



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 12, 2024 – 09:49 am BST

PDB ID : 8RLK  
Title : Structure of the apo form of PIB-1 in an Orthorombic space group  
Authors : Medrano, F.J.; Romero, A.  
Deposited on : 2024-01-03  
Resolution : 2.00 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.37.1  
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) : 2.37.1

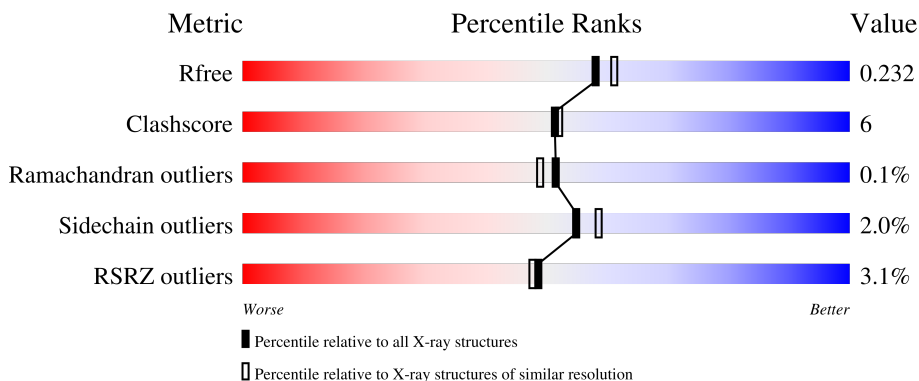
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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.



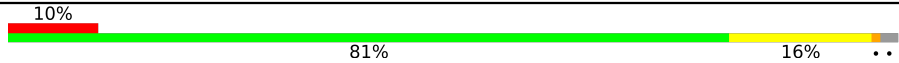
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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	391	 2% 86% 12% ..
1	B	391	 % 86% 12% .
1	C	391	 % 86% 12% ..
1	D	391	 2% 86% 13% .
1	E	391	 2% 84% 14% ..

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Mol	Chain	Length	Quality of chain
1	F	391	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into three segments: a red segment on the left labeled '10%', a large green segment in the middle labeled '81%', and a yellow segment on the right labeled '16%'. At the far right end of the bar, there are two small black dots.</p>

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 19068 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.

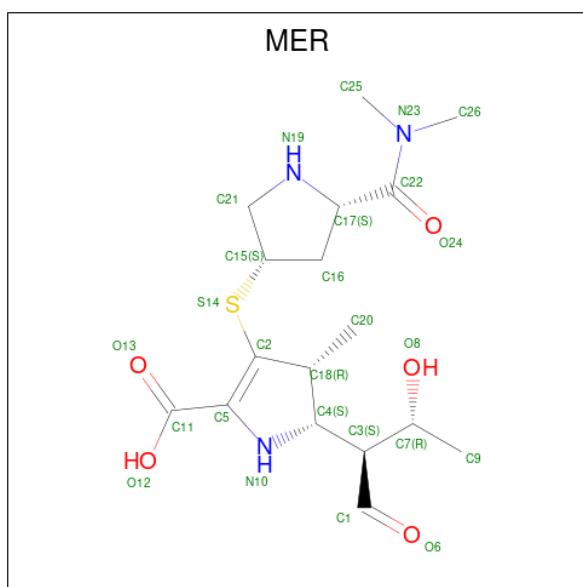
- Molecule 1 is a protein called Class C beta-lactamase-related serine hydrolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	385	3041	1927	536	571	7	0	0	0
1	B	385	3041	1927	536	571	7	0	0	0
1	C	385	3041	1927	536	571	7	0	0	0
1	D	385	3041	1927	536	571	7	0	0	0
1	E	385	3041	1927	536	571	7	0	0	0
1	F	385	3041	1927	536	571	7	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	25	PRO	ALA	cloning artifact	UNP A0A1J0J3U4
B	25	PRO	ALA	cloning artifact	UNP A0A1J0J3U4
C	25	PRO	ALA	cloning artifact	UNP A0A1J0J3U4
D	25	PRO	ALA	cloning artifact	UNP A0A1J0J3U4
E	25	PRO	ALA	cloning artifact	UNP A0A1J0J3U4
F	25	PRO	ALA	cloning artifact	UNP A0A1J0J3U4

- Molecule 2 is (4R,5S)-3-[[[(3S,5S)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]sulfanyl]-5-[(2S,3R)-3-hydroxy-1-oxobutan-2-yl]-4-methyl-4,5-dihydro-1H-pyrrole-2-carboxylic acid (three-letter code: MER) (formula: C<sub>17</sub>H<sub>27</sub>N<sub>3</sub>O<sub>5</sub>S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			26	17	3	5	1		
2	B	1	Total	C	N	O	S	0	0
			26	17	3	5	1		
2	C	1	Total	C	N	O	S	0	0
			26	17	3	5	1		
2	D	1	Total	C	N	O	S	0	0
			26	17	3	5	1		

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Zn	0	0
			2	2		
4	B	2	Total	Zn	0	0
			2	2		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	1	Total 1	Zn 1	0	0
4	E	1	Total 1	Zn 1	0	0
4	F	1	Total 1	Zn 1	0	0

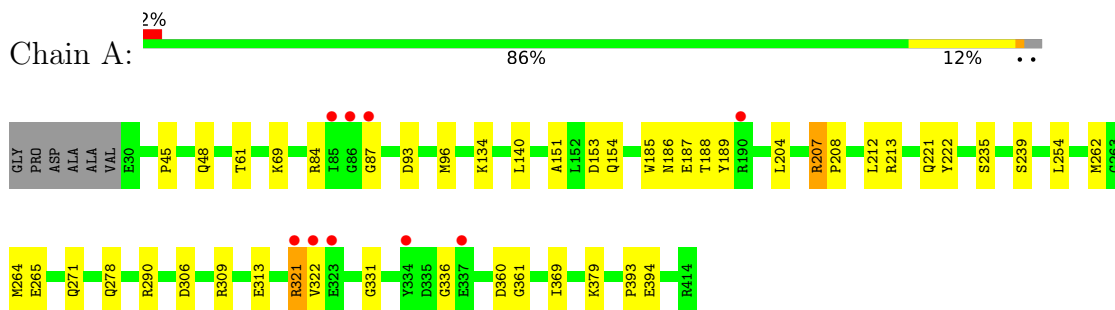
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	145	Total 145	O 145	0	0
5	B	138	Total 138	O 138	0	0
5	C	132	Total 132	O 132	0	0
5	D	132	Total 132	O 132	0	0
5	E	110	Total 110	O 110	0	0
5	F	51	Total 51	O 51	0	0

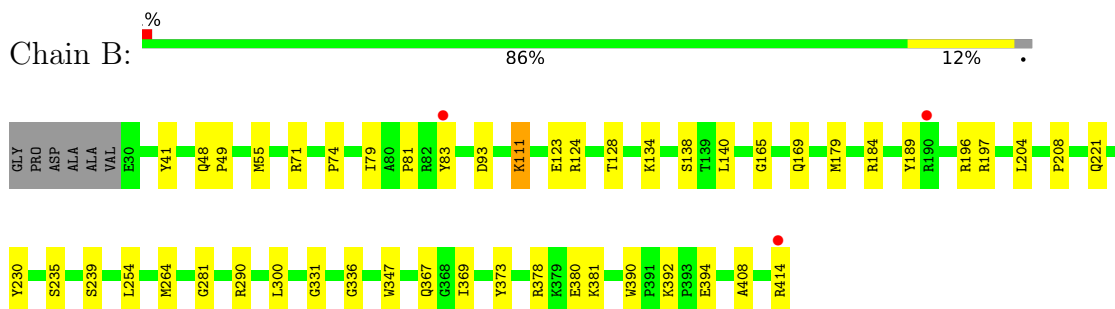
### 3 Residue-property plots [i](#)

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.

