



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 18, 2024 – 12:27 AM EDT

PDB ID : 5TC3  
Title : Structure of IMP dehydrogenase from *Ashbya gossypii* bound to ATP and GDP  
Authors : Fernandez-Justel, D.; de Pereda, J.M.; Revuelta, J.L.; Buey, R.M.  
Deposited on : 2016-09-14  
Resolution : 2.46 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](mailto: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>.

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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 : 2.37.1  
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) : 2.37.1

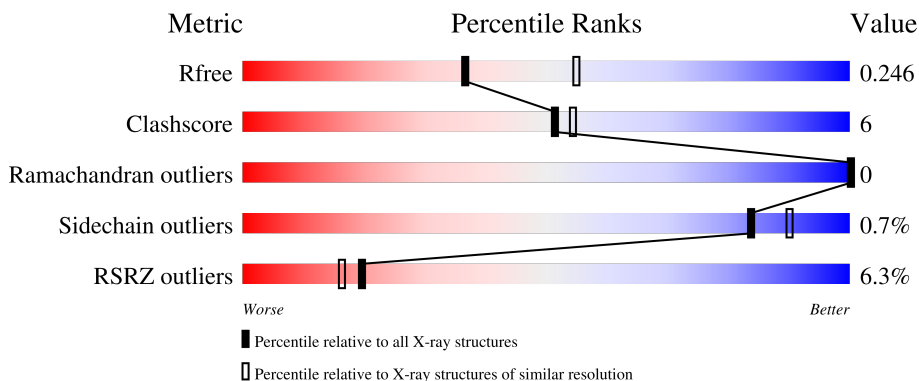
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

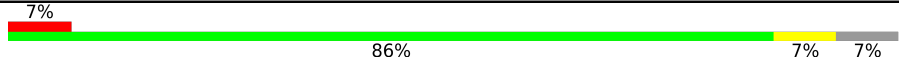
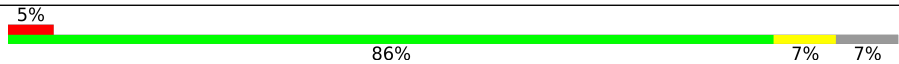
The reported resolution of this entry is 2.46 Å.

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	1544 (2.48-2.44)
Clashscore	141614	1613 (2.48-2.44)
Ramachandran outliers	138981	1598 (2.48-2.44)
Sidechain outliers	138945	1598 (2.48-2.44)
RSRZ outliers	127900	1523 (2.48-2.44)

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  $\geq 3$ , 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	523	
1	B	523	

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 14581 atoms, of which 7078 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.

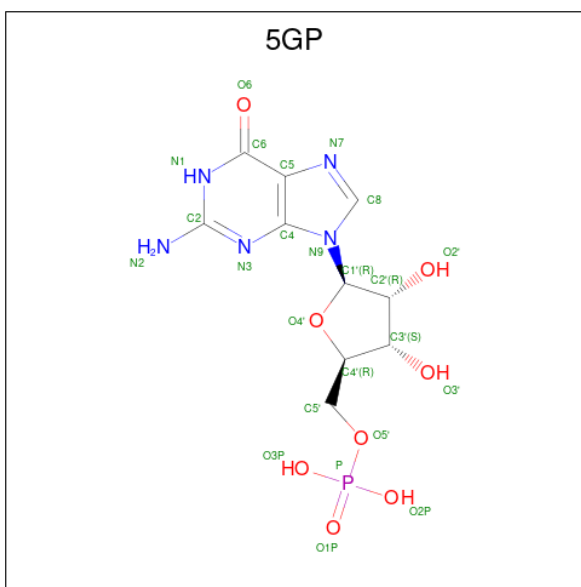
- Molecule 1 is a protein called Inosine-5'-monophosphate dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	488	7077	2250	3491	621	693	22	0	0	0
1	B	489	7054	2250	3470	616	696	22	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	HIS	-	expression tag	UNP Q756Z6
B	0	HIS	-	expression tag	UNP Q756Z6

- Molecule 2 is GUANOSINE-5'-MONOPHOSPHATE (three-letter code: 5GP) (formula: C<sub>10</sub>H<sub>14</sub>N<sub>5</sub>O<sub>8</sub>P).



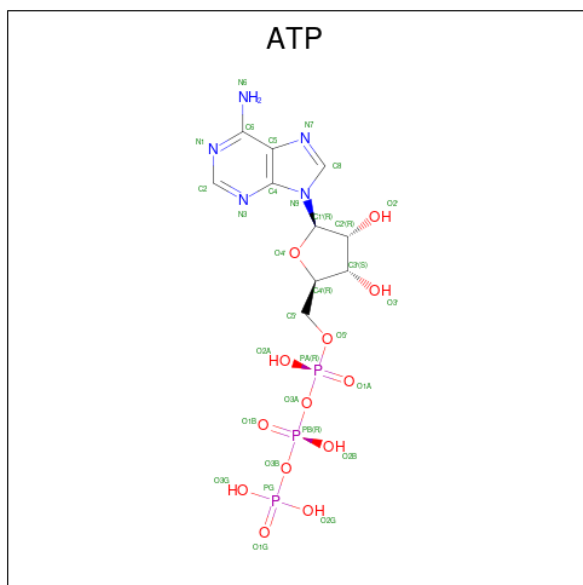
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
2	A	1	35	10	11	5	8	1	0	0

