



Full wwPDB X-ray Structure Validation Report ⓘ

May 22, 2020 – 05:41 pm BST

PDB ID : 3NUT
Title : Crystal structure of the methyltransferase CobJ
Authors : Pickersgill, R.W.; Hutchison, T.; To, T.T.
Deposited on : 2010-07-07
Resolution : 2.22 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
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) : 2.11

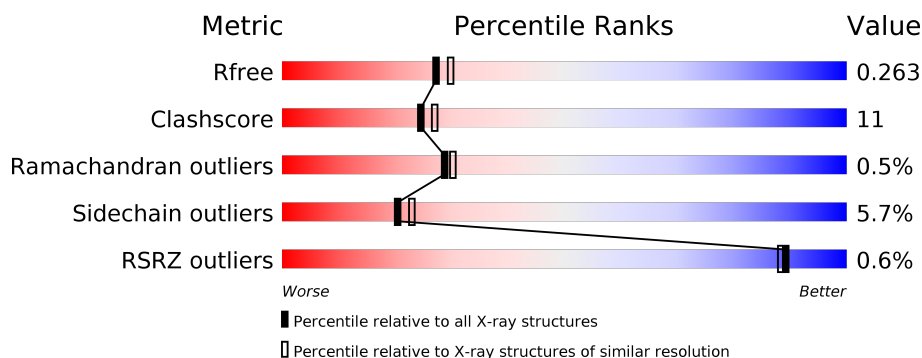
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.22 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	5912 (2.24-2.20)
Clashscore	141614	6646 (2.24-2.20)
Ramachandran outliers	138981	6543 (2.24-2.20)
Sidechain outliers	138945	6544 (2.24-2.20)
RSRZ outliers	127900	5797 (2.24-2.20)

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 on 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	251	<div> <div>%</div> <div> <div></div> <div>80%</div> <div>14%</div> <div>• •</div> </div> </div>
1	B	251	<div> <div>74%</div> <div>20%</div> <div>• •</div> </div>
1	C	251	<div> <div>%</div> <div> <div></div> <div>82%</div> <div>14%</div> <div>•</div> </div> </div>
1	D	251	<div> <div>%</div> <div> <div></div> <div>69%</div> <div>24%</div> <div>• 5%</div> </div> </div>

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

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	GOL	B	246	-	-	X	-
3	GOL	C	246	-	-	X	-
3	GOL	C	247	-	-	X	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7643 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 Precorrin-3 methylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	240	Total	C	N	O	S	0	0	0
			1824	1149	332	335	8			
1	B	240	Total	C	N	O	S	0	0	0
			1822	1148	332	334	8			
1	C	242	Total	C	N	O	S	0	0	0
			1835	1155	334	337	9			
1	D	239	Total	C	N	O	S	0	0	0
			1813	1143	328	334	8			

There are 24 discrepancies between the modelled and reference sequences:

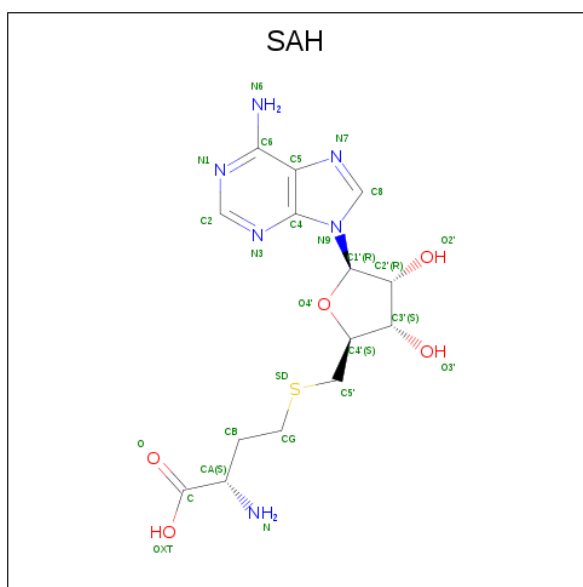
Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	HIS	-	EXPRESSION TAG	UNP O68097
A	-4	HIS	-	EXPRESSION TAG	UNP O68097
A	-3	HIS	-	EXPRESSION TAG	UNP O68097
A	-2	HIS	-	EXPRESSION TAG	UNP O68097
A	-1	HIS	-	EXPRESSION TAG	UNP O68097
A	0	HIS	-	EXPRESSION TAG	UNP O68097
B	-5	HIS	-	EXPRESSION TAG	UNP O68097
B	-4	HIS	-	EXPRESSION TAG	UNP O68097
B	-3	HIS	-	EXPRESSION TAG	UNP O68097
B	-2	HIS	-	EXPRESSION TAG	UNP O68097
B	-1	HIS	-	EXPRESSION TAG	UNP O68097
B	0	HIS	-	EXPRESSION TAG	UNP O68097
C	-5	HIS	-	EXPRESSION TAG	UNP O68097
C	-4	HIS	-	EXPRESSION TAG	UNP O68097
C	-3	HIS	-	EXPRESSION TAG	UNP O68097
C	-2	HIS	-	EXPRESSION TAG	UNP O68097
C	-1	HIS	-	EXPRESSION TAG	UNP O68097
C	0	HIS	-	EXPRESSION TAG	UNP O68097
D	-5	HIS	-	EXPRESSION TAG	UNP O68097
D	-4	HIS	-	EXPRESSION TAG	UNP O68097
D	-3	HIS	-	EXPRESSION TAG	UNP O68097

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
D	-2	HIS	-	EXPRESSION TAG	UNP O68097
D	-1	HIS	-	EXPRESSION TAG	UNP O68097
D	0	HIS	-	EXPRESSION TAG	UNP O68097

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



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	B	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	C	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	D	1	Total	C	N	O	S	0	0
			26	14	6	5	1		

