



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 5, 2026 – 08:06 AM EDT

PDB ID : 1JH0 / pdb_00001jh0
Title : Photosynthetic Reaction Center Mutant With Glu L 205 Replaced to Leu
Authors : Camara-Artigas, A.; Magee, C.L.; Williams, J.C.; Allen, J.P.
Deposited on : 2001-06-27
Resolution : 3.50 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

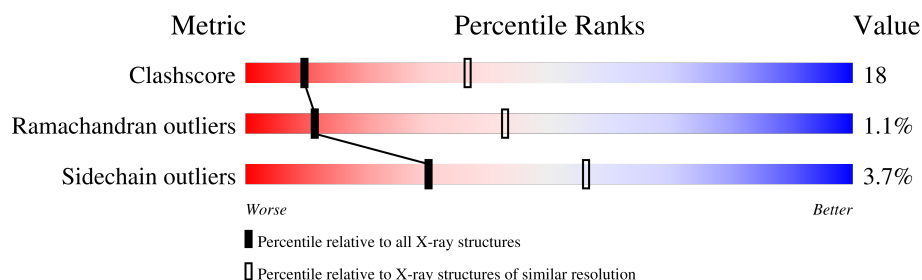
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.50 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))
Clashscore	190562	1140 (3.54-3.46)
Ramachandran outliers	187476	1113 (3.54-3.46)
Sidechain outliers	187428	1114 (3.54-3.46)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	L	281	62% 35% .
2	M	307	64% 30% . .
3	H	260	64% 25% . 8%

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
8	SPO	M	859	-	X	-	-

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 7025 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 Photosynthetic Reaction Center L subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	280	Total	C	N	O	S	0	0	0
			2226	1506	354	358	8			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	205	LEU	GLU	engineered mutation	UNP P02954

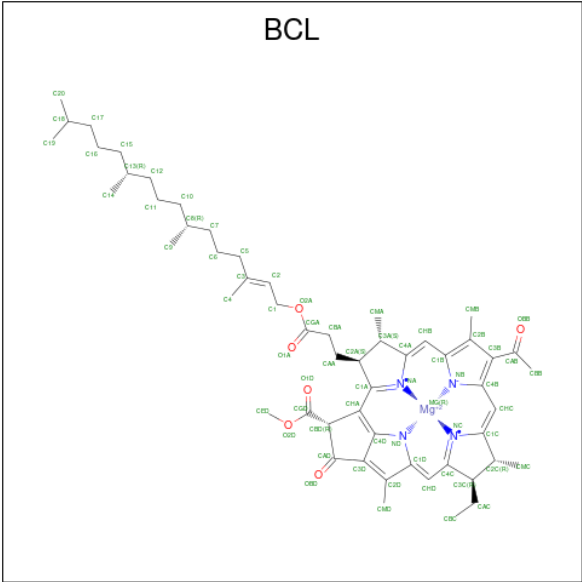
- Molecule 2 is a protein called Photosynthetic Reaction Center M subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	M	301	Total	C	N	O	S	0	0	0
			2404	1605	393	396	10			

- Molecule 3 is a protein called Photosynthetic Reaction Center H subunit.

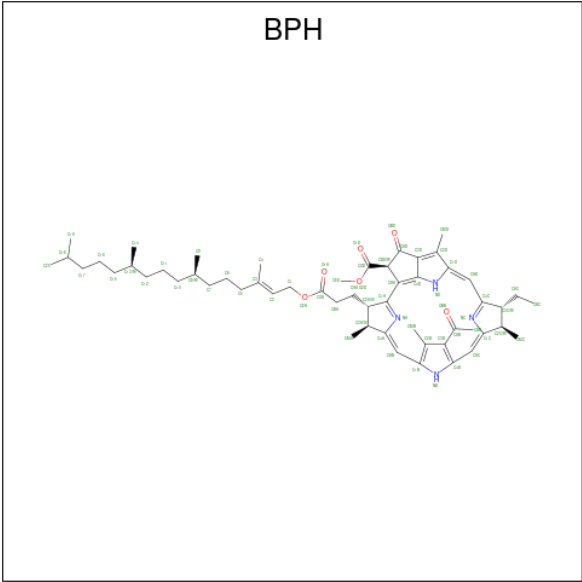
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	H	238	Total	C	N	O	S	0	0	0
			1814	1160	311	334	9			

- 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

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

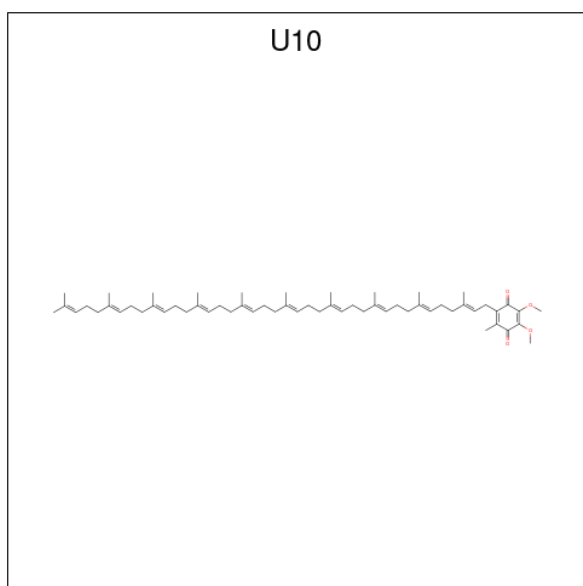


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	L	1	Total	C	N	O	0	0
			65	55	4	6		
5	M	1	Total	C	N	O	0	0
			65	55	4	6		

- Molecule 6 is FE (III) ION (CCD ID: FE) (formula: Fe).

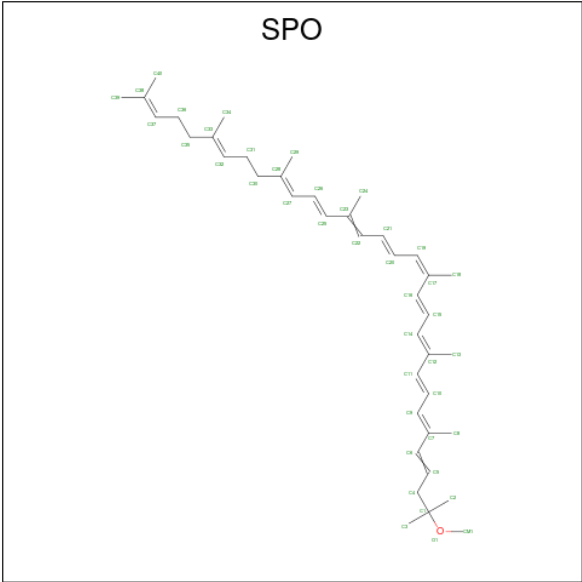
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	M	1	Total	Fe	0	0
			1	1		

- Molecule 7 is UBIQUINONE-10 (CCD ID: U10) (formula: C₅₉H₉₀O₄).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	M	1	Total	C	O	0	0
			48	44	4		

- Molecule 8 is SPHEROIDENE (CCD ID: SPO) (formula: C₄₁H₆₀O).



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

- Molecule 9 is water.

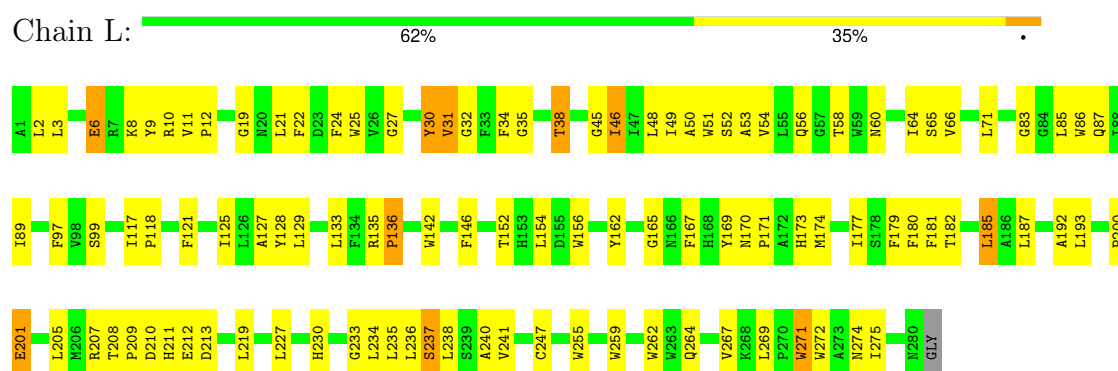
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	L	23	Total	O	0	0
			23	23		
9	M	45	Total	O	0	0
			45	45		
9	H	28	Total	O	0	0
			28	28		

3 Residue-property plots

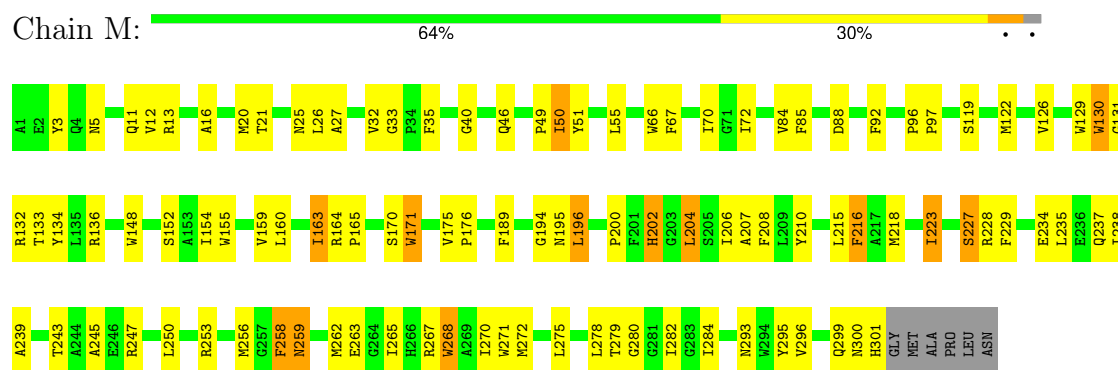
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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.

Note EDS was not executed.