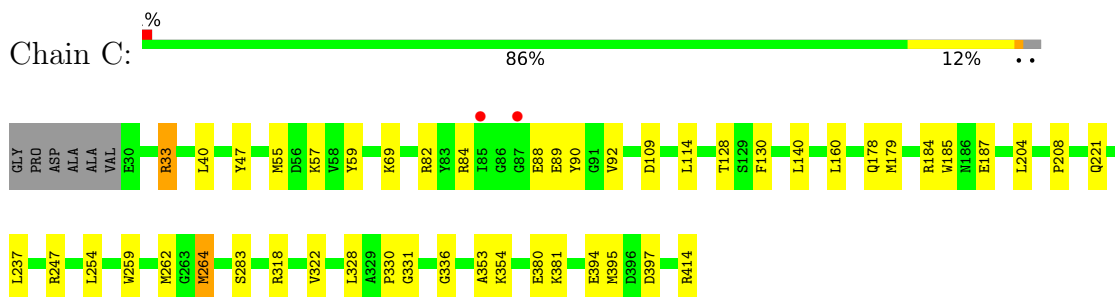
- Molecule 1: Class C beta-lactamase-related serine hydrolase



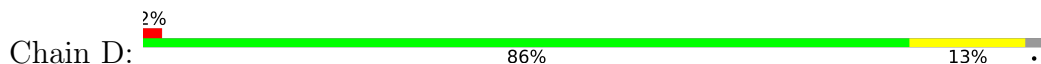
- Molecule 1: Class C beta-lactamase-related serine hydrolase

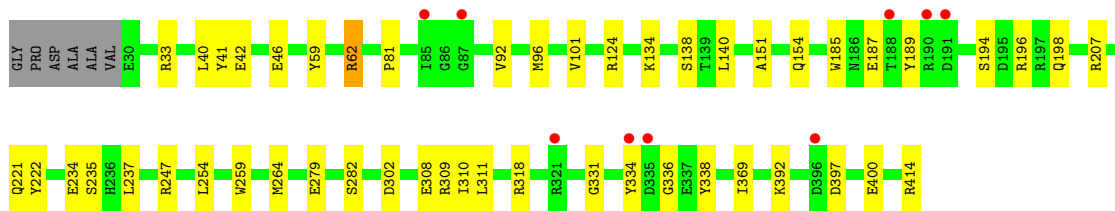


- Molecule 1: Class C beta-lactamase-related serine hydrolase

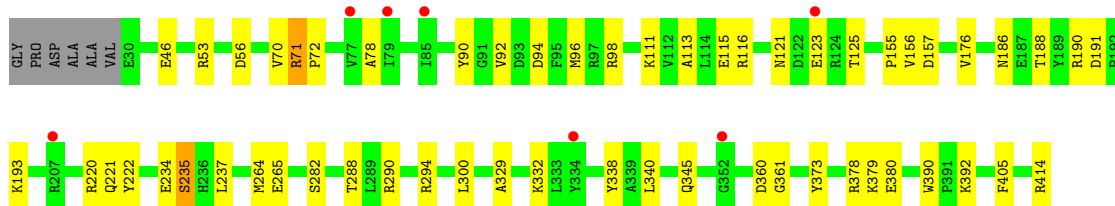
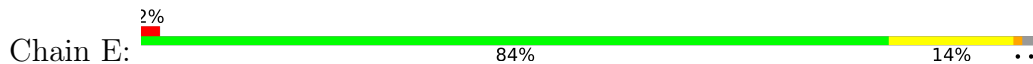


- Molecule 1: Class C beta-lactamase-related serine hydrolase

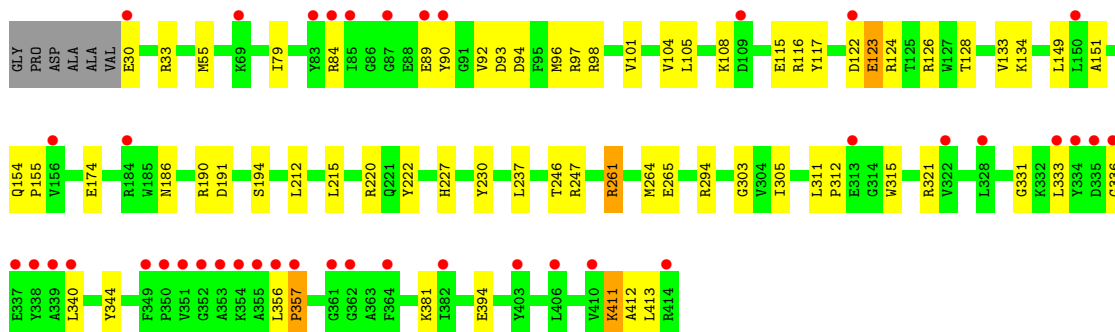
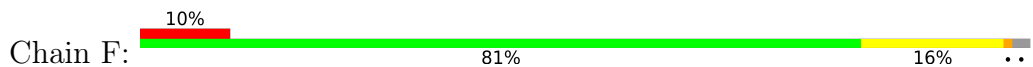




• Molecule 1: Class C beta-lactamase-related serine hydrolase



• Molecule 1: Class C beta-lactamase-related serine hydrolase





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	78.89Å 101.45Å 267.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.44 – 2.00 47.44 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.6 (47.44-2.00) 96.0 (47.44-2.00)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.27 (at 2.00Å)	Xtrriage
Refinement program	PHENIX dev_4746, PHENIX dev_4746	Depositor
R, $R_{free}$	0.191 , 0.235 0.190 , 0.232	Depositor DCC
$R_{free}$ test set	2000 reflections (1.37%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	33.6	Xtrriage
Anisotropy	0.204	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 52.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.44$ , $\langle L^2 \rangle = 0.26$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	19068	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.49% of the height of the origin peak. No significant pseudotranslation is detected.*

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

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, MER, MG

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	0.44	0/3117	0.67	0/4225
1	B	0.46	0/3117	0.67	0/4225
1	C	0.43	0/3117	0.67	0/4225
1	D	0.45	0/3117	0.67	0/4225
1	E	0.41	0/3117	0.64	0/4225
1	F	0.37	0/3117	0.61	0/4225
All	All	0.43	0/18702	0.66	0/25350

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	D	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	62	ARG	Sidechain

### 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	3041	0	2963	31	0
1	B	3041	0	2963	34	0
1	C	3041	0	2963	28	0
1	D	3041	0	2963	30	0
1	E	3041	0	2964	41	0
1	F	3041	0	2964	48	0
2	A	26	0	25	2	0
2	B	26	0	25	4	0
2	C	26	0	25	3	0
2	D	26	0	25	6	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
4	A	2	0	0	0	0
4	B	2	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
5	A	145	0	0	2	0
5	B	138	0	0	3	1
5	C	132	0	0	4	1
5	D	132	0	0	2	0
5	E	110	0	0	3	0
5	F	51	0	0	2	0
All	All	19068	0	17880	204	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (204) 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:33:ARG:NH2	5:C:601:HOH:O	1.98	0.95
1:E:72:PRO:HA	1:F:124:ARG:HD2	1.51	0.91
1:C:82:ARG:HH21	1:C:89:GLU:HB3	1.41	0.86
1:A:321:ARG:HE	1:A:322:VAL:H	1.24	0.84
1:E:360:ASP:OD1	1:E:361:GLY:N	2.16	0.79
1:C:185:TRP:NE1	1:C:187:GLU:OE1	2.15	0.79
1:C:57:LYS:NZ	5:C:603:HOH:O	2.14	0.78
1:C:318:ARG:NH2	5:C:604:HOH:O	2.16	0.78

