-C16
6	M	857	U10	C5-C4-O4-C4M
4	M	851	BCL	C4-C3-C5-C6
4	M	851	BCL	C2-C1-O2A-CGA
4	M	856	BCL	C6-C7-C8-C10
4	M	856	BCL	C15-C16-C17-C18
8	L	864	LDA	C2-C1-N1-O1
8	L	865	LDA	C2-C1-N1-O1
8	L	864	LDA	C4-C5-C6-C7
14	M	862	CDL	CB5-C51-C52-C53
6	L	859	U10	C2-C3-O3-C3M

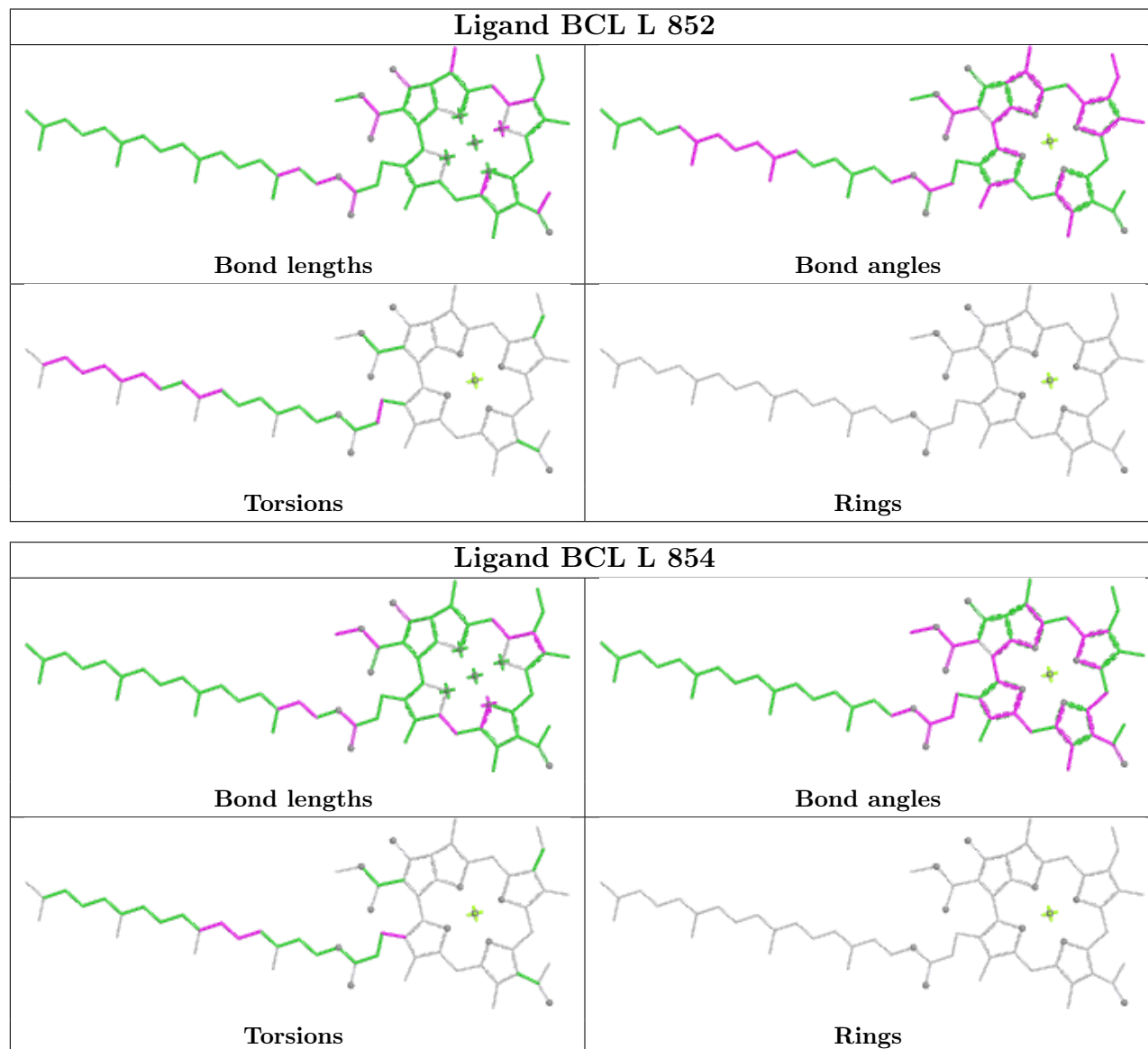
There are no ring outliers.

