Full wwPDB X-ray Structure Validation Report (i)

Oct 10, 2021 – 12:19 PM EDT

PDB ID	:	3EQG
Title	:	X-ray structure of the human mitogen-activated protein kinase kinase 1 (MEK1) in a ternary complex with PD, ADP AND MG2P
Authors	:	Fischmann, T.O.
Deposited on	:	2008-09-30
Resolution	:	2.50 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.23.2
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)	:	2.23.2
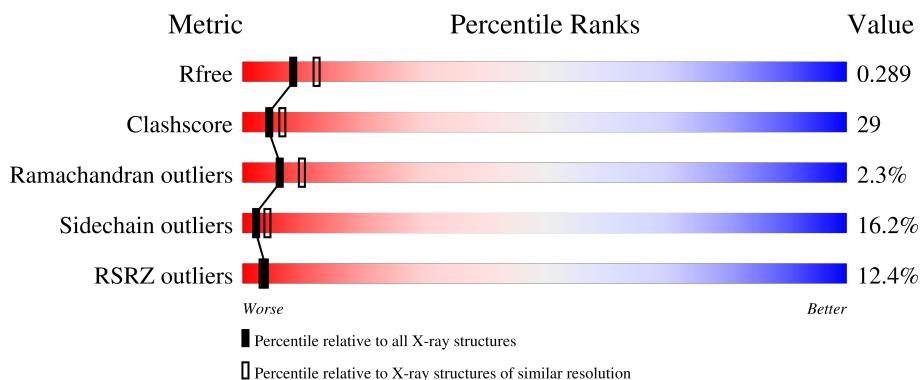
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION
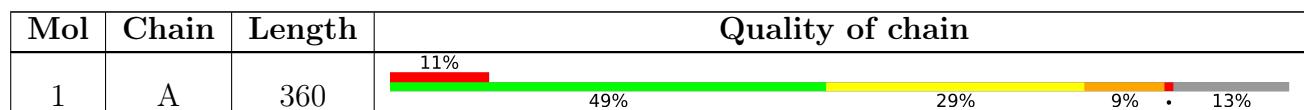
The reported resolution of this entry is 2.50 Å.

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	Percentile Ranks	Value
Rfree		0.289
Clashscore		29
Ramachandran outliers		2.3%
Sidechain outliers		16.2%
RSRZ outliers		12.4%

Worse   *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	360	11% (upper bar) / 49% 29% 9% · 13%

2 Entity composition ⓘ

There are 7 unique types of molecules in this entry. The entry contains 2563 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.
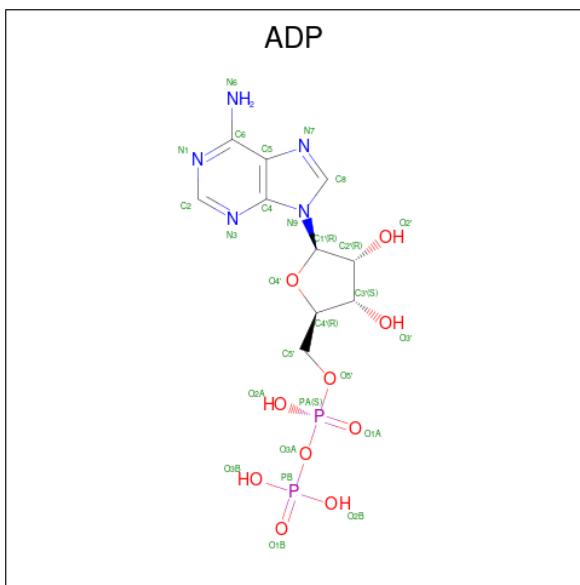
- Molecule 1 is a protein called Dual specificity mitogen-activated protein kinase kinase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	314	2463	1574	419	454	16	0	0	1

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	34	GLY	-	expression tag	UNP Q02750
A	298	ASN	SER	engineered mutation	UNP Q02750
A	299	LYS	SER	engineered mutation	UNP Q02750
A	300	PHE	TYR	engineered mutation	UNP Q02750

- Molecule 2 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		
2	A	1	27	10	5	10	2	0	0

