



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 01:13 PM UTC

PDB ID : 6Y3J / pdb_00006y3j
Title : RING-DTC domains of Deltex 2, bound to ADP-ribose
Authors : Gabrielssen, M.; Buetow, L.; Huang, D.T.
Deposited on : 2020-02-18
Resolution : 2.60 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

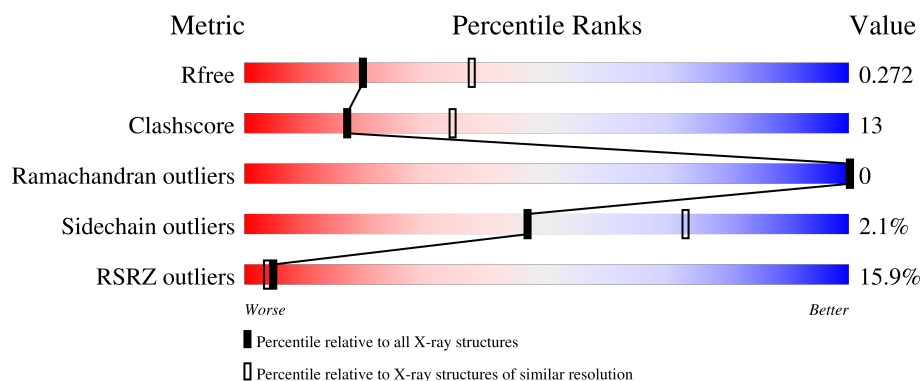
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	235	15% 69% 25% • •

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 1790 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.

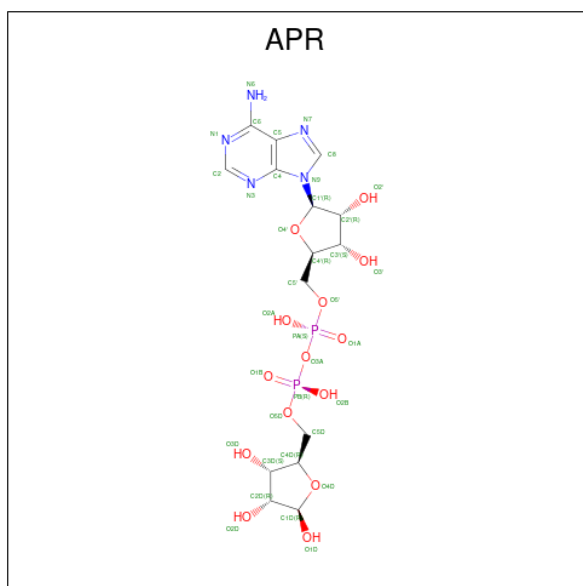
- Molecule 1 is a protein called Probable E3 ubiquitin-protein ligase DTX2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	227	1737	1090	299	334	14	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	388	GLY	-	expression tag	UNP Q86UW9
A	389	SER	-	expression tag	UNP Q86UW9

- Molecule 2 is ADENOSINE-5-DIPHOSPHORIBOSE (CCD ID: APR) (formula: $C_{15}H_{23}N_5O_{14}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	36	15	5	14	2	0	0

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Zn	0	0
			2	2		

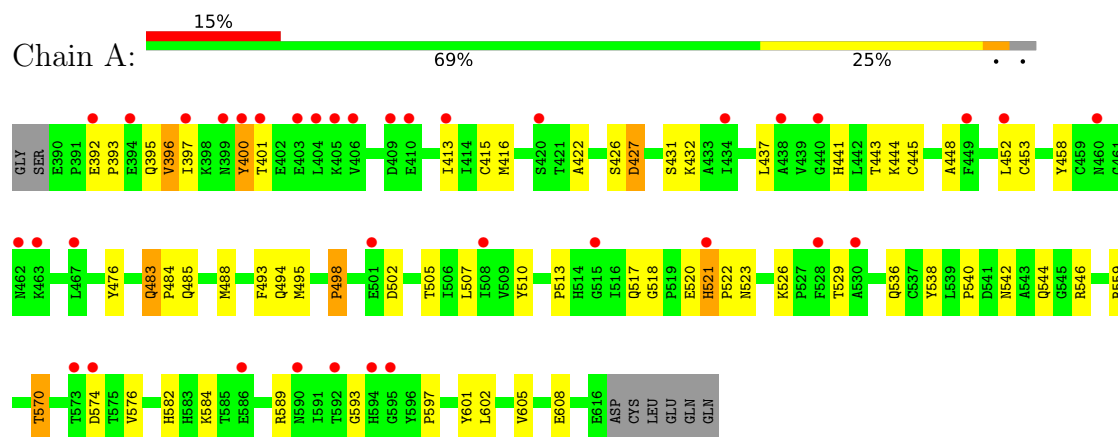
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	15	Total	O	0	0
			15	15		

