Full wwPDB X-ray Structure Validation Report (i)

Apr 21, 2024 – 05:00 am BST

PDB ID	:	4AN9
Title	:	Crystal structures of human MEK1 with carboxamide-based allosteric inhibitor XL518 (GDC-0973), or related analogs.
Authors	:	Rice, K.D.; Aay, N.; Anand, N.K.; Blazey, C.M.; Bowles, O.J.; Bussenius, J.; Costanzo, S.; Curtis, J.K.; Defina, S.C.; Dubenko, L.; Engst, S.; Joshi, A.A.; Kennedy, A.R.; Kim, A.I.; Koltun, E.S.; Lougheed, J.C.; Manalo, J.C.L.; Martini, J.F.; Nuss, J.M.; Peto, C.J.; Tsang, T.H.; Yu, P.; Johnston, S.
Deposited on	:	2012-03-16
Resolution	:	2.80 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:

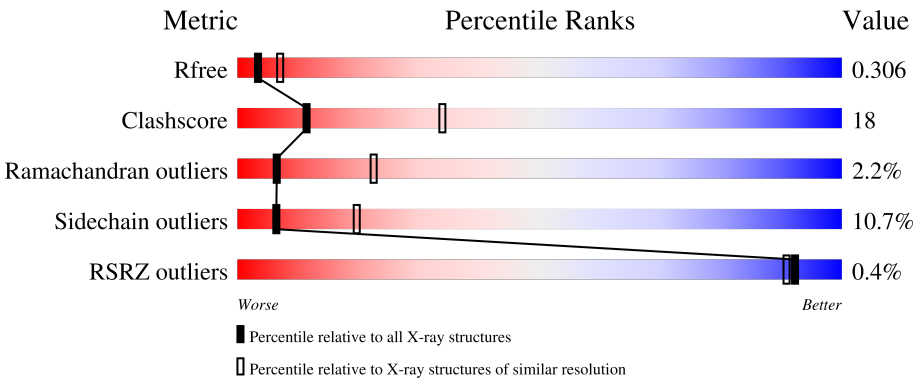
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)

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 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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	301	59% 29% 5% 7%

Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36.2

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 2259 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.

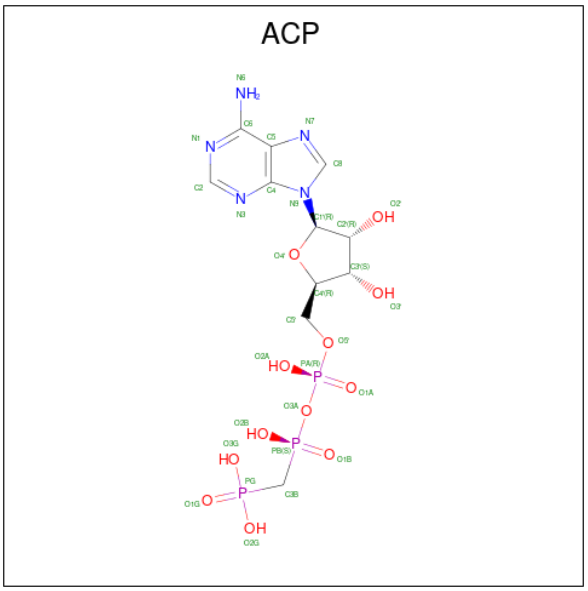
- Molecule 1 is a protein called DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	281	2198	1403	375	404	16	0	0	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	58	MET	-	expression tag	UNP Q02750
A	59	ALA	-	expression tag	UNP Q02750
A	60	LEU	-	expression tag	UNP Q02750
A	393	GLU	-	expression tag	UNP Q02750
A	394	GLY	-	expression tag	UNP Q02750
A	395	HIS	-	expression tag	UNP Q02750
A	396	HIS	-	expression tag	UNP Q02750
A	397	HIS	-	expression tag	UNP Q02750
A	398	HIS	-	expression tag	UNP Q02750
A	399	HIS	-	expression tag	UNP Q02750
A	400	HIS	-	expression tag	UNP Q02750
A	218	GLU	SER	engineered mutation	UNP Q02750
A	222	GLU	SER	engineered mutation	UNP Q02750
A	328	ALA	GLY	engineered mutation	UNP Q02750

- Molecule 2 is PHOSPHOMETHYLPHOSPHONIC ACID ADENYLATE ESTER (three-letter code: ACP) (formula: $C_{11}H_{18}N_5O_{12}P_3$).

