Full wwPDB X-ray Structure Validation Report (i)

Dec 12, 2023 – 06:33 pm GMT

PDB ID	:	4BNZ
Title	:	Crystal structure of 3-oxoacyl-(acyl-carrier-protein) reductase (FabG) from Pseudomonas aeruginosa in complex with 1-methyl-N-phenylindole-3-carboxamide at 2.5A resolution
Authors	:	Cukier, C.D.; Schnell, R.; Lindqvist, Y.; Schneider, G.
Deposited on	:	2013-05-17
Resolution	:	2.50 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

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

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

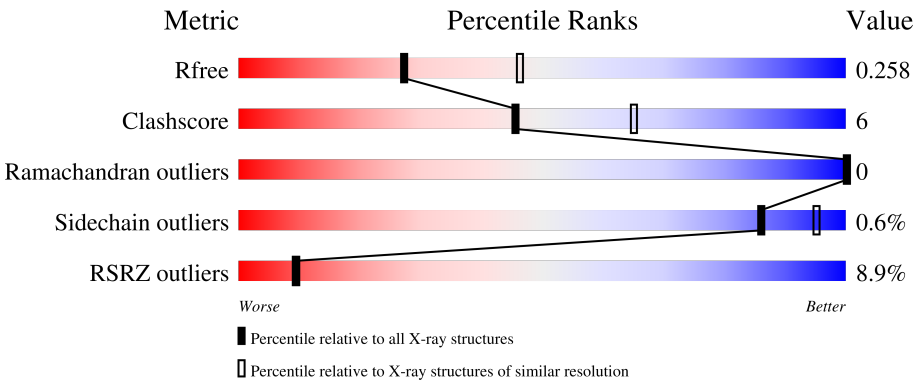
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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

Mol	Chain	Length	Quality of chain
1	A	269	6% 80% 9% 10%
1	B	269	8% 79% 10% 11%
1	C	269	7% 83% 9% 8%
1	D	269	11% 83% 8% 8%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 7234 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 3-OXOACYL-[ACYL-CARRIER-PROTEIN] REDUCTASE FABG.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	241	1757	1092	315	343	7	0	2	0
1	B	240	1772	1112	313	342	5	0	3	0
1	C	248	1815	1132	329	348	6	0	1	0
1	D	247	1806	1131	321	347	7	0	1	0

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-21	MET	-	expression tag	UNP O54438
A	-20	HIS	-	expression tag	UNP O54438
A	-19	HIS	-	expression tag	UNP O54438
A	-18	HIS	-	expression tag	UNP O54438
A	-17	HIS	-	expression tag	UNP O54438
A	-16	HIS	-	expression tag	UNP O54438
A	-15	HIS	-	expression tag	UNP O54438
A	-14	SER	-	expression tag	UNP O54438
A	-13	SER	-	expression tag	UNP O54438
A	-12	GLY	-	expression tag	UNP O54438
A	-11	VAL	-	expression tag	UNP O54438
A	-10	ASP	-	expression tag	UNP O54438
A	-9	LEU	-	expression tag	UNP O54438
A	-8	GLY	-	expression tag	UNP O54438
A	-7	THR	-	expression tag	UNP O54438
A	-6	GLU	-	expression tag	UNP O54438
A	-5	ASN	-	expression tag	UNP O54438
A	-4	LEU	-	expression tag	UNP O54438
A	-3	TYR	-	expression tag	UNP O54438
A	-2	PHE	-	expression tag	UNP O54438

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLN	-	expression tag	UNP O54438
A	0	SER	-	expression tag	UNP O54438
B	-21	MET	-	expression tag	UNP O54438
B	-20	HIS	-	expression tag	UNP O54438
B	-19	HIS	-	expression tag	UNP O54438
B	-18	HIS	-	expression tag	UNP O54438
B	-17	HIS	-	expression tag	UNP O54438
B	-16	HIS	-	expression tag	UNP O54438
B	-15	HIS	-	expression tag	UNP O54438
B	-14	SER	-	expression tag	UNP O54438
B	-13	SER	-	expression tag	UNP O54438
B	-12	GLY	-	expression tag	UNP O54438
B	-11	VAL	-	expression tag	UNP O54438
B	-10	ASP	-	expression tag	UNP O54438
B	-9	LEU	-	expression tag	UNP O54438
B	-8	GLY	-	expression tag	UNP O54438
B	-7	THR	-	expression tag	UNP O54438
B	-6	GLU	-	expression tag	UNP O54438
B	-5	ASN	-	expression tag	UNP O54438
B	-4	LEU	-	expression tag	UNP O54438
B	-3	TYR	-	expression tag	UNP O54438
B	-2	PHE	-	expression tag	UNP O54438
B	-1	GLN	-	expression tag	UNP O54438
B	0	SER	-	expression tag	UNP O54438
C	-21	MET	-	expression tag	UNP O54438
C	-20	HIS	-	expression tag	UNP O54438
C	-19	HIS	-	expression tag	UNP O54438
C	-18	HIS	-	expression tag	UNP O54438
C	-17	HIS	-	expression tag	UNP O54438
C	-16	HIS	-	expression tag	UNP O54438
C	-15	HIS	-	expression tag	UNP O54438
C	-14	SER	-	expression tag	UNP O54438
C	-13	SER	-	expression tag	UNP O54438
C	-12	GLY	-	expression tag	UNP O54438
C	-11	VAL	-	expression tag	UNP O54438
C	-10	ASP	-	expression tag	UNP O54438
C	-9	LEU	-	expression tag	UNP O54438
C	-8	GLY	-	expression tag	UNP O54438
C	-7	THR	-	expression tag	UNP O54438
C	-6	GLU	-	expression tag	UNP O54438
C	-5	ASN	-	expression tag	UNP O54438
C	-4	LEU	-	expression tag	UNP O54438