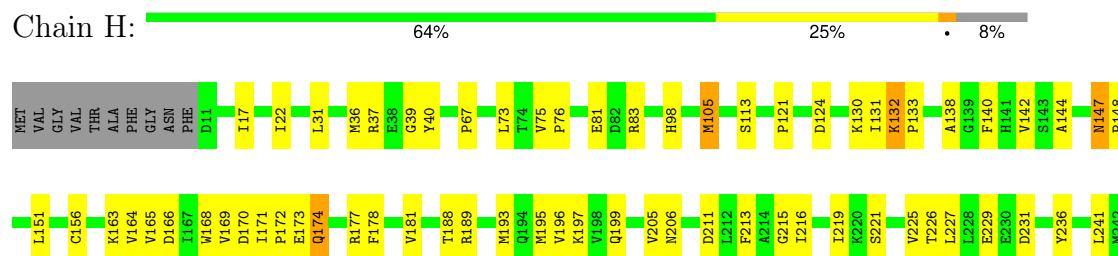
• Molecule 1: Photosynthetic Reaction Center L subunit



• Molecule 2: Photosynthetic Reaction Center M subunit



• Molecule 3: Photosynthetic Reaction Center H subunit



Y243	A244	A245	P246	R247	R248	LYS	SER	VAL	VAL	ALA	ALA	MET	LEU	ALA	GLU	TYR	ALA
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4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	141.80Å 141.80Å 187.40Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.90 – 3.50	Depositor
% Data completeness (in resolution range)	99.5 (29.90-3.50)	Depositor
R_{merge}	0.23	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.225 , 0.269	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	7025	wwPDB-VP
Average B, all atoms (Å ²)	66.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BCL, SPO, FE, U10, BPH

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	0.52	0/2314	0.97	8/3169 (0.3%)
2	M	0.53	0/2496	0.99	12/3408 (0.4%)
3	H	0.53	0/1862	1.01	8/2534 (0.3%)
All	All	0.53	0/6672	0.99	28/9111 (0.3%)

There are no bond length outliers.

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	35	GLY	N-CA-C	-7.51	103.16	112.77
3	H	138	ALA	N-CA-C	6.64	118.97	108.67
2	M	202	HIS	N-CA-C	-6.47	104.15	111.07
2	M	227	SER	N-CA-C	-6.37	104.43	111.82
2	M	163	ILE	N-CA-C	6.19	116.86	110.36
2	M	46	GLN	N-CA-C	6.16	118.67	109.25
3	H	22	ILE	N-CA-C	-6.08	104.93	110.82
2	M	215	LEU	N-CA-C	5.85	117.33	111.07
3	H	132	LYS	CA-C-N	-5.70	114.38	120.03
3	H	132	LYS	C-N-CA	-5.70	114.38	120.03
1	L	11	VAL	CA-C-N	5.68	125.65	120.03
1	L	11	VAL	C-N-CA	5.68	125.65	120.03
3	H	133	PRO	N-CA-C	-5.55	103.09	111.41
2	M	130	TRP	N-CA-C	-5.38	105.05	111.03
1	L	30	TYR	N-CA-C	-5.37	102.54	110.48
1	L	6	GLU	N-CA-C	5.36	119.76	112.04
1	L	169	TYR	N-CA-C	5.31	119.02	112.54
3	H	147	ASN	CA-C-N	5.30	124.93	119.05
3	H	147	ASN	C-N-CA	5.30	124.93	119.05
3	H	243	TYR	N-CA-C	5.27	118.86	112.23
1	L	56	GLN	N-CA-C	-5.25	106.73	113.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	27	GLY	N-CA-C	-5.20	101.74	112.34
2	M	268	TRP	N-CA-C	-5.17	105.29	111.03
2	M	170	SER	N-CA-C	5.08	116.78	108.76
2	M	237	GLN	N-CA-C	-5.07	107.04	113.18
2	M	72	ILE	N-CA-C	-5.06	105.46	110.62
2	M	171	TRP	N-CA-C	-5.02	107.22	113.19
2	M	259	ASN	N-CA-C	5.00	114.75	108.45

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	2226	0	2189	95	0
2	M	2404	0	2318	97	0
3	H	1814	0	1818	62	0
4	L	132	0	148	10	0
4	M	132	0	148	14	0
5	L	65	0	76	8	0
5	M	65	0	76	6	0
6	M	1	0	0	0	0
7	M	48	0	63	4	0
8	M	42	0	60	1	0
9	H	28	0	0	0	0
9	L	23	0	0	3	0
9	M	45	0	0	1	0
All	All	7025	0	6896	244	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 18.

