Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 09:57 PM EDT

PDB ID	:	3WT0
Title	:	Crystal Structure Analysis of Cell Division Protein
Authors	:	Kato, K.; Ishido, T.; Matsui, T.; Yao, M.
Deposited on	:	2014-03-31
Resolution	:	2.00 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:

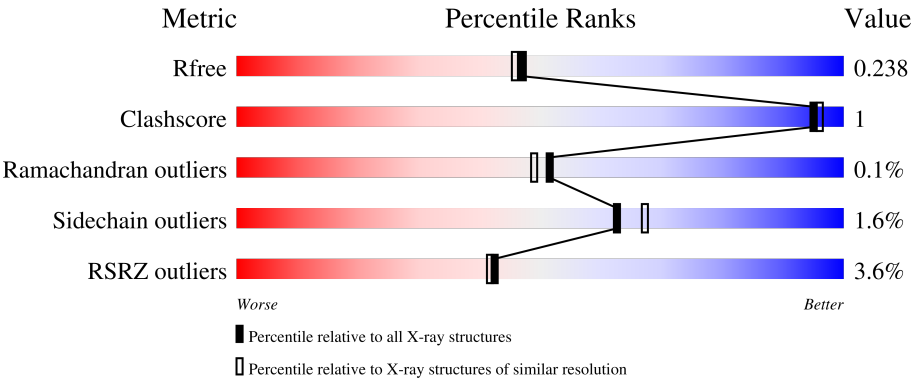
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (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 2.00 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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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	402	4% 89% • 6%
1	B	402	4% 89% • 6%
1	C	402	3% 89% • 7%
1	D	402	2% 91% • 6%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 12594 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 Cell division protein FtsA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	376	Total	C	N	O	S	0	1	0
			2927	1843	467	610	7			
1	B	376	Total	C	N	O	S	0	0	0
			2921	1840	466	608	7			
1	C	374	Total	C	N	O	S	0	0	0
			2903	1830	464	602	7			
1	D	378	Total	C	N	O	S	0	0	0
			2938	1853	468	610	7			

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-17	MET	-	expression tag	UNP Q8NX33
A	-16	ASN	-	expression tag	UNP Q8NX33
A	-15	HIS	-	expression tag	UNP Q8NX33
A	-14	HIS	-	expression tag	UNP Q8NX33
A	-13	HIS	-	expression tag	UNP Q8NX33
A	-12	HIS	-	expression tag	UNP Q8NX33
A	-11	HIS	-	expression tag	UNP Q8NX33
A	-10	HIS	-	expression tag	UNP Q8NX33
A	-9	GLU	-	expression tag	UNP Q8NX33
A	-8	ASN	-	expression tag	UNP Q8NX33
A	-7	LEU	-	expression tag	UNP Q8NX33
A	-6	TYR	-	expression tag	UNP Q8NX33
A	-5	PHE	-	expression tag	UNP Q8NX33
A	-4	GLN	-	expression tag	UNP Q8NX33
A	-3	GLY	-	expression tag	UNP Q8NX33
A	-2	GLY	-	expression tag	UNP Q8NX33
A	-1	ALA	-	expression tag	UNP Q8NX33
A	0	HIS	-	expression tag	UNP Q8NX33
B	-17	MET	-	expression tag	UNP Q8NX33
B	-16	ASN	-	expression tag	UNP Q8NX33
B	-15	HIS	-	expression tag	UNP Q8NX33

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-14	HIS	-	expression tag	UNP Q8NX33
B	-13	HIS	-	expression tag	UNP Q8NX33
B	-12	HIS	-	expression tag	UNP Q8NX33
B	-11	HIS	-	expression tag	UNP Q8NX33
B	-10	HIS	-	expression tag	UNP Q8NX33
B	-9	GLU	-	expression tag	UNP Q8NX33
B	-8	ASN	-	expression tag	UNP Q8NX33
B	-7	LEU	-	expression tag	UNP Q8NX33
B	-6	TYR	-	expression tag	UNP Q8NX33
B	-5	PHE	-	expression tag	UNP Q8NX33
B	-4	GLN	-	expression tag	UNP Q8NX33
B	-3	GLY	-	expression tag	UNP Q8NX33
B	-2	GLY	-	expression tag	UNP Q8NX33
B	-1	ALA	-	expression tag	UNP Q8NX33
B	0	HIS	-	expression tag	UNP Q8NX33
C	-17	MET	-	expression tag	UNP Q8NX33
C	-16	ASN	-	expression tag	UNP Q8NX33
C	-15	HIS	-	expression tag	UNP Q8NX33
C	-14	HIS	-	expression tag	UNP Q8NX33
C	-13	HIS	-	expression tag	UNP Q8NX33
C	-12	HIS	-	expression tag	UNP Q8NX33
C	-11	HIS	-	expression tag	UNP Q8NX33
C	-10	HIS	-	expression tag	UNP Q8NX33
C	-9	GLU	-	expression tag	UNP Q8NX33
C	-8	ASN	-	expression tag	UNP Q8NX33
C	-7	LEU	-	expression tag	UNP Q8NX33
C	-6	TYR	-	expression tag	UNP Q8NX33
C	-5	PHE	-	expression tag	UNP Q8NX33
C	-4	GLN	-	expression tag	UNP Q8NX33
C	-3	GLY	-	expression tag	UNP Q8NX33
C	-2	GLY	-	expression tag	UNP Q8NX33
C	-1	ALA	-	expression tag	UNP Q8NX33
C	0	HIS	-	expression tag	UNP Q8NX33
D	-17	MET	-	expression tag	UNP Q8NX33
D	-16	ASN	-	expression tag	UNP Q8NX33
D	-15	HIS	-	expression tag	UNP Q8NX33
D	-14	HIS	-	expression tag	UNP Q8NX33
D	-13	HIS	-	expression tag	UNP Q8NX33
D	-12	HIS	-	expression tag	UNP Q8NX33
D	-11	HIS	-	expression tag	UNP Q8NX33
D	-10	HIS	-	expression tag	UNP Q8NX33
D	-9	GLU	-	expression tag	UNP Q8NX33

