Full wwPDB X-ray Structure Validation Report ⓘ

Oct 23, 2023 – 07:40 AM EDT

PDB ID	:	3AV5
Title	:	Crystal structure of mouse DNA methyltransferase 1 with AdoHcy
Authors	:	Takeshita, K.; Suetake, I.; Yamashita, E.; Suga, M.; Narita, H.; Nakagawa, A.; Tajima, S.
Deposited on	:	2011-02-22
Resolution	:	3.25 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

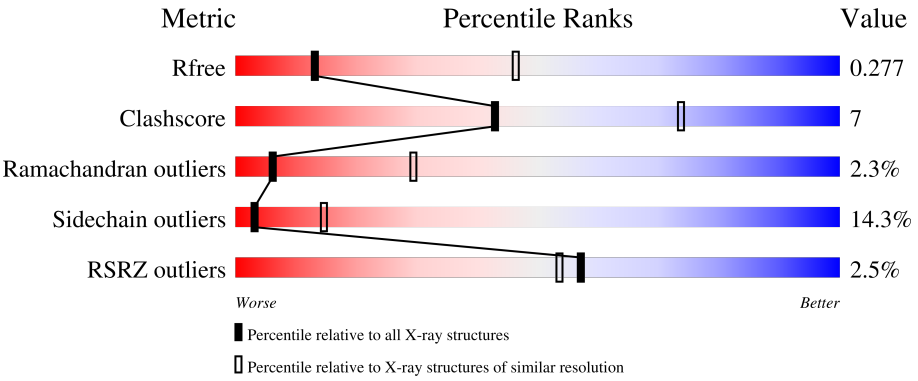
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 3.25 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	1191 (3.30-3.22)
Clashscore	141614	1251 (3.30-3.22)
Ramachandran outliers	138981	1229 (3.30-3.22)
Sidechain outliers	138945	1228 (3.30-3.22)
RSRZ outliers	127900	1154 (3.30-3.22)

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	1330	2% 60% 22% · 14%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 9135 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.

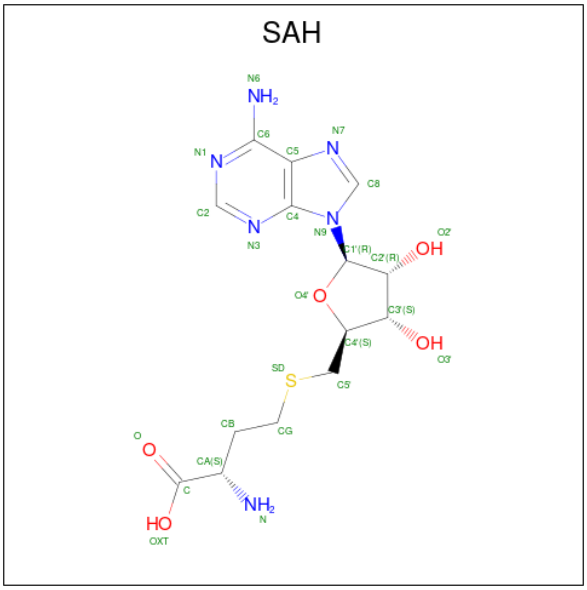
- Molecule 1 is a protein called DNA (cytosine-5)-methyltransferase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1139	Total	C	N	O	S	0	0	0
			9105	5760	1584	1701	60			

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	4	Total	Zn	0	0
			4	4		

- Molecule 3 is S-ADENOSYL-L-HOMOCYSTEINE (three-letter code: SAH) (formula: $C_{14}H_{20}N_6O_5S$).



