Full wwPDB X-ray Structure Validation Report (i)

Nov 20, 2023 – 10:19 PM JST

PDB ID	:	7DRK
Title	:	Crystal structure of phosphatidylglycerol phosphate synthase in complex with cytidine diphosphate-diacylglycerol
Authors	:	Yang, B.W.; Liu, Z.F.
Deposited on	:	2020-12-28
Resolution	:	3.00 Å(reported)

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

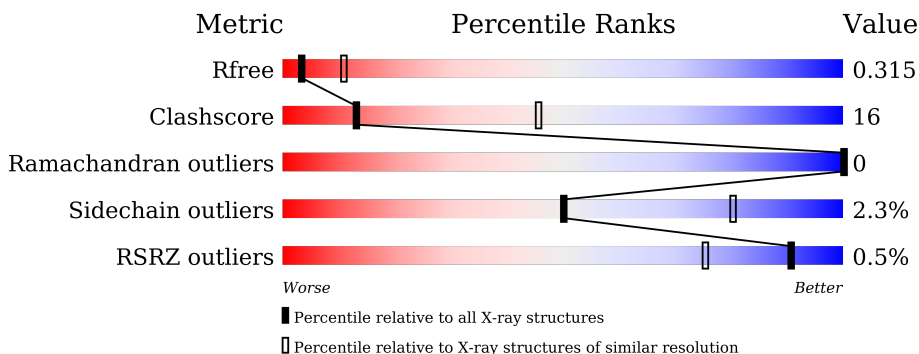|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh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

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.00 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	Percentile Ranks	Value
Rfree		0.315
Clashscore		16
Ramachandran outliers		0
Sidechain outliers		2.3%
RSRZ outliers		0.5%

Worse ← → Better

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	212	59% 27% 13%
1	B	212	57% 30% 13%

2 Entry composition ⓘ

There are 8 unique types of molecules in this entry. The entry contains 3272 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 CDP-diacylglycerol--glycerol-3-phosphate 3-phosphatidyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	184	Total	C	N	O	S	0	0	0
			1415	953	219	241	2			
1	B	185	Total	C	N	O	S	0	0	0
			1420	956	220	242	2			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP P63756
A	-18	GLY	-	expression tag	UNP P63756
A	-17	SER	-	expression tag	UNP P63756
A	-16	SER	-	expression tag	UNP P63756
A	-15	HIS	-	expression tag	UNP P63756
A	-14	HIS	-	expression tag	UNP P63756
A	-13	HIS	-	expression tag	UNP P63756
A	-12	HIS	-	expression tag	UNP P63756
A	-11	HIS	-	expression tag	UNP P63756
A	-10	HIS	-	expression tag	UNP P63756
A	-9	SER	-	expression tag	UNP P63756
A	-8	SER	-	expression tag	UNP P63756
A	-7	GLY	-	expression tag	UNP P63756
A	-6	LEU	-	expression tag	UNP P63756
A	-5	VAL	-	expression tag	UNP P63756
A	-4	PRO	-	expression tag	UNP P63756
A	-3	ARG	-	expression tag	UNP P63756
A	-2	GLY	-	expression tag	UNP P63756
A	-1	SER	-	expression tag	UNP P63756
A	0	HIS	-	expression tag	UNP P63756
B	-19	MET	-	initiating methionine	UNP P63756
B	-18	GLY	-	expression tag	UNP P63756
B	-17	SER	-	expression tag	UNP P63756
B	-16	SER	-	expression tag	UNP P63756

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-15	HIS	-	expression tag	UNP P63756
B	-14	HIS	-	expression tag	UNP P63756
B	-13	HIS	-	expression tag	UNP P63756
B	-12	HIS	-	expression tag	UNP P63756
B	-11	HIS	-	expression tag	UNP P63756
B	-10	HIS	-	expression tag	UNP P63756
B	-9	SER	-	expression tag	UNP P63756
B	-8	SER	-	expression tag	UNP P63756
B	-7	GLY	-	expression tag	UNP P63756
B	-6	LEU	-	expression tag	UNP P63756
B	-5	VAL	-	expression tag	UNP P63756
B	-4	PRO	-	expression tag	UNP P63756
B	-3	ARG	-	expression tag	UNP P63756
B	-2	GLY	-	expression tag	UNP P63756
B	-1	SER	-	expression tag	UNP P63756
B	0	HIS	-	expression tag	UNP P63756

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total 2	Zn 2	0	0
2	B	2	Total 2	Zn 2	0	0

- Molecule 3 is 5'-O-[(R)-{[(S)-{(2R)-2,3-bis[(9E)-octadec-9-enoyloxy]propoxy}(hydroxy)phosphoryl]oxy}(hydroxy)phosphoryl]cytidine (three-letter code: 58A) (formula: $C_{48}H_{85}N_3O_{15}P_2$) (labeled as "Ligand of Interest" by depositor).
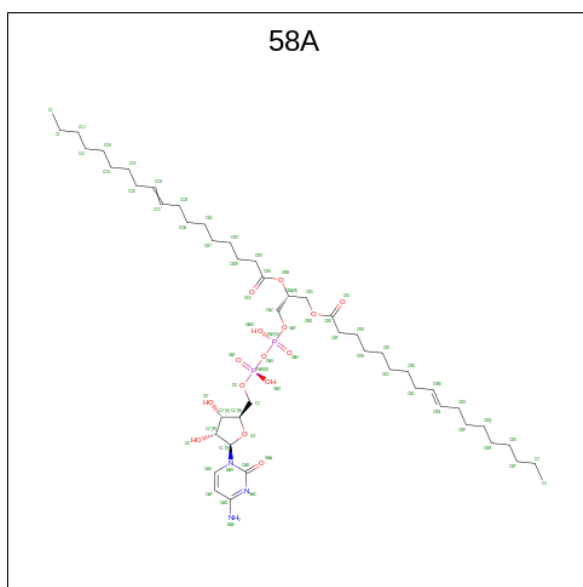
58A

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			68	48	3	15	2		
3	B	1	Total	C	N	O	P	0	0
			68	48	3	15	2		

- Molecule 4 is SN-GLYCEROL-3-PHOSPHATE (three-letter code: G3P) (formula: $C_3H_9O_6P$).
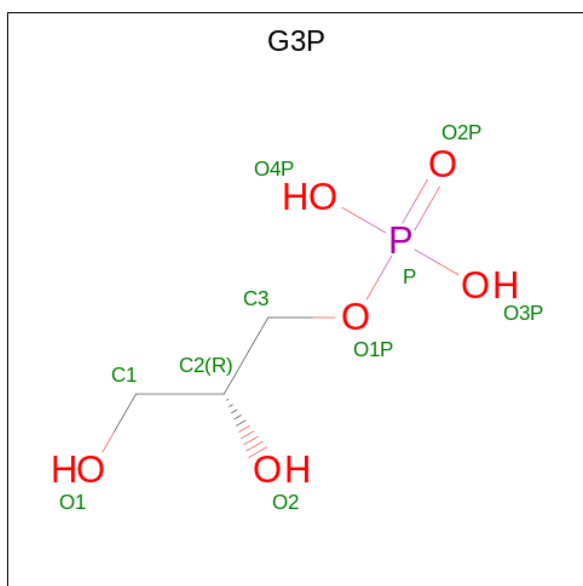
G3P

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	O	P	0	0
			10	3	6	1		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total 10	C 3	O 6	P 1	0	0
4	A	1	Total 10	C 3	O 6	P 1	0	0
4	A	1	Total 10	C 3	O 6	P 1	0	0
4	B	1	Total 10	C 3	O 6	P 1	0	0