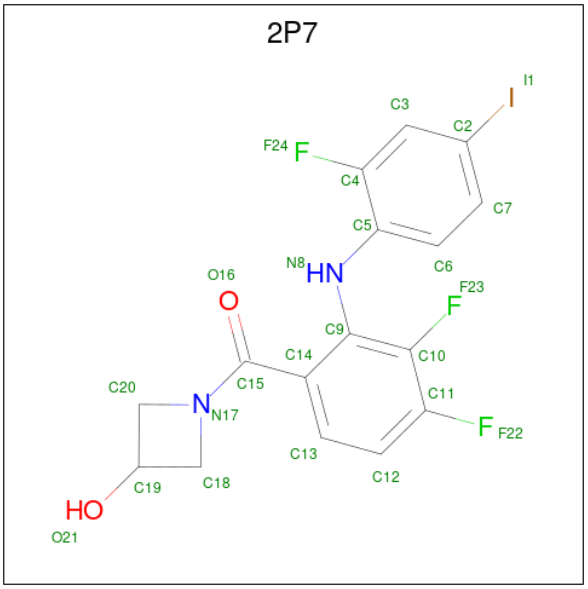


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	31	11	5	12	3	0	0

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

- Molecule 4 is [3,4-BIS(FLUORANYL)-2-[(2-FLUORANYL-4-IODANYL-PHENYL)AMINO]PHENYL]-(3-OXIDANYLAZETIDIN-1-YL)METHANONE (three-letter code: 2P7) (formula: $C_{16}H_{12}F_3IN_2O_2$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	F	I	N	O		
4	A	1	24	16	3	1	2	2	0	0

- Molecule 5 is water.

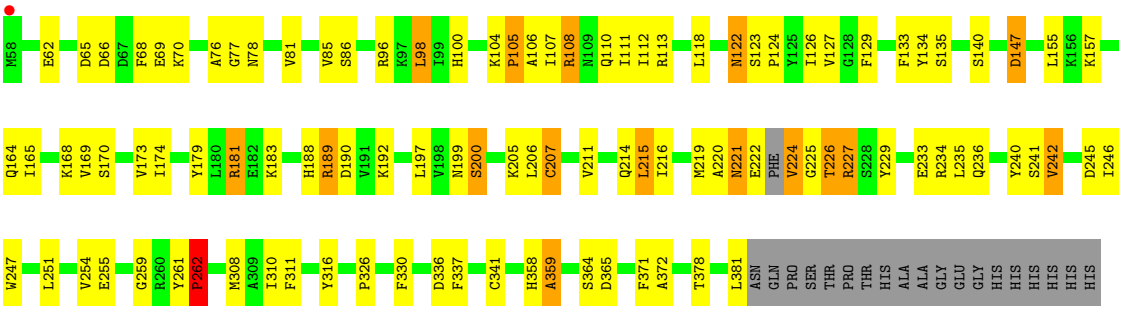
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	5	5	5	0	0

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: DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 1

Chain A:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 61	Depositor
Cell constants a, b, c, α, β, γ	108.65Å 108.65Å 49.39Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.40 – 2.80 43.73 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.7 (49.40-2.80) 99.7 (43.73-2.80)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.28 (at 2.81Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.200 , 0.313 0.198 , 0.306	Depositor DCC
R_{free} test set	429 reflections (5.14%)	wwPDB-VP
Wilson B-factor (Å^2)	58.6	Xtriage
Anisotropy	0.111	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 33.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.058 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	2259	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.04% 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: ACP, MG, 2P7

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	0.98	3/2241 (0.1%)	1.02	3/3019 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	262	PRO	C-N	8.28	1.53	1.34
1	A	341	CYS	CB-SG	-6.40	1.71	1.82
1	A	207	CYS	CB-SG	-5.97	1.72	1.81

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	262	PRO	O-C-N	-9.39	107.68	122.70
1	A	336	ASP	CB-CG-OD1	-5.31	113.52	118.30
1	A	245	ASP	CB-CG-OD1	5.17	122.95	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	262	PRO	Mainchain

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	2198	0	2227	73	0
2	A	31	0	14	0	0
3	A	1	0	0	0	0
4	A	24	0	12	5	0
5	A	5	0	0	1	0
All	All	2259	0	2253	78	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 18.

