



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 2, 2023 – 03:33 AM EDT

PDB ID : 6MQ3
Title : Structure of Cysteine-free Human Insulin-Degrading Enzyme in complex with Substrate-selective Macrocyclic Inhibitor 63
Authors : Tan, G.A.; Seeliger, M.A.; Welsh, A.J.; Maianti, J.P.; Liu, D.R.
Deposited on : 2018-10-09
Resolution : 3.57 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)
Xtrriage (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 3.57 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 [i](#)

There are 3 unique types of molecules in this entry. The entry contains 15798 atoms, of which 102 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 Insulin-degrading enzyme.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	959	7798	5021	1310	1445	22	0	0	0
1	B	959	7798	5021	1310	1445	22	0	0	0

There are 28 discrepancies between the modelled and reference sequences:

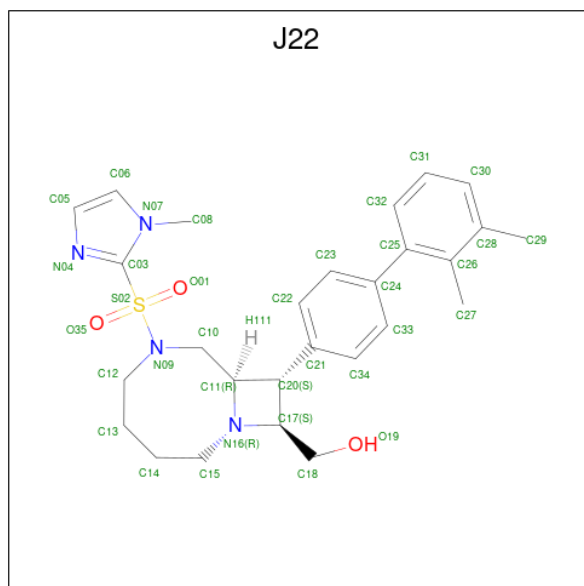
Chain	Residue	Modelled	Actual	Comment	Reference
A	110	LEU	CYS	engineered mutation	UNP P14735
A	111	GLN	GLU	engineered mutation	UNP P14735
A	171	SER	CYS	engineered mutation	UNP P14735
A	178	ALA	CYS	engineered mutation	UNP P14735
A	257	VAL	CYS	engineered mutation	UNP P14735
A	414	LEU	CYS	engineered mutation	UNP P14735
A	573	ASN	CYS	engineered mutation	UNP P14735
A	590	SER	CYS	engineered mutation	UNP P14735
A	789	SER	CYS	engineered mutation	UNP P14735
A	812	ALA	CYS	engineered mutation	UNP P14735
A	819	ALA	CYS	engineered mutation	UNP P14735
A	904	SER	CYS	engineered mutation	UNP P14735
A	966	ASN	CYS	engineered mutation	UNP P14735
A	974	ALA	CYS	engineered mutation	UNP P14735
B	110	LEU	CYS	engineered mutation	UNP P14735
B	111	GLN	GLU	engineered mutation	UNP P14735
B	171	SER	CYS	engineered mutation	UNP P14735
B	178	ALA	CYS	engineered mutation	UNP P14735
B	257	VAL	CYS	engineered mutation	UNP P14735
B	414	LEU	CYS	engineered mutation	UNP P14735
B	573	ASN	CYS	engineered mutation	UNP P14735
B	590	SER	CYS	engineered mutation	UNP P14735
B	789	SER	CYS	engineered mutation	UNP P14735
B	812	ALA	CYS	engineered mutation	UNP P14735
B	819	ALA	CYS	engineered mutation	UNP P14735

Continued on next page...

Continued from previous page...

