Full wwPDB X-ray Structure Validation Report (i)

Jun 11, 2024 – 06:28 PM EDT

PDB ID	:	1VHT
Title	:	Crystal structure of dephospho-coA kinase with bis(adenosine)-5'-triphosphate
Authors	:	Structural GenomiX
Deposited on	:	2003-12-01
Resolution	:	1.59 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

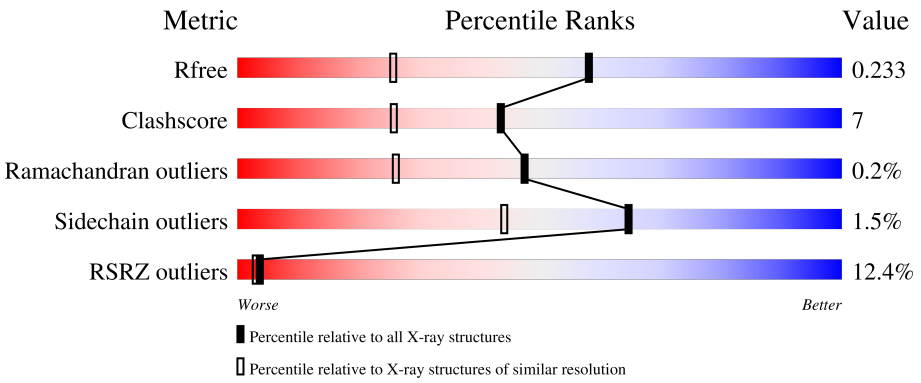
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber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

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 1.59 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	3398 (1.60-1.60)
Clashscore	141614	3665 (1.60-1.60)
Ramachandran outliers	138981	3564 (1.60-1.60)
Sidechain outliers	138945	3563 (1.60-1.60)
RSRZ outliers	127900	3321 (1.60-1.60)

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 <=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	218	12%, 83%, 12%, • 5%
1	B	218	3%, 86%, 8%, • 5%
1	C	218	20%, 72%, 14%, 13%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	ACT	A	217	-	-	X	-

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 5305 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 Dephospho-CoA kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	208	1567	984	286	295	2	0	0	0
			Total	C	N	O	S			
1	B	208	1603	1005	293	303	2	0	2	0
			Total	C	N	O	S			
1	C	189	1393	877	246	268	2	0	1	0

There are 39 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	cloning artifact	UNP P0A6I9
A	0	SER	-	cloning artifact	UNP P0A6I9
A	1	LEU	-	cloning artifact	UNP P0A6I9
A	207	GLU	-	cloning artifact	UNP P0A6I9
A	208	GLY	-	cloning artifact	UNP P0A6I9
A	209	GLY	-	cloning artifact	UNP P0A6I9
A	210	SER	-	cloning artifact	UNP P0A6I9
A	211	HIS	-	cloning artifact	UNP P0A6I9
A	212	HIS	-	cloning artifact	UNP P0A6I9
A	213	HIS	-	cloning artifact	UNP P0A6I9
A	214	HIS	-	cloning artifact	UNP P0A6I9
A	215	HIS	-	cloning artifact	UNP P0A6I9
A	216	HIS	-	cloning artifact	UNP P0A6I9
B	-1	MET	-	cloning artifact	UNP P0A6I9
B	0	SER	-	cloning artifact	UNP P0A6I9
B	1	LEU	-	cloning artifact	UNP P0A6I9
B	207	GLU	-	cloning artifact	UNP P0A6I9
B	208	GLY	-	cloning artifact	UNP P0A6I9
B	209	GLY	-	cloning artifact	UNP P0A6I9
B	210	SER	-	cloning artifact	UNP P0A6I9
B	211	HIS	-	cloning artifact	UNP P0A6I9
B	212	HIS	-	cloning artifact	UNP P0A6I9
B	213	HIS	-	cloning artifact	UNP P0A6I9

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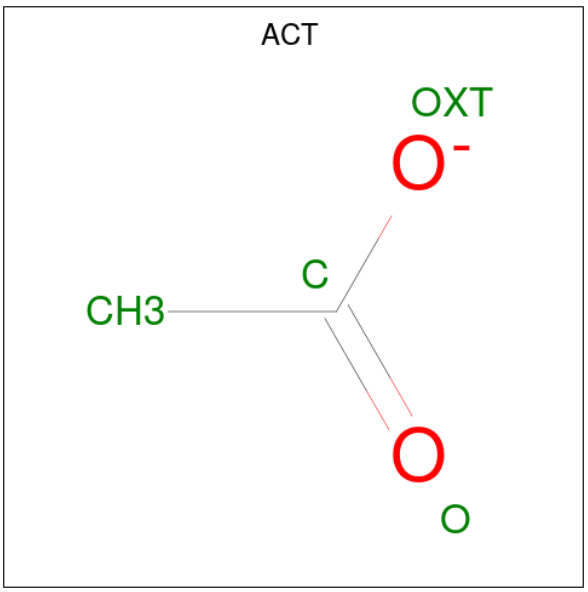
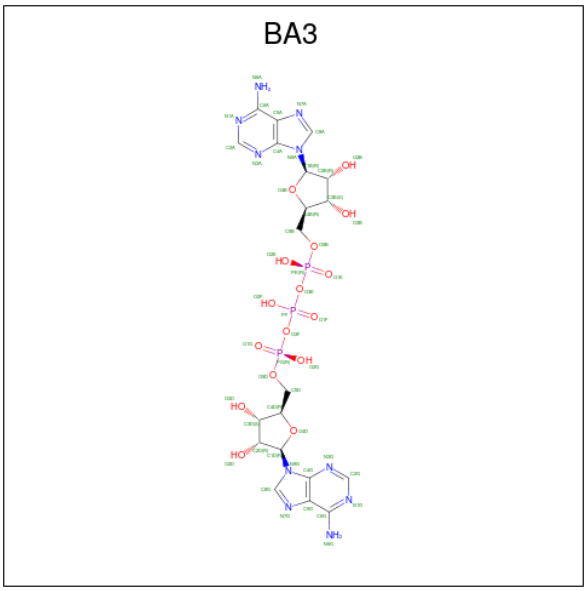
Chain	Residue	Modelled	Actual	Comment	Reference
B	214	HIS	-	cloning artifact	UNP P0A6I9
B	215	HIS	-	cloning artifact	UNP P0A6I9
B	216	HIS	-	cloning artifact	UNP P0A6I9
C	-1	MET	-	cloning artifact	UNP P0A6I9
C	0	SER	-	cloning artifact	UNP P0A6I9
C	1	LEU	-	cloning artifact	UNP P0A6I9
C	207	GLU	-	cloning artifact	UNP P0A6I9
C	208	GLY	-	cloning artifact	UNP P0A6I9
C	209	GLY	-	cloning artifact	UNP P0A6I9
C	210	SER	-	cloning artifact	UNP P0A6I9
C	211	HIS	-	cloning artifact	UNP P0A6I9
C	212	HIS	-	cloning artifact	UNP P0A6I9
C	213	HIS	-	cloning artifact	UNP P0A6I9
C	214	HIS	-	cloning artifact	UNP P0A6I9
C	215	HIS	-	cloning artifact	UNP P0A6I9
C	216	HIS	-	cloning artifact	UNP P0A6I9