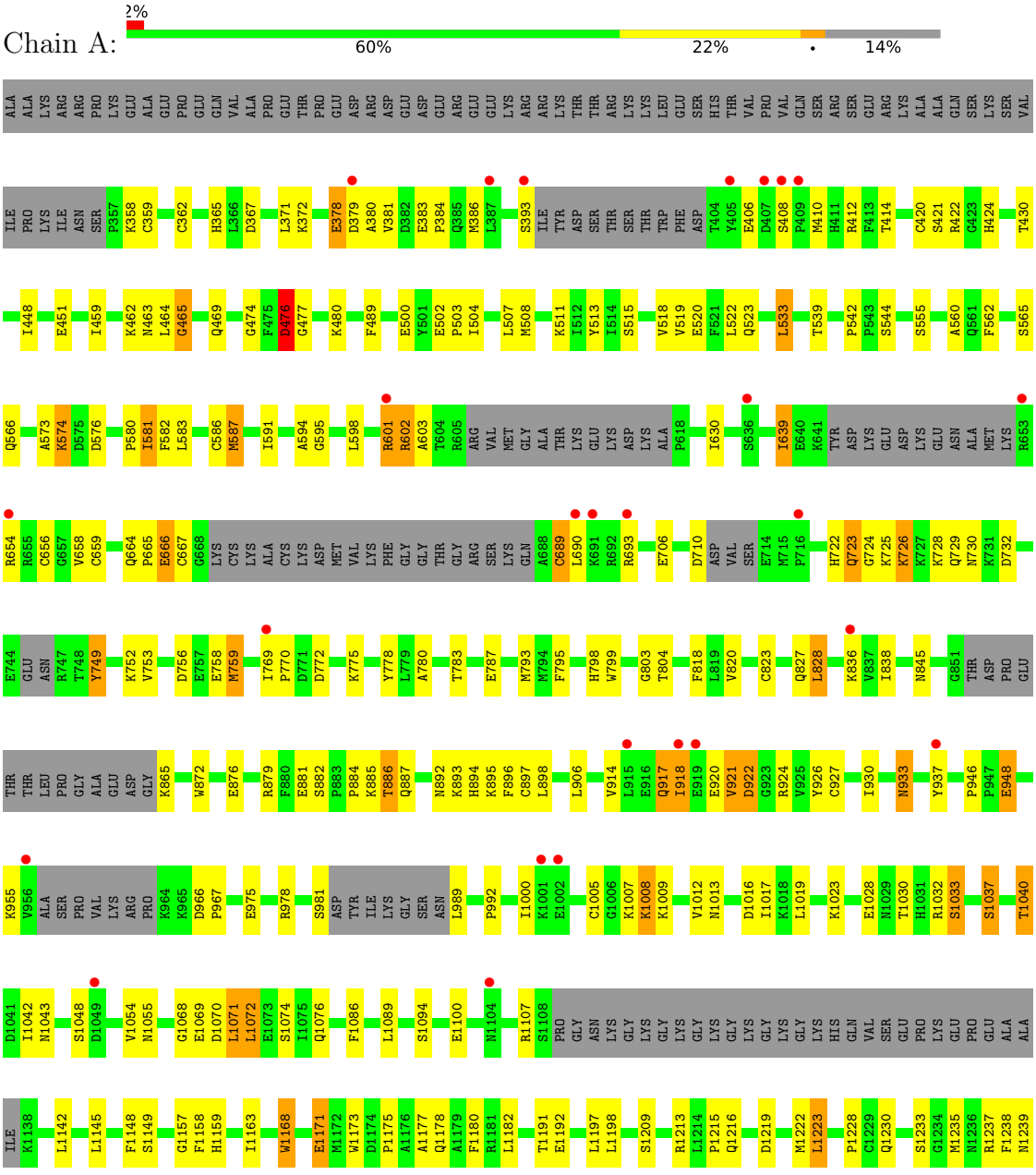
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			26	14	6	5	1		

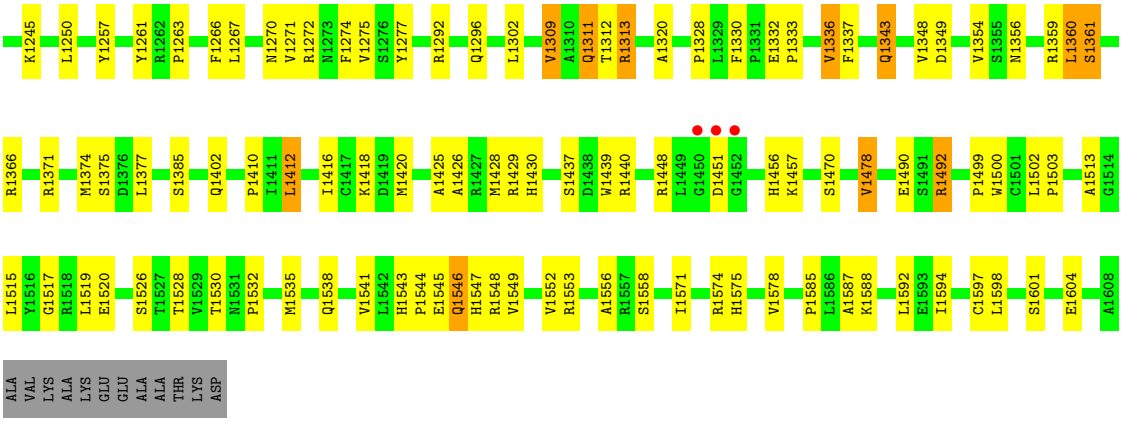
3 Residue-property plots (i)

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: DNA (cytosine-5)-methyltransferase 1

Chain A:




