



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 01:50 PM UTC

PDB ID : 1YXQ / pdb_00001yxq
Title : Crystal structure of actin in complex with swinholide A
Authors : Klenchin, V.A.; King, R.; Tanaka, J.; Marriott, G.; Rayment, I.
Deposited on : 2005-02-22
Resolution : 2.01 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 : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

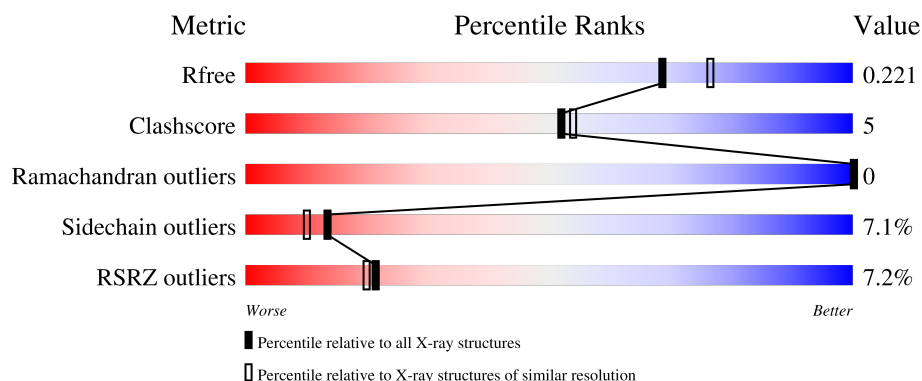
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.01 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}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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 $\leq 5\%$. 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	375	83% 11% .. 5%
1	B	375	12% 77% 17% ..

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 6057 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 actin, alpha skeletal muscle.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	356	Total	C	N	O	S	0	3	0
			2792	1769	470	535	18			
1	B	359	Total	C	N	O	S	0	0	0
			2812	1782	474	537	19			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	73	HIC	HIS	modified residue	UNP P68135
B	73	HIC	HIS	modified residue	UNP P68135

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Mg	0	0
			2	2		
2	B	1	Total	Mg	0	0
			1	1		

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃).



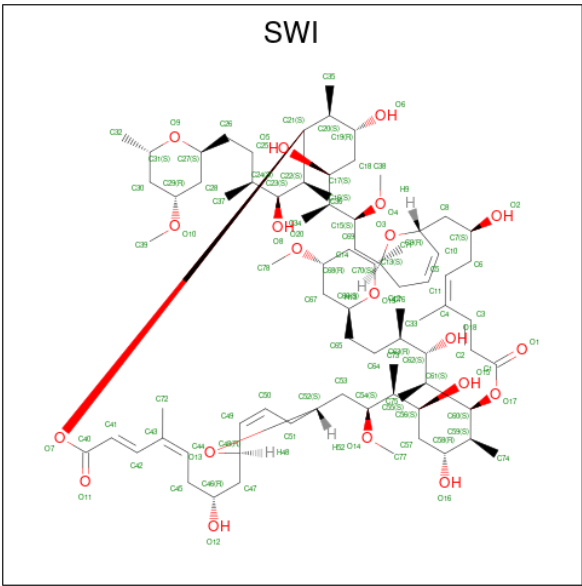
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 31	C 10	N 5	O 13	P 3	0	0
3	B	1	Total 31	C 10	N 5	O 13	P 3	0	0

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $\text{C}_2\text{H}_6\text{O}_2$).



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

- Molecule 5 is SWINHOLIDE A (CCD ID: SWI) (formula: C₇₈H₁₃₂O₂₀).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	1	Total	C O	0	0
			98	78 20		

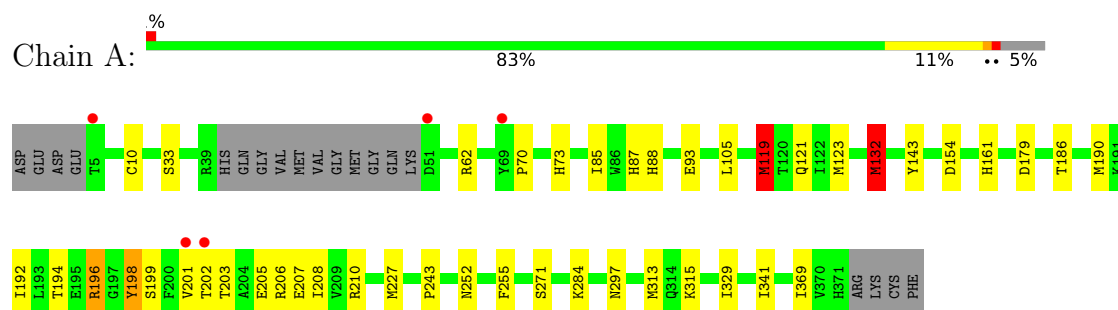
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	243	Total	O	0	0
			243	243		
6	B	39	Total	O	0	0
			39	39		

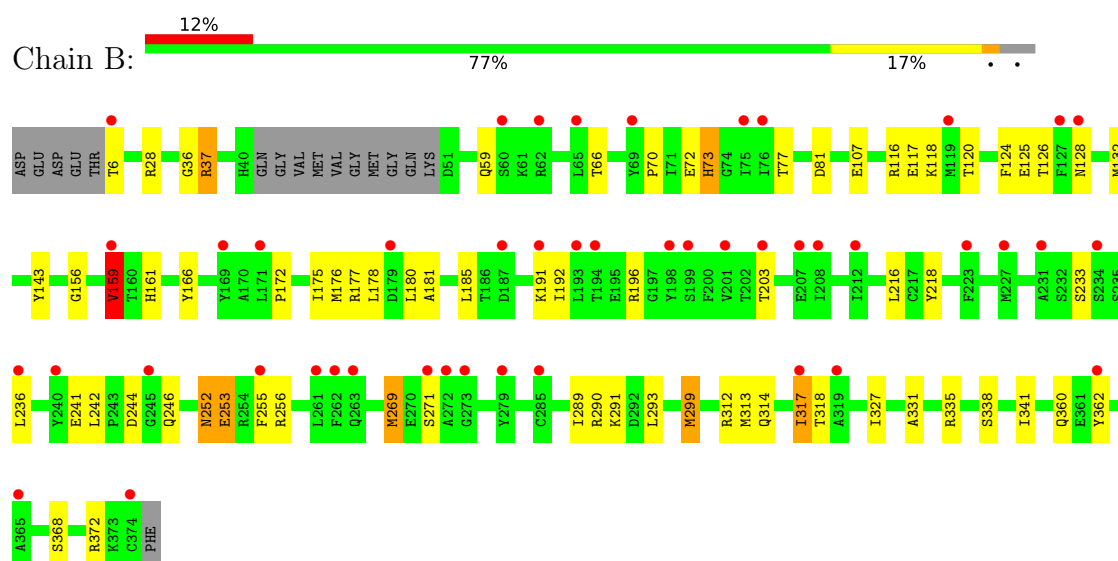
3 Residue-property plots [i](#)