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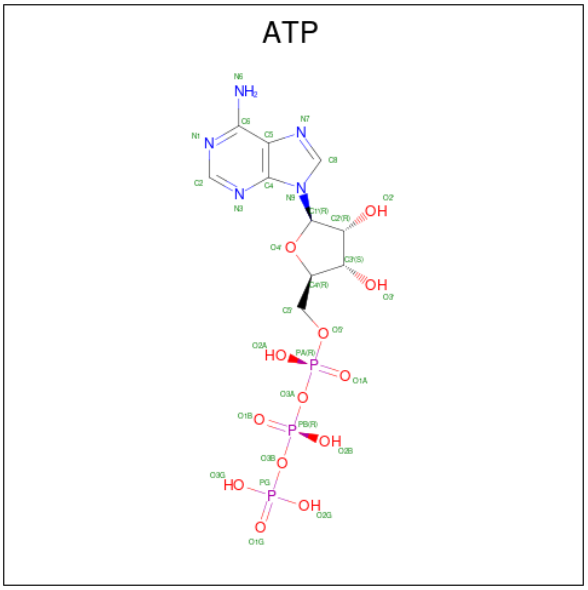
Chain	Residue	Modelled	Actual	Comment	Reference
D	-8	ASN	-	expression tag	UNP Q8NX33
D	-7	LEU	-	expression tag	UNP Q8NX33
D	-6	TYR	-	expression tag	UNP Q8NX33
D	-5	PHE	-	expression tag	UNP Q8NX33
D	-4	GLN	-	expression tag	UNP Q8NX33
D	-3	GLY	-	expression tag	UNP Q8NX33
D	-2	GLY	-	expression tag	UNP Q8NX33
D	-1	ALA	-	expression tag	UNP Q8NX33
D	0	HIS	-	expression tag	UNP Q8NX33

- Molecule 2 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



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

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

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

- Molecule 4 is water.

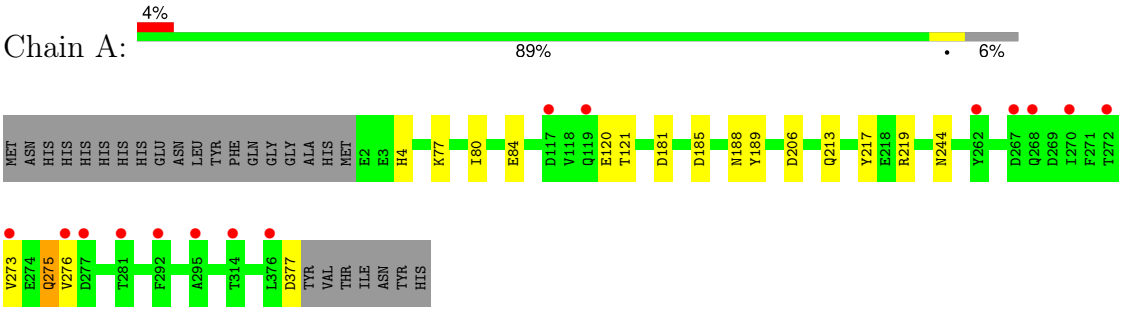
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	147	Total O 147 147	0	0
4	B	191	Total O 191 191	0	0
4	C	218	Total O 218 218	0	0
4	D	221	Total O 221 221	0	0

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.

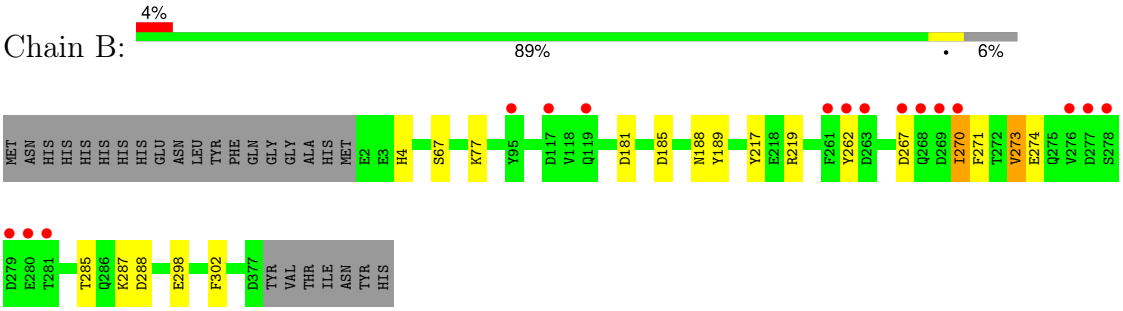
• Molecule 1: Cell division protein FtsA

Chain A:



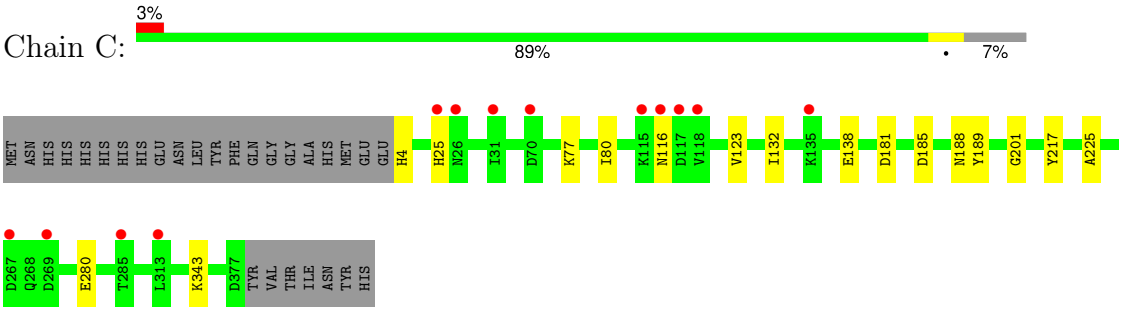
• Molecule 1: Cell division protein FtsA

Chain B:



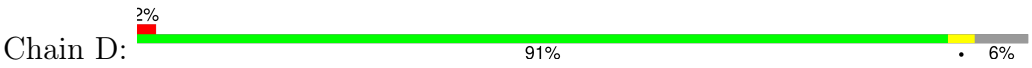
• Molecule 1: Cell division protein FtsA