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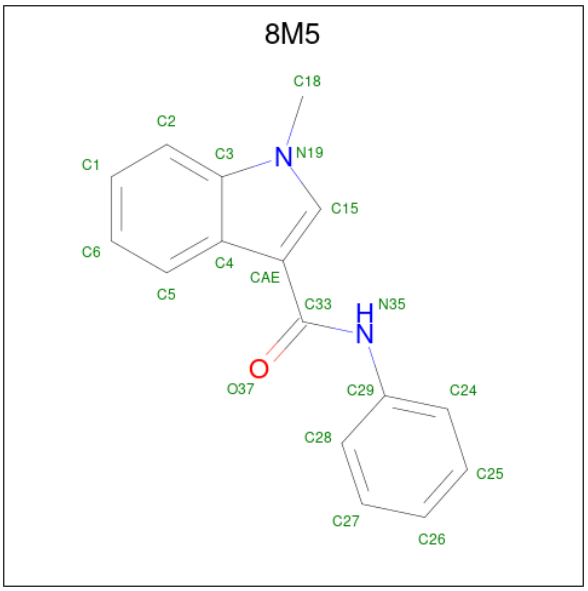
Chain	Residue	Modelled	Actual	Comment	Reference
C	-3	TYR	-	expression tag	UNP O54438
C	-2	PHE	-	expression tag	UNP O54438
C	-1	GLN	-	expression tag	UNP O54438
C	0	SER	-	expression tag	UNP O54438
D	-21	MET	-	expression tag	UNP O54438
D	-20	HIS	-	expression tag	UNP O54438
D	-19	HIS	-	expression tag	UNP O54438
D	-18	HIS	-	expression tag	UNP O54438
D	-17	HIS	-	expression tag	UNP O54438
D	-16	HIS	-	expression tag	UNP O54438
D	-15	HIS	-	expression tag	UNP O54438
D	-14	SER	-	expression tag	UNP O54438
D	-13	SER	-	expression tag	UNP O54438
D	-12	GLY	-	expression tag	UNP O54438
D	-11	VAL	-	expression tag	UNP O54438
D	-10	ASP	-	expression tag	UNP O54438
D	-9	LEU	-	expression tag	UNP O54438
D	-8	GLY	-	expression tag	UNP O54438
D	-7	THR	-	expression tag	UNP O54438
D	-6	GLU	-	expression tag	UNP O54438
D	-5	ASN	-	expression tag	UNP O54438
D	-4	LEU	-	expression tag	UNP O54438
D	-3	TYR	-	expression tag	UNP O54438
D	-2	PHE	-	expression tag	UNP O54438
D	-1	GLN	-	expression tag	UNP O54438
D	0	SER	-	expression tag	UNP O54438

- Molecule 2 is 1-methyl-N-phenyl-indole-3-carboxamide (three-letter code: 8M5) (formula: $C_{16}H_{14}N_2O$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			19	16	2	1		
2	D	1	Total	C	N	O	0	0
			19	16	2	1		

- Molecule 3 is water.

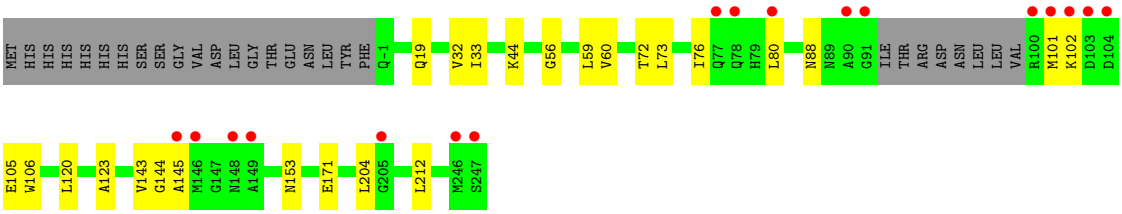
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	13	Total	O	0	0
			13	13		
3	B	15	Total	O	0	0
			15	15		
3	C	11	Total	O	0	0
			11	11		
3	D	7	Total	O	0	0
			7	7		

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.

