



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 19, 2022 – 12:52 pm GMT

PDB ID : 7QKB  
Title : Crystal structure of human Cathepsin L in complex with covalently bound GC376  
Authors : Reinke, P.Y.A.; Falke, S.; Lieske, J.; Ewert, W.; Loboda, J.; Rahmani Mashhour, A.; Hauser, M.; Karnicar, K.; Usenik, A.; Lindic, N.; Lach, M.; Boehler, H.; Beck, T.; Cox, R.; Chapman, H.N.; Hinrichs, W.; Turk, D.; Guenther, S.; Meents, A.  
Deposited on : 2021-12-17  
Resolution : 1.80 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	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.31.3
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)

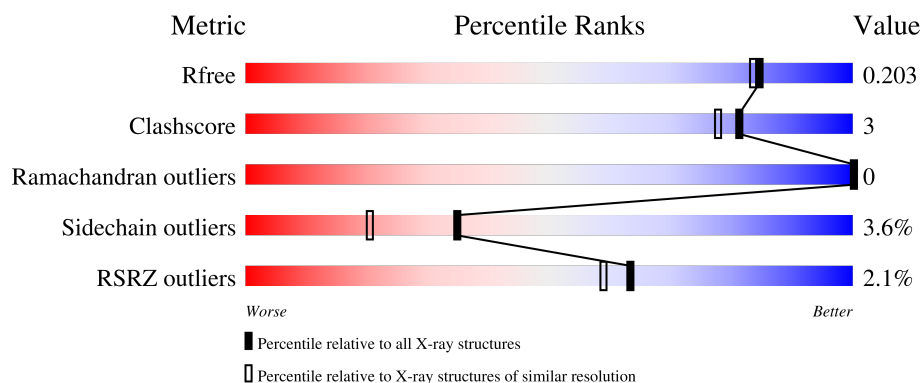
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.80 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	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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	220	<div> <div>5%</div> <div>93% 7%</div> </div>
1	B	220	<div> <div>88% 10% .</div> </div>
1	C	220	<div> <div>5%</div> <div>88% 9% .</div> </div>

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Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
 Validation Pipeline (wwPDB-VP) : 2.31.3

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Mol	Chain	Length	Quality of chain
1	D	220	<div><div></div><div>2%</div><div>93%</div><div>6%</div></div>

## 2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 13831 atoms, of which 6552 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 Cathepsin L.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	220	Total	C	H	N	O	S	0	2	0
			3295	1070	1583	283	345	14			
1	B	214	Total	C	H	N	O	S	0	1	0
			3201	1041	1540	276	330	14			
1	C	215	Total	C	H	N	O	S	0	2	0
			3237	1052	1557	281	334	13			
1	D	218	Total	C	H	N	O	S	0	7	0
			3342	1081	1610	291	346	14			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	110	ALA	THR	engineered mutation	UNP P07711
B	110	ALA	THR	engineered mutation	UNP P07711
C	110	ALA	THR	engineered mutation	UNP P07711
D	110	ALA	THR	engineered mutation	UNP P07711

- Molecule 2 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C<sub>4</sub>H<sub>10</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	0	0
			17	4	10	3		
2	A	1	Total	C	H	O	0	0
			17	4	10	3		
2	B	1	Total	C	H	O	0	0
			17	4	10	3		
2	B	1	Total	C	H	O	0	0
			17	4	10	3		
2	C	1	Total	C	H	O	0	0
			17	4	10	3		
2	C	1	Total	C	H	O	0	0
			17	4	10	3		

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 4 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: C<sub>6</sub>H<sub>14</sub>O<sub>4</sub>).

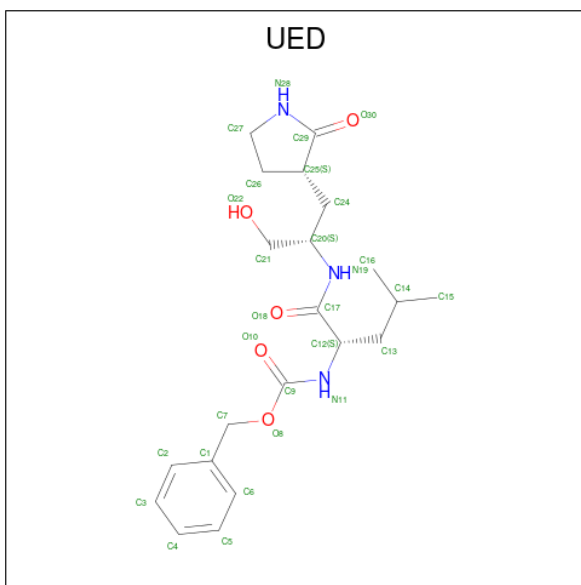


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	H	O	0	0
			24	6	14	4		
4	B	1	Total	C	H	O	0	0
			24	6	14	4		

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

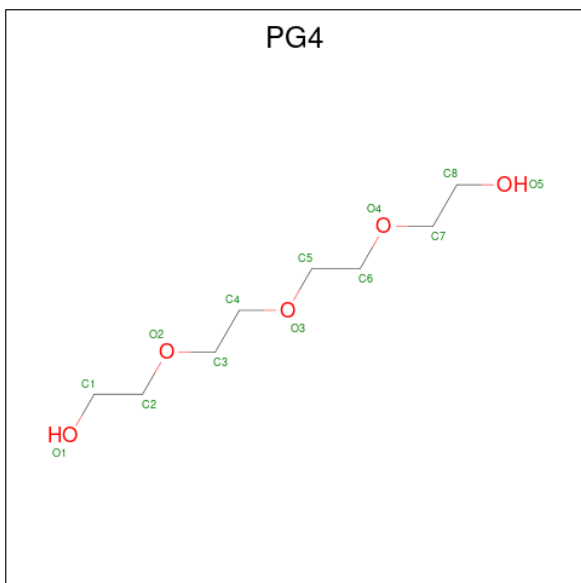
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Cl	0	0
			1	1		

- Molecule 6 is N<sup>2</sup> -[(benzyloxy)carbonyl]-N-{(2S)-1-hydroxy-3-[(3S)-2-oxopyrrolidin-3-yl]propan-2-yl}-L-leucinamide (three-letter code: UED) (formula: C<sub>21</sub>H<sub>31</sub>N<sub>3</sub>O<sub>5</sub>) (labeled as "Ligand of Interest" by depositor).