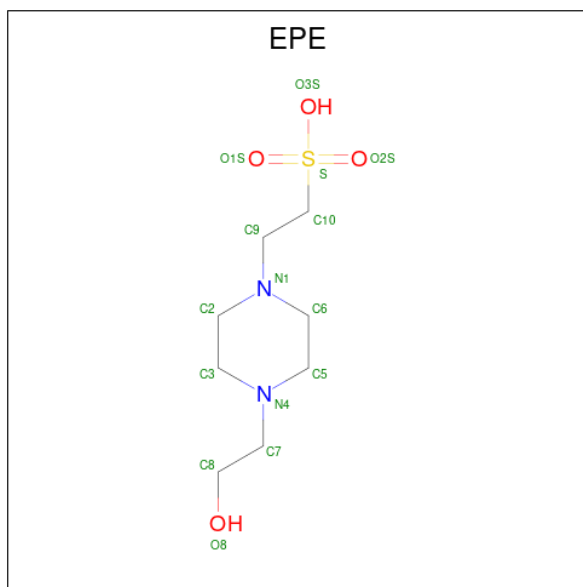
Chain	Residue	Modelled	Actual	Comment	Reference
B	904	SER	CYS	engineered mutation	UNP P14735
B	966	ASN	CYS	engineered mutation	UNP P14735
B	974	ALA	CYS	engineered mutation	UNP P14735

- Molecule 2 is {(8R,9S,10S)-9-(2',3'-dimethyl[1,1'-biphenyl]-4-yl)-6-[(1-methyl-1H-imidazol-2-yl)sulfonyl]-1,6-diazabicyclo[6.2.0]decan-10-yl}methanol (three-letter code: J22) (formula: C₂₇H₃₄N₄O₃S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			S
2	A	1	Total	C	H	N	O	S	0	0
			69	27	34	4	3	1		
2	B	1	Total	C	H	N	O	S	0	0
			69	27	34	4	3	1		

- Molecule 3 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: C₈H₁₈N₂O₄S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf		
			Total	C	H	N	O			S	
3	A	1	Total	32	8	17	2	4	1	0	0
3	B	1	Total	32	8	17	2	4	1	0	0

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 65	Depositor
Cell constants a, b, c, α , β , γ	263.25Å 263.25Å 91.23Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	65.81 – 3.57	Depositor
% Data completeness (in resolution range)	99.9 (65.81-3.57)	Depositor
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.22 (at 3.58Å)	Xtrriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.162 , 0.211	Depositor
Wilson B-factor (Å ²)	69.5	Xtrriage
Anisotropy	0.124	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	0.038 for h,-h-k,-l	Xtrriage
Total number of atoms	15798	wwPDB-VP
Average B, all atoms (Å ²)	71.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.78% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical 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	J22	A	1101	-	33,39,39	1.69	9 (27%)	39,58,58	2.30	6 (15%)
2	J22	B	1101	-	33,39,39	1.81	8 (24%)	39,58,58	2.26	4 (10%)
3	EPE	A	1102	-	15,15,15	0.75	1 (6%)	18,20,20	1.81	5 (27%)
3	EPE	B	1102	-	15,15,15	0.78	1 (6%)	18,20,20	1.94	6 (33%)

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	J22	A	1101	-	-	5/16/49/49	0/4/5/5
2	J22	B	1101	-	-	10/16/49/49	0/4/5/5
3	EPE	A	1102	-	-	7/9/19/19	0/1/1/1
3	EPE	B	1102	-	-	5/9/19/19	0/1/1/1

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1101	J22	C10-N09	4.23	1.53	1.48
2	A	1101	J22	C13-C12	2.84	1.58	1.52
2	B	1101	J22	S02-N09	2.80	1.67	1.63
2	B	1101	J22	C18-C17	2.73	1.56	1.52
2	A	1101	J22	O01-S02	2.64	1.46	1.43
2	A	1101	J22	C12-N09	2.61	1.52	1.48
2	B	1101	J22	O01-S02	2.61	1.46	1.43
2	B	1101	J22	C12-N09	2.59	1.52	1.48
2	A	1101	J22	C14-C15	2.55	1.57	1.52
3	A	1102	EPE	C10-S	2.53	1.81	1.77
3	B	1102	EPE	C10-S	2.52	1.81	1.77
2	B	1101	J22	C25-C24	-2.46	1.45	1.49
2	A	1101	J22	C32-C25	2.40	1.43	1.40
2	A	1101	J22	C25-C26	2.26	1.44	1.40
2	A	1101	J22	C25-C24	-2.21	1.45	1.49
2	B	1101	J22	C32-C25	2.06	1.43	1.40
2	A	1101	J22	C33-C24	2.03	1.43	1.39
2	B	1101	J22	C14-C15	2.03	1.56	1.52

