wwPDB X-ray Structure Validation Summary Report (i)

Nov 3, 2026 – 06:10 pm GMT

PDB ID	:	34CM / pdb_000034cm
Title	:	Crystal structure of human Cathepsin L in complex with 8-hydroxy-2,6-diaza spiro[3.5]nonan-5-one
Authors	:	Falke, S.; Meents, A.
Deposited on	:	2026-09-07
Resolution	:	1.70 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

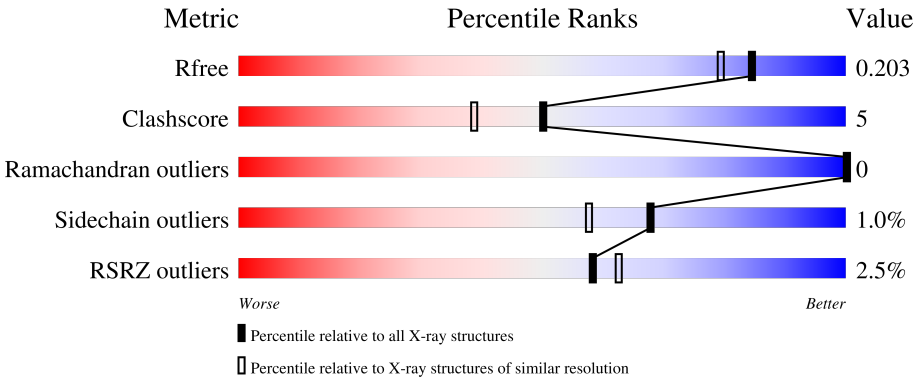
MolProbity	:	4-5-2 with Phenix2.2
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.2
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 1.70 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}	180053	5551 (1.70-1.70)
Clashscore	190562	5924 (1.70-1.70)
Ramachandran outliers	187476	5846 (1.70-1.70)
Sidechain outliers	187428	5846 (1.70-1.70)
RSRZ outliers	180081	5554 (1.70-1.70)

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

Mol	Chain	Length	Quality of chain
1	A	220	5% 90% 10%
1	B	220	2% 91% 9%
1	C	220	3% 85% 14%
1	D	220	92% 8%

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 7734 atoms, of which 50 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.

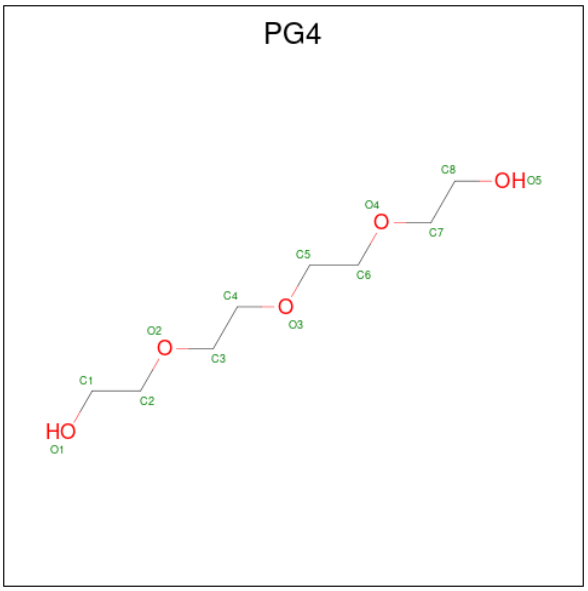
- Molecule 1 is a protein called Cathepsin L.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	220	Total	C	N	O	S	0	3	0
			1717	1072	284	346	15			
1	B	220	Total	C	N	O	S	0	4	0
			1728	1078	285	350	15			
1	C	217	Total	C	N	O	S	0	3	0
			1701	1063	284	339	15			
1	D	220	Total	C	N	O	S	0	11	0
			1783	1110	295	362	16			

There are 4 discrepancies between the modelled and reference sequences:

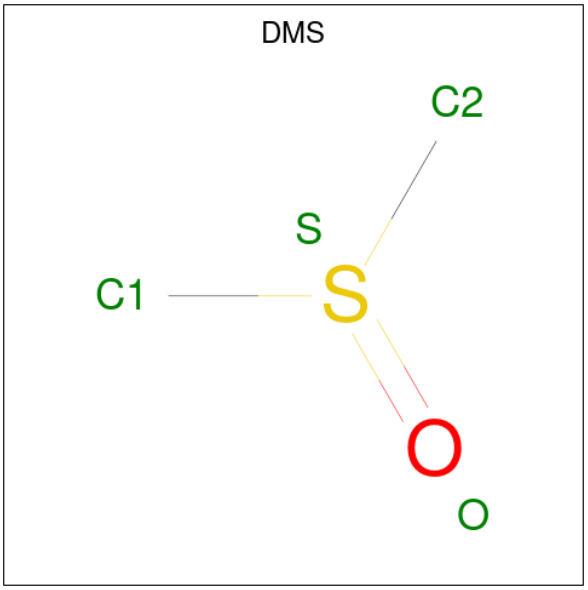
Chain	Residue	Modelled	Actual	Comment	Reference
A	110	ALA	THR	engineered mutation	UNP P07711
B	110	ALA	THR	engineered mutation	UNP P07711
C	110	ALA	THR	engineered mutation	UNP P07711
D	110	ALA	THR	engineered mutation	UNP P07711

- Molecule 2 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



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

- Molecule 3 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C_2H_6OS).