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

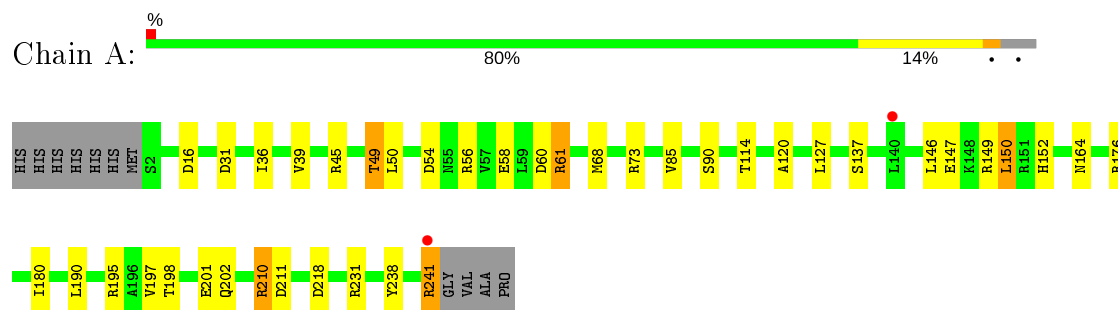
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	46	Total	O	0	0
			46	46		
4	B	54	Total	O	0	0
			54	54		
4	C	59	Total	O	0	0
			59	59		
4	D	38	Total	O	0	0
			38	38		

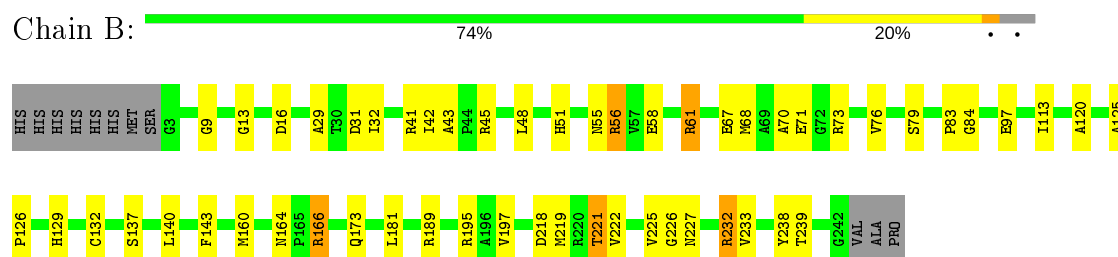
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

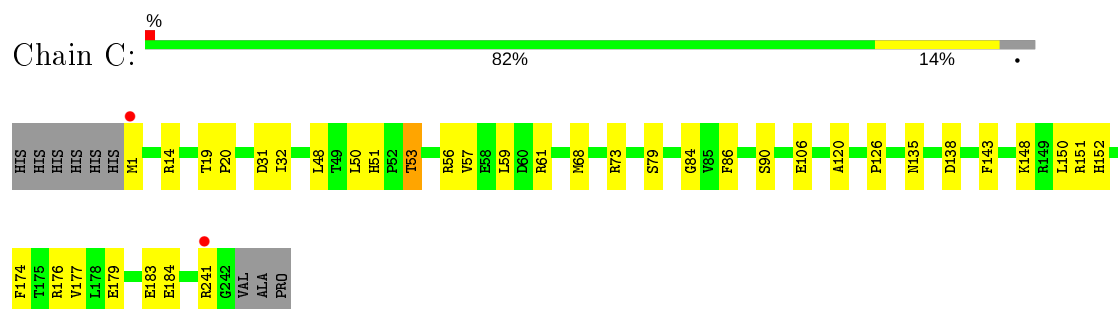
• Molecule 1: Precorrin-3 methylase



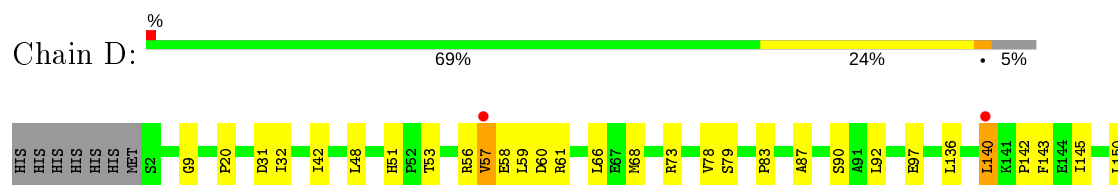
• Molecule 1: Precorrin-3 methylase



• Molecule 1: Precorrin-3 methylase



• Molecule 1: Precorrin-3 methylase



R151	H152		R155	G156		M160		P165	R166	S167	K168	S169	R170	P171	H172	Q173		R176	V177		I180		R189	L190	I191	L192		V197	T198		E201	Q202		S205	V206		R210	D211	A212	T213		M216	A217	D218	M219		L224	V225	G226		P240	ARG	GLY	VAL	ALA	PRO
------	------	--	------	------	--	------	--	------	------	------	------	------	------	------	------	------	--	------	------	--	------	--	------	------	------	------	--	------	------	--	------	------	--	------	------	--	------	------	------	------	--	------	------	------	------	--	------	------	------	--	------	-----	-----	-----	-----	-----

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	85.64Å 110.99Å 116.19Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	58.56 – 2.22 58.56 – 2.22	Depositor EDS
% Data completeness (in resolution range)	99.1 (58.56-2.22) 99.1 (58.56-2.22)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.41 (at 2.22Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.216 , 0.264 0.215 , 0.263	Depositor DCC
R_{free} test set	2773 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	37.8	Xtriage
Anisotropy	0.126	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 38.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7643	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.95% 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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.64	0/1863	0.73	0/2539
1	B	0.73	1/1861 (0.1%)	0.79	0/2536
1	C	0.65	0/1874	0.72	0/2552
1	D	0.63	0/1852	0.70	0/2525
All	All	0.66	1/7450 (0.0%)	0.73	0/10152

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	132	CYS	CB-SG	-7.69	1.69	1.82

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1824	0	1830	28	0
1	B	1822	0	1828	66	0
1	C	1835	0	1841	34	0
1	D	1813	0	1817	43	0
2	A	26	0	19	1	0
2	B	26	0	19	3	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	26	0	19	1	0
2	D	26	0	19	0	0
3	A	18	0	24	2	0
3	B	18	0	24	14	0
3	C	12	0	16	13	0
4	A	46	0	0	5	0
4	B	54	0	0	2	0
4	C	59	0	0	4	0
4	D	38	0	0	0	0
All	All	7643	0	7456	163	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 11.