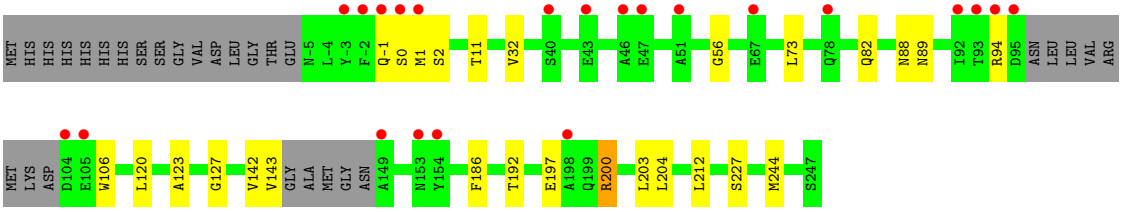
• Molecule 1: 3-OXOACYL-[ACYL-CARRIER-PROTEIN] REDUCTASE FABG

Chain A:



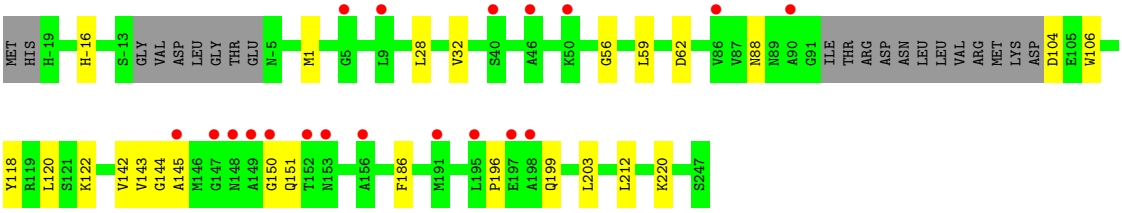
• Molecule 1: 3-OXOACYL-[ACYL-CARRIER-PROTEIN] REDUCTASE FABG

Chain B:



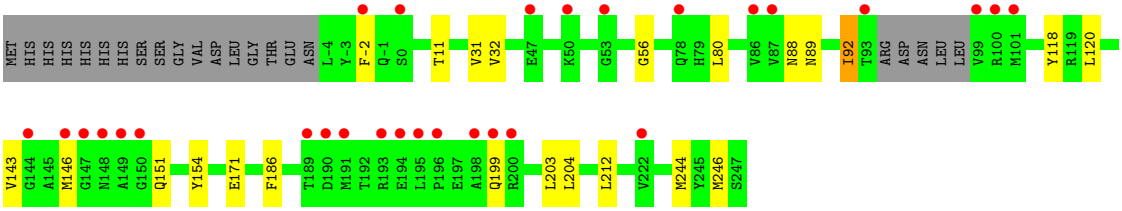
• Molecule 1: 3-OXOACYL-[ACYL-CARRIER-PROTEIN] REDUCTASE FABG

Chain C:



• Molecule 1: 3-OXOACYL-[ACYL-CARRIER-PROTEIN] REDUCTASE FABG

Chain D:


MET HIS HIS HIS HIS HIS HIS SER SER GLY VAL ASP LEU GLY THR GLU ASN L-4 Y-3 F-2 Q-1 S0 T11 V31 V32 E47 K50 G53 G56 Q78 H79 L80 V86 V87 N88 N89 I92 T93 ARG ASP ASN LEU LEU V99 R100 M101 Y118 R119 L120
V143 G144 A145 M146 G147 N148 A149 G150 Q151 Y154 E171 F186 T189 D190 M191 T192 R193 E194 L195 P196 E197 A198 Q199 R200 L203 L204 L212 V222 M244 Y245 M246 S247

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	53.93Å 108.20Å 147.16Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.50 29.98 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.7 (30.00-2.50) 99.9 (29.98-2.50)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.25 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.200 , 0.259 0.204 , 0.258	Depositor DCC
R_{free} test set	1527 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	38.4	Xtriage
Anisotropy	0.199	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 36.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7234	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.91% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: 8M5

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	0.60	0/1780	0.73	0/2405
1	B	0.59	0/1800	0.78	2/2435 (0.1%)
1	C	0.63	0/1841	0.79	2/2490 (0.1%)
1	D	0.60	0/1829	0.73	0/2473
All	All	0.61	0/7250	0.76	4/9803 (0.0%)

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	B	0	1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	62	ASP	CB-CG-OD2	-6.83	112.16	118.30
1	B	200	ARG	NE-CZ-NH1	5.61	123.11	120.30
1	B	200	ARG	NE-CZ-NH2	-5.44	117.58	120.30
1	C	212	LEU	CB-CG-CD1	5.14	119.74	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	-1	GLN	Peptide

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	1757	0	1791	23	0
1	B	1772	0	1809	27	0
1	C	1815	0	1833	21	0
1	D	1806	0	1844	24	0
2	A	19	0	14	2	0
2	D	19	0	14	0	0
3	A	13	0	0	0	0
3	B	15	0	0	3	0
3	C	11	0	0	0	0
3	D	7	0	0	0	0
All	All	7234	0	7305	93	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 6.