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 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: actin, alpha skeletal muscle



- Molecule 1: actin, alpha skeletal muscle



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	68.00Å 76.80Å 98.40Å 90.00° 101.20° 90.00°	Depositor
Resolution (Å)	50.00 – 2.01 50.00 – 2.01	Depositor EDS
% Data completeness (in resolution range)	99.6 (50.00-2.01) 99.7 (50.00-2.01)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.43 (at 2.01Å)	Xtriage
Refinement program	REFMAC 5.1.19	Depositor
R, R_{free}	0.184 , 0.219 0.191 , 0.221	Depositor DCC
R_{free} test set	3353 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å ²)	30.0	Xtriage
Anisotropy	0.553	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 47.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6057	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.76% 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.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, EDO, SWI, MG, HIC

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	0.96	4/2853 (0.1%)	0.93	5/3867 (0.1%)
1	B	0.80	4/2860 (0.1%)	0.91	2/3875 (0.1%)
All	All	0.89	8/5713 (0.1%)	0.92	7/7742 (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	B	0	1

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	132	MET	SD-CE	-12.87	1.47	1.79
1	A	119	MET	SD-CE	10.61	2.06	1.79
1	B	269	MET	C-O	8.39	1.34	1.24
1	A	227	MET	SD-CE	-7.79	1.60	1.79
1	B	37	ARG	C-O	7.54	1.31	1.23
1	B	299	MET	SD-CE	-5.51	1.65	1.79
1	B	125	GLU	C-O	5.40	1.30	1.24
1	A	313	MET	SD-CE	-5.02	1.67	1.79

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	37	ARG	N-CA-C	-7.74	101.02	110.31
1	A	196	ARG	NE-CZ-NH2	-6.53	113.33	119.20
1	A	196	ARG	CG-CD-NE	-6.29	98.17	112.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	159	VAL	CB-CA-C	-6.27	101.02	110.55
1	A	198	TYR	CA-C-N	-5.42	115.46	123.05
1	A	198	TYR	C-N-CA	-5.42	115.46	123.05
1	A	271	SER	N-CA-C	5.02	117.01	110.43

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	72	GLU	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	2792	0	2756	26	0
1	B	2812	0	2782	26	0
2	A	2	0	0	0	0
2	B	1	0	0	0	0
3	A	31	0	12	0	0
3	B	31	0	12	0	0
4	A	4	0	6	0	0
4	B	4	0	6	0	0
5	B	98	0	131	11	0
6	A	243	0	0	8	0
6	B	39	0	0	2	0
All	All	6057	0	5705	59	0

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 5.

All (59) 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:119:MET:SD	1:A:119:MET:CE	2.06	1.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:600:SWI:H372	5:B:600:SWI:H361	1.10	1.07
5:B:600:SWI:H361	5:B:600:SWI:C37	1.88	1.01
5:B:600:SWI:H362	6:B:9013:HOH:O	1.72	0.89
5:B:600:SWI:H372	5:B:600:SWI:C36	2.03	0.79
1:A:207:GLU:OE1	1:A:210[A]:ARG:NH2	2.21	0.73
1:B:314:GLN:O	1:B:318:THR:HG23	1.89	0.73
1:B:191:LYS:NZ	6:B:9021:HOH:O	2.23	0.71
1:A:207:GLU:OE1	1:A:210[A]:ARG:CZ	2.39	0.71
1:A:87:HIS:HD2	6:A:9085:HOH:O	1.74	0.71
5:B:600:SWI:H363	5:B:600:SWI:O11	1.93	0.67
1:A:121:GLN:NE2	6:A:9163:HOH:O	2.31	0.64
1:B:313:MET:O	1:B:317:ILE:HG23	1.98	0.63
1:B:143:TYR:HB3	5:B:600:SWI:H763	1.81	0.62
1:A:297[A]:ASN:HD22	1:A:329:ILE:HD12	1.67	0.60
1:B:107:GLU:OE1	1:B:116:ARG:HG2	2.02	0.60
1:A:205:GLU:HA	1:A:208:ILE:HD12	1.84	0.58
1:B:318:THR:HG22	1:B:327:ILE:HD13	1.85	0.57
1:B:335:ARG:HA	1:B:338:SER:OG	2.04	0.57
1:B:120:THR:HA	1:B:132:MET:HE3	1.87	0.56
1:B:73:HIC:HB2	1:B:159:VAL:HG13	1.88	0.55
1:A:341:ILE:HG23	5:B:600:SWI:H49	1.88	0.55
1:A:161:HIS:HD2	6:A:9138:HOH:O	1.91	0.54
1:A:123:MET:HB2	1:A:132:MET:HE3	1.91	0.52
1:A:88:HIS:HE1	1:A:93:GLU:OE2	1.92	0.51
1:A:123:MET:CB	1:A:132:MET:HE3	2.41	0.51
1:B:218:TYR:O	1:B:255:PHE:HA	2.11	0.50
1:A:186:THR:O	1:A:190:MET:HG3	2.12	0.50
1:B:36:GLY:HA2	1:B:66:THR:O	2.11	0.50
1:A:154:ASP:CG	6:A:9140:HOH:O	2.54	0.50
1:A:179:ASP:HB3	6:A:9200:HOH:O	2.12	0.50
1:A:190:MET:SD	1:A:206:ARG:HG3	2.53	0.49
1:B:124:PHE:CD2	1:B:362:TYR:CG	3.01	0.49
1:B:172:PRO:HA	1:B:175:ILE:HD12	1.94	0.48
1:A:143:TYR:HB3	5:B:600:SWI:H373	1.96	0.48
1:A:201:VAL:HG13	6:A:9055:HOH:O	2.12	0.48
1:B:341:ILE:HG23	5:B:600:SWI:H10	1.96	0.47
5:B:600:SWI:C36	5:B:600:SWI:O11	2.61	0.47
1:A:70:PRO:HG2	1:A:85:ILE:HD12	1.98	0.46
1:B:117:GLU:HA	1:B:120:THR:HG22	1.96	0.46
1:B:161:HIS:NE2	1:B:177:ARG:HG3	2.31	0.46
1:B:73:HIC:HB2	1:B:159:VAL:CG1	2.46	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:194:THR:HA	1:A:198:TYR:O	2.16	0.45
5:B:600:SWI:O11	5:B:600:SWI:C22	2.59	0.45
1:A:119:MET:CE	1:A:119:MET:CB	2.95	0.45
1:B:117:GLU:O	1:B:120:THR:HG22	2.17	0.45
1:B:156:GLY:O	1:B:181:ALA:HB1	2.17	0.44
1:A:10:CYS:HB3	1:A:105:LEU:HD23	1.99	0.44
1:B:299:MET:HE3	1:B:331:ALA:HB2	2.01	0.43
1:A:202:THR:OG1	6:A:9146:HOH:O	2.22	0.42
1:B:178:LEU:CD1	1:B:271:SER:OG	2.67	0.42
1:A:252:ASN:HA	1:A:255:PHE:CE2	2.55	0.42
1:B:117:GLU:O	1:B:120:THR:CG2	2.67	0.42
1:B:124:PHE:O	1:B:128:ASN:HA	2.20	0.42
1:B:252:ASN:HD22	1:B:253:GLU:N	2.17	0.42
1:B:166:TYR:CE2	1:B:289:ILE:CG2	3.02	0.42
1:B:70:PRO:HG3	1:B:81:ASP:HB3	2.02	0.42
1:A:208:ILE:HD11	1:A:243:PRO:HG2	2.03	0.41
1:A:315:LYS:NZ	6:A:9187:HOH:O	2.51	0.41