All (163) 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:166:ARG:HG2	1:B:166:ARG:HH11	1.04	1.18
1:D:213:THR:H	1:D:216:MET:HE2	1.08	1.08
1:B:84:GLY:HA3	3:C:246:GOL:H2	1.10	1.08
3:B:246:GOL:H2	1:C:84:GLY:CA	1.90	0.99
3:B:246:GOL:H2	1:C:84:GLY:HA3	0.99	0.98
1:B:84:GLY:HA3	3:C:246:GOL:C2	1.95	0.96
1:B:84:GLY:CA	3:C:246:GOL:H2	1.95	0.95
3:B:246:GOL:C2	1:C:84:GLY:HA3	1.95	0.95
1:B:232:ARG:HH11	1:B:232:ARG:HG2	1.34	0.93
1:B:166:ARG:CG	1:B:166:ARG:HH11	1.81	0.92
1:B:56:ARG:HH11	1:B:56:ARG:HG3	1.32	0.91
1:B:166:ARG:HG2	1:B:166:ARG:NH1	1.86	0.89
1:B:56:ARG:HH11	1:B:56:ARG:CG	1.90	0.85
1:C:120:ALA:HB1	3:C:246:GOL:H32	1.59	0.85
1:C:120:ALA:HB1	3:C:246:GOL:C3	2.10	0.82
1:D:213:THR:N	1:D:216:MET:HE2	1.93	0.81
1:D:213:THR:H	1:D:216:MET:CE	1.92	0.79
1:B:120:ALA:HB1	3:B:246:GOL:C3	2.13	0.79
1:B:42:ILE:HD13	1:B:48:LEU:HD21	1.66	0.76
1:B:113:ILE:HD11	1:C:19:THR:HG21	1.67	0.75
1:B:113:ILE:HD11	1:C:19:THR:CG2	2.17	0.75
1:C:135:ASN:HD22	3:C:247:GOL:H11	1.52	0.74
1:A:68:MET:HE2	1:A:73:ARG:CZ	2.18	0.73
1:B:232:ARG:NH1	1:B:232:ARG:HG2	2.03	0.73

