



wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 17, 2021 – 08:02 AM EDT

PDB ID : 1KY5
Title : D244E mutant S-Adenosylhomocysteine hydrolase refined with noncrystallographic restraints
Authors : Takata, Y.; Takusagawa, F.
Deposited on : 2002-02-03
Resolution : 2.80 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 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)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.23.2

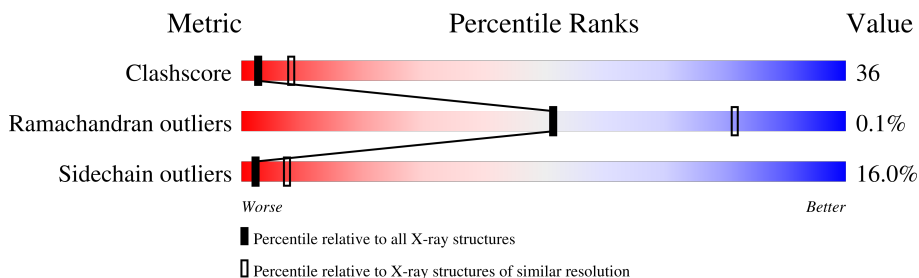
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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))
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)

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 $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	431	
1	B	431	
1	C	431	
1	D	431	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 13784 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.

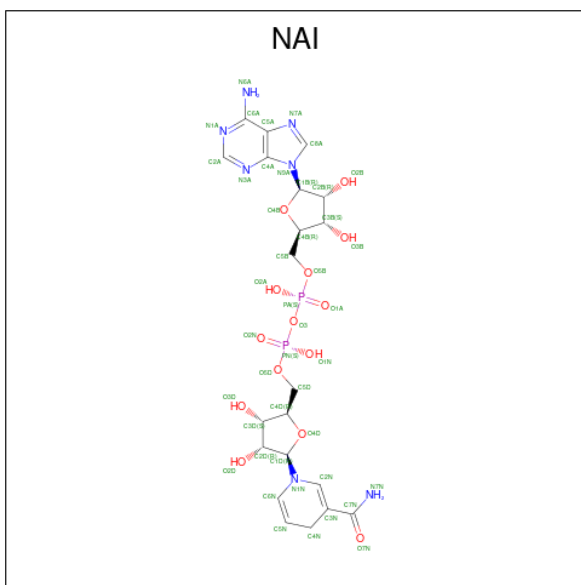
- Molecule 1 is a protein called S-adenosylhomocysteine hydrolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	430	3320	2109	571	615	25	0	0	0
1	B	430	3320	2109	571	615	25	0	0	0
1	C	430	3320	2109	571	615	25	0	0	0
1	D	430	3320	2109	571	615	25	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

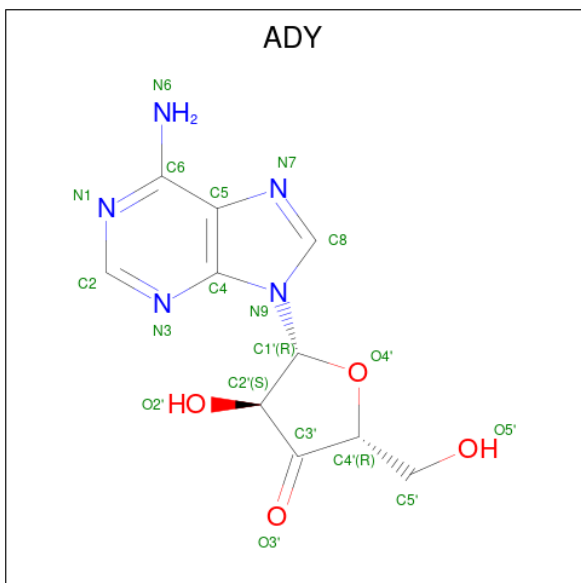
Chain	Residue	Modelled	Actual	Comment	Reference
A	244	GLU	ASP	engineered mutation	UNP P10760
B	1244	GLU	ASP	engineered mutation	UNP P10760
C	2244	GLU	ASP	engineered mutation	UNP P10760
D	3244	GLU	ASP	engineered mutation	UNP P10760

- Molecule 2 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (three-letter code: NAI) (formula: C₂₁H₂₉N₇O₁₄P₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf		
			Total	C	N	O			P	
2	A	1	Total	44	21	7	14	2	0	0
2	B	1	Total	44	21	7	14	2	0	0
2	C	1	Total	44	21	7	14	2	0	0
2	D	1	Total	44	21	7	14	2	0	0

- Molecule 3 is 3'-OXO-ADENOSINE (three-letter code: ADY) (formula: C₁₀H₁₁N₅O₄).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			19	10	5	4		
3	B	1	Total	C	N	O	0	0
			19	10	5	4		
3	C	1	Total	C	N	O	0	0
			19	10	5	4		
3	D	1	Total	C	N	O	0	0
			19	10	5	4		

- Molecule 4 is water.

