



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 21, 2020 – 01:16 PM BST

PDB ID : 6TMT
Title : Crystal structure of the chaperonin gp146 from the bacteriophage EL 2 (Pseudomonas aeruginosa) in presence of ATP-BeFx, crystal form I
Authors : Bracher, A.; Paul, S.S.; Wang, H.; Wischnewski, N.; Hartl, F.U.; Hayer-Hartl, M.
Deposited on : 2019-12-05
Resolution : 4.03 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.13.1
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) : 2.13.1

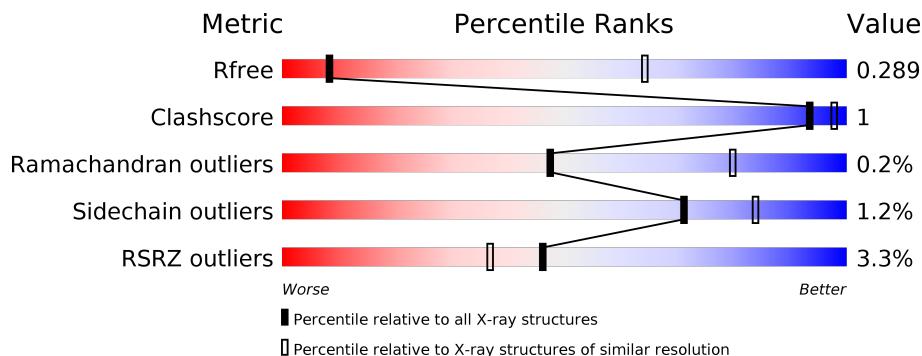
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.03 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.



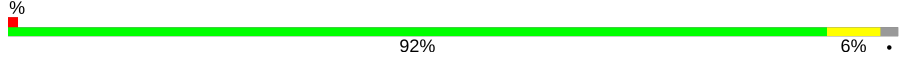
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1105 (4.38-3.70)
Clashscore	141614	1005 (4.36-3.72)
Ramachandran outliers	138981	1125 (4.38-3.70)
Sidechain outliers	138945	1115 (4.38-3.70)
RSRZ outliers	127900	1003 (4.40-3.68)

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 on 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	558	
1	B	558	
1	C	558	
1	D	558	
1	E	558	
1	F	558	

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Mol	Chain	Length	Quality of chain
1	G	558	 % 92% 6%

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	MG	B	601	-	-	-	X
2	MG	E	601	-	-	-	X
2	MG	F	601	-	-	-	X

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 29379 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.

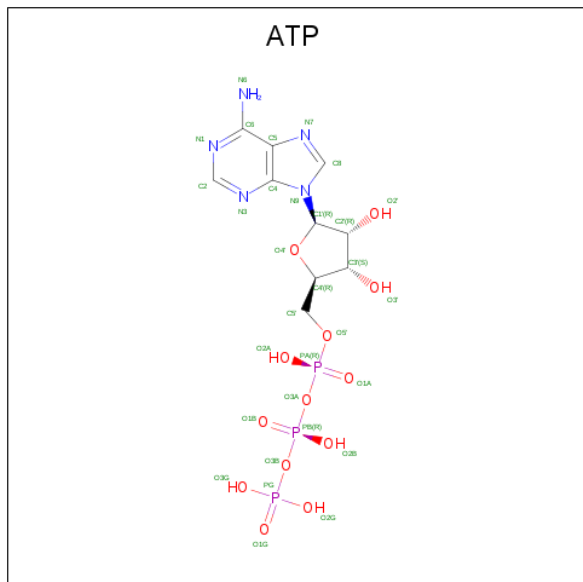
- Molecule 1 is a protein called Putative GroEL-like chaperonine protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	545	4165	2607	727	820	11	0	0	0
1	B	545	4165	2607	727	820	11	0	0	0
1	C	545	4165	2607	727	820	11	0	0	0
1	D	545	4165	2607	727	820	11	0	0	0
1	E	545	4165	2607	727	820	11	0	0	0
1	F	545	4165	2607	727	820	11	0	0	0
1	G	545	4165	2607	727	820	11	0	0	0

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	G	1	Total 1	Mg 1	0	0
2	D	1	Total 1	Mg 1	0	0
2	E	1	Total 1	Mg 1	0	0
2	B	1	Total 1	Mg 1	0	0
2	C	1	Total 1	Mg 1	0	0
2	A	1	Total 1	Mg 1	0	0
2	F	1	Total 1	Mg 1	0	0

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

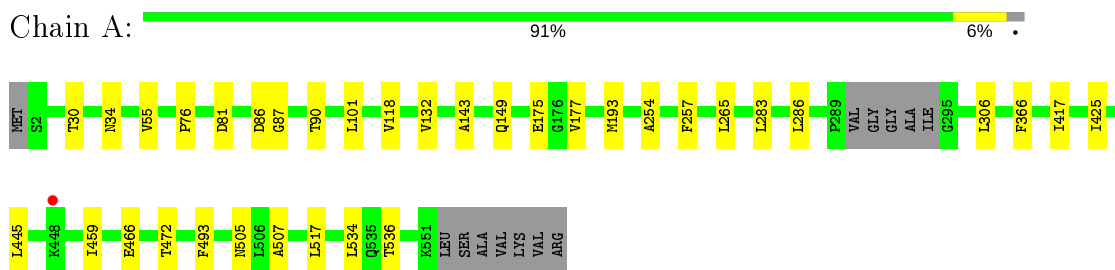


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
3	B	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
3	C	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
3	D	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
3	E	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
3	F	1	Total	C	N	O	P	0	0
		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

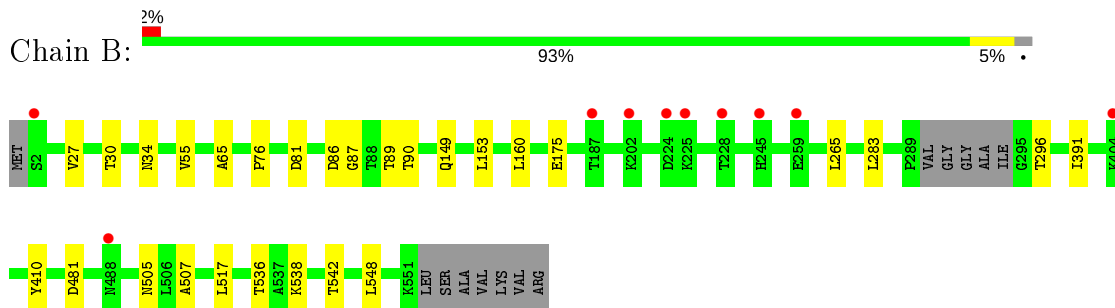
3 Residue-property plots [i](#)

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.

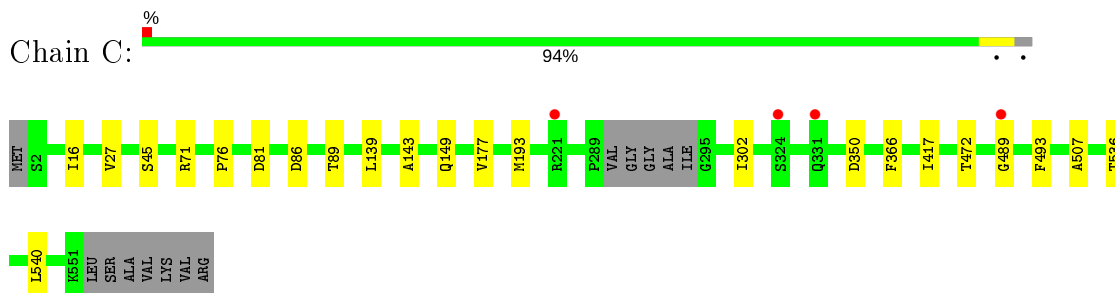
- Molecule 1: Putative GroEL-like chaperonine protein



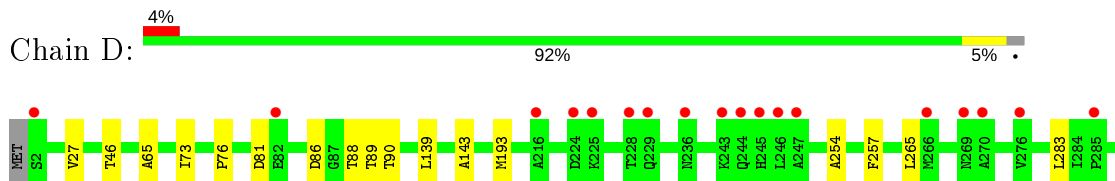
- Molecule 1: Putative GroEL-like chaperonine protein

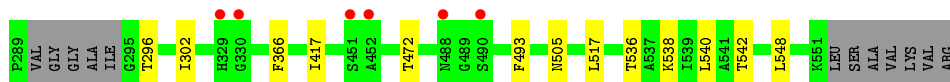


- Molecule 1: Putative GroEL-like chaperonine protein

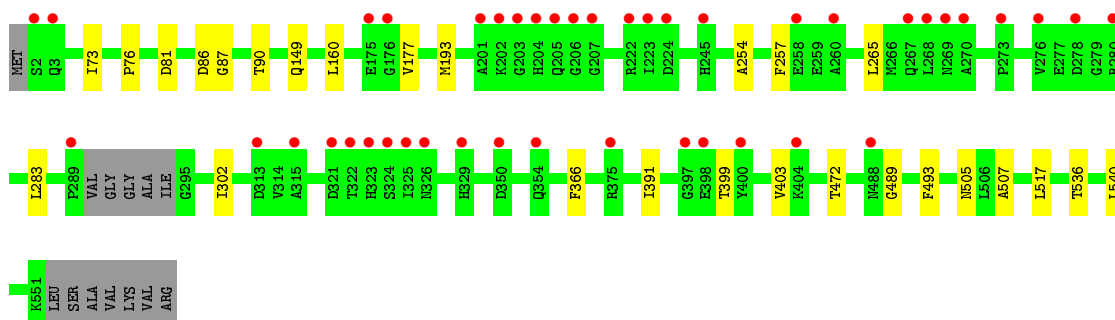
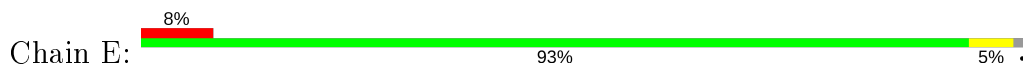


