



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 17, 2021 – 07:16 AM EDT

PDB ID : 1KZJ  
Title : Crystal Structure of EcTS W80G/dUMP/CB3717 Complex  
Authors : Fritz, T.A.; Liu, L.; Finer-Moore, J.S.; Stroud, R.M.  
Deposited on : 2002-02-06  
Resolution : 2.60 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.

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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)  
Xtriage (Phenix) : 1.13  
EDS : 2.23.2  
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) : 2.23.2

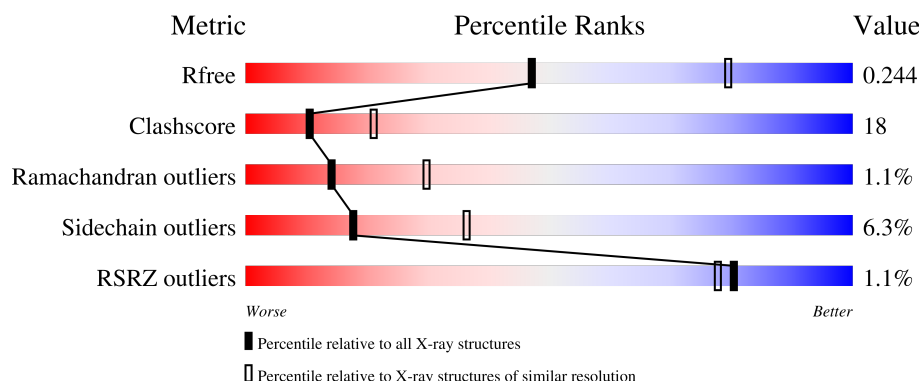
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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	264	<div> <div>61%</div> <div>36%</div> <div>.</div> </div>
1	B	264	<div> <div>63%</div> <div>32%</div> <div>5%</div> </div>
1	C	264	<div> <div>64%</div> <div>30%</div> <div>6%</div> </div>
1	D	264	<div> <div>3%</div> <div>61%</div> <div>37%</div> <div>.</div> </div>
1	E	264	<div> <div>2%</div> <div>60%</div> <div>35%</div> <div>..</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	264	<div> <div>%</div> <div> <div></div> <div>68%</div> <div>29%</div> <div></div> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	CXM	E	1	-	-	X	-

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 13459 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.

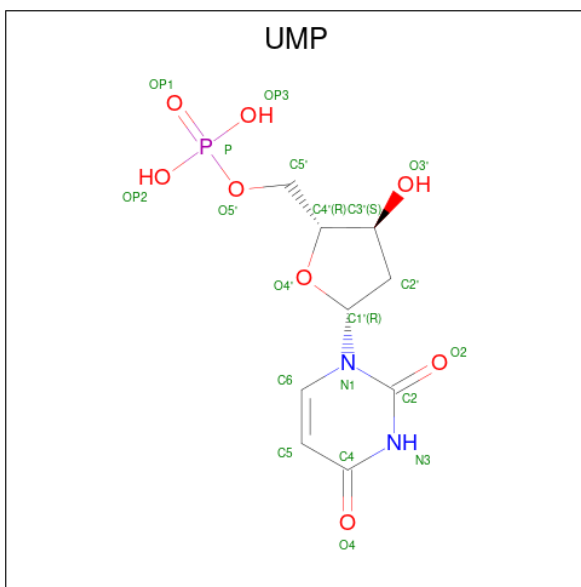
- Molecule 1 is a protein called Thymidylate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	264	Total	C	N	O	S	0	0	0
			2143	1366	370	395	12			
1	B	264	Total	C	N	O	S	0	0	0
			2143	1366	370	395	12			
1	C	264	Total	C	N	O	S	0	0	0
			2143	1366	370	395	12			
1	D	264	Total	C	N	O	S	0	0	0
			2143	1366	370	395	12			
1	E	261	Total	C	N	O	S	0	0	0
			2122	1352	367	391	12			
1	F	264	Total	C	N	O	S	0	0	0
			2143	1366	370	395	12			

There are 12 discrepancies between the modelled and reference sequences:

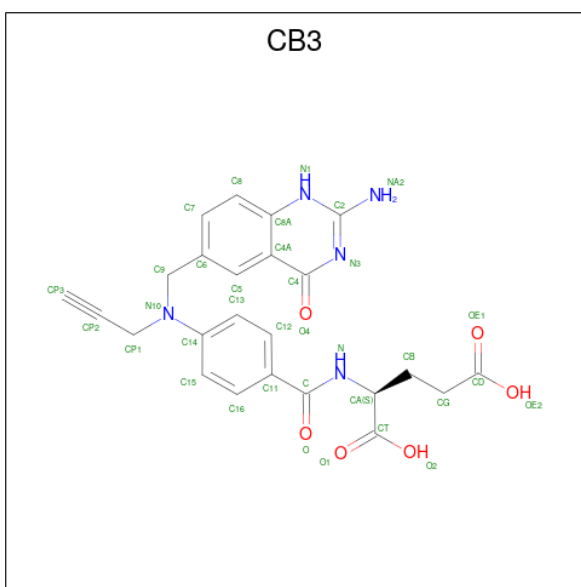
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	CXM	MET	modified residue	UNP P0A884
A	80	GLY	TRP	engineered mutation	UNP P0A884
B	1	CXM	MET	modified residue	UNP P0A884
B	80	GLY	TRP	engineered mutation	UNP P0A884
C	1	CXM	MET	modified residue	UNP P0A884
C	80	GLY	TRP	engineered mutation	UNP P0A884
D	1	CXM	MET	modified residue	UNP P0A884
D	80	GLY	TRP	engineered mutation	UNP P0A884
E	1	CXM	MET	modified residue	UNP P0A884
E	80	GLY	TRP	engineered mutation	UNP P0A884
F	1	CXM	MET	modified residue	UNP P0A884
F	80	GLY	TRP	engineered mutation	UNP P0A884

- Molecule 2 is 2'-DEOXYURIDINE 5'-MONOPHOSPHATE (three-letter code: UMP) (formula: C<sub>9</sub>H<sub>13</sub>N<sub>2</sub>O<sub>8</sub>P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
2	B	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
2	C	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
2	D	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
2	E	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
2	F	1	Total	C	N	O	P	0	0
			20	9	2	8	1		

- Molecule 3 is 10-PROPARGYL-5,8-DIDEAZAFOLIC ACID (three-letter code: CB3) (formula: C<sub>24</sub>H<sub>23</sub>N<sub>5</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total 35	C 24	N 5	O 6	0	0
3	B	1	Total 35	C 24	N 5	O 6	0	0
3	C	1	Total 35	C 24	N 5	O 6	0	0
3	D	1	Total 35	C 24	N 5	O 6	0	0
3	E	1	Total 35	C 24	N 5	O 6	0	0
3	F	1	Total 35	C 24	N 5	O 6	0	0

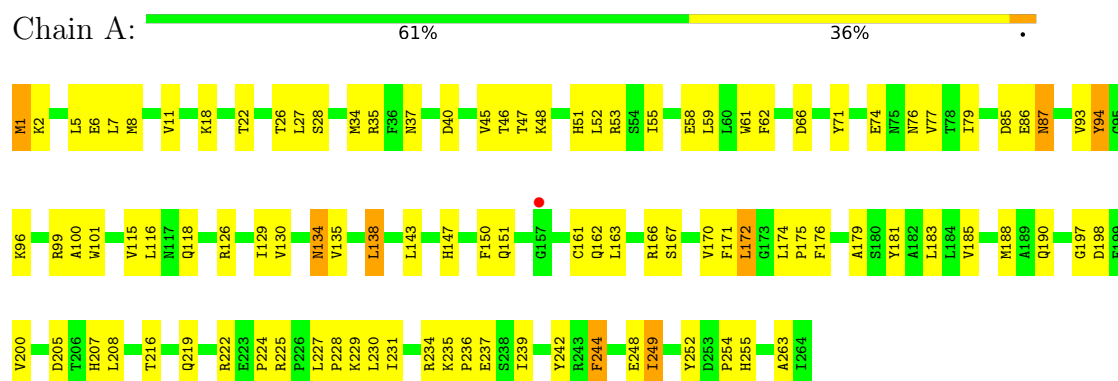
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	54	Total O 54 54	0	0
4	B	54	Total O 54 54	0	0
4	C	62	Total O 62 62	0	0
4	D	34	Total O 34 34	0	0
4	E	36	Total O 36 36	0	0
4	F	52	Total O 52 52	0	0

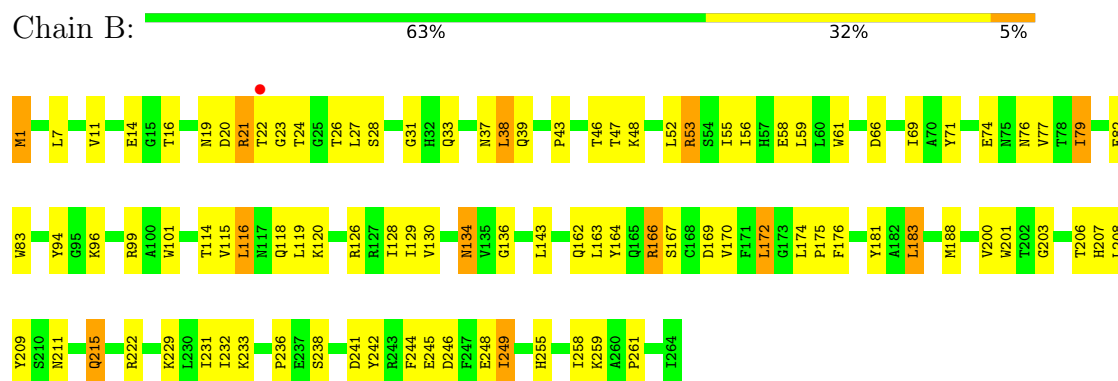
### 3 Residue-property plots

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

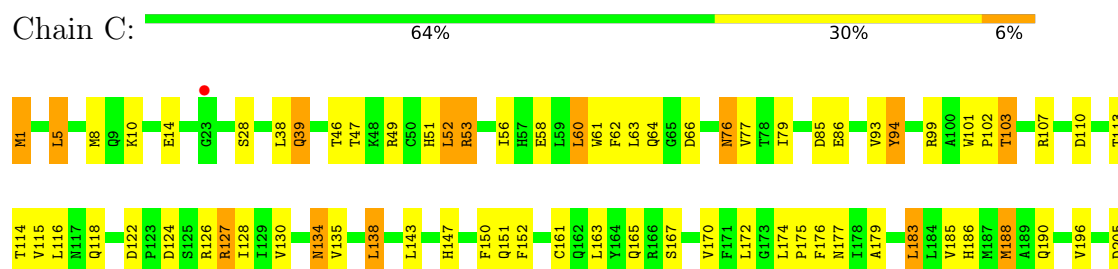
#### • Molecule 1: Thymidylate synthase

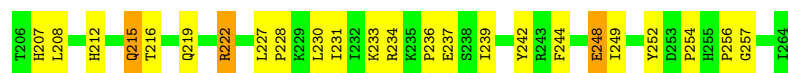


#### • Molecule 1: Thymidylate synthase



#### • Molecule 1: Thymidylate synthase

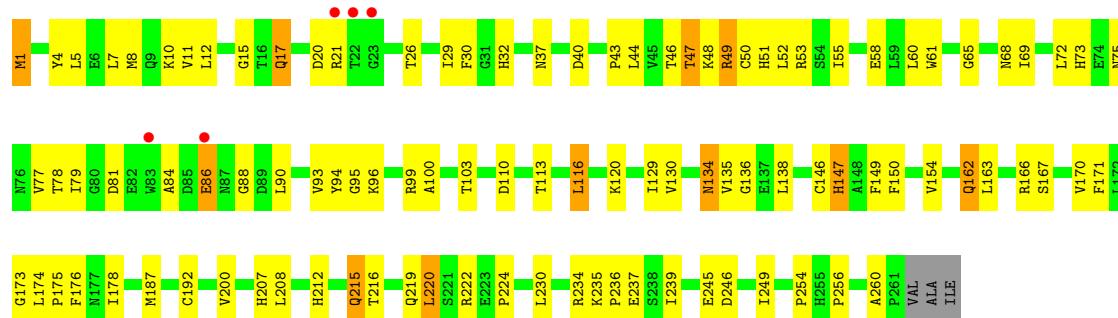




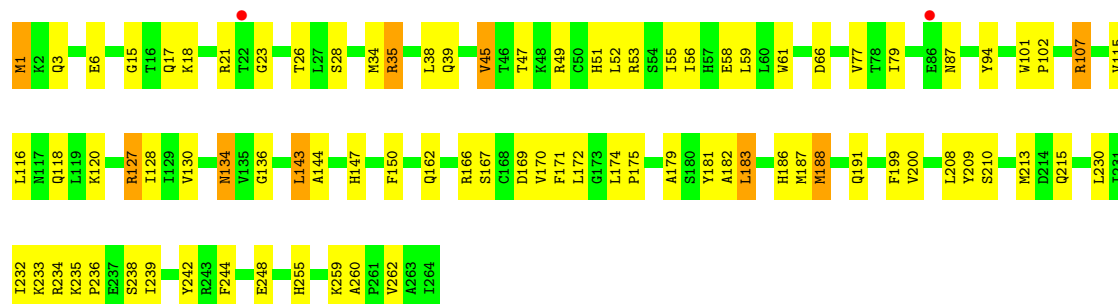
• Molecule 1: Thymidylate synthase



• Molecule 1: Thymidylate synthase



• Molecule 1: Thymidylate synthase





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	95.55Å 84.57Å 111.52Å 90.00° 111.37° 90.00°	Depositor
Resolution (Å)	25.35 – 2.60 25.35 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.2 (25.35-2.60) 98.3 (25.35-2.60)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.95 (at 2.60Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.215 , 0.258 0.201 , 0.244	Depositor DCC
$R_{free}$ test set	3545 reflections (7.06%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	21.8	Xtriage
Anisotropy	0.230	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 40.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	13459	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 26.90 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.4247e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: CXM, CB3, UMP

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	0.39	0/2190	0.66	1/2972 (0.0%)
1	B	0.39	0/2190	0.65	0/2972
1	C	0.37	0/2190	0.64	0/2972
1	D	0.37	0/2190	0.63	0/2972
1	E	0.39	0/2169	0.66	1/2944 (0.0%)
1	F	0.39	0/2190	0.65	0/2972
All	All	0.38	0/13119	0.65	2/17804 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	147	HIS	N-CA-C	-5.38	96.47	111.00
1	A	27	LEU	N-CA-C	-5.09	97.26	111.00

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	2143	0	2072	89	0
1	B	2143	0	2072	70	0
1	C	2143	0	2072	80	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2143	0	2073	85	0
1	E	2122	0	2048	89	0
1	F	2143	0	2072	73	0
2	A	20	0	10	0	0
2	B	20	0	10	1	0
2	C	20	0	10	1	0
2	D	20	0	11	1	0
2	E	20	0	11	1	0
2	F	20	0	10	2	0
3	A	35	0	21	2	0
3	B	35	0	21	2	0
3	C	35	0	21	3	0
3	D	35	0	21	6	0
3	E	35	0	21	5	0
3	F	35	0	21	1	0
4	A	54	0	0	2	0
4	B	54	0	0	4	0
4	C	62	0	0	6	0
4	D	34	0	0	1	0
4	E	36	0	0	1	0
4	F	52	0	0	3	0
All	All	13459	0	12597	476	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 18.

