WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Aug 26, 2024 – 10:07 AM EDT

PDB ID	:	8U0H
Title	:	Crystal structure of PTPN2 with a PROTAC
Authors	:	Jain, R.; Longenecker, K.; Qiu, W.
Deposited on	:	2023-08-29
Resolution	:	1.93 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.002 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.38.3

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 1.93 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.
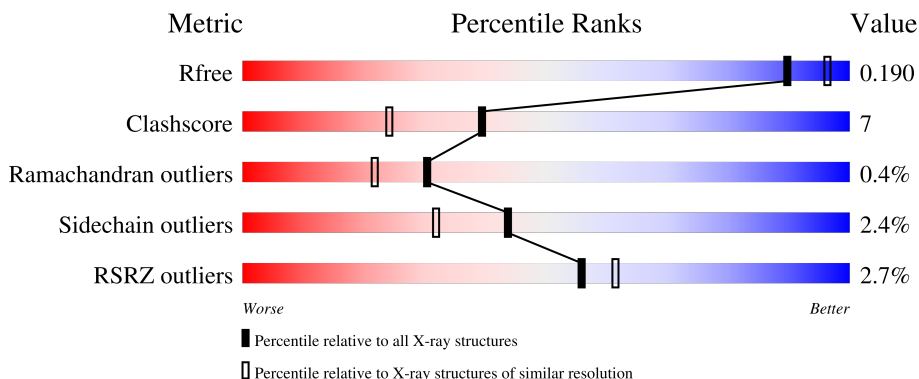
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1306 (1.94-1.94)
Clashscore	180529	1400 (1.94-1.94)
Ramachandran outliers	177936	1387 (1.94-1.94)
Sidechain outliers	177891	1387 (1.94-1.94)
RSRZ outliers	164620	1306 (1.94-1.94)

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 <=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	324	2% / 78% / 7% · / 14%
1	B	324	2% / 72% / 11% · / 15%

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
3	ACT	A	802	-	-	X	-
3	ACT	B	802	-	-	X	-

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 5135 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 PTPN2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	279	Total 2330	C 1474	N 406	O 436	S 14	0	6	0
1	B	277	Total 2277	C 1441	N 397	O 426	S 13	0	1	0

There are 20 discrepancies between the modelled and reference sequences:

| Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	expression tag	UNP P17706
A	0	ALA	-	expression tag	UNP P17706
A	315	HIS	-	expression tag	UNP P17706
A	316	HIS	-	expression tag	UNP P17706
A	317	HIS	-	expression tag	UNP P17706
A	318	HIS	-	expression tag	UNP P17706
A	319	HIS	-	expression tag	UNP P17706
A	320	HIS	-	expression tag	UNP P17706
A	321	HIS	-	expression tag	UNP P17706
A	322	HIS	-	expression tag	UNP P17706
B	-1	MET	-	expression tag	UNP P17706
B	0	ALA	-	expression tag	UNP P17706
B	315	HIS	-	expression tag	UNP P17706
B	316	HIS	-	expression tag	UNP P17706
B	317	HIS	-	expression tag	UNP P17706
B	318	HIS	-	expression tag	UNP P17706
B	319	HIS	-	expression tag	UNP P17706
B	320	HIS	-	expression tag	UNP P17706
B	321	HIS	-	expression tag	UNP P17706
B	322	HIS	-	expression tag	UNP P17706

- Molecule 2 is (5P)-3-(carboxymethoxy)-4-chloro-5-(3-{[(4S)-1-({3-[2-(4-{3-[(3R)-2,6-di oxopiperidin-3-yl]-2-oxo-2,3-dihydro-1,3-benzoxazol-6-yl}piperidin-1-yl)acetamido]phe nyl}methanesulfonyl)-2,2-dimethylpiperidin-4-yl]amino}phenyl)thiophene-2-carboxylic acid (three-letter code: UB0) (formula: $C_{46}H_{49}ClN_6O_{12}S_2$) (labeled as "Ligand of Interest"