- Molecule 1: Putative GroEL-like chaperonine protein

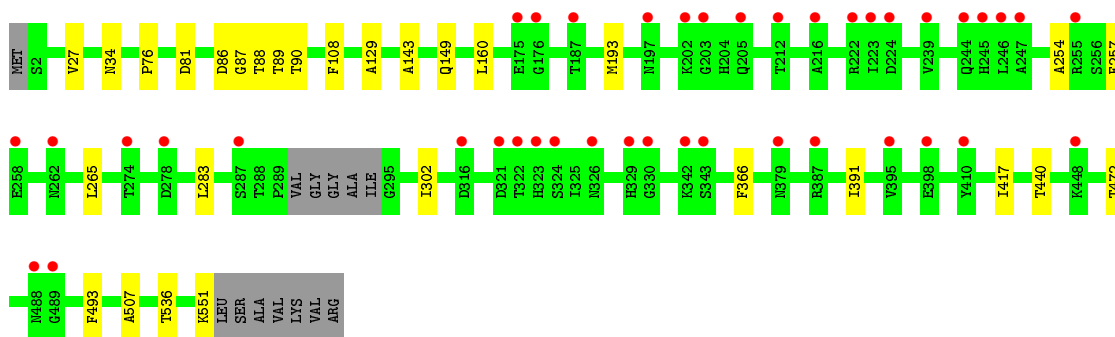
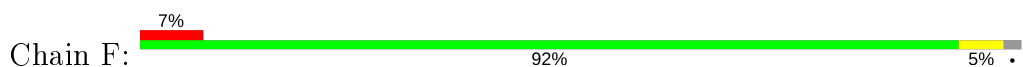




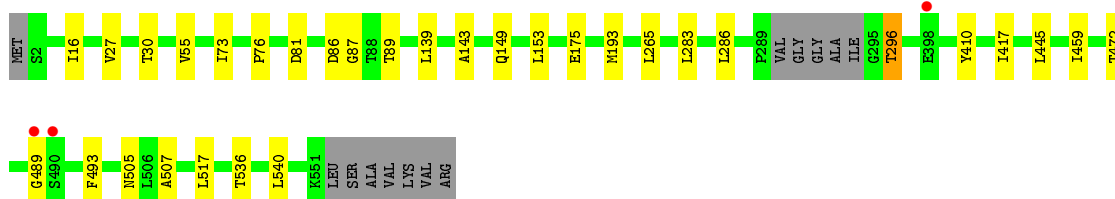
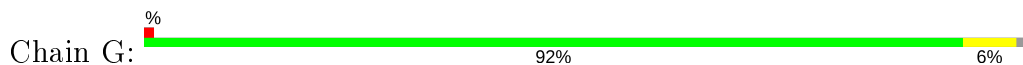
- Molecule 1: Putative GroEL-like chaperonine protein



- Molecule 1: Putative GroEL-like chaperonine protein



- Molecule 1: Putative GroEL-like chaperonine protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	137.92Å 149.43Å 268.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 4.03 29.99 – 4.03	Depositor EDS
% Data completeness (in resolution range)	99.7 (30.00-4.03) 100.0 (29.99-4.03)	Depositor EDS
R_{merge}	0.34	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.66 (at 3.98Å)	Xtrriage
Refinement program	REFMAC 5.8.0155	Depositor
R, R_{free}	0.256 , 0.299 0.248 , 0.289	Depositor DCC
R_{free} test set	2214 reflections (4.76%)	wwPDB-VP
Wilson B-factor (Å ²)	124.5	Xtrriage
Anisotropy	0.266	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 82.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	29379	wwPDB-VP
Average B, all atoms (Å ²)	174.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.19% 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 [i](#)

5.1 Standard geometry [i](#)

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	0.37	0/4230	0.56	0/5743
1	B	0.38	0/4230	0.56	0/5743
1	C	0.38	0/4230	0.56	0/5743
1	D	0.38	0/4230	0.56	0/5743
1	E	0.39	0/4230	0.55	0/5743
1	F	0.39	1/4230 (0.0%)	0.55	0/5743
1	G	0.38	0/4230	0.57	0/5743
All	All	0.38	1/29610 (0.0%)	0.56	0/40201

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

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

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	551	LYS	C-O	6.52	1.35	1.23

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	F	108	PHE	Peptide

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	4165	0	4079	15	0
1	B	4165	0	4079	12	0
1	C	4165	0	4079	10	0
1	D	4165	0	4079	14	0
1	E	4165	0	4079	11	0
1	F	4165	0	4079	9	0
1	G	4165	0	4079	16	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
2	G	1	0	0	0	0
3	A	31	0	12	0	0
3	B	31	0	12	0	0
3	C	31	0	12	0	0
3	D	31	0	12	0	0
3	E	31	0	12	0	0
3	F	31	0	12	0	0
3	G	31	0	12	0	0
All	All	29379	0	28637	83	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 (83) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:177:VAL:HG21	1:G:296:THR:HG23	1.58	0.85
1:D:296:THR:HG23	1:E:177:VAL:HG21	1.79	0.65
1:E:149:GLN:HG3	1:E:507:ALA:HB2	1.82	0.61
1:F:265:LEU:HD22	1:F:283:LEU:HD21	1.85	0.59
1:B:160:LEU:HD11	1:B:391:ILE:HD13	1.86	0.58
1:A:265:LEU:HD22	1:A:283:LEU:HD21	1.86	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:143:ALA:HB2	1:F:417:ILE:HD11	1.89	0.54
1:C:27:VAL:HG12	1:C:89:THR:HG23	1.88	0.53
1:D:143:ALA:HB2	1:D:417:ILE:HD11	1.92	0.52
1:C:472:THR:HG23	1:C:493:PHE:CZ	2.44	0.52
1:D:265:LEU:HD22	1:D:283:LEU:HD21	1.91	0.52
1:A:149:GLN:HG3	1:A:507:ALA:HB2	1.91	0.51
1:E:76:PRO:HG2	1:E:536:THR:HG21	1.91	0.51
1:G:27:VAL:HG12	1:G:89:THR:HG23	1.93	0.51
1:B:76:PRO:HG2	1:B:536:THR:HG21	1.93	0.51
1:A:101:LEU:HD13	1:A:466:GLU:HG2	1.93	0.50
1:G:149:GLN:HG3	1:G:507:ALA:HB2	1.93	0.50
1:C:143:ALA:HB2	1:C:417:ILE:HD11	1.95	0.49
1:E:472:THR:HG23	1:E:493:PHE:CZ	2.48	0.49
1:C:76:PRO:HG2	1:C:536:THR:HG21	1.94	0.49
1:F:193:MET:HE1	1:F:302:ILE:HG23	1.95	0.48
1:A:143:ALA:HB2	1:A:417:ILE:HD11	1.94	0.48
1:B:296:THR:HG23	1:C:177:VAL:HG21	1.96	0.48
1:E:265:LEU:HD22	1:E:283:LEU:HD21	1.96	0.48
1:G:505:ASN:HB2	1:G:517:LEU:HD13	1.95	0.48
1:G:472:THR:HG23	1:G:493:PHE:CZ	2.49	0.47
1:E:505:ASN:HB2	1:E:517:LEU:HD13	1.97	0.47
1:B:505:ASN:HB2	1:B:517:LEU:HD13	1.95	0.47
1:B:265:LEU:HD22	1:B:283:LEU:HD21	1.96	0.47
1:B:27:VAL:HG12	1:B:89:THR:HG23	1.95	0.47
1:D:505:ASN:HB2	1:D:517:LEU:HD13	1.96	0.47
1:D:76:PRO:HG2	1:D:536:THR:HG21	1.96	0.47
1:D:73:ILE:HG12	1:D:540:LEU:HD11	1.97	0.47
1:C:149:GLN:HG3	1:C:507:ALA:HB2	1.96	0.47
1:D:27:VAL:HG12	1:D:89:THR:HG23	1.98	0.46
1:F:160:LEU:HD11	1:F:391:ILE:HD13	1.98	0.46
1:B:149:GLN:HG3	1:B:507:ALA:HB2	1.98	0.46
1:D:65:ALA:HA	1:D:548:LEU:HD21	1.98	0.46
1:G:76:PRO:HG2	1:G:536:THR:HG21	1.97	0.46
1:A:445:LEU:HD13	1:A:459:ILE:CD1	2.46	0.45
1:F:472:THR:HG23	1:F:493:PHE:CZ	2.51	0.45
1:E:254:ALA:HB3	1:E:257:PHE:CE2	2.51	0.45
1:B:30:THR:HG21	1:B:55:VAL:HG21	1.99	0.45
1:D:254:ALA:HB3	1:D:257:PHE:CE2	2.52	0.45
1:F:76:PRO:HG2	1:F:536:THR:HG21	1.98	0.45
1:A:76:PRO:HG2	1:A:536:THR:HG21	1.99	0.44
1:B:153:LEU:HD13	1:B:410:TYR:CZ	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:65:ALA:HA	1:B:548:LEU:HD21	1.98	0.44
1:G:153:LEU:HD13	1:G:410:TYR:CE2	2.53	0.44
1:D:538:LYS:O	1:D:542:THR:HG22	2.17	0.44
1:E:193:MET:HE1	1:E:302:ILE:HG23	1.99	0.44
1:G:265:LEU:HD22	1:G:283:LEU:HD21	1.99	0.44
1:D:472:THR:HG23	1:D:493:PHE:CZ	2.52	0.44
1:E:160:LEU:HD11	1:E:391:ILE:HD13	1.99	0.43
1:F:254:ALA:HB3	1:F:257:PHE:CE2	2.53	0.43
1:A:472:THR:HG23	1:A:493:PHE:CZ	2.52	0.43
1:A:505:ASN:HB2	1:A:517:LEU:HD13	1.99	0.43
1:G:153:LEU:HD13	1:G:410:TYR:CZ	2.54	0.43
1:C:139:LEU:HD22	1:C:417:ILE:HG23	2.01	0.43
1:D:139:LEU:HD22	1:D:417:ILE:HG23	2.01	0.43
1:G:30:THR:HG21	1:G:55:VAL:HG21	2.00	0.43
1:G:73:ILE:HG12	1:G:540:LEU:HD11	2.01	0.42
1:A:30:THR:HG21	1:A:55:VAL:HG21	2.02	0.42
1:G:193:MET:SD	1:G:286:LEU:HD13	2.59	0.42
1:A:193:MET:HE1	1:A:306:LEU:HD11	2.01	0.42
1:C:16:ILE:HG23	1:C:540:LEU:HD22	2.01	0.42
1:C:71:ARG:NH1	1:D:46:THR:OG1	2.52	0.42
1:A:132:VAL:HG21	1:A:425:ILE:HD12	2.02	0.41
1:C:193:MET:HE1	1:C:302:ILE:HG23	2.00	0.41
1:F:149:GLN:HG3	1:F:507:ALA:HB2	2.01	0.41
1:B:153:LEU:HD13	1:B:410:TYR:CE2	2.55	0.41
1:A:193:MET:SD	1:A:286:LEU:HD13	2.60	0.41
1:A:118:VAL:HG11	1:A:534:LEU:HD13	2.02	0.41
1:D:193:MET:HE1	1:D:302:ILE:HG23	2.03	0.41
1:G:139:LEU:HD22	1:G:417:ILE:HG23	2.03	0.41
1:E:399:THR:O	1:E:403:VAL:HG23	2.21	0.41
1:E:73:ILE:HG12	1:E:540:LEU:HD11	2.03	0.40
1:G:445:LEU:HD22	1:G:459:ILE:CD1	2.52	0.40
1:F:27:VAL:HG12	1:F:89:THR:HG23	2.03	0.40
1:A:254:ALA:HB3	1:A:257:PHE:CE2	2.57	0.40
1:B:538:LYS:O	1:B:542:THR:HG22	2.21	0.40
1:G:16:ILE:HG23	1:G:540:LEU:HD22	2.04	0.40
1:G:143:ALA:HB2	1:G:417:ILE:HD11	2.03	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	541/558 (97%)	510 (94%)	30 (6%)	1 (0%)	47	80
1	B	541/558 (97%)	508 (94%)	32 (6%)	1 (0%)	47	80
1	C	541/558 (97%)	511 (94%)	29 (5%)	1 (0%)	47	80
1	D	541/558 (97%)	514 (95%)	27 (5%)	0	100	100
1	E	541/558 (97%)	513 (95%)	26 (5%)	2 (0%)	34	71
1	F	541/558 (97%)	509 (94%)	30 (6%)	2 (0%)	34	71
1	G	541/558 (97%)	513 (95%)	26 (5%)	2 (0%)	34	71
All	All	3787/3906 (97%)	3578 (94%)	200 (5%)	9 (0%)	47	80

