Full wwPDB X-ray Structure Validation Report ⓘ

Jul 3, 2026 – 01:15 AM JST

PDB ID	:	22OW / pdb_000022ow
Title	:	Crystal structure of O-adenosylmethionine-dependent methyltransferase McbD in complex with SAH
Authors	:	Qiao, Z.; Teng, Y.B.
Deposited on	:	2026-01-19
Resolution	:	3.00 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
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:

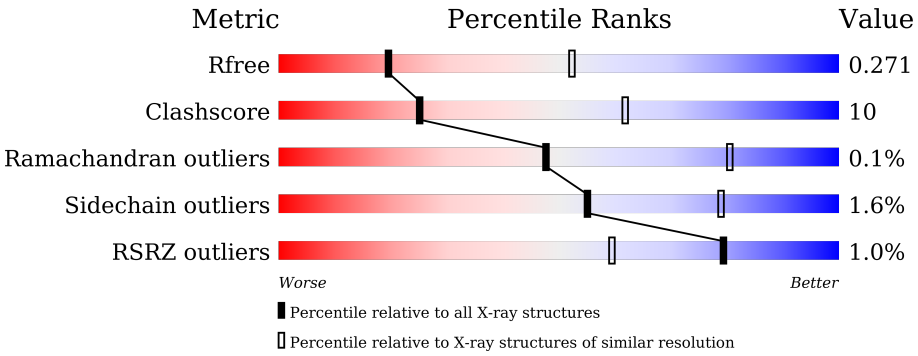
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

1 Overall quality at a glance (i)

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

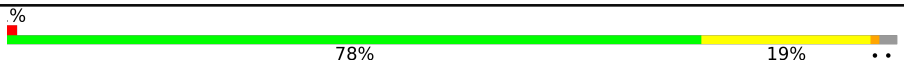
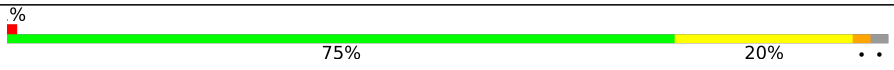
The reported resolution of this entry is 3.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	2672 (3.00-3.00)
Clashscore	190562	2977 (3.00-3.00)
Ramachandran outliers	187476	2877 (3.00-3.00)
Sidechain outliers	187428	2880 (3.00-3.00)
RSRZ outliers	180081	2671 (3.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=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	461	
1	B	461	

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
2	SAH	A	501	-	-	X	-

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 13966 atoms, of which 6900 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.

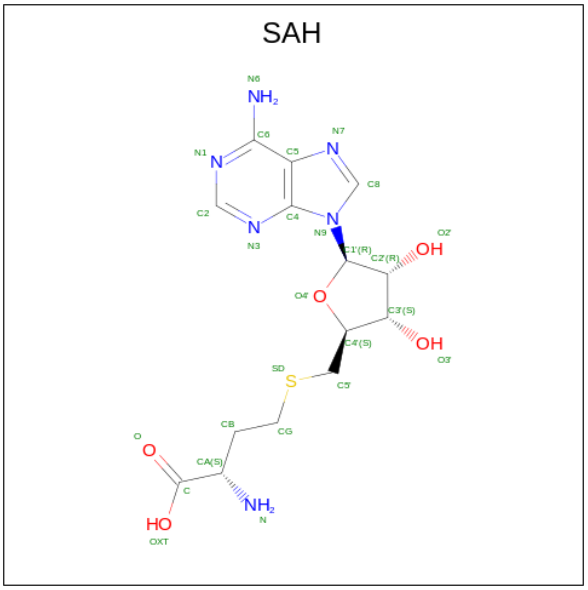
- Molecule 1 is a protein called Methyltransferase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	451	Total	C	H	N	O	S	78	0	0
			6938	2213	3431	640	643	11			
1	B	451	Total	C	H	N	O	S	78	0	0
			6938	2213	3431	640	643	11			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	SER	-	expression tag	UNP A0A1V0EL88
B	1	SER	-	expression tag	UNP A0A1V0EL88

- Molecule 2 is S-ADENOSYL-L-HOMOCYSTEINE (CCD ID: SAH) (formula: $C_{14}H_{20}N_6O_5S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	S	2	0
			45	14	19	6	5	1		