All (78) 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:227:ARG:HH11	1:A:227:ARG:HG2	1.22	1.02
1:A:326:PRO:HG2	1:A:330:PHE:HE2	1.37	0.89
1:A:112:ILE:HD11	1:A:134:TYR:HB2	1.58	0.86
1:A:147:ASP:OD2	1:A:200:SER:HB3	1.81	0.79
1:A:227:ARG:HH11	1:A:227:ARG:CG	1.95	0.79
1:A:65:ASP:HA	1:A:68:PHE:HD2	1.50	0.74
1:A:188:HIS:O	1:A:189:ARG:HB2	1.88	0.72
1:A:170:SER:O	1:A:174:ILE:HG12	1.90	0.71
1:A:233:GLU:HG2	1:A:234:ARG:H	1.55	0.69
1:A:326:PRO:HG2	1:A:330:PHE:CE2	2.26	0.69
1:A:127:VAL:HG23	1:A:206:LEU:O	1.93	0.68
1:A:227:ARG:HG2	1:A:227:ARG:NH1	1.95	0.67
1:A:112:ILE:HD11	1:A:134:TYR:CB	2.26	0.65
1:A:70:LYS:HA	1:A:85:VAL:HG12	1.77	0.65
1:A:65:ASP:HA	1:A:68:PHE:CD2	2.31	0.64
1:A:147:ASP:OD1	1:A:199:ASN:HB2	2.01	0.61
1:A:105:PRO:O	1:A:106:ALA:C	2.38	0.61
1:A:233:GLU:HG2	1:A:234:ARG:N	2.17	0.59
1:A:105:PRO:HA	1:A:108:ARG:NH1	2.20	0.56
1:A:174:ILE:HD11	1:A:337:PHE:HZ	1.70	0.55
4:A:1384:2P7:C20	4:A:1384:2P7:H13	2.37	0.54
4:A:1384:2P7:H13	4:A:1384:2P7:H201	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:155:LEU:HD11	1:A:259:GLY:HA2	1.90	0.53
1:A:122:ASN:C	1:A:122:ASN:HD22	2.12	0.53
1:A:255:GLU:O	1:A:259:GLY:N	2.38	0.50
1:A:189:ARG:HD2	1:A:216:ILE:CD1	2.42	0.50
1:A:215:LEU:O	1:A:219:MET:HB2	2.12	0.50
1:A:77:GLY:O	1:A:78:ASN:C	2.50	0.49
1:A:169:VAL:O	1:A:173:VAL:HG23	2.13	0.48
1:A:261:TYR:CD1	1:A:262:PRO:HD2	2.48	0.48
1:A:164:GLN:HA	5:A:2004:HOH:O	2.13	0.48
1:A:225:GLY:C	1:A:227:ARG:H	2.17	0.48
1:A:168:LYS:NZ	1:A:364:SER:O	2.39	0.48
1:A:227:ARG:CG	1:A:227:ARG:NH1	2.64	0.47
1:A:124:PRO:O	1:A:205:LYS:HD3	2.15	0.47
1:A:76:ALA:HB2	1:A:81:VAL:HG23	1.97	0.47
1:A:308:MET:HE1	1:A:316:TYR:CD2	2.49	0.47
1:A:122:ASN:C	1:A:122:ASN:ND2	2.68	0.46
1:A:371:PHE:O	1:A:372:ALA:C	2.53	0.46
1:A:225:GLY:C	1:A:227:ARG:N	2.68	0.46
1:A:358:HIS:O	1:A:359:ALA:C	2.53	0.46
1:A:221:ASN:O	1:A:222:GLU:HG3	2.16	0.46
1:A:229:TYR:CD2	1:A:251:LEU:HD23	2.51	0.45
1:A:190:ASP:OD2	1:A:192:LYS:HE2	2.16	0.45
1:A:189:ARG:HD2	1:A:216:ILE:HD13	1.98	0.45
1:A:100:HIS:C	1:A:100:HIS:CD2	2.90	0.45
4:A:1384:2P7:C6	4:A:1384:2P7:F23	2.55	0.45
1:A:235:LEU:HD23	1:A:235:LEU:HA	1.78	0.45
1:A:189:ARG:HA	1:A:240:TYR:CZ	2.52	0.44
1:A:65:ASP:HB3	1:A:133:PHE:CE2	2.53	0.44
1:A:118:LEU:HB3	1:A:129:PHE:CG	2.52	0.44
1:A:310:ILE:HG23	1:A:311:PHE:CD2	2.52	0.44
1:A:68:PHE:HA	1:A:86:SER:O	2.16	0.44
1:A:126:ILE:HG22	1:A:127:VAL:O	2.17	0.44
1:A:112:ILE:CD1	1:A:134:TYR:CB	2.96	0.43
1:A:181:ARG:HD3	1:A:242:VAL:HG11	2.00	0.43
1:A:127:VAL:HG21	1:A:207:CYS:HB3	2.00	0.43
1:A:254:VAL:HG12	1:A:262:PRO:HB3	2.00	0.43
1:A:127:VAL:HG22	1:A:205:LYS:HB2	1.99	0.43
1:A:246:ILE:HG22	1:A:247:TRP:N	2.33	0.43
1:A:112:ILE:CD1	1:A:134:TYR:HB2	2.39	0.43
1:A:127:VAL:HG21	1:A:197:LEU:HD12	2.00	0.43
4:A:1384:2P7:C20	4:A:1384:2P7:C13	2.97	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:310:ILE:HG23	1:A:311:PHE:N	2.34	0.43
1:A:181:ARG:CD	1:A:242:VAL:HG11	2.49	0.42
1:A:111:ILE:HG12	1:A:214:GLN:HB3	2.01	0.42
1:A:104:LYS:HA	1:A:105:PRO:HD2	1.85	0.42
1:A:122:ASN:N	1:A:179:TYR:OH	2.45	0.42
1:A:165:ILE:O	1:A:165:ILE:HG22	2.20	0.41
4:A:1384:2P7:H6	4:A:1384:2P7:C10	2.49	0.41
1:A:65:ASP:HB2	1:A:96:ARG:HH12	1.85	0.41
1:A:222:GLU:O	1:A:224:VAL:N	2.54	0.41
1:A:104:LYS:O	1:A:107:ILE:N	2.34	0.41
1:A:98:LEU:H	1:A:98:LEU:HD12	1.86	0.41
1:A:174:ILE:HG12	1:A:174:ILE:H	1.70	0.40
1:A:123:SER:HB3	1:A:126:ILE:HG12	2.03	0.40
1:A:98:LEU:HD12	1:A:98:LEU:N	2.36	0.40
1:A:127:VAL:CG2	1:A:207:CYS:HB3	2.51	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	277/301 (92%)	237 (86%)	34 (12%)	6 (2%)	6 22