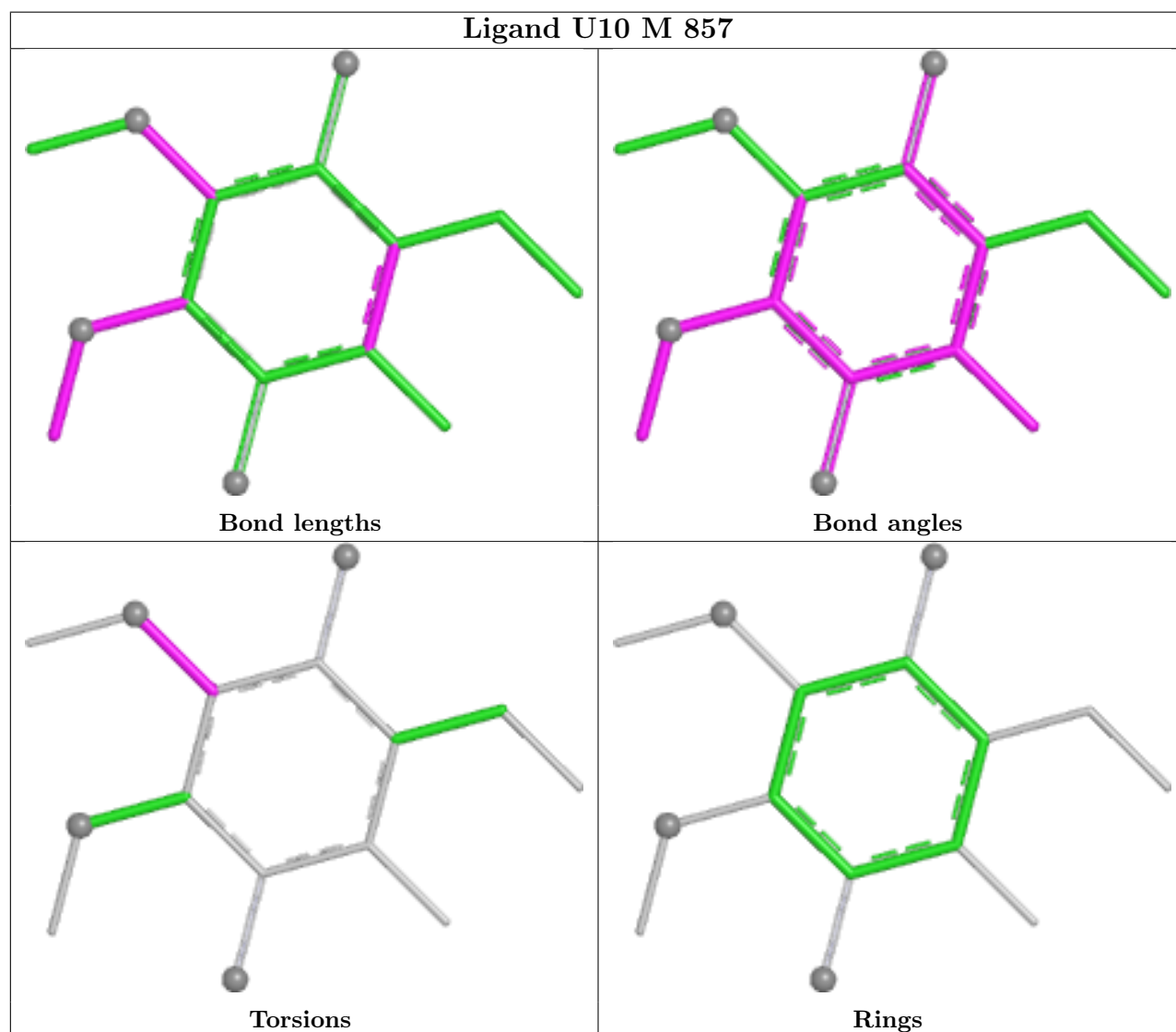
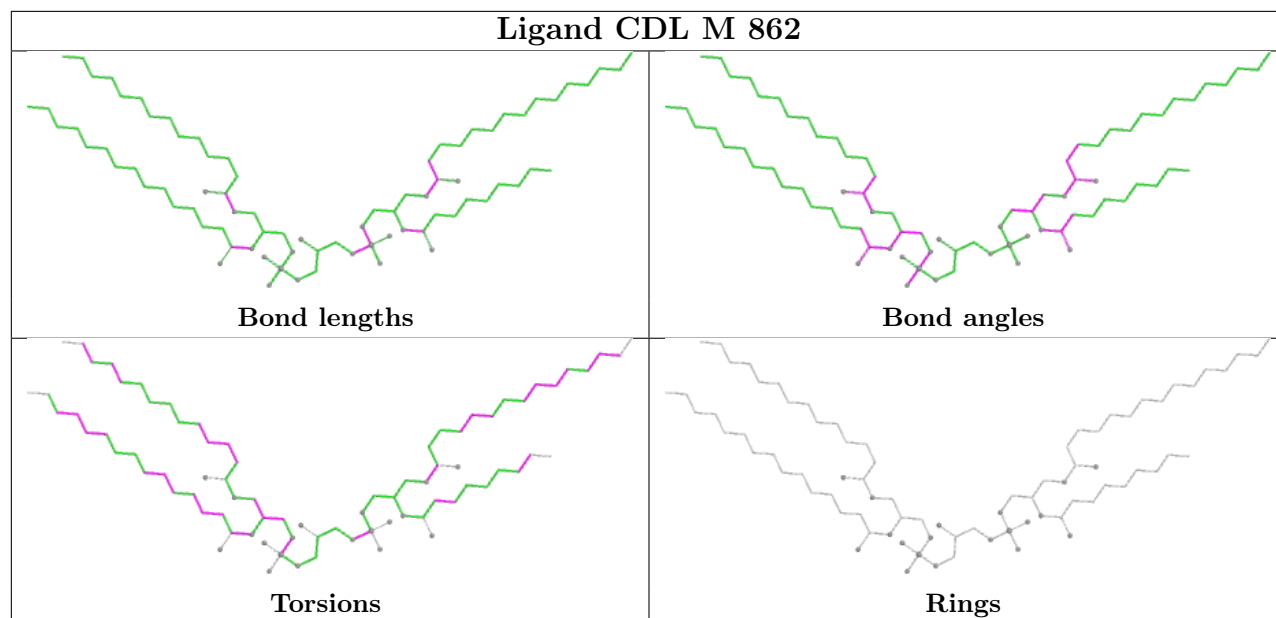
11 monomers are involved in 27 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	L	852	BCL	1	0
4	L	854	BCL	4	0
14	M	862	CDL	1	0
8	M	866	LDA	1	0
6	M	857	U10	2	0
6	L	858	U10	4	0
5	L	855	BPH	6	0
4	M	853	BCL	2	0
13	M	860	SPO	1	0
4	M	856	BCL	4	0
4	M	851	BCL	2	0

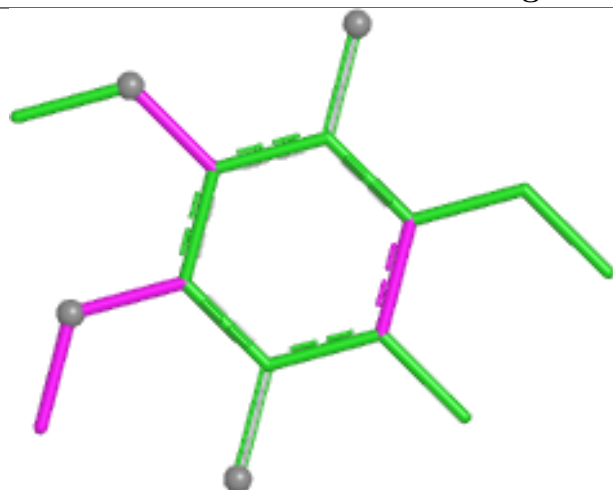
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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.