All (244) 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:48:LEU:HB2	1:L:89:ILE:HD11	1.37	1.04
2:M:256:MET:HE3	2:M:258:PHE:CE2	2.02	0.94
2:M:245:ALA:HB2	2:M:262:MET:HE2	1.50	0.91
3:H:156:CYS:SG	3:H:248:ARG:HB2	2.13	0.88
1:L:97:PHE:HB3	1:L:125:ILE:HD12	1.59	0.83
1:L:58:THR:HG23	1:L:64:ILE:HD13	1.60	0.82
1:L:271:TRP:H	1:L:271:TRP:CD1	1.96	0.80
1:L:48:LEU:HB2	1:L:89:ILE:CD1	2.12	0.79
3:H:248:ARG:HB2	3:H:248:ARG:NH1	1.98	0.79
1:L:48:LEU:CB	1:L:89:ILE:HD11	2.12	0.79
1:L:117:ILE:H	1:L:117:ILE:HD12	1.47	0.78
3:H:196:VAL:HG12	3:H:205:VAL:HG22	1.66	0.78
1:L:241:VAL:HG21	5:L:855:BPH:HAC2	1.70	0.73
1:L:219:LEU:HD12	2:M:132:ARG:NH1	2.04	0.73
2:M:238:ILE:HD13	2:M:262:MET:HB3	1.73	0.70
3:H:130:LYS:HE3	3:H:170:ASP:OD2	1.92	0.70
5:L:855:BPH:HBB2	2:M:210:TYR:HB3	1.73	0.70
3:H:148:PRO:HA	3:H:151:LEU:HD12	1.72	0.70
3:H:132:LYS:HD2	3:H:171:ILE:HD11	1.73	0.69
1:L:173:HIS:CE1	1:L:177:ILE:HD11	2.27	0.69
3:H:130:LYS:HZ2	3:H:172:PRO:HG2	1.57	0.69
1:L:192:ALA:HB2	2:M:270:ILE:HD11	1.75	0.68
1:L:97:PHE:HB3	1:L:125:ILE:CD1	2.24	0.68
1:L:205:LEU:HD13	3:H:67:PRO:HA	1.76	0.68
1:L:219:LEU:HD11	2:M:133:THR:HG22	1.74	0.68
1:L:38:THR:HG22	1:L:99:SER:CB	2.24	0.67
1:L:174:MET:HB3	4:M:850:BCL:O1D	1.94	0.67
3:H:156:CYS:SG	3:H:248:ARG:CB	2.82	0.67
2:M:196:LEU:HD23	2:M:202:HIS:CD2	2.30	0.66
3:H:142:VAL:HG21	3:H:147:ASN:ND2	2.10	0.66
1:L:51:TRP:O	1:L:54:VAL:HG22	1.95	0.66
1:L:38:THR:HG22	1:L:99:SER:HB2	1.75	0.66
3:H:248:ARG:HB2	3:H:248:ARG:HH11	1.59	0.66
1:L:135:ARG:HB3	1:L:136:PRO:HD3	1.78	0.65
1:L:264:GLN:HA	1:L:267:VAL:HG12	1.79	0.64
2:M:253:ARG:HB2	2:M:259:ASN:HD22	1.61	0.64
2:M:200:PRO:HB2	3:H:17:ILE:HD12	1.79	0.63
1:L:271:TRP:CD1	1:L:271:TRP:N	2.65	0.62
2:M:228:ARG:HB3	3:H:195:MET:HE3	1.80	0.62
3:H:156:CYS:SG	3:H:248:ARG:HA	2.39	0.62
1:L:60:ASN:O	1:L:64:ILE:HG12	2.00	0.62
1:L:121:PHE:CZ	1:L:125:ILE:HD11	2.34	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:181:PHE:HB3	5:M:854:BPH:CBB	2.28	0.62
2:M:228:ARG:CB	3:H:195:MET:HE3	2.29	0.62
1:L:6:GLU:HG3	2:M:250:LEU:HD21	1.80	0.62
1:L:45:GLY:HA3	5:L:855:BPH:H9C1	1.82	0.62
2:M:16:ALA:HB1	2:M:32:VAL:HG21	1.82	0.61
2:M:119:SER:HB3	8:M:859:SPO:H311	1.83	0.61
3:H:165:VAL:O	3:H:166:ASP:HB2	2.00	0.60
2:M:50:ILE:HD13	2:M:51:TYR:C	2.27	0.60
3:H:131:ILE:HD13	3:H:170:ASP:HA	1.83	0.60
1:L:182:THR:HG22	1:L:236:LEU:HD13	1.83	0.60
1:L:34:PHE:O	1:L:38:THR:HG23	2.02	0.60
3:H:130:LYS:HZ2	3:H:172:PRO:CG	2.15	0.60
2:M:159:VAL:HA	2:M:163:ILE:HB	1.84	0.59
1:L:192:ALA:N	2:M:270:ILE:HD13	2.17	0.59
2:M:148:TRP:CD1	9:M:901:HOH:O	2.57	0.58
4:M:850:BCL:H11	5:M:854:BPH:HBB2	1.84	0.58
3:H:131:ILE:CD1	3:H:177:ARG:HD2	2.33	0.58
3:H:156:CYS:SG	3:H:248:ARG:CA	2.91	0.58
2:M:275:LEU:HD23	2:M:278:LEU:HD23	1.85	0.58
1:L:49:ILE:HD13	1:L:66:VAL:HG21	1.86	0.58
2:M:202:HIS:O	2:M:206:ILE:HD13	2.04	0.57
1:L:192:ALA:HB2	2:M:270:ILE:CD1	2.35	0.57
3:H:81:GLU:O	3:H:83:ARG:HG2	2.04	0.57
1:L:269:LEU:HB2	1:L:272:TRP:NE1	2.20	0.57
1:L:208:THR:HB	1:L:209:PRO:HD2	1.85	0.56
4:M:850:BCL:CBB	4:M:850:BCL:HHC	2.36	0.56
1:L:52:SER:HB2	1:L:85:LEU:HD13	1.87	0.56
2:M:267:ARG:HH11	2:M:267:ARG:HG2	1.71	0.55
1:L:211:HIS:CE1	2:M:20:MET:HE2	2.41	0.55
2:M:21:THR:HG23	2:M:26:LEU:HD21	1.88	0.55
2:M:245:ALA:CB	2:M:262:MET:HE2	2.30	0.55
2:M:206:ILE:HD12	4:M:852:BCL:HMA2	1.88	0.54
1:L:58:THR:HG23	1:L:64:ILE:CD1	2.35	0.54
2:M:11:GLN:HB2	3:H:144:ALA:HB3	1.89	0.54
2:M:267:ARG:O	2:M:270:ILE:HG22	2.07	0.54
2:M:202:HIS:CE1	2:M:206:ILE:HD11	2.41	0.54
2:M:280:GLY:HA2	4:M:852:BCL:HED2	1.90	0.54
4:M:850:BCL:HHC	4:M:850:BCL:HBB3	1.90	0.54
1:L:255:TRP:CZ2	1:L:262:TRP:HB2	2.43	0.54
3:H:168:TRP:HB2	3:H:178:PHE:HB2	1.90	0.53
2:M:132:ARG:O	2:M:136:ARG:HG2	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:131:ILE:HD12	3:H:177:ARG:HD2	1.91	0.53
4:L:853:BCL:HAA2	4:L:853:BCL:HBD	1.91	0.53
2:M:267:ARG:HG2	2:M:267:ARG:NH1	2.22	0.53
4:L:851:BCL:H122	5:L:855:BPH:H3A	1.91	0.53
3:H:75:VAL:HA	3:H:76:PRO:C	2.35	0.52
2:M:25:ASN:OD1	2:M:27:ALA:HB3	2.10	0.52
1:L:83:GLY:O	1:L:87:GLN:HG3	2.09	0.52
2:M:160:LEU:HD23	2:M:284:ILE:HG21	1.91	0.52
2:M:164:ARG:HB3	2:M:165:PRO:HD3	1.91	0.52
1:L:117:ILE:HB	1:L:118:PRO:CD	2.40	0.52
2:M:206:ILE:HG23	4:M:852:BCL:HMB2	1.92	0.52
3:H:226:THR:OG1	3:H:229:GLU:HG3	2.09	0.52
1:L:174:MET:HE2	4:M:850:BCL:HED3	1.91	0.52
1:L:181:PHE:CD2	5:M:854:BPH:HBB1	2.45	0.52
2:M:32:VAL:HG12	2:M:33:GLY:O	2.09	0.52
2:M:129:TRP:O	2:M:133:THR:HG23	2.10	0.52
1:L:117:ILE:HB	1:L:118:PRO:HD3	1.93	0.51
3:H:248:ARG:NH1	3:H:248:ARG:CB	2.73	0.51
1:L:49:ILE:CD1	1:L:66:VAL:HG21	2.41	0.51
3:H:226:THR:O	3:H:227:LEU:C	2.53	0.51
2:M:253:ARG:HB2	2:M:259:ASN:ND2	2.26	0.51
3:H:105:MET:HE1	3:H:236:TYR:O	2.11	0.50
1:L:87:GLN:NE2	1:L:142:TRP:CD1	2.80	0.50
3:H:213:PHE:O	3:H:216:ILE:HG13	2.12	0.50
1:L:50:ALA:O	1:L:53:ALA:HB3	2.12	0.50
2:M:234:GLU:O	2:M:238:ILE:HG12	2.12	0.50
3:H:241:LEU:O	3:H:248:ARG:NH2	2.45	0.50
2:M:271:TRP:O	2:M:272:MET:C	2.55	0.50
3:H:244:ALA:O	3:H:246:PRO:HD2	2.11	0.50
3:H:219:ILE:HD12	3:H:221:SER:O	2.12	0.50
3:H:173:GLU:O	3:H:174:GLN:C	2.54	0.49
1:L:181:PHE:HB3	5:M:854:BPH:HBB2	1.93	0.49
4:L:851:BCL:CAA	4:L:853:BCL:HBC1	2.42	0.49
2:M:155:TRP:HZ2	2:M:282:ILE:HD13	1.78	0.49
1:L:12:PRO:HD3	3:H:98:HIS:O	2.11	0.49
3:H:193:MET:O	3:H:196:VAL:HG22	2.13	0.49
1:L:6:GLU:HG3	2:M:250:LEU:CD2	2.42	0.49
1:L:179:PHE:HB3	1:L:240:ALA:HB2	1.93	0.49
2:M:50:ILE:HD13	2:M:51:TYR:N	2.28	0.49
4:L:851:BCL:HAA2	4:L:853:BCL:HBC1	1.95	0.48
1:L:46:ILE:HD13	1:L:46:ILE:N	2.27	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:151:LEU:O	3:H:164:VAL:HG23	2.14	0.48
1:L:2:LEU:HD21	1:L:10:ARG:CZ	2.43	0.48
1:L:34:PHE:HB2	9:L:939:HOH:O	2.13	0.48
9:L:897:HOH:O	2:M:49:PRO:HG2	2.14	0.48
1:L:52:SER:HB2	1:L:85:LEU:CD1	2.44	0.47
2:M:96:PRO:HB2	2:M:97:PRO:HD2	1.95	0.47
2:M:134:TYR:CD1	2:M:134:TYR:C	2.91	0.47
1:L:219:LEU:HA	2:M:132:ARG:HH12	1.79	0.47
3:H:245:ALA:HB3	3:H:246:PRO:HD3	1.96	0.47
1:L:87:GLN:HE21	1:L:142:TRP:CD1	2.31	0.47
2:M:97:PRO:CG	2:M:171:TRP:HB2	2.44	0.47
2:M:239:ALA:O	3:H:73:LEU:HD22	2.14	0.47
1:L:6:GLU:OE2	1:L:10:ARG:NH2	2.46	0.47
3:H:124:ASP:OD1	3:H:124:ASP:C	2.57	0.47
1:L:25:TRP:CD1	1:L:30:TYR:HA	2.50	0.47
1:L:31:VAL:HG12	1:L:32:GLY:N	2.29	0.47
2:M:3:TYR:CZ	2:M:5:ASN:HA	2.50	0.47
2:M:13:ARG:O	3:H:140:PHE:HA	2.14	0.47
4:M:852:BCL:H201	5:M:854:BPH:H8	1.96	0.47
1:L:200:PRO:O	1:L:201:GLU:C	2.58	0.47
2:M:97:PRO:HG2	2:M:171:TRP:HB2	1.95	0.47
3:H:131:ILE:HD11	3:H:177:ARG:HD2	1.97	0.46
3:H:131:ILE:HA	3:H:169:VAL:O	2.15	0.46
1:L:171:PRO:HD2	1:L:259:TRP:CZ3	2.51	0.46
1:L:208:THR:C	1:L:210:ASP:N	2.72	0.46
1:L:38:THR:HG22	1:L:99:SER:HB3	1.95	0.46
1:L:180:PHE:CD2	1:L:240:ALA:HB1	2.51	0.46
2:M:194:GLY:O	2:M:195:ASN:HB3	2.15	0.46
1:L:117:ILE:H	1:L:117:ILE:CD1	2.24	0.46
1:L:185:LEU:HD23	1:L:185:LEU:C	2.41	0.46
4:M:850:BCL:HAA2	4:M:850:BCL:HBD	1.98	0.46
3:H:248:ARG:CB	3:H:248:ARG:CZ	2.94	0.46
1:L:127:ALA:CB	4:L:851:BCL:H43	2.47	0.45
2:M:235:LEU:O	2:M:238:ILE:HB	2.16	0.45
2:M:275:LEU:CD2	2:M:278:LEU:HD23	2.46	0.45
3:H:163:LYS:O	3:H:181:VAL:HG13	2.15	0.45
2:M:66:TRP:CD1	2:M:122:MET:HB2	2.52	0.45
2:M:268:TRP:CE3	3:H:31:LEU:HD13	2.51	0.45
2:M:228:ARG:CZ	3:H:195:MET:HE1	2.47	0.45
3:H:37:ARG:HH11	3:H:37:ARG:HG2	1.81	0.45
2:M:148:TRP:HA	2:M:148:TRP:CE3	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:270:ILE:HG23	2:M:271:TRP:N	2.32	0.45
2:M:284:ILE:HG12	4:M:852:BCL:HED3	1.98	0.45
1:L:127:ALA:HB1	4:L:851:BCL:H43	1.98	0.45
1:L:219:LEU:HD12	2:M:132:ARG:HH11	1.80	0.45
3:H:156:CYS:HB3	3:H:206:ASN:O	2.17	0.45
1:L:182:THR:OG1	4:M:850:BCL:H42	2.16	0.44
2:M:66:TRP:O	2:M:70:ILE:HG12	2.17	0.44
2:M:130:TRP:O	2:M:131:GLY:C	2.57	0.44
4:L:851:BCL:HAA2	4:L:851:BCL:HBD	1.99	0.44
3:H:248:ARG:O	3:H:248:ARG:HG2	2.15	0.44
1:L:212:GLU:O	1:L:213:ASP:C	2.58	0.44
2:M:88:ASP:HB2	2:M:92:PHE:CZ	2.53	0.44
1:L:170:ASN:O	1:L:174:MET:HG3	2.18	0.44
3:H:244:ALA:C	3:H:246:PRO:HD2	2.43	0.44
1:L:128:TYR:HB2	4:L:851:BCL:H61	2.00	0.44
2:M:84:VAL:O	2:M:85:PHE:C	2.61	0.44
1:L:66:VAL:HG12	1:L:86:TRP:HB2	2.00	0.44
1:L:162:TYR:HA	1:L:165:GLY:O	2.17	0.44
1:L:269:LEU:HD12	1:L:272:TRP:CZ2	2.53	0.44
2:M:238:ILE:HD12	2:M:263:GLU:HB2	1.98	0.44
1:L:200:PRO:O	1:L:201:GLU:O	2.36	0.44
5:L:855:BPH:HHC	5:L:855:BPH:HBB3	2.00	0.44
2:M:293:ASN:OD1	2:M:295:TYR:HB3	2.18	0.44
3:H:189:ARG:HG2	3:H:189:ARG:HH11	1.83	0.43
2:M:218:MET:HE2	7:M:857:U10:H1M1	2.00	0.43
3:H:197:LYS:HE3	3:H:199:GLN:NE2	2.32	0.43
3:H:215:GLY:O	3:H:216:ILE:C	2.60	0.43
2:M:296:VAL:O	2:M:299:GLN:HB2	2.19	0.43
2:M:11:GLN:OE1	2:M:40:GLY:HA3	2.18	0.43
1:L:22:PHE:HA	1:L:24:PHE:CE2	2.53	0.43
2:M:13:ARG:HD3	2:M:35:PHE:CD2	2.54	0.43
2:M:164:ARG:CZ	2:M:189:PHE:HE2	2.32	0.43
1:L:3:LEU:HD22	3:H:39:GLY:HA3	2.00	0.43
1:L:146:PHE:HB3	1:L:156:TRP:CD2	2.54	0.42
2:M:148:TRP:HA	2:M:148:TRP:HE3	1.84	0.42
2:M:275:LEU:HA	2:M:278:LEU:HB3	2.02	0.42
3:H:181:VAL:O	3:H:188:THR:HA	2.19	0.42
1:L:8:LYS:HE2	1:L:9:TYR:CE2	2.54	0.42
2:M:265:ILE:HG21	7:M:857:U10:C3M	2.48	0.42
7:M:857:U10:H222	7:M:857:U10:H201	1.78	0.42
1:L:237:SER:O	1:L:238:LEU:C	2.62	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:55:LEU:HD12	2:M:55:LEU:HA	1.86	0.42
1:L:129:LEU:O	1:L:133:LEU:HB3	2.20	0.42
1:L:193:LEU:HD23	9:L:941:HOH:O	2.19	0.42
1:L:219:LEU:O	2:M:132:ARG:NH1	2.46	0.42
1:L:238:LEU:HD23	5:L:855:BPH:CB	2.50	0.42
2:M:152:SER:O	2:M:155:TRP:HB3	2.20	0.42
1:L:65:SER:CB	1:L:152:THR:HG21	2.50	0.42
4:L:853:BCL:H43	4:L:853:BCL:O1A	2.19	0.42
3:H:36:MET:HE3	3:H:40:TYR:CD2	2.54	0.42
1:L:230:HIS:CD2	2:M:223:ILE:HG21	2.55	0.42
2:M:175:VAL:HG13	2:M:176:PRO:HD2	2.02	0.42
3:H:36:MET:HE3	3:H:40:TYR:CE2	2.55	0.42
1:L:227:LEU:O	1:L:227:LEU:HG	2.20	0.41
2:M:204:LEU:O	2:M:207:ALA:HB3	2.19	0.41
1:L:233:GLY:HA3	2:M:216:PHE:CE1	2.55	0.41
2:M:227:SER:C	2:M:229:PHE:H	2.28	0.41
2:M:122:MET:HE2	4:M:852:BCL:H142	2.02	0.41
7:M:857:U10:H271	7:M:857:U10:H251	1.81	0.41
1:L:117:ILE:HD12	1:L:117:ILE:N	2.24	0.41
1:L:187:LEU:HB2	2:M:216:PHE:CD2	2.55	0.41
2:M:247:ARG:NH2	3:H:113:SER:O	2.52	0.41
1:L:274:ASN:O	1:L:275:ILE:C	2.64	0.41
4:L:851:BCL:HBC2	4:L:851:BCL:H2C	1.95	0.41
5:L:855:BPH:CBB	2:M:210:TYR:HB3	2.47	0.41
2:M:253:ARG:HG3	2:M:253:ARG:HH11	1.85	0.41
2:M:300:ASN:O	2:M:301:HIS:HB2	2.21	0.41
4:M:850:BCL:HBB3	4:M:850:BCL:CHC	2.49	0.41
1:L:45:GLY:HA3	5:L:855:BPH:C9	2.50	0.41
2:M:208:PHE:HE2	2:M:279:THR:HG21	1.86	0.41
2:M:253:ARG:HG3	2:M:253:ARG:NH1	2.36	0.41
3:H:216:ILE:HG13	3:H:216:ILE:H	1.57	0.41
2:M:228:ARG:HG3	2:M:229:PHE:CE2	2.56	0.40
1:L:269:LEU:HD12	1:L:272:TRP:HZ2	1.85	0.40
3:H:142:VAL:CG2	3:H:147:ASN:ND2	2.82	0.40
1:L:234:LEU:O	1:L:238:LEU:HG	2.22	0.40
2:M:67:PHE:CD1	5:M:854:BPH:H9C1	2.57	0.40
2:M:243:THR:O	2:M:247:ARG:HG3	2.22	0.40
3:H:130:LYS:NZ	3:H:172:PRO:CG	2.85	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	278/281 (99%)	246 (88%)	27 (10%)	5 (2%)	6	34
2	M	299/307 (97%)	271 (91%)	27 (9%)	1 (0%)	36	67
3	H	236/260 (91%)	223 (94%)	10 (4%)	3 (1%)	9	39
All	All	813/848 (96%)	740 (91%)	64 (8%)	9 (1%)	11	43