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	147	ASP
1	A	220	ALA
1	A	226	THR
1	A	236	GLN
1	A	105	PRO
1	A	359	ALA

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	242/258 (94%)	216 (89%)	26 (11%)	6 20

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	62	GLU
1	A	66	ASP
1	A	69	GLU
1	A	98	LEU
1	A	108	ARG
1	A	110	GLN
1	A	113	ARG
1	A	122	ASN
1	A	135	SER
1	A	140	SER
1	A	157	LYS
1	A	181	ARG
1	A	183	LYS
1	A	189	ARG
1	A	200	SER
1	A	211	VAL
1	A	215	LEU
1	A	221	ASN
1	A	224	VAL
1	A	226	THR
1	A	227	ARG
1	A	241	SER
1	A	242	VAL
1	A	365	ASP
1	A	378	THR
1	A	381	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	100	HIS
1	A	110	GLN
1	A	122	ASN
1	A	164	GLN
1	A	236	GLN
1	A	339	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 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	ACP	A	1382	3	27,33,33	1.44	5 (18%)	32,52,52	1.98	8 (25%)
4	2P7	A	1384	-	24,26,26	1.08	2 (8%)	28,38,38	1.99	10 (35%)

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	ACP	A	1382	3	-	2/15/38/38	0/3/3/3
4	2P7	A	1384	-	-	1/12/20/20	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1382	ACP	C4-N3	2.96	1.39	1.35
2	A	1382	ACP	C2-N3	2.63	1.36	1.32
2	A	1382	ACP	C5-C4	2.61	1.47	1.40
2	A	1382	ACP	PB-O3A	2.50	1.61	1.58
4	A	1384	2P7	C15-N17	2.46	1.40	1.34
4	A	1384	2P7	C18-N17	2.44	1.49	1.47
2	A	1382	ACP	PG-O3G	-2.08	1.50	1.54