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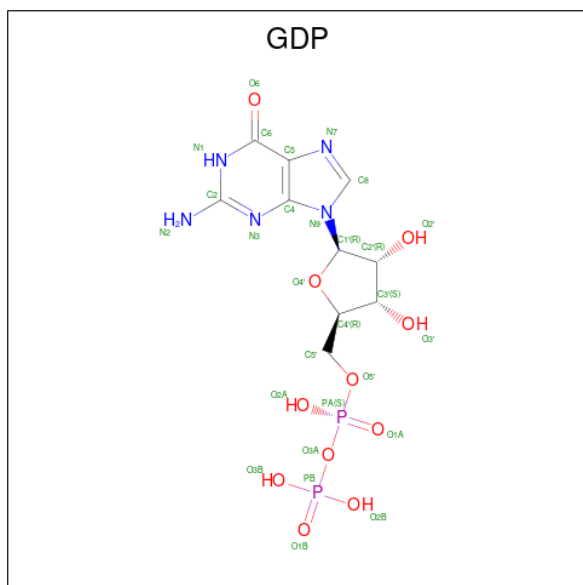
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
2	B	1	35	10	11	5	8	1	0	0

- 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	H	N	O			P
3	A	1	42	10	11	5	13	3	0	0
3	B	1	42	10	11	5	13	3	0	0

- Molecule 4 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula:  $C_{10}H_{15}N_5O_{11}P_2$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
4	A	1	Total	C	H	N	O	P	0	0
			39	10	11	5	11	2		
4	A	1	Total	C	H	N	O	P	0	1
			80	20	24	10	22	4		
4	B	1	Total	C	H	N	O	P	0	0
			39	10	11	5	11	2		
4	B	1	Total	C	H	N	O	P	0	1
			80	20	24	10	22	4		

- Molecule 5 is ACETATE ION (three-letter code: ACT) (formula:  $C_2H_3O_2$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	H	O	0	0
			7	2	3	2		

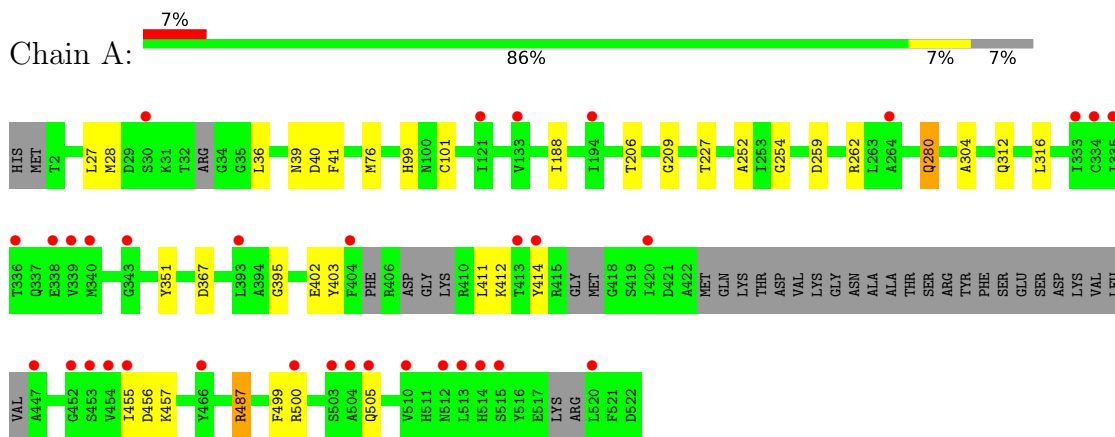
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	28	Total	O	0	0
			28	28		
6	B	23	Total	O	0	0
			23	23		

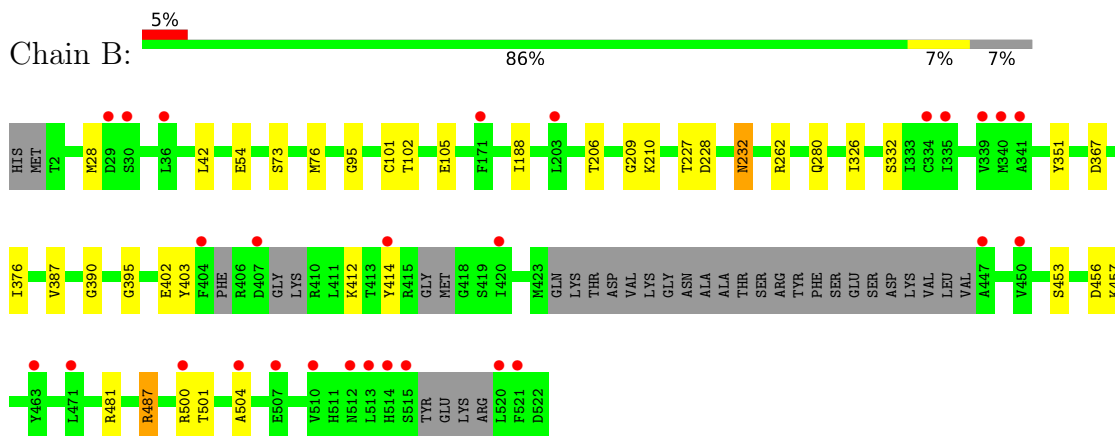
### 3 Residue-property plots [i](#)

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: Inosine-5'-monophosphate dehydrogenase



- Molecule 1: Inosine-5'-monophosphate dehydrogenase



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 4	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	147.88Å 147.88Å 103.54Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.76 – 2.46 46.76 – 2.46	Depositor EDS
% Data completeness (in resolution range)	99.7 (46.76-2.46) 99.8 (46.76-2.46)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.42 (at 2.45Å)	Xtrriage
Refinement program	PHENIX (1.11rc1_2513: ???)	Depositor
R, $R_{free}$	0.216 , 0.242 0.227 , 0.246	Depositor DCC
$R_{free}$ test set	2110 reflections (5.23%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	66.7	Xtrriage
Anisotropy	0.305	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 36.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	0.478 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	14581	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	82.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.33% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: ACT, GDP, ATP, 5GP

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	0.41	0/3633	0.54	0/4910
1	B	0.43	0/3632	0.54	0/4912
All	All	0.42	0/7265	0.54	0/9822

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 [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	3586	3491	3515	39	0
1	B	3584	3470	3501	41	0
2	A	24	11	12	1	0
2	B	24	11	12	1	0
3	A	31	11	12	2	0
3	B	31	11	12	2	0
4	A	84	35	36	1	0
4	B	84	35	36	9	0
5	A	4	3	3	0	0
6	A	28	0	0	0	0
6	B	23	0	0	0	0
All	All	7503	7078	7139	81	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 6.

