



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 5, 2023 – 06:26 AM EDT

PDB ID : 6VO8
Title : X-ray structure of the Cj1427 in the presence of NADH and GDP-D-glycero-D-mannoheptose, an essential NAD-dependent dehydrogenase from *Campylobacter jejuni*
Authors : Spencer, K.D.; Anderson, T.K.; Thoden, J.B.; Huddleston, J.P.; Raushel, F.M.; Holden, H.M.
Deposited on : 2020-01-30
Resolution : 2.40 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 : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : **FAILED**
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) : 2.35.1

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 2.40 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 5165 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.

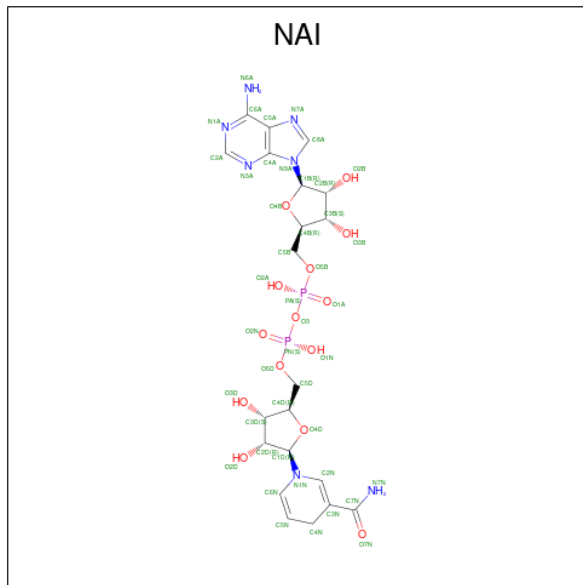
- Molecule 1 is a protein called Putative sugar-nucleotide epimerase/dehydratase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	303	Total	C	N	O	S	0	0	0
			2416	1549	406	446	15			
1	B	299	Total	C	N	O	S	0	0	0
			2385	1531	401	438	15			

There are 16 discrepancies between the modelled and reference sequences:

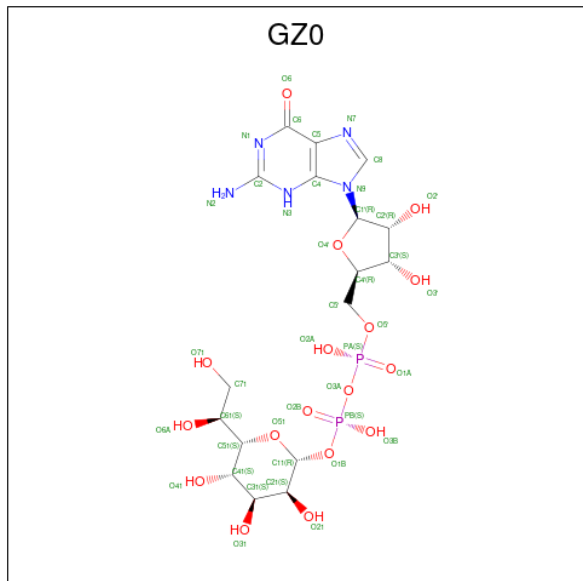
Chain	Residue	Modelled	Actual	Comment	Reference
A	314	LEU	-	expression tag	UNP Q0P8I7
A	315	GLU	-	expression tag	UNP Q0P8I7
A	316	HIS	-	expression tag	UNP Q0P8I7
A	317	HIS	-	expression tag	UNP Q0P8I7
A	318	HIS	-	expression tag	UNP Q0P8I7
A	319	HIS	-	expression tag	UNP Q0P8I7
A	320	HIS	-	expression tag	UNP Q0P8I7
A	321	HIS	-	expression tag	UNP Q0P8I7
B	314	LEU	-	expression tag	UNP Q0P8I7
B	315	GLU	-	expression tag	UNP Q0P8I7
B	316	HIS	-	expression tag	UNP Q0P8I7
B	317	HIS	-	expression tag	UNP Q0P8I7
B	318	HIS	-	expression tag	UNP Q0P8I7
B	319	HIS	-	expression tag	UNP Q0P8I7
B	320	HIS	-	expression tag	UNP Q0P8I7
B	321	HIS	-	expression tag	UNP Q0P8I7

