



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 19, 2020 – 07:34 pm BST

PDB ID : 5OXL
Title : PepTSt in complex with dipeptide Ala-Leu
Authors : Martinez Molledo, M.; Quistgaard, E.M.; Loew, C.
Deposited on : 2017-09-07
Resolution : 2.66 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 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 : 2.11
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) : 2.11

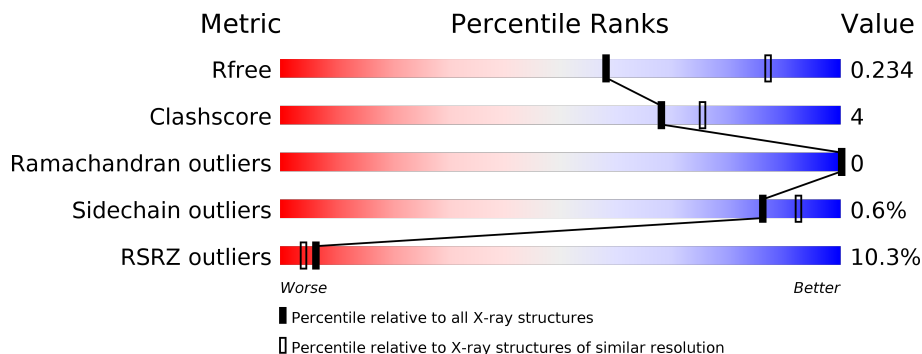
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.66 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	1332 (2.68-2.64)
Clashscore	141614	1374 (2.68-2.64)
Ramachandran outliers	138981	1349 (2.68-2.64)
Sidechain outliers	138945	1349 (2.68-2.64)
RSRZ outliers	127900	1318 (2.68-2.64)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	490	

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
5	78N	A	507	-	-	-	X

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 3786 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.

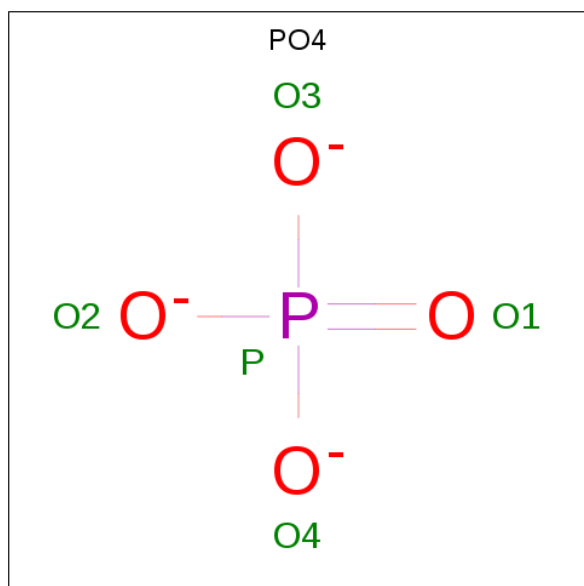
- Molecule 1 is a protein called Di-or tripeptide:H⁺ symporter.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	448	3463	2337	531	578	17	0	0	0

There are 7 discrepancies between the modelled and reference sequences:

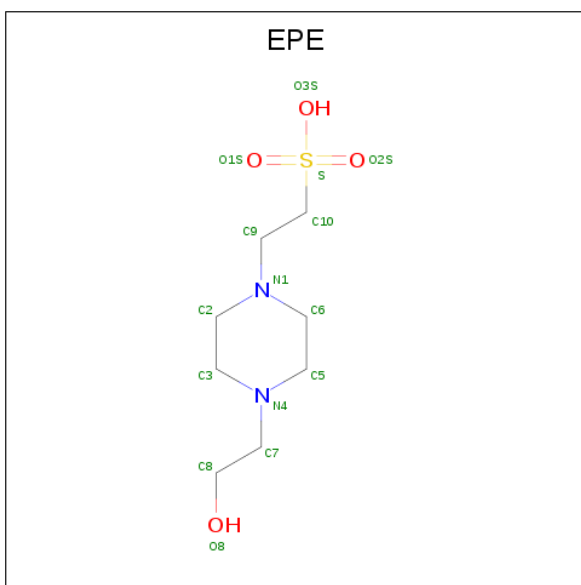
Chain	Residue	Modelled	Actual	Comment	Reference
A	484	ALA	-	expression tag	UNP Q5M4H8
A	485	GLU	-	expression tag	UNP Q5M4H8
A	486	ASN	-	expression tag	UNP Q5M4H8
A	487	LEU	-	expression tag	UNP Q5M4H8
A	488	TYR	-	expression tag	UNP Q5M4H8
A	489	PHE	-	expression tag	UNP Q5M4H8
A	490	GLN	-	expression tag	UNP Q5M4H8

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O₄P).



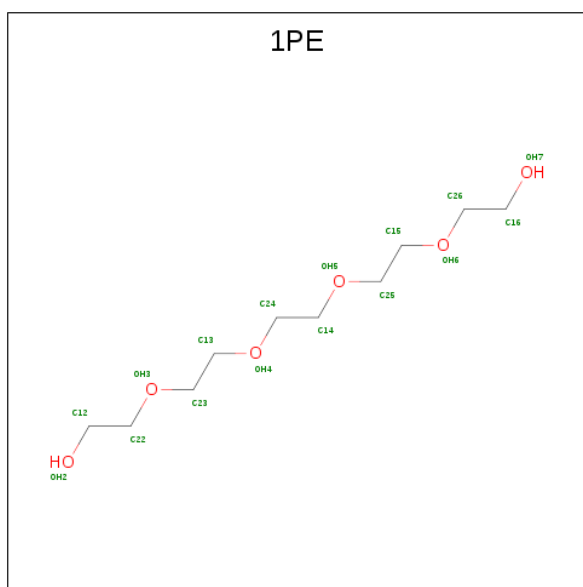
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	P	0	0
			5	4	1		
2	A	1	Total	O	P	0	0
			5	4	1		

- Molecule 3 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: C₈H₁₈N₂O₄S).



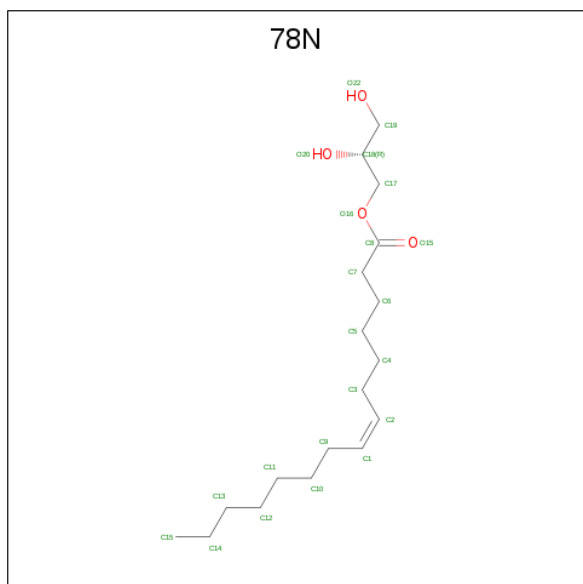
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 4 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: C₁₀H₂₂O₆).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	C O	0	0
			16	10 6		
4	A	1	Total	C O	0	0
			16	10 6		

- Molecule 5 is (2R)-2,3-DIHYDROXYPROPYL(7Z)-PENTADEC-7-ENOATE (three-letter code: 78N) (formula: C₁₈H₃₄O₄).