There are no symmetry-related clashes.

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	354/375 (94%)	348 (98%)	6 (2%)	0	100	100
1	B	354/375 (94%)	344 (97%)	10 (3%)	0	100	100
All	All	708/750 (94%)	692 (98%)	16 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	303/317 (96%)	293 (97%)	10 (3%)	33	34
1	B	304/317 (96%)	271 (89%)	33 (11%)	6	3
All	All	607/634 (96%)	564 (93%)	43 (7%)	13	10

All (43) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	33	SER
1	A	62	ARG
1	A	119	MET
1	A	132	MET
1	A	192	ILE
1	A	196	ARG
1	A	199	SER
1	A	203	THR
1	A	284	LYS
1	A	369	ILE
1	B	6	THR
1	B	28	ARG
1	B	37	ARG
1	B	59	GLN
1	B	77	THR
1	B	118	LYS
1	B	126	THR
1	B	159	VAL
1	B	176	MET
1	B	180	LEU
1	B	185	LEU
1	B	192	ILE
1	B	196	ARG
1	B	203	THR
1	B	216	LEU
1	B	233	SER
1	B	236	LEU

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Mol	Chain	Res	Type
1	B	241	GLU
1	B	242	LEU
1	B	244	ASP
1	B	246	GLN
1	B	252	ASN
1	B	253	GLU
1	B	256	ARG
1	B	269	MET
1	B	290	ARG
1	B	291	LYS
1	B	293	LEU
1	B	312	ARG
1	B	317	ILE
1	B	360	GLN
1	B	368	SER
1	B	372	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	59	GLN
1	A	87	HIS
1	A	88	HIS
1	A	92	ASN
1	A	121	GLN
1	A	161	HIS
1	A	225	ASN
1	B	162	ASN
1	B	225	ASN
1	B	246	GLN
1	B	252	ASN
1	B	275	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	HIC	A	73	1	10,11,12	0.72	0	9,14,16	3.18	2 (22%)
1	HIC	B	73	1	10,11,12	0.63	0	9,14,16	3.04	2 (22%)

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
1	HIC	A	73	1	-	3/5/6/8	0/1/1/1
1	HIC	B	73	1	-	1/5/6/8	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	73	HIC	NE2-CE1-ND1	-8.70	109.33	112.66
1	B	73	HIC	NE2-CE1-ND1	-8.27	109.50	112.66
1	A	73	HIC	CE1-ND1-CG	2.39	109.63	105.80
1	B	73	HIC	CZ-NE2-CD2	-2.31	123.00	126.03

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	73	HIC	O-C-CA-CB
1	B	73	HIC	N-CA-CB-CG
1	A	73	HIC	CA-CB-CG-ND1
1	A	73	HIC	CA-CB-CG-CD2

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	73	HIC	2	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 3 are monoatomic - leaving 5 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	$\# Z > 2$
3	ATP	B	2380	2	32,33,33	1.04	3 (9%)	48,52,52	1.93	13 (27%)
3	ATP	A	1380	2	32,33,33	1.05	3 (9%)	48,52,52	1.62	9 (18%)
4	EDO	B	9002	-	3,3,3	0.63	0	2,2,2	0.22	0
5	SWI	B	600	-	100,102,102	2.25	40 (40%)	122,140,140	3.22	47 (38%)
4	EDO	A	9001	-	3,3,3	0.45	0	2,2,2	0.18	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	ATP	B	2380	2	-	6/22/38/38	0/3/3/3
3	ATP	A	1380	2	-	2/22/38/38	0/3/3/3
4	EDO	B	9002	-	-	1/1/1/1	-
5	SWI	B	600	-	-	30/126/170/170	0/4/5/5
4	EDO	A	9001	-	-	0/1/1/1	-

