Full wwPDB X-ray Structure Validation Report (i)

Jun 12, 2024 – 03:45 PM EDT

PDB ID	:	2XZL
Title	:	Upf1-RNA complex
Authors	:	Chakrabarti, S.; Jayachandran, U.; Bonneau, F.; Fiorini, F.; Basquin, C.; Domcke, S.; Le Hir, H.; Conti, E.
Deposited on	:	2010-11-26
Resolution	:	2.40 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 (i) 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 (i)) were used in the production of this report:

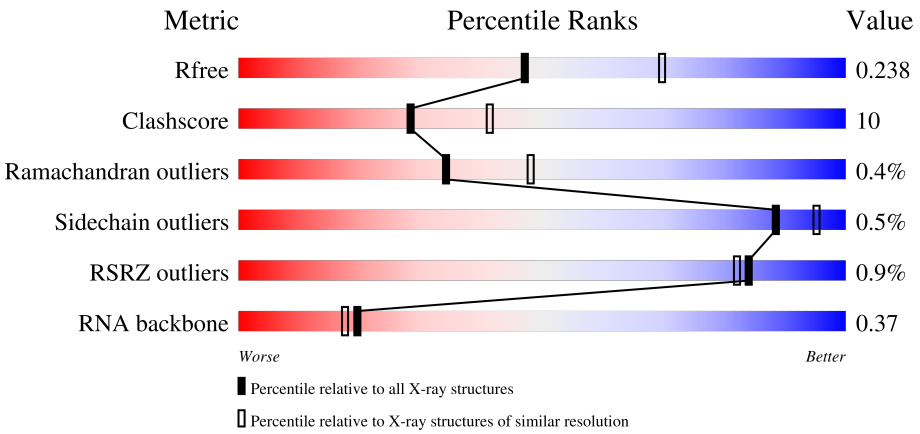
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)
RNA backbone	3102	1174 (2.80-2.00)

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 <=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	802	% 77% 17% 6%
2	B	9	67% 22% 11%

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 6041 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 ATP-DEPENDENT HELICASE NAM7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	756	5649	3626	979	1015	29	0	0	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	49	GLY	-	expression tag	UNP P30771
A	50	ALA	-	expression tag	UNP P30771
A	51	ALA	-	expression tag	UNP P30771
A	52	SER	-	expression tag	UNP P30771
A	53	MET	-	expression tag	UNP P30771

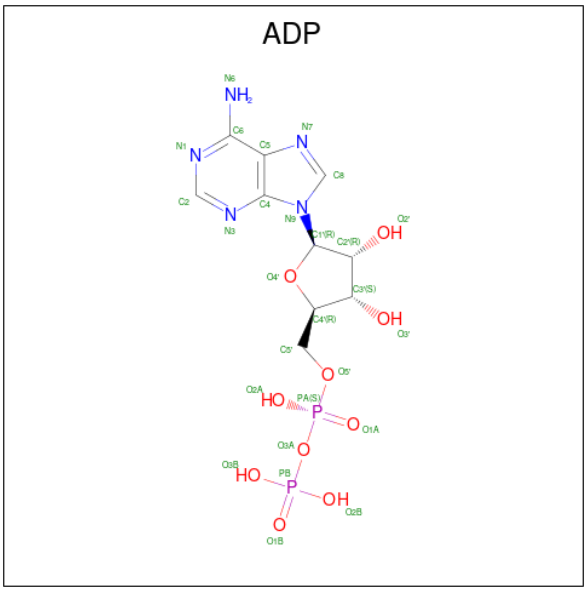
- Molecule 2 is a RNA chain called 5- R(*UP*UP*UP*UP*UP*UP*UP*UP*U) -3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	B	9	164	72	16	67	9	0	0	0

