



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 30, 2025 – 02:21 PM JST

PDB ID : 8JM4 / pdb_00008jm4
Title : Endo-deglycosylated hydroxynitrile lyase isozyme 5 mutant L331A from Prunus communis complexed with 2-methyl-4H-benzo[d][1,3]dioxine-6-carbaldehyde
Authors : Zheng, Y.C.; Li, F.L.; Yu, H.L.; Xu, J.H.
Deposited on : 2023-06-04
Resolution : 1.60 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

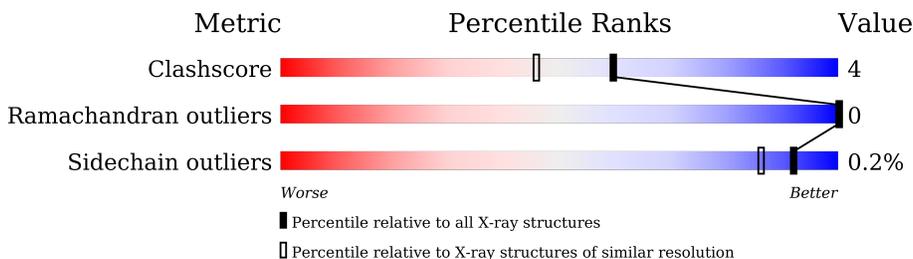
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.60 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	180529	4682 (1.60-1.60)
Ramachandran outliers	177936	4583 (1.60-1.60)
Sidechain outliers	177891	4582 (1.60-1.60)

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	540	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	FQ9	A	601[A]	-	X	X	-
6	DMS	A	610	-	-	X	-

2 Entry composition [i](#)

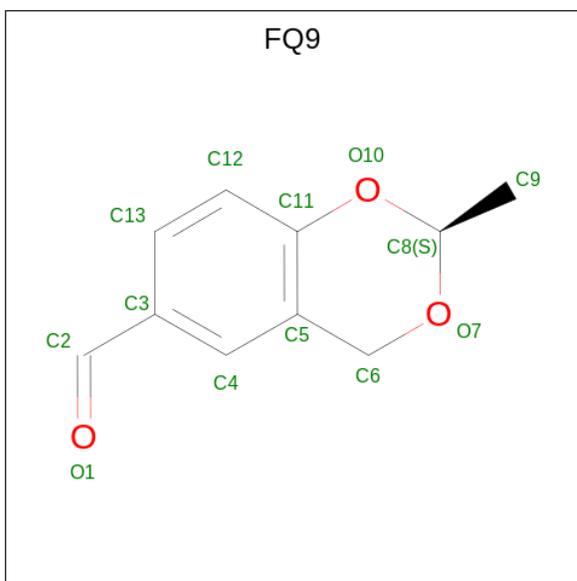
There are 7 unique types of molecules in this entry. The entry contains 4515 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 (R)-mandelonitrile lyase.

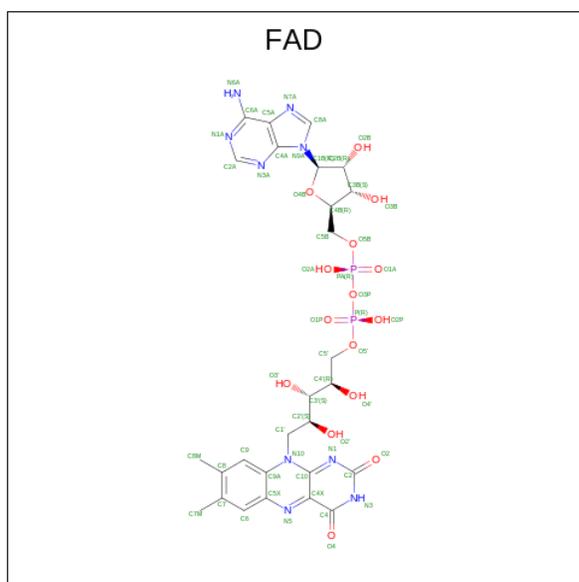
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	514	3952	2516	657	773	6	0	0	0

- Molecule 2 is (2S)-2-methyl-4H-1,3-benzodioxine-6-carbaldehyde (CCD ID: FQ9) (formula: C₁₀H₁₀O₃) (labeled as "Ligand of Interest" by depositor).