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:218:ASP:H	1:B:221:THR:HG23	1.54	0.72
1:B:120:ALA:HB3	3:B:246:GOL:H12	1.71	0.72
1:C:53:THR:HG22	1:C:61:ARG:HH21	1.55	0.71
1:D:56:ARG:HG3	1:D:57:VAL:H	1.56	0.70
1:B:120:ALA:HB1	3:B:246:GOL:H31	1.74	0.69
1:B:233:VAL:CG2	1:B:238:TYR:HE2	2.06	0.69
1:C:120:ALA:HB3	3:C:246:GOL:H12	1.76	0.68
1:A:210:ARG:HG2	1:A:211:ASP:N	2.10	0.67
1:B:218:ASP:H	1:B:221:THR:CG2	2.08	0.66
1:B:166:ARG:CG	1:B:166:ARG:NH1	2.49	0.66
1:B:31:ASP:OD1	1:B:68:MET:HE1	1.95	0.66
1:A:31:ASP:OD2	1:A:68:MET:HE1	1.96	0.65
1:B:222:VAL:HG23	2:B:1501:SAH:N3	2.11	0.65
3:A:246:GOL:H32	4:A:1637:HOH:O	1.98	0.64
1:A:68:MET:CE	1:A:73:ARG:CZ	2.75	0.63
1:B:129:HIS:HD2	4:C:1672:HOH:O	1.81	0.63
1:B:120:ALA:HB1	3:B:246:GOL:H32	1.80	0.62
1:B:218:ASP:OD1	1:B:221:THR:HG22	1.99	0.62
1:B:73:ARG:HD3	4:B:1699:HOH:O	1.99	0.62
1:C:68:MET:HE1	4:C:1609:HOH:O	1.99	0.62
1:C:143:PHE:CZ	1:C:176:ARG:HG2	2.34	0.62
1:B:197:VAL:HG12	2:B:1501:SAH:N1	2.15	0.62
1:B:233:VAL:CG2	1:B:238:TYR:CE2	2.82	0.62
1:D:32:ILE:HG12	1:D:48:LEU:HD11	1.82	0.62
4:A:1508:HOH:O	1:B:51:HIS:HD2	1.81	0.62
1:B:218:ASP:OD1	1:B:221:THR:CG2	2.48	0.62
1:A:146:LEU:O	1:A:150:LEU:HD22	1.99	0.61
1:D:56:ARG:HG3	1:D:57:VAL:N	2.15	0.61
1:D:142:PRO:HG2	1:D:145:ILE:HD12	1.83	0.60
1:B:233:VAL:HG23	1:B:238:TYR:CE2	2.37	0.59
1:B:113:ILE:CD1	1:C:19:THR:HG21	2.32	0.59
1:B:120:ALA:CB	3:B:246:GOL:H12	2.32	0.59
1:A:241:ARG:HD3	1:D:140:LEU:HD13	1.85	0.58
1:C:14:ARG:NH2	4:C:1639:HOH:O	2.36	0.58
1:D:58:GLU:O	1:D:60:ASP:N	2.37	0.58
1:A:85:VAL:HG21	1:A:114:THR:HG21	1.87	0.56
1:C:32:ILE:HG12	1:C:48:LEU:HD11	1.88	0.56
1:D:160:MET:HB2	1:D:225:VAL:HB	1.88	0.56
1:C:86:PHE:HA	3:C:247:GOL:H31	1.88	0.56
1:D:83:PRO:O	1:D:87:ALA:HB3	2.05	0.55
1:B:233:VAL:HG23	1:B:238:TYR:HE2	1.70	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:140:LEU:CD1	1:C:241:ARG:HH11	2.19	0.55
1:D:68:MET:HE2	1:D:73:ARG:CZ	2.37	0.55
1:C:151:ARG:NH1	1:C:184:GLU:OE2	2.38	0.55
1:B:126:PRO:HD2	3:B:246:GOL:H32	1.89	0.55
1:B:140:LEU:HD13	1:C:241:ARG:HD3	1.88	0.54
1:D:197:VAL:HG12	1:D:198:THR:HG23	1.89	0.54
1:B:143:PHE:HD1	1:B:173:GLN:HE21	1.55	0.54
1:A:152:HIS:HB3	1:D:152:HIS:O	2.07	0.54
1:A:58:GLU:HG3	1:A:60:ASP:H	1.73	0.54
1:D:42:ILE:HD11	1:D:78:VAL:HG11	1.90	0.54
1:C:126:PRO:HD2	3:C:246:GOL:H32	1.90	0.54
1:C:31:ASP:OD1	1:C:51:HIS:HE1	1.91	0.53
1:B:58:GLU:OE2	1:B:61:ARG:HD2	2.08	0.53
1:A:68:MET:HB3	1:A:73:ARG:HD3	1.91	0.53
1:A:39:VAL:HA	3:A:247:GOL:H31	1.90	0.52
1:A:68:MET:HE2	1:A:73:ARG:NH1	2.24	0.52
1:C:53:THR:HG22	1:C:61:ARG:NH2	2.24	0.52
1:B:219:MET:HA	4:B:1531:HOH:O	2.09	0.52
1:C:138:ASP:OD2	3:C:247:GOL:H12	2.10	0.52
1:A:195:ARG:O	1:A:202:GLN:HA	2.09	0.51
1:B:56:ARG:NH1	1:B:56:ARG:HG3	2.12	0.51
1:D:180:ILE:H	1:D:180:ILE:HD12	1.76	0.51
1:B:13:GLY:O	3:B:248:GOL:H2	2.10	0.51
1:C:120:ALA:HB1	3:C:246:GOL:H31	1.88	0.51
1:B:56:ARG:NH1	1:B:58:GLU:OE1	2.44	0.51
1:D:56:ARG:CG	1:D:57:VAL:N	2.73	0.51
1:A:120:ALA:HB2	1:A:127:LEU:HD12	1.92	0.51
2:C:1501:SAH:HG1	4:C:1564:HOH:O	2.11	0.51
1:A:238:TYR:OH	1:D:97:GLU:OE1	2.17	0.51
1:B:120:ALA:CB	3:B:246:GOL:H31	2.41	0.50
1:C:31:ASP:OD2	1:C:73:ARG:HD3	2.11	0.50
1:B:227:ASN:HD21	1:B:239:THR:HG21	1.77	0.50
1:B:31:ASP:OD1	1:B:68:MET:CE	2.59	0.50
1:D:168:LYS:HA	1:D:171:PRO:HA	1.94	0.50
1:B:68:MET:HE2	1:B:73:ARG:CZ	2.42	0.50
1:A:16:ASP:O	1:D:20:PRO:HD2	2.10	0.50
1:A:176:ARG:O	1:A:180:ILE:HG12	2.12	0.49
1:B:232:ARG:CG	1:B:232:ARG:HH11	2.14	0.49
1:C:53:THR:CG2	1:C:61:ARG:HH21	2.23	0.49
1:D:150:LEU:HD21	1:D:177:VAL:HG13	1.95	0.49
1:B:56:ARG:NH1	1:B:56:ARG:CG	2.60	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:9:GLY:HA3	1:D:83:PRO:HD3	1.95	0.49
1:A:197:VAL:HG12	1:A:198:THR:HG23	1.95	0.49
1:D:143:PHE:HD1	1:D:173:GLN:HE21	1.60	0.48
1:B:137:SER:OG	1:B:164:ASN:HB3	2.14	0.48
1:C:120:ALA:CB	3:C:246:GOL:H12	2.44	0.48
1:A:36:ILE:HD12	1:A:50:LEU:HD23	1.95	0.48
1:B:32:ILE:HD12	1:B:42:ILE:HD12	1.96	0.48
1:D:166:ARG:HD2	1:D:217:ALA:O	2.13	0.48
1:D:172:HIS:CD2	1:D:173:GLN:H	2.33	0.47
1:C:150:LEU:HD11	1:C:177:VAL:HG22	1.96	0.47
1:C:135:ASN:HD22	3:C:247:GOL:H32	1.80	0.47
1:D:192:LEU:HG	1:D:206:VAL:HG22	1.97	0.46
1:C:179:GLU:O	1:C:183:GLU:HG3	2.15	0.46
1:C:148:LYS:O	1:C:152:HIS:HD2	1.97	0.46
1:A:147:GLU:HG3	1:A:180:ILE:HD12	1.97	0.46
1:D:66:LEU:HD21	1:D:92:LEU:HD11	1.98	0.46
1:B:160:MET:HB2	1:B:225:VAL:HB	1.98	0.45
1:B:67:GLU:O	1:B:70:ALA:HB3	2.16	0.45
1:D:31:ASP:OD2	1:D:51:HIS:HE1	1.98	0.45
1:B:143:PHE:HD1	1:B:173:GLN:NE2	2.15	0.45
1:D:189:ARG:HD2	1:D:226:GLY:O	2.17	0.45
1:C:32:ILE:HB	1:C:50:LEU:HD23	1.99	0.45
1:D:167:SER:C	1:D:169:SER:H	2.19	0.45
1:D:212:ALA:HA	1:D:216:MET:CE	2.47	0.45
1:B:120:ALA:HB3	3:B:246:GOL:C1	2.43	0.45
1:D:216:MET:HE3	1:D:216:MET:HB2	1.76	0.45
1:C:53:THR:CG2	1:C:61:ARG:NH2	2.80	0.44
1:D:68:MET:CE	1:D:73:ARG:CZ	2.95	0.44
1:B:222:VAL:HG22	2:B:1501:SAH:H1'	2.00	0.44
1:D:192:LEU:HB2	1:D:224:LEU:HB2	2.00	0.43
1:B:29:ALA:HB2	1:B:76:VAL:HG23	2.00	0.43
1:A:137:SER:HB2	1:A:164:ASN:HB3	2.00	0.43
1:B:31:ASP:OD1	1:B:51:HIS:HE1	2.02	0.43
1:B:9:GLY:HA3	1:B:83:PRO:HD3	1.99	0.43
1:B:42:ILE:HG12	1:B:43:ALA:N	2.34	0.43
1:A:149:ARG:NE	1:D:156:GLY:O	2.51	0.43
1:D:192:LEU:N	1:D:192:LEU:HD12	2.33	0.43
1:D:151:ARG:HD3	1:D:155:ARG:HH21	1.84	0.43
1:D:136:LEU:HD12	1:D:165:PRO:HA	2.01	0.42
1:B:125:ALA:HA	3:B:246:GOL:H32	2.02	0.42
1:B:195:ARG:NH1	1:B:195:ARG:HB2	2.35	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:218:ASP:N	1:B:221:THR:HG23	2.29	0.42
1:A:114:THR:HG22	2:A:1501:SAH:O	2.20	0.42
1:A:49:THR:CG2	4:A:1528:HOH:O	2.67	0.42
1:D:172:HIS:CG	1:D:173:GLN:H	2.37	0.42
1:D:190:LEU:HD12	1:D:190:LEU:HA	1.89	0.42
1:B:16:ASP:O	1:C:20:PRO:HD2	2.20	0.41
1:D:212:ALA:HA	1:D:216:MET:HE1	2.02	0.41
1:A:56:ARG:O	1:A:61:ARG:NH1	2.54	0.41
1:B:189:ARG:HD2	1:B:226:GLY:O	2.21	0.41
1:A:68:MET:CE	1:A:73:ARG:NH1	2.83	0.41
1:D:197:VAL:HA	1:D:202:GLN:HG3	2.03	0.41
4:A:1509:HOH:O	3:B:247:GOL:H12	2.20	0.41
1:D:176:ARG:O	1:D:180:ILE:HD12	2.21	0.41
1:A:231:ARG:HB2	4:A:1700:HOH:O	2.21	0.40
1:A:54:ASP:C	1:A:54:ASP:OD1	2.59	0.40
1:B:68:MET:CE	1:B:73:ARG:CZ	2.98	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	238/251 (95%)	228 (96%)	10 (4%)	0	100	100
1	B	238/251 (95%)	225 (94%)	12 (5%)	1 (0%)	34	37
1	C	240/251 (96%)	228 (95%)	12 (5%)	0	100	100
1	D	237/251 (94%)	220 (93%)	13 (6%)	4 (2%)	9	6
All	All	953/1004 (95%)	901 (94%)	47 (5%)	5 (0%)	29	30