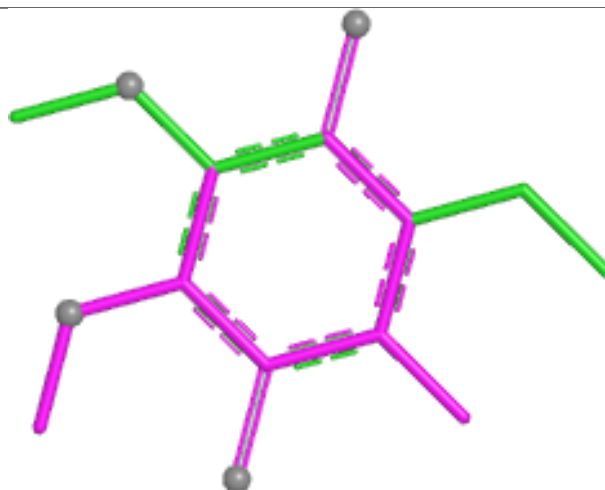




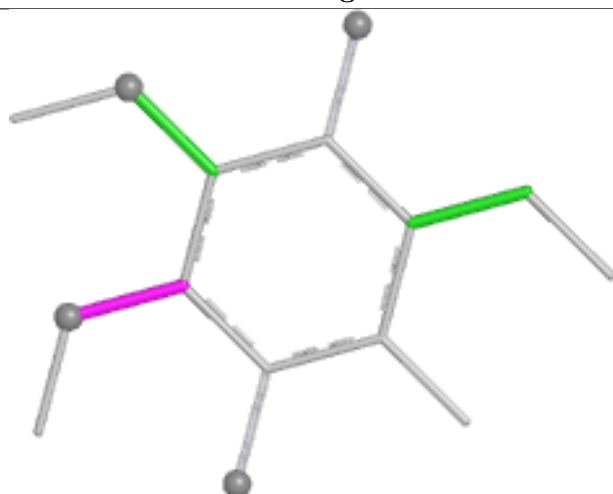
Ligand U10 L 859



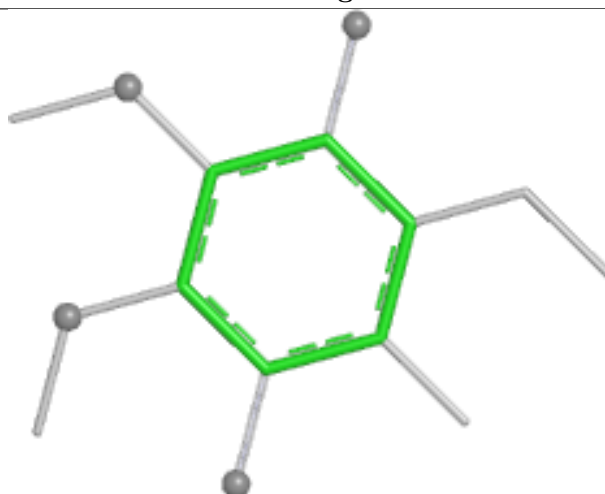
Bond lengths



Bond angles

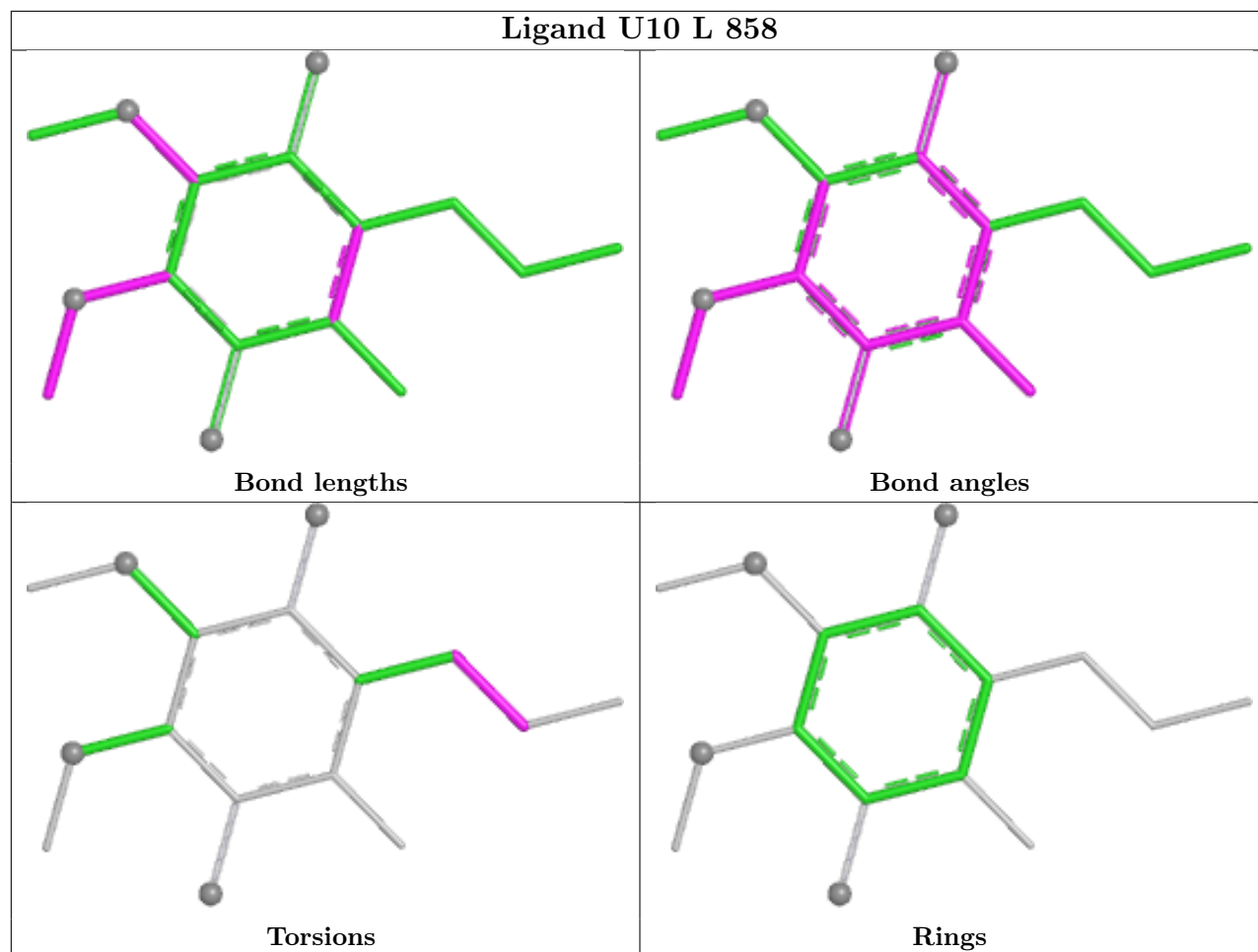


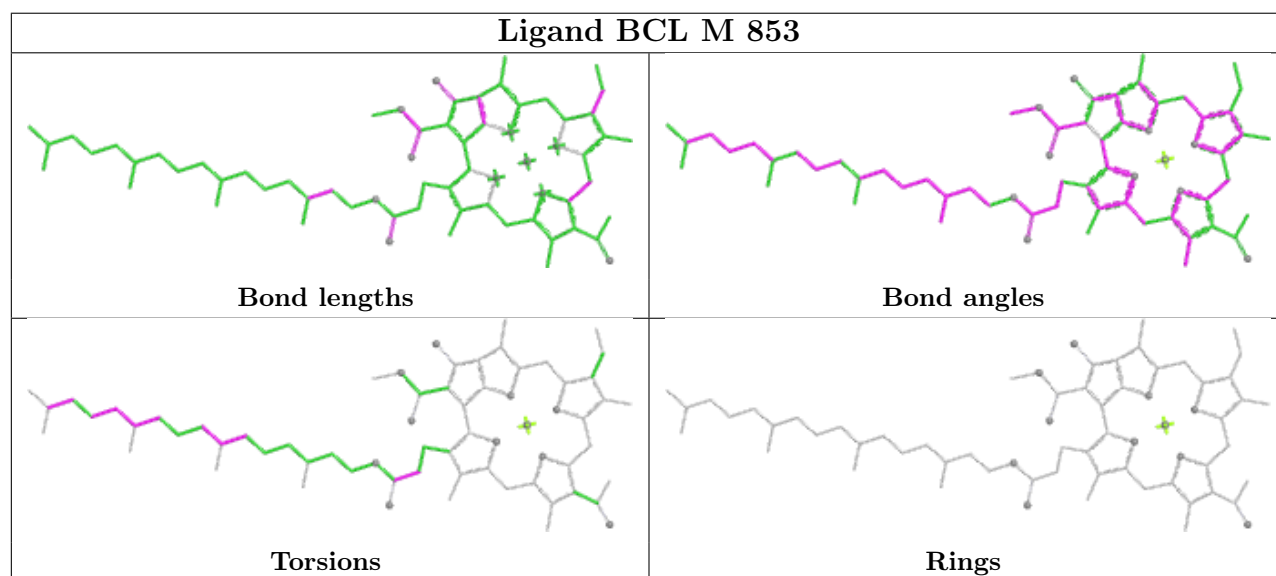
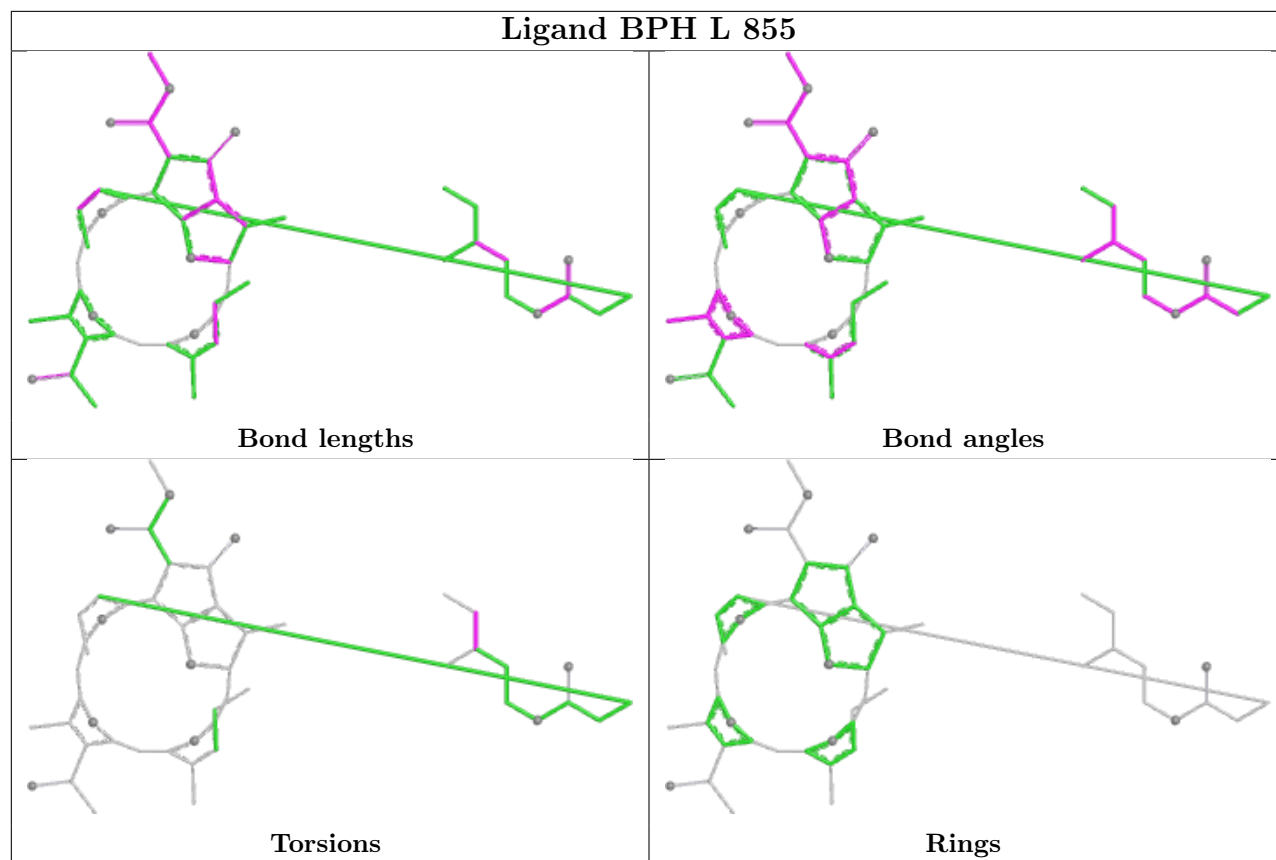
Torsions

