



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 13, 2024 – 07:41 AM EDT

PDB ID : 1LW4  
Title : X-ray structure of L-Threonine Aldolase (low-specificity) in complex with L-allo-threonine  
Authors : Kielkopf, C.L.; Burley, S.K.; New York SGX Research Center for Structural Genomics (NYSGXRC)  
Deposited on : 2002-05-30  
Resolution : 1.90 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](mailto: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>.

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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)  
Xtrriage (Phenix) : 1.13  
EDS : 2.36.2  
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) : 2.36.2

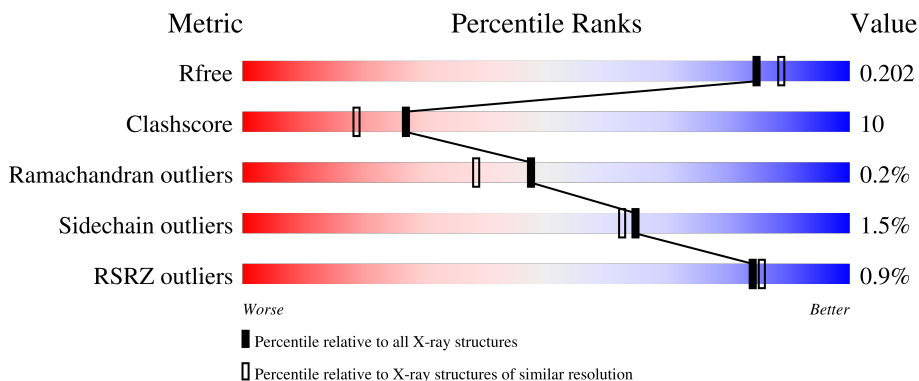
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*



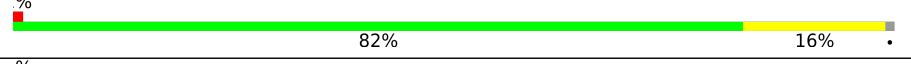

The reported resolution of this entry is 1.90 Å.

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	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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  $\geq 3$ , 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	347	 82% 16% ..
1	B	347	 81% 17% ..
1	C	347	 82% 16% .
1	D	347	 81% 17% ..

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:

<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
5	PLP	B	1053[B]	-	X	-	-

## 2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 11495 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 L-allo-threonine aldolase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace	
			Total	C	N	O	P	S				Se
1	A	343	2599	1626	463	493	1	3	13	0	0	0
1	B	343	2587	1621	461	489		3	13	0	1	0
1	C	343	2584	1618	463	487		3	13	0	0	0
1	D	344	2600	1627	463	493		3	14	0	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	cloning artifact	UNP Q9X266
A	-2	PRO	-	cloning artifact	UNP Q9X266
A	-1	HIS	-	cloning artifact	UNP Q9X266
A	0	MSE	-	cloning artifact	UNP Q9X266
B	-3	GLY	-	cloning artifact	UNP Q9X266
B	-2	PRO	-	cloning artifact	UNP Q9X266
B	-1	HIS	-	cloning artifact	UNP Q9X266
B	0	MSE	-	cloning artifact	UNP Q9X266
C	-3	GLY	-	cloning artifact	UNP Q9X266
C	-2	PRO	-	cloning artifact	UNP Q9X266
C	-1	HIS	-	cloning artifact	UNP Q9X266
D	-3	GLY	-	cloning artifact	UNP Q9X266
D	-2	PRO	-	cloning artifact	UNP Q9X266
D	-1	HIS	-	cloning artifact	UNP Q9X266

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Ca	0	0
			1	1		

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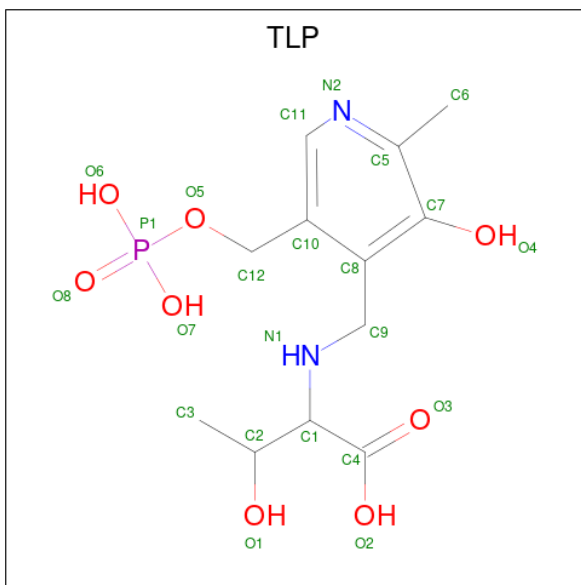
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	3	Total Ca 3 3	0	0
2	D	2	Total Ca 2 2	0	0

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	2	Total Cl 2 2	0	0
3	B	2	Total Cl 2 2	0	0
3	C	1	Total Cl 1 1	0	0
3	D	1	Total Cl 1 1	0	0

- Molecule 4 is 3-HYDROXY-2-[(3-HYDROXY-2-METHYL-5-PHOSPHONOXYMETHYL)-PYRIDIN-4-YLMETHYL]-AMINO]-BUTYRIC ACID (three-letter code: TLP) (formula: C<sub>12</sub>H<sub>19</sub>N<sub>2</sub>O<sub>8</sub>P).



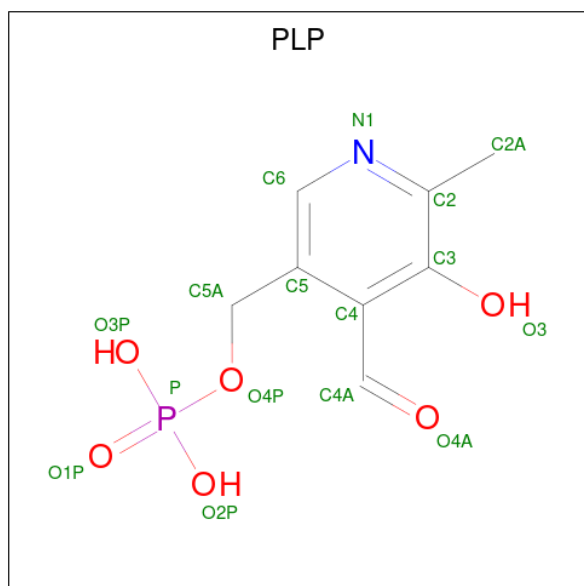
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C N O P 23 12 2 8 1	0	1
4	C	1	Total C N O P 23 12 2 8 1	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	D	1	Total	C	N	O	P	0	0
			23	12	2	8	1		

- Molecule 5 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C<sub>8</sub>H<sub>10</sub>NO<sub>6</sub>P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total	C	N	O	P	0	1
			15	8	1	5	1		

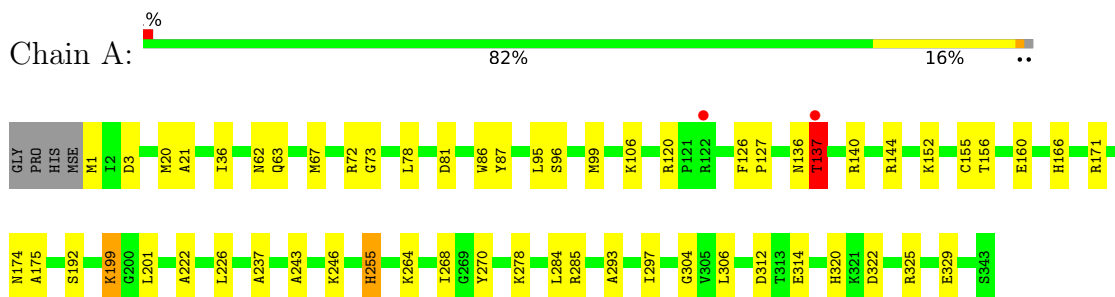
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	255	Total	O	0	0
			255	255		
6	B	234	Total	O	0	0
			234	234		
6	C	266	Total	O	0	0
			266	266		
6	D	274	Total	O	0	0
			274	274		