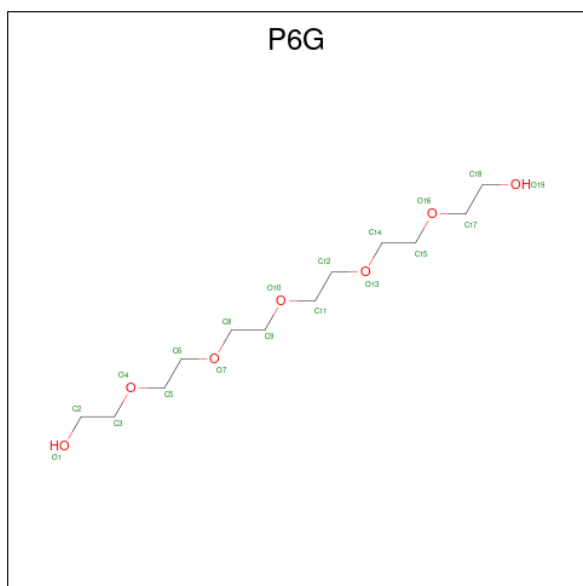
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	H	N	O	0	0
			59	21	30	3	5		
6	B	1	Total	C	H	N	O	0	0
			59	21	30	3	5		
6	C	1	Total	C	H	N	O	0	0
			59	21	30	3	5		
6	D	1	Total	C	H	N	O	0	0
			59	21	30	3	5		

- Molecule 7 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula:  $C_8H_{18}O_5$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	C	1	Total	C	H	O	0	0
			31	8	18	5		

- Molecule 8 is HEXAETHYLENE GLYCOL (three-letter code: P6G) (formula:  $C_{12}H_{26}O_7$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	D	1	Total	C	H	O	0	0
			45	12	26	7		

- Molecule 9 is water.

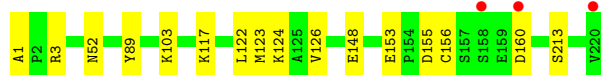
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	72	Total	O	0	0
			72	72		
9	B	80	Total	O	0	0
			80	80		
9	C	39	Total	O	0	0
			39	39		
9	D	81	Total	O	0	0
			81	81		



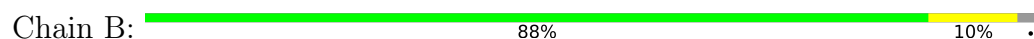
### 3 Residue-property plots [i](#)

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.

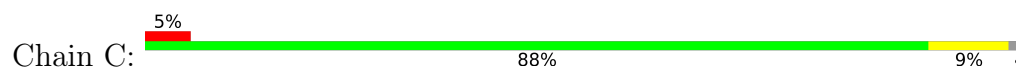
#### • Molecule 1: Cathepsin L



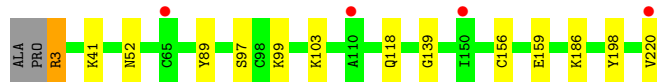
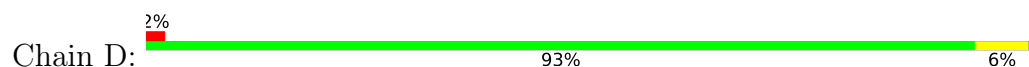
#### • Molecule 1: Cathepsin L



#### • Molecule 1: Cathepsin L



#### • Molecule 1: Cathepsin L



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	57.29Å 62.45Å 67.82Å 105.31° 93.52° 115.93°	Depositor
Resolution (Å)	44.25 – 1.80 44.25 – 1.80	Depositor EDS
% Data completeness (in resolution range)	90.6 (44.25-1.80) 85.5 (44.25-1.80)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.60 (at 1.79Å)	Xtriage
Refinement program	PHENIX 1.18-3855_9999	Depositor
R, $R_{free}$	0.169 , 0.203 0.169 , 0.203	Depositor DCC
$R_{free}$ test set	1980 reflections (2.94%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	39.6	Xtriage
Anisotropy	0.083	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 52.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	13831	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.34% 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: NA, CL, PEG, UED, PGE, P6G, PG4

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	0.45	0/1754	0.49	0/2370
1	B	0.42	0/1701	0.51	0/2295
1	C	0.32	0/1721	0.48	0/2322
1	D	0.32	0/1779	0.48	0/2399
All	All	0.38	0/6955	0.49	0/9386

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	1712	1583	1581	8	0
1	B	1661	1540	1538	11	0
1	C	1680	1557	1555	12	0
1	D	1732	1610	1599	6	0
2	A	14	20	20	0	0
2	B	21	30	30	0	0
2	C	14	20	20	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	10	14	14	1	0
4	B	10	14	14	2	0
5	A	1	0	0	0	0
6	A	29	30	0	0	0
6	B	29	30	0	0	0
6	C	29	30	0	0	0
6	D	29	30	0	0	0
7	C	13	18	18	0	0
8	D	19	26	26	1	0
9	A	72	0	0	0	0
9	B	80	0	0	0	0
9	C	39	0	0	0	0
9	D	81	0	0	0	0
All	All	7279	6552	6415	35	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 3.

