



Full wwPDB X-ray Structure Validation Report ⓘ

May 19, 2025 – 06:08 PM JST

PDB ID : 8ZMC / pdb_00008zmc
Title : Dengue 3 NS5 methyltransferase bound to S-Adenosyl-L-homocysteine and Herbacetin
Authors : Bhutkar, M.; Verma, S.; Tomar, S.; Kumar, P.
Deposited on : 2024-05-23
Resolution : 2.80 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 : 4-5-2 with Phenix2.0rc1
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 2.0rc1
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.006 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.43.1

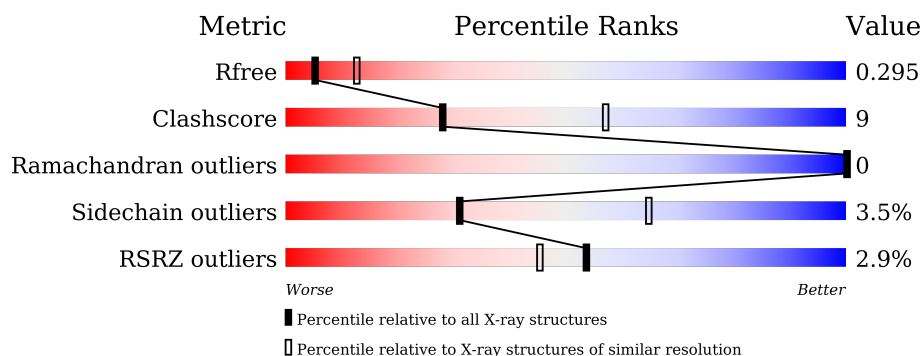
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3657 (2.80-2.80)
Clashscore	180529	4123 (2.80-2.80)
Ramachandran outliers	177936	4071 (2.80-2.80)
Sidechain outliers	177891	4073 (2.80-2.80)
RSRZ outliers	164620	3659 (2.80-2.80)

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 $\leq 5\%$. 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	284	<div> <div style="width: 100%; height: 10px; background-color: red; position: relative;"> % </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> 73% 15% • 10% </div> </div>
1	B	284	<div> <div style="width: 100%; height: 10px; background-color: red; position: relative;"> 4% </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> 71% 16% • 10% </div> </div>

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	GOL	A	304	-	-	X	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4180 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 Dengue 3 NS5 methyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	256	Total	C	N	O	S	0	0	0
			2038	1284	368	372	14			
1	B	256	Total	C	N	O	S	0	0	0
			2038	1284	368	372	14			

There are 42 discrepancies between the modelled and reference sequences:

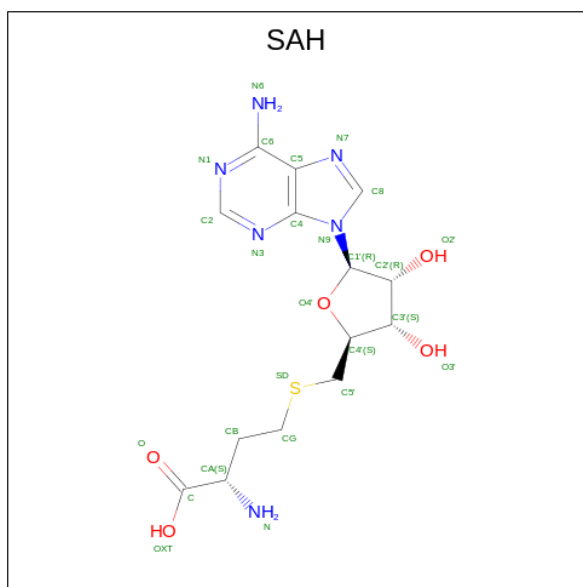
Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	HIS	-	expression tag	UNP C1KBQ3
A	-17	HIS	-	expression tag	UNP C1KBQ3
A	-16	HIS	-	expression tag	UNP C1KBQ3
A	-15	HIS	-	expression tag	UNP C1KBQ3
A	-14	HIS	-	expression tag	UNP C1KBQ3
A	-13	HIS	-	expression tag	UNP C1KBQ3
A	-12	SER	-	expression tag	UNP C1KBQ3
A	-11	SER	-	expression tag	UNP C1KBQ3
A	-10	GLY	-	expression tag	UNP C1KBQ3
A	-9	LEU	-	expression tag	UNP C1KBQ3
A	-8	VAL	-	expression tag	UNP C1KBQ3
A	-7	PRO	-	expression tag	UNP C1KBQ3
A	-6	ARG	-	expression tag	UNP C1KBQ3
A	-5	GLY	-	expression tag	UNP C1KBQ3
A	-4	SER	-	expression tag	UNP C1KBQ3
A	-3	HIS	-	expression tag	UNP C1KBQ3
A	-2	MET	-	expression tag	UNP C1KBQ3
A	-1	ALA	-	expression tag	UNP C1KBQ3
A	0	SER	-	expression tag	UNP C1KBQ3
A	163	LYS	ARG	conflict	UNP C1KBQ3
A	188	ALA	THR	conflict	UNP C1KBQ3
B	-18	HIS	-	expression tag	UNP C1KBQ3
B	-17	HIS	-	expression tag	UNP C1KBQ3
B	-16	HIS	-	expression tag	UNP C1KBQ3
B	-15	HIS	-	expression tag	UNP C1KBQ3