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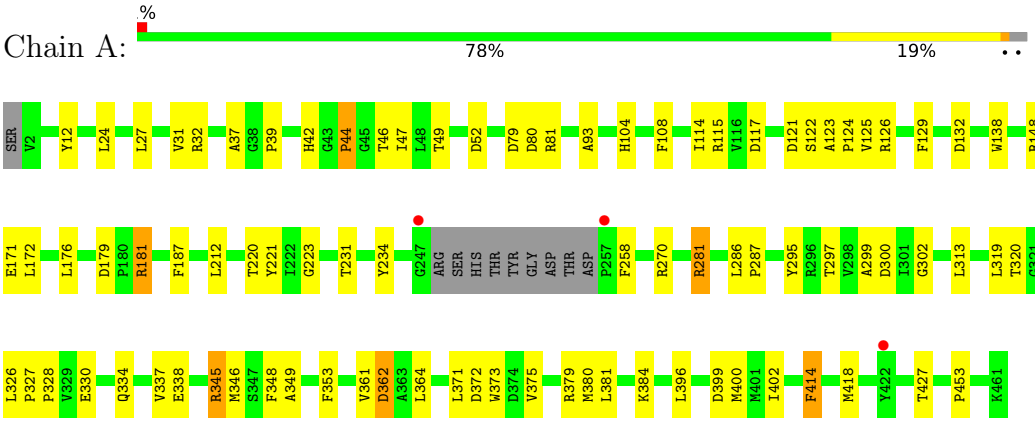
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	B	1	Total	C	H	N	O	S	2	0
			45	14	19	6	5	1		

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.

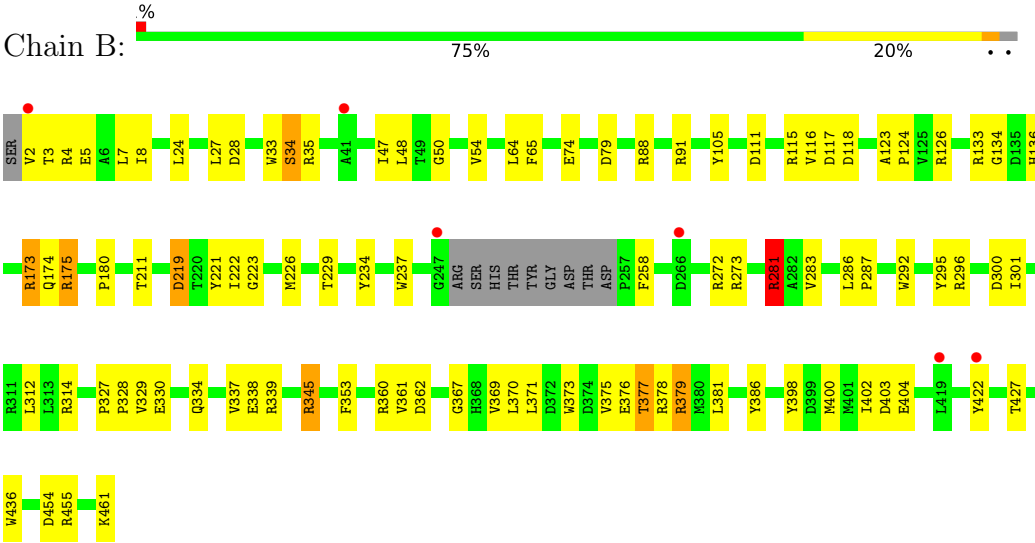
• Molecule 1: Methyltransferase

Chain A:



• Molecule 1: Methyltransferase

Chain B:



4 Data and refinement statistics (i)

Property	Value
Space group	P 65 2 2
Cell constants a, b, c, α, β, γ	132.07Å 132.07Å 250.43Å 90.00° 90.00° 120.00°
Resolution (Å)	39.91 – 3.00 39.91 – 3.00
% Data completeness (in resolution range)	99.9 (39.91-3.00) 99.9 (39.91-3.00)
R_{merge}	0.04
R_{sym}	(Not available)
$< I/\sigma(I) >$ [1]	2.93 (at 3.01Å)
Refinement program	REFMAC 5.8.0430 (refmacat 0.4.100), REFMAC 5.8.0430 (refmacat 0.4
R, R_{free}	0.197 , 0.272 0.196 , 0.271
R_{free} test set	1330 reflections (5.00%)
Wilson B-factor (Å^2)	72.4
Anisotropy	0.029
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 31.9
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$
Estimated twinning fraction	No twinning to report.
F_o,F_c correlation	0.94
Total number of atoms	13966
Average B, all atoms (Å^2)	75.0

