



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 07:11 PM UTC

PDB ID : 4BZX / pdb_00004bzx
Title : Structure of the Mycobacterium tuberculosis APS kinase CysC in complex with AMPPNP and APS
Authors : Poyraz, O.; Lohkamp, B.; Schnell, R.; Schneider, G.
Deposited on : 2013-07-30
Resolution : 1.70 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

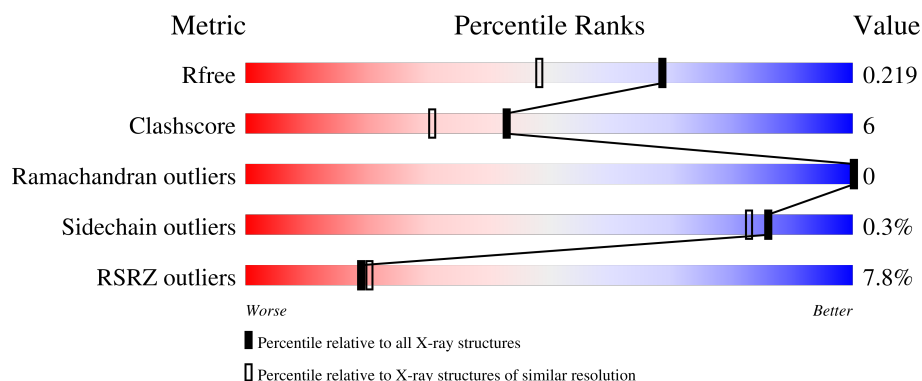
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.70 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	5551 (1.70-1.70)
Clashscore	190562	5924 (1.70-1.70)
Ramachandran outliers	187476	5846 (1.70-1.70)
Sidechain outliers	187428	5846 (1.70-1.70)
RSRZ outliers	180081	5554 (1.70-1.70)

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	173	4% 84% 16%
1	B	173	12% 83% 17%

2 Entry composition [i](#)

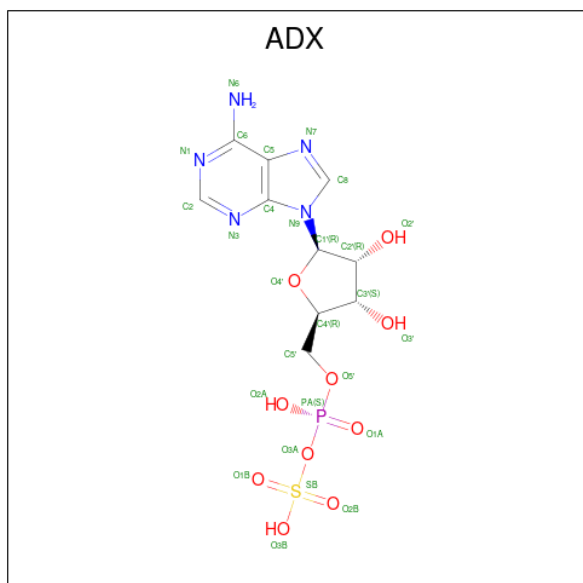
There are 8 unique types of molecules in this entry. The entry contains 3152 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 BIFUNCTIONAL ENZYME CYSN/CYSC.

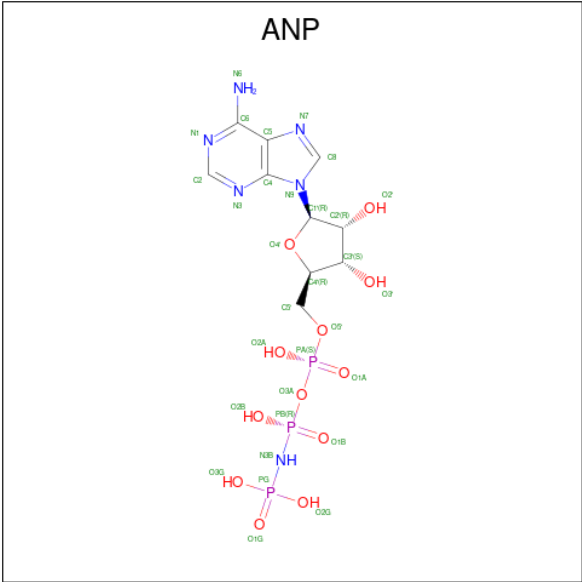
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	173	Total	C	N	O	S	0	9	0
			1389	880	246	257	6			
1	B	173	Total	C	N	O	S	0	9	0
			1387	875	247	259	6			

- Molecule 2 is ADENOSINE-5'-PHOSPHOSULFATE (CCD ID: ADX) (formula: $C_{10}H_{14}N_5O_{10}PS$).



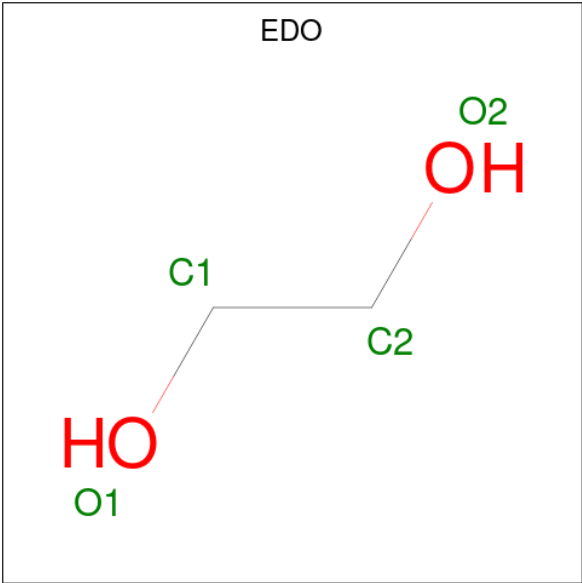
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			27	10	5	10	1		
2	B	1	Total	C	N	O	P	0	0
			27	10	5	10	1		

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (CCD ID: ANP) (formula: $C_{10}H_{17}N_6O_{12}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	B	1	Total	C	N	O	P	0	0
			31	10	6	12	3		

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



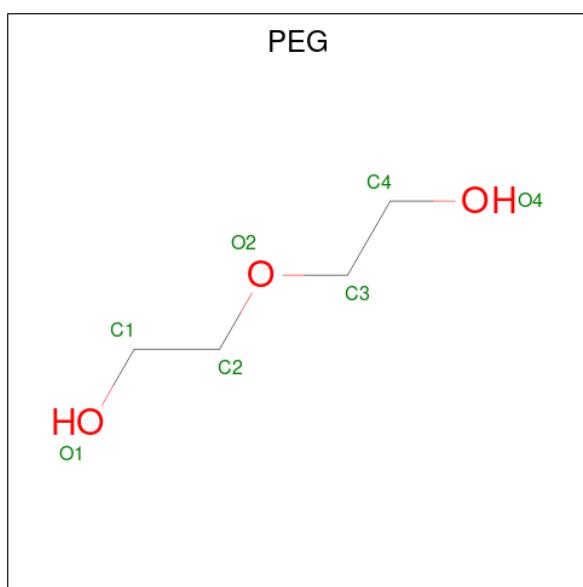
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		

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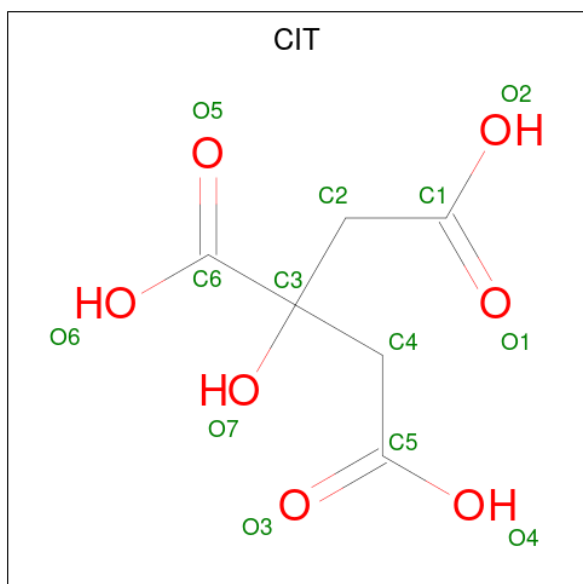
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total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

- Molecule 5 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: C₄H₁₀O₃).



