



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 1, 2023 – 11:52 PM EDT

PDB ID : 6N55
Title : Crystal structure of human uridine-cytidine kinase 2 complexed with 2'-azidouridine
Authors : Cuthbert, B.J.; Nainar, S.; Spitale, R.C.; Goulding, C.W.
Deposited on : 2018-11-21
Resolution : 3.08 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 3.08 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 5 unique types of molecules in this entry. The entry contains 13198 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 Uridine-cytidine kinase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	201	Total 1569	C 1008	N 262	O 296	S 3	0	1	0
1	B	206	Total 1582	C 1015	N 260	O 304	S 3	0	1	0
1	C	212	Total 1647	C 1062	N 273	O 309	S 3	0	1	0
1	D	213	Total 1661	C 1067	N 275	O 316	S 3	0	0	0
1	E	214	Total 1658	C 1063	N 280	O 312	S 3	0	1	0
1	F	212	Total 1621	C 1037	N 271	O 310	S 3	0	1	0
1	G	201	Total 1475	C 950	N 249	O 273	S 3	0	0	0
1	H	211	Total 1542	C 991	N 259	O 289	S 3	0	0	0

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	GLY	-	expression tag	UNP Q9BZX2
A	-3	PRO	-	expression tag	UNP Q9BZX2
A	-2	LEU	-	expression tag	UNP Q9BZX2
A	-1	GLY	-	expression tag	UNP Q9BZX2
A	0	SER	-	expression tag	UNP Q9BZX2
B	-4	GLY	-	expression tag	UNP Q9BZX2
B	-3	PRO	-	expression tag	UNP Q9BZX2
B	-2	LEU	-	expression tag	UNP Q9BZX2
B	-1	GLY	-	expression tag	UNP Q9BZX2
B	0	SER	-	expression tag	UNP Q9BZX2
C	-4	GLY	-	expression tag	UNP Q9BZX2
C	-3	PRO	-	expression tag	UNP Q9BZX2
C	-2	LEU	-	expression tag	UNP Q9BZX2

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-1	GLY	-	expression tag	UNP Q9BZX2
C	0	SER	-	expression tag	UNP Q9BZX2
D	-4	GLY	-	expression tag	UNP Q9BZX2
D	-3	PRO	-	expression tag	UNP Q9BZX2
D	-2	LEU	-	expression tag	UNP Q9BZX2
D	-1	GLY	-	expression tag	UNP Q9BZX2
D	0	SER	-	expression tag	UNP Q9BZX2
E	-4	GLY	-	expression tag	UNP Q9BZX2
E	-3	PRO	-	expression tag	UNP Q9BZX2
E	-2	LEU	-	expression tag	UNP Q9BZX2
E	-1	GLY	-	expression tag	UNP Q9BZX2
E	0	SER	-	expression tag	UNP Q9BZX2
F	-4	GLY	-	expression tag	UNP Q9BZX2
F	-3	PRO	-	expression tag	UNP Q9BZX2
F	-2	LEU	-	expression tag	UNP Q9BZX2
F	-1	GLY	-	expression tag	UNP Q9BZX2
F	0	SER	-	expression tag	UNP Q9BZX2
G	-4	GLY	-	expression tag	UNP Q9BZX2
G	-3	PRO	-	expression tag	UNP Q9BZX2
G	-2	LEU	-	expression tag	UNP Q9BZX2
G	-1	GLY	-	expression tag	UNP Q9BZX2
G	0	SER	-	expression tag	UNP Q9BZX2
H	-4	GLY	-	expression tag	UNP Q9BZX2
H	-3	PRO	-	expression tag	UNP Q9BZX2
H	-2	LEU	-	expression tag	UNP Q9BZX2
H	-1	GLY	-	expression tag	UNP Q9BZX2
H	0	SER	-	expression tag	UNP Q9BZX2

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O₄P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	P	0	0
			5	4	1		
2	B	1	Total	O	P	0	0
			5	4	1		
2	C	1	Total	O	P	0	0
			5	4	1		
2	D	1	Total	O	P	0	0
			5	4	1		
2	E	1	Total	O	P	0	0
			5	4	1		
2	F	1	Total	O	P	0	0
			5	4	1		
2	G	1	Total	O	P	0	0
			5	4	1		
2	H	1	Total	O	P	0	0
			5	4	1		