K1245 L1250 Y1257 Y1261 R1262 P1263 F1266 L1267 N1270 V1271 R1272 N1273 F1274 V1275 S1276 Y1277 R1292 Q1296 L1302 V1309 A1310 Q1311 T1312 R1313 A1320 P1328 L1329 F1330 P1331 E1332 P1333 V1336 F1337 Q1343 V1348 D1349 V1354 S1355 N1356 R1359 L1360 S1361
R1366 R1371 M1374 S1375 D1376 L1377 S1385 Q1402 P1410 I1411 L1412 I1416 C1417 K1418 D1419 M1420 A1425 A1426 R1427 M1428 R1429 H1430 S1437 D1438 W1439 R1440 R1448 L1449 G1450 D1451 G1452 H1456 K1457 S1470 V1478 E1490 S1491 R1492 P1499 W1500 C1501 L1502 P1503 A1513 G1514
L1515 Y1516 G1517 R1518 L1519 E1520 S1526 T1527 T1528 V1529 T1530 N1531 P1532 M1535 Q1538 V1541 L1542 H1543 P1544 E1545 Q1546 H1547 R1548 V1549 V1552 R1553 A1556 R1557 S1558 I1571 R1574 H1575 V1578 P1585 L1586 A1587 K1588 L1592 E1593 I1594 C1597 L1598 S1601 E1604 A1608
ALA VAL LYS ALA LYS GLU GLU ALA ALA THR LYS ASP

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	134.99Å 96.92Å 130.62Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.66 – 3.25 40.81 – 3.25	Depositor EDS
% Data completeness (in resolution range)	(Not available) (38.66-3.25) 95.8 (40.81-3.25)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	5.11 (at 3.25Å)	Xtriage
Refinement program	BUSTER-TNT, BUSTER 2.8.0	Depositor
R, R_{free}	0.183 , 0.264 0.192 , 0.277	Depositor DCC
R_{free} test set	1367 reflections (5.17%)	wwPDB-VP
Wilson B-factor (Å^2)	59.9	Xtriage
Anisotropy	0.261	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 72.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.018 for l,-k,h	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	9135	wwPDB-VP
Average B, all atoms (Å^2)	59.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.72% 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: ZN, 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	0.52	0/9325	0.78	1/12607 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1360	LEU	C-N-CA	6.83	138.78	121.70

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	9105	0	8877	123	0
2	A	4	0	0	0	0
3	A	26	0	19	0	0
All	All	9135	0	8896	123	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 7.

