



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 16, 2023 – 03:47 AM EDT

PDB ID : 1YF6
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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35
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) : 2.35

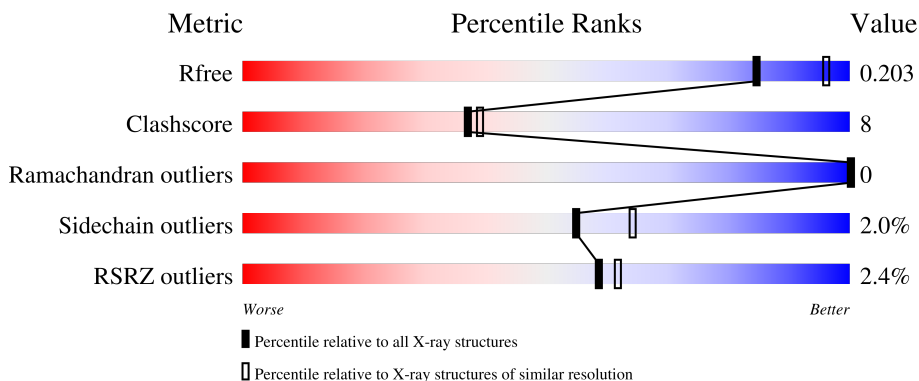
1 Overall quality at a glance

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}	130704	1377 (2.26-2.26)
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)
RSRZ outliers	127900	1356 (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
			Total	C	N	O	S			
1	L	281	2233	1507	355	363	8	0	0	0

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
			Total	C	N	O	S			
2	M	301	2418	1615	396	397	10	0	0	0

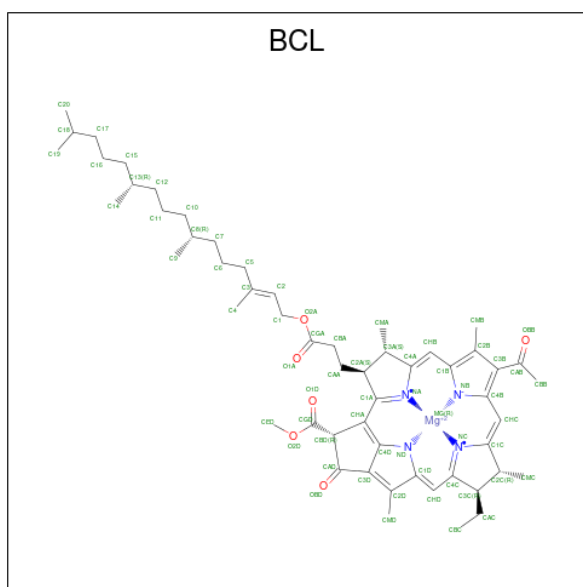
There are 4 discrepancies between the modelled and reference sequences:

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.

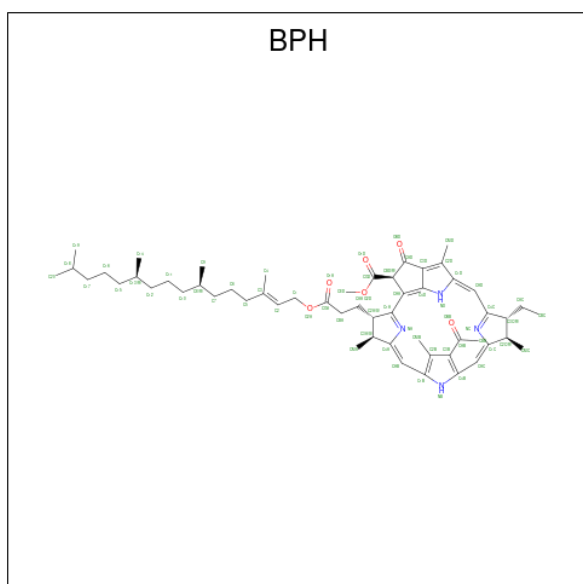
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	H	238	1814	1160	311	334	9	0	0	0

- Molecule 4 is BACTERIOCHLOROPHYLL A (three-letter code: BCL) (formula: C₅₅H₇₄MgN₄O₆).



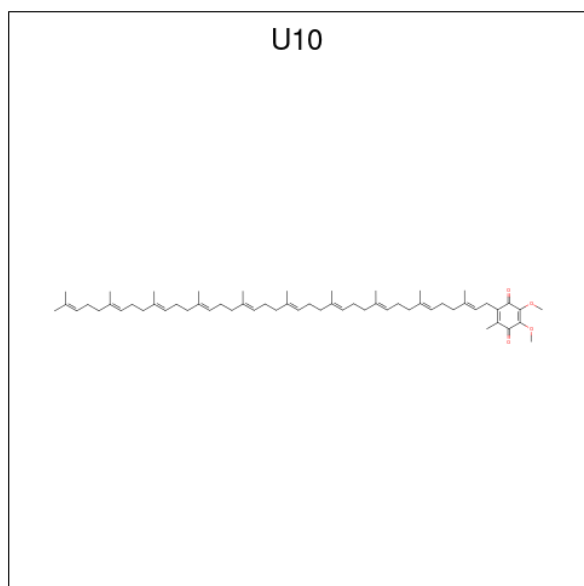
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf		
			Total	C	Mg	N			O	
4	L	1	Total	66	55	1	4	6	0	0
4	L	1	Total	66	55	1	4	6	0	0
4	M	1	Total	66	55	1	4	6	0	0
4	M	1	Total	66	55	1	4	6	0	0
4	M	1	Total	66	55	1	4	6	0	0

- Molecule 5 is BACTERIOPHEOPHYTIN A (three-letter code: BPH) (formula: $C_{55}H_{76}N_4O_6$).



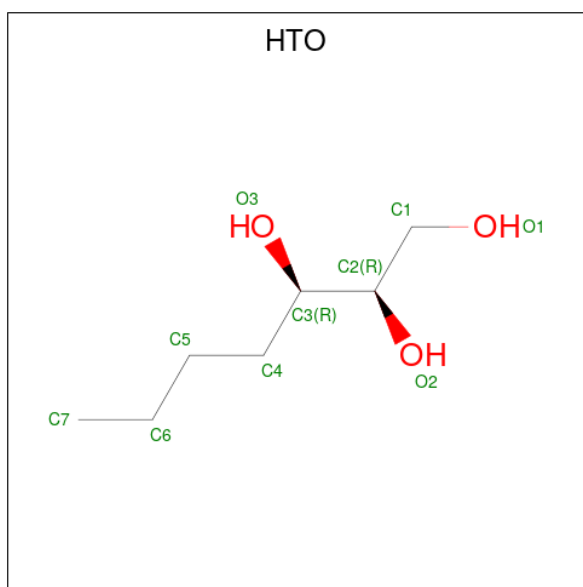
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	L	1	51	41	4	6	0	0

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



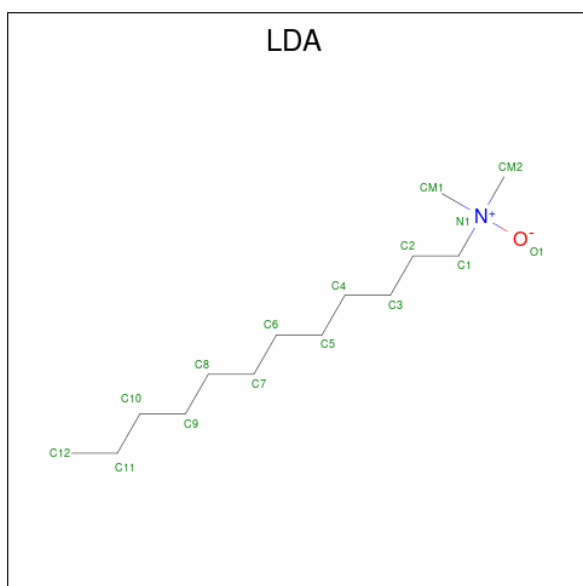
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	L	1	16	12	4	0	0
6	L	1	15	11	4	0	0
6	M	1	15	11	4	0	0

- Molecule 7 is HEPTANE-1,2,3-TRIOL (three-letter code: 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 (three-letter code: LDA) (formula: $C_{14}H_{31}NO$).



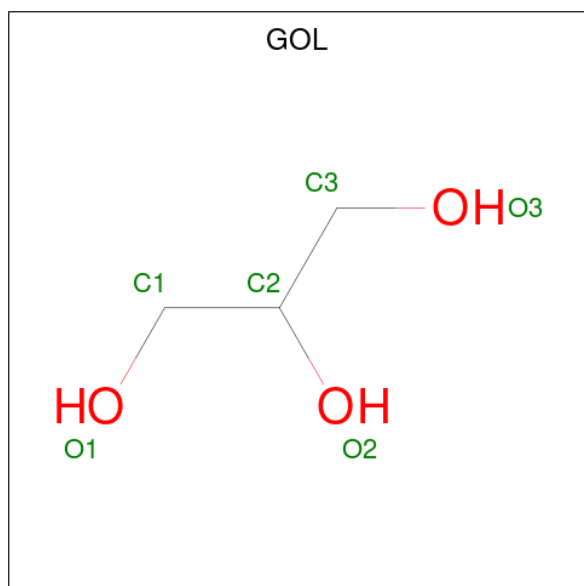
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	L	1	Total	C	N	O	0	0
			16	14	1	1		
8	L	1	Total	C	N	O	0	0
			16	14	1	1		

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

- Molecule 9 is GLYCEROL (three-letter code: 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 (three-letter code: FE2) (formula: Fe).

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

- Molecule 11 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

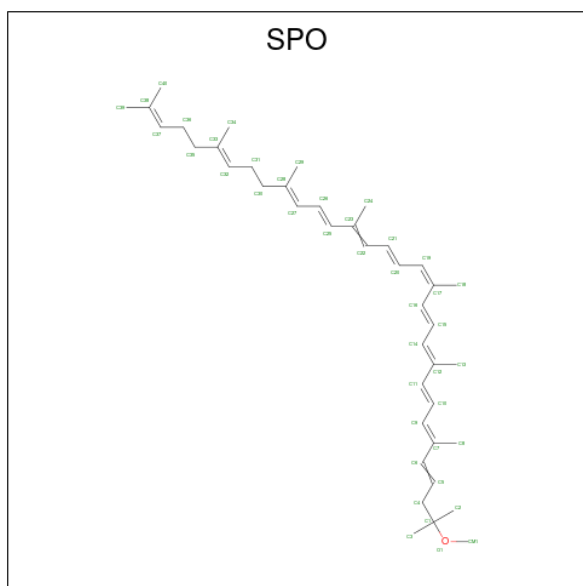
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	M	1	Total	Cl	0	0
			1	1		

- Molecule 12 is PHOSPHATE ION (three-letter code: 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 (three-letter code: 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 (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



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

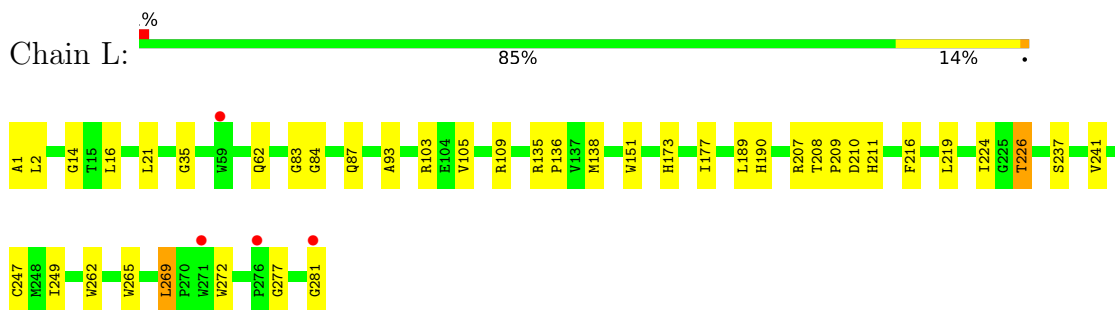
- Molecule 15 is water.