All (476) 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:C:127:ARG:HH21	1:C:127:ARG:HG3	1.27	0.99
1:D:83:TRP:HH2	3:D:307:CB3:H8	1.25	0.98
1:B:233:LYS:HD2	1:B:248:GLU:HG2	1.44	0.97
1:A:59:LEU:HD23	1:A:183:LEU:HD23	1.45	0.96
1:C:127:ARG:HH21	1:C:127:ARG:CG	1.83	0.91
1:D:129:ILE:HG12	1:D:151:GLN:HB2	1.53	0.90
1:C:116:LEU:HG	1:C:188:MET:HE1	1.53	0.90
1:E:173:GLY:HA2	3:E:309:CB3:HP3	1.54	0.88
1:F:183:LEU:HD22	1:F:187:MET:HE2	1.56	0.87
1:A:231:ILE:HB	1:A:248:GLU:HB3	1.55	0.85
1:B:115:VAL:HA	1:B:118:GLN:HE21	1.43	0.83
1:A:229:LYS:HE2	1:A:231:ILE:HD11	1.61	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:102:PRO:HG2	4:C:441:HOH:O	1.77	0.82
1:E:215:GLN:H	1:E:215:GLN:HE21	1.27	0.82
1:E:174:LEU:HG	1:E:178:ILE:HD11	1.62	0.82
1:D:83:TRP:CH2	3:D:307:CB3:H8	2.15	0.81
1:C:177:ASN:HD21	2:C:304:UMP:HN3	1.26	0.81
1:F:107:ARG:HH11	1:F:107:ARG:HG3	1.45	0.81
1:D:116:LEU:HD12	1:D:120:LYS:HE3	1.61	0.81
1:B:21:ARG:HG2	1:B:21:ARG:HH21	1.47	0.79
1:C:51:HIS:CD2	1:C:53:ARG:HB3	2.18	0.78
1:C:127:ARG:HG3	1:C:127:ARG:NH2	1.96	0.78
1:F:116:LEU:HD22	1:F:188:MET:CE	2.14	0.78
1:E:51:HIS:HD2	1:E:53:ARG:H	1.32	0.77
1:A:222:ARG:NH2	1:A:255:HIS:HB3	1.98	0.77
1:A:59:LEU:CD2	1:A:183:LEU:HD23	2.13	0.77
1:C:103:THR:HG23	1:C:107:ARG:O	1.85	0.76
1:E:51:HIS:CD2	1:E:53:ARG:H	2.03	0.76
1:F:127:ARG:HG3	1:F:127:ARG:HH11	1.50	0.76
1:A:115:VAL:HA	1:A:118:GLN:HE21	1.51	0.75
1:F:116:LEU:HD22	1:F:188:MET:HE1	1.69	0.75
1:D:134:ASN:C	1:D:134:ASN:HD22	1.88	0.75
1:E:134:ASN:C	1:E:134:ASN:HD22	1.90	0.74
1:C:116:LEU:HG	1:C:188:MET:CE	2.16	0.74
1:C:28:SER:HB3	1:C:207:HIS:HB3	1.71	0.73
1:C:53:ARG:HD3	1:C:244:PHE:CE1	2.24	0.73
1:C:212:HIS:O	1:C:215:GLN:HG2	1.88	0.72
1:B:233:LYS:HD2	1:B:248:GLU:CG	2.20	0.72
1:A:51:HIS:CD2	1:A:53:ARG:HB3	2.23	0.72
1:A:86:GLU:CD	1:A:86:GLU:H	1.93	0.72
1:E:215:GLN:HE21	1:E:215:GLN:N	1.88	0.71
1:F:234:ARG:HG2	1:F:235:LYS:N	2.06	0.70
1:E:1:CXM:ON1	1:E:47:THR:OG1	2.08	0.70
1:F:51:HIS:CD2	1:F:53:ARG:HB2	2.26	0.70
1:F:51:HIS:HD2	1:F:53:ARG:HB2	1.56	0.70
1:D:52:LEU:HD12	1:D:55:ILE:HD12	1.74	0.70
1:B:11:VAL:HG11	1:B:208:LEU:HB2	1.74	0.69
1:D:262:VAL:HG12	1:D:263:ALA:H	1.56	0.69
1:E:170:VAL:HB	1:E:208:LEU:HD13	1.74	0.69
1:B:21:ARG:HG2	1:B:21:ARG:NH2	2.04	0.69
1:C:127:ARG:HG3	1:C:127:ARG:O	1.91	0.69
1:C:143:LEU:HD13	4:C:663:HOH:O	1.93	0.69
1:E:234:ARG:HD3	1:E:246:ASP:OD1	1.93	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1:CXM:HE1	1:D:43:PRO:HA	1.75	0.68
1:E:53:ARG:NH2	1:E:75:ASN:O	2.27	0.68
1:A:222:ARG:HH21	1:A:255:HIS:HB3	1.55	0.68
1:F:170:VAL:HB	1:F:208:LEU:HD13	1.74	0.68
1:F:26:THR:HG22	1:F:209:TYR:HA	1.75	0.68
1:B:53:ARG:HA	1:B:244:PHE:HE1	1.58	0.67
1:C:5:LEU:HD21	1:C:47:THR:HG21	1.75	0.67
1:A:2:LYS:O	1:A:6:GLU:HG3	1.94	0.67
1:B:22:THR:O	1:B:24:THR:N	2.26	0.67
1:C:135:VAL:HA	1:C:138:LEU:HD22	1.75	0.67
1:E:69:ILE:HG22	1:E:72:LEU:HD12	1.76	0.67
1:E:234:ARG:O	1:E:236:PRO:HD3	1.95	0.66
1:F:107:ARG:HG3	1:F:107:ARG:NH1	2.09	0.66
1:A:22:THR:HG21	1:A:263:ALA:HB1	1.78	0.66
1:A:222:ARG:HH21	1:A:255:HIS:CB	2.08	0.66
1:B:116:LEU:HD12	1:B:120:LYS:HE3	1.76	0.66
1:B:174:LEU:HB3	1:B:175:PRO:HD3	1.77	0.66
1:B:238:SER:HB3	1:B:241:ASP:OD2	1.96	0.66
1:C:230:LEU:HA	1:C:249:ILE:HD13	1.77	0.66
1:D:170:VAL:HB	1:D:208:LEU:HD13	1.78	0.66
1:D:262:VAL:HG12	1:D:263:ALA:N	2.11	0.65
1:A:222:ARG:HD3	1:A:255:HIS:ND1	2.11	0.65
1:E:215:GLN:H	1:E:215:GLN:NE2	1.94	0.65
1:F:116:LEU:CD2	1:F:188:MET:CE	2.75	0.65
1:E:173:GLY:CA	3:E:309:CB3:HP3	2.26	0.64
1:D:228:PRO:O	1:D:229:LYS:HD2	1.98	0.64
1:E:47:THR:HB	1:E:219:GLN:HG3	1.78	0.64
1:A:87:ASN:N	1:A:87:ASN:HD22	1.93	0.64
1:A:96:LYS:HE2	1:A:100:ALA:O	1.97	0.64
1:C:135:VAL:HA	1:C:138:LEU:CD2	2.28	0.64
1:A:51:HIS:NE2	1:A:53:ARG:HB3	2.13	0.64
1:A:55:ILE:HD13	1:A:179:ALA:HB3	1.80	0.64
1:B:115:VAL:HG13	1:B:128:ILE:CG2	2.28	0.64
1:B:119:LEU:HD23	1:B:128:ILE:HD13	1.80	0.64
1:B:172:LEU:HD21	3:B:303:CB3:C	2.28	0.63
3:C:305:CB3:HA	4:C:513:HOH:O	1.97	0.63
1:A:5:LEU:HD11	1:A:47:THR:HG21	1.80	0.63
1:C:8:MET:HE2	1:C:216:THR:HG23	1.79	0.63
1:B:136:GLY:HA3	4:B:573:HOH:O	1.97	0.63
1:D:116:LEU:CD1	1:D:120:LYS:HE3	2.29	0.63
1:C:8:MET:CE	1:C:216:THR:HG23	2.29	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:126:ARG:HD3	1:B:167:SER:OG	1.99	0.62
1:B:28:SER:HB3	1:B:207:HIS:HB3	1.80	0.62
1:F:183:LEU:HD22	1:F:187:MET:CE	2.26	0.62
1:E:21:ARG:HB3	1:E:21:ARG:NH1	2.14	0.62
1:D:212:HIS:O	1:D:215:GLN:HG2	2.00	0.62
4:C:441:HOH:O	1:D:104:PRO:HG3	2.00	0.62
1:C:219:GLN:HA	1:C:222:ARG:HG3	1.82	0.61
1:E:116:LEU:O	1:E:120:LYS:HG3	2.00	0.61
1:A:170:VAL:HB	1:A:208:LEU:HD13	1.82	0.61
1:B:61:TRP:CD1	1:B:66:ASP:HB3	2.36	0.60
1:A:222:ARG:HB3	1:A:255:HIS:CE1	2.35	0.60
1:B:20:ASP:OD2	1:B:22:THR:HB	2.02	0.60
1:E:96:LYS:HE2	1:E:100:ALA:HB3	1.84	0.60
1:E:99:ARG:HG3	1:E:99:ARG:HH11	1.66	0.60
1:E:47:THR:HG22	1:E:222:ARG:HB2	1.83	0.60
1:A:135:VAL:HA	1:A:138:LEU:HD22	1.83	0.59
3:A:301:CB3:HB1	1:F:259:LYS:HE3	1.84	0.59
1:C:130:VAL:HB	1:C:150:PHE:CZ	2.37	0.59
1:A:5:LEU:CD1	1:A:224:PRO:HG3	2.32	0.59
1:C:233:LYS:HZ2	1:C:248:GLU:HG3	1.67	0.59
1:D:222:ARG:HH11	1:D:255:HIS:HB3	1.67	0.59
3:E:309:CB3:H5	3:E:309:CB3:CP3	2.33	0.59
1:F:127:ARG:HG3	1:F:127:ARG:NH1	2.18	0.59
1:A:170:VAL:HG23	1:A:207:HIS:O	2.01	0.59
1:A:225:ARG:CZ	1:A:255:HIS:CD2	2.86	0.58
1:C:61:TRP:CD1	1:C:66:ASP:HB3	2.38	0.58
1:F:116:LEU:CD2	1:F:188:MET:HE2	2.33	0.58
1:C:205:ASP:OD2	1:D:126:ARG:HG2	2.03	0.58
1:F:232:ILE:HG22	1:F:234:ARG:O	2.04	0.58
1:D:28:SER:HB3	1:D:207:HIS:HB3	1.85	0.58
1:C:233:LYS:NZ	1:C:248:GLU:HG3	2.18	0.58
1:C:228:PRO:HB2	1:C:249:ILE:HG23	1.83	0.58
3:E:309:CB3:H13	3:E:309:CB3:C6	2.34	0.58
1:A:7:LEU:HD22	1:A:34:MET:HE3	1.86	0.57
1:B:47:THR:HA	1:B:255:HIS:HD2	1.68	0.57
1:C:51:HIS:NE2	1:C:53:ARG:HB3	2.19	0.57
1:C:234:ARG:O	1:C:236:PRO:HD3	2.04	0.57
1:E:134:ASN:HD22	1:E:136:GLY:H	1.51	0.57
1:E:21:ARG:NH1	2:E:308:UMP:OP1	2.36	0.57
1:A:134:ASN:C	1:A:134:ASN:HD22	2.07	0.57
1:E:216:THR:HG22	1:E:220:LEU:HD23	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:174:LEU:HB3	1:F:175:PRO:HD3	1.87	0.57
3:E:309:CB3:H5	3:E:309:CB3:CP2	2.34	0.56
1:F:15:GLY:HA2	1:F:28:SER:O	2.05	0.56
1:F:144:ALA:HB3	1:F:166:ARG:NH2	2.21	0.56
1:A:222:ARG:HB3	1:A:255:HIS:ND1	2.20	0.56
1:C:47:THR:HB	1:C:219:GLN:HG3	1.87	0.56
1:F:116:LEU:HD22	1:F:188:MET:HE2	1.88	0.56
1:E:10:LYS:NZ	1:E:32:HIS:HD2	2.03	0.56
1:F:3:GLN:HB3	1:F:34:MET:CG	2.35	0.56
1:C:28:SER:CB	1:C:207:HIS:HB3	2.35	0.56
1:E:110:ASP:CG	1:E:113:THR:HG22	2.26	0.56
1:A:35:ARG:HD3	1:A:198:ASP:OD2	2.06	0.56
1:B:134:ASN:C	1:B:134:ASN:HD22	2.10	0.55
1:D:216:THR:HG22	1:D:220:LEU:HD12	1.87	0.55
1:E:187:MET:HB3	1:E:239:ILE:CD1	2.37	0.55
1:C:56:ILE:HG12	1:C:183:LEU:HD11	1.87	0.55
1:E:44:LEU:HD13	1:E:52:LEU:HD21	1.88	0.55
1:B:222:ARG:HD3	1:B:255:HIS:CG	2.40	0.55
1:A:87:ASN:N	1:A:87:ASN:ND2	2.54	0.55
1:E:134:ASN:ND2	1:E:136:GLY:H	2.05	0.55
1:A:22:THR:HG21	1:A:263:ALA:CB	2.36	0.55
1:E:162:GLN:HB2	1:E:200:VAL:HB	1.89	0.55
1:C:127:ARG:CG	1:C:127:ARG:NH2	2.53	0.54
1:D:222:ARG:NH1	1:D:255:HIS:HB3	2.22	0.54
1:C:170:VAL:HB	1:C:208:LEU:CD1	2.37	0.54
1:D:85:ASP:OD2	1:D:89:ASP:HB2	2.07	0.54
1:B:215:GLN:HB2	1:B:258:ILE:HG21	1.88	0.54
1:F:45:VAL:HG23	4:F:475:HOH:O	2.07	0.54
1:F:162:GLN:HA	1:F:200:VAL:O	2.08	0.54
1:D:17:GLN:HA	1:D:26:THR:O	2.08	0.54
1:E:68:ASN:HA	1:E:88:GLY:O	2.08	0.54
1:D:7:LEU:O	1:D:11:VAL:HG23	2.08	0.54
1:D:48:LYS:HE2	4:D:497:HOH:O	2.08	0.54
1:F:59:LEU:HD21	1:F:187:MET:HE3	1.89	0.54
1:A:197:GLY:HA2	4:A:544:HOH:O	2.08	0.54
1:A:37:ASN:HB3	1:A:40:ASP:OD2	2.08	0.53
1:D:263:ALA:HB3	3:D:307:CB3:HN21	1.73	0.53
1:F:234:ARG:CG	1:F:235:LYS:N	2.71	0.53
1:D:99:ARG:HG3	1:D:99:ARG:HH11	1.73	0.53
1:A:8:MET:CE	1:A:216:THR:HG23	2.37	0.53
1:B:58:GLU:O	1:B:61:TRP:HB3	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:5:LEU:HD11	1:D:47:THR:HG21	1.90	0.53
1:E:49:ARG:HG3	1:E:254:PRO:HG2	1.89	0.53
1:E:171:PHE:HE2	1:E:260:ALA:CB	2.22	0.53
1:A:162:GLN:HA	1:A:200:VAL:O	2.08	0.53
1:B:245:GLU:CD	1:B:245:GLU:H	2.11	0.53
1:D:45:VAL:HG21	1:D:175:PRO:HB3	1.91	0.53
1:F:45:VAL:HG21	1:F:175:PRO:HB3	1.91	0.53
1:B:208:LEU:HD12	4:B:617:HOH:O	2.09	0.53
1:E:21:ARG:CB	1:E:21:ARG:HH11	2.21	0.53
1:E:129:ILE:HD13	1:E:149:PHE:HZ	1.72	0.53
1:A:190:GLN:NE2	1:A:235:LYS:HA	2.24	0.53
1:C:124:ASP:OD1	1:D:18:LYS:HD2	2.09	0.53
1:E:84:ALA:HA	1:E:90:LEU:HD23	1.91	0.53
1:A:234:ARG:O	1:A:236:PRO:HD3	2.09	0.52
1:D:222:ARG:HD3	1:D:255:HIS:CG	2.44	0.52
1:A:7:LEU:O	1:A:11:VAL:HG23	2.09	0.52
1:A:147:HIS:HD2	1:A:181:TYR:OH	1.92	0.52
1:A:101:TRP:CH2	1:A:134:ASN:HA	2.45	0.52
1:E:37:ASN:HB3	1:E:40:ASP:OD2	2.08	0.52
1:E:116:LEU:HD23	1:E:192:CYS:SG	2.49	0.52
1:C:114:THR:O	1:C:118:GLN:HG3	2.09	0.52
1:D:53:ARG:HG3	1:D:244:PHE:CZ	2.45	0.52
1:E:1:CXM:HA	1:E:224:PRO:HB3	1.90	0.52
1:B:129:ILE:HG22	1:B:130:VAL:N	2.24	0.52
1:E:174:LEU:HG	1:E:178:ILE:CD1	2.38	0.52
1:E:245:GLU:CD	1:E:245:GLU:H	2.12	0.52
1:B:1:CXM:CN	1:B:46:THR:H	2.23	0.52
1:B:59:LEU:HD23	1:B:183:LEU:HD12	1.91	0.52
1:B:129:ILE:CG2	1:B:130:VAL:N	2.73	0.52
1:B:22:THR:C	1:B:24:THR:H	2.12	0.52
1:E:129:ILE:HD13	1:E:149:PHE:CZ	2.45	0.52
1:E:187:MET:HB3	1:E:239:ILE:HD11	1.90	0.52
1:E:147:HIS:H	1:E:147:HIS:CD2	2.27	0.52
1:A:47:THR:HB	1:A:219:GLN:HG2	1.92	0.51
1:A:61:TRP:CD1	1:A:66:ASP:HB3	2.45	0.51
1:C:143:LEU:HD12	1:C:143:LEU:O	2.10	0.51
1:F:186:HIS:CG	1:F:230:LEU:HD23	2.45	0.51
1:D:17:GLN:HE21	1:D:27:LEU:CD2	2.23	0.51
1:D:83:TRP:HH2	3:D:307:CB3:C8	2.11	0.51
1:E:7:LEU:O	1:E:11:VAL:HG23	2.10	0.51
1:E:55:ILE:HG13	1:E:176:PHE:CE1	2.45	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:134:ASN:C	1:C:134:ASN:HD22	2.15	0.51
1:F:169:ASP:OD2	3:F:311:CB3:N3	2.44	0.51
1:C:165:GLN:HG2	1:C:167:SER:O	2.10	0.50
1:C:222:ARG:NH2	1:C:256:PRO:O	2.44	0.50
1:C:230:LEU:HD13	1:C:231:ILE:N	2.25	0.50
1:A:96:LYS:HE2	1:A:100:ALA:HB3	1.92	0.50
1:F:77:VAL:HG12	1:F:79:ILE:HG12	1.92	0.50
1:C:170:VAL:HB	1:C:208:LEU:HD12	1.92	0.50
1:C:64:GLN:HG2	4:C:444:HOH:O	2.12	0.50
1:B:82:GLU:HB2	1:B:83:TRP:CZ3	2.47	0.50
1:A:1:CXM:CN	1:A:46:THR:H	2.25	0.50
1:A:116:LEU:HD11	1:A:239:ILE:CG2	2.42	0.50
1:D:38:LEU:HD21	1:D:199:PHE:HB2	1.94	0.50
1:F:102:PRO:HA	1:F:107:ARG:O	2.12	0.50
1:B:47:THR:HA	1:B:255:HIS:CD2	2.47	0.50
1:E:1:CXM:CE	1:E:43:PRO:HA	2.41	0.50
3:B:303:CB3:HG1	3:B:303:CB3:O2	2.12	0.49
1:B:170:VAL:HB	1:B:208:LEU:HD13	1.95	0.49
1:E:170:VAL:HG23	1:E:207:HIS:O	2.12	0.49
1:A:5:LEU:HD12	1:A:224:PRO:HG3	1.93	0.49
1:B:207:HIS:NE2	2:B:302:UMP:O3'	2.37	0.49
1:D:59:LEU:HD23	1:D:183:LEU:HD23	1.93	0.49
1:B:116:LEU:HD22	1:B:188:MET:SD	2.52	0.49
1:D:211:ASN:ND2	1:D:261:PRO:HG2	2.27	0.49