All (123) 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:1543:HIS:HD2	1:A:1546:GLN:H	1.18	0.85
1:A:1330:PHE:H	1:A:1356:ASN:HD21	1.24	0.83
1:A:885:LYS:HA	1:A:886:THR:HG23	1.61	0.80
1:A:1068:GLY:HA2	1:A:1071:LEU:HD12	1.62	0.79
1:A:1223:LEU:HB2	1:A:1263:PRO:HG3	1.66	0.77
1:A:383:GLU:HG3	1:A:464:LEU:HD23	1.67	0.77
1:A:975:GLU:OE1	1:A:978:ARG:HD2	1.90	0.72
1:A:1157:GLY:HA3	1:A:1587:ALA:HB3	1.71	0.71
1:A:1028:GLU:HG3	1:A:1037:SER:HB3	1.71	0.71
1:A:1543:HIS:CD2	1:A:1546:GLN:H	2.06	0.71
1:A:966:ASP:HB2	1:A:967:PRO:HD2	1.73	0.70
1:A:783:THR:HG21	1:A:897:CYS:HB2	1.75	0.69
1:A:886:THR:HG22	1:A:898:LEU:HD21	1.75	0.68
1:A:503:PRO:HG2	1:A:504:ILE:HD12	1.79	0.65
1:A:522:LEU:HB3	1:A:581:ILE:HG13	1.76	0.65
1:A:1371:ARG:O	1:A:1375:SER:HB3	1.99	0.63
1:A:1000:ILE:HG12	1:A:1019:LEU:HD23	1.81	0.62
1:A:1171:GLU:HB3	1:A:1177:ALA:HB2	1.81	0.61
1:A:1266:PHE:HB3	1:A:1320:ALA:HB3	1.83	0.61
1:A:1030:THR:HG22	1:A:1032:ARG:H	1.67	0.60
1:A:380:ALA:HB1	1:A:462:LYS:HB3	1.85	0.59
1:A:1040:THR:CG2	1:A:1366:ARG:HH22	2.15	0.59
1:A:1456:HIS:CG	1:A:1457:LYS:H	2.21	0.59
1:A:515:SER:O	1:A:519:VAL:HG23	2.04	0.57
1:A:992:PRO:HG2	1:A:1336:VAL:HG22	1.87	0.57
1:A:1028:GLU:O	1:A:1033:SER:HA	2.06	0.56
1:A:1478:VAL:HG13	1:A:1500:TRP:NE1	2.20	0.56
1:A:1543:HIS:CD2	1:A:1545:GLU:H	2.24	0.55
1:A:753:VAL:HG11	1:A:759:MET:SD	2.48	0.54
1:A:1173:TRP:CD1	1:A:1175:PRO:HD2	2.43	0.53
1:A:1076:GLN:HE22	1:A:1402:GLN:HE22	1.56	0.53
1:A:1426:ALA:O	1:A:1430:HIS:HD2	1.91	0.53
1:A:1343:GLN:HE21	1:A:1343:GLN:H	1.58	0.52
1:A:1302:LEU:HD21	1:A:1330:PHE:HD2	1.74	0.51
1:A:1588:LYS:HG2	1:A:1592:LEU:HD23	1.93	0.51
1:A:1216:GLN:O	1:A:1219:ASP:HB2	2.10	0.50
1:A:894:HIS:CD2	1:A:895:LYS:HG3	2.47	0.50
1:A:793:MET:HB3	1:A:828:LEU:HD13	1.93	0.50
1:A:378:GLU:C	1:A:380:ALA:H	2.15	0.49
1:A:582:PHE:HA	1:A:587:MET:HG3	1.93	0.49
1:A:602:ARG:HH11	1:A:603:ALA:H	1.59	0.49
1:A:381:VAL:HG23	1:A:386:MET:HB3	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1332:GLU:HG3	1:A:1359:ARG:HD2	1.95	0.49
1:A:917:GLN:HA	1:A:927:CYS:HA	1.95	0.48
1:A:1532:PRO:HB2	1:A:1549:VAL:HG13	1.95	0.48
1:A:1515:LEU:HD22	1:A:1535:MET:HA	1.95	0.48
1:A:1171:GLU:O	1:A:1191:THR:HA	2.14	0.48
1:A:723:GLN:N	1:A:724:GLY:HA3	2.29	0.48
1:A:881:GLU:HG2	1:A:1296:GLN:HE21	1.79	0.47
1:A:1313:ARG:HH11	1:A:1528:THR:HG21	1.79	0.47
1:A:667:CYS:HA	1:A:689:CYS:H	1.79	0.47
1:A:464:LEU:O	1:A:465:GLY:O	2.33	0.47
1:A:1546:GLN:HB3	1:A:1548:ARG:HG2	1.96	0.47
1:A:1274:PHE:HA	1:A:1277:TYR:CD1	2.49	0.47
1:A:725:LYS:NZ	1:A:726:LYS:H	2.13	0.47
1:A:1416:ILE:HG12	1:A:1571:ILE:HD12	1.97	0.47
1:A:1437:SER:O	1:A:1517:GLY:HA2	2.15	0.47
1:A:1023:LYS:O	1:A:1048:SER:HB3	2.14	0.47
1:A:1149:SER:HB2	1:A:1180:PHE:CE1	2.50	0.47
1:A:1333:PRO:HD2	1:A:1359:ARG:HB2	1.97	0.46
1:A:630:ILE:HD11	1:A:1292:ARG:HG2	1.97	0.46
1:A:879:ARG:NH2	1:A:1328:PRO:O	2.49	0.46