- Molecule 5 is (2R)-2,3-dihydroxypropyl (9Z)-octadec-9-enoate (three-letter code: OLC) (formula: $C_{21}H_{40}O_4$).
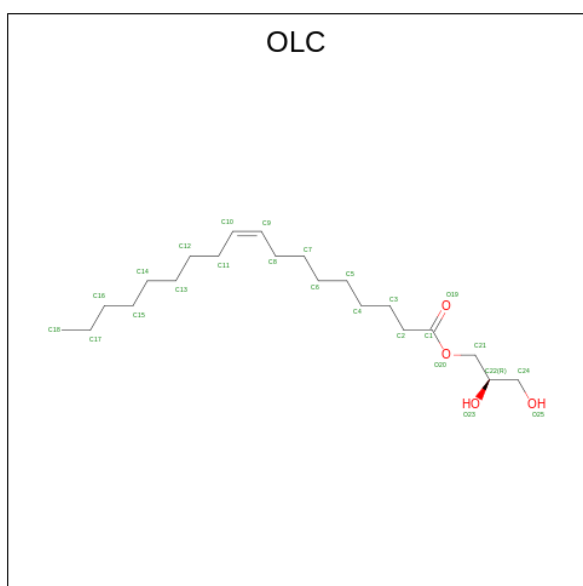
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 25	C 21	O 4	0	0
5	B	1	Total 25	C 21	O 4	0	0
5	B	1	Total 25	C 21	O 4	0	0

- Molecule 6 is 1,4-BUTANEDIOL (three-letter code: BU1) (formula: $C_4H_{10}O_2$).
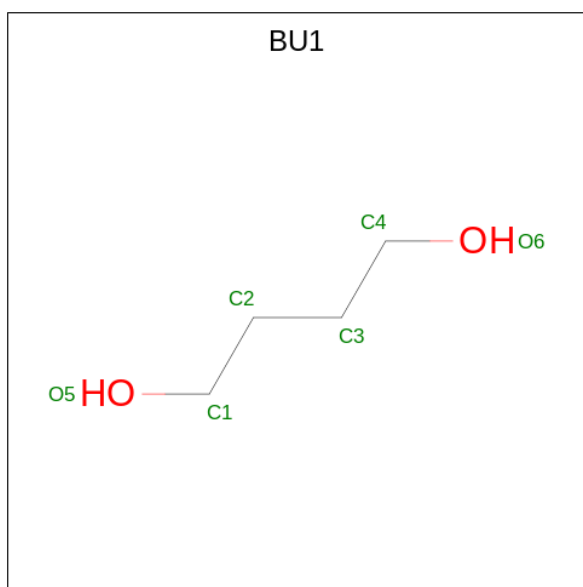
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0
6	B	1	Total 6	C 4	O 2	0	0

- Molecule 7 is ACETIC ACID (three-letter code: ACY) (formula: $C_2H_4O_2$).
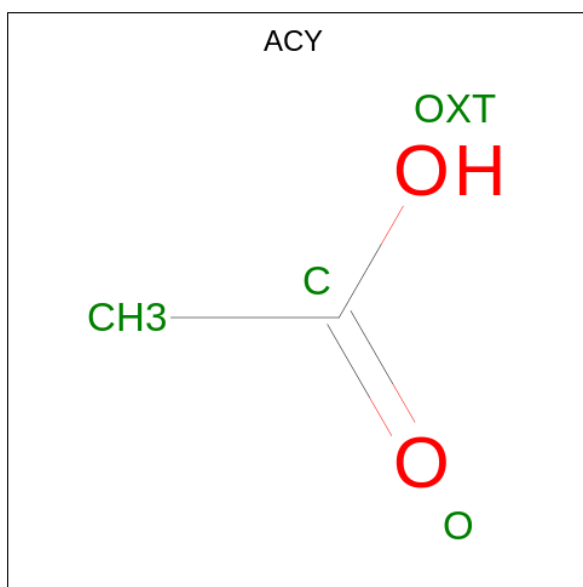
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total 4	C 2	O 2	0	0
7	A	1	Total 4	C 2	O 2	0	0

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	52	Total 52	O 52	0	0
8	B	52	Total 52	O 52	0	0

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 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.
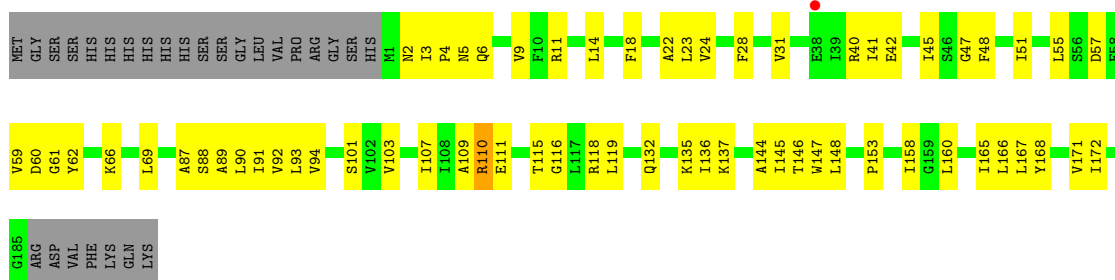
- Molecule 1: CDP-diacylglycerol--glycerol-3-phosphate 3-phosphatidyltransferase
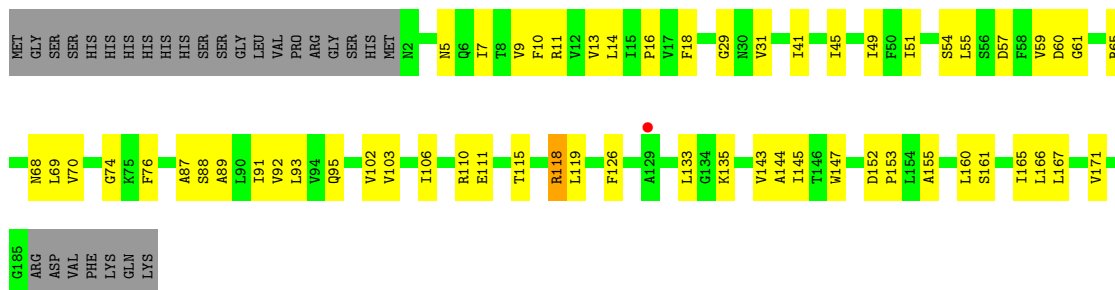
- Molecule 1: CDP-diacylglycerol--glycerol-3-phosphate 3-phosphatidyltransferase

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	127.78Å 59.43Å 73.03Å 90.00° 106.66° 90.00°	Depositor
Resolution (Å)	9.99 – 3.00 9.99 – 3.00	Depositor EDS
% Data completeness (in resolution range)	99.2 (9.99-3.00) 99.2 (9.99-3.00)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.47 (at 2.99Å)	Xtriage
Refinement program	PHENIX (1.17.1_3660: ???)	Depositor
R, R_{free}	0.250 , 0.299 0.259 , 0.315	Depositor DCC
R_{free} test set	490 reflections (4.75%)	wwPDB-VP
Wilson B-factor (Å^2)	58.9	Xtriage
Anisotropy	0.360	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.41 , 111.3	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	3272	wwPDB-VP
Average B, all atoms (Å^2)	54.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 41.86 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.2191e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< \lvert L \rvert >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: OLC, ACY, 58A, BU1, G3P, ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$ >5	RMSZ	#$|Z|$ >5
1	A	0.30	0/1441	0.49	0/1960
1	B	0.29	0/1446	0.48	0/1967
All	All	0.30	0/2887	0.49	0/3927

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 ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1415	0	1516	40	0
1	B	1420	0	1521	66	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	68	0	83	10	0
3	B	68	0	82	4	0
4	A	40	0	28	0	0
4	B	10	0	7	0	0
5	A	25	0	40	3	0
5	B	50	0	80	2	0
6	A	6	0	10	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	54	0	90	0	0
7	A	8	0	6	0	0
8	A	52	0	0	0	0
8	B	52	0	0	0	0
All	All	3272	0	3463	108	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 16.