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

- Molecule 6 is CITRIC ACID (CCD ID: CIT) (formula: $C_6H_8O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			13	6	7		
6	B	1	Total	C	O	0	0
			13	6	7		

- Molecule 7 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

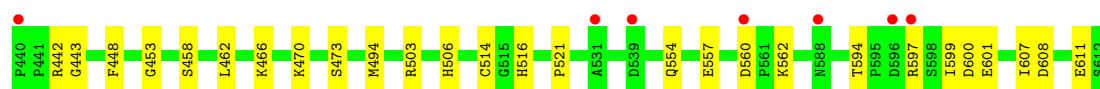
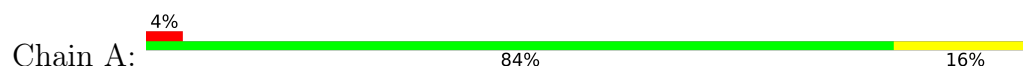
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	97	Total	O	0	0
			97	97		
8	B	76	Total	O	0	0
			76	76		

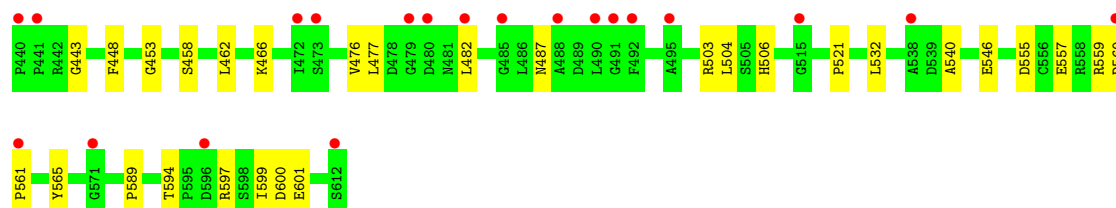
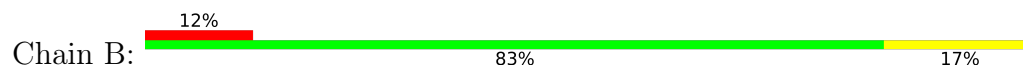
3 Residue-property plots [i](#)

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: BIFUNCTIONAL ENZYME CYSN/CYSC



- Molecule 1: BIFUNCTIONAL ENZYME CYSN/CYSC



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	63.82Å 69.43Å 79.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	52.26 – 1.70 52.26 – 1.70	Depositor EDS
% Data completeness (in resolution range)	96.3 (52.26-1.70) 96.3 (52.26-1.70)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.98 (at 1.70Å)	Xtriage
Refinement program	REFMAC 5.8.0073	Depositor
R, R_{free}	0.174 , 0.216 0.186 , 0.219	Depositor DCC
R_{free} test set	1930 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	26.3	Xtriage
Anisotropy	0.671	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 40.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3152	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.56% 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: MG, CIT, ADX, EDO, ANP, PEG

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	1.16	3/1440 (0.2%)	1.08	3/1945 (0.2%)
1	B	1.19	2/1435 (0.1%)	1.09	3/1939 (0.2%)
All	All	1.18	5/2875 (0.2%)	1.08	6/3884 (0.2%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	443	GLY	C-O	6.07	1.29	1.23
1	A	608	ASP	C-O	5.74	1.30	1.24
1	A	503	ARG	N-CA	-5.42	1.40	1.46
1	B	443	GLY	C-O	5.16	1.28	1.23
1	B	532	LEU	N-CA	5.09	1.52	1.46

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	594	THR	CA-C-N	-7.26	112.11	121.91
1	A	594	THR	C-N-CA	-7.26	112.11	121.91
1	B	594	THR	CA-C-N	-6.04	113.76	121.91
1	B	594	THR	C-N-CA	-6.04	113.76	121.91
1	B	561	PRO	N-CA-C	5.91	121.31	113.57
1	A	514	CYS	N-CA-C	5.42	119.52	113.01

There are no chirality outliers.

There are no planarity outliers.

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	1389	0	1417	18	0
1	B	1387	0	1405	18	0
2	A	27	0	13	0	0
2	B	27	0	12	0	0
3	A	31	0	13	1	2
3	B	31	0	13	1	2
4	A	28	0	42	3	0
4	B	24	0	36	5	0
5	A	7	0	10	1	0
6	A	13	0	5	0	0
6	B	13	0	5	1	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
8	A	97	0	0	3	0
8	B	76	0	0	0	0
All	All	3152	0	2971	37	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 6.

All (37) 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:597:ARG:HB2	1:B:601:GLU:OE1	1.89	0.72
1:A:597:ARG:HB2	1:A:601:GLU:OE1	1.89	0.71
1:A:442:ARG:O	8:A:2001:HOH:O	2.13	0.67
1:B:555:ASP:O	1:B:559:ARG:HG3	2.00	0.61
1:A:607:ILE:HG21	4:A:1617:EDO:H12	1.84	0.59
1:B:448[B]:PHE:HB2	1:B:521:PRO:HA	1.89	0.54
4:B:1615:EDO:H21	4:B:1618:EDO:H12	1.90	0.53
1:B:506:HIS:CE1	4:B:1616:EDO:H22	2.44	0.53
1:B:482:LEU:HD22	1:B:504[B]:LEU:HD13	1.93	0.51
1:B:589:PRO:HD2	4:B:1615:EDO:H12	1.93	0.50
1:A:494:MET:HE2	8:A:2038:HOH:O	2.12	0.50
1:A:453:GLY:H	3:A:1614:ANP:HNB1	1.59	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:476:VAL:HB	4:B:1620:EDO:H22	1.93	0.49
1:B:557:GLU:O	1:B:560:ASP:HB2	2.13	0.49
1:A:458:SER:HB3	1:A:599:ILE:HD13	1.95	0.48
1:A:462:LEU:CD2	1:A:600:ASP:HA	2.44	0.47
1:B:487:ASN:OD1	1:B:503:ARG:HD2	2.15	0.46
1:A:506:HIS:HE2	4:A:1618:EDO:C2	2.27	0.46
1:B:540:ALA:HB2	4:B:1616:EDO:C1	2.45	0.46
1:A:554:GLN:H	1:A:554:GLN:CD	2.23	0.46
1:B:462:LEU:CD2	1:B:600:ASP:HA	2.46	0.45
1:B:477[B]:LEU:HB3	1:B:504[B]:LEU:HD11	1.97	0.45
1:A:562:LYS:HE3	8:A:2060:HOH:O	2.16	0.45
1:B:453:GLY:H	3:B:1614:ANP:HNB1	1.63	0.45
1:A:470[B]:LYS:HD3	4:A:1617:EDO:H11	2.00	0.44
1:B:458:SER:HB3	1:B:599:ILE:HD13	1.99	0.44
1:A:448[B]:PHE:HB2	1:A:521:PRO:HA	2.01	0.43
1:A:506:HIS:ND1	5:A:1622:PEG:H41	2.34	0.43
1:A:557:GLU:O	1:A:560:ASP:HB2	2.19	0.43
1:B:477[B]:LEU:HD13	1:B:504[B]:LEU:HD12	2.01	0.42
1:A:597:ARG:HD3	1:A:601:GLU:HB3	2.02	0.42
1:B:557:GLU:HB3	1:B:565:TYR:CG	2.55	0.42
1:A:470[B]:LYS:HE2	1:A:470[B]:LYS:HB2	1.79	0.42
1:A:466:LYS:NZ	1:A:600:ASP:OD1	2.49	0.42
1:B:546:GLU:OE2	6:B:1621:CIT:O6	2.38	0.41
1:B:466:LYS:NZ	1:B:600:ASP:OD1	2.52	0.41
1:A:473:SER:OG	1:A:516:HIS:ND1	2.50	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)
3:A:1614:ANP:O3'	3:B:1614:ANP:O2'[3_644]	1.93	0.27
3:A:1614:ANP:O2'	3:B:1614:ANP:O3'[3_644]	2.00	0.20