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.77% 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: 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	0.53	0/3591	1.08	5/4869 (0.1%)
1	B	0.55	0/3591	1.14	15/4869 (0.3%)
All	All	0.54	0/7182	1.11	20/9738 (0.2%)

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	4
1	B	0	16
All	All	0	20

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	431	ARG	CB-CA-C	-7.44	99.09	110.92
1	A	79	ASP	CA-CB-CG	6.98	119.58	112.60
1	B	118	ASP	CA-CB-CG	6.68	119.28	112.60
1	B	345	ARG	CB-CA-C	-6.51	99.32	109.80
1	B	219	ASP	CB-CA-C	-6.20	99.17	110.63
1	B	155	GLU	CB-CA-C	-6.18	100.92	110.81
1	B	219	ASP	CA-CB-CG	6.02	118.62	112.60
1	B	330	GLU	N-CA-CB	5.88	118.86	110.16
1	A	414	PHE	CA-CB-CG	-5.69	108.11	113.80
1	B	330	GLU	CB-CA-C	-5.58	101.37	110.85
1	B	454	ASP	CA-CB-CG	5.46	118.06	112.60
1	B	229	THR	CA-CB-OG1	-5.42	101.47	109.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	362	ASP	CA-CB-CG	5.39	117.99	112.60
1	A	320	THR	CA-CB-OG1	-5.36	101.56	109.60
1	B	300	ASP	CA-CB-CG	5.32	117.92	112.60
1	B	28	ASP	CA-CB-CG	5.29	117.89	112.60
1	B	211	THR	CA-CB-OG1	-5.23	101.76	109.60
1	B	377	THR	CA-CB-OG1	-5.20	101.80	109.60
1	B	79	ASP	CA-CB-CG	5.11	117.71	112.60
1	A	300	ASP	CA-CB-CG	5.06	117.66	112.60

There are no chirality outliers.

All (20) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	115	ARG	Sidechain
1	A	181	ARG	Sidechain
1	A	281	ARG	Sidechain
1	A	345	ARG	Sidechain
1	B	115	ARG	Sidechain
1	B	126	ARG	Sidechain
1	B	133	ARG	Sidechain
1	B	148	ARG	Sidechain
1	B	173	ARG	Sidechain
1	B	175	ARG	Sidechain
1	B	272	ARG	Sidechain
1	B	273	ARG	Sidechain
1	B	281	ARG	Sidechain
1	B	339	ARG	Sidechain
1	B	345	ARG	Sidechain
1	B	35	ARG	Sidechain
1	B	379	ARG	Sidechain
1	B	455	ARG	Sidechain
1	B	88	ARG	Sidechain
1	B	91	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3507	3431	3418	75	1
1	B	3507	3431	3418	64	1
2	A	26	19	19	17	0
2	B	26	19	19	1	0
All	All	7066	6900	6874	135	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