- Molecule 2 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (three-letter code: NAI) (formula: C₂₁H₂₉N₇O₁₄P₂) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 3 is [[(2 {R},3 {S},4 {R},5 {R})-5-(2-azanyl-6-oxidanylidene-3 {H}-purin-9-yl)-3,4-bis(oxidanyl)oxolan-2-yl)methoxy-oxidanyl-phosphoryl] [(2 {R},3 {S},4 {S},5 {S},6 {S})-6-[(1 {S})-1,2-bis(oxidanyl)ethyl]-3,4,5-tris(oxidanyl)oxan-2-yl] hydrogen phosphate (three-letter code: GZ0) (formula: C₁₇H₂₇N₅O₁₇P₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			41	17	5	17	2		
3	B	1	Total	C	N	O	P	0	0
			41	17	5	17	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	128	Total	O	0	0
			128	128		
4	B	66	Total	O	0	0
			66	66		

MolProbity and EDS failed to run properly - this section is therefore empty.

3 Data and refinement statistics i

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	98.72Å 98.85Å 72.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.01 – 2.40	Depositor
% Data completeness (in resolution range)	98.9 (30.01-2.40)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.46 (at 2.39Å)	Xtrriage
Refinement program	REFMAC 5.8.0253	Depositor
R, R_{free}	0.206 , 0.286	Depositor
Wilson B-factor (Å ²)	20.9	Xtrriage
Anisotropy	0.293	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	0.032 for k,h,-l	Xtrriage
Total number of atoms	5165	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.33% 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.

4 Model quality [i](#)

4.1 Standard geometry [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles [i](#)

4.3.1 Protein backbone [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA [i](#)

MolProbity failed to run properly - this section is therefore empty.

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

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

4.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

4.6 Ligand geometry [i](#)

4 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	NAI	B	401	-	42,48,48	1.11	3 (7%)	47,73,73	1.41	6 (12%)
2	NAI	A	401	-	42,48,48	1.10	3 (7%)	47,73,73	1.49	7 (14%)
3	GZ0	B	402	-	35,44,44	0.86	1 (2%)	48,68,68	2.50	11 (22%)
3	GZ0	A	402	-	35,44,44	1.17	2 (5%)	48,68,68	2.12	10 (20%)

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	NAI	B	401	-	-	10/25/72/72	0/5/5/5
2	NAI	A	401	-	-	10/25/72/72	0/5/5/5
3	GZ0	B	402	-	-	11/23/63/63	0/4/4/4
3	GZ0	A	402	-	-	9/23/63/63	0/4/4/4

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	402	GZ0	O51-C51	-3.97	1.37	1.44
2	B	401	NAI	C6N-C5N	3.65	1.39	1.33
3	A	402	GZ0	C2'-C1'	-3.27	1.48	1.53
2	A	401	NAI	C6N-C5N	3.00	1.38	1.33
2	B	401	NAI	C2N-C3N	2.80	1.42	1.34
3	B	402	GZ0	C6-N1	-2.76	1.33	1.39
2	B	401	NAI	O4B-C1B	2.34	1.44	1.41
2	A	401	NAI	C4N-C5N	-2.23	1.43	1.48
2	A	401	NAI	C5A-C4A	2.10	1.46	1.40