All (46) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	600	SWI	C63-C62	-6.17	1.43	1.53
5	B	600	SWI	O9-C27	-5.84	1.34	1.44
5	B	600	SWI	C26-C25	-5.84	1.37	1.53
5	B	600	SWI	C57-C56	-5.01	1.41	1.53
5	B	600	SWI	C45-C44	-4.67	1.41	1.50
5	B	600	SWI	O7-C21	4.27	1.51	1.44
5	B	600	SWI	C69-C68	-3.84	1.43	1.52
5	B	600	SWI	C59-C58	-3.74	1.47	1.54
5	B	600	SWI	C28-C29	3.69	1.60	1.52
5	B	600	SWI	C22-C23	-3.62	1.44	1.54
5	B	600	SWI	C25-C24	-3.57	1.45	1.54
5	B	600	SWI	C20-C21	3.28	1.62	1.54
5	B	600	SWI	C42-C41	3.11	1.42	1.33
5	B	600	SWI	O20-C68	3.05	1.51	1.43
5	B	600	SWI	C69-C70	3.03	1.57	1.52
5	B	600	SWI	O17-C1	3.01	1.40	1.34
5	B	600	SWI	O2-C7	2.97	1.52	1.43
5	B	600	SWI	O13-C52	2.93	1.48	1.44
3	B	2380	ATP	C2-N3	2.91	1.39	1.33
5	B	600	SWI	O13-C48	2.90	1.51	1.44
3	B	2380	ATP	C2-N1	2.90	1.39	1.33
5	B	600	SWI	C55-C56	2.89	1.59	1.54
5	B	600	SWI	O14-C77	2.74	1.51	1.42
5	B	600	SWI	C8-C7	-2.74	1.46	1.52
5	B	600	SWI	C9-C10	2.69	1.54	1.50
3	A	1380	ATP	C2-N1	2.62	1.38	1.33
5	B	600	SWI	O1-C1	-2.56	1.16	1.21
5	B	600	SWI	O9-C31	-2.48	1.40	1.44
5	B	600	SWI	C34-C16	2.42	1.58	1.53
5	B	600	SWI	C20-C19	2.37	1.58	1.54
5	B	600	SWI	C51-C50	-2.37	1.44	1.49
5	B	600	SWI	C10-C11	-2.36	1.26	1.32
3	A	1380	ATP	C8-N7	2.35	1.36	1.31
3	A	1380	ATP	C2-N3	2.32	1.38	1.33
5	B	600	SWI	C72-C43	2.30	1.55	1.50
5	B	600	SWI	C57-C58	-2.26	1.47	1.53
5	B	600	SWI	C2-C1	2.24	1.53	1.48
5	B	600	SWI	O5-C17	-2.19	1.38	1.43
5	B	600	SWI	O3-C9	2.11	1.49	1.44
5	B	600	SWI	C42-C43	2.10	1.50	1.46
3	B	2380	ATP	C5-N7	-2.08	1.35	1.39
5	B	600	SWI	C2-C3	-2.08	1.26	1.33
5	B	600	SWI	O17-C60	2.04	1.47	1.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	600	SWI	O16-C58	2.03	1.47	1.43
5	B	600	SWI	O10-C29	2.00	1.48	1.43
5	B	600	SWI	O18-C62	-2.00	1.38	1.43

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	600	SWI	C20-C21-C22	12.81	140.56	114.68
5	B	600	SWI	C42-C43-C44	12.59	136.02	118.49
5	B	600	SWI	O8-C23-C24	9.17	127.27	109.79
5	B	600	SWI	C63-C62-C61	7.94	128.10	116.20
5	B	600	SWI	O17-C1-C2	7.34	127.35	111.39
5	B	600	SWI	C46-C45-C44	-7.08	101.69	113.02
5	B	600	SWI	C45-C44-C43	6.85	142.52	127.50
5	B	600	SWI	C72-C43-C44	-6.44	112.58	123.73
5	B	600	SWI	C3-C4-C5	6.43	127.44	118.49
5	B	600	SWI	C8-C9-C10	-5.97	102.59	112.94
3	B	2380	ATP	N3-C2-N1	-5.80	119.80	128.58
3	A	1380	ATP	N3-C2-N1	-5.27	120.61	128.58
5	B	600	SWI	C33-C4-C3	-5.19	110.17	118.09
5	B	600	SWI	O7-C21-C22	-5.07	95.84	107.52
5	B	600	SWI	C8-C7-C6	5.04	122.78	112.94
5	B	600	SWI	C37-C24-C23	4.89	120.32	111.45
5	B	600	SWI	C72-C43-C42	-4.85	110.68	118.09
3	B	2380	ATP	C5-C4-N3	-4.76	120.17	126.72
5	B	600	SWI	C13-C12-C11	-4.75	100.12	109.49
5	B	600	SWI	O7-C40-O11	-4.56	116.03	123.34
5	B	600	SWI	C7-C6-C5	4.33	119.95	113.02
3	A	1380	ATP	N9-C8-N7	-4.27	107.88	113.94
5	B	600	SWI	C41-C42-C43	-4.09	120.19	126.23
3	B	2380	ATP	N9-C8-N7	-4.04	108.20	113.94
3	B	2380	ATP	O4'-C1'-N9	3.98	115.73	108.09
5	B	600	SWI	O1-C1-C2	-3.95	110.26	123.69
5	B	600	SWI	C78-O20-C68	3.92	123.27	113.81
5	B	600	SWI	C36-C22-C21	3.67	117.87	111.40
5	B	600	SWI	O9-C31-C32	3.64	113.70	106.88
5	B	600	SWI	C47-C48-C49	-3.62	106.67	112.94
3	B	2380	ATP	N3-C4-N9	3.54	133.19	127.17
3	B	2380	ATP	C5-N7-C8	3.54	109.02	103.45
3	B	2380	ATP	C2-N3-C4	3.53	120.44	111.83
5	B	600	SWI	O9-C27-C26	3.51	117.53	107.96
5	B	600	SWI	C64-C63-C62	3.41	116.95	111.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	600	SWI	O2-C7-C6	-3.39	100.41	109.45
5	B	600	SWI	C48-C49-C50	-3.31	114.33	122.76
5	B	600	SWI	C21-O7-C40	-3.31	112.15	117.42
5	B	600	SWI	O7-C21-C20	-3.12	100.32	107.52
3	A	1380	ATP	C5-N7-C8	2.97	108.11	103.45
5	B	600	SWI	C39-O10-C29	2.94	120.89	113.81
5	B	600	SWI	C28-C29-C30	-2.93	106.63	112.03
5	B	600	SWI	O9-C27-C28	-2.84	105.81	110.14
3	B	2380	ATP	O3G-PG-O3B	2.82	114.09	104.64
5	B	600	SWI	O17-C60-C61	2.70	113.75	107.52
5	B	600	SWI	O18-C62-C63	-2.70	104.65	109.79
5	B	600	SWI	O10-C29-C28	2.64	117.39	109.28
3	A	1380	ATP	C4-N9-C8	2.57	108.44	105.74
5	B	600	SWI	C32-C31-C30	-2.55	109.41	113.27
3	A	1380	ATP	C5-C4-N3	-2.49	123.28	126.72
5	B	600	SWI	C47-C46-C45	2.48	117.78	112.94
5	B	600	SWI	O6-C19-C20	-2.48	104.69	110.09
5	B	600	SWI	C31-O9-C27	2.41	118.94	114.00
5	B	600	SWI	O13-C52-C53	-2.38	102.06	107.84
5	B	600	SWI	O3-C9-C10	-2.36	105.30	110.98
5	B	600	SWI	O16-C58-C57	-2.35	104.45	109.15
3	A	1380	ATP	O3G-PG-O3B	2.33	112.45	104.64
3	A	1380	ATP	C2-N3-C4	2.32	117.49	111.83
5	B	600	SWI	C52-C51-C50	2.27	113.97	109.49
3	A	1380	ATP	O2B-PB-O3B	2.23	113.29	107.27
5	B	600	SWI	C24-C23-C22	-2.22	112.87	116.20
5	B	600	SWI	O18-C62-C61	2.20	114.44	109.56
3	B	2380	ATP	C6-C5-C4	2.15	120.12	117.18
5	B	600	SWI	O11-C40-C41	2.14	130.95	123.69
3	B	2380	ATP	C4-N9-C8	2.14	107.98	105.74
3	B	2380	ATP	C4-C5-N7	-2.11	108.17	110.58
3	A	1380	ATP	C4-C5-N7	-2.05	108.23	110.58
3	B	2380	ATP	O2B-PB-O3B	2.05	112.80	107.27
3	B	2380	ATP	C2'-C1'-N9	-2.02	108.28	113.30

