



# Full wwPDB X-ray Structure Validation Report ⓘ

May 22, 2020 – 11:24 pm BST

PDB ID : 5WTC  
Title : Structure of human PARP1 catalytic domain bound to a quinazoline-2,4(1H,3H)-dione inhibitor  
Authors : Cao, R.; Wang, Y.L.; Zhou, J.; Huang, N.; Xu, B.L.  
Deposited on : 2016-12-11  
Resolution : 2.20 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](mailto: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.

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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)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

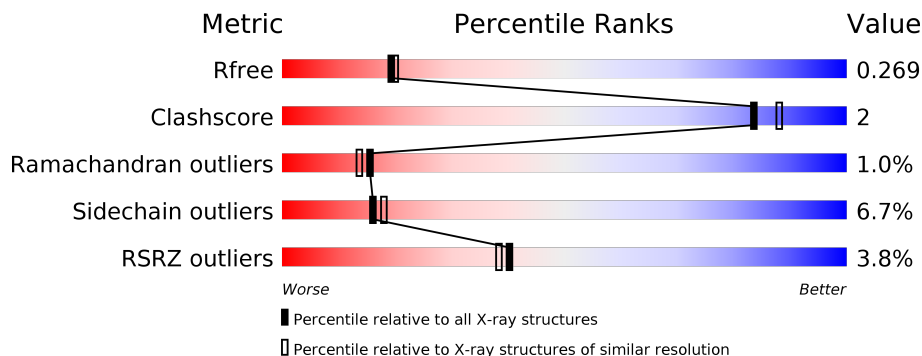
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*



The reported resolution of this entry is 2.20 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))
$R_{free}$	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	352	 2% 88% 9%
1	B	352	 6% 85% 10%

## 2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 5612 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.

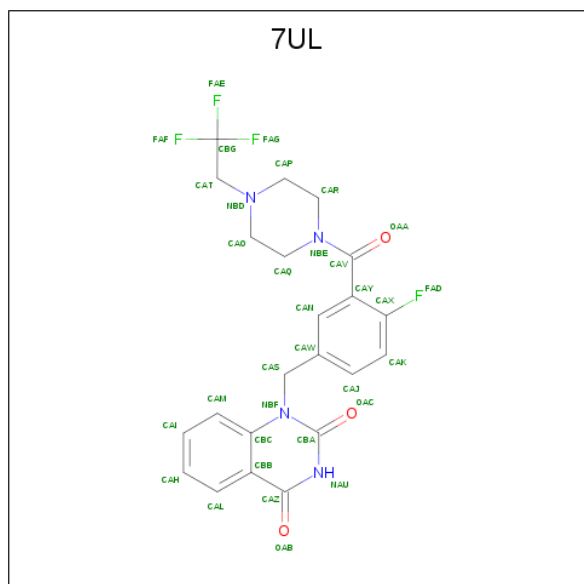
- Molecule 1 is a protein called Poly [ADP-ribose] polymerase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	351	Total	C	N	O	S	0	3	0
			2773	1763	470	527	13			
1	B	351	Total	C	N	O	S	0	3	0
			2773	1763	470	527	13			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	660	HIS	-	expression tag	UNP P09874
A	661	MET	-	expression tag	UNP P09874
A	762	ALA	VAL	engineered mutation	UNP P09874
B	660	HIS	-	expression tag	UNP P09874
B	661	MET	-	expression tag	UNP P09874
B	762	ALA	VAL	engineered mutation	UNP P09874

- Molecule 2 is 1-[[4-fluoranyl-3-[4-[2,2,2-tris(fluoranyl)ethyl]piperazin-1-yl]carbonyl-phenyl]methyl]quinazoline-2,4-dione (three-letter code: 7UL) (formula: C<sub>22</sub>H<sub>20</sub>F<sub>4</sub>N<sub>4</sub>O<sub>3</sub>).