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	59	LEU
1	D	57	VAL
1	B	71	GLU
1	D	173	GLN
1	D	168	LYS

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	186/195 (95%)	176 (95%)	10 (5%)	22	25
1	B	185/195 (95%)	174 (94%)	11 (6%)	19	22
1	C	187/195 (96%)	178 (95%)	9 (5%)	25	30
1	D	185/195 (95%)	173 (94%)	12 (6%)	17	18
All	All	743/780 (95%)	701 (94%)	42 (6%)	20	23

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	45	ARG
1	A	49	THR
1	A	61	ARG
1	A	90	SER
1	A	150	LEU
1	A	190	LEU
1	A	201	GLU
1	A	210	ARG
1	A	218	ASP
1	A	241	ARG
1	B	41	ARG
1	B	45	ARG
1	B	55	ASN
1	B	56	ARG
1	B	61	ARG
1	B	79	SER
1	B	97	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	166	ARG
1	B	181	LEU
1	B	221	THR
1	B	232	ARG
1	C	1	MET
1	C	53	THR
1	C	56	ARG
1	C	57	VAL
1	C	59	LEU
1	C	79	SER
1	C	90	SER
1	C	106	GLU
1	C	174	PHE
1	D	53	THR
1	D	61	ARG
1	D	79	SER
1	D	90	SER
1	D	140	LEU
1	D	169	SER
1	D	170	ARG
1	D	190	LEU
1	D	201	GLU
1	D	205	SER
1	D	210	ARG
1	D	219	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	227	ASN
1	B	51	HIS
1	B	102	HIS
1	B	129	HIS
1	B	164	ASN
1	B	173	GLN
1	D	51	HIS
1	D	164	ASN
1	D	173	GLN

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 carbohydrates in this entry.

5.6 Ligand geometry ⓘ

12 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
2	SAH	D	1501	-	21,28,28	1.21	3 (14%)	20,40,40	1.27	1 (5%)
3	GOL	A	248	-	5,5,5	0.38	0	5,5,5	0.77	0
3	GOL	A	247	-	5,5,5	0.40	0	5,5,5	0.33	0
2	SAH	A	1501	-	21,28,28	1.18	3 (14%)	20,40,40	1.38	2 (10%)
3	GOL	B	248	-	5,5,5	0.39	0	5,5,5	0.29	0
2	SAH	C	1501	-	21,28,28	1.41	2 (9%)	20,40,40	1.64	4 (20%)
3	GOL	B	246	-	5,5,5	0.82	0	5,5,5	1.05	0
3	GOL	C	247	-	5,5,5	0.32	0	5,5,5	0.96	0
3	GOL	C	246	-	5,5,5	0.74	0	5,5,5	1.02	0
2	SAH	B	1501	-	21,28,28	1.25	2 (9%)	20,40,40	1.54	3 (15%)
3	GOL	A	246	-	5,5,5	0.38	0	5,5,5	0.39	0
3	GOL	B	247	-	5,5,5	0.30	0	5,5,5	0.35	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
2	SAH	D	1501	-	-	0/7/31/31	0/3/3/3
3	GOL	A	248	-	-	3/4/4/4	-
3	GOL	A	247	-	-	2/4/4/4	-
2	SAH	A	1501	-	-	1/7/31/31	0/3/3/3
3	GOL	B	248	-	-	2/4/4/4	-
2	SAH	C	1501	-	-	2/7/31/31	0/3/3/3
3	GOL	B	246	-	-	2/4/4/4	-
3	GOL	C	247	-	-	1/4/4/4	-
3	GOL	C	246	-	-	2/4/4/4	-
2	SAH	B	1501	-	-	0/7/31/31	0/3/3/3
3	GOL	A	246	-	-	0/4/4/4	-
3	GOL	B	247	-	-	2/4/4/4	-

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1501	SAH	O4'-C1'	4.18	1.46	1.41
2	B	1501	SAH	C2-N3	3.21	1.37	1.32
2	B	1501	SAH	C5-C4	2.64	1.47	1.40
2	D	1501	SAH	C2-N3	2.45	1.36	1.32
2	C	1501	SAH	C5-C4	2.45	1.47	1.40
2	D	1501	SAH	C5-C4	2.38	1.47	1.40
2	A	1501	SAH	C5-C4	2.35	1.47	1.40
2	A	1501	SAH	C2-N3	2.33	1.35	1.32
2	A	1501	SAH	O4'-C1'	2.09	1.44	1.41
2	D	1501	SAH	O4'-C1'	2.07	1.44	1.41