All (108) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:70:VAL:HG23	3:A:203:58A:H4	1.41	1.02
1:A:31:VAL:HG13	1:A:41:ILE:HG12	1.53	0.89
1:B:135:LYS:HB3	3:B:203:58A:H50	1.66	0.77
1:B:115:THR:HG22	1:B:118:ARG:HH21	1.47	0.77
1:B:4:PRO:CD	1:B:69:LEU:HD13	2.18	0.73
1:B:4:PRO:HD3	1:B:69:LEU:CD1	2.20	0.71
1:B:4:PRO:HG3	1:B:69:LEU:CD1	2.20	0.71
1:B:4:PRO:HD3	1:B:69:LEU:HD13	1.73	0.70
1:A:54:SER:HB2	3:A:203:58A:H59	1.72	0.70
1:A:103:VAL:HG23	1:A:171:VAL:HG11	1.74	0.69
1:B:22:ALA:O	1:B:40:ARG:NH1	2.26	0.68
1:B:5:ASN:OD1	3:B:203:58A:NAE	2.27	0.68
5:A:205:OLC:H12	5:A:205:OLC:H16A	1.80	0.64
1:B:103:VAL:HG13	1:B:171:VAL:HG11	1.80	0.63
1:A:55:LEU:O	1:A:59:VAL:HG23	2.00	0.61
1:A:135:LYS:HB3	3:A:203:58A:H16	1.81	0.61
1:A:89:ALA:HB1	1:A:145:ILE:HG21	1.83	0.61
1:B:4:PRO:HG3	1:B:69:LEU:HD12	1.81	0.61
1:B:144:ALA:HB2	1:B:166:LEU:HB3	1.83	0.60
1:B:115:THR:HG22	1:B:118:ARG:NH2	2.16	0.60
1:B:31:VAL:HB	1:B:41:ILE:HG12	1.84	0.58
1:B:158:ILE:HG22	1:B:160:LEU:HG	1.85	0.57
1:A:119:LEU:HD23	1:B:119:LEU:HD23	1.88	0.55
1:B:47:GLY:O	1:B:51:ILE:HG23	2.06	0.55
1:A:11:ARG:NH2	1:A:60:ASP:OD2	2.39	0.55
1:B:93:LEU:HD11	1:B:145:ILE:HG23	1.87	0.55
1:A:118:ARG:HE	1:B:119:LEU:HD11	1.71	0.55
1:B:4:PRO:CG	1:B:69:LEU:CD1	2.85	0.55
1:B:40:ARG:NH2	1:B:42:GLU:HG3	2.22	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:60:ASP:OD1	1:A:61:GLY:N	2.40	0.55
1:A:76:PHE:HZ	1:B:116:GLY:HA2	1.71	0.55
1:B:4:PRO:CD	1:B:69:LEU:CD1	2.83	0.55
1:B:48:PHE:O	1:B:51:ILE:HG12	2.07	0.55
1:A:76:PHE:HZ	1:B:116:GLY:CA	2.20	0.54
1:B:40:ARG:HB3	1:B:42:GLU:HG2	1.90	0.54
1:B:87:ALA:O	1:B:91:ILE:HG13	2.08	0.54
1:B:51:ILE:HG22	1:B:146:THR:HG23	1.90	0.54
1:B:11:ARG:HA	1:B:14:LEU:HD12	1.90	0.53
1:B:55:LEU:O	1:B:59:VAL:HG23	2.09	0.53
1:B:4:PRO:HG3	1:B:69:LEU:HD13	1.90	0.53
1:B:4:PRO:CG	1:B:69:LEU:HD13	2.40	0.52
1:A:51:ILE:HD13	3:A:203:58A:H76	1.90	0.52
1:A:41:ILE:O	1:A:45:ILE:HG13	2.08	0.52
1:B:88:SER:O	1:B:92:VAL:HG23	2.09	0.52
1:A:95:GLN:OE1	1:B:101:SER:N	2.43	0.52
1:B:24:VAL:O	1:B:40:ARG:NH2	2.43	0.51
1:B:51:ILE:HG22	1:B:146:THR:CG2	2.40	0.51
1:A:14:LEU:HG	1:A:49:ILE:HG23	1.93	0.51
1:A:111:GLU:O	1:A:115:THR:HG22	2.11	0.50
1:B:111:GLU:O	1:B:115:THR:HG23	2.11	0.50
1:A:29:GLY:C	1:A:41:ILE:HG13	2.31	0.49
1:A:152:ASP:HB3	1:A:155:ALA:HB2	1.94	0.49
3:A:203:58A:H74	3:A:203:58A:H84	1.93	0.49
1:B:3:ILE:O	1:B:6:GLN:HG2	2.12	0.49
1:B:5:ASN:O	1:B:9:VAL:HG12	2.13	0.49
1:A:102:VAL:O	1:A:106:ILE:HG12	2.14	0.48
1:B:111:GLU:OE2	1:B:137:LYS:NZ	2.36	0.48
1:B:28:PHE:HB2	1:B:42:GLU:OE2	2.13	0.48
1:B:62:TYR:HE1	1:B:66:LYS:HE3	1.78	0.48
1:A:135:LYS:CB	3:A:203:58A:H16	2.44	0.48
1:A:144:ALA:HB2	1:A:166:LEU:HB3	1.95	0.47
1:B:160:LEU:HD13	1:B:165:ILE:HD12	1.95	0.47
1:B:89:ALA:HB1	1:B:145:ILE:HG21	1.95	0.47
1:A:103:VAL:HG23	1:A:171:VAL:CG1	2.42	0.47
1:B:2:ASN:HB3	1:B:4:PRO:HD2	1.95	0.47
1:B:90:LEU:O	1:B:94:VAL:HG23	2.15	0.47
1:B:23:LEU:HD21	1:B:92:VAL:HG13	1.96	0.47
1:A:5:ASN:O	1:A:9:VAL:HG23	2.16	0.46
3:A:203:58A:H72	3:A:203:58A:H65	1.48	0.46
6:A:206:BU1:H12	6:A:206:BU1:H42	1.81	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:203:58A:OAA	3:B:203:58A:H11	2.16	0.46
1:A:160:LEU:HD21	1:A:165:ILE:HG21	1.98	0.46
1:A:93:LEU:HD11	1:A:145:ILE:HG23	1.96	0.45
1:B:3:ILE:HA	1:B:6:GLN:CD	2.37	0.45
1:B:132:GLN:O	1:B:136:ILE:HG13	2.15	0.45
1:A:74:GLY:HA3	3:A:203:58A:CAF	2.46	0.45
5:A:205:OLC:H6A	5:A:205:OLC:H9	1.64	0.45
1:B:60:ASP:OD2	1:B:61:GLY:N	2.49	0.45
1:A:7:ILE:O	1:A:10:PHE:HB3	2.17	0.44
3:A:203:58A:H74	3:A:203:58A:H79	1.75	0.44
1:B:148:LEU:HD11	1:B:167:LEU:HD22	1.99	0.44
1:B:167:LEU:O	1:B:171:VAL:HG13	2.17	0.44
1:A:143:VAL:HG22	3:A:203:58A:H64	1.99	0.44
1:B:4:PRO:HD3	1:B:69:LEU:HD11	1.98	0.44
1:B:166:LEU:CD1	3:B:203:58A:H73	2.46	0.44
1:A:68:ASN:O	1:A:69:LEU:HD22	2.17	0.44
1:B:158:ILE:CG2	1:B:160:LEU:HG	2.47	0.44
1:B:41:ILE:O	1:B:45:ILE:HG13	2.17	0.43
1:A:87:ALA:O	1:A:91:ILE:HG13	2.18	0.43
1:B:3:ILE:N	1:B:4:PRO:HD2	2.33	0.43
1:B:110:ARG:HA	5:B:205:OLC:H21	1.99	0.43
1:A:13:VAL:O	1:A:16:PRO:HD2	2.19	0.43
1:B:90:LEU:HD11	1:B:107:ILE:HD12	2.00	0.43
1:A:133:LEU:HD11	5:A:205:OLC:H2A	2.00	0.43
1:B:3:ILE:HG23	1:B:4:PRO:HD3	2.01	0.43
1:B:168:TYR:O	1:B:172:ILE:HD13	2.19	0.43
1:A:11:ARG:NH2	1:A:57:ASP:HA	2.34	0.42
1:B:166:LEU:HD12	1:B:166:LEU:HA	1.75	0.42
1:B:57:ASP:HA	1:B:60:ASP:OD1	2.19	0.42
1:A:152:ASP:OD2	1:A:161:SER:OG	2.29	0.42
1:B:69:LEU:HD12	1:B:69:LEU:O	2.19	0.42
1:A:88:SER:O	1:A:92:VAL:HG23	2.20	0.42
1:A:166:LEU:HD12	1:A:166:LEU:HA	1.88	0.41
1:B:147:TRP:CZ2	1:B:153:PRO:HB2	2.55	0.41
1:A:167:LEU:HD12	1:A:167:LEU:HA	1.95	0.41
1:B:103:VAL:HG13	1:B:171:VAL:CG1	2.48	0.41
1:B:109:ALA:HB1	5:B:205:OLC:H2	2.04	0.40
1:A:147:TRP:CE2	1:A:153:PRO:HD2	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	182/212 (86%)	180 (99%)	2 (1%)	0	100	100
1	B	183/212 (86%)	181 (99%)	2 (1%)	0	100	100
All	All	365/424 (86%)	361 (99%)	4 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	152/177 (86%)	147 (97%)	5 (3%)	38	73
1	B	152/177 (86%)	150 (99%)	2 (1%)	69	89
All	All	304/354 (86%)	297 (98%)	7 (2%)	50	80