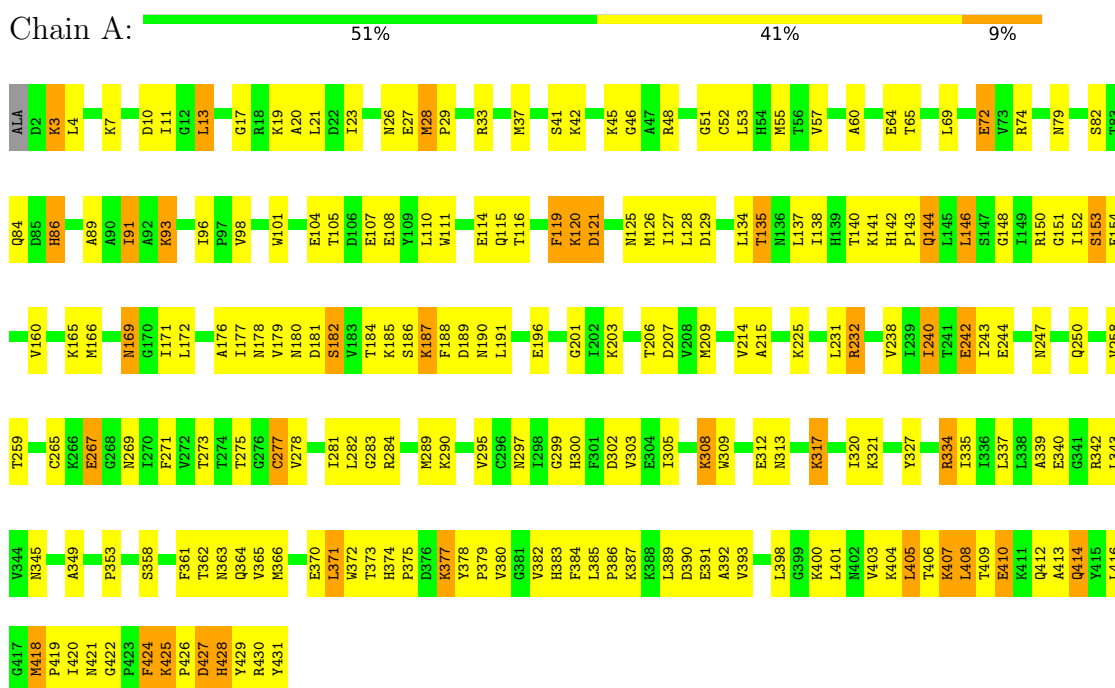
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	79	Total	O	0	0
			79	79		
4	B	68	Total	O	0	0
			68	68		
4	C	54	Total	O	0	0
			54	54		
4	D	51	Total	O	0	0
			51	51		

3 Residue-property plots

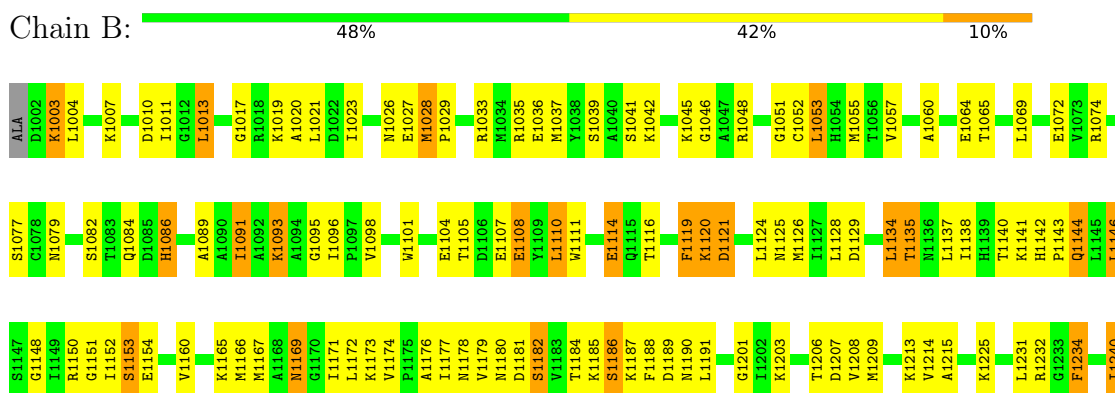
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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.

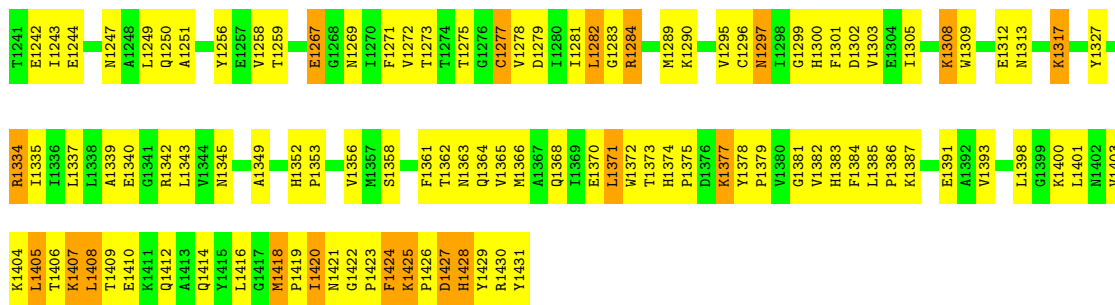
Note EDS was not executed.