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

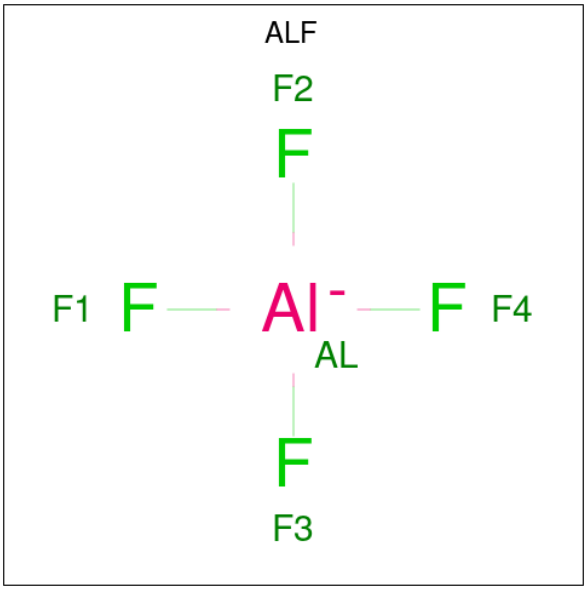
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
3	A	3	3	3	0	0

- Molecule 4 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
4	A	1	27	10	5	10	2	0	0

- Molecule 5 is TETRAFLUOROALUMINATE ION (three-letter code: ALF) (formula: AlF_4).

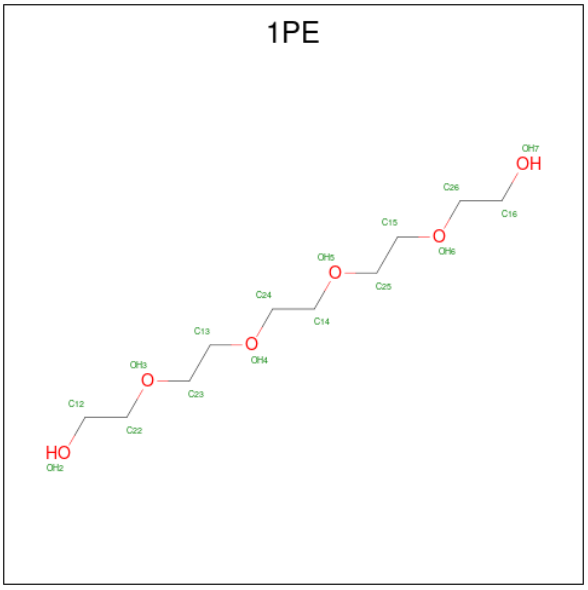


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	Al	F		
5	A	1	5	1	4	0	0

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
6	A	1	1	1	0	0

- Molecule 7 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: $C_{10}H_{22}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
7	A	1	10	6	4	0	0
			Total	C	O		
7	A	1	13	8	5	0	0
			Total	C	O		
7	A	1	7	4	3	0	0
			Total	C	O		
7	A	1	7	4	3	0	0
			Total	C	O		
7	A	1	10	6	4	0	0
			Total	C	O		
7	A	1	7	4	3	0	0
			Total	C	O		
7	A	1	7	4	3	0	0
			Total	C	O		
7	A	1	7	4	3	0	0
			Total	C	O		
7	A	1	7	4	3	0	0
			Total	C	O		
7	A	1	7	4	3	0	0
			Total	C	O		
7	A	1	7	4	3	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
7	A	1	7	4	3	0	0

- Molecule 8 is water.

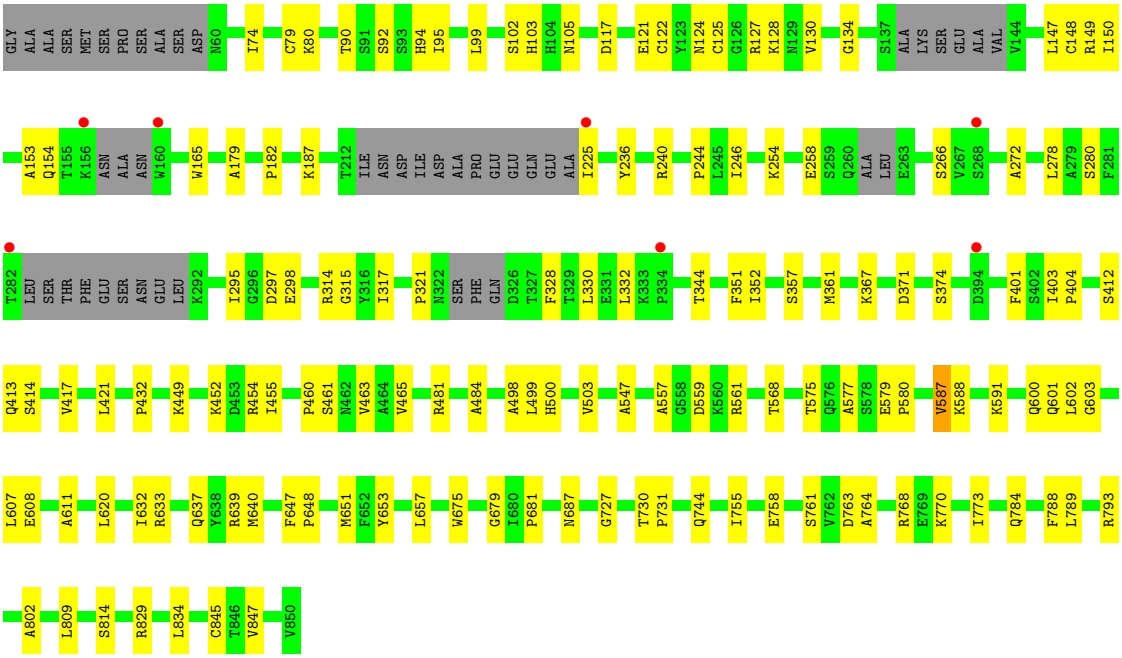
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
8	A	91	91	91	0	0
			Total	O		
8	B	5	5	5	0	0

