



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 7, 2026 – 02:18 AM UTC

PDB ID : 4O0M / pdb_00004o0m
Title : Crystal structure of T. Elongatus BP-1 Clock Protein KaiC
Authors : Pattanayek, R.; Egli, M.
Deposited on : 2013-12-13
Resolution : 2.84 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

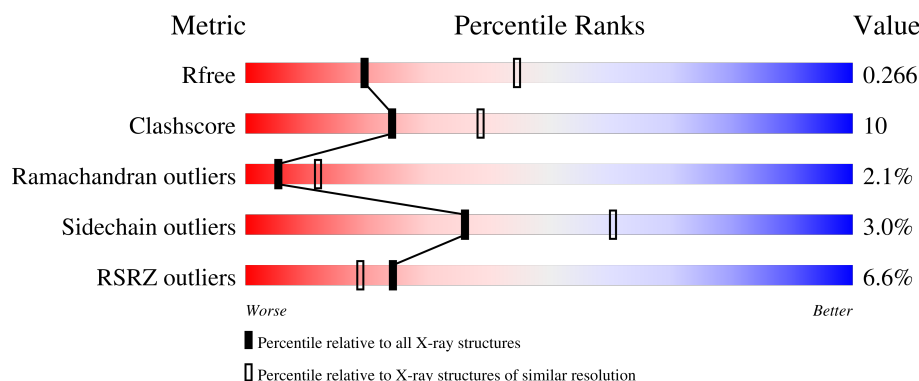
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.84 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	1520 (2.86-2.82)
Clashscore	190562	1559 (2.86-2.82)
Ramachandran outliers	187476	1517 (2.86-2.82)
Sidechain outliers	187428	1518 (2.86-2.82)
RSRZ outliers	180081	1521 (2.86-2.82)

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	524	5% 72% 21% • 6%
1	B	524	7% 65% 25% • 6%
1	C	524	6% 70% 22% • 6%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 11943 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 Circadian clock protein kinase KaiC.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	494	Total	C	N	O	P	S	0	0	0
			3873	2439	670	751	2	11			
1	B	490	Total	C	N	O	P	S	0	0	0
			3841	2419	665	744	2	11			
1	C	490	Total	C	N	O	P	S	0	0	0
			3832	2413	665	741	2	11			

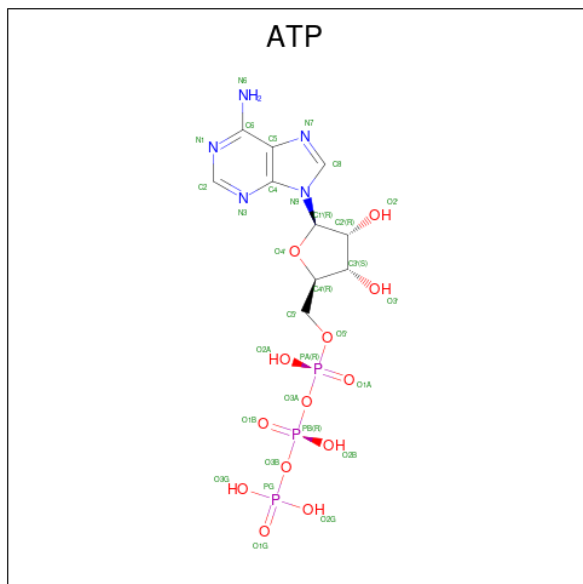
There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	519	HIS	-	expression tag	UNP Q79V60
A	520	HIS	-	expression tag	UNP Q79V60
A	521	HIS	-	expression tag	UNP Q79V60
A	522	HIS	-	expression tag	UNP Q79V60
A	523	HIS	-	expression tag	UNP Q79V60
A	524	HIS	-	expression tag	UNP Q79V60
B	519	HIS	-	expression tag	UNP Q79V60
B	520	HIS	-	expression tag	UNP Q79V60
B	521	HIS	-	expression tag	UNP Q79V60
B	522	HIS	-	expression tag	UNP Q79V60
B	523	HIS	-	expression tag	UNP Q79V60
B	524	HIS	-	expression tag	UNP Q79V60
C	519	HIS	-	expression tag	UNP Q79V60
C	520	HIS	-	expression tag	UNP Q79V60
C	521	HIS	-	expression tag	UNP Q79V60
C	522	HIS	-	expression tag	UNP Q79V60
C	523	HIS	-	expression tag	UNP Q79V60
C	524	HIS	-	expression tag	UNP Q79V60

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Mg 2 2	0	0
2	B	2	Total Mg 2 2	0	0
2	C	2	Total Mg 2 2	0	0

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O P 31 10 5 13 3	0	0
3	A	1	Total C N O P 31 10 5 13 3	0	0
3	B	1	Total C N O P 31 10 5 13 3	0	0
3	B	1	Total C N O P 31 10 5 13 3	0	0
3	C	1	Total C N O P 31 10 5 13 3	0	0
3	C	1	Total C N O P 31 10 5 13 3	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	80	Total O 80 80	0	0

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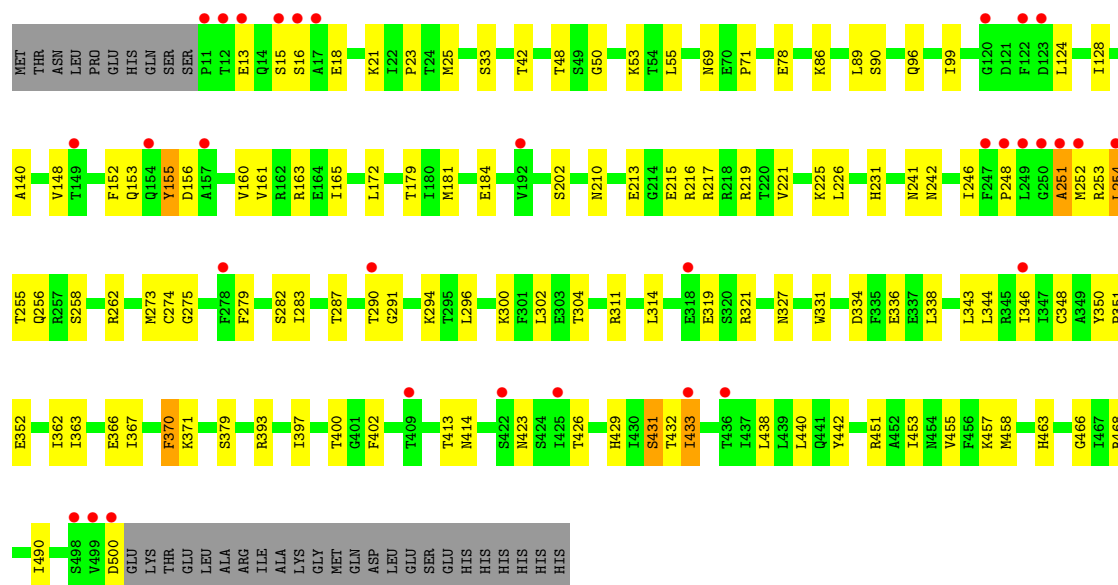
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	66	Total 66	O 66	0	0
4	C	59	Total 59	O 59	0	0

- Molecule 1: Circadian clock protein kinase KaiC



● Molecule 1: Circadian clock protein kinase KaiC

Chain C:  6% 70% 22% 6%



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	130.81Å 195.29Å 136.64Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	58.99 – 2.84 58.99 – 2.84	Depositor EDS
% Data completeness (in resolution range)	99.4 (58.99-2.84) 94.6 (58.99-2.84)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.51 (at 2.86Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.225 , 0.270 0.226 , 0.266	Depositor DCC
R_{free} test set	2079 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	45.0	Xtriage
Anisotropy	0.687	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 47.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	11943	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.53% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: TPO, MG, SEP, ATP

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	0.33	0/3915	0.75	2/5279 (0.0%)
1	B	0.35	0/3882	0.74	1/5235 (0.0%)
1	C	0.30	0/3873	0.70	1/5223 (0.0%)
All	All	0.33	0/11670	0.73	4/15737 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	116	GLN	CA-C-N	6.25	132.96	121.70
1	A	116	GLN	C-N-CA	6.25	132.96	121.70
1	B	157	ALA	N-CA-C	5.20	116.69	109.31
1	C	155	TYR	CB-CA-C	-5.09	110.68	116.54

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	3873	0	3858	76	0
1	B	3841	0	3824	96	0
1	C	3832	0	3820	78	0
2	A	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	2	0	0	0	0
2	C	2	0	0	0	0
3	A	62	0	24	0	0
3	B	62	0	24	2	0
3	C	62	0	24	3	0
4	A	80	0	0	1	0
4	B	66	0	0	3	0
4	C	59	0	0	4	0
All	All	11943	0	11574	233	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 10.