1:F:172:LEU:HD13	1:F:262:VAL:HG22	1.93	0.49
1:A:229:LYS:HE2	1:A:231:ILE:CD1	2.36	0.49
1:D:134:ASN:C	1:D:134:ASN:ND2	2.61	0.49
1:F:1:CXM:HA	4:F:422:HOH:O	2.10	0.49
1:D:12:LEU:CD1	1:D:208:LEU:HD23	2.43	0.49
1:E:171:PHE:HE2	1:E:260:ALA:HB3	1.76	0.49
1:D:9:GLN:O	1:D:12:LEU:HB2	2.12	0.49
1:E:146:CYS:SG	1:E:167:SER:O	2.70	0.49
1:A:58:GLU:HG2	1:A:62:PHE:CZ	2.48	0.49
1:F:115:VAL:HG21	1:F:130:VAL:HG23	1.94	0.49
1:B:232:ILE:HA	1:B:246:ASP:O	2.13	0.48
1:C:126:ARG:HD3	1:D:167:SER:OG	2.13	0.48
1:D:168:CYS:SG	1:D:174:LEU:HB2	2.53	0.48
1:F:52:LEU:O	1:F:56:ILE:HG13	2.14	0.48
1:E:5:LEU:HD22	1:E:220:LEU:HD13	1.94	0.48
1:F:239:ILE:HG13	1:F:239:ILE:O	2.12	0.48
1:E:1:CXM:CN	1:E:46:THR:H	2.27	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:77:VAL:HG12	1:E:79:ILE:HG12	1.95	0.48
1:A:7:LEU:HD22	1:A:34:MET:CE	2.43	0.48
1:D:52:LEU:O	1:D:56:ILE:HG13	2.13	0.48
1:E:222:ARG:NH2	1:E:256:PRO:O	2.43	0.48
1:A:174:LEU:HB3	1:A:175:PRO:HD3	1.95	0.48
1:C:58:GLU:O	1:C:61:TRP:HB3	2.13	0.48
1:D:59:LEU:HD11	1:D:184:LEU:HD13	1.95	0.48
1:E:212:HIS:O	1:E:215:GLN:HG2	2.14	0.48
1:F:53:ARG:HA	1:F:244:PHE:HE1	1.78	0.48
1:B:169:ASP:OD2	1:B:172:LEU:CB	2.62	0.48
1:B:231:ILE:HB	1:B:248:GLU:HB2	1.94	0.48
1:D:44:LEU:HD11	1:D:50:CYS:HB2	1.94	0.48
1:E:86:GLU:CD	1:E:86:GLU:H	2.16	0.48
1:A:28:SER:HB3	1:A:207:HIS:HB3	1.96	0.48
1:A:22:THR:CB	1:A:263:ALA:HB1	2.44	0.47
1:B:116:LEU:CD2	1:B:188:MET:SD	3.02	0.47
1:E:154:VAL:O	1:F:18:LYS:NZ	2.30	0.47
1:D:61:TRP:CD1	1:D:66:ASP:HB3	2.49	0.47
1:E:1:CXM:HE1	1:E:43:PRO:HA	1.95	0.47
1:F:182:ALA:O	1:F:186:HIS:HD2	1.97	0.47
1:F:55:ILE:HD13	1:F:179:ALA:HB3	1.96	0.47
1:C:110:ASP:CG	1:C:113:THR:HG23	2.34	0.47
1:B:33:GLN:HA	1:B:201:TRP:O	2.15	0.47
1:F:61:TRP:CD1	1:F:66:ASP:HB3	2.50	0.47
1:F:120:LYS:HE2	1:F:191:GLN:O	2.13	0.47
1:F:143:LEU:N	1:F:143:LEU:CD2	2.77	0.47
1:A:76:ASN:HA	1:F:53:ARG:HH11	1.79	0.47
1:A:171:PHE:CD2	1:A:172:LEU:HD13	2.50	0.47
1:D:228:PRO:C	1:D:229:LYS:HD2	2.35	0.47
1:E:30:PHE:O	1:F:35:ARG:NH2	2.39	0.47
1:E:130:VAL:HB	1:E:150:PHE:CZ	2.50	0.47
1:F:147:HIS:CD2	1:F:147:HIS:H	2.31	0.47
1:A:237:GLU:OE2	1:A:237:GLU:HA	2.15	0.47
1:C:174:LEU:HB3	1:C:175:PRO:HD3	1.96	0.47
1:D:144:ALA:HB3	1:D:166:ARG:NH2	2.30	0.47
1:E:58:GLU:O	1:E:61:TRP:HB3	2.15	0.47
1:B:114:THR:O	1:B:118:GLN:HG3	2.15	0.47
1:C:128:ILE:CG2	1:C:152:PHE:HB2	2.45	0.47
1:F:166:ARG:HD2	1:F:167:SER:N	2.30	0.47
1:A:22:THR:CG2	1:A:263:ALA:HB1	2.44	0.46
1:E:15:GLY:HA2	1:E:29:ILE:HG22	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:181:TYR:O	1:A:185:VAL:HG23	2.16	0.46
1:F:118:GLN:NE2	1:F:128:ILE:HA	2.30	0.46
1:A:129:ILE:HD11	1:B:166:ARG:HD3	1.98	0.46
1:C:230:LEU:HD23	1:C:249:ILE:HD11	1.98	0.46
1:D:147:HIS:H	1:D:147:HIS:CD2	2.33	0.46
1:D:174:LEU:O	1:D:178:ILE:HG13	2.16	0.46
1:E:21:ARG:NH1	1:E:21:ARG:CB	2.77	0.46
1:C:127:ARG:CG	1:C:127:ARG:O	2.61	0.46
1:E:166:ARG:NH1	1:E:167:SER:HB2	2.30	0.46
1:A:126:ARG:HD3	1:B:167:SER:HG	1.80	0.46
1:A:8:MET:HE2	1:A:216:THR:HG23	1.97	0.46
1:C:126:ARG:NH2	1:D:20:ASP:HB3	2.30	0.46
1:F:115:VAL:HA	1:F:118:GLN:HE21	1.80	0.46
1:A:222:ARG:NH2	1:A:255:HIS:CB	2.70	0.46
1:E:78:THR:HA	1:E:81:ASP:OD1	2.15	0.46
1:B:52:LEU:O	1:B:56:ILE:HG13	2.16	0.46
1:B:169:ASP:OD2	1:B:172:LEU:HB2	2.16	0.46
1:B:229:LYS:HA	4:B:545:HOH:O	2.15	0.46
1:C:126:ARG:NH2	1:D:20:ASP:CB	2.79	0.46
1:D:165:GLN:HG2	1:D:167:SER:O	2.16	0.46
1:C:52:LEU:HD11	1:C:249:ILE:CG1	2.46	0.45
1:A:228:PRO:HB2	1:A:249:ILE:HD12	1.97	0.45
1:E:17:GLN:HA	1:E:26:THR:O	2.15	0.45
1:A:77:VAL:HG12	1:A:79:ILE:HG12	1.98	0.45
1:F:170:VAL:HB	1:F:208:LEU:CD1	2.42	0.45
1:B:99:ARG:HG3	1:B:99:ARG:HH11	1.81	0.45
1:D:129:ILE:CG2	1:D:130:VAL:N	2.78	0.45
1:D:147:HIS:HB2	1:D:163:LEU:HD11	1.99	0.45
1:C:1:CXM:CN	1:C:46:THR:H	2.30	0.45
1:E:58:GLU:HB2	1:E:79:ILE:HD11	1.99	0.45
1:A:163:LEU:HD22	1:A:181:TYR:CE1	2.52	0.45
1:B:7:LEU:HD11	1:B:206:THR:HG21	1.97	0.45
1:A:147:HIS:HB2	1:A:163:LEU:HD11	1.99	0.45
1:B:53:ARG:HA	1:B:244:PHE:CE1	2.46	0.45
1:C:115:VAL:HA	1:C:118:GLN:HE21	1.82	0.45
1:E:110:ASP:OD1	1:E:113:THR:HG22	2.17	0.45
1:A:163:LEU:HD22	1:A:181:TYR:CD1	2.52	0.45
1:C:116:LEU:HD11	1:C:239:ILE:CG2	2.47	0.45
1:E:235:LYS:HE2	4:E:589:HOH:O	2.16	0.45
1:A:55:ILE:HD13	1:A:179:ALA:CB	2.47	0.45
1:A:71:TYR:O	1:A:74:GLU:HB2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:71:TYR:O	1:B:74:GLU:HB3	2.17	0.45
1:D:36:PHE:O	1:D:38:LEU:HD22	2.16	0.45
1:D:115:VAL:HG13	1:D:128:ILE:CG2	2.47	0.45
1:D:263:ALA:HB3	3:D:307:CB3:NA2	2.31	0.45
1:F:53:ARG:NH2	4:F:678:HOH:O	2.49	0.45
1:B:211:ASN:ND2	1:B:261:PRO:HG2	2.31	0.44
1:D:82:GLU:CD	1:D:82:GLU:H	2.19	0.44
1:C:151:GLN:O	1:C:161:CYS:HA	2.17	0.44
1:C:94:TYR:CE1	1:C:147:HIS:CE1	3.05	0.44
1:B:77:VAL:HG12	1:B:79:ILE:HG12	1.99	0.44
1:D:170:VAL:HB	1:D:208:LEU:CD1	2.46	0.44
1:E:129:ILE:HG21	1:E:149:PHE:CZ	2.53	0.44
1:F:150:PHE:HA	1:F:162:GLN:O	2.17	0.44
1:C:76:ASN:HD22	1:C:76:ASN:HA	1.63	0.44
1:D:212:HIS:HA	1:D:215:GLN:OE1	2.17	0.44
1:A:1:CXM:ON2	1:A:45:VAL:HG13	2.18	0.44
1:C:101:TRP:CD2	1:D:135:VAL:HB	2.53	0.44
1:E:162:GLN:HA	1:E:200:VAL:O	2.17	0.44
1:F:236:PRO:HG2	1:F:242:TYR:CG	2.53	0.44
1:C:5:LEU:HD12	1:C:5:LEU:HA	1.81	0.44
1:D:53:ARG:HG3	1:D:244:PHE:HZ	1.81	0.44
1:C:38:LEU:HD12	1:C:185:VAL:HG11	1.99	0.43
1:D:57:HIS:CE1	1:D:75:ASN:ND2	2.86	0.43
1:D:201:TRP:CH2	1:D:203:GLY:HA3	2.53	0.43
1:E:167:SER:OG	1:E:207:HIS:HE1	2.01	0.43
1:A:166:ARG:NH1	1:A:167:SER:HB2	2.32	0.43
1:C:215:GLN:H	1:C:215:GLN:NE2	2.16	0.43
1:C:252:TYR:CE2	1:C:254:PRO:HG3	2.53	0.43
1:D:183:LEU:HD12	1:D:230:LEU:HD21	2.00	0.43
1:D:247:PHE:O	1:D:248:GLU:HG2	2.19	0.43
1:E:69:ILE:HD12	1:E:73:HIS:CE1	2.52	0.43
1:F:233:LYS:HD2	1:F:248:GLU:HG2	2.00	0.43
1:A:86:GLU:C	1:A:87:ASN:HD22	2.21	0.43
1:B:31:GLY:HA2	1:B:203:GLY:O	2.18	0.43
1:E:4:TYR:OH	1:E:171:PHE:HA	2.18	0.43
1:E:135:VAL:HB	1:F:101:TRP:CD2	2.54	0.43
1:A:171:PHE:HD2	1:A:172:LEU:HD13	1.83	0.43
1:C:56:ILE:HG22	1:C:60:LEU:HD22	2.00	0.43
1:D:1:CXM:HE3	1:D:43:PRO:CB	2.48	0.43
1:E:65:GLY:HA2	1:E:95:GLY:O	2.18	0.43
1:E:134:ASN:C	1:E:134:ASN:ND2	2.61	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:162:GLN:HA	1:B:200:VAL:O	2.19	0.43
1:D:215:GLN:HE21	1:D:215:GLN:HB3	1.63	0.43
1:D:228:PRO:HB3	1:D:252:TYR:HB2	2.00	0.43
1:E:10:LYS:NZ	1:E:32:HIS:CD2	2.85	0.43
1:F:47:THR:HA	1:F:255:HIS:HD2	1.84	0.43
1:F:210:SER:O	1:F:213:MET:HG2	2.18	0.43
1:B:249:ILE:HD13	1:B:249:ILE:HA	1.72	0.43
1:C:39:GLN:HE21	1:C:39:GLN:HB3	1.49	0.43
1:C:77:VAL:HG12	1:C:79:ILE:HG12	2.00	0.43
1:D:1:CXM:CN	1:D:1:CXM:HG2	2.48	0.43
1:E:8:MET:O	1:E:12:LEU:HG	2.19	0.43
1:E:75:ASN:O	1:E:77:VAL:HG23	2.17	0.43
1:F:3:GLN:HB3	1:F:34:MET:HG2	2.01	0.43
1:B:37:ASN:OD1	1:B:39:GLN:HB2	2.19	0.43
1:D:46:THR:HG21	1:D:225:ARG:O	2.18	0.43
1:D:222:ARG:HD3	1:D:255:HIS:ND1	2.33	0.43
1:A:147:HIS:CD2	1:A:181:TYR:OH	2.70	0.43
1:A:252:TYR:CE2	1:A:254:PRO:HG3	2.54	0.43
3:A:301:CB3:HA	4:A:472:HOH:O	2.19	0.43
1:E:10:LYS:HZ3	1:E:32:HIS:HD2	1.65	0.43
1:F:58:GLU:O	1:F:61:TRP:HB3	2.18	0.43
1:F:183:LEU:HD13	1:F:187:MET:HE1	2.01	0.43
1:D:115:VAL:HG21	1:D:130:VAL:HG23	2.00	0.43
1:F:208:LEU:HD12	1:F:208:LEU:HA	1.82	0.42
1:E:174:LEU:O	1:E:178:ILE:HG13	2.19	0.42
1:A:151:GLN:NE2	1:B:164:TYR:OH	2.52	0.42
1:D:146:CYS:SG	2:D:306:UMP:C6	3.12	0.42
1:F:59:LEU:CD2	1:F:187:MET:HE3	2.47	0.42
1:F:134:ASN:C	1:F:134:ASN:HD22	2.23	0.42
1:A:53:ARG:NH2	1:A:244:PHE:CZ	2.87	0.42
1:B:259:LYS:HE3	3:C:305:CB3:HB1	2.02	0.42
1:C:179:ALA:O	1:C:183:LEU:HB2	2.20	0.42
4:C:465:HOH:O	1:D:126:ARG:HD3	2.19	0.42
1:F:21:ARG:NH2	2:F:310:UMP:O5'	2.52	0.42
1:C:58:GLU:OE2	3:C:305:CB3:HP11	2.19	0.42
1:A:93:VAL:O	1:A:94:TYR:C	2.58	0.42
1:A:26:THR:HB	1:A:207:HIS:HB2	2.01	0.42
1:A:96:LYS:HE2	1:A:100:ALA:CB	2.50	0.42
1:B:163:LEU:HD22	1:B:181:TYR:CD1	2.54	0.42
1:C:10:LYS:O	1:C:14:GLU:HG2	2.19	0.42
1:D:22:THR:HG22	1:D:23:GLY:N	2.35	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:48:LYS:HB3	1:D:219:GLN:NE2	2.35	0.42
1:D:115:VAL:HG11	1:D:152:PHE:CD2	2.55	0.42
1:D:174:LEU:HB3	1:D:175:PRO:HD3	2.02	0.42
1:B:236:PRO:HG2	1:B:242:TYR:CD2	2.55	0.42
1:C:49:ARG:H	1:C:257:GLY:HA2	1.85	0.42
1:C:186:HIS:CE1	1:C:196:VAL:HG11	2.55	0.42
1:C:190:GLN:NE2	1:C:242:TYR:OH	2.51	0.42
1:C:228:PRO:HB2	1:C:249:ILE:CG2	2.48	0.42
1:B:38:LEU:HD12	1:B:43:PRO:HD3	2.01	0.42
1:D:115:VAL:HG21	1:D:130:VAL:CG2	2.50	0.42
1:D:232:ILE:HG22	1:D:234:ARG:O	2.19	0.42
1:A:190:GLN:NE2	1:A:242:TYR:OH	2.53	0.41
1:B:46:THR:C	1:B:48:LYS:H	2.23	0.41
1:D:169:ASP:OD2	3:D:307:CB3:N3	2.53	0.41
1:F:49:ARG:HG3	1:F:49:ARG:HH11	1.85	0.41
1:F:87:ASN:ND2	1:F:87:ASN:N	2.67	0.41
1:F:181:TYR:HB3	1:F:199:PHE:CE1	2.55	0.41
1:A:205:ASP:OD2	1:B:126:ARG:HG2	2.19	0.41
1:C:85:ASP:OD1	1:C:85:ASP:C	2.59	0.41
1:C:172:LEU:HD12	1:C:172:LEU:HA	1.91	0.41
1:D:210:SER:O	1:D:213:MET:HG2	2.21	0.41
1:E:103:THR:HG22	1:F:136:GLY:HA2	2.02	0.41
1:B:16:THR:C	1:B:27:LEU:HD23	2.41	0.41
1:B:118:GLN:NE2	4:B:612:HOH:O	2.44	0.41
1:A:151:GLN:O	1:A:161:CYS:HA	2.19	0.41
1:C:63:LEU:O	1:C:99:ARG:NH1	2.50	0.41
1:D:116:LEU:HD12	1:D:120:LYS:CE	2.39	0.41
1:E:174:LEU:HB3	1:E:175:PRO:HD3	2.02	0.41
1:F:21:ARG:HH21	2:F:310:UMP:P	2.43	0.41
1:F:59:LEU:HD23	1:F:187:MET:HE1	2.02	0.41
1:D:262:VAL:CG1	1:D:263:ALA:N	2.80	0.41
1:E:147:HIS:HB2	1:E:163:LEU:HD11	2.01	0.41
1:E:220:LEU:HD13	1:E:220:LEU:HA	1.79	0.41
1:A:85:ASP:OD1	1:A:85:ASP:C	2.59	0.41
1:A:130:VAL:HB	1:A:150:PHE:CZ	2.55	0.41
1:A:99:ARG:HH11	1:A:99:ARG:HG3	1.85	0.41
1:A:129:ILE:HG22	1:A:130:VAL:N	2.35	0.41
1:B:82:GLU:HB2	1:B:83:TRP:CE3	2.56	0.41
1:B:222:ARG:HD3	1:B:255:HIS:CB	2.51	0.41
1:C:52:LEU:HD11	1:C:249:ILE:HG12	2.03	0.41
1:D:103:THR:HB	1:D:104:PRO:CD	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:1:CXM:HE3	1:E:43:PRO:CB	2.51	0.41
1:E:86:GLU:CD	1:E:86:GLU:N	2.74	0.41
1:F:171:PHE:CD1	1:F:171:PHE:C	2.93	0.41
1:A:129:ILE:CG2	1:A:130:VAL:N	2.84	0.41
1:C:147:HIS:HB2	1:C:163:LEU:HD11	2.03	0.41
1:A:46:THR:C	1:A:48:LYS:H	2.25	0.40
1:B:55:ILE:HG13	1:B:176:PHE:CE2	2.56	0.40
1:F:52:LEU:HB3	1:F:56:ILE:HG13	2.03	0.40
1:A:134:ASN:C	1:A:134:ASN:ND2	2.73	0.40
1:C:58:GLU:HG2	1:C:62:PHE:CE2	2.57	0.40
1:E:166:ARG:HG3	1:E:167:SER:N	2.36	0.40
1:F:215:GLN:HE21	1:F:260:ALA:HA	1.85	0.40
1:B:26:THR:HG22	1:B:209:TYR:CD1	2.56	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	262/264 (99%)	246 (94%)	15 (6%)	1 (0%)	34	57
1	B	262/264 (99%)	240 (92%)	18 (7%)	4 (2%)	10	21
1	C	262/264 (99%)	244 (93%)	15 (6%)	3 (1%)	14	30
1	D	262/264 (99%)	240 (92%)	20 (8%)	2 (1%)	19	39
1	E	259/264 (98%)	235 (91%)	20 (8%)	4 (2%)	10	21
1	F	262/264 (99%)	244 (93%)	15 (6%)	3 (1%)	14	30
All	All	1569/1584 (99%)	1449 (92%)	103 (7%)	17 (1%)	14	30