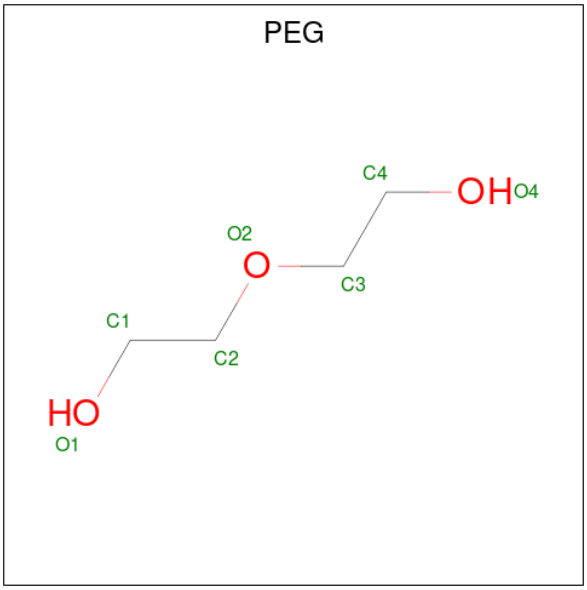
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C H O S 10 2 6 1 1	0	0
3	B	1	Total C O S 4 2 1 1	0	0
3	B	1	Total C O S 4 2 1 1	0	0

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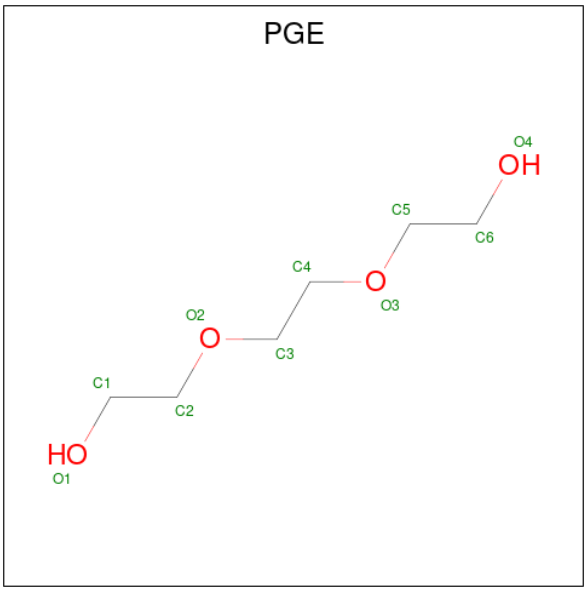
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	D	1	Total C O S 4 2 1 1	0	0

- Molecule 4 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



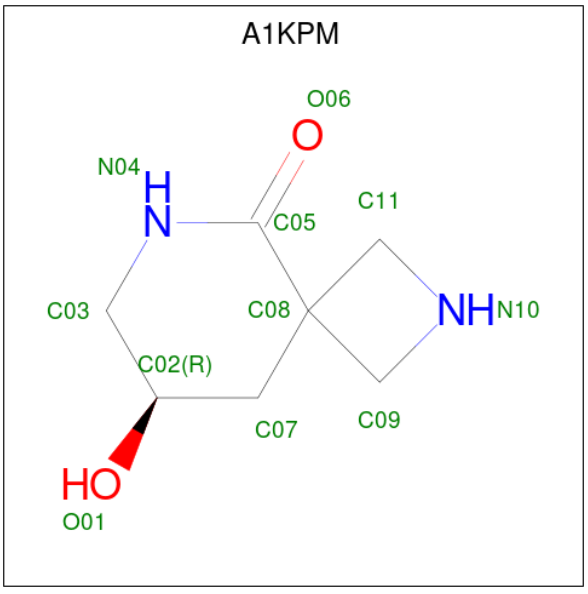
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 7 4 3	0	0
4	B	1	Total C O 7 4 3	0	0
4	B	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0
4	D	1	Total C O 7 4 3	0	0

- Molecule 5 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).



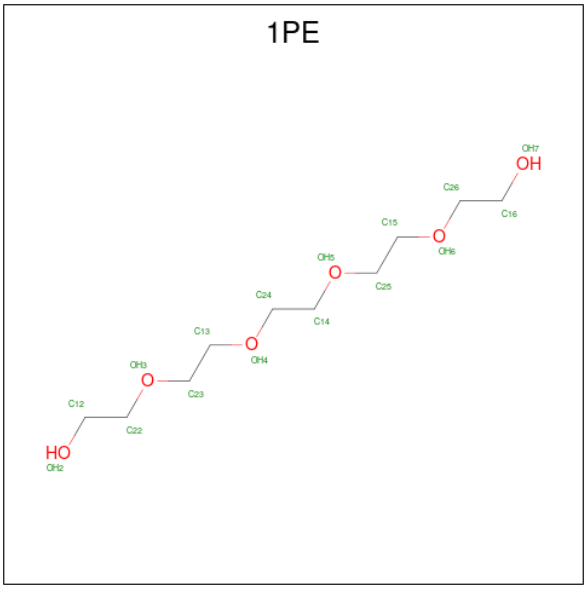
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 10 6 4	0	0
5	B	1	Total C O 10 6 4	0	0
5	D	1	Total C O 10 6 4	0	0

- Molecule 6 is (8 {R})-8-oxidanyl-2,6-diazaspiro[3.5]nonan-5-one (CCD ID: A1KPM) (formula: $C_7H_{12}N_2O_2$) (labeled as "Ligand of Interest" by depositor).