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1501	SAH	N3-C2-N1	-4.26	122.02	128.68
2	C	1501	SAH	N3-C2-N1	-3.80	122.74	128.68
2	A	1501	SAH	C4-C5-N7	-3.77	105.47	109.40
2	C	1501	SAH	C4-C5-N7	-3.63	105.62	109.40
2	D	1501	SAH	N3-C2-N1	-3.61	123.04	128.68
2	A	1501	SAH	N3-C2-N1	-3.51	123.19	128.68
2	B	1501	SAH	N6-C6-N1	2.66	124.10	118.57
2	B	1501	SAH	C4'-C5'-SD	-2.12	106.16	113.78
2	C	1501	SAH	CB-CG-SD	-2.12	108.55	113.31
2	C	1501	SAH	C2-N1-C6	2.09	122.34	118.75

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	247	GOL	C1-C2-C3-O3
3	A	247	GOL	O2-C2-C3-O3
3	B	248	GOL	C1-C2-C3-O3
3	B	246	GOL	C1-C2-C3-O3
3	C	246	GOL	C1-C2-C3-O3
3	B	247	GOL	C1-C2-C3-O3
3	A	248	GOL	O1-C1-C2-C3
3	C	247	GOL	C1-C2-C3-O3
3	B	246	GOL	O2-C2-C3-O3
3	C	246	GOL	O2-C2-C3-O3
3	B	247	GOL	O2-C2-C3-O3
3	B	248	GOL	O2-C2-C3-O3
3	A	248	GOL	O2-C2-C3-O3
2	A	1501	SAH	C3'-C4'-C5'-SD
2	C	1501	SAH	CB-CG-SD-C5'
3	A	248	GOL	O1-C1-C2-O2
2	C	1501	SAH	C-CA-CB-CG

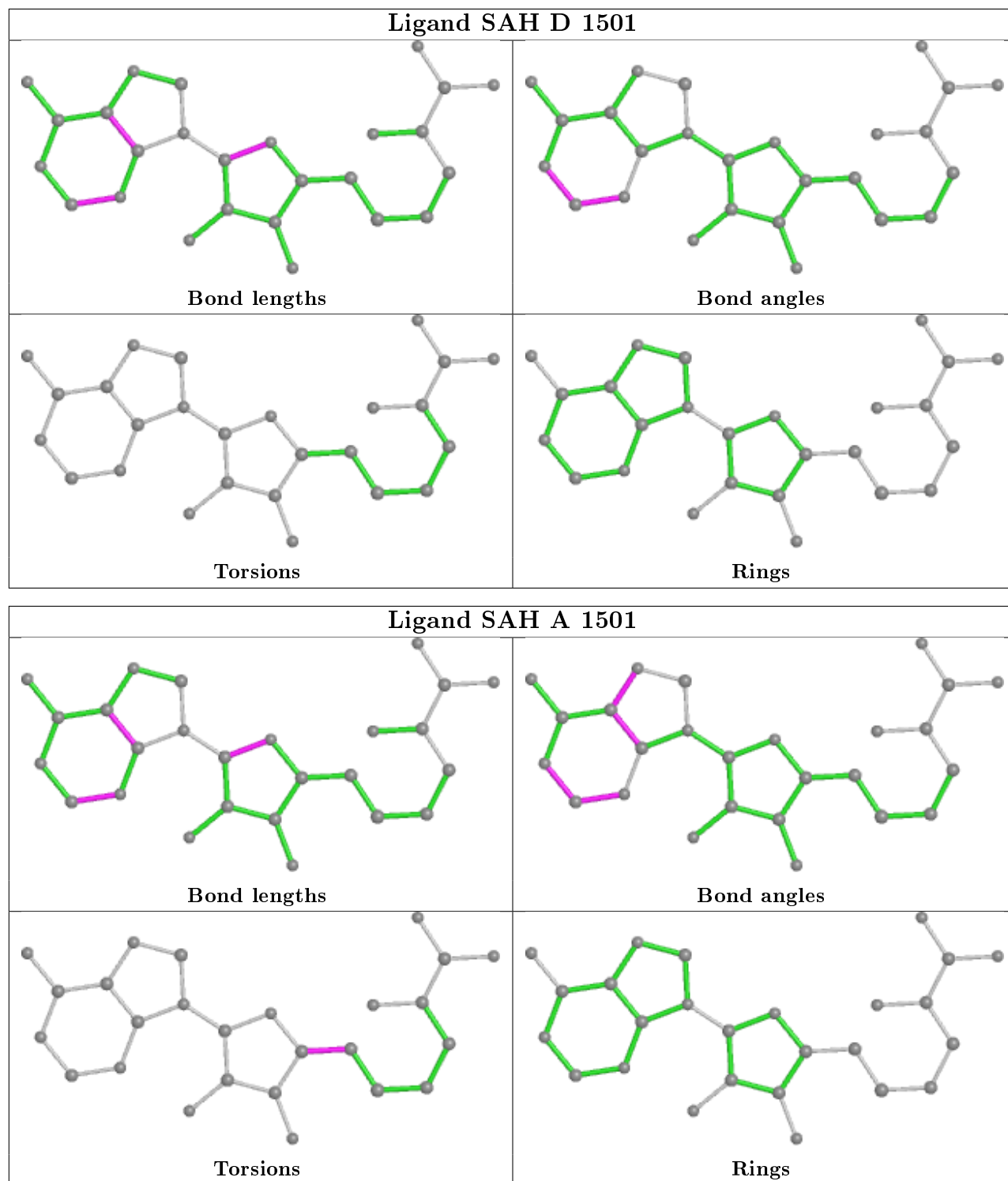
There are no ring outliers.

