



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 13, 2026 – 11:24 PM UTC

PDB ID : 3TOS / pdb_00003tos
Title : Crystal Structure of CalS11, Calicheamicin Methyltransferase
Authors : Chang, A.; Aceti, D.J.; Beebe, E.T.; Makino, S.-I.; Wrobel, R.L.; Bingman, C.A.; Thorson, J.S.; Phillips Jr., G.N.; Center for Eukaryotic Structural Genomics (CESG); Enzyme Discovery for Natural Product Biosynthesis (NatPro)
Deposited on : 2011-09-06
Resolution : 1.55 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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

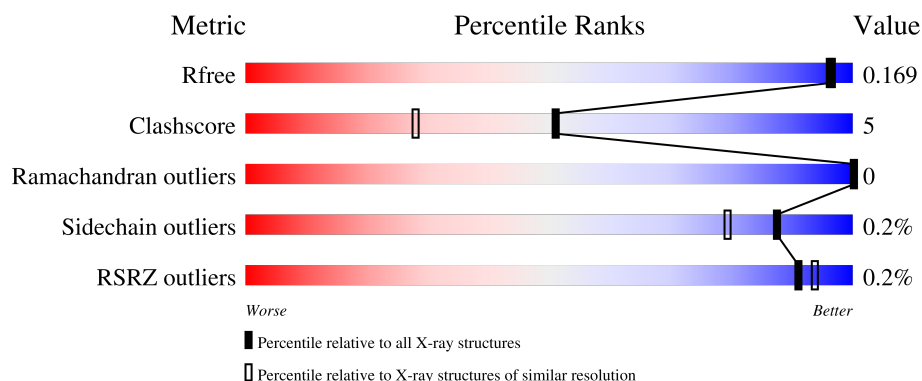
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.55 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	2145 (1.56-1.56)
Clashscore	190562	2189 (1.56-1.56)
Ramachandran outliers	187476	2153 (1.56-1.56)
Sidechain outliers	187428	2150 (1.56-1.56)
RSRZ outliers	180081	2146 (1.56-1.56)

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	257	90% 7% .
1	B	257	91% 9%
1	C	257	87% 11% .
1	D	257	88% 9% .

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Mol	Chain	Length	Quality of chain
1	E	257	 91% 6% .
1	F	257	 88% 9% .
1	G	257	 90% 8% .
1	H	257	 90% 7% .
1	I	257	 89% 8% .
1	J	257	 90% 8% .

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 26923 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 CalS11.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	251	Total	C	N	O	S	Se	0	13	0
			2127	1355	375	389	3	5			
1	B	257	Total	C	N	O	S	Se	0	14	0
			2173	1380	384	401	3	5			
1	C	251	Total	C	N	O	S	Se	0	14	0
			2136	1360	376	392	3	5			
1	D	251	Total	C	N	O	S	Se	0	13	0
			2125	1355	374	388	3	5			
1	E	251	Total	C	N	O	S	Se	0	12	0
			2118	1350	373	387	3	5			
1	F	251	Total	C	N	O	S	Se	0	14	0
			2136	1360	376	392	3	5			
1	G	252	Total	C	N	O	S	Se	0	13	0
			2131	1357	376	390	3	5			
1	H	251	Total	C	N	O	S	Se	0	11	0
			2109	1345	371	385	3	5			
1	I	251	Total	C	N	O	S	Se	0	12	0
			2118	1349	373	388	3	5			
1	J	251	Total	C	N	O	S	Se	0	12	0
			2118	1349	373	388	3	5			

There are 10 discrepancies between the modelled and reference sequences:

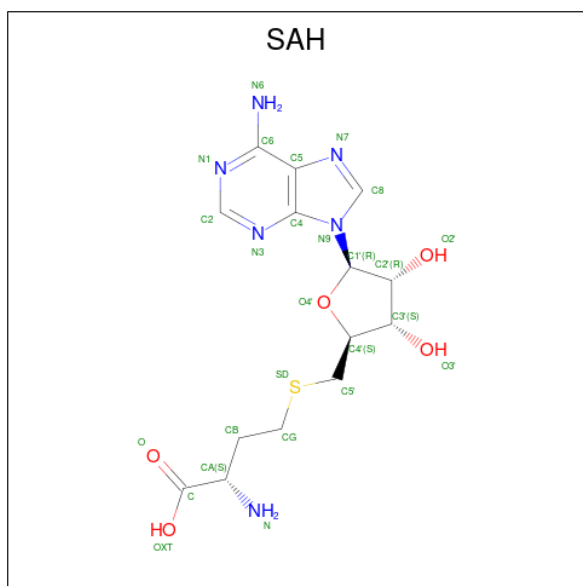
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	SER	-	expression tag	UNP Q8KNF1
B	1	SER	-	expression tag	UNP Q8KNF1
C	1	SER	-	expression tag	UNP Q8KNF1
D	1	SER	-	expression tag	UNP Q8KNF1
E	1	SER	-	expression tag	UNP Q8KNF1
F	1	SER	-	expression tag	UNP Q8KNF1
G	1	SER	-	expression tag	UNP Q8KNF1
H	1	SER	-	expression tag	UNP Q8KNF1
I	1	SER	-	expression tag	UNP Q8KNF1

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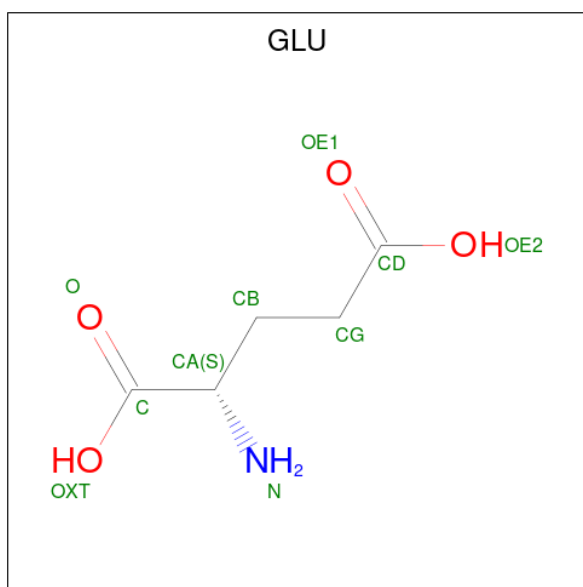
Chain	Residue	Modelled	Actual	Comment	Reference
J	1	SER	-	expression tag	UNP Q8KNF1

- Molecule 2 is S-ADENOSYL-L-HOMOCYSTEINE (CCD ID: 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		
2	E	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	F	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	G	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	H	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	I	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	J	1	Total	C	N	O	S	0	0
			26	14	6	5	1		

- Molecule 3 is GLUTAMIC ACID (CCD ID: GLU) (formula: $C_5H_9NO_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			10	5	1	4		
3	B	1	Total	C	N	O	0	0
			10	5	1	4		
3	C	1	Total	C	N	O	0	0
			10	5	1	4		
3	D	1	Total	C	N	O	0	0
			10	5	1	4		
3	E	1	Total	C	N	O	0	0
			10	5	1	4		
3	F	1	Total	C	N	O	0	0
			10	5	1	4		
3	G	1	Total	C	N	O	0	0
			10	5	1	4		
3	H	1	Total	C	N	O	0	0
			10	5	1	4		
3	I	1	Total	C	N	O	0	0
			10	5	1	4		
3	J	1	Total	C	N	O	0	0
			10	5	1	4		

- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Na	0	0
			1	1		
4	B	1	Total	Na	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	1	Total	Na	0	0
			1	1		
4	D	1	Total	Na	0	0
			1	1		
4	E	1	Total	Na	0	0
			1	1		
4	F	1	Total	Na	0	0
			1	1		
4	G	1	Total	Na	0	0
			1	1		
4	H	1	Total	Na	0	0
			1	1		
4	I	1	Total	Na	0	0
			1	1		
4	J	1	Total	Na	0	0
			1	1		

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	C	1	Total	C	O	0	0
			4	2	2		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	C	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	D	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	G	1	Total C O 4 2 2	0	0
5	H	1	Total C O 4 2 2	0	0
5	I	1	Total C O 4 2 2	0	0
5	I	1	Total C O 4 2 2	0	0
5	J	1	Total C O 4 2 2	0	0
5	J	1	Total C O 4 2 2	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	551	Total O 551 551	0	0
6	B	494	Total O 494 494	0	0
6	C	516	Total O 516 516	0	0
6	D	495	Total O 495 495	0	0
6	E	477	Total O 477 477	0	0
6	F	512	Total O 512 512	0	0
6	G	514	Total O 514 514	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	H	565	Total 565	O 565	0	0
6	I	540	Total 540	O 540	0	0
6	J	538	Total 538	O 538	0	0

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.