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	94	TYR
1	A	94	TYR
1	B	23	GLY
1	B	79	ILE
1	E	94	TYR
1	F	23	GLY
1	E	86	GLU
1	F	94	TYR
1	C	94	TYR
1	D	24	THR
1	E	48	LYS
1	C	93	VAL
1	E	93	VAL
1	B	69	ILE
1	F	45	VAL
1	C	122	ASP
1	D	93	VAL

### 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	231/231 (100%)	218 (94%)	13 (6%)	21	42
1	B	231/231 (100%)	215 (93%)	16 (7%)	15	31
1	C	231/231 (100%)	212 (92%)	19 (8%)	11	22
1	D	231/231 (100%)	219 (95%)	12 (5%)	23	46
1	E	229/231 (99%)	214 (93%)	15 (7%)	16	33
1	F	231/231 (100%)	219 (95%)	12 (5%)	23	46
All	All	1384/1386 (100%)	1297 (94%)	87 (6%)	18	36

All (87) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	LYS
1	A	52	LEU

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Mol	Chain	Res	Type
1	A	87	ASN
1	A	134	ASN
1	A	138	LEU
1	A	143	LEU
1	A	172	LEU
1	A	176	PHE
1	A	188	MET
1	A	227	LEU
1	A	230	LEU
1	A	244	PHE
1	A	249	ILE
1	B	14	GLU
1	B	19	ASN
1	B	21	ARG
1	B	38	LEU
1	B	53	ARG
1	B	76	ASN
1	B	96	LYS
1	B	101	TRP
1	B	116	LEU
1	B	134	ASN
1	B	143	LEU
1	B	166	ARG
1	B	172	LEU
1	B	183	LEU
1	B	215	GLN
1	B	249	ILE
1	C	5	LEU
1	C	39	GLN
1	C	52	LEU
1	C	53	ARG
1	C	60	LEU
1	C	76	ASN
1	C	86	GLU
1	C	103	THR
1	C	127	ARG
1	C	134	ASN
1	C	138	LEU
1	C	176	PHE
1	C	183	LEU
1	C	188	MET
1	C	215	GLN

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Mol	Chain	Res	Type
1	C	222	ARG
1	C	227	LEU
1	C	237	GLU
1	C	248	GLU
1	D	39	GLN
1	D	82	GLU
1	D	116	LEU
1	D	127	ARG
1	D	134	ASN
1	D	143	LEU
1	D	172	LEU
1	D	195	GLU
1	D	215	GLN
1	D	223	GLU
1	D	238	SER
1	D	243	ARG
1	E	17	GLN
1	E	20	ASP
1	E	47	THR
1	E	49	ARG
1	E	50	CYS
1	E	60	LEU
1	E	116	LEU
1	E	134	ASN
1	E	138	LEU
1	E	162	GLN
1	E	215	GLN
1	E	220	LEU
1	E	230	LEU
1	E	237	GLU
1	E	249	ILE
1	F	6	GLU
1	F	17	GLN
1	F	35	ARG
1	F	38	LEU
1	F	39	GLN
1	F	107	ARG
1	F	127	ARG
1	F	134	ASN
1	F	143	LEU
1	F	183	LEU
1	F	188	MET

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Mol	Chain	Res	Type
1	F	238	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (61) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	39	GLN
1	A	64	GLN
1	A	75	ASN
1	A	87	ASN
1	A	97	GLN
1	A	117	ASN
1	A	118	GLN
1	A	121	ASN
1	A	134	ASN
1	A	147	HIS
1	A	151	GLN
1	A	190	GLN
1	A	217	HIS
1	B	17	GLN
1	B	19	ASN
1	B	32	HIS
1	B	33	GLN
1	B	57	HIS
1	B	76	ASN
1	B	117	ASN
1	B	118	GLN
1	B	134	ASN
1	B	162	GLN
1	C	3	GLN
1	C	39	GLN
1	C	64	GLN
1	C	76	ASN
1	C	87	ASN
1	C	117	ASN
1	C	118	GLN
1	C	134	ASN
1	C	151	GLN
1	C	177	ASN
1	C	190	GLN
1	C	215	GLN
1	C	217	HIS
1	D	17	GLN

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Mol	Chain	Res	Type
1	D	75	ASN
1	D	117	ASN
1	D	134	ASN
1	D	219	GLN
1	E	19	ASN
1	E	32	HIS
1	E	51	HIS
1	E	73	HIS
1	E	75	ASN
1	E	97	GLN
1	E	117	ASN
1	E	121	ASN
1	E	134	ASN
1	E	190	GLN
1	E	215	GLN
1	F	32	HIS
1	F	39	GLN
1	F	51	HIS
1	F	87	ASN
1	F	117	ASN
1	F	118	GLN
1	F	134	ASN
1	F	186	HIS
1	F	217	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

6 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	CXM	C	1	1	6,10,11	1.02	1 (16%)	5,11,13	1.07	1 (20%)
1	CXM	B	1	1	6,10,11	1.33	1 (16%)	5,11,13	0.67	0
1	CXM	A	1	1	6,10,11	0.95	1 (16%)	5,11,13	0.70	0
1	CXM	F	1	1	6,10,11	1.43	1 (16%)	5,11,13	0.87	0
1	CXM	E	1	1	6,10,11	1.01	1 (16%)	5,11,13	0.68	0
1	CXM	D	1	1	6,10,11	1.18	1 (16%)	5,11,13	0.69	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	CXM	C	1	1	-	1/7/10/12	-
1	CXM	B	1	1	-	0/7/10/12	-
1	CXM	A	1	1	-	1/7/10/12	-
1	CXM	F	1	1	-	4/7/10/12	-
1	CXM	E	1	1	-	2/7/10/12	-
1	CXM	D	1	1	-	2/7/10/12	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	1	CXM	CA-N	3.30	1.51	1.46
1	B	1	CXM	CA-N	3.05	1.50	1.46
1	D	1	CXM	CA-N	2.56	1.49	1.46
1	C	1	CXM	CA-N	2.28	1.49	1.46
1	E	1	CXM	CA-N	2.16	1.49	1.46
1	A	1	CXM	CA-N	2.03	1.49	1.46

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	1	CXM	C-CA-N	2.03	113.39	109.73

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	D	1	CXM	O-C-CA-CB
1	F	1	CXM	N-CA-CB-CG
1	F	1	CXM	C-CA-CB-CG
1	F	1	CXM	O-C-CA-CB
1	E	1	CXM	CA-CB-CG-SD
1	F	1	CXM	CB-CG-SD-CE
1	A	1	CXM	CA-CB-CG-SD
1	C	1	CXM	CA-CB-CG-SD
1	D	1	CXM	C-CA-N-CN
1	E	1	CXM	CB-CA-N-CN

There are no ring outliers.

6 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	C	1	CXM	1	0
1	B	1	CXM	1	0
1	A	1	CXM	2	0
1	F	1	CXM	1	0
1	E	1	CXM	6	0
1	D	1	CXM	3	0

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

12 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	$\# Z  > 2$
3	CB3	C	305	-	30,37,37	1.88	7 (23%)	38,51,51	3.91	13 (34%)
3	CB3	D	307	-	30,37,37	2.14	10 (33%)	38,51,51	2.95	11 (28%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	CB3	A	301	-	30,37,37	1.81	6 (20%)	38,51,51	3.30	12 (31%)
3	CB3	B	303	-	30,37,37	1.86	7 (23%)	38,51,51	3.09	9 (23%)
2	UMP	A	300	1	18,21,21	3.94	4 (22%)	21,31,31	1.58	3 (14%)
3	CB3	E	309	-	30,37,37	1.89	5 (16%)	38,51,51	3.32	10 (26%)
2	UMP	E	308	-	18,21,21	3.71	5 (27%)	21,31,31	1.33	2 (9%)
2	UMP	C	304	1	18,21,21	4.10	5 (27%)	21,31,31	1.58	3 (14%)
2	UMP	D	306	-	18,21,21	3.28	4 (22%)	21,31,31	1.44	3 (14%)
3	CB3	F	311	-	30,37,37	2.32	11 (36%)	38,51,51	4.15	17 (44%)
2	UMP	B	302	1	18,21,21	4.20	5 (27%)	21,31,31	2.03	3 (14%)
2	UMP	F	310	1	18,21,21	4.93	4 (22%)	21,31,31	1.88	4 (19%)

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
3	CB3	C	305	-	-	3/21/28/28	0/3/3/3
3	CB3	D	307	-	-	0/21/28/28	0/3/3/3
3	CB3	A	301	-	-	1/21/28/28	0/3/3/3
3	CB3	B	303	-	-	3/21/28/28	0/3/3/3
2	UMP	A	300	1	-	1/7/22/22	0/2/2/2
3	CB3	E	309	-	-	5/21/28/28	0/3/3/3
2	UMP	E	308	-	-	1/7/22/22	0/2/2/2
2	UMP	C	304	1	-	1/7/22/22	0/2/2/2
2	UMP	D	306	-	-	1/7/22/22	0/2/2/2
3	CB3	F	311	-	-	5/21/28/28	0/3/3/3
2	UMP	B	302	1	-	4/7/22/22	0/2/2/2
2	UMP	F	310	1	-	1/7/22/22	0/2/2/2

All (73) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	310	UMP	C6-N1	17.54	1.57	1.35
2	B	302	UMP	C6-N1	13.20	1.52	1.35
2	C	304	UMP	C6-N1	12.72	1.51	1.35
2	A	300	UMP	C6-N1	11.88	1.50	1.35
2	E	308	UMP	C6-N1	11.16	1.49	1.35
2	D	306	UMP	C6-N1	9.43	1.47	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	304	UMP	C6-C5	8.92	1.57	1.38
2	B	302	UMP	C6-C5	8.20	1.56	1.38
2	A	300	UMP	O4-C4	7.90	1.44	1.24
2	F	310	UMP	C6-C5	7.86	1.55	1.38
2	E	308	UMP	O4-C4	7.32	1.43	1.24
2	E	308	UMP	C6-C5	7.08	1.53	1.38
2	F	310	UMP	O4-C4	7.00	1.42	1.24
2	B	302	UMP	O4-C4	7.00	1.42	1.24
2	A	300	UMP	C6-C5	6.84	1.53	1.38
2	D	306	UMP	O4-C4	6.84	1.41	1.24
2	D	306	UMP	C6-C5	6.05	1.51	1.38
2	C	304	UMP	O4-C4	5.94	1.39	1.24
3	C	305	CB3	C4-N3	5.81	1.43	1.33
3	F	311	CB3	C4-N3	5.53	1.42	1.33
3	D	307	CB3	C4-N3	5.51	1.42	1.33
3	A	301	CB3	C4-N3	5.32	1.42	1.33
3	F	311	CB3	CP1-N10	5.24	1.51	1.46
3	E	309	CB3	CP1-N10	4.97	1.51	1.46
3	E	309	CB3	C4-N3	4.77	1.41	1.33
3	B	303	CB3	C4-N3	4.60	1.41	1.33
3	B	303	CB3	CA-N	4.53	1.52	1.46
3	D	307	CB3	CB-CA	4.42	1.59	1.53
3	D	307	CB3	CP1-N10	4.11	1.50	1.46
3	F	311	CB3	CP1-CP2	-4.05	1.41	1.47
3	F	311	CB3	CB-CA	3.65	1.58	1.53
2	A	300	UMP	C4-N3	3.60	1.39	1.33
2	D	306	UMP	C4-N3	3.57	1.39	1.33
3	F	311	CB3	C9-N10	3.54	1.51	1.46
3	D	307	CB3	C8A-N1	3.45	1.43	1.37
3	A	301	CB3	C8A-N1	3.33	1.43	1.37
3	E	309	CB3	CA-N	3.30	1.50	1.46
2	C	304	UMP	C4-N3	3.29	1.38	1.33
3	F	311	CB3	C2-N3	3.21	1.41	1.35
3	E	309	CB3	C8A-N1	3.16	1.42	1.37
3	A	301	CB3	C2-N3	3.15	1.41	1.35
3	C	305	CB3	CP1-N10	3.04	1.49	1.46
3	C	305	CB3	CP1-CP2	3.03	1.50	1.47
3	E	309	CB3	C2-N3	3.02	1.40	1.35
3	D	307	CB3	C2-N3	2.92	1.40	1.35
3	C	305	CB3	CA-N	2.85	1.50	1.46
2	B	302	UMP	C4-N3	2.84	1.38	1.33
3	D	307	CB3	C-N	2.77	1.40	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	311	CB3	C8A-N1	2.76	1.42	1.37
3	C	305	CB3	CB-CA	2.76	1.56	1.53
3	B	303	CB3	C2-N3	2.76	1.40	1.35
3	A	301	CB3	C2-NA2	2.71	1.39	1.33
3	A	301	CB3	C9-N10	2.71	1.50	1.46
2	E	308	UMP	C4-N3	2.68	1.37	1.33
3	B	303	CB3	CB-CA	2.64	1.56	1.53
2	F	310	UMP	C4-N3	2.62	1.37	1.33
3	B	303	CB3	C8A-N1	2.52	1.41	1.37
3	F	311	CB3	C2-NA2	2.42	1.38	1.33
3	C	305	CB3	C8A-N1	2.41	1.41	1.37
3	B	303	CB3	C-N	2.40	1.39	1.34
3	D	307	CB3	CP1-CP2	2.32	1.50	1.47
3	F	311	CB3	C14-N10	2.32	1.45	1.38
3	F	311	CB3	CA-N	2.32	1.49	1.46
3	D	307	CB3	CA-N	2.25	1.49	1.46
3	A	301	CB3	CP1-N10	2.18	1.48	1.46
3	D	307	CB3	C9-N10	2.17	1.49	1.46
3	D	307	CB3	C7-C6	2.17	1.43	1.38
3	C	305	CB3	C2-N3	2.15	1.39	1.35
2	E	308	UMP	P-OP2	-2.06	1.46	1.54
2	B	302	UMP	C3'-C4'	2.05	1.58	1.53
3	F	311	CB3	C16-C11	2.04	1.42	1.39
2	C	304	UMP	C2-N3	2.03	1.42	1.38
3	B	303	CB3	C16-C11	2.00	1.42	1.39