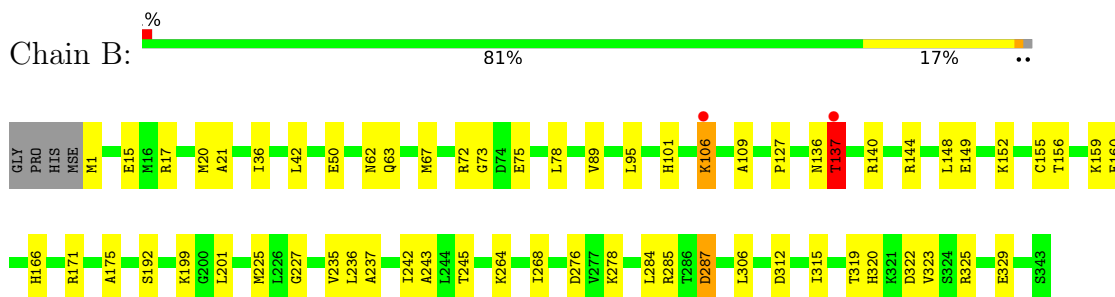
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

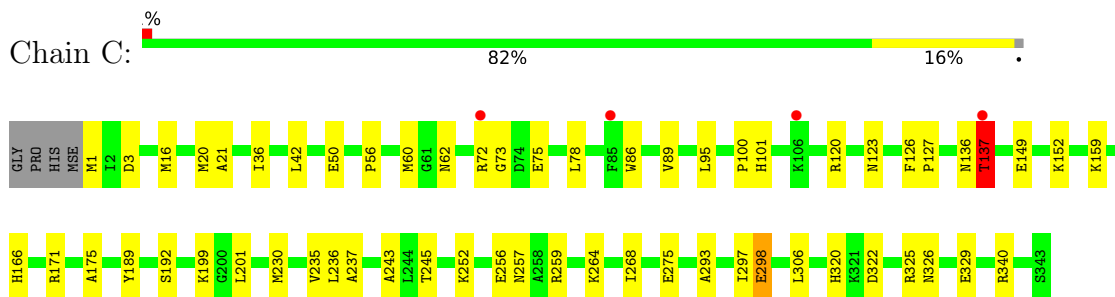
- Molecule 1: L-allo-threonine aldolase



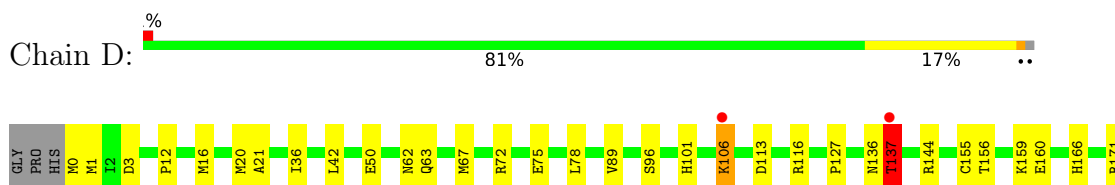
- Molecule 1: L-allo-threonine aldolase



- Molecule 1: L-allo-threonine aldolase



- Molecule 1: L-allo-threonine aldolase







## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	95.90Å 100.50Å 150.32Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 1.90 29.86 – 1.90	Depositor EDS
% Data completeness (in resolution range)	(Not available) (20.00-1.90) 99.8 (29.86-1.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	8.44 (at 1.91Å)	Xtrriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.183 , 0.206 0.179 , 0.202	Depositor DCC
$R_{free}$ test set	7904 reflections (6.90%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	19.8	Xtrriage
Anisotropy	0.064	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 57.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.006 for k,h,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	11495	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	22.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.31% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: LLP, PLP, TLP, CA, CL

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	0.31	0/2603	0.63	1/3500 (0.0%)
1	B	0.30	0/2597	0.64	1/3493 (0.0%)
1	C	0.39	1/2603 (0.0%)	0.67	4/3500 (0.1%)
1	D	0.40	2/2618 (0.1%)	0.74	4/3517 (0.1%)
All	All	0.35	3/10421 (0.0%)	0.67	10/14010 (0.1%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	301	ARG	CZ-NH1	10.15	1.46	1.33
1	C	298	GLU	CB-CG	10.13	1.71	1.52
1	D	301	ARG	CG-CD	6.41	1.68	1.51

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	301	ARG	NE-CZ-NH1	19.79	130.20	120.30
1	B	137	THR	N-CA-C	-10.13	83.65	111.00
1	A	137	THR	N-CA-C	-9.29	85.93	111.00
1	D	137	THR	N-CA-C	-9.26	86.00	111.00
1	C	137	THR	N-CA-C	-8.72	87.44	111.00
1	D	301	ARG	NE-CZ-NH2	-6.92	116.84	120.30
1	C	298	GLU	CA-CB-CG	6.16	126.94	113.40
1	D	301	ARG	NH1-CZ-NH2	-5.94	112.87	119.40
1	C	298	GLU	CG-CD-OE1	-5.82	106.66	118.30
1	C	298	GLU	N-CA-CB	-5.77	100.21	110.60

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	2599	0	2576	53	0
1	B	2587	0	2566	64	0
1	C	2584	0	2571	57	0
1	D	2600	0	2586	59	0
2	A	1	0	0	0	0
2	B	3	0	0	0	0
2	D	2	0	0	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	B	23	0	15	4	0
4	C	23	0	15	1	0
4	D	23	0	15	2	0
5	B	15	0	6	4	0
6	A	255	0	0	7	0
6	B	234	0	0	6	0
6	C	266	0	0	9	1
6	D	274	0	0	13	1
All	All	11495	0	10350	212	1

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 10.

All (212) 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:B:199[A]:LLP:NZ	4:B:1050[A]:TLP:H13	1.37	1.37
1:A:99:MSE:HE3	1:C:100:PRO:HG3	1.29	1.08
1:C:340:ARG:HG2	6:C:1320:HOH:O	1.53	1.05
1:B:199[A]:LLP:NZ	4:B:1050[A]:TLP:C9	2.20	1.04
1:D:136:ASN:O	1:D:137:THR:HG23	1.58	1.04
1:D:12:PRO:HG3	1:D:204:PRO:HG3	1.46	0.98
1:B:1:MSE:HE3	1:B:306:LEU:HD21	1.49	0.94
1:D:72:ARG:HB3	6:D:1271:HOH:O	1.67	0.93