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:69:LYS:NZ	5:C:602:HOH:O	2.01	0.77
1:A:84:ARG:NH2	1:A:87:GLY:O	2.18	0.76
1:F:215:LEU:HD13	1:F:237:LEU:HD13	1.70	0.73
1:A:69:LYS:NZ	1:A:306:ASP:OD2	2.21	0.73
1:A:321:ARG:HE	1:A:322:VAL:N	1.87	0.73
1:A:393:PRO:HB2	1:A:394:GLU:OE2	1.88	0.73
1:A:151:ALA:HB3	1:A:154:GLN:HG2	1.72	0.72
2:A:501:MER:H16	2:A:501:MER:C11	2.20	0.72
1:B:394:GLU:OE1	5:B:601:HOH:O	2.07	0.71
1:D:134:LYS:HE2	1:D:282:SER:HB2	1.73	0.69
1:E:265:GLU:HG3	1:E:294:ARG:NH1	2.08	0.68
1:D:247:ARG:HH11	1:D:247:ARG:HG3	1.57	0.68
5:B:678:HOH:O	1:C:247:ARG:HD2	1.96	0.66
1:B:165:GLY:N	1:B:169:GLN:OE1	2.25	0.66
1:E:111:LYS:NZ	1:F:126:ARG:HH22	1.94	0.64
1:A:134:LYS:HG2	1:A:235:SER:OG	1.98	0.64
1:D:369:ILE:HG21	2:D:501:MER:H20B	1.80	0.63
2:C:501:MER:C11	2:C:501:MER:H16A	2.29	0.63
1:F:94:ASP:O	1:F:98:ARG:HG3	1.99	0.63
1:B:124:ARG:HB3	1:F:411:LYS:HE2	1.81	0.62
1:B:290:ARG:HH12	1:F:84:ARG:NH1	1.98	0.62
1:E:46:GLU:OE2	1:E:46:GLU:N	2.20	0.62
1:F:394:GLU:OE2	5:F:601:HOH:O	2.16	0.62
1:E:90:TYR:HD1	1:E:94:ASP:HB3	1.65	0.62
1:B:381:LYS:NZ	5:B:604:HOH:O	2.24	0.61
1:A:360:ASP:OD1	1:A:361:GLY:N	2.32	0.61
1:B:204:LEU:HB3	1:C:208:PRO:HG2	1.82	0.61
1:B:71:ARG:HH11	1:B:71:ARG:HG2	1.65	0.61
1:B:124:ARG:HB3	1:F:411:LYS:HG3	1.83	0.61
1:F:312:PRO:HG2	1:F:315:TRP:HB2	1.83	0.60
1:E:380:GLU:OE2	1:E:414:ARG:NH1	2.35	0.60
1:A:208:PRO:HG2	1:C:204:LEU:HB3	1.84	0.60
1:A:185:TRP:NE1	1:A:187:GLU:OE1	2.25	0.60
1:B:41:TYR:OH	1:B:196:ARG:NH2	2.35	0.60
1:B:331:GLY:O	1:B:336:GLY:HA2	2.03	0.59
1:D:41:TYR:OH	1:D:196:ARG:NH2	2.36	0.59
1:E:235:SER:OG	1:E:345:GLN:OE1	2.20	0.59
1:D:140:LEU:HD11	1:D:254:LEU:HB2	1.85	0.58
1:C:109:ASP:OD2	1:C:381:LYS:HD3	2.03	0.58
1:D:33:ARG:HD2	1:D:46:GLU:HG2	1.86	0.58
1:B:123:GLU:HG2	1:F:84:ARG:NH1	2.19	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:300:LEU:HD12	1:B:378:ARG:HG2	1.85	0.57
1:F:122:ASP:HB2	1:F:124:ARG:H	1.69	0.57
1:A:379:LYS:NZ	5:A:602:HOH:O	2.34	0.57
1:E:115:GLU:O	1:E:116:ARG:HD3	2.05	0.57
1:D:33:ARG:NH2	5:D:603:HOH:O	2.37	0.56
1:D:259:TRP:CE2	1:D:264:MET:HG3	2.40	0.56
1:D:331:GLY:O	1:D:336:GLY:HA2	2.04	0.56
1:C:380:GLU:OE2	1:C:414:ARG:NH1	2.37	0.56
1:F:191:ASP:HB3	1:F:194:SER:HB3	1.88	0.56
1:A:321:ARG:NE	1:A:322:VAL:H	1.99	0.56
1:D:234:GLU:O	1:D:237:LEU:HB2	2.05	0.56
1:E:300:LEU:HD12	1:E:378:ARG:HG2	1.87	0.56
1:D:185:TRP:NE1	1:D:187:GLU:OE1	2.35	0.56
1:E:221:GLN:HG2	1:E:222:TYR:CD2	2.42	0.55
1:B:290:ARG:NH2	1:F:89:GLU:OE2	2.40	0.55
1:F:154:GLN:HG3	1:F:155:PRO:HD2	1.89	0.55
1:B:79:ILE:HG13	1:B:81:PRO:HD3	1.88	0.54
1:A:331:GLY:O	1:A:336:GLY:HA2	2.07	0.54
1:B:83:TYR:HB3	1:B:408:ALA:HB2	1.89	0.54
1:D:235:SER:HB3	1:D:282:SER:HB3	1.90	0.53
1:B:179:MET:HE2	1:B:235:SER:HB2	1.89	0.53
1:F:105:LEU:HD12	1:F:115:GLU:HB2	1.90	0.53
1:B:55:MET:HG3	1:B:128:THR:HB	1.91	0.53
2:C:501:MER:H16A	2:C:501:MER:O12	2.09	0.52
1:C:394:GLU:OE1	2:C:501:MER:H17	2.10	0.52
1:C:395:MET:HB3	1:C:397:ASP:OD1	2.09	0.52
1:E:56:ASP:N	1:E:56:ASP:OD1	2.43	0.52
1:F:92:VAL:O	1:F:96:MET:HG3	2.10	0.52
1:A:239:SER:OG	1:A:278:GLN:NE2	2.42	0.51
1:F:261:ARG:HG2	1:F:305:ILE:HD12	1.91	0.51
2:B:501:MER:H25A	2:B:501:MER:O12	2.11	0.51
1:B:74:PRO:HG2	1:B:111:LYS:HG3	1.93	0.51
1:F:93:ASP:O	1:F:97:ARG:HG2	2.10	0.51
1:F:303:GLY:HA3	1:F:311:LEU:HG	1.93	0.51
1:E:70:VAL:HG12	1:F:124:ARG:HD3	1.93	0.51
1:E:190:ARG:NH2	5:E:604:HOH:O	2.43	0.51
1:F:108:LYS:HD3	1:F:413:LEU:HB3	1.93	0.51
1:F:190:ARG:NH1	5:F:605:HOH:O	2.43	0.51
1:E:71:ARG:HG3	1:E:72:PRO:N	2.21	0.50
1:E:123:GLU:HB2	1:E:290:ARG:NH1	2.26	0.50
1:C:331:GLY:O	1:C:336:GLY:HA2	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:92:VAL:HG12	1:E:405:PHE:HE1	1.76	0.50
1:E:265:GLU:OE1	1:E:290:ARG:NH2	2.45	0.50
1:B:380:GLU:OE2	1:B:414:ARG:NH1	2.44	0.50
1:D:309:ARG:HG2	1:D:311:LEU:O	2.11	0.50
1:D:40:LEU:HB2	1:D:59:TYR:OH	2.11	0.50
1:E:265:GLU:CD	1:E:290:ARG:HH21	2.15	0.50
1:D:338:TYR:CD2	2:D:501:MER:H26	2.46	0.50
1:E:329:ALA:HB3	1:E:332:LYS:HG3	1.94	0.49
1:C:84:ARG:HA	1:C:88:GLU:O	2.13	0.49
1:A:204:LEU:HB3	1:B:208:PRO:HG2	1.94	0.49
1:A:369:ILE:HG21	2:A:501:MER:H20B	1.94	0.49
2:D:501:MER:O13	2:D:501:MER:H15	2.12	0.49
1:F:79:ILE:HG12	1:F:412:ALA:HB1	1.94	0.49
1:B:134:LYS:HE2	1:B:230:TYR:CZ	2.48	0.49
1:E:123:GLU:HB2	1:E:290:ARG:HH12	1.78	0.49
1:D:42:GLU:OE2	1:D:189:TYR:HE2	1.96	0.48
1:A:321:ARG:HE	1:A:321:ARG:HA	1.77	0.48