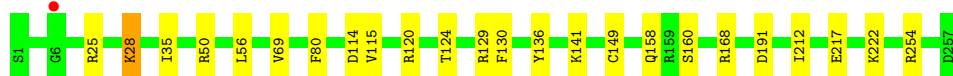
- Molecule 1: CalS11

Chain A: 



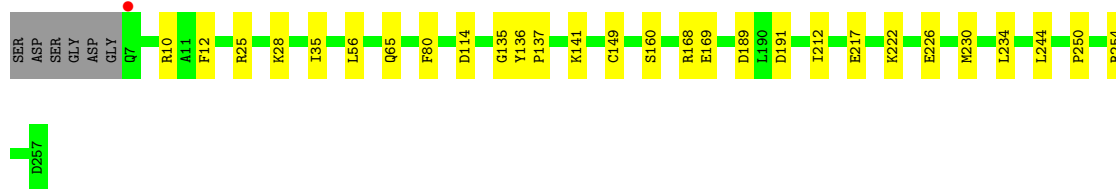
- Molecule 1: CalS11

Chain B: 



- Molecule 1: CalS11

Chain C: 



- Molecule 1: CalS11

Chain D: 

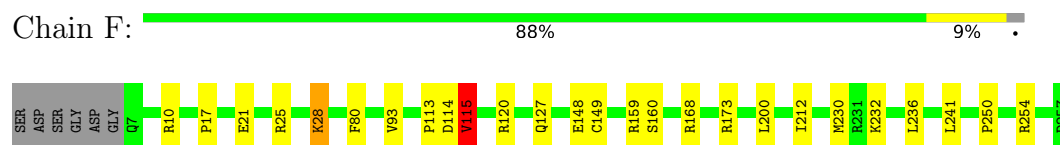


- Molecule 1: CalS11

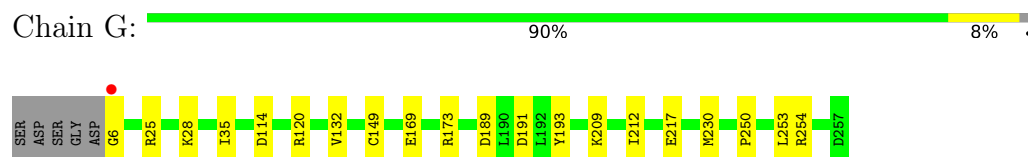
Chain E: 



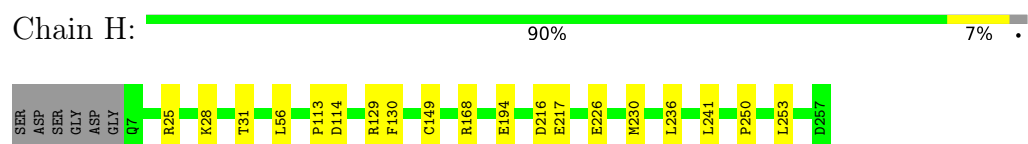
● Molecule 1: CalS11



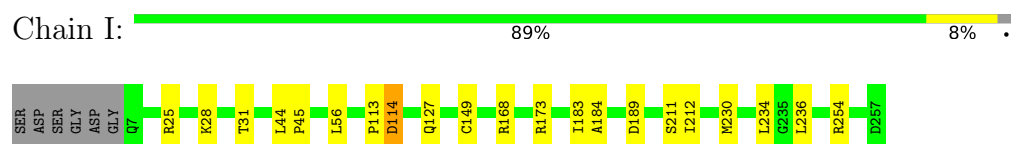
● Molecule 1: CalS11



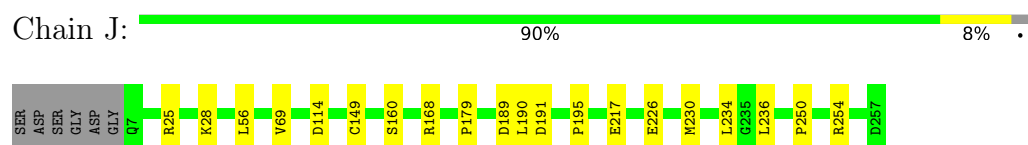
● Molecule 1: CalS11



● Molecule 1: CalS11



● Molecule 1: CalS11



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	78.32Å 106.08Å 106.33Å 68.69° 69.63° 88.56°	Depositor
Resolution (Å)	43.10 – 1.55 43.10 – 1.55	Depositor EDS
% Data completeness (in resolution range)	95.5 (43.10-1.55) 95.6 (43.10-1.55)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.49 (at 1.55Å)	Xtriage
Refinement program	PHENIX 1.6.4_486	Depositor
R, R_{free}	0.146 , 0.173 0.142 , 0.169	Depositor DCC
R_{free} test set	1875 reflections (0.45%)	wwPDB-VP
Wilson B-factor (Å ²)	11.3	Xtriage
Anisotropy	0.490	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 66.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.000 for h,-k,h-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	26923	wwPDB-VP
Average B, all atoms (Å ²)	17.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.90% 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: SAH, EDO, NA

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	1.02	1/2178 (0.0%)	0.92	0/2956
1	B	1.03	2/2224 (0.1%)	0.94	0/3018
1	C	1.05	0/2187	0.92	1/2968 (0.0%)
1	D	1.04	1/2176 (0.0%)	0.89	4/2954 (0.1%)
1	E	0.99	0/2169	0.91	4/2944 (0.1%)
1	F	1.05	1/2187 (0.0%)	0.95	1/2968 (0.0%)
1	G	1.03	1/2182 (0.0%)	0.95	1/2961 (0.0%)
1	H	1.06	2/2160 (0.1%)	0.97	0/2932
1	I	1.04	1/2169 (0.0%)	0.95	4/2945 (0.1%)
1	J	1.09	2/2169 (0.1%)	0.98	0/2945
All	All	1.04	11/21801 (0.1%)	0.94	15/29591 (0.1%)

The worst 5 of 11 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	J	226	GLU	N-CA	6.07	1.53	1.46
1	J	69	VAL	CA-C	5.90	1.56	1.52
1	F	93	VAL	CA-CB	5.79	1.61	1.54
1	H	226	GLU	N-CA	5.65	1.53	1.46
1	D	121	VAL	CA-CB	-5.56	1.49	1.54

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	193	TYR	N-CA-C	6.05	117.57	110.97
1	I	114[A]	ASP	CA-C-N	-5.75	113.59	122.68
1	I	114[A]	ASP	C-N-CA	-5.75	113.59	122.68
1	I	114[B]	ASP	CA-C-N	-5.75	113.59	122.68
1	I	114[B]	ASP	C-N-CA	-5.75	113.59	122.68

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	2127	0	2089	21	0
1	B	2173	0	2132	25	0
1	C	2136	0	2094	34	0
1	D	2125	0	2089	28	0
1	E	2118	0	2082	21	0
1	F	2136	0	2094	25	0
1	G	2131	0	2092	29	0
1	H	2109	0	2074	19	0
1	I	2118	0	2077	23	0
1	J	2118	0	2077	22	0
2	A	26	0	19	0	0
2	B	26	0	19	0	0
2	C	26	0	19	1	0
2	D	26	0	19	0	0
2	E	26	0	19	1	0
2	F	26	0	19	0	0
2	G	26	0	18	1	0
2	H	26	0	19	0	0
2	I	26	0	19	1	0
2	J	26	0	19	1	0
3	A	10	0	5	0	0
3	B	10	0	5	0	0
3	C	10	0	5	0	0
3	D	10	0	5	0	0
3	E	10	0	5	0	0
3	F	10	0	5	0	0
3	G	10	0	5	0	0
3	H	10	0	5	0	0
3	I	10	0	5	0	0
3	J	10	0	5	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	E	1	0	0	0	0
4	F	1	0	0	0	0
4	G	1	0	0	0	0
4	H	1	0	0	0	0
4	I	1	0	0	0	0
4	J	1	0	0	0	0
5	A	4	0	6	0	0
5	B	4	0	6	0	0
5	C	8	0	12	1	0
5	D	8	0	12	0	0
5	E	4	0	6	1	0
5	F	8	0	12	1	0
5	G	4	0	6	1	0
5	H	4	0	6	1	0
5	I	8	0	12	3	0
5	J	8	0	12	2	0
6	A	551	0	0	10	0
6	B	494	0	0	7	0
6	C	516	0	0	15	0
6	D	495	0	0	10	0
6	E	477	0	0	7	0
6	F	512	0	0	10	0
6	G	514	0	0	17	0
6	H	565	0	0	5	0
6	I	540	0	0	9	0
6	J	538	0	0	5	0
All	All	26923	0	21229	223	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 5.

The worst 5 of 223 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:E:7:GLN:HG3	1:E:8:ASP:H	1.17	1.04
1:F:80:PHE:CG	6:G:5934:HOH:O	2.21	0.93
1:D:28[B]:LYS:HE3	6:D:5445:HOH:O	1.70	0.92
1:C:12:PHE:HB3	6:C:5960:HOH:O	1.72	0.89
1:A:28[A]:LYS:HE2	6:A:4790:HOH:O	1.74	0.85

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	263/257 (102%)	258 (98%)	5 (2%)	0	100	100
1	B	270/257 (105%)	260 (96%)	10 (4%)	0	100	100
1	C	264/257 (103%)	253 (96%)	11 (4%)	0	100	100
1	D	263/257 (102%)	255 (97%)	8 (3%)	0	100	100
1	E	262/257 (102%)	258 (98%)	4 (2%)	0	100	100
1	F	264/257 (103%)	254 (96%)	10 (4%)	0	100	100
1	G	264/257 (103%)	256 (97%)	8 (3%)	0	100	100
1	H	261/257 (102%)	251 (96%)	10 (4%)	0	100	100
1	I	262/257 (102%)	254 (97%)	8 (3%)	0	100	100
1	J	262/257 (102%)	254 (97%)	8 (3%)	0	100	100
All	All	2635/2570 (102%)	2553 (97%)	82 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	229/215 (106%)	229 (100%)	0	100	100
1	B	234/215 (109%)	232 (99%)	2 (1%)	70	51
1	C	230/215 (107%)	230 (100%)	0	100	100
1	D	229/215 (106%)	229 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	228/215 (106%)	227 (100%)	1 (0%)	84	73
1	F	230/215 (107%)	227 (99%)	3 (1%)	61	36
1	G	229/215 (106%)	229 (100%)	0	100	100
1	H	227/215 (106%)	227 (100%)	0	100	100
1	I	228/215 (106%)	228 (100%)	0	100	100
1	J	228/215 (106%)	228 (100%)	0	100	100
All	All	2292/2150 (107%)	2286 (100%)	6 (0%)	87	77