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.

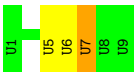
• Molecule 1: ATP-DEPENDENT HELICASE NAM7

Chain A:



• Molecule 2: 5- R(*UP*UP*UP*UP*UP*UP*UP*UP*U) -3

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	64.14Å 114.12Å 65.73Å 90.00° 110.24° 90.00°	Depositor
Resolution (Å)	41.88 – 2.40 41.88 – 2.40	Depositor EDS
% Data completeness (in resolution range)	97.9 (41.88-2.40) 97.9 (41.88-2.40)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.68 (at 2.39Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.197 , 0.243 0.200 , 0.238	Depositor DCC
R_{free} test set	1726 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å^2)	19.5	Xtriage
Anisotropy	0.205	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 46.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.030 for l,-k,h	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	6041	wwPDB-VP
Average B, all atoms (Å^2)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.60% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: ZN, MG, 1PE, ADP, ALF

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	0.21	0/5763	0.41	0/7839
2	B	0.24	0/179	0.67	0/275
All	All	0.22	0/5942	0.42	0/8114

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	5649	0	5459	111	0
2	B	164	0	80	2	0
3	A	3	0	0	0	0
4	A	27	0	12	0	0
5	A	5	0	0	0	0
6	A	1	0	0	0	0
7	A	96	0	124	22	0
8	A	91	0	0	0	0
8	B	5	0	0	1	0
All	All	6041	0	5675	114	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 10.