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: Probable E3 ubiquitin-protein ligase DTX2



4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	104.93Å 104.93Å 74.54Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	45.44 – 2.60 45.44 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.9 (45.44-2.60) 99.9 (45.44-2.60)	Depositor EDS
R_{merge}	0.27	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.55 (at 2.62Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.238 , 0.282 (Not available) , 0.272	Depositor DCC
R_{free} test set	704 reflections (3.87%)	wwPDB-VP
Wilson B-factor (Å ²)	38.6	Xtriage
Anisotropy	1.362	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 39.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.054 for -h,-k,l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	1790	wwPDB-VP
Average B, all atoms (Å ²)	58.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.21% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, APR

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.90	6/1778 (0.3%)	1.06	6/2418 (0.2%)

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	521	HIS	C-N	11.30	1.49	1.33
1	A	484	PRO	C-O	-7.10	1.15	1.23
1	A	540	PRO	C-O	-7.03	1.15	1.23
1	A	498	PRO	C-O	-5.76	1.16	1.24
1	A	396	VAL	C-O	-5.46	1.18	1.24
1	A	393	PRO	C-O	-5.26	1.17	1.24

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	521	HIS	CA-C-N	12.77	132.52	119.24
1	A	521	HIS	C-N-CA	12.77	132.52	119.24
1	A	540	PRO	CB-CA-C	-7.59	101.67	111.46
1	A	521	HIS	CA-CB-CG	-6.00	107.80	113.80
1	A	570	THR	CA-CB-OG1	-5.51	101.34	109.60
1	A	483	GLN	CB-CA-C	5.10	115.67	109.85

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	1737	0	1684	44	0
2	A	36	0	20	0	0
3	A	2	0	0	0	0
4	A	15	0	0	1	0
All	All	1790	0	1704	44	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 13.

All (44) 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:517:GLN:HG3	1:A:526:LYS:O	1.82	0.79
1:A:427:ASP:OD1	1:A:427:ASP:N	2.19	0.76
1:A:483:GLN:HB3	1:A:559:ARG:HB3	1.71	0.72
1:A:542:ASN:O	1:A:546:ARG:CZ	2.44	0.66
1:A:400:TYR:HA	1:A:443:THR:OG1	1.96	0.65
1:A:431:SER:OG	1:A:432:LYS:N	2.28	0.63
1:A:605:VAL:HA	1:A:608:GLU:HB2	1.80	0.62
1:A:397:ILE:O	1:A:401:THR:HG21	2.00	0.62
1:A:444:LYS:HD2	1:A:476:TYR:HE1	1.66	0.60
1:A:413:ILE:HA	1:A:416:MET:HE3	1.83	0.60
1:A:415:CYS:HB3	1:A:453:CYS:SG	2.42	0.59
1:A:397:ILE:O	1:A:401:THR:CG2	2.52	0.58
1:A:396:VAL:HG11	1:A:458:TYR:CE2	2.41	0.56
1:A:426:SER:HA	1:A:452:LEU:HD21	1.88	0.54
1:A:507:LEU:HD13	1:A:538:TYR:CE1	2.44	0.53
1:A:416:MET:HE2	1:A:416:MET:HA	1.90	0.52
1:A:444:LYS:HD2	1:A:476:TYR:CE1	2.44	0.51
1:A:493:PHE:CE1	1:A:505:THR:HB	2.46	0.51
1:A:584:LYS:HE2	1:A:601:TYR:CD1	2.46	0.51
1:A:422:ALA:HA	1:A:437:LEU:HD23	1.94	0.50
1:A:523:ASN:HB3	1:A:526:LYS:NZ	2.26	0.50
1:A:395:GLN:HA	1:A:395:GLN:OE1	2.12	0.50
1:A:582:HIS:ND1	1:A:608:GLU:OE2	2.38	0.49
1:A:589:ARG:NH1	1:A:597:PRO:O	2.42	0.49
1:A:518:GLY:H	1:A:521:HIS:HD2	1.60	0.48
1:A:529:THR:O	1:A:576:VAL:HG23	2.14	0.48
1:A:502:ASP:OD1	1:A:502:ASP:N	2.47	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:483:GLN:HB3	1:A:559:ARG:CB	2.44	0.45
1:A:507:LEU:HD11	1:A:536:GLN:HB3	1.97	0.45
1:A:544:GLN:HB3	1:A:602:LEU:HD23	1.99	0.44
1:A:521:HIS:HB3	1:A:522:PRO:HD2	2.00	0.44
1:A:542:ASN:O	1:A:546:ARG:NH2	2.51	0.43
1:A:413:ILE:HA	1:A:416:MET:CE	2.47	0.43
1:A:485:GLN:O	1:A:513:PRO:HD2	2.18	0.43
1:A:570:THR:O	1:A:570:THR:OG1	2.34	0.43
1:A:392:GLU:O	1:A:396:VAL:HG23	2.18	0.43
1:A:445:CYS:SG	1:A:476:TYR:OH	2.70	0.43
1:A:488:MET:HG3	1:A:510:TYR:CE1	2.54	0.42
1:A:593:GLY:O	4:A:801:HOH:O	2.21	0.42
1:A:495:MET:HB2	1:A:495:MET:HE3	1.69	0.42
1:A:520:GLU:H	1:A:520:GLU:CD	2.27	0.42
1:A:544:GLN:CB	1:A:602:LEU:HD23	2.51	0.41
1:A:517:GLN:NE2	1:A:574:ASP:OD1	2.44	0.40
1:A:441:HIS:HA	1:A:448:ALA:HA	2.03	0.40