All (233) 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:C:438:LEU:CD2	1:C:455:VAL:HG22	1.78	1.13
1:C:438:LEU:HD21	1:C:455:VAL:HG22	1.57	0.86
1:A:116:GLN:HB2	1:A:117:GLU:HB2	1.58	0.85
1:B:379:SER:H	1:B:413:THR:HB	1.43	0.83
1:A:415:THR:HG21	1:B:432:TPO:HG21	1.60	0.82
1:B:112:ASP:HB3	1:B:113:PRO:HD2	1.65	0.78
1:A:283:ILE:HG13	1:A:400:THR:HG23	1.65	0.78
1:C:248:PRO:HB2	1:C:251:ALA:HB3	1.68	0.75
1:C:393:ARG:HH21	1:C:429:HIS:HB2	1.50	0.74
1:A:209:ARG:NH2	1:A:222:GLU:OE1	2.23	0.72
1:B:124:LEU:HD21	1:B:167:ARG:HD3	1.74	0.70
1:B:42:THR:HG22	1:B:179:THR:HB	1.74	0.69
1:A:126:ALA:HB2	1:A:129:GLU:HB2	1.74	0.69
1:C:438:LEU:HD22	1:C:455:VAL:HG22	1.72	0.68
1:A:194:ARG:NH2	1:B:196:GLY:O	2.27	0.68
1:B:253:ARG:O	1:B:255:THR:N	2.27	0.68
1:A:125:SER:O	1:A:129:GLU:N	2.28	0.67
1:B:86:LYS:HA	1:B:89:LEU:HD12	1.76	0.67
1:B:121:ASP:C	1:B:123:ASP:H	2.03	0.67
1:B:248:PRO:O	1:B:251:ALA:N	2.24	0.66
1:C:156:ASP:HB3	1:C:160:VAL:HG21	1.77	0.66
1:B:294:LYS:HG3	1:B:440:LEU:HD12	1.78	0.66
1:B:28:GLY:HA2	1:B:248:PRO:HG3	1.77	0.65
1:A:57:ALA:HB1	1:A:144:SER:HB3	1.78	0.65
1:C:283:ILE:HG13	1:C:400:THR:HG23	1.77	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:371:LYS:NZ	4:C:757:HOH:O	2.30	0.64
1:C:241:ASN:OD1	1:C:242:ASN:N	2.29	0.64
1:B:498:SER:HA	1:B:499:VAL:C	2.23	0.64
1:A:117:GLU:H	1:A:118:VAL:HG22	1.62	0.64
1:B:45:VAL:HG23	1:B:180:ILE:HD11	1.80	0.64
1:B:118:VAL:O	1:B:119:ALA:C	2.42	0.63
1:A:124:LEU:O	1:A:126:ALA:N	2.32	0.62
1:B:69:ASN:ND2	4:B:720:HOH:O	2.31	0.62
1:C:253:ARG:O	1:C:255:THR:N	2.33	0.62
1:B:127:LEU:HA	1:B:130:ARG:HB2	1.80	0.62
1:B:426:THR:HG22	1:B:428:SER:H	1.65	0.62
1:A:210:ASN:O	1:A:217:ARG:NH1	2.33	0.61
1:C:202:SER:O	1:C:225:LYS:NZ	2.31	0.61
1:A:118:VAL:H	1:A:121:ASP:HA	1.65	0.61
1:A:352:GLU:HB3	1:B:249:LEU:HD21	1.83	0.61
1:C:21:LYS:NZ	1:C:33:SER:O	2.29	0.61
1:C:397:ILE:HD11	1:C:433:ILE:HD13	1.82	0.61
1:A:345:ARG:NH1	1:A:366:GLU:OE1	2.32	0.61
1:A:426:THR:HG22	1:A:428:SER:H	1.65	0.61
1:A:226:LEU:HD12	1:A:231:HIS:HB3	1.83	0.61
1:C:50:GLY:O	1:C:219:ARG:NH2	2.34	0.61
1:B:221:VAL:HG23	1:B:238:PHE:CD1	2.36	0.61
1:C:15:SER:HB2	1:C:16:SER:HA	1.82	0.61
1:C:438:LEU:HD23	1:C:455:VAL:HA	1.82	0.60
1:A:216:ARG:NH2	1:B:235:GLU:O	2.34	0.60
1:A:393:ARG:NH2	1:A:428:SER:O	2.35	0.60
1:B:283:ILE:HG13	1:B:400:THR:HG23	1.83	0.60
1:B:317:TYR:HB3	1:B:351:PRO:HG3	1.85	0.59
1:B:124:LEU:HD11	1:B:167:ARG:HB2	1.84	0.59
1:A:481:ASP:OD1	1:A:482:SER:N	2.36	0.59
1:B:162:ARG:HH12	1:B:200:PHE:HB2	1.69	0.58
1:B:326:ARG:HD3	1:C:258:SER:HB3	1.85	0.58
1:C:338:LEU:HB3	1:C:344:LEU:HB3	1.85	0.58
1:A:21:LYS:NZ	1:A:33:SER:O	2.32	0.58
1:A:287:THR:HG21	1:A:425:ILE:HG23	1.85	0.58
1:A:148:VAL:HG21	1:A:181:MET:HG2	1.84	0.57
1:C:69:ASN:ND2	4:C:729:HOH:O	2.37	0.57
1:B:438:LEU:HD23	1:B:455:VAL:HA	1.87	0.57
1:C:311:ARG:HG2	1:C:343:LEU:HA	1.86	0.57
1:B:337:GLU:OE2	1:B:340:ARG:NH1	2.38	0.57
1:B:446:ARG:HH21	1:B:496:ARG:HH12	1.49	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:287:THR:HG22	1:C:414:ASN:HB3	1.87	0.57
1:B:116:GLN:OE1	1:B:116:GLN:N	2.38	0.57
1:A:127:LEU:H	1:A:127:LEU:HD23	1.70	0.56
1:B:246:ILE:O	1:B:248:PRO:HD3	2.05	0.56
1:C:321:ARG:HD3	1:C:346:ILE:HG21	1.86	0.56
1:C:311:ARG:NH1	1:C:370:PHE:O	2.38	0.55
1:A:47:GLY:HA3	1:A:51:THR:HG21	1.88	0.55
1:A:229:THR:OG1	1:A:230:THR:N	2.39	0.55
1:A:248:PRO:HB2	1:A:251:ALA:HB3	1.87	0.55
1:B:117:GLU:C	1:B:119:ALA:H	2.15	0.55
1:C:379:SER:H	1:C:413:THR:HG1	1.53	0.55
1:A:302:LEU:HD22	1:A:312:ALA:HB1	1.88	0.55
1:A:317:TYR:HB3	1:A:351:PRO:HG3	1.90	0.54
1:A:153:GLN:O	1:B:159:SER:HB3	2.07	0.54
1:B:462:TRP:O	1:B:463:HIS:ND1	2.40	0.54
1:B:121:ASP:OD1	1:B:123:ASP:HB2	2.08	0.54
1:A:240:ILE:HG12	4:A:967:HOH:O	2.08	0.54
1:B:252:MET:HE3	1:B:401:GLY:HA3	1.89	0.53
1:C:311:ARG:HH22	1:C:371:LYS:HB2	1.72	0.53
1:B:481:ASP:HB3	1:B:484:ARG:NH2	2.24	0.53
1:A:305:GLY:O	1:A:310:GLU:HG2	2.08	0.53
1:B:90:SER:OG	3:B:604:ATP:N6	2.38	0.53
1:B:149:THR:HG21	1:B:184:GLU:H	1.74	0.53
1:B:198:GLU:OE1	1:B:198:GLU:N	2.39	0.52
1:B:438:LEU:CD2	1:B:455:VAL:HG22	2.39	0.52
1:C:262:ARG:NH1	1:C:275:GLY:O	2.40	0.52
1:B:301:PHE:O	1:B:374:ARG:NH1	2.42	0.52
1:C:23:PRO:HB2	1:C:25:MET:HE3	1.90	0.52
1:A:351:PRO:HB3	1:A:383:LEU:HD23	1.92	0.52
1:B:127:LEU:O	1:B:131:ILE:N	2.41	0.52
1:A:127:LEU:HD12	1:A:131:ILE:HD11	1.92	0.52
1:A:117:GLU:H	1:A:118:VAL:CG2	2.23	0.51
1:C:334:ASP:OD1	1:C:336:GLU:HG2	2.11	0.51
1:C:153:GLN:C	1:C:155:TYR:H	2.17	0.51
1:B:160:VAL:O	1:B:164:GLU:HG3	2.10	0.51
1:C:319:GLU:OE1	1:C:327:ASN:ND2	2.44	0.51
1:A:112:ASP:C	1:A:114:ASP:H	2.18	0.51
1:C:458:MET:HE2	1:C:463:HIS:HB3	1.93	0.51
1:C:90:SER:OG	3:C:603:ATP:N6	2.32	0.50
1:A:112:ASP:O	1:A:114:ASP:N	2.40	0.50
1:A:216:ARG:NH1	1:B:233:LYS:O	2.44	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:311:ARG:HB3	1:B:370:PHE:CE2	2.46	0.50
1:C:184:GLU:OE2	4:C:756:HOH:O	2.20	0.50
1:C:251:ALA:O	1:C:253:ARG:N	2.45	0.50
1:A:116:GLN:CB	1:A:117:GLU:HB2	2.38	0.50
1:B:279:PHE:HB2	1:B:282:SER:HB3	1.94	0.50
1:B:283:ILE:N	1:B:435:ASP:OD2	2.41	0.50
1:A:499:VAL:HA	1:A:500:ASP:C	2.35	0.49
1:B:287:THR:HG21	1:B:425:ILE:HG23	1.94	0.49
1:C:221:VAL:HG11	1:C:246:ILE:HD13	1.93	0.49
1:C:291:GLY:O	1:C:451:ARG:NH1	2.40	0.49
1:A:162:ARG:HB2	1:A:197:VAL:HG11	1.95	0.48
1:A:301:PHE:O	1:A:374:ARG:NH1	2.44	0.48
1:B:128:ILE:HD11	1:B:171:ARG:HB2	1.96	0.48
1:C:165:ILE:HG23	1:C:181:MET:HE1	1.95	0.48
1:A:125:SER:O	1:A:129:GLU:HG2	2.13	0.48
1:B:121:ASP:C	1:B:123:ASP:N	2.72	0.48
1:A:117:GLU:N	1:A:118:VAL:HA	2.27	0.48
1:A:32:ILE:HA	1:A:232:MET:SD	2.54	0.48
1:B:112:ASP:HB3	1:B:113:PRO:CD	2.41	0.48
1:B:156:ASP:O	4:B:732:HOH:O	2.20	0.48
1:C:279:PHE:HB2	1:C:282:SER:HB2	1.95	0.48
1:A:78:GLU:HG3	1:B:162:ARG:HH21	1.78	0.47
1:C:160:VAL:HG22	1:C:163:ARG:HH12	1.79	0.47
1:C:172:LEU:HD13	1:C:179:THR:HG21	1.96	0.47
1:A:132:GLN:HE21	1:A:136:ARG:NH2	2.12	0.47
1:B:147:SER:H	1:B:182:THR:HB	1.79	0.47
1:A:232:MET:HE2	1:A:236:TYR:OH	2.15	0.47
1:B:27:GLU:HG2	1:B:245:ASN:HA	1.97	0.47
1:B:248:PRO:O	1:B:250:GLY:N	2.47	0.47
1:C:42:THR:HG21	1:C:181:MET:SD	2.54	0.47
1:C:215:GLU:HB2	1:C:216:ARG:NH1	2.29	0.47
1:A:311:ARG:HB3	1:A:370:PHE:CE2	2.50	0.47
1:B:441:GLN:NE2	1:B:490:ILE:O	2.33	0.47
1:B:348:CYS:HB3	1:C:254:LEU:HB2	1.97	0.46
1:C:362:ILE:O	1:C:366:GLU:HG2	2.16	0.46
1:B:212:LEU:HD12	1:B:216:ARG:O	2.15	0.46
1:C:25:MET:HE2	1:C:25:MET:HA	1.97	0.46
1:C:226:LEU:HD12	1:C:231:HIS:HB3	1.97	0.46
1:A:381:SER:OG	1:A:415:THR:HG22	2.15	0.46
1:A:114:ASP:OD1	1:A:115:GLY:N	2.49	0.46
1:A:279:PHE:HB2	1:A:282:SER:HB3	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:210:ASN:O	1:C:217:ARG:NH1	2.48	0.46
1:A:262:ARG:HH22	1:A:461:SER:HB2	1.81	0.46
1:B:499:VAL:O	1:B:500:ASP:HB2	2.15	0.46
1:A:162:ARG:HG3	1:A:201:VAL:HG21	1.98	0.46
1:A:13:GLU:HG2	1:A:14:GLN:H	1.79	0.45
1:C:367:ILE:HG21	1:C:402:PHE:HE2	1.81	0.45
1:B:291:GLY:O	1:B:451:ARG:NH1	2.31	0.45
1:A:12:THR:H	1:A:13:GLU:HA	1.82	0.45
1:C:273:MET:SD	1:C:468:ARG:HD3	2.57	0.45
1:C:86:LYS:HA	1:C:89:LEU:HD12	1.99	0.45
1:B:185:ARG:NH1	1:B:188:GLU:O	2.49	0.45
1:C:55:LEU:HG	3:C:603:ATP:O1A	2.17	0.45
1:C:290:THR:O	1:C:442:TYR:OH	2.25	0.45
1:C:367:ILE:O	1:C:371:LYS:N	2.43	0.44
1:B:43:THR:HA	1:B:204:ASN:HB2	1.99	0.44
1:B:426:THR:HG21	1:B:430:ILE:HG12	1.99	0.44
1:A:50:GLY:HA3	1:B:225:LYS:HB3	1.98	0.44
1:B:123:ASP:HA	1:B:127:LEU:H	1.83	0.44
1:C:300:LYS:O	1:C:304:THR:OG1	2.34	0.44
1:C:338:LEU:HB3	1:C:344:LEU:CB	2.47	0.44
1:C:294:LYS:HG3	1:C:440:LEU:HD12	1.99	0.44
1:B:55:LEU:HG	3:B:604:ATP:O1A	2.17	0.44
1:A:449:MET:HE2	1:A:449:MET:HA	2.00	0.44
1:C:296:LEU:HD13	1:C:331:TRP:CD2	2.52	0.44
1:B:162:ARG:HG3	1:B:201:VAL:CG2	2.48	0.44
1:A:54:THR:HG23	1:A:146:ASP:OD2	2.18	0.43
1:B:488:GLY:O	1:B:491:SER:OG	2.28	0.43
1:C:48:THR:O	1:C:53:LYS:NZ	2.51	0.43
1:C:217:ARG:NH2	4:C:741:HOH:O	2.52	0.43
1:C:363:ILE:O	1:C:367:ILE:HG12	2.18	0.43
1:A:115:GLY:HA3	1:A:116:GLN:HA	1.66	0.43
1:B:123:ASP:O	1:B:127:LEU:N	2.51	0.43
1:C:152:PHE:CE2	1:C:161:VAL:HG13	2.53	0.43
1:A:149:THR:HG21	1:A:194:ARG:HD2	2.00	0.43
1:A:448:GLU:HG2	1:B:466:GLY:HA2	1.99	0.43
1:B:210:ASN:O	1:B:217:ARG:NH1	2.51	0.43
1:B:248:PRO:HG2	1:B:251:ALA:HB2	2.00	0.43
1:B:148:VAL:HG21	1:B:181:MET:SD	2.58	0.43
1:C:274:CYS:HA	1:C:458:MET:HE1	2.00	0.43
1:A:207:ILE:HD11	1:A:224:LEU:HD22	2.00	0.43
1:A:425:ILE:HD11	1:A:456:PHE:CE2	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:448:GLU:HG2	1:C:466:GLY:HA2	2.01	0.43
1:A:15:SER:HB3	1:A:16:SER:HA	2.01	0.43
1:A:253:ARG:O	1:A:255:THR:N	2.48	0.43
1:C:426:THR:OG1	1:C:431:SEP:O1P	2.25	0.43
1:B:499:VAL:C	1:B:501:GLU:HA	2.43	0.42
1:B:209:ARG:NH1	4:B:737:HOH:O	2.51	0.42
1:A:447:GLY:HA2	1:B:489:ILE:HD12	2.02	0.42
1:B:458:MET:HG2	1:B:461:SER:HB3	1.99	0.42
1:C:90:SER:HG	3:C:603:ATP:HN61	1.59	0.42
1:B:283:ILE:HD12	1:B:412:PHE:HE2	1.84	0.42
1:A:117:GLU:HB3	1:A:118:VAL:HA	2.01	0.42
1:B:322:ALA:HB3	1:C:256:GLN:O	2.19	0.42
1:B:254:LEU:HD23	1:B:254:LEU:HA	1.94	0.42
1:C:273:MET:HE2	1:C:455:VAL:HG23	2.00	0.42
1:C:302:LEU:HD11	1:C:314:LEU:HD13	2.02	0.42
1:C:71:PRO:HB2	1:C:140:ALA:HA	2.01	0.42
1:B:226:LEU:HD12	1:B:231:HIS:HB3	2.01	0.42
1:C:423:ASN:OD1	1:C:423:ASN:N	2.50	0.42
1:B:497:ILE:O	1:B:500:ASP:N	2.53	0.41
1:A:379:SER:N	1:A:413:THR:OG1	2.35	0.41
1:B:420:MET:HE1	1:C:490:ILE:HG13	2.02	0.41
1:B:499:VAL:O	1:B:501:GLU:HA	2.20	0.41
1:A:126:ALA:HA	1:A:129:GLU:H	1.85	0.41
1:A:348:CYS:HB3	1:B:254:LEU:HB3	2.02	0.41
1:A:294:LYS:HB2	1:A:294:LYS:HE2	1.84	0.41
1:B:257:ARG:HH21	1:B:407:GLU:HG2	1.86	0.41
1:C:216:ARG:NH2	1:C:352:GLU:OE1	2.53	0.41
1:C:350:TYR:HA	1:C:351:PRO:HD3	1.94	0.41
1:A:264:SER:OG	1:A:304:THR:HG21	2.21	0.41
1:A:393:ARG:HH21	1:A:429:HIS:HB2	1.85	0.41
1:A:165:ILE:HG23	1:A:181:MET:HE1	2.03	0.41
1:B:393:ARG:NH2	1:B:429:HIS:HB2	2.36	0.41
1:A:187:ASP:OD1	1:A:188:GLU:N	2.53	0.41
1:B:43:THR:O	1:B:180:ILE:HD12	2.20	0.41
1:B:125:SER:C	1:B:128:ILE:HG22	2.46	0.41
1:C:148:VAL:HG21	1:C:181:MET:HE3	2.03	0.41
1:C:262:ARG:HH12	1:C:275:GLY:C	2.29	0.41
1:B:296:LEU:O	1:B:300:LYS:HG2	2.20	0.41
1:B:290:THR:OG1	1:C:457:LYS:NZ	2.35	0.40
1:B:29:PHE:O	1:B:33:SER:OG	2.35	0.40
1:C:96:GLN:HA	1:C:99:ILE:HD12	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:420:MET:HE2	1:A:420:MET:HB2	1.76	0.40
1:B:229:THR:OG1	1:B:230:THR:N	2.54	0.40
1:C:438:LEU:HD23	1:C:455:VAL:HG22	1.87	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	490/524 (94%)	455 (93%)	24 (5%)	11 (2%)	5	11
1	B	486/524 (93%)	443 (91%)	31 (6%)	12 (2%)	4	9
1	C	486/524 (93%)	447 (92%)	32 (7%)	7 (1%)	9	18
All	All	1462/1572 (93%)	1345 (92%)	87 (6%)	30 (2%)	5	12

