Full wwPDB X-ray Structure Validation Report ⓘ

Sep 17, 2024 – 04:06 PM EDT

PDB ID	:	8VPI
Title	:	CamA Adenine Methyltransferase Complexed to Cognate Substrate DNA and Containing Quinoline-based SGI-1027 Analog 462
Authors	:	Zhou, J.; Horton, J.R.; Cheng, X.
Deposited on	:	2024-01-16
Resolution	:	2.89 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 ⓘ 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 ⓘ) were used in the production of this report:

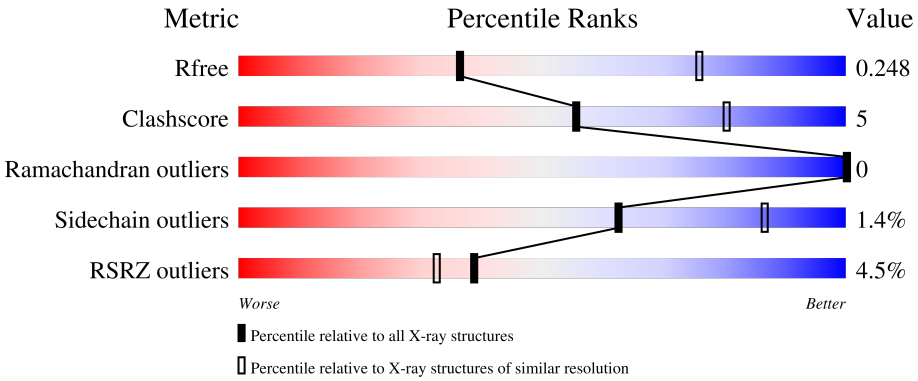
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.002 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.38.3

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 2.89 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}	164625	2335 (2.90-2.90)
Clashscore	180529	2564 (2.90-2.90)
Ramachandran outliers	177936	2514 (2.90-2.90)
Sidechain outliers	177891	2516 (2.90-2.90)
RSRZ outliers	164620	2337 (2.90-2.90)

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	577	5% 82% 12% 6%
1	B	577	2% 87% 8% 5%
1	C	577	6% 81% 12% • 6%
2	E	14	29% 64% 7%
2	G	14	64% 36%

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Mol	Chain	Length	Quality of chain
2	I	14	57% 43%
3	D	14	7% 57% 43%
3	F	14	71% 29%
3	H	14	21% 79%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 15117 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 Site-specific DNA-methyltransferase (adenine-specific).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	543	Total	C	N	O	S	0	0	0
			4418	2870	701	830	17			
1	B	551	Total	C	N	O	S	0	0	0
			4559	2968	730	844	17			
1	C	540	Total	C	N	O	S	0	0	0
			4341	2823	692	809	17			

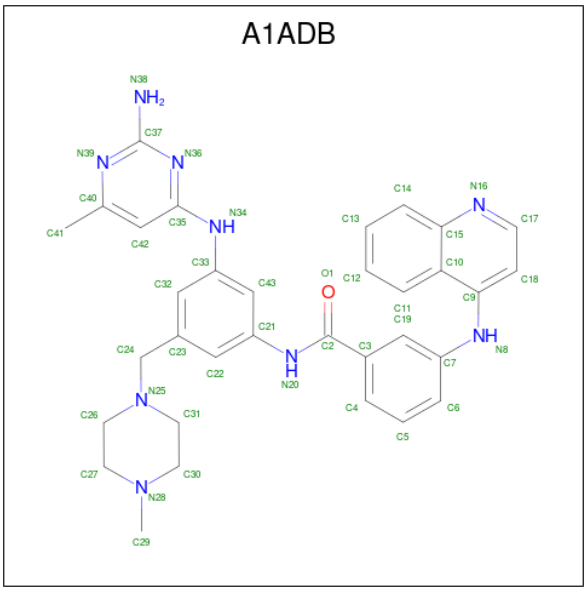
- Molecule 2 is a DNA chain called DNA Strand II.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	13	Total	C	N	O	P	0	0	0
			269	129	45	82	13			
2	G	14	Total	C	N	O	P	0	0	0
			287	139	50	85	13			
2	I	14	Total	C	N	O	P	0	0	0
			287	139	50	85	13			

- Molecule 3 is a DNA chain called DNA Strand I.

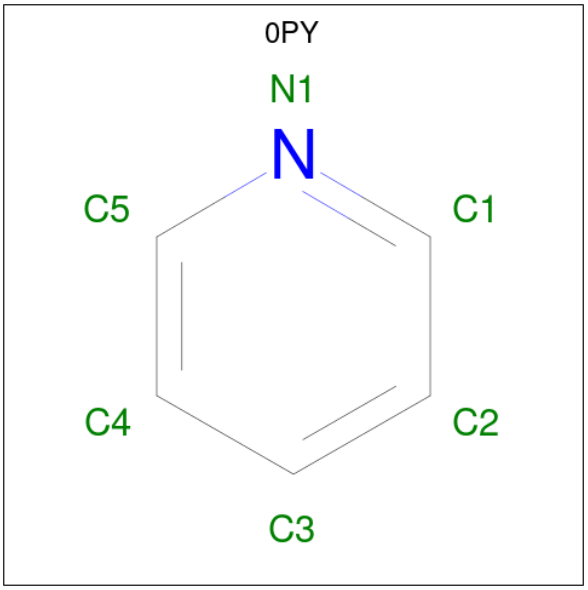
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	14	Total	C	N	O	P	0	0	0
			281	136	53	79	13			
3	F	14	Total	C	N	O	P	0	0	0
			281	136	53	79	13			
3	H	14	Total	C	N	O	P	0	0	0
			281	136	53	79	13			