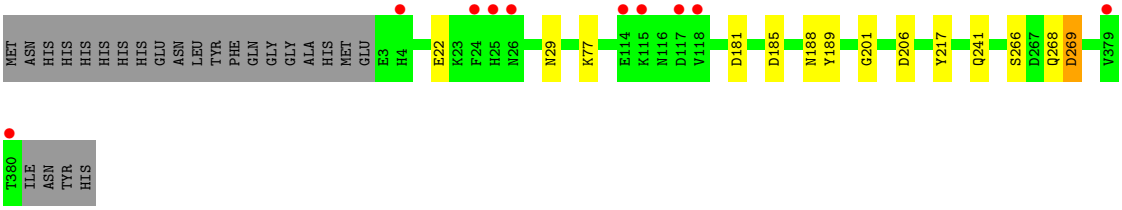
Chain C:



• Molecule 1: Cell division protein FtsA

Chain D:




MET
ASN
HIS
HIS
HIS
HIS
HIS
GLU
ASN
LEU
TYR
PHE
GLN
GLY
GLY
ALA
HIS
MET
GLU
E3
H4
E22
K23
F24
H25
N26
N29
K77
E114
K115
N116
D117
V118
D181
D185
N188
Y189
G201
D206
Y217
Q241
S266
D267
Q268
D269
V379
T380
ILE
ASN
TYR
HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	106.03Å 70.63Å 120.68Å 90.00° 108.00° 90.00°	Depositor
Resolution (Å)	44.54 – 2.00 44.54 – 1.99	Depositor EDS
% Data completeness (in resolution range)	99.9 (44.54-2.00) 99.6 (44.54-1.99)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.45 (at 2.00Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.4_1496)	Depositor
R, R_{free}	0.208 , 0.236 0.212 , 0.238	Depositor DCC
R_{free} test set	5816 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	34.4	Xtriage
Anisotropy	0.606	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 47.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	12594	wwPDB-VP
Average B, all atoms (Å^2)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 25.99 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.8605e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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: MG, 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	0.30	0/2967	0.51	0/4013
1	B	0.30	0/2961	0.53	0/4005
1	C	0.29	0/2943	0.52	0/3981
1	D	0.29	0/2979	0.53	0/4031
All	All	0.29	0/11850	0.52	0/16030

There are no bond length outliers.

There are no bond angle outliers.

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	2927	0	2862	6	0
1	B	2921	0	2858	9	0
1	C	2903	0	2846	9	0
1	D	2938	0	2877	8	0
2	A	31	0	12	0	0
2	B	31	0	12	0	0
2	C	31	0	12	0	0
2	D	31	0	12	0	0
3	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	147	0	0	0	0
4	B	191	0	0	0	0
4	C	218	0	0	1	0
4	D	221	0	0	0	0
All	All	12594	0	11491	29	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 1.

All (29) 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:116:ASN:HD22	1:C:123:VAL:HG23	1.51	0.75
1:C:280:GLU:O	4:C:716:HOH:O	2.15	0.64
1:D:266:SER:HB2	1:D:269:ASP:HB2	1.81	0.62
1:D:22:GLU:OE2	1:D:29:ASN:ND2	2.26	0.59
1:B:285:THR:HG22	1:B:288:ASP:OD2	2.09	0.52
1:B:270:ILE:HG12	1:B:271:PHE:N	2.27	0.49
1:B:267:ASP:OD1	1:B:285:THR:HG21	2.12	0.48
1:B:67:SER:O	1:D:241:GLN:NE2	2.49	0.46
1:D:189:TYR:OH	1:D:206:ASP:OD2	2.34	0.45
1:B:262:TYR:CE1	1:B:287:LYS:HG2	2.52	0.44
1:A:120:GLU:HG2	1:A:121:THR:HG23	2.00	0.44
1:B:298:GLU:HG2	1:B:302:PHE:CE1	2.53	0.44
1:D:185:ASP:HA	1:D:188:ASN:HB2	2.00	0.43
1:A:189:TYR:OH	1:A:206:ASP:OD2	2.27	0.43
1:A:244:ASN:ND2	1:A:275:GLN:HG3	2.34	0.43
1:D:201:GLY:HA2	1:D:217:TYR:O	2.19	0.43
1:C:185:ASP:HA	1:C:188:ASN:HB2	2.01	0.42
1:A:185:ASP:HA	1:A:188:ASN:HB2	2.01	0.42
1:A:189:TYR:HB2	1:A:217:TYR:OH	2.19	0.42
1:A:80:ILE:HD12	1:A:213:GLN:HB3	2.02	0.42
1:B:189:TYR:HB2	1:B:217:TYR:OH	2.19	0.42
1:B:273:VAL:HG13	1:B:274:GLU:O	2.21	0.41
1:C:189:TYR:HB2	1:C:217:TYR:OH	2.21	0.41
1:C:201:GLY:HA2	1:C:217:TYR:O	2.20	0.41
1:C:343:LYS:HA	1:D:268:GLN:HG3	2.02	0.40
1:B:185:ASP:HA	1:B:188:ASN:HB2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:132:ILE:HG12	1:C:138:GLU:HG2	2.03	0.40
1:C:80:ILE:HD13	1:C:225:ALA:HB1	2.03	0.40
1:C:343:LYS:HG2	1:D:268:GLN:OE1	2.21	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	375/402 (93%)	366 (98%)	9 (2%)	0	100	100
1	B	374/402 (93%)	364 (97%)	10 (3%)	0	100	100
1	C	372/402 (92%)	362 (97%)	9 (2%)	1 (0%)	41	37
1	D	376/402 (94%)	367 (98%)	9 (2%)	0	100	100
All	All	1497/1608 (93%)	1459 (98%)	37 (2%)	1 (0%)	51	49

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	25	HIS

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	328/350 (94%)	319 (97%)	9 (3%)	44	46
1	B	327/350 (93%)	321 (98%)	6 (2%)	59	63
1	C	325/350 (93%)	322 (99%)	3 (1%)	78	83
1	D	329/350 (94%)	326 (99%)	3 (1%)	78	83
All	All	1309/1400 (94%)	1288 (98%)	21 (2%)	62	67