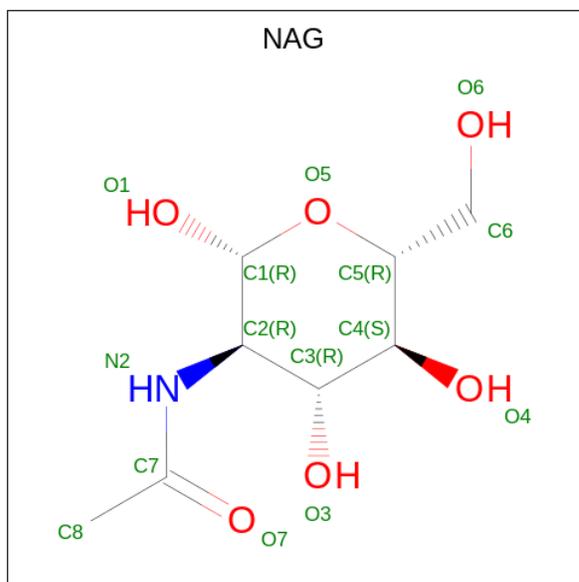
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	26	20	6	0	1

- Molecule 3 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: C₂₇H₃₃N₉O₁₅P₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	53	27	9	15	2	0	0

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



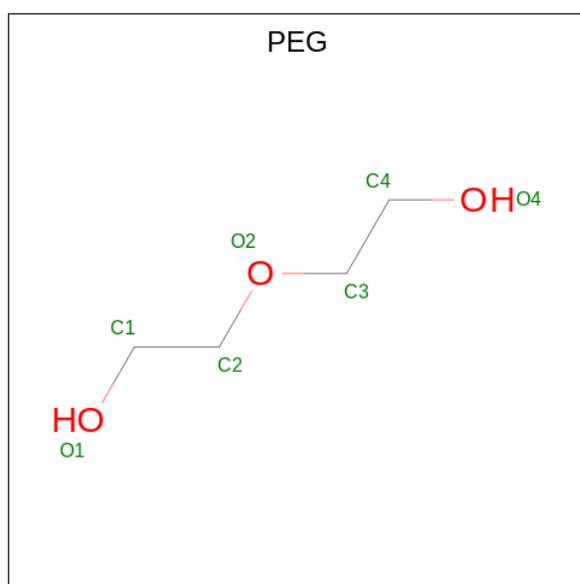
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O			
4	A	1	14	8	1	5	0	0	
4	A	1	14	8	1	5	0	0	

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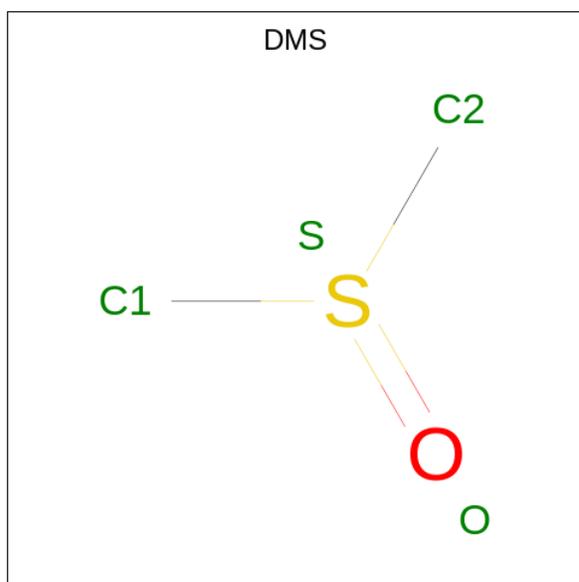
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			7	4	3		

- Molecule 6 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C₂H₆OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	S		
6	A	1	4	2	1	1	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
7	A	389	389	389	0	0