5 of 6 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	28[A]	LYS
1	F	28[B]	LYS
1	F	115	VAL
1	B	28[B]	LYS
1	B	28[A]	LYS

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

Mol	Chain	Res	Type
1	B	65	GLN
1	F	238	HIS
1	H	127	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 45 ligands modelled in this entry, 10 are monoatomic - leaving 35 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	GLU	D	259	4	8,9,9	1.35	1 (12%)	8,11,11	1.09	1 (12%)
3	GLU	A	259	4	8,9,9	1.28	0	8,11,11	1.45	1 (12%)
5	EDO	I	260	4	3,3,3	0.41	0	2,2,2	0.98	0
2	SAH	B	258	-	27,28,28	1.32	6 (22%)	36,40,40	2.17	13 (36%)
2	SAH	E	258	-	27,28,28	1.54	5 (18%)	36,40,40	2.08	11 (30%)
2	SAH	G	258	-	27,28,28	1.59	6 (22%)	36,40,40	4.27	12 (33%)
5	EDO	J	261	-	3,3,3	0.49	0	2,2,2	0.47	0
5	EDO	J	262	4	3,3,3	0.47	0	2,2,2	0.83	0
2	SAH	I	261	-	27,28,28	1.32	4 (14%)	36,40,40	1.90	6 (16%)
3	GLU	E	259	4	8,9,9	1.22	0	8,11,11	1.08	1 (12%)
5	EDO	G	261	4	3,3,3	0.33	0	2,2,2	0.80	0
5	EDO	H	261	4	3,3,3	0.38	0	2,2,2	1.04	0
3	GLU	F	259	4	8,9,9	1.35	0	8,11,11	1.19	1 (12%)
5	EDO	B	261	4	3,3,3	0.58	0	2,2,2	0.71	0
3	GLU	G	259	4	8,9,9	1.32	0	8,11,11	0.97	0
2	SAH	A	258	-	27,28,28	1.36	3 (11%)	36,40,40	2.08	13 (36%)
2	SAH	J	258	-	27,28,28	1.30	4 (14%)	36,40,40	2.05	10 (27%)
5	EDO	C	261	4	3,3,3	0.68	0	2,2,2	0.46	0
5	EDO	D	262	-	3,3,3	0.33	0	2,2,2	0.60	0
2	SAH	F	258	-	27,28,28	1.24	4 (14%)	36,40,40	2.01	12 (33%)
5	EDO	C	262	-	3,3,3	0.31	0	2,2,2	1.16	0
5	EDO	E	261	4	3,3,3	0.41	0	2,2,2	0.70	0
3	GLU	I	258	4	8,9,9	1.26	1 (12%)	8,11,11	1.48	1 (12%)
5	EDO	D	261	4	3,3,3	0.43	0	2,2,2	0.50	0
5	EDO	F	261	4	3,3,3	0.48	0	2,2,2	0.63	0
5	EDO	F	262	-	3,3,3	0.48	0	2,2,2	1.23	0
5	EDO	A	261	4	3,3,3	0.41	0	2,2,2	0.89	0
2	SAH	C	258	-	27,28,28	1.38	3 (11%)	36,40,40	1.99	11 (30%)
3	GLU	H	259	4	8,9,9	1.39	0	8,11,11	0.95	1 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GLU	J	259	4	8,9,9	1.17	0	8,11,11	1.37	2 (25%)
2	SAH	H	258	-	27,28,28	1.37	4 (14%)	36,40,40	1.84	9 (25%)
5	EDO	I	262	-	3,3,3	0.40	0	2,2,2	0.59	0
2	SAH	D	258	-	27,28,28	1.26	2 (7%)	36,40,40	2.07	11 (30%)
3	GLU	B	259	4	8,9,9	1.36	0	8,11,11	1.20	1 (12%)
3	GLU	C	259	4	8,9,9	1.19	0	8,11,11	0.80	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
3	GLU	D	259	4	-	2/9/9/9	-
3	GLU	A	259	4	-	1/9/9/9	-
5	EDO	I	260	4	-	0/1/1/1	-
2	SAH	B	258	-	-	0/15/31/31	0/3/3/3
2	SAH	E	258	-	-	1/15/31/31	0/3/3/3
2	SAH	G	258	-	-	4/15/31/31	0/3/3/3
5	EDO	J	261	-	-	1/1/1/1	-
5	EDO	J	262	4	-	0/1/1/1	-
2	SAH	I	261	-	-	0/15/31/31	0/3/3/3
3	GLU	E	259	4	-	0/9/9/9	-
5	EDO	G	261	4	-	0/1/1/1	-
5	EDO	H	261	4	-	0/1/1/1	-
3	GLU	F	259	4	-	0/9/9/9	-
5	EDO	B	261	4	-	0/1/1/1	-
3	GLU	G	259	4	-	0/9/9/9	-
2	SAH	A	258	-	-	0/15/31/31	0/3/3/3
2	SAH	J	258	-	-	0/15/31/31	0/3/3/3
5	EDO	C	261	4	-	0/1/1/1	-
5	EDO	D	262	-	-	1/1/1/1	-
2	SAH	F	258	-	-	0/15/31/31	0/3/3/3
5	EDO	C	262	-	-	0/1/1/1	-
5	EDO	E	261	4	-	0/1/1/1	-
3	GLU	I	258	4	-	2/9/9/9	-
5	EDO	D	261	4	-	0/1/1/1	-
5	EDO	F	261	4	-	0/1/1/1	-
5	EDO	F	262	-	-	0/1/1/1	-
5	EDO	A	261	4	-	0/1/1/1	-
2	SAH	C	258	-	-	1/15/31/31	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GLU	H	259	4	-	2/9/9/9	-
3	GLU	J	259	4	-	1/9/9/9	-
2	SAH	H	258	-	-	0/15/31/31	0/3/3/3
5	EDO	I	262	-	-	0/1/1/1	-
2	SAH	D	258	-	-	0/15/31/31	0/3/3/3
3	GLU	B	259	4	-	0/9/9/9	-
3	GLU	C	259	4	-	0/9/9/9	-

The worst 5 of 43 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	258	SAH	C5-C4	4.48	1.47	1.39
2	E	258	SAH	C5-C4	4.46	1.47	1.39
2	A	258	SAH	C5-C4	4.41	1.47	1.39
2	C	258	SAH	C5-C4	4.41	1.47	1.39
2	J	258	SAH	C5-C4	4.03	1.46	1.39

The worst 5 of 117 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	258	SAH	CB-CG-SD	16.05	149.29	113.45
2	G	258	SAH	C4'-C5'-SD	-15.31	59.13	113.78
2	I	261	SAH	C2-N1-C6	5.64	128.00	118.73
2	B	258	SAH	C4-N9-C8	5.40	111.41	105.74
2	B	258	SAH	N9-C8-N7	-5.23	106.52	113.94

There are no chirality outliers.

5 of 16 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	G	258	SAH	O4'-C4'-C5'-SD
2	G	258	SAH	C3'-C4'-C5'-SD
2	G	258	SAH	CA-CB-CG-SD
3	D	259	GLU	OXT-C-CA-CB
3	H	259	GLU	OXT-C-CA-CB

There are no ring outliers.