All (114) 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:637:GLN:NE2	1:A:640:MET:H	1.47	1.13
1:A:637:GLN:HE22	1:A:640:MET:H	0.97	0.93
1:A:632:ILE:HD11	7:A:1864:1PE:H222	1.56	0.86
1:A:637:GLN:HE22	1:A:640:MET:N	1.73	0.84
1:A:675:TRP:O	7:A:1859:1PE:H132	1.82	0.80
1:A:834:LEU:HB3	7:A:1862:1PE:H122	1.64	0.80
1:A:744:GLN:NE2	1:A:755:ILE:HG23	2.01	0.76
1:A:637:GLN:HB2	1:A:657:LEU:HD11	1.66	0.76
1:A:637:GLN:NE2	1:A:640:MET:N	2.30	0.76
1:A:829:ARG:HG3	7:A:1862:1PE:H121	1.68	0.76
1:A:225:ILE:HD12	1:A:244:PRO:HB2	1.69	0.72
1:A:587:VAL:HG12	1:A:587:VAL:O	1.91	0.69
1:A:647:PHE:CZ	1:A:651:MET:HG3	2.28	0.68
1:A:236:TYR:O	1:A:240:ARG:HG3	1.94	0.67
1:A:367:LYS:HB3	1:A:587:VAL:HG11	1.78	0.65
1:A:317:ILE:HD11	1:A:351:PHE:HE1	1.63	0.64
1:A:315:GLY:HA3	1:A:330:LEU:HD11	1.80	0.64
1:A:374:SER:HB2	1:A:587:VAL:HG13	1.79	0.62
1:A:559:ASP:OD1	1:A:561:ARG:HD3	2.00	0.62
1:A:730:THR:O	1:A:761:SER:HA	2.00	0.62
1:A:834:LEU:HB3	7:A:1862:1PE:C12	2.30	0.61
1:A:647:PHE:HB3	1:A:648:PRO:HD3	1.82	0.61
1:A:298:GLU:HG2	1:A:352:ILE:HD12	1.84	0.60
1:A:90:THR:HG21	1:A:94:HIS:CD2	2.37	0.60
1:A:414:SER:O	1:A:417:VAL:HG22	2.02	0.59
1:A:412:SER:HB2	7:A:1866:1PE:H222	1.82	0.59
1:A:374:SER:HB2	1:A:587:VAL:CG1	2.33	0.58
1:A:246:ILE:HD11	1:A:580:PRO:HG2	1.86	0.58
1:A:557:ALA:O	1:A:588:LYS:HE3	2.04	0.57
1:A:784:GLN:HG2	1:A:814:SER:HA	1.84	0.57
1:A:847:VAL:O	7:A:1862:1PE:H131	2.05	0.56
1:A:95:ILE:O	1:A:99:LEU:HG	2.07	0.55
1:A:608:GLU:HG3	1:A:611:ALA:H	1.72	0.54
1:A:675:TRP:HB2	7:A:1859:1PE:H231	1.90	0.54
1:A:463:VAL:HG13	8:B:2003:HOH:O	2.08	0.53
1:A:90:THR:HG21	1:A:94:HIS:HD2	1.72	0.53
1:A:105:ASN:O	1:A:130:VAL:HG22	2.08	0.53
1:A:829:ARG:HD3	7:A:1862:1PE:H231	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:845:CYS:SG	1:A:847:VAL:HG12	2.48	0.52
1:A:122:CYS:SG	1:A:147:LEU:HA	2.49	0.52
1:A:149:ARG:O	1:A:153:ALA:HB3	2.10	0.52
1:A:633:ARG:O	7:A:1866:1PE:H121	2.09	0.52
1:A:454:ARG:HG2	1:A:547:ALA:O	2.09	0.52
1:A:280:SER:HA	1:A:328:PHE:O	2.09	0.52
2:B:5:U:O2'	2:B:6:U:H5'	2.10	0.52
1:A:371:ASP:HB3	1:A:374:SER:HB3	1.93	0.51
1:A:413:GLN:O	1:A:417:VAL:HG13	2.10	0.51
1:A:182:PRO:HG2	1:A:187:LYS:HG3	1.93	0.51
1:A:272:ALA:HB2	1:A:278:LEU:HD21	1.93	0.51
1:A:134:GLY:HA3	1:A:165:TRP:CZ2	2.46	0.51
1:A:314:ARG:NH1	1:A:352:ILE:HD13	2.26	0.50
1:A:266:SER:HA	1:A:344:THR:O	2.11	0.50
1:A:484:ALA:HB1	2:B:7:U:OP2	2.12	0.50
1:A:297:ASP:HB2	1:A:317:ILE:HD12	1.94	0.50
1:A:321:PRO:HD3	1:A:328:PHE:CG	2.47	0.50
1:A:637:GLN:NE2	1:A:639:ARG:N	2.59	0.49