All (35) 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:78:GLN:HE22	4:B:305:PGE:H52	1.62	0.65
1:B:179:ASN:OD1	1:B:180:ASN:N	2.33	0.61
1:B:40:ARG:HG2	1:B:41:LYS:HD3	1.86	0.57
1:D:139:GLY:HA2	8:D:302:P6G:H171	1.89	0.54
1:C:189:TRP:O	1:C:192[B]:GLU:OE2	2.27	0.53
1:C:172:PHE:N	1:C:172:PHE:CD1	2.78	0.51
1:B:78:GLN:NE2	4:B:305:PGE:H52	2.24	0.51
1:A:153:GLU:OE2	1:A:155:ASP:OD1	2.29	0.50
1:B:3:ARG:O	1:B:172:PHE:HE1	1.94	0.50
1:C:148:GLU:HG2	1:C:149:GLY:N	2.27	0.50
1:B:155:ASP:O	1:B:155:ASP:OD1	2.31	0.49
1:A:122:LEU:O	1:A:126:VAL:HG23	2.13	0.49
1:C:173:GLU:HG2	1:C:173:GLU:O	2.11	0.48
1:C:173:GLU:OE2	1:C:180:ASN:HB2	2.14	0.47
1:A:103:LYS:NZ	4:A:403:PGE:O2	2.49	0.46
1:D:3[B]:ARG:HG2	1:D:3[B]:ARG:HH11	1.81	0.45
1:A:1:ALA:HB3	1:A:123:MET:CE	2.46	0.45
1:B:146:TYR:CE2	1:B:199:VAL:HG23	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:97:SER:O	1:D:99[A]:LYS:HE3	2.16	0.45
1:A:148:GLU:OE1	1:C:192[A]:GLU:CD	2.56	0.44
1:B:146:TYR:CZ	1:B:199:VAL:HG23	2.53	0.44
1:C:113:VAL:HG23	1:C:219:THR:CG2	2.47	0.44
1:C:150:ILE:HD12	1:C:150:ILE:N	2.31	0.44
1:C:5:VAL:HG23	1:C:169:GLY:HA2	1.99	0.44
1:B:122:LEU:O	1:B:126:VAL:HG23	2.18	0.43
1:B:148:GLU:HG2	1:B:149:GLY:N	2.34	0.43
1:C:7:TRP:CE2	1:C:130:GLY:HA2	2.54	0.43
1:D:3[B]:ARG:HG2	1:D:3[B]:ARG:NH1	2.33	0.43
1:A:148:GLU:OE1	1:C:192[A]:GLU:OE2	2.37	0.42
1:A:117:LYS:HE2	1:A:213:SER:O	2.19	0.42
1:D:186:LYS:HB2	1:D:198:TYR:CE2	2.55	0.41
1:D:41:LYS:HE3	1:D:220:VAL:HG12	2.03	0.41
1:B:7:TRP:CE2	1:B:130:GLY:HA2	2.56	0.41
1:A:160:ASP:OD1	1:A:160:ASP:C	2.59	0.41
1:C:192[B]:GLU:CD	1:C:192[B]:GLU:H	2.24	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	220/220 (100%)	215 (98%)	5 (2%)	0	100	100
1	B	211/220 (96%)	204 (97%)	7 (3%)	0	100	100
1	C	213/220 (97%)	204 (96%)	9 (4%)	0	100	100
1	D	222/220 (101%)	216 (97%)	6 (3%)	0	100	100
All	All	866/880 (98%)	839 (97%)	27 (3%)	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	180/178 (101%)	175 (97%)	5 (3%)	43	30
1	B	174/178 (98%)	169 (97%)	5 (3%)	42	29
1	C	176/178 (99%)	167 (95%)	9 (5%)	24	10
1	D	183/178 (103%)	175 (96%)	8 (4%)	28	14
All	All	713/712 (100%)	686 (96%)	27 (4%)	35	18

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	ARG
1	A	52	ASN
1	A	89	TYR
1	A	124	LYS
1	A	156	CYS
1	B	52	ASN
1	B	89	TYR
1	B	156	CYS
1	B	159	GLU
1	B	173	GLU
1	C	4	SER
1	C	52	ASN
1	C	89	TYR
1	C	124	LYS
1	C	156	CYS
1	C	174	SER
1	C	179	ASN
1	C	192[A]	GLU
1	C	192[B]	GLU
1	D	3[A]	ARG
1	D	3[B]	ARG
1	D	52	ASN
1	D	89	TYR
1	D	103	LYS

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Mol	Chain	Res	Type
1	D	118	GLN
1	D	156	CYS
1	D	159	GLU

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 20 ligands modelled in this entry, 5 are monoatomic - leaving 15 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	$\# Z  > 2$
6	UED	A	406	1	30,30,30	0.20	0	37,39,39	0.56	1 (2%)
2	PEG	A	405	-	6,6,6	0.41	0	5,5,5	0.26	0
2	PEG	B	301	-	6,6,6	0.26	0	5,5,5	0.24	0
2	PEG	B	302	-	6,6,6	0.24	0	5,5,5	0.11	0
2	PEG	B	303	-	6,6,6	0.25	0	5,5,5	0.13	0
6	UED	B	306	1	30,30,30	0.20	0	37,39,39	0.49	0
6	UED	D	303	1	30,30,30	0.24	0	37,39,39	0.43	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	PG4	C	304	-	12,12,12	0.44	0	11,11,11	0.23	0
8	P6G	D	302	-	18,18,18	0.20	0	17,17,17	0.20	0
6	UED	C	305	1	30,30,30	0.17	0	37,39,39	0.35	0
4	PGE	A	403	-	9,9,9	0.19	0	8,8,8	0.19	0
2	PEG	C	302	-	6,6,6	0.22	0	5,5,5	0.19	0
2	PEG	A	401	-	6,6,6	0.26	0	5,5,5	0.14	0
2	PEG	C	301	-	6,6,6	0.24	0	5,5,5	0.13	0
4	PGE	B	305	-	9,9,9	0.41	0	8,8,8	0.29	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
6	UED	A	406	1	-	0/27/37/37	0/2/2/2
2	PEG	A	405	-	-	1/4/4/4	-
2	PEG	B	301	-	-	3/4/4/4	-
2	PEG	B	302	-	-	3/4/4/4	-
2	PEG	B	303	-	-	1/4/4/4	-
6	UED	B	306	1	-	0/27/37/37	0/2/2/2
6	UED	D	303	1	-	0/27/37/37	0/2/2/2
7	PG4	C	304	-	-	3/10/10/10	-
8	P6G	D	302	-	-	8/16/16/16	-
6	UED	C	305	1	-	0/27/37/37	0/2/2/2
4	PGE	A	403	-	-	3/7/7/7	-
2	PEG	C	302	-	-	2/4/4/4	-
2	PEG	A	401	-	-	1/4/4/4	-
2	PEG	C	301	-	-	2/4/4/4	-
4	PGE	B	305	-	-	5/7/7/7	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	406	UED	O8-C7-C1	-2.86	102.53	109.39