All (93) 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:D:186[B]:PHE:HE2	1:D:244:MET:SD	1.63	1.22
1:D:186[B]:PHE:CZ	1:D:203:LEU:HD22	1.89	1.08
1:D:186[B]:PHE:CE2	1:D:244:MET:SD	2.50	1.05
1:B:143:VAL:HG11	1:B:186[A]:PHE:CZ	1.97	0.99
1:B:186[A]:PHE:CZ	1:B:203:LEU:HD22	1.99	0.97
1:A:171[A]:GLU:OE1	1:B:106:TRP:NE1	2.13	0.80
1:B:1:MET:HB3	1:B:227:SER:HB2	1.61	0.80
1:B:143:VAL:CG1	1:B:186[A]:PHE:CZ	2.67	0.79
1:D:143:VAL:CG1	1:D:186[B]:PHE:CE1	2.70	0.74
1:D:244:MET:HG3	1:D:244:MET:O	1.88	0.74
1:B:186[A]:PHE:HE2	1:B:244:MET:SD	2.11	0.73
1:C:145:ALA:HB1	1:C:150:GLY:C	2.09	0.73
1:B:186[A]:PHE:CE1	1:B:203:LEU:HD13	2.24	0.73
1:C:143:VAL:HG11	1:C:186:PHE:CZ	2.23	0.73
1:D:143:VAL:HG11	1:D:186[B]:PHE:CE1	2.23	0.73
1:C:142:VAL:O	1:C:144:GLY:HA3	1.88	0.72
1:D:186[B]:PHE:CE1	1:D:203:LEU:HD13	2.24	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:143:VAL:HG11	1:D:186[B]:PHE:CZ	2.26	0.71
1:C:104:ASP:N	1:D:118:TYR:HH	1.88	0.70
1:D:186[B]:PHE:CE1	1:D:203:LEU:HD22	2.27	0.69
1:B:186[A]:PHE:CE2	1:B:244:MET:SD	2.87	0.67
1:A:59:LEU:C	1:A:59:LEU:HD12	2.15	0.67
1:B:143:VAL:CG1	1:B:186[A]:PHE:CE1	2.78	0.67
1:C:145:ALA:CB	1:C:150:GLY:C	2.64	0.67
1:C:196:PRO:HG2	1:C:199:GLN:HG3	1.80	0.64
1:A:106:TRP:HA	1:A:153:ASN:OD1	1.98	0.63
2:A:1248:8M5:O37	2:A:1248:8M5:H28	1.97	0.63
1:A:102:LYS:HB2	1:A:105:GLU:HB2	1.80	0.62
1:C:142:VAL:O	1:C:144:GLY:CA	2.47	0.61
1:C:145:ALA:HB1	1:C:151:GLN:N	2.16	0.60
1:D:186[B]:PHE:CD1	1:D:203:LEU:HD13	2.36	0.60
1:B:192:THR:O	1:B:200:ARG:NH2	2.34	0.60
1:B:143:VAL:HG12	1:B:186[A]:PHE:CE1	2.36	0.59
1:A:19:GLN:OE1	1:A:44:LYS:NZ	2.35	0.59
1:A:33:ILE:HD11	1:A:80:LEU:HD23	1.85	0.58
1:A:59:LEU:HD13	1:A:72:THR:HG23	1.87	0.57
1:A:59:LEU:HD11	1:A:72:THR:HG21	1.87	0.57
1:C:106:TRP:CD1	1:D:171:GLU:HG3	2.41	0.55
1:D:151:GLN:HA	1:D:246:MET:HE1	1.89	0.55
1:C:145:ALA:HB2	1:C:150:GLY:O	2.07	0.55
1:B:142:VAL:CG1	3:B:2009:HOH:O	2.55	0.54
1:A:101:MET:HE1	1:A:153:ASN:HB3	1.92	0.52
1:B:142:VAL:HG12	3:B:2009:HOH:O	2.09	0.52
1:B:88:ASN:OD1	1:B:120:LEU:HD23	2.10	0.52
1:A:88:ASN:OD1	1:A:120:LEU:HD23	2.09	0.52
1:B:186[A]:PHE:CD1	1:B:203:LEU:HD13	2.44	0.52
1:D:88:ASN:OD1	1:D:120:LEU:HD23	2.10	0.51
1:C:118:TYR:O	1:C:122:LYS:HG2	2.10	0.50
1:C:88:ASN:OD1	1:C:120:LEU:HD23	2.12	0.49
1:A:59:LEU:CD1	1:A:72:THR:CG2	2.91	0.49
1:B:186[A]:PHE:HE2	1:B:244:MET:CE	2.25	0.49