- Molecule 2 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).



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

- Molecule 3 is BIS(ADENOSINE)-5'-TRIPHOSPHATE (three-letter code: BA3) (formula: $C_{20}H_{27}N_{10}O_{16}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	49	20	10	16	3	0	0
			Total	C	N	O	P		
3	B	1	49	20	10	16	3	0	0
			Total	C	N	O	P		
3	C	1	49	20	10	16	3	0	0

- Molecule 4 is water.

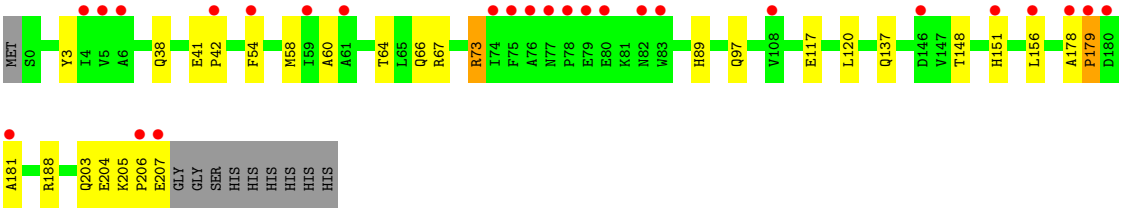
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	221	221	221	0	0
			Total	O		
4	B	234	234	234	0	0
			Total	O		
4	C	132	132	132	0	0

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.

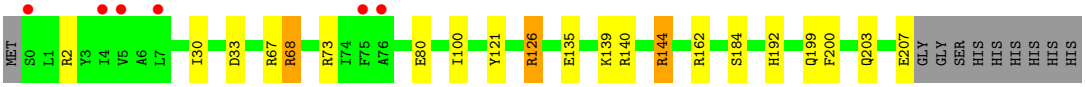
- Molecule 1: Dephospho-CoA kinase

Chain A:



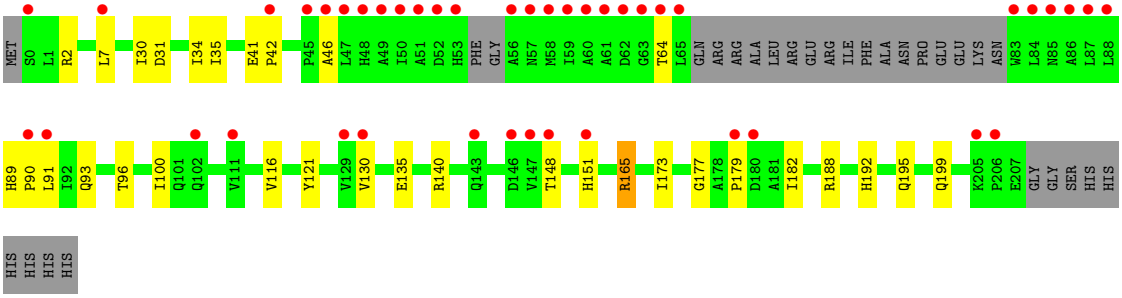
- Molecule 1: Dephospho-CoA kinase

Chain B:



- Molecule 1: Dephospho-CoA kinase

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	55.69Å 80.60Å 75.38Å 90.00° 93.36° 90.00°	Depositor
Resolution (Å)	25.57 – 1.59 25.59 – 1.59	Depositor EDS
% Data completeness (in resolution range)	(Not available) (25.57-1.59) 98.9 (25.59-1.59)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.51 (at 1.59Å)	Xtriage
Refinement program	REFMAC 4.0	Depositor
R, R_{free}	0.210 , 0.247 0.202 , 0.233	Depositor DCC
R_{free} test set	4399 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	18.4	Xtriage
Anisotropy	0.277	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 48.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	5305	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.47% 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: ACT, BA3

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	0.59	0/1592	1.07	4/2173 (0.2%)
1	B	0.61	0/1641	1.11	10/2237 (0.4%)
1	C	0.55	0/1417	1.03	5/1938 (0.3%)
All	All	0.59	0/4650	1.07	19/6348 (0.3%)

There are no bond length outliers.