13 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	258	SAH	1	0

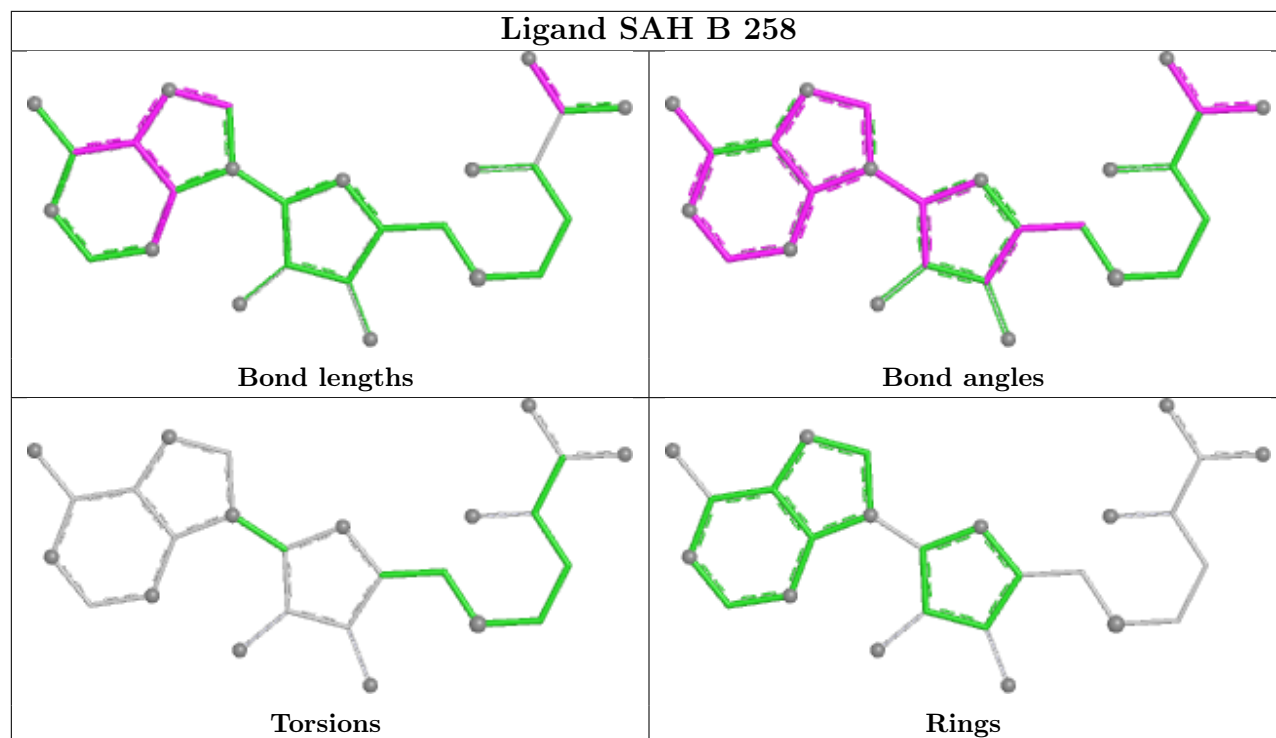
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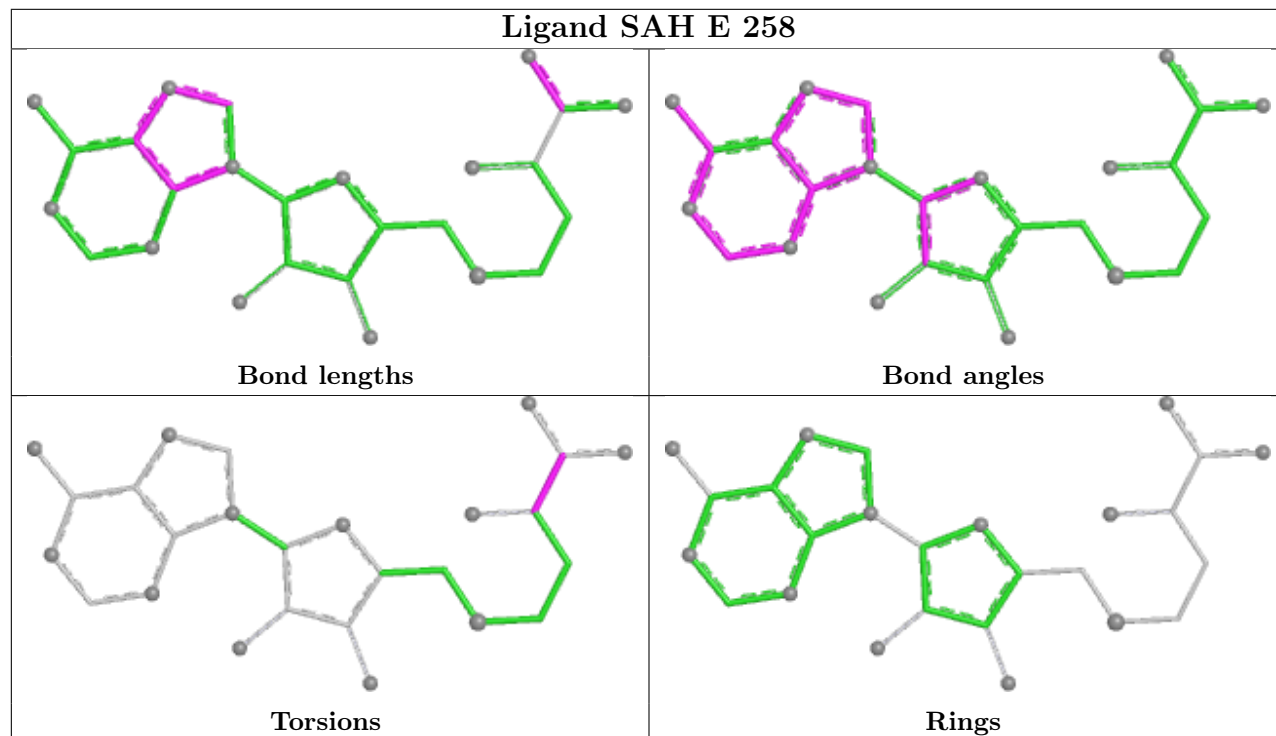
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	G	258	SAH	1	0
5	J	261	EDO	1	0
5	J	262	EDO	1	0
2	I	261	SAH	1	0
5	G	261	EDO	1	0
5	H	261	EDO	1	0
2	J	258	SAH	1	0
5	C	261	EDO	1	0
5	E	261	EDO	1	0
5	F	261	EDO	1	0
2	C	258	SAH	1	0
5	I	262	EDO	3	0

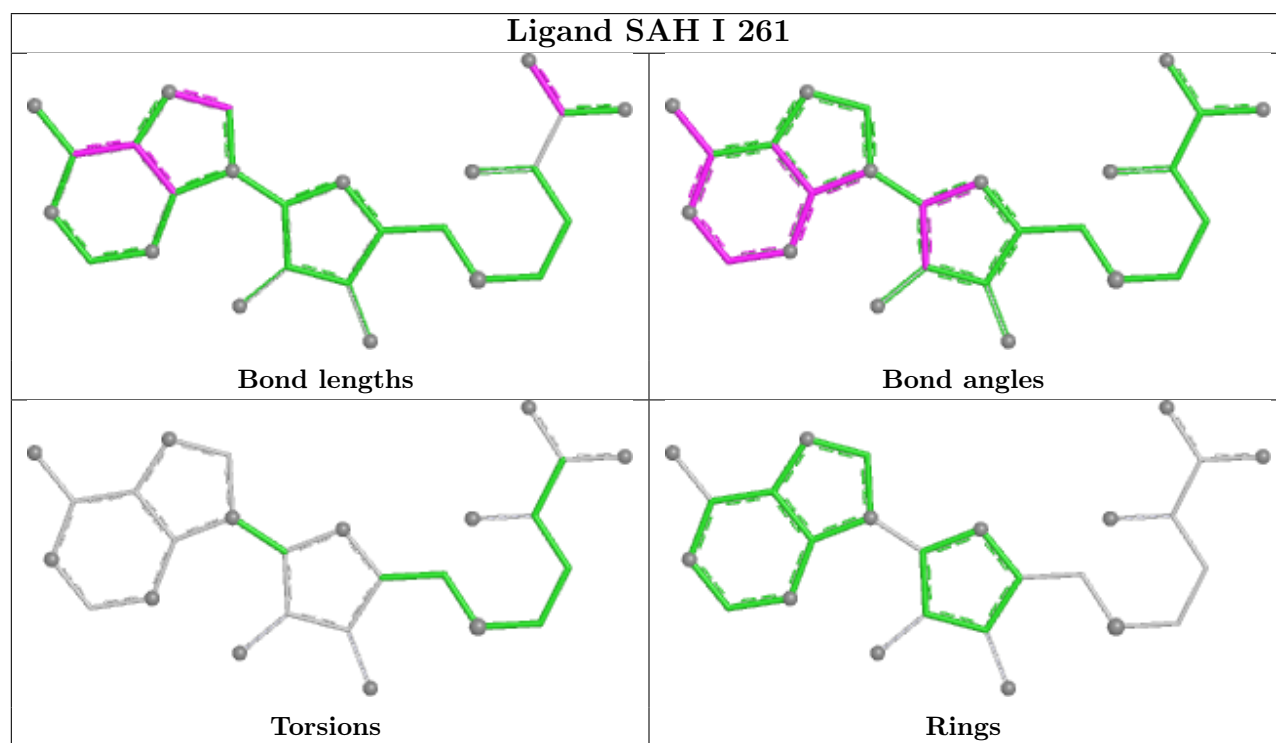
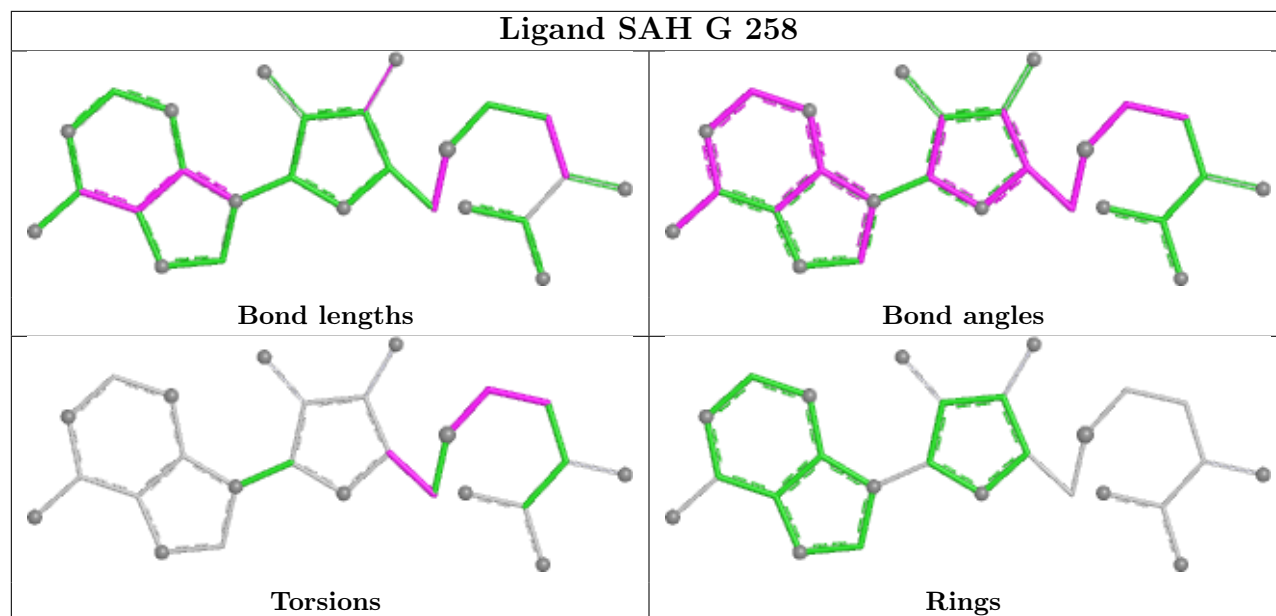
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