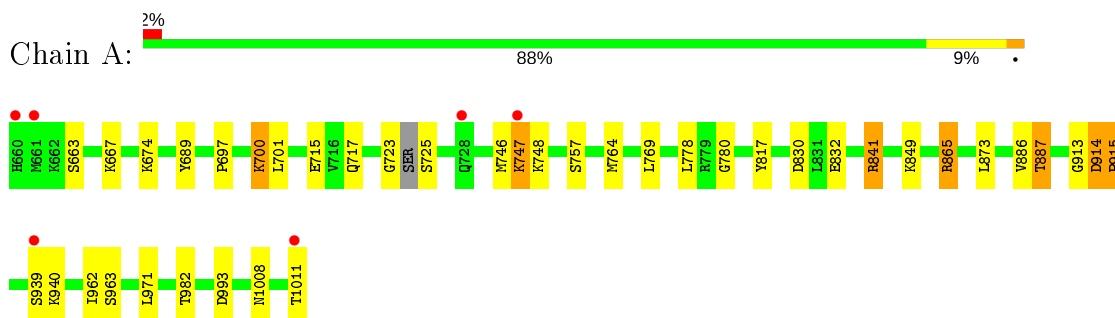


<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>					<b>ZeroOcc</b>	<b>AltConf</b>
2	A	1	Total	C	F	N	O	0	0
			33	22	4	4	3		
2	B	1	Total	C	F	N	O	0	0
			33	22	4	4	3		

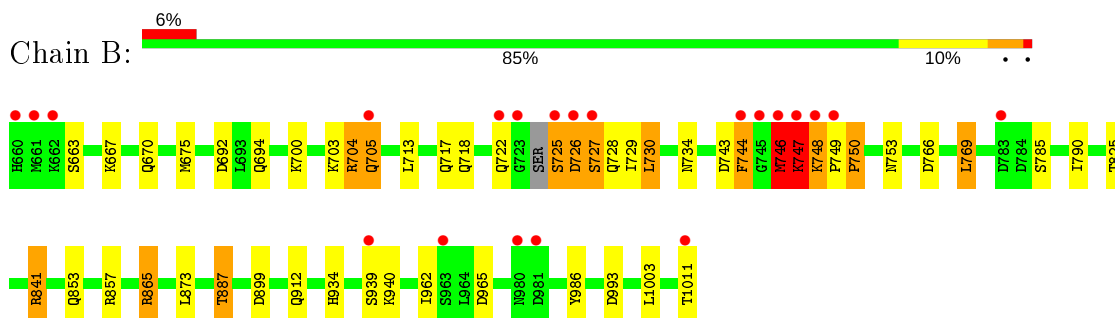
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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.

- Molecule 1: Poly [ADP-ribose] polymerase 1



- Molecule 1: Poly [ADP-ribose] polymerase 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	48.63Å 92.70Å 163.85Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	81.92 – 2.20 81.92 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.5 (81.92-2.20) 99.5 (81.92-2.20)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	7.14 (at 2.20Å)	Xtrriage
Refinement program	REFMAC 5.8.0123	Depositor
R, $R_{free}$	0.223 , 0.266 0.229 , 0.269	Depositor DCC
$R_{free}$ test set	1910 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	17.5	Xtrriage
Anisotropy	0.442	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 31.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	5612	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	22.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.02% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>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.

## 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:  
7UL

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	0.90	1/2837 (0.0%)	1.00	8/3827 (0.2%)
1	B	0.85	4/2837 (0.1%)	1.01	14/3827 (0.4%)
All	All	0.87	5/5674 (0.1%)	1.00	22/7654 (0.3%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	3
All	All	0	5

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	748	LYS	CA-CB	9.70	1.75	1.53
1	A	914	ASP	N-CA	9.50	1.65	1.46
1	B	747	LYS	N-CA	7.57	1.61	1.46
1	B	748	LYS	N-CA	7.48	1.61	1.46
1	B	747	LYS	CA-C	5.97	1.68	1.52