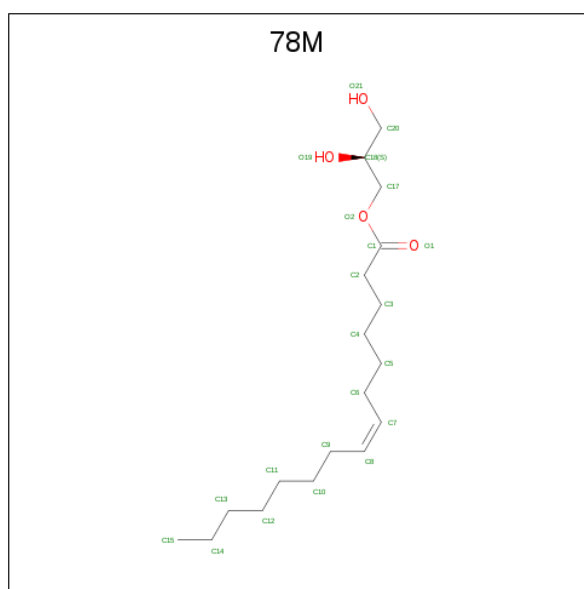
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	C O	0	0
			22	18 4		

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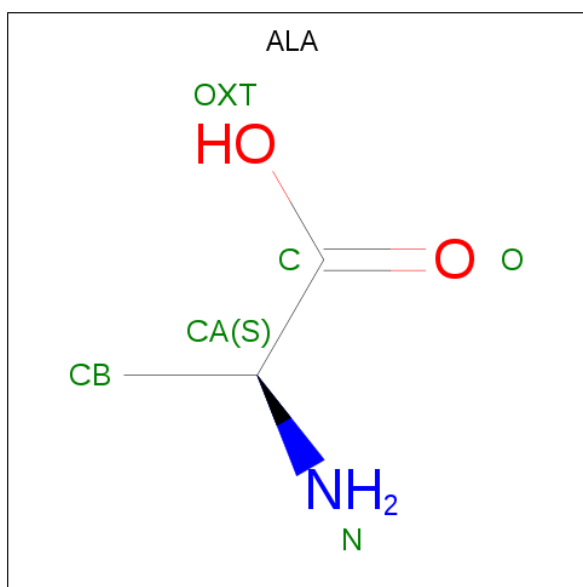
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			22	18	4		
5	A	1	Total	C	O	0	0
			22	18	4		
5	A	1	Total	C	O	0	0
			22	18	4		
5	A	1	Total	C	O	0	0
			22	18	4		
5	A	1	Total	C	O	0	0
			22	18	4		
5	A	1	Total	C	O	0	0
			22	18	4		
5	A	1	Total	C	O	0	0
			22	18	4		

- Molecule 6 is (2S)-2,3-DIHYDROXYPROPYL(7Z)-PENTADEC-7-ENOATE (three-letter code: 78M) (formula: C₁₈H₃₄O₄).



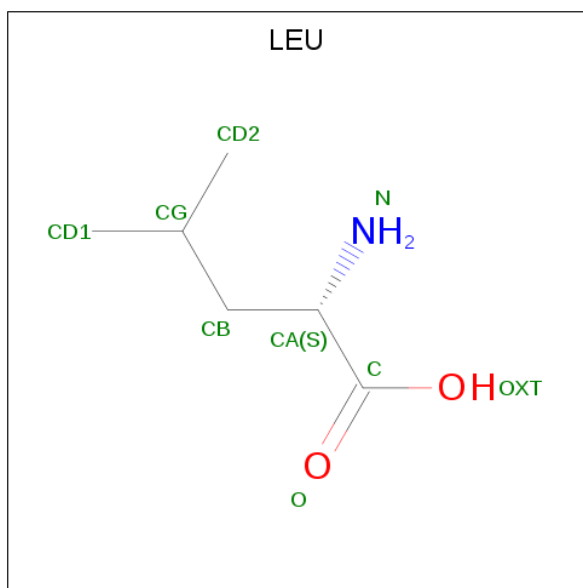
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			22	18	4		

- Molecule 7 is ALANINE (three-letter code: ALA) (formula: C₃H₇NO₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
7	A	1	5	3	1	1	0	0

- Molecule 8 is LEUCINE (three-letter code: LEU) (formula: C₆H₁₃NO₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
8	A	1	9	6	1	2	0	0

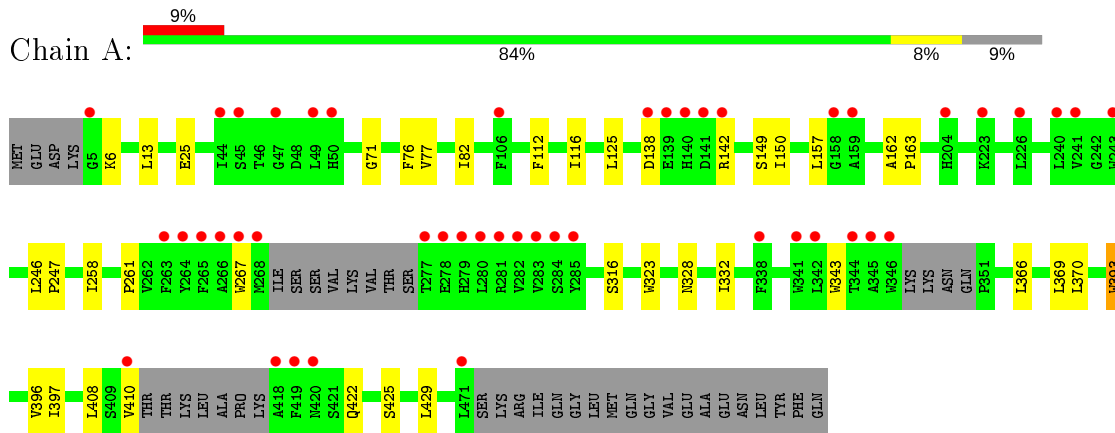
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	32	Total 32	O 32	0	0

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Di- or tripeptide:H⁺ symporter



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	102.30Å 110.60Å 108.50Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.27 – 2.66 46.27 – 2.66	Depositor EDS
% Data completeness (in resolution range)	98.2 (46.27-2.66) 98.3 (46.27-2.66)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.03 (at 2.65Å)	Xtrriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.224 , 0.233 0.227 , 0.234	Depositor DCC
R_{free} test set	878 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å ²)	49.8	Xtrriage
Anisotropy	0.595	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 57.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	3786	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.70% 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: 78M, PO4, EPE, 78N, 1PE

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	0.24	0/3569	0.39	0/4869

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3463	0	3528	25	0
2	A	10	0	0	0	0
3	A	15	0	17	1	0
4	A	32	0	44	1	0
5	A	198	0	306	8	0
6	A	22	0	34	1	0
7	A	5	0	4	1	0
8	A	9	0	11	0	0
9	A	32	0	0	1	0
All	All	3786	0	3944	29	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 4.