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	180/173 (104%)	177 (98%)	3 (2%)	0	100	100
1	B	180/173 (104%)	176 (98%)	4 (2%)	0	100	100
All	All	360/346 (104%)	353 (98%)	7 (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	152/143 (106%)	151 (99%)	1 (1%)	76	69
1	B	152/143 (106%)	152 (100%)	0	100	100
All	All	304/286 (106%)	303 (100%)	1 (0%)	86	83

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	611	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	604	GLN

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 22 ligands modelled in this entry, 2 are monoatomic - leaving 20 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	$\# Z > 2$
4	EDO	B	1619	-	3,3,3	0.65	0	2,2,2	0.30	0
4	EDO	B	1617	-	3,3,3	0.14	0	2,2,2	0.13	0
4	EDO	A	1617	-	3,3,3	0.38	0	2,2,2	0.71	0
2	ADX	A	1613	-	29,29,29	1.30	3 (10%)	42,45,45	1.99	13 (30%)
4	EDO	A	1620	-	3,3,3	0.35	0	2,2,2	0.45	0
4	EDO	B	1620	-	3,3,3	0.28	0	2,2,2	0.58	0
4	EDO	A	1616	-	3,3,3	0.41	0	2,2,2	0.51	0
4	EDO	B	1618	-	3,3,3	0.73	0	2,2,2	0.39	0
6	CIT	B	1621	-	12,12,12	1.21	1 (8%)	17,17,17	1.81	6 (35%)
4	EDO	A	1621	-	3,3,3	0.62	0	2,2,2	0.77	0
4	EDO	A	1618	-	3,3,3	0.24	0	2,2,2	0.73	0
6	CIT	A	1623	-	12,12,12	1.50	2 (16%)	17,17,17	1.36	3 (17%)
4	EDO	B	1615	-	3,3,3	0.81	0	2,2,2	0.70	0
4	EDO	A	1615	-	3,3,3	0.38	0	2,2,2	0.79	0
3	ANP	B	1614	7	33,33,33	2.51	10 (30%)	45,52,52	2.01	12 (26%)
2	ADX	B	1613	-	29,29,29	1.74	7 (24%)	42,45,45	2.18	19 (45%)
4	EDO	A	1619	-	3,3,3	0.38	0	2,2,2	0.31	0
3	ANP	A	1614	7	33,33,33	2.28	10 (30%)	45,52,52	2.13	13 (28%)
5	PEG	A	1622	-	6,6,6	0.83	0	5,5,5	0.92	0
4	EDO	B	1616	-	3,3,3	0.37	0	2,2,2	0.61	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
4	EDO	B	1619	-	-	0/1/1/1	-
4	EDO	B	1617	-	-	0/1/1/1	-
4	EDO	A	1617	-	-	1/1/1/1	-
2	ADX	A	1613	-	-	5/10/32/32	0/3/3/3
4	EDO	A	1620	-	-	1/1/1/1	-
4	EDO	B	1620	-	-	1/1/1/1	-
4	EDO	A	1616	-	-	1/1/1/1	-
4	EDO	B	1618	-	-	0/1/1/1	-
6	CIT	B	1621	-	-	2/16/16/16	-
4	EDO	A	1621	-	-	1/1/1/1	-
4	EDO	A	1618	-	-	1/1/1/1	-
6	CIT	A	1623	-	-	3/16/16/16	-
4	EDO	B	1615	-	-	1/1/1/1	-
4	EDO	A	1615	-	-	0/1/1/1	-
3	ANP	B	1614	7	-	5/18/38/38	0/3/3/3
2	ADX	B	1613	-	-	1/10/32/32	0/3/3/3
4	EDO	A	1619	-	-	1/1/1/1	-
3	ANP	A	1614	7	-	3/18/38/38	0/3/3/3
5	PEG	A	1622	-	-	2/4/4/4	-
4	EDO	B	1616	-	-	1/1/1/1	-

All (33) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1614	ANP	PB-O3A	7.48	1.68	1.59
3	B	1614	ANP	PB-O3A	7.17	1.68	1.59
3	B	1614	ANP	PA-O3A	5.19	1.65	1.59
3	B	1614	ANP	C5-C4	5.18	1.48	1.39
3	A	1614	ANP	C5-C4	4.98	1.48	1.39
3	B	1614	ANP	PB-O1B	4.84	1.53	1.46
3	B	1614	ANP	PG-O1G	4.81	1.53	1.46
3	A	1614	ANP	PB-O1B	4.73	1.53	1.46
2	B	1613	ADX	PA-O3A	4.15	1.70	1.59
2	B	1613	ADX	C5-C4	4.12	1.46	1.39
3	A	1614	ANP	O4'-C4'	-3.15	1.38	1.45
6	A	1623	CIT	C3-C6	-2.97	1.50	1.53
2	A	1613	ADX	C5-C4	2.97	1.44	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1614	ANP	PB-O2B	-2.93	1.49	1.56
2	B	1613	ADX	O3A-SB	-2.67	1.53	1.65
2	A	1613	ADX	C4-N9	-2.65	1.32	1.37
3	A	1614	ANP	C5-C6	2.64	1.48	1.41
2	A	1613	ADX	O4'-C1'	2.63	1.48	1.42
3	A	1614	ANP	PG-N3B	2.61	1.70	1.63
3	B	1614	ANP	C5-N7	-2.59	1.34	1.39
3	B	1614	ANP	PG-N3B	2.59	1.70	1.63
3	A	1614	ANP	C8-N7	2.51	1.36	1.31
3	A	1614	ANP	PB-O2B	-2.38	1.50	1.56
3	A	1614	ANP	PG-O1G	2.35	1.49	1.46
2	B	1613	ADX	C5-C6	2.30	1.47	1.41
6	B	1621	CIT	C3-C6	-2.18	1.51	1.53
6	A	1623	CIT	O5-C6	2.10	1.28	1.22
3	B	1614	ANP	C5-C6	2.10	1.46	1.41
2	B	1613	ADX	O4'-C1'	2.10	1.46	1.42
3	B	1614	ANP	C4-N9	-2.07	1.33	1.37
2	B	1613	ADX	C2-N3	2.04	1.37	1.33
3	A	1614	ANP	PG-O2G	-2.03	1.51	1.56
2	B	1613	ADX	C8-N7	2.00	1.35	1.31