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	140	ARG	CD-NE-CZ	10.68	138.55	123.60
1	B	126	ARG	NE-CZ-NH2	-10.52	115.04	120.30
1	B	67	ARG	NE-CZ-NH1	8.30	124.45	120.30
1	A	67	ARG	CD-NE-CZ	8.05	134.87	123.60
1	C	188	ARG	NE-CZ-NH1	7.88	124.24	120.30
1	A	117	GLU	OE1-CD-OE2	-7.37	114.45	123.30
1	C	121	TYR	CB-CG-CD1	6.33	124.80	121.00
1	A	188	ARG	NE-CZ-NH1	5.85	123.22	120.30
1	A	3	TYR	CB-CG-CD1	-5.83	117.50	121.00
1	C	121	TYR	CB-CG-CD2	-5.61	117.63	121.00
1	B	121	TYR	CB-CG-CD1	5.46	124.28	121.00
1	B	73	ARG	NE-CZ-NH2	-5.42	117.59	120.30
1	B	33	ASP	CB-CG-OD2	-5.38	113.45	118.30
1	B	162	ARG	NE-CZ-NH2	-5.31	117.65	120.30
1	B	68	ARG	NE-CZ-NH2	-5.29	117.66	120.30
1	C	165	ARG	NE-CZ-NH1	-5.06	117.77	120.30
1	B	200	PHE	CB-CG-CD1	-5.05	117.26	120.80
1	B	121	TYR	CB-CG-CD2	-5.05	117.97	121.00
1	B	67	ARG	CD-NE-CZ	5.01	130.61	123.60

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	1567	0	1553	24	0
1	B	1603	0	1595	13	0
1	C	1393	0	1360	23	0
2	A	4	0	3	2	0
2	B	4	0	3	0	0
3	A	49	0	22	0	0
3	B	49	0	22	3	0
3	C	49	0	22	1	0
4	A	221	0	0	7	0
4	B	234	0	0	3	0
4	C	132	0	0	4	0
All	All	5305	0	4580	62	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 7.

All (62) 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:203:GLN:HE22	1:B:207:GLU:HB2	1.18	1.02
1:C:148:THR:HG23	1:C:151:HIS:H	1.30	0.97
1:C:7:LEU:HD11	1:C:130:VAL:HG23	1.55	0.89
1:A:148:THR:HG23	1:A:151:HIS:H	1.42	0.83
1:C:179:PRO:HA	4:C:336:HOH:O	1.86	0.74
1:A:181:ALA:HB3	4:A:381:HOH:O	1.89	0.73
1:C:42:PRO:HG3	1:C:64:THR:HG22	1.72	0.71
1:C:89:HIS:HB3	1:C:90:PRO:HD3	1.73	0.70
1:C:135:GLU:HG3	4:C:318:HOH:O	1.93	0.68
1:C:7:LEU:HD11	1:C:130:VAL:CG2	2.23	0.68
1:B:144:ARG:HD2	3:B:218:BA3:O3B	1.94	0.66
1:B:203:GLN:NE2	1:B:207:GLU:HB2	2.02	0.65
1:A:42:PRO:HG3	1:A:64:THR:HG22	1.78	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:217:ACT:H1	4:A:413:HOH:O	1.96	0.64
1:A:60:ALA:HB2	1:A:66:GLN:HE21	1.64	0.62
1:C:192:HIS:HD2	4:C:252:HOH:O	1.82	0.62
1:C:199:GLN:HG3	4:C:277:HOH:O	1.99	0.62
1:B:203:GLN:HE22	1:B:207:GLU:CB	2.06	0.58
1:C:195:GLN:O	1:C:199:GLN:HG2	2.04	0.57
1:C:148:THR:HG23	1:C:151:HIS:N	2.11	0.56
1:B:192:HIS:HD2	4:B:359:HOH:O	1.89	0.55
1:C:41:GLU:HB2	1:C:42:PRO:HD2	1.90	0.54
1:C:42:PRO:HG3	1:C:64:THR:CG2	2.38	0.53
1:A:207:GLU:HA	4:A:296:HOH:O	2.08	0.53
1:A:137:GLN:NE2	1:A:156:LEU:HD21	2.23	0.53
1:A:206:PRO:O	1:A:207:GLU:C	2.47	0.53
1:B:199:GLN:NE2	1:B:207:GLU:HG3	2.24	0.52
1:A:54:PHE:HB2	1:A:58:MET:HG3	1.91	0.51
1:B:68:ARG:HG3	4:B:404:HOH:O	2.10	0.50
1:C:31:ASP:HB3	1:C:34:ILE:HD12	1.93	0.50
1:B:140:ARG:O	1:B:144:ARG:HG3	2.11	0.50
1:A:120:LEU:HD21	2:A:217:ACT:H3	1.94	0.50
1:A:97:GLN:HG3	4:A:416:HOH:O	2.12	0.49
1:C:173:ILE:HD11	1:C:182:ILE:HB	1.95	0.48
1:A:60:ALA:CB	1:A:66:GLN:HE21	2.25	0.48
1:C:30:ILE:HD13	1:C:100:ILE:HG12	1.95	0.48
1:A:38:GLN:HA	1:A:41:GLU:HG3	1.95	0.48
1:A:148:THR:HG23	1:A:151:HIS:N	2.21	0.47
1:B:144:ARG:HD2	3:B:218:BA3:C3B	2.46	0.46
3:B:218:BA3:C2B	4:B:274:HOH:O	2.64	0.45
1:A:178:ALA:HB1	1:A:179:PRO:HD2	1.99	0.45
1:C:2:ARG:HH21	1:C:2:ARG:HG2	1.82	0.45
1:A:41:GLU:HB3	1:A:42:PRO:HD2	1.99	0.45
1:B:199:GLN:HE22	1:B:207:GLU:HG3	1.82	0.44
1:C:35:ILE:HD13	1:C:96:THR:HA	2.00	0.43
1:C:177:GLY:O	3:C:217:BA3:N6A	2.52	0.43
1:A:156:LEU:HD23	1:A:156:LEU:HA	1.86	0.43
1:A:54:PHE:O	1:A:73:ARG:NH2	2.52	0.43
1:C:46:ALA:HB2	1:C:91:LEU:HD12	2.00	0.43
1:A:89:HIS:HD2	4:A:347:HOH:O	2.01	0.43
1:A:97:GLN:HG2	4:A:318:HOH:O	2.19	0.43
1:B:135:GLU:HG3	1:B:139:LYS:HE2	2.01	0.42
1:A:42:PRO:HG3	1:A:64:THR:CG2	2.47	0.42
1:A:203:GLN:HG3	1:A:205:LYS:O	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:30:ILE:HD13	1:B:100:ILE:CG1	2.50	0.41
1:A:89:HIS:HE1	4:A:370:HOH:O	2.03	0.41
1:A:58:MET:HE3	1:A:58:MET:HA	2.02	0.41
1:C:89:HIS:HB3	1:C:90:PRO:CD	2.44	0.41
1:C:46:ALA:HB2	1:C:91:LEU:CD1	2.51	0.40
1:A:178:ALA:HB1	1:A:179:PRO:CD	2.51	0.40
1:B:80:GLU:HA	1:B:80:GLU:OE1	2.21	0.40
1:C:116:VAL:HG21	1:C:165:ARG:HA	2.04	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	206/218 (94%)	201 (98%)	4 (2%)	1 (0%)	29	11
1	B	208/218 (95%)	207 (100%)	1 (0%)	0	100	100
1	C	184/218 (84%)	183 (100%)	1 (0%)	0	100	100
All	All	598/654 (91%)	591 (99%)	6 (1%)	1 (0%)	47	26