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	225/235 (96%)	207 (92%)	18 (8%)	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	192/203 (95%)	188 (98%)	4 (2%)	47 73

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	400	TYR
1	A	427	ASP
1	A	494	GLN
1	A	498	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	494	GLN
1	A	521	HIS
1	A	594	HIS
1	A	612	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 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 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	APR	A	701	-	39,39,39	1.17	2 (5%)	56,60,60	0.78	2 (3%)

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	APR	A	701	-	-	9/22/54/54	0/4/4/4

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	APR	O4D-C1D	-4.53	1.37	1.43
2	A	701	APR	PB-O3A	-2.72	1.56	1.59

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	701	APR	O1D-C1D-O4D	-2.20	108.31	111.12
2	A	701	APR	O2B-PB-O1B	2.02	121.86	112.44

There are no chirality outliers.

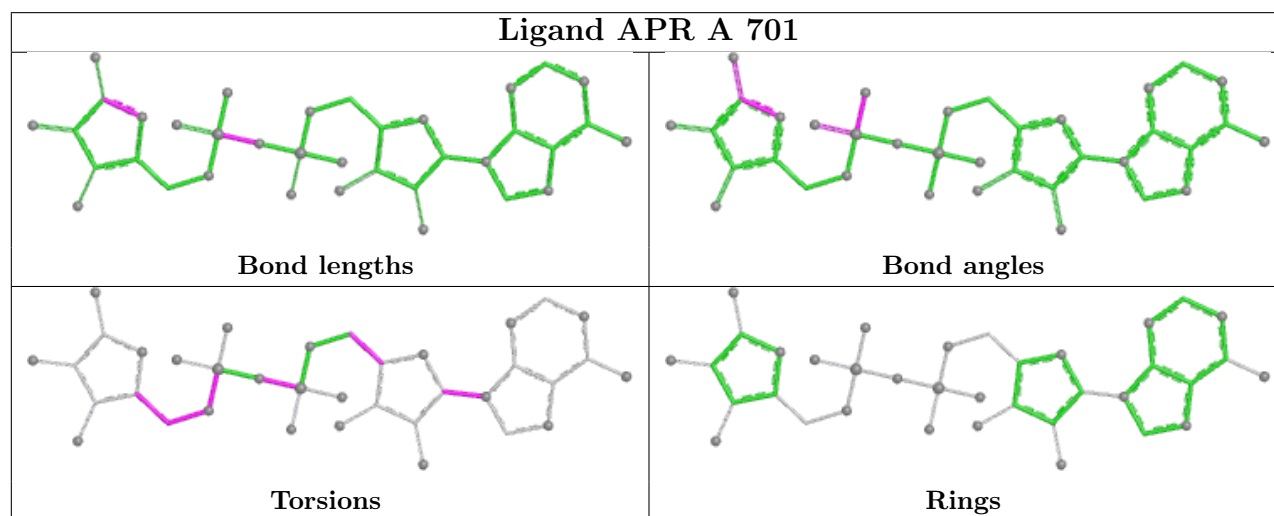
All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	701	APR	C5D-O5D-PB-O3A
2	A	701	APR	C5D-O5D-PB-O2B
2	A	701	APR	O4D-C4D-C5D-O5D
2	A	701	APR	C3D-C4D-C5D-O5D
2	A	701	APR	C4D-C5D-O5D-PB
2	A	701	APR	O4'-C4'-C5'-O5'
2	A	701	APR	C3'-C4'-C5'-O5'
2	A	701	APR	C2'-C1'-N9-C8
2	A	701	APR	PB-O3A-PA-O2A