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total 1	Mg 1	0	0
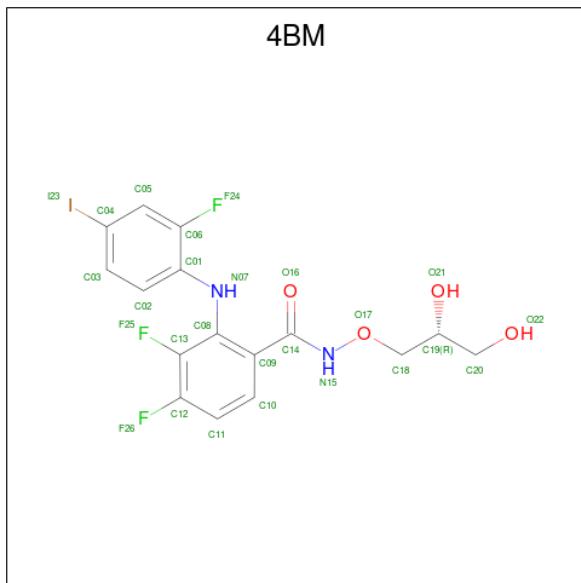
- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total 1	Ca 1	0	0

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total 1	Na 1	0	0

- Molecule 6 is N-{[(2R)-2,3-dihydroxypropyl]oxy}-3,4-difluoro-2-[(2-fluoro-4-iodophenyl)amino]benzamide (three-letter code: 4BM) (formula: $C_{16}H_{14}F_3IN_2O_4$).

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
6	A	1	Total 26	C 16	F 3	I 1	N 2	O 4	0	0
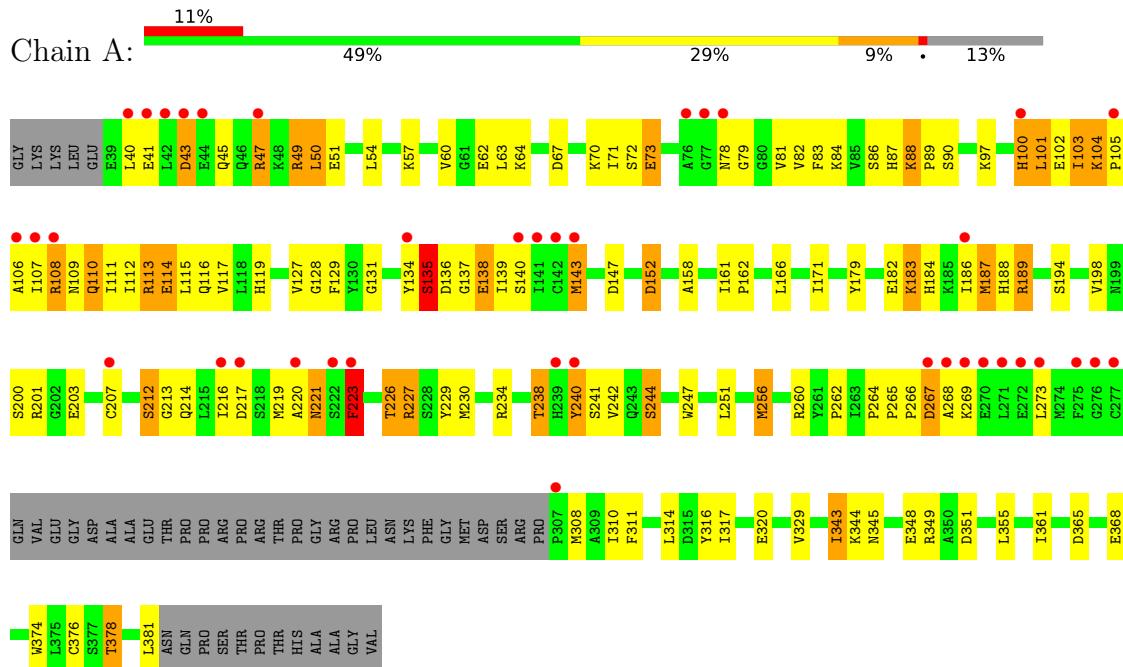
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	44	Total 44	O 44	0	0

3 Residue-property plots ⓘ

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

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α, β, γ	76.00Å 76.00Å 222.32Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	16.54 – 2.50 22.71 – 2.50	Depositor EDS
% Data completeness (in resolution range)	94.0 (16.54-2.50) 94.7 (22.71-2.50)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	5.12 (at 2.50Å)	Xtriage
Refinement program	TNT, BUSTER-TNT 2.1.1	Depositor
R, R_{free}	0.207 , 0.273 0.209 , 0.289	Depositor DCC
R_{free} test set	655 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	44.1	Xtriage
Anisotropy	0.863	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 62.7	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	2563	wwPDB-VP
Average B, all atoms (Å^2)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.15% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ADP, CA, MG, NA, 4BM

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	0.63	0/2511	0.78	3/3380 (0.1%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	84	LYS	N-CA-C	-5.47	96.24	111.00
1	A	262	PRO	N-CA-C	5.36	126.02	112.10
1	A	152	ASP	N-CA-CB	-5.01	101.57	110.60

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	2463	0	2497	143	0
2	A	27	0	12	3	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
5	A	1	0	0	0	0
6	A	26	0	14	4	0
7	A	44	0	0	0	0
All	All	2563	0	2523	145	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 29.