There are no chirality outliers.

All (32) torsion outliers are listed below:



Mol	Chain	Res	Type	Atoms
7	C	304	PG4	C8-C7-O4-C6
8	D	302	P6G	O7-C8-C9-O10
8	D	302	P6G	O4-C5-C6-O7
7	C	304	PG4	O3-C5-C6-O4
2	B	301	PEG	O2-C3-C4-O4
2	B	302	PEG	O2-C3-C4-O4
2	C	302	PEG	O2-C3-C4-O4
4	A	403	PGE	O1-C1-C2-O2
4	A	403	PGE	O3-C5-C6-O4
4	B	305	PGE	O1-C1-C2-O2
8	D	302	P6G	O1-C2-C3-O4
2	C	301	PEG	O1-C1-C2-O2
2	A	401	PEG	O2-C3-C4-O4
2	B	301	PEG	O1-C1-C2-O2
4	B	305	PGE	O3-C5-C6-O4
8	D	302	P6G	C2-C3-O4-C5
2	B	303	PEG	O2-C3-C4-O4
4	B	305	PGE	C3-C4-O3-C5
8	D	302	P6G	C6-C5-O4-C3
8	D	302	P6G	C9-C8-O7-C6
2	C	301	PEG	C4-C3-O2-C2
4	B	305	PGE	C1-C2-O2-C3
8	D	302	P6G	C14-C15-O16-C17
2	C	302	PEG	O1-C1-C2-O2
2	A	405	PEG	O2-C3-C4-O4
2	B	302	PEG	C1-C2-O2-C3
2	B	302	PEG	C4-C3-O2-C2
2	B	301	PEG	C1-C2-O2-C3
4	A	403	PGE	C3-C4-O3-C5
7	C	304	PG4	C6-C5-O3-C4
8	D	302	P6G	O10-C11-C12-O13
4	B	305	PGE	O2-C3-C4-O3

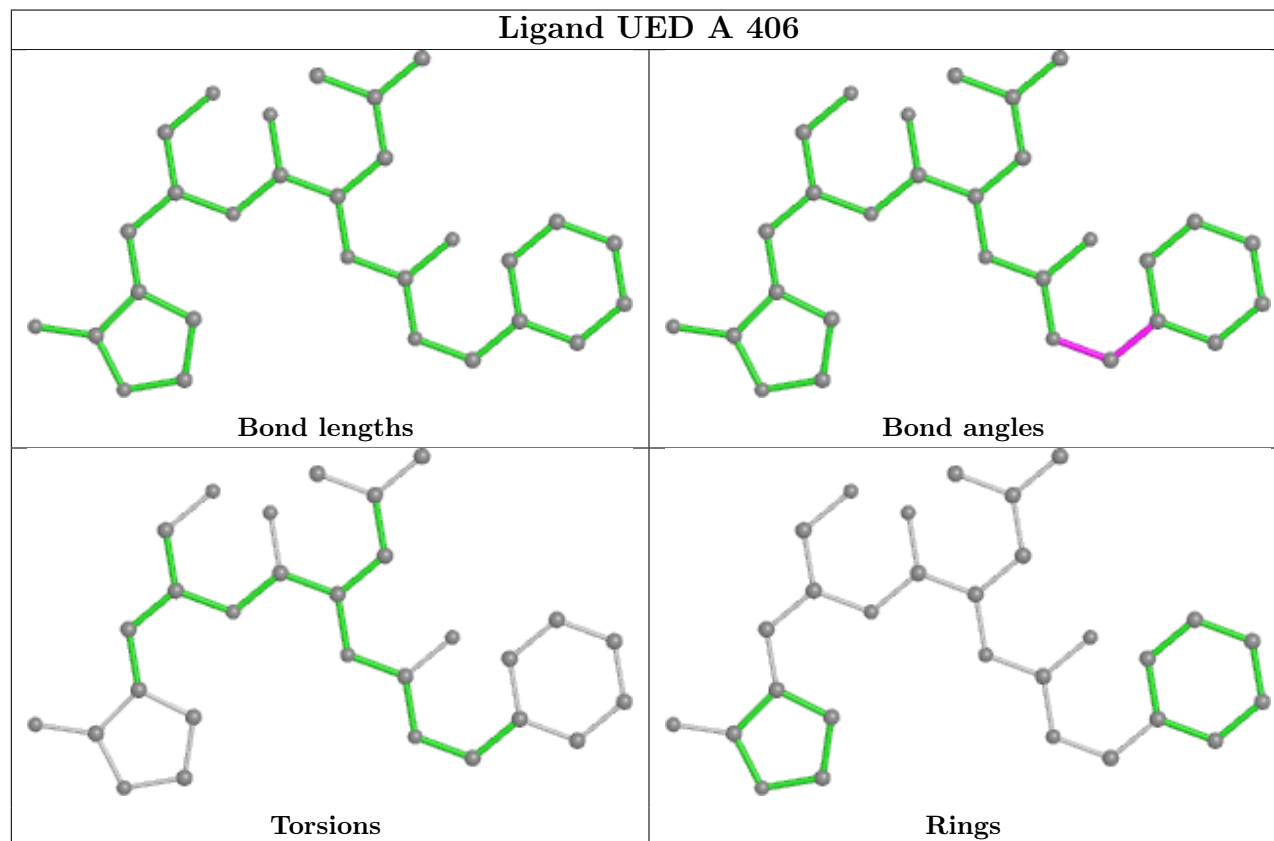
There are no ring outliers.