All (135) 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:173:ARG:NH1	1:B:174:GLN:OE1	1.70	1.24
1:A:258:PHE:CE1	2:A:501:SAH:H8	1.80	1.17
1:B:173:ARG:CZ	1:B:174:GLN:OE1	2.01	1.07
1:A:325:ASP:OD2	2:A:501:SAH:O3'	1.78	1.01
1:B:64:LEU:CD2	1:B:65:PHE:CE2	2.59	0.85
1:A:258:PHE:CE1	2:A:501:SAH:H2'	2.15	0.81
1:A:258:PHE:CD1	2:A:501:SAH:H8	2.16	0.80
1:A:258:PHE:CE1	2:A:501:SAH:C8	2.66	0.78
1:B:334:GLN:HA	1:B:337:VAL:HG12	1.65	0.77
1:A:258:PHE:CZ	2:A:501:SAH:H8	2.20	0.77
1:A:258:PHE:HE1	2:A:501:SAH:H2'	1.50	0.76
1:A:334:GLN:HA	1:A:337:VAL:HG12	1.70	0.73
1:A:327:PRO:HG2	1:A:328:PRO:HD3	1.71	0.71
1:A:325:ASP:OD1	2:A:501:SAH:H1'	1.90	0.71
1:B:64:LEU:HD22	1:B:65:PHE:CE2	2.25	0.70
1:A:47:ILE:HG22	1:A:47:ILE:O	1.94	0.68
1:B:296:ARG:HH11	1:B:296:ARG:HG3	1.59	0.68
1:B:173:ARG:HH21	1:B:180:PRO:HG3	1.60	0.67
1:B:123:ALA:HB3	1:B:124:PRO:HD3	1.76	0.67
1:B:400:MET:O	1:B:427:THR:HG23	1.93	0.67
1:B:281:ARG:HH11	1:B:281:ARG:HG3	1.60	0.67
1:A:221:TYR:CZ	1:A:223:GLY:HA3	2.29	0.67
1:A:258:PHE:CD1	2:A:501:SAH:C8	2.79	0.66
1:B:295:TYR:HD1	1:B:362:ASP:HB3	1.61	0.66
1:A:295:TYR:HD1	1:A:362:ASP:HB3	1.61	0.66
1:B:173:ARG:NE	1:B:174:GLN:OE1	2.27	0.66
1:B:404:GLU:OE1	1:B:431:ARG:HG3	1.96	0.66
1:B:64:LEU:CD2	1:B:65:PHE:CD2	2.78	0.65
1:A:302:GLY:O	2:A:501:SAH:N	2.30	0.65
1:A:81:ARG:HH11	1:B:74:GLU:HG2	1.62	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:42:HIS:HA	1:A:126:ARG:NH2	2.13	0.63
1:B:64:LEU:HD22	1:B:65:PHE:CD2	2.34	0.62
1:A:81:ARG:NH1	1:B:74:GLU:HG2	2.16	0.60
1:B:222:ILE:HD12	1:B:226:MET:HE3	1.83	0.59
1:A:334:GLN:O	1:A:337:VAL:HG12	2.03	0.59
1:A:297:THR:OG1	1:A:361:VAL:HG13	2.04	0.58
1:A:327:PRO:CG	1:A:328:PRO:HD3	2.33	0.58
1:A:37:ALA:HB2	1:A:44:PRO:O	2.04	0.57
1:A:123:ALA:HB3	1:A:124:PRO:HD3	1.86	0.57
1:B:281:ARG:HH11	1:B:281:ARG:CG	2.18	0.56
1:B:367:GLY:HA3	1:B:398:TYR:CZ	2.40	0.56
1:A:42:HIS:HA	1:A:126:ARG:HH21	1.70	0.56
1:A:330:GLU:O	1:A:334:GLN:HG2	2.06	0.56
1:A:326:LEU:HB3	1:A:327:PRO:HD2	1.89	0.55
1:B:310:ALA:O	1:B:314:ARG:HG3	2.07	0.55
1:B:4:ARG:HA	1:B:7:LEU:HD13	1.88	0.55
1:B:296:ARG:HG3	1:B:296:ARG:NH1	2.22	0.55
1:B:258:PHE:CE1	2:B:501:SAH:H2'	2.42	0.54
1:B:34:SER:HB2	1:B:117:ASP:OD1	2.07	0.54
1:B:2:VAL:O	1:B:2:VAL:HG12	2.08	0.54
1:A:400:MET:O	1:A:427:THR:HG23	2.06	0.54
1:A:322:VAL:HG12	1:A:323:GLY:O	2.08	0.54
1:B:334:GLN:HA	1:B:337:VAL:CG1	2.36	0.53
1:A:258:PHE:CD1	2:A:501:SAH:H2'	2.45	0.52
1:B:402:ILE:HG22	1:B:403:ASP:O	2.10	0.52
1:B:402:ILE:HG13	1:B:427:THR:HG21	1.91	0.52
1:B:353:PHE:CD1	1:B:381:LEU:HD21	2.46	0.51
1:A:24:LEU:HD23	1:A:27:LEU:HD12	1.94	0.50
1:B:64:LEU:HD23	1:B:65:PHE:CD2	2.47	0.50
1:A:80:ASP:HB3	1:A:108:PHE:O	2.11	0.49
1:A:212:LEU:HA	1:A:220:THR:O	2.13	0.49
1:A:353:PHE:CD1	1:A:381:LEU:HD21	2.47	0.49
1:B:4:ARG:O	1:B:8:ILE:HG13	2.12	0.49
1:A:325:ASP:CG	2:A:501:SAH:O3'	2.54	0.49
1:B:306:GLY:N	1:B:307:PRO:HD3	2.27	0.48
1:A:156:LEU:O	1:A:176:LEU:HD22	2.13	0.48
1:A:380:MET:SD	1:A:384:LYS:HE3	2.53	0.48
1:B:148:ARG:HD3	1:B:234:TYR:CZ	2.47	0.48