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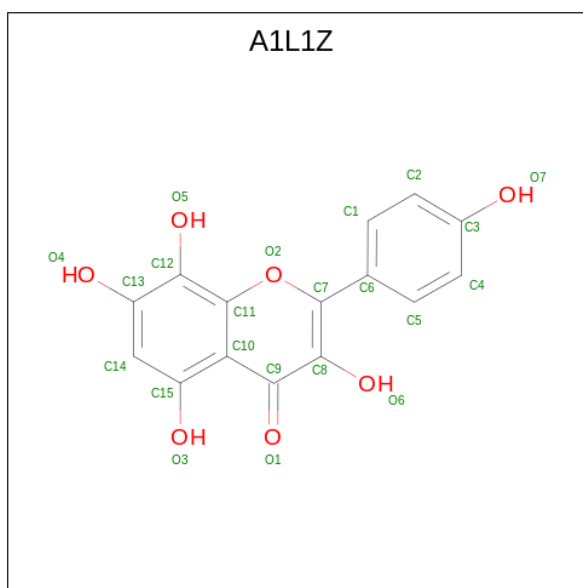
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Chain	Residue	Modelled	Actual	Comment	Reference
B	-14	HIS	-	expression tag	UNP C1KBQ3
B	-13	HIS	-	expression tag	UNP C1KBQ3
B	-12	SER	-	expression tag	UNP C1KBQ3
B	-11	SER	-	expression tag	UNP C1KBQ3
B	-10	GLY	-	expression tag	UNP C1KBQ3
B	-9	LEU	-	expression tag	UNP C1KBQ3
B	-8	VAL	-	expression tag	UNP C1KBQ3
B	-7	PRO	-	expression tag	UNP C1KBQ3
B	-6	ARG	-	expression tag	UNP C1KBQ3
B	-5	GLY	-	expression tag	UNP C1KBQ3
B	-4	SER	-	expression tag	UNP C1KBQ3
B	-3	HIS	-	expression tag	UNP C1KBQ3
B	-2	MET	-	expression tag	UNP C1KBQ3
B	-1	ALA	-	expression tag	UNP C1KBQ3
B	0	SER	-	expression tag	UNP C1KBQ3
B	163	LYS	ARG	conflict	UNP C1KBQ3
B	188	ALA	THR	conflict	UNP C1KBQ3

- Molecule 2 is S-ADENOSYL-L-HOMOCYSTEINE (CCD ID: SAH) (formula: $C_{14}H_{20}N_6O_5S$).

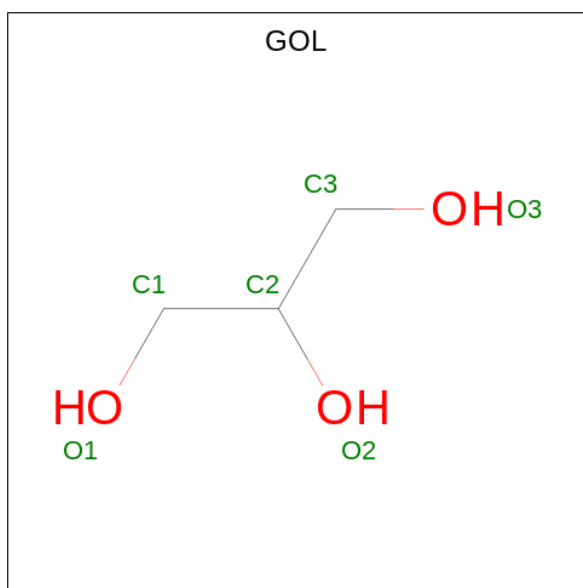


Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			22	15	7		

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		

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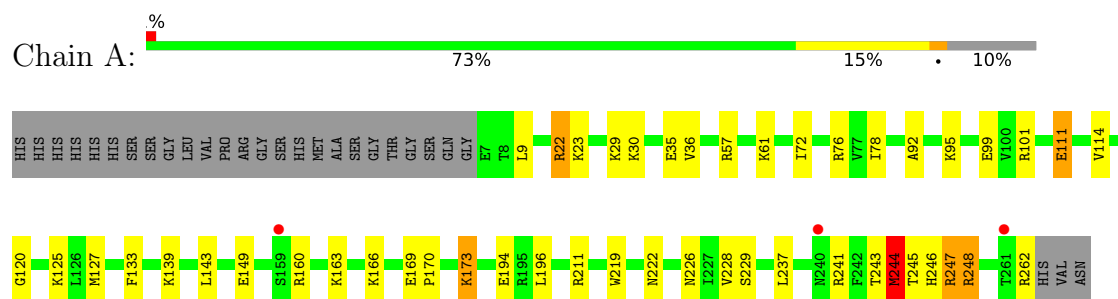
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		