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	HIS
1	A	77	LYS
1	A	84	GLU
1	A	181	ASP
1	A	219	ARG
1	A	273	VAL
1	A	275	GLN
1	A	276	VAL
1	A	377	ASP
1	B	4	HIS
1	B	77	LYS
1	B	181	ASP
1	B	219	ARG
1	B	270	ILE
1	B	273	VAL
1	C	4	HIS
1	C	77	LYS
1	C	181	ASP
1	D	77	LYS
1	D	181	ASP
1	D	269	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	ATP	A	400	3	28,33,33	0.88	0	34,52,52	1.17	3 (8%)
2	ATP	B	400	3	28,33,33	0.91	0	34,52,52	1.23	3 (8%)
2	ATP	D	400	3	28,33,33	0.83	0	34,52,52	1.20	3 (8%)
2	ATP	C	400	3	28,33,33	0.86	0	34,52,52	1.19	3 (8%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ATP	A	400	3	-	1/18/38/38	0/3/3/3
2	ATP	B	400	3	-	2/18/38/38	0/3/3/3
2	ATP	D	400	3	-	2/18/38/38	0/3/3/3
2	ATP	C	400	3	-	2/18/38/38	0/3/3/3

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	400	ATP	N3-C2-N1	-3.98	123.27	128.67
2	B	400	ATP	N3-C2-N1	-3.76	123.57	128.67
2	C	400	ATP	N3-C2-N1	-3.72	123.62	128.67
2	A	400	ATP	N3-C2-N1	-3.72	123.63	128.67
2	A	400	ATP	C4-C5-N7	-2.56	106.63	109.34
2	B	400	ATP	C4-C5-N7	-2.54	106.66	109.34
2	C	400	ATP	C4-C5-N7	-2.46	106.74	109.34
2	D	400	ATP	C4-C5-N7	-2.38	106.83	109.34
2	B	400	ATP	O4'-C1'-N9	2.31	111.81	108.75
2	D	400	ATP	O4'-C1'-N9	2.24	111.71	108.75
2	A	400	ATP	O4'-C1'-N9	2.14	111.58	108.75
2	C	400	ATP	O4'-C1'-N9	2.08	111.50	108.75

There are no chirality outliers.

All (7) torsion outliers are listed below:

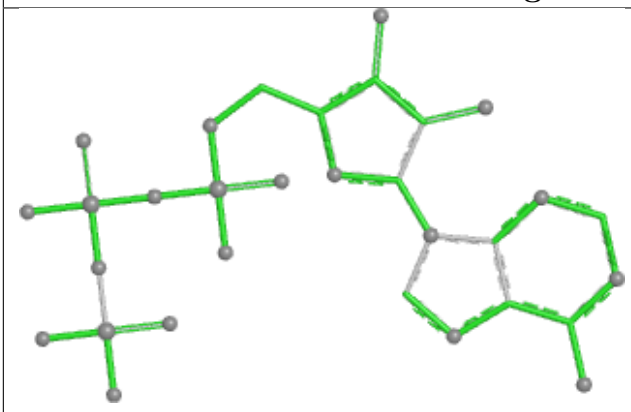
Mol	Chain	Res	Type	Atoms
2	B	400	ATP	PB-O3B-PG-O3G
2	C	400	ATP	PB-O3B-PG-O2G
2	D	400	ATP	PB-O3B-PG-O3G
2	A	400	ATP	PB-O3B-PG-O3G
2	B	400	ATP	PB-O3B-PG-O2G
2	C	400	ATP	PB-O3B-PG-O3G
2	D	400	ATP	PG-O3B-PB-O2B

There are no ring outliers.

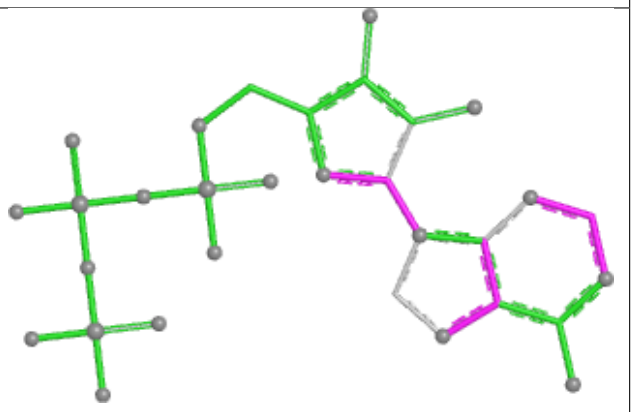
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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.