All (66) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1614	ANP	N3-C4-N9	5.15	135.93	127.17
3	B	1614	ANP	C5-C4-N3	-4.88	120.00	126.72
2	A	1613	ADX	C3'-C2'-C1'	4.86	110.66	101.46
2	B	1613	ADX	C5-C4-N3	-4.83	120.07	126.72
3	A	1614	ANP	C5-C4-N3	-4.79	120.12	126.72
3	A	1614	ANP	O1G-PG-N3B	-4.65	104.93	111.77
3	A	1614	ANP	N3-C4-N9	4.63	135.03	127.17
2	A	1613	ADX	C5-C4-N3	-4.57	120.42	126.72
2	A	1613	ADX	O4'-C1'-N9	-4.43	99.57	108.09
3	A	1614	ANP	N3-C2-N1	-4.28	122.10	128.58
2	B	1613	ADX	N3-C4-N9	4.13	134.19	127.17
3	B	1614	ANP	O2B-PB-O1B	3.99	118.43	109.87
2	B	1613	ADX	C3'-C2'-C1'	3.94	108.92	101.46
2	A	1613	ADX	N3-C4-N9	3.91	133.82	127.17
3	A	1614	ANP	C2-N3-C4	3.86	121.26	111.83
3	A	1614	ANP	C4-N9-C8	3.77	109.70	105.74
3	B	1614	ANP	N3-C2-N1	-3.71	122.96	128.58
3	A	1614	ANP	O2B-PB-O1B	3.70	117.81	109.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1613	ADX	O4'-C4'-C3'	3.47	112.05	105.15
3	B	1614	ANP	C4-N9-C8	3.32	109.23	105.74
2	B	1613	ADX	C2-N3-C4	3.31	119.92	111.83
2	A	1613	ADX	C2'-C1'-N9	3.27	121.44	113.30
2	B	1613	ADX	C4-C5-N7	-3.26	106.85	110.58
3	B	1614	ANP	N6-C6-N1	3.23	125.56	118.38
2	B	1613	ADX	C4-N9-C8	3.20	109.10	105.74
3	B	1614	ANP	C2-N3-C4	3.17	119.57	111.83
2	B	1613	ADX	C5'-C4'-C3'	-2.91	104.72	115.21
6	B	1621	CIT	O2-C1-C2	2.90	123.54	114.35
6	B	1621	CIT	C3-C4-C5	-2.83	106.18	113.92
3	A	1614	ANP	C2'-C1'-N9	-2.80	106.34	113.30
2	B	1613	ADX	N3-C2-N1	-2.80	124.34	128.58
3	A	1614	ANP	O3A-PB-N3B	-2.79	98.84	106.59
2	B	1613	ADX	O3A-PA-O1A	-2.75	102.44	110.70
2	B	1613	ADX	O2'-C2'-C3'	-2.74	103.02	111.82
2	B	1613	ADX	O2A-PA-O1A	2.71	125.06	112.44
6	B	1621	CIT	O1-C1-C2	-2.68	115.37	122.95
3	B	1614	ANP	C2-N1-C6	2.65	123.09	118.73
2	B	1613	ADX	C2'-C1'-N9	2.64	119.86	113.30
2	B	1613	ADX	O5'-PA-O3A	-2.61	95.21	103.09
6	B	1621	CIT	C3-C2-C1	-2.60	106.83	113.92
2	A	1613	ADX	N6-C6-N1	2.56	124.07	118.38
2	B	1613	ADX	C5-N7-C8	2.54	107.44	103.45
6	A	1623	CIT	O1-C1-C2	-2.45	116.01	122.95
3	B	1614	ANP	C5-C6-N6	-2.45	117.23	123.29
3	B	1614	ANP	O3A-PA-O1A	-2.42	103.44	110.70
3	B	1614	ANP	O5'-PA-O1A	2.38	118.38	108.94
2	A	1613	ADX	O4'-C4'-C3'	2.36	109.83	105.15
6	B	1621	CIT	O5-C6-C3	-2.35	117.54	122.09
3	B	1614	ANP	O2B-PB-O3A	2.34	112.44	104.64
3	A	1614	ANP	C2-N1-C6	2.32	122.53	118.73
2	B	1613	ADX	O3B-SB-O2B	2.28	116.55	108.56
2	A	1613	ADX	C4-N9-C8	2.28	108.13	105.74
2	B	1613	ADX	N6-C6-N1	2.25	123.40	118.38
3	A	1614	ANP	C6-C5-N7	2.25	136.43	132.09
6	A	1623	CIT	C3-C4-C5	-2.23	107.82	113.92
2	A	1613	ADX	O2A-PA-O3A	2.23	113.30	107.27
2	A	1613	ADX	C2-N3-C4	2.20	117.19	111.83
2	B	1613	ADX	N9-C8-N7	-2.18	110.84	113.94
6	A	1623	CIT	O2-C1-C2	2.16	121.20	114.35
2	B	1613	ADX	C5-C6-N6	-2.14	118.00	123.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1614	ANP	N9-C8-N7	-2.13	110.91	113.94
2	A	1613	ADX	N3-C2-N1	-2.10	125.40	128.58
2	A	1613	ADX	C5'-C4'-C3'	-2.09	107.69	115.21
3	A	1614	ANP	C4-C5-N7	-2.08	108.20	110.58
6	B	1621	CIT	O6-C6-C3	2.07	117.11	113.14
2	A	1613	ADX	O2'-C2'-C3'	-2.06	105.20	111.82

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1614	ANP	PG-N3B-PB-O1B
3	A	1614	ANP	PA-O3A-PB-O2B
3	B	1614	ANP	PB-N3B-PG-O1G
3	B	1614	ANP	PG-N3B-PB-O1B
3	B	1614	ANP	PA-O3A-PB-O2B
5	A	1622	PEG	C4-C3-O2-C2
6	A	1623	CIT	C1-C2-C3-O7
6	A	1623	CIT	C1-C2-C3-C6
2	A	1613	ADX	C3'-C4'-C5'-O5'
4	A	1616	EDO	O1-C1-C2-O2
4	B	1620	EDO	O1-C1-C2-O2
4	A	1619	EDO	O1-C1-C2-O2
4	A	1620	EDO	O1-C1-C2-O2
6	A	1623	CIT	C1-C2-C3-C4
2	A	1613	ADX	C2'-C1'-N9-C8
2	A	1613	ADX	C2'-C1'-N9-C4
6	B	1621	CIT	C4-C3-C6-O6
4	A	1617	EDO	O1-C1-C2-O2
6	B	1621	CIT	C4-C3-C6-O5
4	A	1621	EDO	O1-C1-C2-O2
4	B	1616	EDO	O1-C1-C2-O2
5	A	1622	PEG	C1-C2-O2-C3
2	A	1613	ADX	O4'-C1'-N9-C8
4	A	1618	EDO	O1-C1-C2-O2
4	B	1615	EDO	O1-C1-C2-O2
3	A	1614	ANP	PA-O3A-PB-O1B
3	B	1614	ANP	PA-O3A-PB-O1B
2	A	1613	ADX	O4'-C4'-C5'-O5'
3	B	1614	ANP	PG-N3B-PB-O3A
2	B	1613	ADX	O4'-C1'-N9-C8