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1380	ATP	PB-O3B-PG-O3G
3	B	2380	ATP	PB-O3B-PG-O3G
5	B	600	SWI	O7-C21-C22-C36

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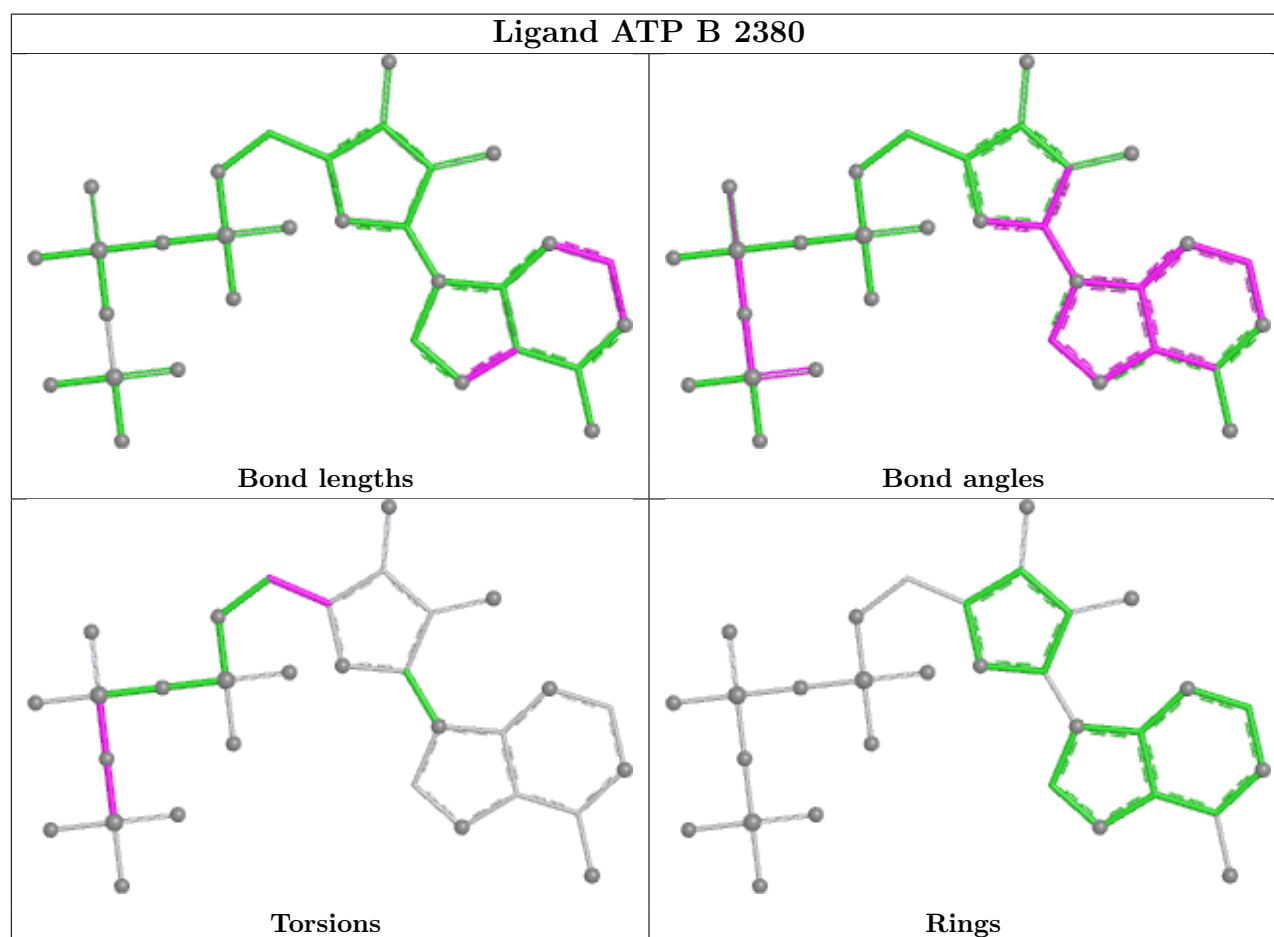
Mol	Chain	Res	Type	Atoms
5	B	600	SWI	C20-C21-C22-C23
5	B	600	SWI	C20-C21-C22-C36
5	B	600	SWI	C22-C23-C24-C25
5	B	600	SWI	C22-C23-C24-C37
5	B	600	SWI	O8-C23-C24-C37
5	B	600	SWI	C28-C29-O10-C39
5	B	600	SWI	C41-C42-C43-C44
5	B	600	SWI	C42-C43-C44-C45
5	B	600	SWI	O12-C46-C47-C48
5	B	600	SWI	C61-C62-C63-C76
5	B	600	SWI	C61-C62-C63-C64
5	B	600	SWI	O18-C62-C63-C76
5	B	600	SWI	O18-C62-C63-C64
5	B	600	SWI	C67-C68-O20-C78
5	B	600	SWI	C45-C46-C47-C48
5	B	600	SWI	C2-C3-C4-C33
5	B	600	SWI	O8-C23-C24-C25
5	B	600	SWI	O7-C21-C22-C23
5	B	600	SWI	C30-C29-O10-C39
5	B	600	SWI	C2-C3-C4-C5
5	B	600	SWI	C22-C21-O7-C40
4	B	9002	EDO	O1-C1-C2-O2
5	B	600	SWI	C69-C68-O20-C78
5	B	600	SWI	C46-C47-C48-O13
3	B	2380	ATP	PG-O3B-PB-O1B
5	B	600	SWI	C46-C47-C48-C49
5	B	600	SWI	C60-C61-C62-O18
5	B	600	SWI	C63-C64-C65-C66
5	B	600	SWI	C44-C45-C46-O12
5	B	600	SWI	C36-C22-C23-C24
5	B	600	SWI	C13-C14-C15-O4
3	A	1380	ATP	PB-O3B-PG-O1G
3	B	2380	ATP	PB-O3B-PG-O2G
3	B	2380	ATP	C3'-C4'-C5'-O5'
3	B	2380	ATP	PG-O3B-PB-O2B
3	B	2380	ATP	PB-O3B-PG-O1G