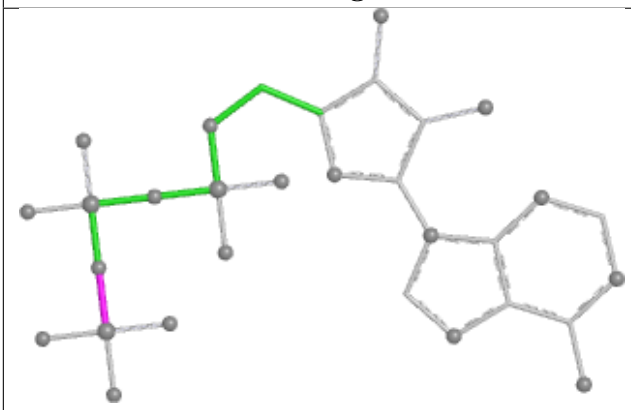
Ligand ATP A 400



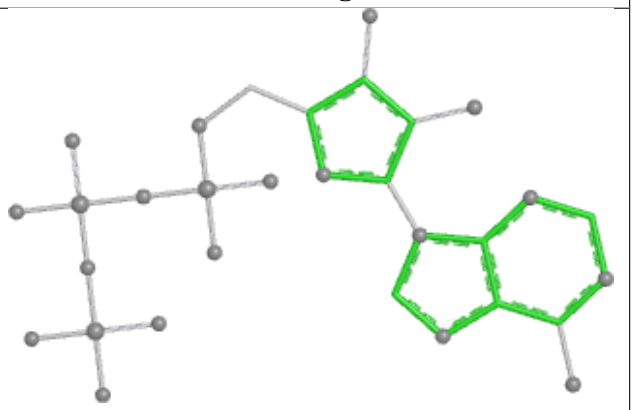
Bond lengths



Bond angles

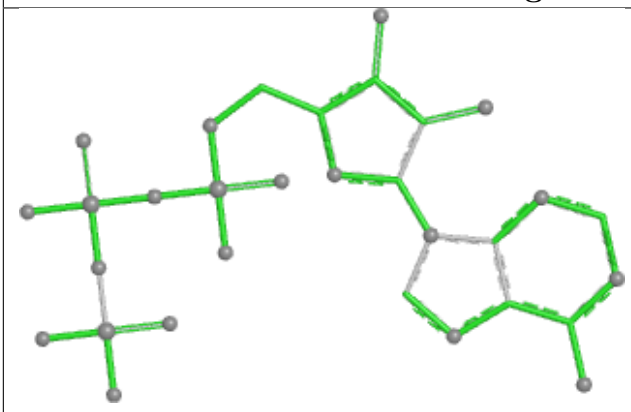


Torsions

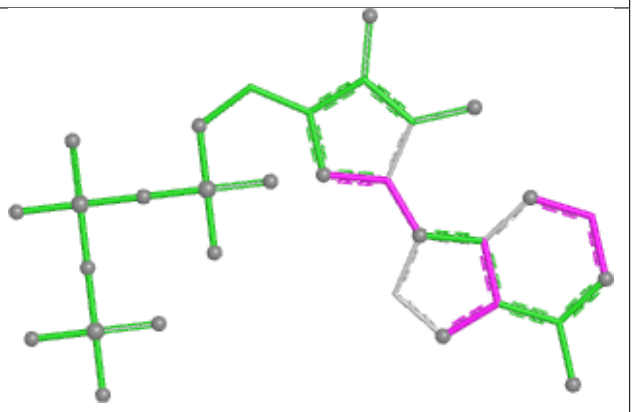


Rings

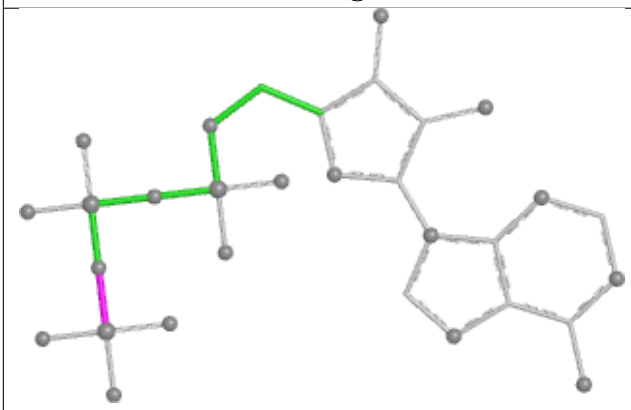
Ligand ATP B 400



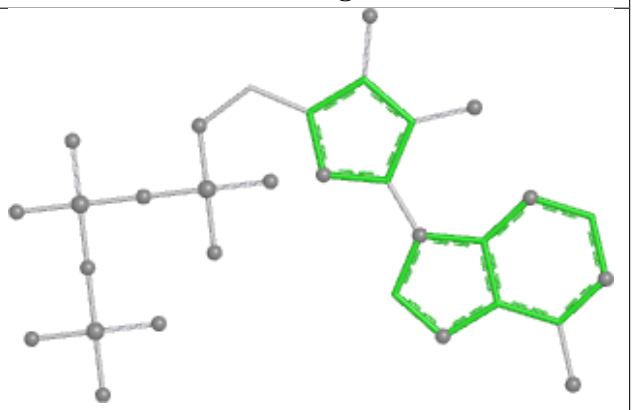
Bond lengths



Bond angles

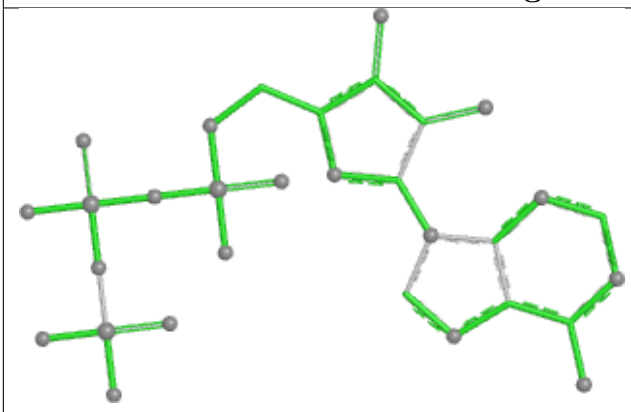


Torsions

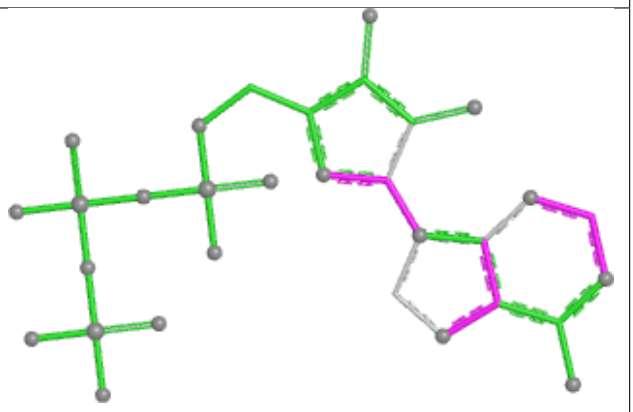


Rings

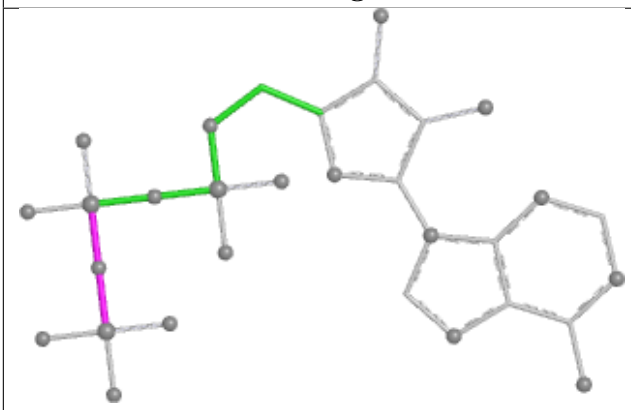
Ligand ATP D 400



