



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 17, 2022 – 07:30 PM EDT

PDB ID : 3WHK
Title : Crystal structure of PAN-Rpt5C chimera
Authors : Satoh, T.; Saeki, Y.; Hiromoto, T.; Wang, Y.-H.; Uekusa, Y.; Yagi, H.; Yoshihara, H.; Yagi-Utsumi, M.; Mizushima, T.; Tanaka, K.; Kato, K.
Deposited on : 2013-08-26
Resolution : 2.60 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.29
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) : 2.29

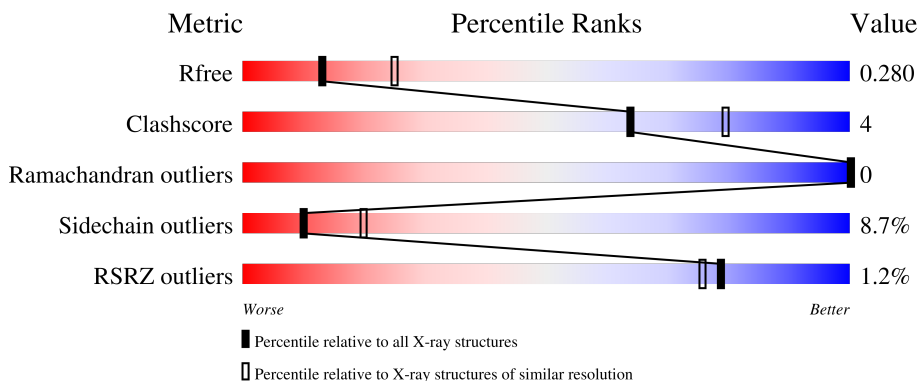
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	270	<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 2%, orange 2%, yellow 11%, green 78%, grey 88%);"></div> <div style="margin-left: 5px;">%</div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 78% 11% • 8% </div>
1	B	270	<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 2%, orange 2%, yellow 11%, green 77%, grey 88%);"></div> <div style="margin-left: 5px;">%</div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 77% 11% • 10% </div>
1	C	270	<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 2%, orange 2%, yellow 11%, green 77%, grey 88%);"></div> <div style="margin-left: 5px;">%</div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 77% 11% • 9% </div>
1	D	270	<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 100%; height: 15px; background: linear-gradient(to right, red 2%, orange 2%, yellow 13%, green 75%, grey 88%);"></div> <div style="margin-left: 5px;">%</div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 75% 13% • 9% </div>
1	E	270	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 15px; background: linear-gradient(to right, green 77%, yellow 12%, grey 88%);"></div> </div> <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> 77% 12% • 9% </div>

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Mol	Chain	Length	Quality of chain
1	F	270	 <p>% 78% 10% • 10%</p>
1	G	270	 <p>% 78% 11% • 9%</p>
1	H	270	 <p>% 75% 13% • 9%</p>

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 15673 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 Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	248	Total 1937	C 1223	N 340	O 367	S 7	0	0	0
1	B	244	Total 1907	C 1205	N 334	O 361	S 7	0	0	0
1	C	245	Total 1915	C 1210	N 337	O 361	S 7	0	0	0
1	D	245	Total 1913	C 1209	N 336	O 361	S 7	0	0	0
1	E	247	Total 1926	C 1217	N 336	O 366	S 7	0	0	0
1	F	244	Total 1907	C 1205	N 334	O 361	S 7	0	0	0
1	G	245	Total 1915	C 1210	N 337	O 361	S 7	0	0	0
1	H	246	Total 1922	C 1214	N 337	O 364	S 7	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	165	GLY	-	expression tag	UNP Q8U4H3
A	166	SER	-	expression tag	UNP Q8U4H3
A	167	HIS	-	expression tag	UNP Q8U4H3
A	168	MET	-	expression tag	UNP Q8U4H3
A	354	GLU	-	linker	UNP P33297
A	355	PHE	-	linker	UNP P33297
B	165	GLY	-	expression tag	UNP Q8U4H3
B	166	SER	-	expression tag	UNP Q8U4H3
B	167	HIS	-	expression tag	UNP Q8U4H3
B	168	MET	-	expression tag	UNP Q8U4H3
B	354	GLU	-	linker	UNP P33297
B	355	PHE	-	linker	UNP P33297

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Chain	Residue	Modelled	Actual	Comment	Reference
C	165	GLY	-	expression tag	UNP Q8U4H3
C	166	SER	-	expression tag	UNP Q8U4H3
C	167	HIS	-	expression tag	UNP Q8U4H3
C	168	MET	-	expression tag	UNP Q8U4H3
C	354	GLU	-	linker	UNP P33297
C	355	PHE	-	linker	UNP P33297
D	165	GLY	-	expression tag	UNP Q8U4H3
D	166	SER	-	expression tag	UNP Q8U4H3
D	167	HIS	-	expression tag	UNP Q8U4H3
D	168	MET	-	expression tag	UNP Q8U4H3
D	354	GLU	-	linker	UNP P33297
D	355	PHE	-	linker	UNP P33297
E	165	GLY	-	expression tag	UNP Q8U4H3
E	166	SER	-	expression tag	UNP Q8U4H3
E	167	HIS	-	expression tag	UNP Q8U4H3
E	168	MET	-	expression tag	UNP Q8U4H3
E	354	GLU	-	linker	UNP P33297
E	355	PHE	-	linker	UNP P33297
F	165	GLY	-	expression tag	UNP Q8U4H3
F	166	SER	-	expression tag	UNP Q8U4H3
F	167	HIS	-	expression tag	UNP Q8U4H3
F	168	MET	-	expression tag	UNP Q8U4H3
F	354	GLU	-	linker	UNP P33297
F	355	PHE	-	linker	UNP P33297
G	165	GLY	-	expression tag	UNP Q8U4H3
G	166	SER	-	expression tag	UNP Q8U4H3
G	167	HIS	-	expression tag	UNP Q8U4H3
G	168	MET	-	expression tag	UNP Q8U4H3
G	354	GLU	-	linker	UNP P33297
G	355	PHE	-	linker	UNP P33297
H	165	GLY	-	expression tag	UNP Q8U4H3
H	166	SER	-	expression tag	UNP Q8U4H3
H	167	HIS	-	expression tag	UNP Q8U4H3
H	168	MET	-	expression tag	UNP Q8U4H3
H	354	GLU	-	linker	UNP P33297
H	355	PHE	-	linker	UNP P33297

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

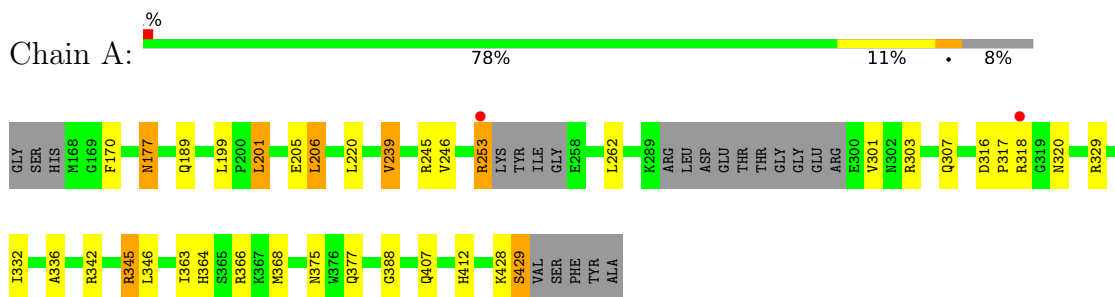
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	13	Total 13	O 13	0	0
3	F	11	Total 11	O 11	0	0
3	G	5	Total 5	O 5	0	0
3	H	6	Total 6	O 6	0	0

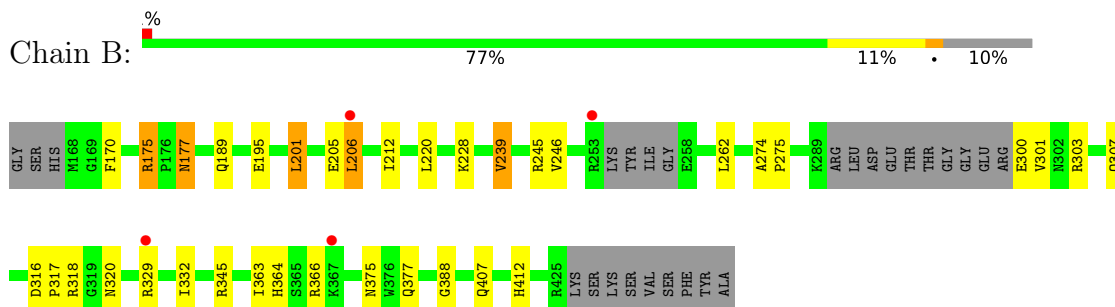
3 Residue-property plots [i](#)

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.