1:B:334:GLN:O	1:B:337:VAL:HG12	2.14	0.48
1:A:337:VAL:HG13	1:A:338:GLU:HG3	1.96	0.47
1:B:334:GLN:CA	1:B:337:VAL:HG12	2.41	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:376:GLU:H	1:B:376:GLU:CD	2.21	0.47
1:B:3:THR:O	1:B:4:ARG:HB2	2.14	0.47
1:A:12:TYR:HH	1:A:104:HIS:HD1	1.63	0.47
1:A:32:ARG:NH1	1:A:117:ASP:OD1	2.48	0.47
1:B:327:PRO:N	1:B:328:PRO:HD2	2.29	0.47
1:A:281:ARG:HG3	1:A:281:ARG:HH11	1.79	0.47
1:A:353:PHE:CD2	2:A:501:SAH:C2	2.98	0.47
1:A:327:PRO:CD	1:A:328:PRO:HD3	2.45	0.46
1:B:301:ILE:N	1:B:301:ILE:HD13	2.30	0.46
1:B:105:TYR:O	1:B:116:VAL:HA	2.15	0.46
1:B:33:TRP:HD1	1:B:48:LEU:HD12	1.82	0.45
1:B:286:LEU:N	1:B:287:PRO:CD	2.79	0.45
1:B:221:TYR:CZ	1:B:223:GLY:HA3	2.52	0.45
1:A:121:ASP:O	1:A:124:PRO:HD2	2.16	0.45
1:A:297:THR:O	1:A:362:ASP:HB2	2.16	0.45
1:B:386:TYR:CE2	1:B:461:LYS:HG3	2.52	0.45
1:B:433:CYS:HA	1:B:436:TRP:CE3	2.51	0.45
1:A:258:PHE:HE1	2:A:501:SAH:C2'	2.23	0.45
1:B:402:ILE:HG13	1:B:427:THR:CG2	2.47	0.45
1:A:334:GLN:CA	1:A:337:VAL:HG12	2.44	0.44
1:B:24:LEU:HD23	1:B:27:LEU:HD12	1.99	0.44
1:A:81:ARG:HH11	1:B:74:GLU:CG	2.27	0.44
1:B:292:TRP:CE2	1:B:312:LEU:HD11	2.52	0.44
1:A:371:LEU:HD23	1:A:399:ASP:OD1	2.16	0.44
1:A:179:ASP:OD1	1:A:181:ARG:HG2	2.18	0.44
1:A:372:ASP:O	1:A:373:TRP:CG	2.70	0.44
1:B:375:VAL:O	1:B:379:ARG:HG3	2.18	0.44
1:A:31:VAL:O	1:A:49:THR:HA	2.18	0.44
1:A:148:ARG:HG3	1:B:237:TRP:HB3	1.99	0.44
1:A:39:PRO:HB2	1:A:129:PHE:CD1	2.53	0.44
1:A:172:LEU:HD23	1:A:187:PHE:CE2	2.53	0.43
1:A:402:ILE:HG13	1:A:427:THR:HG22	1.99	0.43
1:A:319:LEU:O	1:A:345:ARG:HD2	2.18	0.43
1:A:170:GLU:HG3	1:A:171:GLU:H	1.83	0.43
1:A:348:PHE:CD1	1:A:349:ALA:N	2.87	0.43
1:A:138:TRP:CD1	1:B:281:ARG:NH2	2.87	0.43
1:A:148:ARG:HD3	1:A:234:TYR:CZ	2.53	0.43
1:B:400:MET:HB2	1:B:400:MET:HE3	1.87	0.43
1:A:313:LEU:CD1	1:A:346:MET:HB2	2.49	0.43
1:B:34:SER:HB2	1:B:117:ASP:CG	2.44	0.43
1:A:286:LEU:N	1:A:287:PRO:CD	2.82	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:299:ALA:HB3	1:A:364:LEU:HD23	2.01	0.43
1:A:414:PHE:O	1:A:418:MET:HG2	2.18	0.43
1:B:373:TRP:O	1:B:378:ARG:NH2	2.52	0.42
1:A:396:LEU:HD12	1:A:396:LEU:N	2.33	0.42
1:A:231:THR:OG1	1:A:270:ARG:NH1	2.53	0.42
1:A:372:ASP:O	1:A:373:TRP:CD2	2.73	0.42
1:A:47:ILE:O	1:A:47:ILE:CG2	2.65	0.41
1:A:375:VAL:O	1:A:379:ARG:HG3	2.20	0.41
1:B:219:ASP:HB3	1:B:283:VAL:HG11	2.03	0.41
1:B:4:ARG:O	1:B:5:GLU:C	2.61	0.41
2:A:501:SAH:H4'	2:A:501:SAH:HG2	1.73	0.41
1:A:172:LEU:HG	1:A:187:PHE:CZ	2.55	0.41
1:A:325:ASP:CG	2:A:501:SAH:HO3'	2.20	0.41
1:A:93:ALA:N	1:A:132:ASP:OD2	2.54	0.41
1:A:400:MET:HG2	1:A:453:PRO:HB2	2.03	0.41
1:B:134:GLY:C	1:B:136:HIS:H	2.28	0.41
1:B:50:GLY:O	1:B:54:VAL:HG23	2.21	0.40
1:B:371:LEU:C	1:B:371:LEU:HD12	2.46	0.40
1:A:353:PHE:CE2	2:A:501:SAH:C2	3.05	0.40
1:B:369:VAL:O	1:B:370:LEU:C	2.65	0.40
1:A:122:SER:O	1:A:125:VAL:HB	2.21	0.40
1:B:334:GLN:OE1	1:B:337:VAL:HG11	2.21	0.40
1:B:360:ARG:C	1:B:361:VAL:HG23	2.46	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:52:ASP:OD2	1:B:296:ARG:HH12[12_554]	1.54	0.06