1:A:1309:VAL:HG23	1:A:1585:PRO:HG2	1.99	0.45
1:A:1348:VAL:HG12	1:A:1349:ASP:OD2	2.16	0.45
1:A:1223:LEU:HD11	1:A:1257:TYR:HB3	1.98	0.45
1:A:1500:TRP:O	1:A:1503:PRO:HD2	2.16	0.45
1:A:591:ILE:HG12	1:A:598:LEU:HD21	1.98	0.45
1:A:798:HIS:HA	1:A:823:CYS:HB3	1.99	0.45
1:A:1556:ALA:HA	1:A:1578:VAL:HG11	1.99	0.45
1:A:946:PRO:HB2	1:A:948:GLU:HG2	1.98	0.45
1:A:1142:LEU:HD11	1:A:1598:LEU:HD21	1.99	0.45
1:A:580:PRO:HD2	1:A:583:LEU:HD12	1.99	0.45
1:A:476:ASP:HB3	1:A:477:GLY:H	1.56	0.44
1:A:1068:GLY:O	1:A:1071:LEU:HB2	2.17	0.44
1:A:1530:THR:O	1:A:1575:HIS:HB3	2.18	0.44
1:A:689:CYS:HB2	1:A:690:LEU:H	1.60	0.44
1:A:885:LYS:HA	1:A:886:THR:CG2	2.40	0.44
1:A:511:LYS:HB3	1:A:562:PHE:CD2	2.53	0.44
1:A:886:THR:CB	1:A:887:GLN:HA	2.47	0.44
1:A:1499:PRO:HB2	1:A:1502:LEU:HG	2.00	0.44
1:A:566:GLN:HE22	1:A:603:ALA:HB3	1.83	0.44
1:A:1228:PRO:HD2	1:A:1250:LEU:HD13	2.00	0.44
1:A:1519:LEU:HB2	1:A:1544:PRO:HD3	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:359:CYS:SG	1:A:422:ARG:HD2	2.58	0.43
1:A:384:PRO:HG3	1:A:489:PHE:CE1	2.52	0.43
1:A:1158:PHE:HZ	1:A:1267:LEU:HD13	1.83	0.43
1:A:730:ASN:HD21	1:A:732:ASP:HB2	1.83	0.43
1:A:594:ALA:HB1	1:A:1492:ARG:HH21	1.83	0.43
1:A:770:PRO:HB3	1:A:778:TYR:CE1	2.53	0.43
1:A:1043:ASN:HD22	1:A:1086:PHE:HA	1.84	0.43
1:A:513:TYR:HE2	1:A:542:PRO:HB3	1.84	0.43
1:A:914:VAL:HA	1:A:930:ILE:HG22	2.01	0.43
1:A:1145:LEU:HA	1:A:1168:TRP:O	2.19	0.43
1:A:1311:GLN:HE21	1:A:1313:ARG:HB2	1.84	0.42
1:A:520:GLU:HA	1:A:523:GLN:NE2	2.34	0.42
1:A:1215:PRO:O	1:A:1261:TYR:OH	2.27	0.42
1:A:1005:CYS:CB	1:A:1017:ILE:HA	2.49	0.42
1:A:1425:ALA:HA	1:A:1428:MET:HE2	2.02	0.42
1:A:1552:VAL:HG11	1:A:1574:ARG:HB3	2.01	0.42
1:A:780:ALA:HB2	1:A:799:TRP:CE3	2.55	0.42
1:A:1072:LEU:H	1:A:1072:LEU:HG	1.54	0.42
1:A:518:VAL:HG22	1:A:533:LEU:HD21	2.02	0.42
1:A:924:ARG:HG3	1:A:926:TYR:HE1	1.85	0.42
1:A:1418:LYS:HE2	1:A:1420:MET:HE3	2.01	0.41
1:A:1008:LYS:HB3	1:A:1013:ASN:HB2	2.02	0.41
1:A:665:PRO:HB2	1:A:666:GLU:HB2	2.02	0.41
1:A:371:LEU:HD11	1:A:424:HIS:HD2	1.86	0.41
1:A:803:GLY:HA2	1:A:818:PHE:HE1	1.85	0.41
1:A:371:LEU:HD11	1:A:424:HIS:CD2	2.56	0.41
1:A:749:TYR:HD2	1:A:787:GLU:HB3	1.85	0.41
1:A:1456:HIS:CG	1:A:1457:LYS:N	2.88	0.41
1:A:1439:TRP:CE2	1:A:1440:ARG:HG3	2.56	0.41
1:A:921:VAL:HG12	1:A:922:ASP:H	1.86	0.41
1:A:1163:ILE:HD13	1:A:1594:ILE:HB	2.01	0.41
1:A:1377:LEU:HD22	1:A:1412:LEU:HD11	2.01	0.41
1:A:362:CYS:HB3	1:A:420:CYS:HB3	2.03	0.41
1:A:522:LEU:HD21	1:A:586:CYS:SG	2.61	0.41
1:A:930:ILE:HG13	1:A:937:TYR:HB2	2.02	0.41
1:A:1429:ARG:HA	1:A:1547:HIS:CG	2.57	0.40
1:A:372:LYS:HD2	1:A:500:GLU:HB3	2.02	0.40
1:A:1068:GLY:HA3	1:A:1089:LEU:HD21	2.02	0.40
1:A:1070:ASP:HB3	1:A:1107:ARG:HH21	1.86	0.40
1:A:1530:THR:H	1:A:1538:GLN:NE2	2.20	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	1117/1330 (84%)	992 (89%)	99 (9%)	26 (2%)	6 29