Ligand SAH B 258

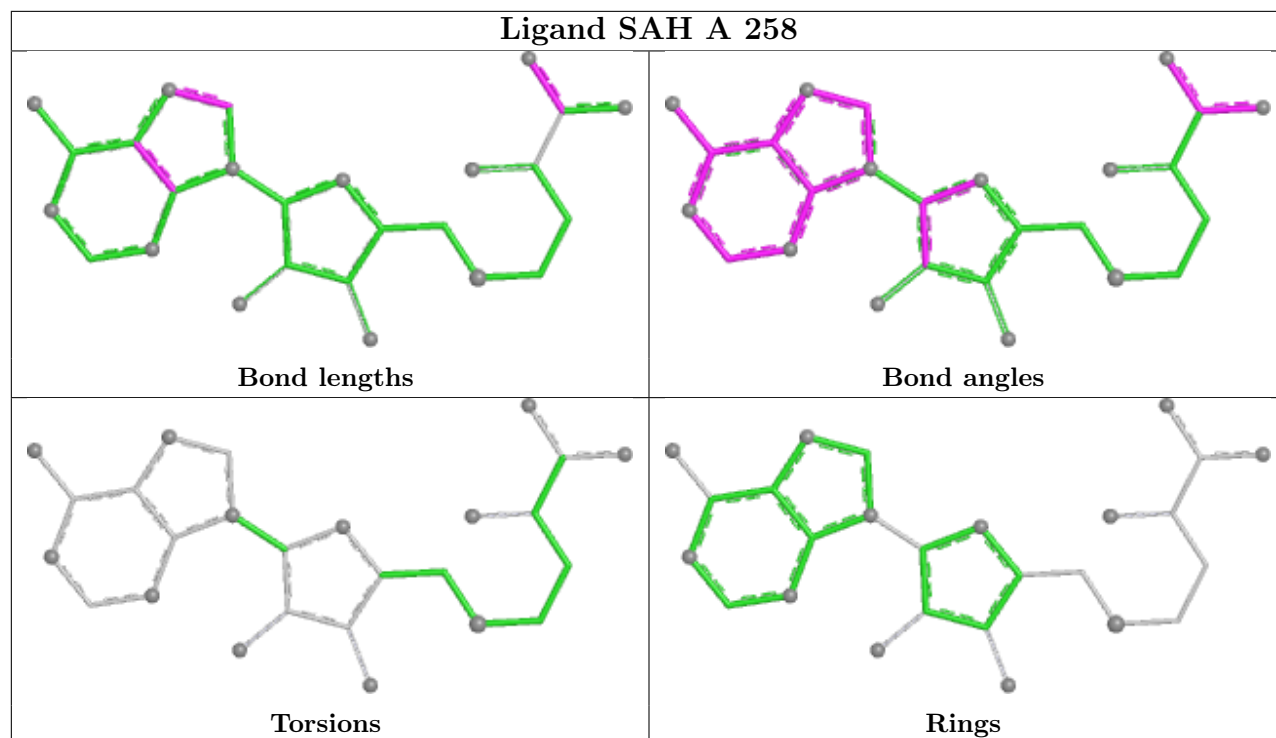


Ligand SAH E 258

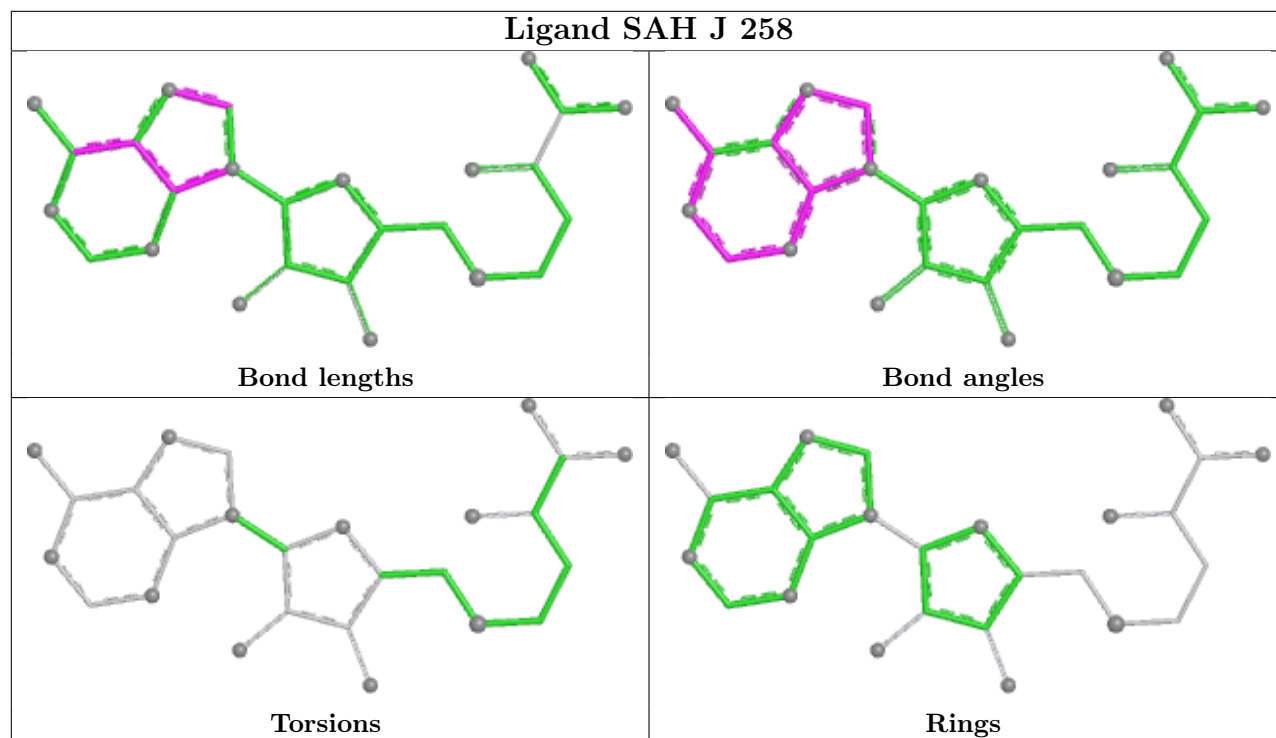




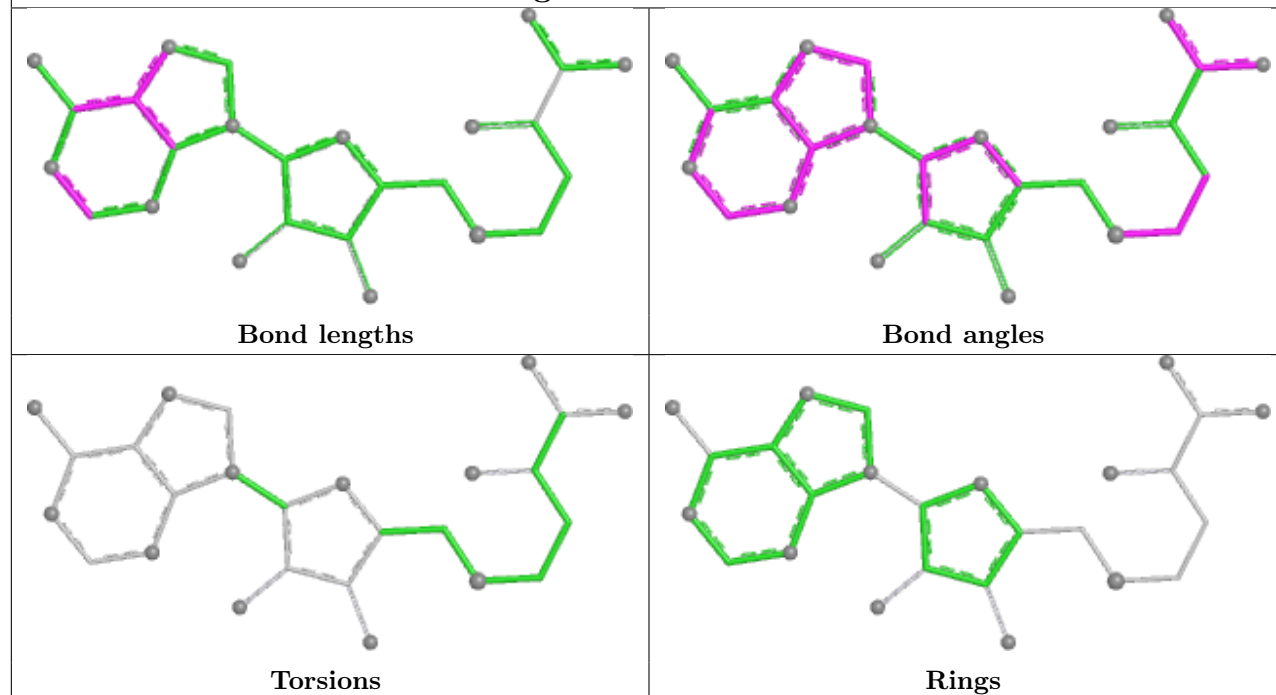
Ligand SAH A 258



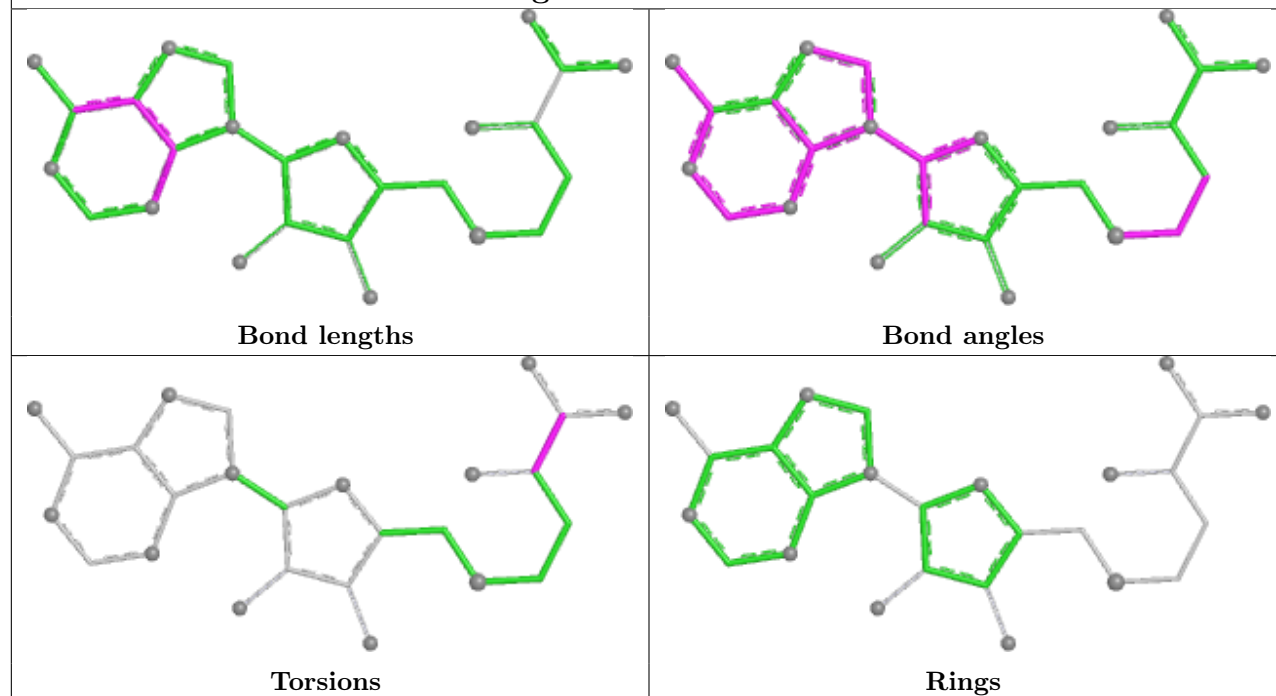
Ligand SAH J 258

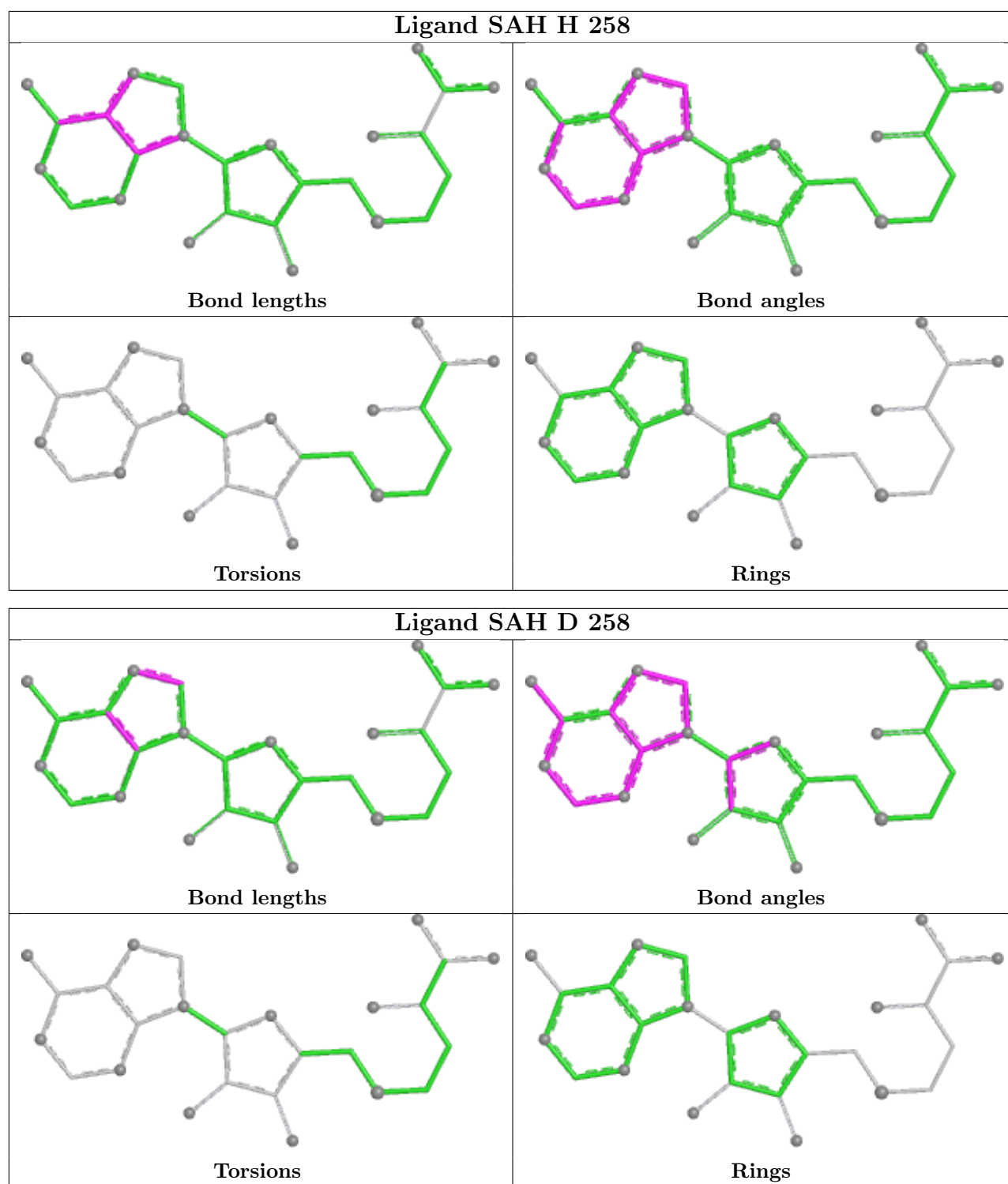


Ligand SAH F 258



Ligand SAH C 258





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 ⓘ

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, 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	247/257 (96%)	-0.68	1 (0%) 88 92	4, 11, 18, 50	13 (5%)
1	B	253/257 (98%)	-0.66	1 (0%) 88 92	4, 11, 19, 60	14 (5%)
1	C	247/257 (96%)	-0.71	1 (0%) 88 92	4, 11, 17, 57	14 (5%)
1	D	247/257 (96%)	-0.69	0 100 100	5, 12, 19, 47	13 (5%)
1	E	247/257 (96%)	-0.75	1 (0%) 88 92	4, 11, 18, 59	13 (5%)
1	F	247/257 (96%)	-0.70	0 100 100	4, 11, 18, 53	14 (5%)
1	G	248/257 (96%)	-0.69	1 (0%) 88 92	4, 11, 17, 65	13 (5%)
1	H	247/257 (96%)	-0.60	0 100 100	5, 12, 20, 43	11 (4%)
1	I	247/257 (96%)	-0.67	0 100 100	4, 11, 17, 56	12 (4%)
1	J	247/257 (96%)	-0.63	0 100 100	5, 12, 19, 41	12 (4%)
All	All	2477/2570 (96%)	-0.68	5 (0%) 91 94	4, 11, 19, 65	129 (5%)

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	6	GLY	5.1
1	A	114[A]	ASP	2.9
1	E	7	GLN	2.6
1	B	6	GLY	2.3
1	C	7	GLN	2.0

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, 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.