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	PHE
1	A	65	ARG
1	A	110	ARG
1	A	118	ARG
1	A	126	PHE
1	B	18	PHE
1	B	110	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 26 ligands modelled in this entry, 4 are monoatomic - leaving 22 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	OLC	A	205	-	24,24,24	0.78	2 (8%)	25,25,25	1.09	2 (8%)
6	BU1	B	207	-	5,5,5	0.33	0	4,4,4	0.56	0
3	58A	A	203	2	67,69,69	2.59	19 (28%)	79,86,86	1.23	7 (8%)
4	G3P	A	209	-	9,9,9	0.62	0	11,12,12	0.65	0
6	BU1	A	206	-	5,5,5	0.35	0	4,4,4	0.48	0
6	BU1	B	214	-	5,5,5	0.34	0	4,4,4	0.56	0
6	BU1	B	213	-	5,5,5	0.33	0	4,4,4	0.59	0
6	BU1	B	210	-	5,5,5	0.35	0	4,4,4	0.50	0
6	BU1	B	204	-	5,5,5	0.34	0	4,4,4	0.52	0
4	G3P	A	204	-	9,9,9	0.61	0	11,12,12	0.64	0
3	58A	B	203	2	67,69,69	2.61	18 (26%)	79,86,86	1.36	11 (13%)
6	BU1	B	211	-	5,5,5	0.32	0	4,4,4	0.62	0
7	ACY	A	210	-	3,3,3	0.69	0	3,3,3	0.58	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
5	OLC	B	206	-	24,24,24	0.80	2 (8%)	25,25,25	0.96	1 (4%)
6	BU1	B	208	-	5,5,5	0.33	0	4,4,4	0.58	0
4	G3P	A	208	-	9,9,9	0.61	0	11,12,12	0.69	0
5	OLC	B	205	-	24,24,24	0.82	1 (4%)	25,25,25	1.00	1 (4%)
6	BU1	B	212	-	5,5,5	0.34	0	4,4,4	0.55	0
7	ACY	A	211	-	3,3,3	1.45	0	3,3,3	1.71	1 (33%)
6	BU1	B	209	-	5,5,5	0.34	0	4,4,4	0.51	0
4	G3P	B	215	-	9,9,9	0.61	0	11,12,12	0.63	0
4	G3P	A	207	-	9,9,9	0.61	0	11,12,12	0.66	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	OLC	A	205	-	-	13/24/24/24	-
6	BU1	B	207	-	-	0/3/3/3	-
3	58A	A	203	2	-	28/65/81/81	0/2/2/2
4	G3P	A	209	-	-	1/8/8/8	-
6	BU1	A	206	-	-	2/3/3/3	-
6	BU1	B	214	-	-	1/3/3/3	-
6	BU1	B	213	-	-	3/3/3/3	-
6	BU1	B	210	-	-	0/3/3/3	-
6	BU1	B	204	-	-	0/3/3/3	-
4	G3P	A	204	-	-	7/8/8/8	-
3	58A	B	203	2	-	33/65/81/81	0/2/2/2
6	BU1	B	211	-	-	0/3/3/3	-
5	OLC	B	206	-	-	8/24/24/24	-
6	BU1	B	208	-	-	3/3/3/3	-
4	G3P	A	208	-	-	2/8/8/8	-
5	OLC	B	205	-	-	12/24/24/24	-
6	BU1	B	212	-	-	1/3/3/3	-
6	BU1	B	209	-	-	2/3/3/3	-
4	G3P	B	215	-	-	5/8/8/8	-
4	G3P	A	207	-	-	5/8/8/8	-

All (42) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	203	58A	C3'-C2'	-10.87	1.23	1.53
3	B	203	58A	C3'-C2'	-10.85	1.23	1.53
3	A	203	58A	CAB-NAC	6.58	1.49	1.36
3	B	203	58A	CAB-NAC	6.44	1.49	1.36
3	B	203	58A	CAG-CAF	6.34	1.49	1.35
3	A	203	58A	CAG-CAF	6.16	1.49	1.35
3	A	203	58A	CAD-NAE	5.49	1.46	1.33
3	B	203	58A	CAD-NAE	5.45	1.46	1.33
3	A	203	58A	CAD-NAC	5.33	1.45	1.34
3	B	203	58A	CAB-NAH	5.09	1.51	1.40
3	B	203	58A	CAD-NAC	5.06	1.44	1.34
3	A	203	58A	CAB-NAH	5.04	1.50	1.40
3	B	203	58A	O4'-C1'	-4.66	1.31	1.42
3	A	203	58A	O4'-C1'	-4.53	1.31	1.42
3	B	203	58A	C2'-C1'	4.44	1.67	1.53
3	A	203	58A	C2'-C1'	4.23	1.67	1.53
3	B	203	58A	C5'-C4'	-4.18	1.38	1.51
3	A	203	58A	C5'-C4'	-3.76	1.39	1.51
3	A	203	58A	O3'-C3'	3.32	1.50	1.43
3	A	203	58A	CAG-NAH	3.32	1.46	1.38
3	B	203	58A	O3'-C3'	3.29	1.50	1.43
3	B	203	58A	CAG-NAH	3.18	1.45	1.38
3	B	203	58A	OAA-CAB	-3.15	1.17	1.23
3	B	203	58A	O4'-C4'	2.90	1.51	1.45
3	A	203	58A	O4'-C4'	2.81	1.51	1.45
3	B	203	58A	OBD-CBE	2.79	1.41	1.33
3	A	203	58A	C3'-C4'	2.78	1.60	1.53
3	B	203	58A	CAF-CAD	2.64	1.49	1.42
3	A	203	58A	CAF-CAD	2.63	1.49	1.42
3	A	203	58A	O2'-C2'	2.56	1.49	1.43
3	B	203	58A	C3'-C4'	2.55	1.59	1.53
3	A	203	58A	OBD-CBE	2.53	1.40	1.33
5	B	205	OLC	O20-C1	2.49	1.40	1.33
3	A	203	58A	OAA-CAB	-2.45	1.19	1.23
5	B	206	OLC	O20-C1	2.42	1.40	1.33
3	B	203	58A	O2'-C2'	2.41	1.48	1.43
3	B	203	58A	OBB-CBU	2.38	1.41	1.34
3	A	203	58A	OBB-CBU	2.37	1.41	1.34
5	A	205	OLC	O20-C1	2.35	1.40	1.33
3	A	203	58A	OBB-CBA	-2.12	1.41	1.46
5	A	205	OLC	O20-C21	-2.09	1.40	1.45
5	B	206	OLC	O20-C21	-2.09	1.40	1.45