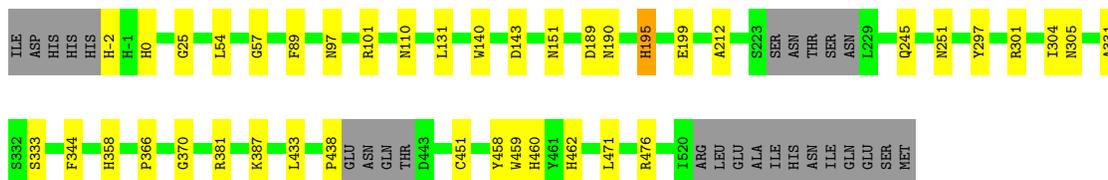
3 Residue-property plots [i](#)

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. 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: (R)-mandelonitrile lyase

Chain A:  88% 7% 5%



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 21	Depositor
Cell constants a, b, c, α , β , γ	49.52Å 90.97Å 130.49Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	33.52 – 1.60	Depositor
% Data completeness (in resolution range)	92.9 (33.52-1.60)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.184 , 0.214	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	4515	wwPDB-VP
Average B, all atoms (Å ²)	16.0	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: NAG, DMS, FAD, PEG, FQ9

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	1.11	4/4047 (0.1%)	1.27	8/5523 (0.1%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	57	GLY	C-O	6.29	1.30	1.23
1	A	451	CYS	C-O	6.11	1.31	1.24
1	A	140	TRP	C-O	-5.87	1.17	1.24
1	A	25	GLY	C-O	5.62	1.30	1.23

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	101	ARG	NE-CZ-NH2	-6.34	113.50	119.20
1	A	190	ASN	CA-CB-CG	-6.12	106.48	112.60
1	A	195	HIS	CA-CB-CG	-5.67	108.13	113.80
1	A	151	ASN	CB-CA-C	-5.38	101.76	109.84
1	A	101	ARG	NE-CZ-NH1	5.35	126.85	121.50
1	A	189	ASP	CA-CB-CG	5.20	117.80	112.60
1	A	251	ASN	N-CA-C	-5.17	106.82	112.72
1	A	344	PHE	CB-CA-C	5.05	116.33	108.61

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	3952	0	3827	29	0
2	A	26	0	0	7	0
3	A	53	0	31	3	0
4	A	84	0	78	1	0
5	A	7	0	10	3	0
6	A	4	0	6	4	0
7	A	389	0	0	8	1
All	All	4515	0	3952	34	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 4.

All (34) 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:438:PRO:C	7:A:702:HOH:O	2.10	0.94
1:A:438:PRO:O	7:A:702:HOH:O	1.96	0.81
1:A:331:ALA:HB3	2:A:601[A]:FQ9:O10	1.87	0.74
1:A:381:ARG:NH1	7:A:706:HOH:O	2.27	0.67
2:A:601[A]:FQ9:C6	6:A:610:DMS:H11	2.26	0.66
1:A:476:ARG:CZ	7:A:707:HOH:O	2.43	0.66
1:A:110:ASN:HB2	3:A:602:FAD:C5X	2.28	0.63
1:A:476:ARG:NH1	7:A:707:HOH:O	2.33	0.61
1:A:301:ARG:HH11	1:A:358:HIS:HE1	1.50	0.59
1:A:305:ASN:OD1	1:A:358:HIS:HD2	1.85	0.59
1:A:333:SER:HB2	2:A:601[A]:FQ9:C13	2.32	0.59
4:A:605:NAG:H3	5:A:609:PEG:H21	1.85	0.57
1:A:-2:HIS:CE1	7:A:942:HOH:O	2.57	0.55
1:A:-2:HIS:HE1	7:A:942:HOH:O	1.90	0.54
1:A:195:HIS:HA	1:A:199:GLU:OE1	2.11	0.51
1:A:331:ALA:HB3	2:A:601[A]:FQ9:C11	2.41	0.50
2:A:601[B]:FQ9:C8	6:A:610:DMS:H11	2.41	0.50
1:A:297:TYR:HB3	1:A:366:PRO:HD2	1.95	0.48
1:A:0:HIS:O	1:A:143:ASP:HA	2.14	0.47
1:A:131:LEU:HB3	5:A:609:PEG:H31	1.96	0.46
1:A:301:ARG:HH11	1:A:358:HIS:CE1	2.33	0.46
1:A:305:ASN:HB2	1:A:433:LEU:HB3	1.99	0.45
1:A:459:TRP:HB3	3:A:602:FAD:C8	2.47	0.45
1:A:460:HIS:O	1:A:462:HIS:HD2	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:89:PHE:CZ	1:A:97:ASN:HB3	2.52	0.45
1:A:245:GLN:NE2	7:A:717:HOH:O	2.46	0.45
1:A:131:LEU:HD22	5:A:609:PEG:H42	2.00	0.43
1:A:54:LEU:HD23	1:A:212:ALA:HB3	2.00	0.43
2:A:601[A]:FQ9:C3	6:A:610:DMS:H21	2.49	0.43
1:A:458:TYR:O	1:A:459:TRP:HB2	2.20	0.41
1:A:370:GLY:HA3	1:A:387:LYS:O	2.21	0.41
2:A:601[A]:FQ9:C5	6:A:610:DMS:H11	2.51	0.40
1:A:110:ASN:HB2	3:A:602:FAD:N5	2.37	0.40
1:A:471:LEU:HA	1:A:476:ARG:O	2.22	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:A:703:HOH:O	7:A:823:HOH:O[3_554]	2.16	0.04