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	379	ASP
1	A	408	SER
1	A	465	GLY
1	A	573	ALA
1	A	896	PHE
1	A	1233	SER
1	A	1513	ALA
1	A	430	THR
1	A	476	ASP
1	A	574	LYS
1	A	639	ILE
1	A	772	ASP
1	A	1361	SER
1	A	775	LYS
1	A	1009	LYS
1	A	1037	SER
1	A	601	ARG
1	A	463	ASN
1	A	560	ALA
1	A	595	GLY
1	A	921	VAL
1	A	933	ASN
1	A	474	GLY
1	A	884	PRO
1	A	918	ILE
1	A	1410	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	1003/1162 (86%)	860 (86%)	143 (14%)	3 14

All (143) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	358	LYS
1	A	365	HIS
1	A	367	ASP
1	A	378	GLU
1	A	393	SER
1	A	406	GLU
1	A	410	MET
1	A	412	ARG
1	A	414	THR
1	A	421	SER
1	A	448	ILE
1	A	451	GLU
1	A	459	ILE
1	A	469	GLN
1	A	476	ASP
1	A	480	LYS
1	A	502	GLU
1	A	507	LEU
1	A	508	MET
1	A	533	LEU
1	A	539	THR
1	A	544	SER
1	A	555	SER
1	A	565	SER
1	A	574	LYS
1	A	576	ASP
1	A	581	ILE
1	A	587	MET
1	A	601	ARG
1	A	602	ARG

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Mol	Chain	Res	Type
1	A	639	ILE
1	A	654	ARG
1	A	656	CYS
1	A	658	VAL
1	A	659	CYS
1	A	664	GLN
1	A	666	GLU
1	A	689	CYS
1	A	693	ARG
1	A	706	GLU
1	A	710	ASP
1	A	722	HIS
1	A	723	GLN
1	A	726	LYS
1	A	728	LYS
1	A	729	GLN
1	A	749	TYR
1	A	752	LYS
1	A	756	ASP
1	A	758	GLU
1	A	759	MET
1	A	769	ILE
1	A	795	PHE
1	A	804	THR
1	A	820	VAL
1	A	827	GLN
1	A	828	LEU
1	A	836	LYS
1	A	838	ILE
1	A	845	ASN
1	A	865	LYS
1	A	872	TRP
1	A	876	GLU
1	A	882	SER
1	A	886	THR
1	A	892	ASN
1	A	893	LYS
1	A	906	LEU
1	A	917	GLN
1	A	918	ILE
1	A	920	GLU
1	A	922	ASP

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Mol	Chain	Res	Type
1	A	933	ASN
1	A	948	GLU
1	A	955	LYS
1	A	981	SER
1	A	989	LEU
1	A	1007	LYS
1	A	1008	LYS
1	A	1012	VAL
1	A	1016	ASP
1	A	1033	SER
1	A	1040	THR
1	A	1042	ILE
1	A	1054	VAL
1	A	1055	ASN
1	A	1069	GLU
1	A	1071	LEU
1	A	1072	LEU
1	A	1074	SER
1	A	1094	SER
1	A	1100	GLU
1	A	1148	PHE
1	A	1159	HIS
1	A	1168	TRP
1	A	1171	GLU
1	A	1178	GLN
1	A	1182	LEU
1	A	1192	GLU
1	A	1197	LEU
1	A	1198	LEU
1	A	1209	SER
1	A	1213	ARG
1	A	1222	MET
1	A	1223	LEU
1	A	1230	GLN
1	A	1235	MET
1	A	1237	ARG
1	A	1238	PHE
1	A	1239	ASN
1	A	1245	LYS
1	A	1270	ASN
1	A	1271	VAL
1	A	1272	ARG

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Mol	Chain	Res	Type
1	A	1275	VAL
1	A	1309	VAL
1	A	1311	GLN
1	A	1312	THR
1	A	1313	ARG
1	A	1336	VAL
1	A	1337	PHE
1	A	1343	GLN
1	A	1354	VAL
1	A	1360	LEU
1	A	1361	SER
1	A	1374	MET
1	A	1385	SER
1	A	1412	LEU
1	A	1448	ARG
1	A	1451	ASP
1	A	1470	SER
1	A	1478	VAL
1	A	1490	GLU
1	A	1492	ARG
1	A	1520	GLU
1	A	1526	SER
1	A	1541	VAL
1	A	1546	GLN
1	A	1553	ARG
1	A	1558	SER
1	A	1597	CYS
1	A	1601	SER
1	A	1604	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	469	GLN
1	A	509	GLN
1	A	523	GLN
1	A	592	HIS
1	A	600	GLN
1	A	663	GLN
1	A	730	ASN
1	A	917	GLN
1	A	1029	ASN

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Mol	Chain	Res	Type
1	A	1043	ASN
1	A	1076	GLN
1	A	1159	HIS
1	A	1296	GLN
1	A	1311	GLN
1	A	1343	GLN
1	A	1356	ASN
1	A	1430	HIS
1	A	1446	GLN
1	A	1509	HIS
1	A	1543	HIS

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 monosaccharides in this entry.