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	402	GZ0	O51-C51-C41	9.30	120.93	107.87
3	B	402	GZ0	C11-O51-C51	8.89	127.39	113.06
3	B	402	GZ0	O51-C11-O1B	-8.84	99.81	111.36
2	A	401	NAI	N3A-C2A-N1A	-5.41	120.22	128.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	402	GZO	C11-O51-C51	5.31	121.61	113.06
2	B	401	NAI	N3A-C2A-N1A	-5.30	120.39	128.68
3	B	402	GZO	O51-C51-C41	5.11	115.05	107.87
3	B	402	GZO	O4'-C1'-C2'	-4.25	100.71	106.93
3	A	402	GZO	O4'-C1'-C2'	-3.94	101.16	106.93
3	A	402	GZO	PA-O3A-PB	-3.90	119.43	132.83
2	B	401	NAI	C1B-N9A-C4A	-3.60	120.32	126.64
3	B	402	GZO	O31-C31-C41	-3.26	102.82	110.35
2	A	401	NAI	C2A-N1A-C6A	3.03	123.94	118.75
3	B	402	GZO	O3A-PB-O1B	-2.87	96.70	102.48
3	B	402	GZO	PA-O3A-PB	-2.86	123.02	132.83
2	A	401	NAI	O7N-C7N-C3N	-2.85	115.52	120.90
3	A	402	GZO	O4'-C4'-C5'	2.75	118.42	109.37
2	A	401	NAI	PN-O3-PA	-2.68	123.64	132.83
3	A	402	GZO	O71-C71-C61	-2.67	105.26	111.07
2	A	401	NAI	C3B-C2B-C1B	-2.64	97.01	100.98
3	B	402	GZO	C31-C41-C51	2.51	115.40	109.68
3	B	402	GZO	C8-N7-C5	2.42	107.60	102.99
3	A	402	GZO	O5'-PA-O1A	2.40	118.45	109.07
2	B	401	NAI	C3N-C7N-N7N	2.37	121.88	117.67
2	B	401	NAI	C1D-N1N-C6N	-2.29	115.89	120.83
3	A	402	GZO	C61-C51-C41	-2.23	110.33	114.03
3	B	402	GZO	O51-C11-C21	2.23	115.07	110.35
2	B	401	NAI	O5B-PA-O1A	2.21	117.71	109.07
2	A	401	NAI	C3N-C7N-N7N	2.18	121.54	117.67
3	A	402	GZO	O51-C11-C21	2.17	114.94	110.35
3	B	402	GZO	O21-C21-C31	2.12	115.26	110.35
2	B	401	NAI	PN-O3-PA	-2.08	125.68	132.83
3	A	402	GZO	C8-N7-C5	2.08	106.94	102.99
2	A	401	NAI	O4D-C1D-C2D	-2.02	102.24	106.64

There are no chirality outliers.

All (40) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	NAI	PN-O3-PA-O5B
2	A	401	NAI	C5D-O5D-PN-O2N
2	B	401	NAI	C5B-O5B-PA-O1A
2	B	401	NAI	C5D-O5D-PN-O1N
2	B	401	NAI	C5D-O5D-PN-O2N
3	A	402	GZO	O51-C51-C61-O6A
3	B	402	GZO	O51-C51-C61-O6A