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	508/540 (94%)	494 (97%)	14 (3%)	0	100 100

There are no Ramachandran outliers to report.

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	436/461 (95%)	435 (100%)	1 (0%)	92 86

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	304	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	-2	HIS
1	A	191	ASN
1	A	245	GLN
1	A	287	GLN
1	A	353	ASN
1	A	358	HIS
1	A	462	HIS
1	A	516	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

11 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
4	NAG	A	606	1	14,14,15	0.77	0	17,19,21	2.21	5 (29%)
5	PEG	A	609	-	6,6,6	0.31	0	5,5,5	0.29	0
2	FQ9	A	601[A]	-	14,14,14	5.50	11 (78%)	17,19,19	2.43	7 (41%)
4	NAG	A	603	1	14,14,15	0.60	0	17,19,21	2.02	7 (41%)
4	NAG	A	608	1	14,14,15	0.78	0	17,19,21	1.65	4 (23%)
6	DMS	A	610	-	3,3,3	0.53	0	3,3,3	0.41	0
4	NAG	A	605	1	14,14,15	0.77	0	17,19,21	1.53	3 (17%)
4	NAG	A	607	1	14,14,15	0.83	0	17,19,21	1.27	3 (17%)
3	FAD	A	602	-	53,58,58	0.81	2 (3%)	68,89,89	0.80	2 (2%)
2	FQ9	A	601[B]	-	14,14,14	5.76	11 (78%)	17,19,19	2.80	6 (35%)
4	NAG	A	604	1	14,14,15	0.61	0	17,19,21	1.85	6 (35%)

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
4	NAG	A	606	1	-	2/6/23/26	0/1/1/1
5	PEG	A	609	-	-	2/4/4/4	-
2	FQ9	A	601[A]	-	-	2/2/11/11	0/2/2/2
4	NAG	A	603	1	-	0/6/23/26	0/1/1/1
4	NAG	A	608	1	-	0/6/23/26	0/1/1/1
4	NAG	A	605	1	-	0/6/23/26	0/1/1/1
4	NAG	A	607	1	-	0/6/23/26	0/1/1/1
3	FAD	A	602	-	-	3/30/50/50	0/6/6/6
2	FQ9	A	601[B]	-	-	0/2/11/11	0/2/2/2
4	NAG	A	604	1	-	2/6/23/26	0/1/1/1