All (29) 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:316:SER:O	9:A:601:HOH:O	2.14	0.65
1:A:142:ARG:HB3	1:A:410:VAL:HG13	1.81	0.62
1:A:332:ILE:HG13	1:A:397:ILE:HG23	1.83	0.61
1:A:6:LYS:HG2	1:A:13:LEU:HD21	1.83	0.59
1:A:261:PRO:HG3	1:A:429:LEU:HD21	1.87	0.55
1:A:393:TRP:HA	1:A:396:VAL:HG12	1.92	0.50
1:A:343:TRP:CE2	4:A:505:1PE:H242	2.48	0.49
1:A:328:ASN:OD1	7:A:516:ALA:N	2.47	0.48
1:A:76:PHE:HA	1:A:422:GLN:HG2	1.97	0.47
1:A:157:LEU:HD21	5:A:515:78N:H142	1.97	0.47
1:A:258:ILE:O	1:A:261:PRO:HD2	2.16	0.46
1:A:323:TRP:O	5:A:509:78N:H2	2.15	0.46
1:A:25:GLU:HG3	1:A:125:LEU:HD22	1.99	0.44
1:A:408:LEU:O	5:A:515:78N:O22	2.32	0.44
3:A:503:EPE:H82	3:A:503:EPE:H31	1.82	0.43
1:A:370:LEU:HD21	6:A:508:78M:H42C	2.01	0.43
5:A:509:78N:H91C	5:A:509:78N:H31C	1.74	0.43
1:A:162:ALA:HB3	1:A:163:PRO:HD3	2.01	0.43
1:A:366:LEU:HD23	1:A:369:LEU:HD12	2.00	0.42
1:A:150:ILE:HG12	5:A:515:78N:H171	2.00	0.42
1:A:71:GLY:O	1:A:425:SER:OG	2.37	0.42
1:A:149:SER:HB3	5:A:515:78N:H192	2.02	0.42
1:A:267:TRP:CD1	1:A:267:TRP:C	2.94	0.41
1:A:149:SER:OG	1:A:408:LEU:HB2	2.21	0.41
1:A:246:LEU:HB3	1:A:247:PRO:HD3	2.03	0.41
1:A:77:VAL:HG12	1:A:82:ILE:HG12	2.03	0.41
1:A:112:PHE:O	1:A:116:ILE:HG12	2.21	0.41
5:A:515:78N:H1	5:A:515:78N:H122	2.02	0.41
5:A:512:78N:H91C	5:A:512:78N:H31C	1.87	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [\(i\)](#)

5.3.1 Protein backbone [\(i\)](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	440/490 (90%)	432 (98%)	8 (2%)	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	A	359/397 (90%)	357 (99%)	2 (1%)	86	92

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	138	ASP
1	A	393	TRP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	170	GLN
1	A	328	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

17 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	1PE	A	504	-	15,15,15	0.64	0	14,14,14	0.48	0
2	PO4	A	501	-	4,4,4	0.91	0	6,6,6	0.42	0
5	78N	A	511	-	21,21,21	0.95	1 (4%)	22,22,22	0.95	1 (4%)
5	78N	A	510	-	21,21,21	0.93	1 (4%)	22,22,22	0.91	1 (4%)
2	PO4	A	502	-	4,4,4	0.93	0	6,6,6	0.41	0
5	78N	A	509	-	21,21,21	0.96	1 (4%)	22,22,22	0.95	1 (4%)
5	78N	A	513	-	21,21,21	0.95	1 (4%)	22,22,22	0.94	1 (4%)
6	78M	A	508	-	21,21,21	1.14	1 (4%)	22,22,22	0.92	1 (4%)
5	78N	A	507	-	21,21,21	0.95	1 (4%)	22,22,22	0.91	1 (4%)
5	78N	A	506	-	21,21,21	0.94	1 (4%)	22,22,22	1.03	1 (4%)
4	1PE	A	505	-	15,15,15	0.61	0	14,14,14	0.51	0
5	78N	A	512	-	21,21,21	0.94	1 (4%)	22,22,22	0.96	1 (4%)
3	EPE	A	503	-	15,15,15	0.89	0	18,20,20	1.35	1 (5%)
5	78N	A	515	-	21,21,21	0.97	1 (4%)	22,22,22	0.96	1 (4%)
5	78N	A	514	-	21,21,21	0.93	1 (4%)	22,22,22	0.94	1 (4%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	1PE	A	504	-	-	6/13/13/13	-
5	78N	A	511	-	-	11/21/21/21	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	78N	A	510	-	-	10/21/21/21	-
5	78N	A	509	-	-	11/21/21/21	-
5	78N	A	513	-	-	11/21/21/21	-
5	78N	A	507	-	-	13/21/21/21	-
6	78M	A	508	-	-	14/21/21/21	-
5	78N	A	506	-	-	9/21/21/21	-
4	1PE	A	505	-	-	6/13/13/13	-
5	78N	A	512	-	-	11/21/21/21	-
3	EPE	A	503	-	-	6/9/19/19	0/1/1/1
5	78N	A	515	-	-	9/21/21/21	-
5	78N	A	514	-	-	8/21/21/21	-

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	508	78M	O2-C1	3.26	1.42	1.33
5	A	515	78N	O16-C8	3.00	1.42	1.33
5	A	513	78N	O16-C8	2.99	1.42	1.33
5	A	509	78N	O16-C8	2.98	1.42	1.33
5	A	512	78N	O16-C8	2.96	1.42	1.33
5	A	514	78N	O16-C8	2.95	1.42	1.33
5	A	507	78N	O16-C8	2.95	1.42	1.33
5	A	510	78N	O16-C8	2.94	1.41	1.33
5	A	511	78N	O16-C8	2.94	1.41	1.33
5	A	506	78N	O16-C8	2.88	1.41	1.33

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	506	78N	O16-C8-C7	2.89	120.99	111.91
5	A	515	78N	O16-C8-C7	2.79	120.65	111.91
3	A	503	EPE	O1S-S-C10	-2.66	103.71	106.92
5	A	509	78N	O16-C8-C7	2.62	120.12	111.91
5	A	512	78N	O16-C8-C7	2.58	120.00	111.91
5	A	513	78N	O16-C8-C7	2.56	119.95	111.91
6	A	508	78M	O2-C1-C2	2.53	119.86	111.91
5	A	507	78N	O16-C8-C7	2.50	119.76	111.91
5	A	511	78N	O16-C8-C7	2.48	119.67	111.91
5	A	514	78N	O16-C8-C7	2.34	119.25	111.91
5	A	510	78N	O16-C8-C7	2.09	118.47	111.91

There are no chirality outliers.

All (125) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	511	78N	O20-C18-C19-O22
5	A	511	78N	C17-C18-C19-O22
5	A	511	78N	O16-C17-C18-O20
5	A	507	78N	C17-C18-C19-O22
5	A	507	78N	O16-C17-C18-C19
5	A	507	78N	O16-C17-C18-O20
5	A	510	78N	O16-C17-C18-C19
5	A	510	78N	O16-C17-C18-O20
5	A	509	78N	C17-C18-C19-O22
5	A	512	78N	C17-C18-C19-O22
6	A	508	78M	C17-C18-C20-O21
6	A	508	78M	O2-C17-C18-C20
6	A	508	78M	O2-C17-C18-O19
3	A	503	EPE	C10-C9-N1-C6
3	A	503	EPE	C9-C10-S-O1S
5	A	515	78N	C17-C18-C19-O22
5	A	514	78N	C17-C18-C19-O22
5	A	511	78N	O15-C8-O16-C17
5	A	511	78N	C7-C8-O16-C17
5	A	515	78N	O15-C8-O16-C17
5	A	515	78N	C7-C8-O16-C17
5	A	512	78N	C7-C8-O16-C17
5	A	506	78N	O16-C17-C18-O20
5	A	512	78N	O15-C8-O16-C17
5	A	509	78N	C7-C8-O16-C17
6	A	508	78M	C2-C1-O2-C17
5	A	511	78N	O16-C17-C18-C19
6	A	508	78M	C1-C2-C3-C4
6	A	508	78M	O1-C1-O2-C17
3	A	503	EPE	N4-C7-C8-O8
5	A	512	78N	O20-C18-C19-O22
5	A	510	78N	C5-C6-C7-C8
4	A	504	1PE	OH7-C16-C26-OH6
5	A	509	78N	O15-C8-O16-C17
5	A	513	78N	C5-C6-C7-C8
5	A	513	78N	O16-C17-C18-O20
5	A	512	78N	O16-C17-C18-O20
5	A	512	78N	C5-C6-C7-C8
3	A	503	EPE	C9-C10-S-O3S
4	A	505	1PE	OH5-C14-C24-OH4