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1382	ACP	PB-O3A-PA	-4.79	117.36	132.56
2	A	1382	ACP	N3-C2-N1	-4.75	121.25	128.68
4	A	1384	2P7	O16-C15-C14	-4.19	111.61	120.06
2	A	1382	ACP	O2B-PB-O1B	3.55	121.93	110.07
4	A	1384	2P7	C7-C2-C3	-3.53	116.94	121.09
2	A	1382	ACP	C1'-N9-C4	-3.34	120.78	126.64
2	A	1382	ACP	O1G-PG-C3B	-3.23	104.28	111.24
4	A	1384	2P7	F24-C4-C5	3.01	121.27	117.50
2	A	1382	ACP	C2-N1-C6	2.75	123.45	118.75
4	A	1384	2P7	F22-C11-C10	2.69	122.08	118.30
2	A	1382	ACP	C4-C5-N7	-2.61	106.67	109.40
4	A	1384	2P7	C14-C9-N8	2.60	124.51	120.14
4	A	1384	2P7	C14-C15-N17	2.58	122.41	118.28
4	A	1384	2P7	C9-N8-C5	2.56	128.36	123.01
4	A	1384	2P7	C12-C11-C10	-2.49	118.91	121.18
2	A	1382	ACP	O3'-C3'-C4'	2.47	118.20	111.05
4	A	1384	2P7	F23-C10-C9	-2.35	116.03	119.56
4	A	1384	2P7	O16-C15-N17	2.20	125.97	122.34

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1382	ACP	C3'-C4'-C5'-O5'
2	A	1382	ACP	O4'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
4	A	1384	2P7	C13-C14-C15-N17

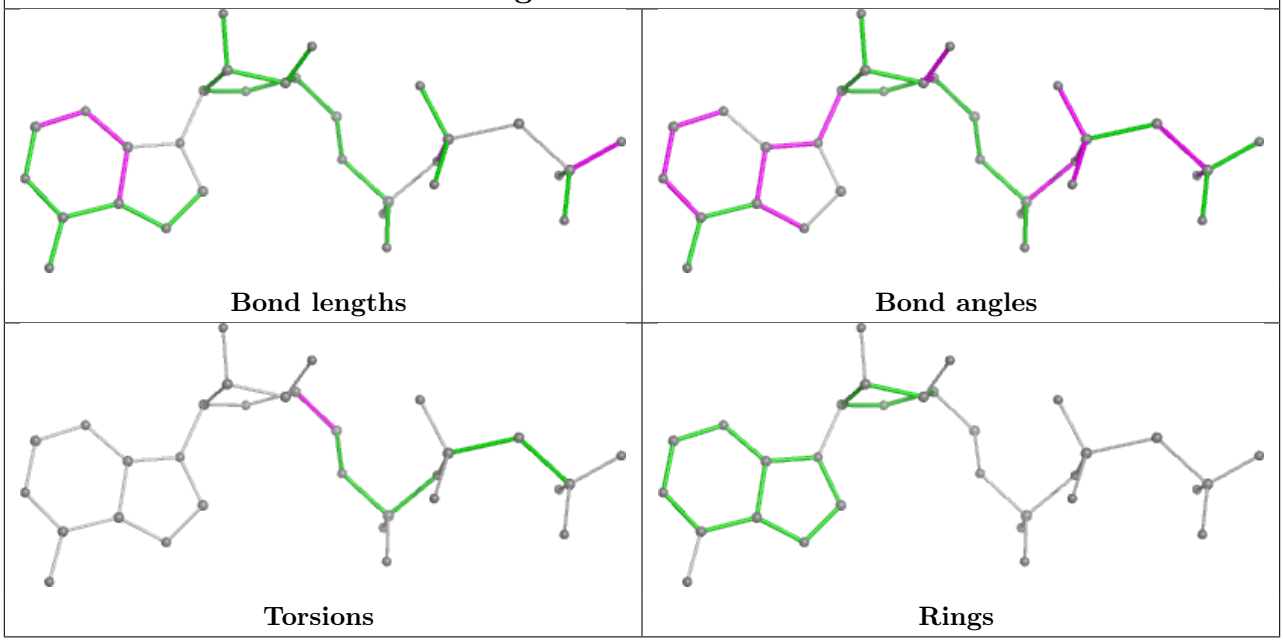
There are no ring outliers.