All (90) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	311	CB3	CP1-N10-C9	-15.74	102.12	117.10
3	C	305	CB3	C4A-C4-N3	-14.61	114.22	124.40
3	C	305	CB3	CP1-N10-C9	-12.78	104.93	117.10
3	E	309	CB3	C4A-C4-N3	-12.75	115.51	124.40
3	D	307	CB3	C4A-C4-N3	-12.45	115.72	124.40
3	F	311	CB3	C4A-C4-N3	-11.99	116.04	124.40
3	A	301	CB3	C4A-C4-N3	-11.75	116.21	124.40
3	B	303	CB3	C4A-C4-N3	-11.41	116.45	124.40
3	B	303	CB3	CP1-N10-C9	-9.48	108.08	117.10
3	E	309	CB3	C4A-C8A-N1	-8.77	118.84	123.60
3	A	301	CB3	CP1-N10-C9	-8.25	109.25	117.10
3	F	311	CB3	C9-N10-C14	7.04	132.88	120.78
3	E	309	CB3	CP1-N10-C9	-6.93	110.51	117.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	301	CB3	C4A-C8A-N1	-6.80	119.91	123.60
3	A	301	CB3	N1-C2-N3	-6.73	118.24	127.22
3	F	311	CB3	N1-C2-N3	-6.71	118.27	127.22
2	B	302	UMP	C5-C6-N1	-6.28	106.67	120.68
3	D	307	CB3	CP1-N10-C9	-5.92	111.46	117.10
3	B	303	CB3	C4A-C8A-N1	-5.89	120.40	123.60
2	F	310	UMP	C5-C6-N1	-5.88	107.56	120.68
3	D	307	CB3	N1-C2-N3	-5.86	119.41	127.22
3	A	301	CB3	C9-N10-C14	5.60	130.40	120.78
3	C	305	CB3	C4A-C8A-N1	-5.54	120.59	123.60
3	E	309	CB3	N1-C2-N3	-5.53	119.85	127.22
3	F	311	CB3	C4A-C8A-N1	-5.51	120.61	123.60
3	B	303	CB3	N1-C2-N3	-5.39	120.03	127.22
3	C	305	CB3	N1-C2-N3	-5.32	120.12	127.22
3	C	305	CB3	C4-N3-C2	5.03	123.92	115.93
3	C	305	CB3	C9-C6-C7	-4.95	111.45	120.77
2	C	304	UMP	C5-C6-N1	-4.91	109.72	120.68
3	F	311	CB3	C4-N3-C2	4.80	123.56	115.93
3	A	301	CB3	CA-N-C	-4.59	116.43	122.34
3	C	305	CB3	C9-N10-C14	4.45	128.43	120.78
2	B	302	UMP	C6-N1-C2	4.45	128.27	121.20
2	A	300	UMP	C5-C6-N1	-4.39	110.88	120.68
3	E	309	CB3	C4-N3-C2	4.31	122.78	115.93
2	D	306	UMP	C6-N1-C2	4.31	128.04	121.20
3	B	303	CB3	C4-N3-C2	4.21	122.61	115.93
3	D	307	CB3	C4-N3-C2	4.19	122.58	115.93
3	D	307	CB3	C6-C5-C4A	-4.13	116.48	122.65
3	F	311	CB3	O-C-C11	4.10	128.25	120.94
3	E	309	CB3	C9-N10-C14	4.06	127.75	120.78
3	D	307	CB3	CP1-N10-C14	4.06	126.73	119.01
3	F	311	CB3	C9-C6-C7	-4.02	113.21	120.77
2	F	310	UMP	C2'-C1'-N1	-3.98	105.09	114.27
3	A	301	CB3	C4-N3-C2	3.97	122.24	115.93
3	E	309	CB3	C4-C4A-C8A	3.92	122.00	118.59
2	E	308	UMP	C6-N1-C2	3.85	127.31	121.20
3	D	307	CB3	C4A-C8A-N1	-3.58	121.66	123.60
3	C	305	CB3	C8-C8A-C4A	3.35	124.66	120.05
3	B	303	CB3	C9-N10-C14	3.33	126.50	120.78
2	A	300	UMP	C6-N1-C2	3.22	126.31	121.20
2	B	302	UMP	C2'-C1'-N1	-3.21	106.88	114.27
3	C	305	CB3	C7-C8-C8A	-3.12	116.91	120.84
2	C	304	UMP	C6-N1-C2	3.10	126.12	121.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	308	UMP	C5-C6-N1	-3.06	113.85	120.68
3	A	301	CB3	NA2-C2-N1	3.04	122.74	117.79
3	C	305	CB3	C6-C5-C4A	-2.93	118.26	122.65
3	D	307	CB3	C15-C14-N10	-2.92	117.35	121.38
3	F	311	CB3	C7-C8-C8A	-2.83	117.27	120.84
2	C	304	UMP	C2'-C1'-N1	-2.77	107.88	114.27
2	F	310	UMP	C6-N1-C2	2.66	125.42	121.20
3	A	301	CB3	C6-C5-C4A	-2.66	118.68	122.65
3	F	311	CB3	C6-C5-C4A	-2.65	118.69	122.65
3	C	305	CB3	CP1-N10-C14	2.65	124.04	119.01
3	B	303	CB3	C9-C6-C7	-2.63	115.82	120.77
2	D	306	UMP	C5-C6-N1	-2.62	114.84	120.68
3	C	305	CB3	O-C-N	-2.60	117.67	122.45
3	C	305	CB3	C8-C8A-N1	-2.59	114.75	118.69
3	B	303	CB3	C7-C8-C8A	-2.58	117.59	120.84
2	D	306	UMP	P-O5'-C5'	2.56	125.35	118.30
3	A	301	CB3	C9-C6-C7	-2.50	116.07	120.77
3	F	311	CB3	CP1-CP2-CP3	-2.45	173.56	177.67
3	D	307	CB3	O-C-N	-2.40	118.04	122.45
3	F	311	CB3	NA2-C2-N1	2.37	121.65	117.79
3	E	309	CB3	C9-C6-C7	-2.36	116.34	120.77
3	F	311	CB3	CA-N-C	2.31	125.31	122.34
2	A	300	UMP	C2'-C1'-N1	-2.29	108.99	114.27
3	F	311	CB3	O-C-N	-2.19	118.42	122.45
3	F	311	CB3	C11-C-N	-2.17	112.90	117.06
3	B	303	CB3	C6-C5-C4A	-2.17	119.40	122.65
2	F	310	UMP	OP3-P-OP2	2.16	115.90	107.64
3	F	311	CB3	C15-C14-N10	-2.16	118.40	121.38
3	E	309	CB3	CB-CG-CD	-2.13	109.02	113.59
3	D	307	CB3	NA2-C2-N3	2.12	120.55	117.25
3	D	307	CB3	C7-C8-C8A	-2.12	118.18	120.84
3	A	301	CB3	C2-N1-C8A	2.07	121.45	116.33
3	E	309	CB3	C7-C8-C8A	-2.06	118.24	120.84
3	F	311	CB3	C9-C6-C5	2.05	126.29	121.30
3	A	301	CB3	CG-CB-CA	-2.03	108.94	113.04

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	302	UMP	C5'-O5'-P-OP2
2	B	302	UMP	C5'-O5'-P-OP3

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Mol	Chain	Res	Type	Atoms
3	C	305	CB3	CA-CB-CG-CD
3	E	309	CB3	CT-CA-CB-CG
3	E	309	CB3	CA-CB-CG-CD
3	F	311	CB3	C6-C9-N10-C14
3	F	311	CB3	CA-CB-CG-CD
3	E	309	CB3	N-CA-CB-CG
3	B	303	CB3	C6-C9-N10-C14
3	C	305	CB3	C6-C9-N10-C14
3	F	311	CB3	C13-C14-N10-C9
3	F	311	CB3	C15-C14-N10-C9
3	A	301	CB3	C6-C9-N10-C14
3	B	303	CB3	C15-C14-N10-C9
2	B	302	UMP	C5'-O5'-P-OP1
3	B	303	CB3	C13-C14-N10-C9
3	E	309	CB3	C15-C14-N10-CP1
3	F	311	CB3	C6-C9-N10-CP1
3	C	305	CB3	C6-C9-N10-CP1
3	E	309	CB3	C6-C9-N10-C14
2	F	310	UMP	O4'-C4'-C5'-O5'
2	B	302	UMP	O4'-C4'-C5'-O5'
2	D	306	UMP	O4'-C4'-C5'-O5'
2	E	308	UMP	O4'-C4'-C5'-O5'
2	A	300	UMP	O4'-C4'-C5'-O5'
2	C	304	UMP	O4'-C4'-C5'-O5'

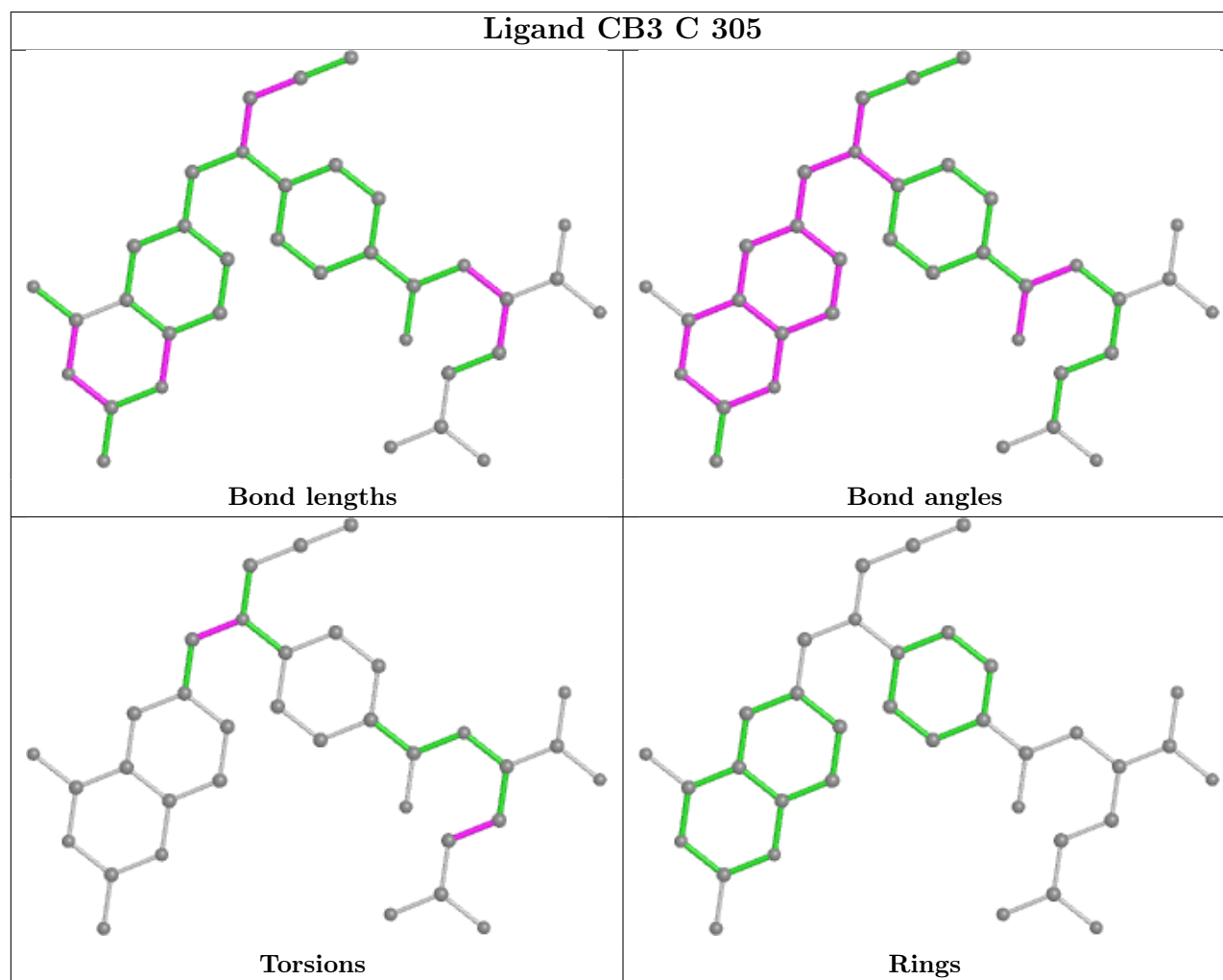
There are no ring outliers.

11 monomers are involved in 25 short contacts:

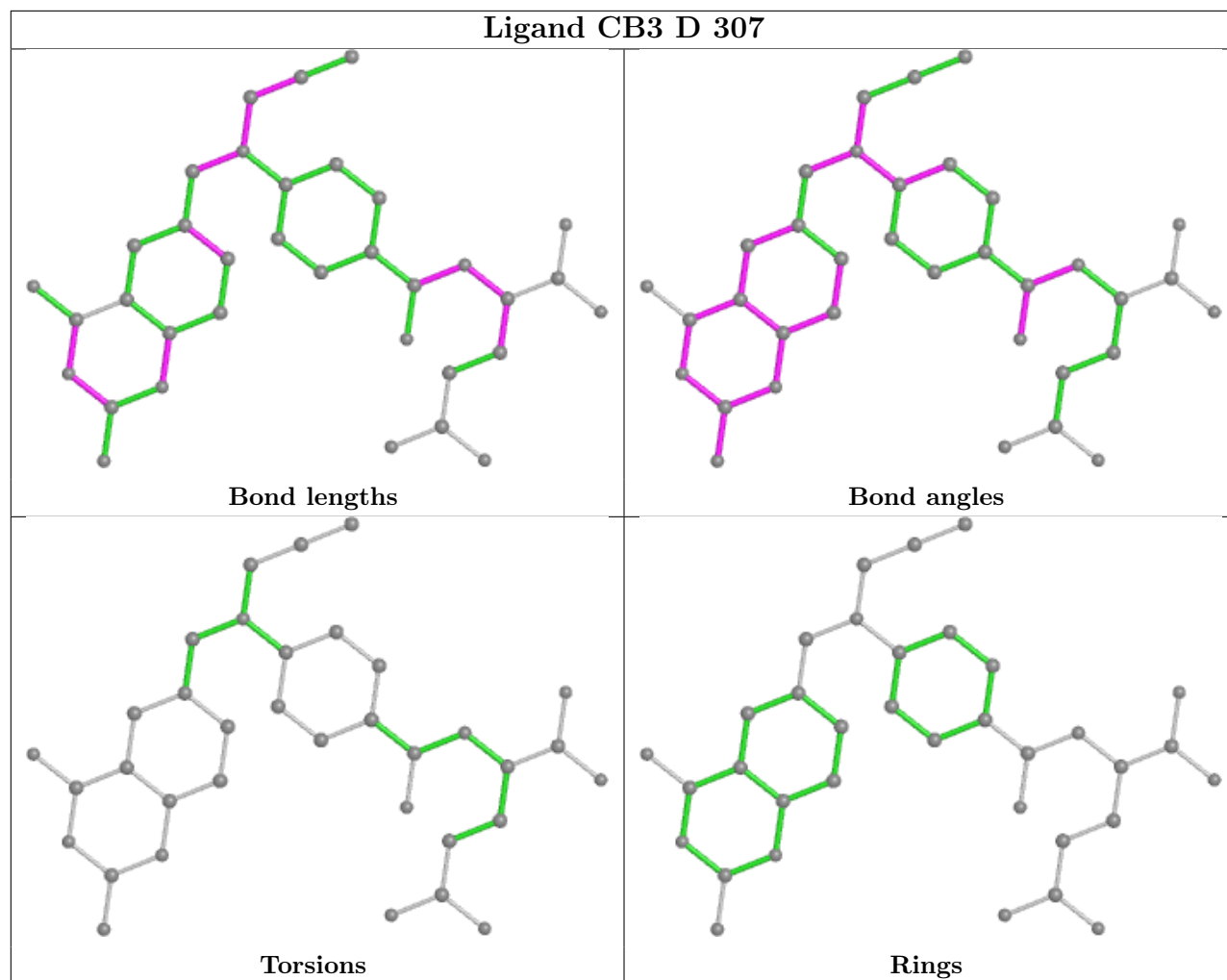
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	305	CB3	3	0
3	D	307	CB3	6	0
3	A	301	CB3	2	0
3	B	303	CB3	2	0
3	E	309	CB3	5	0
2	E	308	UMP	1	0
2	C	304	UMP	1	0
2	D	306	UMP	1	0
3	F	311	CB3	1	0
2	B	302	UMP	1	0
2	F	310	UMP	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