1:E:186:ASN:OD1	1:E:188:THR:HG22	2.13	0.48
1:A:265:GLU:OE2	1:A:290:ARG:NH2	2.38	0.48
1:A:221:GLN:HG2	1:A:222:TYR:CD1	2.47	0.48
1:E:111:LYS:HZ1	1:F:126:ARG:HH22	1.62	0.48
1:E:90:TYR:CE1	1:E:98:ARG:HD2	2.49	0.48
1:B:140:LEU:HD11	1:B:254:LEU:HB2	1.95	0.47
1:D:338:TYR:CG	2:D:501:MER:H26	2.49	0.47
1:C:40:LEU:HB2	1:C:59:TYR:OH	2.15	0.47
1:F:222:TYR:HD2	1:F:227:HIS:CB	2.27	0.47
1:B:184:ARG:HB2	1:B:221:GLN:HB2	1.97	0.47
1:D:308:GLU:HG3	1:D:310:ILE:HD11	1.97	0.47
1:D:334:TYR:CE2	2:D:501:MER:H26B	2.50	0.47
1:D:96:MET:HA	1:D:101:VAL:HB	1.97	0.47
1:B:134:LYS:HG2	1:B:235:SER:OG	2.15	0.47
1:F:261:ARG:HE	1:F:261:ARG:HB2	1.62	0.47
1:F:331:GLY:O	1:F:336:GLY:HA2	2.14	0.47
1:A:221:GLN:HG2	1:A:222:TYR:CE1	2.50	0.46
1:D:194:SER:O	1:D:198:GLN:HG3	2.15	0.46
1:E:155:PRO:HB2	1:E:157:ASP:OD1	2.15	0.46
1:C:140:LEU:HD11	1:C:254:LEU:HB2	1.98	0.46
1:D:338:TYR:CZ	2:D:501:MER:H25	2.50	0.46
1:D:397:ASP:OD1	1:D:397:ASP:N	2.47	0.46
1:C:92:VAL:HG21	1:C:114:LEU:HD21	1.97	0.46
1:F:212:LEU:HD23	1:F:212:LEU:HA	1.84	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:189:TYR:CE1	1:B:197:ARG:HD3	2.50	0.45
1:A:207:ARG:HD3	1:A:213:ARG:NH2	2.30	0.45
1:D:414:ARG:HH11	1:D:414:ARG:HG2	1.81	0.45
1:B:290:ARG:NH1	1:F:84:ARG:NH1	2.65	0.45
1:B:369:ILE:HG21	2:B:501:MER:H20B	1.97	0.45
1:E:373:TYR:HH	1:E:390:TRP:HH2	1.64	0.45
1:F:134:LYS:NZ	1:F:230:TYR:CZ	2.81	0.45
1:A:321:ARG:HE	1:A:321:ARG:CA	2.30	0.45
1:F:222:TYR:HE2	1:F:227:HIS:ND1	2.15	0.45
1:F:96:MET:HA	1:F:101:VAL:HB	1.99	0.45
1:D:151:ALA:HB3	1:D:154:GLN:HG2	1.99	0.44
1:F:222:TYR:HD2	1:F:227:HIS:HB2	1.81	0.44
1:E:53:ARG:NH1	1:E:121:ASN:OD1	2.47	0.44
1:F:117:TYR:CZ	1:F:123:GLU:HA	2.52	0.44
1:F:247:ARG:HG3	1:F:247:ARG:NH1	2.32	0.44
1:C:259:TRP:CE2	1:C:264:MET:HG2	2.53	0.44
1:B:373:TYR:HH	1:B:390:TRP:HH2	1.65	0.43
1:C:322:VAL:HG13	1:C:330:PRO:HD2	1.99	0.43
1:D:221:GLN:HG2	1:D:222:TYR:CD2	2.54	0.43
1:E:378:ARG:NH2	5:E:602:HOH:O	2.40	0.43
1:E:188:THR:HG23	1:E:191:ASP:HB3	1.99	0.43
2:B:501:MER:H25A	2:B:501:MER:C11	2.48	0.43
1:A:309:ARG:NH2	1:A:313:GLU:HA	2.33	0.43
1:B:239:SER:HB2	1:B:281:GLY:CA	2.48	0.43
1:A:45:PRO:HA	1:A:48:GLN:OE1	2.18	0.43
1:B:124:ARG:CB	1:F:411:LYS:HE2	2.46	0.43
1:B:48:GLN:HB2	1:B:49:PRO:HD3	2.01	0.43
1:C:33:ARG:HD3	1:C:47:TYR:CE1	2.53	0.43
1:F:356:LEU:HB3	1:F:357:PRO:HD2	2.00	0.43
1:F:55:MET:HG3	1:F:128:THR:HB	2.01	0.43
1:B:184:ARG:HD3	1:B:221:GLN:OE1	2.19	0.42
1:A:61:THR:HG22	1:A:271:GLN:HA	2.00	0.42
1:D:318:ARG:NH2	5:D:613:HOH:O	2.51	0.42
1:F:222:TYR:CE2	1:F:227:HIS:ND1	2.87	0.42
1:A:212:LEU:HD23	1:A:212:LEU:HA	1.84	0.42
1:E:235:SER:HB3	1:E:282:SER:HB3	2.01	0.42
1:E:392:LYS:HA	1:E:392:LYS:HE2	2.02	0.42
2:B:501:MER:C11	2:B:501:MER:H16	2.50	0.42
1:C:55:MET:HG3	1:C:128:THR:HB	2.02	0.42
1:A:140:LEU:HD11	1:A:254:LEU:HB2	2.02	0.42
1:B:140:LEU:HD21	1:B:254:LEU:HA	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:186:ASN:OD1	1:A:188:THR:HG23	2.20	0.42
1:E:90:TYR:CD1	1:E:94:ASP:HB3	2.50	0.42
1:E:300:LEU:HD11	1:E:378:ARG:HA	2.02	0.42
1:F:104:VAL:CG1	1:F:116:ARG:HB2	2.50	0.42
1:F:220:ARG:NH1	1:F:222:TYR:O	2.52	0.42
1:A:262:MET:HE2	1:A:262:MET:HB2	1.84	0.42
1:E:156:VAL:HG11	1:E:176:VAL:HG21	2.02	0.42
1:E:234:GLU:O	1:E:237:LEU:HB2	2.20	0.42
1:B:347:TRP:CD1	1:B:367:GLN:HG2	2.55	0.41
1:C:88:GLU:HG2	1:C:90:TYR:CE1	2.56	0.41
1:D:247:ARG:HG3	1:D:247:ARG:NH1	2.29	0.41
1:C:184:ARG:HB2	1:C:221:GLN:HB2	2.01	0.41
1:F:174:GLU:OE2	1:F:344:TYR:OH	2.37	0.41
1:F:265:GLU:HG3	1:F:294:ARG:NH1	2.35	0.41
1:E:78:ALA:HA	1:E:113:ALA:O	2.21	0.41
1:E:111:LYS:HZ3	1:F:126:ARG:HH22	1.63	0.41
1:C:160:LEU:HD23	1:C:160:LEU:HA	1.94	0.41
1:A:93:ASP:HA	1:A:96:MET:HE2	2.02	0.41
1:C:178:GLN:HB3	1:C:328:LEU:HD11	2.02	0.41
1:C:237:LEU:HD12	1:C:237:LEU:HA	1.86	0.41
1:D:92:VAL:O	1:D:96:MET:HG3	2.21	0.41
1:E:379:LYS:HG2	5:E:606:HOH:O	2.21	0.41
1:F:90:TYR:HB3	1:F:94:ASP:HB2	2.03	0.41
1:A:189:TYR:N	5:A:612:HOH:O	2.54	0.41
1:E:125:THR:O	1:E:288:THR:HA	2.21	0.41
1:E:338:TYR:CE2	1:E:340:LEU:HB2	2.57	0.40
1:F:149:LEU:HD12	1:F:246:THR:HG22	2.03	0.40
1:F:151:ALA:HB3	1:F:154:GLN:HB2	2.03	0.40
1:F:333:LEU:HD12	1:F:340:LEU:O	2.21	0.40
1:E:92:VAL:HG12	1:E:405:PHE:CE1	2.56	0.40
1:C:353:ALA:C	1:C:354:LYS:HD3	2.42	0.40
1:D:62:ARG:HH21	1:D:279:GLU:CD	2.25	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:730:HOH:O	5:C:722:HOH:O[1_455]	2.11	0.09