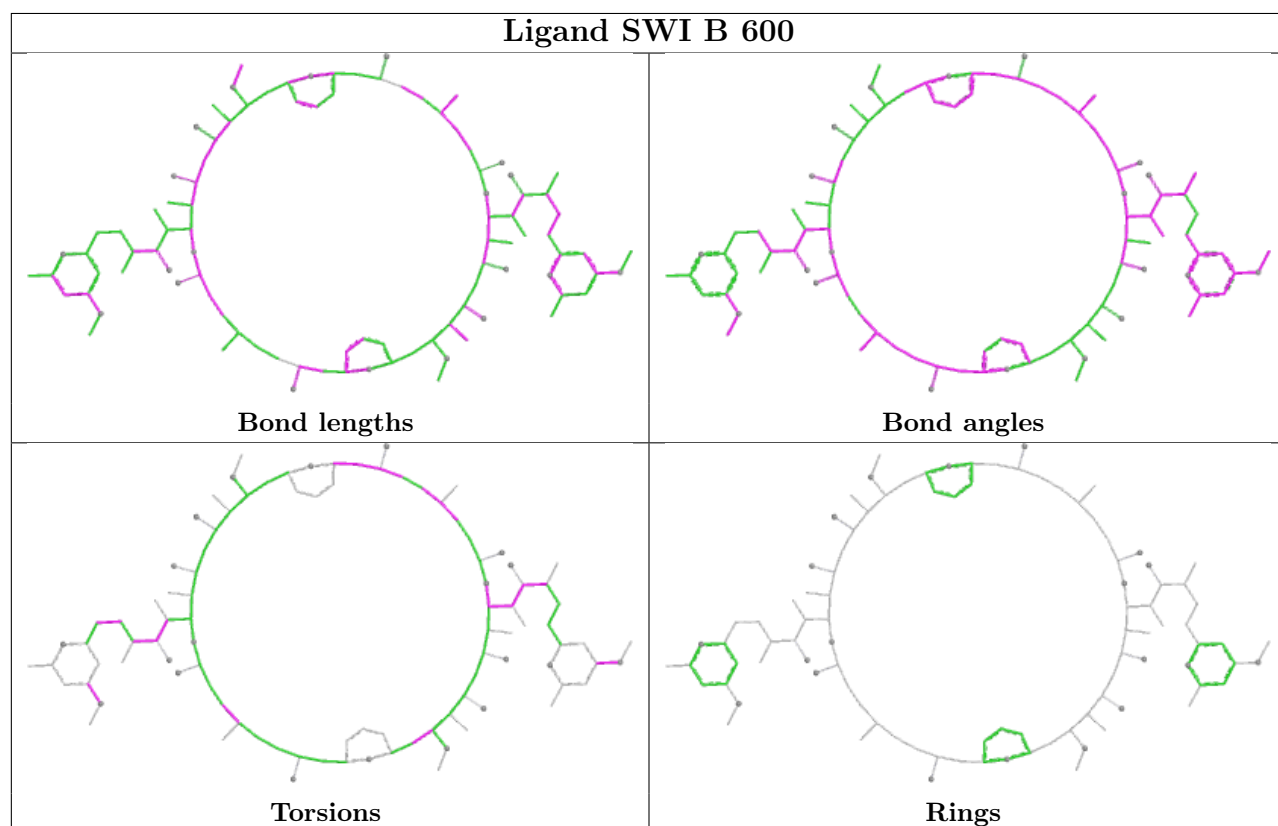
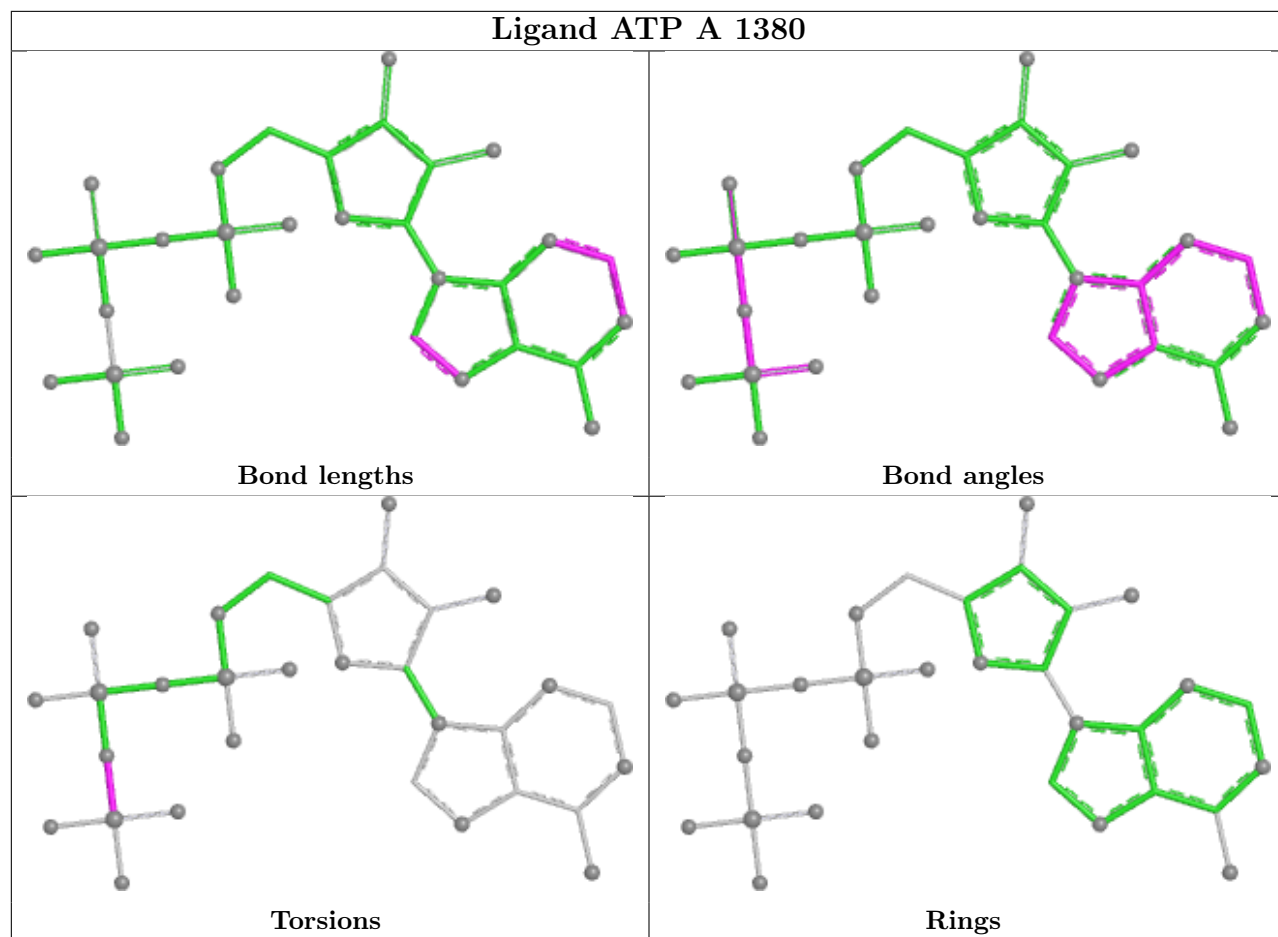
There are no ring outliers.