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		

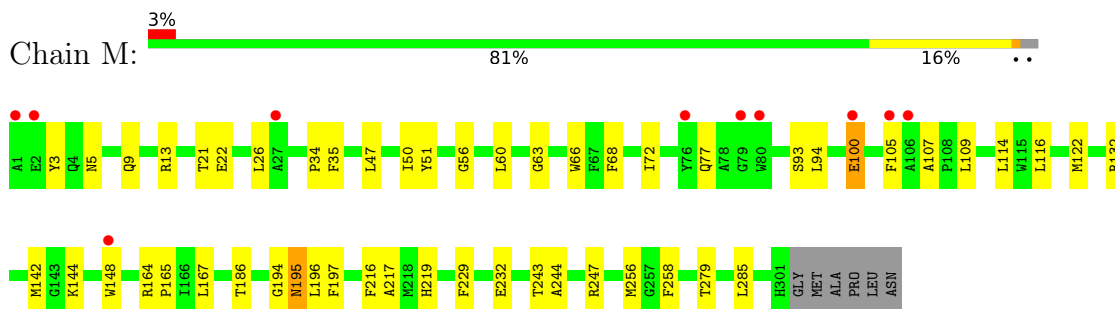
3 Residue-property plots [i](#)

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.

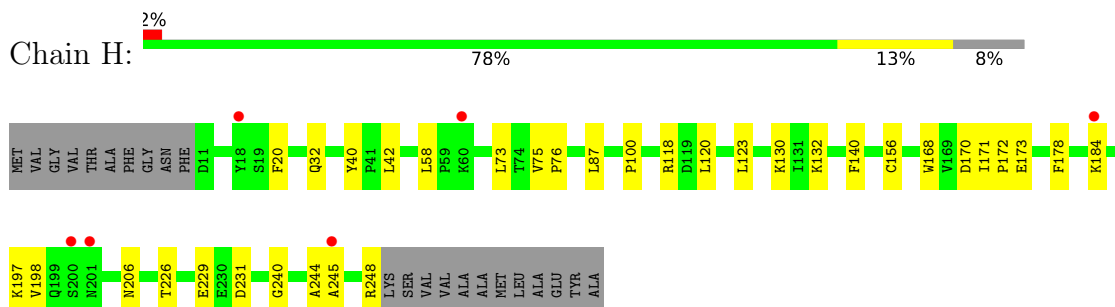
- Molecule 1: Reaction center protein L chain



- Molecule 2: Reaction center protein M chain



- Molecule 3: Reaction center protein H chain



4 Data and refinement statistics i

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 43.20 – 2.25	Depositor EDS
% Data completeness (in resolution range)	84.8 (39.34-2.25) 84.9 (43.20-2.25)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.97 (at 2.24Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	0.197 , 0.216 0.183 , 0.203	Depositor DCC
R_{free} test set	4275 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	29.7	Xtrriage
Anisotropy	0.327	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 59.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.023 for -h,-k,l	Xtrriage
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

Xtrriage'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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.38	0/2321	0.55	0/3177
2	M	0.38	0/2513	0.52	0/3432
3	H	0.33	0/1862	0.59	0/2534
All	All	0.37	0/6696	0.55	0/9143

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	L	2233	0	2187	34	0
2	M	2418	0	2320	49	0
3	H	1814	0	1818	26	0
4	L	132	0	146	5	0
4	M	198	0	222	11	0
5	L	51	0	45	5	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

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
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	110	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 (110) 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
4:L:854:BCL:HMB1	4:L:854:BCL:HBB2	1.63	0.78
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: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
4:M:851:BCL:HMB1	4:M:851:BCL:CBB	2.23	0.69
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:256:MET:HG2	2:M:258:PHE:CE1	2.30	0.67
2:M:13:ARG:HD2	2:M:35:PHE:CD2	2.33	0.63
4:M:853:BCL:CBB	4:M:853:BCL:HMB1	2.28	0.63
2:M:100:GLU:H	2:M:100:GLU:CD	2.03	0.62
4:M:851:BCL:HMB1	4:M:851:BCL:HBB2	1.82	0.61
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
4:L:854:BCL:HMB1	4:L:854:BCL:CBB	2.34	0.57
2:M:256:MET:HG2	2:M:258:PHE:CZ	2.40	0.56
4:M:856:BCL:HMB1	4:M:856:BCL:HBB3	1.86	0.56
2:M:195:ASN:ND2	2:M:197:PHE:H	2.03	0.56
1:L:226:THR:HB	3:H:173:GLU:OE1	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:13:ARG:O	3:H:140:PHE:HA	2.05	0.56
4:L:852:BCL:HMB1	4:L:852:BCL:CBB	2.37	0.54
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
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
2:M:186:THR:HG23	4:M:853:BCL:HMD2	1.92	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
2:M:195:ASN:HD22	2:M:195:ASN:C	2.14	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
4:L:852:BCL:HMB1	4:L:852:BCL:HBB3	1.94	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
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
2:M:56:GLY:HA2	2:M:132:ARG:HD2	1.94	0.48
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
1:L:1:ALA:C	1:L:2:LEU:HD12	2.35	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
4:M:856:BCL:HMB1	4:M:856:BCL:CBB	2.44	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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
4:M:853:BCL:HMB1	4:M:853:BCL:HBB3	1.96	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
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
2:M:256:MET:CE	4:M:856:BCL:HED2	2.47	0.44
4:M:853:BCL:HMB1	4:M:853:BCL:HBB2	1.99	0.44
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:75:VAL:HA	3:H:76:PRO:C	2.37	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
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
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
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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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 [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	L	220/220 (100%)	214 (97%)	6 (3%)	44	54
2	M	238/242 (98%)	234 (98%)	4 (2%)	60	71

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	H	193/208 (93%)	190 (98%)	3 (2%)	62	73
All	All	651/670 (97%)	638 (98%)	13 (2%)	55	64

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	210	ASP
1	L	216	PHE
1	L	226	THR
1	L	247	CYS
1	L	269	LEU
1	L	272	TRP
2	M	94	LEU
2	M	100	GLU
2	M	195	ASN
2	M	216	PHE
3	H	73	LEU
3	H	123	LEU
3	H	231	ASP

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

Mol	Chain	Res	Type
1	L	62	GLN
1	L	87	GLN
1	L	211	HIS
2	M	9	GLN
2	M	77	GLN
2	M	195	ASN
3	H	126	HIS
3	H	206	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](#)

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
8	LDA	L	864	-	12,15,15	2.47	1 (8%)	14,17,17	1.52	1 (7%)
4	BCL	L	852	1	58,74,74	2.20	12 (20%)	69,115,115	2.19	21 (30%)
6	U10	L	858	-	16,16,63	2.13	5 (31%)	19,22,79	2.30	6 (31%)
6	U10	L	859	-	15,15,63	1.98	4 (26%)	19,21,79	2.31	7 (36%)
14	CDL	M	862	-	80,80,99	1.49	8 (10%)	86,92,111	1.59	13 (15%)
4	BCL	M	856	2	58,74,74	2.24	11 (18%)	69,115,115	2.01	25 (36%)
9	GOL	L	869	-	5,5,5	4.59	5 (100%)	5,5,5	5.75	3 (60%)
4	BCL	M	853	2	58,74,74	2.10	8 (13%)	69,115,115	2.32	28 (40%)
12	PO4	M	867	-	4,4,4	1.11	0	6,6,6	1.49	1 (16%)
12	PO4	M	868	-	4,4,4	0.97	0	6,6,6	0.84	0
8	LDA	L	865	-	12,15,15	2.40	1 (8%)	14,17,17	1.07	2 (14%)
13	SPO	M	860	-	40,41,41	1.47	7 (17%)	47,50,50	3.90	13 (27%)
6	U10	M	857	-	15,15,63	2.16	4 (26%)	19,21,79	2.30	7 (36%)
7	HTO	L	863	-	9,9,9	0.87	0	10,10,10	2.09	2 (20%)
4	BCL	M	851	2	58,74,74	2.01	11 (18%)	69,115,115	2.42	27 (39%)
5	BPH	L	855	-	37,56,70	2.69	12 (32%)	35,84,101	3.28	13 (37%)
8	LDA	M	866	-	7,10,15	2.78	1 (14%)	9,12,17	1.03	0
4	BCL	L	854	1	58,74,74	2.21	12 (20%)	69,115,115	2.12	21 (30%)

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
8	LDA	L	864	-	-	11/13/13/13	-
4	BCL	L	852	1	2/2/21/25	13/37/137/137	-
6	U10	L	858	-	-	1/7/31/87	0/1/1/1
6	U10	L	859	-	-	1/6/30/87	0/1/1/1
14	CDL	M	862	-	-	37/91/91/110	-
4	BCL	M	856	2	2/2/21/25	12/37/137/137	-
9	GOL	L	869	-	-	2/4/4/4	-
4	BCL	M	853	2	2/2/21/25	12/37/137/137	-
8	LDA	L	865	-	-	5/13/13/13	-
13	SPO	M	860	-	-	5/47/47/47	-
6	U10	M	857	-	-	1/6/30/87	0/1/1/1
7	HTO	L	863	-	-	7/10/10/10	-
4	BCL	M	851	2	2/2/21/25	11/37/137/137	-
5	BPH	L	855	-	-	4/21/89/105	0/5/6/6
8	LDA	M	866	-	-	3/8/8/13	-
4	BCL	L	854	1	2/2/21/25	5/37/137/137	-