- Molecule 1: S-adenosylhomocysteine hydrolase

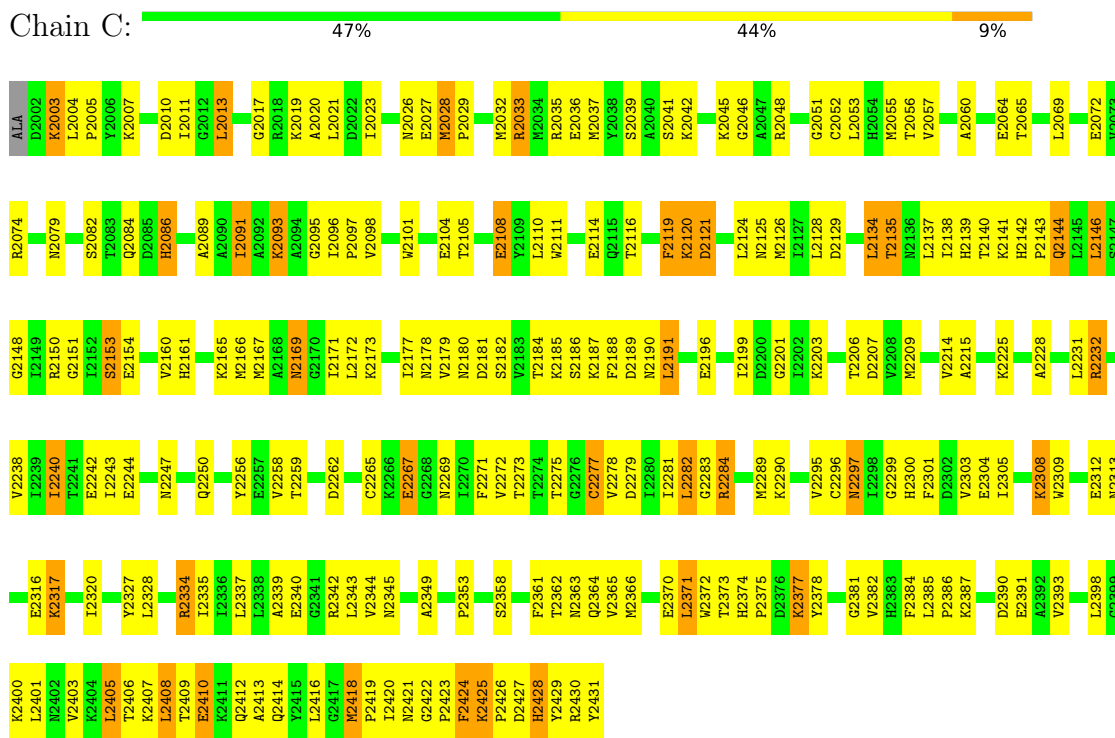


- Molecule 1: S-adenosylhomocysteine hydrolase

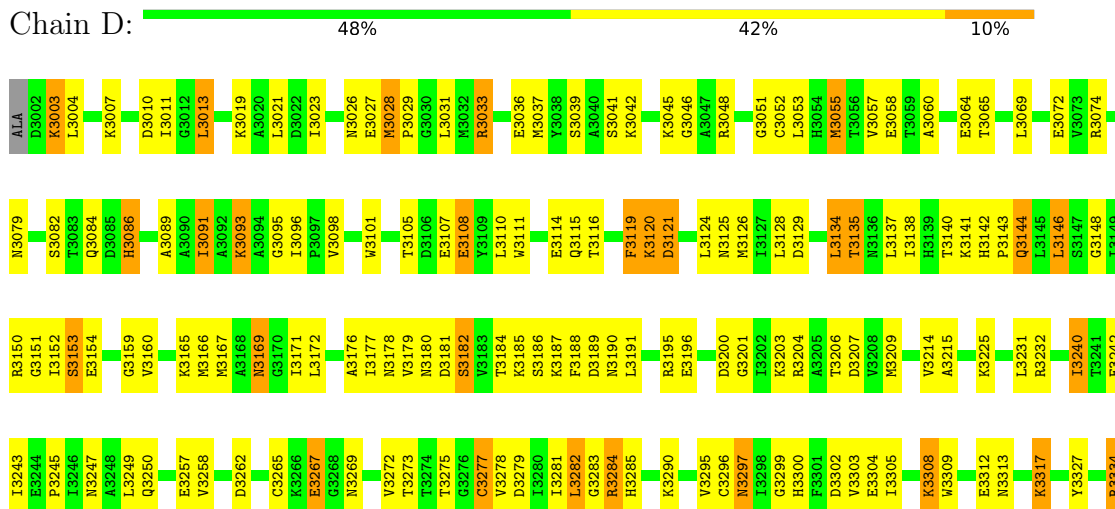




• Molecule 1: S-adenosylhomocysteine hydrolase



• Molecule 1: S-adenosylhomocysteine hydrolase



I3335	I3336	I3337	L3338	A3339	E3340	G3341	R3342	L3343	V3344	N3345	A3349	H3352	P3353	K3357	S3358	F3361	T3362	N3363	Q3364	V3365	H3366	E3370	L3371	W3372	T3373	H3374	P3375	D3376	K3377	Y3378	P3379	V3380	G3381	V3382	H3383	F3384	K3387	E3391	A3392	V3393	L3398	G3399	K3400	L3401	N3402	V3403	K3404	L3405	T3406	K3407	L3408
T3409	E3410	K3411	Q3412	A3413	Q3414	Y3415	L3416	G3417	M3418	P3419	I3420	N3421	G3422	P3423	F3424	K3425	P3426	D3427	H3428	Y3429	R3430	Y3431																													

4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	91.00Å 223.00Å 91.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.80	Depositor
% Data completeness (in resolution range)	(Not available) (8.00-2.80)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
Refinement program	X-PLOR 3.851	Depositor
R, R_{free}	0.215 , 0.293	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	13784	wwPDB-VP
Average B, all atoms (Å ²)	11.0	wwPDB-VP