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	H	245	ALA
1	L	201	GLU
1	L	237	SER
3	H	174	GLN
3	H	211	ASP
1	L	71	LEU
1	L	19	GLY
2	M	126	VAL
1	L	31	VAL

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%)	209 (95%)	11 (5%)	22	48
2	M	236/240 (98%)	228 (97%)	8 (3%)	32	57
3	H	193/208 (93%)	188 (97%)	5 (3%)	40	62

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	649/668 (97%)	625 (96%)	24 (4%)	30 56

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

Mol	Chain	Res	Type
1	L	21	LEU
1	L	38	THR
1	L	46	ILE
1	L	136	PRO
1	L	154	LEU
1	L	167	PHE
1	L	185	LEU
1	L	207	ARG
1	L	235	LEU
1	L	247	CYS
1	L	271	TRP
2	M	12	VAL
2	M	50	ILE
2	M	154	ILE
2	M	196	LEU
2	M	204	LEU
2	M	216	PHE
2	M	223	ILE
2	M	258	PHE
3	H	105	MET
3	H	121	PRO
3	H	225	VAL
3	H	231	ASP
3	H	246	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	L	153	HIS
1	L	173	HIS
1	L	183	ASN
2	M	5	ASN
2	M	188	ASN
2	M	202	HIS
2	M	259	ASN
2	M	299	GLN

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Mol	Chain	Res	Type
3	H	52	ASN
3	H	199	GLN

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 9 ligands modelled in this entry, 1 is monoatomic - leaving 8 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
5	BPH	M	854	-	59,70,70	1.88	12 (20%)	59,101,101	2.54	16 (27%)
5	BPH	L	855	-	59,70,70	1.85	10 (16%)	59,101,101	2.55	18 (30%)
7	U10	M	857	-	48,48,63	2.38	12 (25%)	60,61,79	2.11	20 (33%)
4	BCL	L	851	1	69,74,74	1.34	11 (15%)	79,115,115	1.70	18 (22%)
4	BCL	L	853	1	69,74,74	1.48	10 (14%)	79,115,115	1.93	22 (27%)
8	SPO	M	859	-	41,41,41	3.29	22 (53%)	47,50,50	2.72	16 (34%)
4	BCL	M	852	2	69,74,74	1.40	10 (14%)	79,115,115	1.76	18 (22%)
4	BCL	M	850	2	69,74,74	2.34	13 (18%)	79,115,115	4.71	26 (32%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	BPH	M	854	-	-	7/37/105/105	0/5/6/6
5	BPH	L	855	-	-	8/37/105/105	0/5/6/6
7	U10	M	857	-	-	15/45/69/87	0/1/1/1
4	BCL	L	851	1	-	3/41/137/137	-
4	BCL	L	853	1	-	5/41/137/137	-
8	SPO	M	859	-	-	20/47/47/47	-
4	BCL	M	852	2	-	10/41/137/137	-
4	BCL	M	850	2	-	10/41/137/137	-