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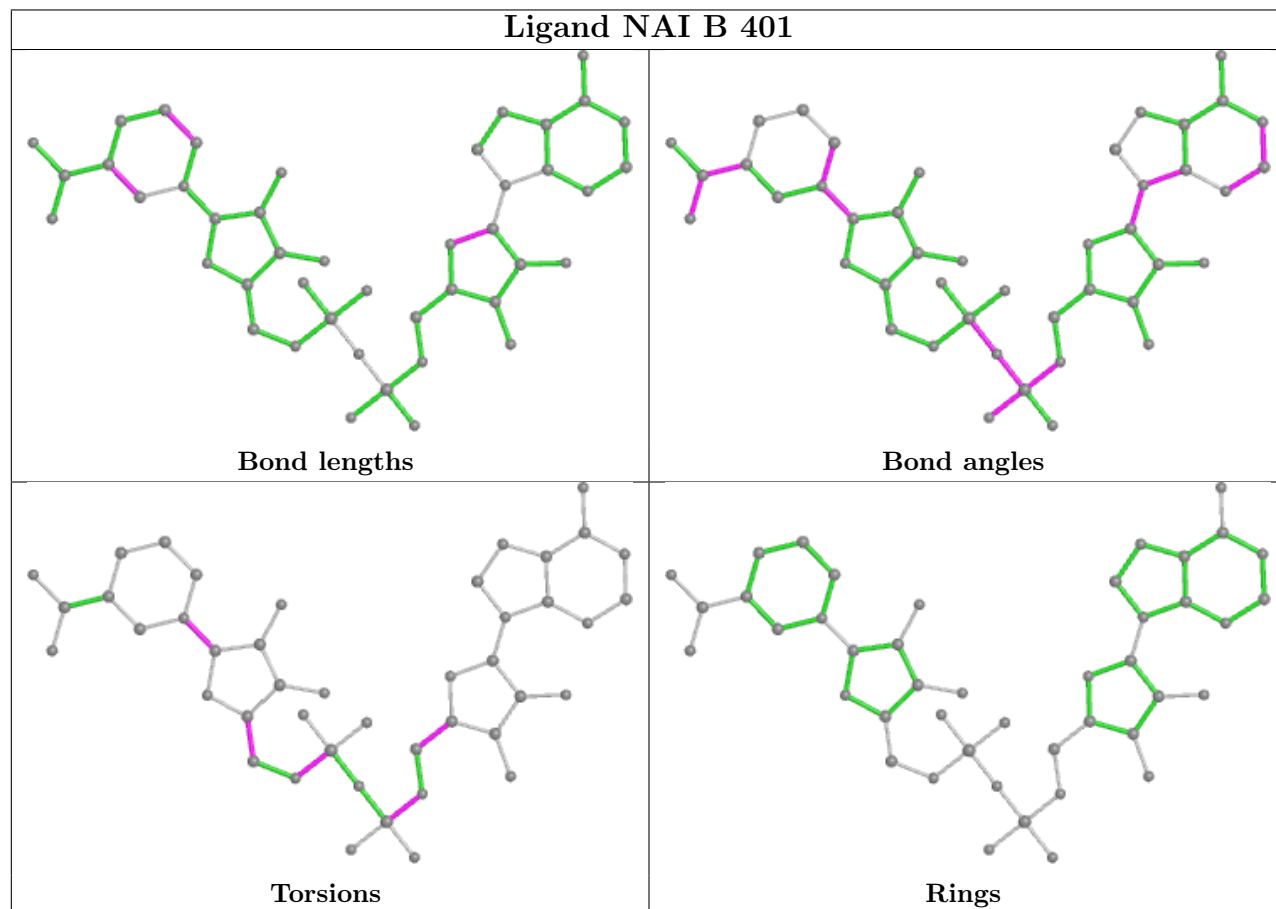
Mol	Chain	Res	Type	Atoms
3	B	402	GZ0	O6A-C61-C71-O71
3	B	402	GZ0	C5'-O5'-PA-O3A
3	B	402	GZ0	C5'-O5'-PA-O1A
3	B	402	GZ0	C5'-O5'-PA-O2A
3	A	402	GZ0	O6A-C61-C71-O71
3	B	402	GZ0	C51-C61-C71-O71
2	B	401	NAI	O4B-C4B-C5B-O5B
3	A	402	GZ0	C51-C61-C71-O71
2	B	401	NAI	C3B-C4B-C5B-O5B
2	A	401	NAI	O4D-C1D-N1N-C6N
3	A	402	GZ0	C11-O1B-PB-O3A
3	A	402	GZ0	O51-C51-C61-C71
3	B	402	GZ0	O51-C51-C61-C71
3	A	402	GZ0	PA-O3A-PB-O1B
2	A	401	NAI	C5B-O5B-PA-O3
2	A	401	NAI	C5D-O5D-PN-O3
2	B	401	NAI	C5D-O5D-PN-O3
3	A	402	GZ0	C5'-O5'-PA-O3A
2	A	401	NAI	PA-O3-PN-O2N
2	A	401	NAI	C5B-O5B-PA-O2A
2	A	401	NAI	C5D-O5D-PN-O1N
2	B	401	NAI	C5B-O5B-PA-O2A
3	A	402	GZ0	C5'-O5'-PA-O1A
3	A	402	GZ0	C5'-O5'-PA-O2A
3	B	402	GZ0	O4'-C4'-C5'-O5'
3	B	402	GZ0	O51-C11-O1B-PB
2	B	401	NAI	O4D-C1D-N1N-C6N
2	A	401	NAI	O4B-C4B-C5B-O5B
2	B	401	NAI	O4D-C4D-C5D-O5D
3	B	402	GZ0	C3'-C4'-C5'-O5'
2	B	401	NAI	C5B-O5B-PA-O3
2	A	401	NAI	PA-O3-PN-O1N
3	B	402	GZ0	PA-O3A-PB-O2B