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	489	GLY
1	E	489	GLY
1	G	489	GLY
1	F	129	ALA
1	B	87	GLY
1	E	87	GLY
1	G	87	GLY
1	A	87	GLY
1	F	87	GLY

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	443/473 (94%)	437 (99%)	6 (1%)	67	81
1	B	443/473 (94%)	437 (99%)	6 (1%)	67	81
1	C	443/473 (94%)	438 (99%)	5 (1%)	73	85
1	D	443/473 (94%)	438 (99%)	5 (1%)	73	85
1	E	443/473 (94%)	439 (99%)	4 (1%)	78	88
1	F	443/473 (94%)	436 (98%)	7 (2%)	62	79
1	G	443/473 (94%)	439 (99%)	4 (1%)	78	88
All	All	3101/3311 (94%)	3064 (99%)	37 (1%)	71	84

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

Mol	Chain	Res	Type
1	A	34	ASN
1	A	81	ASP
1	A	86	ASP
1	A	90	THR
1	A	175	GLU
1	A	366	PHE
1	B	34	ASN
1	B	81	ASP
1	B	86	ASP
1	B	90	THR
1	B	175	GLU
1	B	481	ASP
1	C	45	SER
1	C	81	ASP
1	C	86	ASP
1	C	350	ASP
1	C	366	PHE
1	D	81	ASP
1	D	86	ASP
1	D	88	THR
1	D	90	THR
1	D	366	PHE
1	E	81	ASP
1	E	86	ASP
1	E	90	THR
1	E	366	PHE
1	F	34	ASN
1	F	81	ASP
1	F	86	ASP

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Mol	Chain	Res	Type
1	F	88	THR
1	F	90	THR
1	F	366	PHE
1	F	440	THR
1	G	81	ASP
1	G	86	ASP
1	G	175	GLU
1	G	296	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	337	ASN
1	A	475	HIS
1	C	474	GLN
1	D	474	GLN
1	E	474	GLN
1	F	474	GLN
1	F	475	HIS
1	G	474	GLN
1	G	475	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](#)

Of 14 ligands modelled in this entry, 7 are monoatomic - leaving 7 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	E	602	-	26,33,33	0.98	1 (3%)	31,52,52	1.39	5 (16%)
3	ATP	B	602	-	26,33,33	0.93	1 (3%)	31,52,52	1.50	7 (22%)
3	ATP	D	602	-	26,33,33	0.95	1 (3%)	31,52,52	1.41	5 (16%)
3	ATP	F	602	-	26,33,33	0.97	1 (3%)	31,52,52	1.36	3 (9%)
3	ATP	A	602	-	26,33,33	0.91	1 (3%)	31,52,52	1.36	4 (12%)
3	ATP	G	600	2	26,33,33	0.96	1 (3%)	31,52,52	1.47	6 (19%)
3	ATP	C	602	-	26,33,33	0.95	1 (3%)	31,52,52	1.34	5 (16%)

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	E	602	-	-	4/18/38/38	0/3/3/3
3	ATP	B	602	-	-	2/18/38/38	0/3/3/3
3	ATP	D	602	-	-	5/18/38/38	0/3/3/3
3	ATP	F	602	-	-	7/18/38/38	0/3/3/3
3	ATP	A	602	-	-	6/18/38/38	0/3/3/3
3	ATP	G	600	2	-	4/18/38/38	0/3/3/3
3	ATP	C	602	-	-	5/18/38/38	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	602	ATP	C5-C4	2.51	1.47	1.40
3	G	600	ATP	C5-C4	2.51	1.47	1.40
3	C	602	ATP	C5-C4	2.50	1.47	1.40
3	D	602	ATP	C5-C4	2.48	1.47	1.40
3	B	602	ATP	C5-C4	2.45	1.47	1.40
3	F	602	ATP	C5-C4	2.42	1.47	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	602	ATP	C5-C4	2.36	1.47	1.40

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	602	ATP	N3-C2-N1	-4.24	122.05	128.68
3	F	602	ATP	N3-C2-N1	-4.02	122.39	128.68
3	G	600	ATP	N3-C2-N1	-3.85	122.66	128.68
3	B	602	ATP	N3-C2-N1	-3.83	122.69	128.68
3	A	602	ATP	N3-C2-N1	-3.76	122.80	128.68
3	E	602	ATP	N3-C2-N1	-3.76	122.81	128.68
3	C	602	ATP	N3-C2-N1	-3.59	123.07	128.68
3	G	600	ATP	C4-C5-N7	-3.30	105.96	109.40
3	F	602	ATP	C4-C5-N7	-3.02	106.25	109.40
3	B	602	ATP	C1'-N9-C4	-2.99	121.39	126.64
3	E	602	ATP	C4-C5-N7	-2.97	106.30	109.40
3	B	602	ATP	C4-C5-N7	-2.96	106.32	109.40
3	G	600	ATP	PA-O3A-PB	-2.88	122.94	132.83
3	B	602	ATP	PB-O3B-PG	-2.85	123.05	132.83
3	E	602	ATP	C1'-N9-C4	-2.66	121.97	126.64
3	D	602	ATP	C4-C5-N7	-2.66	106.63	109.40
3	A	602	ATP	C4-C5-N7	-2.62	106.67	109.40
3	C	602	ATP	C4-C5-N7	-2.62	106.67	109.40
3	B	602	ATP	PA-O3A-PB	-2.54	124.11	132.83
3	A	602	ATP	C1'-N9-C4	-2.49	122.26	126.64
3	A	602	ATP	PA-O3A-PB	-2.47	124.36	132.83
3	G	600	ATP	C1'-N9-C4	-2.40	122.42	126.64
3	F	602	ATP	C1'-N9-C4	-2.39	122.44	126.64
3	B	602	ATP	O3G-PG-O2G	2.32	116.52	107.64
3	D	602	ATP	C2-N1-C6	2.25	122.59	118.75
3	D	602	ATP	C1'-N9-C4	-2.25	122.70	126.64
3	E	602	ATP	PA-O3A-PB	-2.17	125.37	132.83
3	C	602	ATP	C1'-N9-C4	-2.17	122.83	126.64
3	D	602	ATP	PA-O3A-PB	-2.16	125.41	132.83
3	G	600	ATP	PB-O3B-PG	-2.10	125.63	132.83
3	B	602	ATP	C2-N1-C6	2.06	122.27	118.75
3	C	602	ATP	PA-O3A-PB	-2.05	125.79	132.83
3	G	600	ATP	C2-N1-C6	2.03	122.23	118.75
3	C	602	ATP	C2-N1-C6	2.02	122.21	118.75
3	E	602	ATP	C2-N1-C6	2.01	122.19	118.75

There are no chirality outliers.

