



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 25, 2026 – 11:12 AM EDT

PDB ID : 2VS1 / pdb_00002vs1
Title : The crystal structure of Pyrococcus abyssi tRNA (uracil-54, C5)- methyltransferase in complex with S-adenosyl-L-homocysteine
Authors : Walbott, H.; Leulliot, N.; Grosjean, H.; Golinelli-Pimpaneau, B.
Deposited on : 2008-04-17
Resolution : 2.10 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	:	2022.3.0, CSD as543be (2022)
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	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

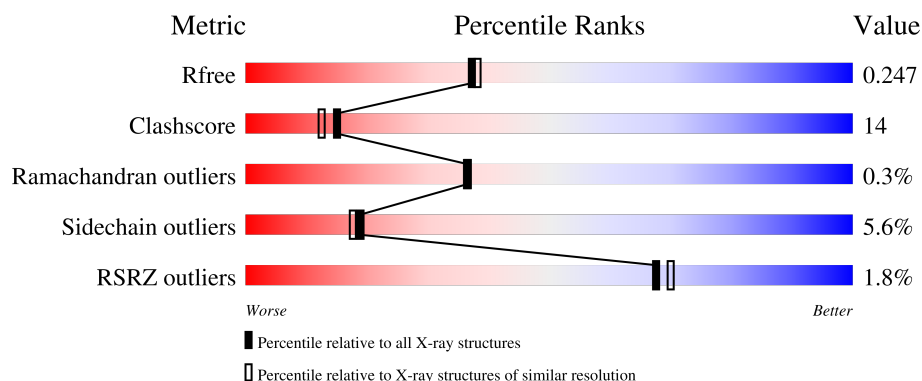
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

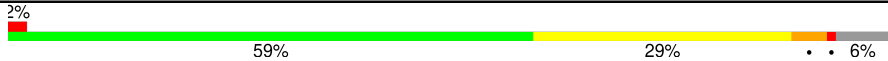
The reported resolution of this entry is 2.10 Å.

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	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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	425	

2 Entry composition [i](#)

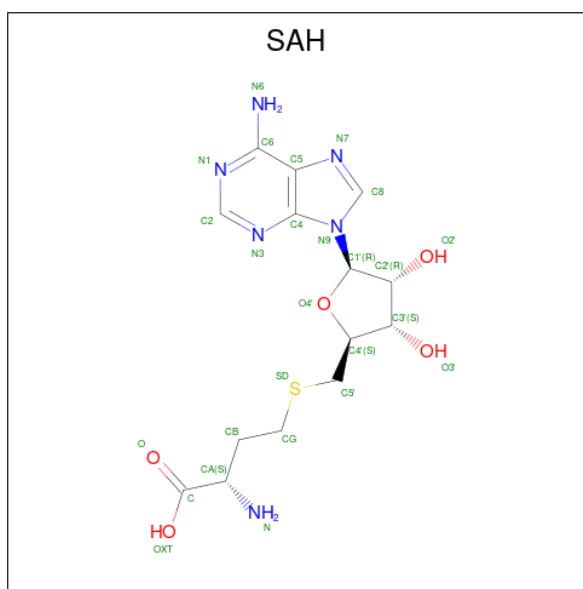
There are 4 unique types of molecules in this entry. The entry contains 3475 atoms, of which 0 are hydrogens and 0 are deuteriums.

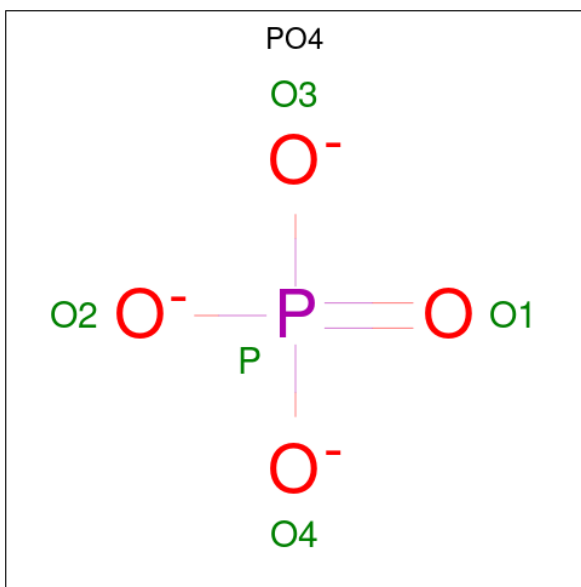
In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called UNCHARACTERIZED RNA METHYLTRANSFERASE PYRAB10780.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	398	3256	2085	569	590	12	0	0	0