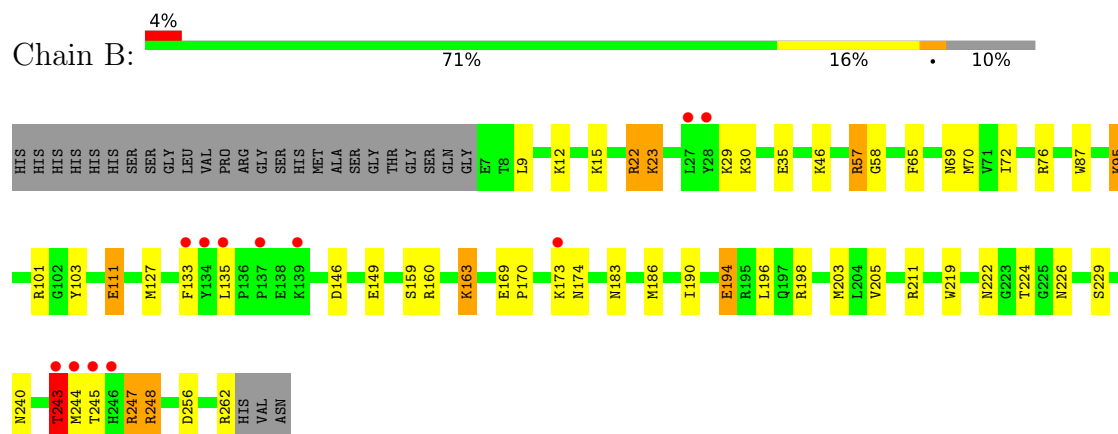
3 Residue-property plots

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

- Molecule 1: Dengue 3 NS5 methyltransferase



- Molecule 1: Dengue 3 NS5 methyltransferase



4 Data and refinement statistics

Property	Value	Source
Space group	P 2 21 21	Depositor
Cell constants a, b, c, α , β , γ	50.88Å 59.97Å 185.04Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.89 – 2.80 24.89 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.7 (24.89-2.80) 99.7 (24.89-2.80)	Depositor EDS
R_{merge}	0.20	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.22 (at 2.80Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.259 , 0.302 0.259 , 0.295	Depositor DCC
R_{free} test set	707 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	34.1	Xtriage
Anisotropy	0.261	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 35.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.39$, $\langle L^2 \rangle = 0.22$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.85	EDS
Total number of atoms	4180	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.46% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SAH, GOL, A1L1Z

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	0/2082	1.25	20/2806 (0.7%)
1	B	0.59	0/2082	1.22	21/2806 (0.7%)
All	All	0.60	0/4164	1.23	41/5612 (0.7%)

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	A	0	3
1	B	0	2
All	All	0	5

There are no bond length outliers.

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	244	MET	CG-SD-CE	14.79	133.45	100.90
1	B	262	ARG	CG-CD-NE	-12.39	84.73	112.00
1	A	262	ARG	CG-CD-NE	-11.65	86.38	112.00
1	B	262	ARG	N-CA-CB	-11.45	91.03	110.50
1	A	262	ARG	N-CA-CB	-10.92	91.94	110.50
1	A	30	LYS	CG-CD-CE	9.74	133.71	111.30
1	B	243	THR	OG1-CB-CG2	-9.29	90.72	109.30
1	A	22	ARG	CD-NE-CZ	8.61	136.46	124.40
1	B	163	LYS	CB-CG-CD	8.47	130.79	111.30
1	A	194	GLU	CB-CG-CD	8.34	126.77	112.60
1	A	194	GLU	CG-CD-OE1	-7.93	100.17	118.40
1	B	163	LYS	CG-CD-CE	7.80	129.25	111.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	194	GLU	CG-CD-OE2	7.72	136.15	118.40
1	A	173	LYS	CB-CA-C	7.49	125.33	110.42
1	B	194	GLU	CG-CD-OE1	-7.28	101.66	118.40
1	B	211	ARG	CD-NE-CZ	7.25	134.55	124.40
1	B	248	ARG	NE-CZ-NH2	7.22	125.69	119.20
1	B	211	ARG	NE-CZ-NH1	-7.18	114.32	121.50
1	B	194	GLU	CG-CD-OE2	7.07	134.67	118.40
1	B	194	GLU	CB-CG-CD	7.05	124.59	112.60
1	B	57	ARG	NH1-CZ-NH2	-6.93	110.30	119.30
1	B	57	ARG	NE-CZ-NH2	6.30	124.87	119.20
1	B	211	ARG	NE-CZ-NH2	5.89	124.50	119.20
1	A	99	GLU	CG-CD-OE1	-5.71	105.26	118.40
1	A	23	LYS	CG-CD-CE	5.62	124.22	111.30
1	B	95	LYS	N-CA-CB	5.52	118.34	110.16
1	B	22	ARG	CD-NE-CZ	5.50	132.10	124.40
1	A	99	GLU	CG-CD-OE2	5.45	130.94	118.40
1	A	29	LYS	N-CA-CB	-5.34	102.26	110.12
1	B	23	LYS	CG-CD-CE	5.24	123.35	111.30
1	A	22	ARG	NE-CZ-NH2	5.22	123.90	119.20
1	B	12	LYS	CG-CD-CE	5.22	123.32	111.30
1	A	173	LYS	CA-C-N	-5.20	111.60	121.54
1	A	173	LYS	C-N-CA	-5.20	111.60	121.54
1	B	46	LYS	CG-CD-CE	5.20	123.26	111.30
1	A	163	LYS	CG-CD-CE	5.17	123.18	111.30
1	B	173	LYS	CG-CD-CE	5.11	123.04	111.30
1	B	111	GLU	CB-CG-CD	5.09	121.25	112.60
1	A	211	ARG	CD-NE-CZ	5.06	131.49	124.40
1	A	211	ARG	NE-CZ-NH1	-5.04	116.46	121.50
1	A	211	ARG	NE-CZ-NH2	5.00	123.70	119.20

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	22	ARG	Sidechain
1	A	247	ARG	Sidechain
1	A	248	ARG	Sidechain
1	B	247	ARG	Sidechain
1	B	248	ARG	Sidechain

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	2038	0	2064	40	2
1	B	2038	0	2064	41	2
2	A	26	0	19	0	0
2	B	26	0	19	3	0
3	A	22	0	0	1	0
4	A	24	0	32	16	0
4	B	6	0	8	1	0
All	All	4180	0	4206	74	2

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 9.