- Molecule 4 is N-{3-[(2-amino-6-methylpyrimidin-4-yl)amino]-5-[(4-methylpiperazin-1-yl) methyl]phenyl}-3-[(quinolin-4-yl)amino]benzamide (three-letter code: A1ADB) (formula: $C_{33}H_{35}N_9O$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	E	1	Total C N O 43 33 9 1	0	0

- Molecule 5 is pyridine (three-letter code: 0PY) (formula: C_5H_5N).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	1	Total C N 6 5 1	0	0

- Molecule 6 is water.

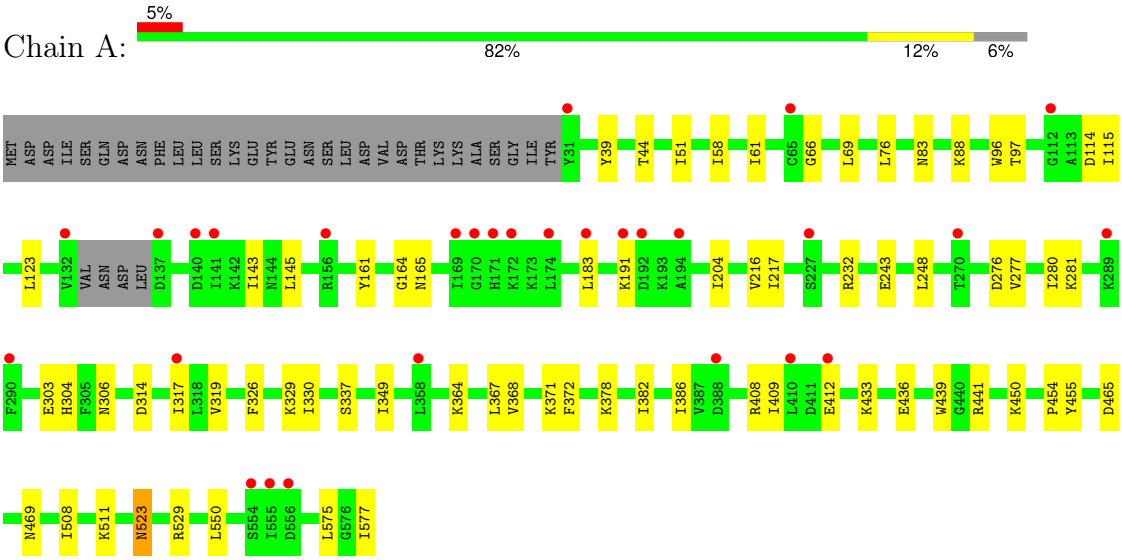
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	10	Total O 10 10	0	0
6	B	26	Total O 26 26	0	0
6	C	10	Total O 10 10	0	0
6	E	4	Total O 4 4	0	0
6	D	3	Total O 3 3	0	0
6	F	7	Total O 7 7	0	0
6	H	1	Total O 1 1	0	0
6	I	3	Total O 3 3	0	0

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.

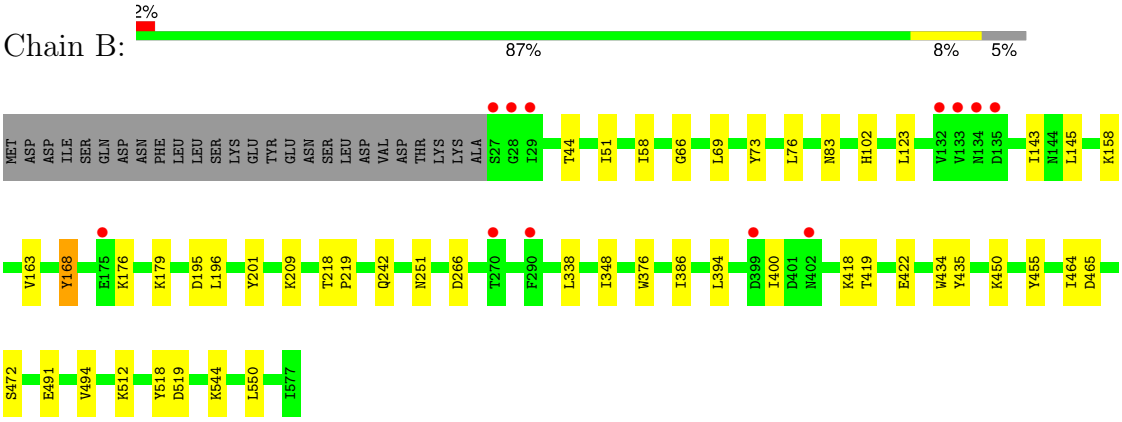
• Molecule 1: Site-specific DNA-methyltransferase (adenine-specific)