by depositor).
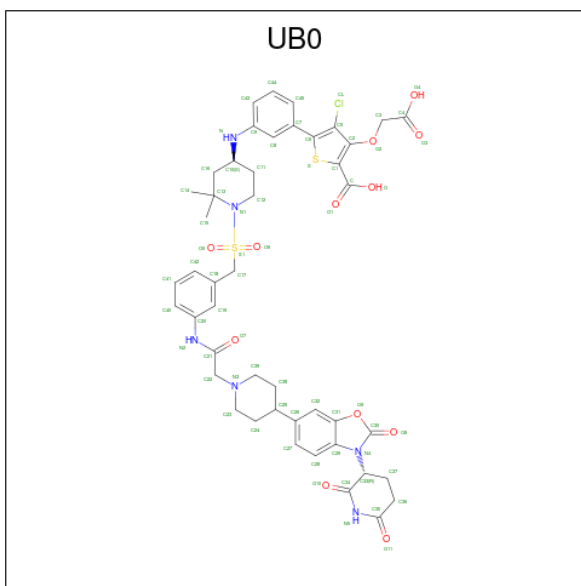
UB0

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	Cl	N	O	S	0	0
			67	46	1	6	12	2		
2	B	1	Total	C	Cl	N	O	S	0	0
			67	46	1	6	12	2		

- Molecule 3 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).
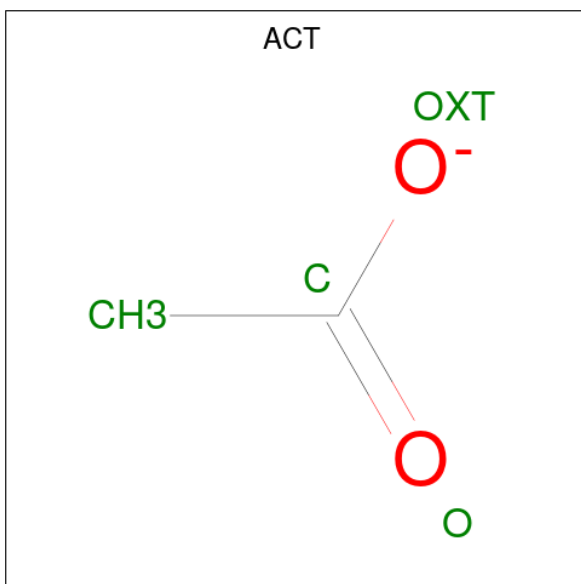
ACT

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

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total 4	C 2	O 2	0	0

• Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total 1	Na 1	0	0

• Molecule 5 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	211	Total 211	O 211	0	0
5	B	174	Total 174	O 174	0	0

3 Residue-property plots ⓘ

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 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: PTPN2

Chain A:

- Molecule 1: PTPN2

Chain B:
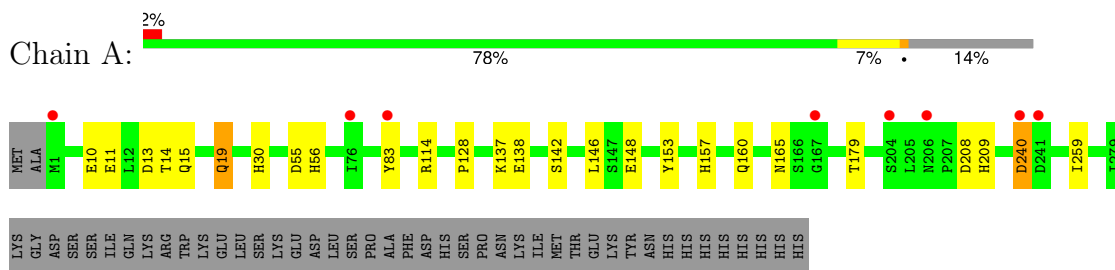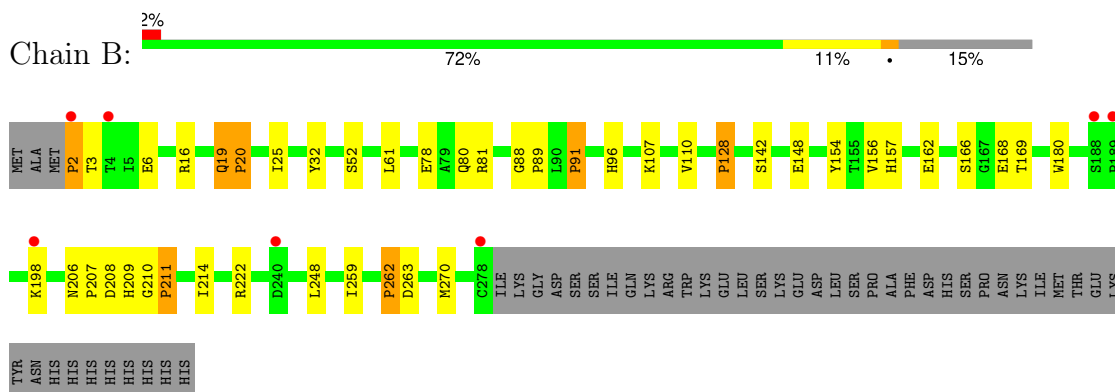
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	77.18Å 126.51Å 150.21Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.59 – 1.93 38.59 – 1.93	Depositor EDS
% Data completeness (in resolution range)	99.9 (38.59-1.93) 99.9 (38.59-1.93)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.37 (at 1.94Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.173 , 0.192 0.172 , 0.190	Depositor DCC
R_{free} test set	2784 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	32.3	Xtriage
Anisotropy	0.144	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 48.8	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.011 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.023 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	5135	wwPDB-VP
Average B, all atoms (Å^2)	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.22% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: ACT, NA, UB0