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:326:ASN:ND2	6:C:1316:HOH:O	2.05	0.90
1:D:137:THR:HG22	1:D:175:ALA:HB2	1.57	0.87
1:A:174:ASN:HD22	1:A:255:HIS:HE1	1.24	0.86
1:D:137:THR:HG21	1:D:171:ARG:O	1.78	0.83
1:C:137:THR:HG23	1:C:175:ALA:HB2	1.60	0.81
1:C:136:ASN:O	1:C:137:THR:OG1	1.99	0.81
1:C:1:MSE:HE3	1:C:306:LEU:HD21	1.61	0.81
1:B:21:ALA:HB2	1:C:21:ALA:HB2	1.61	0.81
1:B:199[B]:LLP:NZ	5:B:1053[B]:PLP:C4A	2.45	0.79
1:D:294:HIS:CD2	6:D:1280:HOH:O	2.35	0.79
1:B:106:LYS:HD2	1:B:106:LYS:O	1.84	0.78
1:A:1:MSE:HE3	1:A:306:LEU:HD21	1.67	0.77
1:A:21:ALA:HB2	1:D:21:ALA:HB2	1.67	0.76
1:B:136:ASN:O	1:B:137:THR:HG23	1.90	0.72
1:D:137:THR:HA	1:D:144:ARG:O	1.90	0.71
1:A:155:CYS:SG	6:A:1289:HOH:O	2.48	0.71
1:D:113:ASP:HB3	6:D:1270:HOH:O	1.91	0.70
1:B:42:LEU:HD21	1:B:245:THR:CG2	2.21	0.70
1:B:73:GLY:O	1:B:127:PRO:HB3	1.90	0.70
1:D:259:ARG:CZ	6:D:1263:HOH:O	2.39	0.70
1:B:15:GLU:HG2	1:B:242:ILE:HD13	1.72	0.70
1:C:72:ARG:NH2	6:C:1171:HOH:O	2.24	0.70
1:C:42:LEU:HD21	1:C:245:THR:CG2	2.21	0.69
1:A:137:THR:CG2	1:A:175:ALA:HB2	2.23	0.69
1:B:199[A]:LLP:NZ	4:B:1050[A]:TLP:C8	2.55	0.69
1:B:199[B]:LLP:CE	5:B:1053[B]:PLP:C4A	2.71	0.69
1:C:325:ARG:NH1	6:C:1254:HOH:O	2.26	0.69
1:A:137:THR:HA	1:A:144:ARG:O	1.94	0.68
1:B:137:THR:HA	1:B:144:ARG:O	1.94	0.68
1:A:156:THR:O	1:A:160:GLU:HG3	1.93	0.68
1:C:36:ILE:HD13	1:C:237:ALA:HB2	1.75	0.68
1:D:259:ARG:NE	6:D:1263:HOH:O	2.25	0.68
1:D:75:GLU:HG3	1:D:127:PRO:HG2	1.77	0.67
1:B:278:LYS:HB2	6:B:1251:HOH:O	1.93	0.67
1:D:156:THR:O	1:D:160:GLU:HG3	1.95	0.67
1:D:259:ARG:NH2	6:D:1263:HOH:O	2.27	0.67
1:D:257:ASN:ND2	1:D:325:ARG:HE	1.93	0.66
1:C:73:GLY:O	1:C:127:PRO:HB3	1.96	0.66
1:B:149:GLU:OE1	6:B:1266:HOH:O	2.14	0.65
1:C:75:GLU:OE2	1:C:101:HIS:HD2	1.80	0.64
1:D:290:LYS:HE3	1:D:290:LYS:HA	1.79	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:81:ASP:O	1:A:140:ARG:HD3	1.98	0.64
1:A:36:ILE:HD13	1:A:237:ALA:HB2	1.80	0.64
1:B:137:THR:HG22	1:B:175:ALA:HB2	1.80	0.64
1:A:325:ARG:O	1:A:329:GLU:HG3	1.98	0.63
1:D:199:LLP:CE	4:D:1052:TLP:H13	2.29	0.63
1:B:137:THR:HG21	1:B:171:ARG:O	2.00	0.62
1:B:199[A]:LLP:CE	4:B:1050[A]:TLP:H13	2.26	0.62
1:C:252:LYS:O	1:C:256:GLU:HG3	1.99	0.62
1:D:75:GLU:HG3	1:D:127:PRO:CG	2.30	0.61
1:B:225:MSE:HA	1:C:89:VAL:HG11	1.82	0.61
1:A:73:GLY:O	1:A:127:PRO:HB3	2.01	0.61
1:B:225:MSE:HA	1:C:89:VAL:CG1	2.31	0.61
1:D:259:ARG:HG3	6:D:1249:HOH:O	1.98	0.61
1:A:320:HIS:HD2	1:A:322:ASP:H	1.48	0.61
1:B:325:ARG:O	1:B:329:GLU:HG3	1.99	0.61
1:A:136:ASN:O	1:A:137:THR:HG23	2.01	0.60
1:A:87:TYR:CD1	1:C:126:PHE:HE1	2.20	0.60
6:C:1074:HOH:O	1:D:72:ARG:NH1	2.35	0.60
1:B:320:HIS:HD2	1:B:322:ASP:H	1.50	0.59
1:A:137:THR:OG1	1:A:171:ARG:HB2	2.03	0.59
1:A:21:ALA:HB2	1:D:21:ALA:CB	2.31	0.59
1:D:298:GLU:OE1	6:D:1295:HOH:O	2.17	0.59
1:A:72:ARG:NH1	6:A:1092:HOH:O	2.35	0.59
1:B:1:MSE:CE	1:B:306:LEU:HD21	2.28	0.58
1:B:42:LEU:HD21	1:B:245:THR:HG23	1.86	0.58
1:A:137:THR:HG22	1:A:175:ALA:HB2	1.86	0.58
1:C:275:GLU:H	1:C:275:GLU:CD	2.07	0.58
1:B:225:MSE:CA	1:C:89:VAL:HG11	2.33	0.57
1:C:264:LYS:O	1:C:268:ILE:HG13	2.04	0.57
6:A:1281:HOH:O	1:B:72:ARG:NH1	2.36	0.57
1:C:62:ASN:ND2	1:C:166:HIS:HE1	2.02	0.57
1:A:285:ARG:HD2	1:A:314:GLU:HG2	1.87	0.57
1:B:106:LYS:HE3	1:B:109:ALA:HB3	1.87	0.57
1:C:256:GLU:OE2	6:C:1271:HOH:O	2.17	0.57
1:A:137:THR:HG21	1:A:171:ARG:O	2.03	0.57
1:D:257:ASN:HD22	1:D:325:ARG:HE	1.53	0.57
1:C:1:MSE:CE	1:C:306:LEU:HD21	2.33	0.56
1:C:62:ASN:HD22	1:C:166:HIS:HE1	1.53	0.56
1:D:166:HIS:HD2	1:D:192:SER:OG	1.88	0.56
1:D:137:THR:CG2	1:D:171:ARG:O	2.52	0.56
1:D:292:ASN:ND2	6:D:1280:HOH:O	2.38	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:320:HIS:H	1:B:323:VAL:CG2	2.19	0.56
1:A:293:ALA:O	1:A:297:ILE:HG12	2.06	0.56
1:D:259:ARG:NH1	1:D:263:LEU:HD11	2.21	0.56
1:A:199:LLP:OP2	6:A:1266:HOH:O	2.18	0.55
1:B:137:THR:CG2	1:B:175:ALA:HB2	2.35	0.55
1:B:50:GLU:HG2	6:B:1083:HOH:O	2.07	0.55
1:D:42:LEU:HD21	1:D:245:THR:CG2	2.37	0.55
1:A:62:ASN:ND2	1:A:166:HIS:HE1	2.05	0.54
1:A:87:TYR:HD1	1:C:126:PHE:HE1	1.55	0.54
1:D:201:LEU:HB3	1:D:243:ALA:HB1	1.89	0.54
1:B:225:MSE:HG3	1:C:89:VAL:HG13	1.89	0.54
1:C:320:HIS:HD2	1:C:322:ASP:H	1.56	0.54
1:D:320:HIS:HD2	1:D:322:ASP:H	1.55	0.54
1:C:42:LEU:HD21	1:C:245:THR:HG23	1.90	0.54
1:D:36:ILE:HD13	1:D:237:ALA:HB2	1.90	0.54
1:A:63:GLN:O	1:A:67:MSE:HG3	2.07	0.54
1:D:0:MSE:HG3	1:D:1:MSE:H	1.74	0.53
1:A:1:MSE:CE	1:A:306:LEU:HD21	2.38	0.53
1:D:50:GLU:HG3	6:D:1080:HOH:O	2.09	0.53
1:B:323:VAL:HG23	1:B:323:VAL:O	2.10	0.52