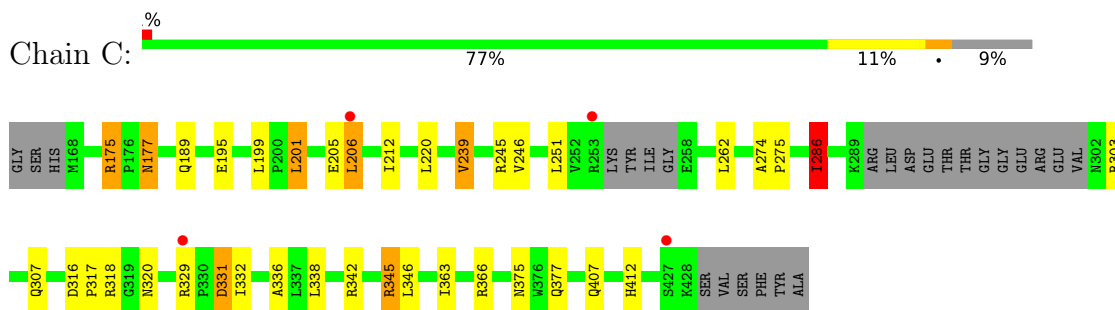
- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A



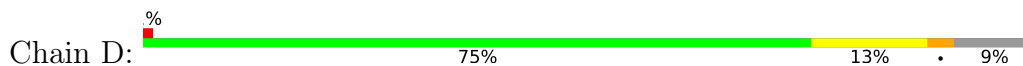
- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A



- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A



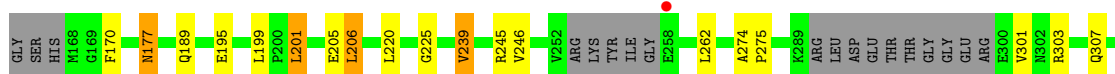
- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A





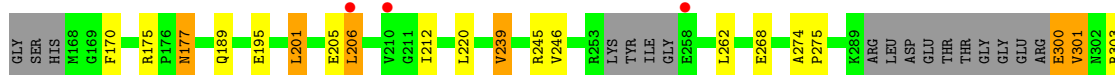
- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A

Chain E: 77% 12% 9%



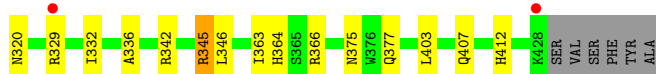
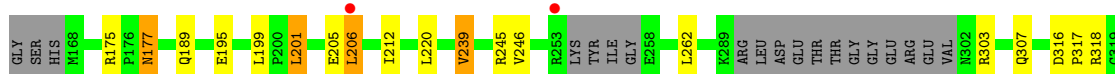
- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A

Chain F: 78% 10% 10%



- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A

Chain G: 78% 11% 9%



- Molecule 1: Proteasome-activating nucleotidase, 26S protease regulatory subunit 6A

Chain H: 75% 13% 9%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	71.04Å 85.76Å 105.26Å 90.04° 90.03° 89.89°	Depositor
Resolution (Å)	20.00 – 2.60 19.86 – 2.60	Depositor EDS
% Data completeness (in resolution range)	96.0 (20.00-2.60) 95.7 (19.86-2.60)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.22 (at 2.59Å)	Xtrriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.242 , 0.275 0.247 , 0.280	Depositor DCC
R_{free} test set	3679 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	48.7	Xtrriage
Anisotropy	0.207	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 23.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.55$, $\langle L^2 \rangle = 0.39$	Xtrriage
Estimated twinning fraction	0.458 for h,-k,-l 0.064 for -h,k,-l 0.063 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	15673	wwPDB-VP
Average B, all atoms (Å ²)	53.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 40.19 % 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 2.8390e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: 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	0.52	0/1967	0.73	1/2654 (0.0%)
1	B	0.50	0/1937	0.71	0/2616
1	C	0.49	0/1945	0.75	3/2624 (0.1%)
1	D	0.47	0/1943	0.73	3/2623 (0.1%)
1	E	0.52	0/1956	0.72	0/2640
1	F	0.52	0/1937	0.72	1/2616 (0.0%)
1	G	0.47	0/1945	0.72	2/2624 (0.1%)
1	H	0.48	0/1952	0.72	1/2635 (0.0%)
All	All	0.50	0/15582	0.73	11/21032 (0.1%)

There are no bond length outliers.

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	245	ARG	NE-CZ-NH1	-8.66	115.97	120.30
1	D	368	MET	CA-CB-CG	6.44	124.24	113.30
1	G	245	ARG	NE-CZ-NH2	-6.27	117.16	120.30
1	C	286	ILE	CG1-CB-CG2	-6.26	97.63	111.40
1	H	286	ILE	CG1-CB-CG2	-6.09	98.01	111.40

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1937	0	1964	17	2
1	B	1907	0	1928	20	1
1	C	1915	0	1944	21	0
1	D	1913	0	1940	26	2
1	E	1926	0	1951	19	2
1	F	1907	0	1928	15	0
1	G	1915	0	1944	16	1
1	H	1922	0	1946	21	2
2	A	31	0	12	2	0
2	B	31	0	12	2	0
2	C	31	0	12	0	0
2	D	31	0	12	1	0
2	E	31	0	12	3	0
2	F	31	0	12	1	0
2	G	31	0	12	1	0
2	H	31	0	12	1	0
3	A	11	0	0	0	0
3	B	13	0	0	2	0
3	C	14	0	0	0	0
3	D	10	0	0	2	0
3	E	13	0	0	0	0
3	F	11	0	0	0	0
3	G	5	0	0	0	0
3	H	6	0	0	2	0
All	All	15673	0	15641	131	5

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 4.

The worst 5 of 131 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:H:174:GLU:OE2	1:H:273:LYS:NZ	1.97	0.97
1:B:303:ARG:NH2	1:B:307:GLN:OE1	2.19	0.76
1:E:303:ARG:NH2	1:E:307:GLN:OE1	2.19	0.76
1:H:303:ARG:NH2	1:H:307:GLN:OE1	2.19	0.76
1:A:303:ARG:NH2	1:A:307:GLN:OE1	2.19	0.75

All (5) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:407:GLN:O	1:E:303:ARG:NH1[1_564]	2.13	0.07
1:B:407:GLN:O	1:G:303:ARG:NH1[1_554]	2.15	0.05
1:A:303:ARG:NH1	1:H:407:GLN:O[1_564]	2.16	0.04
1:D:303:ARG:NH1	1:E:407:GLN:O[1_565]	2.17	0.03
1:A:407:GLN:O	1:H:303:ARG:NH1[1_565]	2.18	0.02

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	242/270 (90%)	236 (98%)	6 (2%)	0	100	100
1	B	238/270 (88%)	231 (97%)	7 (3%)	0	100	100
1	C	239/270 (88%)	234 (98%)	5 (2%)	0	100	100
1	D	239/270 (88%)	233 (98%)	6 (2%)	0	100	100
1	E	241/270 (89%)	234 (97%)	7 (3%)	0	100	100
1	F	238/270 (88%)	232 (98%)	6 (2%)	0	100	100
1	G	239/270 (88%)	234 (98%)	5 (2%)	0	100	100
1	H	240/270 (89%)	234 (98%)	6 (2%)	0	100	100
All	All	1916/2160 (89%)	1868 (98%)	48 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	209/226 (92%)	191 (91%)	18 (9%)	10	20
1	B	205/226 (91%)	187 (91%)	18 (9%)	10	19
1	C	206/226 (91%)	188 (91%)	18 (9%)	10	20
1	D	206/226 (91%)	187 (91%)	19 (9%)	9	17
1	E	208/226 (92%)	191 (92%)	17 (8%)	11	22
1	F	205/226 (91%)	187 (91%)	18 (9%)	10	19
1	G	206/226 (91%)	190 (92%)	16 (8%)	12	25
1	H	207/226 (92%)	187 (90%)	20 (10%)	8	15
All	All	1652/1808 (91%)	1508 (91%)	144 (9%)	10	20

5 of 144 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	239	VAL
1	H	427	SER
1	G	320	ASN
1	H	220	LEU
1	C	320	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 32 such sidechains are listed below:

Mol	Chain	Res	Type
1	H	320	ASN
1	H	328	ASN
1	D	320	ASN
1	C	412	HIS
1	H	364	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](#)