1:A:143:VAL:HG12	1:A:144:GLY:N	2.27	0.48
1:D:143:VAL:HG12	1:D:186[B]:PHE:CE1	2.47	0.48
1:C:143:VAL:CG1	1:C:145:ALA:O	2.63	0.47
1:B:197:GLU:HA	1:B:197:GLU:OE1	2.15	0.47
1:B:186[B]:PHE:CD2	1:B:212:LEU:HG	2.50	0.46
1:A:59:LEU:CD1	1:A:72:THR:HG23	2.46	0.46
1:B:186[A]:PHE:CZ	1:B:203:LEU:CD2	2.88	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:186:PHE:CZ	1:C:203:LEU:HD11	2.51	0.46
1:D:-2:PHE:O	1:D:-2:PHE:CD2	2.70	0.45
1:C:145:ALA:CB	1:C:150:GLY:O	2.63	0.45
2:A:1248:8M5:O37	2:A:1248:8M5:C28	2.64	0.45
1:C:-16:HIS:HA	1:C:59:LEU:HD23	1.99	0.45
1:C:143:VAL:CG1	1:C:186:PHE:CE1	3.00	0.44
1:A:59:LEU:HD12	1:A:60:VAL:N	2.32	0.44
1:C:32:VAL:O	1:C:56:GLY:HA3	2.18	0.44
1:A:59:LEU:HD21	1:A:76:ILE:HD11	2.00	0.44
1:A:204:LEU:HD21	1:A:212:LEU:HD12	1.99	0.44
1:D:143:VAL:HG22	1:D:154:TYR:CE1	2.52	0.44
1:D:204:LEU:HD21	1:D:212:LEU:HD12	2.00	0.44
1:A:32:VAL:O	1:A:56:GLY:HA3	2.18	0.43
1:D:32:VAL:O	1:D:56:GLY:HA3	2.18	0.43
1:B:192:THR:HG21	3:B:2009:HOH:O	2.18	0.43
1:B:204:LEU:HD21	1:B:212:LEU:HD12	2.01	0.43
1:C:145:ALA:HB2	1:C:150:GLY:C	2.39	0.43
1:A:106:TRP:CA	1:A:153:ASN:OD1	2.65	0.43
1:B:186[A]:PHE:HE2	1:B:244:MET:HE1	1.84	0.43
1:B:32:VAL:O	1:B:56:GLY:HA3	2.18	0.43
1:A:101:MET:HE1	1:A:153:ASN:CB	2.48	0.42
1:D:31:VAL:HG11	1:D:80:LEU:HD22	2.02	0.41
1:A:73:LEU:HD12	1:A:123:ALA:HB1	2.02	0.41
1:A:80:LEU:O	1:A:80:LEU:HG	2.21	0.41
1:A:101:MET:SD	1:A:145:ALA:HB2	2.60	0.41
1:B:1:MET:SD	1:C:220:LYS:HD2	2.60	0.41
1:B:73[A]:LEU:HD12	1:B:123:ALA:HB1	2.02	0.41
1:B:82:GLN:CG	1:B:127:GLY:HA3	2.51	0.41
1:B:11:THR:O	1:B:89:ASN:HB3	2.21	0.41
1:D:92:ILE:HG13	1:D:92:ILE:O	2.21	0.41
1:D:186[B]:PHE:CE1	1:D:203:LEU:CD1	3.02	0.40
1:C:1:MET:HA	1:C:28:LEU:O	2.21	0.40
1:A:101:MET:SD	1:A:145:ALA:CB	3.09	0.40
1:D:11:THR:O	1:D:89:ASN:HB3	2.21	0.40
1:D:146:MET:HB2	1:D:199:GLN:HB3	2.03	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	239/269 (89%)	236 (99%)	3 (1%)	0	100	100
1	B	237/269 (88%)	232 (98%)	5 (2%)	0	100	100
1	C	243/269 (90%)	234 (96%)	9 (4%)	0	100	100
1	D	244/269 (91%)	239 (98%)	5 (2%)	0	100	100
All	All	963/1076 (90%)	941 (98%)	22 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	177/201 (88%)	177 (100%)	0	100	100
1	B	180/201 (90%)	177 (98%)	3 (2%)	60	82
1	C	183/201 (91%)	183 (100%)	0	100	100
1	D	182/201 (90%)	181 (100%)	1 (0%)	88	96
All	All	722/804 (90%)	718 (99%)	4 (1%)	86	95