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: ADY, NAI

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	0.41	0/3385	0.63	0/4580
1	B	0.41	0/3385	0.63	0/4580
1	C	0.44	0/3385	0.63	0/4580
1	D	0.42	0/3385	0.66	1/4580 (0.0%)
All	All	0.42	0/13540	0.64	1/18320 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	3376	ASP	CB-CG-OD1	-10.07	109.24	118.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3320	0	3343	257	0
1	B	3320	0	3343	255	0
1	C	3320	0	3343	268	0
1	D	3320	0	3343	278	1
2	A	44	0	27	2	0
2	B	44	0	27	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	44	0	27	1	0
2	D	44	0	27	1	0
3	A	19	0	11	0	0
3	B	19	0	11	0	0
3	C	19	0	10	1	0
3	D	19	0	10	0	0
4	A	79	0	0	2	0
4	B	68	0	0	2	0
4	C	54	0	0	1	0
4	D	51	0	0	2	0
All	All	13784	0	13522	965	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 36.

The worst 5 of 965 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:C:2120:LYS:H	1:C:2120:LYS:HD2	1.13	1.10
1:C:2060:ALA:HB1	1:C:2091:ILE:HD11	1.34	1.08
1:D:3420:ILE:HG23	1:D:3421:ASN:OD1	1.56	1.05
1:A:430:ARG:HA	1:B:1430:ARG:HG2	1.38	1.03
1:D:3120:LYS:H	1:D:3120:LYS:HD2	1.20	1.02

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:D:3317:LYS:O	1:D:3317:LYS:O[2_555]	2.12	0.08

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	428/431 (99%)	398 (93%)	30 (7%)	0	100	100
1	B	428/431 (99%)	401 (94%)	26 (6%)	1 (0%)	47	78
1	C	428/431 (99%)	396 (92%)	32 (8%)	0	100	100
1	D	428/431 (99%)	400 (94%)	28 (6%)	0	100	100
All	All	1712/1724 (99%)	1595 (93%)	116 (7%)	1 (0%)	51	81

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	1420	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	353/353 (100%)	296 (84%)	57 (16%)	2	7
1	B	353/353 (100%)	295 (84%)	58 (16%)	2	7
1	C	353/353 (100%)	298 (84%)	55 (16%)	2	8
1	D	353/353 (100%)	297 (84%)	56 (16%)	2	7
All	All	1412/1412 (100%)	1186 (84%)	226 (16%)	2	7

5 of 226 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	2003	LYS
1	D	3418	MET
1	C	2232	ARG
1	D	3410	GLU
1	D	3242	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 51 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	2169	ASN
1	C	2402	ASN
1	D	3412	GLN
1	C	2247	ASN
1	C	2313	ASN

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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$
3	ADY	C	2433	-	17,21,21	2.00	3 (17%)	16,31,31	2.66	6 (37%)
3	ADY	B	1433	-	17,21,21	1.04	2 (11%)	16,31,31	2.44	7 (43%)
2	NAI	B	1432	-	42,48,48	1.16	3 (7%)	47,73,73	1.40	6 (12%)
2	NAI	A	432	-	42,48,48	1.19	4 (9%)	47,73,73	1.39	7 (14%)
3	ADY	A	433	-	17,21,21	0.81	0	16,31,31	2.46	6 (37%)
2	NAI	C	2432	-	42,48,48	1.23	4 (9%)	47,73,73	1.37	7 (14%)
3	ADY	D	3433	-	17,21,21	1.69	2 (11%)	16,31,31	2.82	5 (31%)
2	NAI	D	3432	-	42,48,48	1.18	3 (7%)	47,73,73	1.36	7 (14%)

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	ADY	C	2433	-	-	0/2/22/22	0/3/3/3
3	ADY	B	1433	-	-	0/2/22/22	0/3/3/3
2	NAI	B	1432	-	-	8/25/72/72	0/5/5/5
2	NAI	A	432	-	-	8/25/72/72	0/5/5/5
3	ADY	A	433	-	-	0/2/22/22	0/3/3/3
2	NAI	C	2432	-	-	8/25/72/72	0/5/5/5
3	ADY	D	3433	-	-	0/2/22/22	0/3/3/3
2	NAI	D	3432	-	-	7/25/72/72	0/5/5/5

The worst 5 of 21 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	2433	ADY	O3'-C3'	6.74	1.32	1.21
3	D	3433	ADY	O3'-C3'	5.36	1.30	1.21
2	A	432	NAI	C2N-C3N	4.20	1.46	1.34
2	D	3432	NAI	C2N-C3N	3.99	1.46	1.34
2	C	2432	NAI	O4B-C1B	-3.95	1.35	1.41

The worst 5 of 51 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	3433	ADY	C5'-C4'-C3'	6.93	129.42	115.14
3	C	2433	ADY	C5'-C4'-C3'	6.37	128.27	115.14
3	D	3433	ADY	C1'-C2'-C3'	-6.00	93.13	104.11
3	C	2433	ADY	C1'-C2'-C3'	-5.89	93.33	104.11
3	A	433	ADY	C5'-C4'-C3'	5.73	126.96	115.14

There are no chirality outliers.