1:D:136:ASN:C	1:D:137:THR:HG23	2.28	0.52
1:A:120:ARG:HH2	1:C:86:TRP:HA	1.75	0.52
1:B:36:ILE:HD13	1:B:237:ALA:HB2	1.92	0.52
1:C:166:HIS:HD2	1:C:192:SER:OG	1.93	0.51
1:D:3:ASP:O	1:D:320:HIS:HE1	1.94	0.51
1:C:259:ARG:NE	6:C:1180:HOH:O	2.43	0.51
1:D:252:LYS:O	1:D:256:GLU:HG3	2.10	0.51
1:A:137:THR:HG23	1:A:175:ALA:HB2	1.93	0.50
1:B:20:MSE:SE	1:C:235:VAL:HG11	2.60	0.50
1:D:63:GLN:O	1:D:67:MSE:HG3	2.12	0.50
1:D:116:ARG:NH2	6:D:1270:HOH:O	2.43	0.50
1:C:89:VAL:HG22	1:C:89:VAL:O	2.11	0.50
1:B:63:GLN:O	1:B:67:MSE:HG3	2.12	0.49
1:B:285:ARG:HB3	1:B:287:ASP:OD1	2.12	0.49
1:A:246:LYS:HB3	1:A:246:LYS:NZ	2.27	0.49
1:B:137:THR:CA	1:B:144:ARG:O	2.60	0.49
1:A:137:THR:OG1	1:A:137:THR:O	2.29	0.49
1:D:42:LEU:HD21	1:D:245:THR:HG23	1.94	0.49
1:B:166:HIS:HD2	1:B:192:SER:OG	1.95	0.49
1:A:174:ASN:HD22	1:A:255:HIS:CE1	2.16	0.48
1:B:75:GLU:OE1	1:B:101:HIS:HD2	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:HIS:HD2	1:A:192:SER:OG	1.96	0.48
1:B:62:ASN:ND2	1:B:166:HIS:HE1	2.12	0.48
1:D:195:PHE:CE1	1:D:208:VAL:HB	2.48	0.48
1:D:106:LYS:N	1:D:106:LYS:HD3	2.29	0.48
1:D:293:ALA:O	1:D:297:ILE:HG12	2.13	0.48
1:B:171:ARG:NH1	5:B:1053[B]:PLP:O3	2.45	0.48
1:C:56:PRO:HG3	1:C:230:MSE:HE2	1.96	0.48
1:A:285:ARG:CD	1:A:314:GLU:HG2	2.44	0.48
1:A:20:MSE:SE	1:D:235:VAL:HG11	2.63	0.47
1:A:137:THR:CA	1:A:144:ARG:O	2.61	0.47
1:D:199:LLP:HE3	4:D:1052:TLP:H13	1.96	0.47
1:C:257:ASN:ND2	1:C:325:ARG:HE	2.11	0.47
1:B:148:LEU:O	1:B:152:LYS:HG3	2.14	0.47
1:D:75:GLU:OE2	1:D:101:HIS:HD2	1.98	0.47
1:B:201:LEU:HB3	1:B:243:ALA:HB1	1.97	0.47
1:C:329:GLU:OE2	6:C:1316:HOH:O	2.20	0.47
1:B:264:LYS:O	1:B:268:ILE:HG13	2.16	0.46
1:C:3:ASP:O	1:C:320:HIS:HE1	1.98	0.46
1:B:140:ARG:HD3	6:B:1220:HOH:O	2.14	0.46
1:D:284:LEU:HD23	1:D:284:LEU:C	2.35	0.46
1:D:320:HIS:H	1:D:323:VAL:CG2	2.29	0.46
1:B:17:ARG:HA	1:B:20:MSE:HE3	1.97	0.46
1:D:136:ASN:O	1:D:137:THR:CG2	2.48	0.46
1:D:101:HIS:HE1	6:D:1158:HOH:O	1.98	0.46
1:C:149:GLU:OE1	1:C:152:LYS:HE2	2.15	0.46
1:A:201:LEU:HB3	1:A:243:ALA:HB1	1.97	0.45
1:B:95:LEU:HD22	1:C:95:LEU:HD22	1.98	0.45
1:D:0:MSE:HE3	1:D:1:MSE:HG2	1.98	0.45
1:B:225:MSE:CB	1:C:89:VAL:HG11	2.47	0.45
1:B:137:THR:OG1	1:B:171:ARG:HB2	2.15	0.45
1:D:137:THR:CA	1:D:144:ARG:O	2.61	0.45
1:A:67:MSE:HG2	1:A:96:SER:OG	2.17	0.45
1:A:278:LYS:HG3	6:A:1126:HOH:O	2.15	0.45
1:D:155:CYS:O	1:D:159:LYS:HG3	2.17	0.45
1:B:155:CYS:O	1:B:159:LYS:HG2	2.17	0.45
1:B:236:LEU:HD11	1:C:236:LEU:HD11	1.99	0.45
1:C:16:MSE:O	1:C:20:MSE:HG3	2.17	0.45
1:A:222:ALA:O	1:A:226:LEU:HG	2.17	0.44
1:B:319:THR:HA	1:B:323:VAL:HG21	2.00	0.44
1:A:106:LYS:NZ	1:A:106:LYS:HB2	2.33	0.44
1:C:201:LEU:HB3	1:C:243:ALA:HB1	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3:ASP:O	1:A:320:HIS:HE1	2.01	0.43
1:A:86:TRP:HA	1:C:120:ARG:HH22	1.82	0.43
1:B:235:VAL:HG11	1:C:20:MSE:SE	2.68	0.43
1:B:284:LEU:C	1:B:284:LEU:HD23	2.38	0.43
1:A:95:LEU:N	1:A:95:LEU:HD12	2.33	0.43
1:B:227:GLY:HA3	1:C:60:MSE:HB2	2.00	0.43
1:B:276:ASP:OD1	6:B:1233:HOH:O	2.22	0.43
1:D:67:MSE:HE2	1:D:67:MSE:HB3	1.89	0.43
1:D:320:HIS:CD2	1:D:322:ASP:H	2.34	0.43
1:A:1:MSE:HE3	1:A:306:LEU:CD2	2.44	0.42
1:A:99:MSE:CE	1:C:100:PRO:HG3	2.22	0.42
1:B:156:THR:O	1:B:160:GLU:HG3	2.20	0.42
1:B:320:HIS:H	1:B:323:VAL:HG22	1.84	0.42
1:D:16:MSE:O	1:D:20:MSE:HG3	2.20	0.42
1:D:67:MSE:HG2	1:D:96:SER:OG	2.19	0.42
1:D:166:HIS:CD2	1:D:192:SER:OG	2.71	0.42
1:A:320:HIS:CD2	1:A:322:ASP:H	2.33	0.42
1:A:152:LYS:HD2	6:A:1192:HOH:O	2.20	0.42
1:A:171:ARG:NH1	1:A:199:LLP:O3	2.52	0.42
1:A:126:PHE:HA	1:A:127:PRO:HD3	1.92	0.42
1:C:50:GLU:HG3	6:C:1092:HOH:O	2.19	0.42
1:C:137:THR:OG1	1:C:171:ARG:HB2	2.20	0.42
1:C:199:LLP:CE	4:C:1051:TLP:H13	2.50	0.41
1:C:293:ALA:O	1:C:297:ILE:HG12	2.19	0.41
1:D:62:ASN:OD1	1:D:166:HIS:HE1	2.02	0.41
1:A:270:TYR:HB3	1:A:284:LEU:CD1	2.50	0.41
1:A:1:MSE:SE	1:A:304:GLY:HA2	2.70	0.41
1:C:152:LYS:HG3	1:C:189:TYR:CE1	2.56	0.41
1:B:137:THR:OG1	1:B:137:THR:O	2.38	0.41
1:B:101:HIS:HE1	6:B:1153:HOH:O	2.03	0.41
1:B:225:MSE:HB2	1:C:89:VAL:HG11	2.03	0.41
1:B:284:LEU:HB3	1:B:315:ILE:CG1	2.50	0.41
1:D:308:ASN:HB2	6:D:1099:HOH:O	2.19	0.41
1:A:264:LYS:O	1:A:268:ILE:HG13	2.20	0.41
6:A:1079:HOH:O	1:C:89:VAL:HG22	2.21	0.41
1:C:78:LEU:O	1:C:78:LEU:HD12	2.21	0.41
1:C:123:ASN:HB3	1:C:126:PHE:CD2	2.56	0.41
1:B:199[B]:LLP:HE3	5:B:1053[B]:PLP:C4A	2.49	0.41
1:C:159:LYS:HE2	1:C:159:LYS:HB3	1.85	0.41
1:B:285:ARG:HH11	1:B:285:ARG:HG3	1.86	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the sym-