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





Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	P	0	0
			5	4	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	188	Total	O	0	0
			188	188		

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: UNCHARACTERIZED RNA METHYLTRANSFERASE PYRAB10780



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	99.53Å 100.42Å 55.74Å 90.00° 111.61° 90.00°	Depositor
Resolution (Å)	68.04 – 2.10 68.04 – 2.10	Depositor EDS
% Data completeness (in resolution range)	97.5 (68.04-2.10) 97.4 (68.04-2.10)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.76 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.4.0069	Depositor
R, R_{free}	0.185 , 0.251 0.182 , 0.247	Depositor DCC
R_{free} test set	1473 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	34.6	Xtriage
Anisotropy	0.199	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 44.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3475	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.56% 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: CSS, PO4, 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	1.64	33/3317 (1.0%)	1.43	29/4463 (0.6%)

All (33) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	323	VAL	CA-CB	8.96	1.65	1.54
1	A	295	VAL	C-O	-7.69	1.15	1.24
1	A	173	ARG	CA-C	7.48	1.59	1.52
1	A	148	ILE	CA-CB	7.40	1.63	1.54
1	A	263	ARG	N-CA	6.84	1.54	1.46
1	A	275	LEU	CA-C	6.78	1.61	1.52
1	A	79	TYR	CA-C	6.36	1.61	1.52
1	A	225	ILE	N-CA	-6.32	1.39	1.46
1	A	188	VAL	CA-CB	6.31	1.62	1.54
1	A	115	ILE	CA-CB	-6.31	1.45	1.53
1	A	305	ILE	CA-C	-6.13	1.45	1.52
1	A	213	VAL	CA-CB	5.99	1.61	1.54
1	A	190	PHE	CA-C	-5.82	1.45	1.52
1	A	149	GLU	C-O	-5.80	1.17	1.24
1	A	96	VAL	CA-CB	5.78	1.62	1.54
1	A	224	ASP	CA-C	-5.75	1.45	1.52
1	A	265	VAL	CA-CB	5.70	1.61	1.54
1	A	308	ALA	N-CA	5.60	1.53	1.46
1	A	213	VAL	CA-C	-5.46	1.45	1.52
1	A	317	VAL	N-CA	-5.45	1.39	1.46
1	A	78	ASP	C-O	-5.42	1.17	1.24
1	A	56	ARG	CD-NE	-5.29	1.38	1.46
1	A	296	LYS	CA-C	5.28	1.58	1.52
1	A	43	VAL	C-O	-5.24	1.18	1.24
1	A	240	ASP	CA-C	5.24	1.60	1.52
1	A	128	TRP	CA-C	5.24	1.59	1.52

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	316	ASN	CA-C	-5.23	1.45	1.52
1	A	392	PHE	C-O	-5.18	1.18	1.24
1	A	320	GLU	N-CA	-5.16	1.40	1.46
1	A	257	GLN	CB-CG	-5.15	1.36	1.52
1	A	135	ASP	C-O	-5.15	1.17	1.24
1	A	110	ARG	C-O	-5.11	1.18	1.23
1	A	298	PHE	N-CA	-5.03	1.39	1.46