All (81) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:232:ASN:ND2	4:B:603[B]:GDP:O1B	1.56	1.39
1:B:232:ASN:HD21	4:B:603[B]:GDP:PB	1.68	1.16
1:B:232:ASN:ND2	4:B:603[B]:GDP:PB	2.31	0.97
1:B:101:CYS:O	1:B:262:ARG:NH2	1.97	0.96
1:A:500:ARG:HH21	1:A:505:GLN:HA	1.31	0.94
1:A:41:PHE:HA	1:A:500:ARG:HG3	1.49	0.93
1:B:403:TYR:CZ	1:B:412:LYS:HE3	2.03	0.93
1:A:101:CYS:O	1:A:262:ARG:NH2	2.03	0.91
1:B:209:GLY:C	1:B:210:LYS:HD2	1.96	0.86
1:A:27:LEU:HD12	1:A:499:PHE:CE1	2.11	0.86
1:A:41:PHE:CA	1:A:500:ARG:HG3	2.08	0.83
1:B:228:ASP:OD1	4:B:602:GDP:O3'	1.99	0.78
1:B:403:TYR:CE2	1:B:412:LYS:HE3	2.18	0.77
1:A:403:TYR:CZ	1:A:412:LYS:HE3	2.20	0.77
1:B:210:LYS:O	3:B:601:ATP:N6	2.18	0.76
1:A:411:LEU:HD23	1:A:455:ILE:HA	1.68	0.74
1:B:209:GLY:N	3:B:601:ATP:O1A	2.20	0.72
1:B:210:LYS:HD2	1:B:210:LYS:N	2.05	0.71
1:A:40:ASP:O	1:A:500:ARG:N	2.24	0.70
1:A:403:TYR:CE2	1:A:412:LYS:HE3	2.30	0.67
1:A:40:ASP:C	1:A:500:ARG:HB2	2.19	0.63
1:A:455:ILE:HD12	1:A:455:ILE:N	2.13	0.62
1:B:367:ASP:OD1	2:B:600:5GP:O3'	2.14	0.62
1:A:456:ASP:OD1	1:A:457:LYS:N	2.33	0.62
1:A:500:ARG:NH2	1:A:505:GLN:HA	2.11	0.62
1:B:76:MET:HE3	1:B:414:TYR:HE1	1.64	0.61
1:A:455:ILE:HG22	1:A:456:ASP:N	2.14	0.61
1:B:227:THR:HG21	4:B:602:GDP:O1A	2.02	0.59
1:A:280:GLN:O	1:A:280:GLN:HG3	2.02	0.59
1:B:76:MET:HE1	1:B:390:GLY:HA3	1.85	0.58
1:A:27:LEU:HD12	1:A:499:PHE:CD1	2.38	0.58
1:A:254:GLY:N	1:A:259:ASP:OD2	2.37	0.58
1:B:76:MET:HE3	1:B:414:TYR:CE1	2.39	0.57
1:A:40:ASP:HA	1:A:500:ARG:HB2	1.86	0.56
1:A:367:ASP:OD2	2:A:600:5GP:O2'	2.20	0.56
1:B:54:GLU:OE2	1:B:481:ARG:NH1	2.36	0.56
1:B:232:ASN:CG	4:B:603[B]:GDP:O1B	2.39	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:232:ASN:ND2	1:B:232:ASN:O	2.40	0.55
1:A:455:ILE:CG2	1:A:456:ASP:N	2.70	0.55
1:B:403:TYR:CE1	1:B:412:LYS:HE3	2.41	0.54
1:B:456:ASP:OD1	1:B:457:LYS:N	2.40	0.54
1:B:102:THR:OG1	1:B:105:GLU:HG3	2.08	0.54
1:B:73:SER:OG	1:B:95:GLY:HA2	2.08	0.53
1:A:41:PHE:N	1:A:500:ARG:HD3	2.24	0.53
1:A:209:GLY:N	3:A:601:ATP:O2A	2.42	0.51
1:A:402:GLU:N	1:A:402:GLU:OE1	2.44	0.50
1:B:402:GLU:OE1	1:B:402:GLU:N	2.44	0.50
1:A:40:ASP:CA	1:A:500:ARG:HB2	2.42	0.49
1:B:501:THR:HG23	1:B:504:ALA:H	1.77	0.49
1:B:210:LYS:N	1:B:210:LYS:CD	2.73	0.49
1:A:455:ILE:N	1:A:455:ILE:CD1	2.78	0.47
1:A:41:PHE:N	1:A:500:ARG:HG3	2.30	0.47
1:B:28:MET:HG3	1:B:351:TYR:CG	2.50	0.46
1:B:188:ILE:HG21	1:B:206:THR:HG21	1.96	0.46
1:A:227:THR:HG21	4:A:602:GDP:O1A	2.16	0.45
1:B:227:THR:CG2	4:B:602:GDP:O1A	2.63	0.45
1:B:487:ARG:HH21	1:B:487:ARG:HB2	1.82	0.45
1:B:412:LYS:O	1:B:453:SER:HA	2.18	0.44
1:B:487:ARG:HB2	1:B:487:ARG:NH2	2.32	0.44
1:A:27:LEU:CD1	1:A:499:PHE:CD1	3.00	0.44
1:A:41:PHE:N	1:A:500:ARG:CD	2.81	0.43
1:A:487:ARG:HH21	1:A:487:ARG:HB2	1.82	0.43
1:A:280:GLN:OE1	1:A:312:GLN:NE2	2.52	0.42
1:A:28:MET:HG3	1:A:351:TYR:CG	2.54	0.42
1:A:99:HIS:HB3	1:A:252:ALA:O	2.20	0.42
1:A:395:GLY:HA2	1:A:412:LYS:HD2	2.00	0.42
1:B:326:ILE:O	1:B:367:ASP:HB3	2.19	0.42
1:A:39:ASN:O	1:A:500:ARG:HD3	2.20	0.42
1:B:395:GLY:HA2	1:B:412:LYS:HD2	2.02	0.41
1:A:36:LEU:C	1:A:36:LEU:HD12	2.40	0.41
1:A:76:MET:HE3	1:A:414:TYR:HE1	1.84	0.41
1:B:232:ASN:ND2	1:B:232:ASN:C	2.73	0.41
1:A:304:ALA:HB1	1:A:316:LEU:HD13	2.03	0.41
1:B:227:THR:HG1	4:B:602:GDP:PA	2.44	0.41
1:B:76:MET:CE	1:B:414:TYR:OH	2.69	0.41
1:B:332:SER:OG	1:B:414:TYR:HE2	2.04	0.40
1:B:376:ILE:HG12	1:B:387:VAL:HG21	2.02	0.40
1:A:188:ILE:HG21	1:A:206:THR:HG21	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:228:ASP:OD2	4:B:602:GDP:O2'	2.29	0.40
3:A:601:ATP:O1A	3:A:601:ATP:O2B	2.38	0.40
1:B:42:LEU:HG	1:B:500:ARG:HD2	2.04	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	475/523 (91%)	461 (97%)	14 (3%)	0	100	100
1	B	477/523 (91%)	460 (96%)	17 (4%)	0	100	100
All	All	952/1046 (91%)	921 (97%)	31 (3%)	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	369/430 (86%)	367 (100%)	2 (0%)	88	93
1	B	368/430 (86%)	365 (99%)	3 (1%)	81	88
All	All	737/860 (86%)	732 (99%)	5 (1%)	84	90