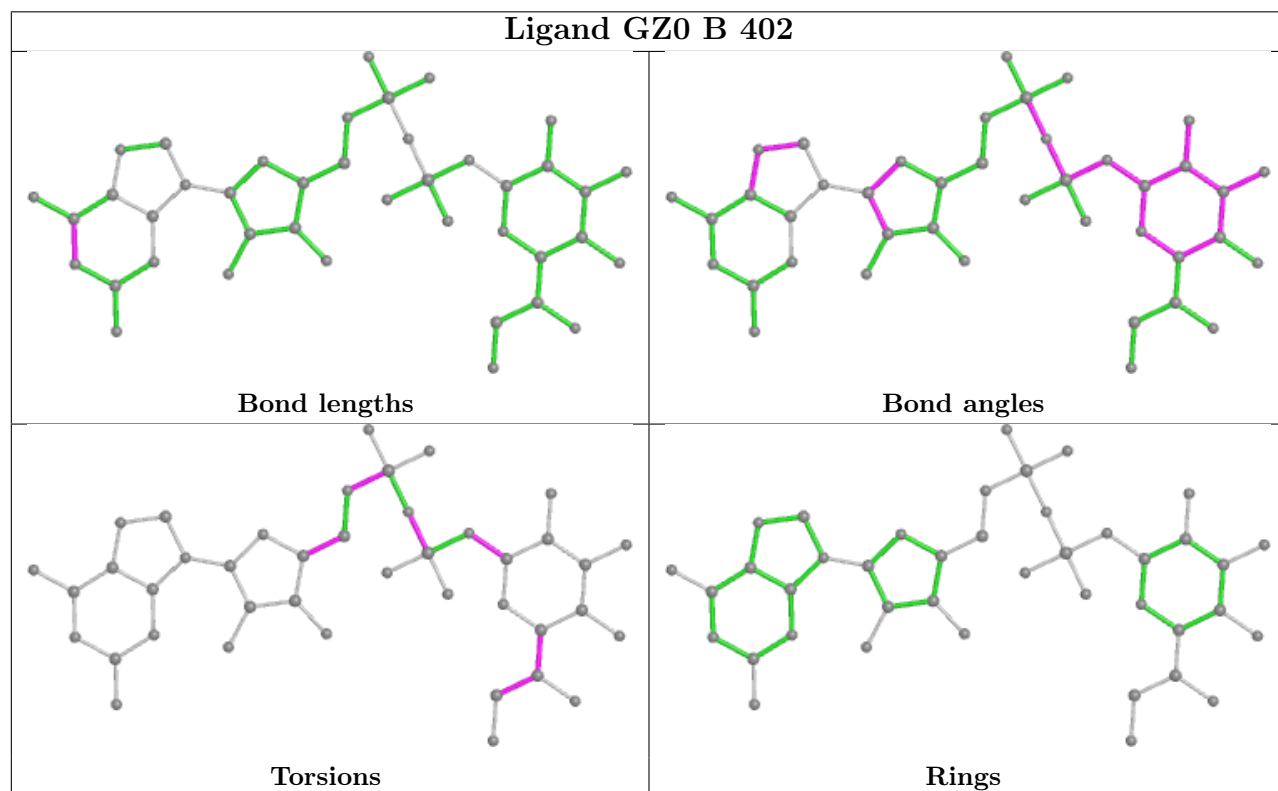