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



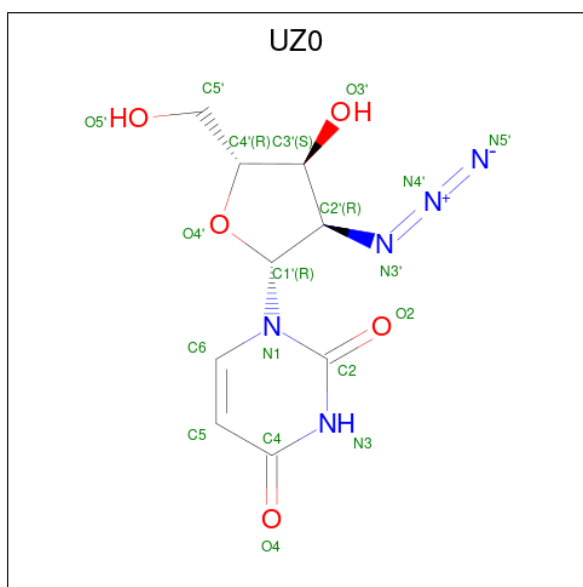
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	D	1	Total 6	C 3	O 3	0	0
3	D	1	Total 6	C 3	O 3	0	0
3	D	1	Total 6	C 3	O 3	0	0
3	E	1	Total 6	C 3	O 3	0	0
3	E	1	Total 6	C 3	O 3	0	0
3	E	1	Total 6	C 3	O 3	0	0
3	E	1	Total 6	C 3	O 3	0	0
3	F	1	Total 6	C 3	O 3	0	0
3	F	1	Total 6	C 3	O 3	0	0
3	F	1	Total 6	C 3	O 3	0	0
3	F	1	Total 6	C 3	O 3	0	0
3	F	1	Total 6	C 3	O 3	0	0
3	G	1	Total 6	C 3	O 3	0	0

- Molecule 4 is 2'-azido-2'-deoxyuridine (three-letter code: UZ0) (formula: C₉H₁₁N₅O₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	D	1	Total	C	N	O	0	0
			19	9	5	5		
4	E	1	Total	C	N	O	0	0
			19	9	5	5		
4	F	1	Total	C	N	O	0	0
			19	9	5	5		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	30	Total	O	0	0
			30	30		
5	B	25	Total	O	0	0
			25	25		
5	C	21	Total	O	0	0
			21	21		
5	D	25	Total	O	0	0
			25	25		
5	E	17	Total	O	0	0
			17	17		
5	F	28	Total	O	0	0
			28	28		
5	G	24	Total	O	0	0
			24	24		
5	H	14	Total	O	0	0
			14	14		

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

3 Data and refinement statistics

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

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	92.75Å 85.76Å 153.37Å 90.00° 95.39° 90.00°	Depositor
Resolution (Å)	38.50 – 3.08	Depositor
% Data completeness (in resolution range)	98.3 (38.50-3.08)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.84 (at 3.06Å)	Xtrriage
Refinement program	PHENIX (1.14_3260: ???)	Depositor
R, R_{free}	0.211 , 0.258	Depositor
Wilson B-factor (Å ²)	86.0	Xtrriage
Anisotropy	0.301	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	13198	wwPDB-VP
Average B, all atoms (Å ²)	76.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.50% 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](#)