All (102) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	M	853	BCL	OBD-CAD	11.35	1.38	1.22
4	M	856	BCL	OBD-CAD	10.93	1.37	1.22
4	L	854	BCL	OBD-CAD	10.43	1.36	1.22
5	L	855	BPH	OBD-CAD	9.63	1.35	1.22
4	M	851	BCL	OBD-CAD	9.07	1.35	1.22
4	L	852	BCL	OBD-CAD	8.59	1.34	1.22
4	L	854	BCL	C1B-NB	8.29	1.42	1.35
4	L	852	BCL	C1B-NB	8.29	1.42	1.35
8	L	865	LDA	O1-N1	-7.84	1.23	1.42
9	L	869	GOL	C3-C2	-7.75	1.19	1.51
8	L	864	LDA	O1-N1	-7.54	1.24	1.42
8	M	866	LDA	O1-N1	-6.90	1.26	1.42
4	M	856	BCL	O1A-CGA	6.22	1.41	1.22
4	M	856	BCL	C4B-NB	6.11	1.40	1.35
14	M	862	CDL	OB6-CB5	5.98	1.51	1.34
5	L	855	BPH	C2-C3	5.83	1.47	1.33
14	M	862	CDL	OA6-CA5	5.71	1.50	1.34
6	M	857	U10	O4-C4	5.41	1.50	1.36
14	M	862	CDL	OA8-CA7	5.31	1.48	1.33
4	M	851	BCL	O1A-CGA	5.29	1.38	1.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	M	853	BCL	O1A-CGA	5.12	1.37	1.22
4	L	852	BCL	O1A-CGA	5.07	1.37	1.22
6	L	858	U10	O4-C4	5.03	1.49	1.36
6	L	859	U10	O4-C4	4.88	1.48	1.36
5	L	855	BPH	C3D-C2D	4.81	1.48	1.39
5	L	855	BPH	O1D-CGD	4.78	1.33	1.21
4	L	854	BCL	O1A-CGA	4.74	1.36	1.22
4	M	853	BCL	C4B-NB	4.44	1.39	1.35
9	L	869	GOL	O1-C1	4.34	1.60	1.42
5	L	855	BPH	O1A-CGA	4.28	1.35	1.22
14	M	862	CDL	OB8-CB7	4.04	1.45	1.33
4	L	852	BCL	C4B-NB	3.97	1.38	1.35
4	M	851	BCL	C4B-NB	3.84	1.38	1.35
4	L	854	BCL	O2A-CGA	-3.81	1.22	1.33
6	M	857	U10	O3-C3	3.78	1.46	1.36
4	M	851	BCL	C1B-NB	3.78	1.38	1.35
4	M	856	BCL	O2D-CGD	-3.74	1.24	1.33
4	M	856	BCL	C3B-C2B	-3.61	1.32	1.39
5	L	855	BPH	OBB-CAB	3.58	1.33	1.22
5	L	855	BPH	CBD-CGD	-3.48	1.47	1.52
4	L	852	BCL	C2-C3	3.41	1.41	1.33
6	L	858	U10	O3-C3	3.35	1.45	1.36
6	L	859	U10	O3-C3	3.32	1.45	1.36
6	L	858	U10	O3-C3M	-3.31	1.37	1.45
4	L	852	BCL	MG-NC	3.22	2.13	2.06
5	L	855	BPH	O2A-CGA	-3.19	1.24	1.33
13	M	860	SPO	C9-C7	3.14	1.39	1.35
6	L	858	U10	C6-C1	3.13	1.40	1.35
13	M	860	SPO	C37-C38	3.10	1.41	1.32
5	L	855	BPH	C3A-C2A	-3.10	1.51	1.54
9	L	869	GOL	C1-C2	-3.09	1.39	1.51
4	L	852	BCL	C3C-C4C	-3.05	1.47	1.51
9	L	869	GOL	O3-C3	3.00	1.55	1.42
6	M	857	U10	O3-C3M	-2.88	1.38	1.45
6	L	859	U10	C6-C1	2.86	1.40	1.35
6	M	857	U10	C6-C1	2.81	1.40	1.35
9	L	869	GOL	O2-C2	-2.79	1.35	1.43
13	M	860	SPO	C20-C19	-2.79	1.34	1.43
4	L	852	BCL	C3D-CAD	-2.79	1.39	1.46
4	M	853	BCL	C2-C3	2.74	1.39	1.33
4	M	856	BCL	C1B-NB	2.74	1.37	1.35
4	L	854	BCL	C3D-CAD	-2.72	1.39	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	M	862	CDL	C71-CB7	2.68	1.58	1.50
4	L	852	BCL	O2A-CGA	-2.64	1.25	1.33
4	M	851	BCL	O1D-CGD	2.63	1.27	1.21
6	L	859	U10	O3-C3M	-2.62	1.39	1.45
4	M	851	BCL	C6-C7	2.55	1.63	1.52
4	M	856	BCL	C3B-CAB	2.53	1.55	1.49
4	M	851	BCL	O2D-CGD	-2.49	1.27	1.33
4	L	854	BCL	C4B-NB	2.49	1.37	1.35
13	M	860	SPO	C24-C23	-2.48	1.45	1.50
4	M	851	BCL	C3D-C2D	2.48	1.43	1.39
4	M	851	BCL	C3D-CAD	-2.46	1.39	1.46
4	M	853	BCL	CAC-C3C	-2.46	1.49	1.54
4	M	851	BCL	CBD-CGD	-2.45	1.44	1.52
4	L	852	BCL	O1D-CGD	2.44	1.27	1.21
4	L	854	BCL	C2-C3	2.38	1.38	1.33
4	L	854	BCL	O2D-CGD	-2.38	1.27	1.33
5	L	855	BPH	CAC-C3C	-2.37	1.48	1.53
4	M	853	BCL	C1B-NB	2.35	1.37	1.35
4	L	854	BCL	O2D-CED	-2.35	1.39	1.45
4	L	854	BCL	C3C-C4C	-2.34	1.48	1.51
5	L	855	BPH	O2D-CGD	-2.32	1.27	1.33
4	M	853	BCL	O2D-CGD	-2.31	1.27	1.33
4	M	856	BCL	O2A-CGA	-2.29	1.26	1.33
4	M	853	BCL	O1D-CGD	2.27	1.26	1.21
4	M	856	BCL	C16-C15	-2.17	1.42	1.52
13	M	860	SPO	C25-C23	2.15	1.50	1.45
5	L	855	BPH	O2D-CED	-2.13	1.40	1.45
4	L	852	BCL	O2D-CGD	-2.11	1.28	1.33
13	M	860	SPO	C32-C33	2.09	1.38	1.33
4	M	851	BCL	CMD-C2D	2.09	1.56	1.51
14	M	862	CDL	PB2-OB5	2.08	1.67	1.59
4	L	854	BCL	CHD-C4C	2.06	1.47	1.41
4	M	856	BCL	CBD-CGD	-2.06	1.46	1.52
4	L	852	BCL	O2A-C1	-2.05	1.40	1.46
4	M	856	BCL	O1D-CGD	2.04	1.26	1.21
4	L	854	BCL	C1-C2	2.04	1.55	1.49
13	M	860	SPO	C10-C9	2.04	1.49	1.43
14	M	862	CDL	PB2-OB2	2.01	1.67	1.59
6	L	858	U10	C7-C6	2.00	1.54	1.51
14	M	862	CDL	CA3-CA4	2.00	1.56	1.50

All (190) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	M	860	SPO	C18-C17-C19	-15.96	100.57	122.92
13	M	860	SPO	C16-C17-C19	14.57	141.30	118.94
5	L	855	BPH	O2D-CGD-CBD	11.56	125.65	111.00
13	M	860	SPO	C20-C21-C22	-10.89	101.16	123.47
9	L	869	GOL	O3-C3-C2	10.51	160.59	110.20
5	L	855	BPH	OBD-CAD-CBD	-7.94	114.18	125.82
5	L	855	BPH	C4-C3-C5	7.60	124.67	115.98
4	M	851	BCL	OBD-CAD-CBD	-7.52	115.15	125.89
4	M	853	BCL	CMB-C2B-C1B	-7.43	117.05	128.46
9	L	869	GOL	O2-C2-C3	6.74	138.80	109.12
6	M	857	U10	C3M-O3-C3	6.50	139.50	116.47
6	L	859	U10	C3M-O3-C3	6.28	138.73	116.47
6	L	858	U10	C3M-O3-C3	6.28	138.72	116.47
4	M	851	BCL	CMB-C2B-C1B	-6.26	118.84	128.46
14	M	862	CDL	OA6-CA5-C11	6.12	124.69	111.50
4	L	854	BCL	O2D-CGD-CBD	6.10	122.10	111.27
13	M	860	SPO	C20-C19-C17	5.97	135.83	127.31
4	L	852	BCL	CMB-C2B-C1B	-5.83	119.51	128.46
4	M	851	BCL	CAD-C3D-C4D	-5.80	105.23	108.47
5	L	855	BPH	O1D-CGD-CBD	-5.63	115.36	124.74
14	M	862	CDL	OB6-CB5-C51	5.60	123.58	111.50
4	L	852	BCL	C1C-NC-C4C	-5.59	104.19	106.71
4	M	853	BCL	CAD-C3D-C4D	-5.45	105.43	108.47
4	L	854	BCL	CMB-C2B-C1B	-5.36	120.23	128.46
4	M	856	BCL	CMB-C2B-C1B	-5.24	120.41	128.46
4	L	852	BCL	C11-C12-C13	5.23	132.83	115.92
4	L	854	BCL	O2A-CGA-O1A	-5.05	110.85	123.59
4	L	852	BCL	C1-O2A-CGA	4.84	129.15	116.44
4	M	856	BCL	C1-O2A-CGA	4.78	128.98	116.44
13	M	860	SPO	C21-C22-C23	4.70	134.02	127.31
14	M	862	CDL	OB8-CB7-OB9	-4.70	111.73	123.59
8	L	864	LDA	CM2-N1-C1	4.70	120.10	110.23
7	L	863	HTO	O3-C3-C4	-4.64	99.06	109.15
4	L	852	BCL	CMA-C3A-C4A	-4.52	99.61	111.77
4	M	853	BCL	C4A-NA-C1A	4.47	108.72	106.71
4	L	852	BCL	O2D-CGD-CBD	4.46	119.20	111.27
4	L	852	BCL	CAD-C3D-C4D	-4.35	106.04	108.47
4	M	853	BCL	O2D-CGD-CBD	4.32	118.95	111.27
4	M	853	BCL	C1C-NC-C4C	-4.23	104.80	106.71
4	M	856	BCL	OBD-CAD-CBD	-4.23	119.85	125.89
4	M	851	BCL	C1-O2A-CGA	4.05	127.07	116.44
4	L	854	BCL	CAD-C3D-C4D	-4.04	106.22	108.47
4	L	854	BCL	CAA-CBA-CGA	4.04	125.07	113.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	L	858	U10	O5-C5-C6	-3.98	114.56	121.55
4	M	856	BCL	CBC-CAC-C3C	3.98	122.32	113.47
4	M	856	BCL	C4C-CHD-C1D	-3.84	120.21	125.88
6	L	859	U10	O5-C5-C6	-3.82	114.84	121.55
6	M	857	U10	O5-C5-C6	-3.82	114.85	121.55
4	M	851	BCL	C3D-CAD-CBD	3.81	112.62	107.61
4	M	853	BCL	CMB-C2B-C3B	3.80	131.79	124.68
4	M	851	BCL	C4B-CHC-C1C	-3.79	122.61	130.12
4	L	854	BCL	C1C-NC-C4C	-3.72	105.03	106.71
4	L	854	BCL	C1-O2A-CGA	3.71	126.18	116.44
4	M	853	BCL	O2A-CGA-CBA	3.71	123.55	111.91
7	L	863	HTO	C4-C3-C2	3.69	122.11	113.35
4	M	851	BCL	C2A-C3A-C4A	3.68	107.81	101.87
4	M	856	BCL	C1-C2-C3	-3.62	119.79	126.04
4	M	853	BCL	CHB-C4A-NA	3.58	129.47	124.51
4	M	851	BCL	CMB-C2B-C3B	3.58	131.38	124.68
4	M	853	BCL	O2D-CGD-O1D	-3.48	117.04	123.84
4	M	851	BCL	C4C-CHD-C1D	-3.47	120.75	125.88
4	L	852	BCL	OBD-CAD-CBD	-3.46	120.95	125.89
4	L	852	BCL	C9-C8-C7	3.46	123.83	111.29
4	M	856	BCL	C2C-C3C-C4C	3.42	106.47	101.34
4	M	851	BCL	C6-C7-C8	3.40	126.92	115.92
4	M	851	BCL	OBB-CAB-C3B	3.39	126.01	119.99
5	L	855	BPH	CED-O2D-CGD	3.34	123.50	115.94
13	M	860	SPO	C21-C20-C19	3.34	130.31	123.47
4	L	854	BCL	C2A-C3A-C4A	3.32	107.24	101.87
4	M	853	BCL	C16-C15-C13	-3.32	105.20	115.92
4	M	853	BCL	CAA-CBA-CGA	-3.29	103.63	113.25
14	M	862	CDL	CB6-CB4-CB3	-3.24	104.11	111.79
4	L	854	BCL	C4A-NA-C1A	3.21	108.15	106.71
4	M	856	BCL	C7-C6-C5	-3.18	104.72	113.36
4	L	852	BCL	O2A-CGA-CBA	3.18	121.90	111.91
6	L	859	U10	O2-C2-C3	-3.16	114.23	120.93
6	L	858	U10	O2-C2-C3	-3.16	114.23	120.93
14	M	862	CDL	OB8-CB7-C71	3.15	121.79	111.91
4	L	854	BCL	CMB-C2B-C3B	3.14	130.55	124.68
4	L	854	BCL	CED-O2D-CGD	3.12	122.99	115.94
4	M	853	BCL	C4B-CHC-C1C	-3.10	123.97	130.12
4	M	851	BCL	C4-C3-C2	-3.09	115.76	123.68
5	L	855	BPH	C4-C3-C2	-3.07	115.79	123.68
5	L	855	BPH	CAC-C3C-C4C	3.06	120.57	113.73
4	L	852	BCL	CMB-C2B-C3B	3.05	130.38	124.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	M	853	BCL	C7-C6-C5	-3.05	105.08	113.36
4	M	851	BCL	C1-C2-C3	-3.04	120.79	126.04
4	M	856	BCL	CMB-C2B-C3B	3.03	130.35	124.68
6	M	857	U10	O2-C2-C3	-3.02	114.51	120.93
4	L	854	BCL	O2D-CGD-O1D	-3.02	117.94	123.84
4	M	856	BCL	C9-C8-C10	3.01	122.18	111.29
14	M	862	CDL	OA8-CA7-C31	3.01	121.34	111.91
4	L	852	BCL	O2D-CGD-O1D	-2.99	118.00	123.84
4	M	851	BCL	C6-C5-C3	-2.98	105.63	113.45
4	L	854	BCL	OBB-CAB-C3B	2.98	125.29	119.99
9	L	869	GOL	O1-C1-C2	2.98	124.49	110.20
4	M	853	BCL	C6-C7-C8	2.96	125.47	115.92
4	M	851	BCL	C4-C3-C5	2.95	120.23	115.27
4	M	851	BCL	CHA-C1A-NA	-2.93	119.69	126.40
4	L	852	BCL	C3C-C4C-CHD	-2.93	117.13	123.39
4	M	851	BCL	O2A-CGA-CBA	2.91	121.03	111.91
6	L	859	U10	C1-C6-C5	-2.90	116.85	119.58
4	M	853	BCL	O2A-CGA-O1A	-2.88	116.33	123.59
4	M	851	BCL	CAA-C2A-C3A	-2.87	104.91	112.78
4	M	856	BCL	C1C-NC-C4C	2.86	107.99	106.71
4	M	851	BCL	C1C-NC-C4C	-2.85	105.42	106.71
14	M	862	CDL	OA5-PA1-OA3	2.81	120.04	109.07
4	M	853	BCL	OBD-CAD-CBD	-2.79	121.91	125.89
4	L	852	BCL	C1B-CHB-C4A	-2.79	124.60	130.12
4	L	854	BCL	C4B-CHC-C1C	-2.78	124.61	130.12
4	M	856	BCL	CAA-C2A-C3A	-2.74	105.27	112.78
4	M	853	BCL	C2A-C3A-C4A	2.74	106.29	101.87
5	L	855	BPH	CMB-C2B-C3B	2.73	129.79	124.68
4	L	854	BCL	CHB-C4A-NA	2.72	128.27	124.51
6	L	858	U10	C1-C6-C5	-2.71	117.03	119.58
4	M	856	BCL	O2D-CGD-O1D	-2.70	118.57	123.84
4	L	852	BCL	C14-C13-C12	2.69	121.04	111.29
12	M	867	PO4	O4-P-O1	2.68	120.70	110.89
4	M	851	BCL	O2D-CGD-CBD	2.62	115.92	111.27
4	M	853	BCL	C4-C3-C5	2.61	119.67	115.27
13	M	860	SPO	C25-C23-C22	-2.60	114.95	118.94
14	M	862	CDL	OA6-CA5-OA7	-2.60	117.42	123.70
4	M	851	BCL	CMA-C3A-C2A	-2.59	103.39	113.83
5	L	855	BPH	C1C-C2C-C3C	-2.57	100.40	102.84
6	M	857	U10	C1-C6-C5	-2.56	117.17	119.58
4	M	853	BCL	C3C-C4C-CHD	-2.54	117.96	123.39
4	L	854	BCL	OBD-CAD-CBD	-2.52	122.29	125.89