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	340	ASP	CA-C-N	8.08	128.70	120.38
1	A	340	ASP	C-N-CA	8.08	128.70	120.38
1	A	295	VAL	N-CA-C	6.78	117.60	108.11
1	A	99	VAL	CA-C-N	-6.73	113.37	120.03
1	A	99	VAL	C-N-CA	-6.73	113.37	120.03
1	A	287	TYR	N-CA-C	-6.72	104.04	111.36
1	A	318	ASP	N-CA-CB	-5.98	101.75	110.84
1	A	253	THR	N-CA-C	5.91	120.22	112.89
1	A	183	THR	N-CA-C	-5.72	106.92	114.31
1	A	333	GLY	N-CA-C	5.71	123.23	115.30
1	A	56	ARG	NE-CZ-NH2	-5.61	114.15	119.20
1	A	75	LEU	CA-C-N	-5.59	110.79	120.97
1	A	75	LEU	C-N-CA	-5.59	110.79	120.97
1	A	264	LYS	N-CA-C	5.56	117.02	111.07
1	A	257	GLN	CB-CA-C	-5.54	100.03	110.67
1	A	341	PRO	CA-C-N	5.53	126.75	119.84
1	A	341	PRO	C-N-CA	5.53	126.75	119.84
1	A	390	ASP	N-CA-CB	5.42	117.89	110.57
1	A	166	LYS	N-CA-C	-5.39	105.32	111.14
1	A	257	GLN	N-CA-C	5.32	117.99	111.82
1	A	309	ARG	NE-CZ-NH1	-5.31	116.19	121.50
1	A	291	ARG	N-CA-C	-5.28	103.75	111.30
1	A	-1	SER	N-CA-C	5.25	118.94	112.54
1	A	91	ILE	N-CA-C	5.23	120.22	109.34
1	A	387	VAL	N-CA-C	-5.21	101.48	108.35
1	A	118	ASP	N-CA-C	5.20	118.64	112.72
1	A	123	ARG	CB-CA-C	5.17	118.27	109.53
1	A	88	LEU	N-CA-C	5.15	116.89	111.28
1	A	108	ARG	CG-CD-NE	-5.01	100.98	112.00

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	3256	0	3266	90	0
2	A	26	0	19	0	0
3	A	5	0	0	0	0
4	A	188	0	0	16	1
All	All	3475	0	3285	90	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 14.

All (90) 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:A:4:VAL:HB	4:A:738:HOH:O	1.35	1.25
1:A:274:ILE:HD11	1:A:293:PHE:CD1	1.88	1.09
1:A:274:ILE:CD1	1:A:293:PHE:HB3	1.87	1.04
1:A:82:GLU:CG	1:A:86:LYS:HE2	1.95	0.96
1:A:274:ILE:HD11	1:A:293:PHE:HD1	1.32	0.92
1:A:82:GLU:HG2	1:A:86:LYS:HE2	1.52	0.90
1:A:4:VAL:CB	4:A:738:HOH:O	2.03	0.90
1:A:116:THR:HG21	1:A:165:ILE:HD11	1.56	0.87
1:A:124:GLU:HB3	1:A:127:LYS:HB2	1.54	0.87
1:A:357:GLU:HB2	4:A:653:HOH:O	1.76	0.83
1:A:4:VAL:CG1	4:A:738:HOH:O	2.32	0.76
1:A:123:ARG:NH2	1:A:219:ASP:OD2	2.20	0.74
1:A:274:ILE:HD13	1:A:293:PHE:HB3	1.70	0.71
1:A:356:ARG:HG2	1:A:356:ARG:HH11	1.54	0.70
1:A:359:PRO:O	1:A:381:TYR:OH	2.10	0.69
1:A:274:ILE:CD1	1:A:293:PHE:CB	2.67	0.69
1:A:224:ASP:OD2	4:A:601:HOH:O	2.11	0.68
1:A:116:THR:CG2	1:A:165:ILE:HD11	2.25	0.67
1:A:244:LEU:O	4:A:602:HOH:O	2.14	0.65
1:A:120:ILE:HD13	1:A:151:LEU:HD23	1.79	0.62