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	203	58A	OBB-CBU-CBV	4.36	120.89	111.50
3	B	203	58A	OBD-CBE-CBF	4.00	124.47	111.91
3	B	203	58A	OBB-CBU-CBV	3.54	119.13	111.50
3	B	203	58A	OAA-CAB-NAC	-3.06	117.35	122.33
5	B	205	OLC	O20-C1-C2	2.94	121.13	111.91
3	B	203	58A	OBB-CBA-CBC	2.63	117.92	108.40
3	B	203	58A	OBD-CBE-OCL	-2.61	117.00	123.59
3	B	203	58A	CBA-OBB-CBU	2.57	124.12	117.79
3	A	203	58A	C4'-O4'-C1'	-2.56	103.83	109.47
5	B	206	OLC	O20-C1-C2	2.49	119.72	111.91
3	B	203	58A	C5'-C4'-C3'	-2.47	105.92	115.18
3	B	203	58A	CBG-CBF-CBE	-2.40	104.91	113.62
3	A	203	58A	OAA-CAB-NAC	-2.39	118.45	122.33
5	A	205	OLC	O20-C1-C2	2.37	119.35	111.91
5	A	205	OLC	C14-C13-C12	-2.36	102.43	114.42
7	A	211	ACY	O-C-CH3	-2.36	113.13	122.33
3	B	203	58A	PAV-OAU-PAR	-2.29	124.97	132.83
3	B	203	58A	CBC-CBA-CAZ	-2.25	106.47	111.79
3	A	203	58A	CBW-CBV-CBU	-2.23	105.51	113.62
3	B	203	58A	C1'-NAH-CAB	2.23	123.39	118.42
3	A	203	58A	C2'-C3'-C4'	-2.15	98.47	102.64
3	A	203	58A	C1'-NAH-CAB	2.09	123.08	118.42
3	A	203	58A	PAV-OAU-PAR	-2.04	125.83	132.83

There are no chirality outliers.

All (126) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	203	58A	O4'-C1'-NAH-CAB
3	A	203	58A	O4'-C1'-NAH-CAG
3	A	203	58A	O4'-C4'-C5'-O5'
3	A	203	58A	C3'-C4'-C5'-O5'
3	A	203	58A	C5'-O5'-PAR-OAT
3	A	203	58A	C5'-O5'-PAR-OAS
3	A	203	58A	C5'-O5'-PAR-OAU
3	A	203	58A	PAR-OAU-PAV-OAY
3	B	203	58A	O4'-C1'-NAH-CAB
3	B	203	58A	O4'-C1'-NAH-CAG
3	B	203	58A	C3'-C4'-C5'-O5'
3	B	203	58A	C5'-O5'-PAR-OAT
3	B	203	58A	C5'-O5'-PAR-OAS
4	A	204	G3P	O1-C1-C2-C3
4	A	204	G3P	C3-O1P-P-O4P

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Mol	Chain	Res	Type	Atoms
4	A	204	G3P	C3-O1P-P-O2P
4	A	204	G3P	C3-O1P-P-O3P
4	A	207	G3P	O1-C1-C2-C3
4	A	207	G3P	C3-O1P-P-O4P
4	A	207	G3P	C3-O1P-P-O2P
4	A	207	G3P	C3-O1P-P-O3P
4	B	215	G3P	O1-C1-C2-C3
4	B	215	G3P	O2-C2-C3-O1P
5	A	205	OLC	C21-C22-C24-O25
3	A	203	58A	CBF-CBE-OBD-CBC
3	B	203	58A	CBF-CBE-OBD-CBC
4	A	204	G3P	O2-C2-C3-O1P
5	B	205	OLC	C2-C1-O20-C21
3	A	203	58A	OCL-CBE-OBD-CBC
3	B	203	58A	OCL-CBE-OBD-CBC
5	B	205	OLC	O19-C1-O20-C21
4	A	204	G3P	C1-C2-C3-O1P
5	A	205	OLC	O20-C21-C22-C24
3	A	203	58A	CBV-CBU-OBB-CBA
3	A	203	58A	CBU-CBV-CBW-CBX
4	B	215	G3P	O1-C1-C2-O2
5	A	205	OLC	O23-C22-C24-O25
3	B	203	58A	CBU-CBV-CBW-CBX
5	B	206	OLC	C1-C2-C3-C4
3	B	203	58A	O4'-C4'-C5'-O5'
3	A	203	58A	OCK-CBU-OBB-CBA
5	A	205	OLC	C6-C7-C8-C9
3	B	203	58A	CCG-CCH-CCI-CCJ
5	A	205	OLC	O20-C21-C22-O23
3	B	203	58A	CBV-CBU-OBB-CBA
4	B	215	G3P	C1-C2-C3-O1P
3	B	203	58A	OCK-CBU-OBB-CBA
3	A	203	58A	CCH-CCI-CCJ-C1
3	A	203	58A	CBR-CBS-CBT-C3
3	B	203	58A	CCH-CCI-CCJ-C1
5	A	205	OLC	C3-C4-C5-C6
5	B	205	OLC	C1-C2-C3-C4
3	A	203	58A	CBV-CBW-CBX-CBY
5	B	206	OLC	C14-C15-C16-C17
3	B	203	58A	CBH-CBI-CBJ-CBK
4	A	208	G3P	O1-C1-C2-C3
5	B	205	OLC	C6-C7-C8-C9

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Mol	Chain	Res	Type	Atoms
5	A	205	OLC	C1-C2-C3-C4
3	A	203	58A	CBH-CBI-CBJ-CBK
5	B	206	OLC	C11-C12-C13-C14
3	B	203	58A	CBV-CBW-CBX-CBY
5	A	205	OLC	C13-C14-C15-C16
4	A	207	G3P	O1-C1-C2-O2
5	B	206	OLC	C2-C3-C4-C5
5	A	205	OLC	C10-C11-C12-C13
5	B	205	OLC	C10-C11-C12-C13
5	B	205	OLC	C13-C14-C15-C16
5	A	205	OLC	C12-C13-C14-C15
5	B	205	OLC	C12-C13-C14-C15
5	B	206	OLC	C4-C5-C6-C7
4	A	204	G3P	O1-C1-C2-O2
4	A	208	G3P	O1-C1-C2-O2
3	A	203	58A	CBQ-CBR-CBS-CBT
5	A	205	OLC	C2-C3-C4-C5
6	B	209	BU1	C2-C3-C4-O6
5	B	206	OLC	C15-C16-C17-C18
3	A	203	58A	C4-C3-CBT-CBS
3	B	203	58A	CBQ-CBR-CBS-CBT
6	A	206	BU1	C2-C3-C4-O6
6	B	214	BU1	C2-C3-C4-O6
3	B	203	58A	CCF-CCG-CCH-CCI
6	A	206	BU1	C1-C2-C3-C4
3	B	203	58A	OAY-CAZ-CBA-OBB
3	A	203	58A	CCF-CCG-CCH-CCI
3	A	203	58A	C2-C1-CCJ-CCI
5	B	205	OLC	C2-C3-C4-C5
4	A	209	G3P	C2-C3-O1P-P
3	B	203	58A	PAV-OAU-PAR-O5'
6	B	208	BU1	O5-C1-C2-C3
3	A	203	58A	CBG-CBH-CBI-CBJ
3	B	203	58A	C5'-O5'-PAR-OAU
5	B	205	OLC	C3-C4-C5-C6
3	B	203	58A	PAR-OAU-PAV-OAX
3	A	203	58A	CBI-CBJ-CBK-CBL
3	B	203	58A	OAY-CAZ-CBA-CBC
6	B	208	BU1	C2-C3-C4-O6
5	B	205	OLC	C5-C6-C7-C8
6	B	213	BU1	C2-C3-C4-O6
3	B	203	58A	CBG-CBH-CBI-CBJ