All (33) torsion outliers are listed below:

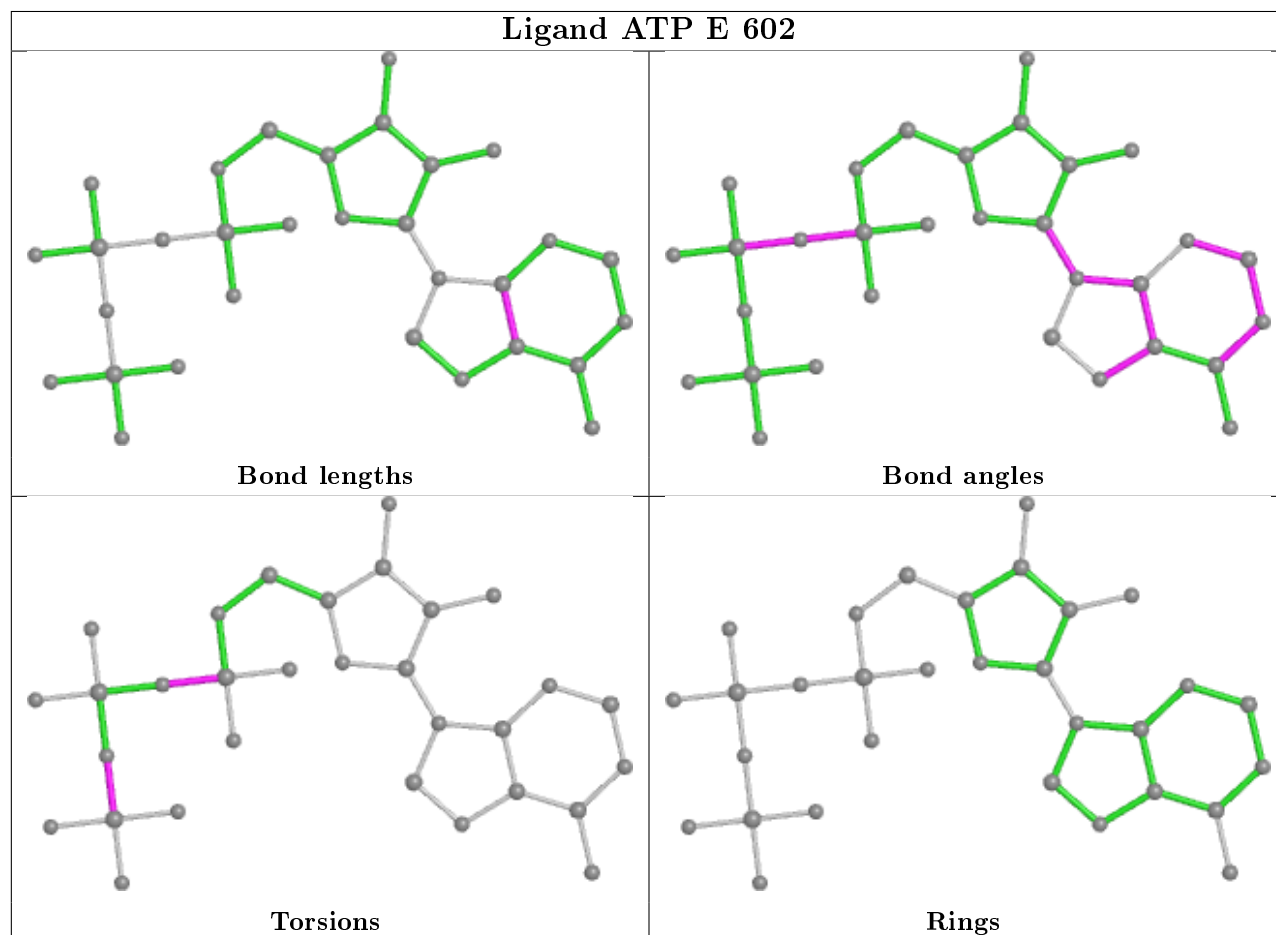
Mol	Chain	Res	Type	Atoms
3	D	602	ATP	C5'-O5'-PA-O2A
3	F	602	ATP	PB-O3B-PG-O3G
3	A	602	ATP	PB-O3B-PG-O2G
3	A	602	ATP	PB-O3B-PG-O3G
3	G	600	ATP	C5'-O5'-PA-O1A
3	G	600	ATP	C5'-O5'-PA-O2A
3	E	602	ATP	PB-O3B-PG-O3G
3	C	602	ATP	PB-O3B-PG-O3G
3	G	600	ATP	C3'-C4'-C5'-O5'
3	E	602	ATP	PB-O3A-PA-O1A
3	D	602	ATP	PB-O3B-PG-O3G
3	C	602	ATP	PB-O3B-PG-O2G
3	D	602	ATP	C5'-O5'-PA-O3A
3	A	602	ATP	C5'-O5'-PA-O3A
3	E	602	ATP	PB-O3A-PA-O2A
3	F	602	ATP	PB-O3A-PA-O1A
3	F	602	ATP	PB-O3A-PA-O2A
3	F	602	ATP	PB-O3B-PG-O1G
3	C	602	ATP	PB-O3B-PG-O1G
3	D	602	ATP	PB-O3B-PG-O2G
3	F	602	ATP	PB-O3B-PG-O2G
3	E	602	ATP	PB-O3B-PG-O2G
3	G	600	ATP	C5'-O5'-PA-O3A
3	C	602	ATP	C5'-O5'-PA-O3A
3	B	602	ATP	PB-O3A-PA-O1A
3	B	602	ATP	PB-O3A-PA-O2A
3	F	602	ATP	PA-O3A-PB-O1B
3	F	602	ATP	PA-O3A-PB-O2B
3	A	602	ATP	PA-O3A-PB-O1B
3	C	602	ATP	PA-O3A-PB-O1B
3	D	602	ATP	C5'-O5'-PA-O1A
3	A	602	ATP	C5'-O5'-PA-O1A
3	A	602	ATP	C3'-C4'-C5'-O5'

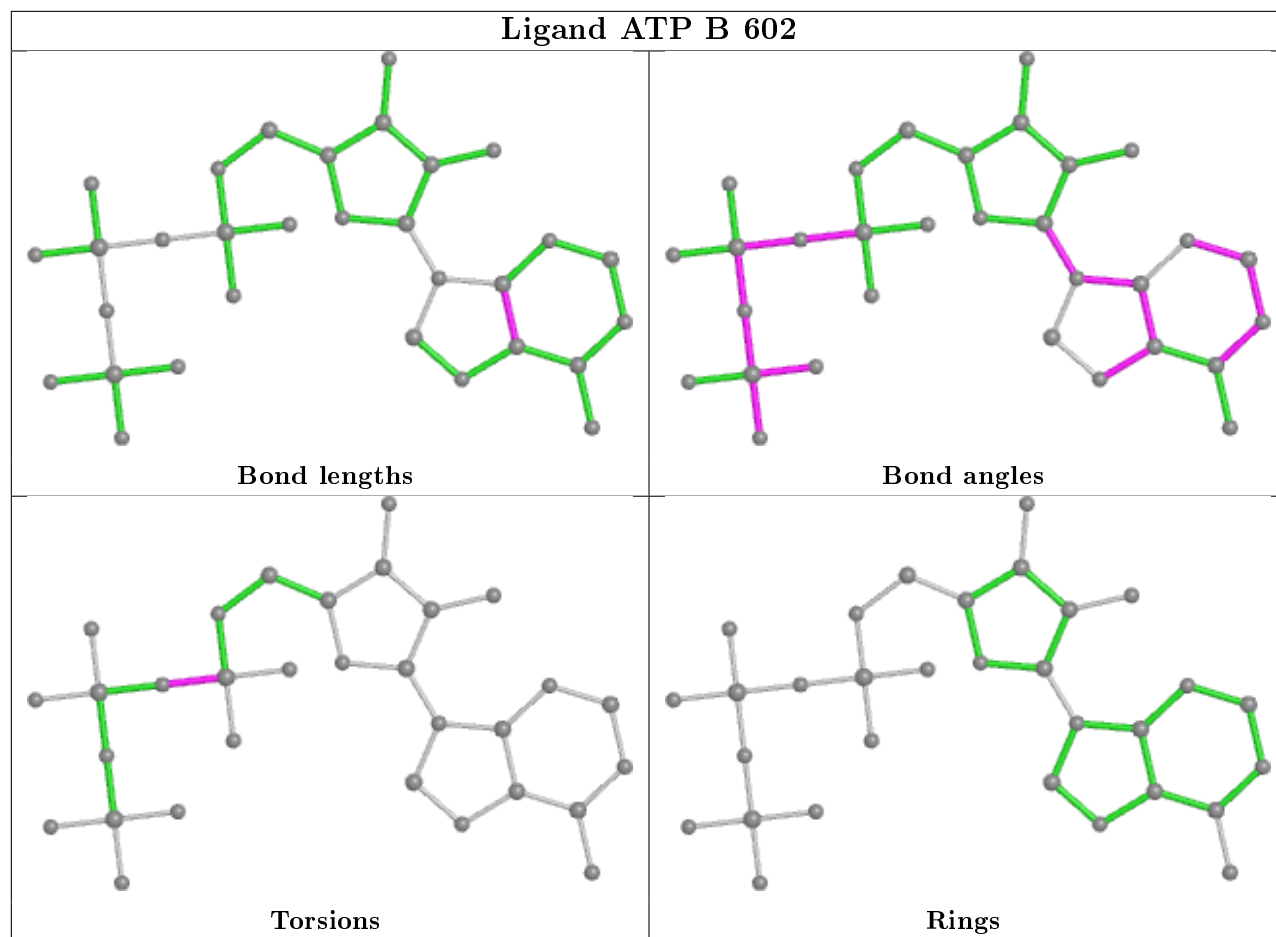
There are no ring outliers.