8 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	ATP	D	600	-	26,33,33	1.17	4 (15%)	31,52,52	1.65	4 (12%)
2	ATP	E	600	-	26,33,33	1.09	3 (11%)	31,52,52	1.95	7 (22%)
2	ATP	H	600	-	26,33,33	0.95	0	31,52,52	1.71	8 (25%)
2	ATP	G	600	-	26,33,33	1.08	2 (7%)	31,52,52	1.65	6 (19%)
2	ATP	A	600	-	26,33,33	1.08	2 (7%)	31,52,52	1.75	7 (22%)
2	ATP	B	600	-	26,33,33	0.98	1 (3%)	31,52,52	1.70	8 (25%)
2	ATP	F	600	-	26,33,33	1.23	2 (7%)	31,52,52	1.70	7 (22%)
2	ATP	C	600	-	26,33,33	1.11	2 (7%)	31,52,52	1.71	7 (22%)

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	D	600	-	-	6/18/38/38	0/3/3/3
2	ATP	E	600	-	-	6/18/38/38	0/3/3/3
2	ATP	H	600	-	-	7/18/38/38	0/3/3/3
2	ATP	G	600	-	-	7/18/38/38	0/3/3/3
2	ATP	A	600	-	-	8/18/38/38	0/3/3/3
2	ATP	B	600	-	-	7/18/38/38	0/3/3/3
2	ATP	F	600	-	-	7/18/38/38	0/3/3/3
2	ATP	C	600	-	-	7/18/38/38	0/3/3/3

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	600	ATP	O4'-C1'	3.45	1.45	1.41
2	D	600	ATP	O4'-C1'	3.41	1.45	1.41
2	E	600	ATP	O4'-C1'	2.97	1.45	1.41
2	A	600	ATP	O4'-C1'	2.55	1.44	1.41
2	E	600	ATP	C5-C4	2.52	1.47	1.40

The worst 5 of 54 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	600	ATP	N3-C2-N1	-4.75	121.25	128.68
2	G	600	ATP	N3-C2-N1	-4.60	121.49	128.68
2	D	600	ATP	C4-C5-N7	-4.52	104.69	109.40
2	B	600	ATP	N3-C2-N1	-4.36	121.87	128.68
2	E	600	ATP	N3-C2-N1	-4.30	121.96	128.68

There are no chirality outliers.

5 of 55 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	600	ATP	PB-O3B-PG-O2G
2	A	600	ATP	C5'-O5'-PA-O1A
2	A	600	ATP	C5'-O5'-PA-O2A
2	B	600	ATP	C5'-O5'-PA-O1A
2	B	600	ATP	C5'-O5'-PA-O2A

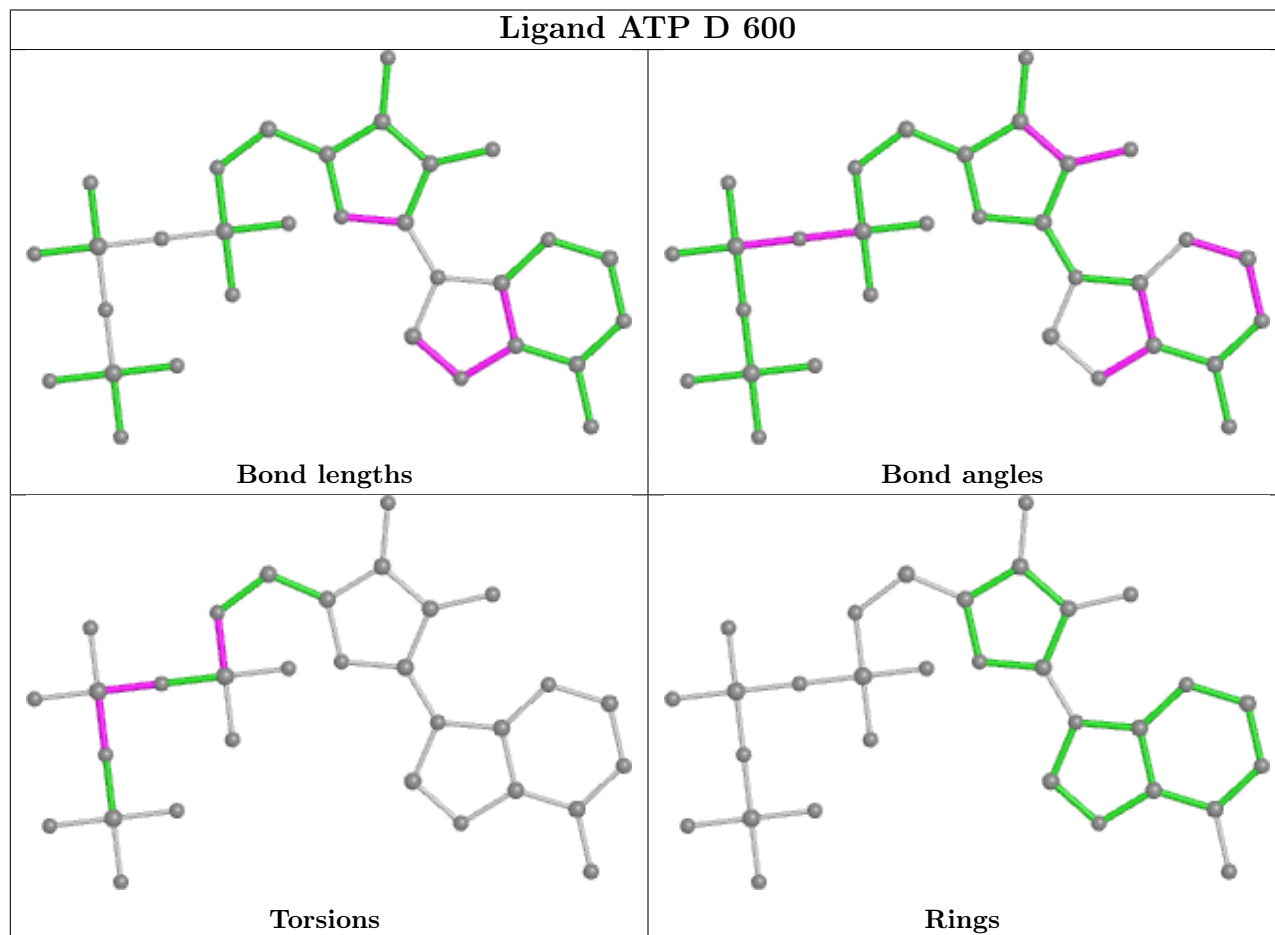
There are no ring outliers.

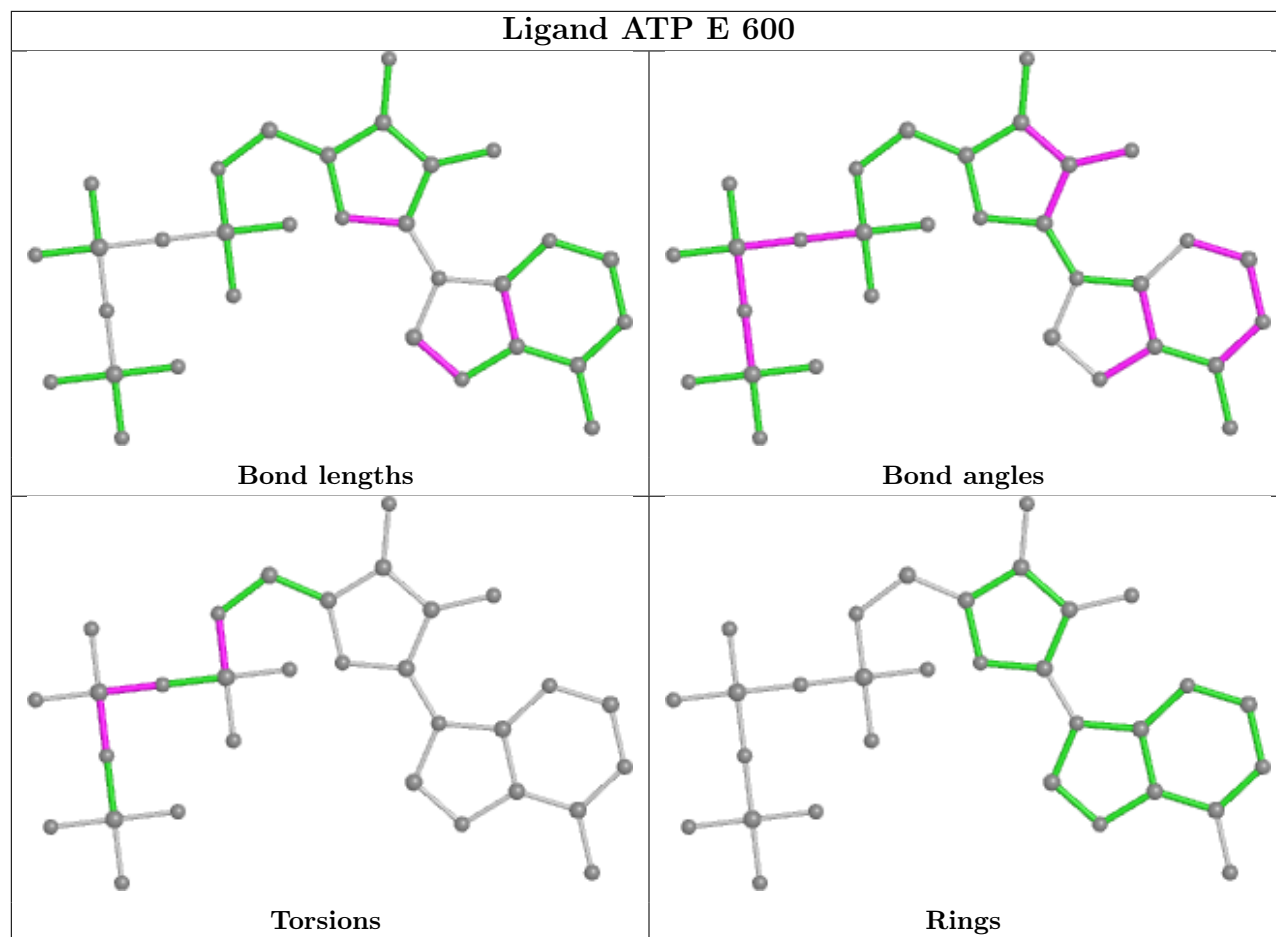
7 monomers are involved in 11 short contacts:

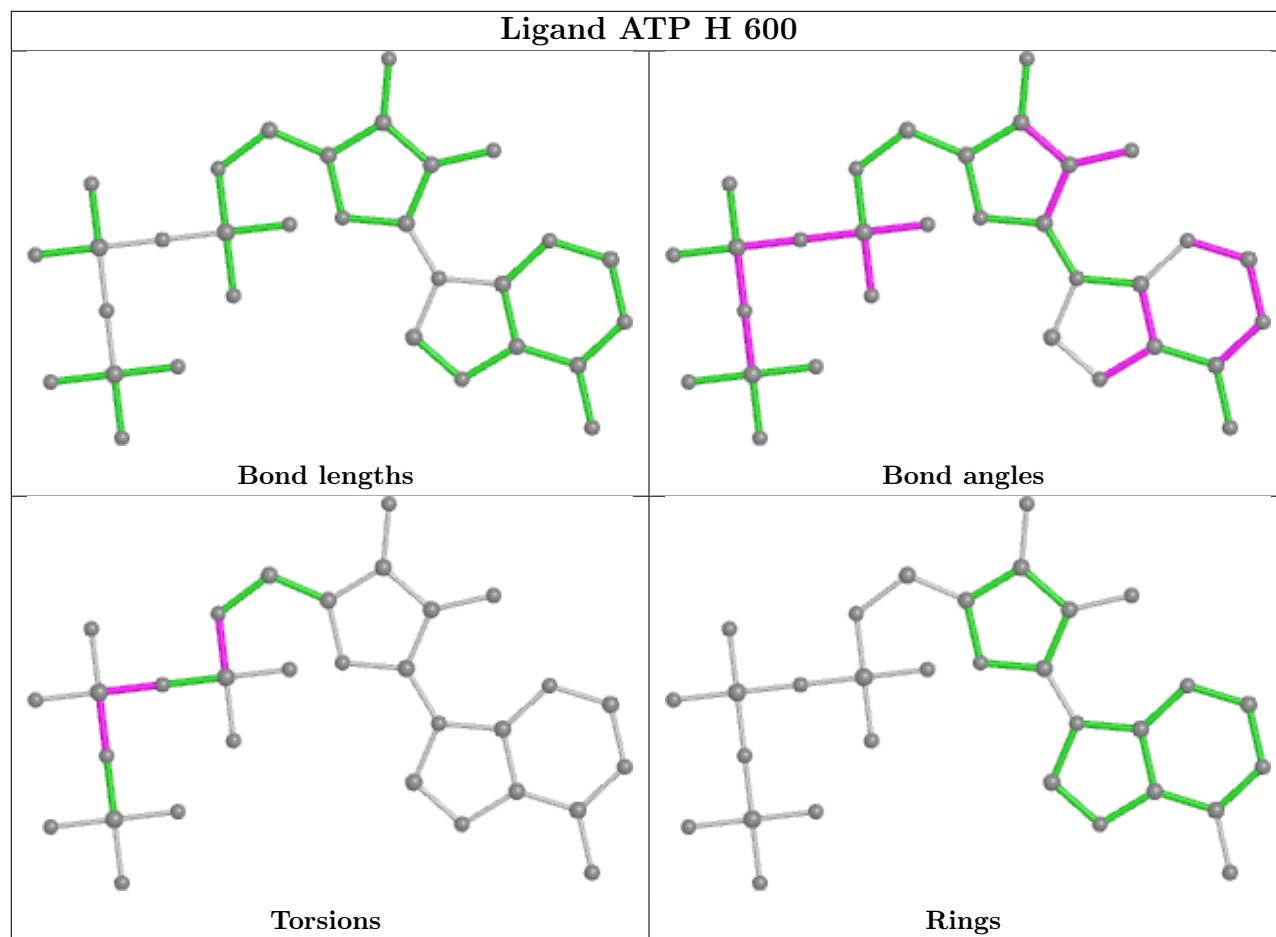
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	600	ATP	1	0
2	E	600	ATP	3	0
2	H	600	ATP	1	0
2	G	600	ATP	1	0
2	A	600	ATP	2	0
2	B	600	ATP	2	0
2	F	600	ATP	1	0

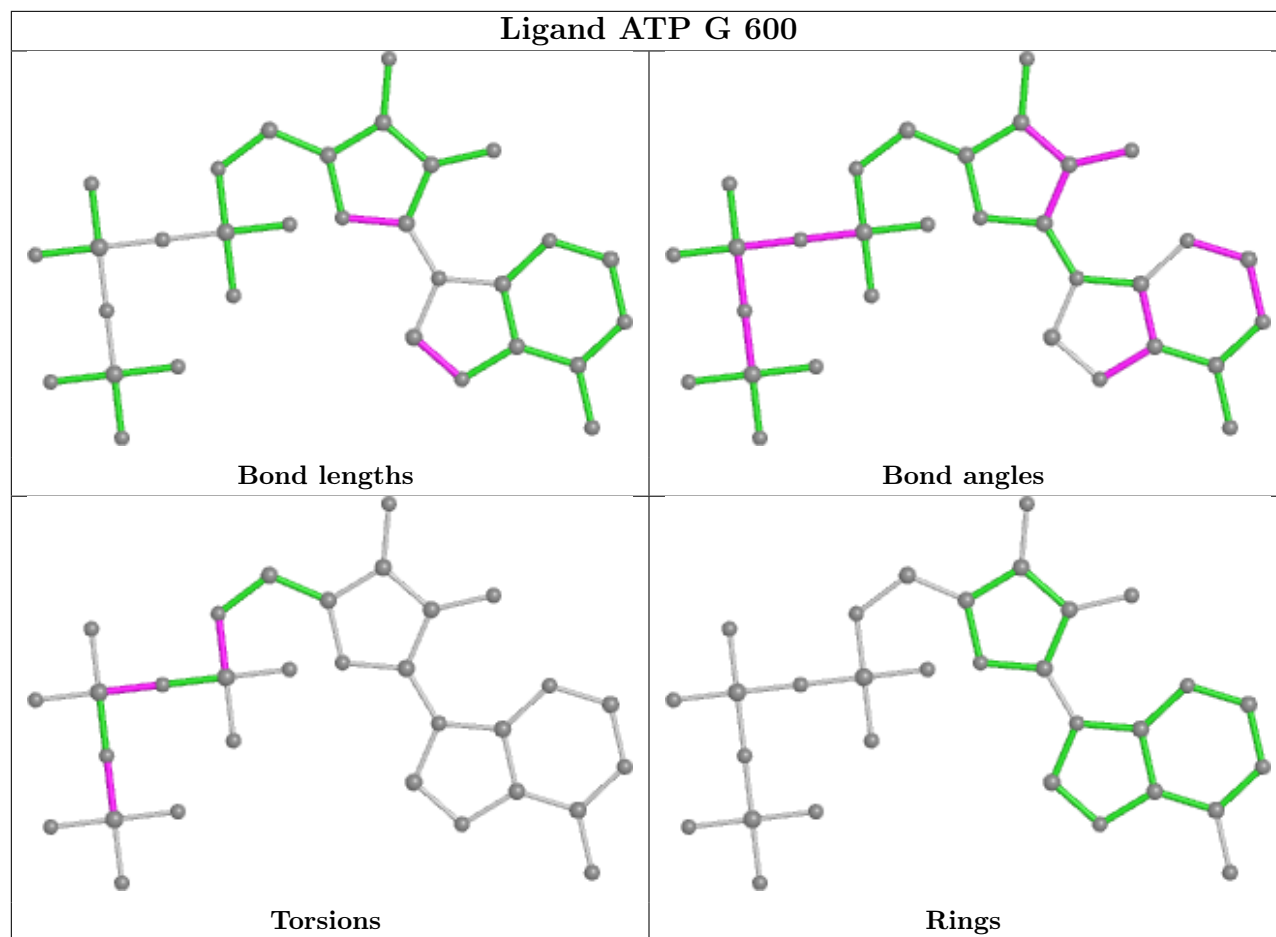
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is