All (74) 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:70:MET:HE1	1:B:205:VAL:HG11	1.24	1.16
1:B:65:PHE:HD1	1:B:70:MET:HE2	1.12	1.07
1:A:57:ARG:HD3	4:A:304:GOL:O2	1.58	1.01
1:B:65:PHE:CD1	1:B:70:MET:HE2	2.02	0.95
1:B:245:THR:HB	1:B:247:ARG:HH22	1.36	0.91
1:A:57:ARG:HD3	4:A:304:GOL:C2	2.00	0.91
1:A:57:ARG:HH11	4:A:304:GOL:H2	1.34	0.91
1:A:139:LYS:HG3	1:B:174:ASN:HD21	1.39	0.87
1:A:36:VAL:HG22	4:A:304:GOL:O3	1.76	0.84
1:B:70:MET:CE	1:B:205:VAL:HG11	2.07	0.81
1:B:72:ILE:HD12	1:B:222:ASN:ND2	1.96	0.81
1:A:57:ARG:CD	4:A:304:GOL:O2	2.30	0.80
1:A:57:ARG:NH1	4:A:304:GOL:H2	1.98	0.79
1:A:245:THR:HB	1:A:247:ARG:NH2	1.97	0.78
1:B:65:PHE:HD1	1:B:70:MET:CE	1.97	0.76
1:B:133:PHE:CE2	1:B:163:LYS:HD2	2.20	0.76
1:A:166:LYS:NZ	1:B:226:ASN:HD22	1.82	0.75
1:A:166:LYS:HZ3	1:B:226:ASN:HD22	1.35	0.74
1:A:57:ARG:HD3	4:A:304:GOL:H2	1.74	0.70
1:A:170:PRO:HA	1:B:198:ARG:O	1.93	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:36:VAL:HG22	4:A:304:GOL:HO3	1.58	0.67
1:A:245:THR:HB	1:A:247:ARG:HH22	1.61	0.66
1:A:111:GLU:H	1:A:111:GLU:CD	2.04	0.66
1:B:245:THR:HB	1:B:247:ARG:NH2	2.10	0.65
1:B:190:ILE:O	1:B:194:GLU:HG3	1.96	0.65
1:A:139:LYS:HG3	1:B:174:ASN:ND2	2.11	0.63
1:B:70:MET:HE1	1:B:205:VAL:CG1	2.16	0.63
1:B:35:GLU:HG3	1:B:57:ARG:HH22	1.64	0.63
1:B:245:THR:O	1:B:247:ARG:NH2	2.32	0.62
1:A:226:ASN:HB3	1:A:229:SER:OG	2.00	0.61
1:A:114:VAL:HG13	4:A:306:GOL:H11	1.81	0.60
1:A:169:GLU:OE1	1:B:198:ARG:HD2	2.03	0.58
1:B:72:ILE:HD12	1:B:222:ASN:HD21	1.66	0.57
1:A:78:ILE:HD13	1:A:101:ARG:HB2	1.87	0.56
1:B:65:PHE:CD1	1:B:70:MET:CE	2.78	0.55
1:A:111:GLU:CD	1:A:111:GLU:N	2.66	0.54
1:B:101:ARG:NE	1:B:127:MET:HE1	2.22	0.54
1:B:245:THR:O	1:B:247:ARG:HD2	2.10	0.52
1:A:72:ILE:HD12	1:A:222:ASN:ND2	2.24	0.52
1:B:244:MET:HE3	1:B:247:ARG:HD3	1.92	0.52
3:A:302:A1L1Z:O7	4:A:303:GOL:O3	2.17	0.50
1:A:35:GLU:HB2	4:A:304:GOL:H11	1.94	0.50
1:A:35:GLU:HB2	4:A:304:GOL:C1	2.41	0.50
1:B:146:ASP:OD2	2:B:301:SAH:HB2	2.12	0.50
1:B:35:GLU:HG3	1:B:57:ARG:NH2	2.27	0.49
1:A:125:LYS:HE3	1:A:127:MET:SD	2.53	0.49
1:B:226:ASN:HB3	1:B:229:SER:OG	2.14	0.48
1:A:149:GLU:O	1:A:160:ARG:NH2	2.44	0.48
1:B:87:TRP:CD1	2:B:301:SAH:O	2.67	0.48
1:B:169:GLU:N	1:B:170:PRO:HD2	2.29	0.48
1:B:76:ARG:NH2	1:B:101:ARG:HG3	2.29	0.47
1:B:76:ARG:HH21	1:B:101:ARG:HG3	1.77	0.47
1:B:256:ASP:H	4:B:302:GOL:H11	1.79	0.47
1:A:57:ARG:HB2	4:A:303:GOL:H32	1.97	0.46
1:A:76:ARG:NH2	1:A:101:ARG:HG3	2.31	0.45
1:B:103:TYR:CD2	1:B:135:LEU:HD11	2.50	0.45
1:A:196:LEU:HB3	1:A:219:TRP:CH2	2.51	0.45
1:B:149:GLU:O	1:B:160:ARG:NH2	2.47	0.44
1:A:245:THR:CB	1:A:247:ARG:HH22	2.31	0.44
1:A:133:PHE:O	1:B:224:THR:HG23	2.18	0.43
1:B:240:ASN:O	1:B:243:THR:HG23	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:76:ARG:HH21	1:A:101:ARG:HG3	1.83	0.43
1:A:111:GLU:HA	4:A:305:GOL:H2	2.01	0.43
1:A:166:LYS:HZ3	1:B:226:ASN:HB2	1.85	0.42
1:B:29:LYS:HG3	1:B:30:LYS:HG3	2.02	0.42
1:B:58:GLY:HA3	2:B:301:SAH:O	2.19	0.42
1:A:92:ALA:O	1:A:120:GLY:HA3	2.19	0.41
1:A:35:GLU:HA	4:A:304:GOL:H32	2.02	0.41
1:A:143:LEU:C	1:A:143:LEU:HD13	2.45	0.41
1:A:237:LEU:O	1:A:241:ARG:HG3	2.20	0.41
1:B:183:ASN:OD1	1:B:186:MET:HG2	2.20	0.41
1:A:61:LYS:HB2	4:A:303:GOL:H11	2.03	0.41
1:A:241:ARG:HA	1:A:244:MET:HG2	2.03	0.41
1:B:196:LEU:HB3	1:B:219:TRP:CH2	2.57	0.40