All (30) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	119	ALA
1	B	117	GLU
1	B	118	VAL
1	B	500	ASP
1	C	254	LEU
1	A	18	GLU
1	A	117	GLU
1	A	155	TYR
1	A	212	LEU
1	B	119	ALA
1	B	121	ASP
1	B	249	LEU
1	B	254	LEU
1	C	251	ALA

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Mol	Chain	Res	Type
1	C	252	MET
1	A	213	GLU
1	A	420	MET
1	B	420	MET
1	C	13	GLU
1	C	124	LEU
1	B	155	TYR
1	B	348	CYS
1	B	463	HIS
1	B	499	VAL
1	C	18	GLU
1	C	348	CYS
1	A	113	PRO
1	A	125	SER
1	A	252	MET
1	A	121	ASP

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	418/445 (94%)	409 (98%)	9 (2%)	45	69
1	B	414/445 (93%)	393 (95%)	21 (5%)	21	44
1	C	413/445 (93%)	406 (98%)	7 (2%)	53	75
All	All	1245/1335 (93%)	1208 (97%)	37 (3%)	36	60

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	16	SER
1	A	83	ASP
1	A	124	LEU
1	A	151	VAL
1	A	201	VAL
1	A	249	LEU

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Mol	Chain	Res	Type
1	A	292	THR
1	A	497	ILE
1	A	499	VAL
1	B	12	THR
1	B	14	GLN
1	B	46	SER
1	B	49	SER
1	B	116	GLN
1	B	135	ILE
1	B	148	VAL
1	B	155	TYR
1	B	192	VAL
1	B	199	GLU
1	B	201	VAL
1	B	220	THR
1	B	242	ASN
1	B	255	THR
1	B	292	THR
1	B	409	THR
1	B	449	MET
1	B	474	GLU
1	B	484	ARG
1	B	499	VAL
1	B	501	GLU
1	C	78	GLU
1	C	128	ILE
1	C	213	GLU
1	C	370	PHE
1	C	433	ILE
1	C	453	ILE
1	C	500	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	308	GLN
1	A	323	GLN
1	A	389	ASN
1	A	429	HIS
1	B	260	ASN
1	B	361	GLN
1	C	414	ASN