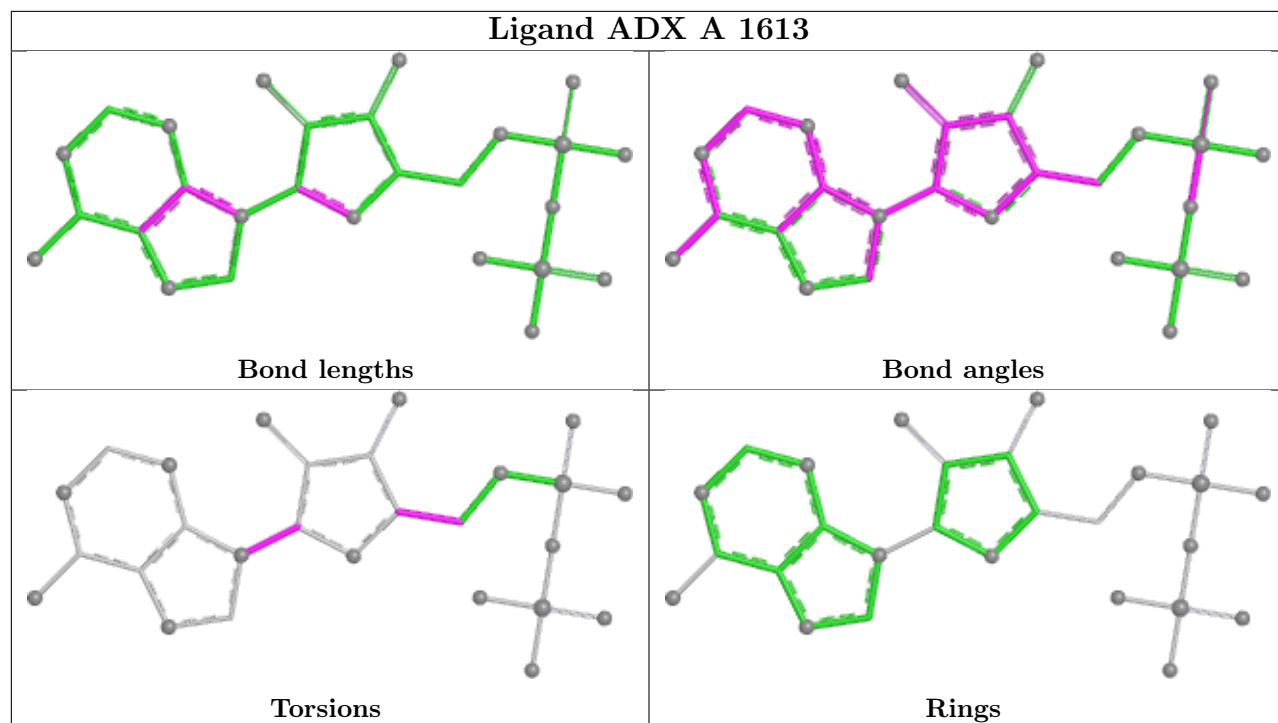
There are no ring outliers.

10 monomers are involved in 14 short contacts:

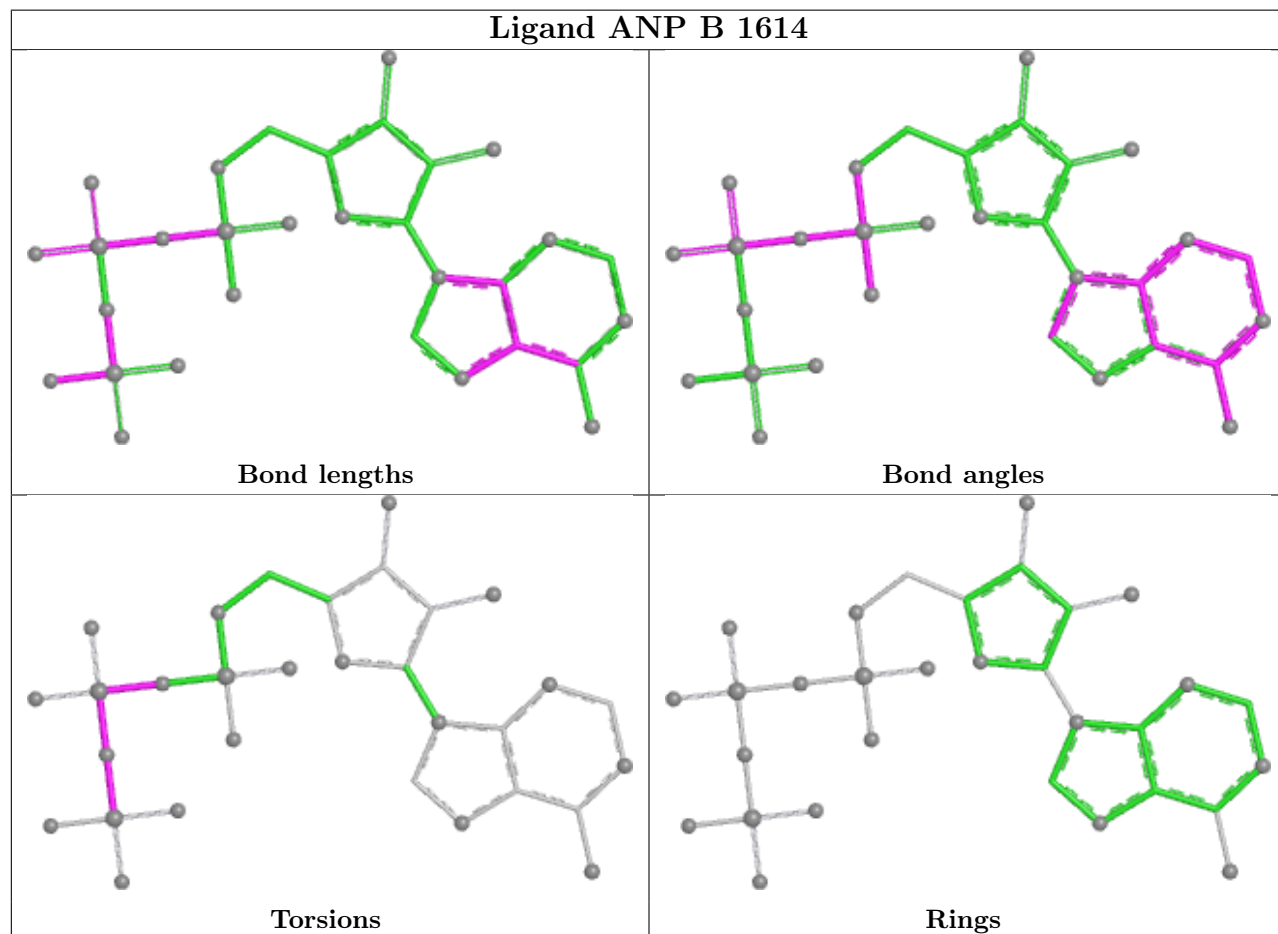
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1617	EDO	2	0
4	B	1620	EDO	1	0
4	B	1618	EDO	1	0
6	B	1621	CIT	1	0
4	A	1618	EDO	1	0
4	B	1615	EDO	2	0
3	B	1614	ANP	1	2
3	A	1614	ANP	1	2
5	A	1622	PEG	1	0
4	B	1616	EDO	2	0

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 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.