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Mol	Chain	Res	Type	Atoms
4	A	505	1PE	OH7-C16-C26-OH6
5	A	511	78N	C10-C11-C12-C13
5	A	512	78N	C9-C10-C11-C12
5	A	513	78N	O16-C17-C18-C19
5	A	512	78N	O16-C17-C18-C19
5	A	513	78N	C4-C5-C6-C7
5	A	509	78N	C11-C12-C13-C14
5	A	512	78N	C10-C11-C12-C13
5	A	514	78N	C2-C3-C4-C5
5	A	510	78N	C11-C12-C13-C14
6	A	508	78M	C3-C4-C5-C6
5	A	507	78N	C9-C10-C11-C12
5	A	509	78N	O20-C18-C19-O22
5	A	509	78N	C9-C10-C11-C12
5	A	510	78N	C11-C10-C9-C1
5	A	509	78N	C11-C10-C9-C1
4	A	505	1PE	OH6-C15-C25-OH5
5	A	507	78N	C4-C5-C6-C7
5	A	513	78N	C2-C3-C4-C5
5	A	506	78N	C11-C10-C9-C1
6	A	508	78M	C4-C5-C6-C7
5	A	507	78N	C7-C8-O16-C17
5	A	506	78N	C4-C5-C6-C7
5	A	507	78N	C11-C10-C9-C1
5	A	515	78N	C11-C10-C9-C1
5	A	515	78N	C11-C12-C13-C14
5	A	512	78N	C11-C10-C9-C1
5	A	507	78N	O15-C8-O16-C17
5	A	509	78N	C3-C4-C5-C6
5	A	515	78N	C12-C13-C14-C15
6	A	508	78M	O19-C18-C20-O21
5	A	515	78N	O20-C18-C19-O22
5	A	514	78N	O20-C18-C19-O22
5	A	514	78N	C11-C10-C9-C1
5	A	506	78N	C17-C18-C19-O22
6	A	508	78M	C9-C10-C11-C12
5	A	513	78N	C7-C8-O16-C17
3	A	503	EPE	C10-C9-N1-C2
5	A	507	78N	C10-C11-C12-C13
5	A	513	78N	C11-C10-C9-C1
5	A	509	78N	O16-C17-C18-O20
5	A	506	78N	C10-C11-C12-C13

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Mol	Chain	Res	Type	Atoms
4	A	504	1PE	C12-C22-OH3-C23
5	A	513	78N	O15-C8-O16-C17
4	A	505	1PE	C16-C26-OH6-C15
5	A	507	78N	O20-C18-C19-O22
5	A	513	78N	O20-C18-C19-O22
5	A	513	78N	C17-C18-C19-O22
5	A	509	78N	O16-C17-C18-C19
3	A	503	EPE	C9-C10-S-O2S
4	A	505	1PE	C24-C14-OH5-C25
6	A	508	78M	C11-C12-C13-C14
5	A	514	78N	O16-C17-C18-C19
4	A	504	1PE	C23-C13-OH4-C24
5	A	507	78N	C2-C1-C9-C10
5	A	510	78N	C1-C2-C3-C4
5	A	510	78N	C12-C13-C14-C15
5	A	509	78N	C10-C11-C12-C13
5	A	511	78N	C4-C5-C6-C7
5	A	510	78N	C10-C11-C12-C13
5	A	506	78N	O16-C17-C18-C19
4	A	504	1PE	C15-C25-OH5-C14
5	A	514	78N	C9-C10-C11-C12
5	A	507	78N	C3-C4-C5-C6
4	A	504	1PE	OH6-C15-C25-OH5
6	A	508	78M	C11-C10-C9-C8
5	A	512	78N	C4-C5-C6-C7
4	A	505	1PE	C12-C22-OH3-C23
5	A	506	78N	C1-C2-C3-C4
6	A	508	78M	C5-C6-C7-C8
6	A	508	78M	C7-C8-C9-C10
5	A	515	78N	C1-C2-C3-C4
5	A	511	78N	C9-C10-C11-C12
5	A	514	78N	C3-C4-C5-C6
5	A	511	78N	C2-C1-C9-C10
5	A	507	78N	C1-C2-C3-C4
5	A	514	78N	C2-C1-C9-C10
5	A	513	78N	C11-C12-C13-C14
4	A	504	1PE	C24-C14-OH5-C25
5	A	515	78N	C10-C11-C12-C13
5	A	510	78N	C4-C5-C6-C7
5	A	510	78N	C2-C1-C9-C10
5	A	506	78N	C12-C13-C14-C15
5	A	506	78N	C2-C1-C9-C10

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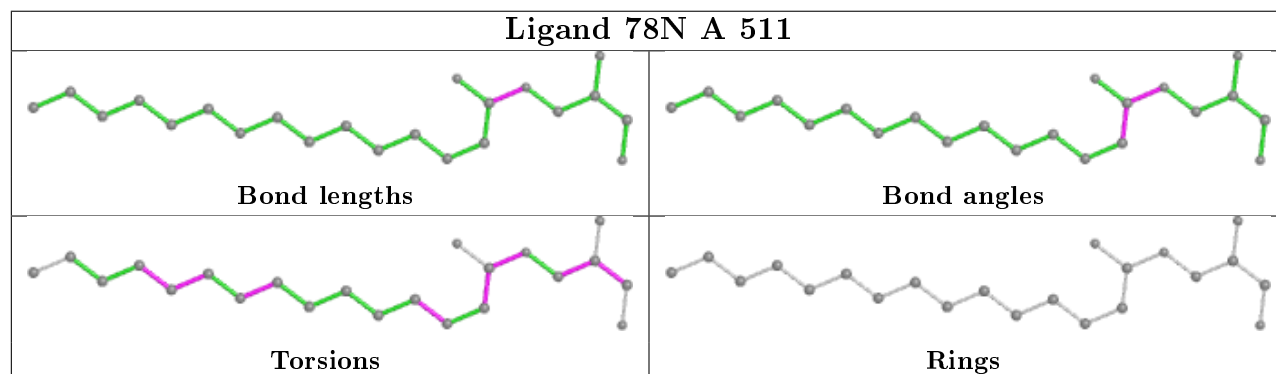
Mol	Chain	Res	Type	Atoms
5	A	511	78N	C6-C7-C8-O16