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	447/461 (97%)	406 (91%)	40 (9%)	1 (0%)	43 76
1	B	447/461 (97%)	417 (93%)	30 (7%)	0	100 100
All	All	894/922 (97%)	823 (92%)	70 (8%)	1 (0%)	48 80

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	44	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	347/356 (98%)	345 (99%)	2 (1%)	78 88
1	B	347/356 (98%)	338 (97%)	9 (3%)	40 72
All	All	694/712 (98%)	683 (98%)	11 (2%)	55 79

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	46	THR
1	A	114	ILE
1	B	34	SER
1	B	47	ILE
1	B	111	ASP
1	B	175	ARG
1	B	281	ARG
1	B	329	VAL
1	B	338	GLU
1	B	377	THR
1	B	422	TYR

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

Mol	Chain	Res	Type
1	A	318	HIS
1	B	42	HIS
1	B	232	GLN

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 oligosaccharides 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	SAH	A	501	-	27,28,28	0.45	0	38,40,40	0.71	0
2	SAH	B	501	-	27,28,28	0.64	1 (3%)	38,40,40	0.78	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	A	501	-	-	6/15/31/31	0/3/3/3
2	SAH	B	501	-	-	5/15/31/31	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	SAH	O-C	2.48	1.29	1.22

There are no bond angle outliers.

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	SAH	N-CA-CB-CG
2	A	501	SAH	C-CA-CB-CG
2	A	501	SAH	C3'-C4'-C5'-SD
2	B	501	SAH	N-CA-CB-CG
2	B	501	SAH	C-CA-CB-CG
2	B	501	SAH	O-C-CA-N
2	A	501	SAH	CB-CG-SD-C5'
2	A	501	SAH	O4'-C4'-C5'-SD
2	B	501	SAH	CB-CG-SD-C5'
2	B	501	SAH	OXT-C-CA-N
2	A	501	SAH	C4'-C5'-SD-CG

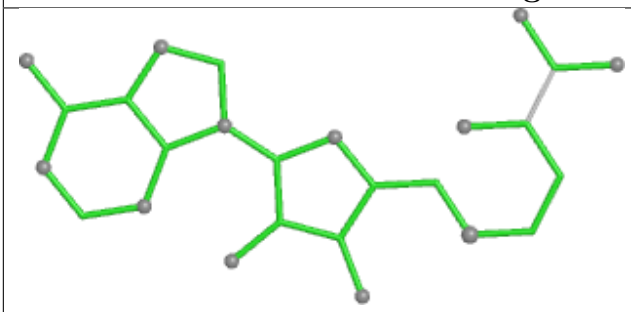
There are no ring outliers.