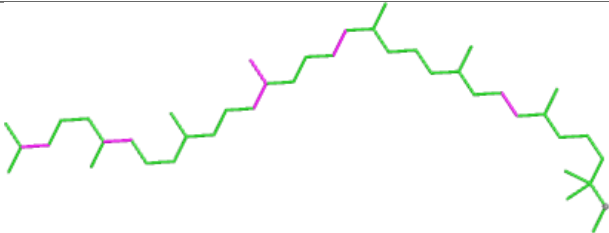
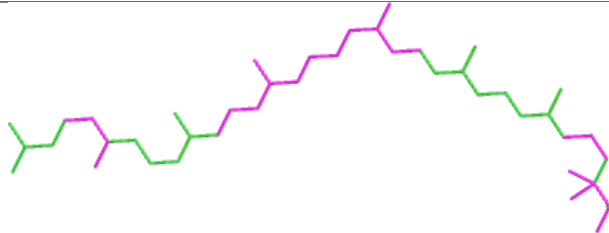
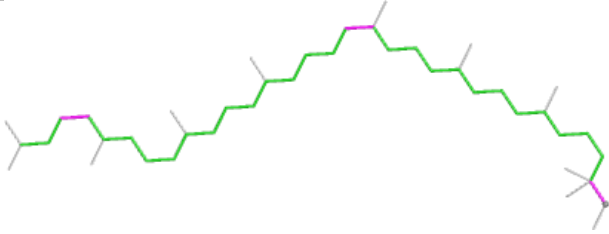
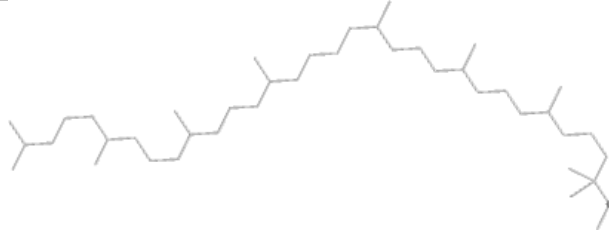


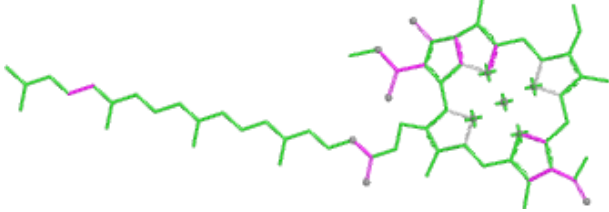
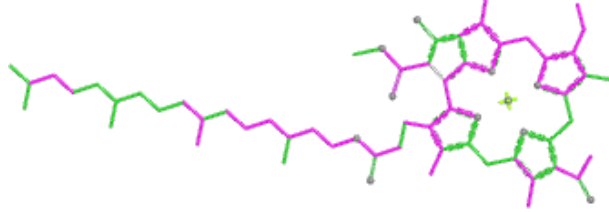
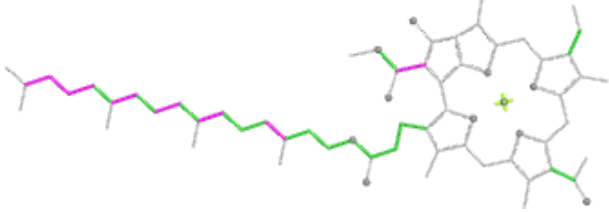
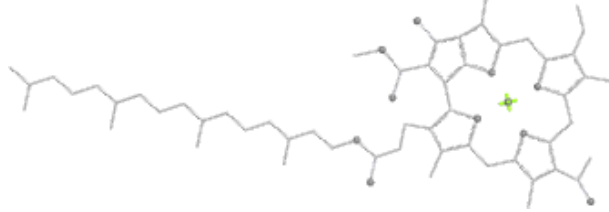
Rings