metry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:C:1316:HOH:O	6:D:1270:HOH:O[2_665]	2.15	0.05

## 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	340/347 (98%)	333 (98%)	6 (2%)	1 (0%)	41 31
1	B	340/347 (98%)	331 (97%)	8 (2%)	1 (0%)	41 31
1	C	340/347 (98%)	334 (98%)	5 (2%)	1 (0%)	41 31
1	D	341/347 (98%)	333 (98%)	8 (2%)	0	100 100
All	All	1361/1388 (98%)	1331 (98%)	27 (2%)	3 (0%)	47 38

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	137	THR
1	A	137	THR
1	B	137	THR

### 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	269/269 (100%)	266 (99%)	3 (1%)	73 73

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	268/269 (100%)	263 (98%)	5 (2%)	57	53
1	C	269/269 (100%)	267 (99%)	2 (1%)	84	84
1	D	272/269 (101%)	266 (98%)	6 (2%)	52	47
All	All	1078/1076 (100%)	1062 (98%)	16 (2%)	65	62

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	78	LEU
1	A	255	HIS
1	A	312	ASP
1	B	78	LEU
1	B	89	VAL
1	B	106	LYS
1	B	287	ASP
1	B	312	ASP
1	C	137	THR
1	C	298	GLU
1	D	78	LEU
1	D	89	VAL
1	D	106	LYS
1	D	137	THR
1	D	244	LEU
1	D	290	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	62	ASN
1	A	71	GLN
1	A	166	HIS
1	A	255	HIS
1	A	257	ASN
1	A	320	HIS
1	B	62	ASN
1	B	101	HIS
1	B	166	HIS
1	B	320	HIS
1	C	22	GLN
1	C	62	ASN

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Mol	Chain	Res	Type
1	C	63	GLN
1	C	101	HIS
1	C	107	ASN
1	C	150	ASN
1	C	166	HIS
1	C	257	ASN
1	C	320	HIS
1	C	326	ASN
1	D	101	HIS
1	D	107	ASN
1	D	125	HIS
1	D	161	HIS
1	D	166	HIS
1	D	257	ASN
1	D	308	ASN
1	D	320	HIS
1	D	333	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](#)

5 non-standard protein/DNA/RNA residues 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	$\# Z  > 2$
1	LLP	A	199	1	23,24,25	3.48	6 (26%)	25,32,34	2.41	10 (40%)
1	LLP	B	199[B]	1	7,8,25	0.75	0	3,8,34	1.07	0
1	LLP	B	199[A]	1	7,8,25	0.49	0	3,8,34	0.65	0
1	LLP	D	199	1	7,8,25	0.50	0	3,8,34	0.36	0
1	LLP	C	199	1	7,8,25	0.48	0	3,8,34	0.53	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
1	LLP	A	199	1	-	8/16/17/19	0/1/1/1
1	LLP	B	199[B]	1	-	1/6/7/19	-
1	LLP	B	199[A]	1	-	1/6/7/19	-
1	LLP	D	199	1	-	1/6/7/19	-
1	LLP	C	199	1	-	1/6/7/19	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	199	LLP	C4-C5	12.34	1.57	1.42
1	A	199	LLP	C3-C2	8.13	1.49	1.40
1	A	199	LLP	C2-N1	3.93	1.41	1.33
1	A	199	LLP	C4'-NZ	3.27	1.38	1.27
1	A	199	LLP	C6-N1	3.26	1.41	1.34
1	A	199	LLP	P-OP3	-2.41	1.45	1.54

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	199	LLP	C2'-C2-C3	6.20	128.55	120.89
1	A	199	LLP	CE-NZ-C4'	4.23	131.89	118.90
1	A	199	LLP	C6-N1-C2	4.11	126.78	119.17
1	A	199	LLP	C3-C2-N1	-3.50	116.25	120.77
1	A	199	LLP	C4-C4'-NZ	-3.20	109.60	124.31
1	A	199	LLP	C5-C4-C4'	3.18	126.79	121.56
1	A	199	LLP	C5-C6-N1	-2.88	119.02	123.82
1	A	199	LLP	OP4-C5'-C5	2.71	114.51	109.35
1	A	199	LLP	C3-C4-C4'	-2.68	115.43	120.41
1	A	199	LLP	O3-C3-C4	2.15	125.38	119.60

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	199	LLP	C4-C5-C5'-OP4
1	A	199	LLP	C6-C5-C5'-OP4
1	A	199	LLP	O-C-CA-CB

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Mol	Chain	Res	Type	Atoms
1	B	199[A]	LLP	O-C-CA-CB
1	B	199[B]	LLP	O-C-CA-CB
1	C	199	LLP	O-C-CA-CB
1	D	199	LLP	O-C-CA-CB
1	A	199	LLP	C3-C4-C4'-NZ
1	A	199	LLP	C5'-OP4-P-OP2
1	A	199	LLP	CG-CD-CE-NZ
1	A	199	LLP	C5-C4-C4'-NZ
1	A	199	LLP	CD-CE-NZ-C4'

There are no ring outliers.

5 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	199	LLP	2	0
1	B	199[B]	LLP	3	0
1	B	199[A]	LLP	4	0
1	D	199	LLP	2	0
1	C	199	LLP	1	0

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 16 ligands modelled in this entry, 12 are monoatomic - leaving 4 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
4	TLP	C	1051	-	23,23,23	3.49	8 (34%)	31,33,33	2.34	8 (25%)
4	TLP	B	1050[A]	-	23,23,23	3.62	7 (30%)	31,33,33	2.35	8 (25%)
5	PLP	B	1053[B]	-	15,15,16	4.85	7 (46%)	20,22,23	2.61	8 (40%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	TLP	D	1052	-	23,23,23	3.52	7 (30%)	31,33,33	2.34	8 (25%)

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	TLP	C	1051	-	-	2/19/19/19	0/1/1/1
4	TLP	B	1050[A]	-	-	2/19/19/19	0/1/1/1
5	PLP	B	1053[B]	-	-	5/6/6/8	0/1/1/1
4	TLP	D	1052	-	-	3/19/19/19	0/1/1/1

All (29) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1053[B]	PLP	C5-C4	15.40	1.57	1.40
4	B	1050[A]	TLP	C10-C8	11.78	1.57	1.40
4	D	1052	TLP	C10-C8	11.65	1.56	1.40
4	C	1051	TLP	C10-C8	11.13	1.56	1.40
4	B	1050[A]	TLP	C7-C5	9.59	1.50	1.40
4	C	1051	TLP	C7-C5	9.31	1.50	1.40
4	D	1052	TLP	C7-C5	9.15	1.50	1.40
5	B	1053[B]	PLP	C3-C2	7.95	1.48	1.40
4	C	1051	TLP	C5-N2	4.41	1.42	1.33
4	B	1050[A]	TLP	C5-N2	4.30	1.41	1.33
4	D	1052	TLP	C5-N2	4.20	1.41	1.33
5	B	1053[B]	PLP	C2-N1	4.01	1.41	1.33
4	C	1051	TLP	C9-N1	-3.39	1.36	1.46
5	B	1053[B]	PLP	C6-N1	3.28	1.41	1.34
4	B	1050[A]	TLP	C9-N1	-3.24	1.37	1.46
4	B	1050[A]	TLP	C11-N2	3.24	1.41	1.34
4	C	1051	TLP	C11-N2	3.18	1.41	1.34
4	D	1052	TLP	C11-N2	3.09	1.40	1.34
4	D	1052	TLP	C9-N1	-2.94	1.38	1.46
4	D	1052	TLP	C7-C8	2.62	1.44	1.40
4	B	1050[A]	TLP	C7-C8	2.57	1.44	1.40
4	C	1051	TLP	C7-C8	2.33	1.43	1.40
5	B	1053[B]	PLP	C5A-C5	2.22	1.57	1.50
4	D	1052	TLP	P1-O7	-2.22	1.46	1.54
5	B	1053[B]	PLP	C4A-C4	-2.21	1.47	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1053[B]	PLP	P-O3P	-2.17	1.46	1.54
4	B	1050[A]	TLP	P1-O7	-2.15	1.46	1.54
4	C	1051	TLP	P1-O7	-2.05	1.46	1.54
4	C	1051	TLP	C9-C8	-2.03	1.49	1.51