2 monomers are involved in 18 short contacts:

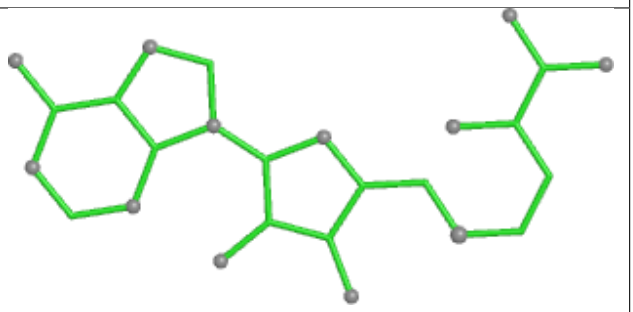
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	501	SAH	17	0
2	B	501	SAH	1	0

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.

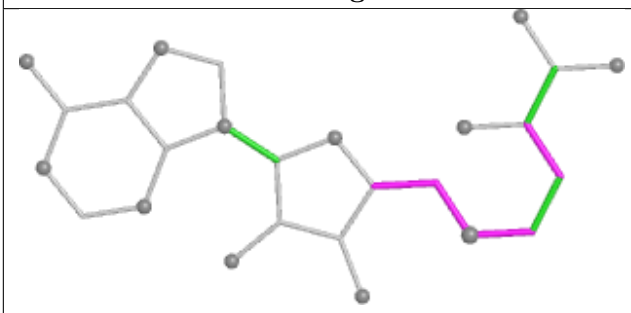
Ligand SAH A 501



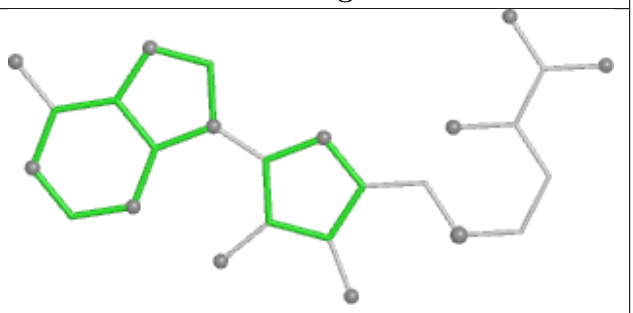
Bond lengths



Bond angles

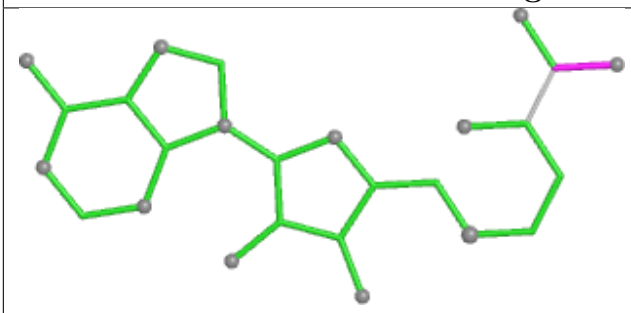


Torsions

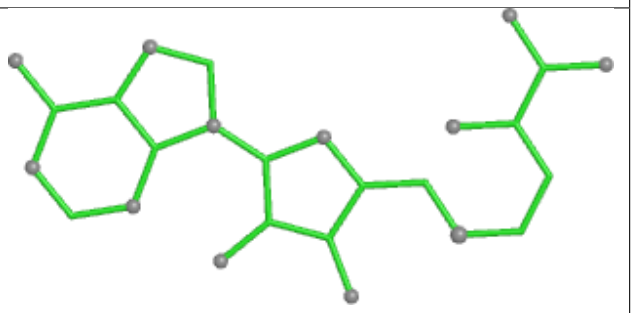


Rings

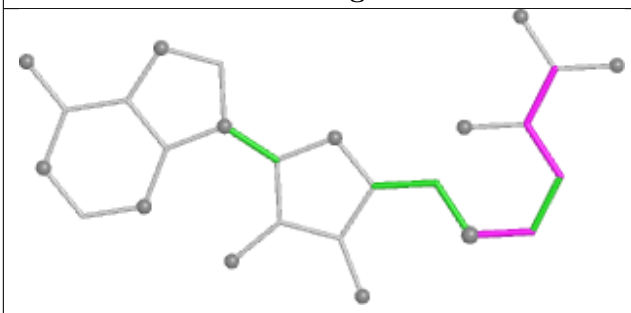
Ligand SAH B 501



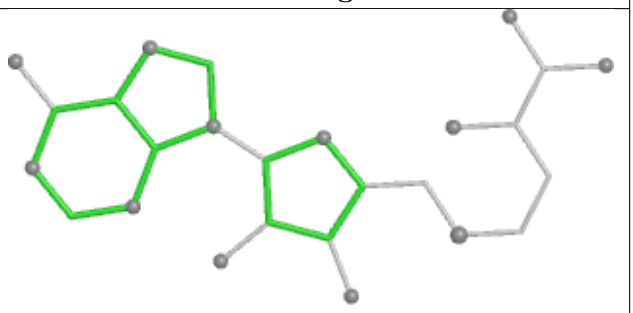
Bond lengths



Bond angles



Torsions



Rings

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	451/461 (97%)	-0.26	3 (0%)	84	66	41, 78, 115, 135	0
1	B	451/461 (97%)	-0.41	6 (1%)	75	53	40, 60, 109, 161	0
All	All	902/922 (97%)	-0.34	9 (0%)	79	59	40, 70, 114, 161	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	422	TYR	4.0
1	A	247	GLY	3.8
1	B	2	VAL	3.2
1	B	422	TYR	2.8
1	B	419	LEU	2.4
1	A	257	PRO	2.4
1	B	266	ASP	2.4