All (2) 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)
1:A:246:HIS:O	1:B:69:ASN:ND2[3_545]	1.79	0.41
1:A:248:ARG:NH2	1:B:222:ASN:O[3_545]	2.06	0.14

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	254/284 (89%)	249 (98%)	5 (2%)	0	100	100
1	B	254/284 (89%)	249 (98%)	5 (2%)	0	100	100
All	All	508/568 (89%)	498 (98%)	10 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	226/248 (91%)	219 (97%)	7 (3%)	35	69
1	B	226/248 (91%)	217 (96%)	9 (4%)	27	60
All	All	452/496 (91%)	436 (96%)	16 (4%)	31	65

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	LEU
1	A	95	LYS
1	A	111	GLU
1	A	173	LYS
1	A	228	VAL
1	A	243	THR
1	A	244	MET
1	B	9	LEU
1	B	15	LYS
1	B	22	ARG
1	B	23	LYS
1	B	95	LYS
1	B	111	GLU
1	B	159	SER
1	B	203	MET
1	B	243	THR

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

Mol	Chain	Res	Type
1	B	52	HIS
1	B	174	ASN
1	B	226	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 ⓘ

8 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	GOL	A	306	-	5,5,5	0.11	0	5,5,5	0.37	0
4	GOL	A	303	-	5,5,5	0.20	0	5,5,5	0.77	0
2	SAH	B	301	-	24,28,28	0.63	0	25,40,40	1.23	2 (8%)
4	GOL	A	304	-	5,5,5	0.19	0	5,5,5	0.55	0
2	SAH	A	301	-	24,28,28	0.72	0	25,40,40	0.94	0
4	GOL	A	305	-	5,5,5	0.13	0	5,5,5	0.42	0
4	GOL	B	302	-	5,5,5	0.15	0	5,5,5	0.47	0
3	A1L1Z	A	302	-	24,24,24	0.50	0	36,36,36	0.71	1 (2%)

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	GOL	A	306	-	-	1/4/4/4	-
4	GOL	A	303	-	-	0/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	SAH	B	301	-	-	3/11/31/31	0/3/3/3
4	GOL	A	304	-	-	4/4/4/4	-
2	SAH	A	301	-	-	4/11/31/31	0/3/3/3
4	GOL	A	305	-	-	2/4/4/4	-
4	GOL	B	302	-	-	3/4/4/4	-
3	A1L1Z	A	302	-	-	2/4/4/4	0/3/3/3

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	301	SAH	O4'-C4'-C3'	-2.98	99.22	105.11
2	B	301	SAH	C5-C6-N6	2.70	124.46	120.35
3	A	302	A1L1Z	O2-C7-C6	2.18	114.06	110.86

There are no chirality outliers.