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	179	PRO

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	157/177 (89%)	155 (99%)	2 (1%)	69	50
1	B	167/177 (94%)	163 (98%)	4 (2%)	49	24
1	C	139/177 (78%)	138 (99%)	1 (1%)	84	73
All	All	463/531 (87%)	456 (98%)	7 (2%)	65	44

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	73	ARG
1	A	204	GLU
1	B	2	ARG
1	B	126	ARG
1	B	144	ARG
1	B	184	SER
1	C	93	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	66	GLN
1	A	89	HIS
1	A	97	GLN
1	A	154	GLN
1	A	199	GLN
1	B	154	GLN
1	B	192	HIS
1	B	195	GLN
1	B	199	GLN
1	B	203	GLN
1	C	192	HIS

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)

5 ligands are modelled in this entry.

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	ACT	B	217	-	3,3,3	1.32	1 (33%)	3,3,3	0.75	0
2	ACT	A	217	-	3,3,3	1.17	0	3,3,3	1.30	0
3	BA3	A	218	-	46,54,54	1.99	13 (28%)	51,84,84	1.74	12 (23%)
3	BA3	B	218	-	46,54,54	1.90	16 (34%)	51,84,84	2.08	16 (31%)
3	BA3	C	217	-	46,54,54	2.03	15 (32%)	51,84,84	1.79	9 (17%)

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
3	BA3	A	218	-	-	3/24/64/64	0/6/6/6
3	BA3	B	218	-	-	3/24/64/64	0/6/6/6
3	BA3	C	217	-	-	3/24/64/64	0/6/6/6

All (45) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	217	BA3	PF-O3E	-7.09	1.51	1.59
3	A	218	BA3	PF-O3E	-5.58	1.53	1.59
3	A	218	BA3	C2B-C3B	-4.17	1.42	1.53
3	B	218	BA3	PF-O3E	-4.04	1.55	1.59
3	C	217	BA3	C5D-C4D	3.99	1.63	1.51
3	A	218	BA3	C5D-C4D	3.94	1.63	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	218	BA3	PG-O3F	-3.92	1.55	1.59
3	B	218	BA3	C5D-C4D	3.88	1.63	1.51
3	A	218	BA3	C6A-N6A	-3.66	1.21	1.34
3	B	218	BA3	C3B-C4B	-3.56	1.44	1.53
3	C	217	BA3	C6A-N6A	-3.52	1.21	1.34
3	C	217	BA3	C2G-N1G	3.45	1.40	1.33
3	A	218	BA3	C2G-N1G	3.38	1.39	1.33
3	C	217	BA3	C2B-C3B	-3.34	1.44	1.53
3	C	217	BA3	PE-O3E	-3.24	1.56	1.59
3	B	218	BA3	C2B-C3B	-3.21	1.44	1.53
3	C	217	BA3	PG-O3F	-3.15	1.56	1.59
3	B	218	BA3	C6A-N6A	-3.14	1.22	1.34
3	B	218	BA3	C2G-N1G	3.11	1.39	1.33
3	A	218	BA3	PE-O3E	-3.09	1.56	1.59
3	B	218	BA3	PG-O3F	-2.99	1.56	1.59
3	B	218	BA3	O2B-C2B	2.88	1.50	1.43
3	A	218	BA3	O4B-C4B	-2.83	1.38	1.45
3	B	218	BA3	C6G-N6G	-2.75	1.24	1.34
3	C	217	BA3	C6G-N6G	-2.69	1.24	1.34
3	A	218	BA3	C6G-N6G	-2.68	1.24	1.34
3	A	218	BA3	C8G-N7G	-2.64	1.29	1.34
3	C	217	BA3	PF-O3F	-2.60	1.56	1.59
3	C	217	BA3	C8G-N7G	-2.48	1.30	1.34
3	B	218	BA3	PG-O1G	2.42	1.59	1.50
3	B	218	BA3	O4B-C4B	-2.42	1.39	1.45
3	A	218	BA3	C2G-N3G	2.38	1.35	1.32
3	C	217	BA3	C2D-C3D	-2.36	1.47	1.53
3	C	217	BA3	C3B-C4B	-2.24	1.47	1.53
2	B	217	ACT	O-C	2.22	1.32	1.22
3	B	218	BA3	C2D-C3D	-2.22	1.47	1.53
3	B	218	BA3	C8G-N7G	-2.20	1.30	1.34
3	B	218	BA3	C2G-N3G	2.19	1.35	1.32
3	A	218	BA3	C2D-C3D	-2.12	1.47	1.53
3	C	217	BA3	C2G-N3G	2.12	1.35	1.32
3	C	217	BA3	C5B-C4B	-2.09	1.45	1.51
3	C	217	BA3	O4B-C4B	-2.08	1.40	1.45
3	B	218	BA3	PF-O3F	-2.07	1.57	1.59
3	B	218	BA3	O4D-C1D	2.05	1.43	1.40
3	A	218	BA3	C5B-C4B	-2.00	1.45	1.51