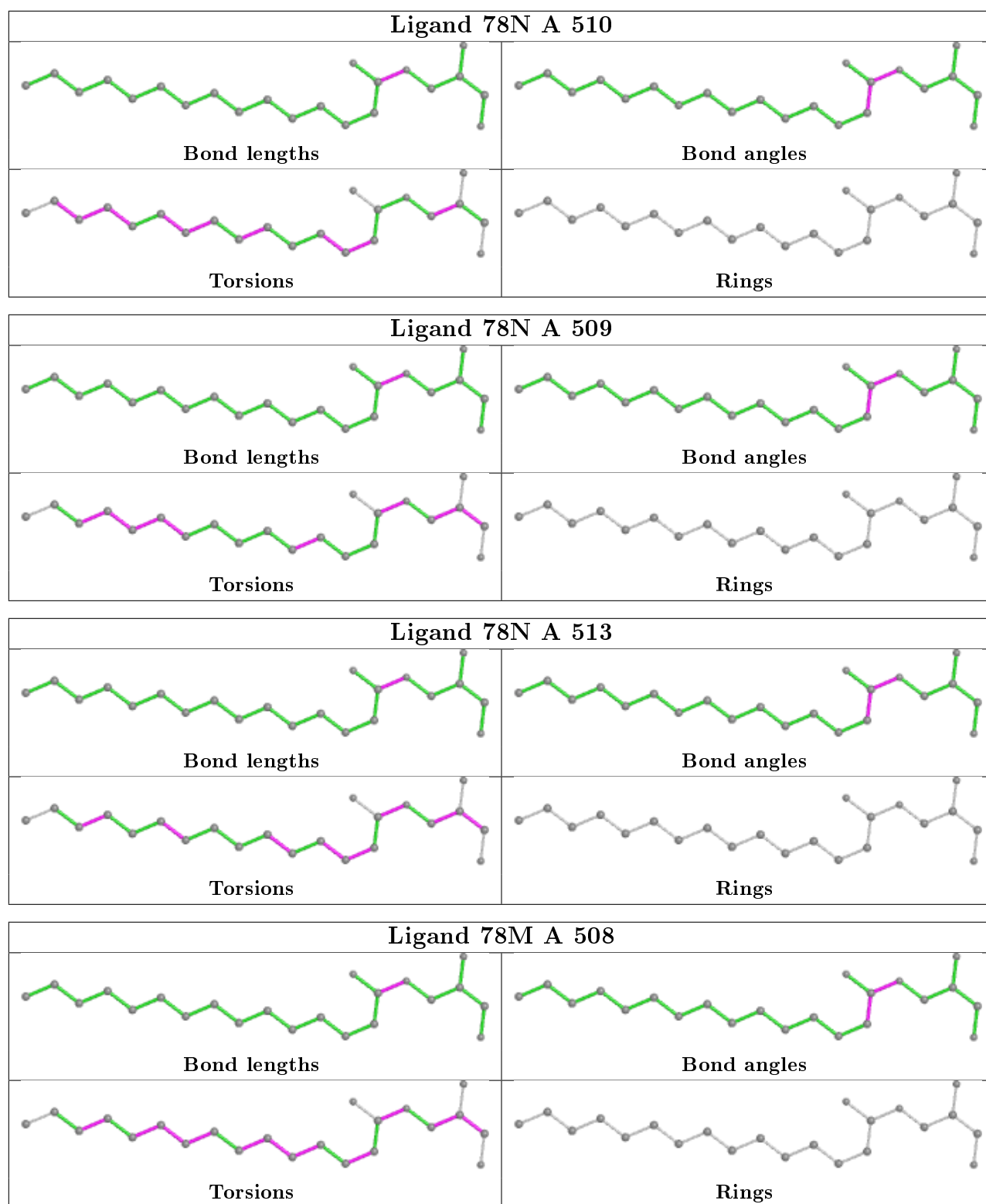
There are no ring outliers.

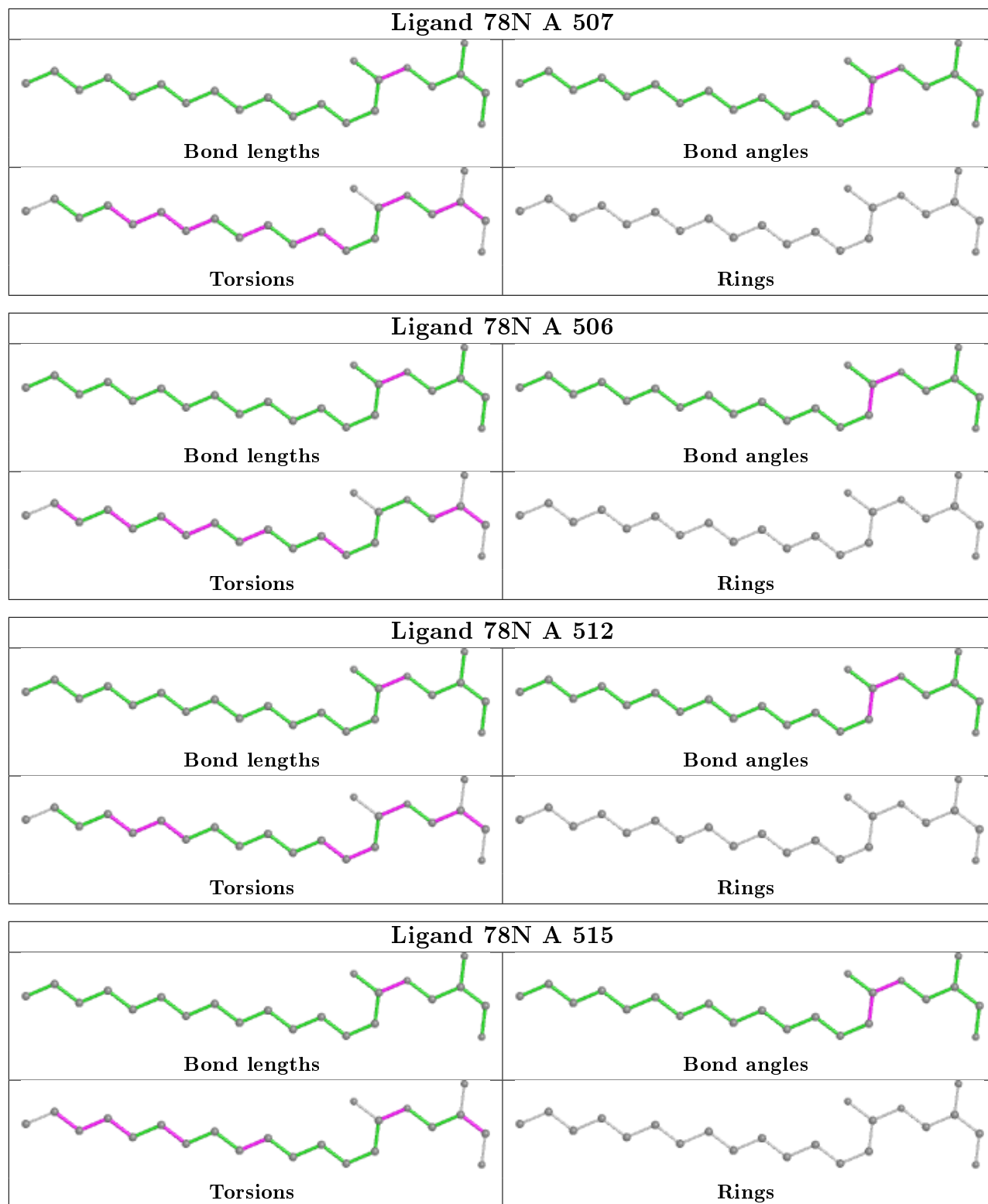
6 monomers are involved in 11 short contacts:

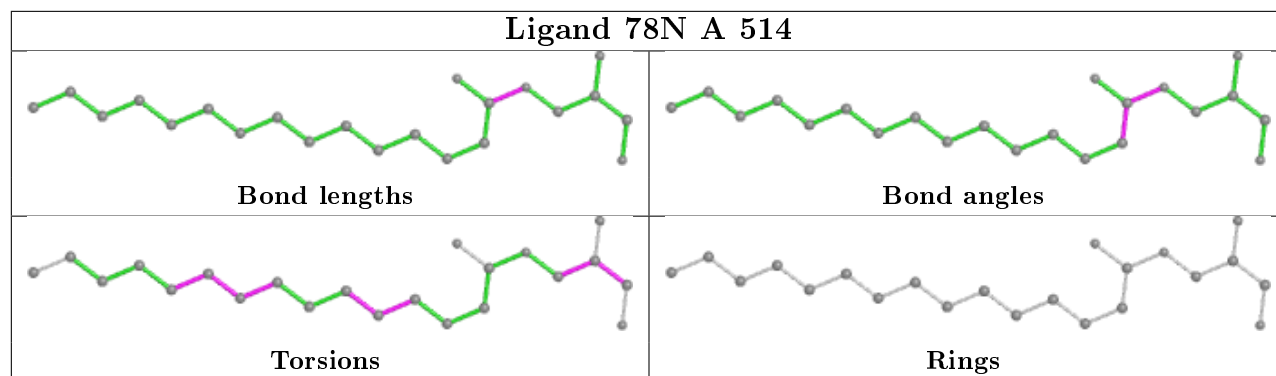
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	509	78N	2	0
6	A	508	78M	1	0
4	A	505	1PE	1	0
5	A	512	78N	1	0
3	A	503	EPE	1	0
5	A	515	78N	5	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	448/490 (91%)	0.53	46 (10%) 6 4	34, 49, 87, 127	0