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	1051	TLP	C6-C5-C7	6.52	128.94	120.89
4	D	1052	TLP	C6-C5-C7	6.40	128.79	120.89
4	B	1050[A]	TLP	C6-C5-C7	6.39	128.78	120.89
4	B	1050[A]	TLP	C9-N1-C1	6.31	129.66	114.89
4	D	1052	TLP	C9-N1-C1	6.18	129.36	114.89
5	B	1053[B]	PLP	C2A-C2-C3	5.99	128.29	120.89
4	C	1051	TLP	C9-N1-C1	5.94	128.80	114.89
5	B	1053[B]	PLP	C4A-C4-C5	5.32	126.42	120.94
4	D	1052	TLP	C11-N2-C5	4.17	126.89	119.17
5	B	1053[B]	PLP	C6-N1-C2	4.12	126.79	119.17
4	B	1050[A]	TLP	C11-N2-C5	4.11	126.78	119.17
4	C	1051	TLP	C11-N2-C5	4.02	126.62	119.17
4	B	1050[A]	TLP	C9-C8-C10	3.91	124.06	119.71
4	C	1051	TLP	C9-C8-C10	3.79	123.93	119.71
4	D	1052	TLP	C9-C8-C10	3.76	123.89	119.71
5	B	1053[B]	PLP	C3-C2-N1	-3.58	116.14	120.77
4	B	1050[A]	TLP	C7-C5-N2	-3.49	116.26	120.77
4	C	1051	TLP	C7-C5-N2	-3.49	116.26	120.77
4	D	1052	TLP	C7-C5-N2	-3.45	116.31	120.77
4	C	1051	TLP	C10-C11-N2	-3.19	118.50	123.82
4	C	1051	TLP	C11-C10-C8	3.12	120.33	118.12
4	D	1052	TLP	C10-C11-N2	-3.12	118.63	123.82
4	B	1050[A]	TLP	C10-C11-N2	-3.04	118.75	123.82
5	B	1053[B]	PLP	O4P-C5A-C5	3.01	115.09	109.35
5	B	1053[B]	PLP	C4A-C4-C3	-2.97	115.46	120.50
4	D	1052	TLP	C11-C10-C8	2.83	120.12	118.12
5	B	1053[B]	PLP	O3-C3-C4	2.83	125.55	118.10
5	B	1053[B]	PLP	C5-C6-N1	-2.78	119.19	123.82
4	D	1052	TLP	O4-C7-C8	2.65	125.89	118.13
4	B	1050[A]	TLP	O4-C7-C8	2.62	125.82	118.13
4	B	1050[A]	TLP	C11-C10-C8	2.60	119.96	118.12
4	C	1051	TLP	O4-C7-C8	2.57	125.66	118.13

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	D	1052	TLP	C7-C8-C9-N1
5	B	1053[B]	PLP	C4-C5-C5A-O4P
5	B	1053[B]	PLP	C6-C5-C5A-O4P
5	B	1053[B]	PLP	C5A-O4P-P-O2P
5	B	1053[B]	PLP	C5A-O4P-P-O3P
4	C	1051	TLP	C10-C8-C9-N1
4	D	1052	TLP	C10-C8-C9-N1
4	C	1051	TLP	C7-C8-C9-N1
4	B	1050[A]	TLP	C10-C8-C9-N1
5	B	1053[B]	PLP	C5A-O4P-P-O1P
4	B	1050[A]	TLP	C2-C1-N1-C9
4	D	1052	TLP	C2-C1-N1-C9

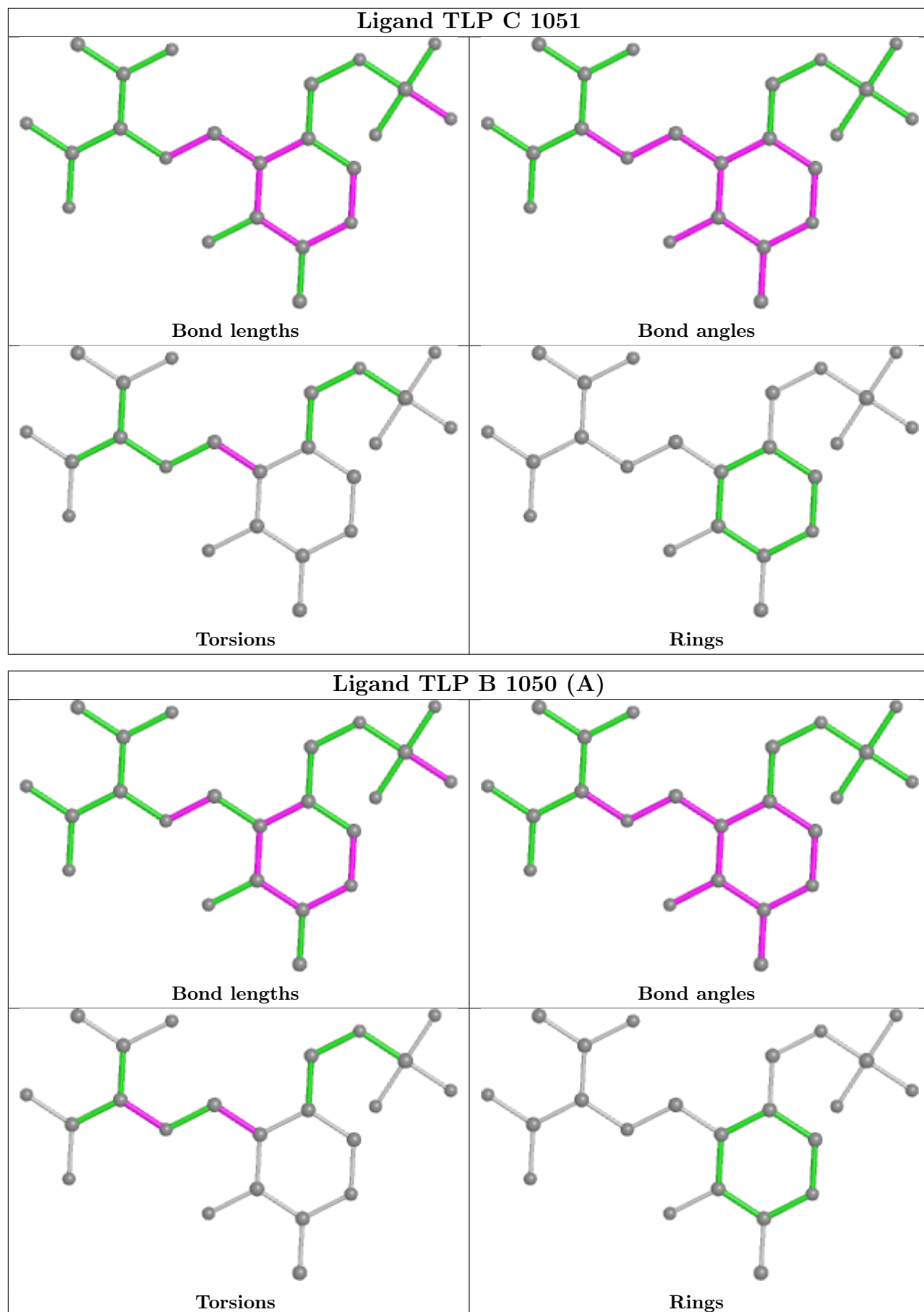
There are no ring outliers.