1 monomer is involved in 5 short contacts:

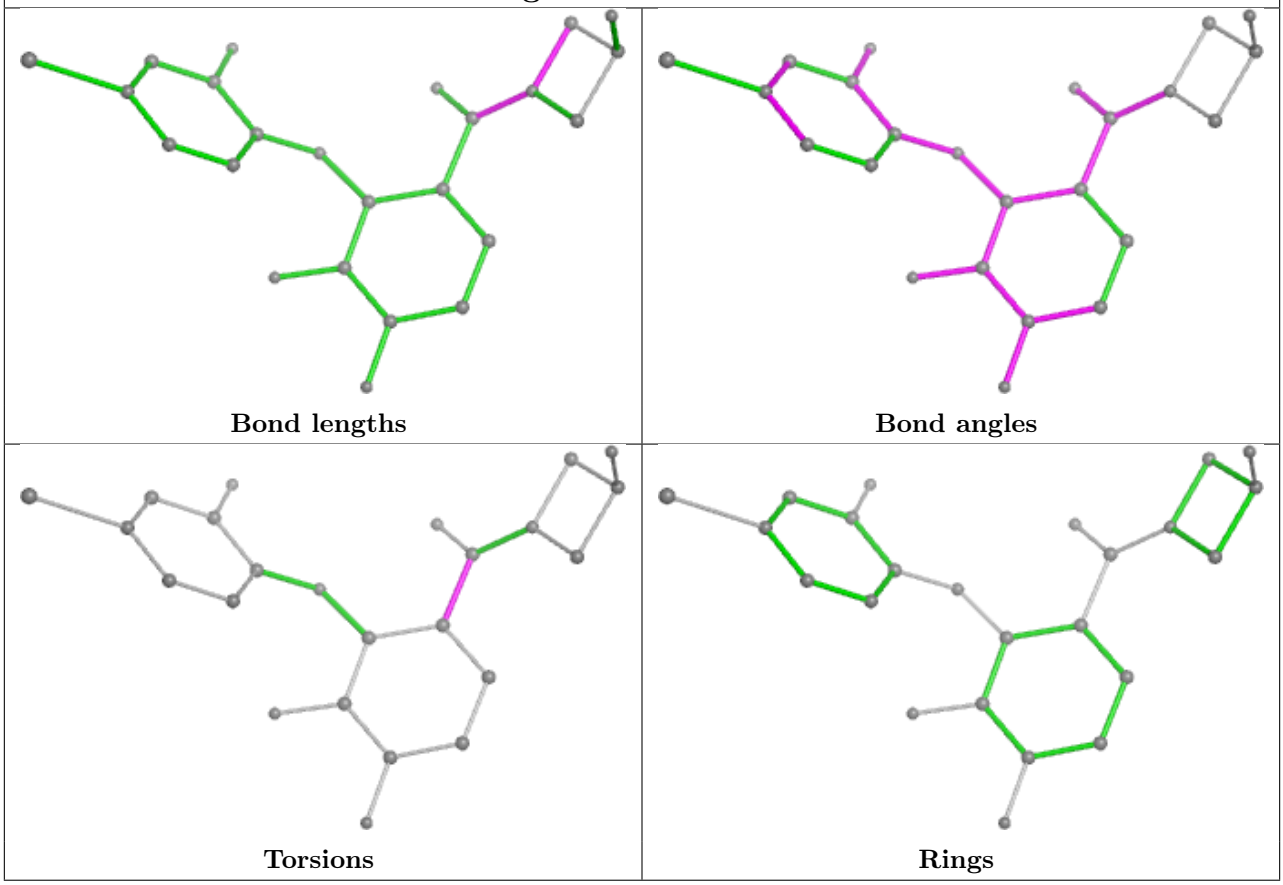
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1384	2P7	5	0

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

Ligand ACP A 1382



Ligand 2P7 A 1384



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	281/301 (93%)	-0.41	1 (0%) 92 91	32, 48, 71, 80	10 (3%)

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	58	MET	2.6

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.