All (145) 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:104:LYS:HG2	1:A:107:ILE:HG13	1.39	1.04
1:A:260:ARG:HH12	1:A:266:PRO:HG3	1.27	0.96
1:A:87:HIS:HD1	1:A:90:SER:HG	1.13	0.96
1:A:260:ARG:NH1	1:A:266:PRO:HG3	1.81	0.94
1:A:105:PRO:HA	1:A:108:ARG:HD3	1.49	0.93
1:A:101:LEU:HD22	1:A:102:GLU:N	1.90	0.87
1:A:104:LYS:N	1:A:107:ILE:HD12	1.89	0.86
1:A:104:LYS:HG3	1:A:106:ALA:HB3	1.57	0.86
1:A:49:ARG:HG2	1:A:201:ARG:HH12	1.41	0.85
1:A:87:HIS:CE1	1:A:89:PRO:HG2	2.13	0.83
1:A:103:ILE:HB	1:A:107:ILE:CD1	2.08	0.83
1:A:234:ARG:HD2	1:A:240:TYR:CD2	2.14	0.82
1:A:79:GLY:HA2	1:A:223:PHE:CZ	2.15	0.81
1:A:49:ARG:HG2	1:A:201:ARG:NH1	1.94	0.81
1:A:104:LYS:H	1:A:107:ILE:HD12	1.45	0.80
1:A:47:ARG:O	1:A:51:GLU:HG3	1.82	0.80
1:A:101:LEU:HD22	1:A:102:GLU:H	1.45	0.80
1:A:101:LEU:HD11	1:A:103:ILE:HG23	1.66	0.77
1:A:110:GLN:NE2	1:A:214:GLN:HG2	2.00	0.77
1:A:103:ILE:HB	1:A:107:ILE:HD13	1.67	0.76
1:A:71:ILE:HD11	1:A:86:SER:HB2	1.67	0.75
1:A:104:LYS:HG2	1:A:107:ILE:CG1	2.16	0.75
1:A:212:SER:O	1:A:216:ILE:HG12	1.87	0.74
1:A:103:ILE:HG13	1:A:107:ILE:HB	1.70	0.74
1:A:104:LYS:CG	1:A:107:ILE:HG13	2.18	0.73
1:A:216:ILE:HD13	6:A:1:4BM:H11	1.71	0.73
1:A:104:LYS:HE3	1:A:107:ILE:HD11	1.72	0.72
1:A:87:HIS:ND1	1:A:90:SER:OG	2.17	0.71
2:A:2:ADP:O2B	2:A:2:ADP:H5'2	1.90	0.71
1:A:79:GLY:HA2	1:A:223:PHE:CE1	2.25	0.71
1:A:260:ARG:NH2	1:A:264:PRO:O	2.25	0.70
1:A:105:PRO:HA	1:A:108:ARG:CD	2.22	0.69
1:A:110:GLN:O	1:A:114:GLU:HG2	1.91	0.69
1:A:134:TYR:OH	1:A:137:GLY:HA2	1.93	0.69
1:A:229:TYR:HA	1:A:251:LEU:HD23	1.75	0.68
1:A:105:PRO:HG3	1:A:108:ARG:NH1	2.07	0.68
1:A:343:ILE:HB	1:A:349:ARG:HB2	1.77	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:110:GLN:HE21	1:A:214:GLN:HG2	1.61	0.66
1:A:108:ARG:HD2	1:A:134:TYR:CE2	2.32	0.65
1:A:219:MET:O	1:A:221:ASN:N	2.27	0.64
1:A:104:LYS:CD	1:A:107:ILE:HD11	2.27	0.63
1:A:43:ASP:OD2	1:A:45:GLN:N	2.30	0.62
1:A:188:HIS:O	1:A:189:ARG:HB2	1.99	0.62
1:A:267:ASP:O	1:A:269:LYS:N	2.33	0.62
1:A:104:LYS:CE	1:A:107:ILE:HD11	2.30	0.61
1:A:345:ASN:ND2	1:A:348:GLU:OE1	2.27	0.61
1:A:103:ILE:HB	1:A:107:ILE:HD12	1.80	0.61
1:A:127:VAL:HG21	1:A:207:CYS:HB3	1.83	0.61