1 monomer is involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	600	SWI	11	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 [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, 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(Å ²)	Q<0.9
1	A	355/375 (94%)	-0.18	5 (1%) 73 73	13, 22, 34, 47	3 (0%)
1	B	358/375 (95%)	0.95	46 (12%) 7 6	14, 27, 40, 51	0
All	All	713/750 (95%)	0.39	51 (7%) 21 20	13, 23, 38, 51	3 (0%)

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	272	ALA	4.5
1	B	127	PHE	4.5
1	B	193	LEU	4.4
1	A	69	TYR	4.0
1	A	201	VAL	3.7
1	B	273	GLY	3.6
1	B	236	LEU	3.4
1	B	198	TYR	3.4
1	B	201	VAL	3.3
1	B	261	LEU	3.1
1	B	365	ALA	3.0
1	B	119	MET	3.0
1	B	234	SER	2.7
1	B	69	TYR	2.6
1	B	240	TYR	2.6
1	B	245	GLY	2.6
1	B	76	ILE	2.6
1	A	5	THR	2.6
1	B	223	PHE	2.5
1	B	227	MET	2.5
1	B	179	ASP	2.5
1	B	319	ALA	2.5
1	A	202	THR	2.4
1	B	212	ILE	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	6	THR	2.4
1	B	362	TYR	2.4
1	B	263	GLN	2.4
1	A	51	ASP	2.4
1	B	207	GLU	2.3
1	B	262	PHE	2.3
1	B	374	CYS	2.3
1	B	159	VAL	2.3
1	B	231	ALA	2.3
1	B	199	SER	2.3
1	B	271	SER	2.3
1	B	203	THR	2.3
1	B	65	LEU	2.3
1	B	194	THR	2.2
1	B	285	CYS	2.2
1	B	60	SER	2.2
1	B	75	ILE	2.2
1	B	169	TYR	2.2
1	B	187	ASP	2.2
1	B	255	PHE	2.1
1	B	128	ASN	2.1
1	B	208	ILE	2.1
1	B	191	LYS	2.1
1	B	62	ARG	2.1
1	B	317	ILE	2.1
1	B	171	LEU	2.0
1	B	279	TYR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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, 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
1	HIC	B	73	11/12	0.82	0.14	32,33,37,39	0
1	HIC	A	73	11/12	0.96	0.07	22,25,39,44	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

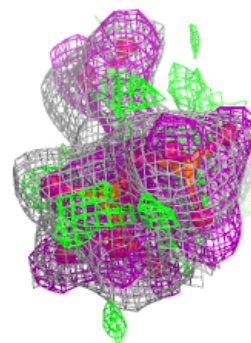
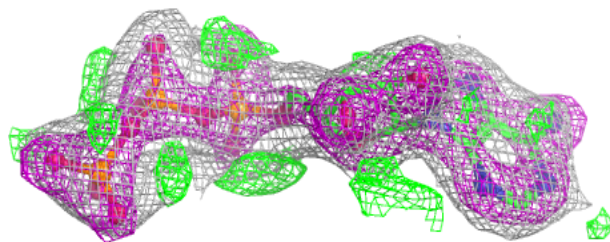
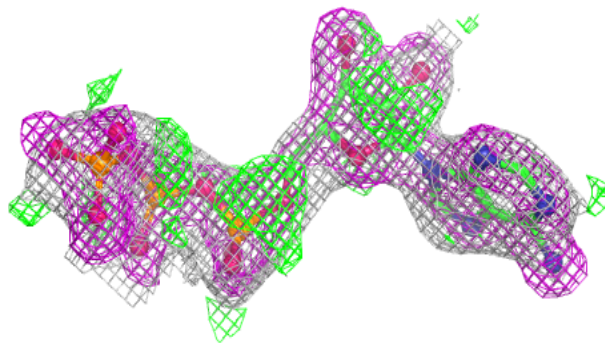
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	B	9002	4/4	0.82	0.17	38,42,49,52	0
3	ATP	B	2380	31/31	0.88	0.12	20,25,29,32	0
4	EDO	A	9001	4/4	0.89	0.12	35,42,42,44	0
5	SWI	B	600	98/98	0.93	0.10	26,36,50,59	0
2	MG	A	5001	1/1	0.97	0.07	56,56,56,56	0
2	MG	B	2390	1/1	0.97	0.05	47,47,47,47	0
2	MG	A	1390	1/1	0.97	0.04	26,26,26,26	0
3	ATP	A	1380	31/31	0.98	0.06	17,21,25,27	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.