1:A:687:ASN:ND2	1:A:809:LEU:HB3	2.27	0.49
1:A:417:VAL:O	1:A:421:LEU:HG	2.12	0.49
1:A:463:VAL:HG21	1:A:764:ALA:O	2.12	0.49
1:A:637:GLN:NE2	1:A:639:ARG:H	2.11	0.48
1:A:651:MET:CE	7:A:1860:1PE:H232	2.44	0.48
1:A:579:GLU:HG3	1:A:620:LEU:HB2	1.95	0.48
1:A:679:GLY:H	7:A:1863:1PE:H131	1.79	0.48
1:A:455:ILE:HG12	1:A:568:THR:HG21	1.94	0.47
1:A:681:PRO:HD3	7:A:1863:1PE:H221	1.96	0.47
1:A:401:PHE:HB3	1:A:417:VAL:HG21	1.97	0.47
1:A:134:GLY:HA3	1:A:165:TRP:CE2	2.49	0.46
1:A:591:LYS:HE2	7:A:1865:1PE:H121	1.97	0.46
1:A:637:GLN:NE2	1:A:640:MET:HG2	2.30	0.46
1:A:315:GLY:CA	1:A:330:LEU:HD11	2.46	0.46
1:A:481:ARG:O	1:A:498:ALA:HA	2.16	0.46
1:A:601:GLN:O	1:A:793:ARG:HD2	2.16	0.46
1:A:367:LYS:NZ	7:A:1867:1PE:C22	2.79	0.45
7:A:1858:1PE:H231	7:A:1858:1PE:H241	1.74	0.45
1:A:449:LYS:HA	1:A:452:LYS:HE2	1.99	0.45
1:A:499:LEU:O	1:A:503:VAL:HG23	2.17	0.45
1:A:150:ILE:HG22	1:A:154:GLN:HG2	1.97	0.45
1:A:647:PHE:CE2	1:A:651:MET:HG3	2.50	0.45
1:A:731:PRO:HG2	1:A:789:LEU:HD21	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:455:ILE:HG12	1:A:568:THR:CG2	2.46	0.45
1:A:829:ARG:CD	7:A:1862:1PE:H231	2.47	0.45
7:A:1865:1PE:H122	7:A:1865:1PE:H231	1.79	0.45
1:A:150:ILE:HD12	1:A:150:ILE:O	2.17	0.45
1:A:127:ARG:HD3	1:A:148:CYS:SG	2.56	0.44
1:A:432:PRO:HD3	1:A:653:TYR:OH	2.17	0.44
1:A:125:CYS:SG	1:A:127:ARG:CD	3.06	0.44
1:A:315:GLY:HA3	1:A:330:LEU:CD1	2.47	0.44
1:A:637:GLN:HE21	1:A:639:ARG:H	1.64	0.44
1:A:640:MET:HB3	1:A:802:ALA:O	2.18	0.44
1:A:679:GLY:H	7:A:1863:1PE:C13	2.31	0.44
1:A:102:SER:O	1:A:103:HIS:HB2	2.17	0.43
1:A:758:GLU:OE1	1:A:768:ARG:NH2	2.51	0.43
1:A:460:PRO:HG3	1:A:577:ALA:HB2	2.00	0.43
1:A:607:LEU:H	1:A:607:LEU:HD22	1.83	0.43
1:A:602:LEU:CD1	1:A:763:ASP:HA	2.49	0.43
1:A:603:GLY:HA3	1:A:793:ARG:NH2	2.34	0.42
1:A:633:ARG:O	7:A:1866:1PE:C12	2.67	0.42
1:A:770:LYS:HB2	1:A:773:ILE:HD11	2.02	0.42
1:A:403:ILE:HA	1:A:404:PRO:HD2	1.86	0.42
1:A:74:ILE:HD11	1:A:179:ALA:HB2	2.01	0.42
1:A:254:LYS:O	1:A:258:GLU:HB2	2.20	0.42
1:A:461:SER:O	1:A:465:VAL:HG23	2.20	0.42
1:A:498:ALA:HB1	1:A:500:HIS:CE1	2.55	0.41
1:A:79:CYS:O	1:A:80:LYS:HB2	2.21	0.41
1:A:357:SER:O	1:A:361:MET:HG3	2.19	0.41
1:A:452:LYS:HD3	1:A:452:LYS:HA	1.86	0.41
1:A:632:ILE:HG23	7:A:1866:1PE:H132	2.03	0.41
1:A:588:LYS:HA	7:A:1867:1PE:H222	2.03	0.41
1:A:600:GLN:HA	1:A:600:GLN:OE1	2.21	0.40
1:A:607:LEU:HD22	1:A:607:LEU:N	2.36	0.40
1:A:727:GLY:HA3	1:A:770:LYS:HG3	2.02	0.40
1:A:90:THR:HG23	1:A:92:SER:O	2.20	0.40
1:A:121:GLU:HB3	1:A:128:LYS:HG2	2.03	0.40
1:A:330:LEU:HD12	1:A:332:LEU:HD23	2.04	0.40