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	280	GLN
1	A	487	ARG
1	B	232	ASN
1	B	280	GLN
1	B	487	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	232	ASN

### 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](#)

11 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	5GP	B	600	-	22,26,26	1.52	3 (13%)	26,40,40	1.34	3 (11%)
3	ATP	B	601	-	26,33,33	1.87	4 (15%)	31,52,52	2.17	8 (25%)
4	GDP	A	603[A]	-	24,30,30	2.37	7 (29%)	30,47,47	1.54	7 (23%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	ACT	A	604	-	3,3,3	0.79	0	3,3,3	1.39	0
4	GDP	A	602	-	24,30,30	2.33	8 (33%)	30,47,47	1.63	7 (23%)
4	GDP	B	603[A]	-	24,30,30	2.39	8 (33%)	30,47,47	1.46	6 (20%)
4	GDP	A	603[B]	-	24,30,30	2.36	8 (33%)	30,47,47	1.54	7 (23%)
4	GDP	B	602	-	24,30,30	1.91	10 (41%)	30,47,47	2.28	13 (43%)
4	GDP	B	603[B]	-	24,30,30	2.39	8 (33%)	30,47,47	1.41	6 (20%)
2	5GP	A	600	-	22,26,26	1.53	3 (13%)	26,40,40	1.33	3 (11%)
3	ATP	A	601	-	26,33,33	1.79	4 (15%)	31,52,52	2.17	9 (29%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	5GP	B	600	-	-	3/6/26/26	0/3/3/3
3	ATP	B	601	-	-	3/18/38/38	0/3/3/3
4	GDP	A	603[A]	-	-	3/12/32/32	0/3/3/3
4	GDP	A	602	-	-	2/12/32/32	0/3/3/3
4	GDP	B	603[A]	-	-	4/12/32/32	0/3/3/3
4	GDP	A	603[B]	-	-	3/12/32/32	0/3/3/3
4	GDP	B	602	-	-	3/12/32/32	0/3/3/3
4	GDP	B	603[B]	-	-	3/12/32/32	0/3/3/3
2	5GP	A	600	-	-	1/6/26/26	0/3/3/3
3	ATP	A	601	-	-	5/18/38/38	0/3/3/3