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	0.78	2/2387 (0.1%)	0.75	1/3235 (0.0%)
1	B	1.07	12/2333 (0.5%)	0.87	6/3161 (0.2%)
All	All	0.93	14/4720 (0.3%)	0.81	7/6396 (0.1%)

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	1

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	91	PRO	N-CA	12.71	1.68	1.47
1	B	2	PRO	N-CA	12.59	1.68	1.47
1	B	211	PRO	N-CA	12.38	1.68	1.47
1	B	262	PRO	N-CA	12.23	1.68	1.47
1	B	128	PRO	N-CA	12.21	1.68	1.47
1	B	20	PRO	N-CA	12.20	1.68	1.47
1	A	128	PRO	N-CA	11.82	1.67	1.47
1	A	19	GLN	C-N	8.06	1.49	1.34
1	B	206	ASN	C-N	8.01	1.49	1.34
1	B	32	TYR	C-N	7.71	1.49	1.34
1	B	52	SER	C-N	7.45	1.48	1.34
1	B	88	GLY	C-N	7.43	1.48	1.34
1	B	19	GLN	C-N	6.24	1.46	1.34
1	B	210	GLY	C-N	5.19	1.44	1.34

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	2	PRO	CA-N-CD	-7.59	100.87	111.50
1	A	240	ASP	CB-CA-C	7.40	125.20	110.40
1	B	211	PRO	CA-N-CD	-6.48	102.43	111.50
1	B	20	PRO	CA-N-CD	-6.21	102.81	111.50
1	B	262	PRO	CA-N-CD	-5.28	104.11	111.50
1	B	91	PRO	CA-N-CD	-5.12	104.33	111.50
1	B	2	PRO	N-CA-C	-5.05	98.96	112.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	55	ASP	Mainchain

5.2 Too-close contacts ⓘ

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	2330	0	2272	15	0
1	B	2277	0	2220	41	0
2	A	67	0	0	0	0
2	B	67	0	0	1	0
3	A	4	0	3	2	0
3	B	4	0	3	2	0
4	A	1	0	0	0	0
5	A	211	0	0	7	2
5	B	174	0	0	2	0
All	All	5135	0	4498	61	2

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 7.