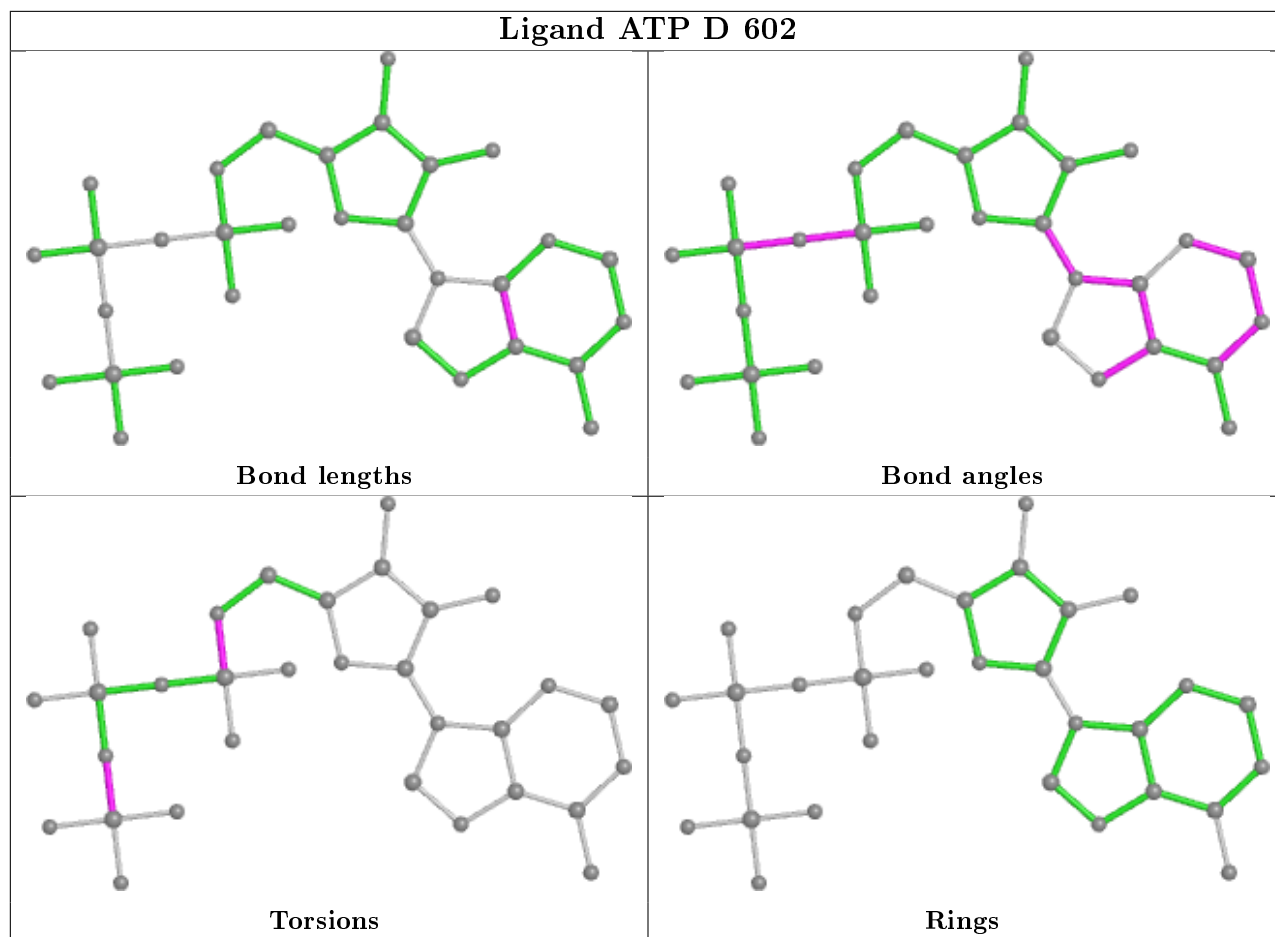
No monomer is involved in short contacts.

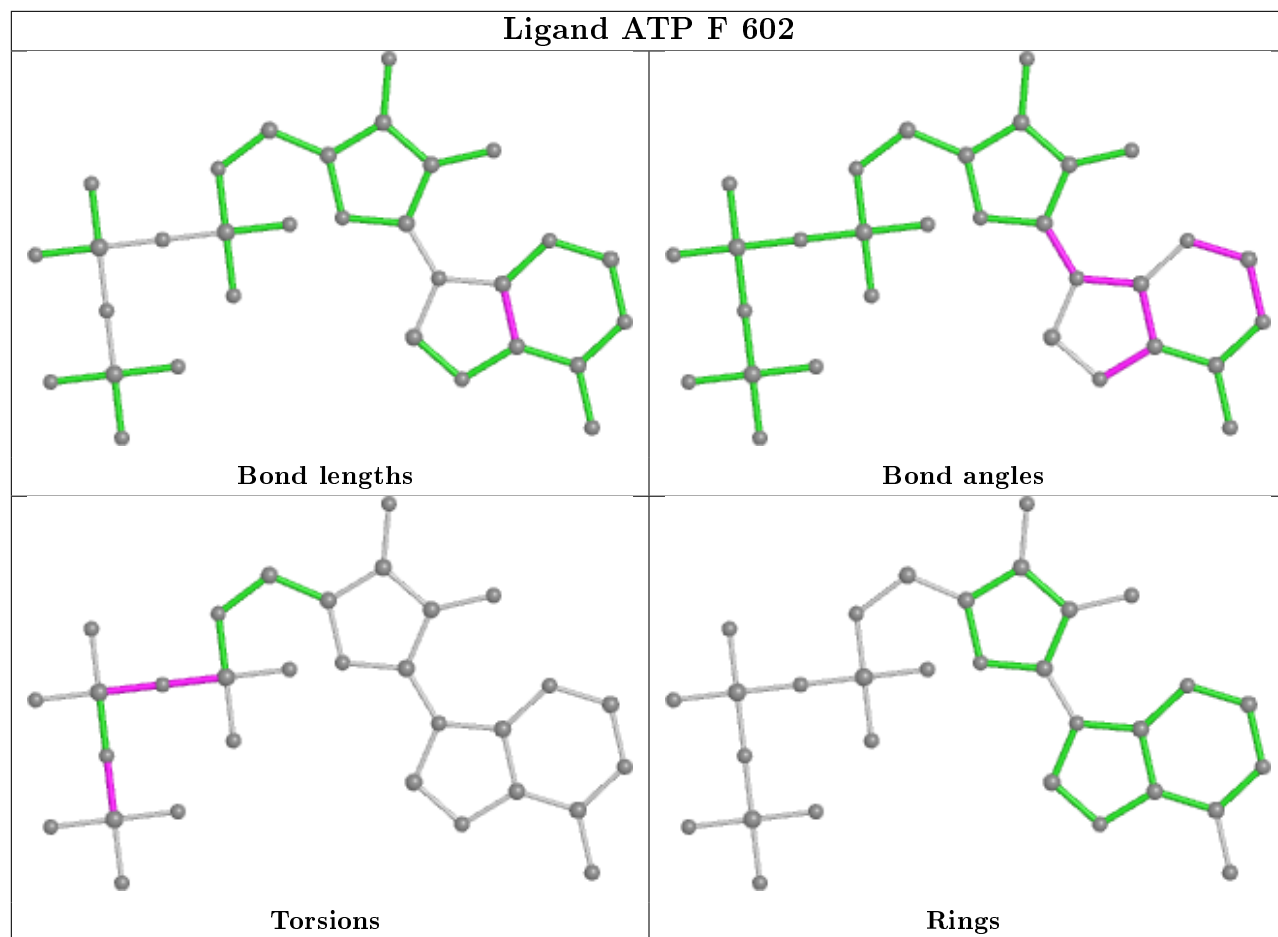
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

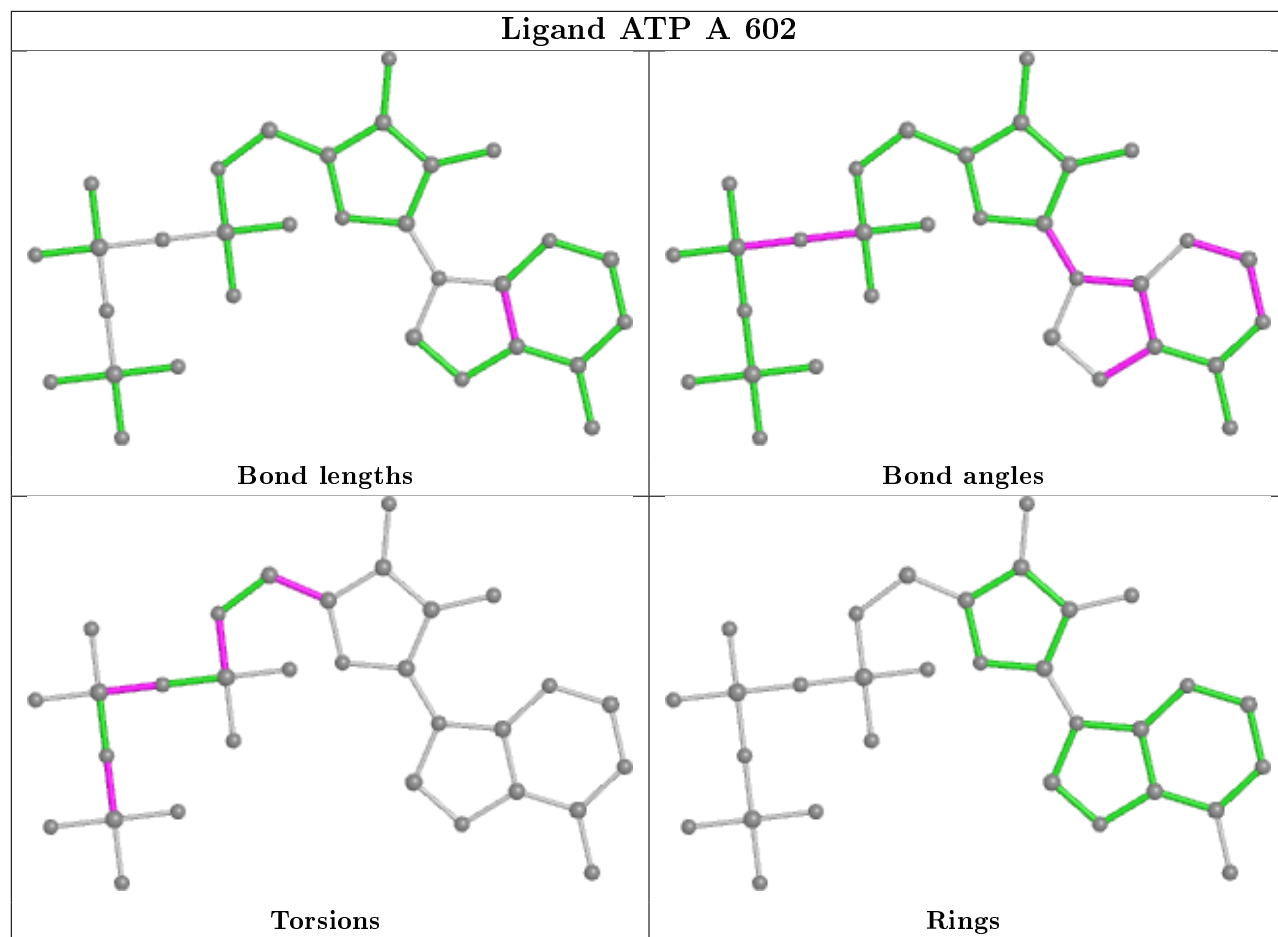
Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD 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.