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1101	J22	C34-C33	2.03	1.42	1.38

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1101	J22	O35-S02-O01	-9.63	103.91	119.52
2	B	1101	J22	O35-S02-O01	-9.59	103.98	119.52
2	B	1101	J22	O35-S02-N09	6.82	112.91	106.69
2	A	1101	J22	O35-S02-N09	6.62	112.72	106.69
2	A	1101	J22	O01-S02-N09	5.38	111.60	106.69
2	B	1101	J22	O01-S02-N09	5.35	111.56	106.69
3	A	1102	EPE	C5-N4-C3	4.47	118.90	108.83
3	B	1102	EPE	C5-N4-C3	4.02	117.89	108.83
3	B	1102	EPE	C7-N4-C5	3.84	121.05	111.23
3	B	1102	EPE	C7-N4-C3	3.74	120.81	111.23
3	A	1102	EPE	C7-N4-C5	3.54	120.29	111.23
2	A	1101	J22	C12-N09-S02	3.44	122.32	116.29
3	B	1102	EPE	O2S-S-C10	2.38	109.78	106.92
2	A	1101	J22	O19-C18-C17	-2.36	106.36	111.42
3	A	1102	EPE	O2S-S-C10	2.34	109.73	106.92
3	A	1102	EPE	C7-N4-C3	2.29	117.09	111.23
3	B	1102	EPE	O3S-S-C10	2.19	109.30	105.77
3	B	1102	EPE	O1S-S-C10	2.17	109.53	106.92
2	A	1101	J22	C06-N07-C03	2.15	110.69	108.51
3	A	1102	EPE	O3S-S-C10	2.14	109.22	105.77
2	B	1101	J22	C13-C14-C15	-2.05	111.38	115.69

There are no chirality outliers.

All (27) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1101	J22	N16-C17-C18-O19
2	A	1101	J22	C12-N09-S02-O35
2	B	1101	J22	C20-C17-C18-O19
2	B	1101	J22	N16-C17-C18-O19
2	B	1101	J22	C10-N09-S02-O35
2	B	1101	J22	C12-N09-S02-C03
3	A	1102	EPE	C10-C9-N1-C2
3	A	1102	EPE	C8-C7-N4-C5
3	A	1102	EPE	C9-C10-S-O2S
3	B	1102	EPE	C9-C10-S-O1S
3	B	1102	EPE	C9-C10-S-O3S

Continued on next page...