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Mol	Chain	Res	Type	Atoms
6	B	213	BU1	C1-C2-C3-C4
3	A	203	58A	CBF-CBG-CBH-CBI
3	B	203	58A	C4-C3-CBT-CBS
6	B	208	BU1	C1-C2-C3-C4
5	B	205	OLC	O20-C1-C2-C3
6	B	213	BU1	O5-C1-C2-C3
5	B	206	OLC	C5-C6-C7-C8
3	B	203	58A	CBA-CAZ-OAY-PAV
3	B	203	58A	CBR-CBS-CBT-C3
3	B	203	58A	CAZ-CBA-OBB-CBU
6	B	209	BU1	O5-C1-C2-C3
3	A	203	58A	CCA-CCB-CCC-CCD
3	B	203	58A	CBF-CBG-CBH-CBI
3	A	203	58A	CCC-CCD-CCE-CCF
4	B	215	G3P	C3-O1P-P-O4P
3	B	203	58A	CBN-CBO-CBP-CBQ
3	A	203	58A	CBK-CBL-CBM-CBN
5	B	205	OLC	C7-C8-C9-C10
3	B	203	58A	C2-C1-CCJ-CCI
3	B	203	58A	CBM-CBN-CBO-CBP
5	A	205	OLC	C7-C8-C9-C10
3	B	203	58A	CBK-CBL-CBM-CBN
5	B	206	OLC	O20-C21-C22-C24
6	B	212	BU1	O5-C1-C2-C3
5	A	205	OLC	C5-C6-C7-C8
3	B	203	58A	CCA-CCB-CCC-CCD
3	A	203	58A	CBN-CBO-CBP-CBQ

There are no ring outliers.

5 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	205	OLC	3	0
3	A	203	58A	10	0
6	A	206	BU1	1	0
3	B	203	58A	4	0
5	B	205	OLC	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is

within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand OLC A 205

Bond lengths — Bond angles — Torsions — Rings

Ligand 58A A 203

Bond lengths — Bond angles — Torsions — Rings

Ligand 58A B 203

Bond lengths

Bond angles

Torsions

Rings

Ligand OLC B 206

Bond lengths

Bond angles

Torsions

Rings

Ligand OLC B 205

Bond lengths

Bond angles

Torsions

Rings
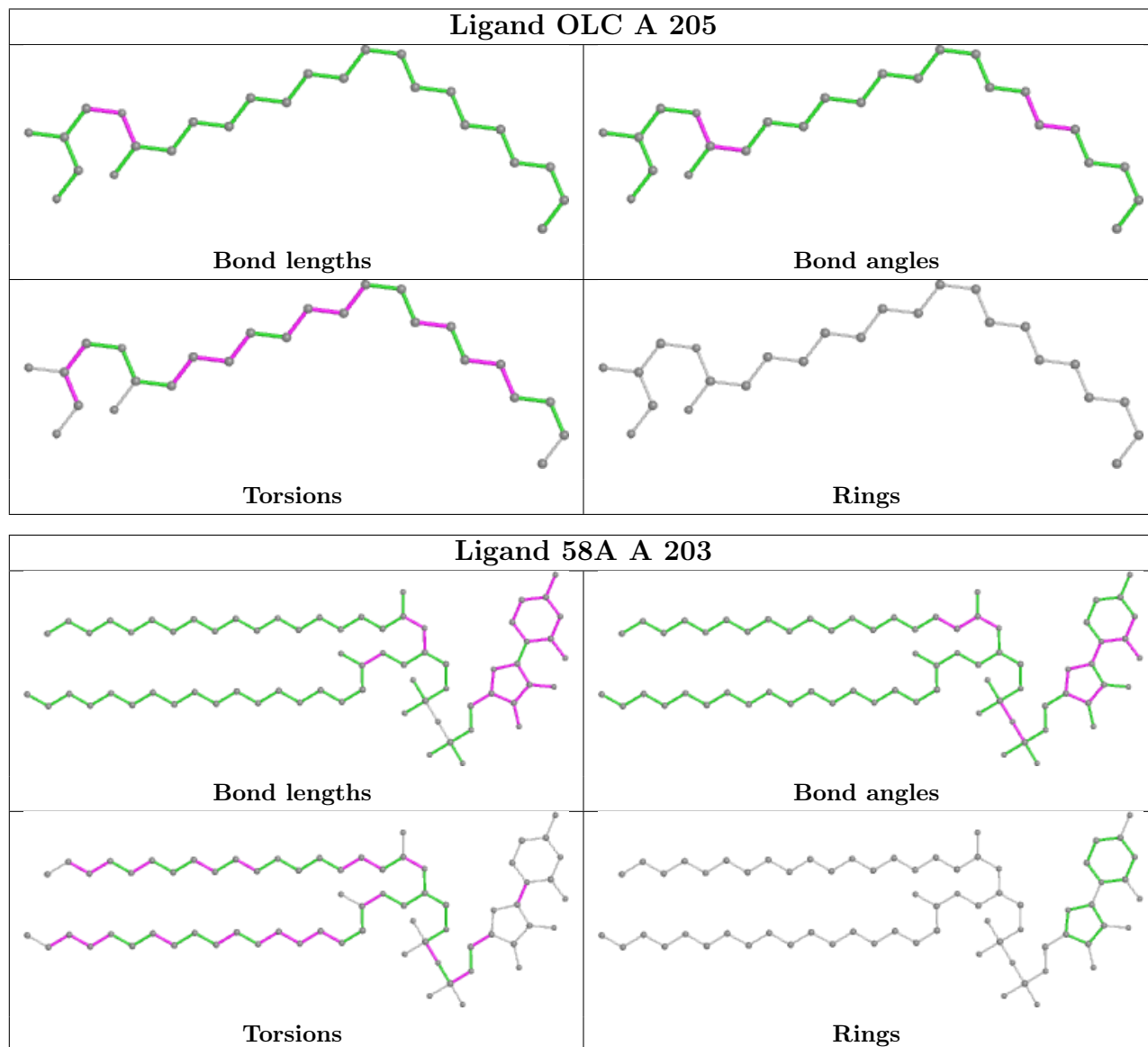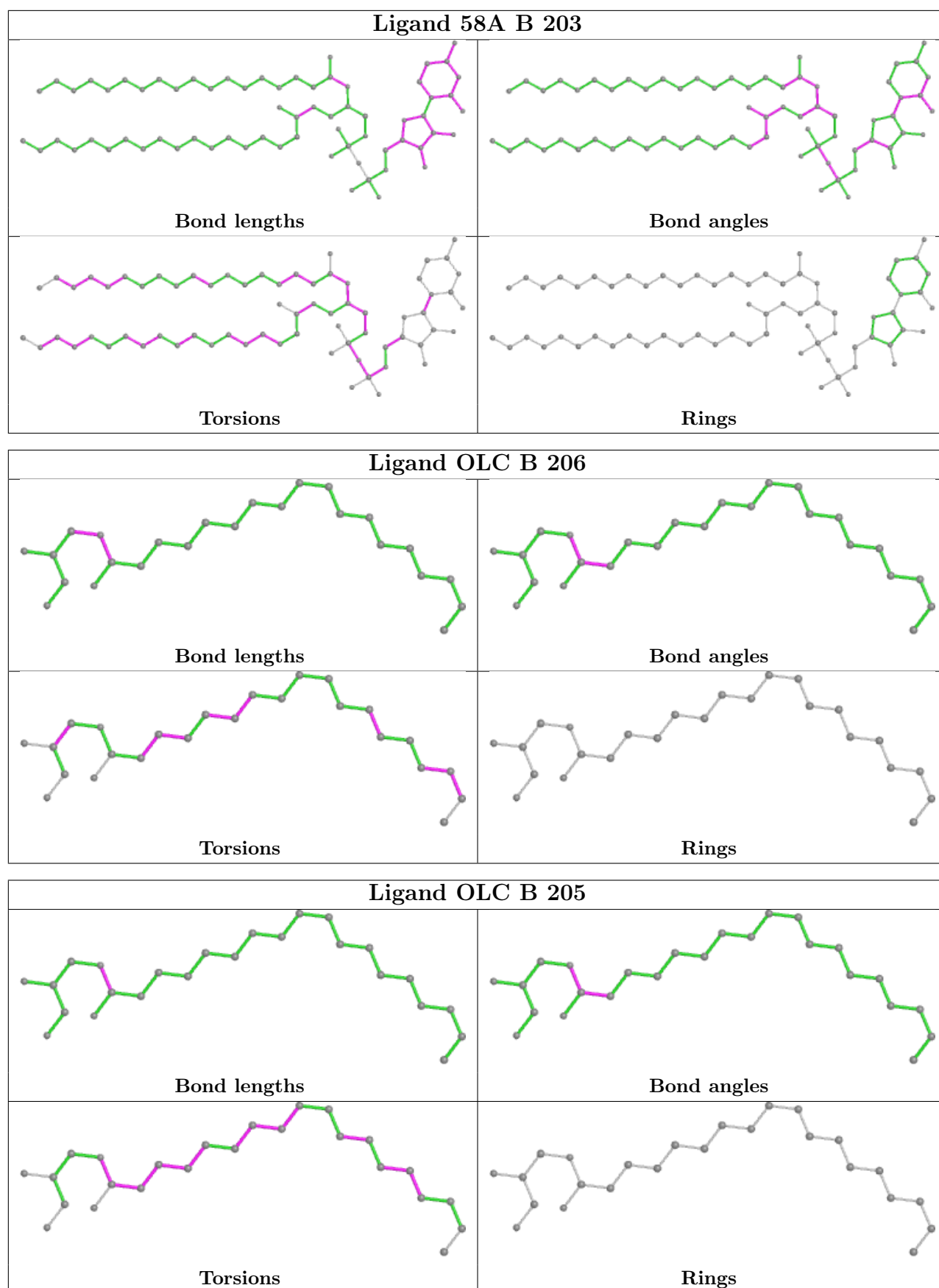
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	184/212 (86%)	-0.27	1 (0%)	91	75	29, 51, 82, 102	0
1	B	185/212 (87%)	-0.24	1 (0%)	91	75	29, 51, 84, 96	0
All	All	369/424 (87%)	-0.25	2 (0%)	91	75	29, 51, 84, 102	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	129	ALA	2.2
1	B	38	GLU	2.2