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	0	SER
1	B	2	SER

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Mol	Chain	Res	Type
1	B	94	ARG
1	D	92	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	111	ASN
1	B	111	ASN
1	C	111	ASN
1	D	111	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)

2 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	$\#\|Z\| > 2$
2	8M5	D	1248	-	19,21,21	3.61	7 (36%)	23,29,29	1.36	3 (13%)
2	8M5	A	1248	-	19,21,21	3.90	8 (42%)	23,29,29	1.62	5 (21%)

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	8M5	D	1248	-	-	0/6/8/8	0/3/3/3
2	8M5	A	1248	-	-	0/6/8/8	0/3/3/3

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1248	8M5	CAE-C4	-10.14	1.33	1.42
2	D	1248	8M5	CAE-C4	-9.97	1.34	1.42
2	A	1248	8M5	CAE-C33	-9.80	1.33	1.50
2	D	1248	8M5	CAE-C33	-8.49	1.36	1.50
2	A	1248	8M5	C5-C4	-4.87	1.32	1.42
2	D	1248	8M5	C5-C4	-4.69	1.32	1.42
2	D	1248	8M5	C2-C3	-4.27	1.32	1.41
2	A	1248	8M5	C2-C3	-3.92	1.33	1.41
2	A	1248	8M5	C29-N35	-3.63	1.34	1.41
2	A	1248	8M5	C15-CAE	-3.51	1.33	1.38
2	A	1248	8M5	C15-N19	-3.36	1.33	1.38
2	D	1248	8M5	C29-N35	-3.26	1.35	1.41
2	D	1248	8M5	C15-N19	-2.98	1.33	1.38
2	D	1248	8M5	C15-CAE	-2.93	1.34	1.38
2	A	1248	8M5	C28-C29	2.16	1.42	1.39

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1248	8M5	C2-C3-N19	-4.31	128.44	132.14
2	D	1248	8M5	C2-C3-N19	-3.89	128.81	132.14
2	D	1248	8M5	C25-C24-C29	2.43	122.63	119.72
2	A	1248	8M5	C29-N35-C33	-2.28	120.66	126.58
2	D	1248	8M5	C5-C4-CAE	-2.25	132.42	135.63
2	A	1248	8M5	C2-C3-C4	2.15	123.86	120.94
2	A	1248	8M5	C5-C4-CAE	-2.09	132.65	135.63
2	A	1248	8M5	O37-C33-CAE	-2.06	118.88	121.72

There are no chirality outliers.

There are no torsion outliers.

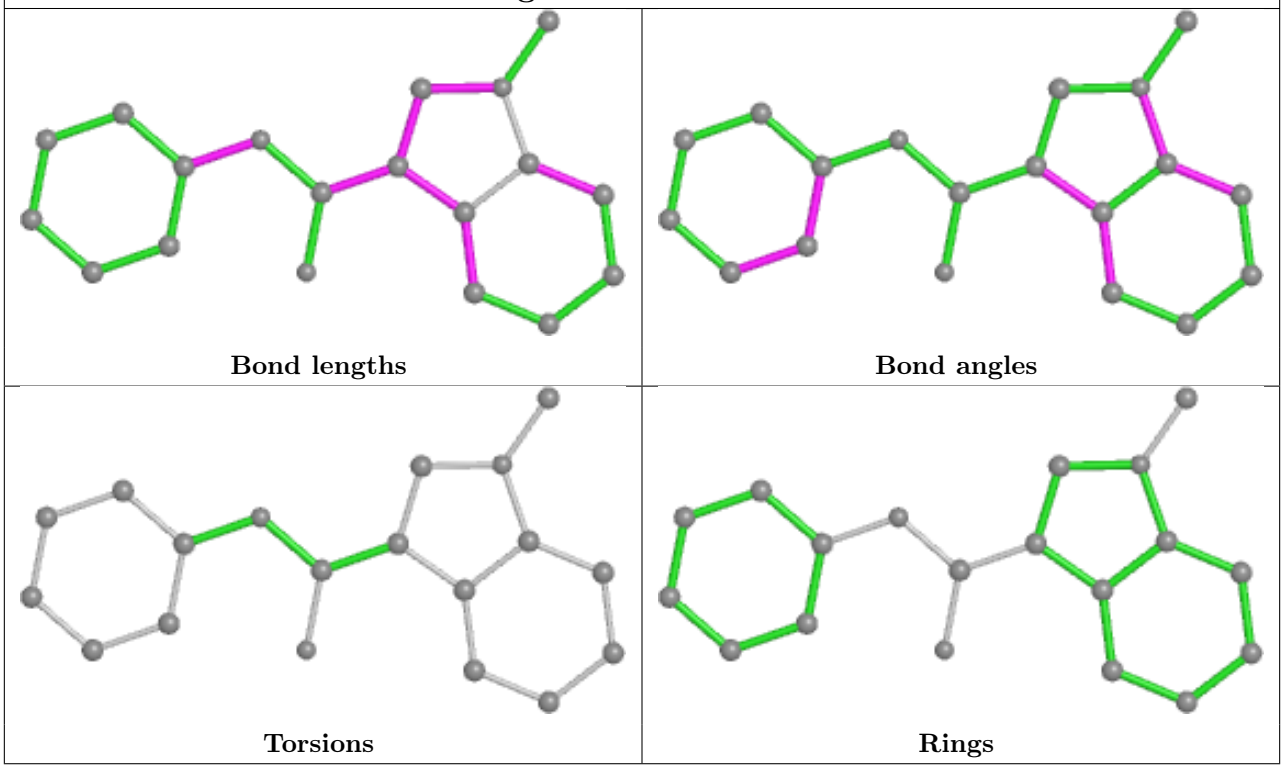
There are no ring outliers.