There are no symmetry-related clashes.

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	742/802 (92%)	726 (98%)	13 (2%)	3 (0%)	34 48

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	117	ASP
1	A	124	ASN
1	A	587	VAL

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	564/703 (80%)	561 (100%)	3 (0%)	88 95

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	295	ILE
1	A	575	THR
1	A	788	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	419	HIS
1	A	637	GLN
1	A	658	GLN
1	A	659	ASN
1	A	744	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	B	7/9 (77%)	1 (14%)	0

All (1) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	B	7	U

There are no RNA pucker outliers to report.

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 18 ligands modelled in this entry, 4 are monoatomic - leaving 14 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	$\#\|Z\| > 2$
7	1PE	A	1866	-	6,6,15	0.68	0	5,5,14	1.36	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
7	1PE	A	1868	-	6,6,15	0.67	0	5,5,14	1.38	0
7	1PE	A	1858	-	12,12,15	0.70	0	11,11,14	1.46	0
7	1PE	A	1863	-	6,6,15	0.67	0	5,5,14	1.39	0
7	1PE	A	1859	-	6,6,15	0.67	0	5,5,14	1.37	0
7	1PE	A	1860	-	6,6,15	0.62	0	5,5,14	1.54	0
7	1PE	A	1857	-	9,9,15	0.70	0	8,8,14	1.38	0
7	1PE	A	1861	-	9,9,15	0.67	0	8,8,14	1.48	0
7	1PE	A	1862	-	6,6,15	0.70	0	5,5,14	1.31	0
7	1PE	A	1865	-	6,6,15	0.65	0	5,5,14	1.32	0
5	ALF	A	1855	4,8	4,4,4	1.36	0	-		
4	ADP	A	1854	5,6	24,29,29	3.37	6 (25%)	29,45,45	2.36	8 (27%)
7	1PE	A	1867	-	6,6,15	0.68	0	5,5,14	1.38	0
7	1PE	A	1864	-	6,6,15	0.66	0	5,5,14	1.47	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
7	1PE	A	1868	-	-	3/4/4/13	-
7	1PE	A	1858	-	-	5/10/10/13	-
7	1PE	A	1863	-	-	2/4/4/13	-
7	1PE	A	1859	-	-	3/4/4/13	-
7	1PE	A	1860	-	-	4/4/4/13	-
7	1PE	A	1857	-	-	2/7/7/13	-
7	1PE	A	1861	-	-	3/7/7/13	-
7	1PE	A	1862	-	-	2/4/4/13	-
7	1PE	A	1865	-	-	3/4/4/13	-
7	1PE	A	1866	-	-	2/4/4/13	-
4	ADP	A	1854	5,6	-	2/12/32/32	0/3/3/3
7	1PE	A	1867	-	-	1/4/4/13	-
7	1PE	A	1864	-	-	2/4/4/13	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1854	ADP	C4-N3	10.76	1.50	1.35
4	A	1854	ADP	O4'-C1'	7.63	1.50	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1854	ADP	C2-N1	5.57	1.43	1.33
4	A	1854	ADP	C2-N3	5.24	1.40	1.32
4	A	1854	ADP	C6-N6	2.77	1.44	1.34
4	A	1854	ADP	C5-N7	2.27	1.48	1.39

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	1854	ADP	O4'-C1'-N9	6.51	117.38	108.75
4	A	1854	ADP	N3-C2-N1	-6.36	120.03	128.67
4	A	1854	ADP	C4'-O4'-C1'	-5.68	104.72	109.92
4	A	1854	ADP	O3'-C3'-C4'	2.96	119.59	111.08
4	A	1854	ADP	O4'-C4'-C5'	2.83	118.42	109.33
4	A	1854	ADP	O3'-C3'-C2'	2.40	119.51	111.82
4	A	1854	ADP	O2'-C2'-C3'	2.32	119.25	111.82
4	A	1854	ADP	O5'-C5'-C4'	2.16	116.36	108.99

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1854	ADP	PA-O3A-PB-O2B
4	A	1854	ADP	PA-O3A-PB-O3B
7	A	1859	1PE	C12-C22-OH3-C23
7	A	1858	1PE	C23-C13-OH4-C24
7	A	1864	1PE	C12-C22-OH3-C23
7	A	1858	1PE	OH4-C13-C23-OH3
7	A	1861	1PE	OH4-C13-C23-OH3
7	A	1868	1PE	OH2-C12-C22-OH3
7	A	1858	1PE	OH2-C12-C22-OH3
7	A	1859	1PE	OH2-C12-C22-OH3
7	A	1860	1PE	OH2-C12-C22-OH3
7	A	1865	1PE	OH4-C13-C23-OH3
7	A	1867	1PE	OH2-C12-C22-OH3
7	A	1865	1PE	C12-C22-OH3-C23
7	A	1865	1PE	OH2-C12-C22-OH3
7	A	1863	1PE	OH2-C12-C22-OH3
7	A	1863	1PE	OH4-C13-C23-OH3
7	A	1860	1PE	OH4-C13-C23-OH3
7	A	1862	1PE	OH2-C12-C22-OH3
7	A	1866	1PE	OH4-C13-C23-OH3
7	A	1860	1PE	C13-C23-OH3-C22