Chain A:



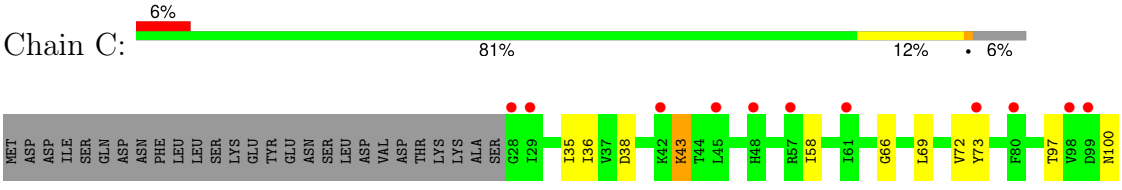
• Molecule 1: Site-specific DNA-methyltransferase (adenine-specific)

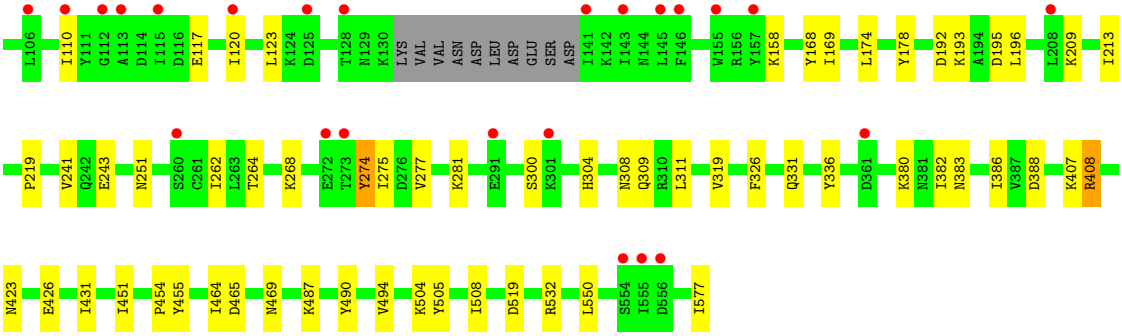
Chain B:



• Molecule 1: Site-specific DNA-methyltransferase (adenine-specific)

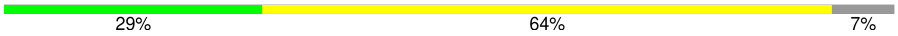
Chain C:

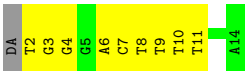




• Molecule 2: DNA Strand II

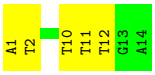
Chain E:





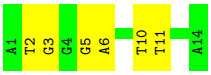
• Molecule 2: DNA Strand II

Chain G:



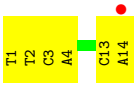
• Molecule 2: DNA Strand II

Chain I:



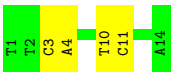
• Molecule 3: DNA Strand I

Chain D:



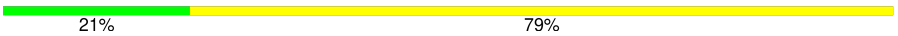
• Molecule 3: DNA Strand I

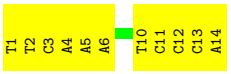
Chain F:



• Molecule 3: DNA Strand I

Chain H:




T1
T2
C3
A4
A5
A6
T10
C11
C12
C13
A14

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	81.59Å 161.26Å 235.72Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.77 – 2.89 47.77 – 2.89	Depositor EDS
% Data completeness (in resolution range)	97.6 (47.77-2.89) 97.6 (47.77-2.89)	Depositor EDS
R_{merge}	0.32	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.13 (at 2.91Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.203 , 0.245 0.209 , 0.248	Depositor DCC
R_{free} test set	68547 reflections (2.90%)	wwPDB-VP
Wilson B-factor (Å^2)	71.5	Xtriage
Anisotropy	0.547	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 54.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	15117	wwPDB-VP
Average B, all atoms (Å^2)	90.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.56% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 0PY, A1ADB

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	0.25	0/4508	0.45	0/6087
1	B	0.25	0/4653	0.45	0/6264
1	C	0.25	0/4430	0.43	0/5983
2	E	0.59	0/300	1.05	0/462
2	G	0.55	0/321	1.01	0/495
2	I	0.55	0/321	1.03	0/495
3	D	0.64	0/315	0.92	0/483
3	F	0.52	0/315	0.89	0/483
3	H	0.55	0/315	0.94	0/483
All	All	0.31	0/15478	0.55	0/21235