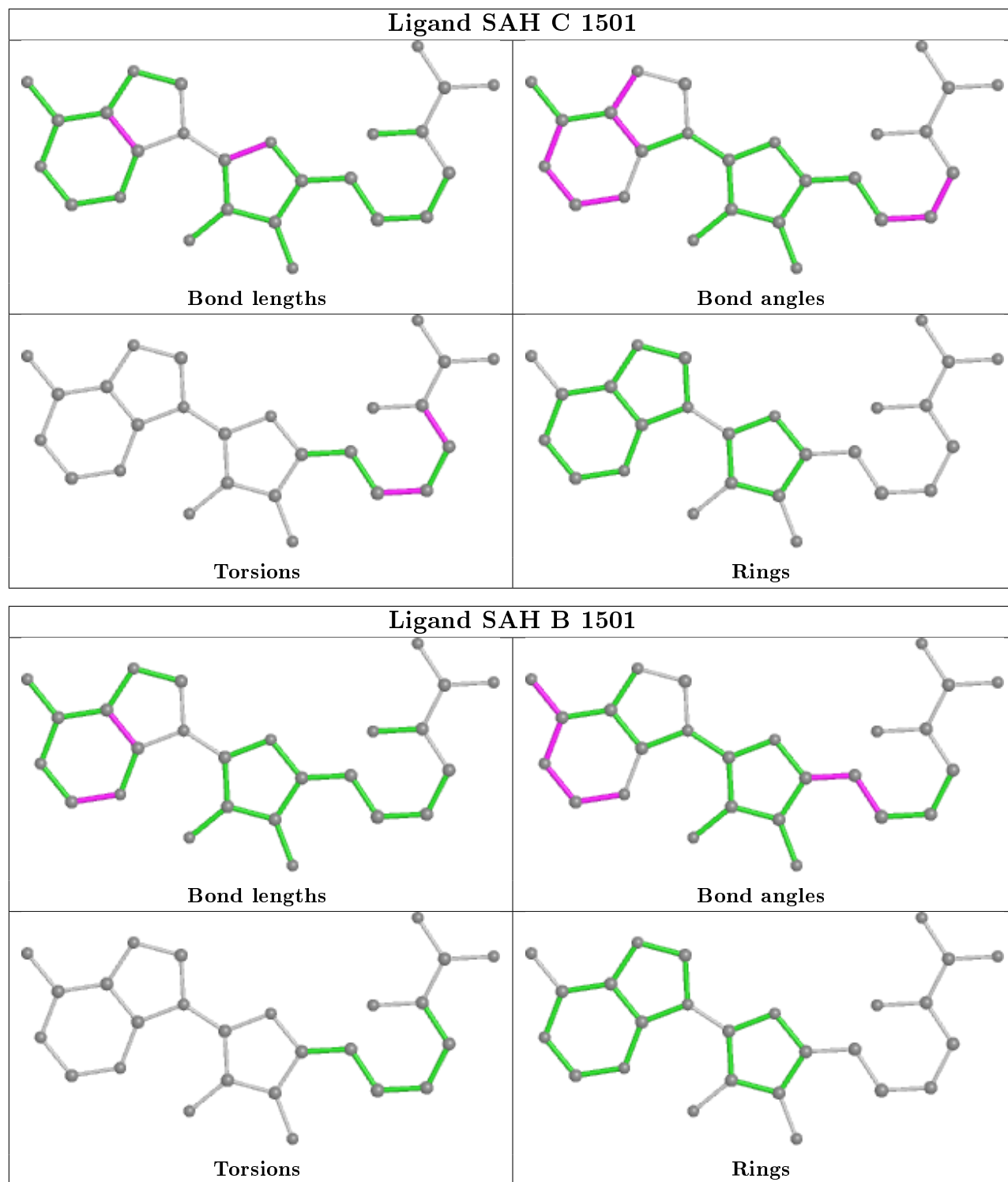
10 monomers are involved in 34 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	247	GOL	1	0
2	A	1501	SAH	1	0
3	B	248	GOL	1	0
2	C	1501	SAH	1	0
3	B	246	GOL	12	0
3	C	247	GOL	4	0
3	C	246	GOL	9	0
2	B	1501	SAH	3	0
3	A	246	GOL	1	0
3	B	247	GOL	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 [i](#)

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	240/251 (95%)	-0.20	2 (0%) 86 85	20, 38, 62, 72	0
1	B	240/251 (95%)	-0.32	0 100 100	22, 33, 47, 52	0
1	C	242/251 (96%)	-0.31	2 (0%) 86 85	22, 37, 49, 61	0
1	D	239/251 (95%)	-0.20	2 (0%) 86 85	22, 45, 70, 79	0
All	All	961/1004 (95%)	-0.26	6 (0%) 89 88	20, 37, 61, 79	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	57	VAL	6.5
1	D	140	LEU	2.9
1	A	241	ARG	2.8
1	C	1	MET	2.7
1	A	140	LEU	2.3
1	C	241	ARG	2.2

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 carbohydrates 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,

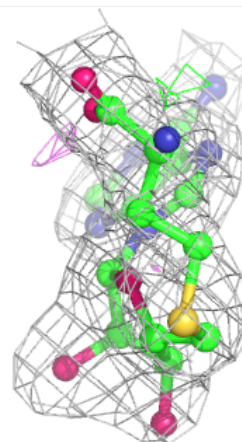
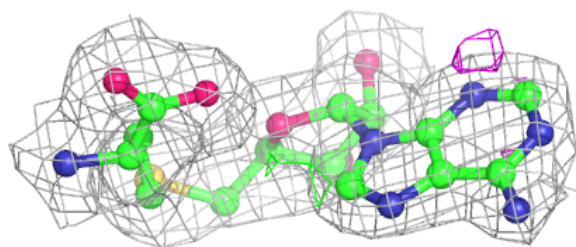
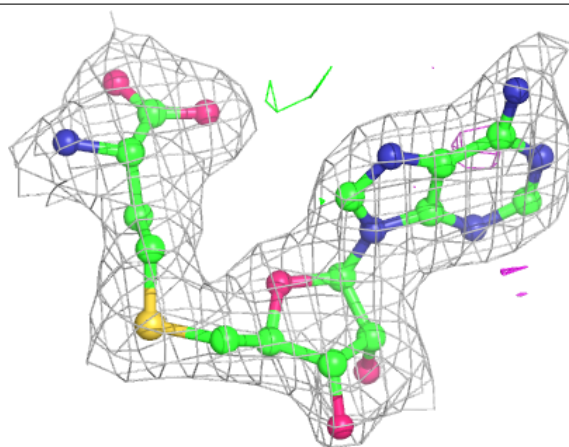
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	GOL	A	247	6/6	0.64	0.19	62,63,64,64	0
3	GOL	B	248	6/6	0.76	0.23	59,66,67,67	0
3	GOL	B	247	6/6	0.78	0.20	60,62,63,65	0
3	GOL	C	246	6/6	0.83	0.33	41,43,44,45	0
3	GOL	A	248	6/6	0.83	0.13	53,57,58,59	0
3	GOL	B	246	6/6	0.87	0.28	32,37,39,39	0
3	GOL	C	247	6/6	0.87	0.19	47,48,49,50	0
3	GOL	A	246	6/6	0.91	0.12	34,46,48,51	0
2	SAH	C	1501	26/26	0.94	0.11	30,35,39,43	0
2	SAH	A	1501	26/26	0.95	0.12	35,38,45,46	0
2	SAH	D	1501	26/26	0.95	0.12	31,38,41,45	0
2	SAH	B	1501	26/26	0.96	0.11	27,31,35,39	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.