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601[B]	FQ9	C11-C5	-12.29	1.19	1.40
2	A	601[A]	FQ9	C4-C5	9.71	1.56	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601[A]	FQ9	C11-C5	-9.67	1.24	1.40
2	A	601[B]	FQ9	C4-C5	9.56	1.55	1.39
2	A	601[B]	FQ9	C12-C11	7.21	1.54	1.39
2	A	601[A]	FQ9	C12-C11	7.16	1.54	1.39
2	A	601[B]	FQ9	O10-C11	6.70	1.47	1.38
2	A	601[A]	FQ9	C6-C5	-6.03	1.36	1.50
2	A	601[A]	FQ9	C13-C12	-6.01	1.27	1.38
2	A	601[B]	FQ9	C13-C12	-5.78	1.28	1.38
2	A	601[A]	FQ9	C4-C3	-5.74	1.30	1.39
2	A	601[A]	FQ9	O10-C11	5.49	1.45	1.38
2	A	601[B]	FQ9	C4-C3	-5.36	1.30	1.39
2	A	601[B]	FQ9	C6-C5	-4.96	1.39	1.50
2	A	601[A]	FQ9	O7-C6	-3.66	1.34	1.43
2	A	601[A]	FQ9	C13-C3	3.60	1.46	1.39
2	A	601[B]	FQ9	O7-C6	-3.46	1.35	1.43
2	A	601[B]	FQ9	O10-C8	3.44	1.52	1.44
2	A	601[A]	FQ9	O10-C8	3.24	1.51	1.44
2	A	601[A]	FQ9	O7-C8	2.57	1.47	1.41
3	A	602	FAD	O2'-C2'	-2.48	1.38	1.43
2	A	601[B]	FQ9	C13-C3	2.43	1.44	1.39
2	A	601[B]	FQ9	C3-C2	2.22	1.54	1.47
3	A	602	FAD	C8A-N7A	-2.09	1.31	1.34

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601[B]	FQ9	O7-C6-C5	6.42	125.78	111.66
2	A	601[A]	FQ9	O7-C6-C5	5.75	124.32	111.66
2	A	601[A]	FQ9	O1-C2-C3	-4.90	108.71	124.59
4	A	606	NAG	O5-C5-C6	4.72	114.61	107.20
2	A	601[B]	FQ9	C12-C13-C3	-4.39	115.53	121.25
2	A	601[B]	FQ9	C4-C5-C11	-4.31	113.74	118.26
2	A	601[B]	FQ9	C6-C5-C4	4.05	128.78	120.80
4	A	608	NAG	O5-C1-C2	-3.93	105.09	111.29
4	A	606	NAG	C1-O5-C5	3.93	117.51	112.19
4	A	606	NAG	C6-C5-C4	-3.77	104.17	113.00
4	A	603	NAG	C4-C3-C2	-3.64	105.69	111.02
4	A	604	NAG	O5-C5-C6	3.55	112.77	107.20
4	A	603	NAG	C1-O5-C5	-3.48	107.47	112.19
2	A	601[B]	FQ9	O7-C8-C9	3.41	113.58	108.58
4	A	605	NAG	O5-C5-C6	3.41	112.56	107.20
2	A	601[A]	FQ9	O7-C8-C9	3.34	113.47	108.58

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	603	NAG	O5-C5-C6	3.16	112.15	107.20
4	A	604	NAG	C3-C4-C5	2.99	115.57	110.24
4	A	603	NAG	O5-C5-C4	-2.87	103.85	110.83
4	A	604	NAG	O3-C3-C4	-2.86	103.73	110.35
4	A	607	NAG	C1-O5-C5	2.85	116.06	112.19
4	A	604	NAG	O5-C1-C2	-2.85	106.79	111.29
4	A	605	NAG	C1-O5-C5	-2.80	108.39	112.19
4	A	606	NAG	O5-C1-C2	-2.79	106.89	111.29
4	A	608	NAG	C2-N2-C7	-2.73	119.01	122.90
4	A	603	NAG	C3-C4-C5	-2.70	105.42	110.24
4	A	605	NAG	O5-C1-C2	-2.69	107.04	111.29
4	A	603	NAG	O4-C4-C5	2.51	115.54	109.30
4	A	604	NAG	C6-C5-C4	-2.50	107.15	113.00
4	A	608	NAG	O7-C7-N2	2.42	126.40	121.95
2	A	601[B]	FQ9	O1-C2-C3	-2.40	116.81	124.59
4	A	607	NAG	O3-C3-C2	-2.30	104.71	109.47
3	A	602	FAD	O4B-C1B-C2B	-2.29	103.57	106.93
2	A	601[A]	FQ9	C11-O10-C8	-2.27	110.96	116.67
4	A	603	NAG	C1-C2-N2	-2.27	106.62	110.49
4	A	604	NAG	C4-C3-C2	2.24	114.30	111.02
2	A	601[A]	FQ9	C13-C3-C2	-2.18	114.36	120.35
4	A	606	NAG	O4-C4-C3	-2.18	105.31	110.35
2	A	601[A]	FQ9	C6-C5-C4	2.14	125.03	120.80
2	A	601[A]	FQ9	C4-C3-C2	2.13	124.53	119.98
3	A	602	FAD	O2P-P-O1P	2.05	122.35	112.24
4	A	607	NAG	O5-C1-C2	-2.04	108.06	111.29
4	A	608	NAG	O3-C3-C4	2.02	115.02	110.35