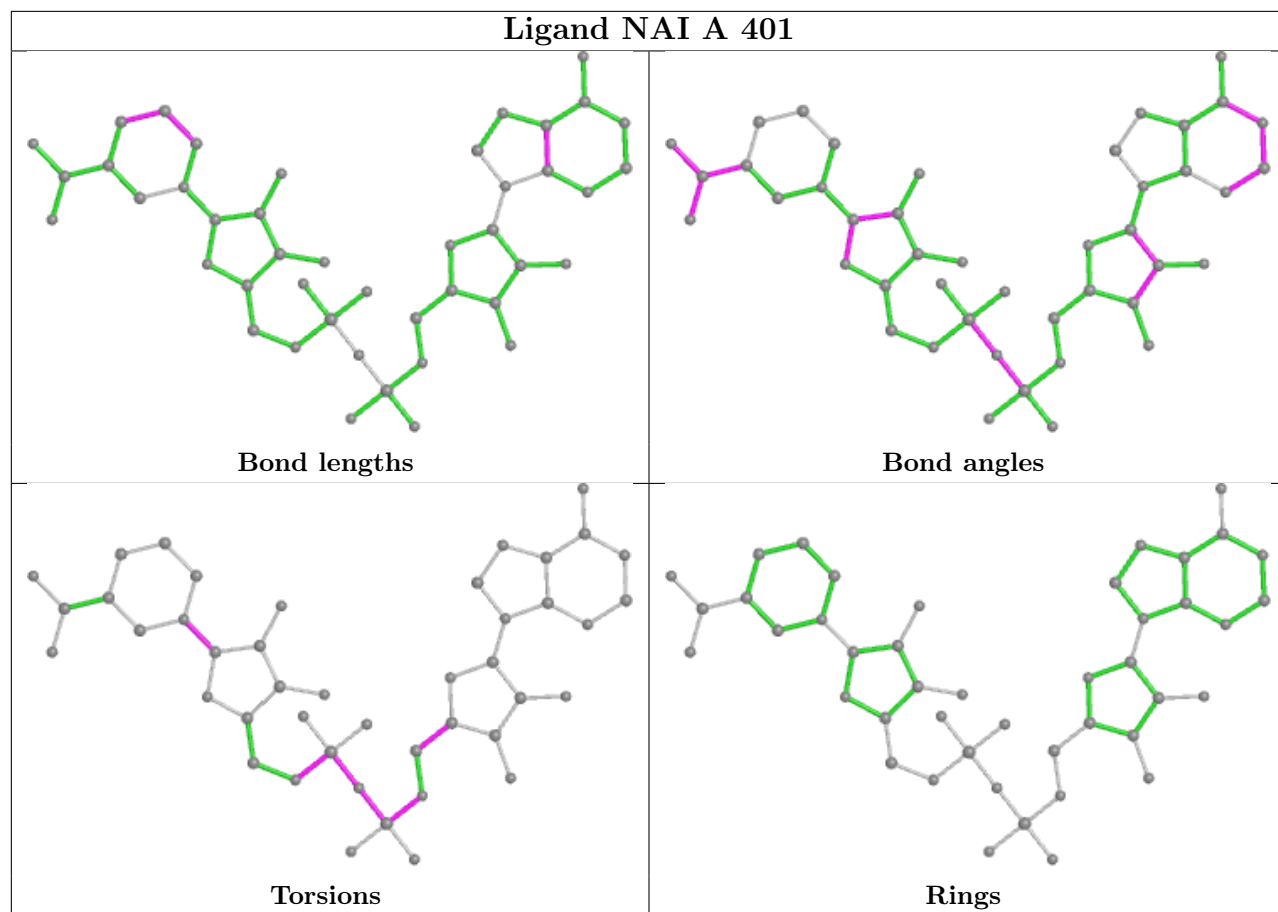
There are no ring outliers.