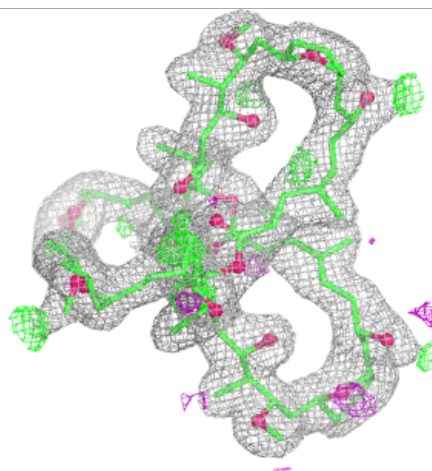
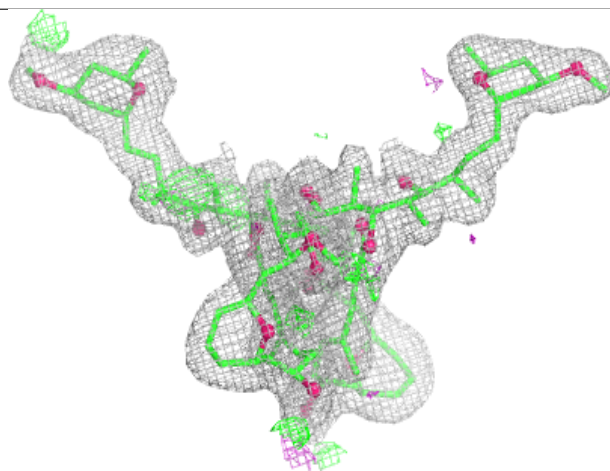
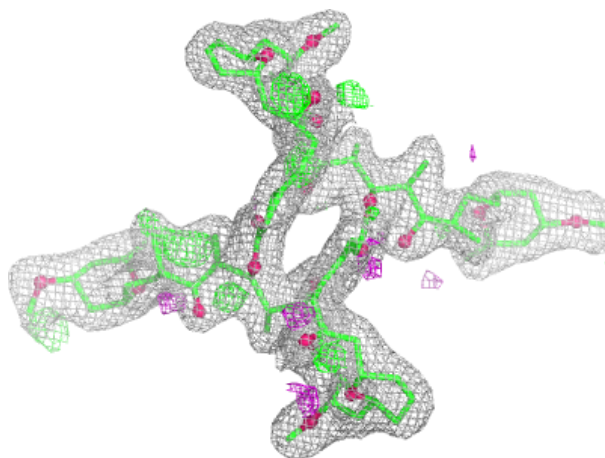
Electron density around ATP B 2380:

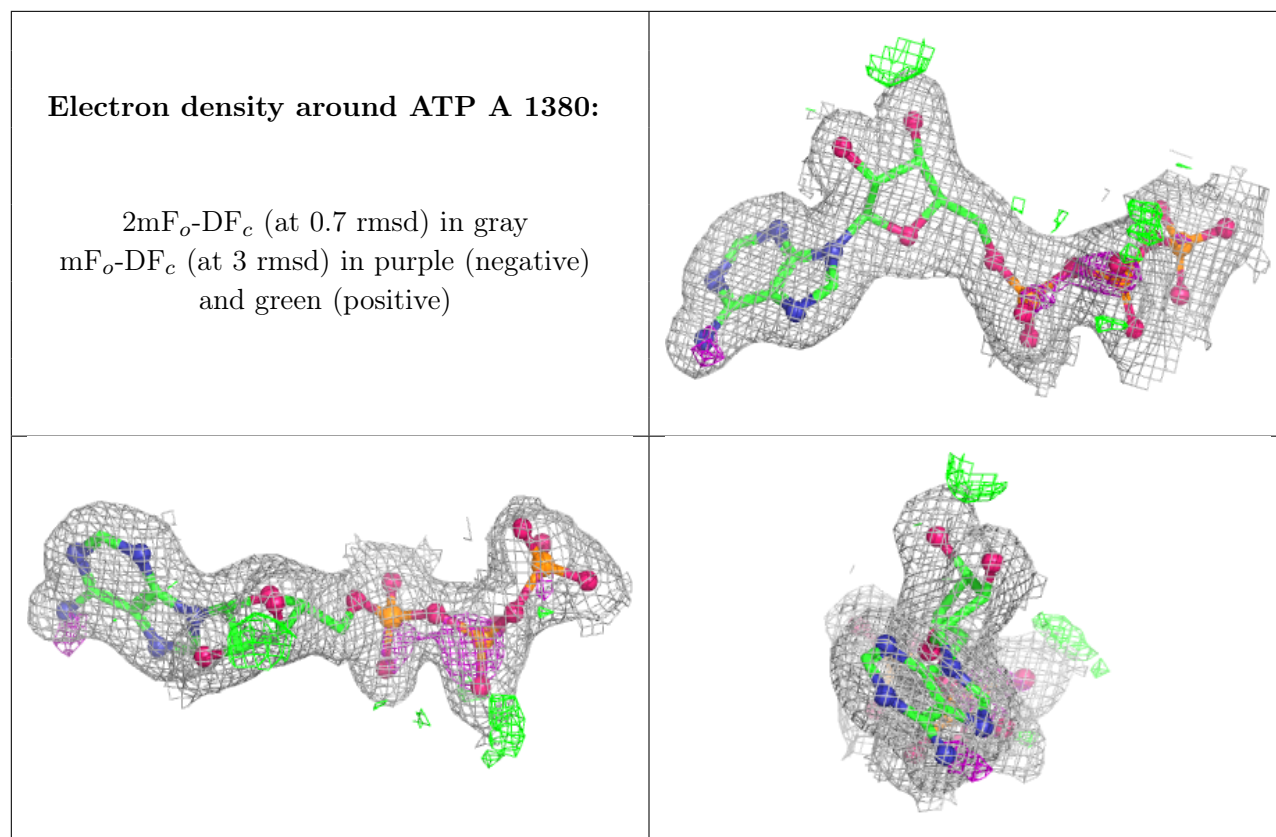
$2mF_o - DF_c$ (at 0.7 rmsd) in gray
 $mF_o - DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around SWI B 600:

$2mF_o-DF_c$ (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.