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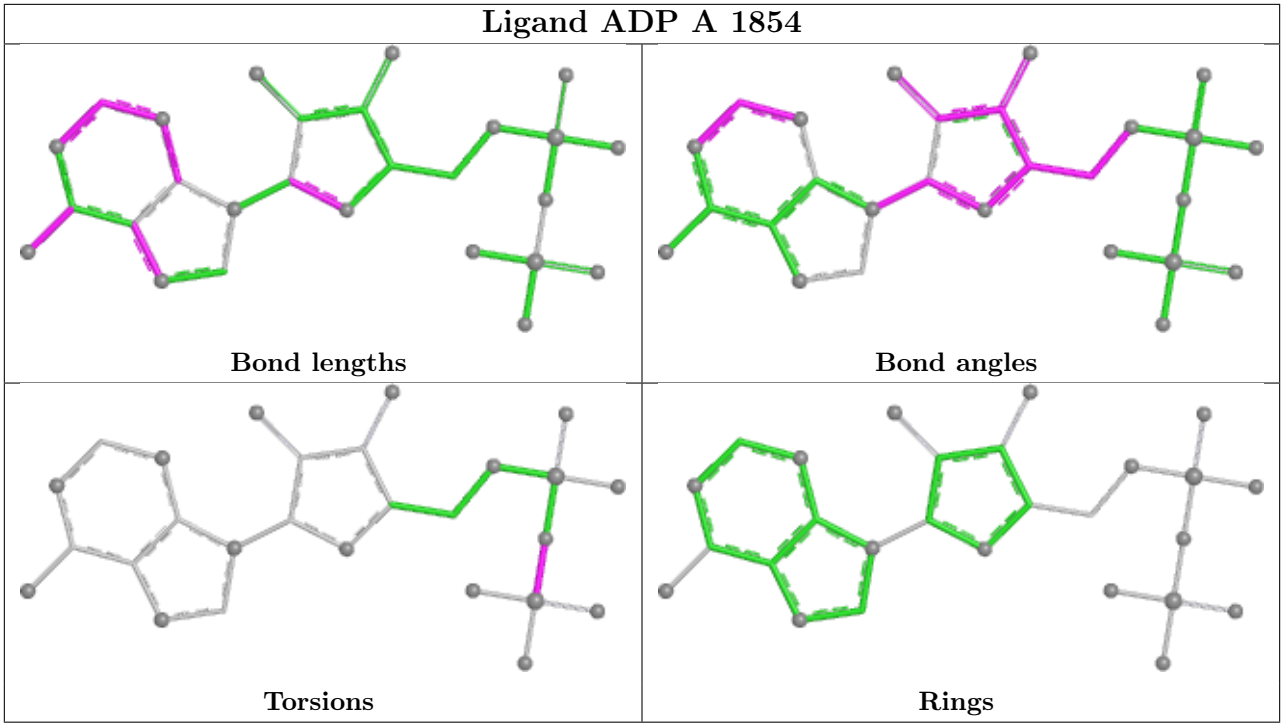
Mol	Chain	Res	Type	Atoms
7	A	1857	1PE	OH4-C13-C23-OH3
7	A	1857	1PE	OH5-C14-C24-OH4
7	A	1858	1PE	C24-C14-OH5-C25
7	A	1866	1PE	C13-C23-OH3-C22
7	A	1859	1PE	OH4-C13-C23-OH3
7	A	1868	1PE	C13-C23-OH3-C22
7	A	1861	1PE	C14-C24-OH4-C13
7	A	1862	1PE	C13-C23-OH3-C22
7	A	1864	1PE	C13-C23-OH3-C22
7	A	1858	1PE	C13-C23-OH3-C22
7	A	1861	1PE	C23-C13-OH4-C24
7	A	1860	1PE	C12-C22-OH3-C23
7	A	1868	1PE	OH4-C13-C23-OH3

There are no ring outliers.