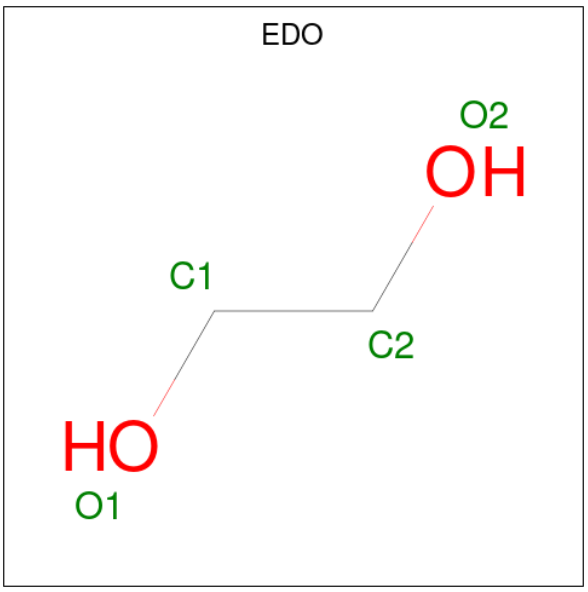
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	H	N	O	0	0
			24	7	13	2	2		

- Molecule 7 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: $C_{10}H_{22}O_6$).



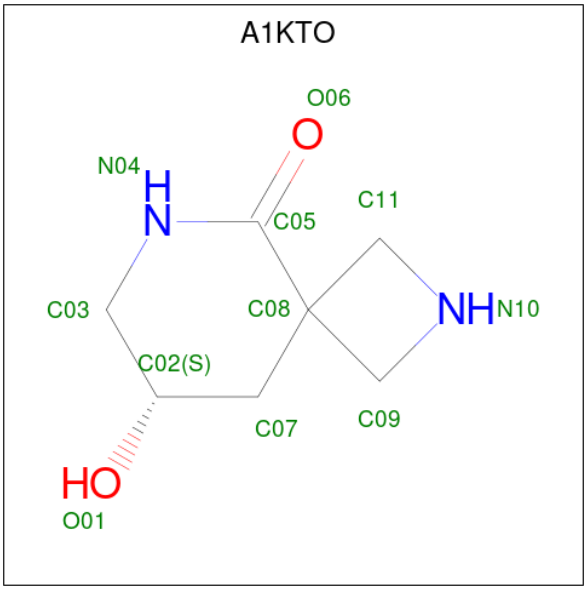
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	C	1	Total	C	O	0	0
			16	10	6		

- Molecule 8 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	D	1	Total C O 4 2 2	0	0
8	D	1	Total C O 4 2 2	0	0

- Molecule 9 is (8 {S})-8-oxidanyl-2,6-diazaspiro[3.5]nonan-5-one (CCD ID: A1KTO) (formula: $C_7H_{12}N_2O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	D	1	Total C H N O 24 7 13 2 2	0	0

- Molecule 10 is water.

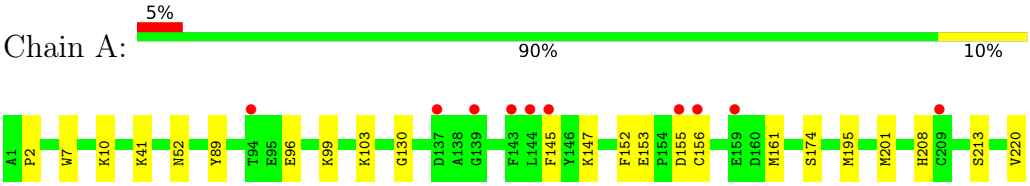
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	137	Total O 137 137	0	0
10	B	167	Total O 167 167	0	0
10	C	102	Total O 102 102	0	0
10	D	195	Total O 195 195	0	0

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.

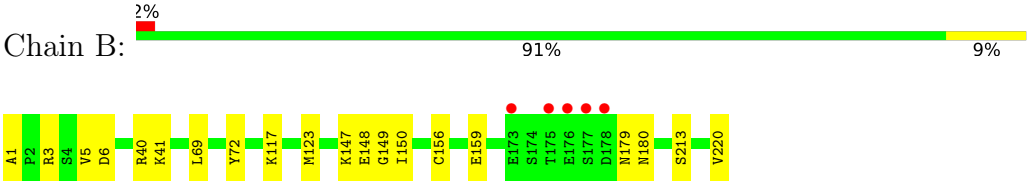
• Molecule 1: Cathepsin L

Chain A:



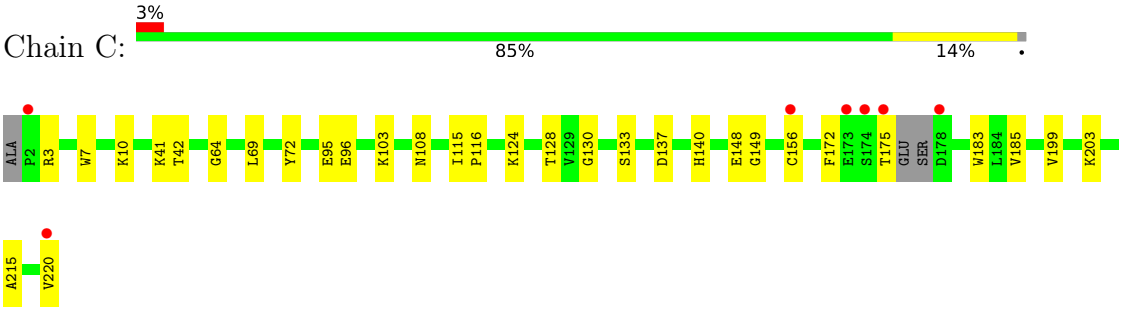
• Molecule 1: Cathepsin L

Chain B:



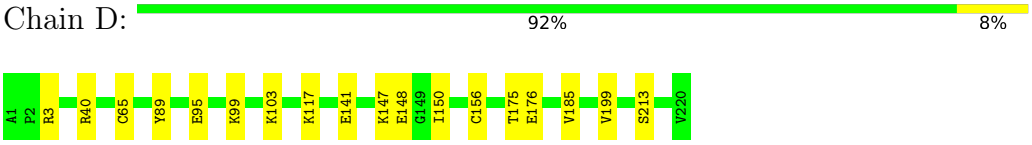
• Molecule 1: Cathepsin L

Chain C:



• Molecule 1: Cathepsin L

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	57.08Å 62.66Å 67.61Å 105.38° 93.80° 115.52°	Depositor
Resolution (Å)	53.45 – 1.70 53.45 – 1.70	Depositor EDS
% Data completeness (in resolution range)	91.9 (53.45-1.70) 91.9 (53.45-1.70)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.29 (at 1.70Å)	Xtriage
Refinement program	PHENIX 2.0-5936_9999	Depositor
R, R_{free}	0.168 , 0.203 0.168 , 0.203	Depositor DCC
R_{free} test set	4096 reflections (1.95%)	wwPDB-VP
Wilson B-factor (Å^2)	17.9	Xtriage
Anisotropy	0.088	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 36.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.52$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	7734	wwPDB-VP
Average B, all atoms (Å^2)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.29% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PG4, A1KTO, PEG, A1KPM, EDO, CSO, 1PE, PGE, DMS

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	0.27	0/1745	0.44	0/2357
1	B	0.29	0/1756	0.49	0/2371
1	C	0.23	0/1728	0.42	0/2330
1	D	0.30	0/1811	0.47	0/2442
All	All	0.27	0/7040	0.46	0/9500

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1717	0	1586	20	0
1	B	1728	0	1590	17	0
1	C	1701	0	1573	22	0
1	D	1783	0	1640	14	0
2	A	13	18	18	2	0
3	A	4	6	6	2	0
3	B	8	0	12	3	0
3	D	4	0	6	0	0
4	A	7	0	10	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	14	0	20	0	0
4	C	21	0	30	0	0
4	D	7	0	10	0	0
5	A	10	0	14	0	0
5	B	10	0	14	2	0
5	D	10	0	14	0	0
6	A	11	13	0	2	0
7	C	16	0	22	1	0
8	D	8	0	12	1	0
9	D	11	13	0	0	0
10	A	137	0	0	1	0
10	B	167	0	0	1	0
10	C	102	0	0	2	0
10	D	195	0	0	1	0
All	All	7684	50	6577	73	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 5.

The worst 5 of 73 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:147:LYS:HD2	1:D:148[A]:GLU:HG3	1.52	0.89
1:C:41:LYS:HD3	1:C:220:VAL:HG12	1.53	0.89
1:B:150:ILE:HD12	1:B:180:ASN:HB3	1.65	0.79
1:C:41:LYS:HD3	1:C:220:VAL:CG1	2.11	0.79
1:A:10:LYS:HA	1:A:10:LYS:HE2	1.64	0.78

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	219/220 (100%)	212 (97%)	7 (3%)	0	100	100
1	B	220/220 (100%)	215 (98%)	5 (2%)	0	100	100
1	C	214/220 (97%)	208 (97%)	6 (3%)	0	100	100
1	D	227/220 (103%)	221 (97%)	6 (3%)	0	100	100
All	All	880/880 (100%)	856 (97%)	24 (3%)	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	179/177 (101%)	177 (99%)	2 (1%)	65	54
1	B	180/177 (102%)	179 (99%)	1 (1%)	78	72
1	C	177/177 (100%)	176 (99%)	1 (1%)	78	72
1	D	187/177 (106%)	184 (98%)	3 (2%)	55	41
All	All	723/708 (102%)	716 (99%)	7 (1%)	68	58

5 of 7 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	156	CYS
1	D	141	GLU
1	D	175	THR
1	D	156	CYS
1	B	156	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	140	HIS
1	D	21	GLN
1	D	75	GLN

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Mol	Chain	Res	Type
1	B	75	GLN
1	A	66	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)

8 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	CSO	C	25[B]	1	4,5,7	0.62	0	1,5,8	0.26	0
1	CSO	B	25[A]	1	3,6,7	0.69	0	0,6,8	-	-
1	CSO	D	25[B]	1	4,5,7	0.62	0	1,5,8	0.54	0
1	CSO	C	25[A]	1	3,6,7	0.64	0	0,6,8	-	-
1	CSO	D	25[A]	1	3,6,7	0.62	0	0,6,8	-	-
1	CSO	B	25[B]	1	4,5,7	0.64	0	1,5,8	0.45	0
1	CSO	A	25[B]	1	4,5,7	0.67	0	1,5,8	0.33	0
1	CSO	A	25[A]	1	3,6,7	0.61	0	0,6,8	-	-