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Mol	Chain	Res	Type
1	C	454	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

6 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	TPO	B	432	1	8,10,11	1.19	0	10,14,16	2.35	2 (20%)
1	TPO	A	432	1	8,10,11	1.09	0	10,14,16	2.19	2 (20%)
1	TPO	C	432	1	8,10,11	1.13	0	10,14,16	2.03	2 (20%)
1	SEP	B	431	1	8,9,10	1.60	1 (12%)	7,12,14	1.30	1 (14%)
1	SEP	C	431	1	8,9,10	1.61	1 (12%)	7,12,14	1.33	1 (14%)
1	SEP	A	431	1	8,9,10	1.60	1 (12%)	7,12,14	1.32	1 (14%)

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
1	TPO	B	432	1	-	1/9/11/13	-
1	TPO	A	432	1	-	0/9/11/13	-
1	TPO	C	432	1	-	1/9/11/13	-
1	SEP	B	431	1	-	3/6/8/10	-
1	SEP	C	431	1	-	3/6/8/10	-
1	SEP	A	431	1	-	4/6/8/10	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	431	SEP	P-O1P	3.51	1.61	1.50
1	A	431	SEP	P-O1P	3.51	1.61	1.50
1	B	431	SEP	P-O1P	3.49	1.61	1.50

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	432	TPO	P-OG1-CB	-6.03	106.94	123.33
1	B	432	TPO	P-OG1-CB	-5.65	107.97	123.33
1	C	432	TPO	P-OG1-CB	-5.30	108.93	123.33
1	B	432	TPO	CG2-CB-CA	-4.29	104.91	113.26
1	A	431	SEP	OG-CB-CA	2.78	110.85	108.14
1	C	431	SEP	OG-CB-CA	2.76	110.83	108.14
1	C	432	TPO	CG2-CB-CA	-2.75	107.90	113.26
1	B	431	SEP	OG-CB-CA	2.64	110.72	108.14
1	A	432	TPO	CG2-CB-CA	-2.59	108.22	113.26

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	431	SEP	CB-OG-P-O2P
1	A	431	SEP	CB-OG-P-O3P
1	B	431	SEP	CB-OG-P-O2P
1	B	431	SEP	CB-OG-P-O3P
1	C	431	SEP	CB-OG-P-O1P
1	C	431	SEP	CB-OG-P-O2P
1	C	431	SEP	CB-OG-P-O3P
1	A	431	SEP	CB-OG-P-O1P
1	B	431	SEP	CB-OG-P-O1P
1	A	431	SEP	CA-CB-OG-P
1	C	432	TPO	CB-OG1-P-O1P
1	B	432	TPO	O-C-CA-CB

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	432	TPO	1	0
1	C	431	SEP	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 6 are monoatomic - leaving 6 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
3	ATP	B	604	2	32,33,33	1.37	4 (12%)	48,52,52	1.78	9 (18%)
3	ATP	C	602	2	32,33,33	1.42	6 (18%)	48,52,52	1.75	8 (16%)
3	ATP	A	803	-	32,33,33	1.38	4 (12%)	48,52,52	1.76	9 (18%)
3	ATP	A	802	2	32,33,33	1.38	4 (12%)	48,52,52	1.76	8 (16%)
3	ATP	B	602	2	32,33,33	1.36	4 (12%)	48,52,52	1.76	8 (16%)
3	ATP	C	603	2	32,33,33	1.39	5 (15%)	48,52,52	1.76	10 (20%)

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	ATP	B	604	2	-	9/22/38/38	0/3/3/3
3	ATP	C	602	2	-	8/22/38/38	0/3/3/3
3	ATP	A	803	-	-	8/22/38/38	0/3/3/3
3	ATP	A	802	2	-	7/22/38/38	0/3/3/3
3	ATP	B	602	2	-	6/22/38/38	0/3/3/3
3	ATP	C	603	2	-	8/22/38/38	0/3/3/3

All (27) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	802	ATP	C5-C4	4.73	1.47	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	602	ATP	C5-C4	4.64	1.47	1.39
3	B	602	ATP	C5-C4	4.64	1.47	1.39
3	C	603	ATP	C5-C4	4.60	1.47	1.39
3	A	803	ATP	C5-C4	4.58	1.47	1.39
3	B	604	ATP	C5-C4	4.53	1.47	1.39
3	A	803	ATP	C5-C6	2.78	1.48	1.41
3	B	604	ATP	C5-C6	2.75	1.48	1.41
3	C	603	ATP	C5-C6	2.71	1.48	1.41
3	B	602	ATP	C5-C6	2.64	1.48	1.41
3	A	802	ATP	C5-C6	2.63	1.48	1.41
3	C	602	ATP	C5-C6	2.62	1.48	1.41
3	A	802	ATP	C5-N7	-2.39	1.34	1.39
3	C	603	ATP	C8-N7	2.39	1.36	1.31
3	A	803	ATP	C8-N7	2.37	1.36	1.31
3	B	604	ATP	C8-N7	2.36	1.36	1.31
3	C	602	ATP	C5-N7	-2.34	1.34	1.39
3	B	604	ATP	C5-N7	-2.31	1.34	1.39
3	B	602	ATP	C5-N7	-2.27	1.34	1.39
3	A	803	ATP	C5-N7	-2.27	1.34	1.39
3	C	603	ATP	C5-N7	-2.26	1.35	1.39
3	C	602	ATP	PB-O3B	2.26	1.61	1.59
3	B	602	ATP	C8-N7	2.26	1.36	1.31
3	A	802	ATP	C8-N7	2.24	1.36	1.31
3	C	602	ATP	C8-N7	2.21	1.35	1.31
3	C	602	ATP	PA-O3A	2.17	1.61	1.59
3	C	603	ATP	PB-O3B	2.04	1.61	1.59

All (52) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	802	ATP	C5-C4-N3	-6.00	118.45	126.72
3	B	604	ATP	C5-C4-N3	-5.89	118.60	126.72
3	C	602	ATP	C5-C4-N3	-5.84	118.68	126.72
3	C	603	ATP	C5-C4-N3	-5.79	118.74	126.72
3	A	803	ATP	C5-C4-N3	-5.78	118.76	126.72
3	B	602	ATP	C5-C4-N3	-5.77	118.77	126.72
3	A	802	ATP	N3-C4-N9	4.79	135.32	127.17
3	C	602	ATP	N3-C4-N9	4.76	135.26	127.17
3	B	602	ATP	N3-C4-N9	4.72	135.20	127.17
3	B	604	ATP	N3-C4-N9	4.54	134.89	127.17
3	C	603	ATP	N3-C4-N9	4.47	134.77	127.17
3	A	803	ATP	N3-C4-N9	4.44	134.72	127.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	604	ATP	C2-N3-C4	3.78	121.07	111.83
3	A	803	ATP	C2-N3-C4	3.74	120.97	111.83
3	C	603	ATP	C2-N3-C4	3.72	120.92	111.83
3	C	602	ATP	C2-N3-C4	3.69	120.84	111.83
3	B	602	ATP	C2-N3-C4	3.67	120.79	111.83
3	A	802	ATP	C2-N3-C4	3.60	120.63	111.83
3	B	604	ATP	C4-C5-N7	-3.52	106.56	110.58
3	A	803	ATP	C4-C5-N7	-3.52	106.56	110.58
3	C	603	ATP	C4-C5-N7	-3.49	106.59	110.58
3	A	802	ATP	C4-C5-N7	-3.35	106.75	110.58
3	A	803	ATP	N3-C2-N1	-3.29	123.60	128.58
3	C	602	ATP	C4-C5-N7	-3.24	106.88	110.58
3	B	602	ATP	C4-C5-N7	-3.24	106.88	110.58
3	C	603	ATP	N3-C2-N1	-3.24	123.68	128.58
3	B	602	ATP	N3-C2-N1	-3.24	123.68	128.58
3	B	604	ATP	N3-C2-N1	-3.22	123.70	128.58
3	C	602	ATP	N3-C2-N1	-3.19	123.76	128.58
3	A	802	ATP	N3-C2-N1	-2.92	124.17	128.58
3	B	602	ATP	C4-N9-C8	2.81	108.69	105.74
3	C	602	ATP	C4-N9-C8	2.75	108.62	105.74
3	A	803	ATP	C5-N7-C8	2.56	107.48	103.45
3	C	603	ATP	C5-N7-C8	2.52	107.41	103.45
3	B	604	ATP	C5-N7-C8	2.51	107.40	103.45
3	A	802	ATP	C3'-C2'-C1'	2.50	106.18	101.46
3	B	604	ATP	C4-N9-C8	2.49	108.35	105.74
3	C	603	ATP	C4-N9-C8	2.49	108.35	105.74
3	A	803	ATP	C4-N9-C8	2.48	108.34	105.74
3	A	802	ATP	C4-N9-C8	2.46	108.32	105.74
3	B	602	ATP	C3'-C2'-C1'	2.43	106.07	101.46
3	A	802	ATP	C5-N7-C8	2.42	107.26	103.45
3	B	602	ATP	C5-N7-C8	2.42	107.25	103.45
3	C	602	ATP	C5-N7-C8	2.41	107.23	103.45
3	C	602	ATP	C3'-C2'-C1'	2.40	106.01	101.46
3	A	803	ATP	C6-C5-N7	2.21	136.35	132.09
3	B	604	ATP	C3'-C2'-C1'	2.19	105.60	101.46
3	C	603	ATP	C6-C5-N7	2.18	136.29	132.09
3	C	603	ATP	C3'-C2'-C1'	2.16	105.55	101.46
3	A	803	ATP	C3'-C2'-C1'	2.15	105.53	101.46
3	B	604	ATP	C6-C5-N7	2.12	136.17	132.09
3	C	603	ATP	O4'-C1'-N9	2.05	112.03	108.09

There are no chirality outliers.