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	841	ARG	NE-CZ-NH2	-12.96	113.82	120.30
1	A	841	ARG	NE-CZ-NH1	10.28	125.44	120.30
1	B	841	ARG	NE-CZ-NH2	-9.00	115.80	120.30
1	B	747	LYS	N-CA-C	8.54	134.06	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	993	ASP	CB-CG-OD1	7.96	125.46	118.30
1	B	841	ARG	NE-CZ-NH1	7.70	124.15	120.30
1	B	748	LYS	CA-CB-CG	7.22	129.28	113.40
1	B	748	LYS	N-CA-CB	7.18	123.52	110.60
1	B	857	ARG	NE-CZ-NH1	7.09	123.85	120.30
1	B	993	ASP	CB-CG-OD2	-7.04	111.96	118.30
1	B	766	ASP	CB-CG-OD1	6.49	124.14	118.30
1	A	747	LYS	N-CA-C	5.97	127.11	111.00
1	A	993	ASP	CB-CG-OD1	5.97	123.67	118.30
1	B	704	ARG	NE-CZ-NH2	5.86	123.23	120.30
1	B	769	LEU	CB-CG-CD2	5.82	120.89	111.00
1	A	993	ASP	CB-CG-OD2	-5.76	113.11	118.30
1	A	780	GLY	N-CA-C	-5.64	99.00	113.10
1	A	914	ASP	N-CA-CB	5.36	120.24	110.60
1	A	865	ARG	CB-CA-C	5.31	121.02	110.40
1	B	865	ARG	NE-CZ-NH2	5.29	122.95	120.30
1	B	899	ASP	CB-CG-OD1	5.20	122.98	118.30
1	B	769	LEU	CA-CB-CG	5.17	127.19	115.30

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	746	MET	Peptide
1	A	747	LYS	Peptide
1	B	743	ASP	Peptide
1	B	744	PHE	Peptide
1	B	746	MET	Peptide

## 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	2773	0	2806	10	16
1	B	2773	0	2806	19	16
2	A	33	0	0	0	0
2	B	33	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	5612	0	5612	27	16

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 2.

All (27) 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:B:748:LYS:CB	1:B:748:LYS:CA	1.75	1.60
1:B:717:GLN:OE1	1:B:887:THR:HB	1.78	0.83
1:B:748:LYS:HA	1:B:748:LYS:CB	2.03	0.83
1:A:689:TYR:OH	1:A:865:ARG:NH2	2.23	0.72
1:B:841:ARG:HD2	1:B:873:LEU:O	1.93	0.69
1:B:744:PHE:CD2	1:B:749:PRO:HB3	2.32	0.64
1:B:726:ASP:HA	1:B:729:ILE:HB	1.80	0.63
1:A:982:THR:O	1:B:718:GLN:NE2	2.33	0.62
1:A:723:GLY:O	1:A:725:SER:N	2.35	0.60
1:A:841:ARG:HD2	1:A:873:LEU:O	2.03	0.59
1:A:717:GLN:OE1	1:A:887:THR:HB	2.07	0.55
1:B:749:PRO:CB	1:B:750:PRO:HD2	2.36	0.55
1:A:841:ARG:CD	1:A:873:LEU:O	2.58	0.52
1:A:689:TYR:HB3	1:A:764:MET:HG3	1.92	0.51
1:B:825:THR:HG1	1:B:986:TYR:HH	1.58	0.50
1:B:726:ASP:O	1:B:730:LEU:N	2.43	0.49
1:A:886:VAL:HG11	1:B:934:HIS:CD2	2.50	0.47
1:B:729:ILE:HG21	1:B:753:ASN:HA	1.95	0.47
1:A:830:ASP:OD2	1:A:1008[A]:ASN:ND2	2.47	0.46
1:B:692:ASP:OD2	1:B:694:GLN:HB3	2.15	0.45
1:B:675:MET:HE3	1:B:675:MET:HB2	1.78	0.44
1:B:725:SER:C	1:B:727:SER:H	2.23	0.41
1:B:670:GLN:HG2	1:B:790:ILE:HG21	2.02	0.41
1:A:697:PRO:HG2	1:A:700:LYS:HD3	2.03	0.41
1:B:1003:LEU:N	1:B:1003:LEU:HD12	2.36	0.41
1:B:749:PRO:CB	1:B:750:PRO:CD	2.98	0.41
1:B:749:PRO:HB2	1:B:750:PRO:CD	2.50	0.41