All (19) torsion outliers are listed below:

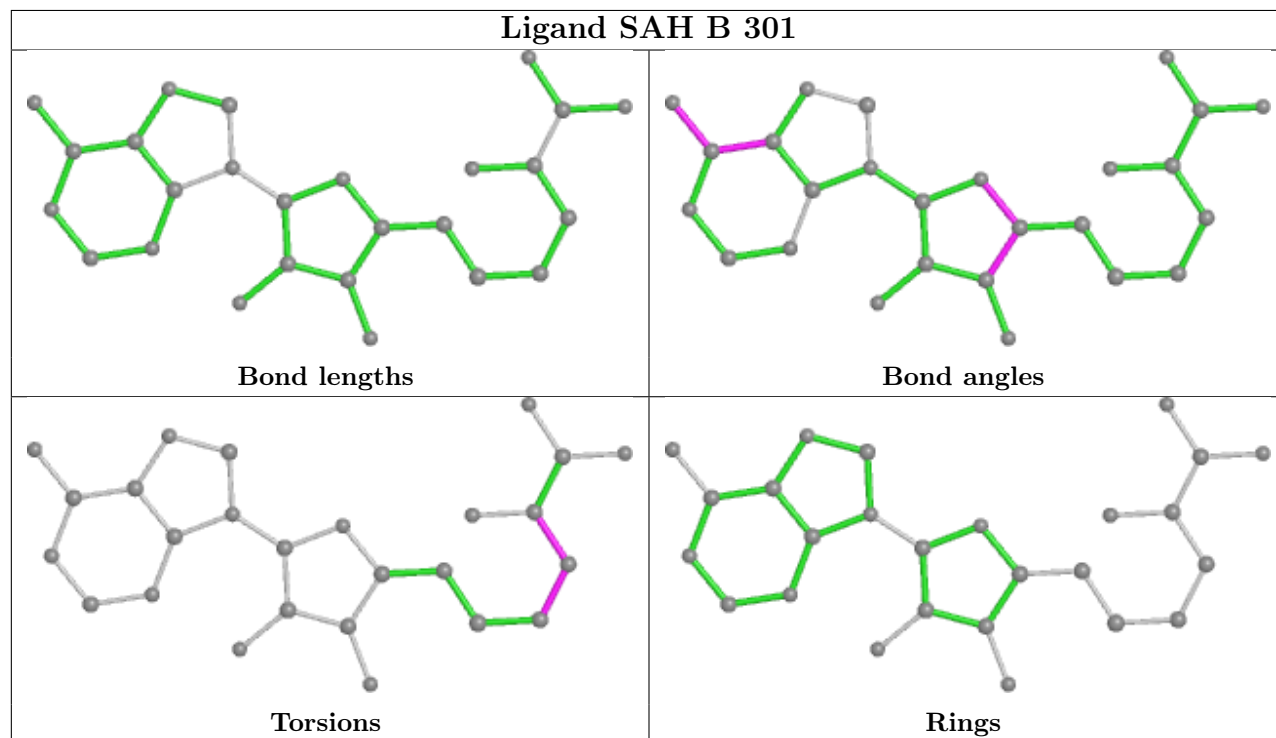
Mol	Chain	Res	Type	Atoms
2	A	301	SAH	N-CA-CB-CG
2	A	301	SAH	C-CA-CB-CG
2	B	301	SAH	N-CA-CB-CG
2	B	301	SAH	C-CA-CB-CG
4	A	304	GOL	O1-C1-C2-C3
4	A	304	GOL	C1-C2-C3-O3
4	A	305	GOL	O1-C1-C2-C3
4	A	304	GOL	O1-C1-C2-O2
4	A	306	GOL	O1-C1-C2-C3
4	A	304	GOL	O2-C2-C3-O3
4	A	305	GOL	O1-C1-C2-O2
4	B	302	GOL	O1-C1-C2-O2
4	B	302	GOL	O2-C2-C3-O3
3	A	302	A1L1Z	C5-C6-C7-C8
2	A	301	SAH	CB-CG-SD-C5'
2	A	301	SAH	CA-CB-CG-SD
3	A	302	A1L1Z	C1-C6-C7-C8
4	B	302	GOL	O1-C1-C2-C3
2	B	301	SAH	CA-CB-CG-SD