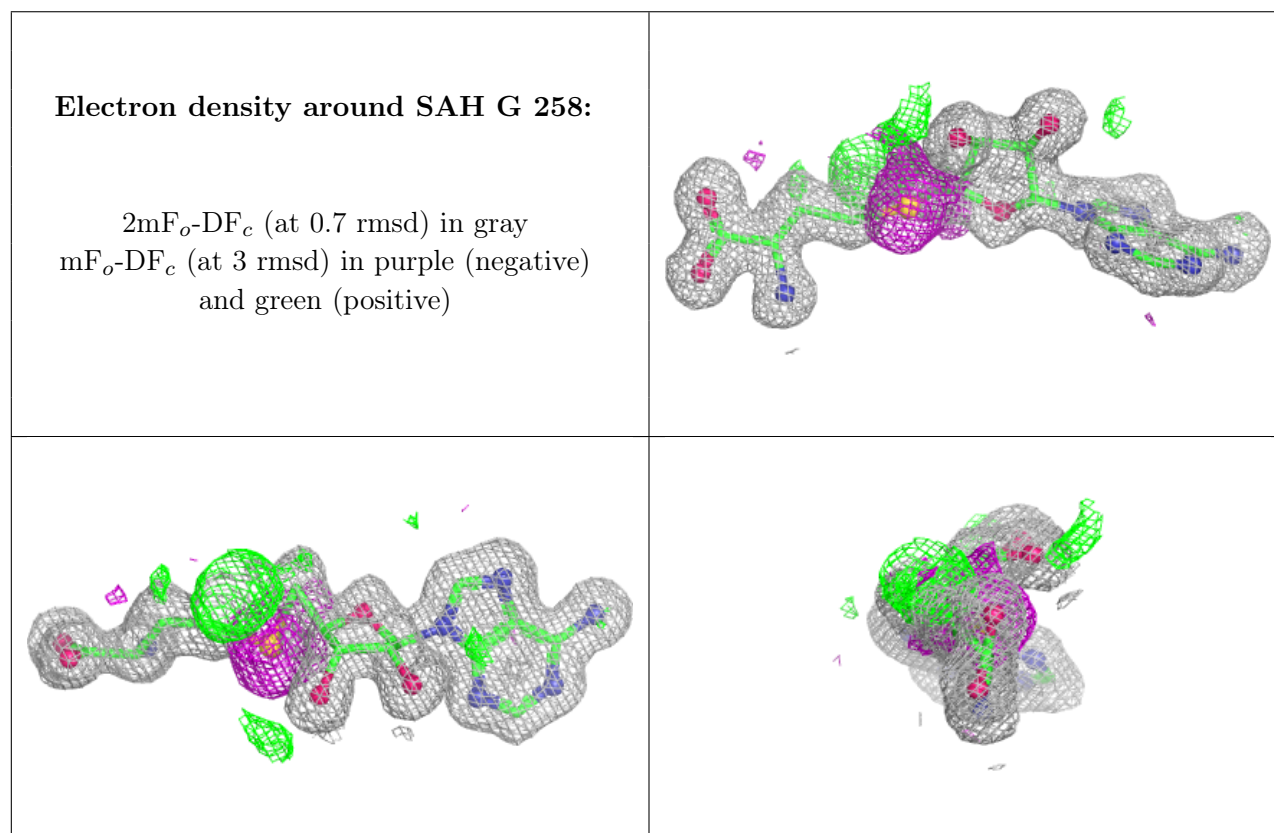
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	SAH	G	258	26/26	0.71	0.08	8,9,12,18	0
5	EDO	F	262	4/4	0.77	0.22	30,31,40,62	0
5	EDO	C	262	4/4	0.82	0.17	30,34,42,56	0
5	EDO	J	261	4/4	0.86	0.16	39,39,55,64	0
3	GLU	E	259	10/10	0.89	0.11	30,33,35,35	0
3	GLU	G	259	10/10	0.91	0.08	21,23,25,26	0
3	GLU	D	259	10/10	0.91	0.10	26,28,30,31	0
3	GLU	A	259	10/10	0.92	0.08	23,26,27,28	0
3	GLU	C	259	10/10	0.92	0.08	21,23,26,27	0
3	GLU	I	258	10/10	0.93	0.08	22,25,26,27	0
5	EDO	D	262	4/4	0.93	0.10	24,31,34,51	0
5	EDO	E	261	4/4	0.93	0.10	18,23,24,25	0
5	EDO	B	261	4/4	0.93	0.11	23,23,24,26	0
5	EDO	C	261	4/4	0.93	0.09	18,19,20,23	0
3	GLU	J	259	10/10	0.94	0.07	22,25,29,29	0
3	GLU	B	259	10/10	0.94	0.07	22,24,25,26	0
3	GLU	H	259	10/10	0.94	0.07	23,26,27,27	0
5	EDO	I	262	4/4	0.94	0.13	23,27,28,85	0
3	GLU	F	259	10/10	0.94	0.07	22,25,26,28	0
5	EDO	H	261	4/4	0.95	0.09	20,21,25,26	0
5	EDO	F	261	4/4	0.95	0.09	24,24,26,26	0
5	EDO	D	261	4/4	0.95	0.08	22,23,23,27	0
5	EDO	I	260	4/4	0.96	0.07	21,23,26,28	0
5	EDO	G	261	4/4	0.96	0.07	20,22,24,26	0
5	EDO	A	261	4/4	0.96	0.07	20,20,21,26	0
5	EDO	J	262	4/4	0.97	0.10	20,23,25,25	0
2	SAH	I	261	26/26	0.98	0.04	7,10,13,14	0
2	SAH	J	258	26/26	0.98	0.04	11,12,13,15	0
4	NA	E	260	1/1	0.98	0.03	12,12,12,12	0
2	SAH	F	258	26/26	0.98	0.04	8,10,12,13	0
2	SAH	B	258	26/26	0.98	0.04	9,10,12,12	0
2	SAH	H	258	26/26	0.98	0.04	10,12,14,15	0

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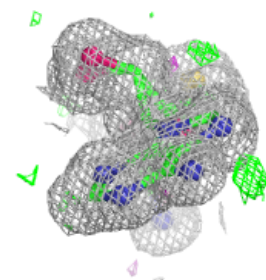
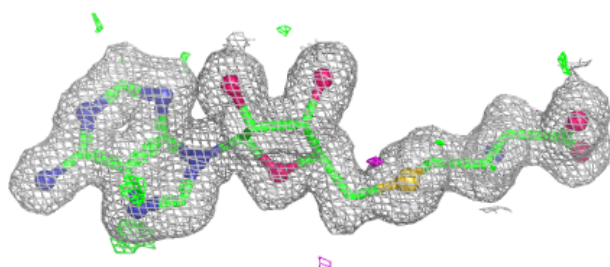
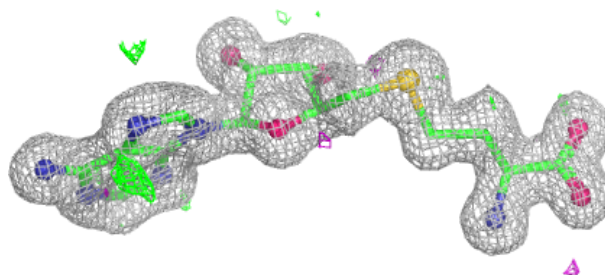
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	NA	B	260	1/1	0.99	0.06	9,9,9,9	0
4	NA	C	260	1/1	0.99	0.06	9,9,9,9	0
4	NA	D	260	1/1	0.99	0.02	11,11,11,11	0
2	SAH	E	258	26/26	0.99	0.03	9,10,12,13	0
4	NA	F	260	1/1	0.99	0.06	8,8,8,8	0
4	NA	G	260	1/1	0.99	0.06	9,9,9,9	0
4	NA	H	260	1/1	0.99	0.05	10,10,10,10	0
4	NA	I	259	1/1	0.99	0.07	9,9,9,9	0
4	NA	J	260	1/1	0.99	0.05	11,11,11,11	0
2	SAH	A	258	26/26	0.99	0.03	9,10,12,13	0
2	SAH	C	258	26/26	0.99	0.03	9,10,11,13	0
2	SAH	D	258	26/26	0.99	0.03	10,12,13,14	0
4	NA	A	260	1/1	1.00	0.06	10,10,10,10	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.

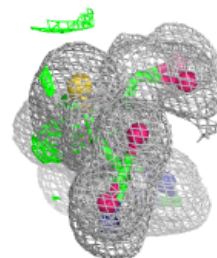
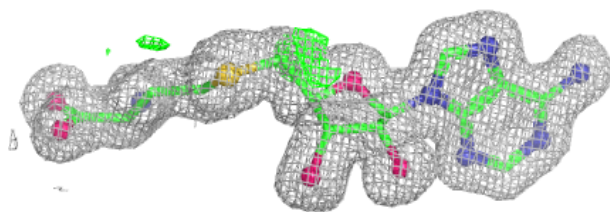
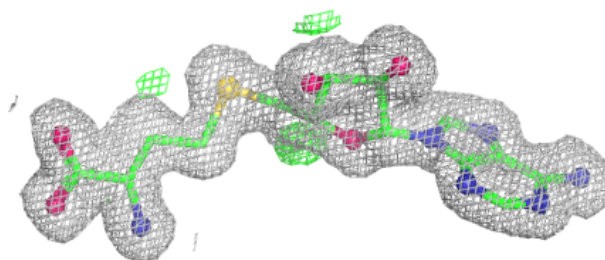


Electron density around SAH I 261:

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

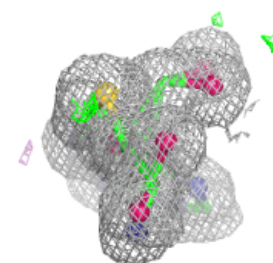
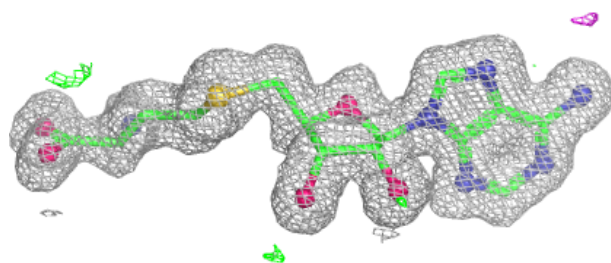
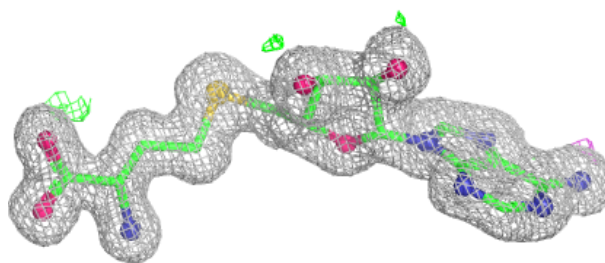
**Electron density around SAH J 258:**