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:405:VAL:OXT	1:A:405:VAL:HG12	2.01	0.61
1:A:270:GLU:HB2	1:A:361:VAL:HG21	1.82	0.60
1:A:360:GLY:HA3	4:A:719:HOH:O	2.00	0.59
1:A:274:ILE:HD11	1:A:293:PHE:HB3	1.82	0.59
1:A:274:ILE:HD13	1:A:293:PHE:CB	2.32	0.58
1:A:89:LYS:CD	1:A:95:GLU:HG3	2.34	0.58
1:A:274:ILE:HD11	1:A:293:PHE:CG	2.39	0.58
1:A:348:PRO:O	1:A:351:VAL:HG22	2.04	0.58
1:A:241:VAL:HG22	1:A:290:LYS:HD3	1.86	0.57
1:A:275:LEU:HD11	1:A:298:PHE:HD2	1.69	0.57
1:A:369:PRO:HB3	1:A:400:LEU:HD11	1.87	0.57
1:A:302:GLU:HG2	1:A:323:VAL:HG21	1.87	0.56
1:A:332:LYS:HD3	4:A:653:HOH:O	2.05	0.56
1:A:82:GLU:OE2	1:A:86:LYS:HE2	2.06	0.56
1:A:82:GLU:OE2	1:A:86:LYS:CE	2.54	0.55
1:A:89:LYS:HD2	1:A:95:GLU:HG3	1.89	0.54
1:A:123:ARG:HD2	1:A:128:TRP:O	2.08	0.54
1:A:28:ASP:OD1	1:A:56:ARG:HD2	2.08	0.53
1:A:156:GLU:O	1:A:159:LYS:HE3	2.08	0.52
1:A:356:ARG:HG2	1:A:356:ARG:NH1	2.23	0.52
1:A:82:GLU:CD	1:A:86:LYS:HE2	2.34	0.51
1:A:90:ARG:HD2	4:A:670:HOH:O	2.09	0.51
1:A:94:PHE:HE2	1:A:386:ILE:HG21	1.75	0.51
1:A:269:VAL:HG12	1:A:336:THR:HG21	1.91	0.51
1:A:91:ILE:HG22	1:A:92:LEU:HD13	1.92	0.50
1:A:296:LYS:NZ	4:A:608:HOH:O	2.39	0.50
1:A:274:ILE:HD12	1:A:293:PHE:HB3	1.87	0.50
1:A:347:HIS:CE1	1:A:349:ARG:HG3	2.47	0.48
1:A:4:VAL:HG12	4:A:738:HOH:O	2.08	0.48
1:A:332:LYS:CD	4:A:653:HOH:O	2.62	0.47
1:A:227:ARG:HD3	1:A:229:TRP:CZ2	2.50	0.47
1:A:266:SER:HA	1:A:288:LEU:HD21	1.96	0.46
1:A:377:LYS:HD3	1:A:377:LYS:HA	1.59	0.46
1:A:41:ARG:HD2	1:A:41:ARG:HA	1.85	0.46
1:A:337:VAL:O	1:A:362:ILE:HA	2.14	0.46
1:A:271:GLY:HA3	1:A:335:ASP:CB	2.46	0.46
1:A:3:GLY:HA3	1:A:16:LEU:HD11	1.98	0.46
1:A:136:GLU:HG2	1:A:137:CSS:N	2.31	0.45
1:A:145:ARG:O	1:A:149:GLU:HG2	2.17	0.45
1:A:328:GLU:HG3	4:A:702:HOH:O	2.15	0.45
1:A:140:PHE:CZ	1:A:179:GLU:HB3	2.52	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:405:VAL:OXT	1:A:405:VAL:CG1	2.65	0.45
1:A:89:LYS:HD3	1:A:95:GLU:HG3	1.99	0.44
1:A:357:GLU:O	1:A:358:LYS:C	2.60	0.44
1:A:91:ILE:HG22	1:A:92:LEU:CD1	2.47	0.43
1:A:374:ARG:O	1:A:378:MET:HG3	2.19	0.43
1:A:193:LYS:HA	1:A:193:LYS:HD2	1.85	0.42
1:A:298:PHE:HA	1:A:322:GLU:O	2.19	0.42
1:A:4:VAL:HG11	1:A:6:ARG:NH2	2.34	0.42
1:A:274:ILE:HD11	1:A:293:PHE:CB	2.45	0.42
1:A:305:ILE:HD12	1:A:321:PHE:HB3	2.00	0.42
1:A:382:ARG:HG2	1:A:383:ILE:O	2.19	0.42
1:A:234:ILE:HG13	1:A:245:ILE:HB	2.00	0.42
1:A:246:HIS:CG	1:A:247:PRO:HD2	2.55	0.42
1:A:269:VAL:O	4:A:603:HOH:O	2.22	0.42
1:A:140:PHE:O	1:A:181:LYS:NZ	2.53	0.42
1:A:274:ILE:CD1	1:A:293:PHE:CD1	2.81	0.41
1:A:76:ASN:ND2	4:A:611:HOH:O	2.45	0.41
1:A:74:HIS:ND1	1:A:74:HIS:N	2.67	0.41
1:A:116:THR:HG21	1:A:165:ILE:CD1	2.37	0.41
1:A:299:ASP:O	1:A:323:VAL:HA	2.22	0.41
1:A:368:ASN:HA	1:A:369:PRO:HD2	1.86	0.41
1:A:358:LYS:HB3	4:A:714:HOH:O	2.20	0.40
1:A:194:GLU:OE2	1:A:215:ARG:HG2	2.22	0.40
1:A:327:ARG:NH2	1:A:349:ARG:HH22	2.20	0.40
1:A:66:LYS:HE2	1:A:66:LYS:HB3	1.68	0.40
1:A:166:LYS:HE3	1:A:166:LYS:HB2	1.50	0.40
1:A:271:GLY:HA3	1:A:335:ASP:HB3	2.03	0.40
1:A:273:LYS:HD3	1:A:333:GLY:O	2.22	0.40
1:A:276:ASP:OD2	1:A:285:GLY:N	2.52	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)
4:A:745:HOH:O	4:A:758:HOH:O[2_656]	2.11	0.09