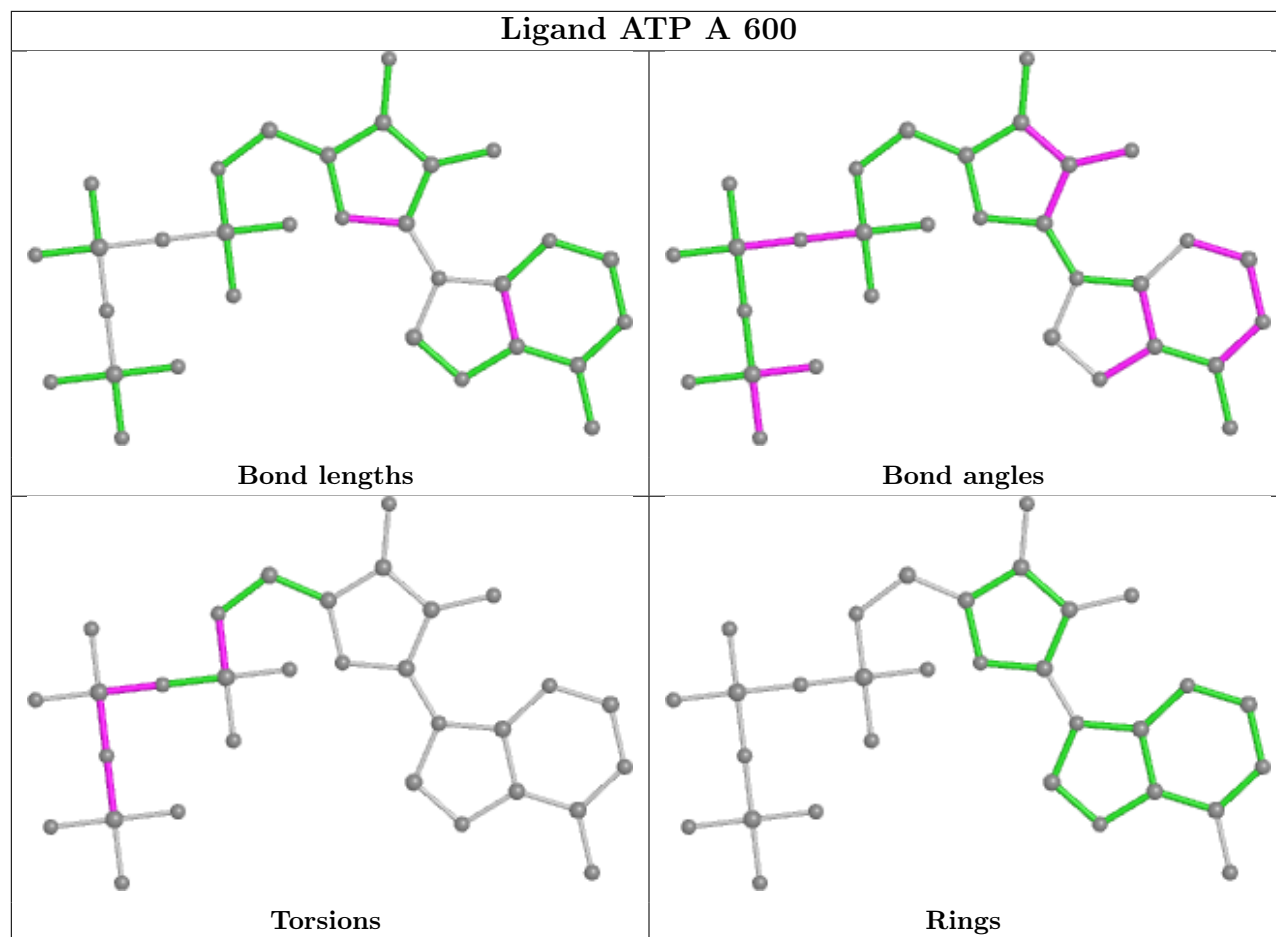
within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question 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.