1:A:186:ILE:HG22	1:A:187:MET:O	2.01	0.61
1:A:264:PRO:HB3	1:A:308:MET:CE	2.32	0.60
1:A:320:GLU:O	1:A:344:LYS:NZ	2.25	0.60
1:A:57:LYS:NZ	1:A:119:HIS:HD2	1.99	0.60
1:A:376:CYS:HA	1:A:381:LEU:HB2	1.82	0.60
1:A:101:LEU:CD1	1:A:103:ILE:HD13	2.34	0.58
1:A:101:LEU:CD1	1:A:103:ILE:HG23	2.34	0.58
1:A:166:LEU:HD22	1:A:256:MET:CE	2.34	0.58
1:A:57:LYS:CE	1:A:119:HIS:HD2	2.17	0.57
1:A:216:ILE:CD1	6:A:1:4BM:H11	2.32	0.57
1:A:104:LYS:HD2	1:A:107:ILE:HD11	1.85	0.57
1:A:60:VAL:CG1	1:A:63:LEU:HD21	2.34	0.57
1:A:101:LEU:HD11	1:A:103:ILE:CG2	2.35	0.56
1:A:70:LYS:HD2	1:A:83:PHE:CE2	2.40	0.56
1:A:143:MET:HE2	2:A:2:ADP:HN61	1.72	0.55
1:A:147:ASP:OD2	1:A:200:SER:OG	2.23	0.54
1:A:73:GLU:OE2	1:A:81:VAL:HG13	2.07	0.54
1:A:138:GLU:O	1:A:138:GLU:HG2	2.08	0.54
1:A:81:VAL:HG12	1:A:82:VAL:N	2.23	0.54
1:A:49:ARG:HH21	1:A:201:ARG:HB3	1.73	0.53
1:A:108:ARG:O	1:A:112:ILE:HG12	2.07	0.53
1:A:111:ILE:O	1:A:115:LEU:HG	2.08	0.53
1:A:227:ARG:HB3	1:A:230:MET:SD	2.49	0.52
1:A:112:ILE:O	1:A:116:GLN:HG2	2.10	0.52
1:A:316:TYR:CZ	1:A:320:GLU:HG3	2.45	0.52
1:A:105:PRO:CA	1:A:108:ARG:HD3	2.32	0.52
1:A:60:VAL:HG11	1:A:63:LEU:HD21	1.91	0.52
1:A:128:GLY:O	1:A:143:MET:HB2	2.11	0.51
1:A:108:ARG:HG3	1:A:134:TYR:CD2	2.46	0.51
1:A:184:HIS:HB2	1:A:186:ILE:HD12	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:129:PHE:CZ	1:A:131:GLY:HA2	2.46	0.50
1:A:57:LYS:NZ	1:A:119:HIS:CD2	2.78	0.50
1:A:70:LYS:HD2	1:A:83:PHE:CD2	2.46	0.50
1:A:314:LEU:HA	1:A:317:ILE:HD12	1.93	0.49
1:A:104:LYS:H	1:A:107:ILE:CD1	2.20	0.49
1:A:264:PRO:HG3	1:A:308:MET:HE2	1.95	0.49
1:A:88:LYS:N	1:A:89:PRO:HD2	2.28	0.49
1:A:184:HIS:HB2	1:A:186:ILE:CD1	2.42	0.48
1:A:49:ARG:CG	1:A:201:ARG:HH12	2.19	0.48
1:A:242:VAL:HG22	1:A:242:VAL:O	2.12	0.48
1:A:40:LEU:HD11	1:A:179:TYR:HA	1.95	0.48
1:A:71:ILE:HG22	1:A:71:ILE:O	2.12	0.48
1:A:166:LEU:HD22	1:A:256:MET:HE3	1.94	0.48
1:A:100:HIS:HA	1:A:138:GLU:HB2	1.96	0.48
1:A:104:LYS:HG2	1:A:107:ILE:CD1	2.44	0.48
1:A:213:GLY:O	1:A:216:ILE:HB	2.14	0.48
1:A:109:ASN:O	1:A:113:ARG:HG3	2.14	0.47
1:A:374:TRP:O	1:A:378:THR:OG1	2.28	0.47
1:A:50:LEU:O	1:A:54:LEU:HD12	2.14	0.47
1:A:256:MET:HB2	1:A:256:MET:HE2	1.65	0.46