38 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	GOL	E	305	-	5,5,5	0.92	0	5,5,5	0.98	0
3	GOL	B	303	-	5,5,5	0.92	0	5,5,5	0.98	0
3	GOL	F	302	-	5,5,5	0.92	0	5,5,5	0.99	0
2	PO4	F	301	-	4,4,4	0.94	0	6,6,6	0.48	0
3	GOL	E	303	-	5,5,5	0.92	0	5,5,5	0.99	0
2	PO4	G	301	-	4,4,4	0.94	0	6,6,6	0.46	0
4	UZ0	E	306	-	17,20,20	0.90	1 (5%)	23,28,28	2.79	11 (47%)
3	GOL	A	303	-	5,5,5	0.92	0	5,5,5	1.00	0
3	GOL	E	302	-	5,5,5	0.92	0	5,5,5	0.97	0
3	GOL	C	304	-	5,5,5	0.91	0	5,5,5	0.99	0
2	PO4	A	301	-	4,4,4	0.93	0	6,6,6	0.45	0
3	GOL	A	304	-	5,5,5	0.90	0	5,5,5	1.00	0
3	GOL	B	302	-	5,5,5	0.90	0	5,5,5	1.05	0
4	UZ0	D	308	-	17,20,20	1.23	1 (5%)	23,28,28	2.98	15 (65%)
3	GOL	C	305	-	5,5,5	0.93	0	5,5,5	0.96	0
3	GOL	C	303	-	5,5,5	0.92	0	5,5,5	0.99	0
3	GOL	F	303	-	5,5,5	0.91	0	5,5,5	0.98	0
3	GOL	G	302	-	5,5,5	0.89	0	5,5,5	1.00	0
2	PO4	C	301	-	4,4,4	0.97	0	6,6,6	0.39	0
3	GOL	E	304	-	5,5,5	0.95	0	5,5,5	0.96	0
2	PO4	H	301	-	4,4,4	0.94	0	6,6,6	0.40	0
3	GOL	C	302	-	5,5,5	0.89	0	5,5,5	1.01	0
3	GOL	D	302	-	5,5,5	0.93	0	5,5,5	0.98	0
3	GOL	F	305	-	5,5,5	0.90	0	5,5,5	1.01	0
3	GOL	D	305	-	5,5,5	0.91	0	5,5,5	1.00	0
4	UZ0	F	307	-	17,20,20	1.29	2 (11%)	23,28,28	2.55	9 (39%)
2	PO4	E	301	-	4,4,4	0.92	0	6,6,6	0.45	0
3	GOL	F	306	-	5,5,5	0.90	0	5,5,5	0.99	0
3	GOL	D	304	-	5,5,5	0.89	0	5,5,5	0.99	0
3	GOL	F	304	-	5,5,5	0.90	0	5,5,5	1.00	0
2	PO4	D	301	-	4,4,4	0.94	0	6,6,6	0.41	0
3	GOL	A	302	-	5,5,5	0.88	0	5,5,5	0.99	0
3	GOL	D	307	-	5,5,5	0.95	0	5,5,5	0.99	0
3	GOL	A	305	-	5,5,5	0.89	0	5,5,5	1.01	0
3	GOL	D	303	-	5,5,5	0.93	0	5,5,5	0.99	0
2	PO4	B	301	-	4,4,4	0.95	0	6,6,6	0.46	0
3	GOL	B	304	-	5,5,5	0.93	0	5,5,5	0.96	0
3	GOL	D	306	-	5,5,5	0.94	0	5,5,5	0.93	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	GOL	E	305	-	-	2/4/4/4	-
3	GOL	B	303	-	-	0/4/4/4	-
3	GOL	F	302	-	-	0/4/4/4	-
3	GOL	E	303	-	-	0/4/4/4	-
4	UZ0	E	306	-	-	5/9/25/25	0/2/2/2
3	GOL	A	303	-	-	0/4/4/4	-
3	GOL	E	302	-	-	0/4/4/4	-
3	GOL	C	304	-	-	1/4/4/4	-
3	GOL	A	304	-	-	0/4/4/4	-
3	GOL	B	302	-	-	0/4/4/4	-
4	UZ0	D	308	-	-	5/9/25/25	0/2/2/2
3	GOL	C	305	-	-	0/4/4/4	-
3	GOL	C	303	-	-	2/4/4/4	-
3	GOL	F	303	-	-	2/4/4/4	-
3	GOL	G	302	-	-	0/4/4/4	-
3	GOL	E	304	-	-	2/4/4/4	-
3	GOL	C	302	-	-	0/4/4/4	-
3	GOL	D	302	-	-	0/4/4/4	-
3	GOL	F	305	-	-	2/4/4/4	-
3	GOL	D	305	-	-	2/4/4/4	-
4	UZ0	F	307	-	-	3/9/25/25	0/2/2/2
3	GOL	F	306	-	-	0/4/4/4	-
3	GOL	D	304	-	-	0/4/4/4	-
3	GOL	F	304	-	-	2/4/4/4	-
3	GOL	A	302	-	-	1/4/4/4	-
3	GOL	D	307	-	-	0/4/4/4	-
3	GOL	A	305	-	-	0/4/4/4	-
3	GOL	D	303	-	-	2/4/4/4	-
3	GOL	B	304	-	-	0/4/4/4	-
3	GOL	D	306	-	-	0/4/4/4	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	308	UZ0	N4'-N3'	-3.70	1.13	1.23
4	F	307	UZ0	N4'-N3'	-3.62	1.13	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	306	UZ0	N4'-N3'	-2.96	1.15	1.23
4	F	307	UZ0	C2-N1	-2.21	1.34	1.38