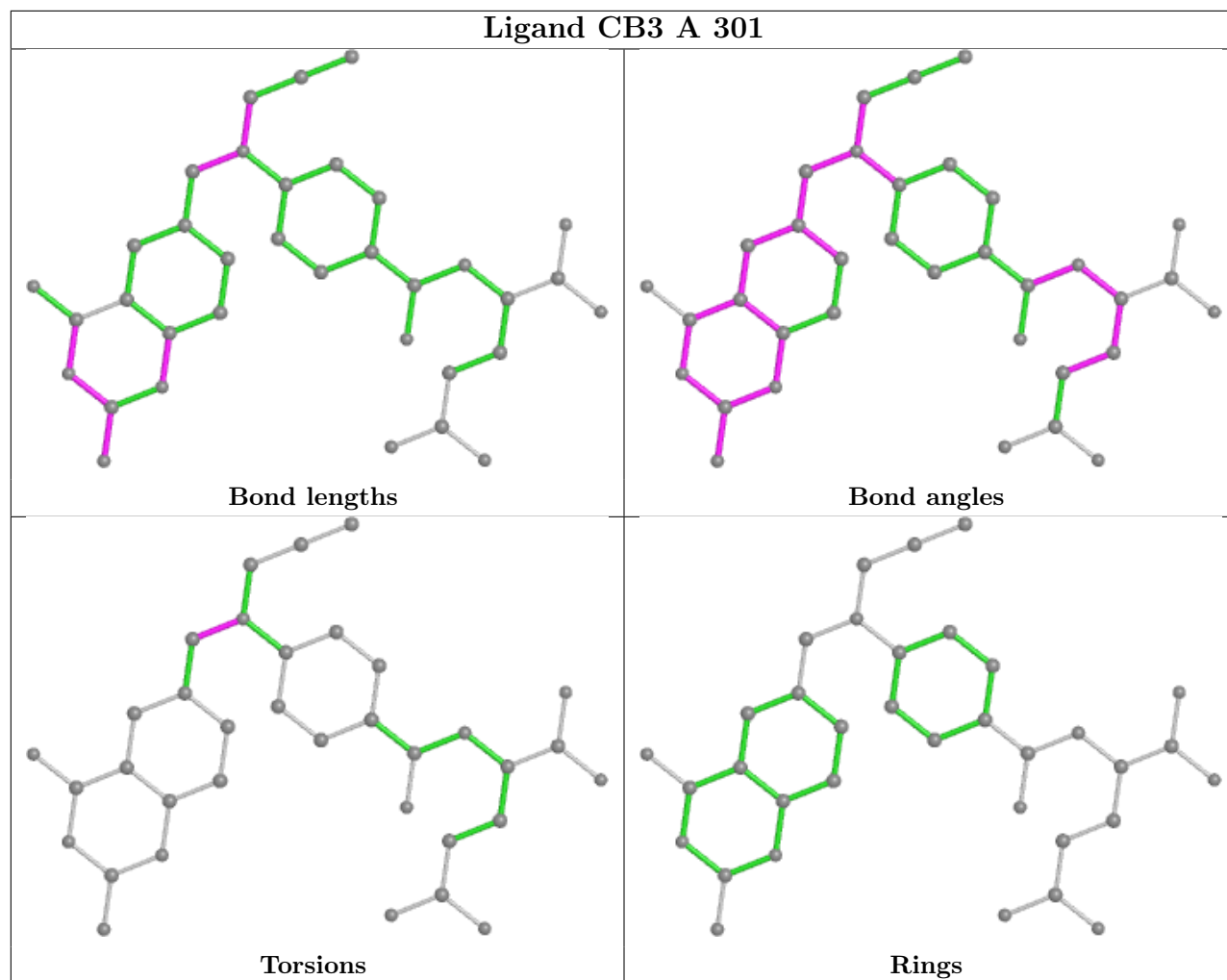
bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 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.