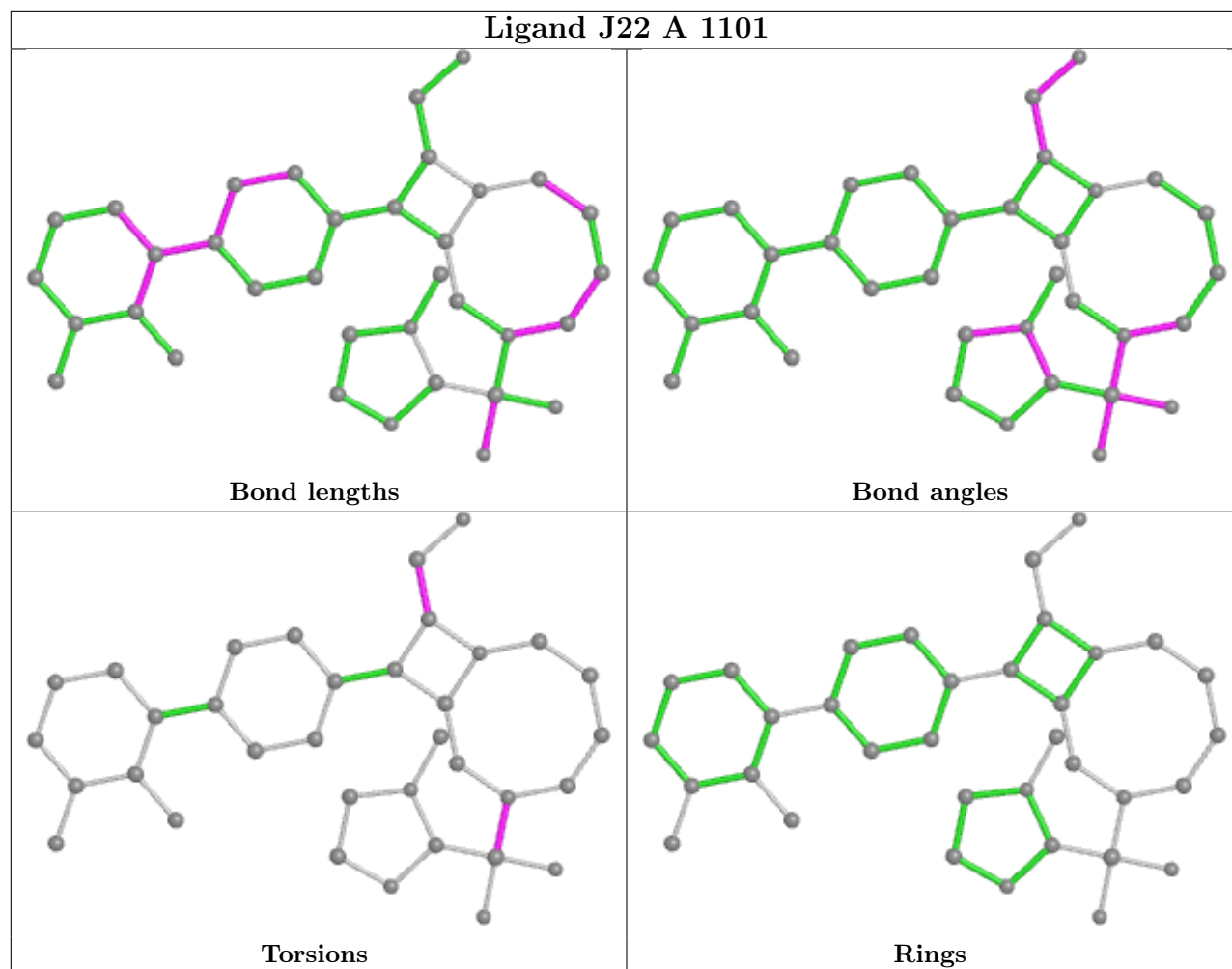
Continued from previous page...