All (46) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	139	GLU	5.9
1	A	279	HIS	5.8
1	A	280	LEU	5.8
1	A	267	TRP	5.5
1	A	268	MET	5.2
1	A	265	PHE	5.2
1	A	140	HIS	5.1
1	A	281	ARG	4.8
1	A	341	TRP	4.7
1	A	345	ALA	4.7
1	A	285	TYR	4.6
1	A	264	TYR	4.5
1	A	346	TRP	4.4
1	A	142	ARG	4.4
1	A	278	GLU	4.4
1	A	419	PHE	4.3
1	A	5	GLY	4.2
1	A	277	THR	4.1
1	A	283	VAL	3.6
1	A	204	HIS	3.4
1	A	282	VAL	3.4
1	A	266	ALA	3.3
1	A	50	HIS	3.3
1	A	471	LEU	3.3
1	A	241	VAL	3.2
1	A	418	ALA	3.1
1	A	284	SER	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	45	SER	2.7
1	A	138	ASP	2.7
1	A	243	TRP	2.7
1	A	240	LEU	2.7
1	A	338	PHE	2.5
1	A	44	ILE	2.5
1	A	344	THR	2.4
1	A	159	ALA	2.4
1	A	420	ASN	2.4
1	A	226	LEU	2.3
1	A	410	VAL	2.3
1	A	263	PHE	2.3
1	A	49	LEU	2.2
1	A	342	LEU	2.2
1	A	106	PHE	2.2
1	A	47	GLY	2.1
1	A	158	GLY	2.1
1	A	223	LYS	2.1
1	A	141	ASP	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no carbohydrates 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.

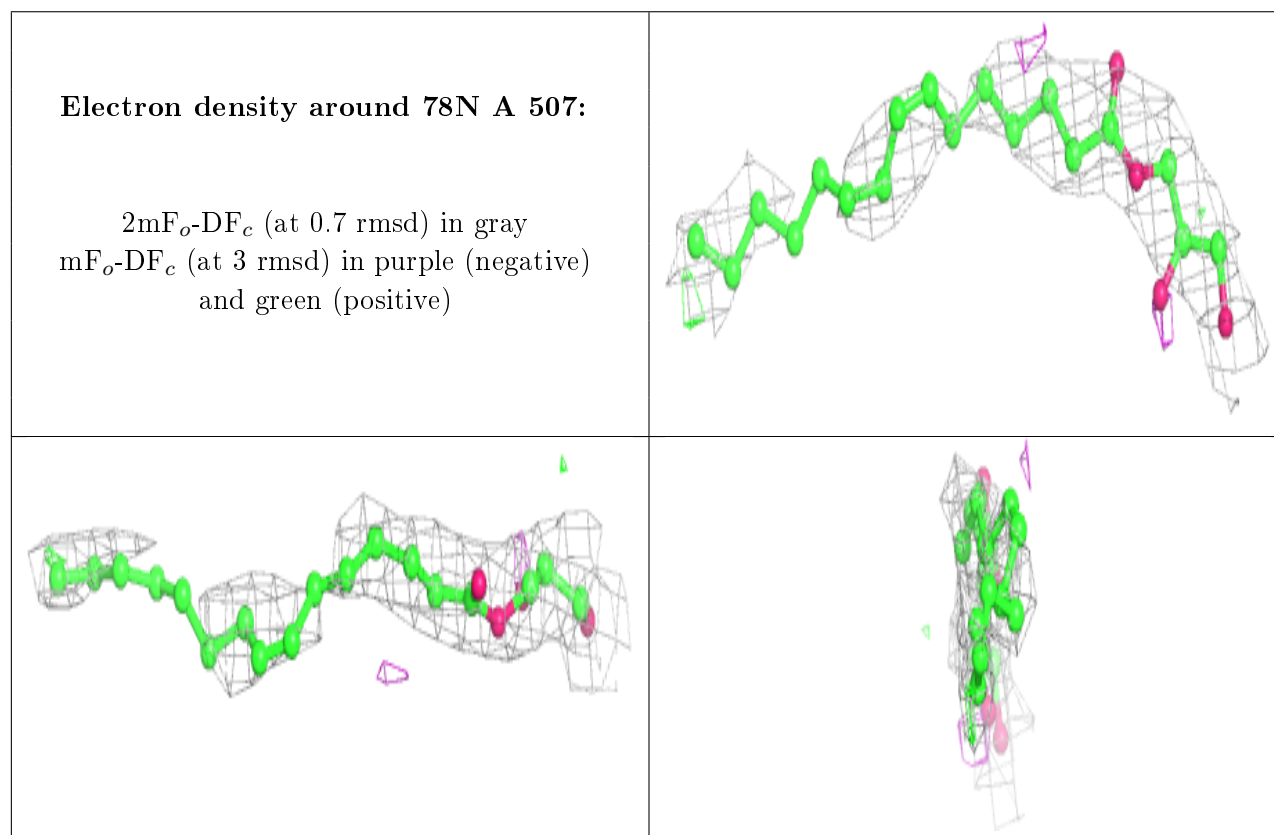
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	78N	A	507	22/22	0.65	0.42	79,94,104,104	0
4	1PE	A	505	16/16	0.67	0.26	86,88,90,90	0
5	78N	A	515	22/22	0.71	0.37	62,74,78,78	0
5	78N	A	511	22/22	0.78	0.38	71,87,120,120	0

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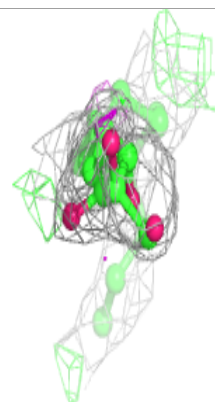
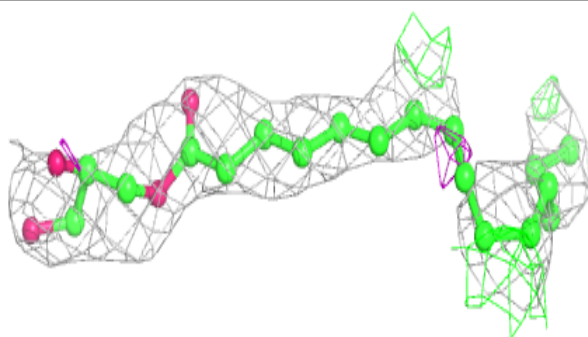
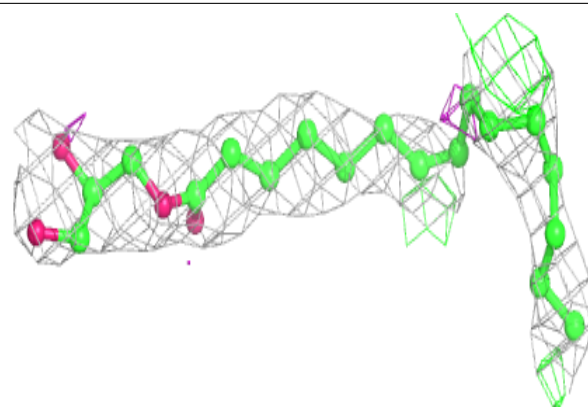
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	78N	A	509	22/22	0.81	0.29	59,74,79,79	0
3	EPE	A	503	15/15	0.81	0.28	97,97,110,110	0
5	78N	A	506	22/22	0.81	0.31	54,70,78,79	0
5	78N	A	513	22/22	0.82	0.30	53,71,90,90	0
6	78M	A	508	22/22	0.82	0.36	51,70,81,82	0
5	78N	A	512	22/22	0.83	0.40	54,73,84,84	0
4	1PE	A	504	16/16	0.84	0.23	87,88,89,89	0
5	78N	A	514	22/22	0.85	0.26	57,69,79,79	0
5	78N	A	510	22/22	0.87	0.29	60,71,72,73	0
2	PO4	A	502	5/5	0.90	0.45	91,91,91,91	0
8	LEU	A	517	9/9	0.91	0.26	44,46,55,57	0
2	PO4	A	501	5/5	0.93	0.24	82,82,83,83	0
7	ALA	A	516	5/6	0.95	0.28	38,42,42,44	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.