All (61) 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:2:PRO:CA	1:B:2:PRO:N	1.68	1.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:262:PRO:CA	1:B:262:PRO:N	1.68	1.46
1:B:20:PRO:N	1:B:20:PRO:CA	1.68	1.39
1:B:211:PRO:N	1:B:211:PRO:CA	1.68	1.37
1:B:128:PRO:CA	1:B:128:PRO:N	1.68	1.36
1:B:91:PRO:N	1:B:91:PRO:CA	1.68	1.29
1:B:3:THR:HG22	1:B:6:GLU:HG3	1.12	1.07
1:B:3:THR:CG2	1:B:6:GLU:HG3	1.85	1.05
1:B:3:THR:HG22	1:B:6:GLU:CG	1.88	1.02
1:B:156:VAL:HG21	1:B:198:LYS:NZ	1.78	0.98
1:B:156:VAL:HG21	1:B:198:LYS:CE	1.96	0.95
1:B:156:VAL:CG2	1:B:198:LYS:NZ	2.33	0.91
1:B:156:VAL:HG21	1:B:198:LYS:HE2	1.58	0.85
3:A:802:ACT:H2	5:A:1087:HOH:O	1.83	0.77
1:B:156:VAL:CG2	1:B:198:LYS:HZ3	1.96	0.75
1:B:156:VAL:HG23	1:B:198:LYS:HZ3	1.54	0.71
1:B:2:PRO:N	1:B:2:PRO:C	2.44	0.70
1:A:10:GLU:O	1:A:14[A]:THR:HG23	1.92	0.68
1:B:20:PRO:N	1:B:20:PRO:C	2.46	0.67
1:B:262:PRO:N	1:B:262:PRO:C	2.46	0.67
1:B:91:PRO:N	1:B:91:PRO:C	2.50	0.65
1:A:148:GLU:HG2	1:A:157:HIS:HD2	1.61	0.65
3:B:802:ACT:CH3	5:B:1030:HOH:O	2.46	0.63
3:B:802:ACT:H2	5:B:1030:HOH:O	1.98	0.63
1:B:208:ASP:OD1	1:B:209:HIS:CD2	2.53	0.62
1:B:128:PRO:N	1:B:128:PRO:C	2.52	0.61
1:B:16:ARG:HH11	1:B:16:ARG:HG3	1.66	0.61
1:B:156:VAL:CG2	1:B:198:LYS:HZ1	2.11	0.59
1:B:154:TYR:HE2	1:B:198:LYS:HZ3	1.50	0.58
1:B:3:THR:HG23	1:B:6:GLU:H	1.70	0.56
1:A:148:GLU:HG2	1:A:157:HIS:CD2	2.40	0.55
1:A:14[A]:THR:HG21	5:A:1028:HOH:O	2.07	0.54
1:B:162:GLU:HG3	1:B:169:THR:HG22	1.90	0.54
1:A:137:LYS:HG2	5:A:964:HOH:O	2.08	0.53
1:B:156:VAL:HG23	1:B:198:LYS:NZ	2.13	0.52
1:B:19:GLN:HB3	1:B:20:PRO:HD3	1.91	0.51
1:B:156:VAL:HG21	1:B:198:LYS:HZ1	1.69	0.49
1:B:211:PRO:N	1:B:211:PRO:C	2.56	0.49
1:B:3:THR:HG22	1:B:6:GLU:CD	2.33	0.48
1:A:11:GLU:O	1:A:15:GLN:HG3	2.13	0.48
1:A:209:HIS:HB2	5:A:919:HOH:O	2.12	0.48
1:B:80:GLN:HG3	1:B:207:PRO:HG3	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:165:ASN:ND2	5:A:904:HOH:O	2.47	0.47
3:A:802:ACT:C	5:A:902:HOH:O	2.63	0.47
1:B:25:ILE:HD13	1:B:248:LEU:HD23	1.97	0.47
1:B:148:GLU:HG2	1:B:157:HIS:HD2	1.79	0.47
1:B:166:SER:OG	1:B:168:GLU:HG3	2.15	0.47
1:A:138:GLU:OE1	1:A:138:GLU:N	2.44	0.46
1:B:110:VAL:HB	1:B:214:ILE:HD13	1.99	0.45
1:A:153:TYR:HB2	1:A:179:THR:OG1	2.17	0.44
1:B:270:MET:HE3	1:B:270:MET:HB3	1.88	0.43
1:A:19:GLN:HB3	5:A:996:HOH:O	2.19	0.43
1:A:146:LEU:HD11	1:A:160:GLN:HB2	2.00	0.42
1:A:148:GLU:CG	1:A:157:HIS:HD2	2.31	0.42
1:B:180:TRP:CE2	1:B:222:ARG:HG2	2.55	0.42
1:A:114:ARG:HG2	1:A:114:ARG:NH1	2.34	0.42
1:B:107:LYS:O	1:B:107:LYS:HG2	2.20	0.41
1:B:148:GLU:HG2	1:B:157:HIS:CD2	2.56	0.41
2:B:801:UB0:O5	2:B:801:UB0:C15	2.69	0.40
1:A:114:ARG:HG2	1:A:114:ARG:HH11	1.86	0.40
1:B:61:LEU:HD11	1:B:96:HIS:HB3	2.04	0.40