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	217	BA3	O4D-C1D-N9G	5.63	116.21	108.75
3	B	218	BA3	O2B-C2B-C3B	-5.27	94.91	111.82
3	B	218	BA3	N3G-C2G-N1G	-4.99	121.89	128.67
3	A	218	BA3	N3G-C2G-N1G	-4.83	122.12	128.67
3	B	218	BA3	O2G-PG-O3F	4.55	119.56	107.27
3	C	217	BA3	N3G-C2G-N1G	-4.47	122.60	128.67
3	B	218	BA3	C5A-C6A-N6A	4.44	127.07	120.31
3	C	217	BA3	C5G-C6G-N6G	4.10	126.56	120.31
3	B	218	BA3	C5G-C6G-N6G	4.03	126.46	120.31
3	B	218	BA3	O3F-PG-O1G	-3.76	99.40	110.70
3	C	217	BA3	N3A-C2A-N1A	-3.68	123.67	128.67
3	A	218	BA3	C5G-C6G-N6G	3.59	125.78	120.31
3	A	218	BA3	C5G-C6G-N1G	-3.57	111.71	120.23
3	B	218	BA3	C5G-C6G-N1G	-3.46	111.99	120.23
3	A	218	BA3	O2G-PG-O3F	3.44	116.57	107.27
3	C	217	BA3	C5G-C6G-N1G	-3.37	112.19	120.23
3	C	217	BA3	C4A-C5A-N7A	3.15	112.67	109.34
3	A	218	BA3	C5A-C6A-N6A	3.09	125.02	120.31
3	A	218	BA3	N3A-C2A-N1A	-3.06	124.52	128.67
3	B	218	BA3	O4D-C1D-N9G	3.00	112.72	108.75
3	B	218	BA3	C5A-C6A-N1A	-2.97	113.14	120.23
3	C	217	BA3	O2G-PG-O3F	2.82	114.89	107.27
3	B	218	BA3	C5B-C4B-C3B	-2.70	105.49	115.21
3	B	218	BA3	O3B-C3B-C2B	-2.61	103.44	111.82
3	A	218	BA3	C1B-N9A-C4A	2.59	131.19	126.64
3	C	217	BA3	C5A-C6A-N1A	-2.53	114.20	120.23
3	A	218	BA3	C5A-C6A-N1A	-2.32	114.70	120.23
3	C	217	BA3	N6A-C6A-N1A	2.27	123.19	118.33
3	A	218	BA3	O3E-PF-O1F	-2.27	103.89	110.70
3	B	218	BA3	N3A-C2A-N1A	-2.24	125.63	128.67
3	A	218	BA3	O2D-C2D-C3D	-2.20	104.75	111.82
3	A	218	BA3	O4D-C1D-N9G	2.19	111.65	108.75
3	B	218	BA3	O2E-PE-O1E	2.10	122.20	112.44
3	A	218	BA3	O4B-C4B-C3B	2.04	109.20	105.15
3	B	218	BA3	C4D-O4D-C1D	-2.03	108.07	109.92
3	B	218	BA3	O4B-C4B-C5B	2.02	115.81	109.33
3	B	218	BA3	C4G-C5G-N7G	2.01	111.46	109.34

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	217	BA3	O4D-C4D-C5D-O5D

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Mol	Chain	Res	Type	Atoms
3	A	218	BA3	O4D-C4D-C5D-O5D
3	A	218	BA3	PG-O3F-PF-O1F
3	B	218	BA3	O4D-C4D-C5D-O5D
3	B	218	BA3	PG-O3F-PF-O1F
3	B	218	BA3	PG-O3F-PF-O2F
3	C	217	BA3	PG-O3F-PF-O1F
3	A	218	BA3	PG-O3F-PF-O2F
3	C	217	BA3	PG-O3F-PF-O2F

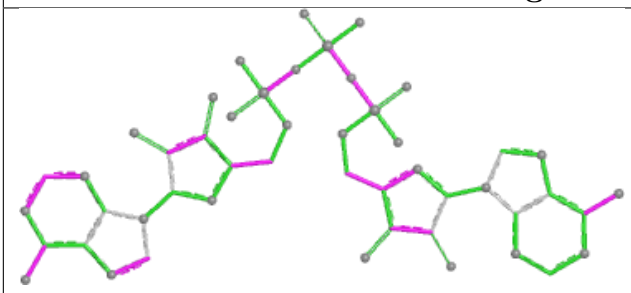
There are no ring outliers.