All (100) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	M	850	BCL	C1B-NB	-11.48	1.22	1.37
7	M	857	U10	C6-C1	9.81	1.52	1.35
8	M	859	SPO	C15-C16	9.02	1.58	1.34
4	M	850	BCL	C3B-C4B	8.83	1.58	1.41
5	L	855	BPH	C3A-C2A	-8.16	1.47	1.54
5	M	854	BPH	C3A-C2A	-7.20	1.48	1.54
8	M	859	SPO	C10-C11	6.89	1.52	1.34
8	M	859	SPO	C6-C5	6.84	1.51	1.32
8	M	859	SPO	C21-C20	5.49	1.51	1.36
8	M	859	SPO	C26-C25	4.96	1.47	1.34
4	M	850	BCL	C3B-CAB	4.84	1.61	1.46
7	M	857	U10	C4-C3	4.82	1.53	1.36
5	L	855	BPH	C3D-C2D	4.72	1.47	1.39
4	L	853	BCL	C2-C3	4.62	1.43	1.33
8	M	859	SPO	O1-CM1	4.38	1.57	1.43
8	M	859	SPO	C13-C12	4.36	1.59	1.50
5	M	854	BPH	C2C-C3C	-4.34	1.51	1.54
5	M	854	BPH	C3D-C2D	4.22	1.46	1.39
8	M	859	SPO	C15-C14	4.12	1.56	1.43
4	M	850	BCL	C3B-C2B	4.11	1.56	1.42
7	M	857	U10	C7-C6	4.04	1.58	1.51
4	M	850	BCL	C2-C3	4.04	1.42	1.33
4	M	850	BCL	C3D-C2D	3.86	1.49	1.39
5	L	855	BPH	C2C-C3C	-3.75	1.51	1.54
5	L	855	BPH	C3B-C4B	3.74	1.47	1.41
4	M	852	BCL	C3D-C2D	3.74	1.49	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	M	857	U10	C6-C5	3.74	1.57	1.46
8	M	859	SPO	C32-C33	3.71	1.41	1.33
4	L	851	BCL	C3D-C2D	3.67	1.49	1.39
5	M	854	BPH	C3B-C4B	3.61	1.47	1.41
4	L	853	BCL	C3B-CAB	3.60	1.57	1.46
5	L	855	BPH	C3B-C2B	3.59	1.45	1.39
4	M	852	BCL	C1D-C2D	-3.59	1.38	1.45
8	M	859	SPO	C35-C33	3.52	1.58	1.51
7	M	857	U10	C7-C8	-3.52	1.45	1.50
5	M	854	BPH	C3D-CAD	-3.45	1.41	1.47
8	M	859	SPO	C4-C5	-3.43	1.45	1.50
5	M	854	BPH	C2-C3	3.43	1.41	1.33
7	M	857	U10	O4-C4	3.37	1.44	1.36
4	L	853	BCL	C3D-C2D	3.37	1.48	1.39
8	M	859	SPO	C11-C12	-3.35	1.38	1.46
4	L	853	BCL	CMB-C2B	3.32	1.57	1.50
5	L	855	BPH	C3D-CAD	-3.31	1.41	1.47
7	M	857	U10	C28-C29	3.30	1.40	1.33
8	M	859	SPO	C37-C38	3.30	1.42	1.32
8	M	859	SPO	O1-C1	3.30	1.60	1.41
4	M	852	BCL	C2-C3	3.28	1.40	1.33
4	L	851	BCL	CBB-CAB	3.28	1.56	1.50
7	M	857	U10	C23-C24	3.19	1.40	1.33
4	M	852	BCL	C3B-CAB	3.14	1.56	1.46
4	M	850	BCL	C4B-NB	-3.12	1.33	1.37
4	M	852	BCL	CBB-CAB	3.09	1.56	1.50
5	M	854	BPH	C3B-C2B	3.09	1.44	1.39
8	M	859	SPO	C8-C7	3.07	1.57	1.50
7	M	857	U10	C18-C19	3.05	1.40	1.33
4	L	851	BCL	CMB-C2B	3.04	1.57	1.50
8	M	859	SPO	C31-C32	-3.04	1.41	1.50
8	M	859	SPO	C10-C9	3.04	1.52	1.43
4	M	850	BCL	CMB-C2B	3.00	1.56	1.50
7	M	857	U10	C33-C34	2.97	1.39	1.33
4	L	853	BCL	CBB-CAB	2.95	1.55	1.50
4	M	852	BCL	CMB-C2B	2.92	1.56	1.50
5	M	854	BPH	CMB-C2B	2.91	1.57	1.51
4	L	851	BCL	C2-C3	2.84	1.39	1.33
4	M	852	BCL	CMD-C2D	2.80	1.56	1.50
4	L	851	BCL	C1D-C2D	-2.73	1.39	1.45
4	M	850	BCL	MG-NB	2.71	2.11	2.05
4	L	851	BCL	C3B-CAB	2.68	1.55	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	853	BCL	C3C-C4C	-2.65	1.48	1.51
5	L	855	BPH	CMB-C2B	2.64	1.56	1.51
7	M	857	U10	C13-C14	2.63	1.39	1.33
4	L	851	BCL	CAC-C3C	2.62	1.59	1.54
8	M	859	SPO	C14-C12	2.60	1.41	1.35
7	M	857	U10	C38-C39	2.60	1.40	1.32
8	M	859	SPO	C25-C23	-2.59	1.40	1.46
4	M	850	BCL	C1D-C2D	-2.58	1.40	1.45
4	L	853	BCL	C3B-C4B	2.57	1.46	1.41
4	M	852	BCL	C1B-NB	-2.56	1.34	1.37
4	L	853	BCL	C1B-NB	-2.55	1.34	1.37
4	M	850	BCL	CHC-C4B	2.54	1.45	1.39
5	M	854	BPH	CMD-C2D	2.53	1.56	1.51
8	M	859	SPO	C29-C28	2.44	1.56	1.50
5	L	855	BPH	CMD-C2D	2.44	1.56	1.51
4	L	853	BCL	MG-NB	2.41	2.10	2.05
4	M	850	BCL	O2D-CGD	-2.33	1.27	1.33
5	L	855	BPH	C2-C3	2.33	1.38	1.33
4	L	851	BCL	CMD-C2D	2.31	1.55	1.50
4	L	853	BCL	C1D-C2D	-2.29	1.40	1.45
4	M	852	BCL	C3B-C4B	2.26	1.45	1.41
4	M	852	BCL	C3C-C4C	-2.24	1.48	1.51
5	L	855	BPH	O2A-CGA	-2.22	1.26	1.33
8	M	859	SPO	C24-C23	2.21	1.55	1.50
5	M	854	BPH	O2D-CGD	-2.18	1.27	1.33
5	M	854	BPH	C5-C3	2.13	1.55	1.51
4	M	850	BCL	CAA-C2A	2.11	1.57	1.54
5	M	854	BPH	CHA-CBD	2.10	1.54	1.51
4	L	851	BCL	C3C-C4C	-2.09	1.49	1.51
8	M	859	SPO	C39-C38	2.06	1.55	1.50
4	L	851	BCL	C3A-C2A	-2.04	1.48	1.54
4	L	851	BCL	O2A-CGA	-2.02	1.27	1.33