All (2) 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)
5:A:1019:HOH:O	5:A:1019:HOH:O[3_655]	2.14	0.06
5:A:1011:HOH:O	5:A:1101:HOH:O[4_555]	2.18	0.02

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	283/324 (87%)	275 (97%)	7 (2%)	1 (0%)	30	22

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	276/324 (85%)	267 (97%)	8 (3%)	1 (0%)	30	22
All	All	559/648 (86%)	542 (97%)	15 (3%)	2 (0%)	30	22

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	259	ILE
1	B	259	ILE

5.3.2   Protein sidechains ⓘ

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	262/298 (88%)	253 (97%)	9 (3%)	32	19
1	B	255/298 (86%)	250 (98%)	5 (2%)	50	38
All	All	517/596 (87%)	503 (97%)	14 (3%)	44	26

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	ASP
1	A	30	HIS
1	A	56[A]	HIS
1	A	56[B]	HIS
1	A	83	TYR
1	A	142[A]	SER
1	A	142[B]	SER
1	A	208	ASP
1	A	240	ASP
1	B	78	GLU
1	B	81	ARG
1	B	89	PRO
1	B	142	SER
1	B	263	ASP

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

Mol	Chain	Res	Type
1	B	15	GLN
1	B	209	HIS

5.3.3　RNA ⓘ

There are no RNA molecules in this entry.

5.4　Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5　Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6　Ligand geometry ⓘ

Of 5 ligands modelled in this entry, 1 is monoatomic - leaving 4 for Mogul analysis.

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	UB0	B	801	-	68,74,74	1.00	4 (5%)	89,110,110	0.79	3 (3%)
3	ACT	B	802	-	3,3,3	1.15	0	3,3,3	0.98	0
2	UB0	A	801	-	68,74,74	1.06	2 (2%)	89,110,110	0.83	4 (4%)
3	ACT	A	802	-	3,3,3	0.95	0	3,3,3	0.75	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
2	UB0	B	801	-	-	4/37/83/83	0/8/8/8
2	UB0	A	801	-	-	4/37/83/83	0/8/8/8

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	UB0	O2-C2	-5.72	1.27	1.39
2	B	801	UB0	O2-C2	-4.66	1.29	1.39
2	B	801	UB0	S1-N1	-2.63	1.58	1.63
2	B	801	UB0	C1-S	-2.40	1.71	1.75
2	B	801	UB0	O1-C	-2.15	1.16	1.22
2	A	801	UB0	C37-C33	-2.11	1.48	1.53

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	801	UB0	C37-C33-N4	-3.61	105.54	113.60
2	A	801	UB0	C16-C10-N	-2.89	106.36	110.33
2	B	801	UB0	C37-C33-N4	-2.76	107.45	113.60
2	B	801	UB0	C16-C10-N	-2.60	106.76	110.33
2	A	801	UB0	C11-C12-N1	2.37	114.96	110.54
2	B	801	UB0	O9-C31-C32	2.33	129.85	124.95
2	A	801	UB0	C16-C13-N1	2.14	111.47	108.31