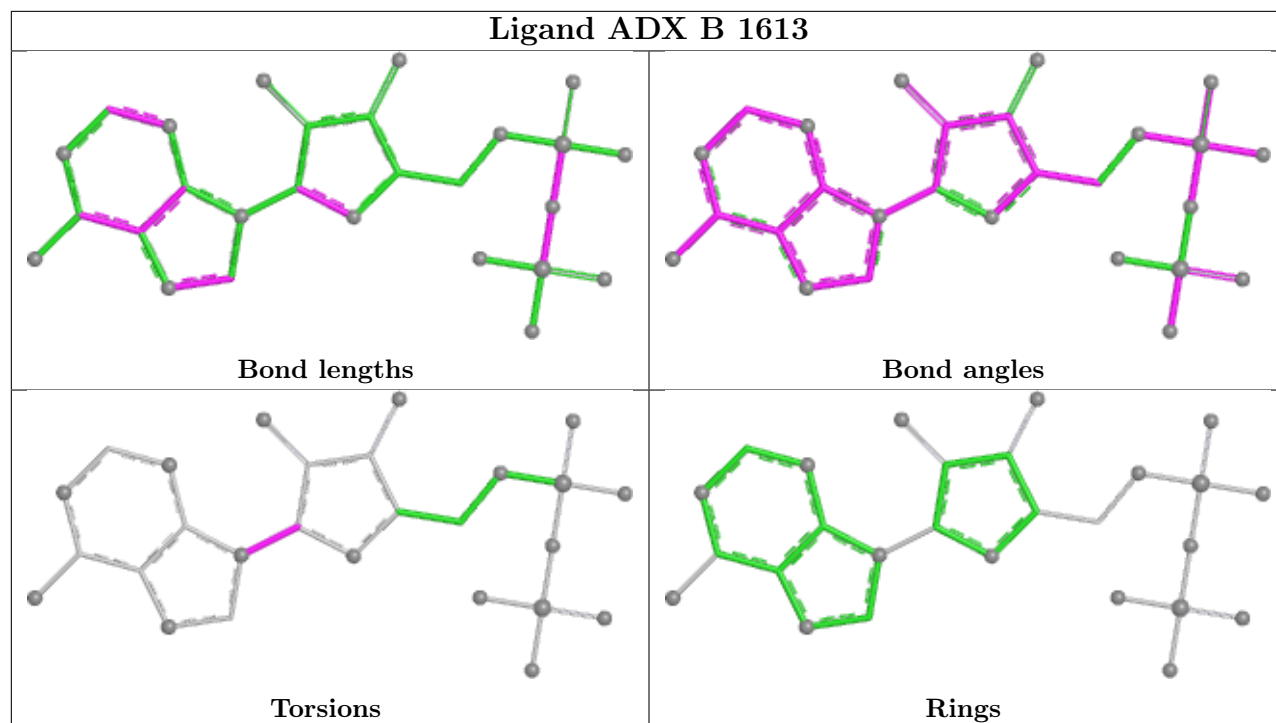
Ligand ADX A 1613



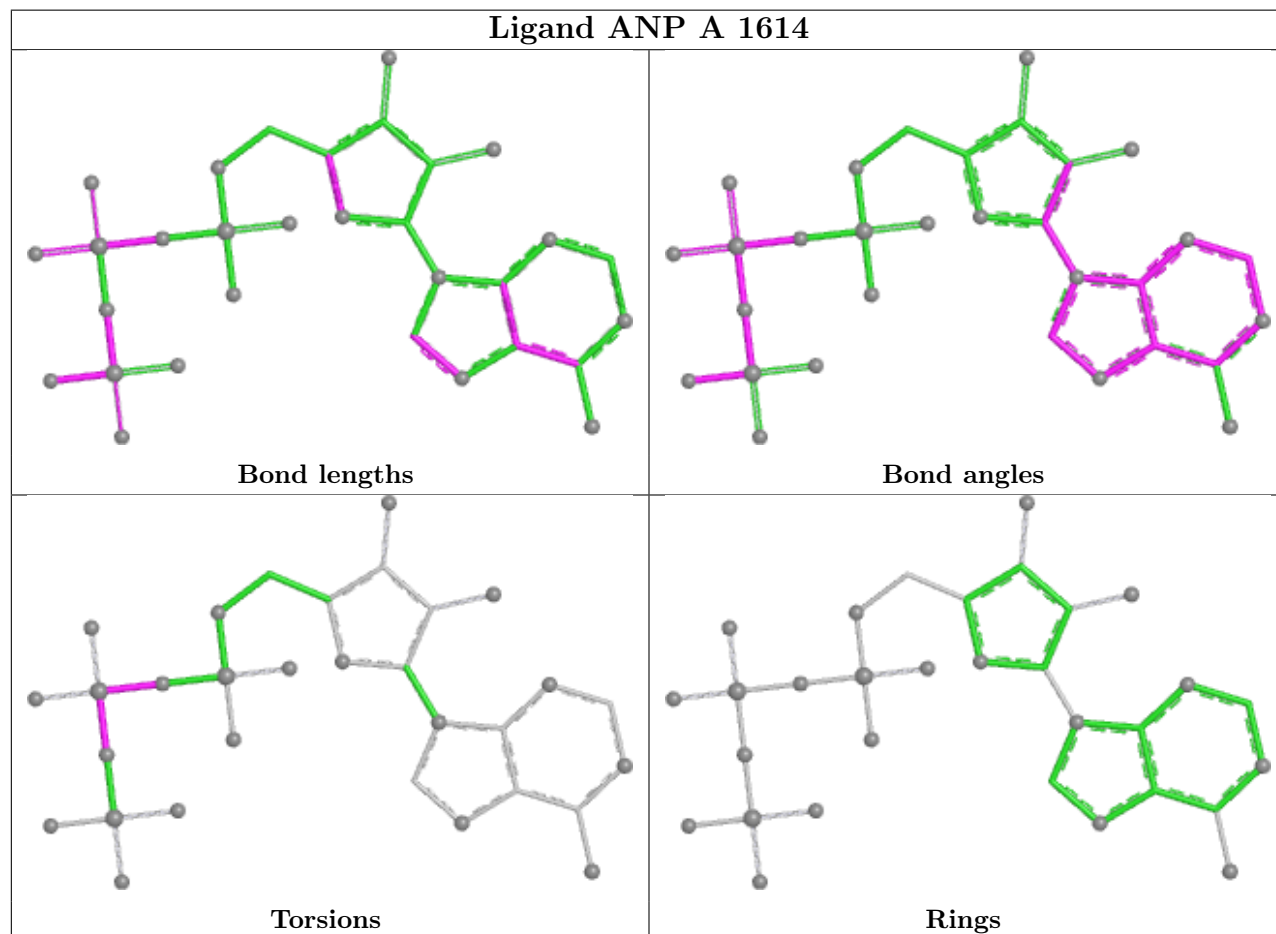
Ligand ANP B 1614



Ligand ADX B 1613



Ligand ANP A 1614



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	173/173 (100%)	0.32	7 (4%) 42 46	10, 28, 48, 68	9 (5%)
1	B	173/173 (100%)	0.68	20 (11%) 9 9	12, 32, 53, 77	9 (5%)
All	All	346/346 (100%)	0.50	27 (7%) 19 20	10, 30, 51, 77	18 (5%)