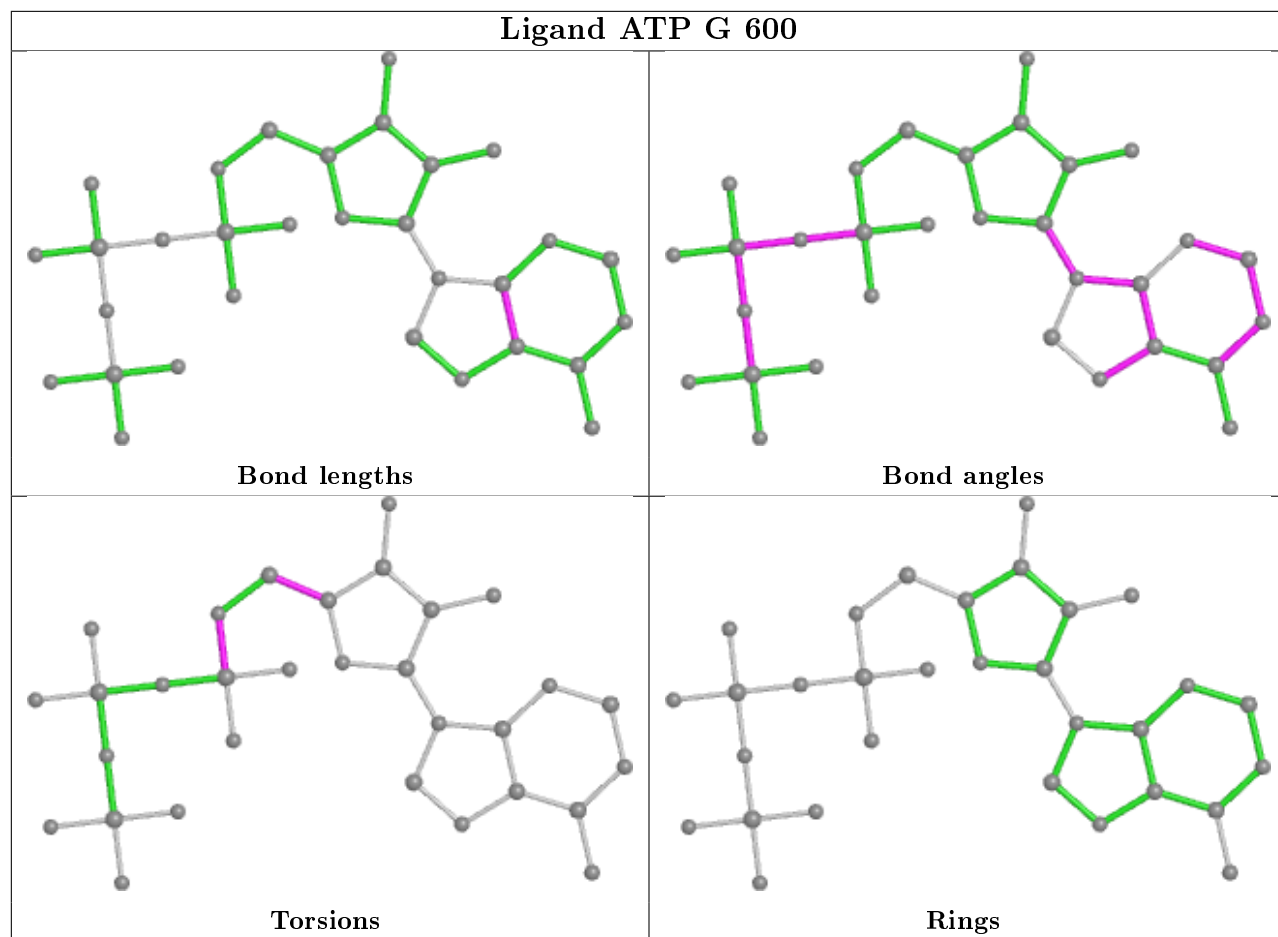


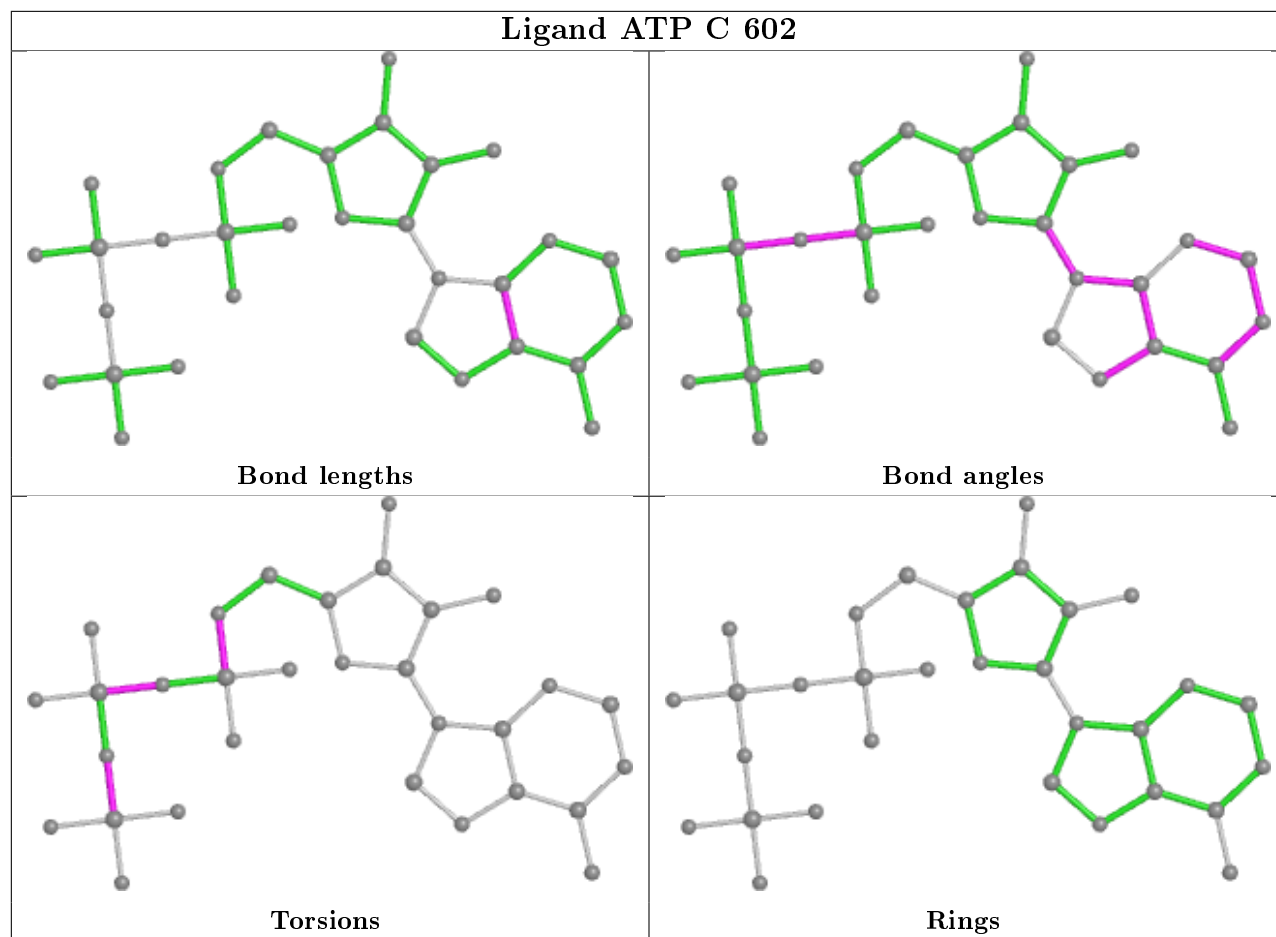












5.7 Other polymers [i](#)

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	545/558 (97%)	-0.29	1 (0%) 95 93	87, 139, 184, 216	0
1	B	545/558 (97%)	-0.10	10 (1%) 68 60	94, 152, 272, 313	0
1	C	545/558 (97%)	-0.24	4 (0%) 87 82	96, 159, 241, 276	0
1	D	545/558 (97%)	0.10	24 (4%) 34 28	96, 166, 316, 341	0
1	E	545/558 (97%)	0.20	43 (7%) 12 11	97, 180, 365, 401	0
1	F	545/558 (97%)	0.20	41 (7%) 14 12	98, 176, 356, 393	0
1	G	545/558 (97%)	-0.28	3 (0%) 89 84	95, 153, 216, 244	0
All	All	3815/3906 (97%)	-0.06	126 (3%) 46 37	87, 155, 317, 401	0