3 monomers are involved in 4 short contacts:

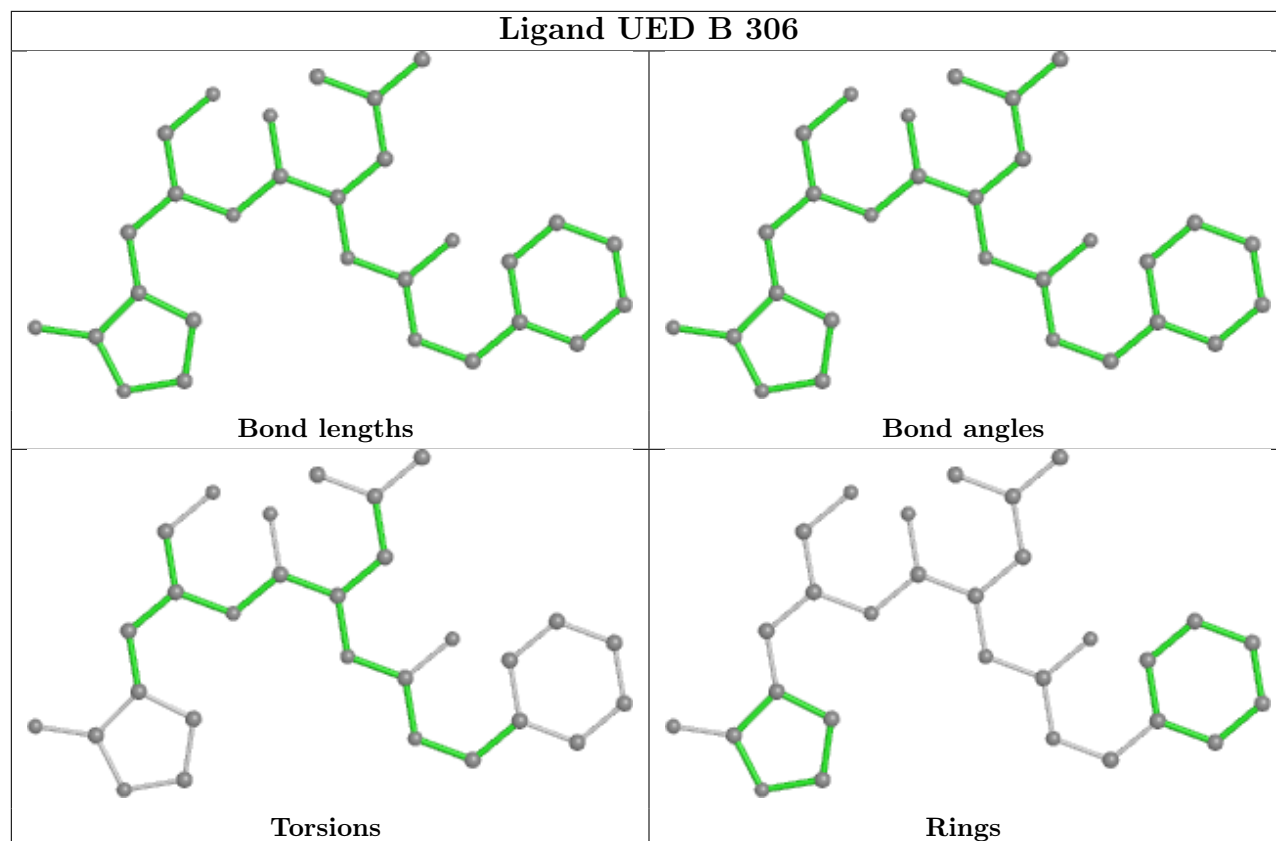
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	D	302	P6G	1	0
4	A	403	PGE	1	0
4	B	305	PGE	2	0