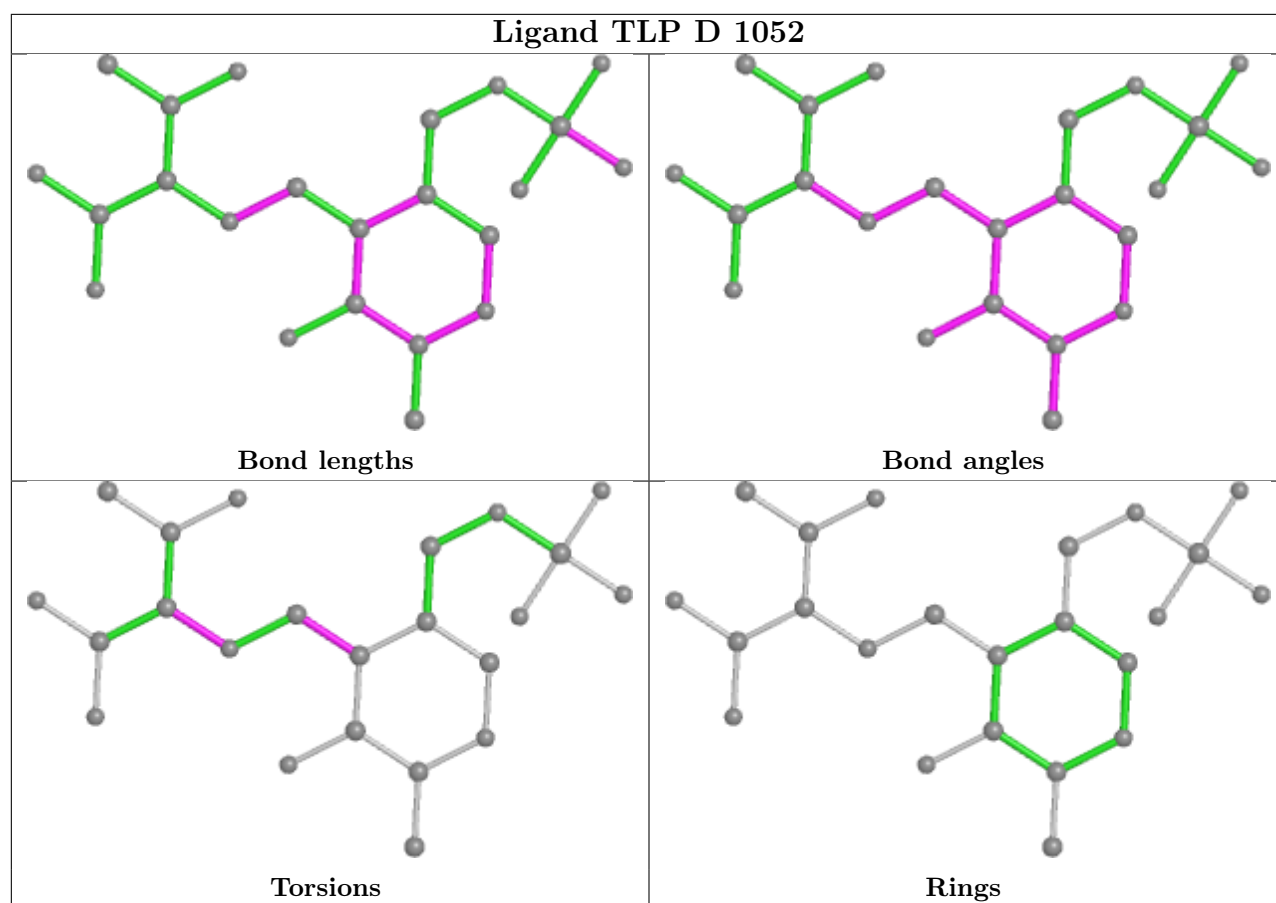
4 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	1051	TLP	1	0
4	B	1050[A]	TLP	4	0
5	B	1053[B]	PLP	4	0
4	D	1052	TLP	2	0

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







## 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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	329/347 (94%)	-0.13	2 (0%) 89 90	13, 20, 30, 41	0
1	B	329/347 (94%)	-0.14	2 (0%) 89 90	11, 18, 32, 41	0
1	C	329/347 (94%)	-0.05	4 (1%) 79 81	10, 21, 33, 42	1 (0%)
1	D	329/347 (94%)	-0.11	4 (1%) 79 81	11, 18, 34, 46	0
All	All	1316/1388 (94%)	-0.11	12 (0%) 84 85	10, 19, 32, 46	1 (0%)

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	137	THR	5.4
1	B	137	THR	5.2
1	D	137	THR	5.0
1	C	137	THR	4.6
1	C	72	ARG	3.4
1	D	290	LYS	2.6
1	A	122	ARG	2.5
1	B	106	LYS	2.3
1	C	85	PHE	2.3
1	D	106	LYS	2.2
1	D	343	SER	2.2
1	C	106	LYS	2.0

### 6.2 Non-standard residues in protein, DNA, RNA chains [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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
1	LLP	A	199	24/25	0.91	0.18	13,22,27,30	0
1	LLP	B	199[A]	9/25	0.95	0.39	13,14,19,23	9
1	LLP	B	199[B]	9/25	0.95	0.39	16,17,21,22	9
1	LLP	C	199	9/25	0.96	0.16	12,14,23,25	0
1	LLP	D	199	9/25	0.96	0.14	12,14,23,29	0

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

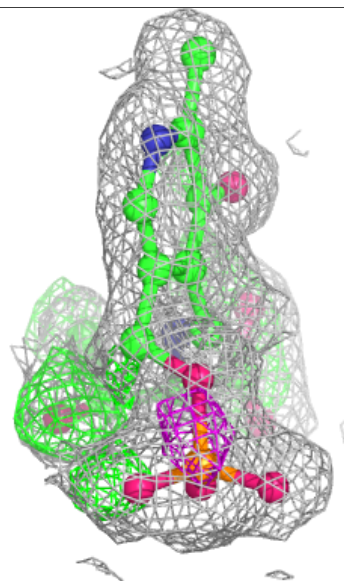
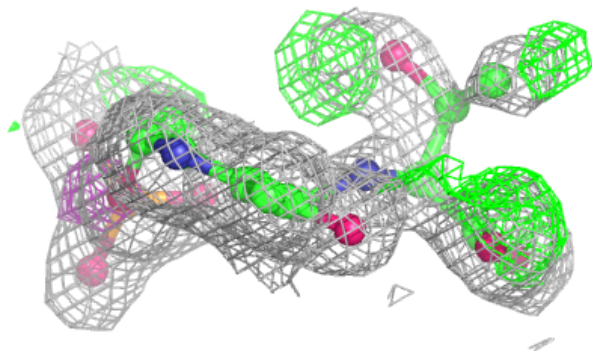
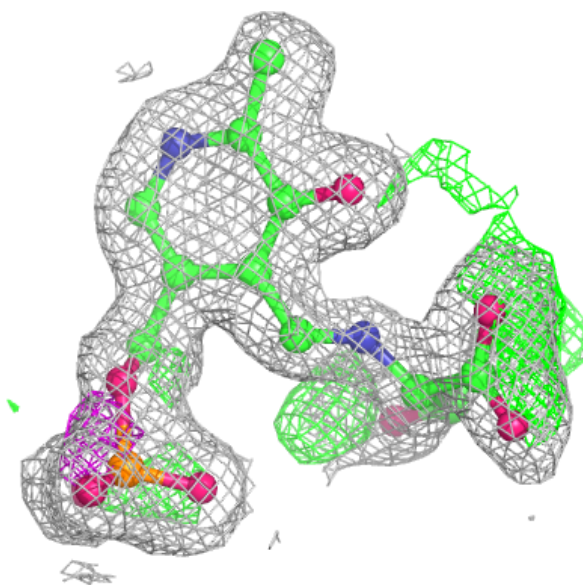
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	TLP	B	1050[A]	23/23	0.92	0.22	14,19,21,22	23
4	TLP	D	1052	23/23	0.92	0.16	13,19,28,32	0
5	PLP	B	1053[B]	15/16	0.94	0.16	18,24,27,27	15
3	CL	D	1062	1/1	0.96	0.06	31,31,31,31	0
4	TLP	C	1051	23/23	0.96	0.14	15,18,24,28	0
3	CL	B	1065	1/1	0.98	0.07	28,28,28,28	0
2	CA	B	1058	1/1	0.98	0.12	27,27,27,27	0
3	CL	B	1063	1/1	0.98	0.04	29,29,29,29	0
2	CA	D	1059	1/1	0.99	0.03	18,18,18,18	0
3	CL	A	1064	1/1	0.99	0.03	31,31,31,31	0
2	CA	A	1056	1/1	0.99	0.05	19,19,19,19	0
2	CA	D	1055	1/1	0.99	0.04	17,17,17,17	0
3	CL	C	1061	1/1	0.99	0.05	24,24,24,24	0
2	CA	B	1057	1/1	1.00	0.04	18,18,18,18	0
2	CA	B	1054	1/1	1.00	0.04	17,17,17,17	0
3	CL	A	1060	1/1	1.00	0.03	19,19,19,19	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