All (16) 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:A:915:PRO:CG	1:B:746:MET:O[4_445]	1.59	0.61
1:A:914:ASP:CA	1:B:748:LYS:CA[4_445]	1.66	0.54
1:A:915:PRO:CB	1:B:746:MET:O[4_445]	1.69	0.51
1:A:914:ASP:CB	1:B:748:LYS:CB[4_445]	1.70	0.50
1:A:915:PRO:CG	1:B:746:MET:C[4_445]	1.74	0.46
1:A:913:GLY:O	1:B:748:LYS:CA[4_445]	1.79	0.41
1:A:915:PRO:CG	1:B:747:LYS:N[4_445]	1.85	0.35
1:A:913:GLY:O	1:B:748:LYS:C[4_445]	1.90	0.30
1:A:914:ASP:N	1:B:748:LYS:CG[4_445]	1.99	0.21
1:A:914:ASP:N	1:B:748:LYS:N[4_445]	2.01	0.19
1:A:915:PRO:CD	1:B:748:LYS:N[4_445]	2.04	0.16
1:A:715:GLU:OE1	1:B:705:GLN:NE2[1_455]	2.07	0.13
1:A:913:GLY:C	1:B:748:LYS:CB[4_445]	2.09	0.11
1:A:914:ASP:CA	1:B:748:LYS:N[4_445]	2.12	0.08
1:A:915:PRO:CG	1:B:747:LYS:CA[4_445]	2.16	0.04
1:A:915:PRO:CD	1:B:747:LYS:CA[4_445]	2.17	0.03

### 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	350/352 (99%)	339 (97%)	9 (3%)	2 (1%)	25	26
1	B	350/352 (99%)	332 (95%)	13 (4%)	5 (1%)	11	8
All	All	700/704 (99%)	671 (96%)	22 (3%)	7 (1%)	15	14

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	722	GLN
1	B	750	PRO
1	B	663	SER
1	B	747	LYS
1	A	663	SER

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Mol	Chain	Res	Type
1	A	748	LYS
1	B	726	ASP

### 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	311/309 (101%)	293 (94%)	18 (6%)	20	23
1	B	311/309 (101%)	288 (93%)	23 (7%)	13	14
All	All	622/618 (101%)	581 (93%)	41 (7%)	16	19

All (41) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	667	LYS
1	A	674	LYS
1	A	700	LYS
1	A	701	LEU
1	A	757	SER
1	A	769	LEU
1	A	778	LEU
1	A	817	TYR
1	A	832	GLU
1	A	849	LYS
1	A	887	THR
1	A	915	PRO
1	A	939	SER
1	A	940	LYS
1	A	962	ILE
1	A	963	SER
1	A	971	LEU
1	A	1011	THR
1	B	667	LYS
1	B	700	LYS
1	B	703	LYS

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Mol	Chain	Res	Type
1	B	704	ARG
1	B	705	GLN
1	B	713	LEU
1	B	725	SER
1	B	727	SER
1	B	728	GLN
1	B	730	LEU
1	B	734	ASN
1	B	746	MET
1	B	769	LEU
1	B	785	SER
1	B	853	GLN
1	B	865	ARG
1	B	887	THR
1	B	912	GLN
1	B	939	SER
1	B	940	LYS
1	B	962	ILE
1	B	965	ASP
1	B	1011	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	868	ASN
1	B	767	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 carbohydrates in this entry.

## 5.6 Ligand geometry

2 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	7UL	B	1101	-	33,36,36	2.51	9 (27%)	45,53,53	2.88	14 (31%)
2	7UL	A	1101	-	33,36,36	2.40	7 (21%)	45,53,53	2.47	16 (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
2	7UL	B	1101	-	-	3/17/27/27	0/4/4/4
2	7UL	A	1101	-	-	5/17/27/27	0/4/4/4