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4418	0	4286	40	0
1	B	4559	0	4540	26	0
1	C	4341	0	4197	37	0
2	E	269	0	150	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	G	287	0	162	3	0
2	I	287	0	162	5	0
3	D	281	0	159	3	0
3	F	281	0	159	2	0
3	H	281	0	159	8	0
4	E	43	0	0	1	0
5	D	6	0	5	0	0
6	A	10	0	0	0	0
6	B	26	0	0	1	0
6	C	10	0	0	0	0
6	D	3	0	0	0	0
6	E	4	0	0	0	0
6	F	7	0	0	0	0
6	H	1	0	0	0	0
6	I	3	0	0	0	0
All	All	15117	0	13979	130	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (130) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:73:TYR:HH	1:B:102:HIS:HD1	1.32	0.76
1:C:43:LYS:HD2	1:C:264:THR:HG21	1.71	0.73
1:A:69:LEU:HD12	1:A:123:LEU:HD21	1.71	0.71
2:E:10:DT:H2"	2:E:11:DT:H72	1.73	0.70
1:A:248:LEU:HD23	1:A:280:ILE:HG22	1.74	0.69
1:A:232:ARG:NH1	1:A:314:ASP:O	2.25	0.68
1:A:66:GLY:HA3	1:A:123:LEU:HD13	1.75	0.68
1:B:51:ILE:HD11	1:B:83:ASN:HB3	1.76	0.68
2:G:10:DT:H2"	2:G:11:DT:H72	1.78	0.67
1:A:281:LYS:HE3	1:A:303:GLU:HB3	1.78	0.65
2:E:3:DG:H2"	2:E:4:DG:C8	2.31	0.65
1:B:66:GLY:HA3	1:B:123:LEU:HD13	1.77	0.65
3:D:3:DC:H2'	3:D:4:DA:C8	2.33	0.64
1:B:58:ILE:HD13	1:B:76:LEU:HD11	1.81	0.62
3:H:3:DC:H2'	3:H:4:DA:C8	2.34	0.62
1:B:69:LEU:HD12	1:B:123:LEU:HD21	1.81	0.61
1:C:158:LYS:HD3	1:C:209:LYS:HA	1.82	0.61
1:A:58:ILE:HG13	1:A:161:TYR:HB2	1.82	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:69:LEU:HD12	1:C:123:LEU:HD21	1.82	0.60
2:I:10:DT:H2"	2:I:11:DT:H72	1.84	0.59
1:C:168:TYR:CE1	1:C:219:PRO:HD3	2.37	0.58
1:C:487:LYS:O	1:C:532:ARG:NH1	2.38	0.56
3:D:13:DC:H2"	3:D:14:DA:C8	2.40	0.56
3:F:3:DC:H2'	3:F:4:DA:C8	2.41	0.56
2:I:3:DG:H8	2:I:3:DG:H5"	1.69	0.56
2:G:1:DA:H1'	2:G:2:DT:H5'	1.88	0.56
2:I:2:DT:H2"	2:I:3:DG:N7	2.21	0.56
1:B:386:ILE:HD13	1:B:550:LEU:HB3	1.88	0.55
2:E:8:DT:H2"	2:E:9:DT:H72	1.88	0.55
2:I:3:DG:H5"	2:I:3:DG:C8	2.42	0.55
1:C:408:ARG:HD3	1:C:408:ARG:H	1.72	0.55
1:B:251:ASN:ND2	6:B:603:HOH:O	2.39	0.54
3:H:2:DT:H2'	3:H:3:DC:C6	2.42	0.54
1:A:364:LYS:HA	1:A:367:LEU:HD13	1.91	0.53
3:H:10:DT:H1'	3:H:11:DC:H5'	1.91	0.53
1:B:168:TYR:CE1	1:B:219:PRO:HD3	2.44	0.53
1:A:450:LYS:NZ	1:A:465:ASP:OD2	2.41	0.53
3:H:11:DC:H1'	3:H:12:DC:H5'	1.91	0.53
1:C:386:ILE:HD13	1:C:550:LEU:HB3	1.92	0.52
1:C:97:THR:HG23	1:C:100:ASN:H	1.74	0.52
1:A:114:ASP:OD1	1:A:115:ILE:N	2.43	0.52
1:B:450:LYS:NZ	1:B:465:ASP:OD2	2.39	0.52
1:A:349:ILE:HB	1:A:439:TRP:HB2	1.94	0.51
1:C:195:ASP:OD1	1:C:196:LEU:N	2.44	0.51
3:D:1:DT:H2'	3:D:2:DT:C6	2.47	0.50
1:C:451:ILE:HG13	1:C:490:TYR:HD1	1.76	0.50
1:A:465:ASP:OD1	1:A:469:ASN:ND2	2.45	0.49
1:C:192:ASP:OD1	1:C:193:LYS:NZ	2.37	0.49
1:A:329:LYS:HE3	1:A:577:ILE:HG22	1.94	0.49
1:B:195:ASP:OD1	1:B:196:LEU:N	2.45	0.49
1:A:317:ILE:HG22	1:A:319:VAL:HG13	1.94	0.49
1:B:418:LYS:NZ	1:B:422:GLU:OE2	2.45	0.49
1:A:39:TYR:OH	1:A:243:GLU:OE2	2.30	0.49
1:A:51:ILE:HD11	1:A:83:ASN:HB3	1.95	0.49
1:C:336:TYR:OH	1:C:487:LYS:NZ	2.34	0.49
1:B:400:ILE:HB	1:B:435:TYR:HE2	1.78	0.48
1:B:418:LYS:HE2	1:B:434:TRP:CE2	2.48	0.48
1:C:326:PHE:CE1	1:C:577:ILE:HD12	2.49	0.48
1:A:326:PHE:HE1	1:A:577:ILE:HD12	1.78	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:13:DC:H2"	3:H:14:DA:N7	2.28	0.48
1:C:382:ILE:HG21	1:C:454:PRO:HD3	1.96	0.48
1:B:158:LYS:HB2	1:B:209:LYS:HG3	1.96	0.48
1:A:433:LYS:HB2	1:A:436:GLU:HG3	1.96	0.47
1:C:504:LYS:O	1:C:508:ILE:HG12	2.15	0.47