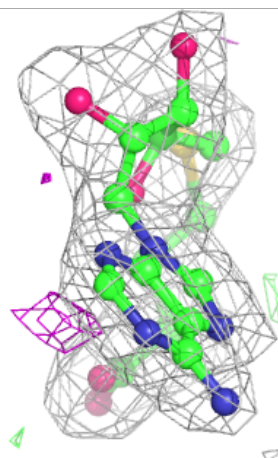
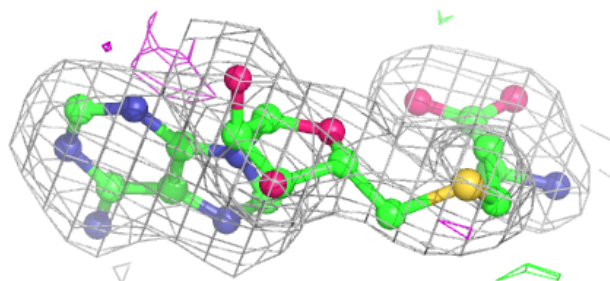
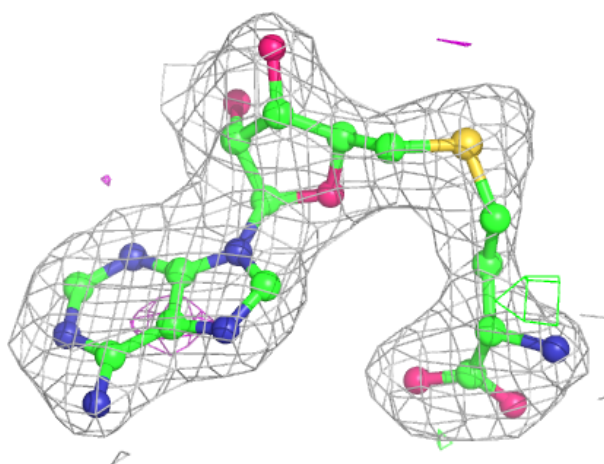
Electron density around SAH C 1501:

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



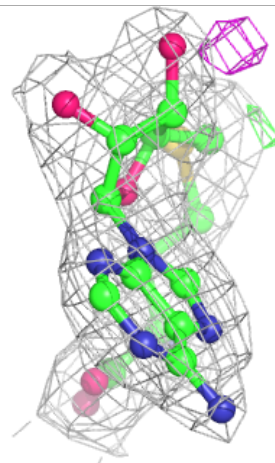
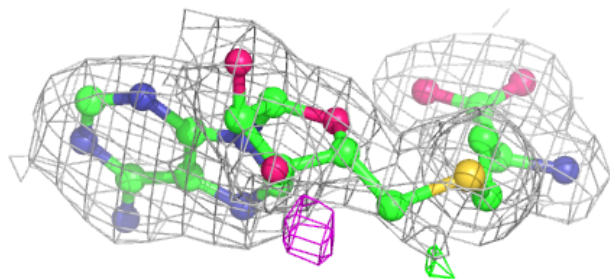
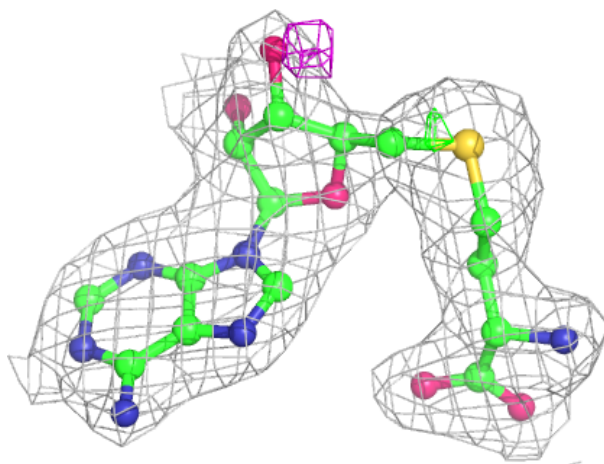
Electron density around SAH A 1501:

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



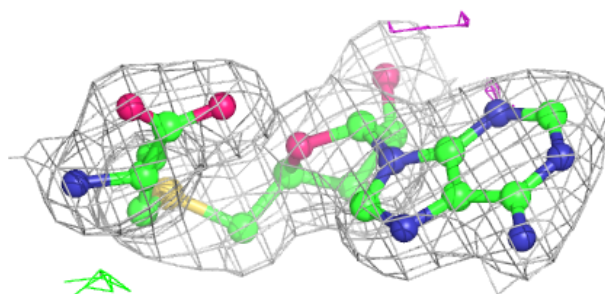
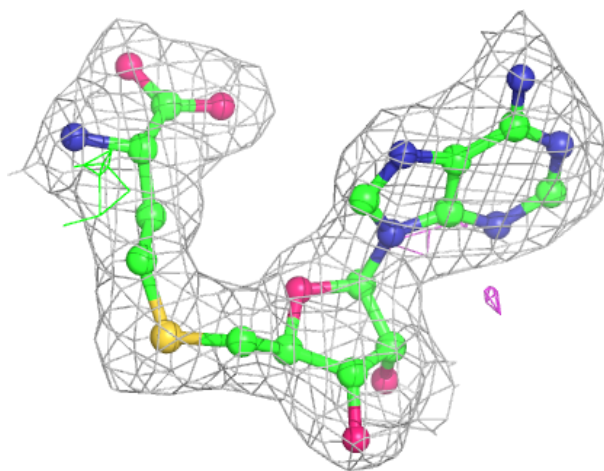
Electron density around SAH D 1501:

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



Electron density around SAH B 1501:

$2mF_o-DF_c$ (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.