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	602	FAD	N10-C1'-C2'-O2'
2	A	601[A]	FQ9	O1-C2-C3-C4
2	A	601[A]	FQ9	O1-C2-C3-C13
4	A	604	NAG	O5-C5-C6-O6
4	A	604	NAG	C4-C5-C6-O6
4	A	606	NAG	C4-C5-C6-O6
4	A	606	NAG	O5-C5-C6-O6
5	A	609	PEG	O2-C3-C4-O4
5	A	609	PEG	C1-C2-O2-C3
3	A	602	FAD	O4B-C4B-C5B-O5B

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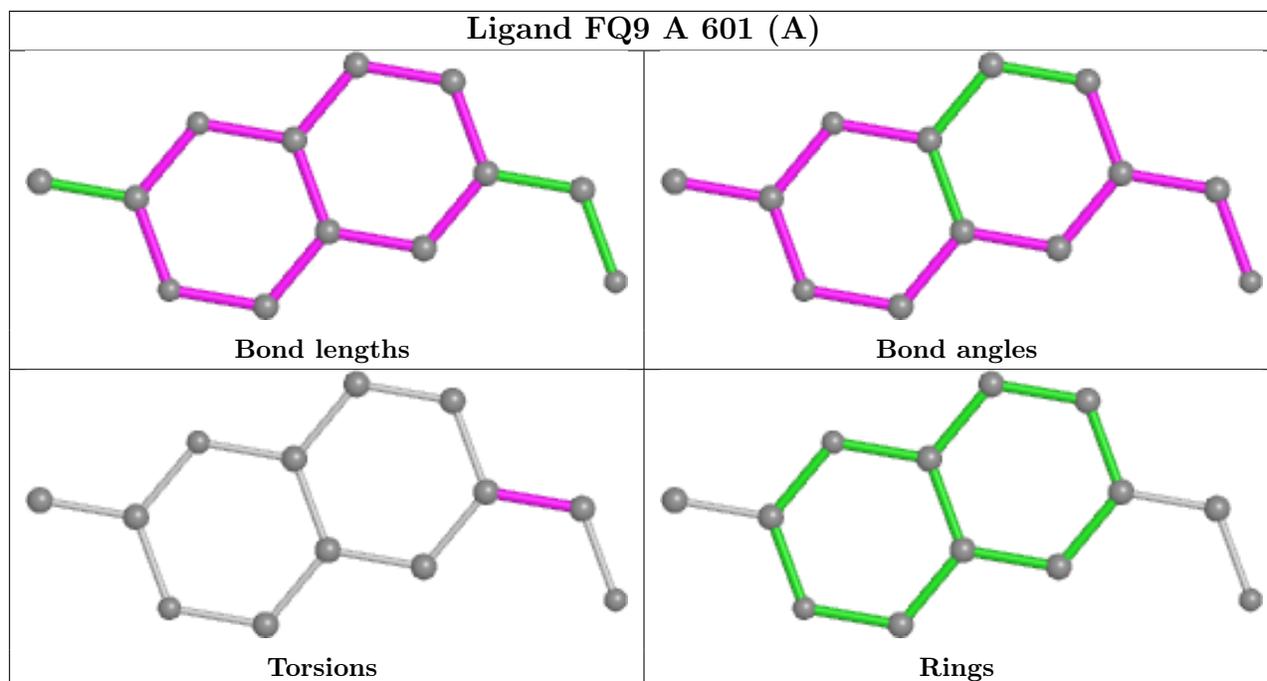
Mol	Chain	Res	Type	Atoms
3	A	602	FAD	N10-C1'-C2'-C3'