All (63) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	603[B]	GDP	O4'-C1'	7.41	1.51	1.41
3	B	601	ATP	PA-O5'	7.33	1.89	1.59
4	B	603[A]	GDP	O4'-C1'	7.28	1.51	1.41
4	A	603[B]	GDP	O4'-C1'	7.17	1.51	1.41
4	A	603[A]	GDP	O4'-C1'	7.15	1.51	1.41
3	A	601	ATP	PA-O5'	6.80	1.86	1.59
4	A	602	GDP	O4'-C1'	6.80	1.50	1.41
4	A	602	GDP	C2'-C1'	-4.08	1.47	1.53
4	A	603[A]	GDP	C2'-C1'	-4.04	1.47	1.53
4	A	603[B]	GDP	C2'-C1'	-4.00	1.47	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	603[A]	GDP	C2'-C1'	-3.99	1.47	1.53
2	A	600	5GP	C2-N2	3.98	1.43	1.34
2	B	600	5GP	C2-N2	3.98	1.43	1.34
4	B	603[B]	GDP	C2'-C1'	-3.92	1.47	1.53
2	A	600	5GP	C4-N3	3.77	1.46	1.37
2	B	600	5GP	C4-N3	3.66	1.46	1.37
4	B	602	GDP	PB-O2B	-3.48	1.41	1.54
4	A	603[A]	GDP	C4-N3	3.39	1.45	1.37
4	B	603[A]	GDP	C4-N3	3.39	1.45	1.37
4	B	603[A]	GDP	C2-N2	3.39	1.42	1.34
4	A	603[A]	GDP	C2-N2	3.38	1.42	1.34
4	A	603[B]	GDP	C2-N2	3.37	1.42	1.34
4	B	603[B]	GDP	C2-N2	3.36	1.42	1.34
4	A	603[B]	GDP	C4-N3	3.35	1.45	1.37
4	A	602	GDP	C4-N3	3.34	1.45	1.37
4	A	602	GDP	C2-N2	3.34	1.42	1.34
4	B	603[B]	GDP	C4-N3	3.33	1.45	1.37
4	B	602	GDP	PB-O3B	-3.16	1.42	1.54
4	A	602	GDP	C2'-C3'	-3.11	1.44	1.53
2	A	600	5GP	C2-N1	3.03	1.45	1.37
4	B	603[A]	GDP	C2'-C3'	-3.03	1.45	1.53
4	B	603[B]	GDP	C2'-C3'	-3.01	1.45	1.53
4	A	603[B]	GDP	C2'-C3'	-2.94	1.45	1.53
4	A	603[A]	GDP	C2'-C3'	-2.91	1.45	1.53
2	B	600	5GP	C2-N1	2.90	1.44	1.37
4	B	602	GDP	C2-N2	2.82	1.40	1.34
4	B	603[A]	GDP	O4'-C4'	2.81	1.51	1.45
3	B	601	ATP	O5'-C5'	-2.75	1.34	1.44
4	A	603[A]	GDP	C2-N1	2.74	1.44	1.37
3	A	601	ATP	C2'-C1'	2.72	1.57	1.53
4	A	603[A]	GDP	O4'-C4'	2.72	1.51	1.45
4	A	603[B]	GDP	O4'-C4'	2.71	1.51	1.45
4	A	603[B]	GDP	C2-N1	2.70	1.44	1.37
4	A	602	GDP	O4'-C4'	2.70	1.51	1.45
4	B	603[A]	GDP	C2-N1	2.70	1.44	1.37
4	B	602	GDP	PA-O2A	-2.69	1.42	1.55
4	A	602	GDP	C2-N1	2.69	1.44	1.37
4	B	603[B]	GDP	C2-N1	2.67	1.44	1.37
4	B	602	GDP	C8-N7	-2.66	1.30	1.35
4	B	602	GDP	PB-O1B	-2.63	1.42	1.50
3	A	601	ATP	O5'-C5'	-2.63	1.34	1.44
4	B	603[B]	GDP	O4'-C4'	2.62	1.50	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	601	ATP	C2'-C1'	2.50	1.57	1.53
4	B	602	GDP	O4'-C1'	-2.49	1.37	1.41
4	B	602	GDP	C6-N1	-2.36	1.34	1.37
4	B	603[B]	GDP	C3'-C4'	-2.26	1.47	1.53
4	B	602	GDP	C4-N3	-2.25	1.31	1.37
4	A	602	GDP	C3'-C4'	-2.23	1.47	1.53
3	B	601	ATP	C2-N1	2.15	1.37	1.33
4	B	602	GDP	PA-O1A	-2.13	1.43	1.50
4	B	603[A]	GDP	C3'-C4'	-2.10	1.47	1.53
4	A	603[B]	GDP	C3'-C4'	-2.07	1.47	1.53
3	A	601	ATP	C2-N1	2.06	1.37	1.33

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	602	GDP	O6-C6-N1	5.90	127.61	120.65
4	B	602	GDP	O6-C6-C5	-5.82	113.00	124.37
3	B	601	ATP	O5'-PA-O1A	-5.55	87.37	109.07
3	A	601	ATP	PA-O3A-PB	-5.40	114.28	132.83
3	B	601	ATP	PA-O3A-PB	-5.36	114.43	132.83
3	B	601	ATP	PB-O3B-PG	-5.36	114.44	132.83
3	A	601	ATP	PB-O3B-PG	-4.84	116.21	132.83
3	A	601	ATP	O5'-PA-O1A	-4.79	90.33	109.07
3	A	601	ATP	O2A-PA-O5'	-4.25	88.02	107.75
4	A	602	GDP	PA-O3A-PB	-3.78	119.87	132.83
4	A	602	GDP	C5-C6-N1	3.50	120.13	113.95
2	B	600	5GP	C8-N7-C5	3.38	109.43	102.99
4	B	603[A]	GDP	C5-C6-N1	3.37	119.91	113.95
4	A	603[A]	GDP	C8-N7-C5	3.34	109.36	102.99
4	A	603[A]	GDP	C3'-C2'-C1'	3.33	105.99	100.98
4	B	603[B]	GDP	C5-C6-N1	3.32	119.82	113.95
4	A	603[A]	GDP	C5-C6-N1	3.32	119.82	113.95
4	B	603[A]	GDP	C8-N7-C5	3.32	109.32	102.99
4	A	603[B]	GDP	C5-C6-N1	3.32	119.81	113.95
2	A	600	5GP	C8-N7-C5	3.30	109.27	102.99
2	A	600	5GP	C5-C6-N1	3.28	119.75	113.95
4	A	603[B]	GDP	C8-N7-C5	3.28	109.24	102.99
4	B	603[B]	GDP	C8-N7-C5	3.28	109.23	102.99
2	B	600	5GP	C5-C6-N1	3.27	119.73	113.95
4	A	602	GDP	C3'-C2'-C1'	3.23	105.84	100.98
4	A	602	GDP	C8-N7-C5	3.14	108.97	102.99
4	B	602	GDP	N2-C2-N1	3.08	123.27	116.71