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	M	862	CDL	C72-C71-CB7	2.51	122.75	113.62
4	M	851	BCL	C3C-C4C-CHD	-2.49	118.06	123.39
5	L	855	BPH	O2D-CGD-O1D	-2.49	118.97	123.84
4	M	856	BCL	O2A-CGA-CBA	2.47	119.66	111.91
4	L	854	BCL	C1B-CHB-C4A	-2.47	125.23	130.12
13	M	860	SPO	C3-C1-C2	-2.46	105.74	110.37
8	L	865	LDA	CM1-N1-C1	2.46	115.41	110.23
4	M	856	BCL	C6-C5-C3	2.45	119.88	113.45
4	M	853	BCL	CHD-C4C-NC	-2.43	122.38	125.08
4	L	852	BCL	CAC-C3C-C4C	-2.41	107.23	112.58
6	M	857	U10	C6-C1-C2	2.41	121.09	119.18
4	L	852	BCL	C11-C10-C8	2.40	123.69	115.92
4	L	854	BCL	O1D-CGD-CBD	-2.40	119.58	124.48
13	M	860	SPO	C24-C23-C25	2.39	121.85	118.08
4	M	853	BCL	C3C-C2C-C1C	-2.39	98.01	101.87
4	L	852	BCL	CHA-C1A-NA	-2.38	120.94	126.40
13	M	860	SPO	C34-C33-C35	2.38	119.28	115.27
4	M	851	BCL	C7-C6-C5	2.38	119.82	113.36
4	M	851	BCL	CHC-C1C-NC	2.36	127.78	124.51
4	M	853	BCL	C1-C2-C3	-2.36	121.97	126.04
4	M	851	BCL	OBD-CAD-C3D	2.35	131.88	127.98
4	M	856	BCL	CAC-C3C-C4C	2.34	117.78	112.58
5	L	855	BPH	O2A-CGA-CBA	2.33	119.22	111.91
4	L	854	BCL	C4C-CHD-C1D	-2.33	122.44	125.88
4	M	851	BCL	CMC-C2C-C1C	-2.32	105.53	111.77
13	M	860	SPO	CM1-O1-C1	2.30	131.78	117.25
4	M	853	BCL	CED-O2D-CGD	2.28	121.08	115.94
6	L	859	U10	C6-C1-C2	2.27	120.97	119.18
4	M	856	BCL	O2D-CGD-CBD	2.26	115.29	111.27
6	M	857	U10	C4-C3-C2	-2.25	116.26	120.68
4	M	853	BCL	C3D-CAD-CBD	2.24	110.56	107.61
13	M	860	SPO	C15-C16-C17	-2.24	120.12	126.42
14	M	862	CDL	CA4-OA6-CA5	-2.24	112.27	117.79
4	L	852	BCL	C14-C13-C15	2.23	119.36	111.29
8	L	865	LDA	CM2-N1-C1	2.22	114.90	110.23
5	L	855	BPH	O2A-CGA-O1A	-2.22	117.99	123.59
4	L	854	BCL	O2A-C1-C2	2.22	114.47	108.64
4	L	852	BCL	CMC-C2C-C1C	2.21	117.71	111.77
4	M	853	BCL	C12-C11-C10	-2.21	103.10	113.24
5	L	855	BPH	C1-O2A-CGA	2.21	122.23	116.44
14	M	862	CDL	OA8-CA7-OA9	-2.18	118.08	123.59
4	M	856	BCL	C3C-C2C-C1C	-2.16	98.38	101.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	M	862	CDL	OA6-CA4-CA3	2.16	116.21	108.40
4	M	853	BCL	C1B-CHB-C4A	-2.14	125.88	130.12
4	M	856	BCL	CHA-C1A-NA	-2.14	121.50	126.40
13	M	860	SPO	C36-C35-C33	2.13	120.00	112.98
4	M	851	BCL	C4A-NA-C1A	2.13	107.66	106.71
6	L	858	U10	C6-C1-C2	2.13	120.86	119.18
6	L	859	U10	C1M-C1-C6	-2.13	120.93	124.40
4	M	856	BCL	OBB-CAB-CBB	-2.10	115.44	120.17
6	M	857	U10	C1M-C1-C6	-2.10	120.97	124.40
4	M	856	BCL	CMA-C3A-C2A	-2.09	105.39	113.83
6	L	859	U10	C4-C3-C2	-2.08	116.59	120.68
4	M	853	BCL	C4C-CHD-C1D	-2.08	122.82	125.88
4	L	852	BCL	CBC-CAC-C3C	-2.07	108.86	113.47
4	M	856	BCL	C16-C17-C18	2.07	125.71	115.98
4	M	856	BCL	C3A-C2A-C1A	2.06	104.43	101.34
4	L	854	BCL	O1A-CGA-CBA	2.05	131.75	123.73
14	M	862	CDL	OB6-CB5-OB7	-2.05	118.75	123.70
4	M	856	BCL	C4B-CHC-C1C	-2.04	126.09	130.12
4	M	856	BCL	C1B-CHB-C4A	-2.03	126.09	130.12
4	M	853	BCL	C16-C17-C18	-2.03	106.41	115.98
6	L	858	U10	C1M-C1-C6	-2.00	121.13	124.40

All (10) chirality outliers are listed below:

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

All (130) 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

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Mol	Chain	Res	Type	Atoms
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
13	M	860	SPO	C4-C1-O1-CM1
14	M	862	CDL	CA3-OA5-PA1-OA3
14	M	862	CDL	CA3-OA5-PA1-OA4
14	M	862	CDL	CB2-OB2-PB2-OB3
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	M	851	BCL	C5-C6-C7-C8
14	M	862	CDL	CA7-C31-C32-C33
4	M	851	BCL	C15-C16-C17-C18
4	L	852	BCL	C11-C10-C8-C7
4	M	853	BCL	C6-C7-C8-C10
14	M	862	CDL	OB9-CB7-OB8-CB6
4	L	852	BCL	C13-C15-C16-C17
14	M	862	CDL	CA3-OA5-PA1-OA2
14	M	862	CDL	CB2-OB2-PB2-OB5
4	M	856	BCL	C16-C17-C18-C20
14	M	862	CDL	C11-CA5-OA6-CA4
14	M	862	CDL	C31-C32-C33-C34
8	L	865	LDA	C6-C7-C8-C9
14	M	862	CDL	C78-C79-C80-C81
14	M	862	CDL	OA7-CA5-OA6-CA4
4	M	856	BCL	C13-C15-C16-C17
4	M	856	BCL	C4-C3-C5-C6
8	L	865	LDA	C11-C10-C9-C8
4	L	852	BCL	C11-C10-C8-C9
4	M	851	BCL	C14-C13-C15-C16

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Mol	Chain	Res	Type	Atoms
14	M	862	CDL	CA5-C11-C12-C13
4	M	856	BCL	C16-C17-C18-C19
14	M	862	CDL	C11-C12-C13-C14
8	L	864	LDA	C11-C10-C9-C8
9	L	869	GOL	O1-C1-C2-O2
8	L	864	LDA	C2-C3-C4-C5
4	M	853	BCL	C16-C17-C18-C20
6	L	858	U10	C6-C7-C8-C9
14	M	862	CDL	C38-C39-C40-C41
4	M	856	BCL	C2-C3-C5-C6
8	L	864	LDA	C1-C2-C3-C4
8	L	864	LDA	C3-C4-C5-C6
4	M	853	BCL	C6-C7-C8-C9
14	M	862	CDL	C77-C78-C79-C80
14	M	862	CDL	C40-C41-C42-C43
4	L	854	BCL	C5-C6-C7-C8
13	M	860	SPO	C33-C35-C36-C37
14	M	862	CDL	C72-C73-C74-C75
7	L	863	HTO	C4-C5-C6-C7
8	L	864	LDA	C6-C7-C8-C9
4	M	851	BCL	C13-C15-C16-C17
4	L	852	BCL	C11-C12-C13-C15
4	M	853	BCL	C12-C13-C15-C16
4	L	852	BCL	C15-C16-C17-C18
14	M	862	CDL	OA5-CA3-CA4-CA6
4	L	854	BCL	C3-C5-C6-C7
4	L	852	BCL	C16-C17-C18-C20
14	M	862	CDL	C20-C21-C22-C23
4	M	851	BCL	C8-C10-C11-C12
14	M	862	CDL	CA3-CA4-CA6-OA8
4	M	853	BCL	C16-C17-C18-C19
4	M	856	BCL	C8-C10-C11-C12
4	L	852	BCL	C16-C17-C18-C19
14	M	862	CDL	C55-C56-C57-C58
4	M	851	BCL	C6-C7-C8-C10
14	M	862	CDL	C19-C20-C21-C22
14	M	862	CDL	C13-C14-C15-C16
14	M	862	CDL	C32-C33-C34-C35
4	L	852	BCL	CAD-CBD-CGD-O2D
5	L	855	BPH	CAD-CBD-CGD-O2D
8	L	864	LDA	C2-C1-N1-CM1
8	M	866	LDA	C4-C5-C6-C7

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Mol	Chain	Res	Type	Atoms
14	M	862	CDL	OA6-CA4-CA6-OA8
8	L	864	LDA	C7-C8-C9-C10
8	M	866	LDA	C2-C3-C4-C5
14	M	862	CDL	CB2-OB2-PB2-OB4
14	M	862	CDL	C73-C74-C75-C76
14	M	862	CDL	OA5-CA3-CA4-OA6
4	L	852	BCL	C10-C11-C12-C13
13	M	860	SPO	C2-C1-O1-CM1
14	M	862	CDL	CB3-OB5-PB2-OB2
4	M	851	BCL	C6-C7-C8-C9
4	L	852	BCL	C2A-CAA-CBA-CGA
4	L	854	BCL	C3A-C2A-CAA-CBA
14	M	862	CDL	C14-C15-C16-C17
4	L	852	BCL	C14-C13-C15-C16
4	M	853	BCL	C11-C12-C13-C14
13	M	860	SPO	C18-C17-C19-C20
14	M	862	CDL	C80-C81-C82-C83
14	M	862	CDL	C18-C19-C20-C21
4	M	851	BCL	C2-C1-O2A-CGA
4	M	853	BCL	CAA-CBA-CGA-O2A
4	M	853	BCL	C13-C15-C16-C17
4	M	853	BCL	C14-C13-C15-C16
4	L	854	BCL	CAD-CBD-CGD-O2D
4	M	853	BCL	CAD-CBD-CGD-O2D
8	L	864	LDA	C5-C6-C7-C8
14	M	862	CDL	C76-C77-C78-C79
5	L	855	BPH	O2A-C1-C2-C3
14	M	862	CDL	C81-C82-C83-C84
4	M	851	BCL	CHA-CBD-CGD-O2D
4	M	853	BCL	CHA-CBD-CGD-O2D
4	M	856	BCL	CHA-CBD-CGD-O2D
13	M	860	SPO	C16-C17-C19-C20
4	M	856	BCL	C11-C12-C13-C15
6	M	857	U10	C5-C4-O4-C4M
14	M	862	CDL	CB3-OB5-PB2-OB3
14	M	862	CDL	CB5-C51-C52-C53
6	L	859	U10	C2-C3-O3-C3M
8	L	864	LDA	C2-C1-N1-O1
8	L	865	LDA	C2-C1-N1-O1
4	M	856	BCL	C15-C16-C17-C18
8	L	864	LDA	C4-C5-C6-C7
4	M	851	BCL	C4-C3-C5-C6