2:G:11:DT:H1'	2:G:12:DT:H5'	1.95	0.47
1:C:213:ILE:HD11	1:C:268:LYS:HE2	1.96	0.47
1:A:319:VAL:HG11	1:A:508:ILE:HG23	1.96	0.47
1:A:386:ILE:HD13	1:A:550:LEU:HB3	1.96	0.47
1:C:169:ILE:HG21	1:C:174:LEU:HD13	1.95	0.47
1:B:418:LYS:HG3	1:B:434:TRP:CE3	2.50	0.47
1:C:331:GLN:OE1	1:C:505:TYR:OH	2.22	0.46
1:B:176:LYS:HA	1:B:179:LYS:HE3	1.97	0.46
1:C:117:GLU:O	1:C:120:ILE:HG13	2.15	0.46
1:C:426:GLU:HG3	1:C:431:ILE:HD11	1.96	0.46
3:F:10:DT:H1'	3:F:11:DC:H5'	1.98	0.46
1:C:43:LYS:NZ	1:C:243:GLU:OE1	2.48	0.46
1:A:88:LYS:HE2	1:A:96:TRP:O	2.15	0.46
1:A:378:LYS:HA	1:A:378:LYS:HE2	1.97	0.46
1:C:66:GLY:HA3	1:C:123:LEU:HD13	1.98	0.46
1:A:330:ILE:HG12	1:A:575:LEU:HD13	1.97	0.46
1:B:44:THR:HG21	1:B:163:VAL:HG12	1.97	0.45
2:E:6:DA:H2"	2:E:7:DC:C6	2.52	0.45
1:C:275:ILE:HD11	1:C:309:GLN:HB2	1.98	0.45
1:A:191:LYS:HE3	1:A:191:LYS:HB2	1.80	0.44
1:B:242:GLN:HE21	1:B:266:ASP:HB3	1.82	0.44
1:B:464:ILE:HG13	1:B:494:VAL:HG11	1.98	0.44
1:A:164:GLY:O	1:A:216:VAL:HA	2.18	0.44
1:C:274:TYR:HD1	1:C:274:TYR:HA	1.66	0.43
1:A:511:LYS:HE3	1:A:511:LYS:HB2	1.79	0.43
1:B:143:ILE:HG22	1:B:145:LEU:HG	2.00	0.43
1:B:376:TRP:CZ3	1:B:394:LEU:HD22	2.53	0.43
3:H:2:DT:H2'	3:H:3:DC:C5	2.54	0.43
1:A:61:ILE:HD12	1:A:204:ILE:HG12	2.00	0.43
1:A:439:TRP:HB3	1:A:441:ARG:NH1	2.33	0.43
1:A:523:ASN:ND2	1:A:523:ASN:H	2.15	0.43
1:C:58:ILE:HG21	1:C:72:VAL:HG11	2.01	0.43
1:A:326:PHE:CE1	1:A:577:ILE:HD12	2.54	0.43
1:A:367:LEU:HD23	1:A:408:ARG:HG3	2.00	0.43
1:B:348:ILE:O	1:B:472:SER:HA	2.19	0.43
1:A:382:ILE:HG21	1:A:454:PRO:HD3	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:338:LEU:HD23	1:B:338:LEU:HA	1.88	0.43
3:H:1:DT:H2'	3:H:2:DT:C6	2.54	0.42
1:A:143:ILE:HG22	1:A:145:LEU:HG	1.99	0.42
3:H:5:DA:H2"	3:H:6:DA:C8	2.55	0.42
1:A:277:VAL:O	1:A:304:HIS:HA	2.19	0.42
1:A:371:LYS:HE3	1:A:372:PHE:CZ	2.55	0.42
1:C:277:VAL:O	1:C:304:HIS:HA	2.20	0.42
1:A:58:ILE:HD13	1:A:76:LEU:HD11	2.01	0.42
1:A:337:SER:HA	1:A:529:ARG:HA	2.02	0.42
1:C:319:VAL:HG11	1:C:508:ILE:HG23	2.00	0.42
1:C:383:ASN:ND2	1:C:388:ASP:OD1	2.53	0.41
1:C:73:TYR:HB2	1:C:110:ILE:HD11	2.02	0.41
1:B:201:TYR:CE2	1:B:218:THR:HG21	2.56	0.41
1:C:308:ASN:HB3	1:C:311:LEU:HD23	2.02	0.41
1:C:464:ILE:HG13	1:C:494:VAL:HG11	2.02	0.41
1:B:491:GLU:HG2	1:B:544:LYS:HG2	2.02	0.41
1:A:368:VAL:HA	1:A:409:ILE:HD11	2.03	0.41
1:C:241:VAL:O	1:C:275:ILE:HG12	2.21	0.41
1:B:512:LYS:HD3	1:B:518:TYR:CE1	2.56	0.41
1:C:281:LYS:HD2	1:C:300:SER:O	2.21	0.41
1:C:465:ASP:OD1	1:C:469:ASN:ND2	2.52	0.41
1:A:276:ASP:OD1	1:A:306:ASN:ND2	2.45	0.41
2:I:5:DG:H2"	2:I:6:DA:C8	2.56	0.41
1:C:36:ILE:HD12	1:C:262:ILE:HD11	2.02	0.40
1:A:165:ASN:HB2	1:A:217:ILE:HG23	2.03	0.40
1:C:43:LYS:HZ2	1:C:43:LYS:HG2	1.79	0.40
1:C:407:LYS:HA	1:C:407:LYS:HD3	1.91	0.40
2:E:2:DT:H6	2:E:2:DT:H2'	1.68	0.40
1:A:408:ARG:HE	1:A:412:GLU:HG3	1.87	0.40
4:E:101:A1ADB:C32	4:E:101:A1ADB:C42	2.99	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	539/577 (93%)	515 (96%)	24 (4%)	0	100	100
1	B	549/577 (95%)	533 (97%)	16 (3%)	0	100	100
1	C	536/577 (93%)	518 (97%)	18 (3%)	0	100	100
All	All	1624/1731 (94%)	1566 (96%)	58 (4%)	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	474/547 (87%)	469 (99%)	5 (1%)	70	90
1	B	500/547 (91%)	496 (99%)	4 (1%)	79	93
1	C	459/547 (84%)	448 (98%)	11 (2%)	44	76
All	All	1433/1641 (87%)	1413 (99%)	20 (1%)	62	86