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	CSO	C	25[B]	1	-	0/1/4/7	-
1	CSO	B	25[A]	1	-	0/1/5/7	-
1	CSO	D	25[B]	1	-	0/1/4/7	-
1	CSO	C	25[A]	1	-	0/1/5/7	-
1	CSO	D	25[A]	1	-	1/1/5/7	-
1	CSO	B	25[B]	1	-	0/1/4/7	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	CSO	A	25[B]	1	-	0/1/4/7	-
1	CSO	A	25[A]	1	-	1/1/5/7	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	25[A]	CSO	N-CA-CB-SG
1	D	25[A]	CSO	N-CA-CB-SG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

20 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	$\#\|Z\| > 2$
5	PGE	D	305	-	9,9,9	0.34	0	8,8,8	0.49	0
3	DMS	B	301	-	3,3,3	0.61	0	3,3,3	0.21	0
4	PEG	B	304	-	6,6,6	0.23	0	5,5,5	0.29	0
9	A1KTO	D	306	-	10,12,12	0.96	0	7,18,18	2.08	1 (14%)
3	DMS	D	301	-	3,3,3	0.59	0	3,3,3	0.19	0
7	1PE	C	304	-	15,15,15	0.29	0	14,14,14	0.22	0
4	PEG	C	303	-	6,6,6	0.24	0	5,5,5	0.27	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
8	EDO	D	303	-	3,3,3	0.32	0	2,2,2	0.44	0
4	PEG	A	303	-	6,6,6	0.24	0	5,5,5	0.21	0
4	PEG	D	304	-	6,6,6	0.20	0	5,5,5	0.35	0
6	A1KPM	A	305	-	10,12,12	0.98	1 (10%)	7,18,18	2.45	2 (28%)
2	PG4	A	301	-	12,12,12	0.28	0	11,11,11	0.37	0
5	PGE	B	305	-	9,9,9	0.33	0	8,8,8	0.51	0
4	PEG	B	303	-	6,6,6	0.23	0	5,5,5	0.31	0
5	PGE	A	304	-	9,9,9	0.32	0	8,8,8	0.54	0
8	EDO	D	302	-	3,3,3	0.31	0	2,2,2	0.15	0
4	PEG	C	302	-	6,6,6	0.24	0	5,5,5	0.34	0
3	DMS	B	302	-	3,3,3	0.54	0	3,3,3	0.16	0
3	DMS	A	302	-	3,3,3	0.71	0	3,3,3	0.80	0
4	PEG	C	301	-	6,6,6	0.24	0	5,5,5	0.20	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
2	PG4	A	301	-	-	6/10/10/10	-
4	PEG	B	304	-	-	2/4/4/4	-
5	PGE	B	305	-	-	3/7/7/7	-
8	EDO	D	303	-	-	1/1/1/1	-
4	PEG	B	303	-	-	2/4/4/4	-
4	PEG	A	303	-	-	0/4/4/4	-
5	PGE	A	304	-	-	4/7/7/7	-
4	PEG	D	304	-	-	3/4/4/4	-
5	PGE	D	305	-	-	2/7/7/7	-
4	PEG	C	302	-	-	3/4/4/4	-
7	1PE	C	304	-	-	10/13/13/13	-
8	EDO	D	302	-	-	1/1/1/1	-
9	A1KTO	D	306	-	-	-	0/2/2/2
6	A1KPM	A	305	-	-	-	0/2/2/2
4	PEG	C	303	-	-	1/4/4/4	-
4	PEG	C	301	-	-	1/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	305	A1KPM	C03-C02	-2.66	1.48	1.51

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	A	305	A1KPM	C09-C08-C11	5.44	87.88	85.26
9	D	306	A1KTO	C02-C03-N04	4.86	113.64	109.57
6	A	305	A1KPM	C02-C03-N04	2.97	112.06	109.57

There are no chirality outliers.

5 of 39 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	C	304	1PE	C16-C26-OH6-C15
2	A	301	PG4	O3-C5-C6-O4
7	C	304	1PE	OH5-C14-C24-OH4
7	C	304	1PE	OH4-C13-C23-OH3
5	B	305	PGE	O3-C5-C6-O4

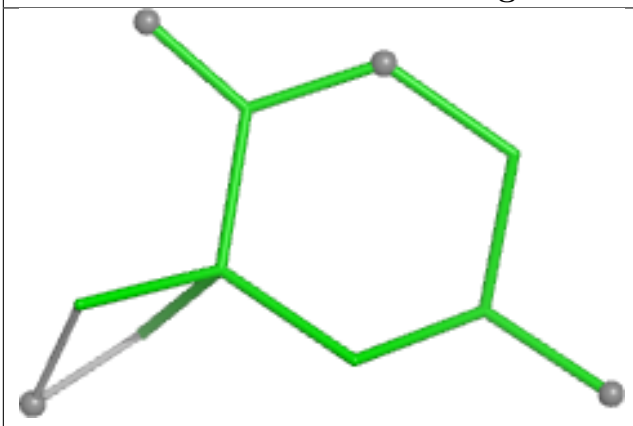
There are no ring outliers.