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

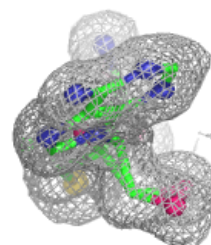
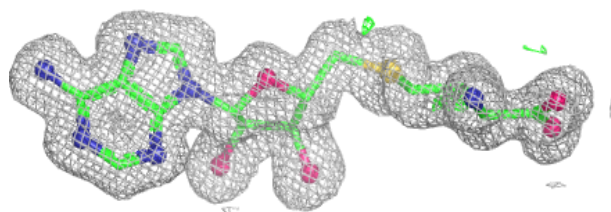
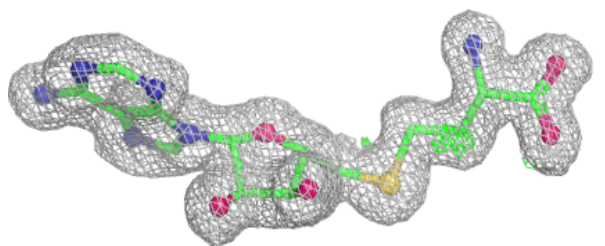


Electron density around SAH F 258:

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

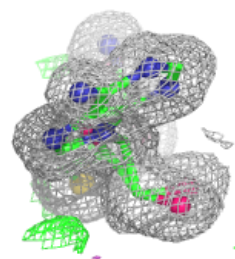
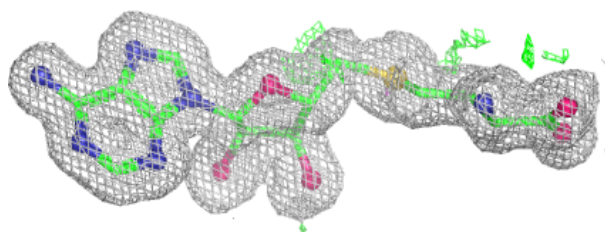
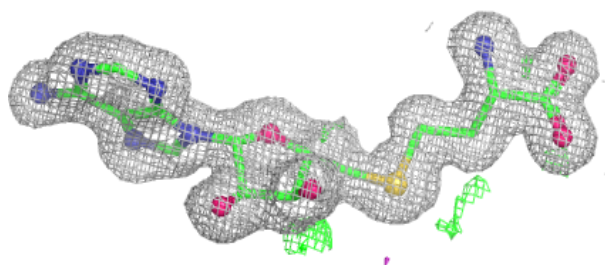
**Electron density around SAH B 258:**

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

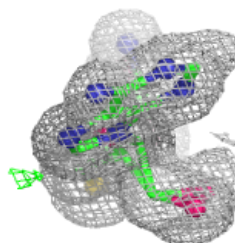
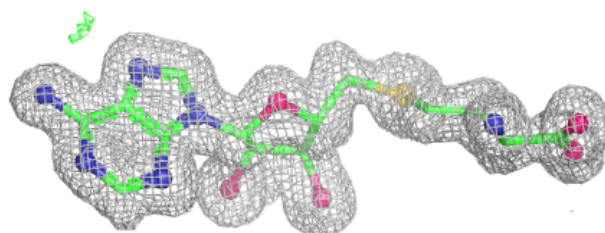
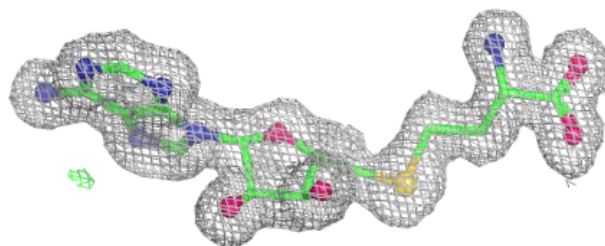


Electron density around SAH H 258:

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

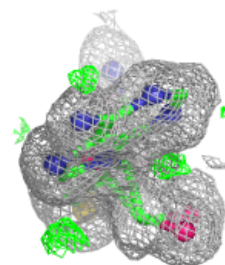
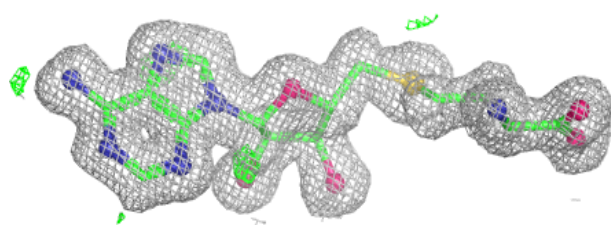
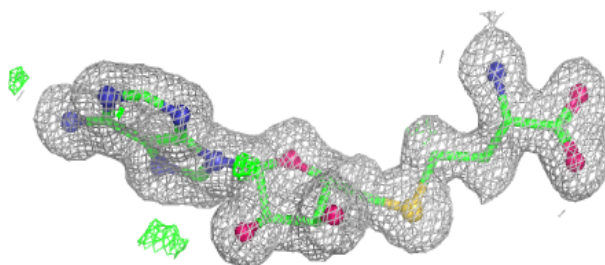
**Electron density around SAH E 258:**

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

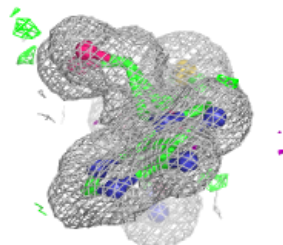
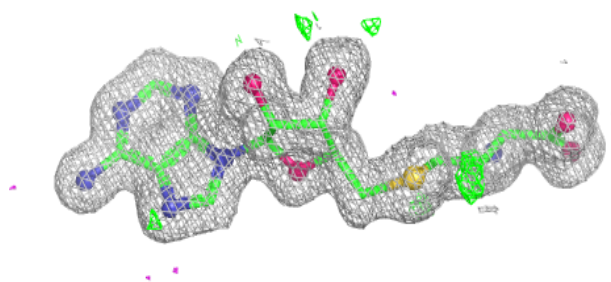
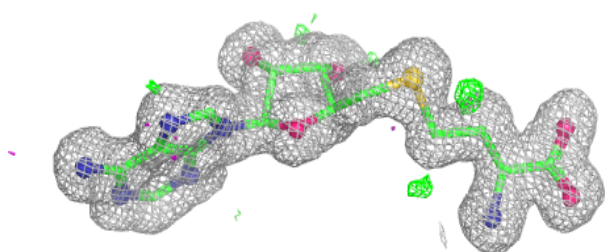


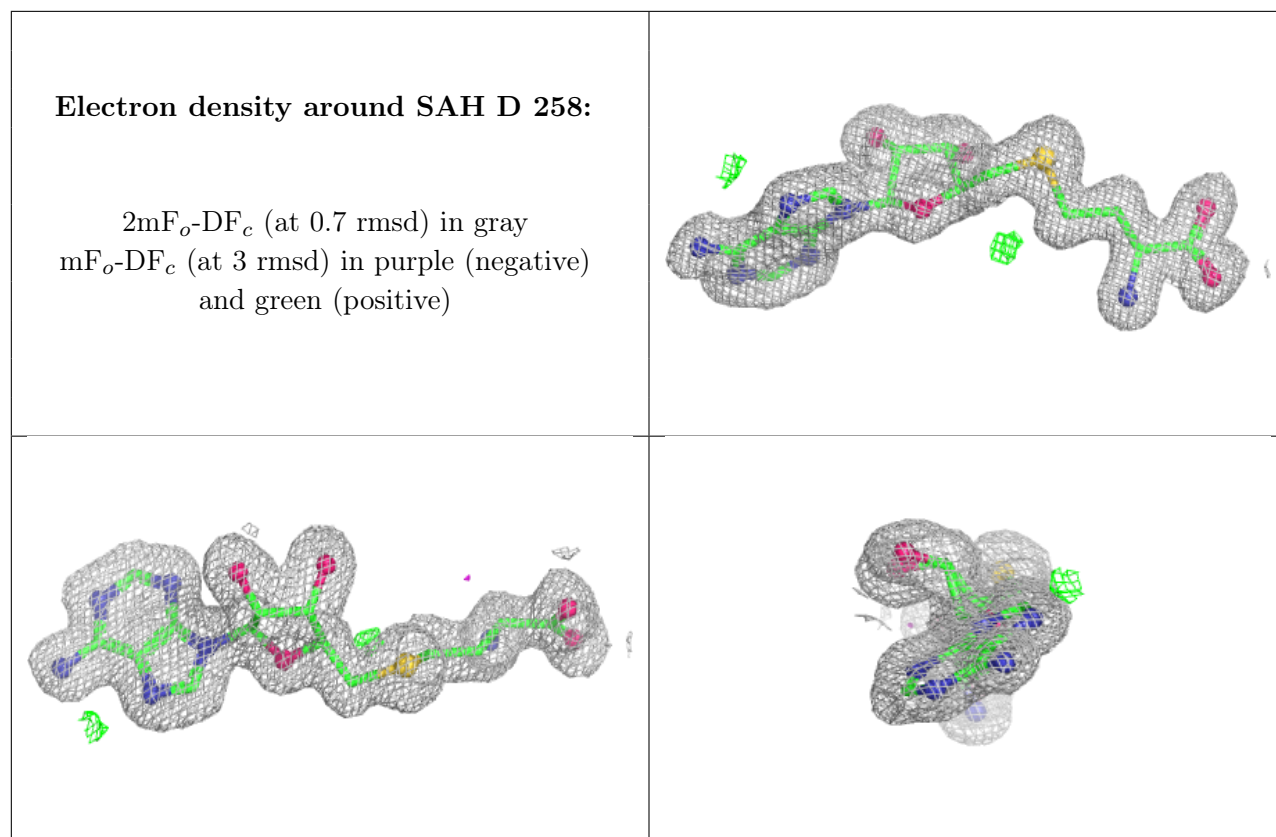
Electron density around SAH A 258:

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

**Electron density around SAH C 258:**

$2mF_o-DF_c$ (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.