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	391/425 (92%)	373 (95%)	17 (4%)	1 (0%)	36	36

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	91	ILE

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	356/377 (94%)	336 (94%)	20 (6%)	19	18

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

Mol	Chain	Res	Type
1	A	4	VAL
1	A	35	VAL
1	A	42	ARG
1	A	57	VAL
1	A	67	CYS
1	A	89	LYS
1	A	92	LEU
1	A	96	VAL
1	A	97	GLU
1	A	117	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	149	GLU
1	A	159	LYS
1	A	166	LYS
1	A	179	GLU
1	A	296	LYS
1	A	328	GLU
1	A	330	SER
1	A	351	VAL
1	A	352	LYS
1	A	358	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	189	ASN
1	A	294	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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	$\# Z > 2$
1	CSS	A	137	1	4,6,7	0.89	0	2,6,8	2.40	1 (50%)

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
1	CSS	A	137	1	-	0/1/5/7	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	137	CSS	CB-CA-C	-3.28	101.89	110.80

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	137	CSS	1	0

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	1.65	6 (22%)	36,40,40	2.43	16 (44%)
3	PO4	A	502	-	4,4,4	1.16	0	6,6,6	0.62	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	-	-	3/15/31/31	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	SAH	C5-C4	4.44	1.47	1.39
2	A	501	SAH	C8-N9	-2.90	1.32	1.37
2	A	501	SAH	C5-C6	2.75	1.48	1.41
2	A	501	SAH	O4'-C1'	2.45	1.47	1.42
2	A	501	SAH	C8-N7	2.42	1.36	1.31
2	A	501	SAH	C6-N6	2.16	1.39	1.34

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	SAH	C4-N9-C8	5.67	111.69	105.74
2	A	501	SAH	C4-C5-N7	-4.64	105.27	110.58
2	A	501	SAH	C5-C4-N3	-4.33	120.76	126.72
2	A	501	SAH	N3-C4-N9	4.10	134.13	127.17
2	A	501	SAH	N9-C8-N7	-3.94	108.35	113.94
2	A	501	SAH	C5-N7-C8	3.86	109.51	103.45
2	A	501	SAH	CB-CG-SD	-3.29	106.12	113.45
2	A	501	SAH	C2-N1-C6	3.22	124.02	118.73
2	A	501	SAH	OXT-C-O	-2.96	117.35	124.08
2	A	501	SAH	C4-N9-C1'	-2.83	120.02	126.63
2	A	501	SAH	N3-C2-N1	-2.80	124.34	128.58
2	A	501	SAH	C6-C5-N7	2.77	137.43	132.09
2	A	501	SAH	O4'-C1'-N9	-2.76	102.79	108.09
2	A	501	SAH	C2'-C1'-N9	2.50	119.52	113.30
2	A	501	SAH	C2-N3-C4	2.42	117.74	111.83
2	A	501	SAH	O2'-C2'-C1'	-2.19	102.56	110.10