1 monomer is involved in 2 short contacts:

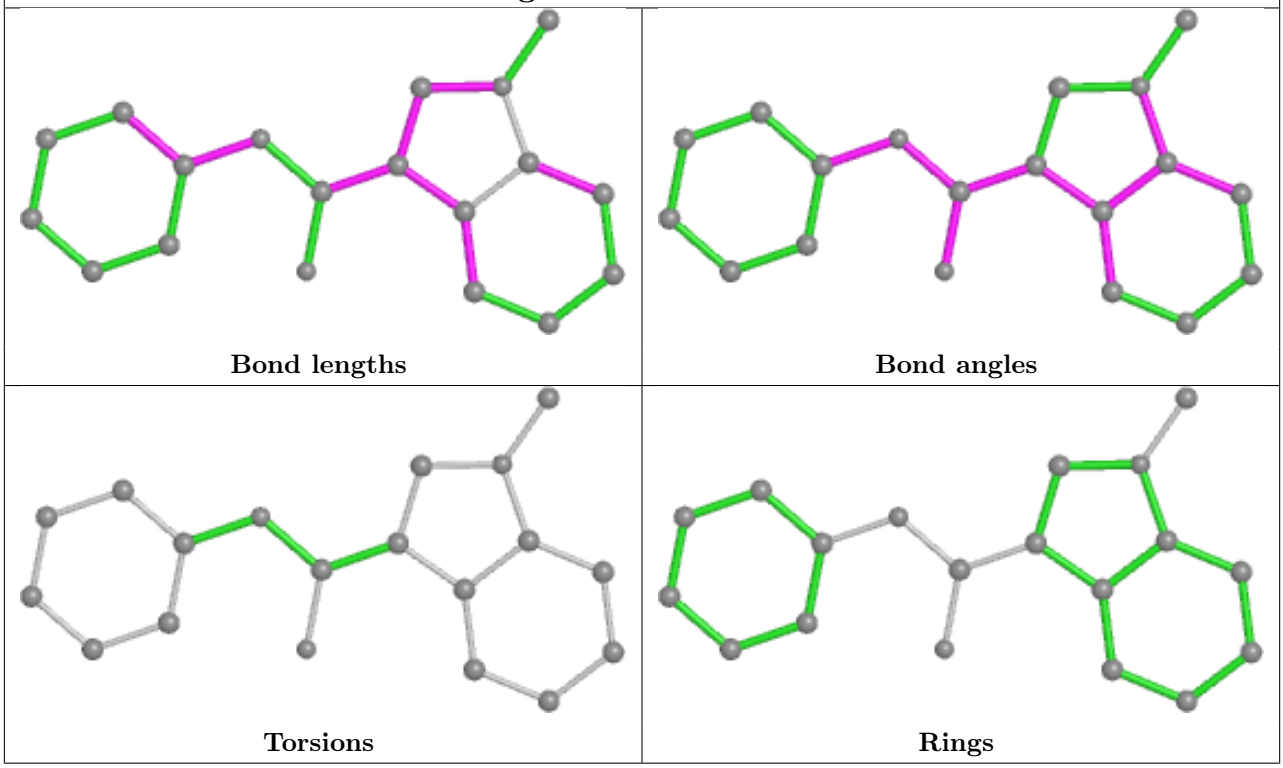
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1248	8M5	2	0

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

Ligand 8M5 D 1248



Ligand 8M5 A 1248



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	241/269 (89%)	0.18	17 (7%)	16	16	19, 33, 84, 114	0
1	B	240/269 (89%)	0.33	22 (9%)	9	9	18, 37, 80, 109	0
1	C	248/269 (92%)	0.39	19 (7%)	13	13	19, 34, 78, 142	0
1	D	247/269 (91%)	0.47	29 (11%)	4	4	20, 37, 100, 126	0
All	All	976/1076 (90%)	0.34	87 (8%)	9	9	18, 35, 85, 142	0

All (87) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	148	ASN	14.4
1	D	198	ALA	6.7
1	C	145	ALA	6.3
1	B	-2	PHE	5.7
1	D	194	GLU	5.6
1	D	148	ASN	5.6
1	B	93	THR	5.5
1	A	101	MET	5.3
1	A	78	GLN	5.0
1	D	146	MET	4.9
1	D	0	SER	4.9
1	B	92	ILE	4.7
1	B	149	ALA	4.4
1	A	100	ARG	4.3
1	D	193	ARG	4.3
1	B	94	ARG	4.2
1	A	104	ASP	4.1
1	A	146	MET	4.1
1	B	1	MET	4.1
1	D	99	VAL	4.1
1	A	145	ALA	4.0