All (126) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	329	HIS	7.3
1	E	324	SER	6.0
1	E	321	ASP	6.0
1	B	224	ASP	5.2
1	F	258	GLU	5.0
1	F	330	GLY	4.9
1	F	323	HIS	4.8
1	E	202	LYS	4.7
1	E	203	GLY	4.7
1	F	324	SER	4.6
1	D	228	THR	4.6
1	E	322	THR	4.4
1	E	2	SER	4.4
1	E	325	ILE	4.3
1	B	259	GLU	4.3
1	D	488	ASN	4.2
1	E	269	ASN	4.1

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Mol	Chain	Res	Type	RSRZ
1	E	224	ASP	3.9
1	F	187	THR	3.9
1	F	202	LYS	3.9
1	E	488	ASN	3.8
1	F	175	GLU	3.8
1	E	276	VAL	3.7
1	D	246	LEU	3.7
1	E	270	ALA	3.6
1	E	205	GLN	3.6
1	B	488	ASN	3.6
1	E	201	ALA	3.5
1	F	247	ALA	3.5
1	D	244	GLN	3.5
1	E	289	PRO	3.5
1	F	245	HIS	3.5
1	F	262	ASN	3.4
1	E	326	ASN	3.4
1	D	245	HIS	3.3
1	E	206	GLY	3.3
1	D	329	HIS	3.3
1	E	273	PRO	3.2
1	F	322	THR	3.2
1	D	243	LYS	3.2
1	E	350	ASP	3.2
1	D	270	ALA	3.2
1	E	267	GLN	3.2
1	F	224	ASP	3.1
1	E	176	GLY	3.1
1	E	354	GLN	3.0
1	D	266	MET	3.0
1	B	225	LYS	3.0
1	D	225	LYS	3.0
1	E	245	HIS	3.0
1	E	258	GLU	3.0
1	G	490	SER	2.9
1	F	205	GLN	2.9
1	F	222	ARG	2.9
1	B	228	THR	2.8
1	E	398	GLU	2.7
1	E	278	ASP	2.7
1	E	223	ILE	2.7
1	E	204	HIS	2.7

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Mol	Chain	Res	Type	RSRZ
1	E	323	HIS	2.7
1	F	244	GLN	2.7
1	F	203	GLY	2.6
1	B	245	HIS	2.6
1	F	379	ASN	2.6
1	F	176	GLY	2.6
1	D	229	GLN	2.5
1	F	342	LYS	2.5
1	F	246	LEU	2.5
1	D	216	ALA	2.5
1	E	375	ARG	2.5
1	D	490	SER	2.5
1	B	202	LYS	2.4
1	D	269	ASN	2.4
1	E	222	ARG	2.4
1	F	239	VAL	2.4
1	F	287	SER	2.4
1	E	175	GLU	2.4
1	F	448	LYS	2.4
1	F	212	THR	2.4
1	D	330	GLY	2.4
1	B	2	SER	2.3
1	B	187	THR	2.3
1	E	315	ALA	2.3
1	E	397	GLY	2.3
1	E	260	ALA	2.3
1	D	224	ASP	2.3
1	E	280	ARG	2.3
1	F	216	ALA	2.3
1	D	2	SER	2.3
1	F	316	ASP	2.3
1	F	410	TYR	2.3
1	F	255	ARG	2.3
1	F	278	ASP	2.3
1	D	285	PRO	2.3
1	F	395	VAL	2.3
1	E	207	GLY	2.3
1	C	324	SER	2.2
1	E	268	LEU	2.2
1	C	221	ARG	2.2
1	D	82	GLU	2.2
1	E	313	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	236	ASN	2.2
1	D	247	ALA	2.2
1	D	276	VAL	2.2
1	D	452	ALA	2.2
1	E	404	LYS	2.1
1	F	326	ASN	2.1
1	C	331	GLN	2.1
1	E	400	TYR	2.1
1	C	489	GLY	2.1
1	F	489	GLY	2.1
1	G	489	GLY	2.1
1	F	343	SER	2.1
1	F	488	ASN	2.1
1	F	197	ASN	2.1
1	G	398	GLU	2.1
1	F	398	GLU	2.1
1	E	3	GLN	2.1
1	E	329	HIS	2.0
1	F	387	ARG	2.0
1	A	448	LYS	2.0
1	F	223	ILE	2.0
1	F	321	ASP	2.0
1	F	274	THR	2.0
1	D	451	SER	2.0
1	B	404	LYS	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](#)

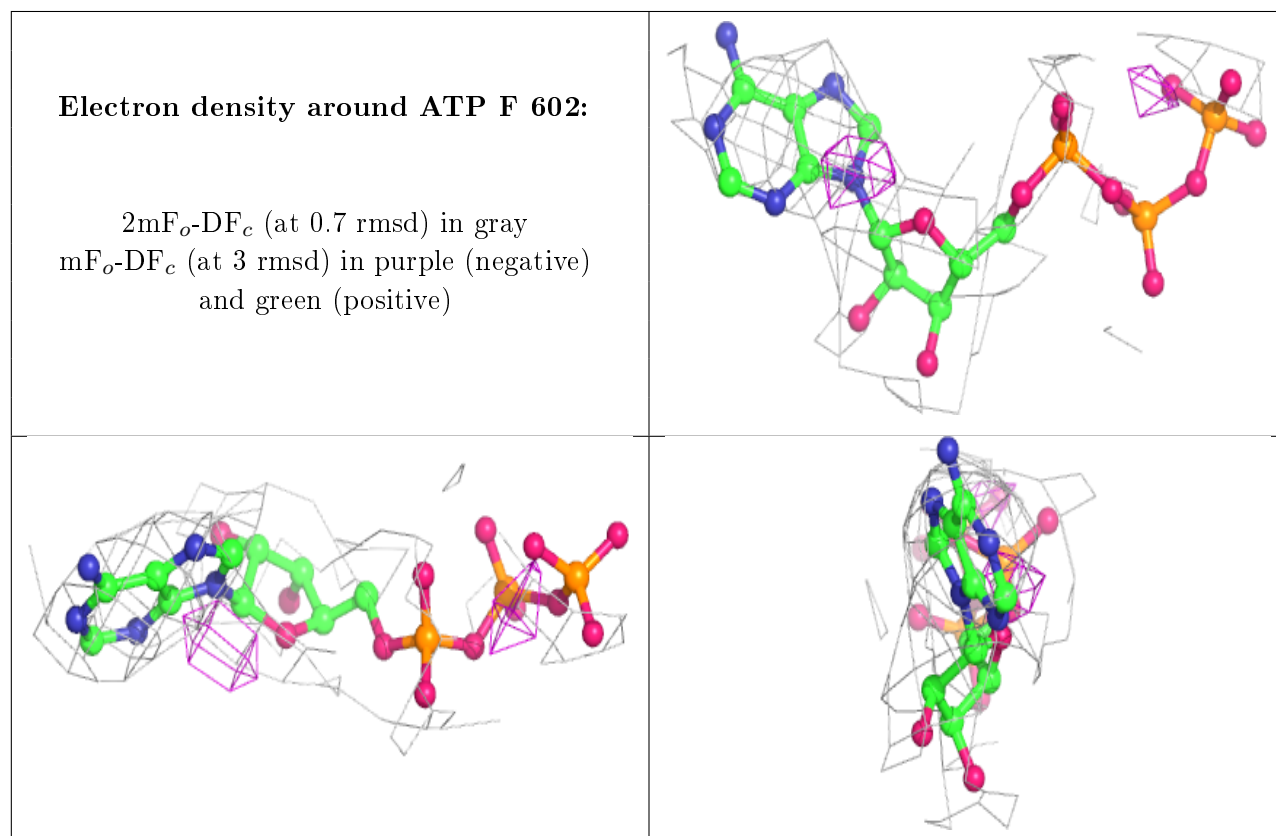
There are no monosaccharides in this entry.

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.

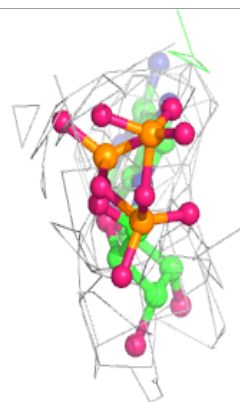
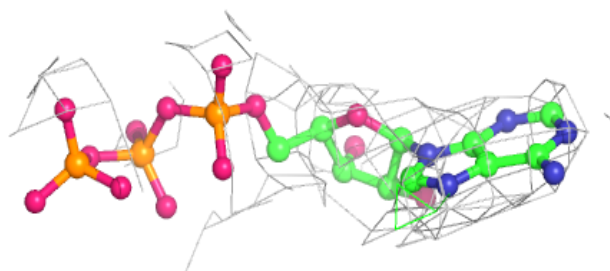
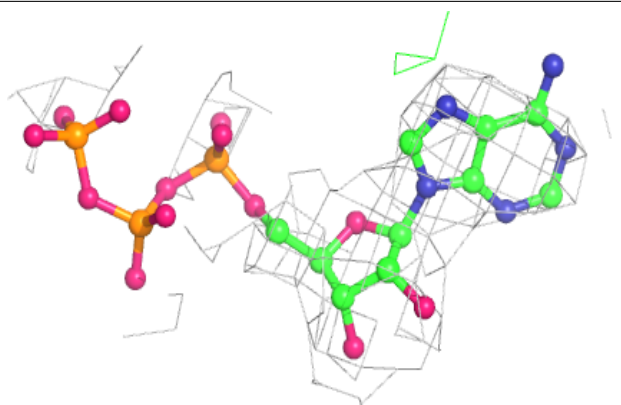
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	MG	B	601	1/1	0.67	0.50	140,140,140,140	0
2	MG	F	601	1/1	0.76	0.59	140,140,140,140	0
2	MG	D	601	1/1	0.77	0.27	127,127,127,127	0
2	MG	E	601	1/1	0.79	0.53	144,144,144,144	0
2	MG	C	601	1/1	0.84	0.57	118,118,118,118	0
3	ATP	F	602	31/31	0.85	0.42	106,117,127,132	0
3	ATP	D	602	31/31	0.87	0.32	107,112,119,123	0
2	MG	A	601	1/1	0.89	0.25	106,106,106,106	0
3	ATP	E	602	31/31	0.90	0.33	103,112,129,133	0
3	ATP	B	602	31/31	0.91	0.35	98,106,121,123	0
2	MG	G	601	1/1	0.92	0.31	129,129,129,129	0
3	ATP	C	602	31/31	0.92	0.32	101,117,132,136	0
3	ATP	A	602	31/31	0.93	0.21	101,104,111,114	0
3	ATP	G	600	31/31	0.93	0.25	94,103,109,111	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.