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	602	GDP	C5-C6-N1	3.08	119.38	113.95
3	B	601	ATP	O3G-PG-O3B	-3.00	94.56	104.64
3	B	601	ATP	O2A-PA-O5'	-2.97	93.97	107.75
4	A	603[B]	GDP	C3'-C2'-C1'	2.95	105.42	100.98
4	B	602	GDP	C8-N7-C5	2.94	108.59	102.99
4	B	602	GDP	PA-O3A-PB	-2.89	122.89	132.83
3	A	601	ATP	PA-O5'-C5'	-2.78	105.39	121.68
4	B	602	GDP	O4'-C1'-C2'	-2.77	102.88	106.93
4	A	603[B]	GDP	PA-O3A-PB	-2.72	123.51	132.83
4	B	602	GDP	C2-N1-C6	-2.69	120.14	125.10
4	A	602	GDP	C2-N1-C6	-2.69	120.15	125.10
4	B	603[B]	GDP	C2-N1-C6	-2.68	120.17	125.10
4	B	603[A]	GDP	C2-N1-C6	-2.66	120.19	125.10
4	A	603[A]	GDP	C2-N1-C6	-2.65	120.23	125.10
2	B	600	5GP	C2-N1-C6	-2.64	120.23	125.10
4	B	603[B]	GDP	PA-O3A-PB	-2.64	123.77	132.83
4	A	603[B]	GDP	C2-N1-C6	-2.64	120.24	125.10
4	B	603[A]	GDP	PA-O3A-PB	-2.61	123.86	132.83
3	A	601	ATP	O3G-PG-O2G	2.60	117.58	107.64
2	A	600	5GP	C2-N1-C6	-2.60	120.31	125.10
3	B	601	ATP	C5'-C4'-C3'	-2.56	105.61	115.18
3	A	601	ATP	O3B-PG-O1G	-2.52	97.21	111.19
4	A	602	GDP	O6-C6-C5	-2.50	119.48	124.37
3	A	601	ATP	C5'-C4'-C3'	-2.48	105.88	115.18
4	B	603[B]	GDP	C3'-C2'-C1'	2.43	104.63	100.98
4	B	602	GDP	O3'-C3'-C4'	2.41	118.02	111.05
4	B	603[A]	GDP	C3'-C2'-C1'	2.40	104.60	100.98
4	B	602	GDP	N1-C2-N3	-2.40	118.84	123.32
4	A	603[A]	GDP	PA-O3A-PB	-2.36	124.73	132.83
3	B	601	ATP	O2G-PG-O3B	-2.30	96.93	104.64
4	B	602	GDP	O2B-PB-O3A	2.29	112.33	104.64
3	A	601	ATP	O3G-PG-O3B	-2.27	97.04	104.64
4	A	603[B]	GDP	O6-C6-C5	-2.24	120.00	124.37
4	A	603[A]	GDP	C2'-C3'-C4'	2.23	106.98	102.64
3	B	601	ATP	PA-O5'-C5'	-2.20	108.81	121.68
4	B	602	GDP	O3B-PB-O1B	2.18	119.21	110.68
4	B	603[B]	GDP	O6-C6-C5	-2.18	120.12	124.37
4	B	603[A]	GDP	O6-C6-C5	-2.15	120.16	124.37
4	A	603[A]	GDP	O6-C6-C5	-2.14	120.19	124.37
4	A	603[B]	GDP	C2'-C3'-C4'	2.12	106.76	102.64
4	A	602	GDP	C2'-C3'-C4'	2.08	106.69	102.64
4	B	602	GDP	O2A-PA-O1A	2.08	122.50	112.24

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	600	5GP	C5'-O5'-P-O3P
4	A	603[B]	GDP	C5'-O5'-PA-O3A
4	B	602	GDP	PA-O3A-PB-O2B
4	B	603[A]	GDP	PB-O3A-PA-O5'
4	B	603[A]	GDP	C5'-O5'-PA-O1A
4	B	603[A]	GDP	C5'-O5'-PA-O2A
4	B	603[B]	GDP	C5'-O5'-PA-O3A
3	A	601	ATP	C3'-C4'-C5'-O5'
3	A	601	ATP	O4'-C4'-C5'-O5'
2	A	600	5GP	C5'-O5'-P-O1P
4	A	603[B]	GDP	PB-O3A-PA-O1A
4	A	603[A]	GDP	PB-O3A-PA-O5'
2	B	600	5GP	C5'-O5'-P-O2P
4	A	603[A]	GDP	C5'-O5'-PA-O3A
4	A	602	GDP	O4'-C4'-C5'-O5'
3	B	601	ATP	PB-O3A-PA-O2A
4	A	603[A]	GDP	C5'-O5'-PA-O1A
4	A	603[B]	GDP	C5'-O5'-PA-O2A
4	B	603[B]	GDP	C5'-O5'-PA-O1A
4	B	603[B]	GDP	C5'-O5'-PA-O2A
3	A	601	ATP	PA-O3A-PB-O2B
2	B	600	5GP	C3'-C4'-C5'-O5'
3	B	601	ATP	C3'-C4'-C5'-O5'
3	A	601	ATP	PB-O3B-PG-O2G
4	B	603[A]	GDP	C5'-O5'-PA-O3A
4	A	602	GDP	C3'-C4'-C5'-O5'
3	A	601	ATP	PA-O3A-PB-O1B
3	B	601	ATP	C5'-O5'-PA-O1A
4	B	602	GDP	O4'-C4'-C5'-O5'
4	B	602	GDP	PA-O3A-PB-O1B

There are no ring outliers.