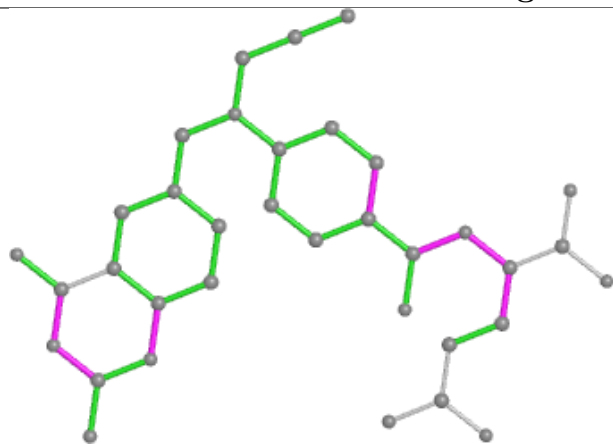
## Ligand CB3 D 307



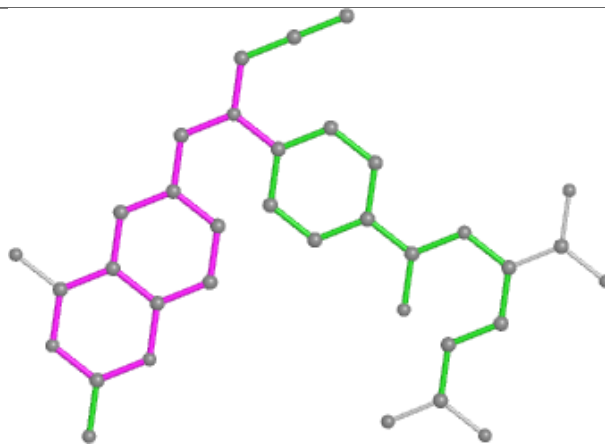
## Ligand CB3 A 301



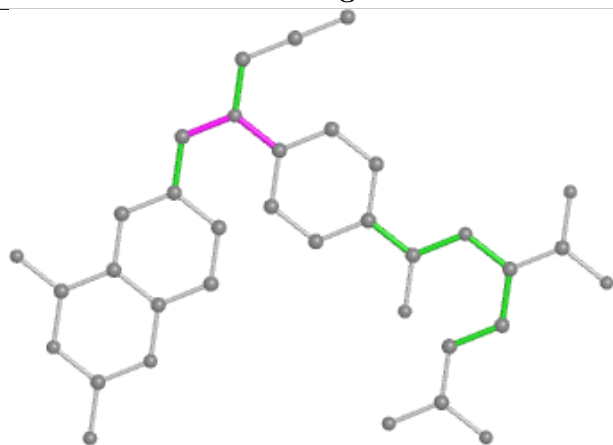
## Ligand CB3 B 303



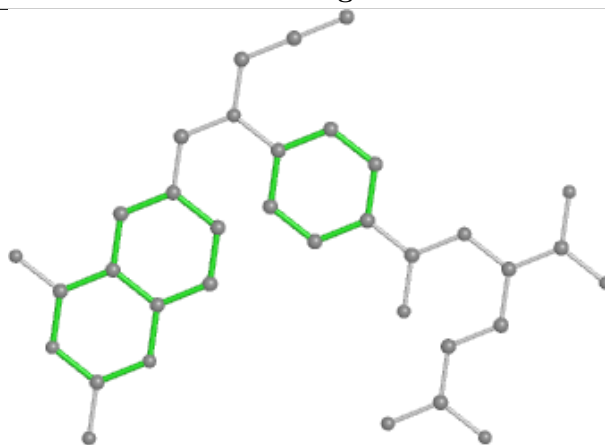
Bond lengths



Bond angles

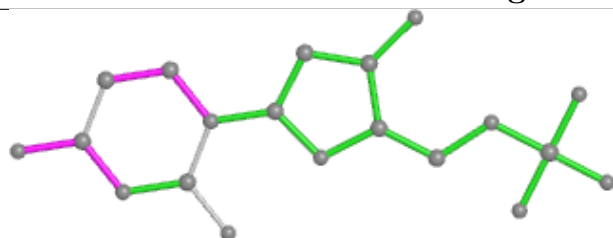


Torsions

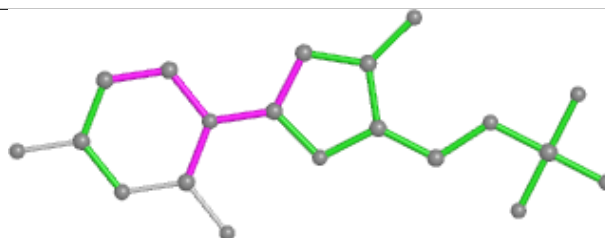


Rings

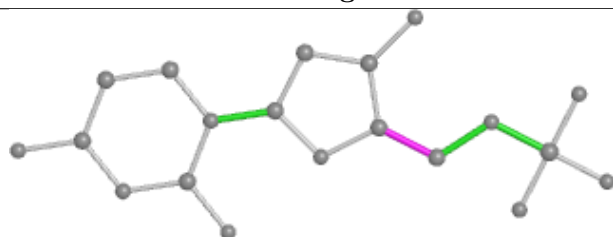
## Ligand UMP A 300



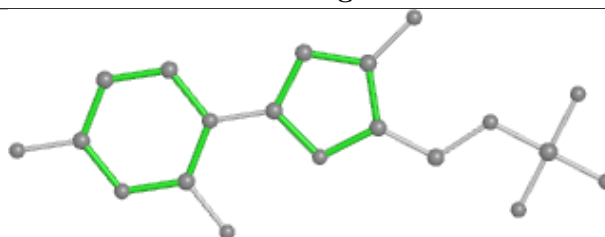
Bond lengths



Bond angles



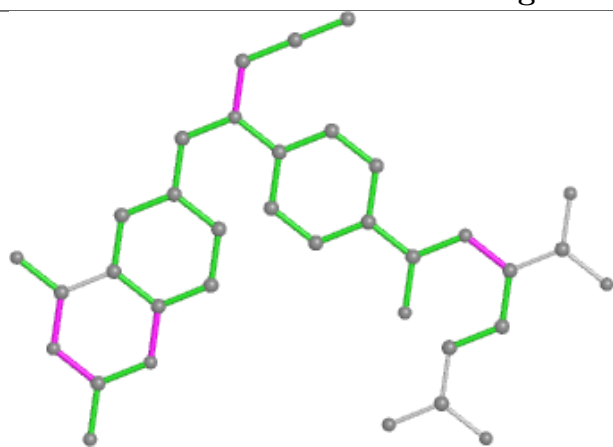
Torsions



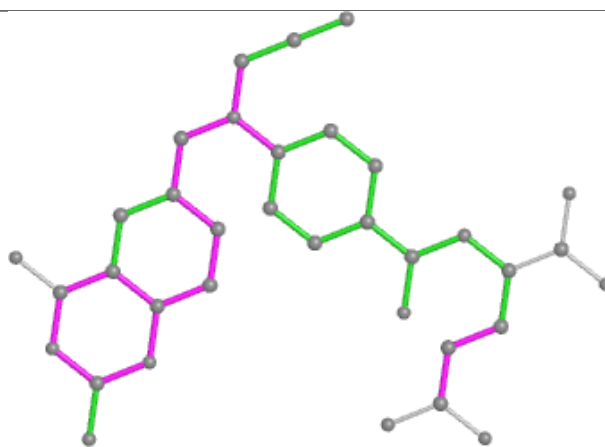
Rings



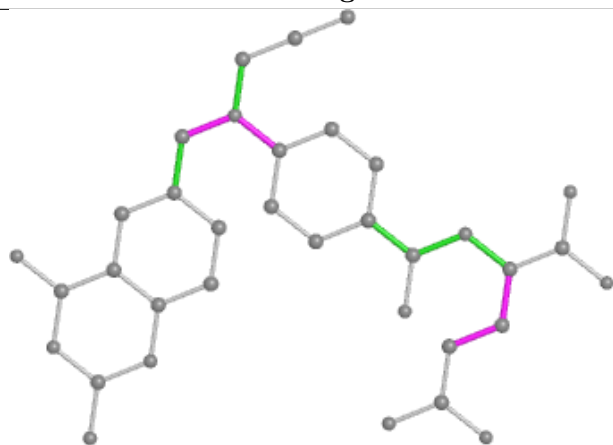
## Ligand CB3 E 309



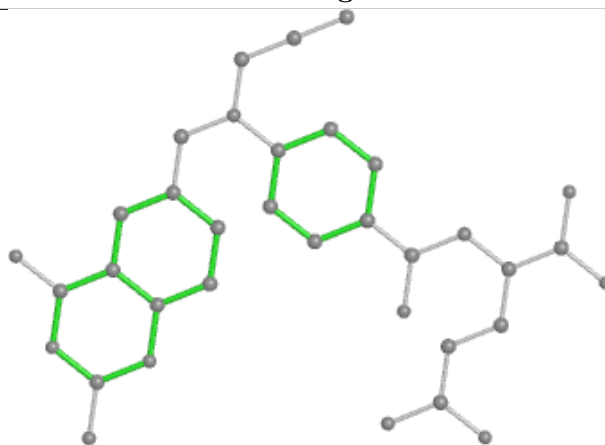
Bond lengths



Bond angles

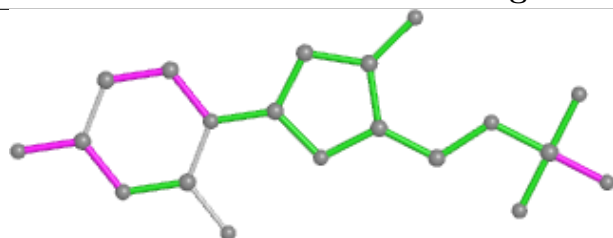


Torsions

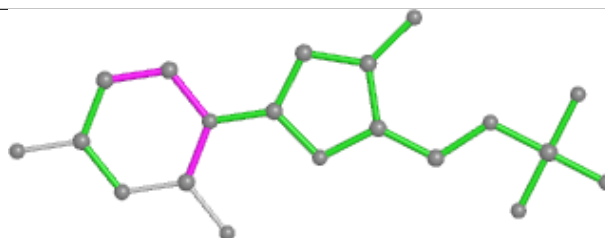


Rings

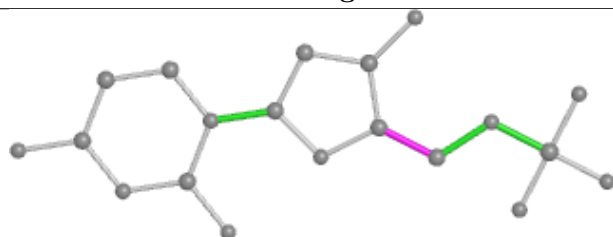
## Ligand UMP E 308



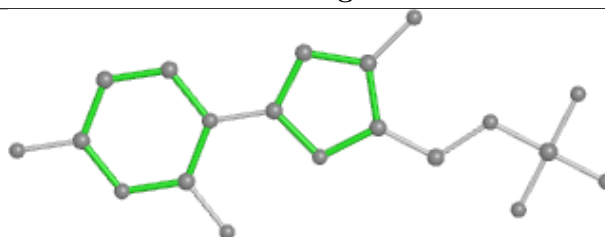
Bond lengths



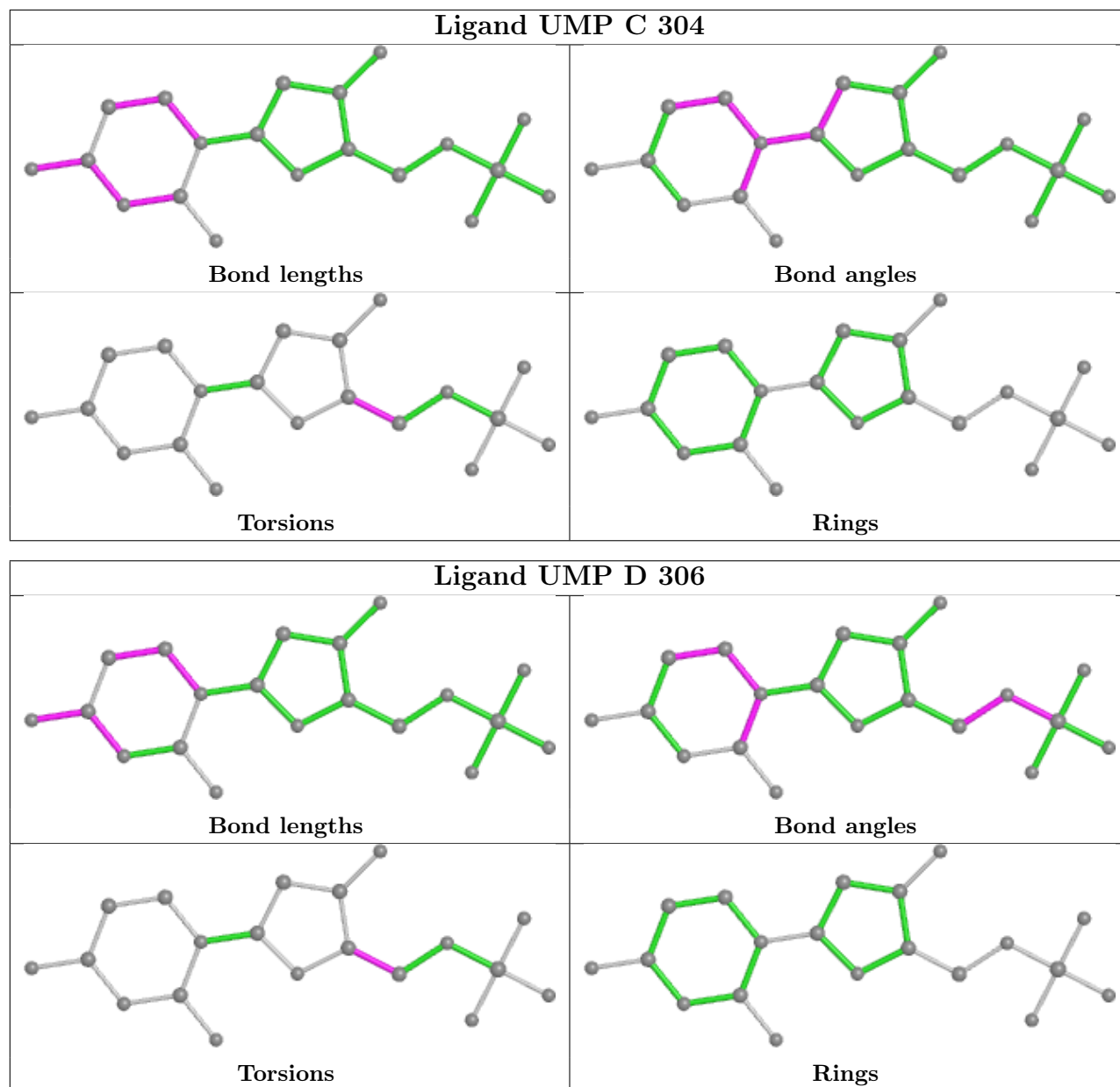
Bond angles



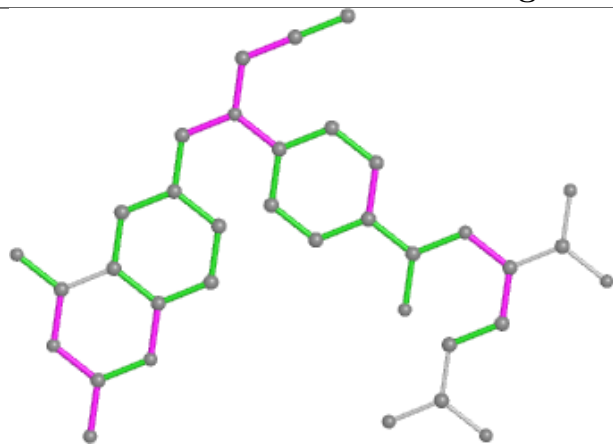
Torsions



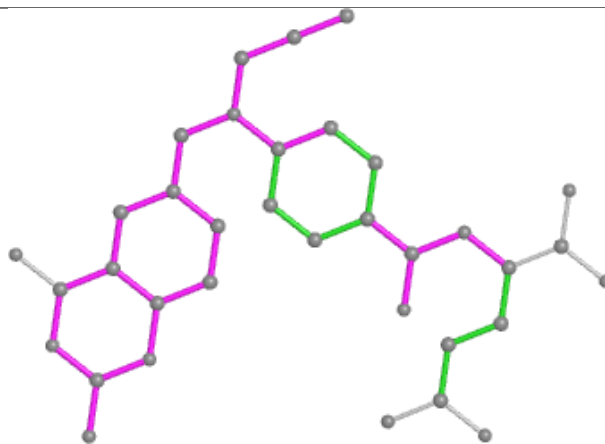
Rings



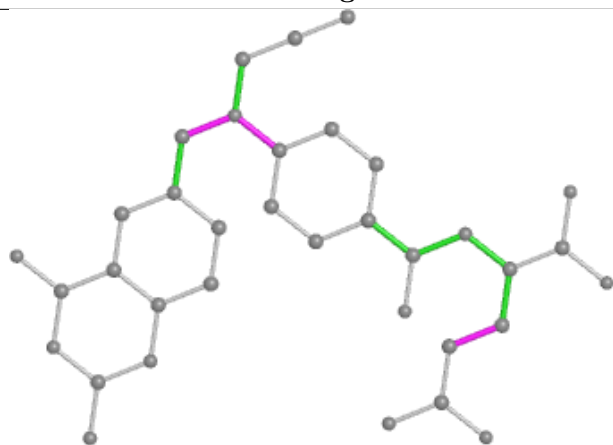
## Ligand CB3 F 311



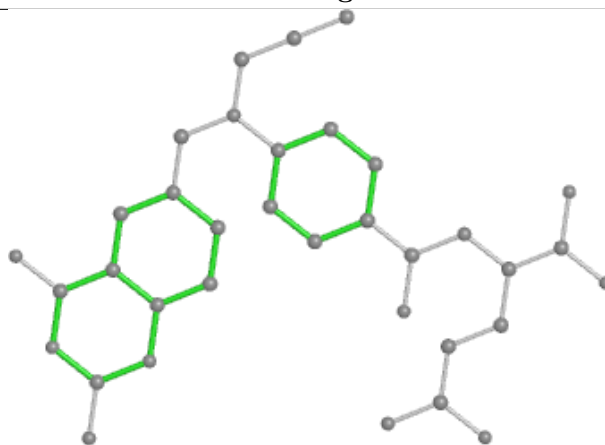
Bond lengths



Bond angles

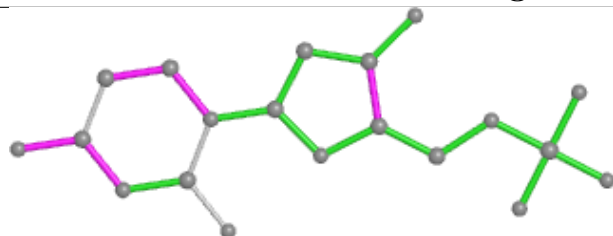


Torsions

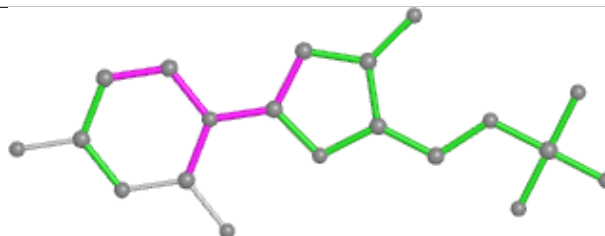


Rings

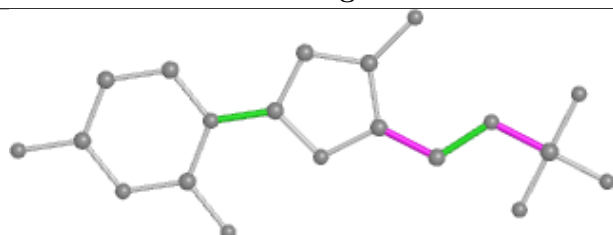
## Ligand UMP B 302



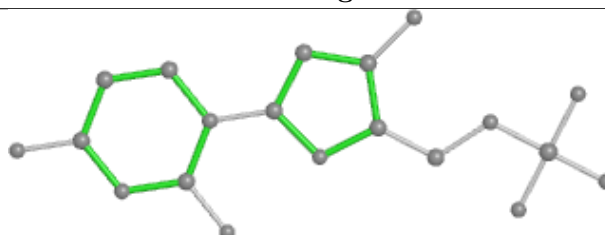
Bond lengths



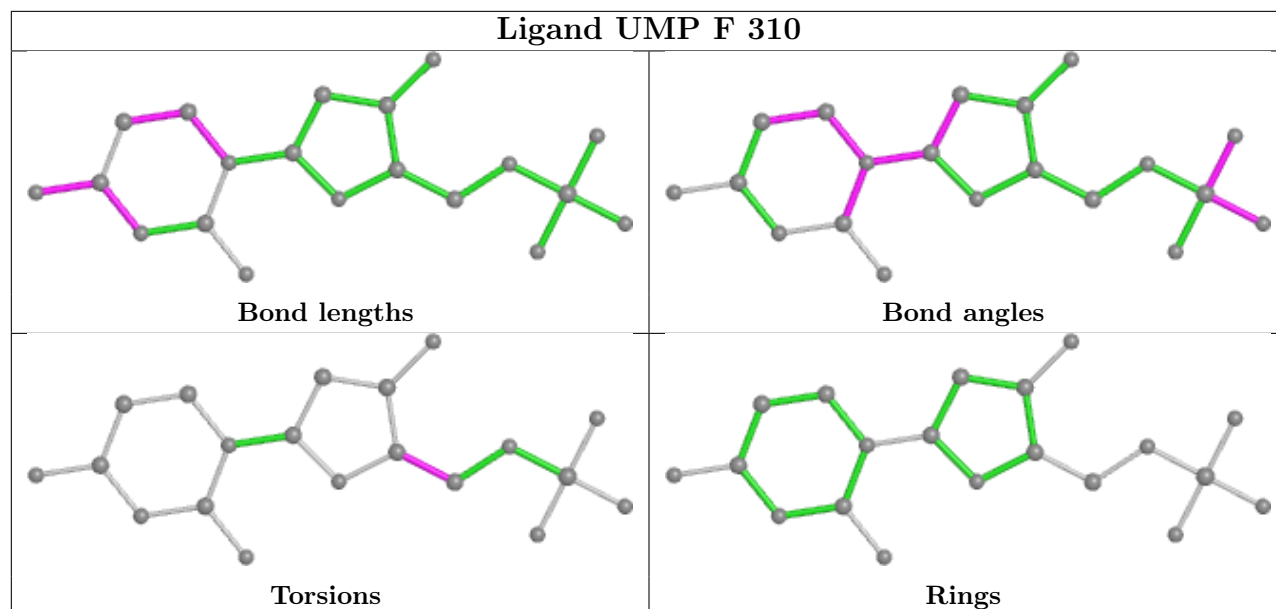
Bond angles



Torsions



Rings



## 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	263/264 (99%)	-0.37	1 (0%) 92 91	3, 16, 29, 39	0
1	B	263/264 (99%)	-0.24	1 (0%) 92 91	4, 17, 36, 45	0
1	C	263/264 (99%)	-0.28	1 (0%) 92 91	3, 19, 33, 50	0
1	D	263/264 (99%)	-0.08	7 (2%) 54 48	5, 22, 42, 62	0
1	E	260/264 (98%)	-0.15	5 (1%) 66 62	6, 22, 43, 60	0
1	F	263/264 (99%)	-0.26	2 (0%) 86 84	7, 20, 31, 44	0
All	All	1575/1584 (99%)	-0.23	17 (1%) 80 78	3, 19, 37, 62	0

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	262	VAL	5.5
1	D	22	THR	4.3
1	B	22	THR	3.3
1	E	22	THR	3.3
1	D	263	ALA	3.2
1	D	264	ILE	3.2
1	E	21	ARG	2.8
1	A	157	GLY	2.4
1	C	23	GLY	2.4
1	D	21	ARG	2.3
1	F	86	GLU	2.2
1	F	22	THR	2.2
1	D	210	SER	2.1
1	E	86	GLU	2.1
1	E	23	GLY	2.0
1	E	83	TRP	2.0
1	D	86	GLU	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(Å <sup>2</sup> )	Q<0.9
1	CXM	E	1	11/12	0.92	0.15	27,30,34,34	0
1	CXM	F	1	11/12	0.94	0.16	21,24,26,27	0
1	CXM	C	1	11/12	0.95	0.15	22,26,28,28	0
1	CXM	D	1	11/12	0.95	0.14	21,22,24,25	0
1	CXM	A	1	11/12	0.96	0.14	13,17,24,27	0
1	CXM	B	1	11/12	0.96	0.12	12,15,24,26	0

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

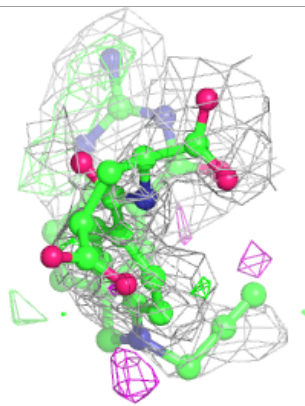
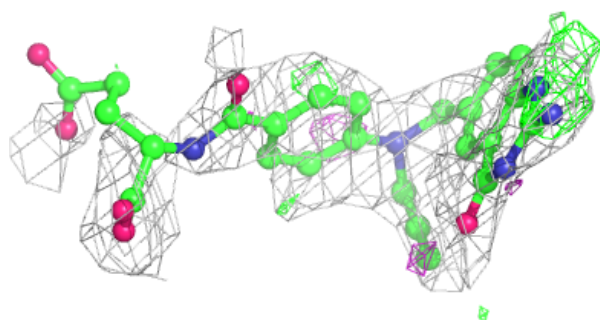
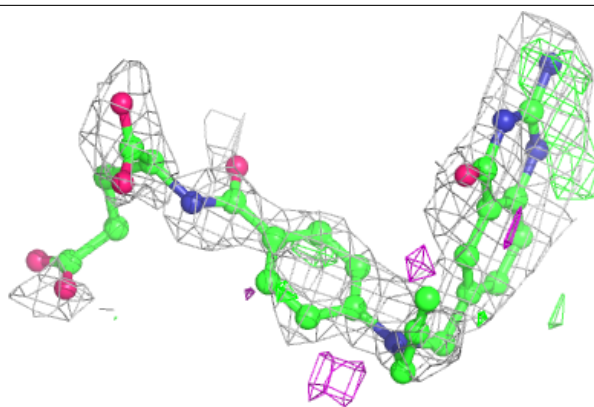
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	CB3	E	309	35/35	0.61	0.39	67,78,92,92	0
3	CB3	D	307	35/35	0.77	0.28	43,49,63,64	0
3	CB3	B	303	35/35	0.84	0.23	24,31,50,52	0
3	CB3	F	311	35/35	0.84	0.22	18,26,47,48	0
3	CB3	C	305	35/35	0.89	0.20	10,24,51,53	0
3	CB3	A	301	35/35	0.90	0.19	9,24,36,37	0
2	UMP	B	302	20/20	0.95	0.16	16,17,21,21	0
2	UMP	E	308	20/20	0.95	0.15	12,15,21,23	0
2	UMP	F	310	20/20	0.95	0.14	12,15,20,20	0
2	UMP	C	304	20/20	0.96	0.12	12,14,17,18	0
2	UMP	D	306	20/20	0.96	0.14	18,21,23,24	0
2	UMP	A	300	20/20	0.98	0.10	4,7,11,12	0

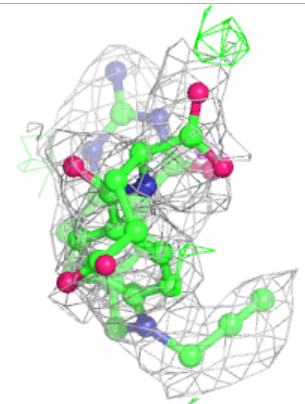
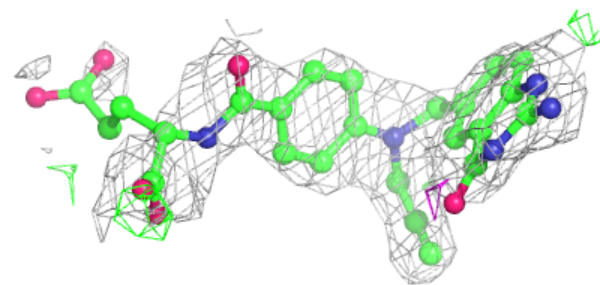
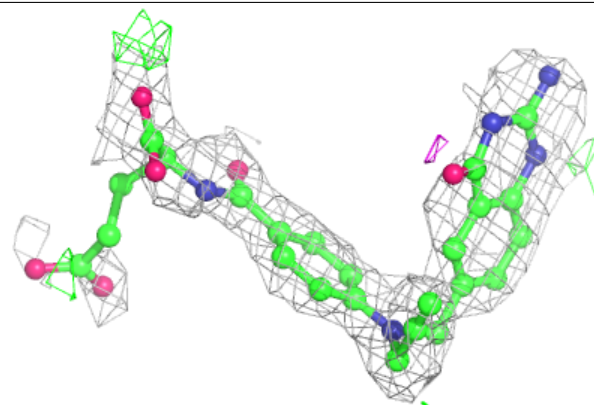
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around CB3 E 309:**

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

**Electron density around CB3 D 307:**

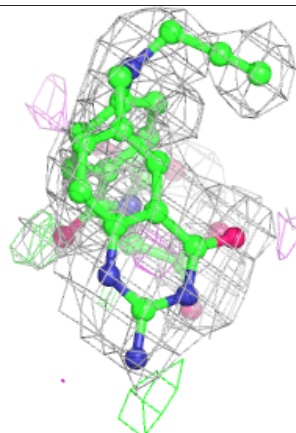
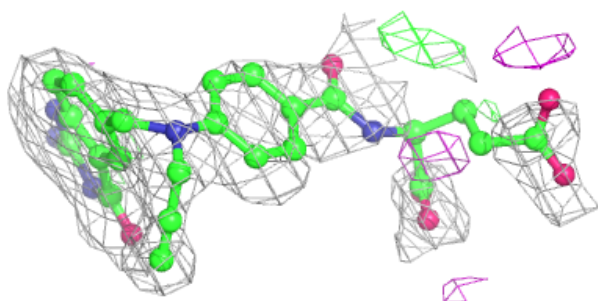
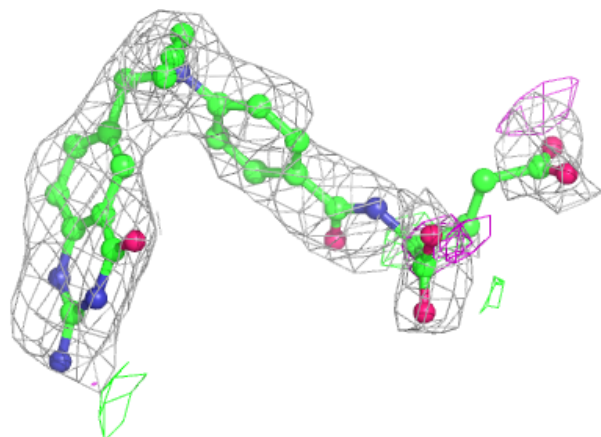
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