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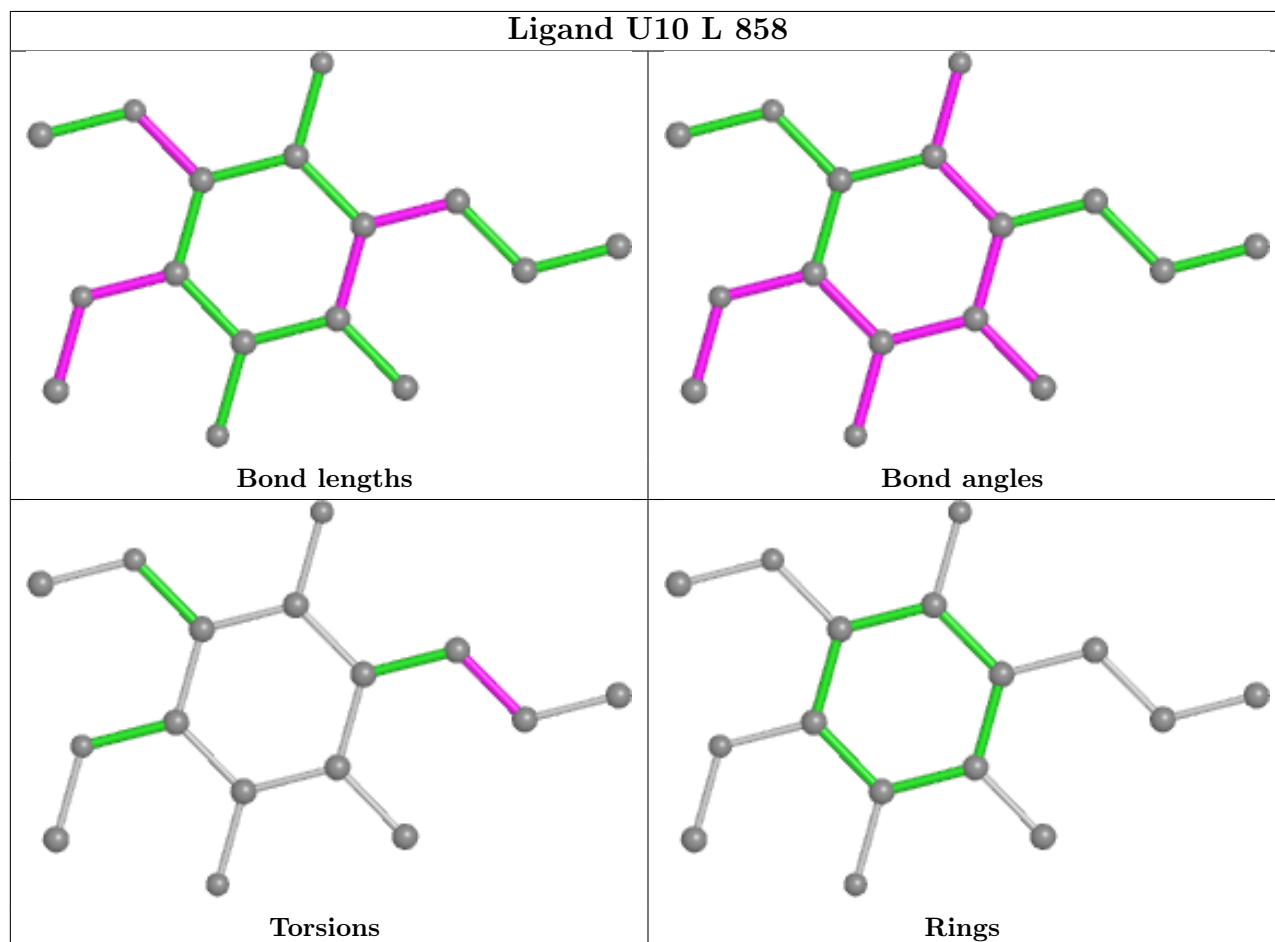
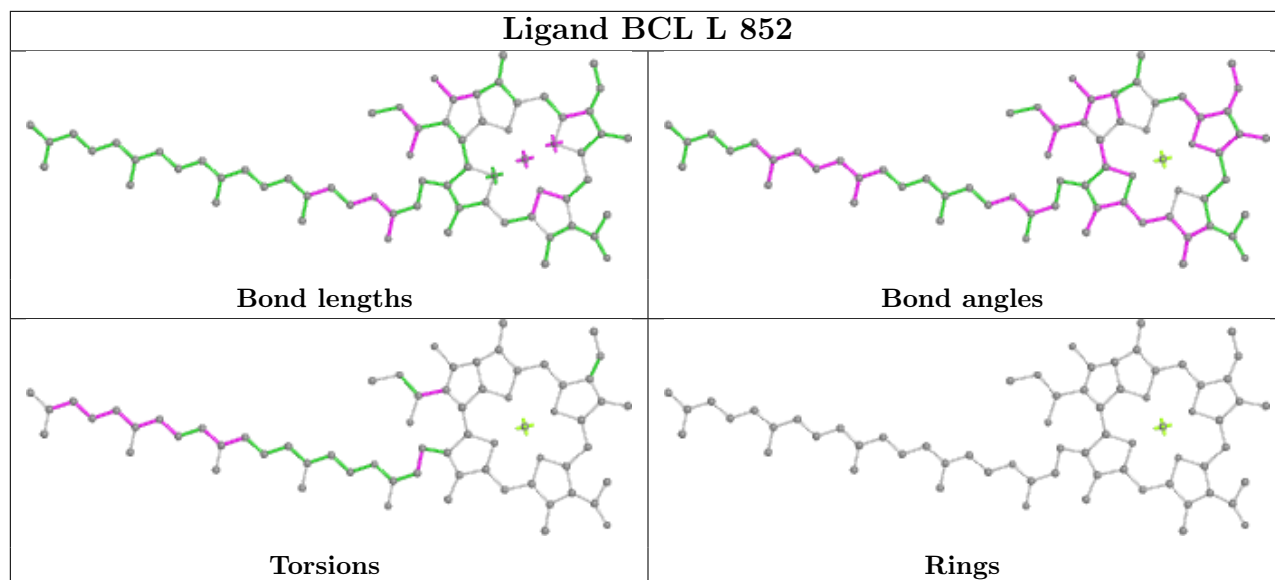
Mol	Chain	Res	Type	Atoms
4	M	856	BCL	C6-C7-C8-C10

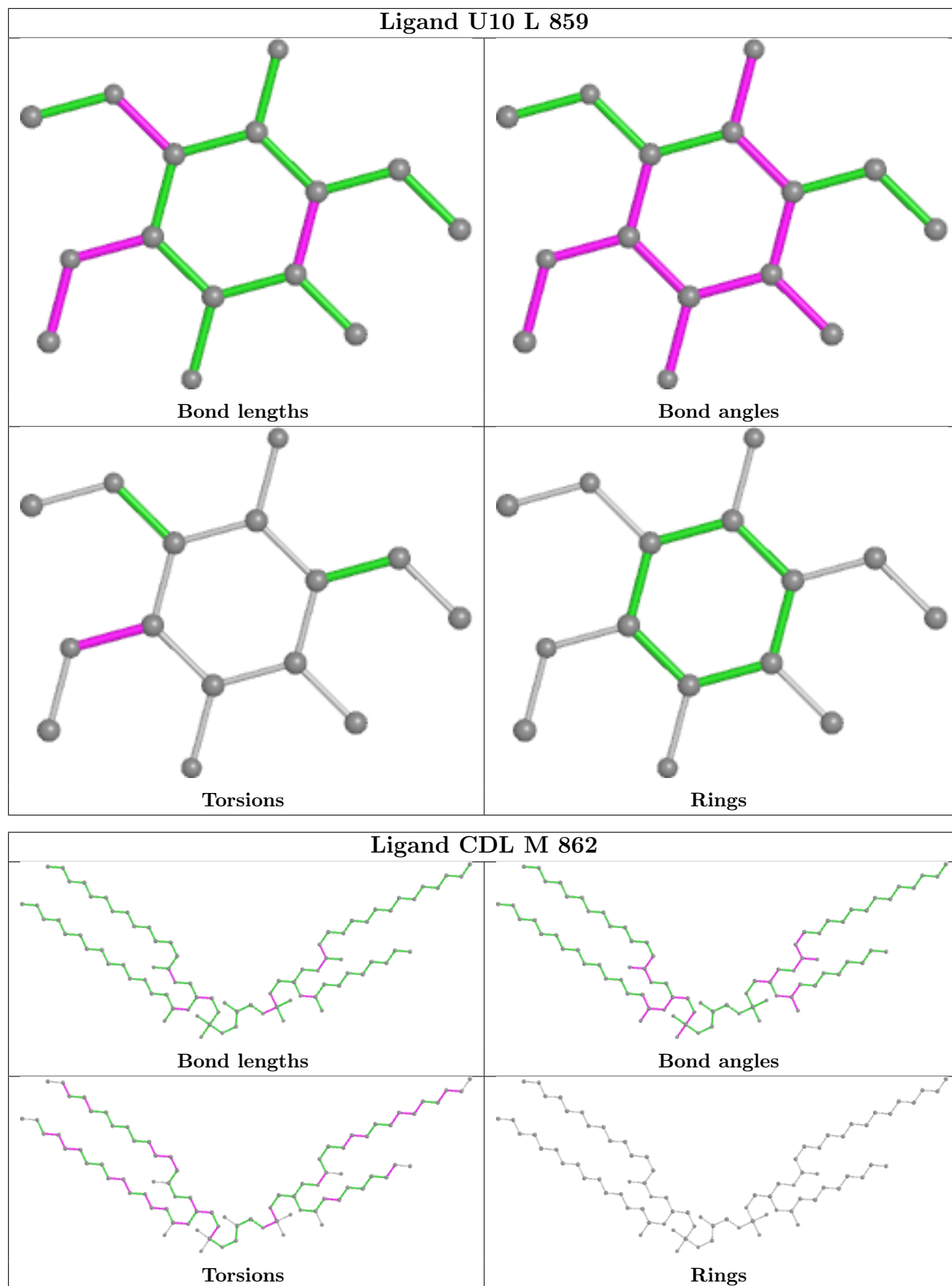
There are no ring outliers.