All (154) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	M	850	BCL	OBB-CAB-C3B	25.26	165.09	120.43
4	M	850	BCL	OBB-CAB-CBB	-17.79	79.93	119.77
4	M	850	BCL	CBB-CAB-C3B	-16.72	85.16	120.40
4	M	850	BCL	C3B-C4B-NB	12.03	125.64	109.76
8	M	859	SPO	C25-C23-C22	-10.89	101.87	119.01
5	M	854	BPH	C4D-CHA-CBD	-10.13	103.59	108.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	L	855	BPH	C4D-CHA-CBD	-8.58	104.34	108.45
4	M	850	BCL	CHC-C4B-NB	-8.25	111.67	124.05
4	M	850	BCL	CMB-C2B-C1B	-7.16	114.51	125.42
5	L	855	BPH	C1-O2A-CGA	6.50	132.37	116.65
5	M	854	BPH	C1-O2A-CGA	6.43	132.23	116.65
5	M	854	BPH	O2D-CGD-CBD	6.32	117.89	110.95
5	L	855	BPH	O2D-CGD-CBD	5.98	117.52	110.95
4	L	853	BCL	CAA-C2A-C1A	-5.81	92.94	111.97
7	M	857	U10	C7-C6-C5	5.66	125.09	118.52
5	L	855	BPH	C3D-C4D-ND	5.60	114.88	107.71
5	M	854	BPH	C3D-C4D-ND	5.39	114.62	107.71
8	M	859	SPO	C18-C17-C19	-5.30	114.23	122.82
8	M	859	SPO	C20-C21-C22	-5.29	112.69	123.52
5	L	855	BPH	C4-C3-C5	5.28	124.40	115.23
7	M	857	U10	C15-C14-C16	4.93	123.78	115.23
4	M	850	BCL	CAA-C2A-C1A	-4.81	96.20	111.97
4	M	850	BCL	CAB-C3B-C2B	-4.78	117.81	127.74
4	L	853	BCL	CHC-C4B-NB	-4.77	116.89	124.05
4	L	853	BCL	CED-O2D-CGD	4.63	126.42	115.92
5	L	855	BPH	CMB-C2B-C3B	4.60	133.87	124.68
5	M	854	BPH	O1D-CGD-CBD	-4.59	117.75	124.72
8	M	859	SPO	C24-C23-C22	-4.59	115.38	122.82
4	M	852	BCL	CMB-C2B-C1B	-4.58	118.45	125.42
4	M	852	BCL	CED-O2D-CGD	4.56	126.26	115.92
4	M	850	BCL	C4A-NA-C1A	4.55	108.76	106.68
4	L	851	BCL	CMB-C2B-C1B	-4.51	118.55	125.42
7	M	857	U10	C15-C14-C13	-4.47	112.15	123.63
4	M	852	BCL	CHC-C4B-NB	-4.45	117.37	124.05
5	L	855	BPH	C2B-C1B-NB	4.40	112.61	109.43
4	L	851	BCL	CED-O2D-CGD	4.40	125.89	115.92
4	M	850	BCL	C3B-C2B-C1B	4.39	120.44	106.40
5	M	854	BPH	CMB-C2B-C3B	4.37	133.41	124.68
7	M	857	U10	C7-C6-C1	-4.36	117.41	124.89
4	M	852	BCL	C4D-CHA-C1A	4.32	126.39	121.24
4	L	853	BCL	CMB-C2B-C1B	-4.31	118.85	125.42
8	M	859	SPO	C26-C27-C28	-4.30	121.64	127.69
5	L	855	BPH	O1D-CGD-CBD	-4.27	118.25	124.72
4	L	851	BCL	CHC-C4B-NB	-4.14	117.83	124.05
5	M	854	BPH	C2B-C1B-NB	4.09	112.38	109.43
4	L	853	BCL	C4A-NA-C1A	4.04	108.52	106.68
7	M	857	U10	C10-C9-C8	-4.03	113.27	123.63
4	M	852	BCL	C6-C5-C3	4.02	123.27	113.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	851	BCL	C4D-CHA-C1A	3.99	126.00	121.24
5	L	855	BPH	C6-C5-C3	3.97	123.13	113.47
8	M	859	SPO	C15-C14-C12	-3.96	121.73	127.28
4	M	850	BCL	CED-O2D-CGD	3.95	124.86	115.92
8	M	859	SPO	C4-C5-C6	-3.94	119.38	124.91
4	L	853	BCL	CBA-CAA-C2A	3.90	125.40	113.79
4	L	853	BCL	C2A-C3A-C4A	3.74	107.91	101.87
5	M	854	BPH	C4D-ND-C1D	-3.68	104.46	108.87
4	L	851	BCL	C2A-C3A-C4A	3.60	107.68	101.87
5	M	854	BPH	C4-C3-C5	3.51	121.32	115.23
8	M	859	SPO	C11-C12-C14	-3.51	113.49	119.01
7	M	857	U10	C7-C8-C9	3.50	132.86	126.83
5	L	855	BPH	C4A-C3A-C2A	3.46	106.13	102.84
4	M	850	BCL	C3D-C4D-ND	3.40	115.52	109.99
4	L	853	BCL	C3D-C4D-ND	3.39	115.50	109.99
7	M	857	U10	C35-C34-C33	-3.35	115.03	123.63
4	M	852	BCL	OBD-CAD-C3D	-3.34	120.60	128.42
5	L	855	BPH	C5-C3-C2	-3.34	113.67	121.17
4	M	852	BCL	C4A-NA-C1A	3.32	108.19	106.68
5	L	855	BPH	C4D-ND-C1D	-3.31	104.90	108.87
4	M	850	BCL	C2A-C3A-C4A	3.25	107.12	101.87
4	L	853	BCL	OBD-CAD-C3D	-3.22	120.90	128.42
8	M	859	SPO	C8-C7-C9	3.20	128.00	122.82
4	L	851	BCL	C3D-C4D-ND	3.16	115.12	109.99
4	L	853	BCL	CMD-C2D-C1D	3.15	130.28	124.73
8	M	859	SPO	C15-C16-C17	-3.14	117.76	126.36
4	M	852	BCL	C2A-C3A-C4A	3.12	106.91	101.87
7	M	857	U10	C4M-O4-C4	3.11	127.39	116.47
4	M	852	BCL	CHA-C1A-NA	-3.10	119.37	126.39
5	M	854	BPH	C3D-CAD-CBD	3.06	111.64	107.61
7	M	857	U10	C11-C9-C8	3.02	127.94	121.17
4	M	850	BCL	CBA-CAA-C2A	3.01	122.74	113.79
4	L	851	BCL	C4A-NA-C1A	2.98	108.04	106.68
7	M	857	U10	C25-C24-C23	-2.96	116.02	123.63
7	M	857	U10	C25-C24-C26	2.94	120.34	115.23
8	M	859	SPO	C18-C17-C16	2.91	122.53	118.09
7	M	857	U10	C20-C19-C18	-2.85	116.32	123.63
4	M	852	BCL	C2A-C1A-CHA	2.84	128.79	123.87
4	L	853	BCL	CMD-C2D-C3D	-2.83	121.21	127.69
4	M	850	BCL	OBD-CAD-C3D	-2.82	121.82	128.42
4	M	850	BCL	C4D-CHA-C1A	2.81	124.60	121.24
4	M	850	BCL	C6-C5-C3	2.81	120.31	113.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	L	851	BCL	CHA-C1A-NA	-2.80	120.05	126.39
4	M	852	BCL	C3D-C4D-ND	2.80	114.53	109.99
7	M	857	U10	O5-C5-C4	-2.79	115.11	121.03
4	M	850	BCL	CMD-C2D-C1D	2.75	129.56	124.73
5	M	854	BPH	C2D-C1D-ND	2.74	111.41	109.43
4	L	851	BCL	OBD-CAD-C3D	-2.74	122.01	128.42
4	M	852	BCL	C4D-C3D-CAD	-2.74	105.13	108.11
4	L	853	BCL	C4D-CHA-C1A	2.74	124.51	121.24
4	L	851	BCL	C4D-C3D-CAD	-2.70	105.17	108.11
5	M	854	BPH	C4A-C3A-C2A	2.70	105.41	102.84
8	M	859	SPO	C16-C17-C19	2.69	123.24	119.01
4	M	850	BCL	C2A-C1A-CHA	2.69	128.53	123.87
7	M	857	U10	C30-C29-C31	2.63	119.79	115.23
5	L	855	BPH	C2D-C1D-ND	2.60	111.31	109.43
4	M	850	BCL	O2D-CGD-CBD	2.60	115.77	111.23
4	L	851	BCL	CMB-C2B-C3B	2.59	133.82	125.67
4	L	851	BCL	C2A-C1A-CHA	2.55	128.30	123.87
5	L	855	BPH	C3D-CAD-CBD	2.55	110.97	107.61
4	M	852	BCL	CMD-C2D-C1D	2.54	129.19	124.73
5	L	855	BPH	C3B-C4B-NB	2.54	111.74	108.05
4	M	852	BCL	CMB-C2B-C3B	2.52	133.61	125.67
4	M	850	BCL	CMD-C2D-C3D	-2.52	121.92	127.69
4	L	851	BCL	CMD-C2D-C1D	2.50	129.13	124.73
7	M	857	U10	C21-C19-C18	2.49	126.76	121.17
4	L	853	BCL	C16-C15-C13	-2.48	107.72	115.97
4	M	850	BCL	CHA-C1A-NA	-2.46	120.82	126.39
4	L	853	BCL	O2A-CGA-CBA	2.46	119.33	111.83
4	M	850	BCL	O2A-CGA-CBA	2.45	119.30	111.83
5	M	854	BPH	O2A-C1-C2	-2.44	98.72	108.11
4	L	853	BCL	C3B-C4B-NB	2.44	112.98	109.76
5	M	854	BPH	CED-O2D-CGD	2.43	121.43	115.92
8	M	859	SPO	C9-C10-C11	-2.43	116.16	123.20
7	M	857	U10	C8-C7-C6	-2.42	106.11	112.08
4	L	853	BCL	C2C-C3C-C4C	2.41	104.94	101.34
4	M	852	BCL	C15-C13-C12	-2.38	100.02	112.07
5	L	855	BPH	CED-O2D-CGD	2.37	121.29	115.92
4	M	852	BCL	CBC-CAC-C3C	2.36	118.42	113.41
5	M	854	BPH	C3B-C4B-NB	2.35	111.48	108.05
4	L	851	BCL	CBC-CAC-C3C	2.34	118.38	113.41
4	M	850	BCL	O1D-CGD-CBD	-2.34	119.90	124.52
4	L	853	BCL	CMB-C2B-C3B	2.34	133.05	125.67
4	M	850	BCL	CHC-C4B-C3B	-2.28	122.64	131.72

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	M	857	U10	C35-C34-C36	2.26	119.15	115.23
4	M	850	BCL	C2B-C1B-NB	-2.22	108.03	110.33
7	M	857	U10	C1-C6-C5	-2.18	117.50	119.62
8	M	859	SPO	C13-C12-C11	2.17	121.41	118.09
4	L	853	BCL	CHA-C1A-NA	-2.17	121.48	126.39
4	L	851	BCL	CMD-C2D-C3D	-2.17	122.72	127.69
4	M	852	BCL	C3B-C4B-NB	2.16	112.61	109.76
4	L	853	BCL	C6-C5-C3	2.16	118.73	113.47
8	M	859	SPO	C10-C9-C7	-2.13	124.29	127.28
5	L	855	BPH	CMA-C3A-C2A	-2.09	106.04	114.13
5	L	855	BPH	CMA-C3A-C4A	-2.08	110.12	114.61
7	M	857	U10	C36-C34-C33	2.07	125.81	121.17
4	L	853	BCL	C2A-C1A-CHA	2.06	127.44	123.87
4	L	853	BCL	O1D-CGD-CBD	-2.05	120.47	124.52
4	L	851	BCL	C2C-C3C-C4C	2.05	104.41	101.34
7	M	857	U10	C10-C9-C11	2.05	118.78	115.23
8	M	859	SPO	C8-C7-C6	-2.05	114.96	118.09
4	L	851	BCL	C6-C5-C3	2.04	118.44	113.47
4	M	852	BCL	CGD-CBD-CAD	-2.03	104.26	110.85
4	L	851	BCL	C1-C2-C3	-2.03	122.87	126.20
4	L	853	BCL	C4D-C3D-CAD	-2.01	105.92	108.11
5	M	854	BPH	CBB-CAB-C3B	-2.01	114.33	120.34

There are no chirality outliers.

All (78) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	L	851	BCL	C2C-C3C-CAC-CBC
4	L	851	BCL	C4C-C3C-CAC-CBC
4	M	852	BCL	C2C-C3C-CAC-CBC
4	M	852	BCL	C4C-C3C-CAC-CBC
5	L	855	BPH	C4C-C3C-CAC-CBC
5	M	854	BPH	C4C-C3C-CAC-CBC
5	M	854	BPH	C2C-C3C-CAC-CBC
7	M	857	U10	C1-C6-C7-C8
7	M	857	U10	C5-C6-C7-C8
8	M	859	SPO	O1-C1-C4-C5
8	M	859	SPO	C2-C1-C4-C5
8	M	859	SPO	C3-C1-C4-C5
8	M	859	SPO	C1-C4-C5-C6
8	M	859	SPO	C21-C22-C23-C24
8	M	859	SPO	C36-C37-C38-C39

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Mol	Chain	Res	Type	Atoms
8	M	859	SPO	C36-C37-C38-C40
4	M	852	BCL	C4-C3-C5-C6
4	M	852	BCL	C2-C3-C5-C6
5	L	855	BPH	C4-C3-C5-C6
5	M	854	BPH	C4-C3-C5-C6
7	M	857	U10	C15-C14-C16-C17
7	M	857	U10	C20-C19-C21-C22
7	M	857	U10	C25-C24-C26-C27
5	L	855	BPH	C2-C3-C5-C6
5	M	854	BPH	C2-C3-C5-C6
7	M	857	U10	C13-C14-C16-C17
7	M	857	U10	C23-C24-C26-C27
7	M	857	U10	C19-C21-C22-C23
7	M	857	U10	C24-C26-C27-C28
7	M	857	U10	C29-C31-C32-C33
7	M	857	U10	C18-C19-C21-C22
8	M	859	SPO	C24-C23-C25-C26
8	M	859	SPO	C20-C21-C22-C23
7	M	857	U10	C9-C11-C12-C13
4	M	850	BCL	C15-C16-C17-C18
4	M	850	BCL	C5-C6-C7-C8
4	M	850	BCL	C2A-CAA-CBA-CGA
4	L	851	BCL	C2A-CAA-CBA-CGA
8	M	859	SPO	C9-C10-C11-C12
5	L	855	BPH	C3-C5-C6-C7
5	L	855	BPH	C2C-C3C-CAC-CBC
4	L	853	BCL	C5-C6-C7-C8
4	M	852	BCL	C11-C10-C8-C9
8	M	859	SPO	C4-C1-O1-CM1
4	L	853	BCL	C2A-CAA-CBA-CGA
4	M	850	BCL	C2B-C3B-CAB-CBB
8	M	859	SPO	C2-C1-O1-CM1
8	M	859	SPO	C3-C1-O1-CM1
4	M	852	BCL	C11-C10-C8-C7
5	M	854	BPH	C2A-CAA-CBA-CGA
4	M	852	BCL	C15-C16-C17-C18
4	M	850	BCL	C4B-C3B-CAB-CBB
4	L	853	BCL	C12-C13-C15-C16
4	L	853	BCL	C14-C13-C15-C16
4	M	850	BCL	CHA-CBD-CGD-O1D
4	M	850	BCL	CHA-CBD-CGD-O2D
8	M	859	SPO	C4-C5-C6-C7