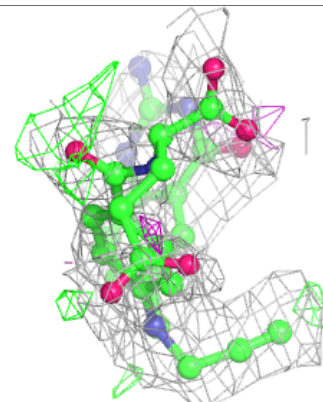
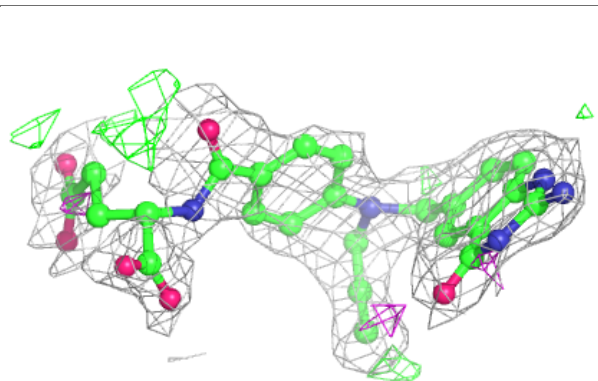
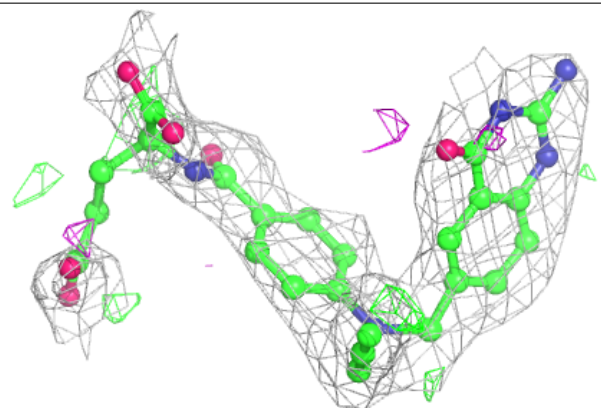


**Electron density around CB3 B 303:**

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

**Electron density around CB3 F 311:**

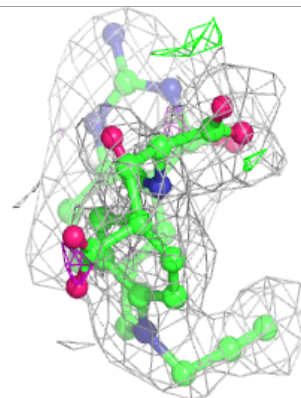
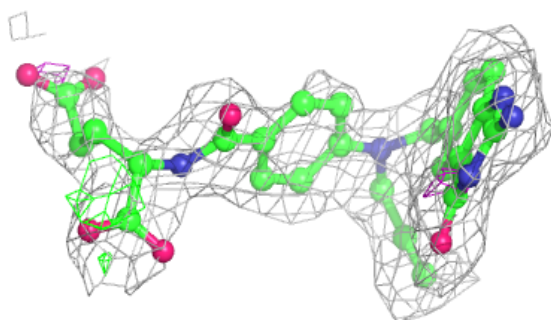
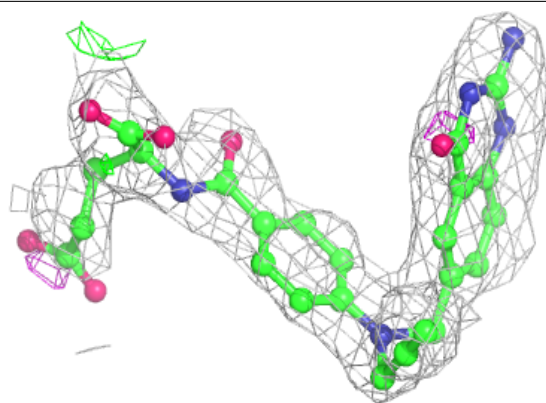
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



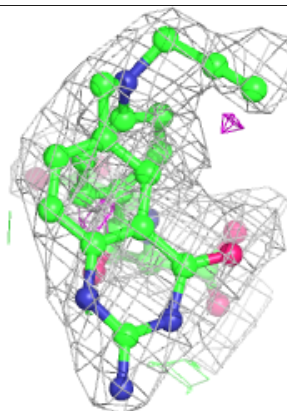
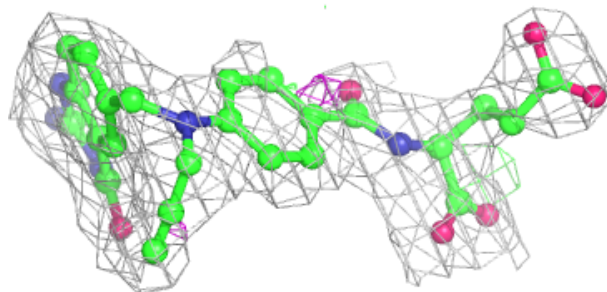
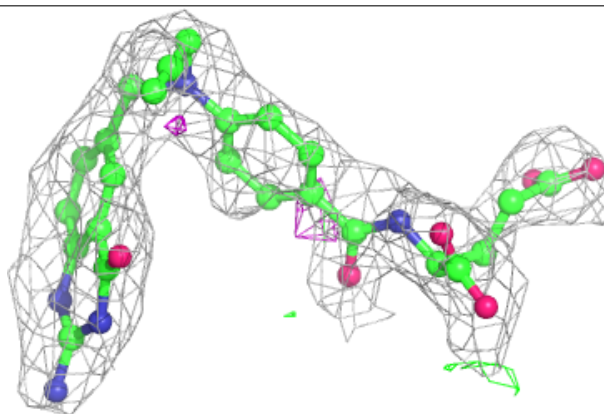


**Electron density around CB3 C 305:**

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

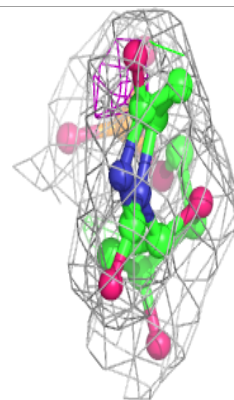
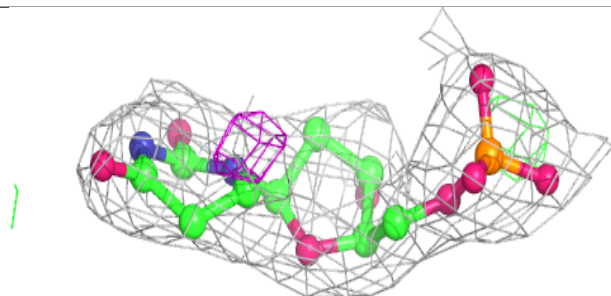
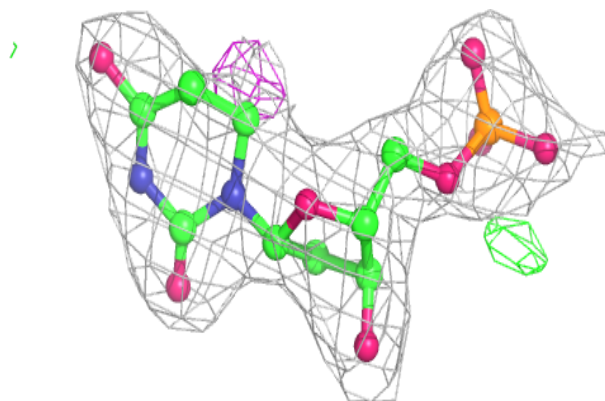
**Electron density around CB3 A 301:**

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

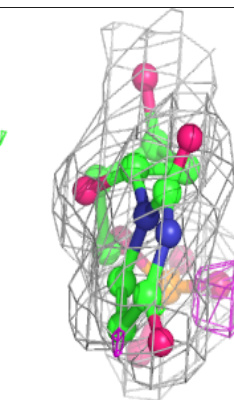
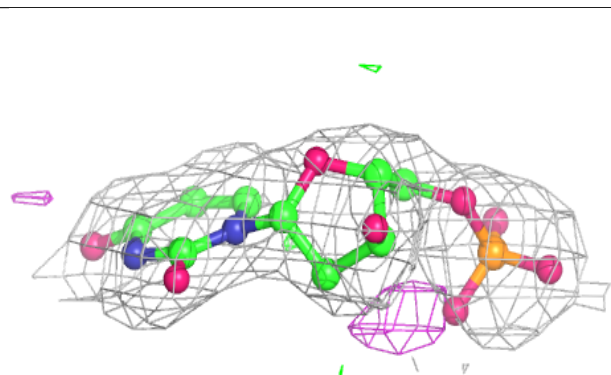
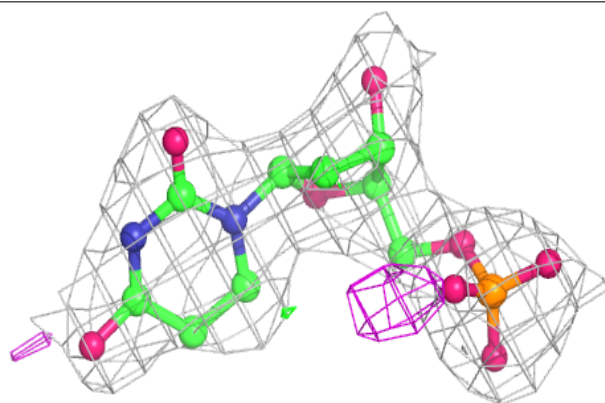


**Electron density around UMP B 302:**

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

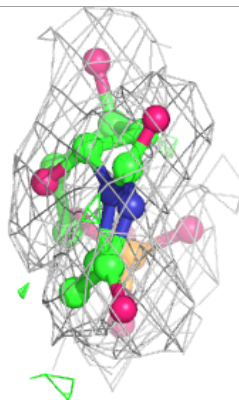
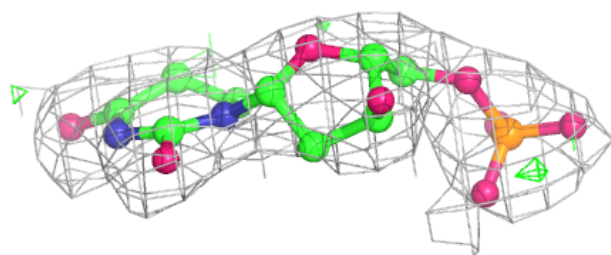
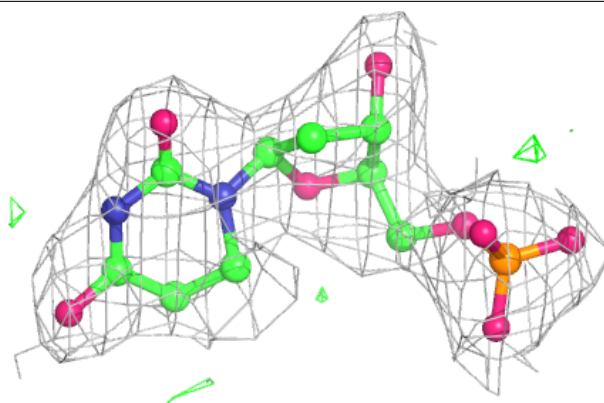
**Electron density around UMP E 308:**

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

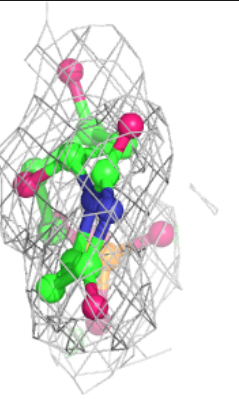
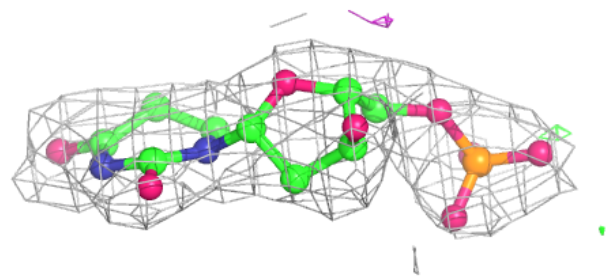
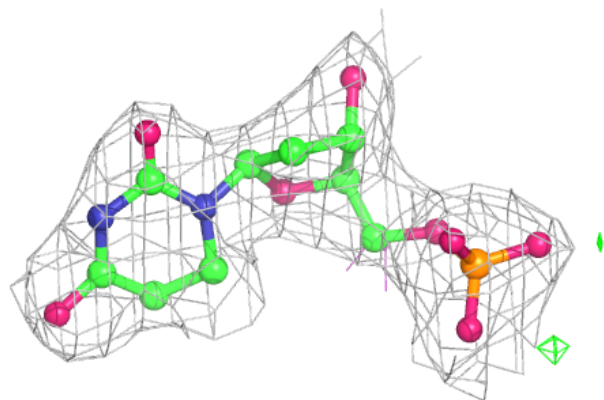


**Electron density around UMP F 310:**

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

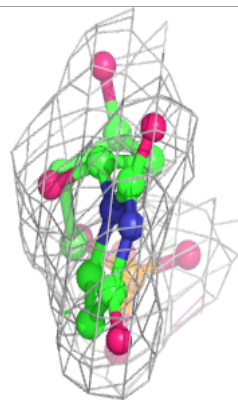
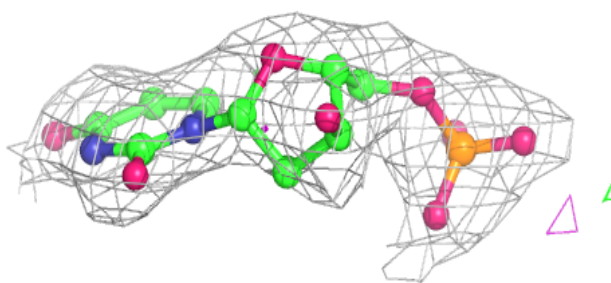
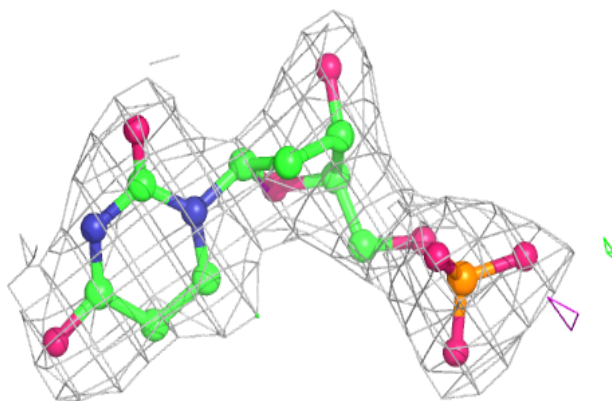
**Electron density around UMP C 304:**

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

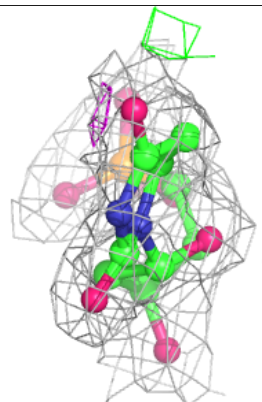
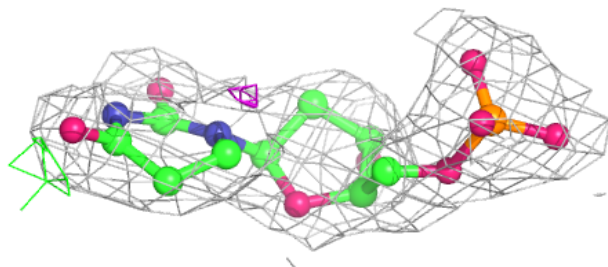
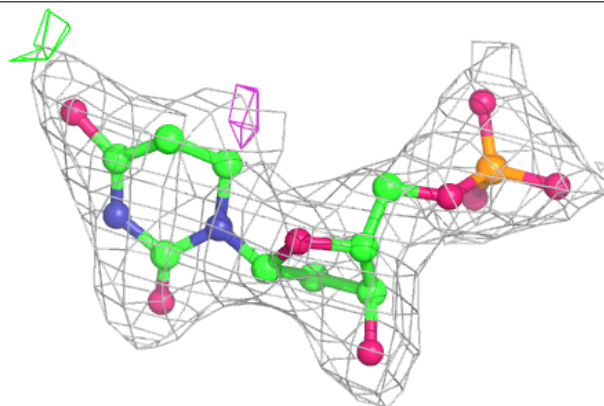


**Electron density around UMP D 306:**

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

**Electron density around UMP A 300:**

$2mF_o-DF_c$  (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.