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	488	ALA	4.2
1	A	596[A]	ASP	4.1
1	A	560	ASP	3.7
1	B	492	PHE	3.7
1	B	491	GLY	3.5
1	B	560	ASP	3.4
1	B	485	GLY	3.3
1	B	482	LEU	3.1
1	B	480	ASP	2.9
1	B	440	PRO	2.8
1	A	440	PRO	2.7
1	B	612	SER	2.6
1	B	441	PRO	2.6
1	B	490	LEU	2.4
1	B	515	GLY	2.3
1	B	472	ILE	2.2
1	B	473[A]	SER	2.2
1	B	561	PRO	2.2
1	A	539	ASP	2.1
1	B	596	ASP	2.1
1	A	597	ARG	2.1
1	B	495	ALA	2.1
1	A	531	ALA	2.1
1	B	479	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	538	ALA	2.1
1	A	588	ASN	2.0
1	B	571	GLY	2.0

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 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.

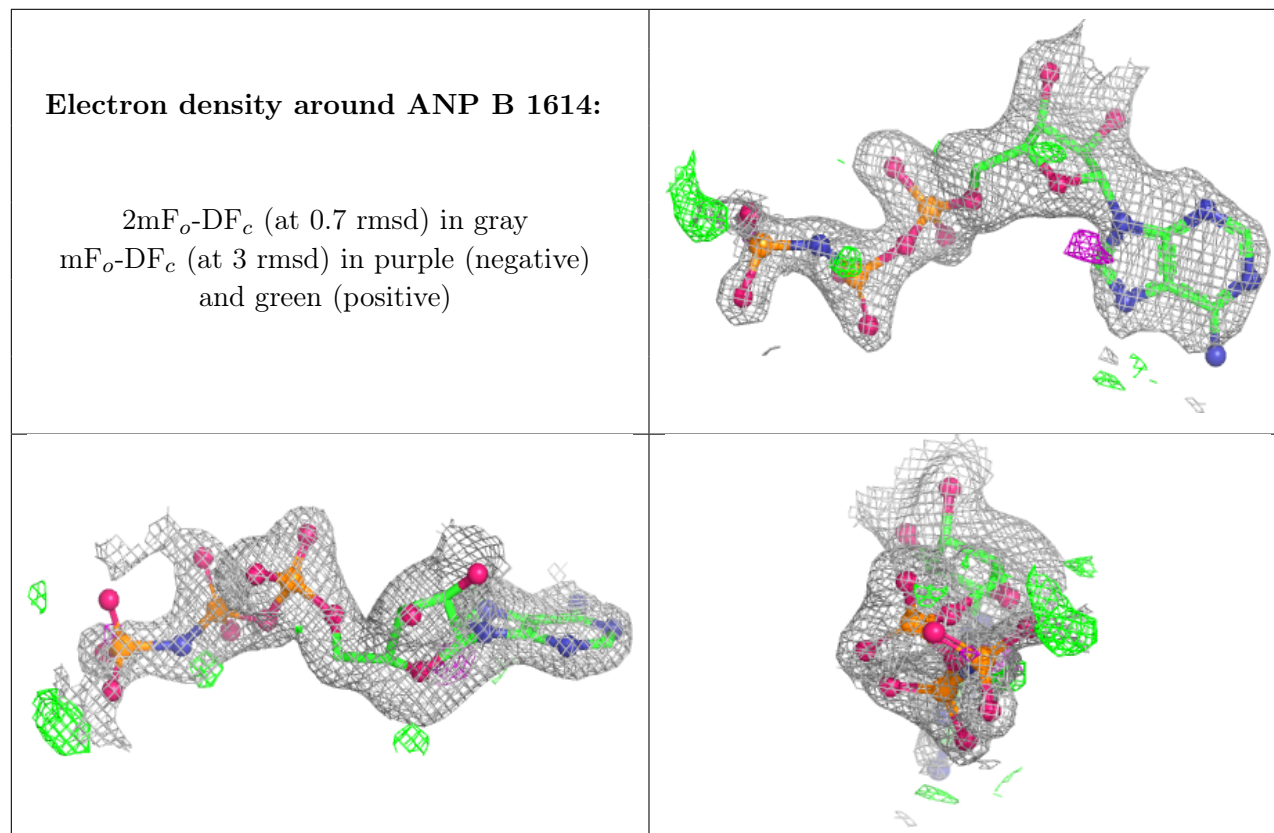
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	A	1621	4/4	0.67	0.22	52,58,60,61	0
4	EDO	A	1620	4/4	0.73	0.19	59,60,61,65	0
4	EDO	A	1616	4/4	0.79	0.16	61,63,64,68	0
6	CIT	A	1623	13/13	0.79	0.15	41,65,78,80	0
4	EDO	A	1618	4/4	0.83	0.13	36,50,52,53	0
4	EDO	B	1620	4/4	0.84	0.14	58,60,61,64	0
4	EDO	B	1619	4/4	0.85	0.18	37,47,50,50	0
5	PEG	A	1622	7/7	0.86	0.10	32,36,42,45	0
4	EDO	A	1615	4/4	0.87	0.14	41,41,43,46	0
4	EDO	A	1619	4/4	0.88	0.10	36,51,58,59	0
4	EDO	B	1615	4/4	0.88	0.10	38,44,47,48	0
4	EDO	B	1616	4/4	0.89	0.08	36,39,41,43	0
6	CIT	B	1621	13/13	0.89	0.10	36,43,47,58	0
7	MG	B	1622	1/1	0.90	0.14	51,51,51,51	0
4	EDO	B	1617	4/4	0.92	0.14	34,38,39,41	0
4	EDO	B	1618	4/4	0.93	0.08	38,42,45,47	0
3	ANP	B	1614	31/31	0.94	0.11	22,46,67,68	4
4	EDO	A	1617	4/4	0.95	0.06	38,40,44,44	0
7	MG	A	1624	1/1	0.96	0.10	31,31,31,31	0
2	ADX	B	1613	27/27	0.96	0.08	23,32,39,48	0