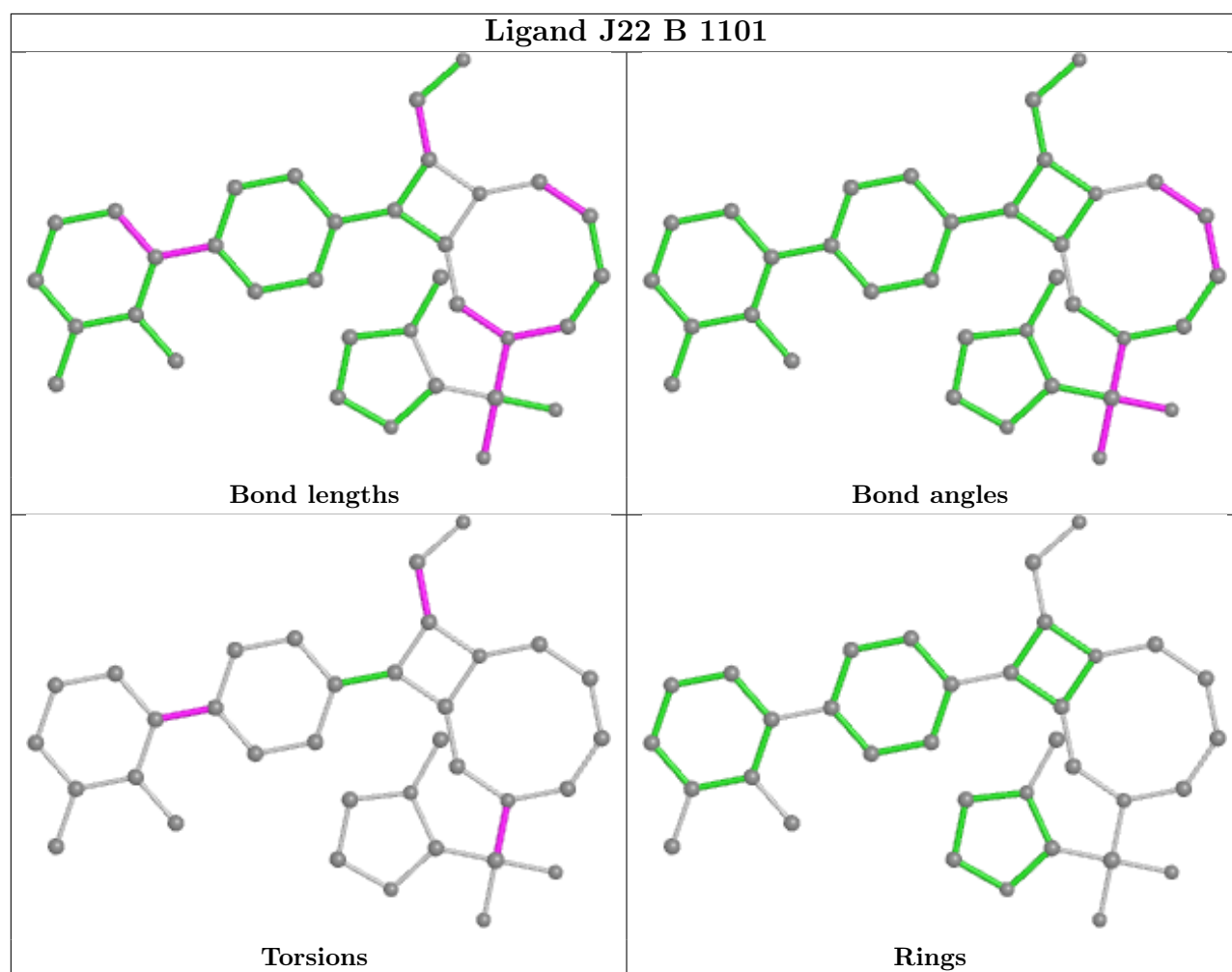
Mol	Chain	Res	Type	Atoms
2	A	1101	J22	C12-N09-S02-O01
2	B	1101	J22	C12-N09-S02-O35
3	A	1102	EPE	C9-C10-S-O3S
2	A	1101	J22	C12-N09-S02-C03
3	B	1102	EPE	C8-C7-N4-C5
3	A	1102	EPE	C9-C10-S-O1S
3	B	1102	EPE	C9-C10-S-O2S
3	B	1102	EPE	N4-C7-C8-O8
2	B	1101	J22	C23-C24-C25-C26
2	B	1101	J22	C33-C24-C25-C26
3	A	1102	EPE	C10-C9-N1-C6
2	B	1101	J22	C23-C24-C25-C32
3	A	1102	EPE	C8-C7-N4-C3
2	B	1101	J22	C33-C24-C25-C32
2	A	1101	J22	C20-C17-C18-O19
2	B	1101	J22	C10-N09-S02-C03

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 [i](#)

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

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

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

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

5.3 Carbohydrates [i](#)

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

5.4 Ligands [i](#)

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

5.5 Other polymers [i](#)

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