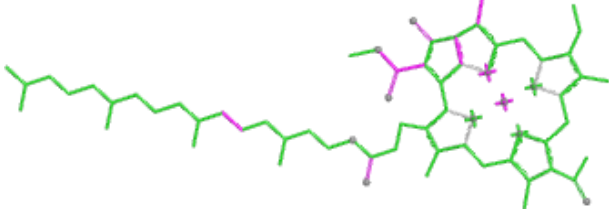
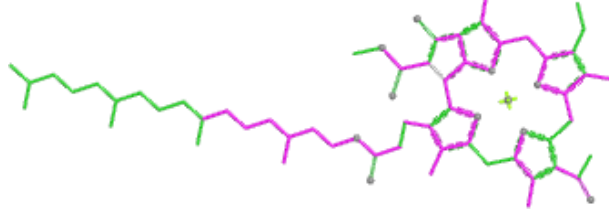
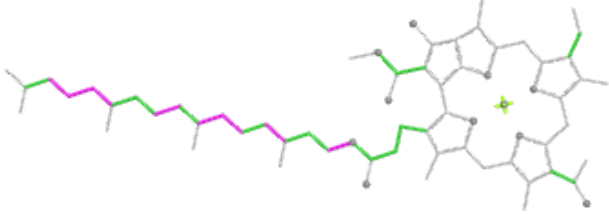
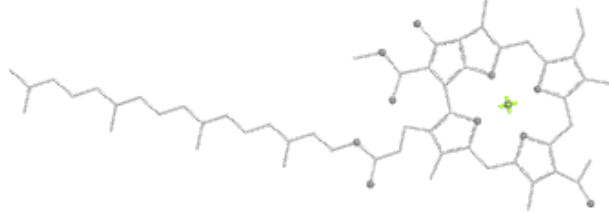
Ligand U10 L 858





Ligand SPO M 860	
	
Bond lengths	Bond angles
	
Torsions	Rings

Ligand BCL M 856	
	
Bond lengths	Bond angles
	
Torsions	Rings

Ligand BCL M 851	
	
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 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	L	281/281 (100%)	-0.19	5 (1%) 67 68	18, 26, 48, 57	0
2	M	301/307 (98%)	-0.01	7 (2%) 61 61	17, 30, 49, 72	0
3	H	238/260 (91%)	-0.12	10 (4%) 40 40	20, 29, 43, 71	0
All	All	820/848 (96%)	-0.10	22 (2%) 56 57	17, 28, 48, 72	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	M	1	ALA	9.3
2	M	2	GLU	5.1
3	H	246	PRO	4.1
2	M	301	HIS	3.9
2	M	148	TRP	3.6
3	H	248	ARG	3.5
2	M	3	TYR	3.4
3	H	18	TYR	2.8
3	H	184	LYS	2.7
3	H	244	ALA	2.6
3	H	245	ALA	2.6
1	L	72	GLU	2.5
3	H	60	LYS	2.4
3	H	11	ASP	2.4
1	L	271	TRP	2.4
3	H	247	LYS	2.3
1	L	155	ASP	2.3
1	L	281	GLY	2.1
2	M	106	ALA	2.1
1	L	277	GLY	2.1
3	H	94	GLU	2.0
2	M	300	ASN	2.0

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

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

6.3 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

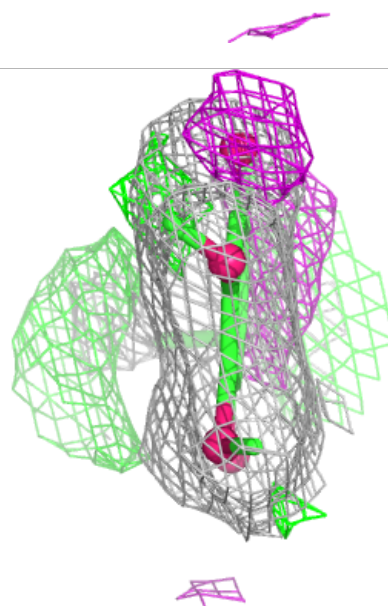
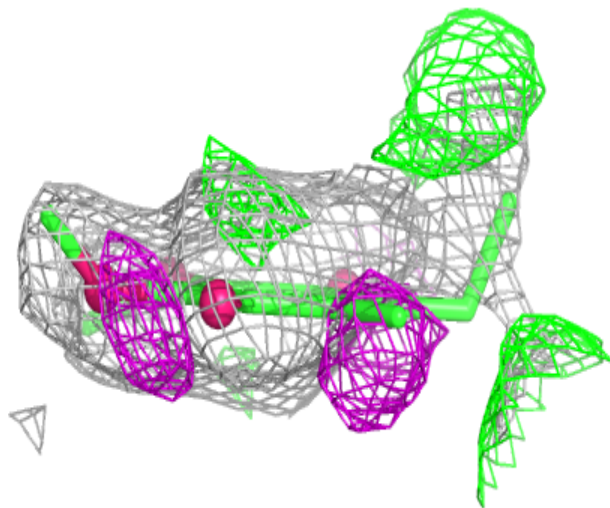
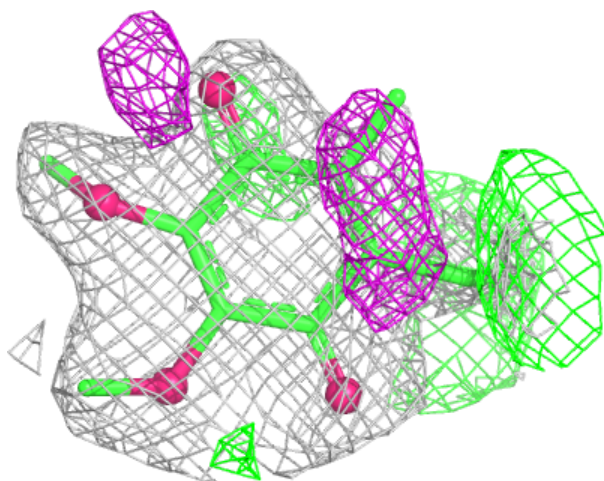
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
9	GOL	L	869	6/6	0.72	0.31	50,54,56,58	0
8	LDA	L	865	16/16	0.75	0.34	70,73,78,79	0
6	U10	M	857	15/63	0.75	0.26	59,63,65,66	0
8	LDA	M	866	11/16	0.77	0.34	77,79,83,83	0
8	LDA	L	864	16/16	0.77	0.32	54,66,74,74	0
14	CDL	M	862	81/100	0.83	0.26	61,72,89,93	0
6	U10	L	858	16/63	0.84	0.17	34,38,43,45	0
7	HTO	L	863	10/10	0.85	0.23	59,61,62,63	0
6	U10	L	859	15/63	0.90	0.12	40,44,48,49	0
13	SPO	M	860	42/42	0.92	0.12	27,35,58,61	0
12	PO4	M	867	5/5	0.92	0.11	67,68,68,69	0
4	BCL	M	851	66/66	0.96	0.11	17,23,66,68	0
4	BCL	L	854	66/66	0.96	0.09	19,23,50,51	0
5	BPH	L	855	51/65	0.97	0.06	22,27,42,46	0
4	BCL	L	852	66/66	0.97	0.07	15,22,43,52	0
12	PO4	M	868	5/5	0.97	0.12	57,58,59,59	0
4	BCL	M	853	66/66	0.97	0.07	19,24,44,53	0
4	BCL	M	856	66/66	0.97	0.07	12,20,32,34	0
11	CL	M	861	1/1	0.99	0.02	24,24,24,24	0
10	FE2	M	850	1/1	1.00	0.01	19,19,19,19	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.