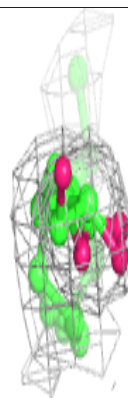
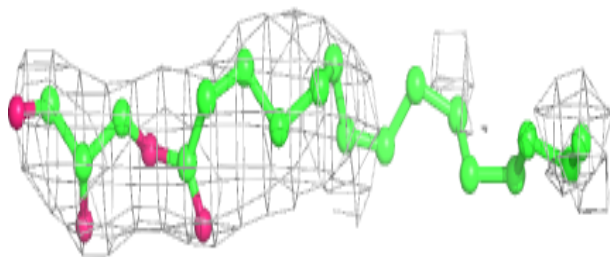
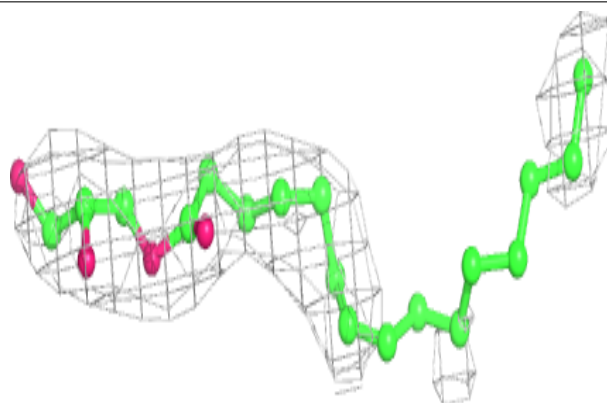


Electron density around 78N A 515:

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

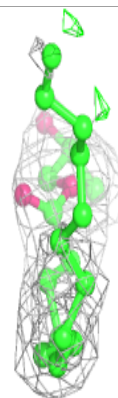
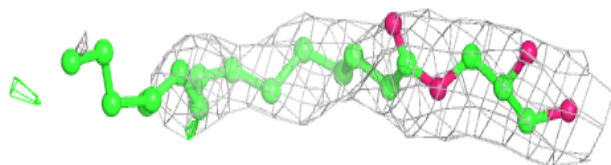
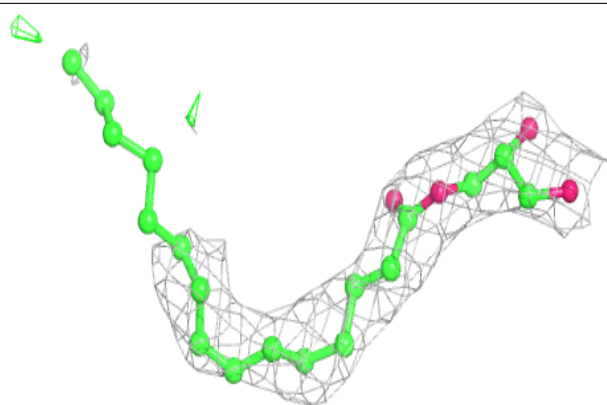
**Electron density around 78N A 511:**

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

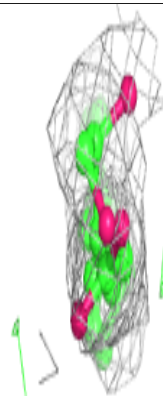
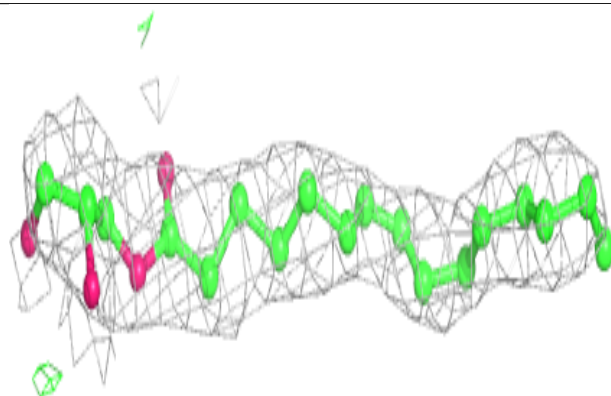
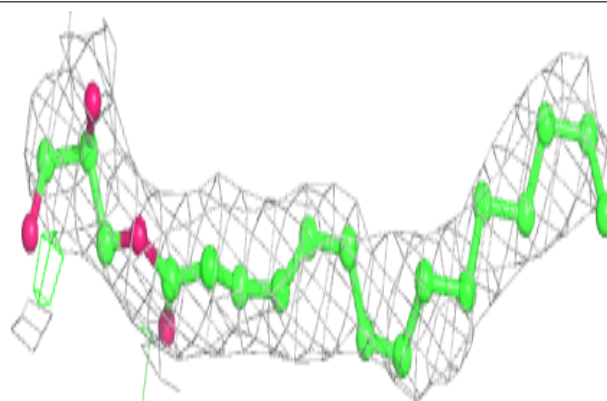


Electron density around 78N A 509:

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

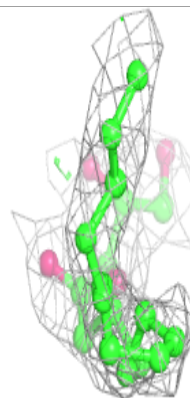
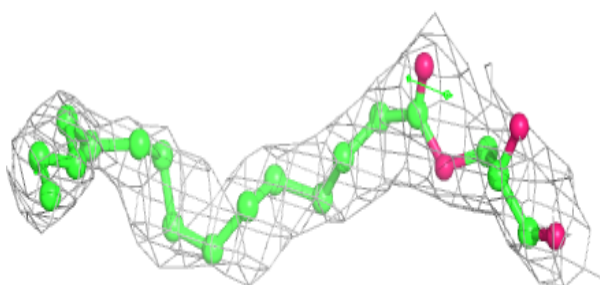
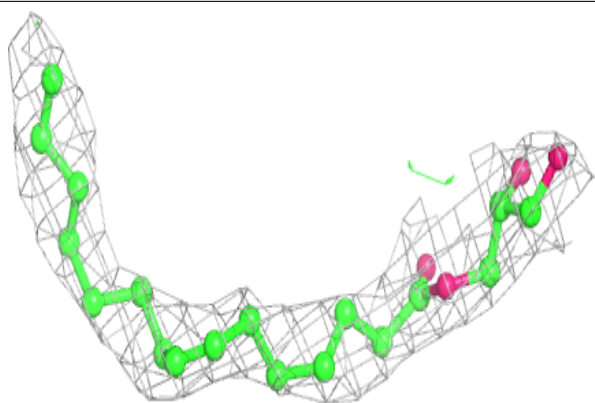
**Electron density around 78N A 506:**

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

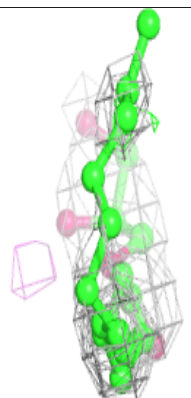
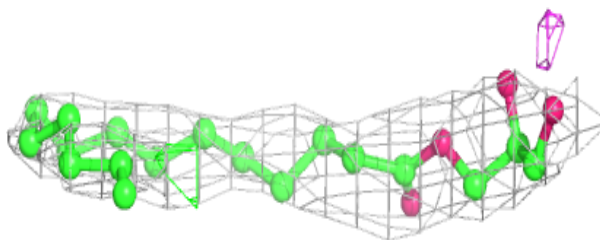
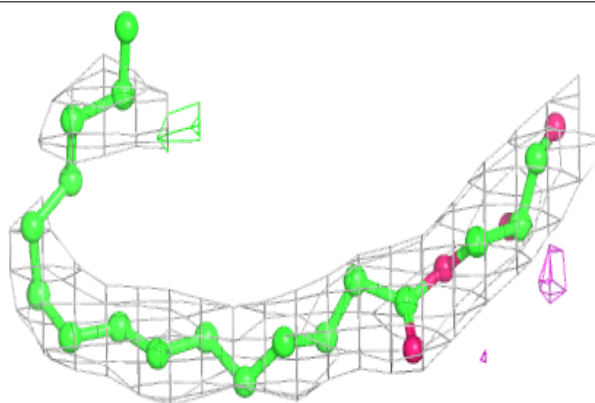