1	B	41	ALA	2.1
1	B	247	GLY	2.1

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

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

6.3 Carbohydrates

There are no oligosaccharides 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,

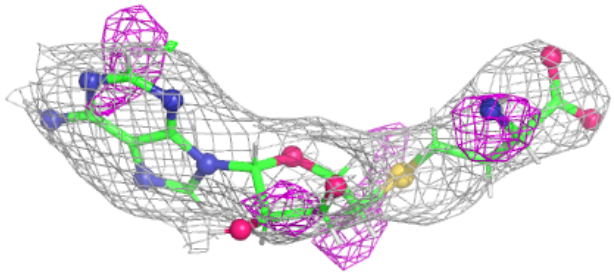
median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

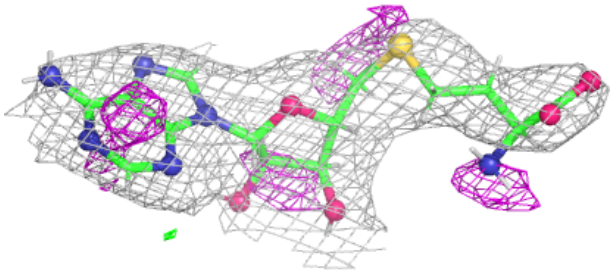
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	SAH	A	501	26/26	0.87	0.10	59,74,86,97	2
2	SAH	B	501	26/26	0.93	0.09	42,47,57,68	2

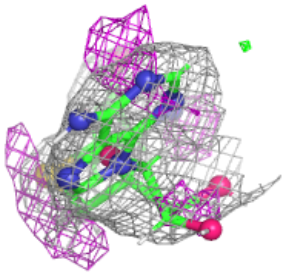
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around SAH A 501:

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

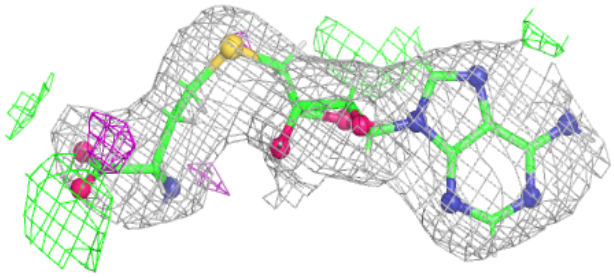


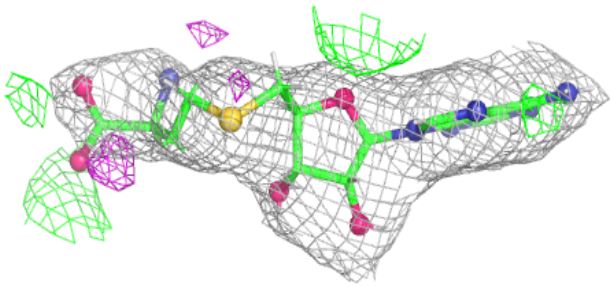


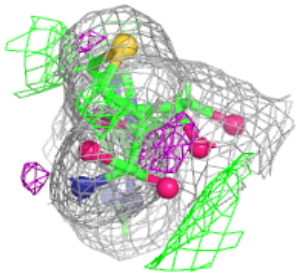


Electron density around SAH B 501:

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







6.5 Other polymers (i)

There are no such residues in this entry.