9 monomers are involved in 22 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	1866	1PE	4	0
7	A	1858	1PE	1	0
7	A	1863	1PE	3	0
7	A	1859	1PE	2	0
7	A	1860	1PE	1	0
7	A	1862	1PE	6	0
7	A	1865	1PE	2	0
7	A	1867	1PE	2	0
7	A	1864	1PE	1	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.



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 (i)

6.1 Protein, DNA and RNA chains (i)

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	756/802 (94%)	-0.19	7 (0%) 84 82	6, 20, 43, 66	0
2	B	9/9 (100%)	-0.32	0 100 100	17, 25, 44, 75	0
All	All	765/811 (94%)	-0.19	7 (0%) 84 82	6, 20, 43, 75	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	225	ILE	3.5
1	A	282	THR	2.8
1	A	394	ASP	2.7
1	A	160	TRP	2.5
1	A	268	SER	2.4
1	A	334	PRO	2.4
1	A	156	LYS	2.3

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 monosaccharides in this entry.

6.4 Ligands (i)

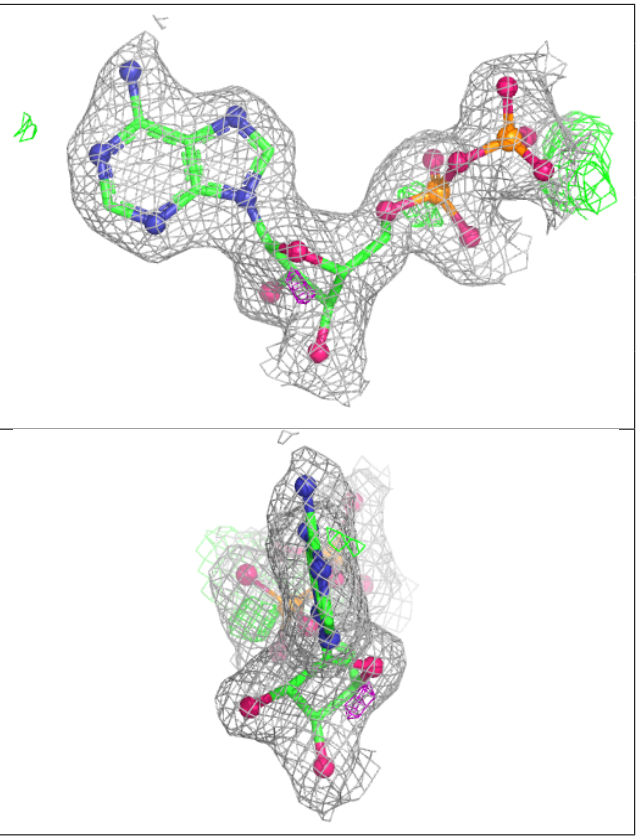
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	1PE	A	1862	7/16	0.82	0.27	26,27,33,40	0
7	1PE	A	1860	7/16	0.88	0.27	26,33,45,47	0
7	1PE	A	1858	13/16	0.88	0.19	21,32,42,50	0
7	1PE	A	1864	7/16	0.88	0.40	21,28,37,45	0
7	1PE	A	1866	7/16	0.88	0.26	28,34,41,46	0
7	1PE	A	1861	10/16	0.89	0.17	31,35,43,59	0
6	MG	A	1856	1/1	0.89	0.30	12,12,12,12	0
7	1PE	A	1867	7/16	0.89	0.25	34,36,44,44	0
7	1PE	A	1863	7/16	0.91	0.25	18,28,32,46	0
7	1PE	A	1859	7/16	0.91	0.28	22,29,35,39	0
7	1PE	A	1868	7/16	0.92	0.16	18,22,30,42	0
7	1PE	A	1865	7/16	0.95	0.16	30,37,41,45	0
7	1PE	A	1857	10/16	0.95	0.11	20,26,33,36	0
3	ZN	A	1853	1/1	0.97	0.08	43,43,43,43	0
4	ADP	A	1854	27/27	0.97	0.14	6,10,15,16	0
3	ZN	A	1852	1/1	0.97	0.10	19,19,19,19	0
5	ALF	A	1855	5/5	0.99	0.15	7,8,9,10	0
3	ZN	A	1851	1/1	1.00	0.09	13,13,13,13	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 ADP A 1854:

$2mF_o$-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 (i)

There are no such residues in this entry.