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.
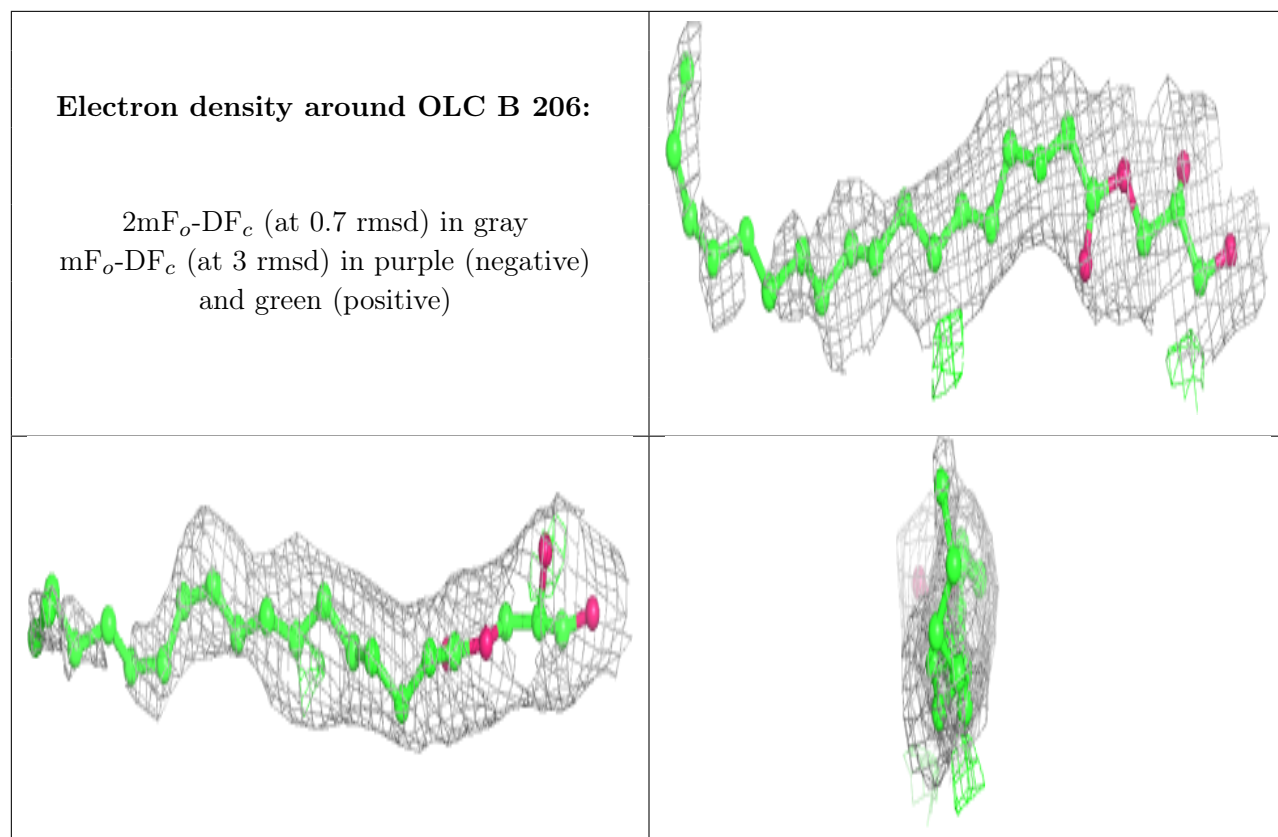
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	BU1	B	213	6/6	0.72	0.26	61,67,73,75	0
4	G3P	A	209	10/10	0.74	0.32	63,78,96,105	0
6	BU1	B	208	6/6	0.78	0.25	67,69,76,84	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	BU1	B	211	6/6	0.79	0.17	59,62,67,70	0
5	OLC	B	206	25/25	0.79	0.26	45,70,80,88	0
2	ZN	A	202	1/1	0.80	0.10	61,61,61,61	0
6	BU1	B	212	6/6	0.82	0.34	57,63,65,68	0
7	ACY	A	210	4/4	0.83	0.26	54,67,70,72	0
5	OLC	A	205	25/25	0.84	0.25	35,61,88,91	0
4	G3P	A	208	10/10	0.86	0.23	50,85,110,121	0
5	OLC	B	205	25/25	0.86	0.27	37,66,85,93	0
4	G3P	A	204	10/10	0.86	0.29	61,69,93,93	0
4	G3P	B	215	10/10	0.86	0.30	74,86,104,108	0
7	ACY	A	211	4/4	0.87	0.18	26,47,51,64	0
6	BU1	B	210	6/6	0.88	0.17	39,48,59,61	0
6	BU1	B	204	6/6	0.88	0.20	27,32,39,44	0
3	58A	A	203	68/68	0.88	0.20	30,53,70,74	0
3	58A	B	203	68/68	0.89	0.20	29,52,71,82	0
6	BU1	B	209	6/6	0.89	0.13	58,67,71,86	0
4	G3P	A	207	10/10	0.91	0.25	54,64,76,79	0
6	BU1	B	207	6/6	0.91	0.18	58,61,63,75	0
6	BU1	A	206	6/6	0.92	0.26	53,60,77,78	0
6	BU1	B	214	6/6	0.93	0.19	62,67,72,77	0
2	ZN	A	201	1/1	0.94	0.07	56,56,56,56	0
2	ZN	B	201	1/1	0.95	0.09	61,61,61,61	0
2	ZN	B	202	1/1	0.98	0.05	45,45,45,45	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.
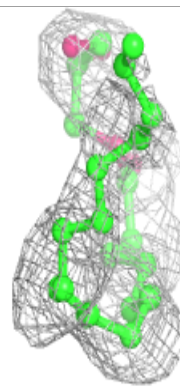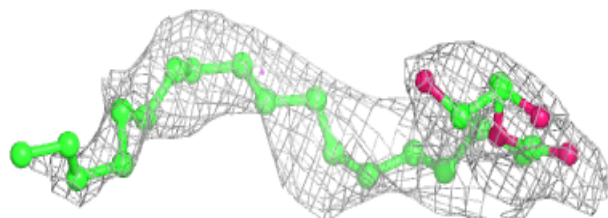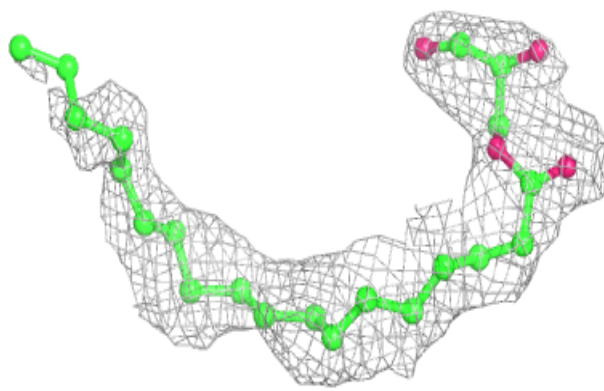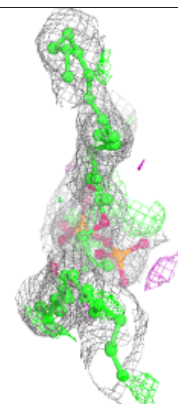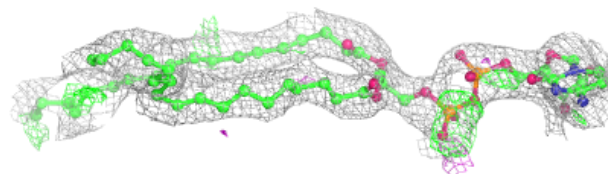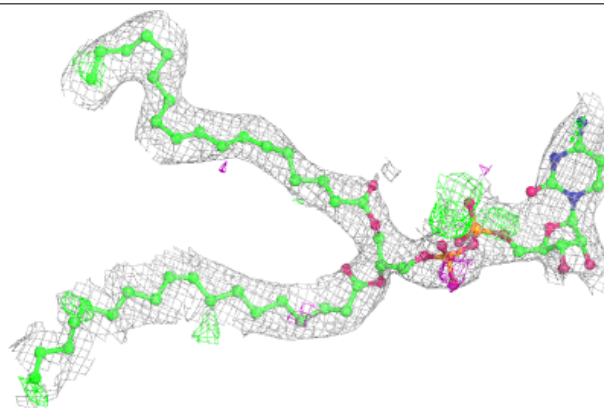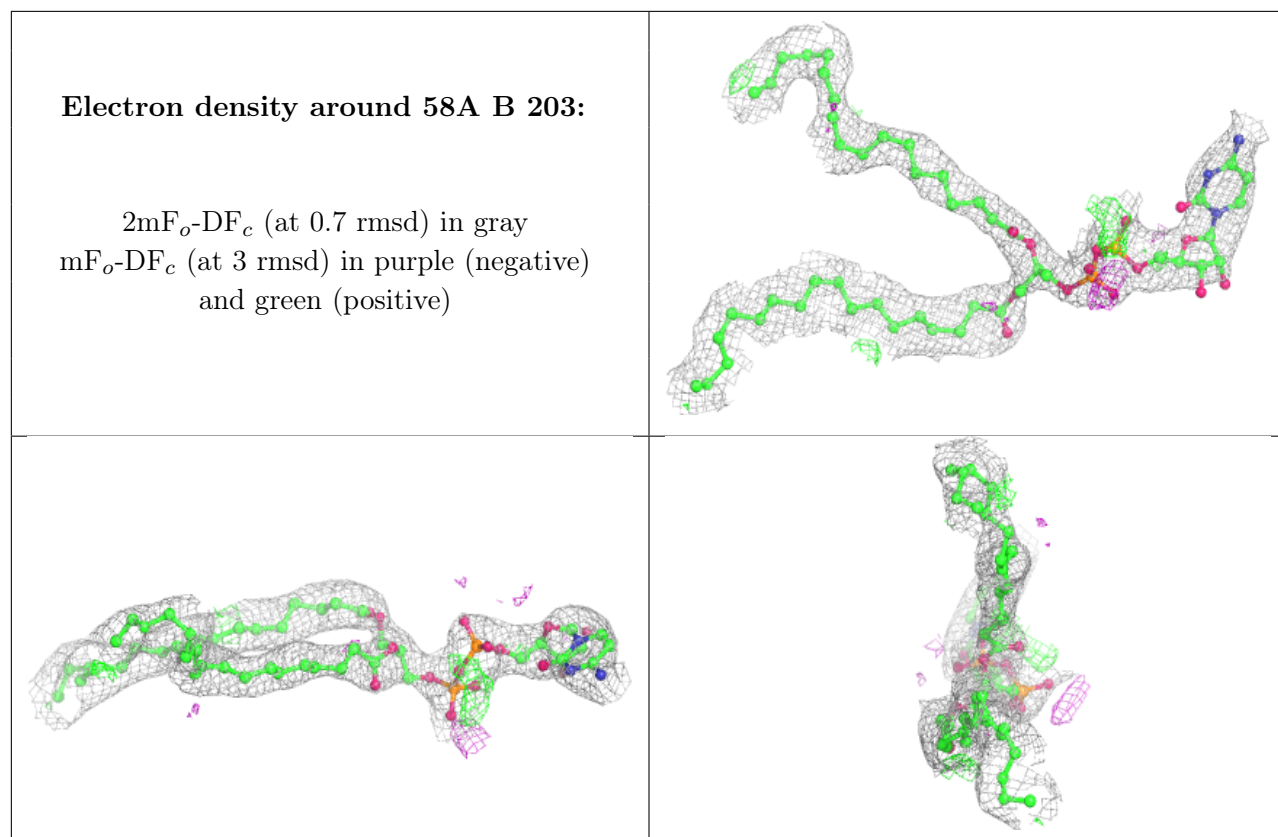
Electron density around OLC B 206:

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

Electron density around OLC A 205:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
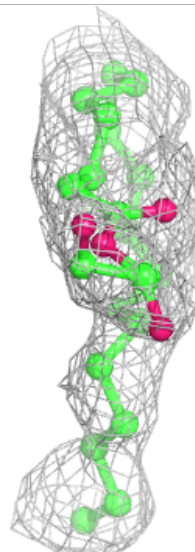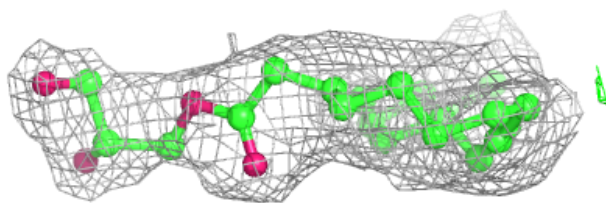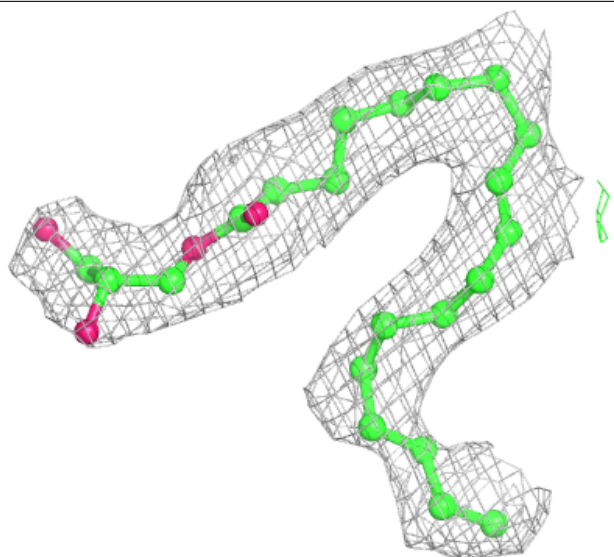
Electron density around OLC B 205:

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

Electron density around 58A A 203:

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

Electron density around 58A B 203:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.