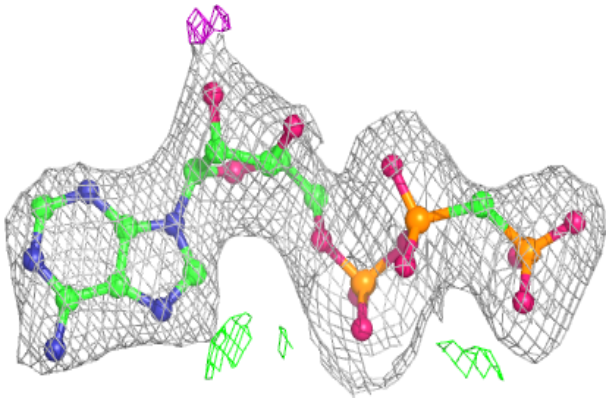
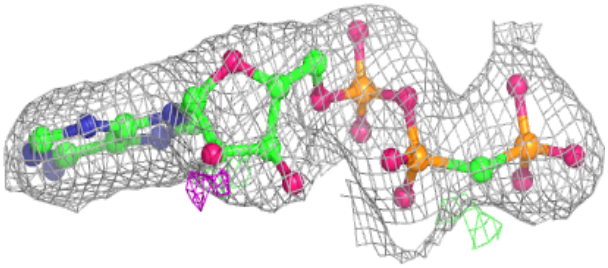
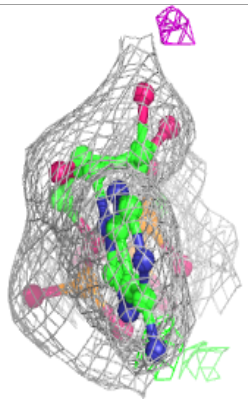
6.4 Ligands (i)

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
3	MG	A	1383	1/1	0.95	0.13	41,41,41,41	0
2	ACP	A	1382	31/31	0.98	0.13	33,43,46,48	0
4	2P7	A	1384	24/24	0.99	0.16	39,44,47,52	0

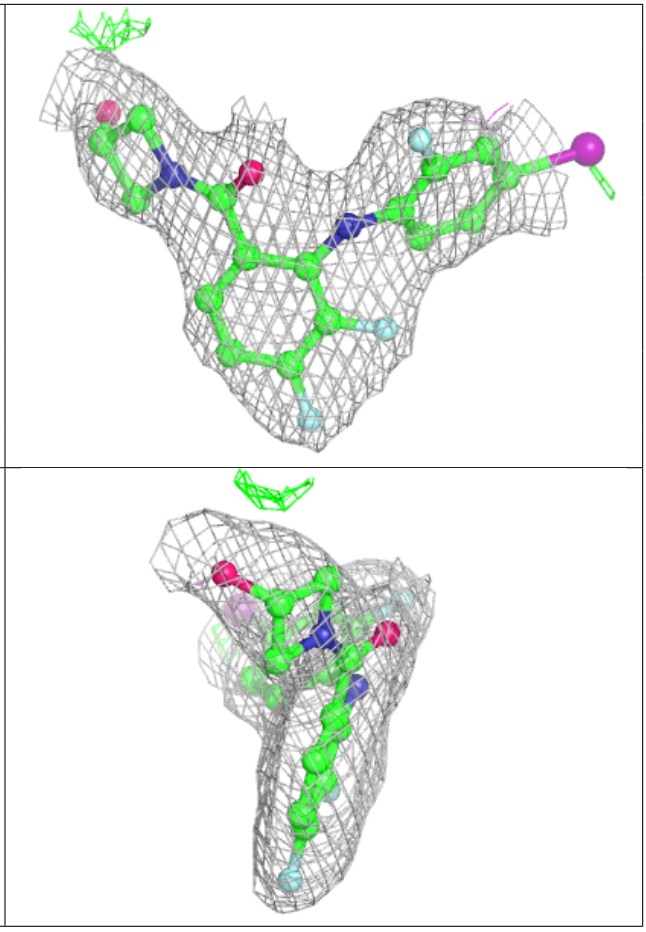
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different

orientation to approximate a three-dimensional view.

Electron density around ACP A 1382: 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 2P7 A 1384:

$2mF_o$-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.