There are no chirality outliers.

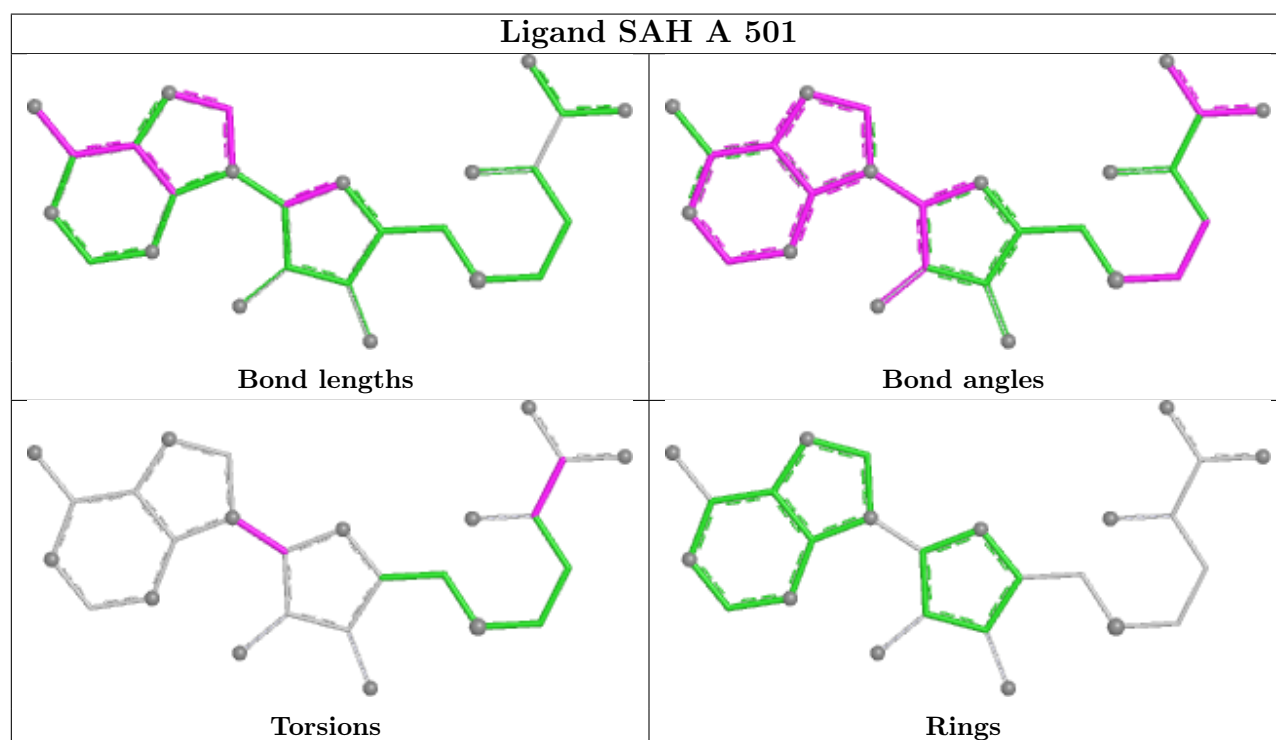
All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	SAH	C2'-C1'-N9-C8
2	A	501	SAH	OXT-C-CA-CB
2	A	501	SAH	O-C-CA-CB

There are no ring outliers.

No monomer is involved in short contacts.