Electron density around 78N A 513:

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

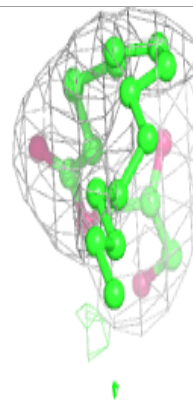
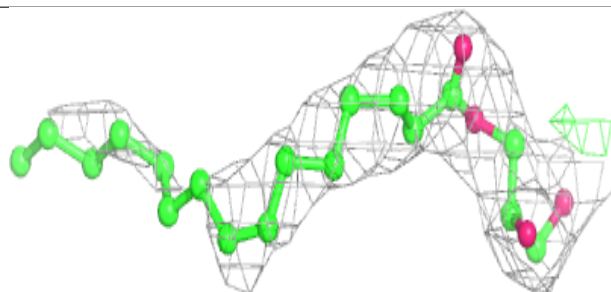
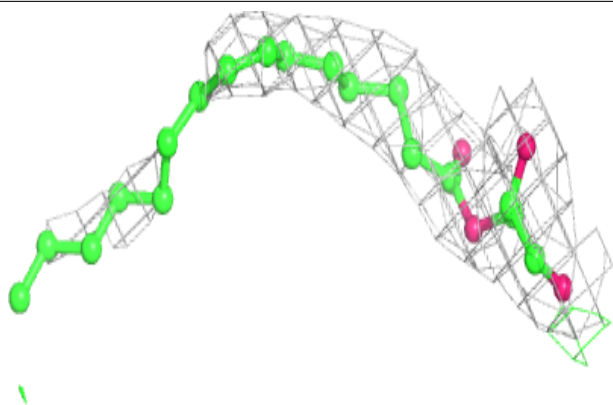
**Electron density around 78M A 508:**

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

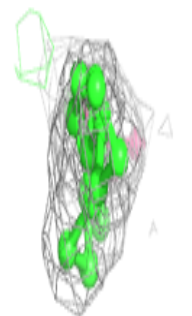
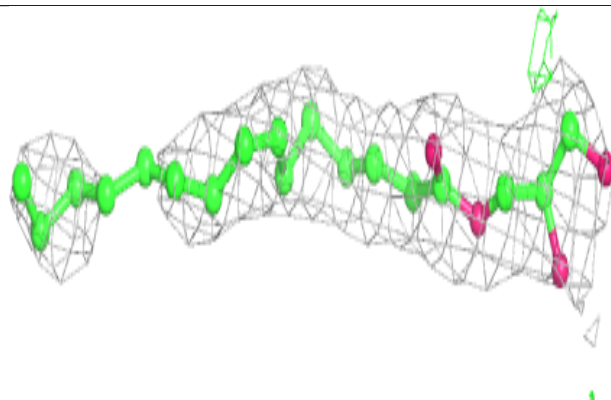
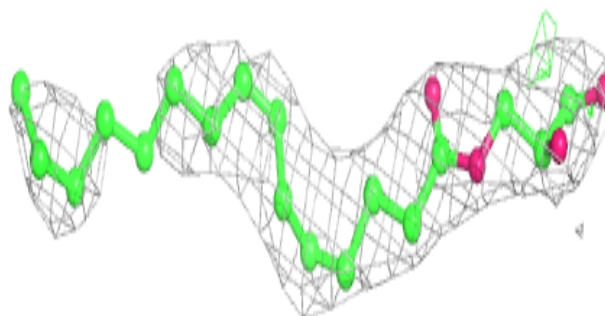


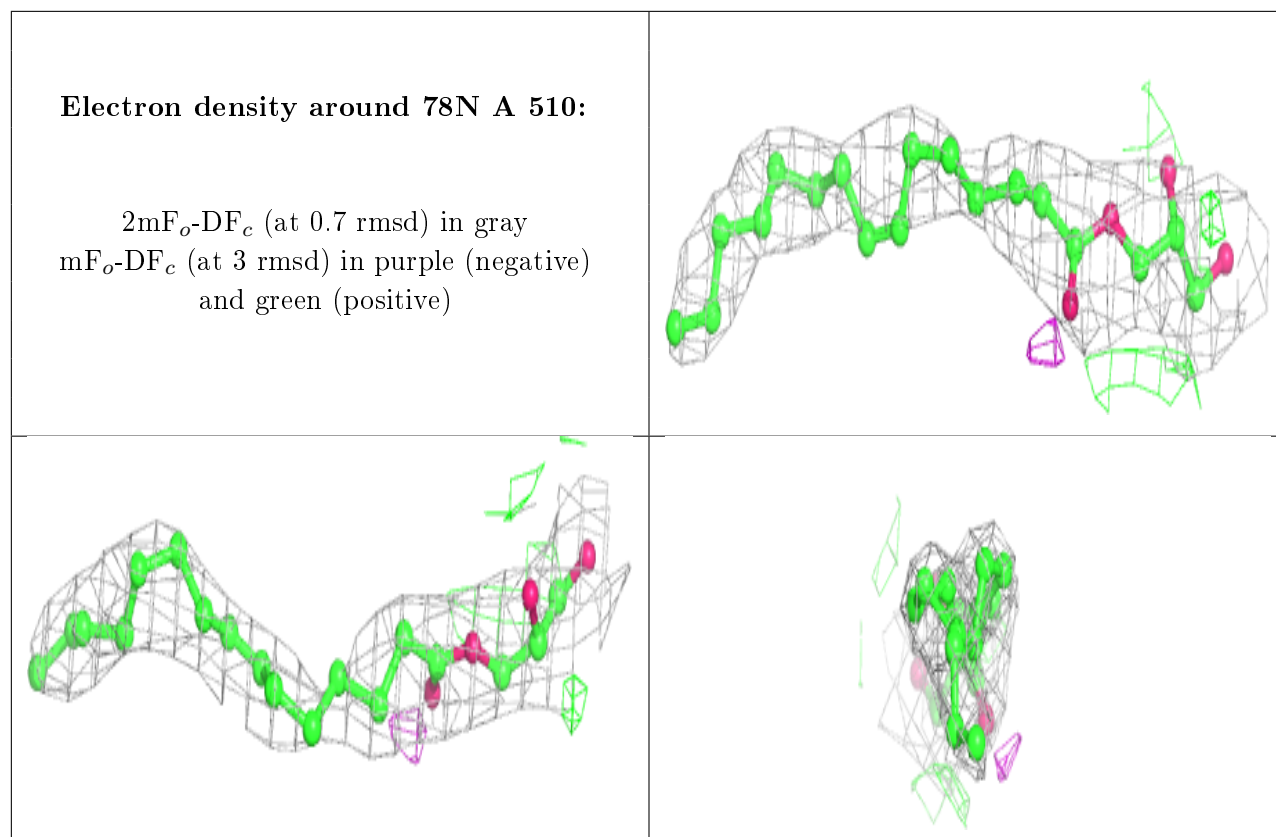
Electron density around 78N A 512:

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

**Electron density around 78N A 514:**

$2mF_o-DF_c$ (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.