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	306	UZ0	C1'-N1-C2	6.73	129.75	117.57
4	D	308	UZ0	O4'-C1'-N1	6.27	122.70	108.36
4	F	307	UZ0	N3-C2-N1	5.39	122.04	114.89
4	F	307	UZ0	C4-N3-C2	-5.19	119.74	126.58
4	E	306	UZ0	C1'-N1-C6	-4.77	110.43	120.84
4	D	308	UZ0	C5'-C4'-C3'	-4.28	104.77	115.09
4	E	306	UZ0	O4-C4-C5	-4.19	117.79	125.16
4	D	308	UZ0	O4'-C4'-C5'	4.19	118.26	109.21
4	F	307	UZ0	O2-C2-N1	-4.18	117.23	122.79
4	D	308	UZ0	C4'-O4'-C1'	-4.09	100.45	109.47
4	F	307	UZ0	C2'-N3'-N4'	4.07	124.78	115.54
4	E	306	UZ0	C4-N3-C2	-4.01	121.28	126.58
4	D	308	UZ0	C1'-N1-C2	3.90	124.64	117.57
4	D	308	UZ0	C2'-N3'-N4'	3.87	124.32	115.54
4	D	308	UZ0	C6-N1-C2	-3.84	116.08	120.99
4	E	306	UZ0	C5'-C4'-C3'	-3.76	106.02	115.09
4	D	308	UZ0	N3-C2-N1	3.70	119.81	114.89
4	F	307	UZ0	C1'-C2'-N3'	3.70	127.23	109.89
4	D	308	UZ0	C1'-C2'-N3'	3.69	127.20	109.89
4	F	307	UZ0	O4-C4-C5	-3.54	118.94	125.16
4	E	306	UZ0	N3-C2-N1	3.36	119.35	114.89
4	F	307	UZ0	C5-C4-N3	3.26	119.72	114.84
4	E	306	UZ0	C1'-C2'-N3'	3.22	124.97	109.89
4	E	306	UZ0	O2-C2-N3	-2.94	116.02	121.50
4	E	306	UZ0	O4-C4-N3	2.90	123.56	119.31
4	D	308	UZ0	C5-C6-N1	2.59	126.15	121.81
4	E	306	UZ0	C5-C4-N3	2.54	118.64	114.84
4	F	307	UZ0	C5'-C4'-C3'	-2.53	108.98	115.09
4	D	308	UZ0	C6-C5-C4	-2.48	116.13	119.52
4	E	306	UZ0	O4'-C4'-C3'	2.48	110.01	105.11
4	D	308	UZ0	O2-C2-N3	-2.41	117.00	121.50
4	D	308	UZ0	C4-N3-C2	-2.39	123.42	126.58
4	D	308	UZ0	C5-C4-N3	2.34	118.35	114.84
4	D	308	UZ0	O4-C4-C5	-2.22	121.26	125.16
4	F	307	UZ0	O4'-C4'-C5'	2.02	113.58	109.21

There are no chirality outliers.

All (31) torsion outliers are listed below:

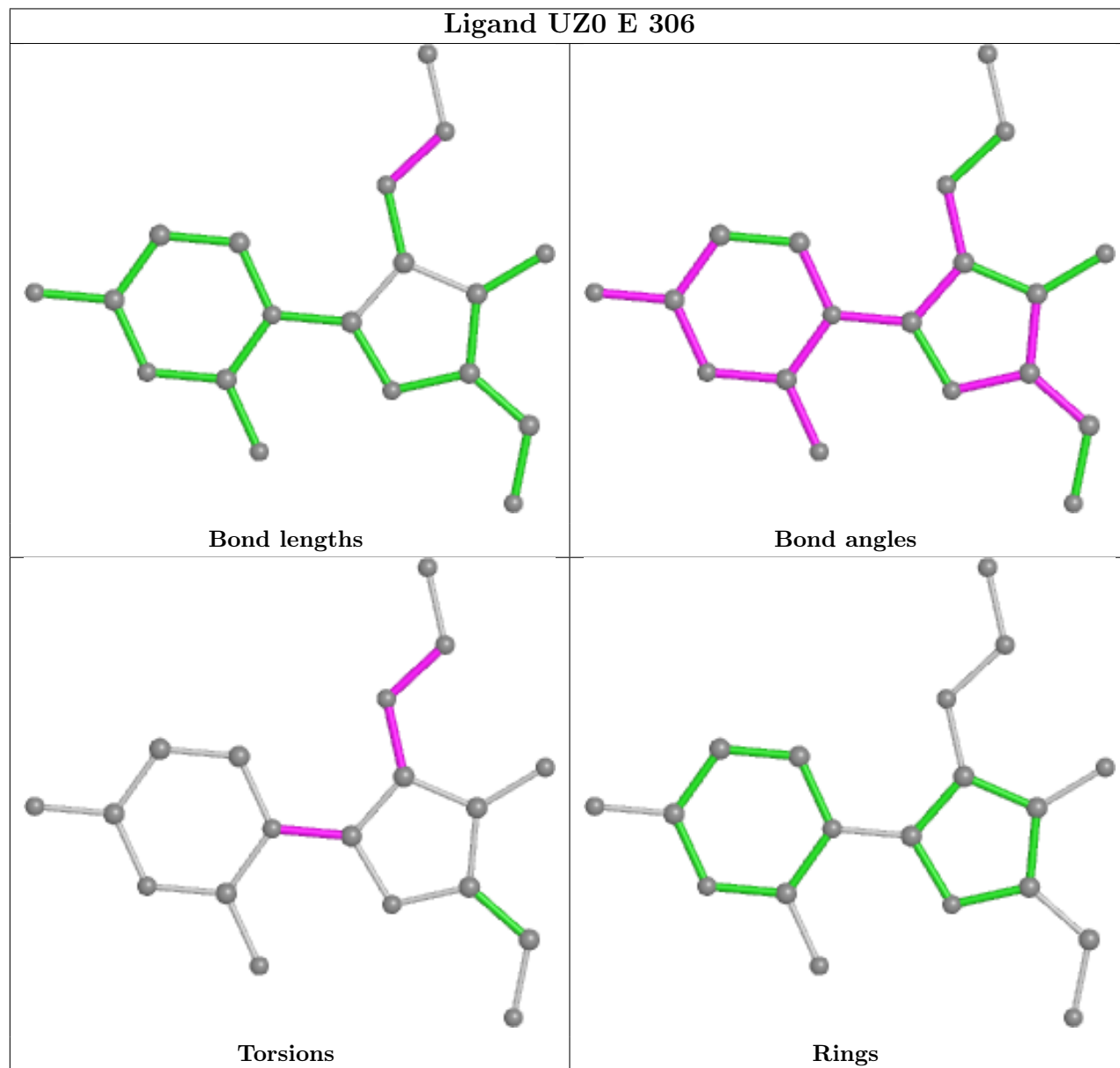
Mol	Chain	Res	Type	Atoms
3	C	303	GOL	O1-C1-C2-C3
3	D	305	GOL	O1-C1-C2-C3
3	E	304	GOL	O1-C1-C2-C3
3	F	303	GOL	O1-C1-C2-C3
3	F	304	GOL	O1-C1-C2-C3
4	D	308	UZ0	C2'-C1'-N1-C2
4	D	308	UZ0	C2'-C1'-N1-C6
4	E	306	UZ0	C2'-C1'-N1-C2
4	F	307	UZ0	C3'-C4'-C5'-O5'
4	E	306	UZ0	C2'-C1'-N1-C6
3	D	305	GOL	O1-C1-C2-O2
3	F	303	GOL	O1-C1-C2-O2
3	F	304	GOL	O1-C1-C2-O2
4	F	307	UZ0	O4'-C4'-C5'-O5'
3	E	305	GOL	O1-C1-C2-C3
3	F	305	GOL	C1-C2-C3-O3
3	C	303	GOL	O1-C1-C2-O2
3	F	305	GOL	O2-C2-C3-O3
4	F	307	UZ0	C1'-C2'-N3'-N4'
3	E	304	GOL	O1-C1-C2-O2
3	E	305	GOL	O1-C1-C2-O2
4	D	308	UZ0	O4'-C1'-N1-C6
4	E	306	UZ0	C2'-N3'-N4'-N5'
3	D	303	GOL	O2-C2-C3-O3
3	D	303	GOL	C1-C2-C3-O3
4	D	308	UZ0	O4'-C1'-N1-C2
4	E	306	UZ0	C3'-C2'-N3'-N4'
3	A	302	GOL	O1-C1-C2-C3
3	C	304	GOL	O1-C1-C2-C3
4	D	308	UZ0	C3'-C2'-N3'-N4'
4	E	306	UZ0	O4'-C1'-N1-C6