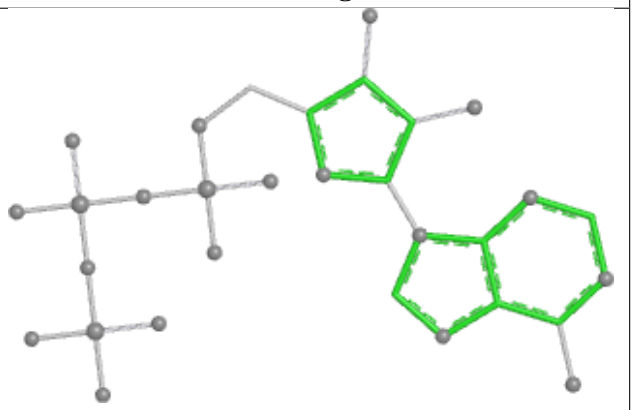
Bond lengths



Bond angles

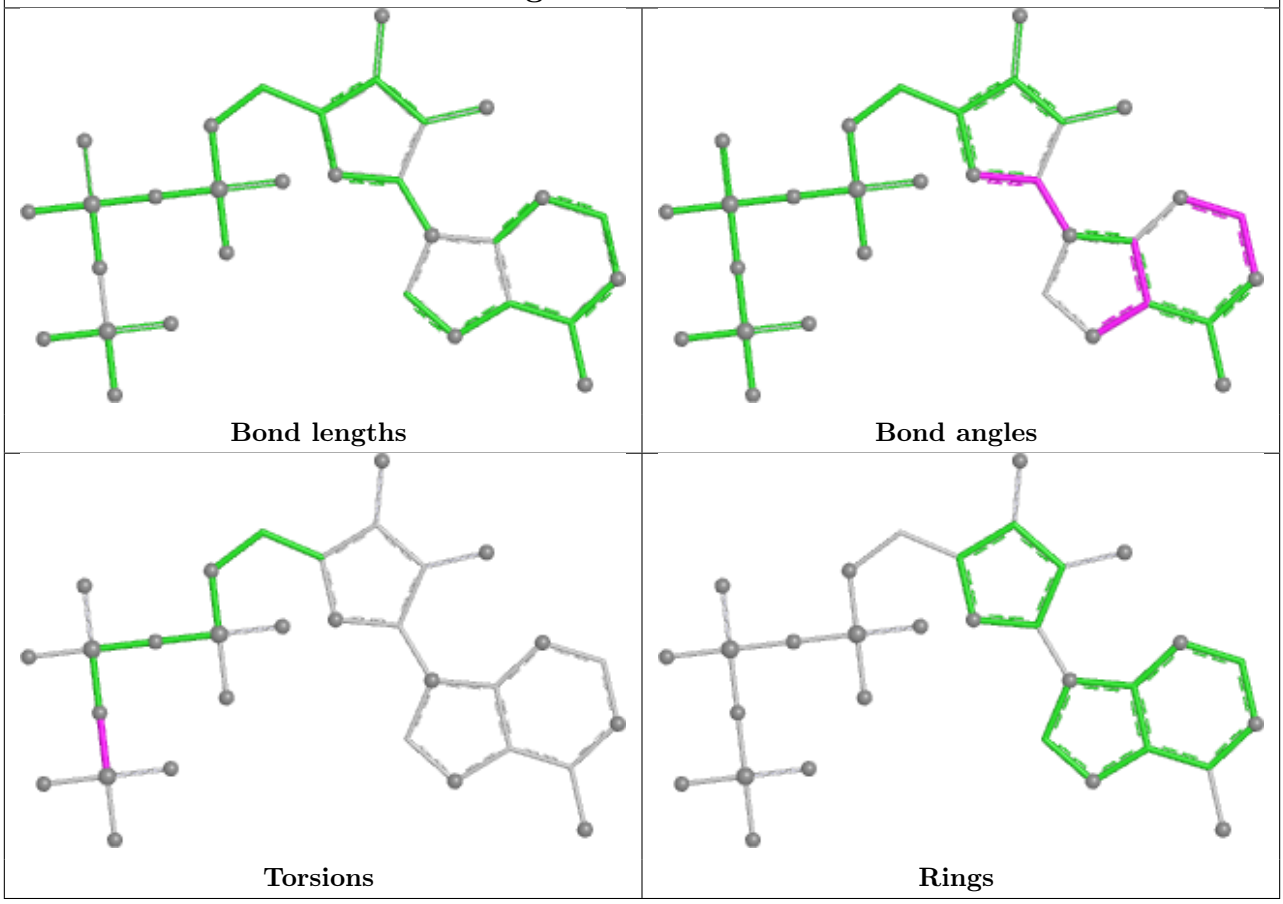


Torsions



Rings

Ligand ATP C 400



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, 95^{th} 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	376/402 (93%)	0.02	15 (3%)	38	37	29, 44, 81, 104	0
1	B	376/402 (93%)	0.15	16 (4%)	35	34	23, 39, 79, 104	0
1	C	374/402 (93%)	0.04	13 (3%)	44	43	25, 40, 71, 88	0
1	D	378/402 (94%)	-0.01	10 (2%)	56	54	24, 39, 68, 100	0
All	All	1504/1608 (93%)	0.05	54 (3%)	42	42	23, 40, 74, 104	0