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

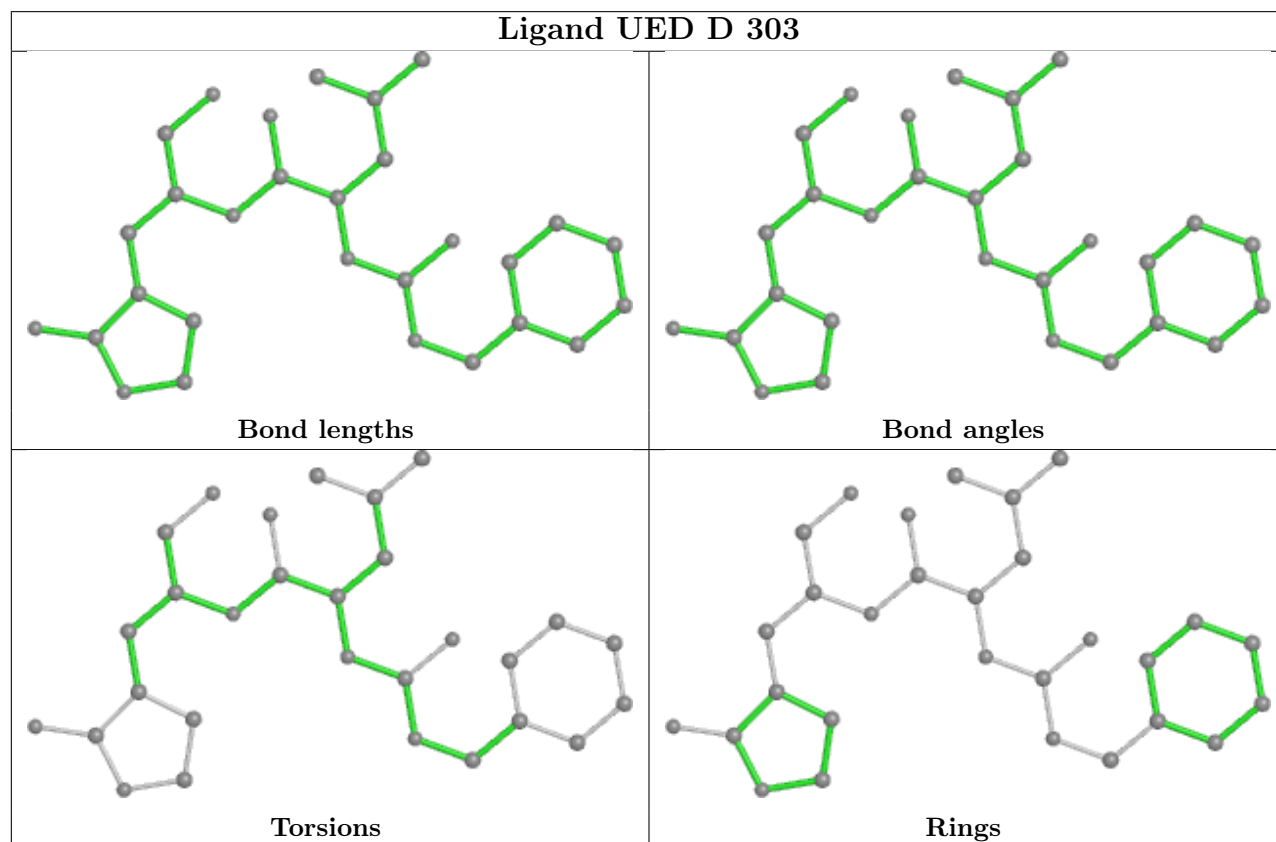
addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. 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.