5 of 31 torsion outliers are listed below:

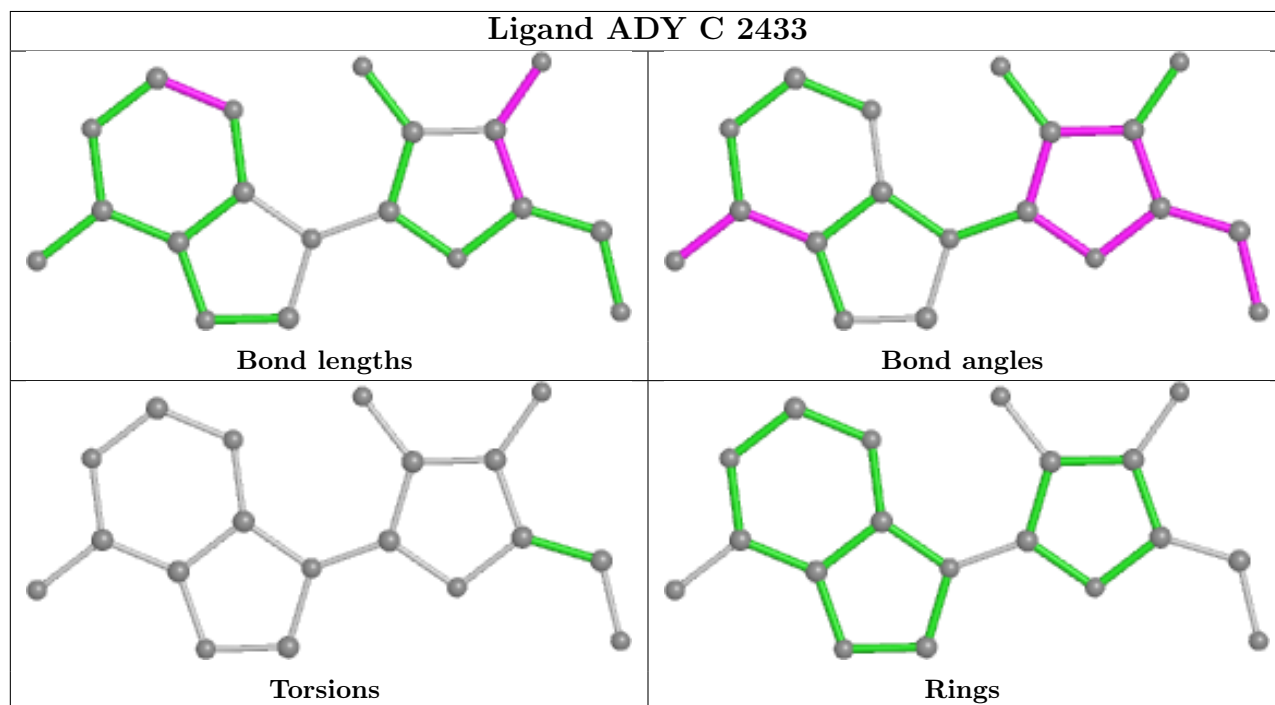
Mol	Chain	Res	Type	Atoms
2	A	432	NAI	C2D-C1D-N1N-C2N
2	B	1432	NAI	C2D-C1D-N1N-C2N
2	D	3432	NAI	C2D-C1D-N1N-C2N
2	C	2432	NAI	C2D-C1D-N1N-C2N
2	D	3432	NAI	O4D-C1D-N1N-C2N