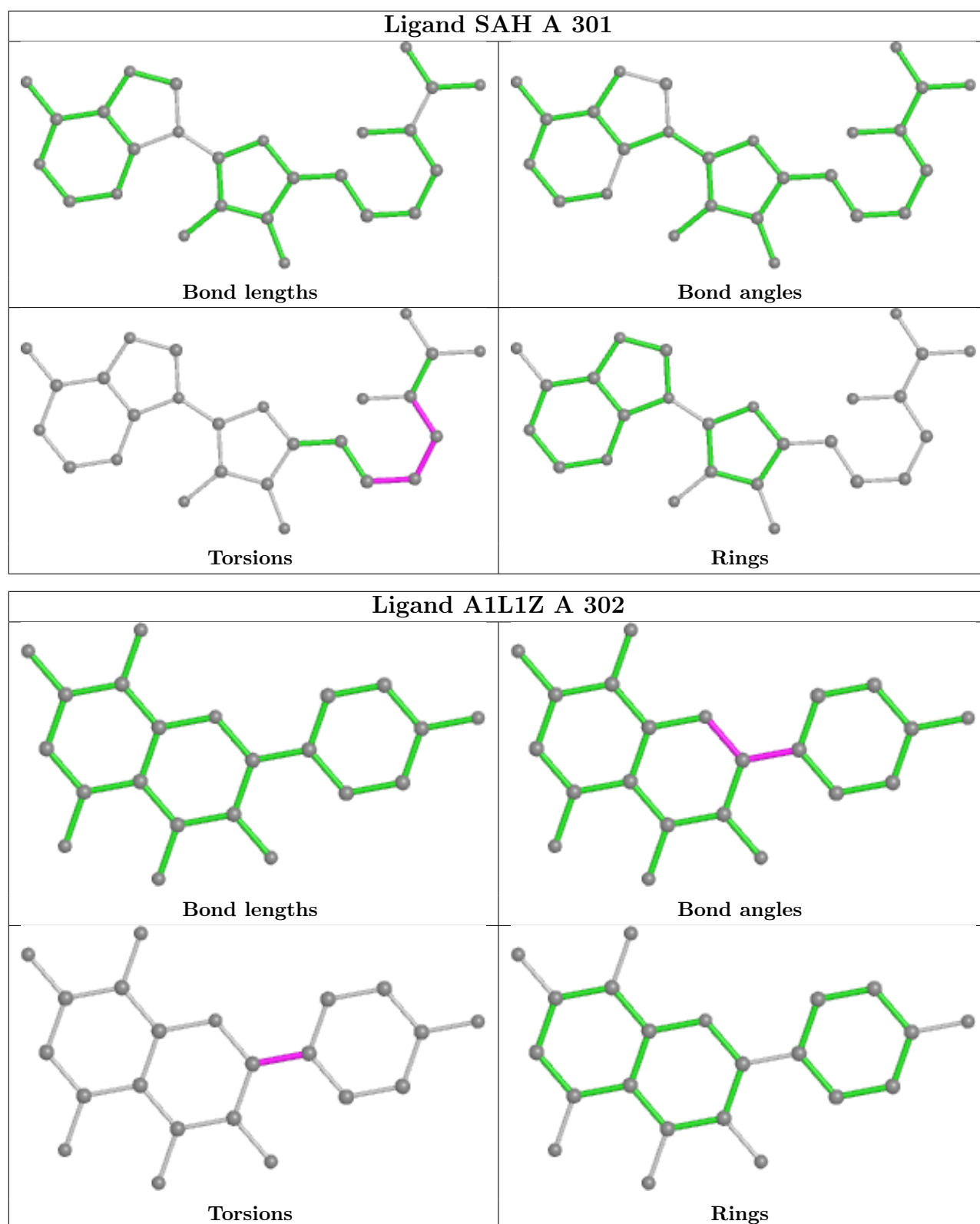
There are no ring outliers.

7 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	306	GOL	1	0
4	A	303	GOL	3	0
2	B	301	SAH	3	0
4	A	304	GOL	11	0
4	A	305	GOL	1	0
4	B	302	GOL	1	0
3	A	302	A1L1Z	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 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 ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data [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	256/284 (90%)	0.06	3 (1%) 76 69	18, 29, 44, 57	0
1	B	256/284 (90%)	0.48	12 (4%) 37 30	21, 42, 66, 94	0
All	All	512/568 (90%)	0.27	15 (2%) 54 45	18, 34, 61, 94	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	245	THR	3.6
1	B	244	MET	3.4
1	B	134	TYR	3.1
1	A	159	SER	3.0
1	B	135	LEU	2.9
1	B	243	THR	2.8
1	B	133	PHE	2.7
1	B	139	LYS	2.6
1	B	27	LEU	2.6
1	B	246	HIS	2.3
1	B	173	LYS	2.3
1	A	261	THR	2.2
1	B	137	PRO	2.2
1	B	28	TYR	2.1
1	A	240	ASN	2.1

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](#)

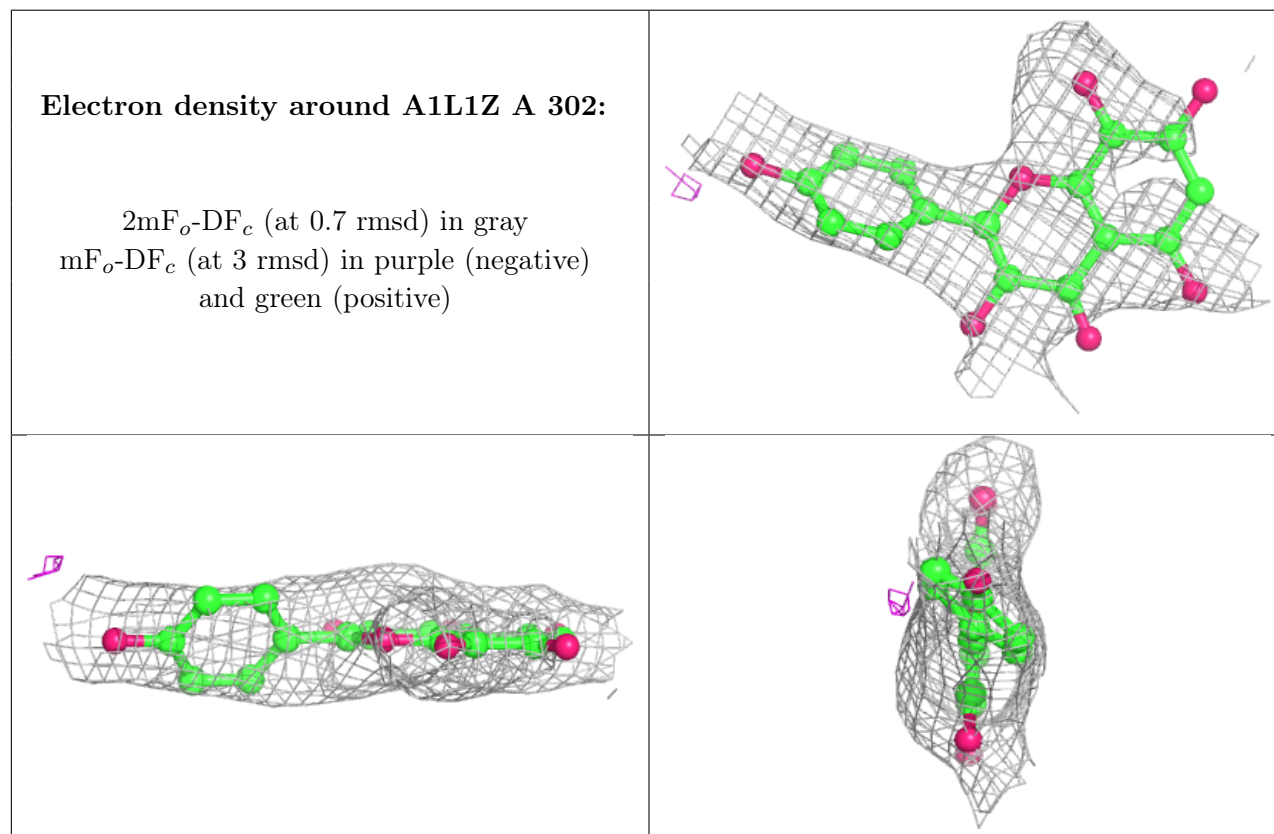
There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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.