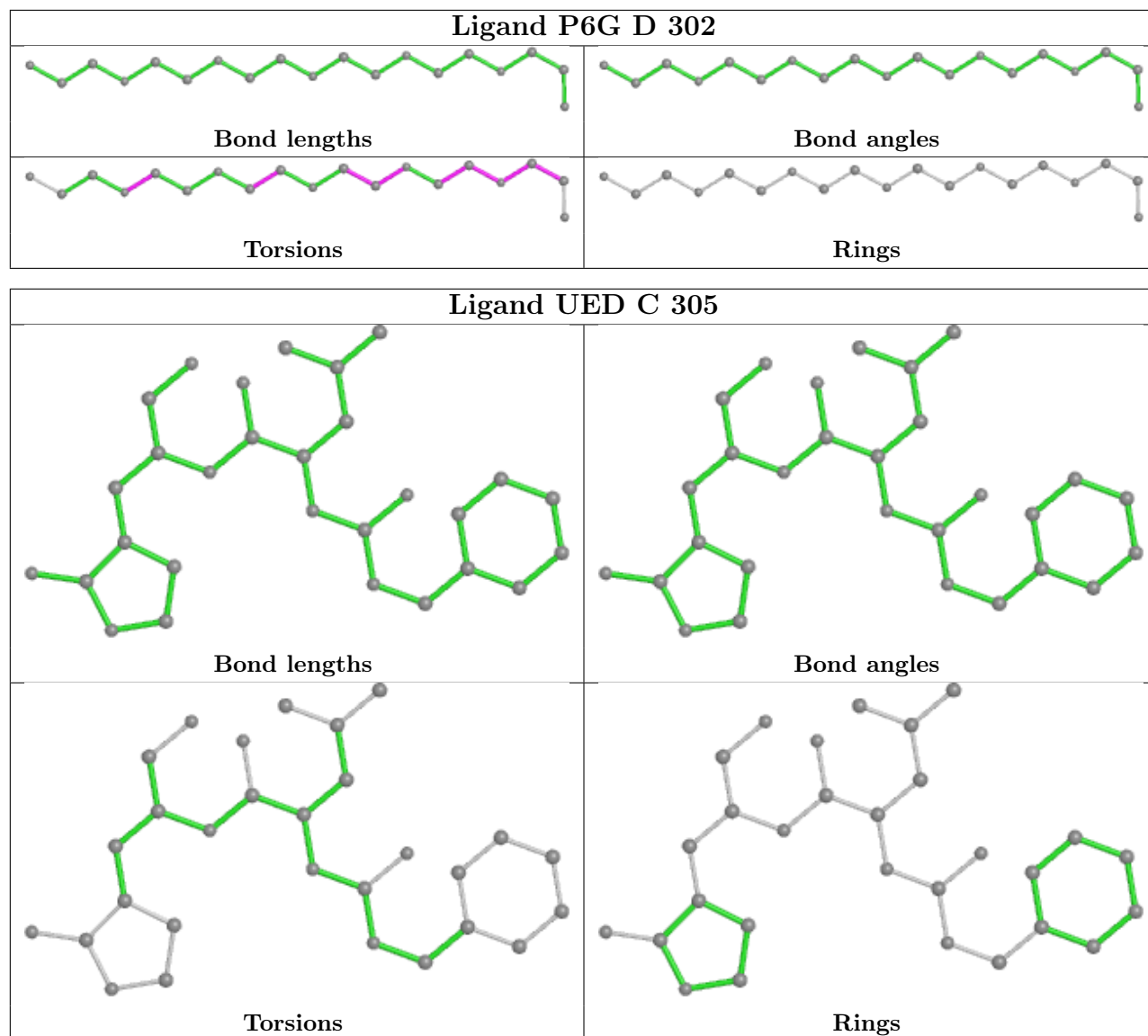


## Ligand UED B 306



## Ligand UED D 303





## 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, 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	220/220 (100%)	0.09	3 (1%) 75 72	39, 48, 68, 94	0
1	B	214/220 (97%)	0.22	0 100 100	36, 46, 73, 103	0
1	C	215/220 (97%)	0.21	11 (5%) 28 22	39, 55, 89, 122	0
1	D	218/220 (99%)	0.10	4 (1%) 68 64	36, 45, 65, 85	0
All	All	867/880 (98%)	0.15	18 (2%) 63 59	36, 48, 76, 122	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	2	PRO	4.2
1	A	158	SER	4.0
1	C	3	ARG	4.0
1	C	170	TYR	3.3
1	C	4	SER	3.2
1	A	160	ASP	3.1
1	D	65	CYS	3.0
1	D	220	VAL	2.9
1	C	173	GLU	2.8
1	D	110	ALA	2.5
1	C	172	PHE	2.2
1	D	150	ILE	2.2
1	C	206[A]	ARG	2.2
1	C	179	ASN	2.1
1	C	5	VAL	2.1
1	C	41	LYS	2.1
1	A	220	VAL	2.0
1	C	180	ASN	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 monosaccharides in this entry.

## 6.4 Ligands [i](#)

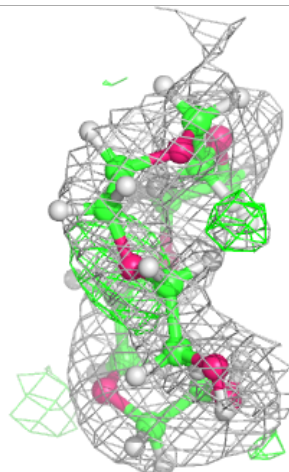
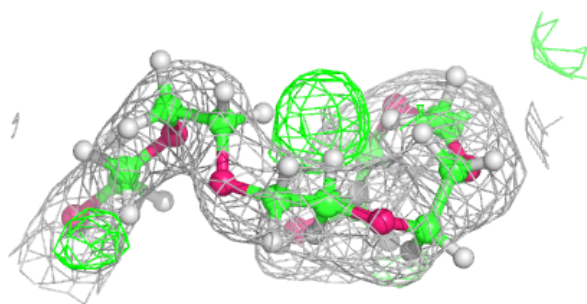
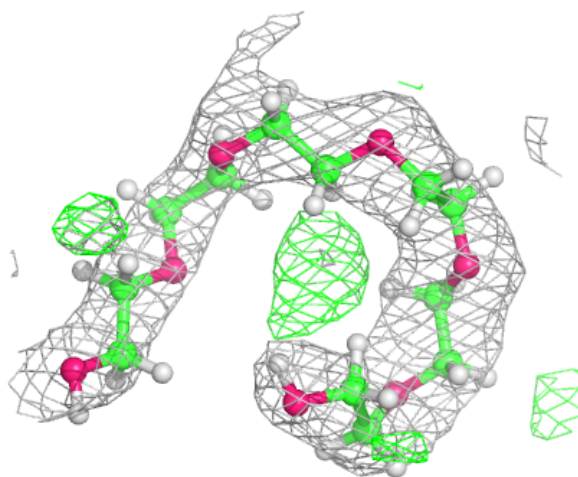
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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	PGE	A	403	10/10	0.67	0.17	62,78,89,97	0
2	PEG	A	401	7/7	0.74	0.16	63,76,89,89	0
2	PEG	B	303	7/7	0.80	0.21	57,72,87,95	0
2	PEG	B	301	7/7	0.80	0.18	56,71,85,87	0
8	P6G	D	302	19/19	0.80	0.14	60,74,86,90	0
7	PG4	C	304	13/13	0.83	0.13	69,94,123,124	0
2	PEG	C	302	7/7	0.85	0.11	57,69,80,86	0
2	PEG	A	405	7/7	0.85	0.10	67,81,96,96	0
4	PGE	B	305	10/10	0.88	0.20	63,83,97,106	0
6	UED	A	406	29/29	0.88	0.24	46,61,98,120	0
2	PEG	B	302	7/7	0.89	0.12	57,68,85,85	0
6	UED	B	306	29/29	0.89	0.19	41,62,92,106	0
6	UED	C	305	29/29	0.90	0.22	45,66,95,100	0
6	UED	D	303	29/29	0.90	0.26	35,55,93,102	0
3	NA	B	304	1/1	0.91	0.15	61,61,61,61	0
5	CL	A	404	1/1	0.91	0.16	77,77,77,77	0
2	PEG	C	301	7/7	0.92	0.09	63,76,81,91	0
3	NA	A	402	1/1	0.92	0.24	72,72,72,72	0
3	NA	C	303	1/1	0.93	0.15	70,70,70,70	0
3	NA	D	301	1/1	0.98	0.17	33,33,33,33	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.

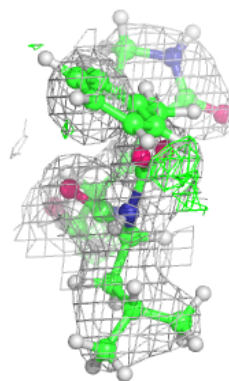
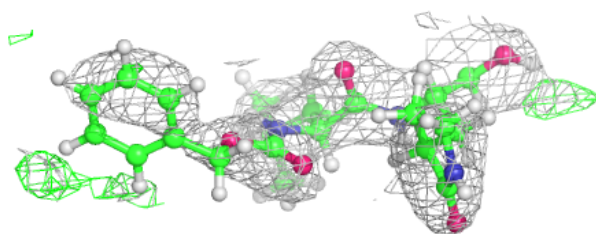
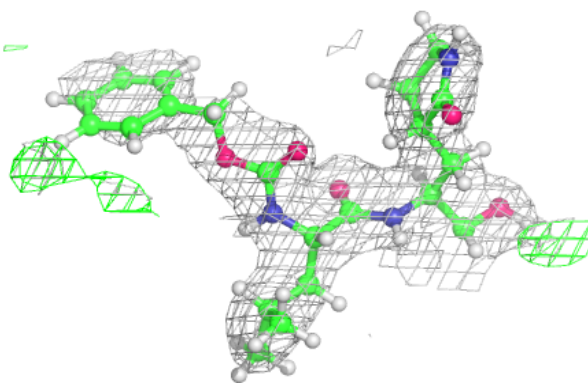
**Electron density around P6G D 302:**