3 monomers are involved in 6 short contacts:

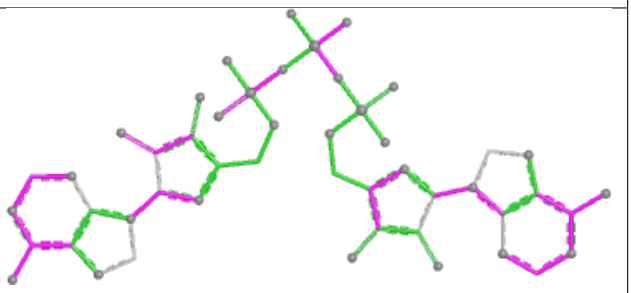
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	217	ACT	2	0
3	B	218	BA3	3	0
3	C	217	BA3	1	0

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

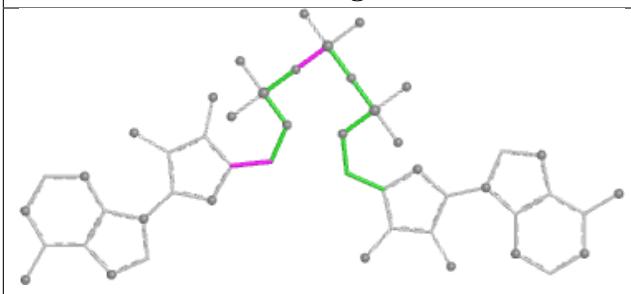
Ligand BA3 A 218



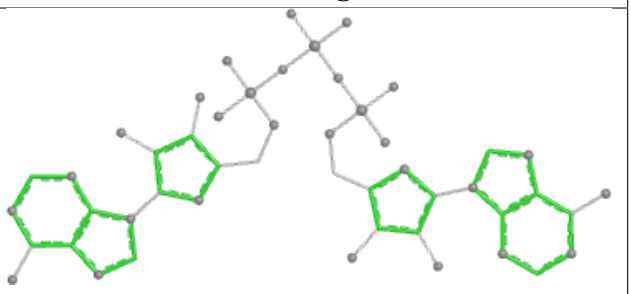
Bond lengths



Bond angles

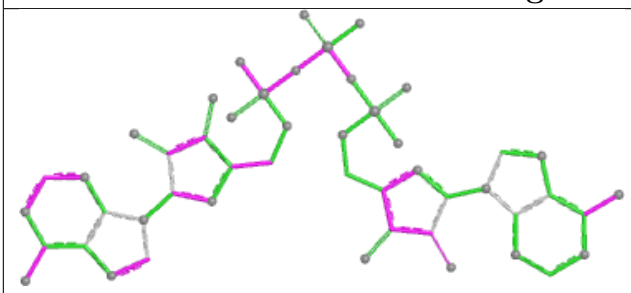


Torsions

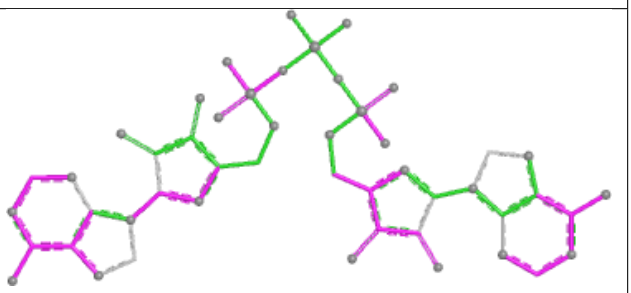


Rings

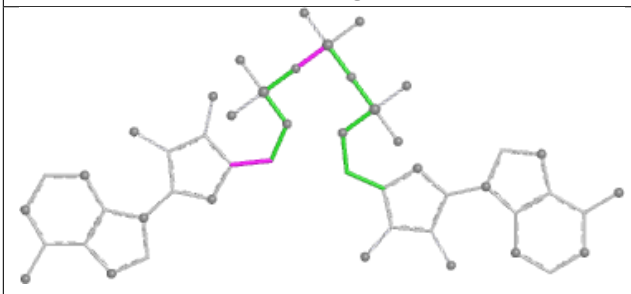
Ligand BA3 B 218



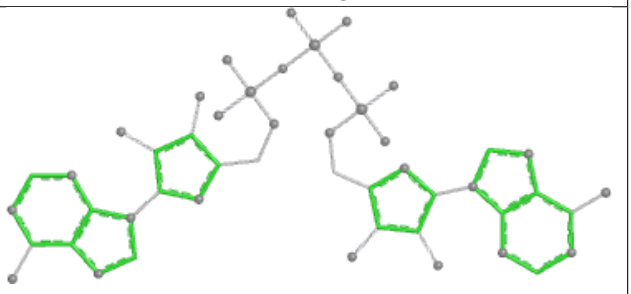
Bond lengths



Bond angles

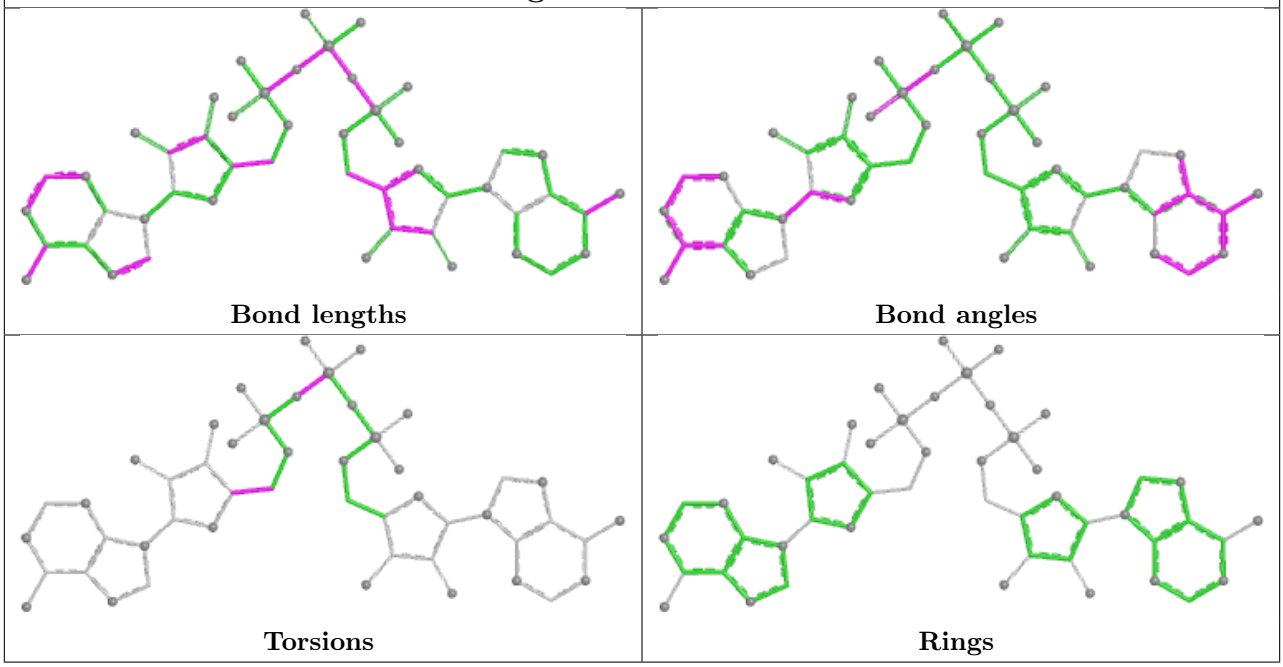


Torsions



Rings

Ligand BA3 C 217



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	208/218 (95%)	0.74	26 (12%)	3	3	10, 19, 42, 52	0
1	B	208/218 (95%)	0.34	6 (2%)	51	49	10, 18, 31, 44	0
1	C	189/218 (86%)	1.38	43 (22%)	0	0	12, 22, 57, 73	0
All	All	605/654 (92%)	0.80	75 (12%)	4	3	10, 19, 47, 73	0

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	50	ILE	11.8
1	C	51	ALA	10.1
1	C	83	TRP	10.0
1	A	76	ALA	7.6
1	C	84	LEU	7.4
1	A	75	PHE	7.1
1	B	76	ALA	7.0
1	C	47	LEU	6.9
1	C	46	ALA	6.6
1	C	59	ILE	6.4
1	C	49	ALA	6.3