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	44	THR
1	A	97	THR
1	A	183	LEU
1	A	455	TYR
1	A	523	ASN
1	B	168	TYR
1	B	419	THR
1	B	455	TYR
1	B	519	ASP
1	C	35	ILE
1	C	38	ASP
1	C	43	LYS
1	C	178	TYR

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Mol	Chain	Res	Type
1	C	251	ASN
1	C	274	TYR
1	C	380	LYS
1	C	408	ARG
1	C	423	ASN
1	C	455	TYR
1	C	519	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	523	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

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	$\#\|Z\| > 2$
4	A1ADB	E	101	-	48,48,48	0.54	0	66,67,67	0.72	3 (4%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
5	0PY	D	101	-	6,6,6	0.40	0	6,6,6	0.42	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
4	A1ADB	E	101	-	-	10/20/30/30	0/6/6/6
5	0PY	D	101	-	-	-	0/1/1/1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	E	101	A1ADB	C21-N20-C2	2.80	133.96	126.61
4	E	101	A1ADB	C22-C21-N20	2.29	127.58	120.13
4	E	101	A1ADB	C43-C21-N20	-2.26	112.79	120.13

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	101	A1ADB	C3-C2-N20-C21
4	E	101	A1ADB	O1-C2-N20-C21
4	E	101	A1ADB	N20-C2-C3-C4
4	E	101	A1ADB	O1-C2-C3-C4
4	E	101	A1ADB	N20-C2-C3-C19
4	E	101	A1ADB	C23-C24-N25-C31
4	E	101	A1ADB	O1-C2-C3-C19
4	E	101	A1ADB	C23-C24-N25-C26
4	E	101	A1ADB	C19-C7-N8-C9
4	E	101	A1ADB	C6-C7-N8-C9