There are no chirality outliers.
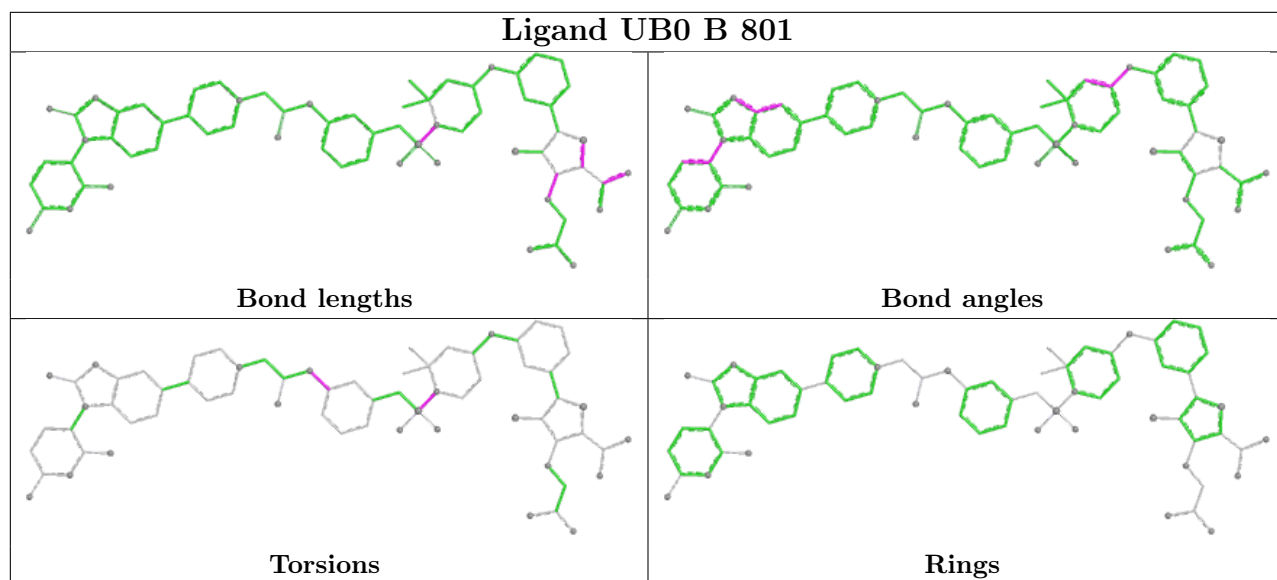
All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	801	UB0	C19-C20-N2-C21
2	B	801	UB0	C19-C20-N2-C21
2	A	801	UB0	C40-C20-N2-C21
2	B	801	UB0	C40-C20-N2-C21
2	A	801	UB0	C12-N1-S1-O5
2	B	801	UB0	C12-N1-S1-O5
2	A	801	UB0	C12-N1-S1-O6
2	B	801	UB0	C12-N1-S1-O6

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	801	UB0	1	0
3	B	802	ACT	2	0
3	A	802	ACT	2	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 then 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.

Ligand UB0 B 801

Bond lengths

Bond angles

Torsions

Rings

Ligand UB0 A 801

Bond lengths

Bond angles

Torsions

Rings
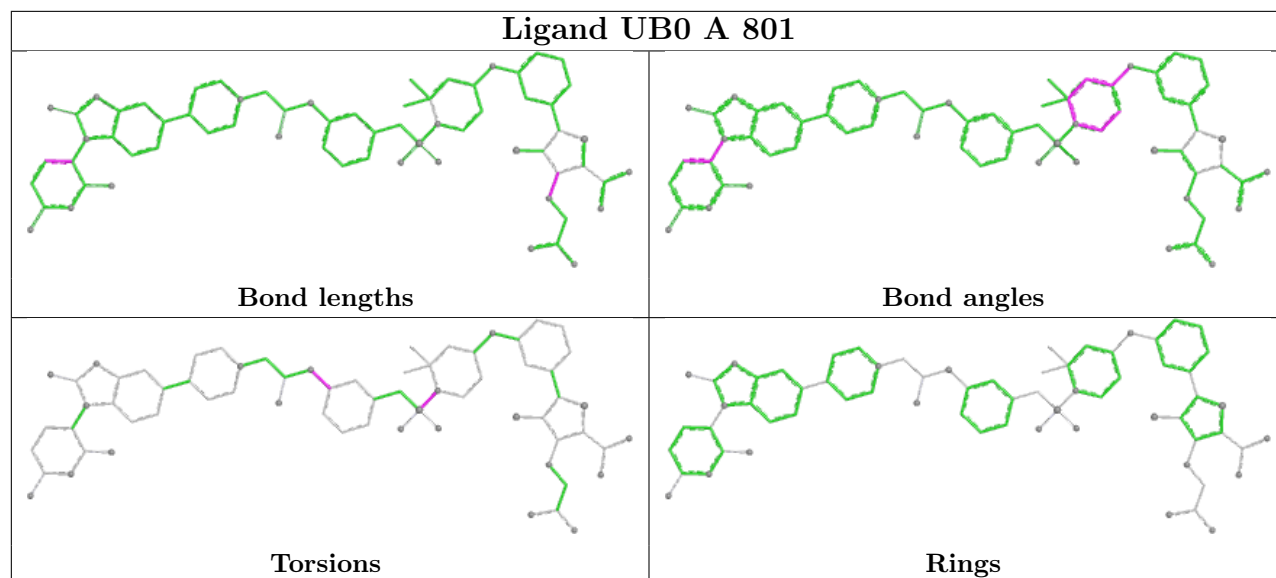
5.7 Other polymers ⓘ

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 ⓘ

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, 95th 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(Å²)	Q<0.9
1	A	279/324 (86%)	-0.13	8 (2%)	54	58	12, 30, 61, 81	6 (2%)
1	B	277/324 (85%)	0.10	7 (2%)	58	64	15, 36, 69, 88	1 (0%)
All	All	556/648 (85%)	-0.02	15 (2%)	56	61	12, 33, 67, 88	7 (1%)