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	227/235 (96%)	1.03	36 (15%) 5 4	30, 57, 88, 134	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	521	HIS	5.1
1	A	409	ASP	4.3
1	A	413	ILE	3.8
1	A	452	LEU	3.8
1	A	574	ASP	3.8
1	A	400	TYR	3.8
1	A	467	LEU	3.7
1	A	394	GLU	3.6
1	A	405	LYS	3.5
1	A	449	PHE	3.2
1	A	440	GLY	3.2
1	A	501	GLU	2.9
1	A	462	ASN	2.8
1	A	438	ALA	2.8
1	A	401	THR	2.7
1	A	397	ILE	2.7
1	A	515	GLY	2.5
1	A	406	VAL	2.5
1	A	399	ASN	2.5
1	A	404	LEU	2.5
1	A	530	ALA	2.5
1	A	590	ASN	2.4
1	A	594	HIS	2.4
1	A	528	PHE	2.3
1	A	392	GLU	2.3
1	A	403	GLU	2.3
1	A	573	THR	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	410	GLU	2.2
1	A	434	ILE	2.2
1	A	586	GLU	2.2
1	A	463	LYS	2.2
1	A	460	ASN	2.1
1	A	508	ILE	2.1
1	A	592	THR	2.0
1	A	420	SER	2.0
1	A	595	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](#)

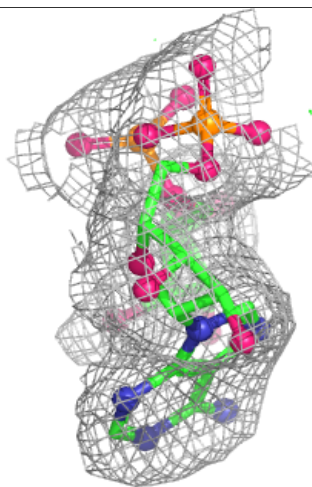
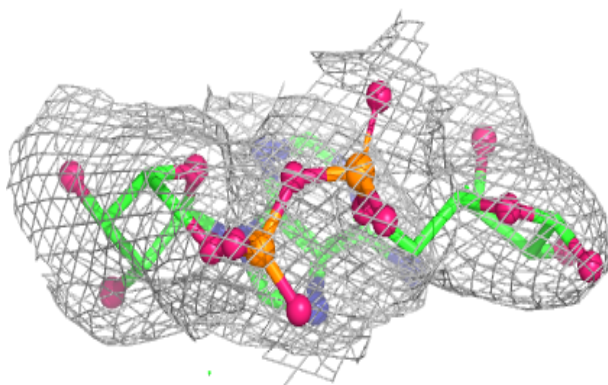
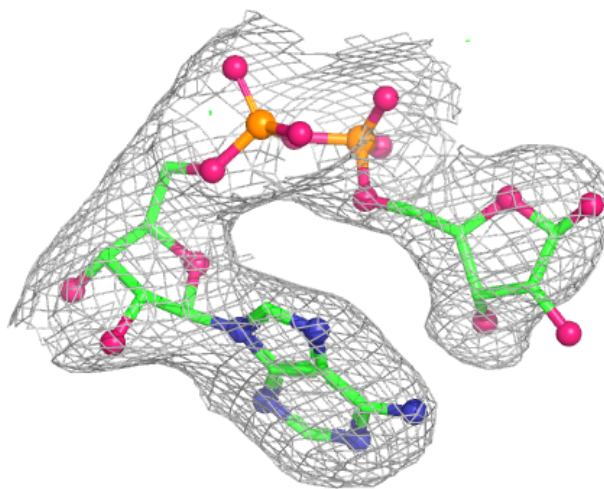
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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
2	APR	A	701	36/36	0.93	0.11	32,53,75,79	0
3	ZN	A	702	1/1	0.98	0.04	57,57,57,57	0
3	ZN	A	703	1/1	0.98	0.03	64,64,64,64	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 APR A 701:

$2mF_o-DF_c$ (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.