7 monomers are involved in 13 short contacts:

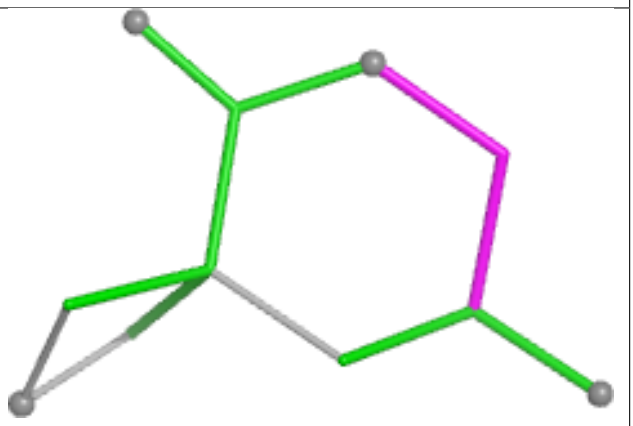
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	301	DMS	3	0
7	C	304	1PE	1	0
8	D	303	EDO	1	0
6	A	305	A1KPM	2	0
2	A	301	PG4	2	0
5	B	305	PGE	2	0
3	A	302	DMS	2	0

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

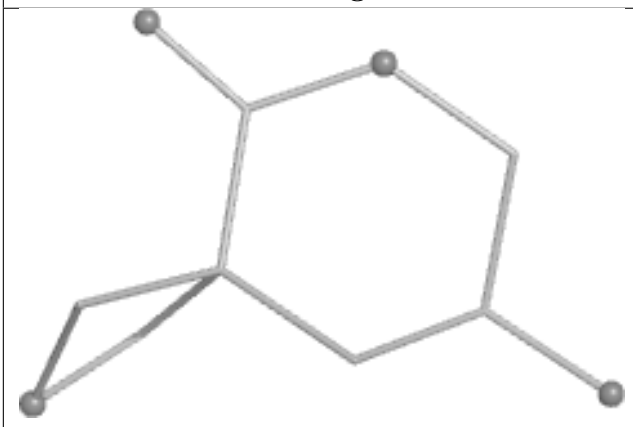
Ligand A1KTO D 306



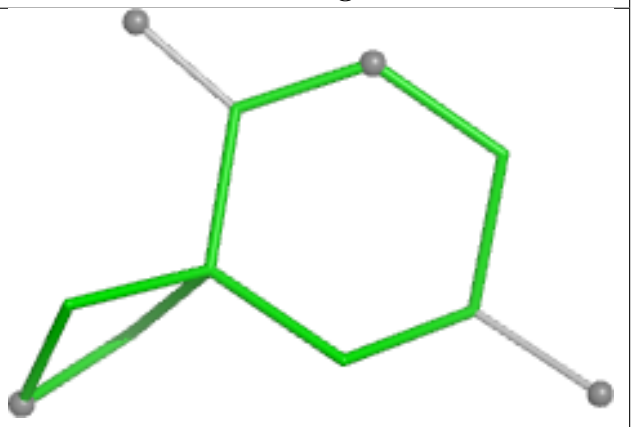
Bond lengths



Bond angles

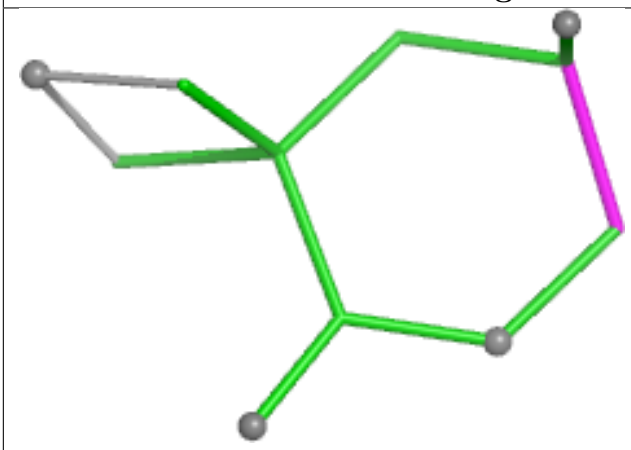


Torsions

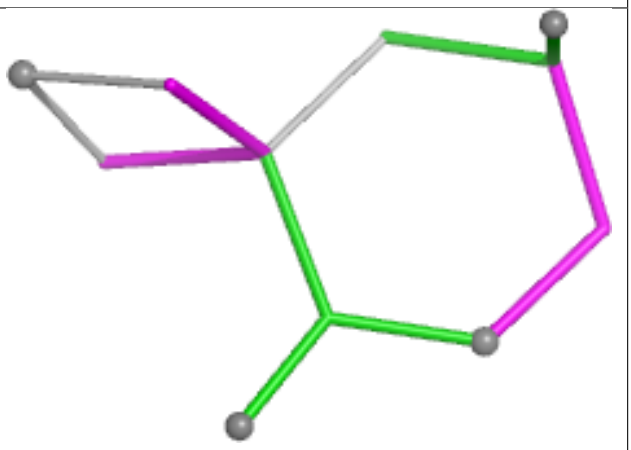


Rings

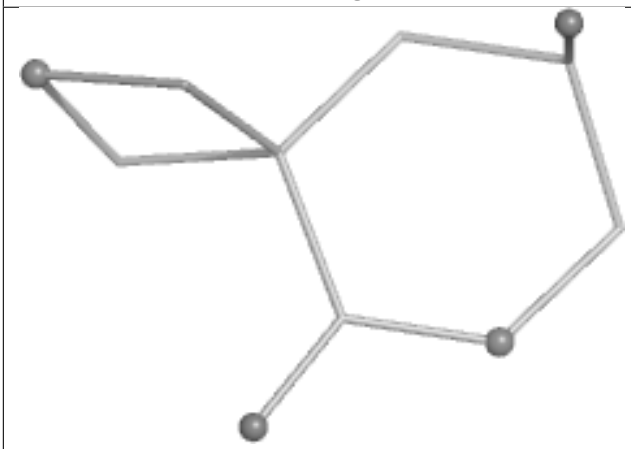
Ligand A1KPM A 305



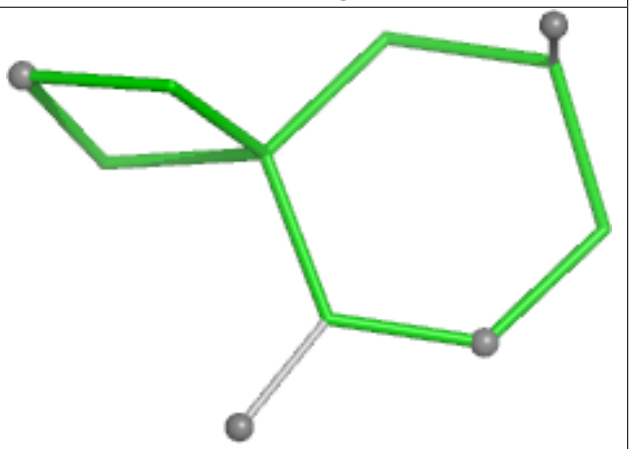
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

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^{th} 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	219/220 (99%)	0.28	10 (4%) 37 41	10, 21, 38, 62	2 (0%)
1	B	219/220 (99%)	-0.07	5 (2%) 61 65	9, 17, 36, 65	3 (1%)
1	C	216/220 (98%)	0.26	7 (3%) 50 54	11, 23, 39, 76	2 (0%)
1	D	219/220 (99%)	-0.21	0 100 100	6, 15, 31, 39	10 (4%)
All	All	873/880 (99%)	0.06	22 (2%) 58 62	6, 19, 36, 76	17 (1%)

The worst 5 of 22 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	175	THR	4.3
1	A	145	PHE	3.6
1	C	174	SER	3.6
1	B	175	THR	3.2
1	A	143	PHE	3.0

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

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^{th} 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