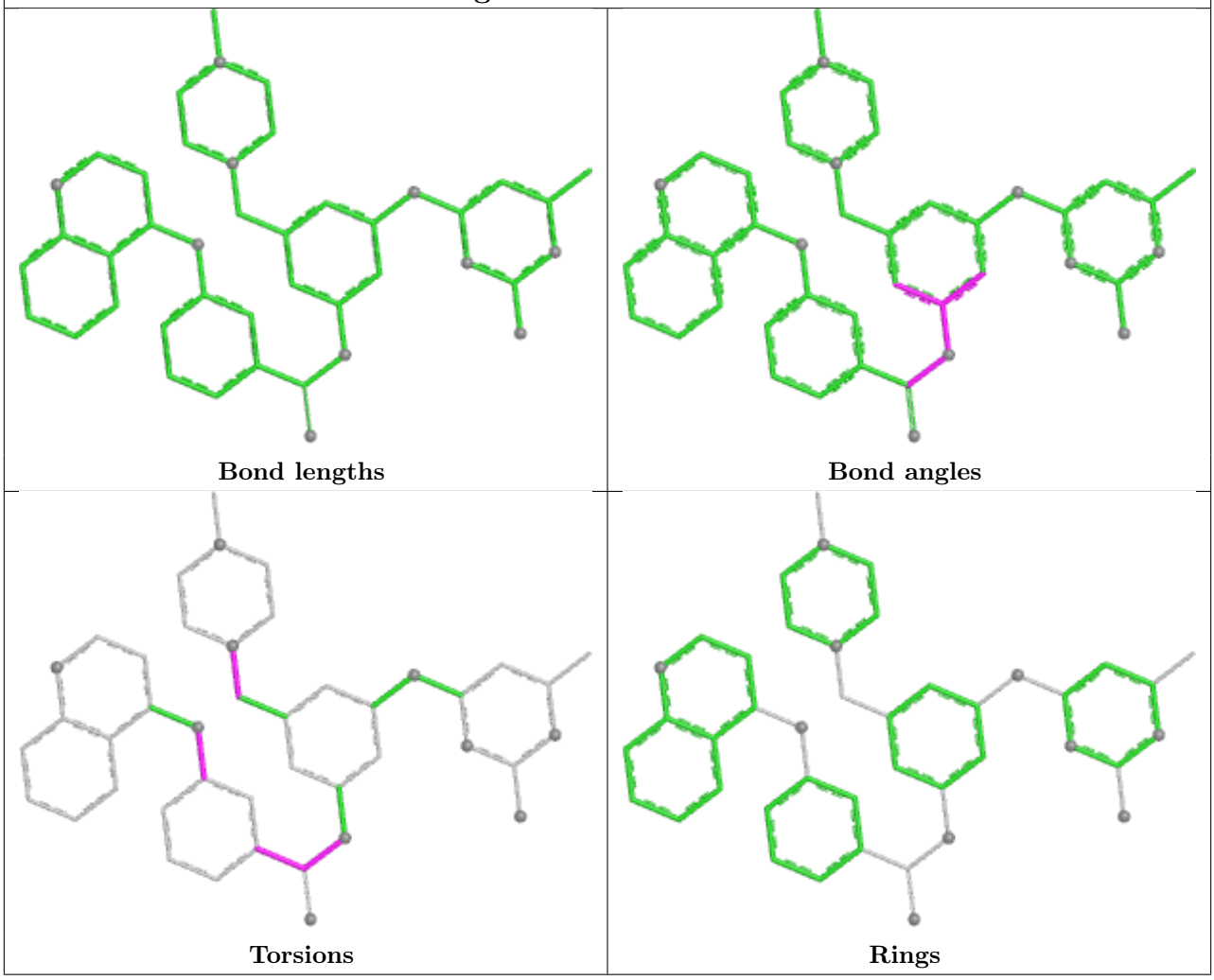
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	101	A1ADB	1	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 A1ADB E 101



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^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	543/577 (94%)	0.58	29 (5%) 33 28	54, 88, 127, 159	0
1	B	551/577 (95%)	0.11	12 (2%) 62 55	45, 72, 111, 159	0
1	C	540/577 (93%)	0.47	35 (6%) 26 22	54, 96, 163, 205	0
2	E	13/14 (92%)	0.31	0 100 100	73, 91, 210, 237	0
2	G	14/14 (100%)	-0.30	0 100 100	55, 66, 92, 93	0
2	I	14/14 (100%)	-0.10	0 100 100	70, 81, 195, 209	0
3	D	14/14 (100%)	0.74	1 (7%) 23 20	66, 92, 199, 221	0
3	F	14/14 (100%)	-0.18	0 100 100	51, 65, 107, 112	0
3	H	14/14 (100%)	0.19	0 100 100	66, 93, 174, 199	0
All	All	1717/1815 (94%)	0.37	77 (4%) 39 32	45, 85, 149, 237	0

All (77) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	28	GLY	5.3
1	B	27	SER	5.2
1	A	169	ILE	5.0
1	A	555	ILE	4.6
1	A	141	ILE	4.3
1	A	171	HIS	4.3
1	C	143	ILE	4.3
1	A	192	ASP	3.9
1	C	141	ILE	3.6
1	C	146	PHE	3.5
1	C	120	ILE	3.3
1	A	174	LEU	3.3
1	C	45	LEU	3.3
1	A	31	TYR	3.3
1	B	29	ILE	3.3

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Mol	Chain	Res	Type	RSRZ
1	C	115	ILE	3.2
1	A	191	LYS	3.1
1	B	28	GLY	3.1
1	C	145	LEU	3.1
1	A	132	VAL	3.1
1	C	556	ASP	2.9
1	A	270	THR	2.9
1	A	137	ASP	2.9
1	C	42	LYS	2.8
1	B	133	VAL	2.7
1	C	157	TYR	2.7
1	C	112	GLY	2.7
1	A	183	LEU	2.7
1	C	73	TYR	2.7
3	D	14	DA	2.7
1	C	61	ILE	2.6
1	A	140	ASP	2.6
1	C	125	ASP	2.6
1	C	113	ALA	2.6
1	A	65	CYS	2.6
1	A	194	ALA	2.5
1	A	170	GLY	2.5
1	C	273	THR	2.5
1	C	208	LEU	2.5
1	A	112	GLY	2.5
1	B	132	VAL	2.5
1	A	227	SER	2.5
1	A	289	LYS	2.5
1	C	48	HIS	2.5
1	A	317	ILE	2.5
1	B	402	ASN	2.4
1	C	260	SER	2.4
1	A	410	LEU	2.4
1	C	98	VAL	2.4
1	C	291	GLU	2.4
1	A	358	LEU	2.3
1	A	412	GLU	2.3
1	B	135	ASP	2.3
1	A	172	LYS	2.3
1	C	29	ILE	2.3
1	B	270	THR	2.3
1	A	290	PHE	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	272	GLU	2.2
1	C	106	LEU	2.2
1	C	128	THR	2.2
1	C	155	TRP	2.2
1	A	554	SER	2.2
1	C	555	ILE	2.2
1	A	156	ARG	2.2
1	C	361	ASP	2.2
1	C	554	SER	2.2
1	A	556	ASP	2.1
1	B	290	PHE	2.1
1	B	134	ASN	2.1
1	A	388	ASP	2.0
1	C	301	LYS	2.0
1	B	399	ASP	2.0
1	C	99	ASP	2.0
1	B	175	GLU	2.0
1	C	110	ILE	2.0
1	C	57	ARG	2.0
1	C	80	PHE	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)