1:A:114:GLU:OE1	1:A:214:GLN:HB3	2.15	0.46
1:A:97:LYS:NZ	6:A:1:4BM:H18	2.31	0.46
1:A:108:ARG:CG	1:A:134:TYR:CD2	2.99	0.46
1:A:110:GLN:NE2	1:A:214:GLN:CG	2.77	0.45
1:A:101:LEU:C	1:A:101:LEU:HD13	2.36	0.45
1:A:134:TYR:CZ	1:A:137:GLY:HA2	2.50	0.45
1:A:183:LYS:HE3	1:A:183:LYS:HB3	1.61	0.45
1:A:100:HIS:NE2	1:A:102:GLU:OE2	2.49	0.45
1:A:101:LEU:HD11	1:A:103:ILE:HD13	1.99	0.45
1:A:234:ARG:HD2	1:A:240:TYR:CE2	2.50	0.45
1:A:81:VAL:CG1	1:A:82:VAL:N	2.80	0.44
1:A:105:PRO:HG3	1:A:108:ARG:HH12	1.79	0.44
1:A:115:LEU:HD23	1:A:115:LEU:HA	1.73	0.44
1:A:108:ARG:HD2	1:A:134:TYR:CD2	2.52	0.44
1:A:143:MET:CE	2:A:2:ADP:HN61	2.31	0.44
1:A:166:LEU:HD22	1:A:256:MET:HE2	1.99	0.44
1:A:264:PRO:HB3	1:A:308:MET:HE3	1.99	0.44
1:A:310:ILE:HG23	1:A:311:PHE:N	2.33	0.44
1:A:108:ARG:CD	1:A:134:TYR:CD2	3.01	0.43
1:A:104:LYS:HD2	1:A:107:ILE:CG1	2.48	0.43
1:A:198:VAL:HA	1:A:203:GLU:O	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:103:ILE:CG1	1:A:107:ILE:HB	2.46	0.43
1:A:104:LYS:CD	1:A:107:ILE:CD1	2.97	0.43
1:A:112:ILE:HD11	1:A:139:ILE:HG12	2.00	0.43
1:A:265:PRO:HA	1:A:266:PRO:HD3	1.66	0.43
1:A:114:GLU:O	1:A:117:VAL:HG23	2.19	0.43
1:A:81:VAL:HG11	1:A:83:PHE:CZ	2.54	0.43
1:A:161:ILE:HA	1:A:162:PRO:HD3	1.88	0.42
6:A:1:4BM:O16	6:A:1:4BM:N07	2.49	0.42
1:A:108:ARG:CZ	1:A:134:TYR:CD1	3.03	0.42
1:A:316:TYR:CE2	1:A:320:GLU:HG3	2.54	0.42
1:A:100:HIS:CD2	1:A:100:HIS:O	2.73	0.42
1:A:104:LYS:HD2	1:A:107:ILE:CD1	2.50	0.42
1:A:247:TRP:CD1	1:A:247:TRP:C	2.93	0.42
1:A:114:GLU:OE1	1:A:214:GLN:CB	2.68	0.41
1:A:127:VAL:CG2	1:A:207:CYS:HB3	2.51	0.41
1:A:187:MET:CG	1:A:189:ARG:HG3	2.50	0.41
1:A:158:ALA:HB2	1:A:378:THR:HG21	2.03	0.41
1:A:351:ASP:O	1:A:355:LEU:HG	2.20	0.41
1:A:71:ILE:O	1:A:71:ILE:CG2	2.68	0.41
1:A:104:LYS:HG2	1:A:107:ILE:H	1.86	0.41
1:A:135:SER:O	1:A:136:ASP:HB2	2.21	0.41
1:A:171:ILE:HG12	1:A:361:ILE:HG23	2.03	0.41
1:A:87:HIS:CE1	1:A:90:SER:HG	2.33	0.40
1:A:152:ASP:HB2	1:A:194:SER:HA	2.03	0.40
1:A:241:SER:O	1:A:244:SER:HB2	2.20	0.40
1:A:269:LYS:HA	1:A:269:LYS:HD3	1.77	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	310/360 (86%)	277 (89%)	26 (8%)	7 (2%)	6 10