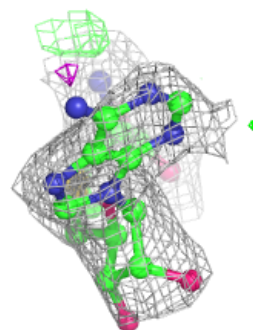
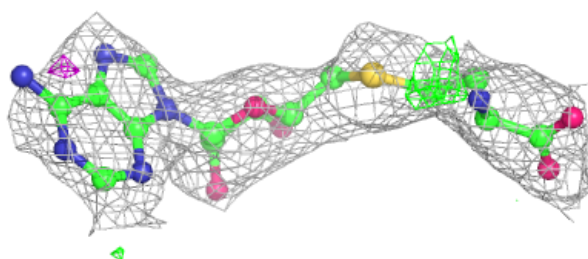
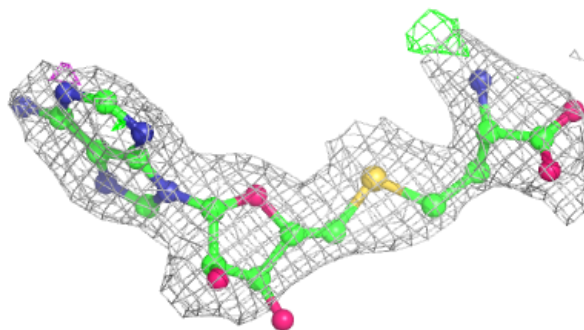
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	A1L1Z	A	302	22/22	0.79	0.14	46,67,72,77	0
4	GOL	A	305	6/6	0.81	0.13	31,39,49,51	0
2	SAH	B	301	26/26	0.85	0.13	31,49,58,62	0
4	GOL	A	304	6/6	0.86	0.19	22,27,30,34	0
4	GOL	A	303	6/6	0.88	0.14	21,25,28,29	0
4	GOL	A	306	6/6	0.88	0.11	36,42,44,46	0
4	GOL	B	302	6/6	0.90	0.10	30,37,43,47	0
2	SAH	A	301	26/26	0.93	0.09	18,20,22,24	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.

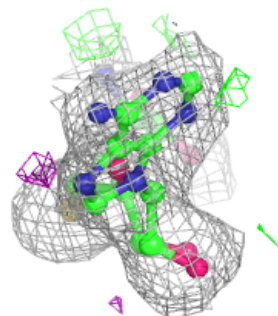
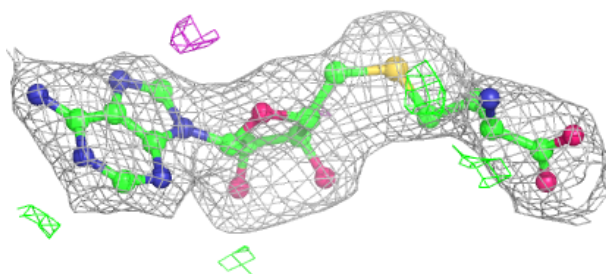
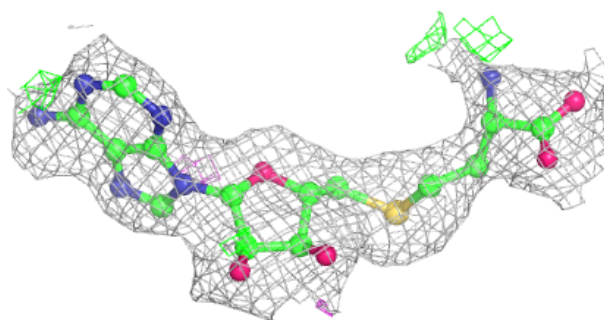


Electron density around SAH B 301:

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

**Electron density around SAH A 301:**

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



6.5 Other polymers [i](#)

There are no such residues in this entry.