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1101	7UL	FAE-CBG	-7.66	1.02	1.33
2	A	1101	7UL	CAY-CAV	-7.36	1.39	1.50
2	B	1101	7UL	FAE-CBG	-7.34	1.04	1.33
2	B	1101	7UL	CAY-CAV	-6.15	1.41	1.50
2	B	1101	7UL	CBC-NBF	-6.02	1.32	1.40
2	B	1101	7UL	CAS-CAW	-5.09	1.39	1.51
2	A	1101	7UL	FAG-CBG	-3.98	1.17	1.33
2	A	1101	7UL	CAS-CAW	-3.48	1.43	1.51
2	A	1101	7UL	CBC-NBF	-3.36	1.36	1.40
2	B	1101	7UL	CAZ-NAU	3.27	1.38	1.33
2	B	1101	7UL	CAT-NBD	-2.58	1.44	1.47
2	A	1101	7UL	CAZ-NAU	2.40	1.37	1.33
2	A	1101	7UL	CAO-CAQ	2.38	1.60	1.51
2	B	1101	7UL	CAP-CAR	2.19	1.59	1.51
2	B	1101	7UL	CAK-CAX	2.14	1.42	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1101	7UL	CAO-CAQ	2.06	1.59	1.51

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1101	7UL	CBB-CAZ-NAU	-9.16	118.01	124.40
2	A	1101	7UL	CBB-CAZ-NAU	-8.67	118.35	124.40
2	B	1101	7UL	CAL-CBB-CBC	8.27	121.70	117.96
2	B	1101	7UL	FAE-CBG-CAT	-7.57	99.71	112.13
2	A	1101	7UL	FAE-CBG-CAT	-7.01	100.63	112.13
2	A	1101	7UL	CAZ-NAU-CBA	5.87	120.10	115.14
2	B	1101	7UL	CAZ-NAU-CBA	5.54	119.82	115.14
2	B	1101	7UL	CAP-NBD-CAT	5.08	120.88	111.81
2	A	1101	7UL	CAL-CBB-CBC	3.89	119.72	117.96
2	B	1101	7UL	CAQ-NBE-CAR	3.53	119.41	112.62
2	A	1101	7UL	CAR-CAP-NBD	-3.30	103.87	110.64
2	B	1101	7UL	CAR-CAP-NBD	-3.17	104.14	110.64
2	B	1101	7UL	CAY-CAV-NBE	2.80	122.75	118.28
2	B	1101	7UL	CAS-NBF-CBC	2.78	124.02	120.13
2	B	1101	7UL	CAQ-CAO-NBD	-2.72	105.06	110.64
2	A	1101	7UL	CAY-CAV-NBE	2.60	122.44	118.28
2	A	1101	7UL	CAZ-CBB-CBC	2.56	120.82	118.59
2	A	1101	7UL	CAK-CAX-CAY	-2.50	120.39	123.11
2	A	1101	7UL	CAQ-NBE-CAR	2.47	117.38	112.62
2	A	1101	7UL	CAJ-CAK-CAX	2.45	122.01	119.05
2	A	1101	7UL	FAE-CBG-FAF	2.42	115.32	106.43
2	A	1101	7UL	CAO-CAQ-NBE	-2.30	105.51	110.44
2	B	1101	7UL	CAK-CAX-CAY	-2.28	120.63	123.11
2	A	1101	7UL	CAK-CAJ-CAW	-2.23	117.96	121.03
2	B	1101	7UL	CAK-CAJ-CAW	-2.17	118.04	121.03
2	A	1101	7UL	CAP-NBD-CAT	2.17	115.68	111.81
2	B	1101	7UL	CAQ-NBE-CAV	-2.16	115.97	122.78
2	A	1101	7UL	OAA-CAV-CAY	-2.11	115.80	120.06
2	B	1101	7UL	CAW-CAS-NBF	2.04	115.80	112.63
2	A	1101	7UL	CAQ-NBE-CAV	-2.01	116.42	122.78

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1101	7UL	NBD-CAT-CBG-FAF
2	A	1101	7UL	NBD-CAT-CBG-FAE