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	238	THR
1	A	268	ALA
1	A	220	ALA
1	A	226	THR
1	A	135	SER
1	A	100	HIS
1	A	223	PHE

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	272/310 (88%)	228 (84%)	44 (16%)	2 4

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	GLU
1	A	43	ASP
1	A	47	ARG
1	A	49	ARG
1	A	50	LEU
1	A	62	GLU
1	A	64	LYS
1	A	67	ASP
1	A	72	SER
1	A	73	GLU
1	A	78	ASN
1	A	88	LYS
1	A	101	LEU
1	A	103	ILE

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Mol	Chain	Res	Type
1	A	104	LYS
1	A	108	ARG
1	A	110	GLN
1	A	113	ARG
1	A	114	GLU
1	A	135	SER
1	A	138	GLU
1	A	140	SER
1	A	143	MET
1	A	182	GLU
1	A	183	LYS
1	A	187	MET
1	A	189	ARG
1	A	212	SER
1	A	217	ASP
1	A	221	ASN
1	A	223	PHE
1	A	226	THR
1	A	227	ARG
1	A	238	THR
1	A	240	TYR
1	A	244	SER
1	A	256	MET
1	A	267	ASP
1	A	273	LEU
1	A	329	VAL
1	A	343	ILE
1	A	365	ASP
1	A	368	GLU
1	A	378	THR

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	110	GLN
1	A	119	HIS
1	A	214	GLN
1	A	339	ASN

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 5 ligands modelled in this entry, 3 are 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	$\#|Z| > 2$
6	4BM	A	1	-	26,27,27	1.65	6 (23%)	33,37,37	2.43	14 (42%)
2	ADP	A	2	3	24,29,29	1.07	1 (4%)	29,45,45	2.12	10 (34%)

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
6	4BM	A	1	-	-	6/16/16/16	0/2/2/2
2	ADP	A	2	3	-	5/12/32/32	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	1	4BM	O17-N15	3.35	1.48	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	1	4BM	F25-C13	-3.11	1.30	1.35
6	A	1	4BM	C12-C13	3.03	1.43	1.37
6	A	1	4BM	C02-C01	3.00	1.44	1.39
2	A	2	ADP	O4'-C1'	2.66	1.44	1.41
6	A	1	4BM	C14-N15	2.38	1.37	1.34
6	A	1	4BM	C01-C06	-2.05	1.36	1.38

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	1	4BM	C02-C01-C06	-5.08	112.06	117.17
6	A	1	4BM	C03-C04-I23	5.05	127.30	119.68
2	A	2	ADP	O2B-PB-O3A	-4.67	88.97	104.64
2	A	2	ADP	O3B-PB-O3A	-4.43	89.79	104.64
2	A	2	ADP	N3-C2-N1	-4.21	122.10	128.68
6	A	1	4BM	F24-C06-C01	4.07	122.60	117.50
6	A	1	4BM	C09-C08-C13	-4.04	113.64	117.04
2	A	2	ADP	PA-O3A-PB	-3.98	119.18	132.83
6	A	1	4BM	C03-C04-C05	-3.76	116.67	121.09
6	A	1	4BM	C03-C02-C01	3.72	126.83	119.64
6	A	1	4BM	C10-C11-C12	-3.65	114.63	119.05
2	A	2	ADP	O3B-PB-O2B	3.25	120.07	107.64
6	A	1	4BM	O16-C14-N15	2.99	127.40	123.03
6	A	1	4BM	O16-C14-C09	-2.79	115.92	121.01
6	A	1	4BM	C08-C13-C12	2.67	125.37	121.78
6	A	1	4BM	C05-C04-I23	-2.64	116.02	119.37
2	A	2	ADP	O2B-PB-O1B	2.58	120.76	110.68
2	A	2	ADP	O3A-PB-O1B	-2.55	97.04	111.19
6	A	1	4BM	C02-C01-N07	2.50	126.53	121.39
6	A	1	4BM	C10-C09-C08	2.49	122.22	118.65
6	A	1	4BM	C05-C06-C01	-2.27	121.34	123.50
2	A	2	ADP	C4-C5-N7	-2.18	107.13	109.40
2	A	2	ADP	C3'-C2'-C1'	2.09	104.13	100.98
2	A	2	ADP	O3B-PB-O1B	2.08	118.83	110.68

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	2	ADP	C5'-O5'-PA-O3A
6	A	1	4BM	C14-N15-O17-C18
6	A	1	4BM	O17-C18-C19-C20