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	117	ASP	7.9
1	D	117	ASP	7.8
1	B	267	ASP	6.3
1	B	277	ASP	6.0
1	D	26	ASN	5.9
1	B	268	GLN	5.2
1	B	270	ILE	4.9
1	A	277	ASP	4.9
1	A	117	ASP	4.5
1	C	118	VAL	4.5
1	C	116	ASN	4.2
1	B	280	GLU	3.8
1	A	273	VAL	3.7
1	A	276	VAL	3.6
1	B	117	ASP	3.6
1	B	262	TYR	3.6
1	B	269	ASP	3.4
1	D	118	VAL	3.3
1	D	379	VAL	3.3
1	D	24	PHE	3.2
1	B	95	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	262	TYR	3.1
1	D	380	THR	3.0
1	C	269	ASP	2.8
1	C	313	LEU	2.8
1	B	261	PHE	2.8
1	C	115	LYS	2.7
1	B	278	SER	2.7
1	D	25	HIS	2.7
1	D	4	HIS	2.6
1	C	26	ASN	2.6
1	B	119	GLN	2.6
1	D	115	LYS	2.5
1	A	295	ALA	2.5
1	B	279	ASP	2.5
1	D	114	GLU	2.4
1	A	272	THR	2.4
1	B	276	VAL	2.4
1	B	263	ASP	2.4
1	C	267	ASP	2.3
1	C	25	HIS	2.3
1	A	376	LEU	2.3
1	A	119	GLN	2.3
1	C	285	THR	2.3
1	A	314	THR	2.3
1	A	268	GLN	2.2
1	A	270	ILE	2.2
1	B	281	THR	2.2
1	C	135	LYS	2.2
1	A	267	ASP	2.2
1	A	292	PHE	2.1
1	C	31	ILE	2.1
1	C	70	ASP	2.0
1	A	281	THR	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)

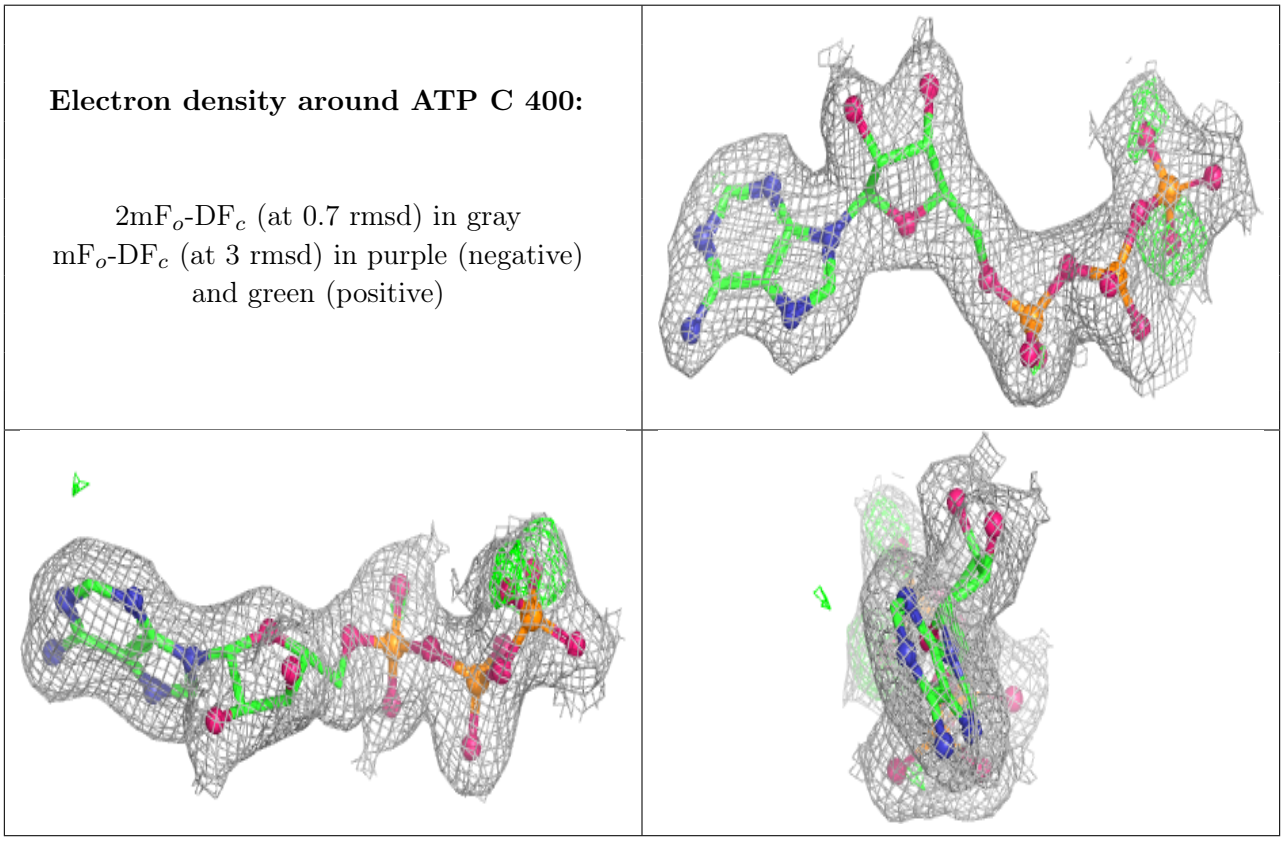
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MG	D	401	1/1	0.85	0.11	33,33,33,33	0
3	MG	C	401	1/1	0.93	0.13	35,35,35,35	0
3	MG	B	401	1/1	0.93	0.14	34,34,34,34	0
3	MG	A	401	1/1	0.94	0.07	35,35,35,35	0
2	ATP	C	400	31/31	0.96	0.13	25,31,38,42	0
2	ATP	A	400	31/31	0.97	0.11	32,38,48,49	0
2	ATP	D	400	31/31	0.97	0.13	24,29,37,57	0
2	ATP	B	400	31/31	0.97	0.14	21,34,43,44	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.

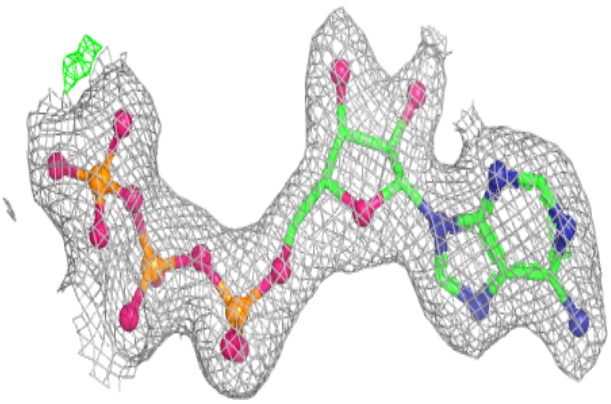
Electron density around ATP C 400:

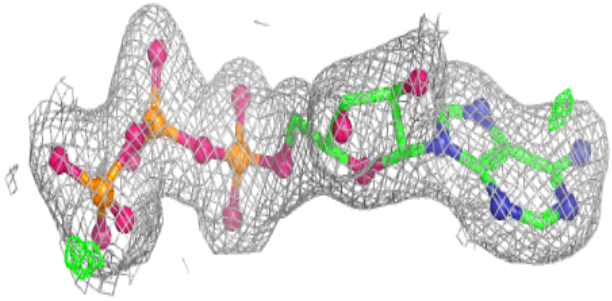
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

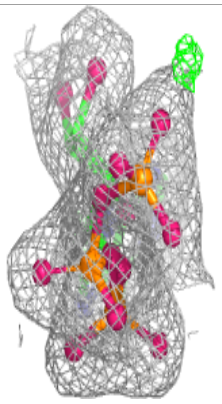


Electron density around ATP A 400:

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

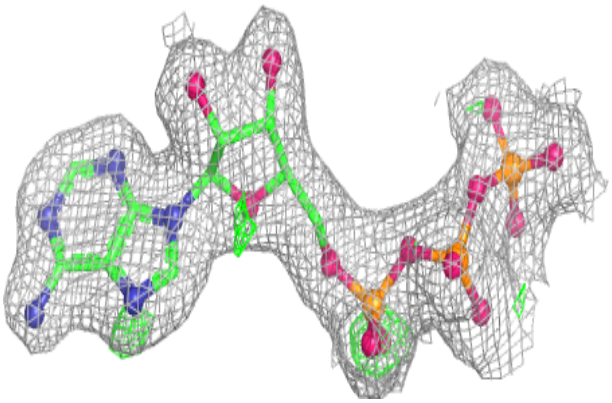


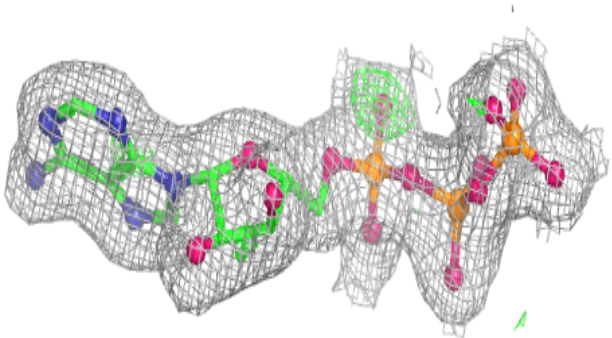


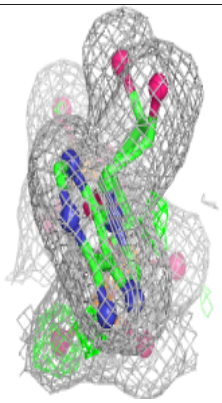


Electron density around ATP D 400:

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

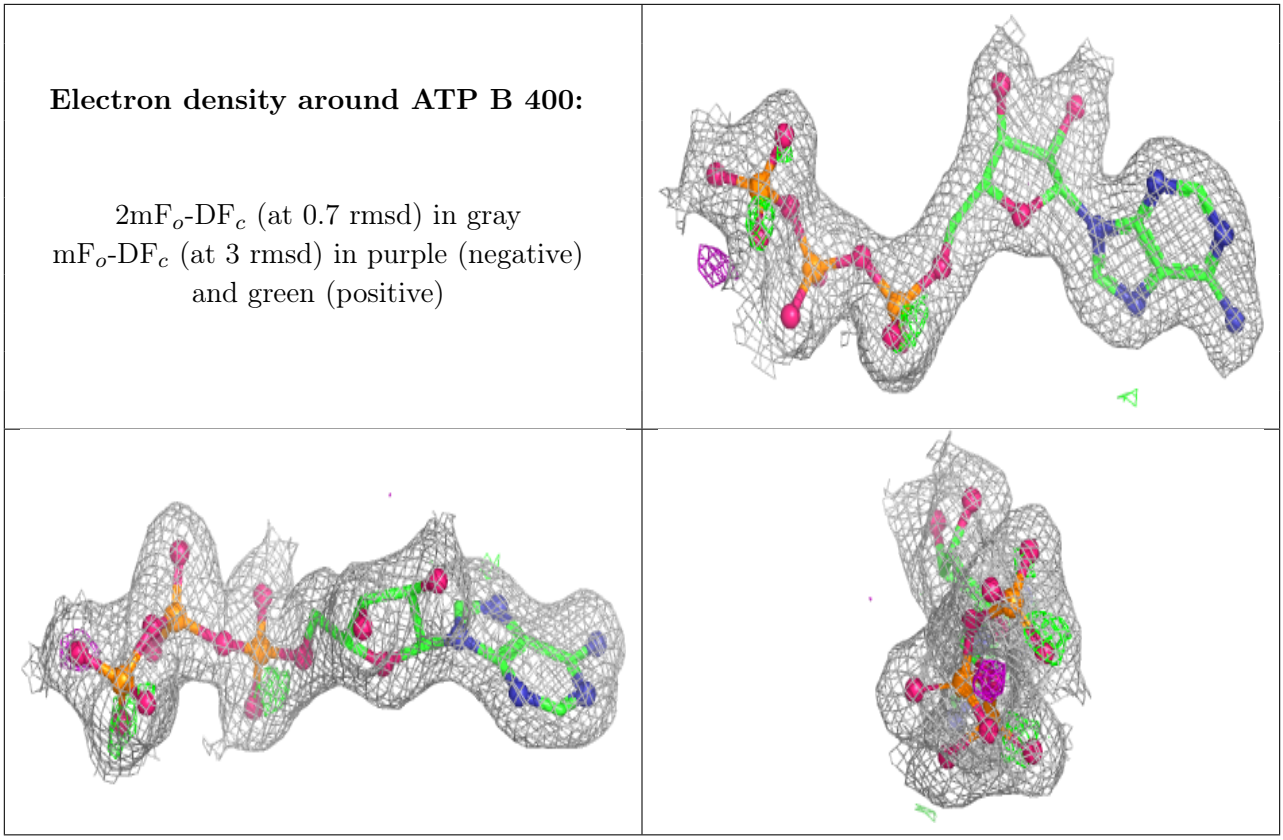






Electron density around ATP B 400:

$2mF_o$-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.