## 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	383/391 (98%)	376 (98%)	7 (2%)	0	100	100
1	B	383/391 (98%)	375 (98%)	8 (2%)	0	100	100
1	C	383/391 (98%)	371 (97%)	11 (3%)	1 (0%)	41	37
1	D	383/391 (98%)	374 (98%)	9 (2%)	0	100	100
1	E	383/391 (98%)	375 (98%)	8 (2%)	0	100	100
1	F	383/391 (98%)	364 (95%)	18 (5%)	1 (0%)	41	37
All	All	2298/2346 (98%)	2235 (97%)	61 (3%)	2 (0%)	51	49

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	130	PHE
1	F	357	PRO

### 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	312/315 (99%)	308 (99%)	4 (1%)	69	74
1	B	312/315 (99%)	307 (98%)	5 (2%)	62	67
1	C	312/315 (99%)	307 (98%)	5 (2%)	62	67
1	D	312/315 (99%)	305 (98%)	7 (2%)	52	55
1	E	312/315 (99%)	306 (98%)	6 (2%)	57	61

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	F	312/315 (99%)	302 (97%)	10 (3%)	39	38
All	All	1872/1890 (99%)	1835 (98%)	37 (2%)	55	58

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	153	ASP
1	A	207	ARG
1	A	264	MET
1	A	321	ARG
1	B	93	ASP
1	B	111	LYS
1	B	138	SER
1	B	264	MET
1	B	392	LYS
1	C	33	ARG
1	C	179	MET
1	C	262	MET
1	C	264	MET
1	C	283	SER
1	D	81	PRO
1	D	124	ARG
1	D	138	SER
1	D	207	ARG
1	D	302	ASP
1	D	392	LYS
1	D	400	GLU
1	E	71	ARG
1	E	96	MET
1	E	193	LYS
1	E	220	ARG
1	E	235	SER
1	E	264	MET
1	F	30	GLU
1	F	33	ARG
1	F	123	GLU
1	F	133	VAL
1	F	186	ASN
1	F	261	ARG
1	F	264	MET
1	F	321	ARG
1	F	381	LYS

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Mol	Chain	Res	Type
1	F	411	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	221	GLN
1	E	221	GLN
1	F	186	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 14 ligands modelled in this entry, 10 are monoatomic - leaving 4 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	MER	B	501	1	24,27,27	1.17	2 (8%)	17,39,39	3.32	7 (41%)
2	MER	A	501	1	24,27,27	0.98	1 (4%)	17,39,39	1.28	1 (5%)
2	MER	D	501	1	24,27,27	1.06	1 (4%)	17,39,39	1.67	3 (17%)
2	MER	C	501	1	24,27,27	0.99	1 (4%)	17,39,39	2.15	4 (23%)

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	MER	B	501	1	-	11/23/51/51	0/2/2/2
2	MER	A	501	1	-	8/23/51/51	0/2/2/2
2	MER	D	501	1	-	8/23/51/51	0/2/2/2
2	MER	C	501	1	-	11/23/51/51	0/2/2/2

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501	MER	C5-C11	4.16	1.54	1.48
2	B	501	MER	C5-C11	3.39	1.53	1.48
2	C	501	MER	C5-C11	3.28	1.53	1.48
2	A	501	MER	C5-C11	2.88	1.52	1.48
2	B	501	MER	C22-N23	2.67	1.38	1.34

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	MER	C17-C22-N23	8.57	128.79	118.57
2	B	501	MER	C11-C5-N10	-7.02	111.54	120.38
2	C	501	MER	C11-C5-N10	-5.32	113.67	120.38
2	C	501	MER	C22-C17-N19	5.17	121.10	111.74
2	D	501	MER	C11-C5-N10	-5.14	113.91	120.38
2	B	501	MER	C16-C17-C22	3.65	119.11	111.53
2	B	501	MER	O24-C22-N23	-3.57	117.30	121.92
2	B	501	MER	C25-N23-C22	3.46	134.14	121.89
2	A	501	MER	C11-C5-N10	-3.22	116.33	120.38
2	B	501	MER	O24-C22-C17	-3.18	113.91	119.66
2	C	501	MER	C16-C17-N19	-2.78	100.80	106.22
2	D	501	MER	C17-C22-N23	-2.29	115.84	118.57
2	B	501	MER	C26-N23-C25	-2.23	108.88	115.77
2	D	501	MER	C20-C18-C4	2.18	118.96	115.12
2	C	501	MER	C17-C22-N23	-2.03	116.15	118.57

There are no chirality outliers.

All (38) torsion outliers are listed below:

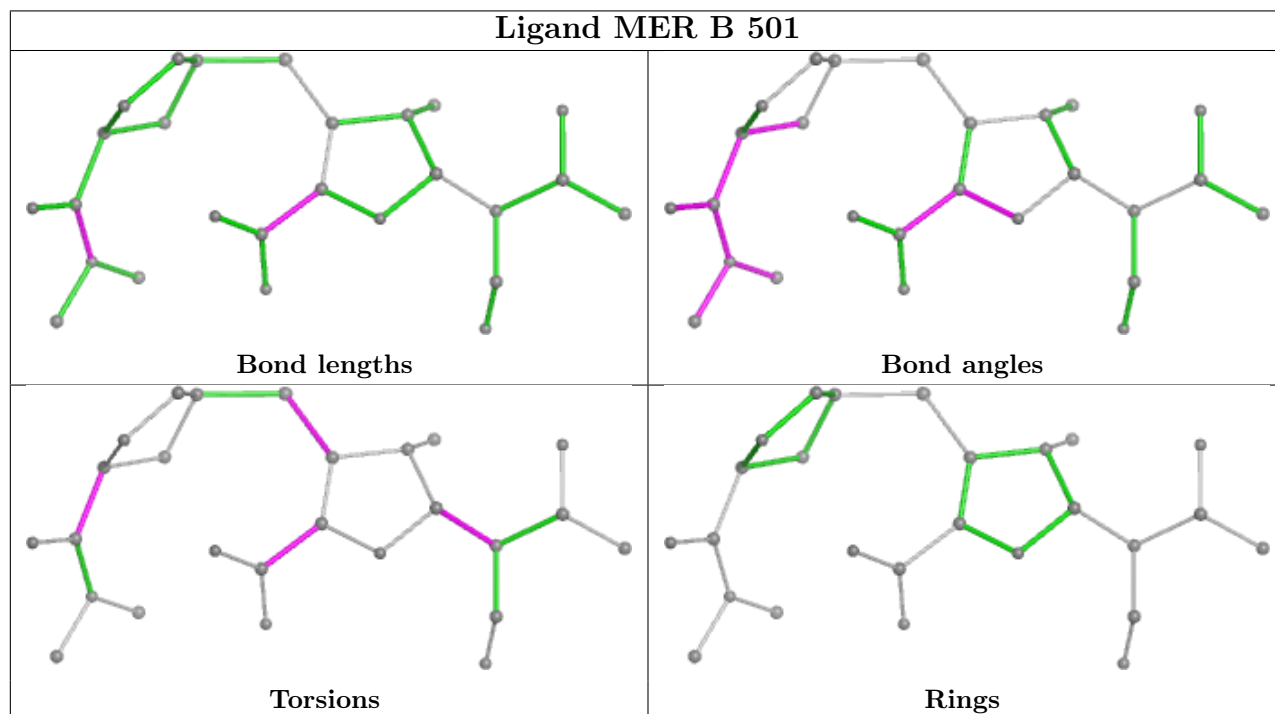
Mol	Chain	Res	Type	Atoms
2	A	501	MER	O12-C11-C5-C2
2	A	501	MER	O13-C11-C5-C2
2	A	501	MER	O12-C11-C5-N10
2	A	501	MER	O13-C11-C5-N10
2	A	501	MER	C16-C15-S14-C2
2	B	501	MER	C5-C2-S14-C15
2	B	501	MER	C18-C2-S14-C15
2	B	501	MER	O12-C11-C5-C2
2	B	501	MER	O13-C11-C5-C2
2	B	501	MER	O12-C11-C5-N10
2	B	501	MER	O13-C11-C5-N10
2	B	501	MER	C16-C17-C22-N23
2	B	501	MER	C16-C17-C22-O24
2	C	501	MER	C5-C2-S14-C15
2	C	501	MER	C18-C2-S14-C15
2	C	501	MER	C7-C3-C4-C18
2	C	501	MER	O12-C11-C5-C2
2	C	501	MER	O13-C11-C5-C2
2	C	501	MER	O12-C11-C5-N10
2	C	501	MER	O13-C11-C5-N10
2	D	501	MER	C5-C2-S14-C15
2	D	501	MER	C18-C2-S14-C15
2	D	501	MER	C7-C3-C4-C18
2	D	501	MER	C16-C15-S14-C2
2	C	501	MER	C16-C17-C22-O24
2	C	501	MER	C16-C17-C22-N23
2	D	501	MER	O12-C11-C5-C2
2	D	501	MER	O13-C11-C5-C2
2	A	501	MER	C18-C2-S14-C15
2	A	501	MER	C21-C15-S14-C2
2	C	501	MER	N19-C17-C22-O24
2	B	501	MER	N19-C17-C22-N23
2	C	501	MER	N19-C17-C22-N23
2	A	501	MER	C7-C3-C4-C18
2	B	501	MER	C7-C3-C4-C18
2	D	501	MER	C21-C15-S14-C2
2	B	501	MER	N19-C17-C22-O24
2	D	501	MER	N19-C17-C22-N23