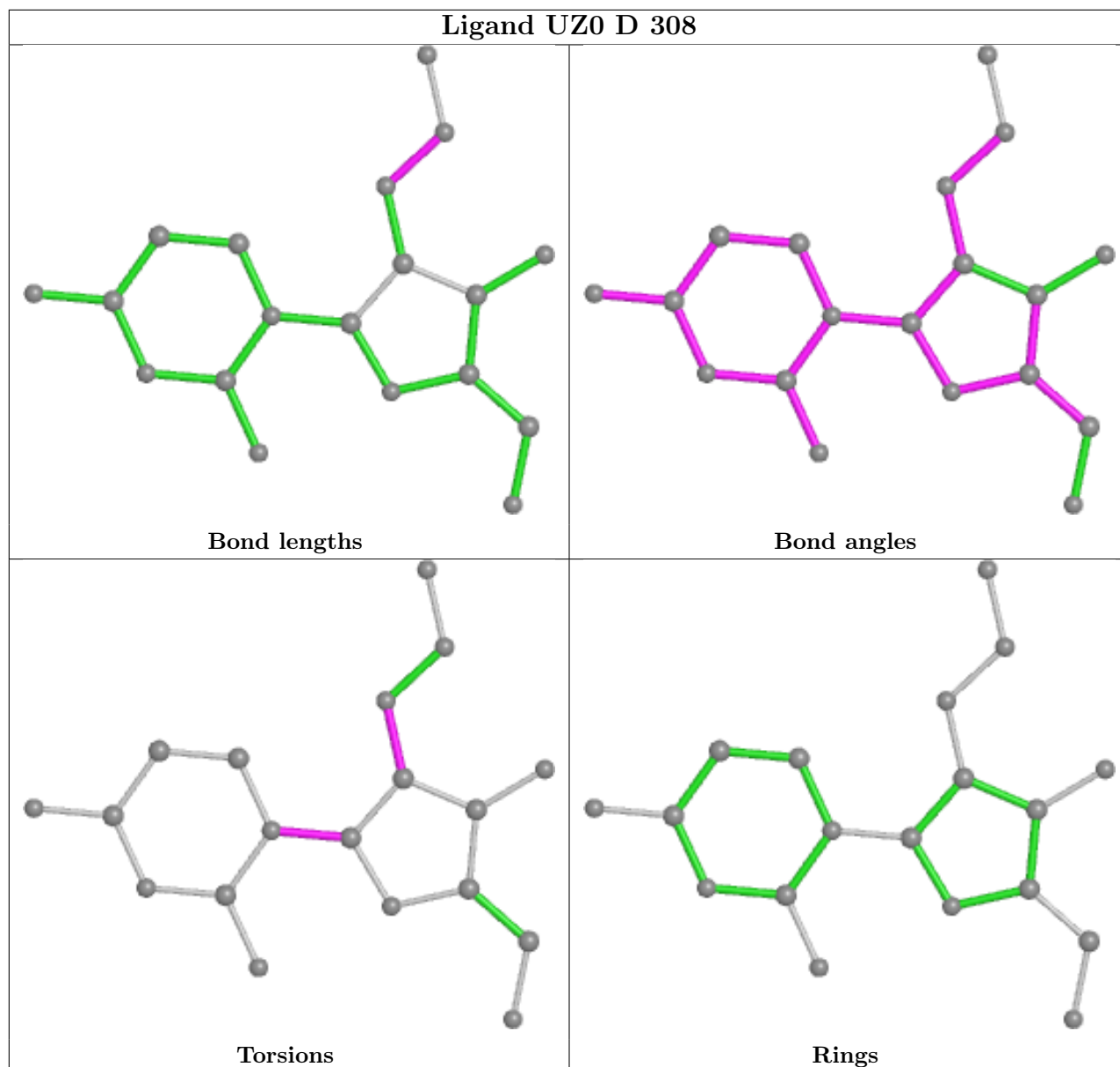
There are no ring outliers.