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Mol	Chain	Res	Type	Atoms
7	M	857	U10	C12-C11-C9-C10
8	M	859	SPO	C18-C17-C19-C20
4	M	850	BCL	C4-C3-C5-C6
4	M	850	BCL	C14-C13-C15-C16
8	M	859	SPO	C16-C17-C19-C20
4	M	850	BCL	C2-C3-C5-C6
4	M	852	BCL	C12-C13-C15-C16
8	M	859	SPO	C29-C28-C30-C31
8	M	859	SPO	C34-C33-C35-C36
5	M	854	BPH	C11-C10-C8-C9
8	M	859	SPO	C32-C33-C35-C36
7	M	857	U10	C5-C4-O4-C4M
5	L	855	BPH	CHA-CBD-CGD-O1D
4	M	852	BCL	C14-C13-C15-C16
7	M	857	U10	C12-C11-C9-C8
5	M	854	BPH	C11-C10-C8-C7
5	L	855	BPH	C6-C7-C8-C10
8	M	859	SPO	C28-C30-C31-C32
4	L	853	BCL	CAD-CBD-CGD-O2D
5	L	855	BPH	CAD-CBD-CGD-O2D
4	M	852	BCL	CAA-CBA-CGA-O2A

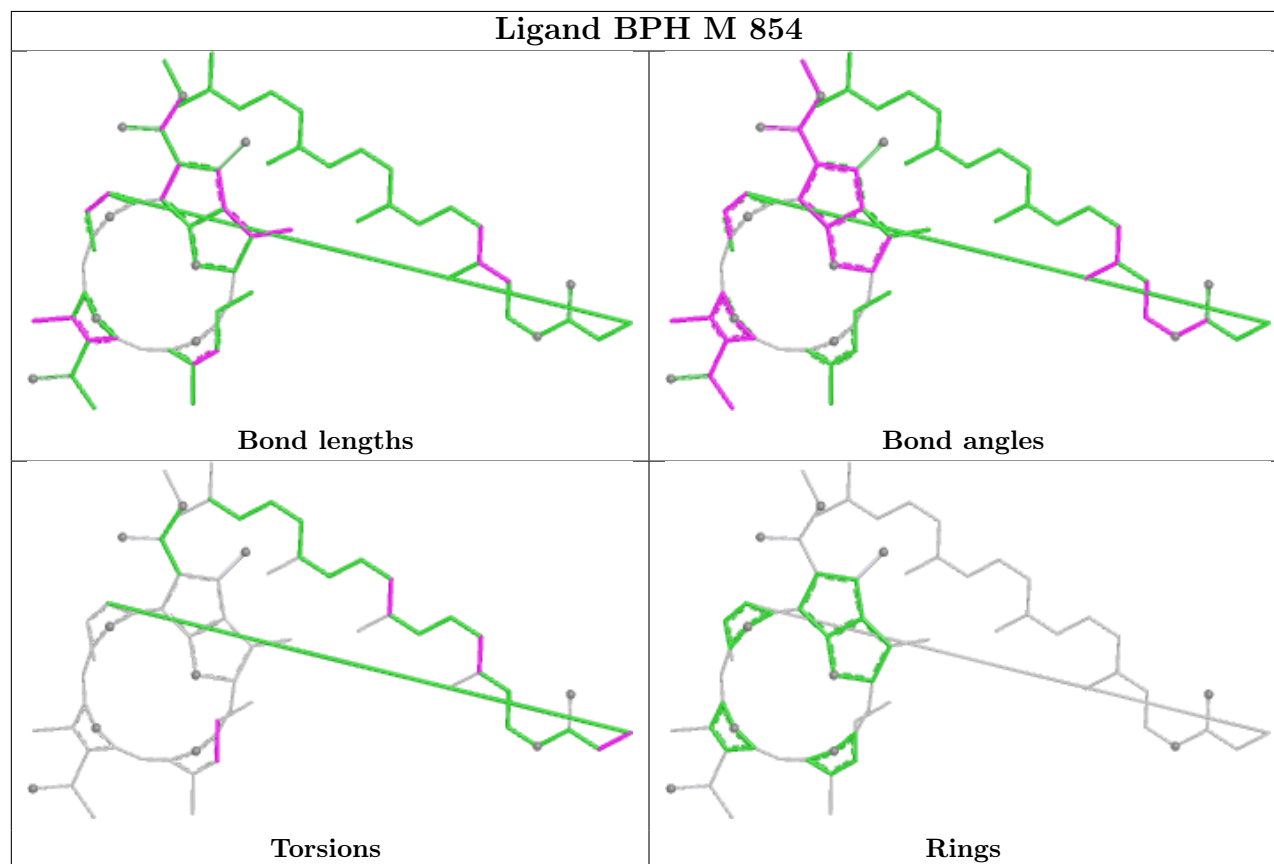
There are no ring outliers.

8 monomers are involved in 40 short contacts:

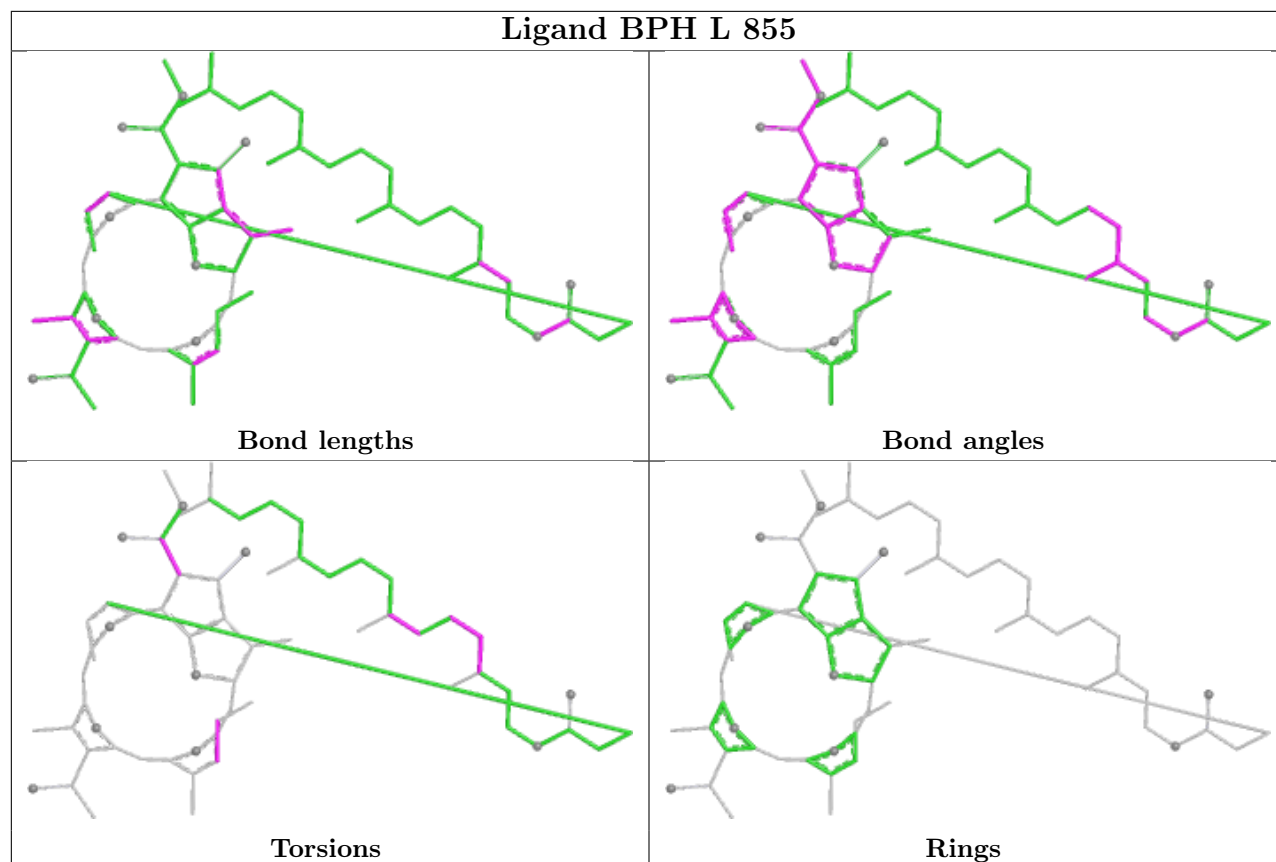
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	M	854	BPH	6	0
5	L	855	BPH	8	0
7	M	857	U10	4	0
4	L	851	BCL	8	0
4	L	853	BCL	4	0
8	M	859	SPO	1	0
4	M	852	BCL	6	0
4	M	850	BCL	8	0

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

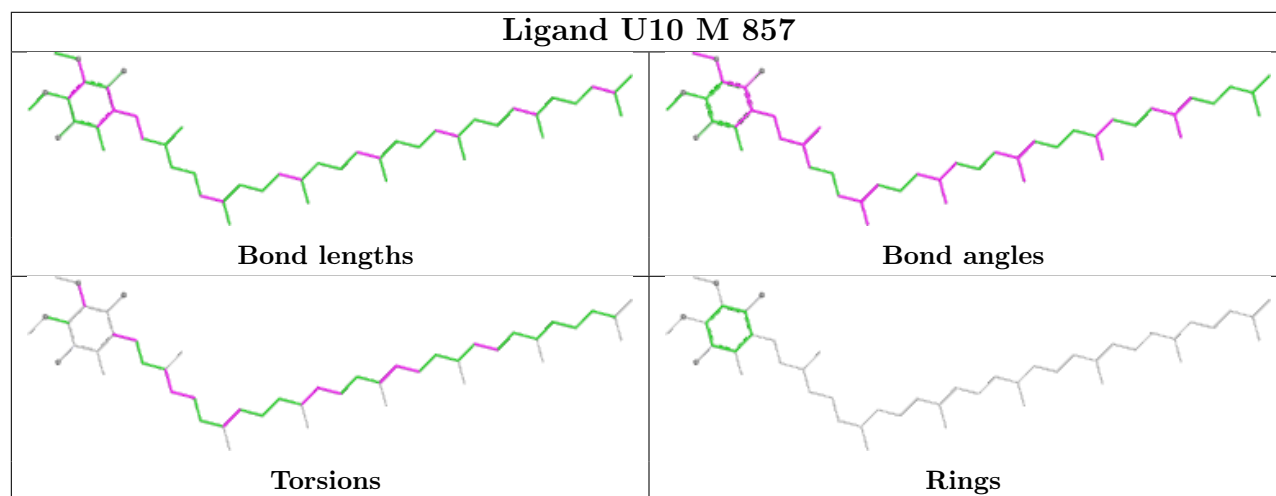
in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