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 [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	397/425 (93%)	0.05	7 (1%) 67 70	20, 34, 60, 73	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	40	LYS	2.8
1	A	405	VAL	2.7
1	A	128	TRP	2.3
1	A	378	MET	2.3
1	A	67	CYS	2.3
1	A	129	TRP	2.3
1	A	94	PHE	2.1

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
1	CSS	A	137	7/8	0.93	0.09	32,33,37,65	0

6.3 Carbohydrates [i](#)

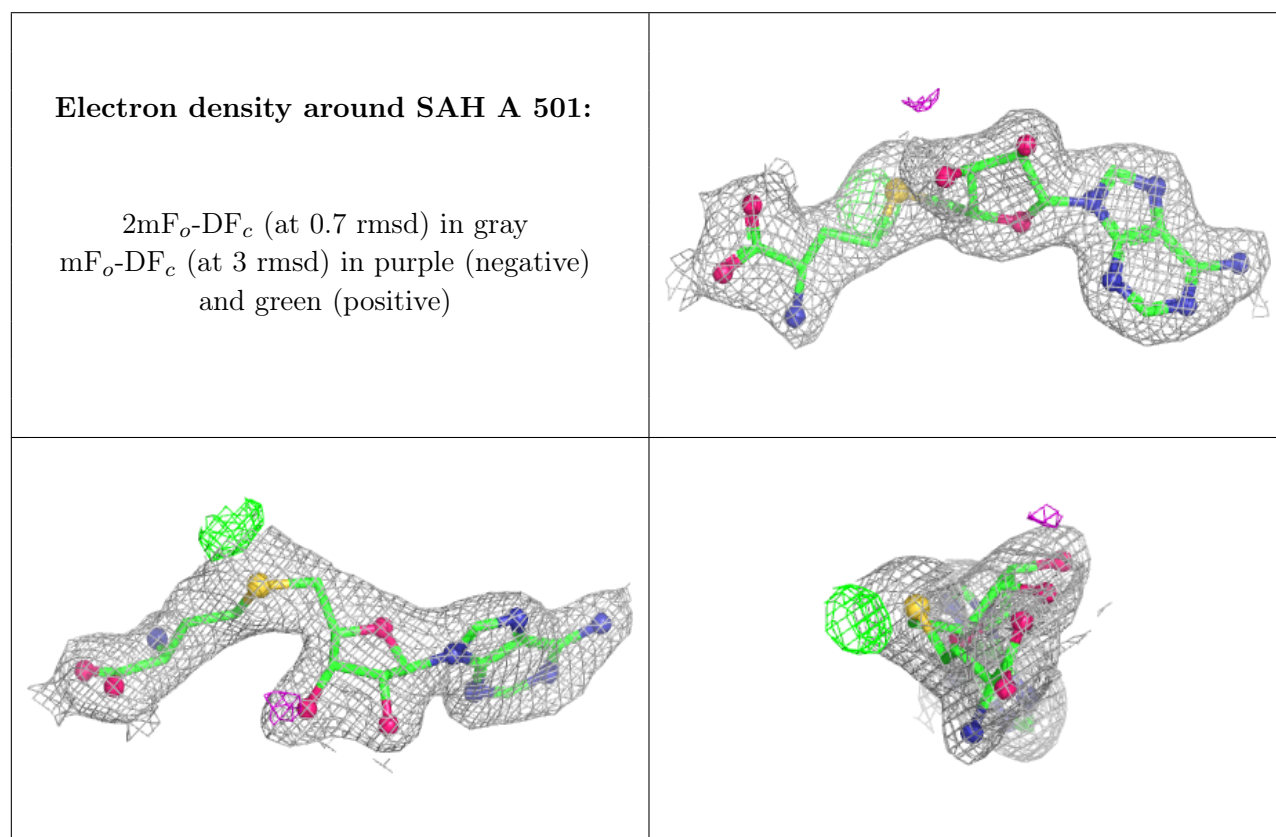
There are no oligosaccharides in this entry.

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($\text{\AA}^2$)	Q<0.9
3	PO4	A	502	5/5	0.94	0.07	72,73,75,75	0
2	SAH	A	501	26/26	0.96	0.06	26,33,38,39	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.