1	C	86	ALA	6.1
1	C	48	HIS	6.1
1	C	60	ALA	5.9
1	C	61	ALA	5.9
1	A	78	PRO	5.8
1	C	64	THR	5.7
1	C	58	MET	5.7
1	C	52	ASP	5.6
1	C	53	HIS	5.3
1	C	63	GLY	5.1
1	A	77	ASN	5.1
1	C	57	ASN	5.0

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Mol	Chain	Res	Type	RSRZ
1	C	87	LEU	4.9
1	B	75	PHE	4.9
1	C	65	LEU	4.8
1	C	62	ASP	4.7
1	A	180	ASP	4.7
1	A	181	ALA	4.5
1	C	179	PRO	4.0
1	C	45	PRO	3.8
1	C	90	PRO	3.7
1	A	59	ILE	3.6
1	A	146	ASP	3.6
1	C	88	LEU	3.6
1	B	0	SER	3.5
1	C	42	PRO	3.4
1	C	146	ASP	3.4
1	B	4	ILE	3.3
1	A	4	ILE	3.2
1	A	80	GLU	3.1
1	C	143	GLN	3.1
1	C	148	THR	3.1
1	A	82	ASN	3.1
1	C	56	ALA	3.1
1	A	178	ALA	3.0
1	A	156	LEU	3.0
1	A	74	ILE	2.9
1	C	7	LEU	2.8
1	A	206	PRO	2.8
1	A	179	PRO	2.8
1	C	147	VAL	2.8
1	C	85	ASN	2.8
1	C	91	LEU	2.6
1	A	108	VAL	2.6
1	C	206	PRO	2.4
1	B	5	VAL	2.4
1	A	151	HIS	2.3
1	A	79	GLU	2.3
1	C	0	SER	2.3
1	A	5	VAL	2.3
1	A	61	ALA	2.2
1	A	42	PRO	2.2
1	C	102	GLN	2.2
1	C	205	LYS	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	111	VAL	2.2
1	A	54	PHE	2.2
1	A	207	GLU	2.1
1	C	129	VAL	2.1
1	A	6	ALA	2.1
1	C	130	VAL	2.0
1	A	83	TRP	2.0
1	B	7	LEU	2.0
1	C	151	HIS	2.0
1	C	180	ASP	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 monosaccharides in this entry.