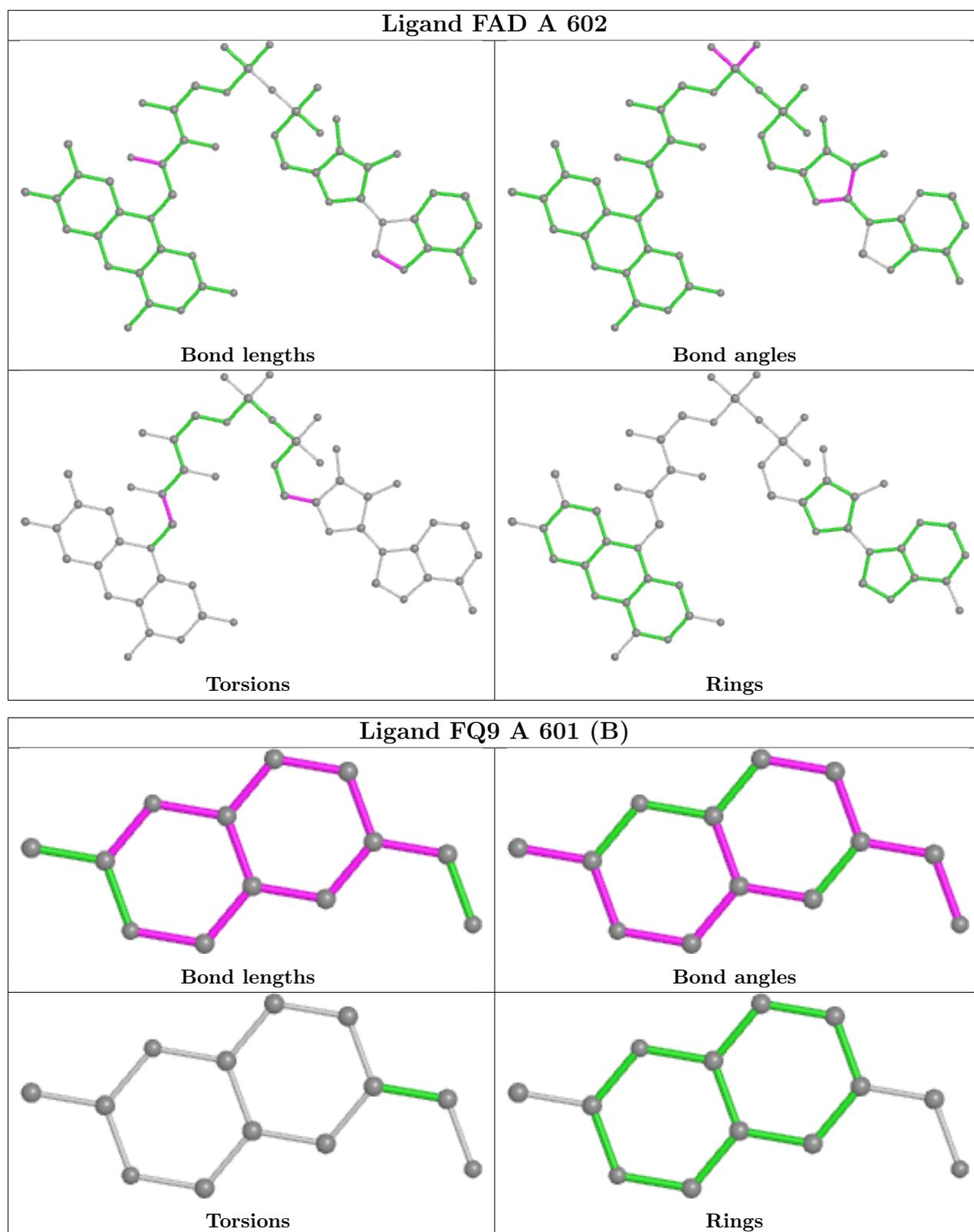
There are no ring outliers.

6 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	609	PEG	3	0
2	A	601[A]	FQ9	6	0
6	A	610	DMS	4	0
4	A	605	NAG	1	0
3	A	602	FAD	3	0
2	A	601[B]	FQ9	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

There are no chain breaks in this entry.

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

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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.