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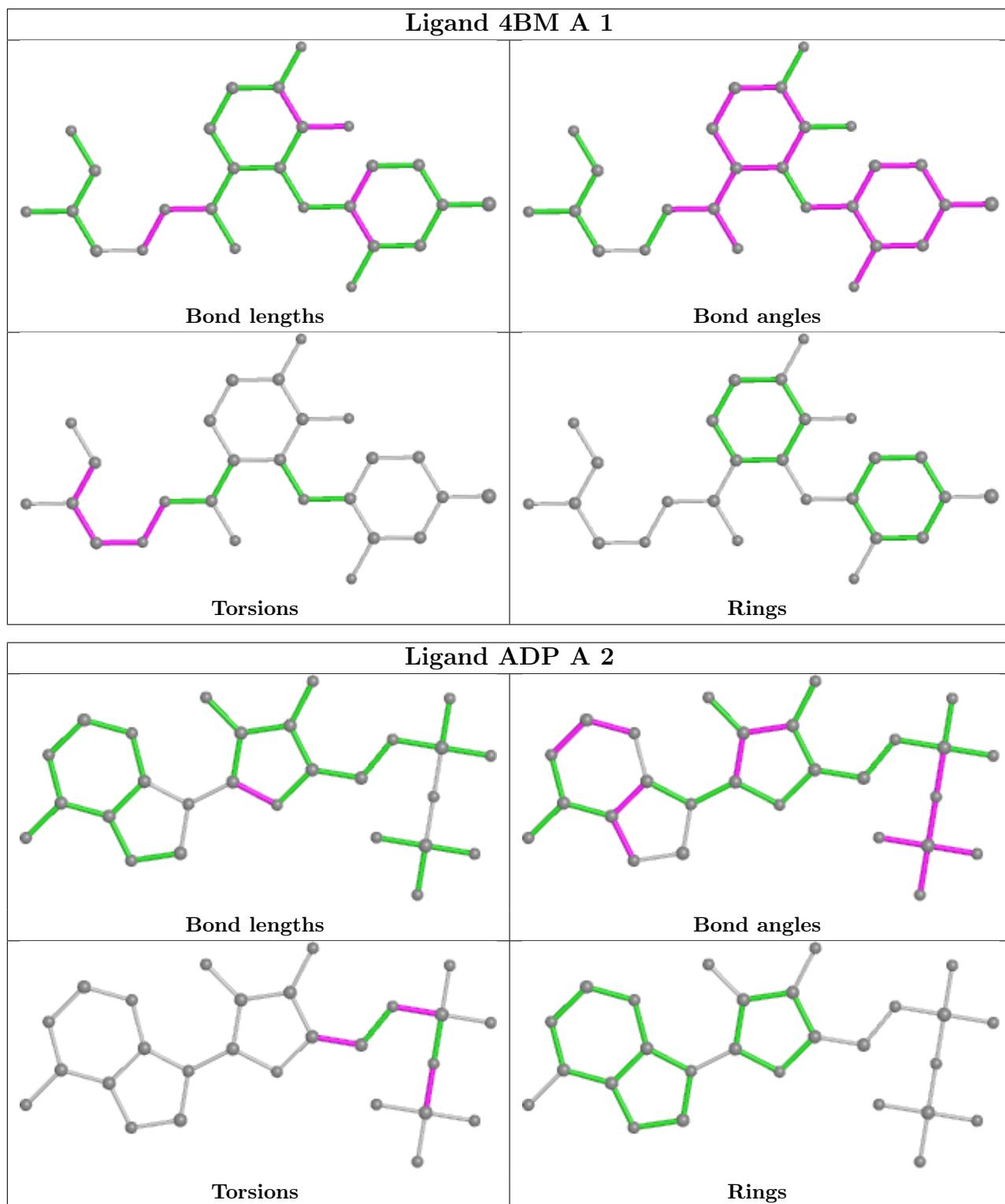
Mol	Chain	Res	Type	Atoms
6	A	1	4BM	O17-C18-C19-O21
2	A	2	ADP	O4'-C4'-C5'-O5'
6	A	1	4BM	O21-C19-C20-O22
2	A	2	ADP	C5'-O5'-PA-O1A
2	A	2	ADP	C5'-O5'-PA-O2A
6	A	1	4BM	C18-C19-C20-O22
6	A	1	4BM	C19-C18-O17-N15
2	A	2	ADP	PA-O3A-PB-O3B

There are no ring outliers.

2 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1	4BM	4	0
2	A	2	ADP	3	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 4BM A 1

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP A 2

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	314/360 (87%)	0.58	39 (12%)	4	3	33, 58, 111, 131	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	78	ASN	8.2
1	A	276	GLY	7.7
1	A	277	CYS	7.3
1	A	269	LYS	6.7
1	A	268	ALA	6.2
1	A	105	PRO	6.0
1	A	220	ALA	5.2
1	A	40	LEU	5.1
1	A	240	TYR	4.5
1	A	141	ILE	4.5
1	A	273	LEU	4.5
1	A	77	GLY	4.4
1	A	267	ASP	4.3
1	A	44	GLU	4.0
1	A	272	GLU	3.9
1	A	143	MET	3.9
1	A	275	PHE	3.8
1	A	271	LEU	3.6
1	A	108	ARG	3.6
1	A	223	PHE	3.5
1	A	42	LEU	3.5
1	A	76	ALA	3.3
1	A	186	ILE	3.2
1	A	142	CYS	3.0
1	A	207	CYS	3.0
1	A	106	ALA	2.9
1	A	107	ILE	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	239	HIS	2.6
1	A	41	GLU	2.6
1	A	307	PRO	2.6
1	A	100	HIS	2.6
1	A	222	SER	2.5
1	A	270	GLU	2.5
1	A	134	TYR	2.4
1	A	217	ASP	2.4
1	A	47	ARG	2.2
1	A	216	ILE	2.2
1	A	43	ASP	2.1
1	A	140	SER	2.1