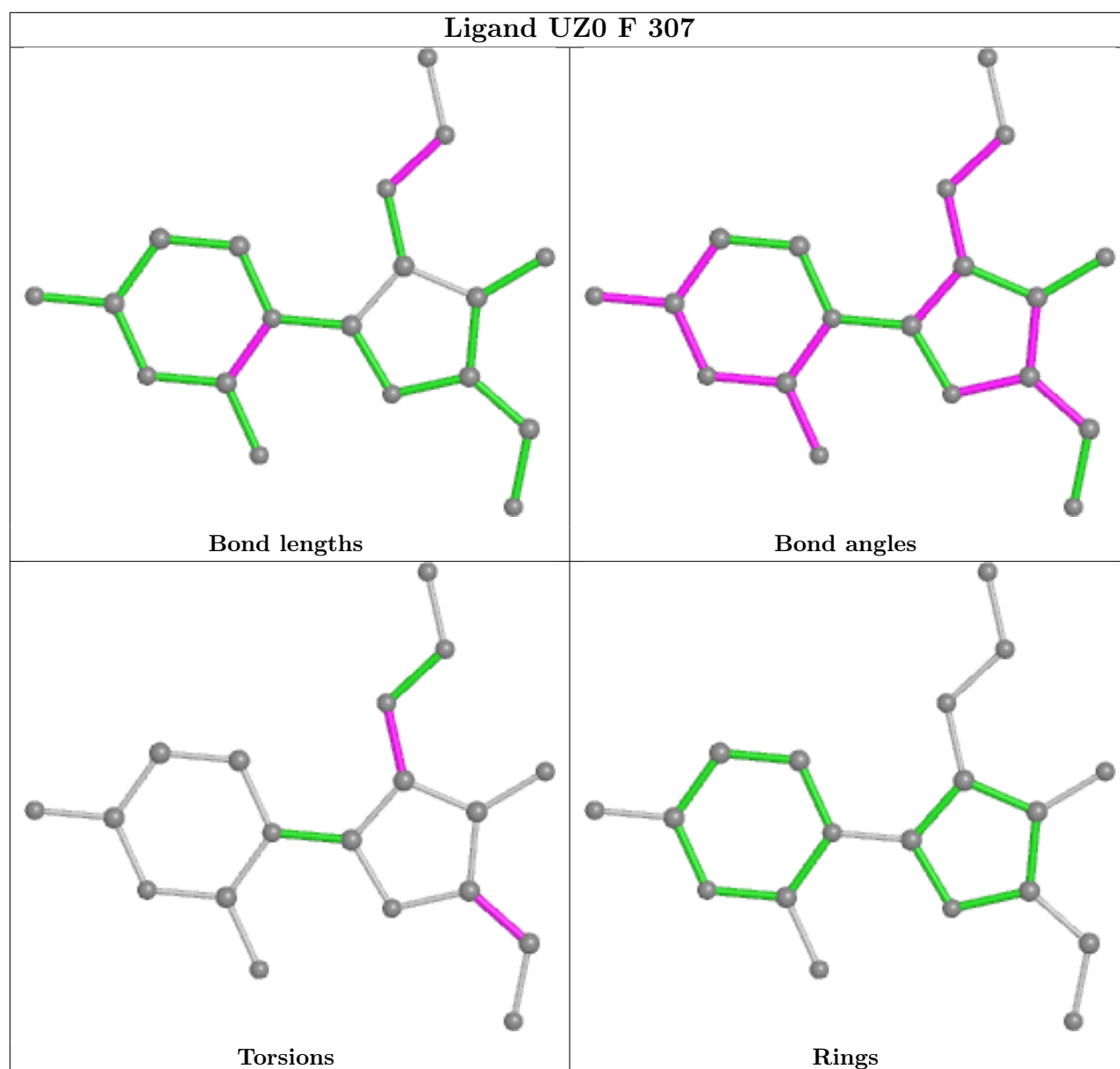
No monomer is involved in short contacts.

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.