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Mol	Chain	Res	Type	RSRZ
1	B	105	GLU	4.0
1	D	190	ASP	3.9
1	C	152	THR	3.8
1	C	150	GLY	3.8
1	D	199	GLN	3.7
1	A	246	MET	3.7
1	D	191	MET	3.7
1	A	148	ASN	3.6
1	A	247	SER	3.6
1	A	91	GLY	3.6
1	A	102	LYS	3.5
1	C	147	GLY	3.5
1	C	195	LEU	3.5
1	B	78	GLN	3.4
1	B	51	ALA	3.4
1	D	149	ALA	3.4
1	C	156	ALA	3.3
1	C	153	ASN	3.2
1	C	50	LYS	3.2
1	D	50	LYS	3.2
1	C	149	ALA	3.2
1	A	90	ALA	3.1
1	B	104	ASP	3.0
1	B	47	GLU	3.0
1	D	195	LEU	3.0
1	D	150	GLY	3.0
1	C	197	GLU	2.9
1	C	9	LEU	2.8
1	D	87	VAL	2.8
1	D	47	GLU	2.8
1	D	100	ARG	2.7
1	A	149	ALA	2.7
1	D	101	MET	2.7
1	D	86	VAL	2.6
1	D	78	GLN	2.6
1	B	95	ASP	2.6
1	D	200	ARG	2.6
1	B	198	ALA	2.6
1	D	147	GLY	2.5
1	D	-2	PHE	2.5
1	C	198	ALA	2.5
1	D	196	PRO	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	80	LEU	2.4
1	C	46	ALA	2.4
1	B	154	TYR	2.4
1	C	90	ALA	2.4
1	B	-1	GLN	2.4
1	C	40	SER	2.4
1	B	67	GLU	2.4
1	C	5	GLY	2.3
1	B	40	SER	2.3
1	C	86	VAL	2.3
1	C	191	MET	2.3
1	B	0	SER	2.3
1	B	46	ALA	2.2
1	B	43	GLU	2.2
1	B	153	ASN	2.2
1	D	53	GLY	2.1
1	A	103	ASP	2.1
1	D	144	GLY	2.1
1	D	93	THR	2.1
1	D	189	THR	2.1
1	B	-3	TYR	2.1
1	D	222	VAL	2.0
1	A	77	GLN	2.0
1	A	205	GLY	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)

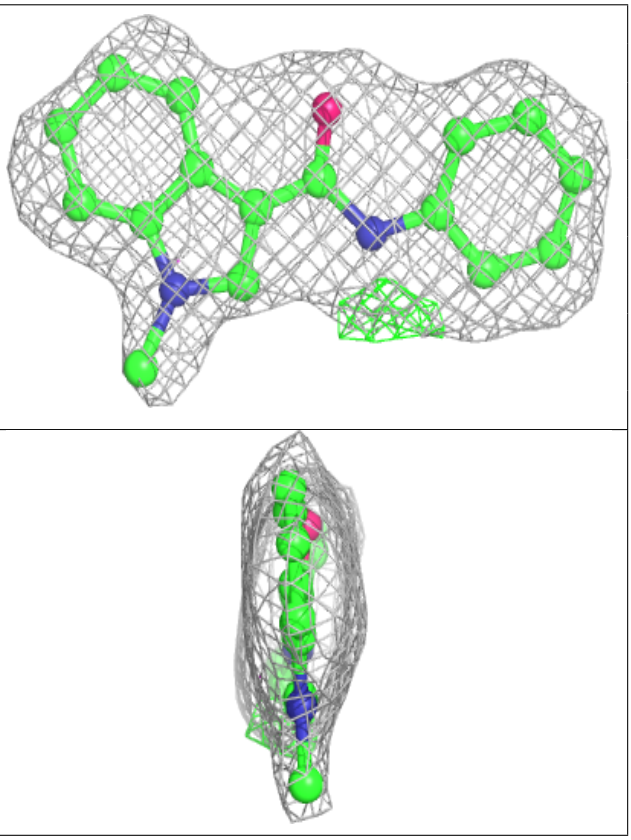
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	8M5	A	1248	19/19	0.92	0.17	31,36,42,43	0
2	8M5	D	1248	19/19	0.97	0.13	24,27,31,32	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.

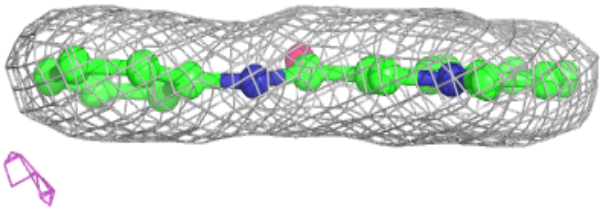
Electron density around 8M5 A 1248:

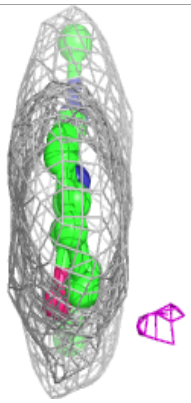
2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative) and green (positive)



Electron density around 8M5 D 1248:

$2mF_o$-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.