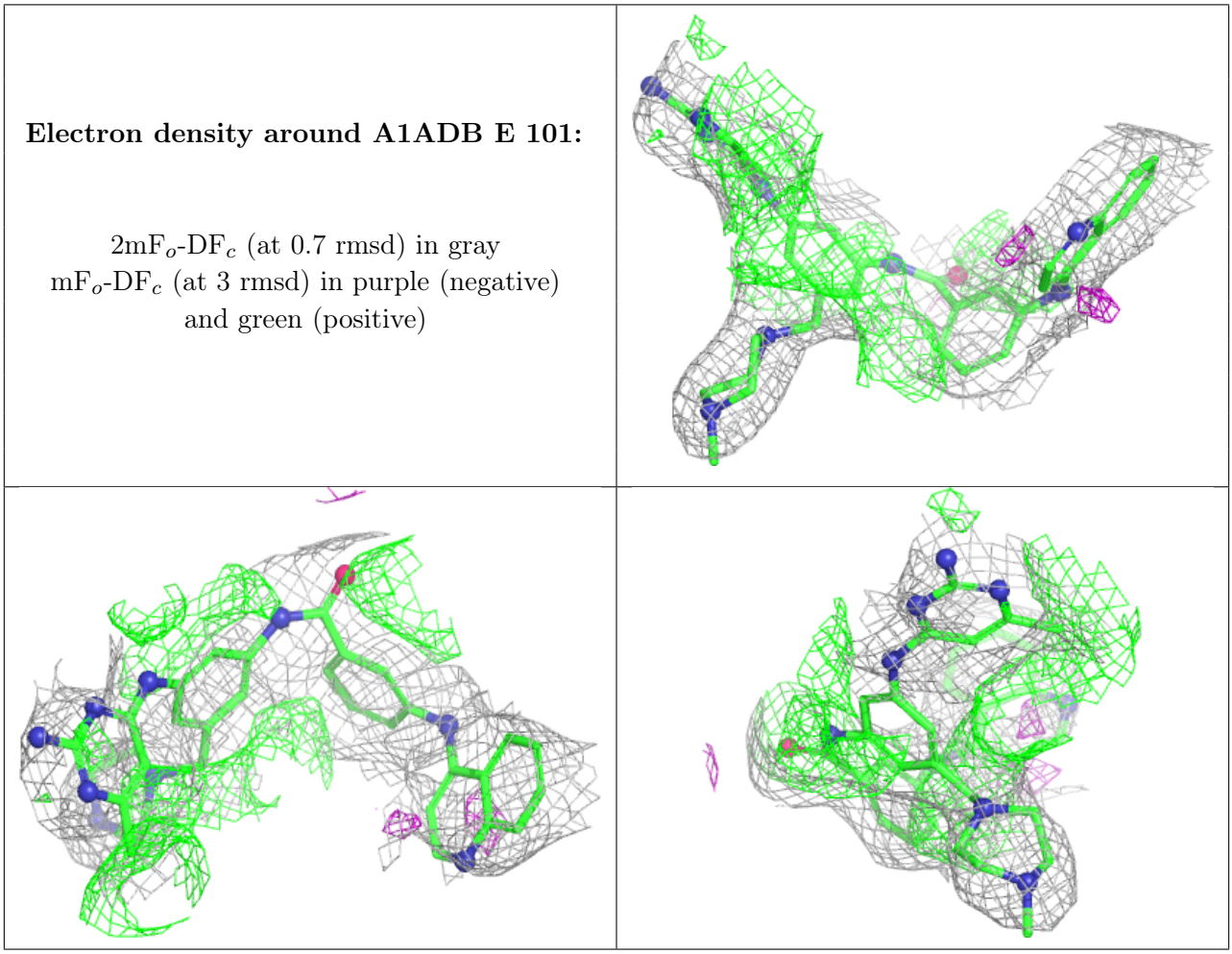
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	0PY	D	101	6/6	0.63	0.12	146,150,152,154	0
4	A1ADB	E	101	43/43	0.72	0.21	85,118,139,149	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 A1ADB E 101:

$2mF_o$-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.