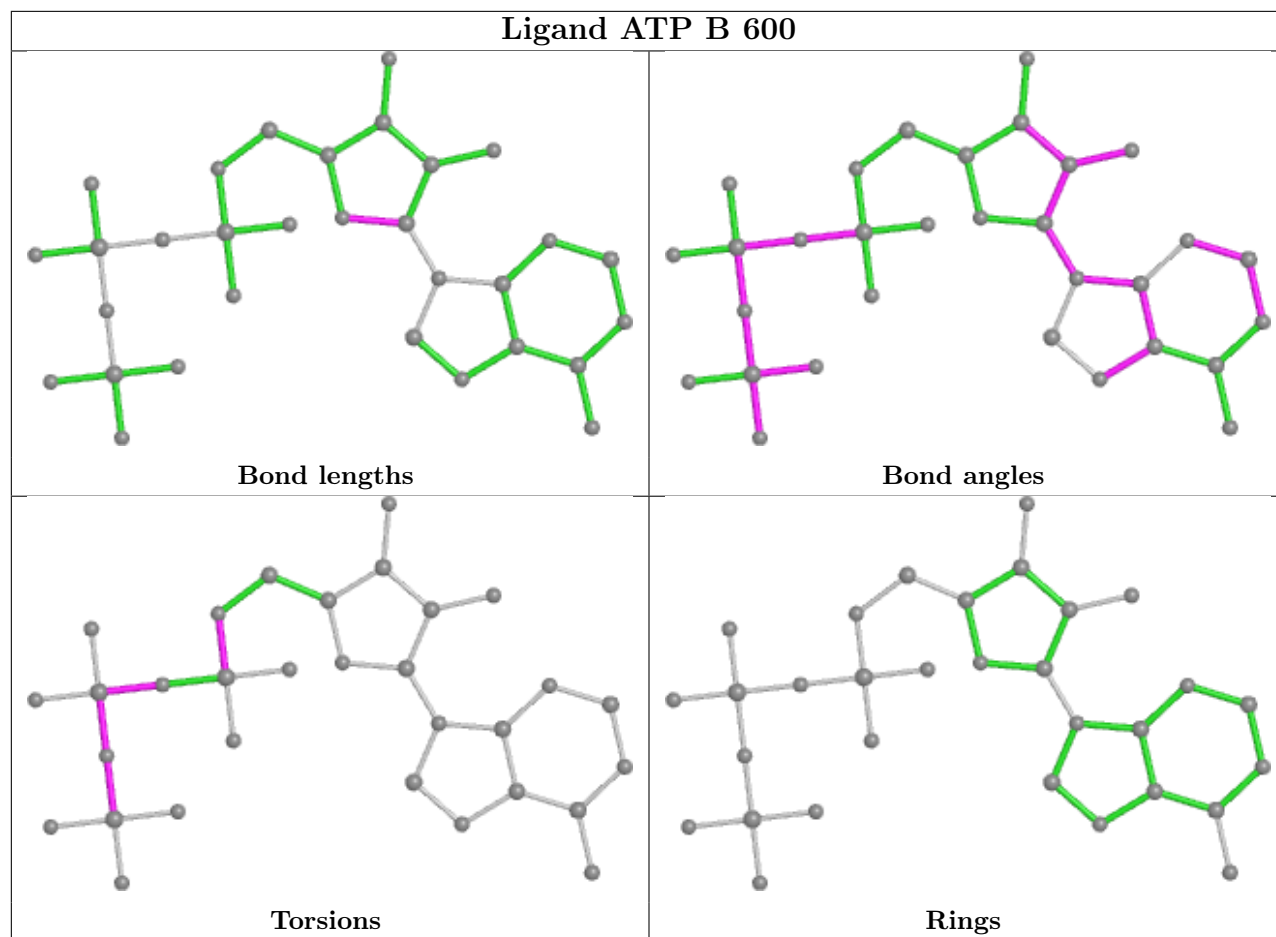


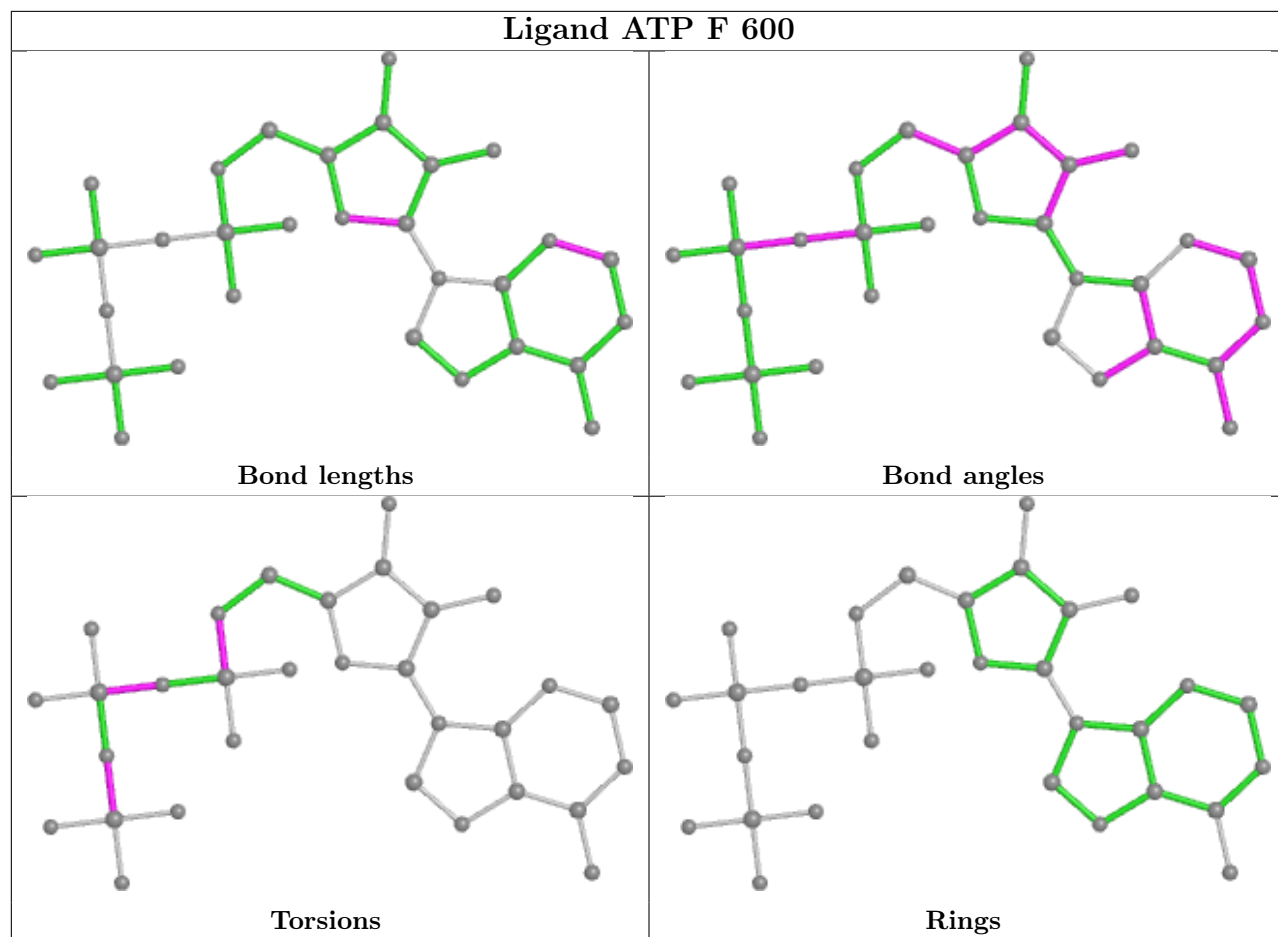


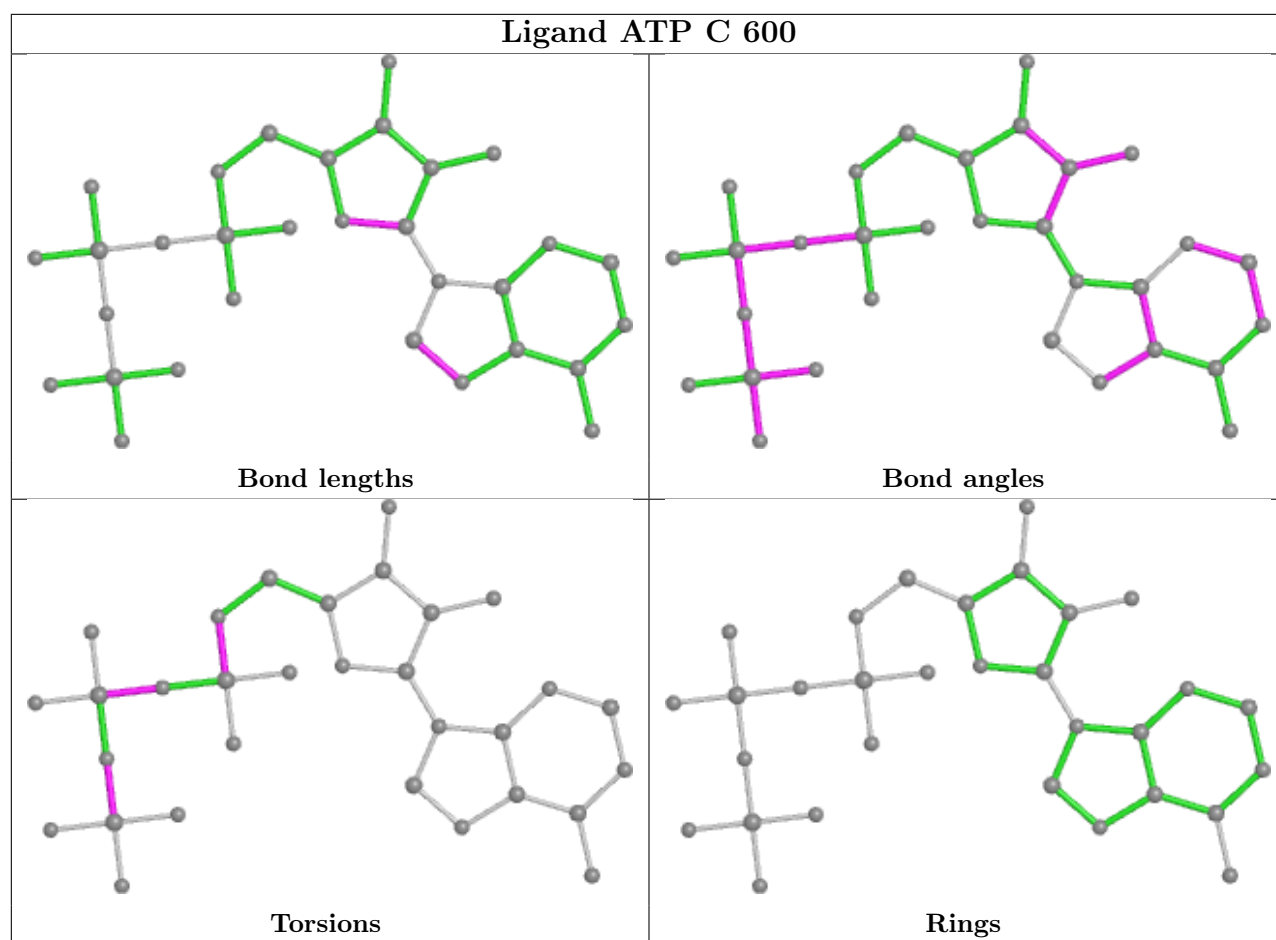












5.7 Other polymers [i](#)

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	248/270 (91%)	-0.12	2 (0%) 86 84	28, 47, 72, 94	0
1	B	244/270 (90%)	-0.12	4 (1%) 72 68	31, 50, 77, 94	0
1	C	245/270 (90%)	-0.07	4 (1%) 72 68	32, 51, 81, 111	0
1	D	245/270 (90%)	-0.06	2 (0%) 86 84	37, 54, 81, 94	0
1	E	247/270 (91%)	-0.15	1 (0%) 92 91	30, 47, 72, 93	0
1	F	244/270 (90%)	-0.09	4 (1%) 72 68	32, 51, 77, 94	0
1	G	245/270 (90%)	-0.08	4 (1%) 72 68	32, 51, 81, 101	0
1	H	246/270 (91%)	-0.04	3 (1%) 79 76	35, 53, 82, 97	0
All	All	1964/2160 (90%)	-0.09	24 (1%) 79 76	28, 51, 79, 111	0