7 monomers are involved in 16 short contacts:

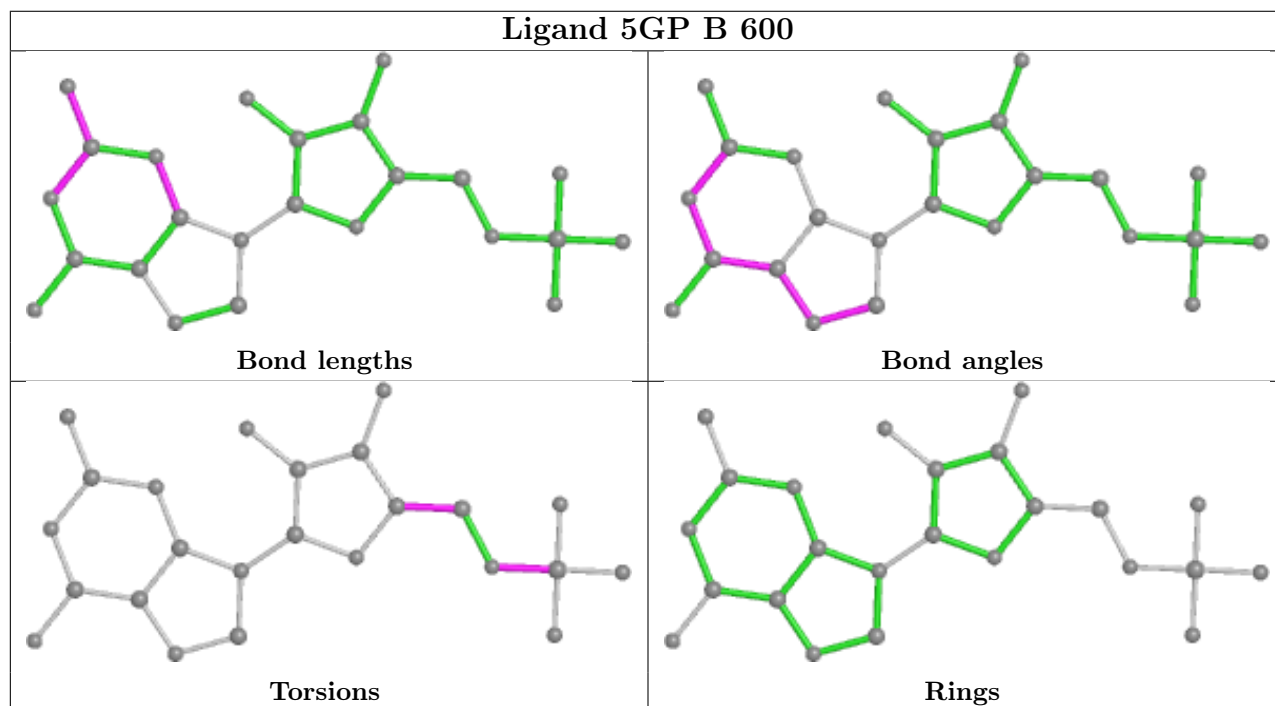
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	600	5GP	1	0
3	B	601	ATP	2	0
4	A	602	GDP	1	0
4	B	602	GDP	5	0
4	B	603[B]	GDP	4	0