All (46) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	802	ATP	PB-O3B-PG-O2G
3	A	802	ATP	C5'-O5'-PA-O1A
3	A	802	ATP	C5'-O5'-PA-O2A
3	A	802	ATP	C5'-O5'-PA-O3A
3	A	803	ATP	C5'-O5'-PA-O1A
3	A	803	ATP	C5'-O5'-PA-O2A
3	A	803	ATP	C5'-O5'-PA-O3A
3	B	602	ATP	PB-O3B-PG-O2G
3	B	602	ATP	PB-O3A-PA-O5'
3	B	602	ATP	C5'-O5'-PA-O1A
3	B	602	ATP	C5'-O5'-PA-O2A
3	B	602	ATP	C5'-O5'-PA-O3A
3	B	604	ATP	C5'-O5'-PA-O2A
3	B	604	ATP	C5'-O5'-PA-O3A
3	C	602	ATP	PB-O3A-PA-O5'
3	C	602	ATP	C5'-O5'-PA-O1A
3	C	602	ATP	C5'-O5'-PA-O2A
3	C	602	ATP	C5'-O5'-PA-O3A
3	C	603	ATP	C5'-O5'-PA-O1A
3	C	603	ATP	C5'-O5'-PA-O2A
3	C	603	ATP	C5'-O5'-PA-O3A
3	A	802	ATP	PA-O3A-PB-O1B
3	A	802	ATP	PB-O3A-PA-O5'
3	B	604	ATP	PB-O3A-PA-O5'
3	A	803	ATP	PB-O3B-PG-O1G
3	B	604	ATP	PB-O3B-PG-O1G
3	B	604	ATP	C3'-C4'-C5'-O5'
3	A	803	ATP	PA-O3A-PB-O2B
3	C	603	ATP	PA-O3A-PB-O1B
3	B	604	ATP	C5'-O5'-PA-O1A
3	A	802	ATP	PA-O3A-PB-O2B
3	B	602	ATP	PA-O3A-PB-O2B
3	C	602	ATP	PA-O3A-PB-O2B
3	C	602	ATP	PB-O3B-PG-O1G
3	C	603	ATP	PA-O3A-PB-O2B
3	C	603	ATP	PB-O3B-PG-O1G
3	A	803	ATP	PB-O3B-PG-O2G
3	A	803	ATP	PB-O3B-PG-O3G
3	B	604	ATP	PB-O3B-PG-O2G
3	B	604	ATP	PB-O3B-PG-O3G
3	C	602	ATP	PB-O3B-PG-O2G
3	C	603	ATP	PB-O3B-PG-O2G

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Mol	Chain	Res	Type	Atoms
3	C	603	ATP	PB-O3B-PG-O3G
3	C	602	ATP	C3'-C4'-C5'-O5'
3	B	604	ATP	PB-O3A-PA-O2A
3	A	803	ATP	PA-O3A-PB-O1B

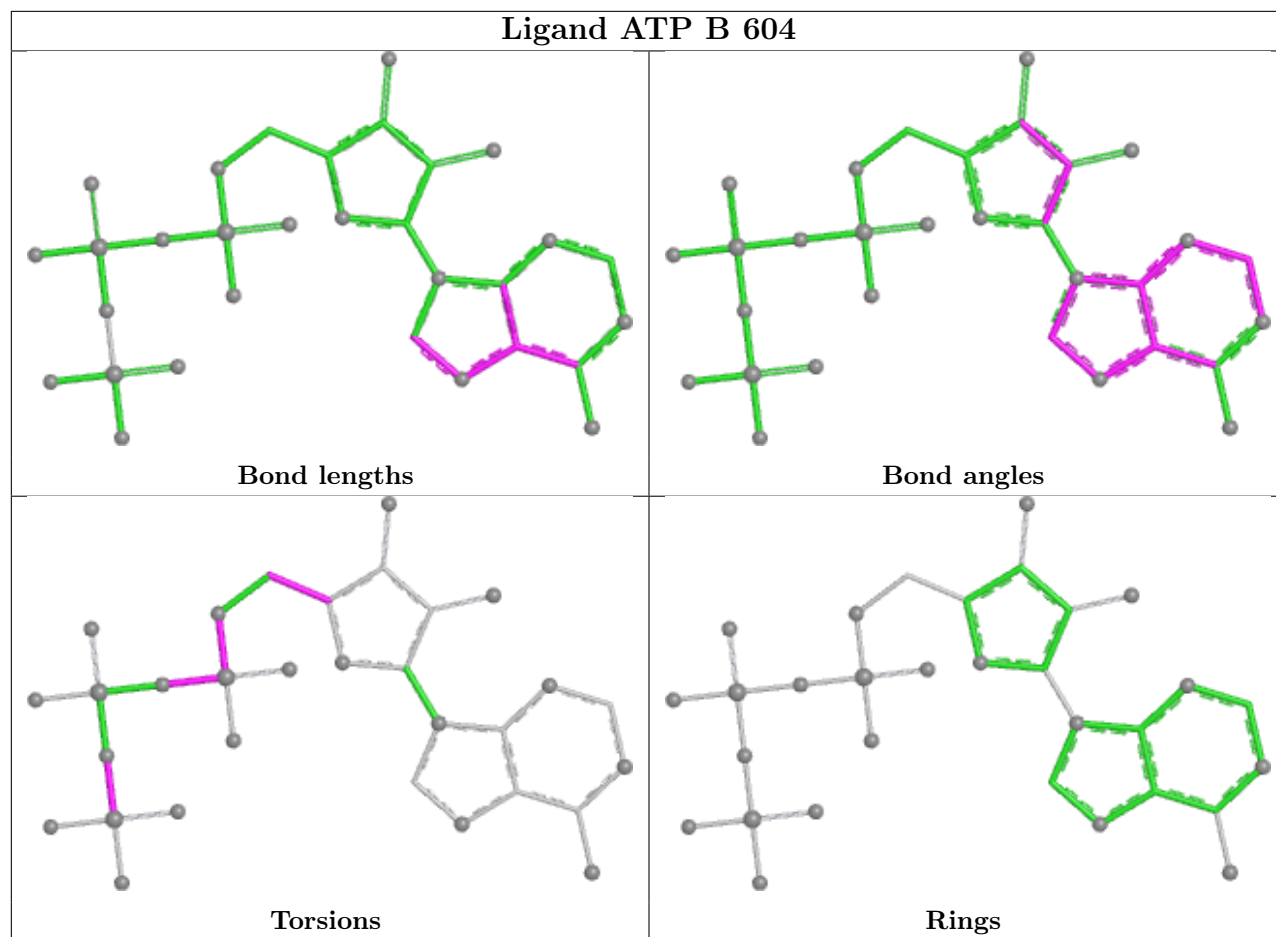
There are no ring outliers.

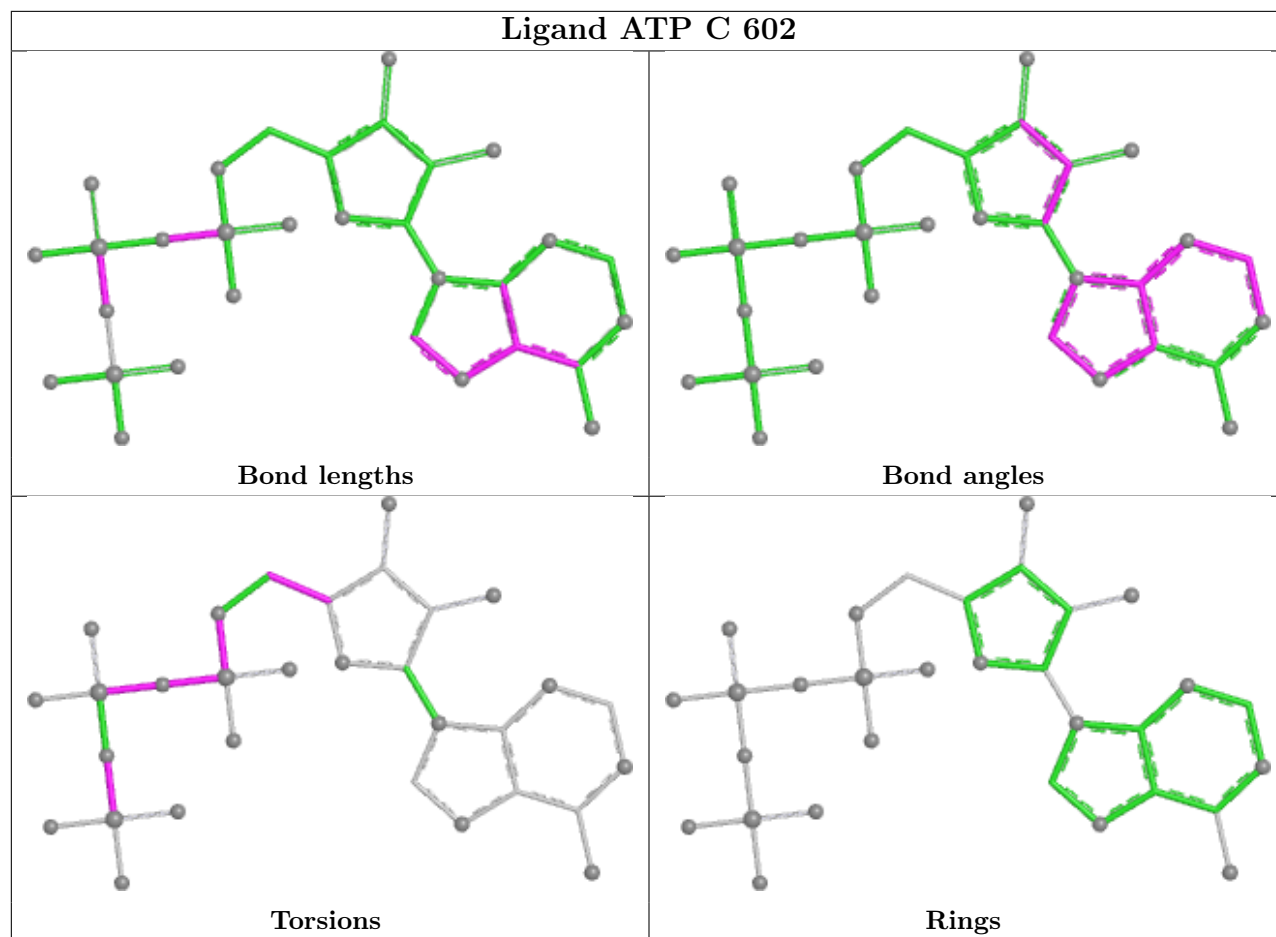
2 monomers are involved in 5 short contacts:

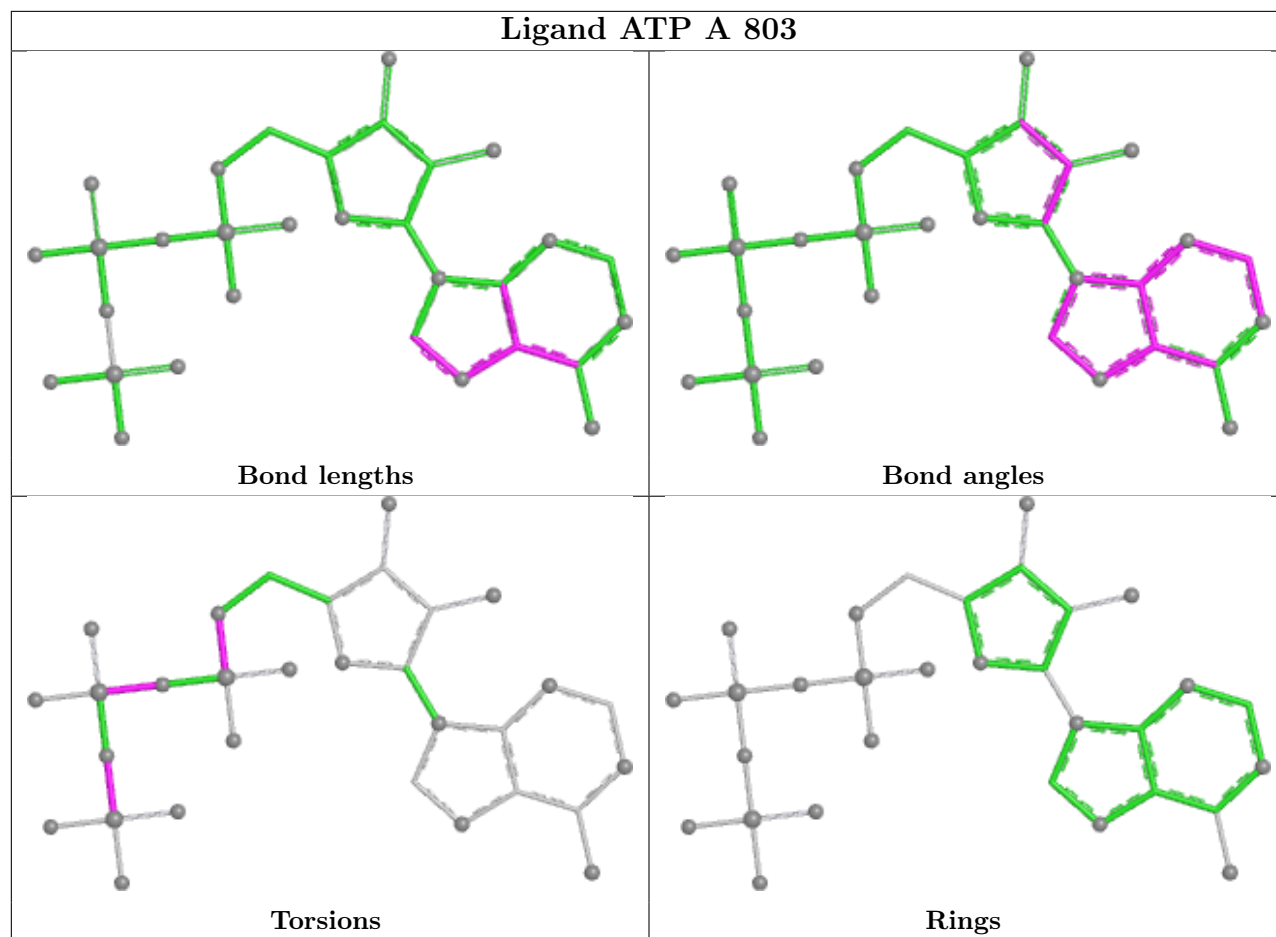
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	604	ATP	2	0
3	C	603	ATP	3	0

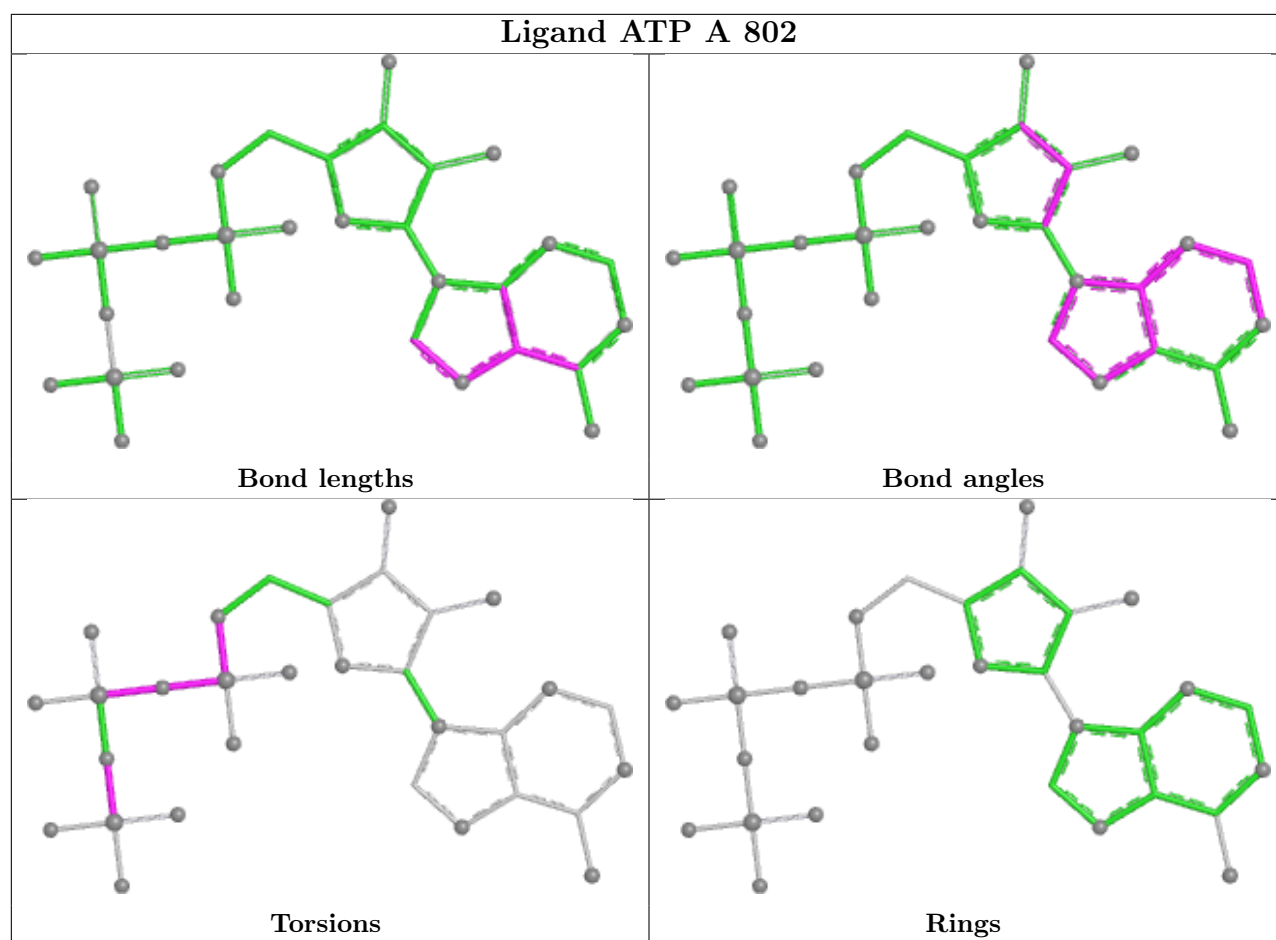
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