5.6 Ligand geometry

Of 5 ligands modelled in this entry, 4 are monoatomic - leaving 1 for Mogul analysis.

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	$\#\|Z\| > 2$
3	SAH	A	1	-	24,28,28	1.31	3 (12%)	25,40,40	2.21	6 (24%)

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
3	SAH	A	1	-	-	3/11/31/31	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1	SAH	C8-N7	-3.46	1.28	1.34
3	A	1	SAH	C2-N3	2.37	1.35	1.32
3	A	1	SAH	C2'-C3'	2.14	1.59	1.53

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	1	SAH	O4'-C1'-C2'	-6.89	96.85	106.93
3	A	1	SAH	N3-C2-N1	-4.65	121.41	128.68
3	A	1	SAH	CB-CA-N	2.88	117.71	110.17
3	A	1	SAH	OXT-C-CA	2.85	123.10	113.38
3	A	1	SAH	C4-C5-N7	-2.75	106.53	109.40
3	A	1	SAH	N6-C6-N1	2.09	122.91	118.57

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1	SAH	CA-CB-CG-SD
3	A	1	SAH	O-C-CA-N
3	A	1	SAH	OXT-C-CA-N

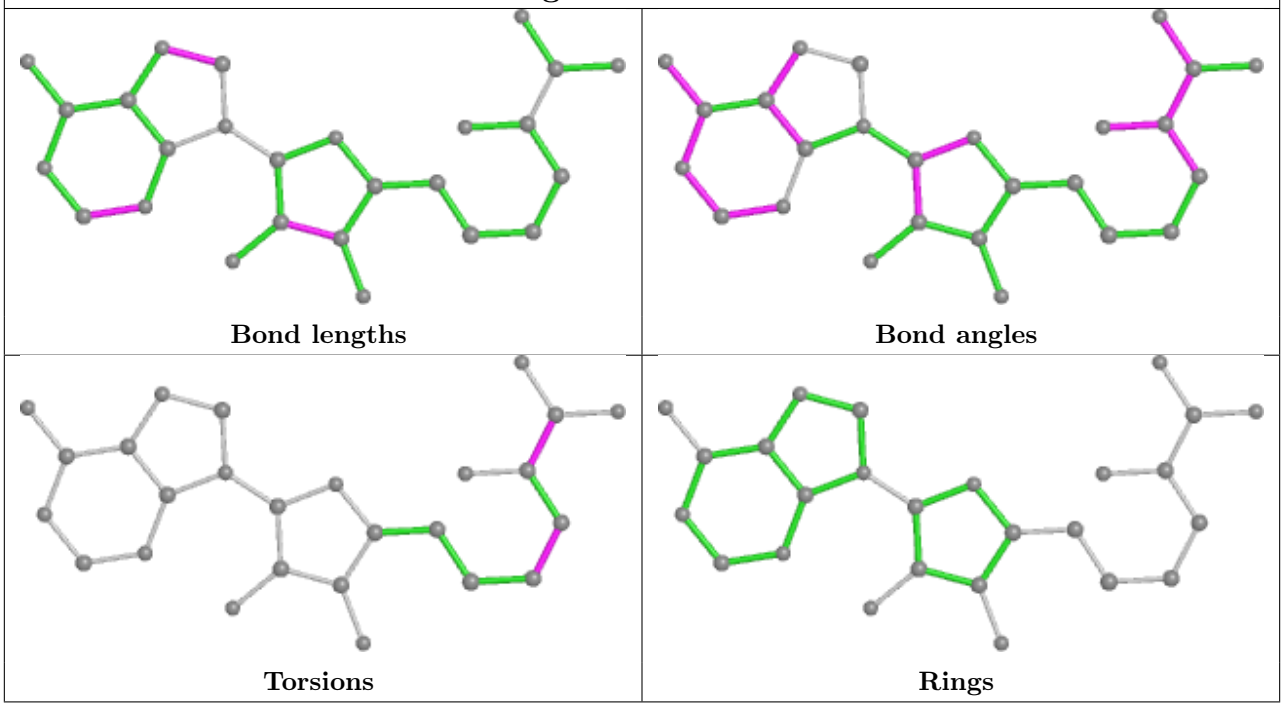
There are no ring outliers.