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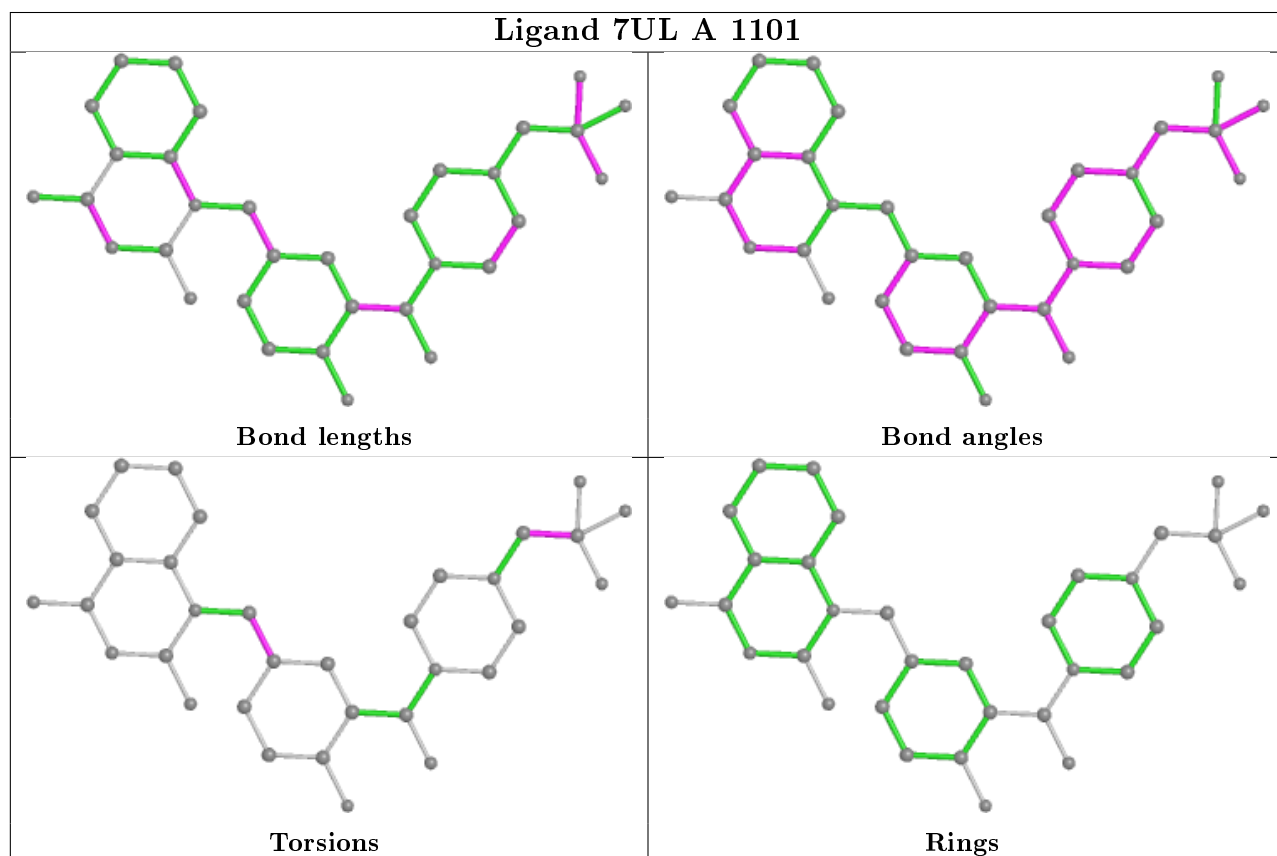
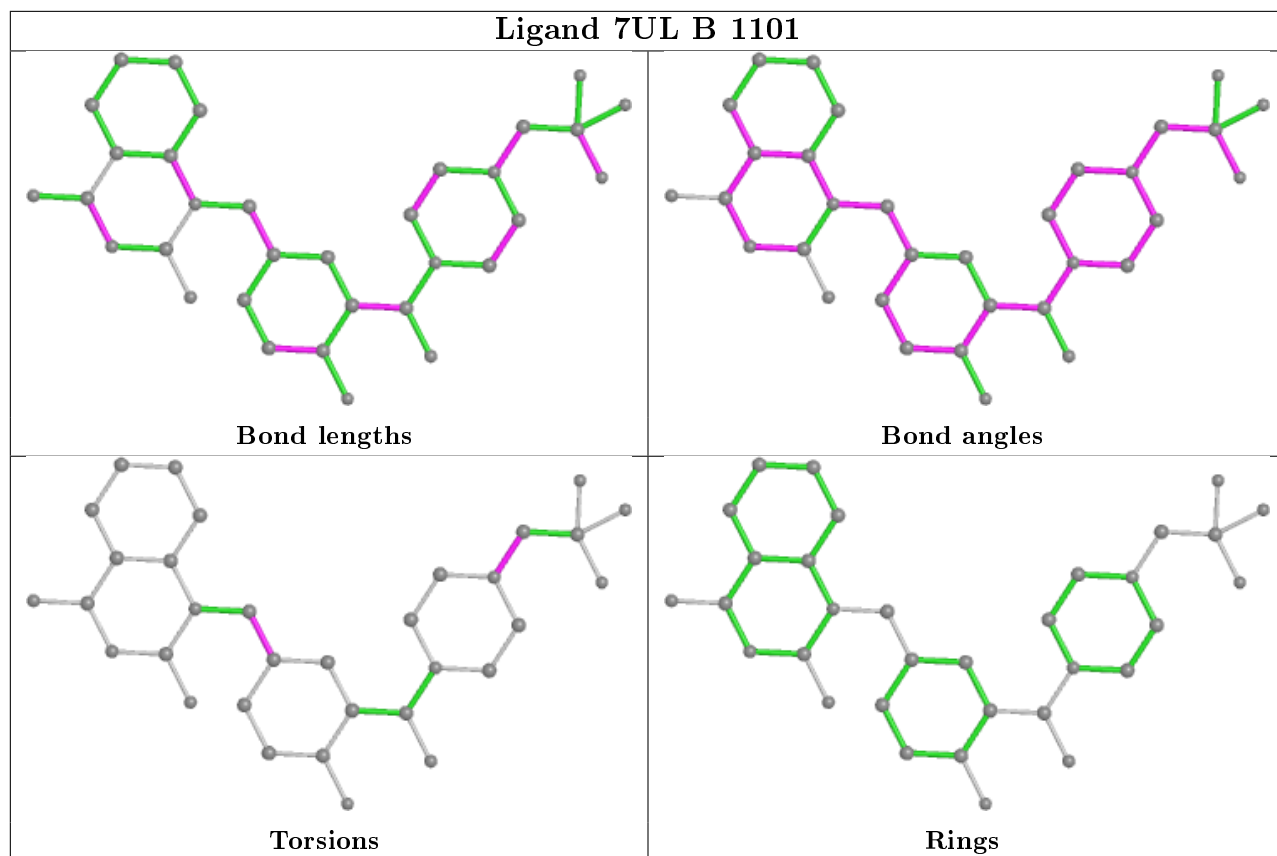
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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>Atoms</b>
2	A	1101	7UL	NBD-CAT-CBG-FAG
2	B	1101	7UL	NBF-CAS-CAW-CAJ
2	A	1101	7UL	NBF-CAS-CAW-CAJ
2	B	1101	7UL	NBF-CAS-CAW-CAN
2	A	1101	7UL	NBF-CAS-CAW-CAN
2	B	1101	7UL	CBG-CAT-NBD-CAO