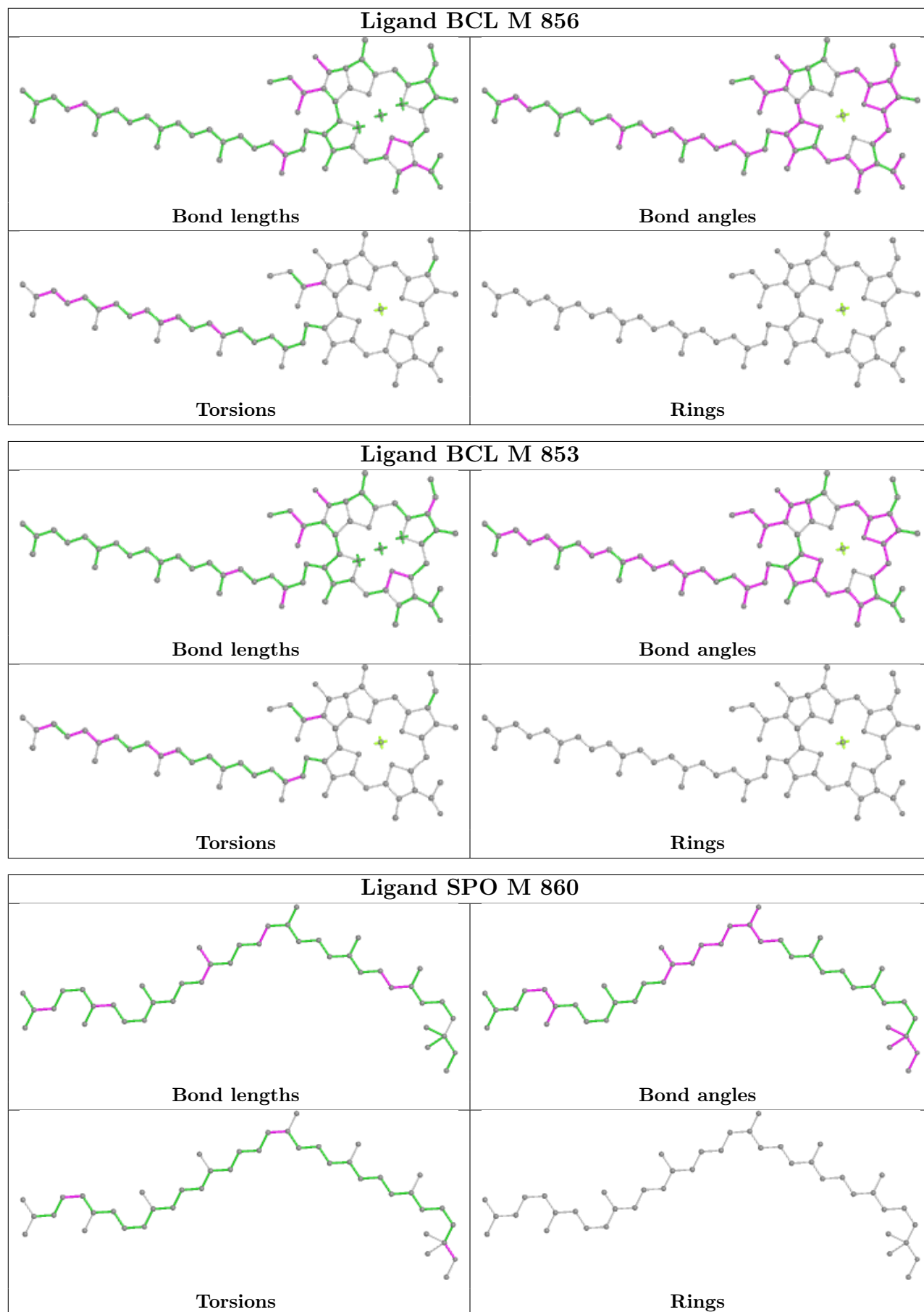
11 monomers are involved in 30 short contacts:

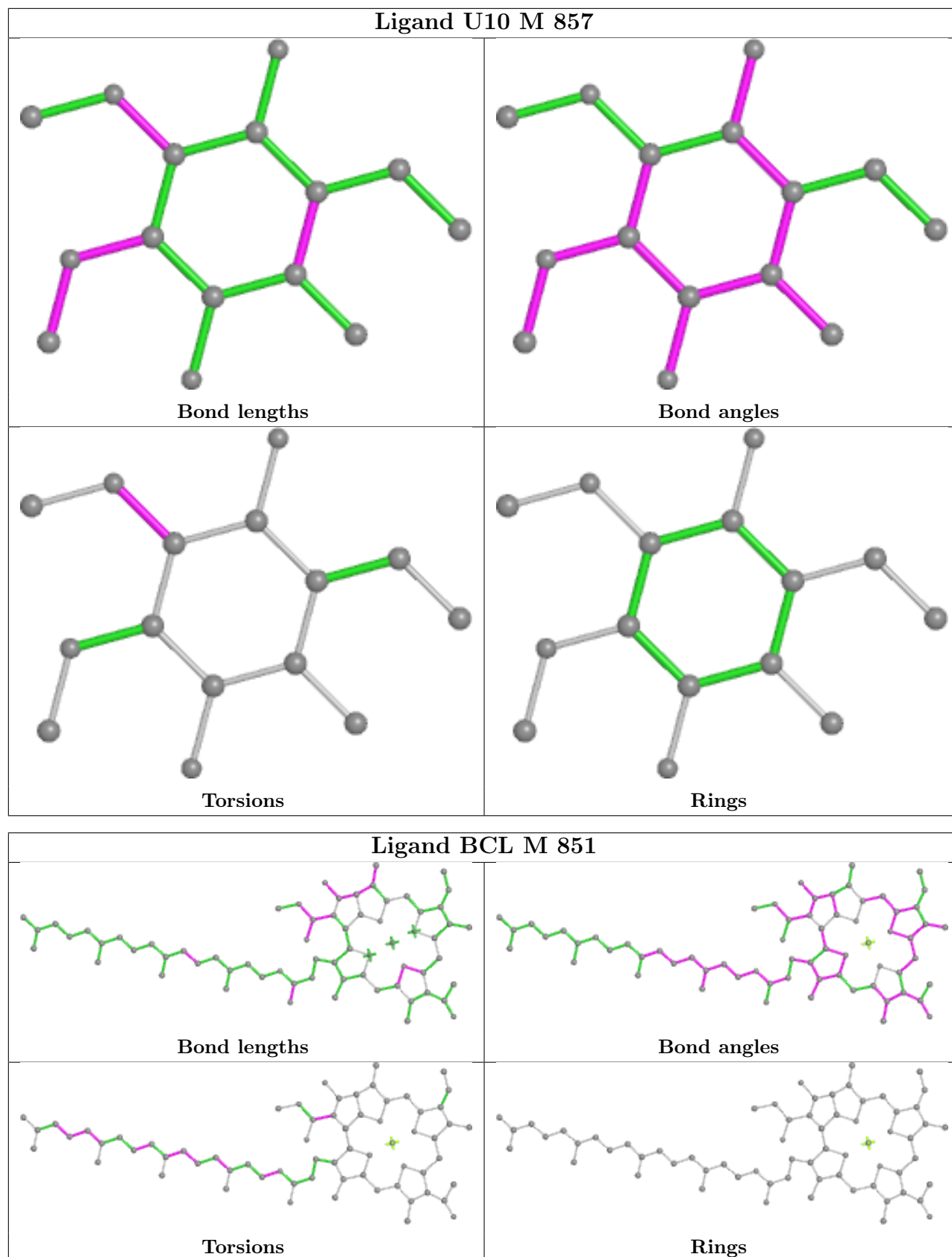
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	L	852	BCL	3	0
6	L	858	U10	4	0
14	M	862	CDL	1	0
4	M	856	BCL	5	0
4	M	853	BCL	4	0
13	M	860	SPO	1	0
6	M	857	U10	2	0
4	M	851	BCL	2	0
5	L	855	BPH	5	0
8	M	866	LDA	1	0
4	L	854	BCL	3	0

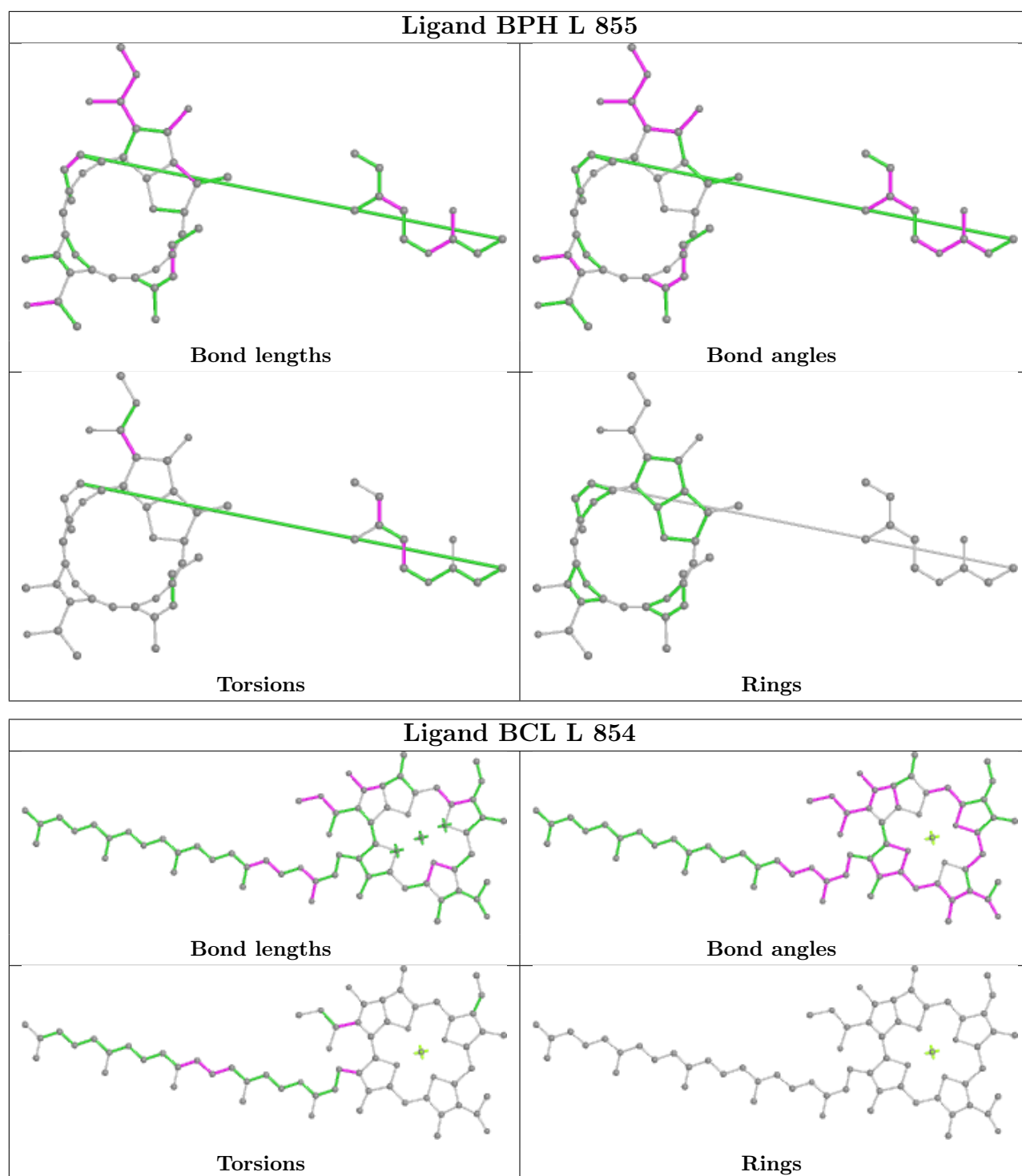
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

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%)	-0.44	4 (1%) 75 77	18, 26, 48, 57	0
2	M	301/307 (98%)	-0.19	10 (3%) 46 48	17, 30, 49, 72	0
3	H	238/260 (91%)	-0.40	6 (2%) 57 60	20, 29, 43, 71	0
All	All	820/848 (96%)	-0.34	20 (2%) 59 62	17, 28, 48, 72	0

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	M	1	ALA	5.6
3	H	18	TYR	3.3
3	H	60	LYS	3.3
2	M	2	GLU	3.0
1	L	281	GLY	2.7
1	L	59	TRP	2.7
1	L	271	TRP	2.6
2	M	106	ALA	2.6
2	M	100	GLU	2.5
3	H	245	ALA	2.5
3	H	201	ASN	2.4
2	M	76	TYR	2.3
2	M	105	PHE	2.3
2	M	80	TRP	2.3
2	M	27	ALA	2.3
2	M	148	TRP	2.3
3	H	184	LYS	2.2
1	L	276	PRO	2.2
3	H	200	SER	2.1
2	M	79	GLY	2.1

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](#)