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



**Electron density around UED A 406:**

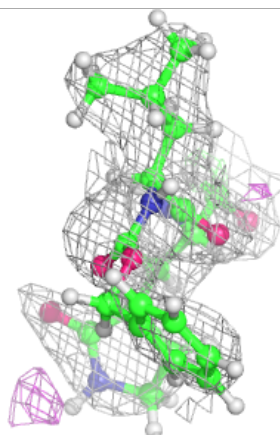
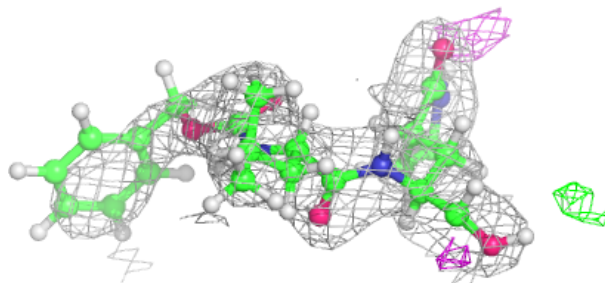
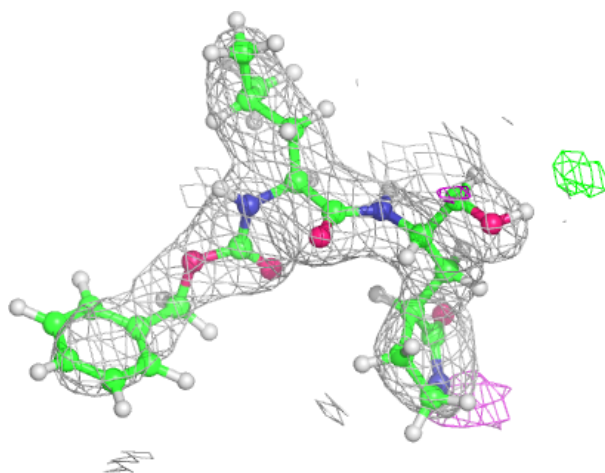
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





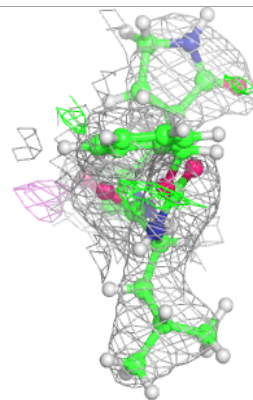
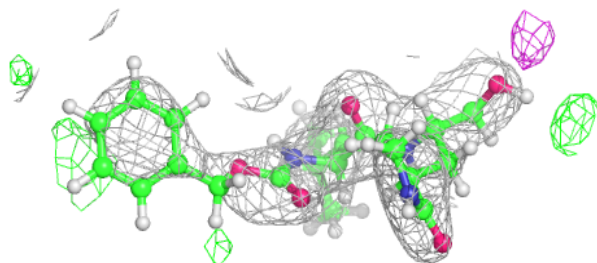
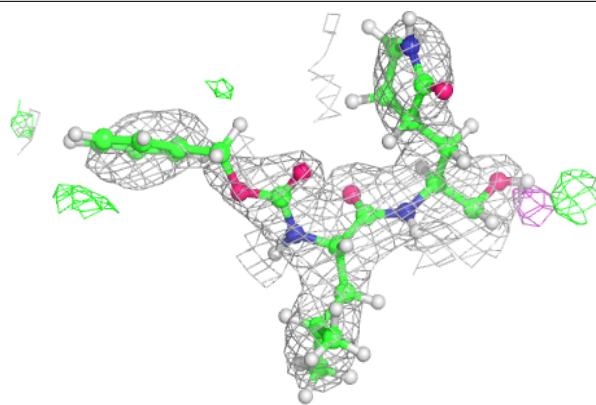
**Electron density around UED B 306:**

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



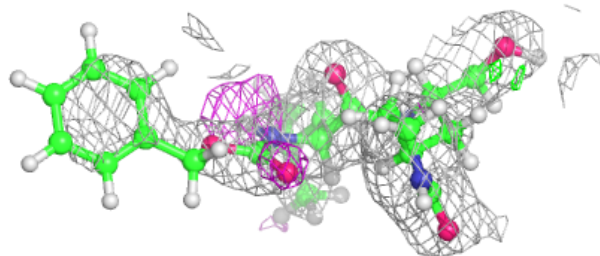
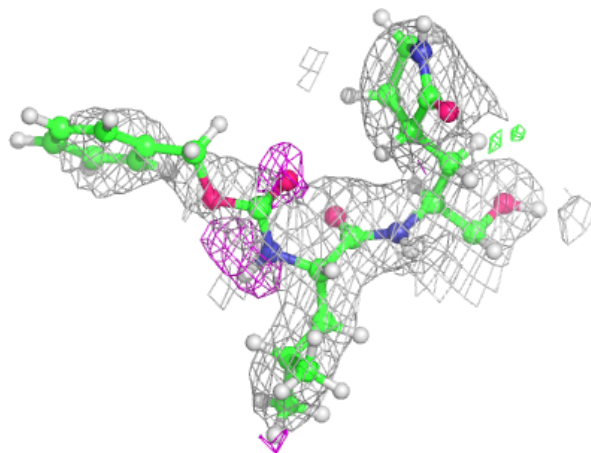
**Electron density around UED C 305:**

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



**Electron density around UED D 303:**

$2mF_o-DF_c$  (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.