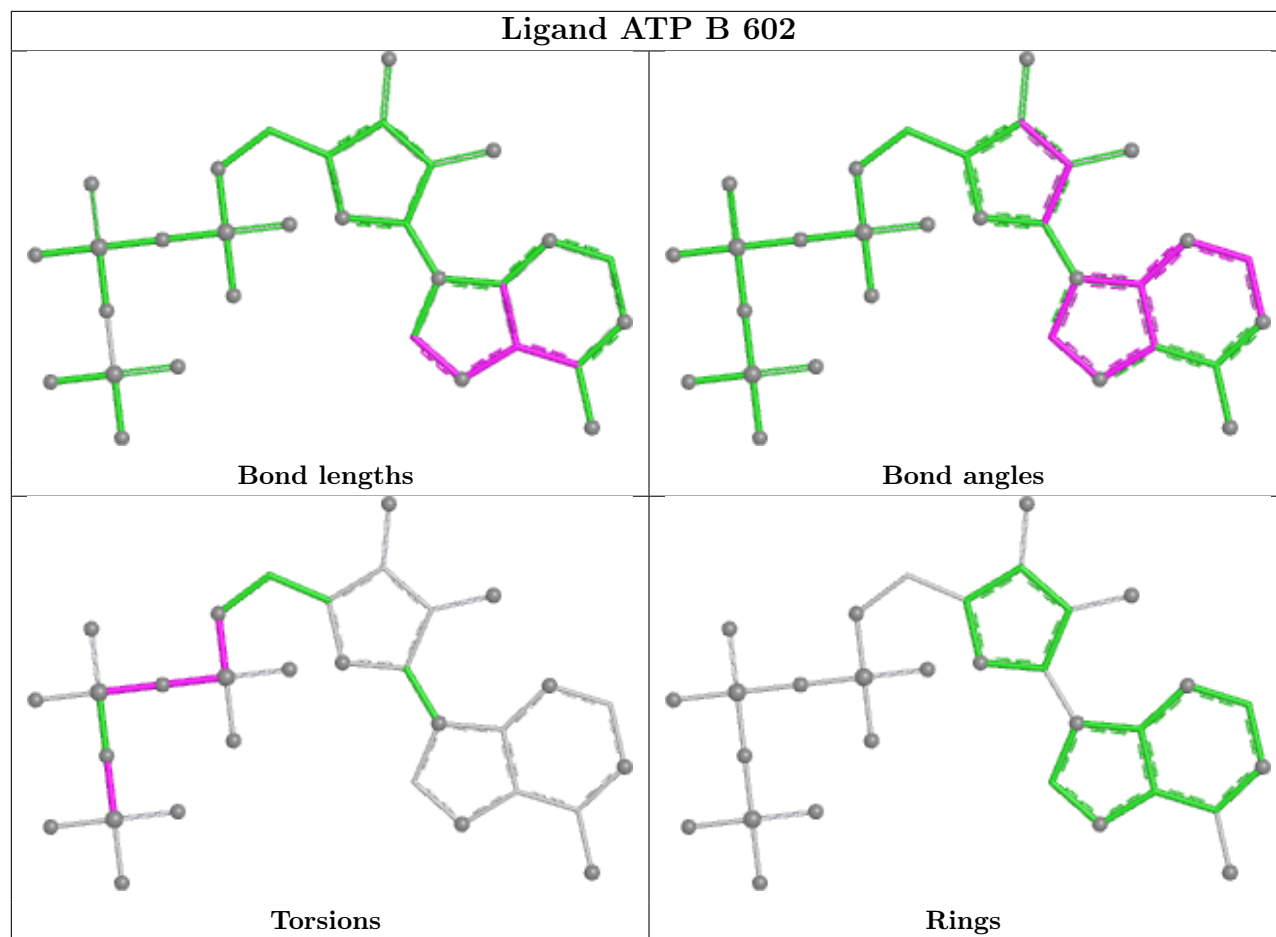
Ligand ATP B 604

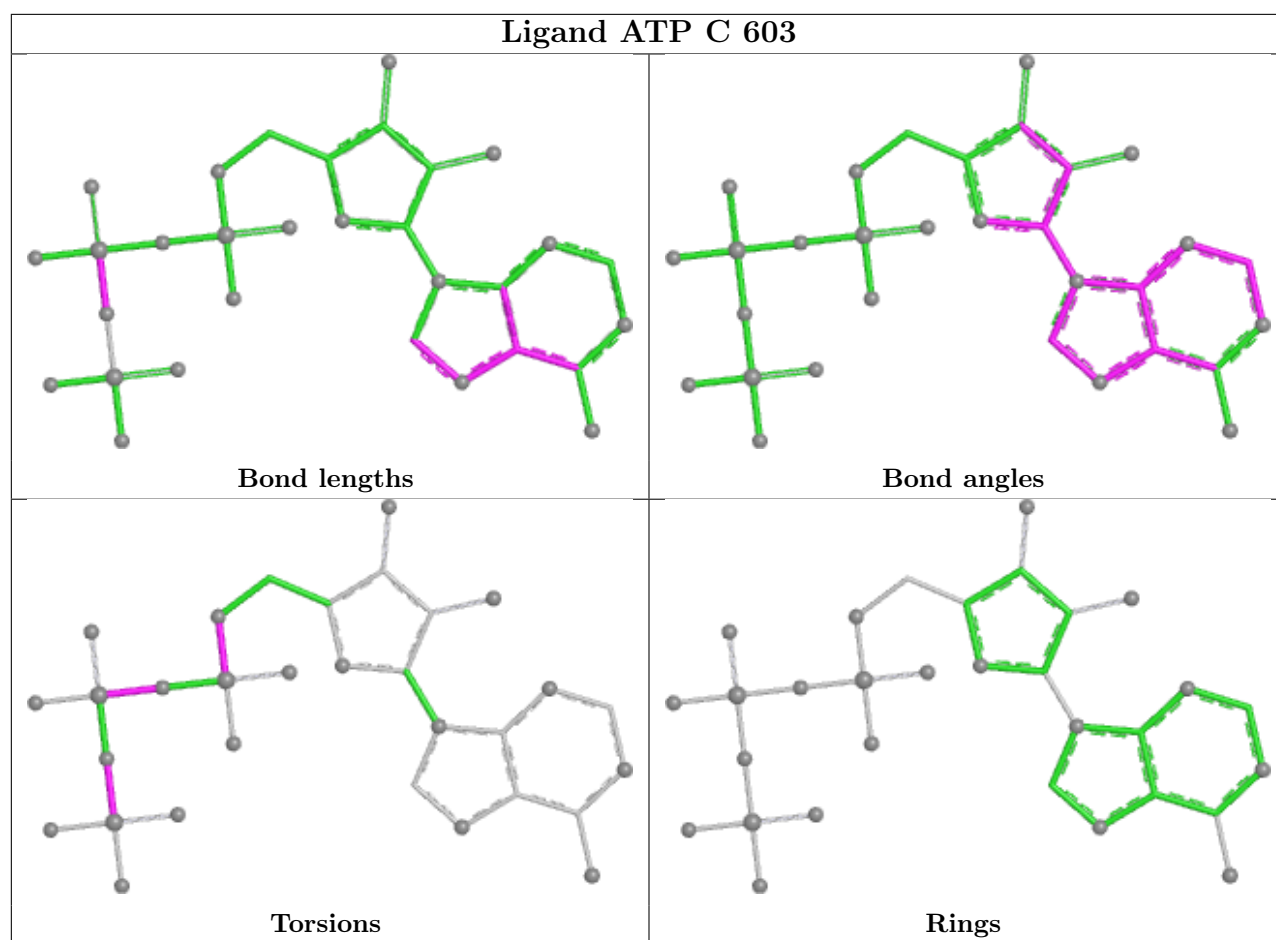












5.7 Other polymers [i](#)

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	492/524 (93%)	0.46	28 (5%)	29 22	24, 44, 109, 151	0
1	B	488/524 (93%)	0.53	37 (7%)	20 15	25, 45, 99, 141	0
1	C	488/524 (93%)	0.55	32 (6%)	24 19	23, 51, 106, 143	0
All	All	1468/1572 (93%)	0.52	97 (6%)	24 19	23, 47, 107, 151	0

All (97) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	124	LEU	6.1
1	B	123	ASP	5.5
1	A	250	GLY	5.0
1	B	249	LEU	5.0
1	A	203	ASP	5.0
1	C	15	SER	4.8
1	A	17	ALA	4.4
1	C	250	GLY	4.3
1	C	123	ASP	4.2
1	C	249	LEU	4.2
1	B	113	PRO	3.9
1	B	15	SER	3.8
1	B	125	SER	3.8
1	B	251	ALA	3.7
1	C	278	PHE	3.6
1	B	247	PHE	3.6
1	B	127	LEU	3.4
1	B	122	PHE	3.4
1	C	433	ILE	3.4
1	B	248	PRO	3.3
1	C	500	ASP	3.2
1	B	12	THR	3.2
1	A	114	ASP	3.2

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Mol	Chain	Res	Type	RSRZ
1	A	248	PRO	3.2
1	C	16	SER	3.2
1	A	12	THR	3.1
1	A	212	LEU	3.1
1	C	251	ALA	3.1
1	C	17	ALA	3.0
1	A	435	ASP	3.0
1	B	118	VAL	3.0
1	A	15	SER	2.9
1	B	499	VAL	2.9
1	C	499	VAL	2.9
1	B	14	GLN	2.8
1	A	155	TYR	2.8
1	A	249	LEU	2.8
1	A	92	GLY	2.8
1	B	347	ILE	2.8
1	B	46	SER	2.8
1	B	13	GLU	2.7
1	A	251	ALA	2.7
1	A	154	GLN	2.7
1	B	155	TYR	2.7
1	B	458	MET	2.7
1	A	499	VAL	2.7
1	B	252	MET	2.6
1	A	115	GLY	2.6
1	A	152	PHE	2.6
1	C	157	ALA	2.6
1	C	254	LEU	2.6
1	C	12	THR	2.6
1	A	158	ALA	2.6
1	B	498	SER	2.5
1	A	93	TRP	2.5
1	C	120	GLY	2.5
1	A	247	PHE	2.4
1	C	122	PHE	2.4
1	A	256	GLN	2.4
1	B	150	ALA	2.4
1	A	94	ASN	2.4
1	B	250	GLY	2.4
1	C	13	GLU	2.4
1	C	149	THR	2.4
1	B	121	ASP	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	275	GLY	2.4
1	B	500	ASP	2.4
1	C	290	THR	2.4
1	C	192	VAL	2.3
1	C	436	THR	2.3
1	C	318	GLU	2.3
1	C	409	THR	2.3
1	C	248	PRO	2.3
1	C	11	PRO	2.2
1	B	474	GLU	2.2
1	C	154	GLN	2.2
1	B	203	ASP	2.2
1	B	186	VAL	2.2
1	A	124	LEU	2.2
1	A	117	GLU	2.2
1	B	158	ALA	2.2
1	B	152	PHE	2.2
1	B	435	ASP	2.1
1	A	254	LEU	2.1
1	C	247	PHE	2.1
1	C	346	ILE	2.1
1	B	111	PRO	2.1
1	B	17	ALA	2.1
1	B	336	GLU	2.1
1	C	422	SER	2.1
1	C	425	ILE	2.1
1	C	252	MET	2.1
1	C	498	SER	2.1
1	A	331	TRP	2.0
1	A	147	SER	2.0
1	B	422	SER	2.0
1	A	197	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	SEP	C	431	10/11	0.76	0.15	56,60,78,92	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
1	TPO	C	432	11/12	0.84	0.17	59,67,78,85	0
1	SEP	B	431	10/11	0.85	0.14	43,50,79,90	0
1	TPO	B	432	11/12	0.90	0.10	44,47,64,69	0
1	TPO	A	432	11/12	0.90	0.10	51,53,65,66	0
1	SEP	A	431	10/11	0.90	0.10	47,54,67,76	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