1	CSO	B	25[A]	7/8	0.92	0.09	12,16,23,24	7
1	CSO	B	25[B]	6/8	0.92	0.09	12,16,17,17	6
1	CSO	D	25[A]	7/8	0.93	0.08	14,15,20,24	7
1	CSO	D	25[B]	6/8	0.93	0.08	13,14,16,17	6
1	CSO	C	25[A]	7/8	0.95	0.07	17,18,27,28	7
1	CSO	C	25[B]	6/8	0.95	0.07	17,18,21,21	6
1	CSO	A	25[A]	7/8	0.97	0.07	15,18,20,22	7

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	CSO	A	25[B]	6/8	0.97	0.07	15,18,20,20	6

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

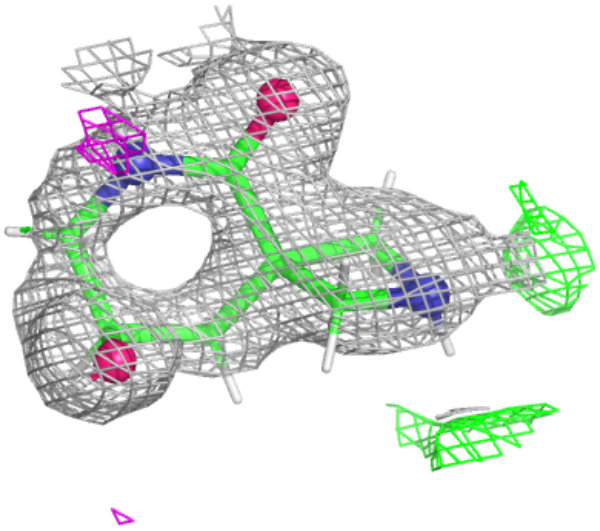
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

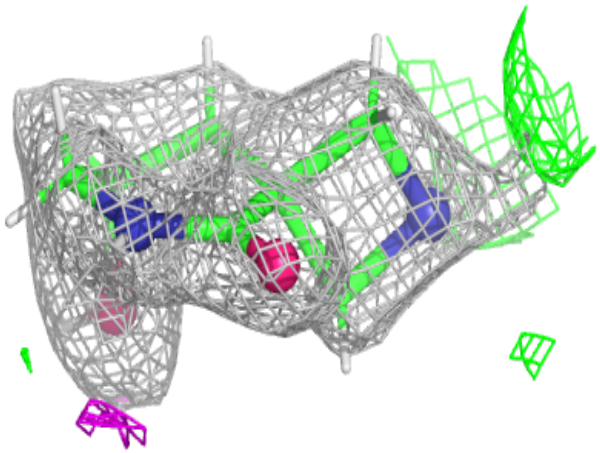
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	PEG	A	303	7/7	0.75	0.15	41,44,52,55	0
3	DMS	B	302	4/4	0.77	0.18	27,42,46,63	0
4	PEG	C	301	7/7	0.77	0.15	38,44,50,53	0
7	1PE	C	304	16/16	0.78	0.17	38,50,57,60	0
8	EDO	D	302	4/4	0.78	0.15	23,31,45,51	0
4	PEG	B	303	7/7	0.79	0.14	36,38,43,49	0
5	PGE	A	304	10/10	0.79	0.14	35,42,49,52	0
3	DMS	A	302	4/4	0.80	0.18	45,54,60,63	0
5	PGE	D	305	10/10	0.80	0.15	34,39,46,46	0
5	PGE	B	305	10/10	0.82	0.15	32,41,42,44	0
2	PG4	A	301	13/13	0.82	0.13	34,47,61,62	0
4	PEG	D	304	7/7	0.84	0.15	32,40,46,47	0
4	PEG	B	304	7/7	0.84	0.14	37,38,45,55	0
4	PEG	C	303	7/7	0.85	0.15	41,48,59,62	0
4	PEG	C	302	7/7	0.86	0.12	31,35,42,43	0
6	A1KPM	A	305	11/11	0.88	0.11	18,27,35,38	24
3	DMS	B	301	4/4	0.92	0.12	32,33,45,53	0
8	EDO	D	303	4/4	0.92	0.15	18,19,28,30	0
9	A1KTO	D	306	11/11	0.94	0.07	10,16,26,26	24
3	DMS	D	301	4/4	0.95	0.10	22,31,33,38	0