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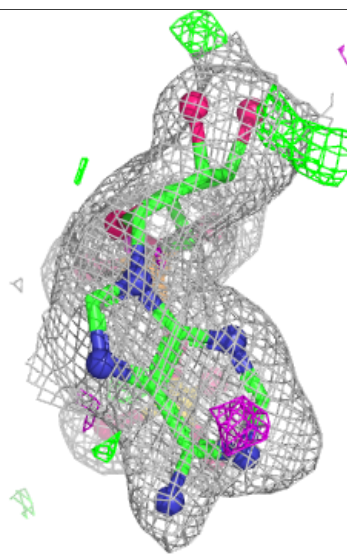
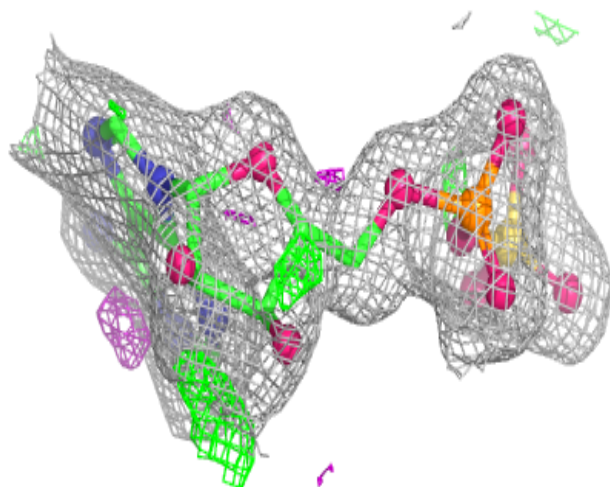
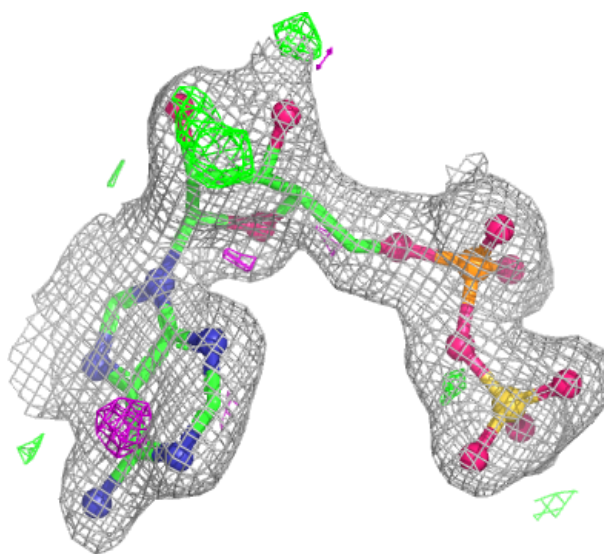
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	ANP	A	1614	31/31	0.97	0.09	15,35,57,62	4
2	ADX	A	1613	27/27	0.98	0.06	18,23,31,38	0

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.



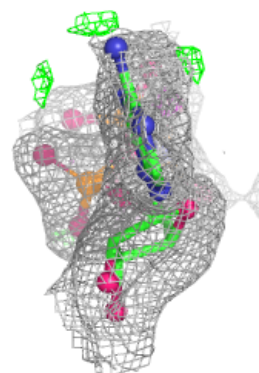
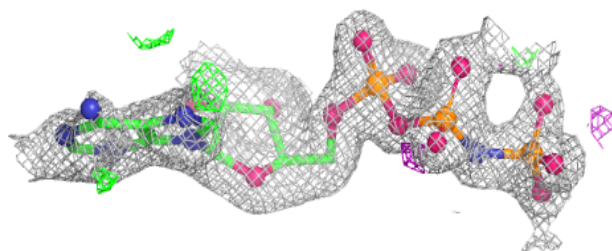
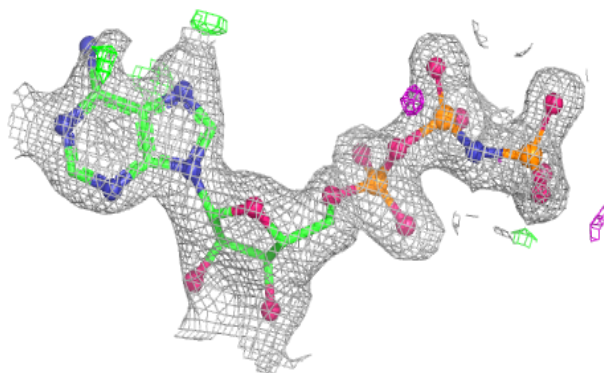
Electron density around ADX B 1613:

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



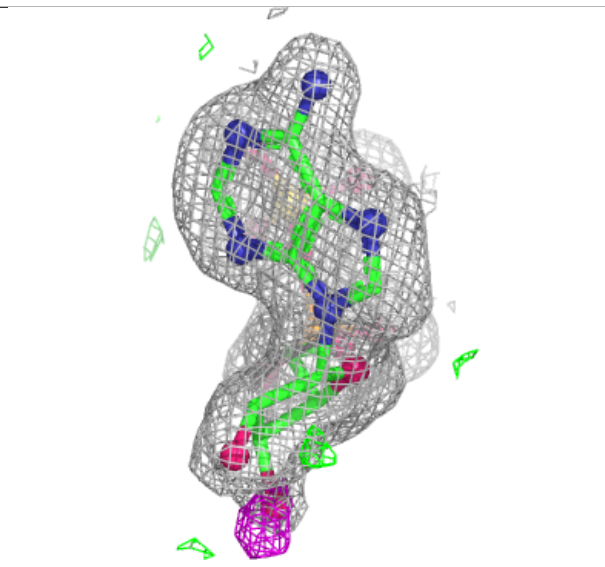
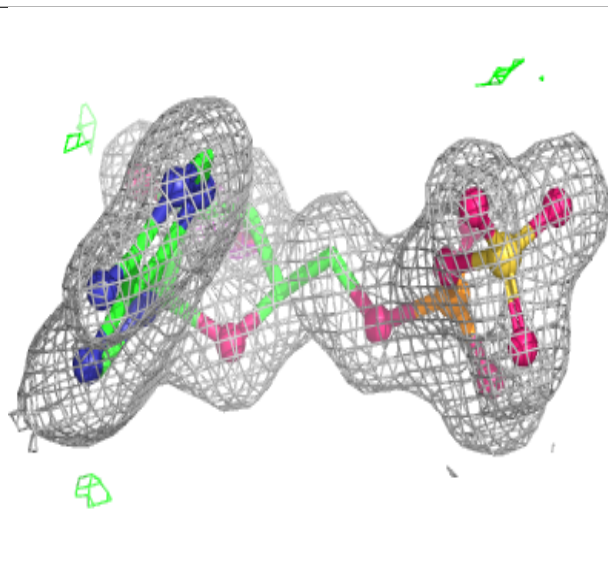
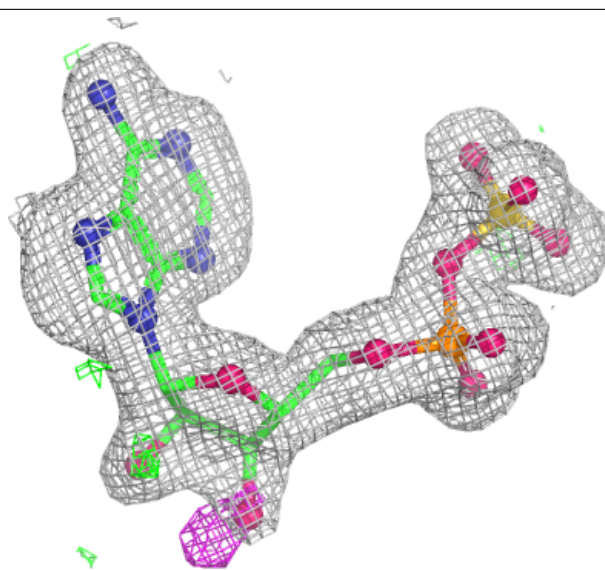
Electron density around ANP A 1614:

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



Electron density around ADX A 1613:

$2mF_o-DF_c$ (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.