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 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 1



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	1139/1330 (85%)	-0.06	29 (2%) 57 53	16, 56, 103, 125	0

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	408	SER	4.5
1	A	379	ASP	4.1
1	A	716	PRO	3.2
1	A	405	TYR	3.2
1	A	690	LEU	3.0
1	A	653	ARG	3.0
1	A	393	SER	2.9
1	A	654	ARG	2.9
1	A	1451	ASP	2.9
1	A	636	SER	2.8
1	A	1001	LYS	2.8
1	A	1049	ASP	2.7
1	A	918	ILE	2.7
1	A	409	PRO	2.6
1	A	919	GLU	2.5
1	A	1452	GLY	2.4
1	A	769	ILE	2.3
1	A	693	ARG	2.3
1	A	1450	GLY	2.3
1	A	836	LYS	2.2
1	A	691	LYS	2.2
1	A	937	TYR	2.2
1	A	956	VAL	2.1
1	A	1002	GLU	2.1
1	A	601	ARG	2.1
1	A	915	LEU	2.1
1	A	387	LEU	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	407	ASP	2.1
1	A	1104	ASN	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

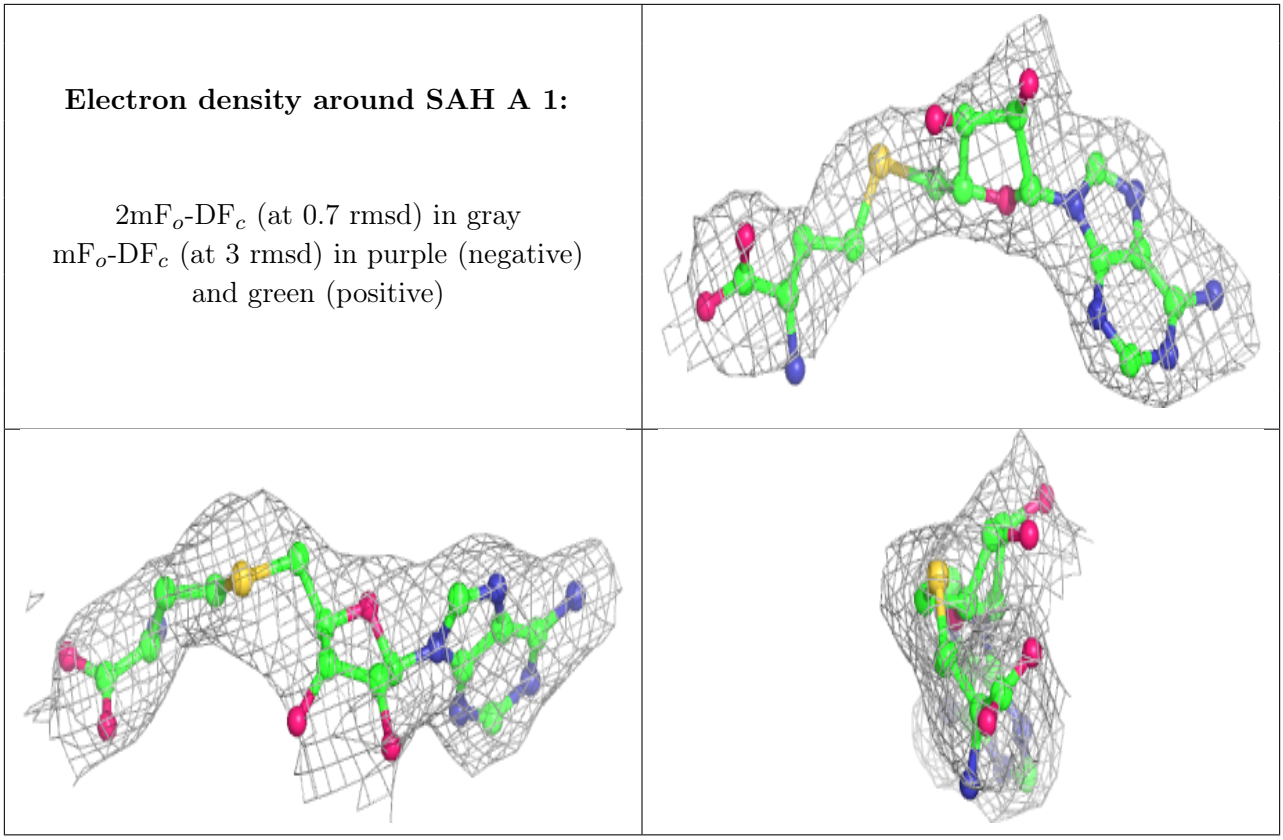
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	SAH	A	1	26/26	0.98	0.19	38,41,51,52	0
2	ZN	A	2002	1/1	0.99	0.05	65,65,65,65	0
2	ZN	A	2001	1/1	0.99	0.12	56,56,56,56	0
2	ZN	A	2005	1/1	1.00	0.10	34,34,34,34	0
2	ZN	A	2004	1/1	1.00	0.08	58,58,58,58	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 A 1:

$2mF_o$-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.