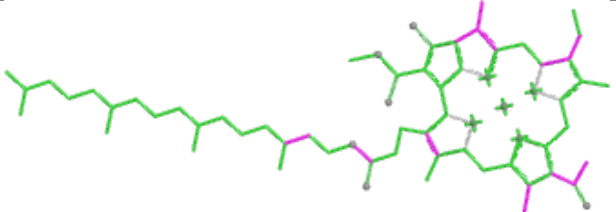
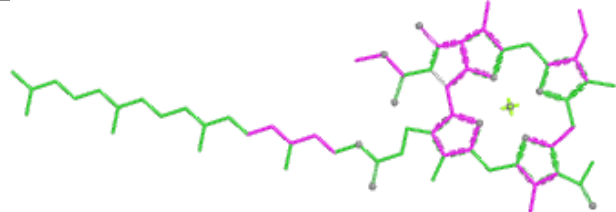
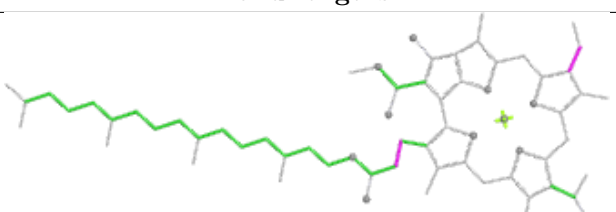
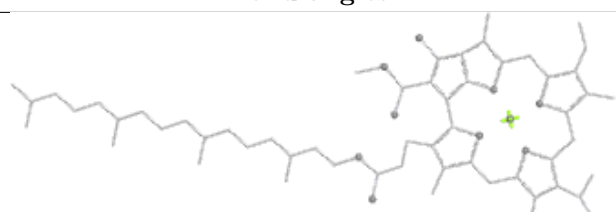
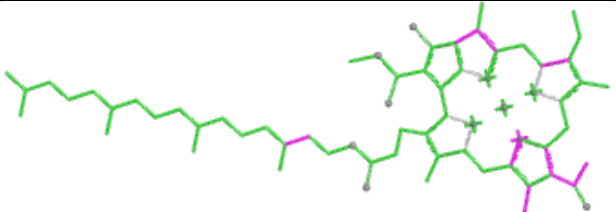
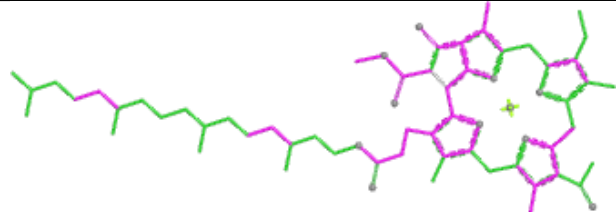
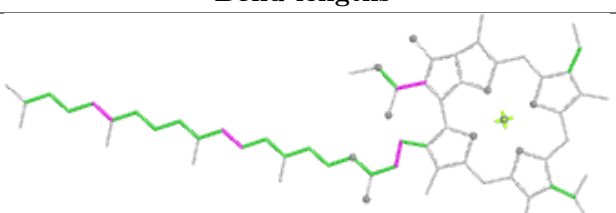
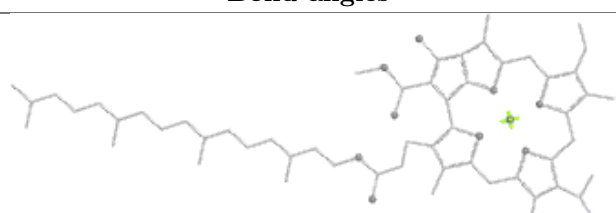
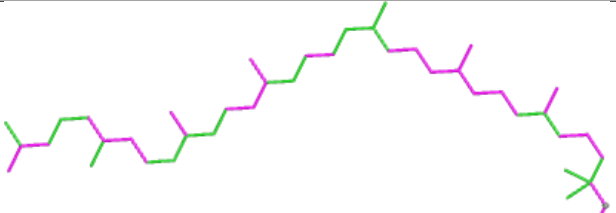
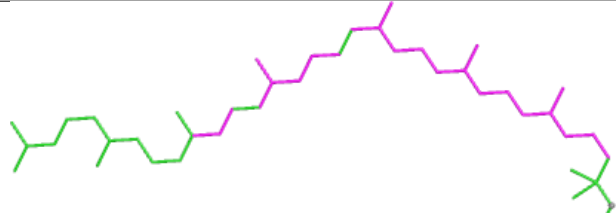
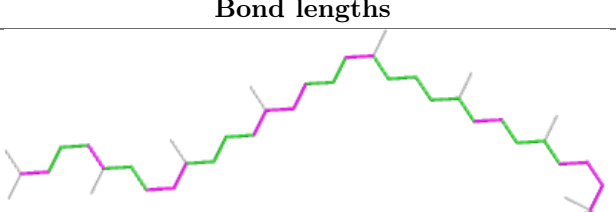
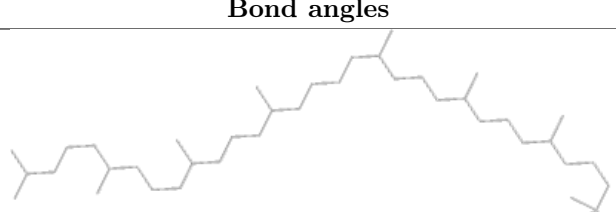


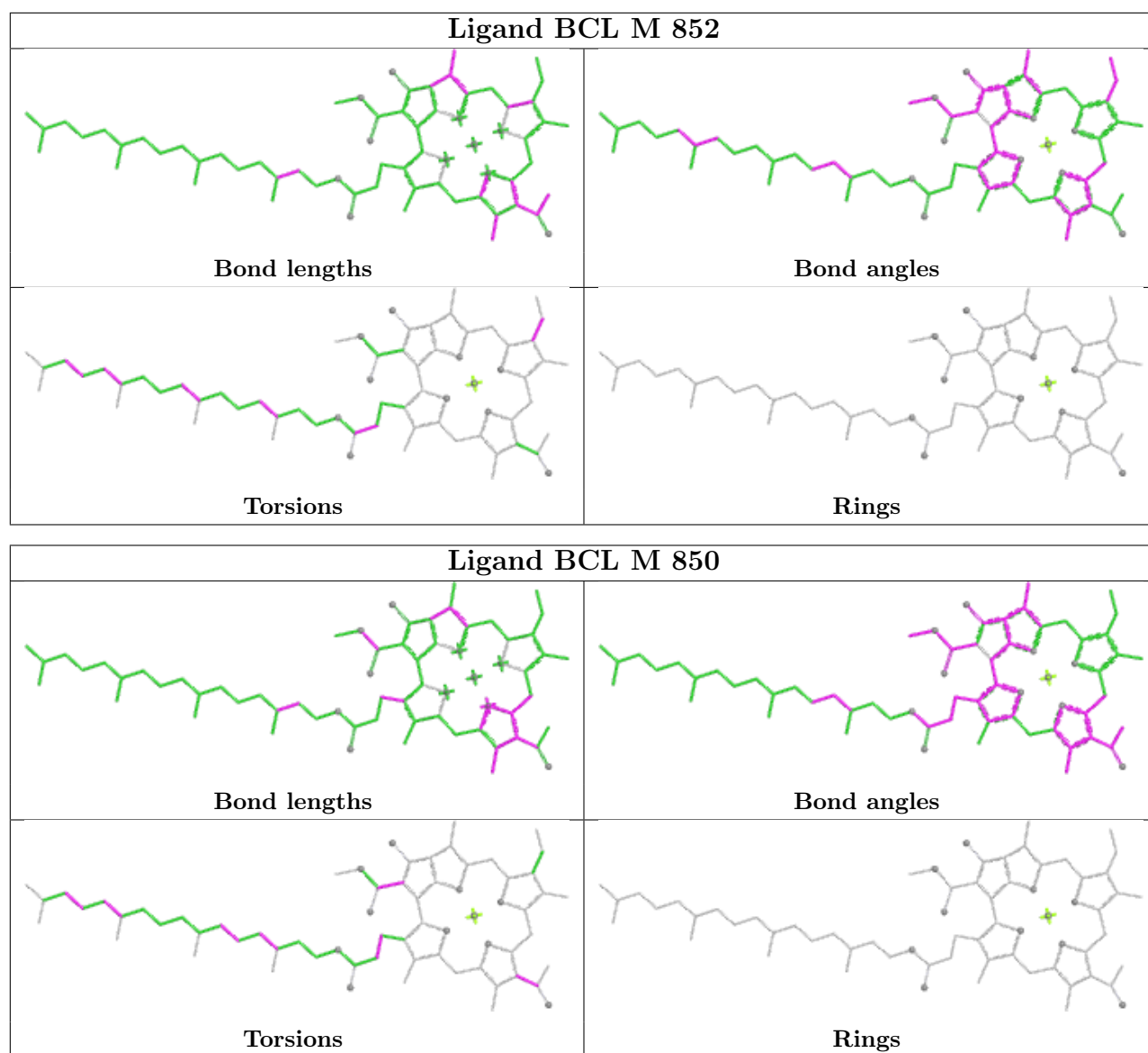
Ligand BPH L 855



Ligand U10 M 857



Ligand BCL L 851	
 Bond lengths	 Bond angles
 Torsions	 Rings
Ligand BCL L 853	
 Bond lengths	 Bond angles
 Torsions	 Rings
Ligand SPO M 859	
 Bond lengths	 Bond angles
 Torsions	 Rings



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section is therefore empty.

6.4 Ligands ⓘ

EDS was not executed - this section is therefore empty.

6.5 Other polymers ⓘ

EDS was not executed - this section is therefore empty.