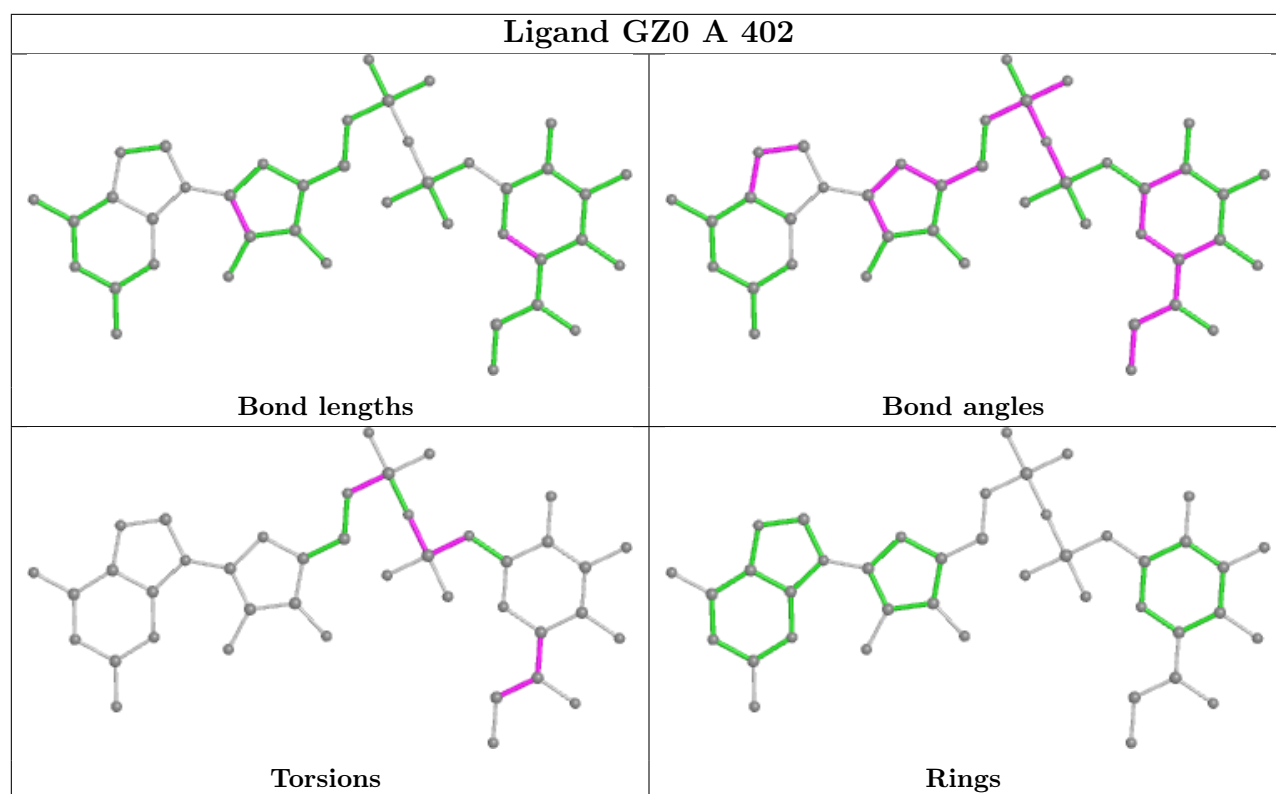
No monomer is involved in short contacts.

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.







4.7 Other polymers [i](#)

There are no such residues in this entry.

4.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

5 Fit of model and data

5.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

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

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

5.4 Ligands

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers

EDS failed to run properly - this section is therefore empty.