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ
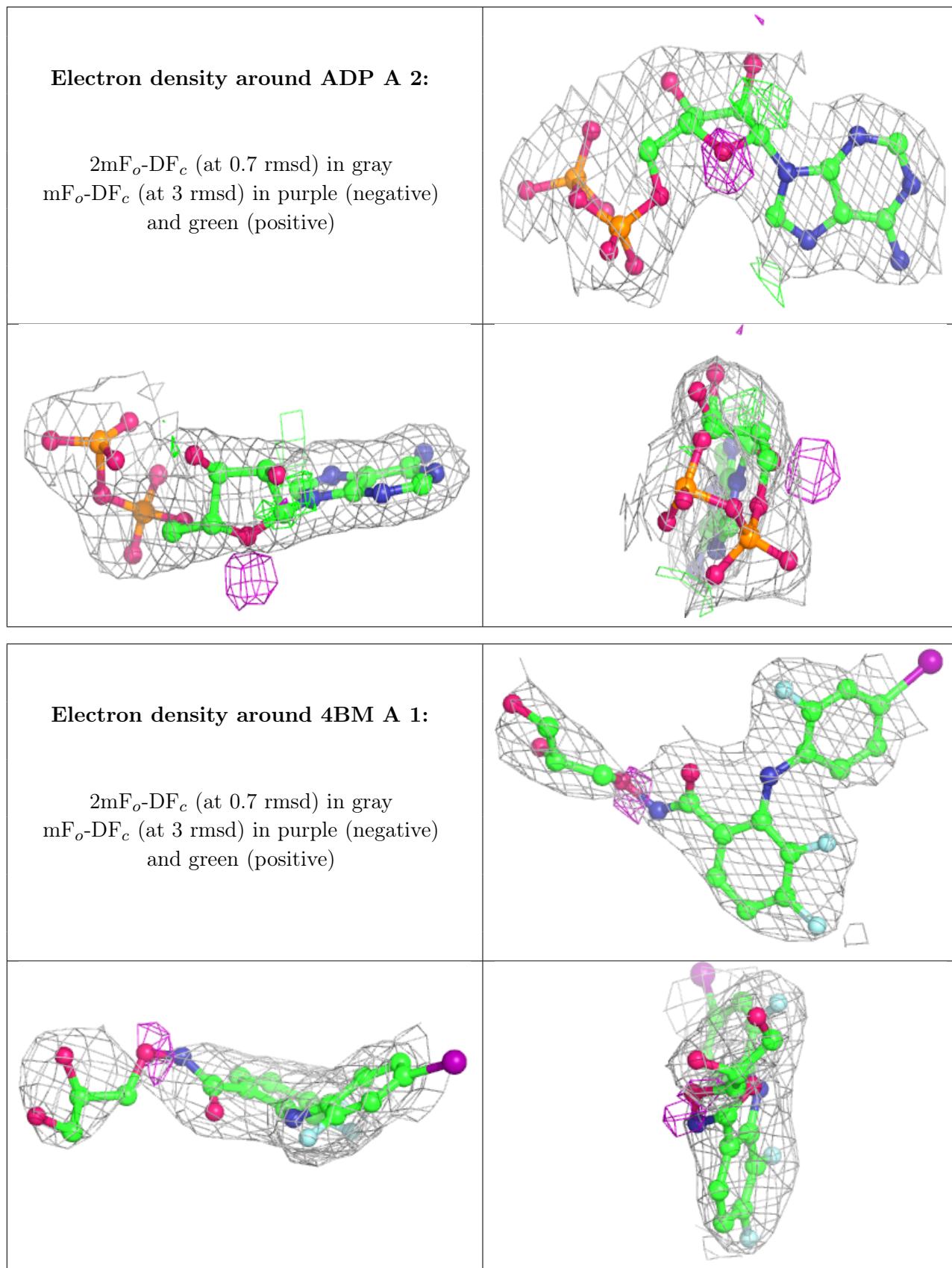
There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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
2	ADP	A	2	27/27	0.95	0.12	45,52,61,62	0
4	CA	A	5	1/1	0.95	0.11	86,86,86,86	1
5	NA	A	6	1/1	0.95	0.23	44,44,44,44	0
3	MG	A	3	1/1	0.97	0.17	34,34,34,34	0
6	4BM	A	1	26/26	0.98	0.19	43,52,80,82	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 2:

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 4BM A 1:

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.