6.4 Ligands (i)

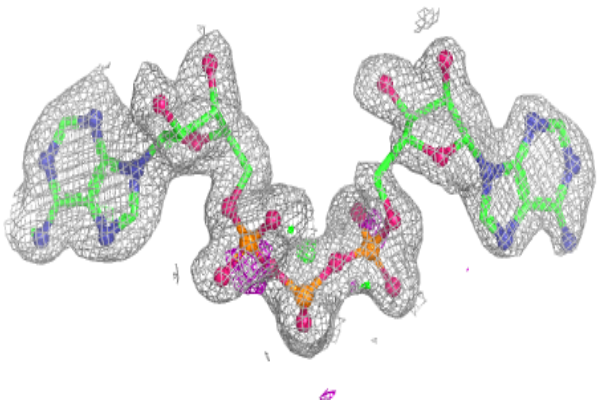
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

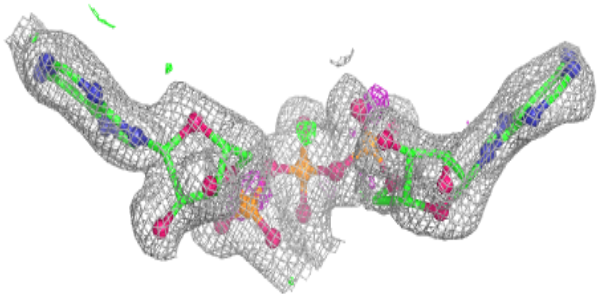
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	ACT	B	217	4/4	0.56	0.25	30,30,30,31	0
2	ACT	A	217	4/4	0.87	0.15	20,23,23,26	0
3	BA3	C	217	49/49	0.90	0.15	26,32,40,41	0
3	BA3	A	218	49/49	0.93	0.12	20,25,36,36	0
3	BA3	B	218	49/49	0.96	0.08	13,22,28,29	0

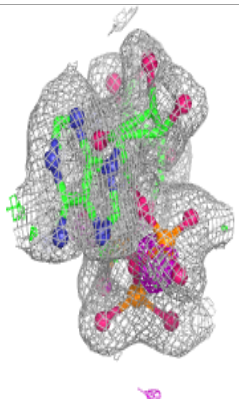
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around BA3 C 217:

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

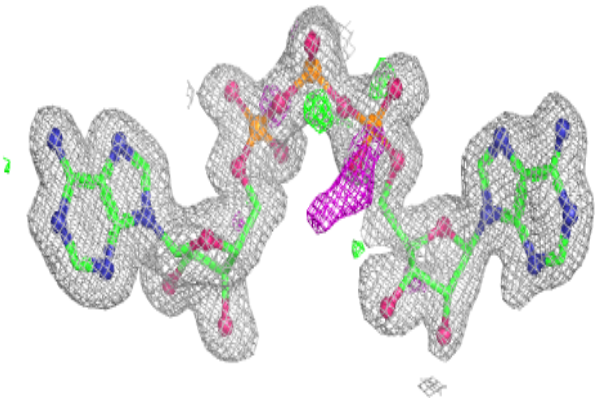


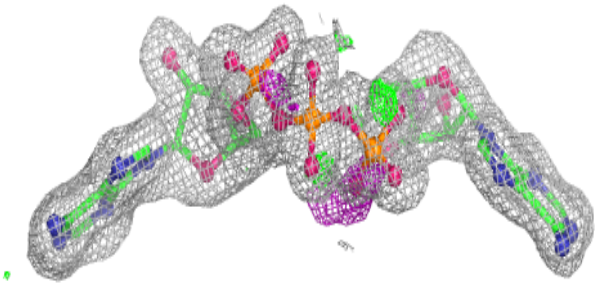


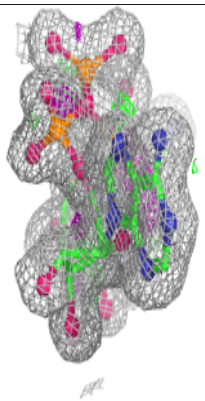


Electron density around BA3 A 218:

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

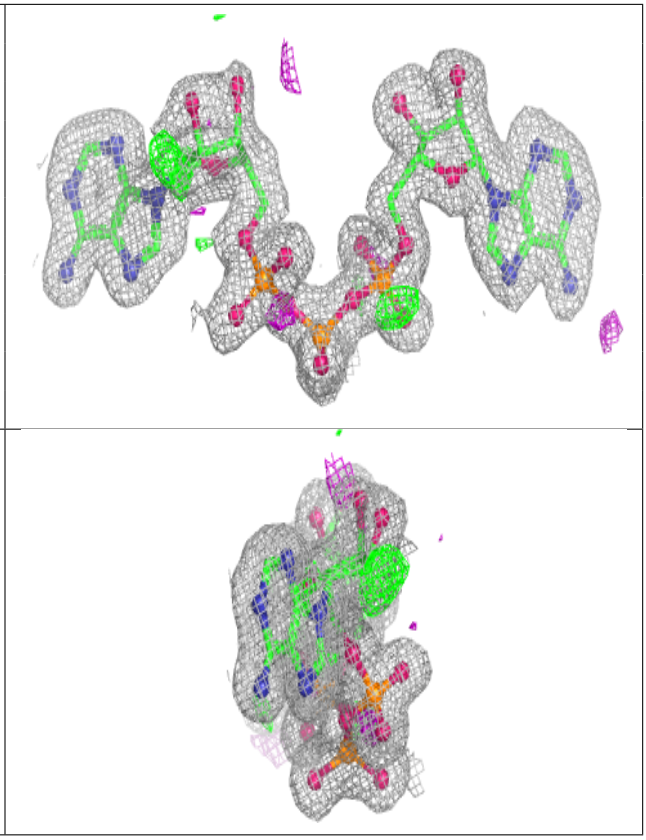






Electron density around BA3 B 218:

$2mF_o$-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.