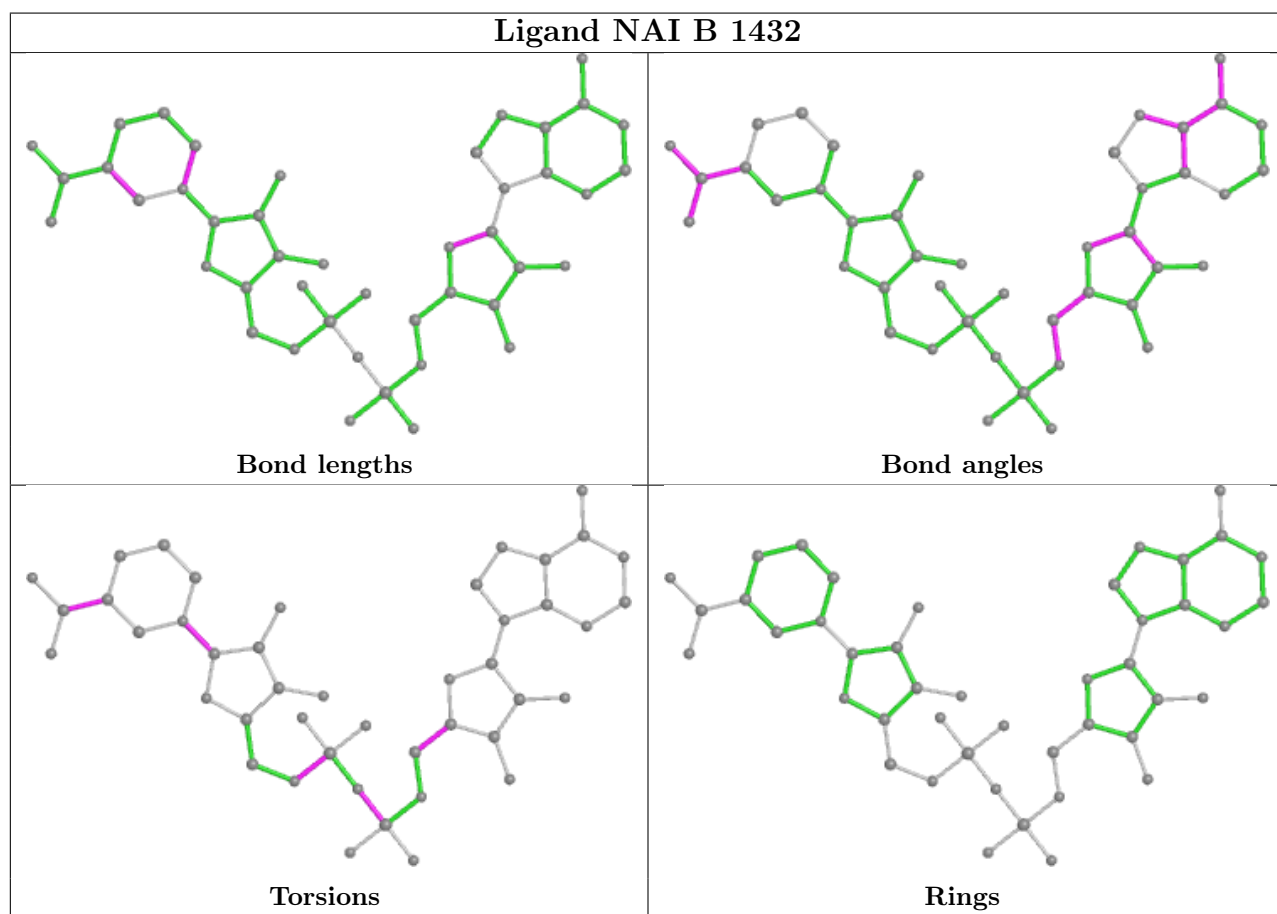
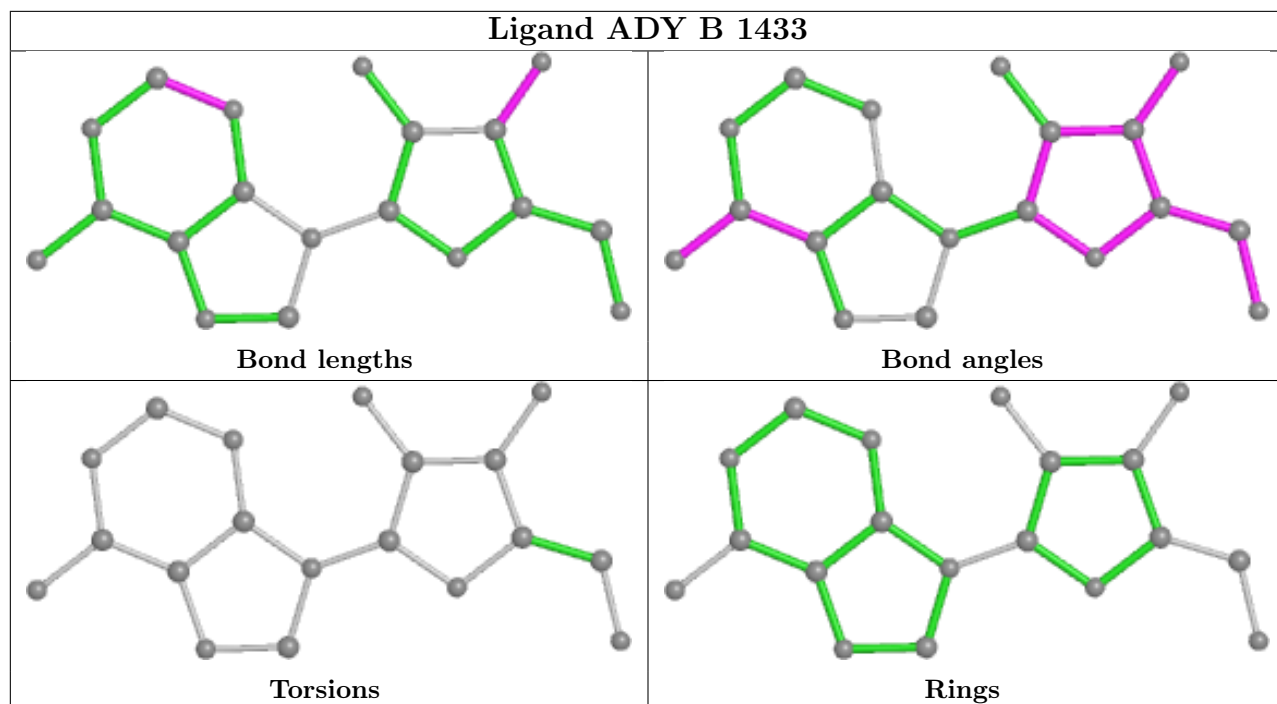
There are no ring outliers.