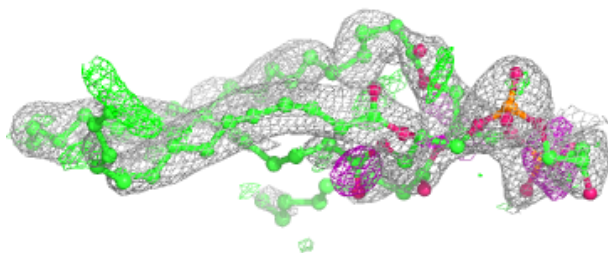
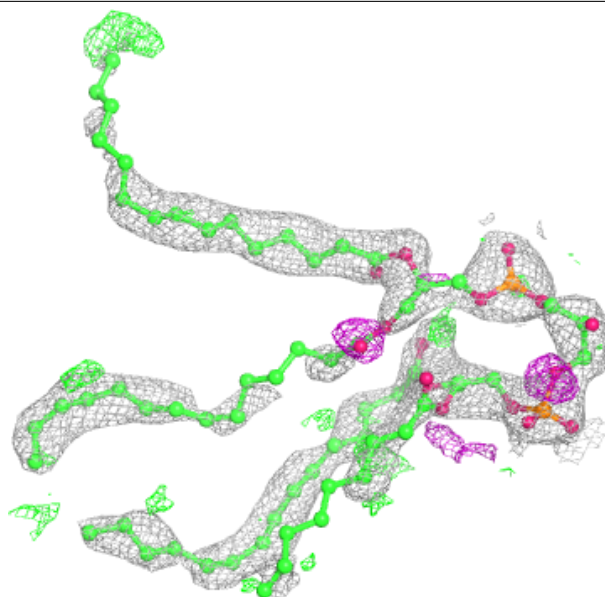
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
8	LDA	L	864	16/16	0.66	0.34	54,66,74,74	0
8	LDA	L	865	16/16	0.67	0.39	70,73,78,79	0
8	LDA	M	866	11/16	0.73	0.34	77,79,83,83	0
14	CDL	M	862	81/100	0.75	0.29	61,72,89,93	0
6	U10	M	857	15/63	0.80	0.23	59,63,65,66	0
9	GOL	L	869	6/6	0.83	0.29	50,54,56,58	0
7	HTO	L	863	10/10	0.84	0.23	59,61,62,63	0
6	U10	L	858	16/63	0.84	0.19	34,38,43,45	0
13	SPO	M	860	42/42	0.91	0.14	27,35,58,61	0
6	U10	L	859	15/63	0.93	0.15	40,44,48,49	0
12	PO4	M	867	5/5	0.95	0.22	67,68,68,69	0
5	BPH	L	855	51/65	0.96	0.11	22,27,42,46	0
4	BCL	L	854	66/66	0.96	0.11	19,23,50,51	0
4	BCL	M	851	66/66	0.96	0.13	17,23,66,68	0
4	BCL	M	853	66/66	0.96	0.14	19,24,44,53	0
12	PO4	M	868	5/5	0.97	0.11	57,58,59,59	0
4	BCL	L	852	66/66	0.97	0.11	15,22,43,52	0
4	BCL	M	856	66/66	0.97	0.12	12,20,32,34	0
10	FE2	M	850	1/1	1.00	0.12	19,19,19,19	0
11	CL	M	861	1/1	1.00	0.17	24,24,24,24	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.

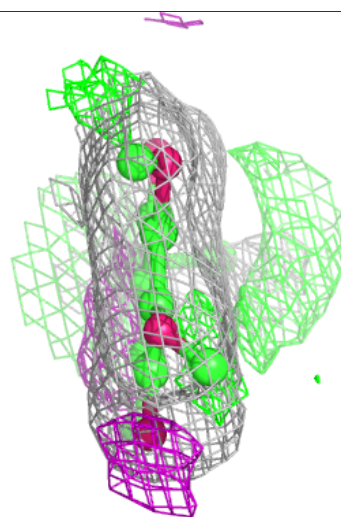
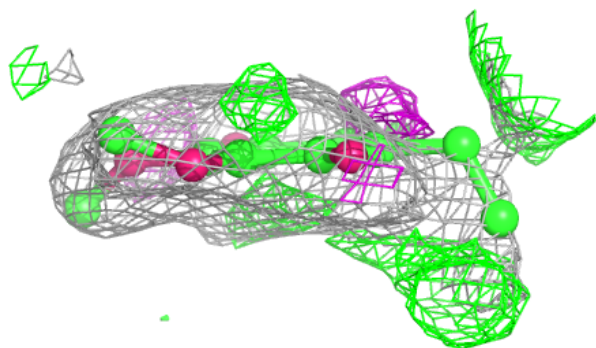
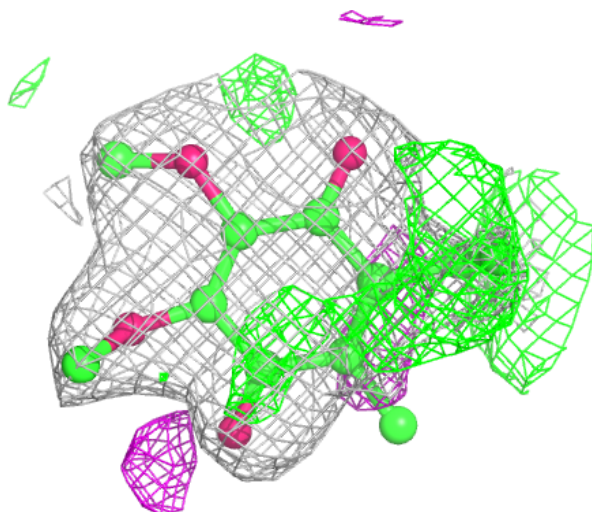
Electron density around CDL M 862:

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



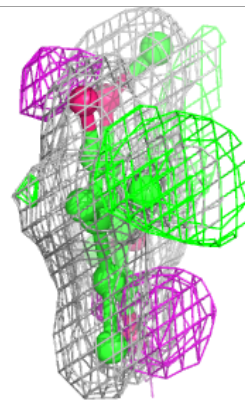
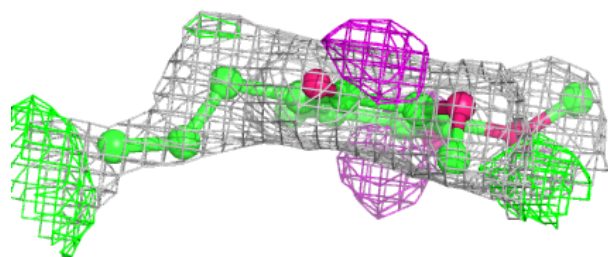
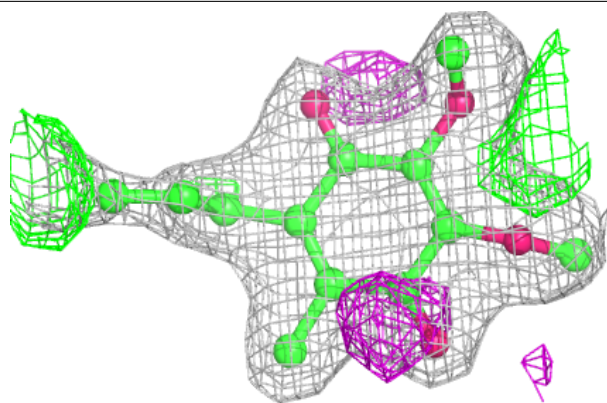
Electron density around U10 M 857:

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

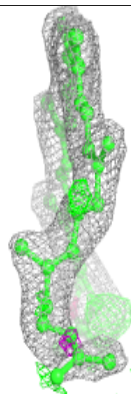
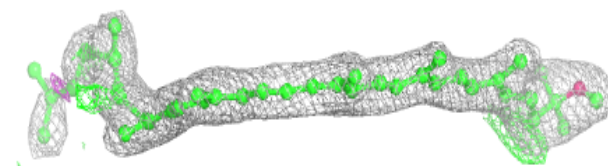
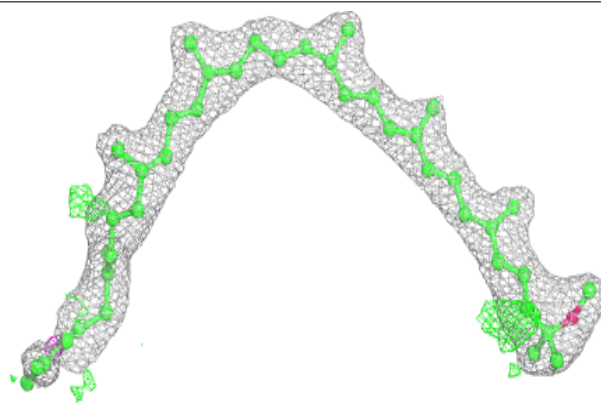


Electron density around U10 L 858:

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

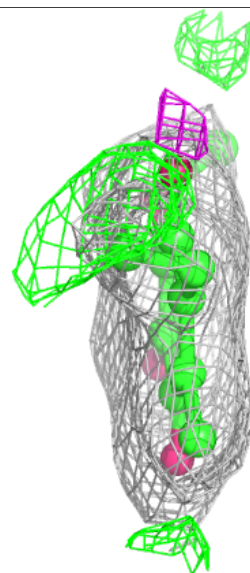
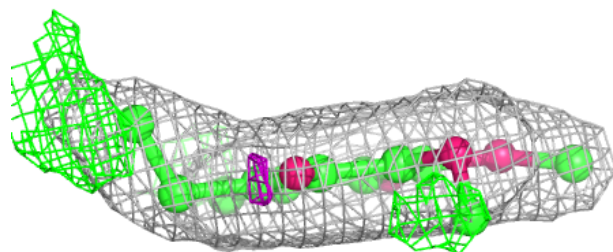
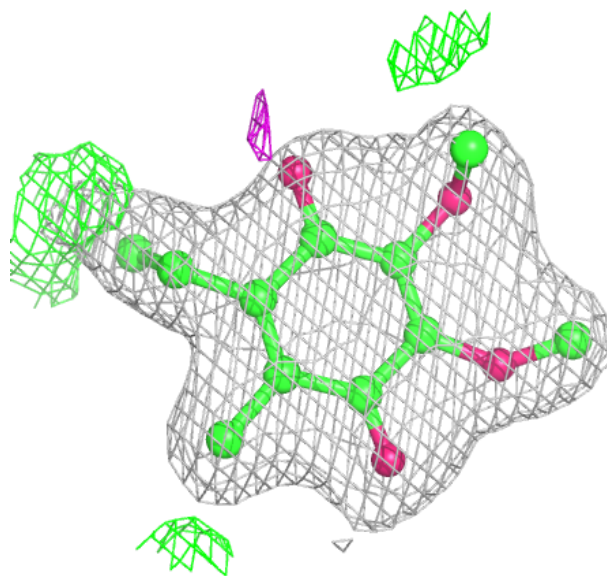
**Electron density around SPO M 860:**

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



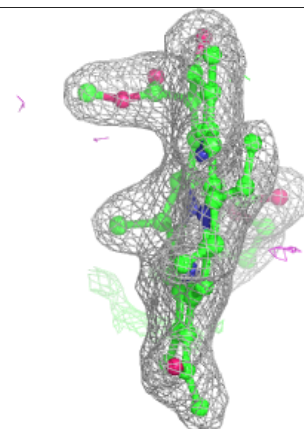
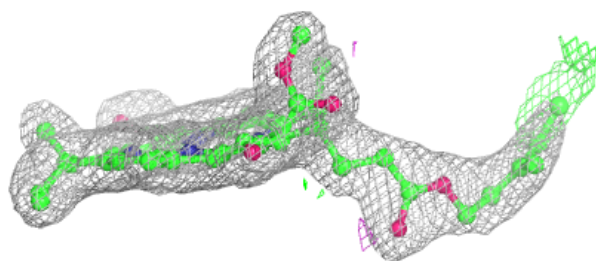
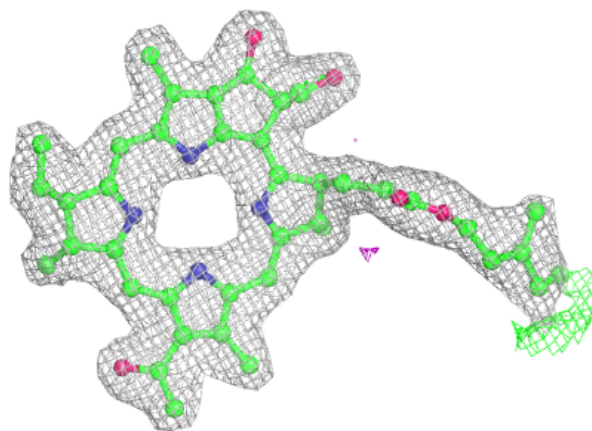
Electron density around U10 L 859:

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



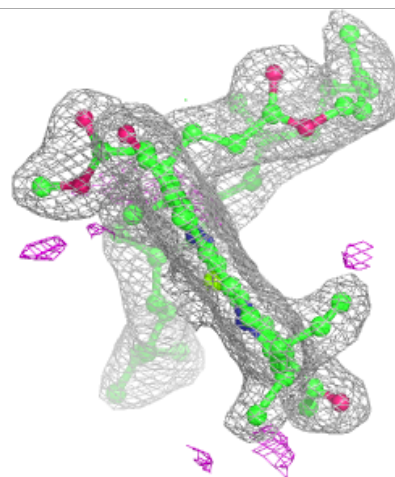
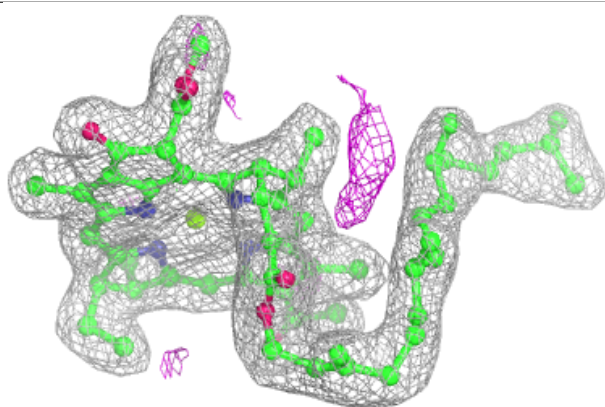
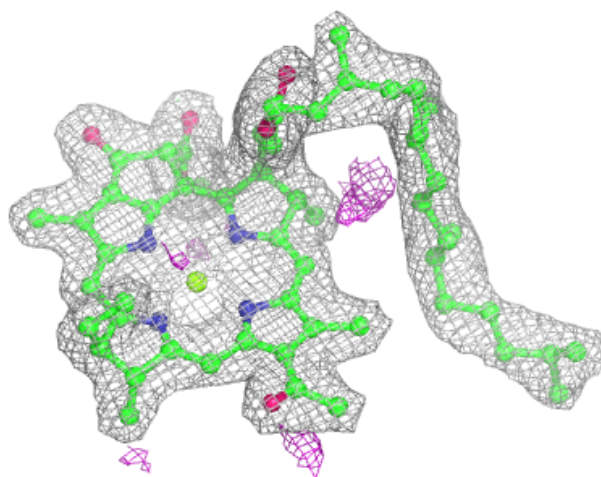
Electron density around BPH L 855:

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



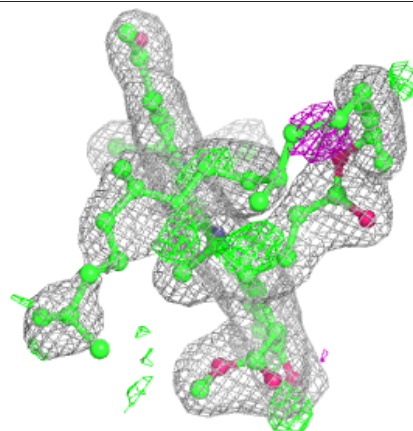
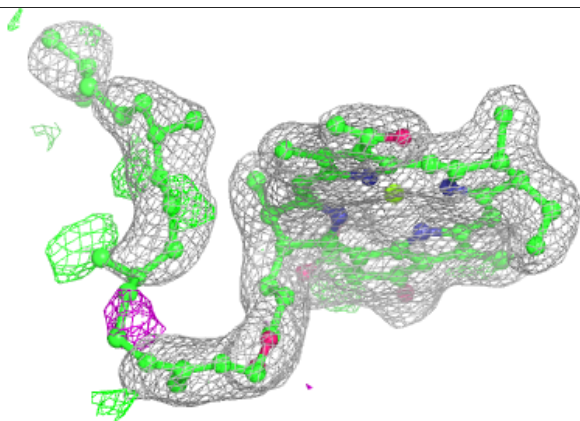
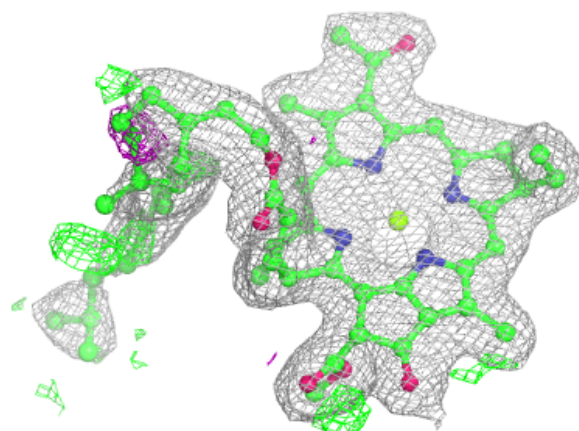
Electron density around BCL L 854:

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

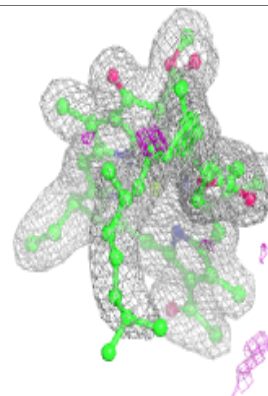
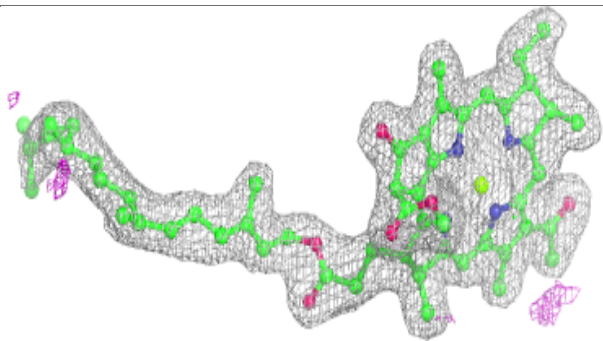
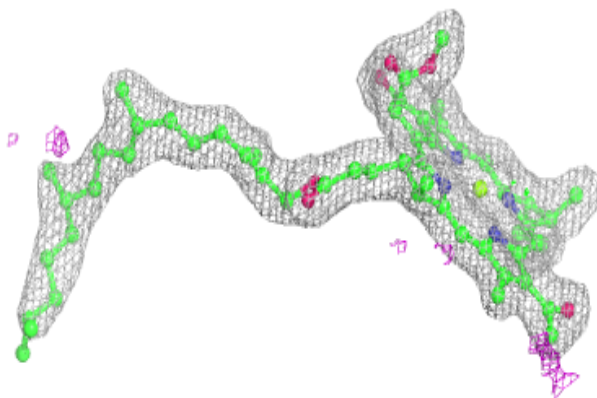


Electron density around BCL M 851:

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

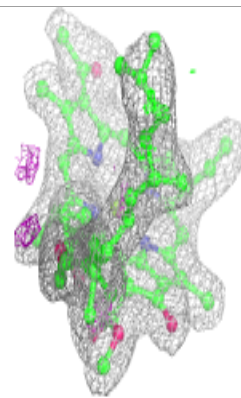
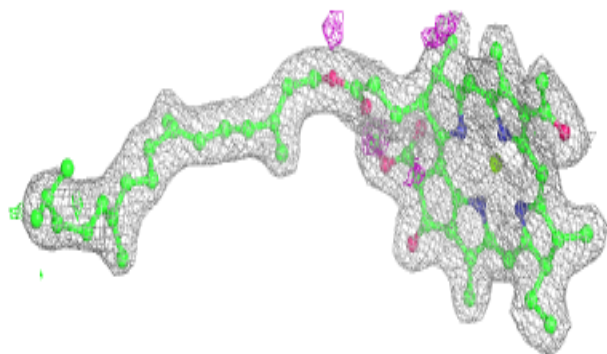
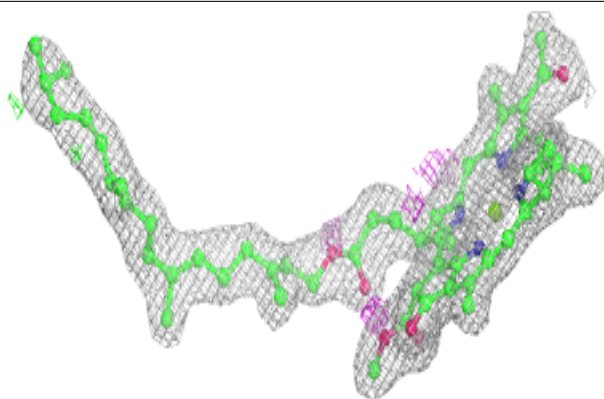
**Electron density around BCL M 853:**

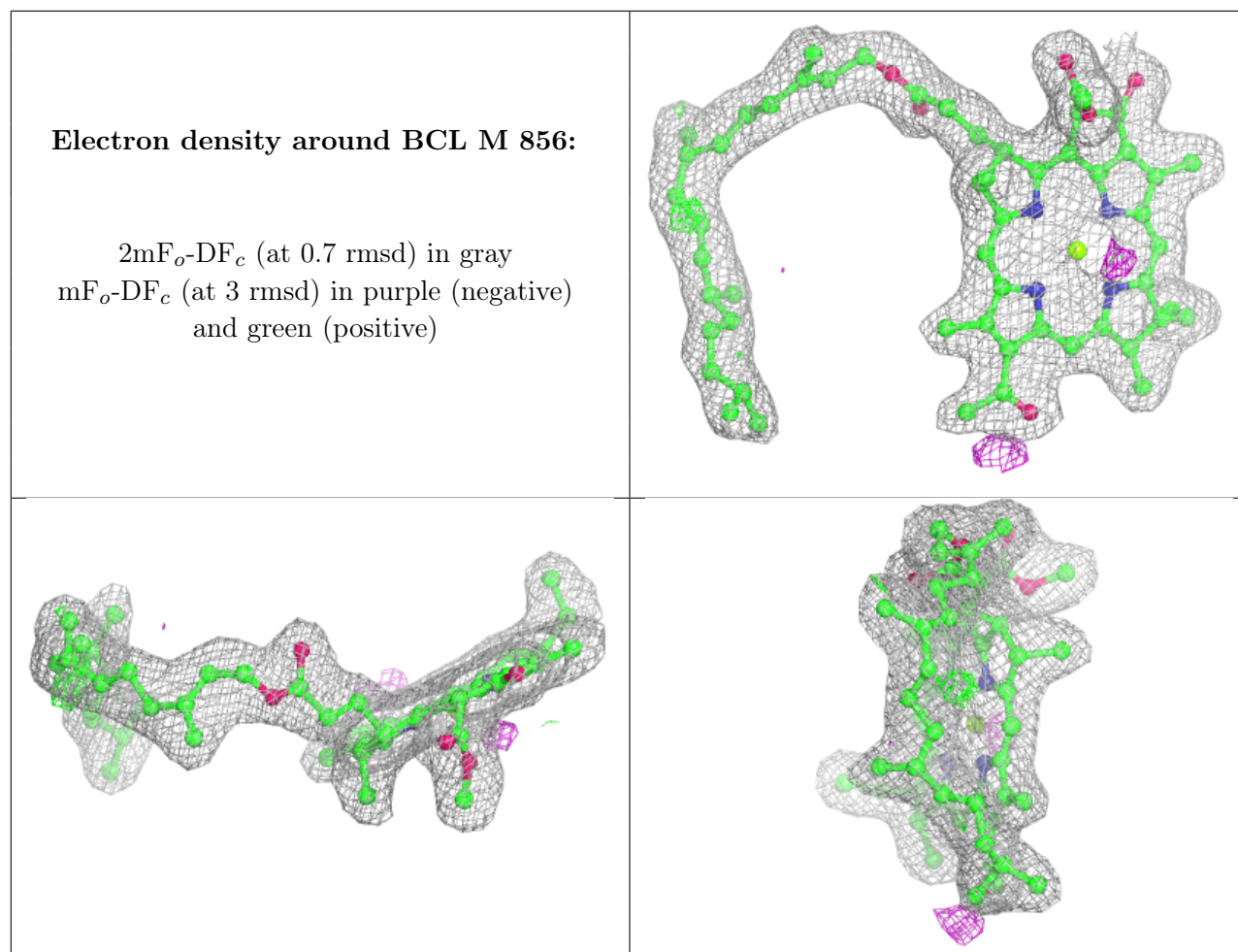
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



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)





6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.