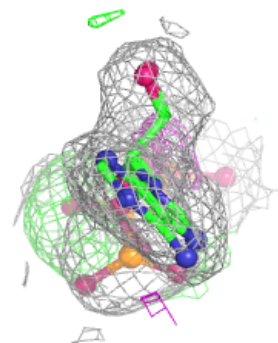
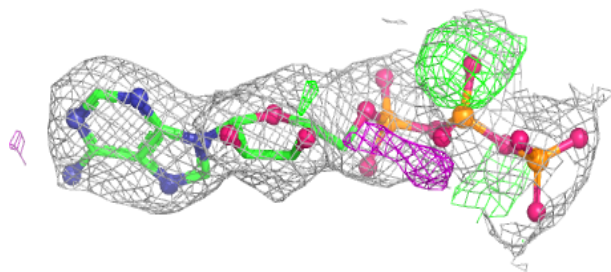
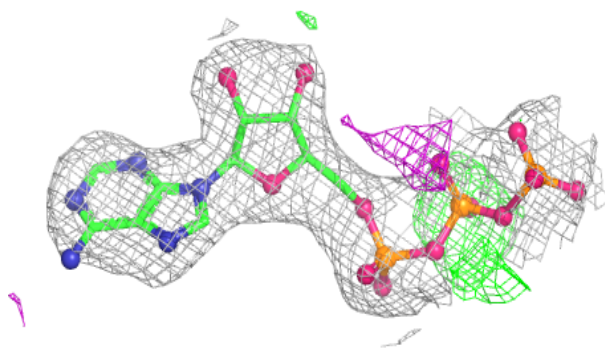
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	MG	A	804	1/1	0.32	0.32	64,64,64,64	0
2	MG	C	604	1/1	0.72	0.12	45,45,45,45	0
2	MG	C	601	1/1	0.87	0.21	44,44,44,44	0
2	MG	B	601	1/1	0.88	0.12	47,47,47,47	0
2	MG	A	801	1/1	0.89	0.18	32,32,32,32	0
3	ATP	B	604	31/31	0.89	0.12	28,37,61,67	0
3	ATP	B	602	31/31	0.91	0.12	32,41,63,75	0
3	ATP	A	803	31/31	0.91	0.12	24,32,63,74	0
3	ATP	C	602	31/31	0.92	0.11	31,36,58,77	0
2	MG	B	603	1/1	0.93	0.21	41,41,41,41	0
3	ATP	A	802	31/31	0.93	0.10	26,33,47,65	0
3	ATP	C	603	31/31	0.93	0.10	26,37,59,68	0

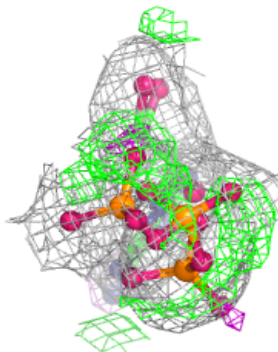
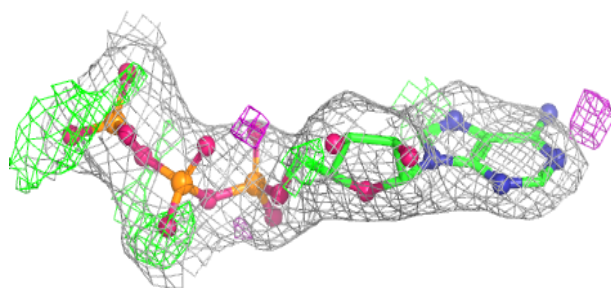
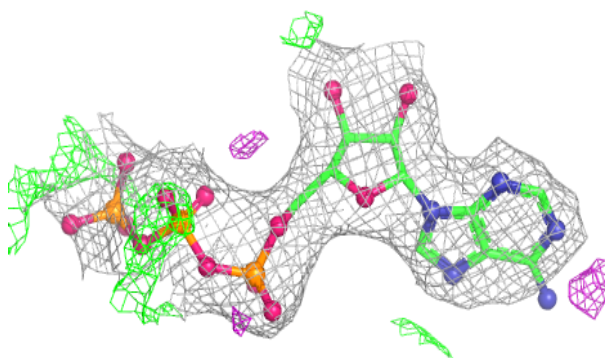
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around ATP B 604:

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

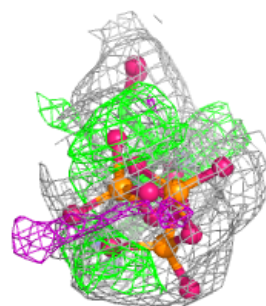
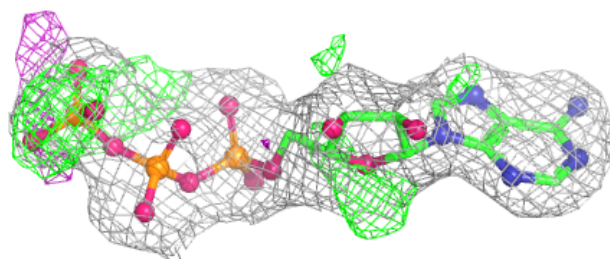
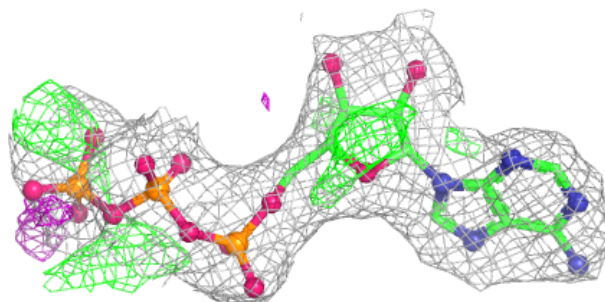
**Electron density around ATP B 602:**

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

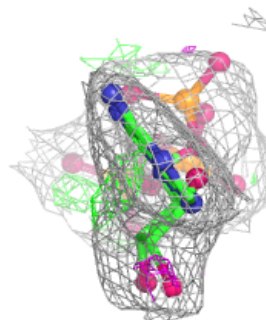
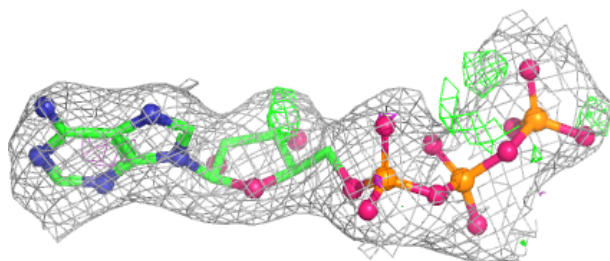
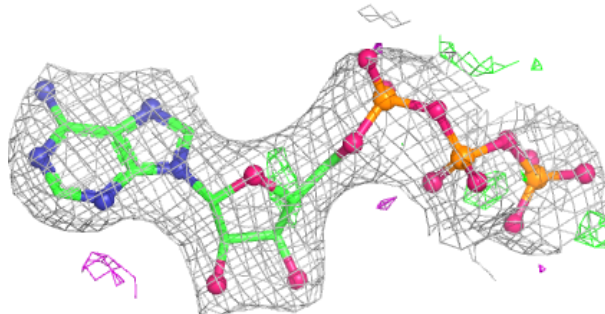


Electron density around ATP A 803:

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

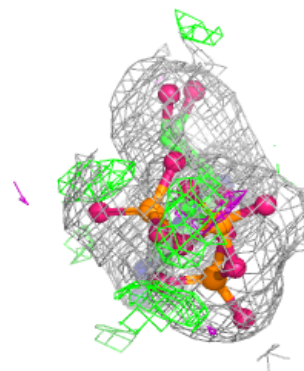
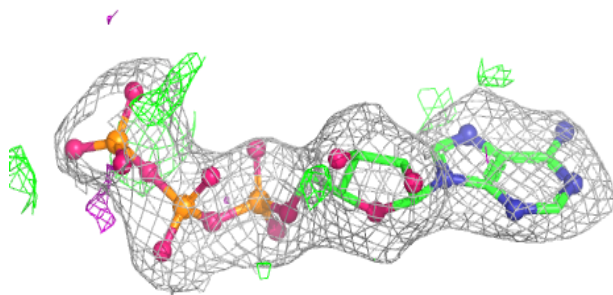
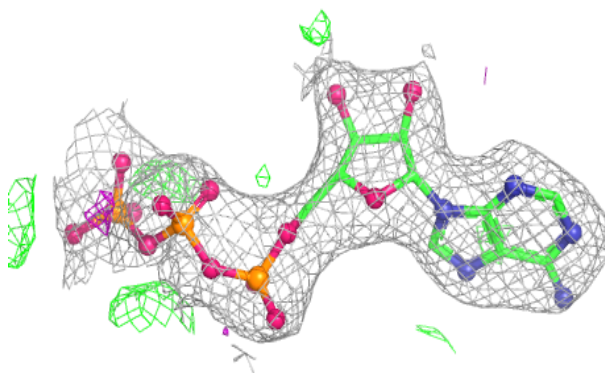
**Electron density around ATP C 602:**

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

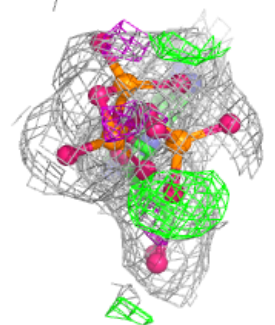
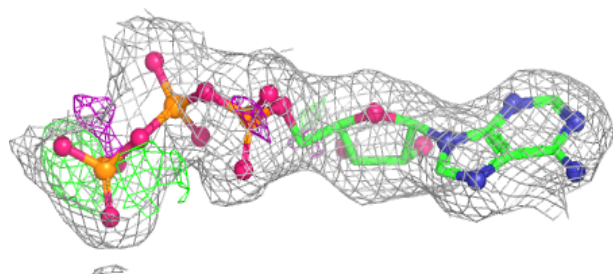
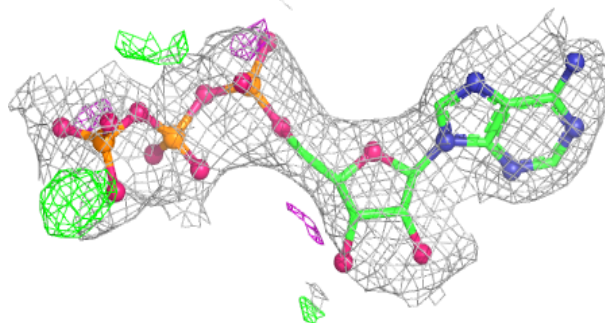


Electron density around ATP A 802:

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

**Electron density around ATP C 603:**

$2mF_o-DF_c$ (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.