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1	MET	3.4
1	B	198	LYS	3.2
1	B	240	ASP	2.6
1	A	76	ILE	2.5
1	A	204	SER	2.5
1	B	278	CYS	2.5
1	A	241	ASP	2.5
1	A	167	GLY	2.3
1	A	83	TYR	2.3
1	A	240	ASP	2.1
1	B	2	PRO	2.1
1	A	206	ASN	2.1
1	B	189	PRO	2.0
1	B	188	SER	2.0
1	B	4	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.
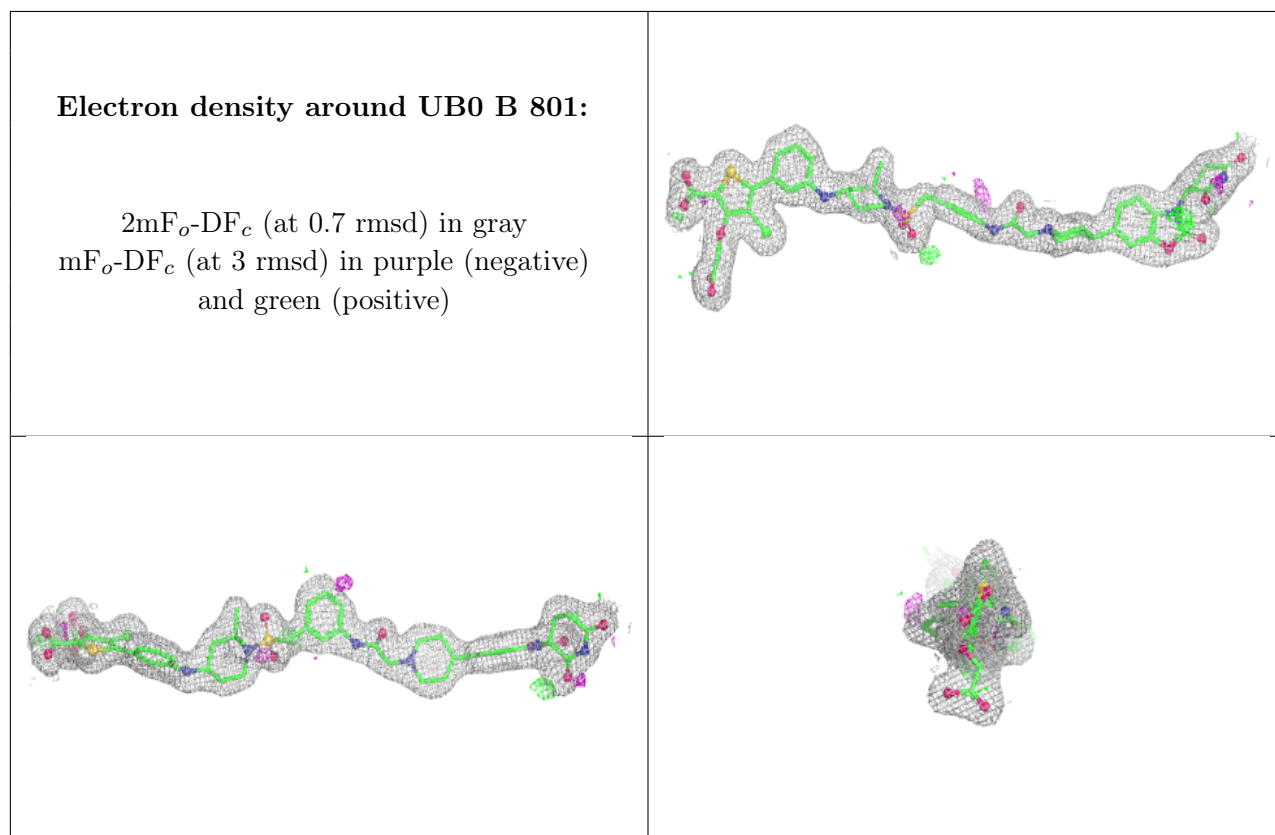
6.3 Carbohydrates ⓘ
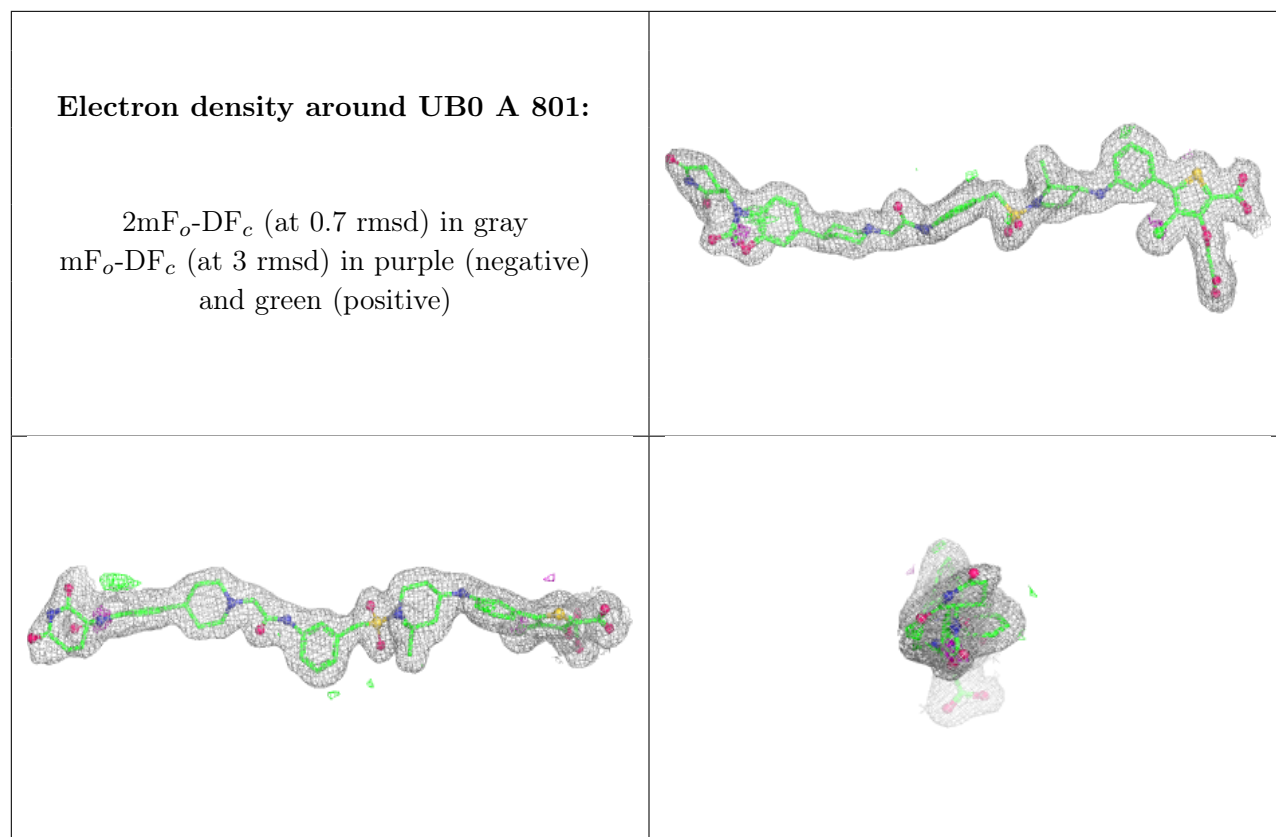
There are no monosaccharides in this entry.

6.4   Ligands   ⓘ

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, 95th 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(Å^2)	Q<0.9
3	ACT	B	802	4/4	0.81	0.17	40,44,53,56	0
3	ACT	A	802	4/4	0.88	0.16	39,43,51,57	0
2	UB0	B	801	67/67	0.96	0.07	23,32,48,51	0
2	UB0	A	801	67/67	0.97	0.07	20,31,58,70	0
4	NA	A	803	1/1	0.99	0.05	28,28,28,28	1

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 UB0 B 801:

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

Electron density around UB0 A 801:

$2mF_o$-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.