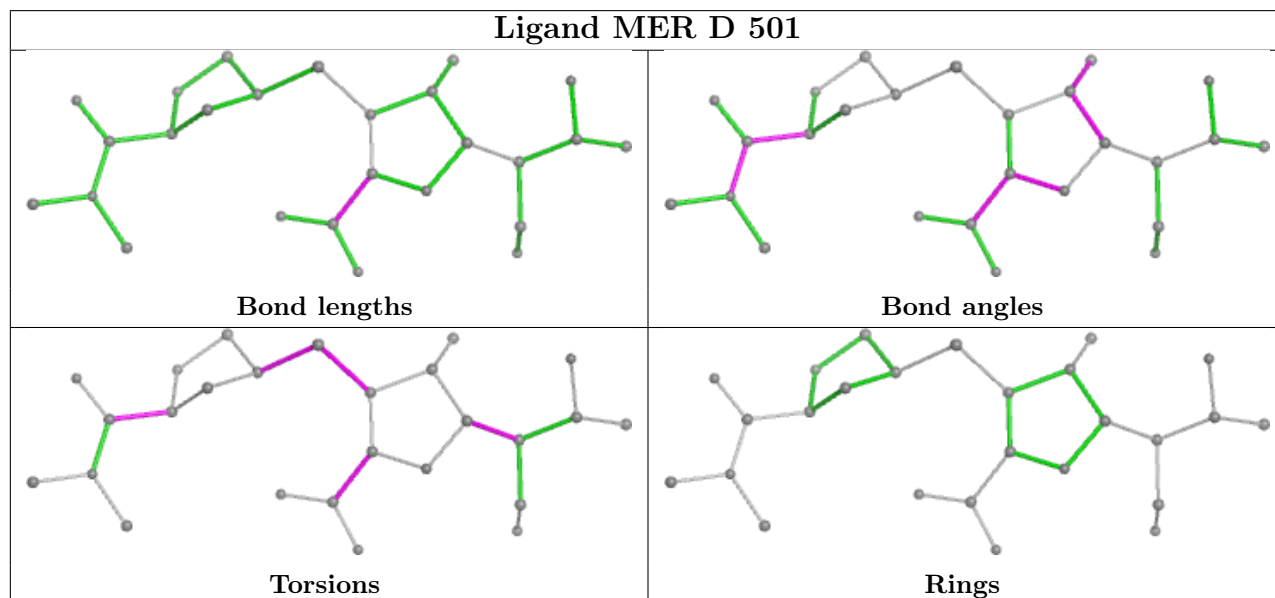
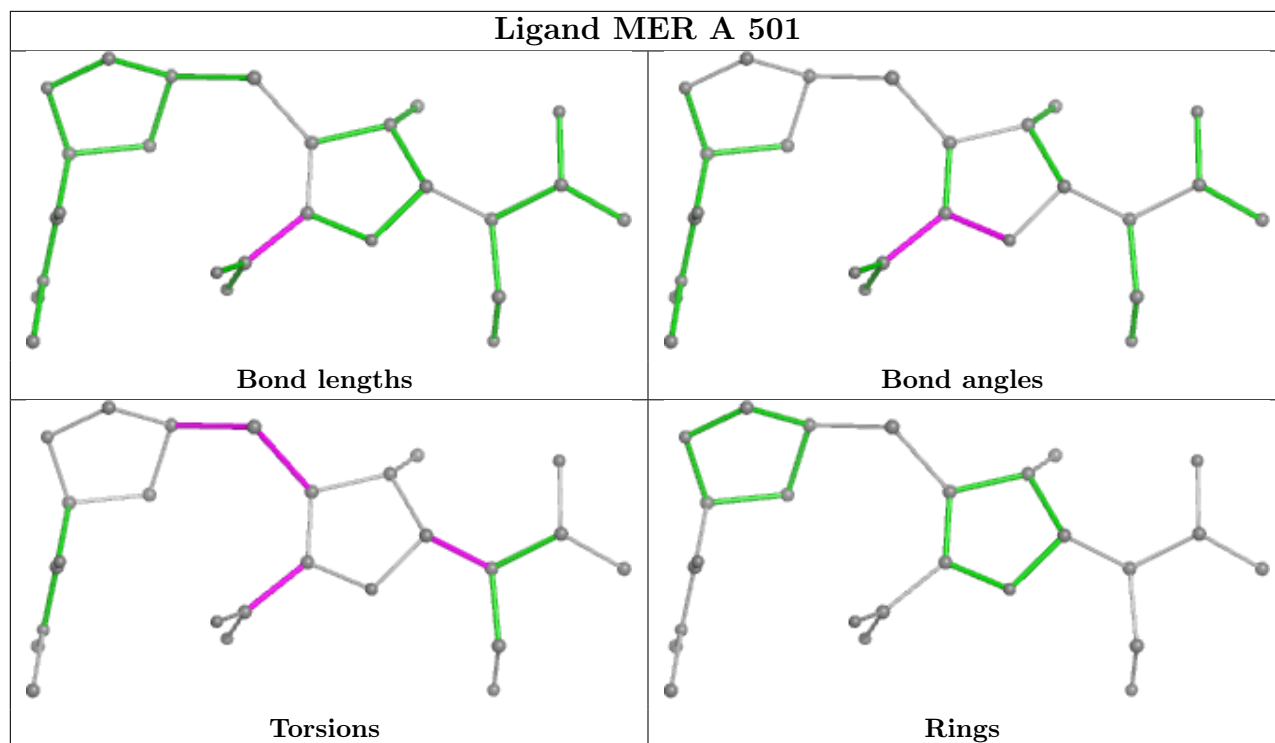
There are no ring outliers.