The worst 5 of 24 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	253	ARG	3.8
1	G	206	LEU	3.4
1	C	253	ARG	3.2
1	C	329	ARG	3.1
1	D	253	ARG	2.9

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

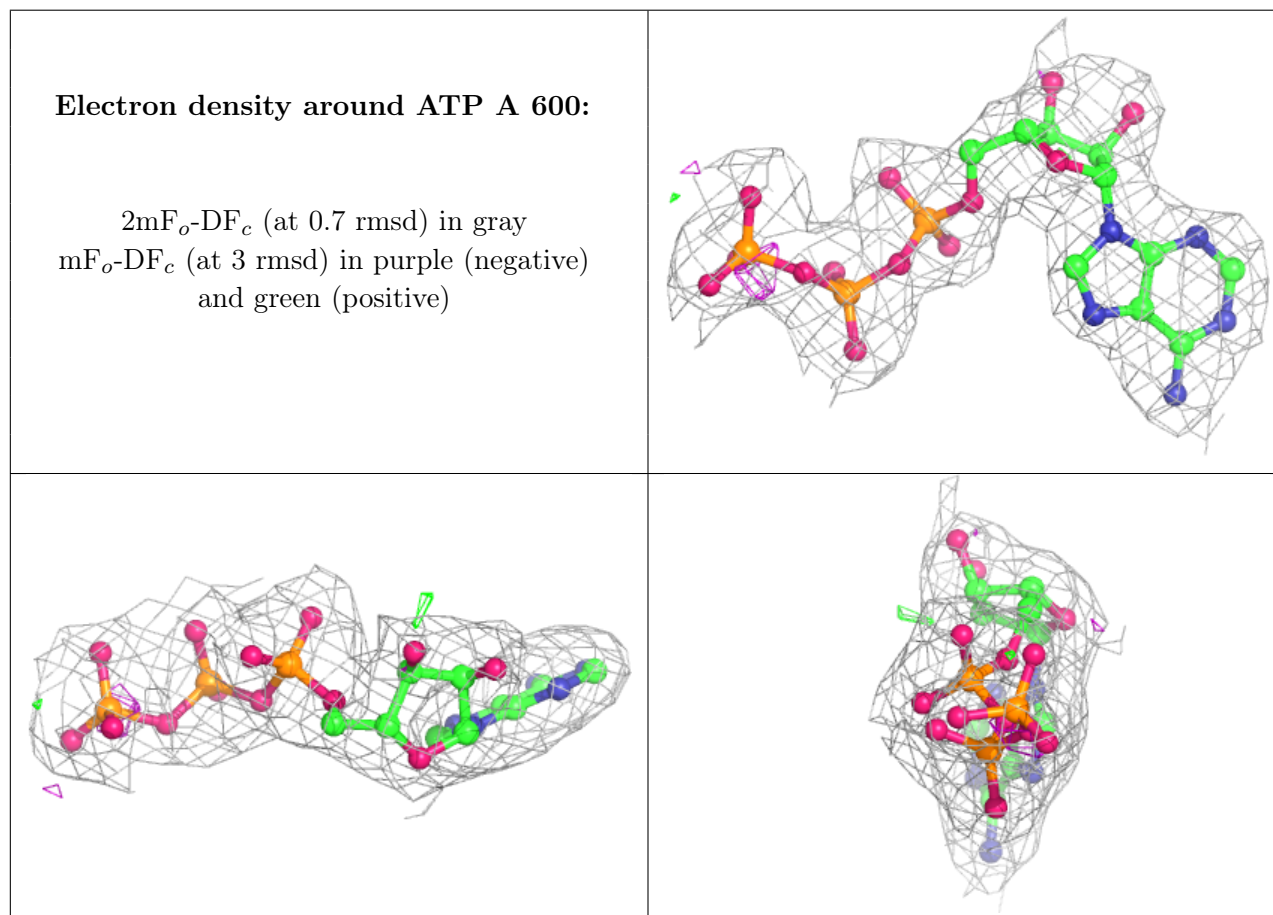
There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

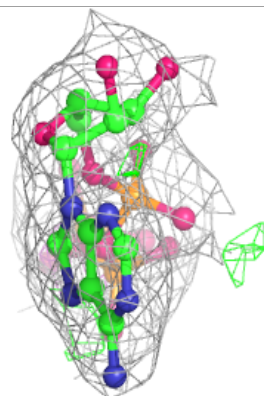
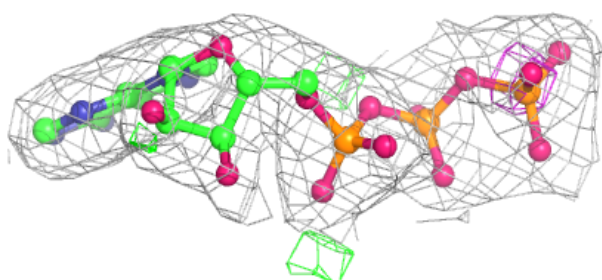
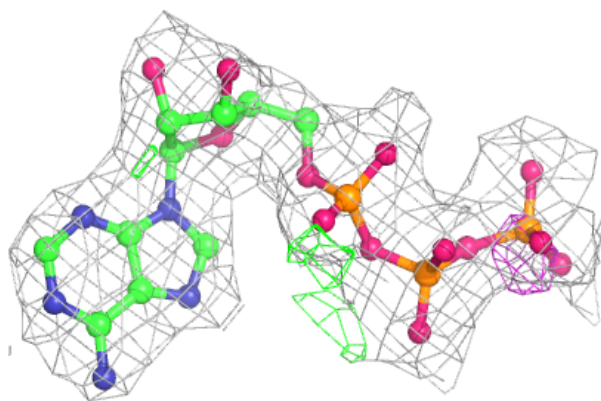
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	ATP	A	600	31/31	0.96	0.13	30,34,54,67	0
2	ATP	C	600	31/31	0.96	0.13	33,37,48,64	0
2	ATP	D	600	31/31	0.96	0.14	32,39,54,66	0
2	ATP	B	600	31/31	0.97	0.14	31,36,59,69	0
2	ATP	F	600	31/31	0.97	0.13	33,36,53,65	0
2	ATP	G	600	31/31	0.97	0.14	31,35,57,64	0
2	ATP	H	600	31/31	0.97	0.13	35,39,57,69	0
2	ATP	E	600	31/31	0.98	0.14	28,34,49,68	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.

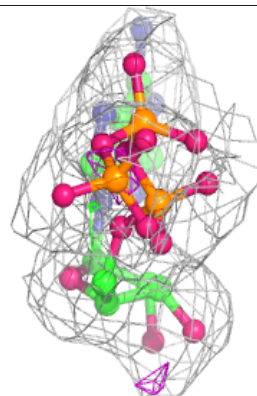
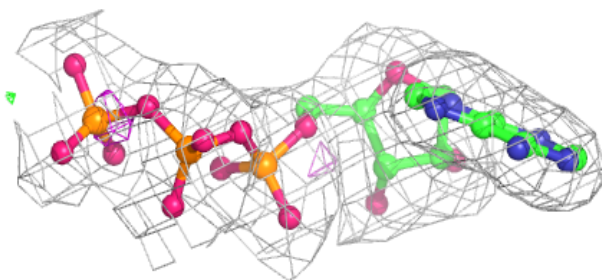
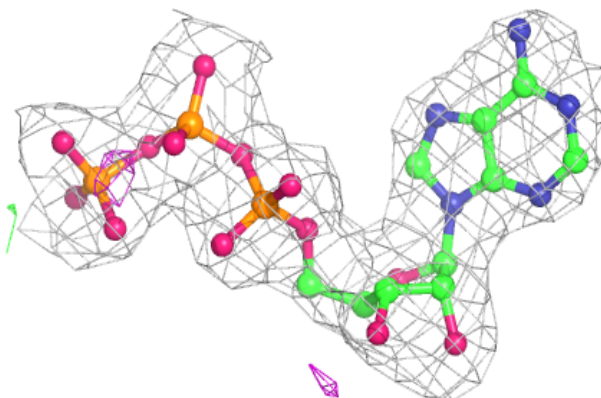


Electron density around ATP C 600:

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

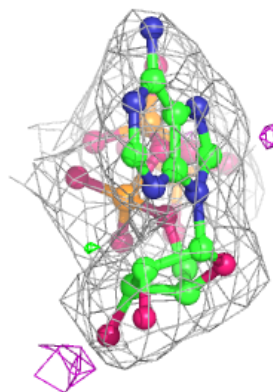
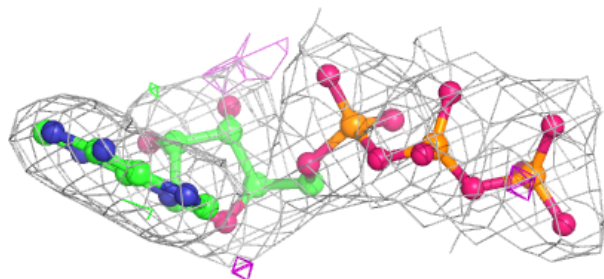
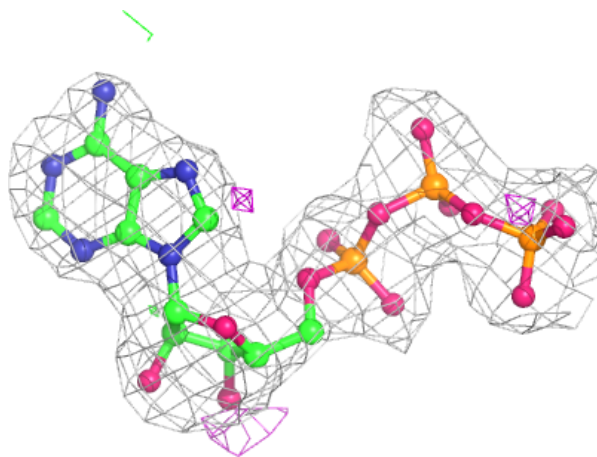
**Electron density around ATP D 600:**

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



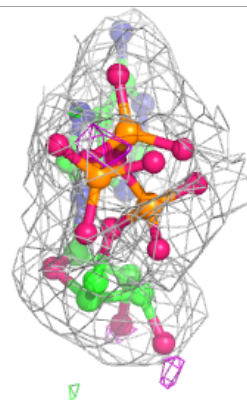
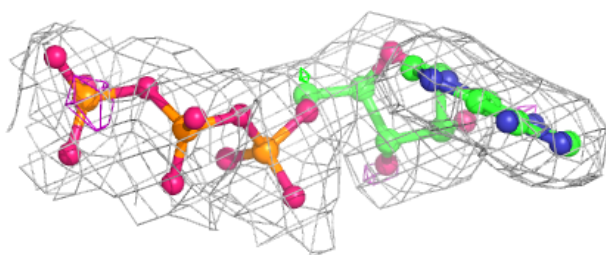
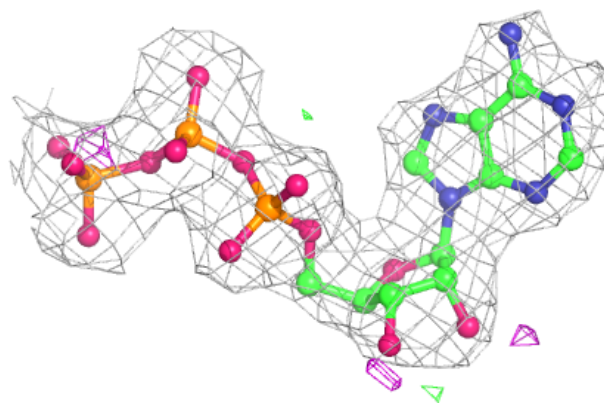
Electron density around ATP B 600:

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

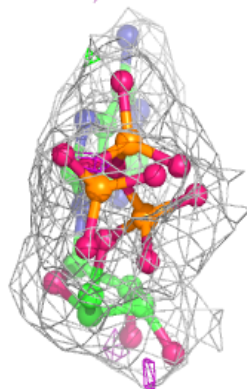
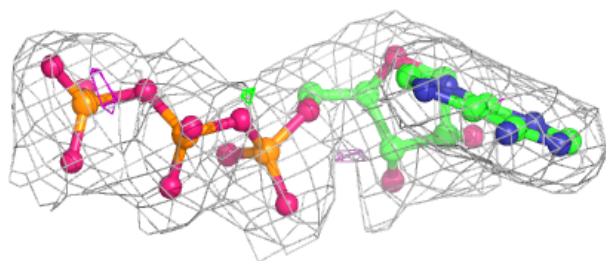
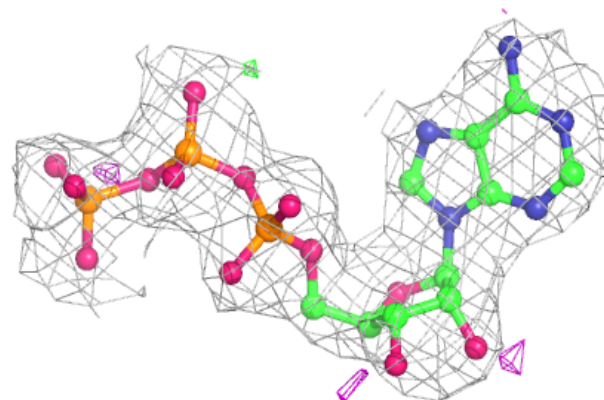


Electron density around ATP F 600:

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

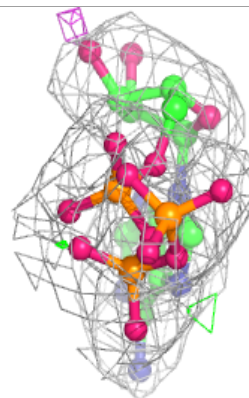
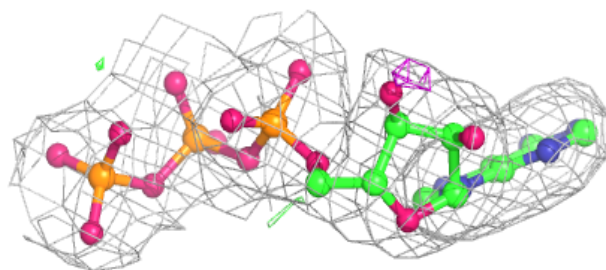
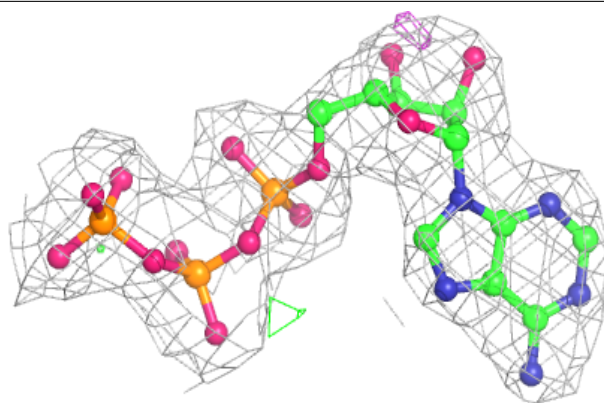
**Electron density around ATP G 600:**

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

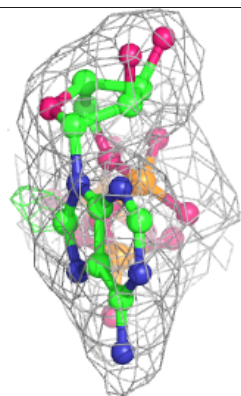
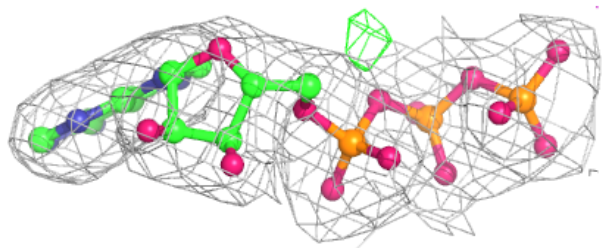
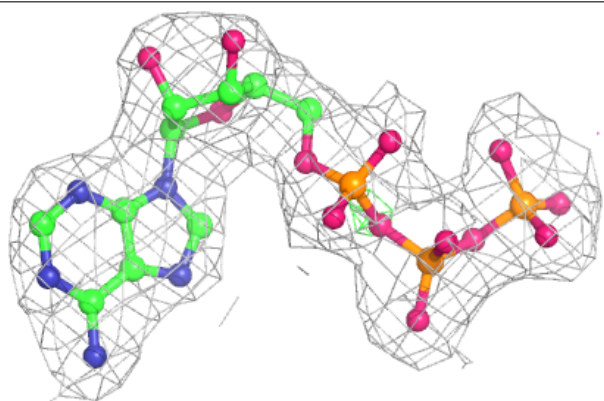


Electron density around ATP H 600:

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

**Electron density around ATP E 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 [i](#)

There are no such residues in this entry.