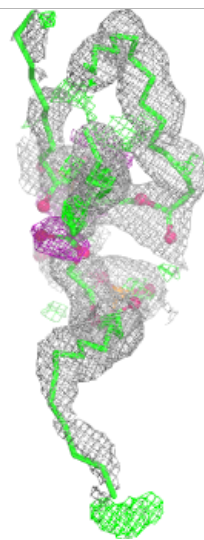
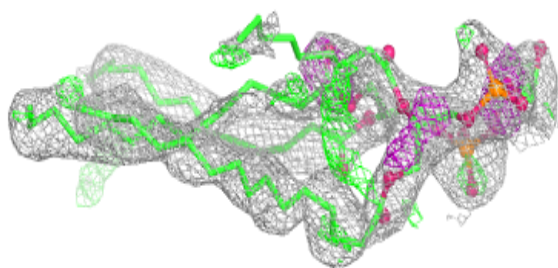
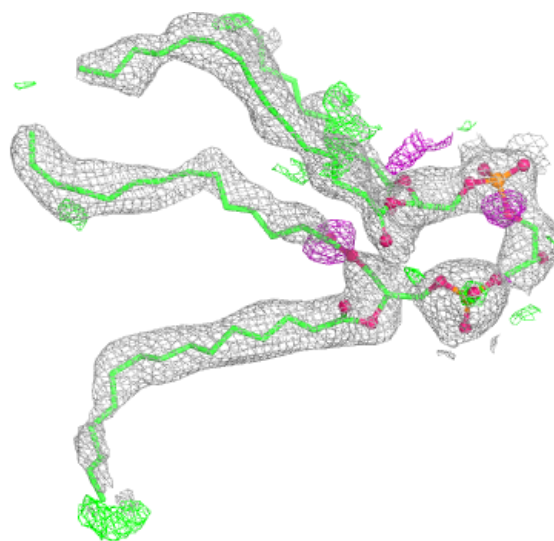
Electron density around U10 M 857:

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



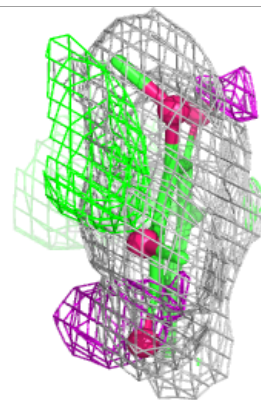
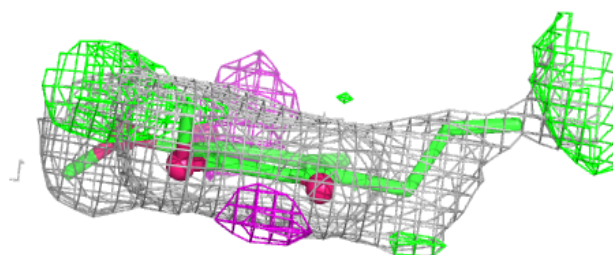
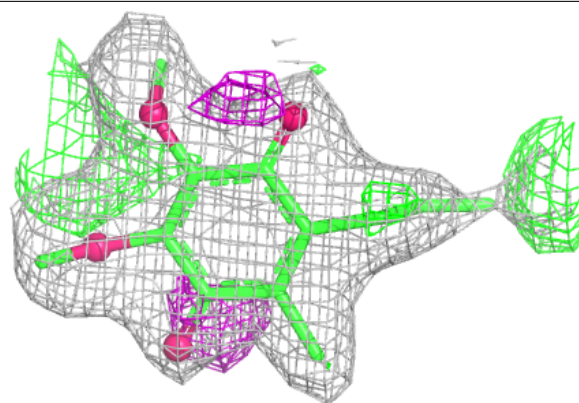
Electron density around CDL M 862:

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



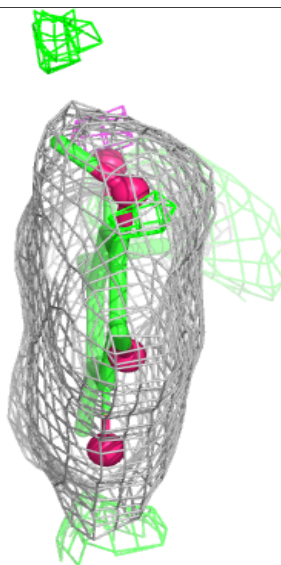
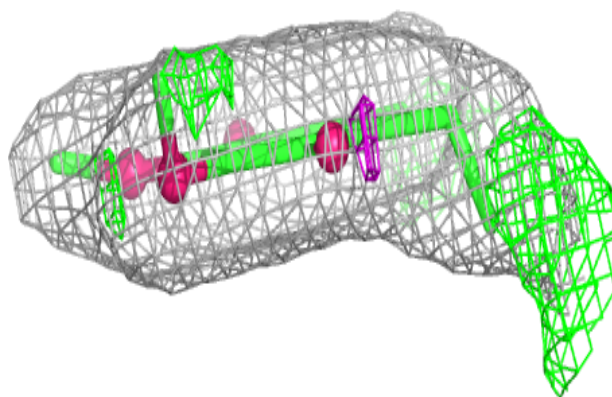
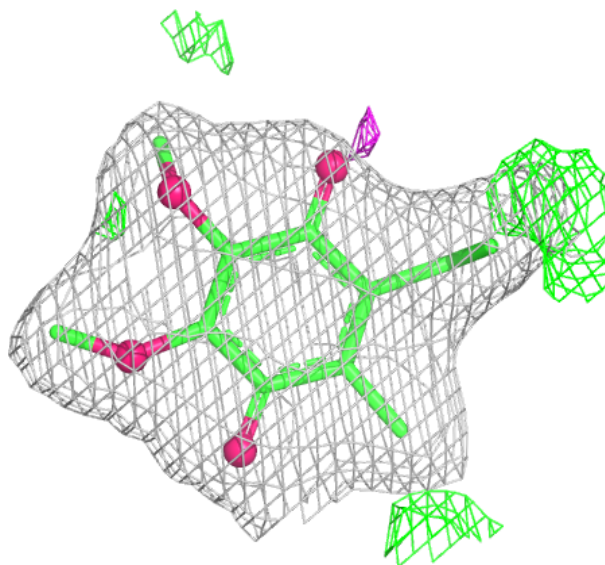
Electron density around U10 L 858:

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



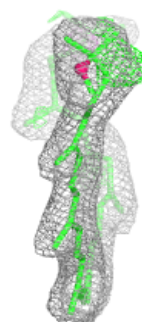
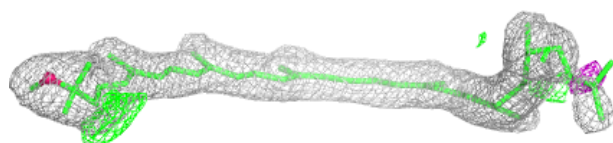
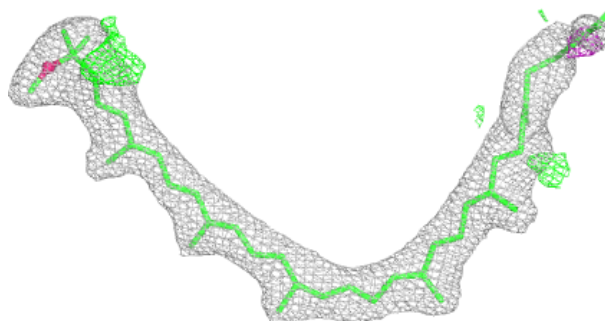
Electron density around U10 L 859:

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

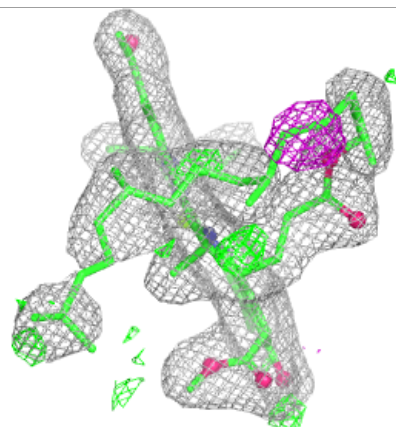
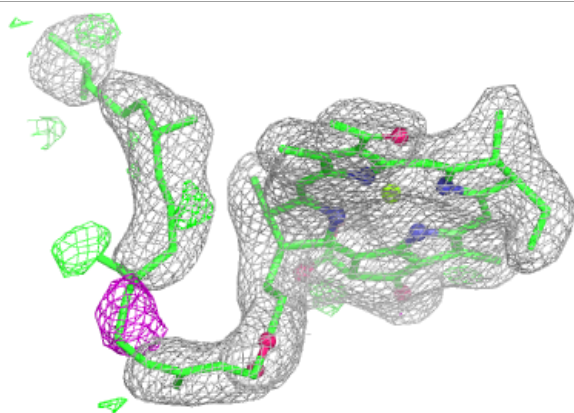
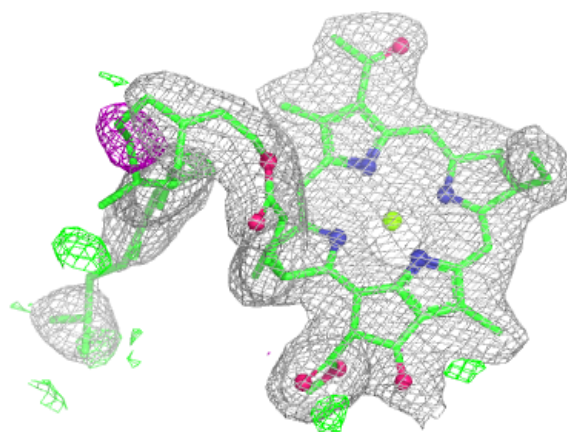


Electron density around SPO M 860:

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

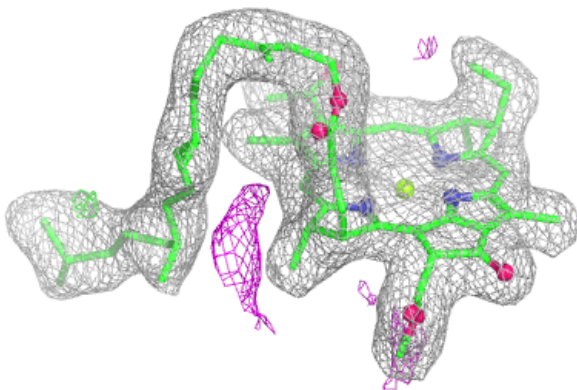
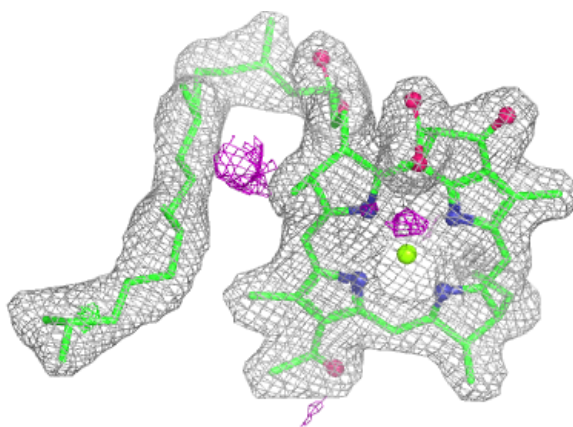
**Electron density around BCL M 851:**

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



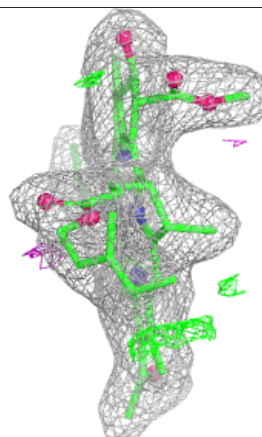
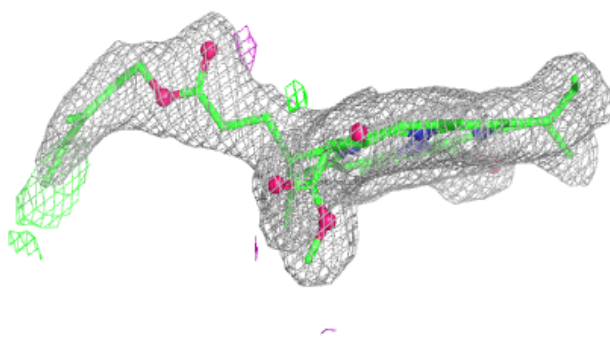
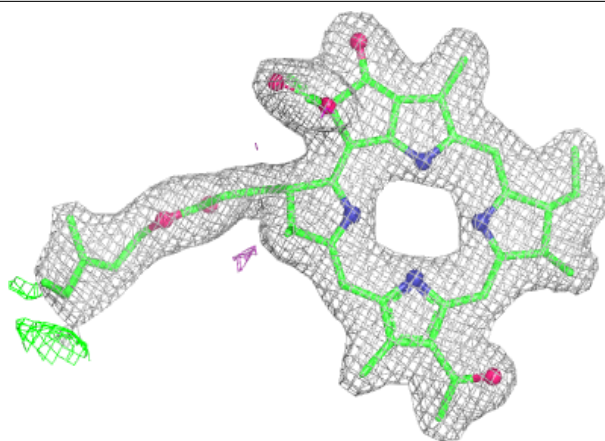
Electron density around BCL L 854:

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



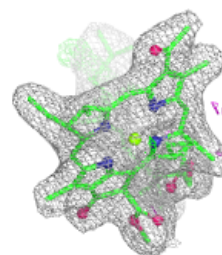
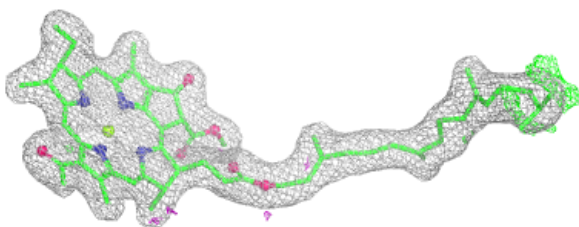
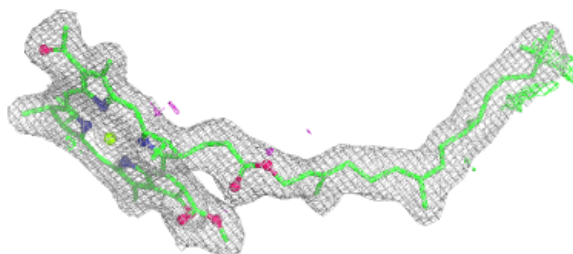
Electron density around BPH L 855:

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

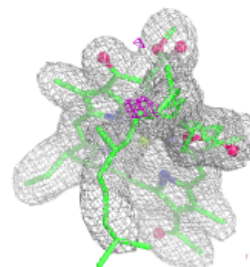
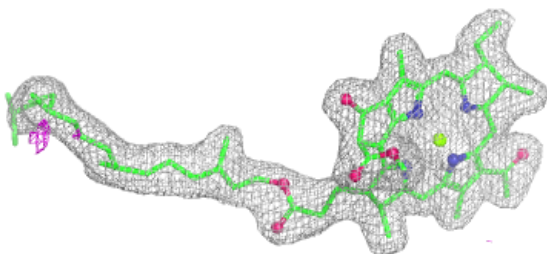
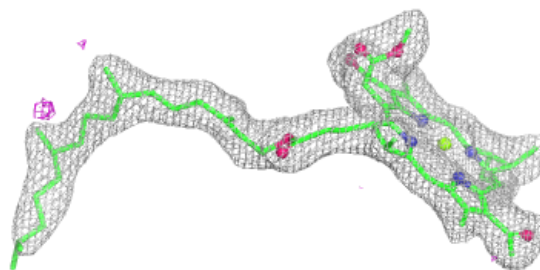


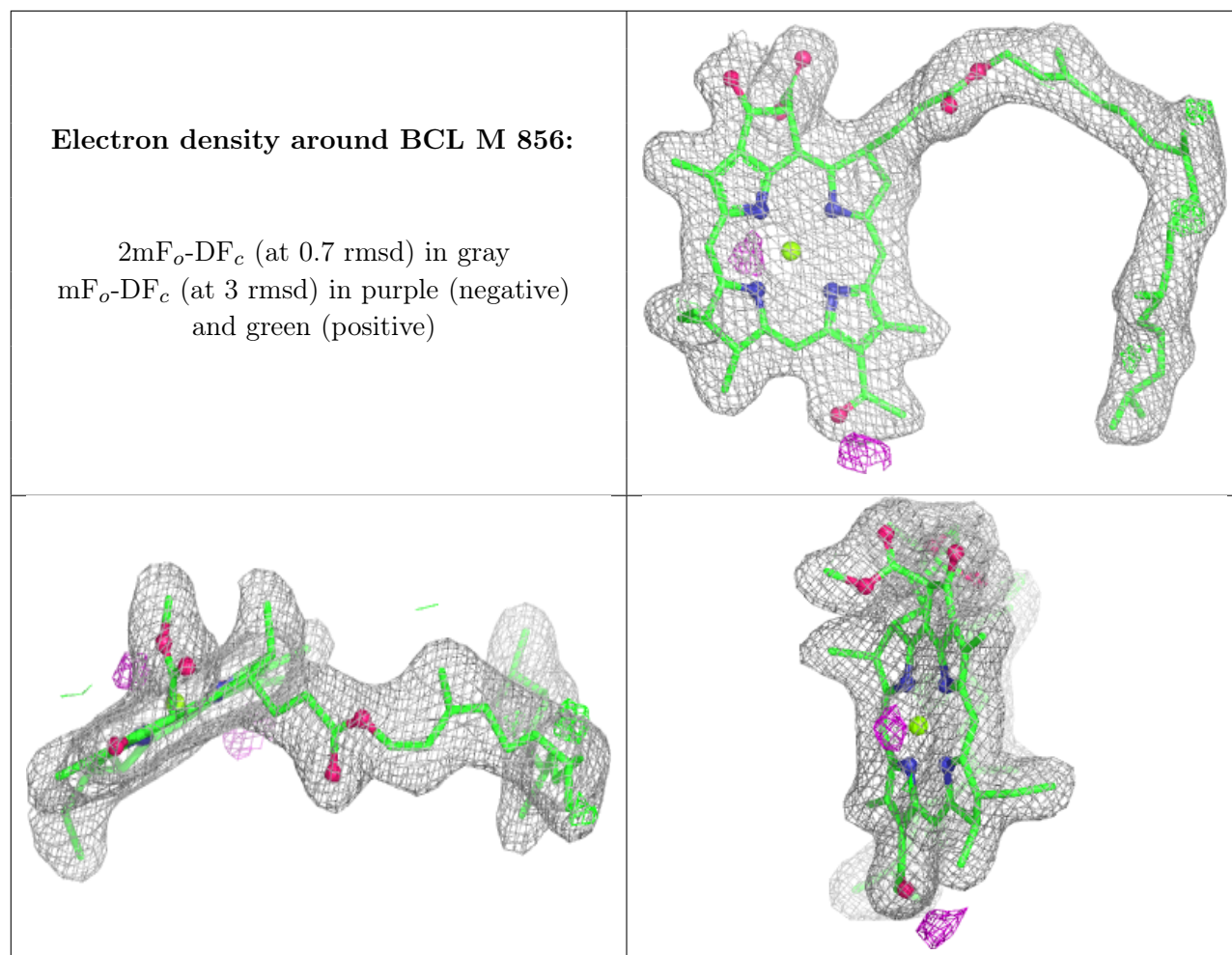
Electron density around BCL L 852:

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

**Electron density around BCL M 853:**

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





6.5 Other polymers ⓘ

There are no such residues in this entry.