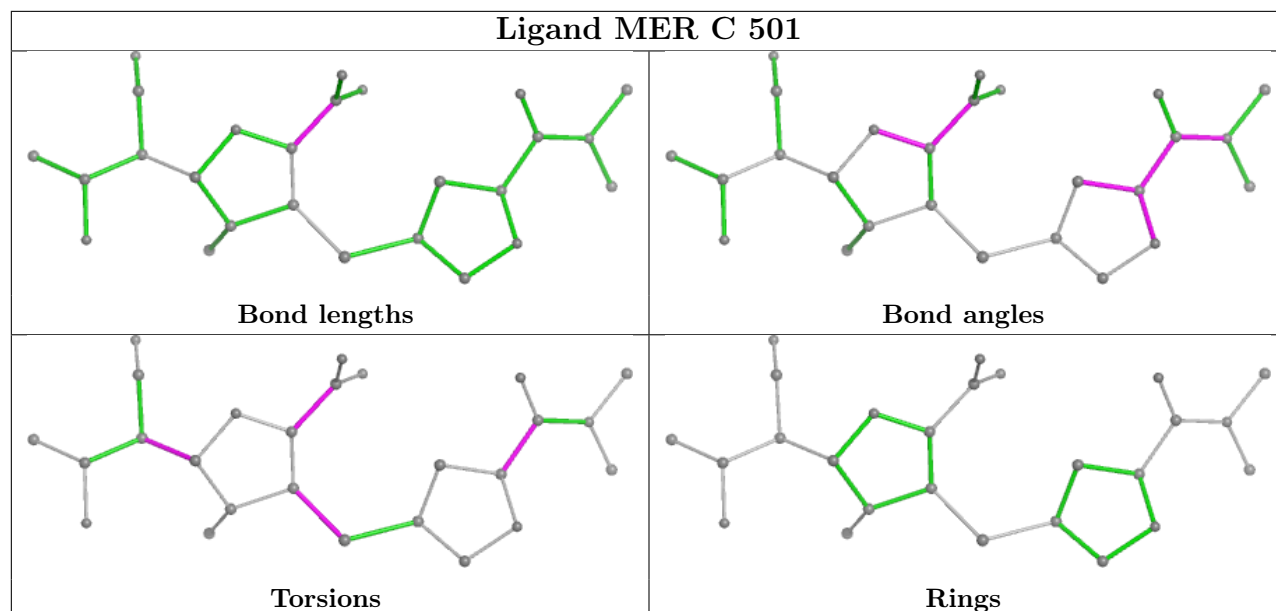
4 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	MER	4	0
2	A	501	MER	2	0
2	D	501	MER	6	0
2	C	501	MER	3	0

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







## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.



## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	385/391 (98%)	0.02	9 (2%) 60 59	23, 35, 53, 73	0
1	B	385/391 (98%)	-0.03	3 (0%) 86 85	23, 35, 54, 71	0
1	C	385/391 (98%)	-0.11	2 (0%) 91 90	24, 35, 56, 70	0
1	D	385/391 (98%)	-0.03	9 (2%) 60 59	24, 35, 55, 89	0
1	E	385/391 (98%)	0.03	7 (1%) 68 66	29, 41, 63, 86	0
1	F	385/391 (98%)	0.58	41 (10%) 6 5	31, 55, 80, 99	0
All	All	2310/2346 (98%)	0.07	71 (3%) 49 48	23, 38, 67, 99	0

All (71) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	351	VAL	6.0
1	D	190	ARG	5.8
1	F	90	TYR	5.2
1	F	352	GLY	5.2
1	F	361	GLY	5.2
1	F	333	LEU	4.5
1	F	349	PHE	4.1
1	F	328	LEU	3.9
1	F	353	ALA	3.7
1	F	357	PRO	3.7
1	F	338	TYR	3.7
1	D	335	ASP	3.6
1	F	83	TYR	3.5
1	F	334	TYR	3.5
1	F	362	GLY	3.5
1	F	340	LEU	3.5
1	F	382	ILE	3.4
1	E	85	ILE	3.4
1	F	337	GLU	3.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	85	ILE	3.3
1	E	77	VAL	3.2
1	F	335	ASP	3.2
1	D	334	TYR	3.2
1	F	89	GLU	3.1
1	D	188	THR	3.0
1	F	85	ILE	3.0
1	A	87	GLY	2.9
1	F	364	PHE	2.9
1	F	354	LYS	2.9
1	A	86	GLY	2.8
1	A	334	TYR	2.8
1	E	123	GLU	2.8
1	B	414	ARG	2.7
1	F	410	VAL	2.6
1	F	69	LYS	2.5
1	F	122	ASP	2.5
1	C	87	GLY	2.5
1	A	85	ILE	2.5
1	F	84	ARG	2.5
1	F	356	LEU	2.5
1	D	87	GLY	2.4
1	B	190	ARG	2.4
1	D	321	ARG	2.4
1	F	322	VAL	2.4
1	F	184	ARG	2.4
1	E	352	GLY	2.4
1	F	350	PRO	2.4
1	A	190	ARG	2.4
1	F	109	ASP	2.3
1	D	191	ASP	2.3
1	F	406	LEU	2.3
1	F	87	GLY	2.3
1	E	334	TYR	2.2
1	F	339	ALA	2.2
1	A	323	GLU	2.2
1	B	83	TYR	2.2
1	E	207	ARG	2.2
1	F	355	ALA	2.2
1	F	30	GLU	2.2
1	F	313	GLU	2.2
1	F	156	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
1	F	414	ARG	2.1
1	E	79	ILE	2.1
1	F	150	LEU	2.1
1	A	322	VAL	2.1
1	D	396	ASP	2.1
1	A	321	ARG	2.1
1	A	337	GLU	2.1
1	F	336	GLY	2.1
1	F	403	TYR	2.0
1	D	85	ILE	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

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

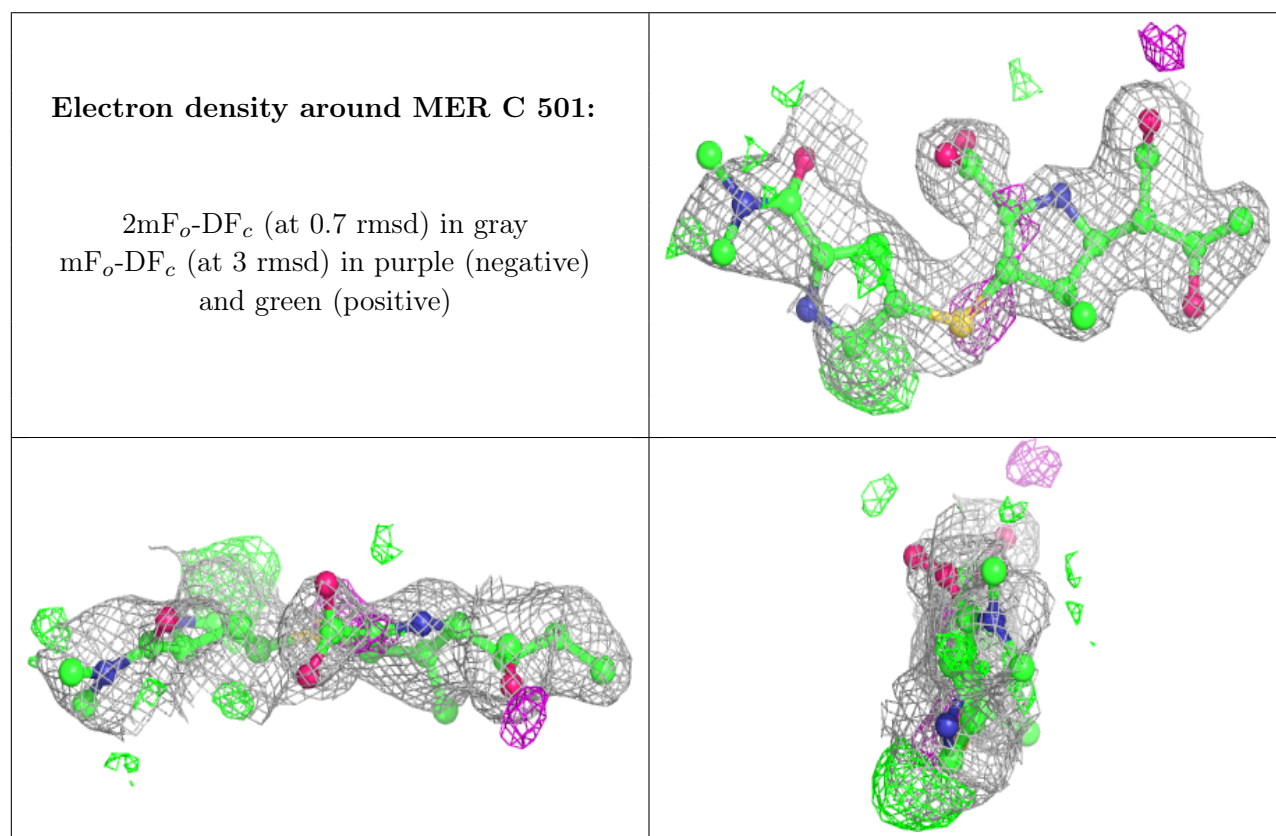
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	MER	C	501	26/26	0.81	0.21	30,62,77,78	0
2	MER	B	501	26/26	0.83	0.18	25,55,62,72	0
2	MER	D	501	26/26	0.84	0.20	29,57,72,78	0
2	MER	A	501	26/26	0.86	0.22	31,62,71,81	0
3	MG	B	502	1/1	0.96	0.04	38,38,38,38	0
3	MG	C	502	1/1	0.96	0.04	41,41,41,41	0
4	ZN	D	502	1/1	0.96	0.06	62,62,62,62	0
4	ZN	E	501	1/1	0.96	0.04	59,59,59,59	0
4	ZN	A	504	1/1	0.97	0.03	54,54,54,54	0
4	ZN	B	503	1/1	0.97	0.08	68,68,68,68	0
3	MG	A	502	1/1	0.98	0.02	37,37,37,37	0
4	ZN	F	501	1/1	0.98	0.02	56,56,56,56	0
4	ZN	B	504	1/1	0.99	0.03	55,55,55,55	0