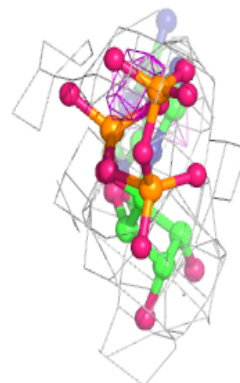
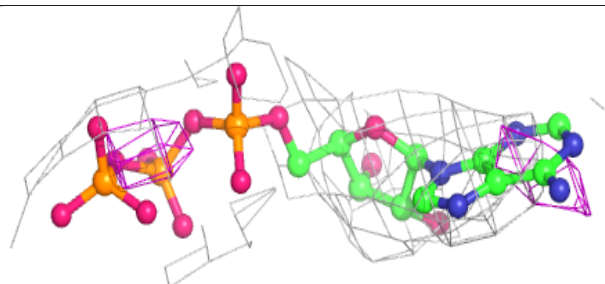
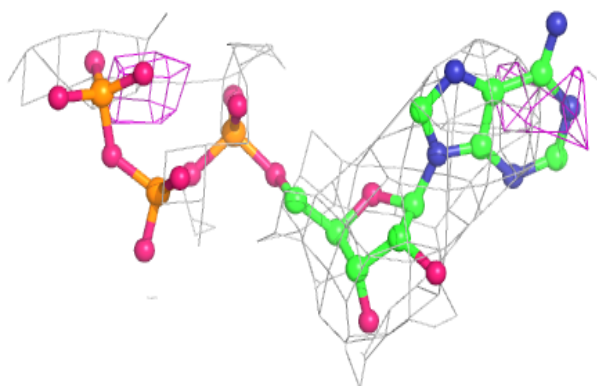


Electron density around ATP D 602:

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

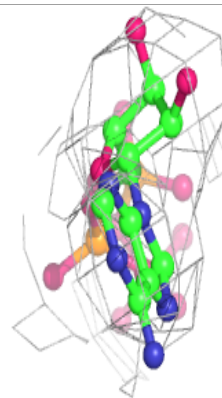
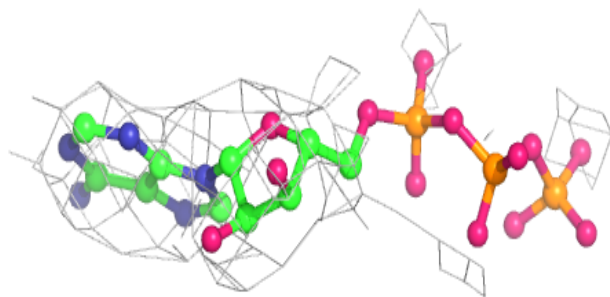
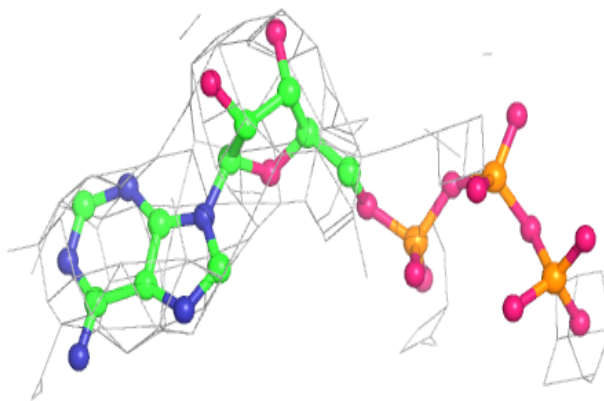
**Electron density around ATP E 602:**

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

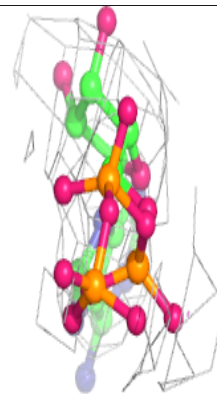
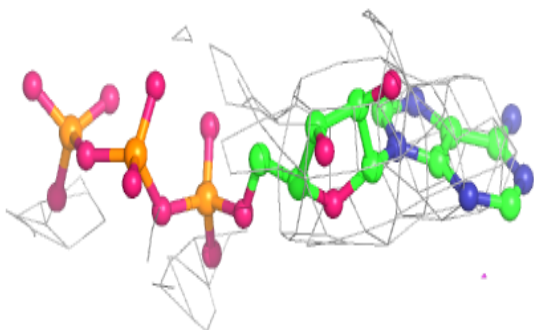
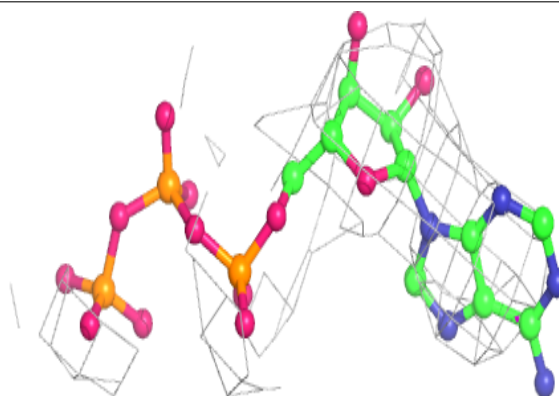


Electron density around ATP B 602:

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

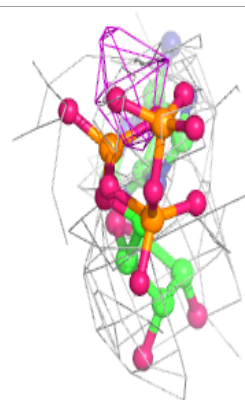
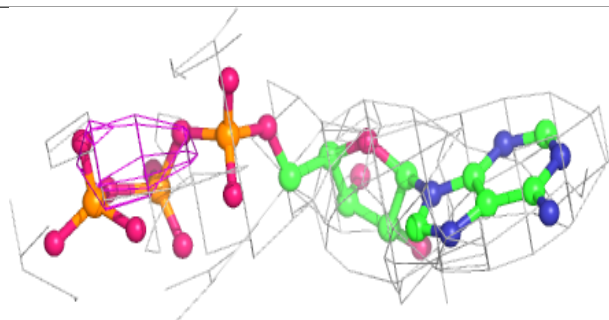
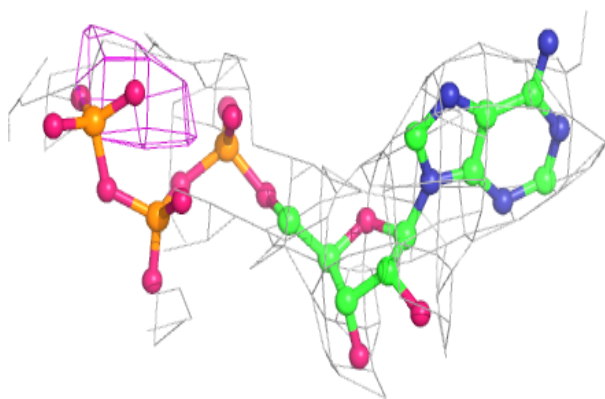
**Electron density around ATP C 602:**

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

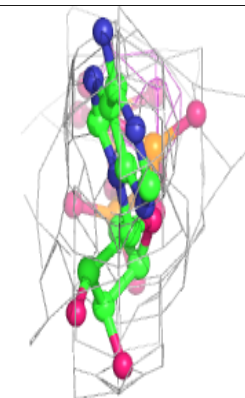
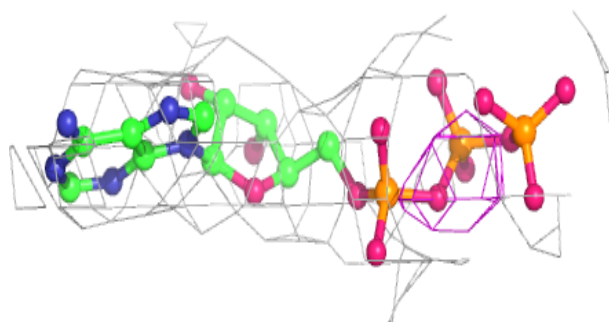
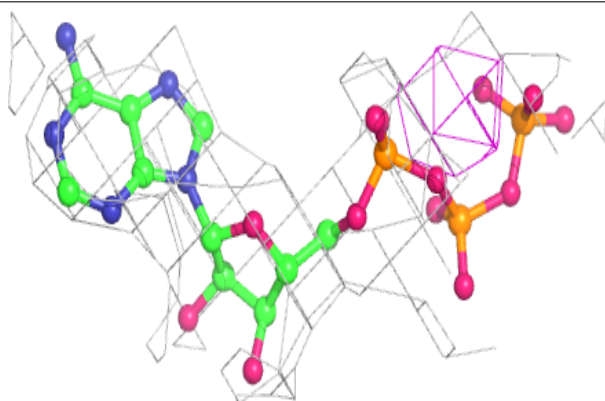


Electron density around ATP A 602:

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

**Electron density around ATP G 600:**

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



6.5 Other polymers

There are no such residues in this entry.