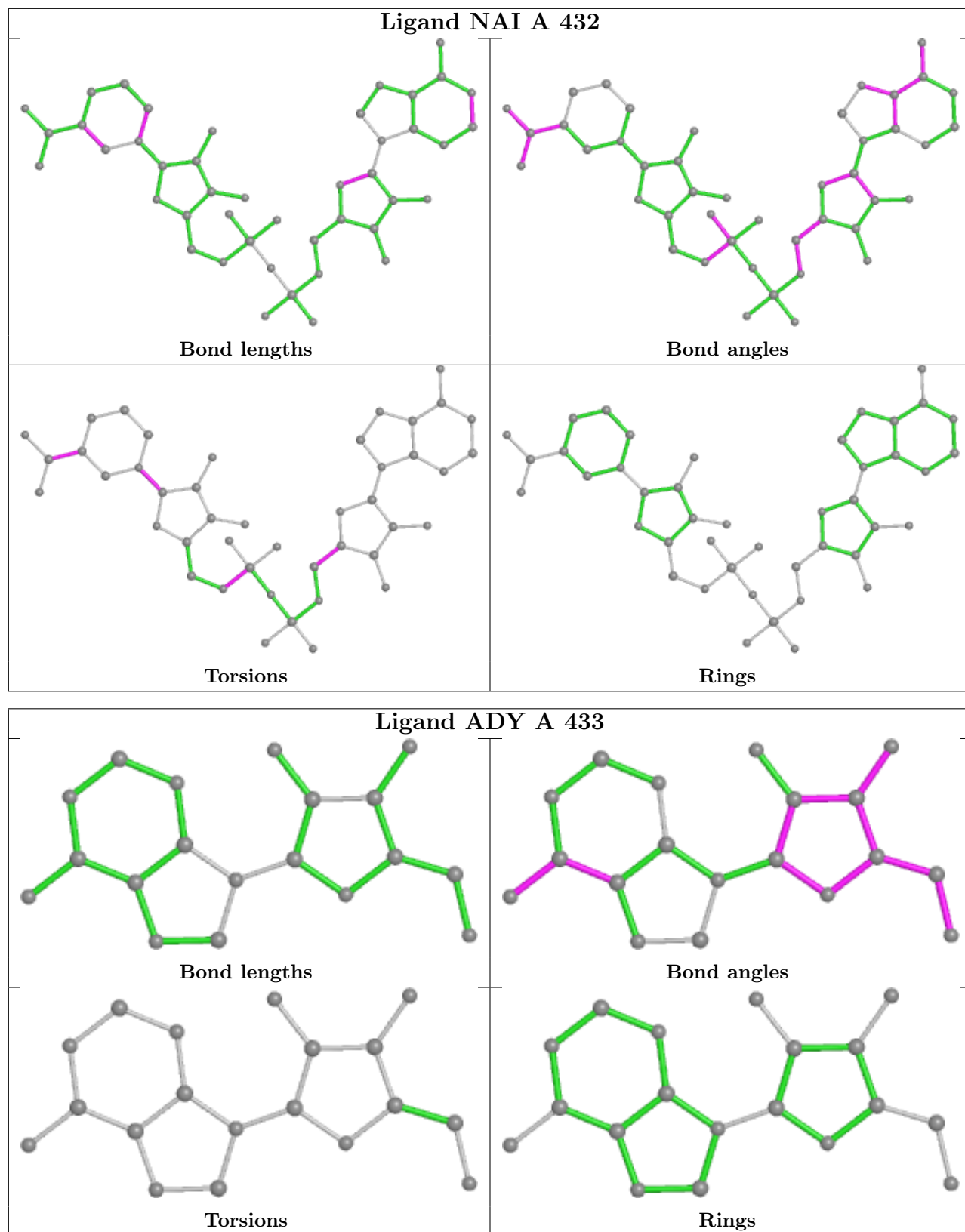
4 monomers are involved in 5 short contacts:

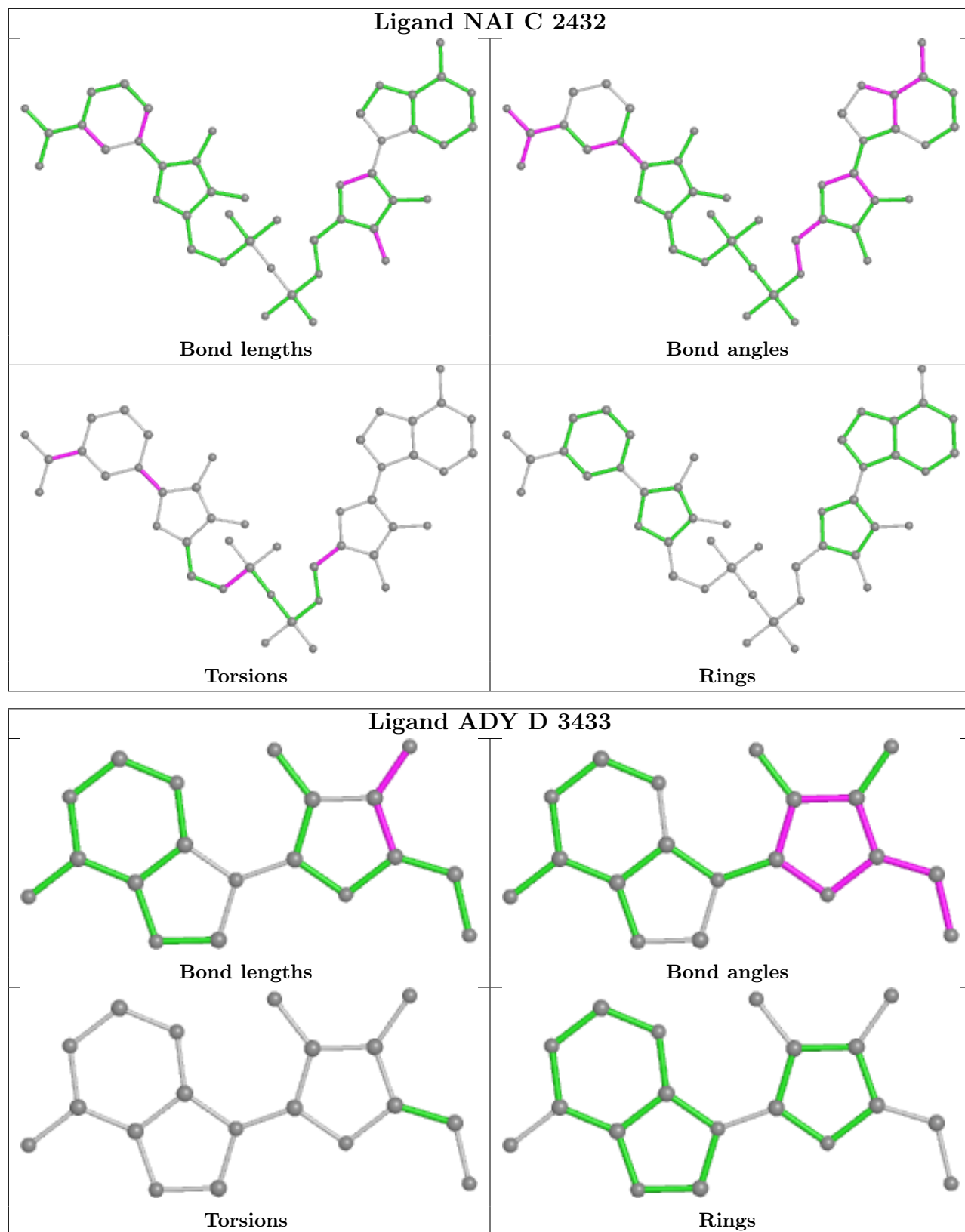
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	2433	ADY	1	0
2	A	432	NAI	2	0
2	C	2432	NAI	1	0
2	D	3432	NAI	1	0