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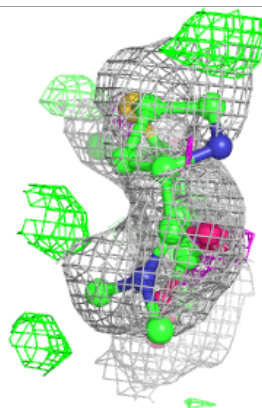
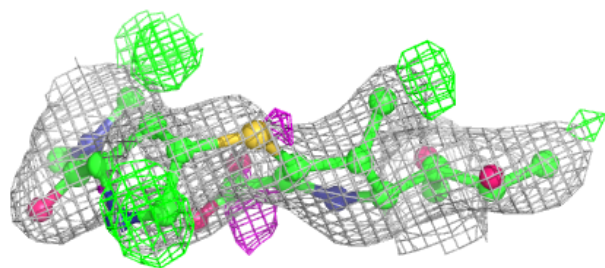
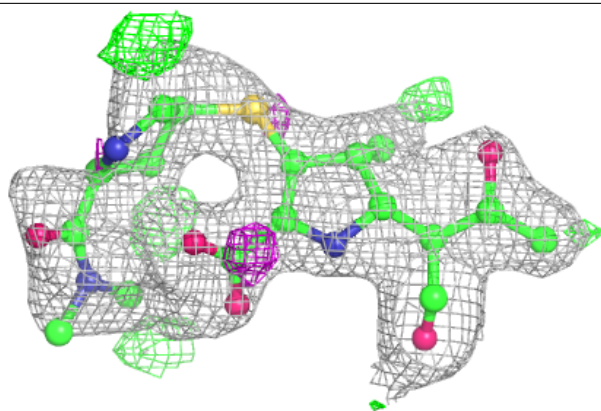
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	ZN	A	503	1/1	0.99	0.03	51,51,51,51	0

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.

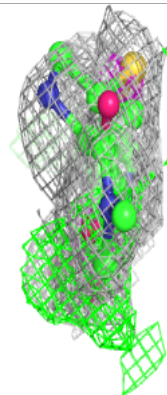
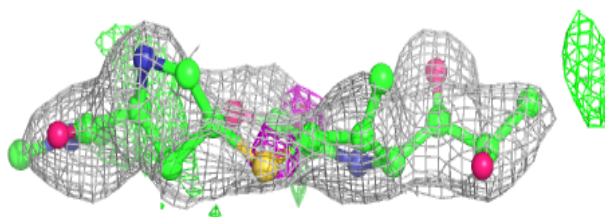
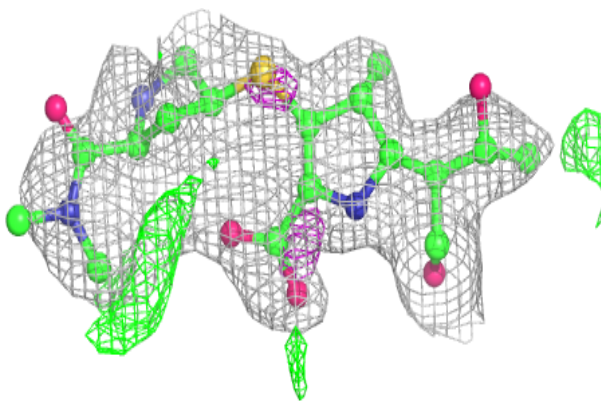


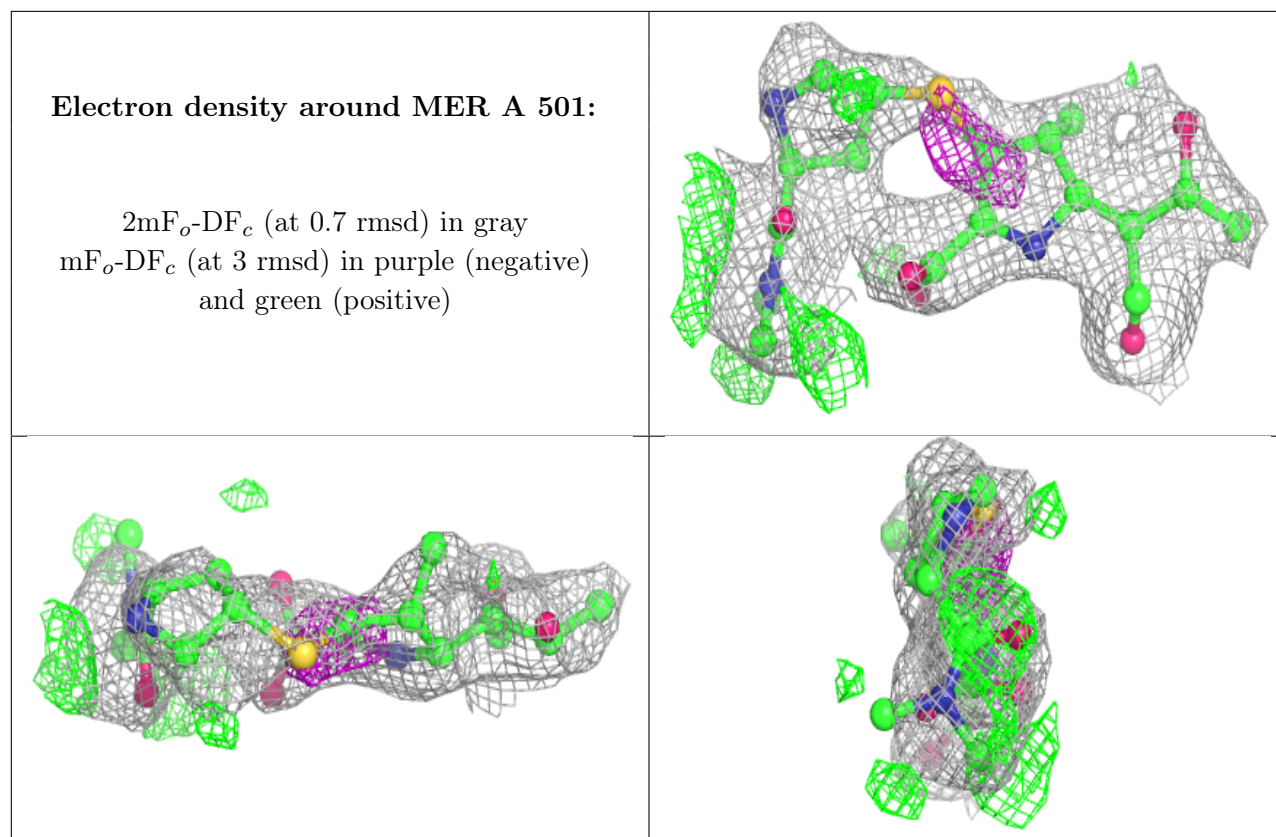
**Electron density around MER B 501:**

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

**Electron density around MER D 501:**

$2mF_o-DF_c$  (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.