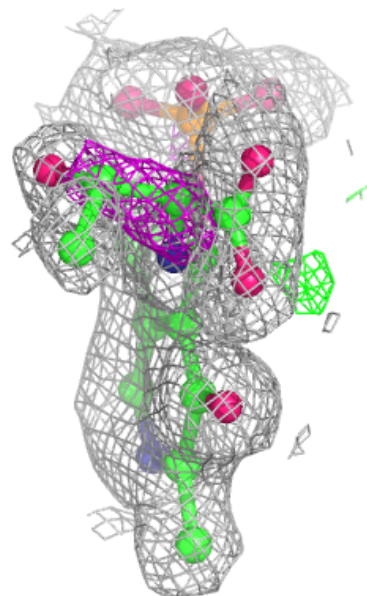
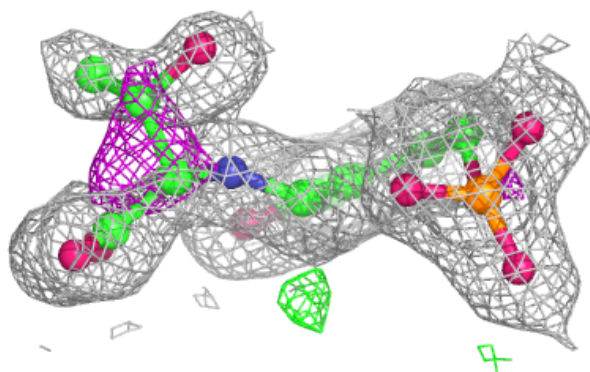
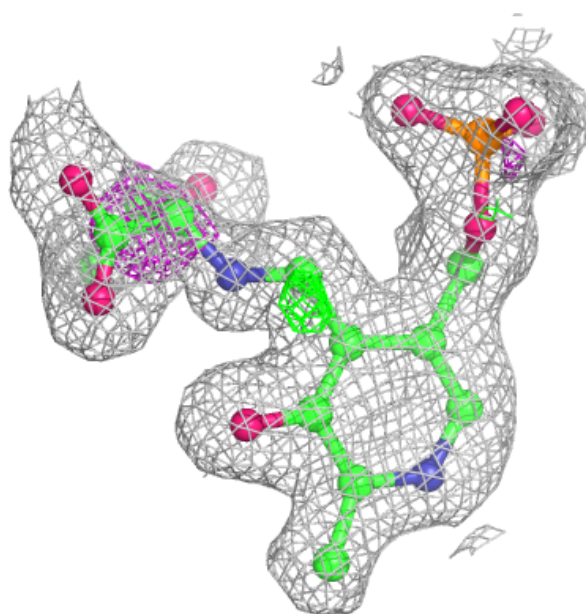
**Electron density around TLP B 1050 (A):**

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

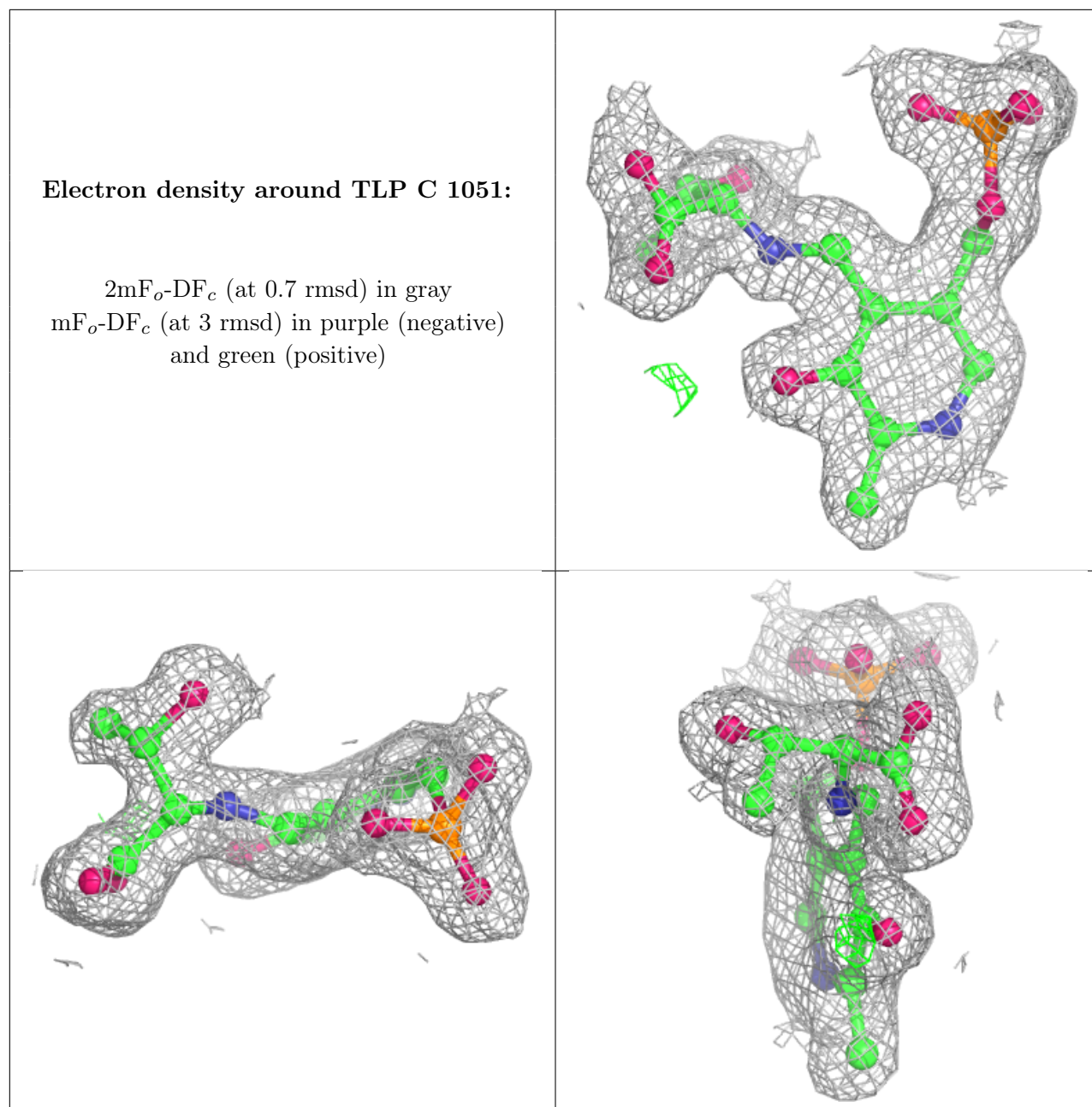


**Electron density around TLP D 1052:**

$2mF_o-DF_c$  (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.