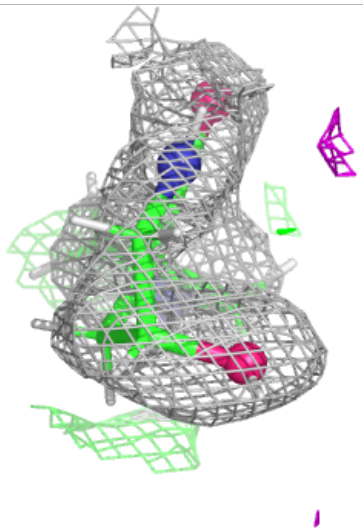
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1KPM A 305:

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

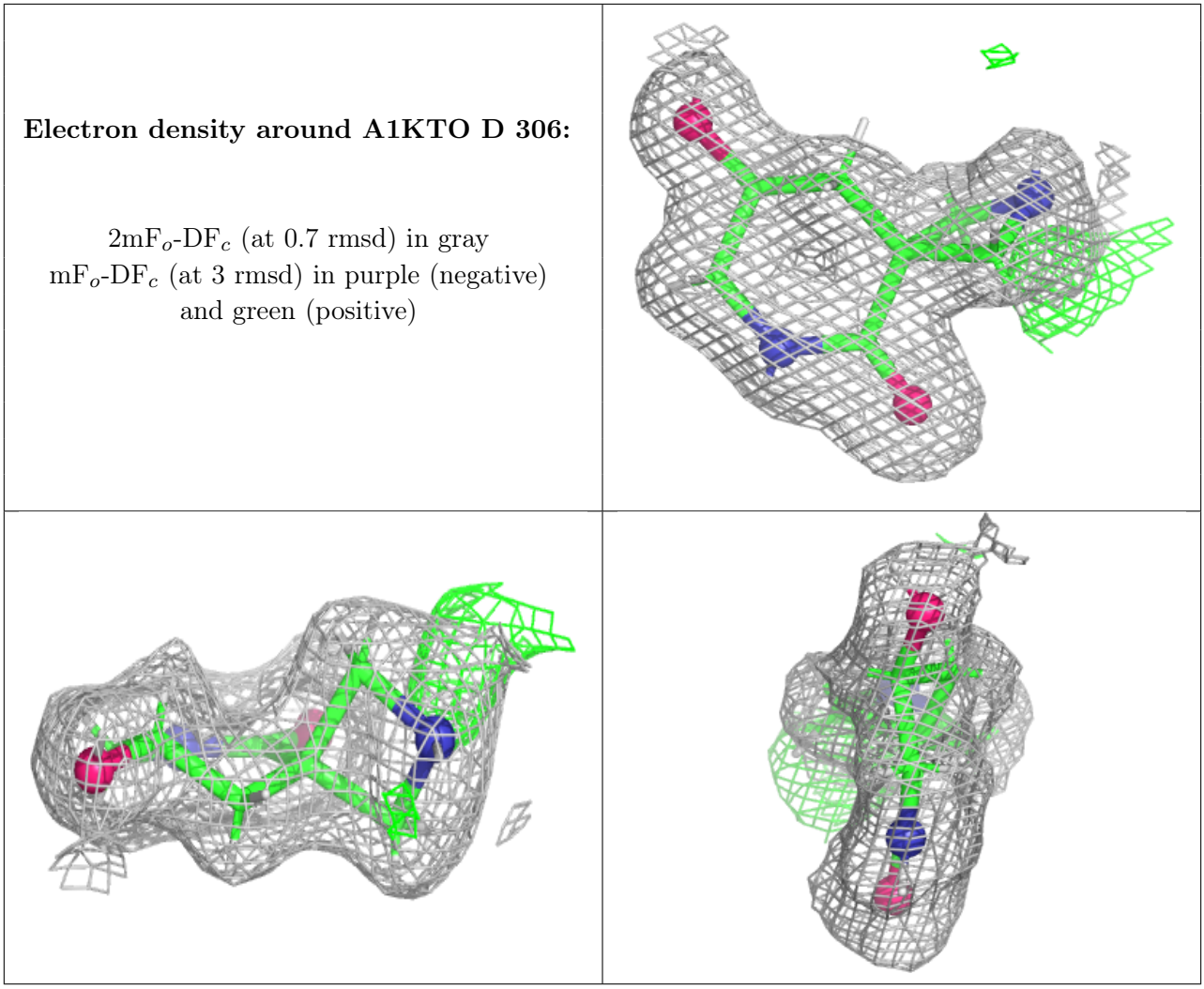






Electron density around A1KTO D 306:

$2mF_o$-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.