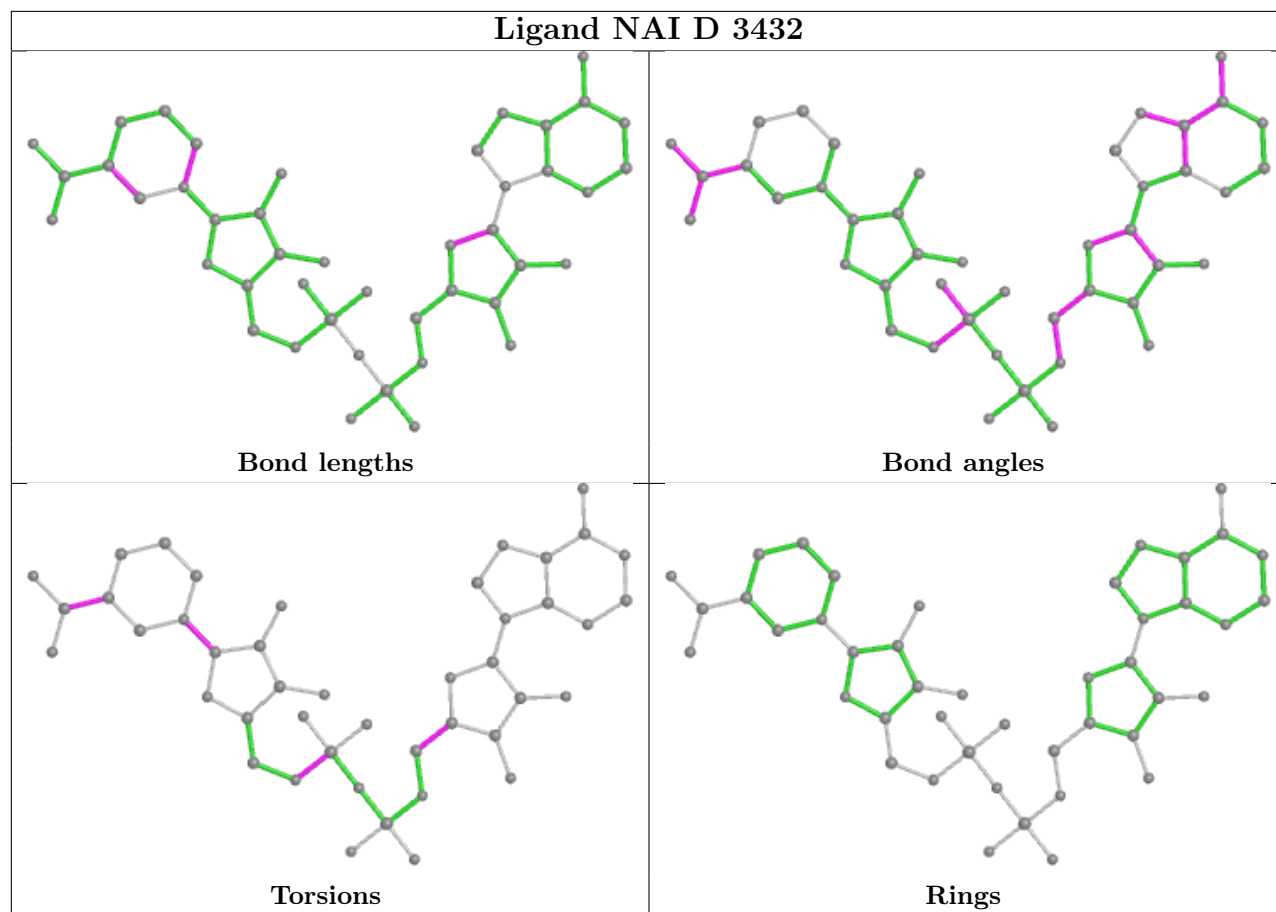
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.











5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.