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.





## 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

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q < 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	351/352 (99%)	-0.34	6 (1%) 70 68	4, 14, 37, 86	0
1	B	351/352 (99%)	0.13	21 (5%) 21 20	8, 22, 55, 267	0
All	All	702/704 (99%)	-0.11	27 (3%) 40 38	4, 18, 46, 267	0

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	746	MET	14.6
1	B	747	LYS	10.5
1	A	661	MET	8.1
1	B	745	GLY	7.6
1	B	1011	THR	7.0
1	B	748	LYS	6.7
1	B	749	PRO	6.6
1	B	661	MET	6.6
1	B	726	ASP	6.2
1	B	744	PHE	6.0
1	B	723	GLY	5.8
1	B	660	HIS	4.2
1	A	660	HIS	4.1
1	B	981	ASP	3.8
1	B	662	LYS	3.8
1	B	980	ASN	3.6
1	A	747	LYS	3.6
1	A	728	GLN	3.3
1	B	725	SER	3.0
1	B	705	GLN	2.6
1	B	939	SER	2.6
1	A	1011	THR	2.5
1	B	963	SER	2.5
1	B	727	SER	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	939	SER	2.2
1	B	722	GLN	2.2
1	B	783	ASP	2.1

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

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

## 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

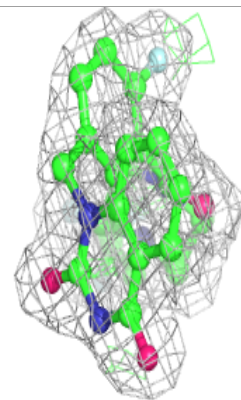
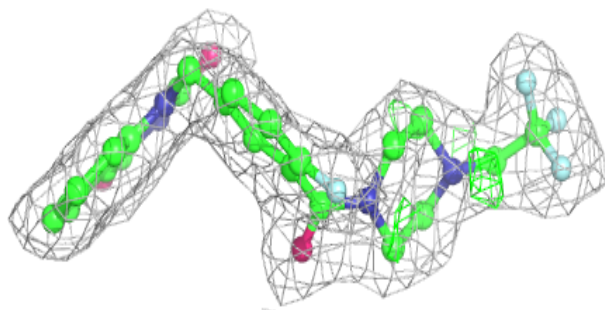
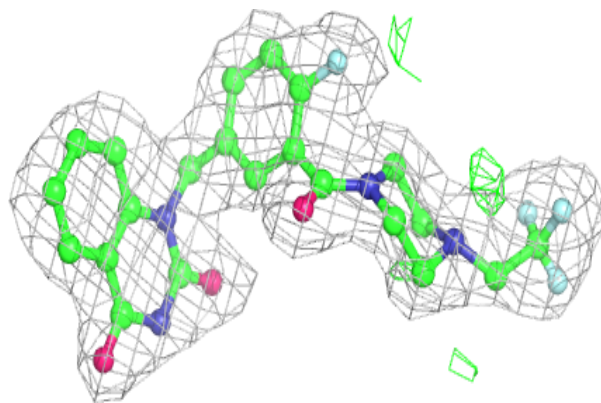
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	7UL	B	1101	33/33	0.95	0.10	9,10,22,29	0
2	7UL	A	1101	33/33	0.95	0.10	6,8,27,34	0

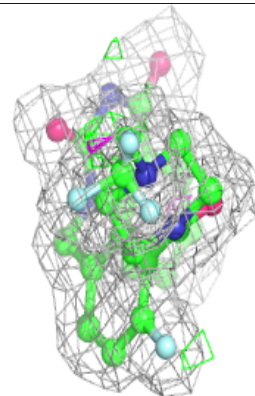
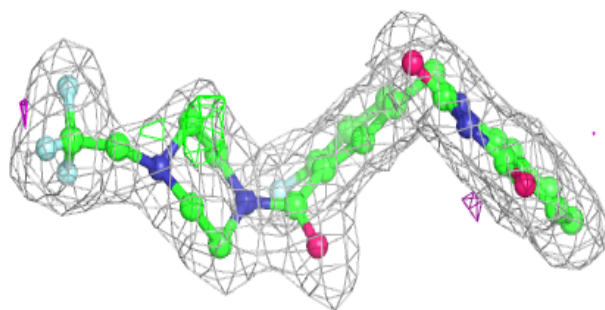
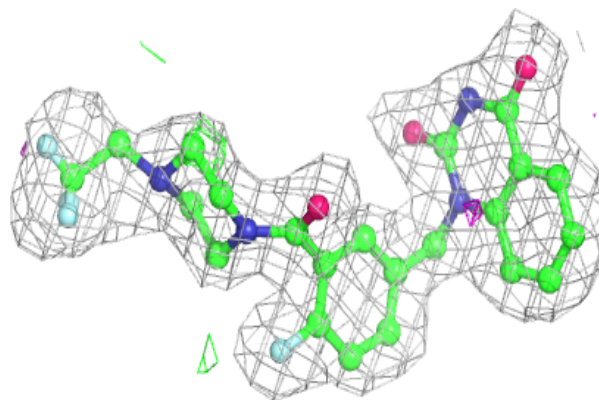
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around 7UL B 1101:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around 7UL A 1101:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



## 6.5 Other polymers

There are no such residues in this entry.