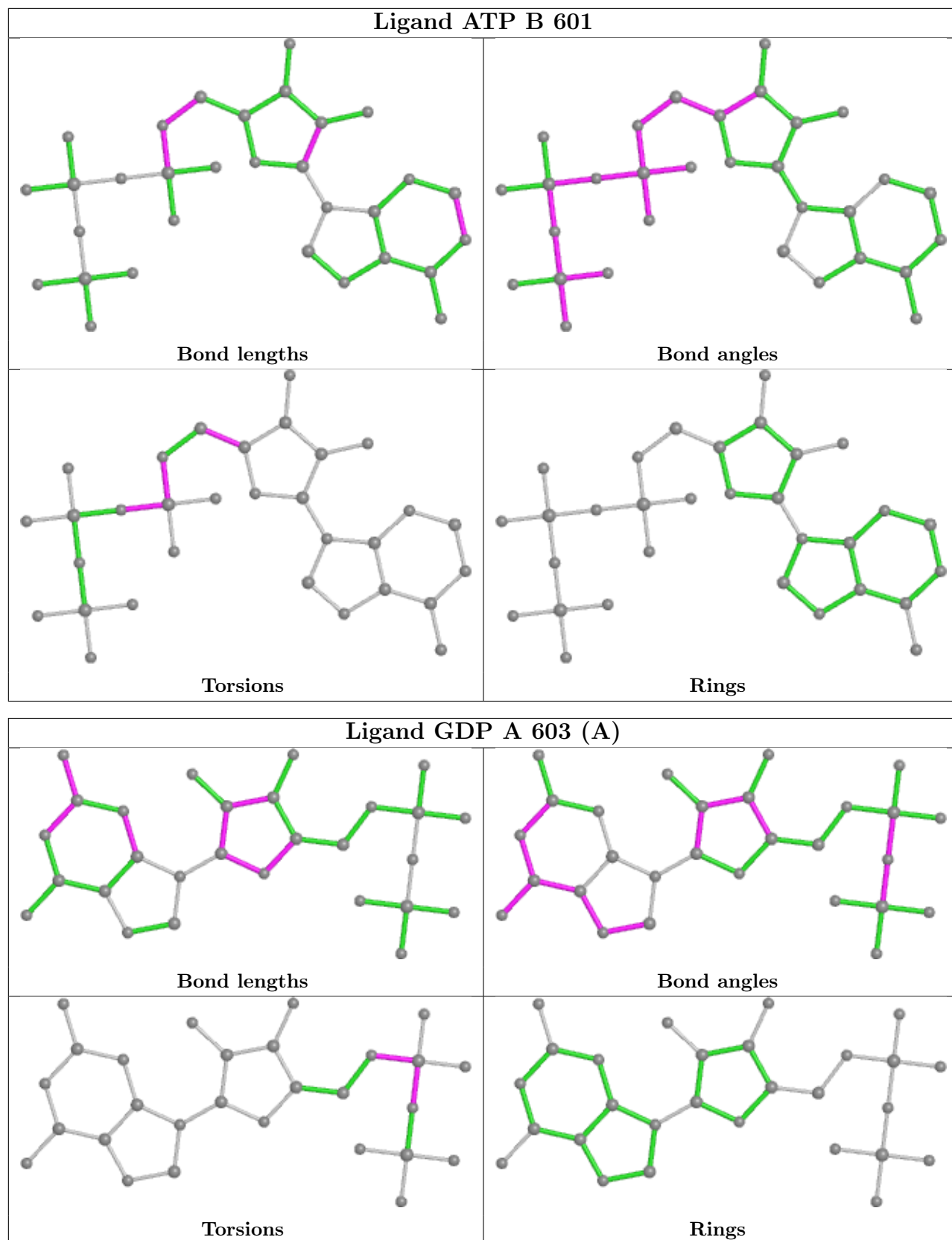
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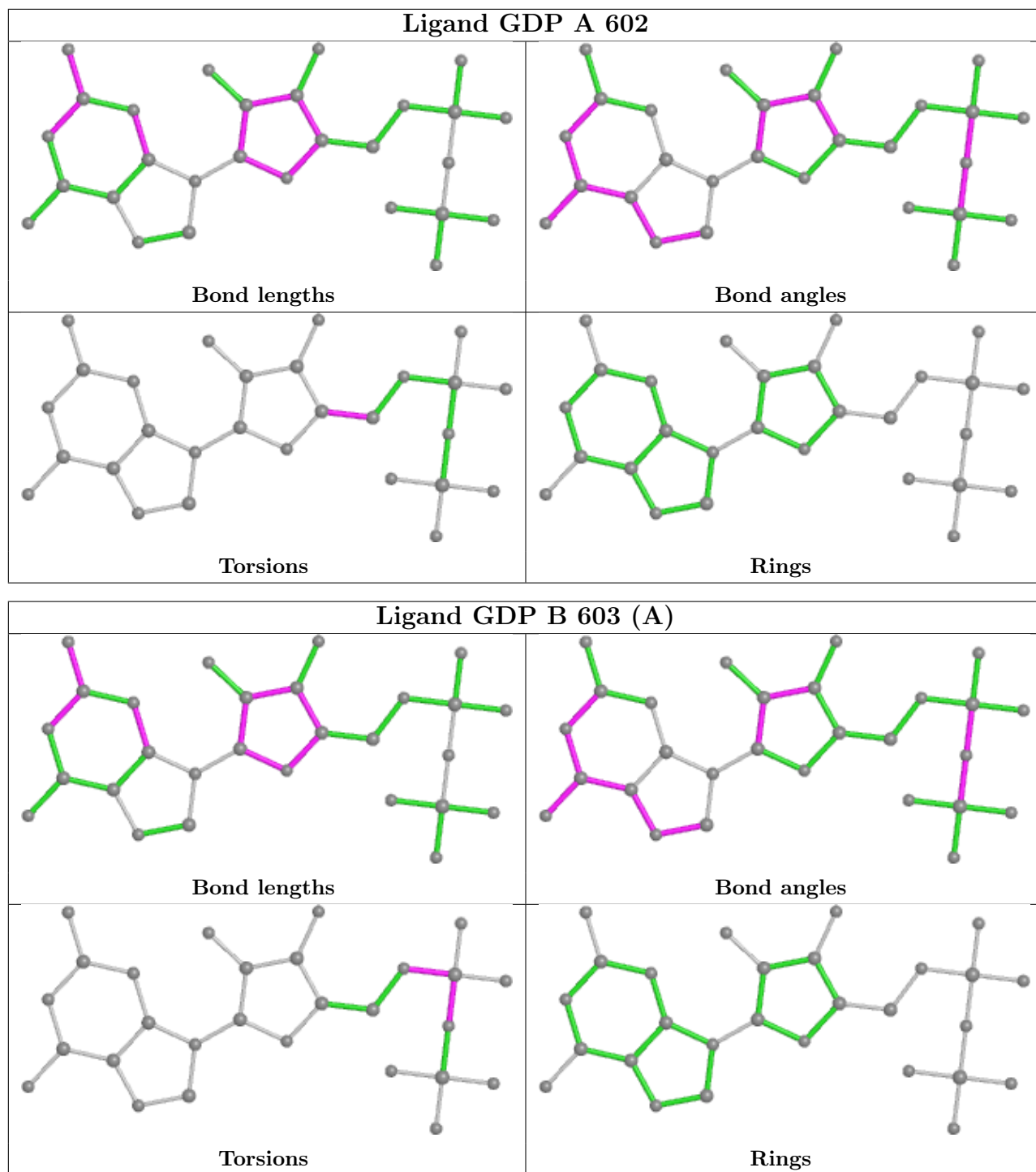
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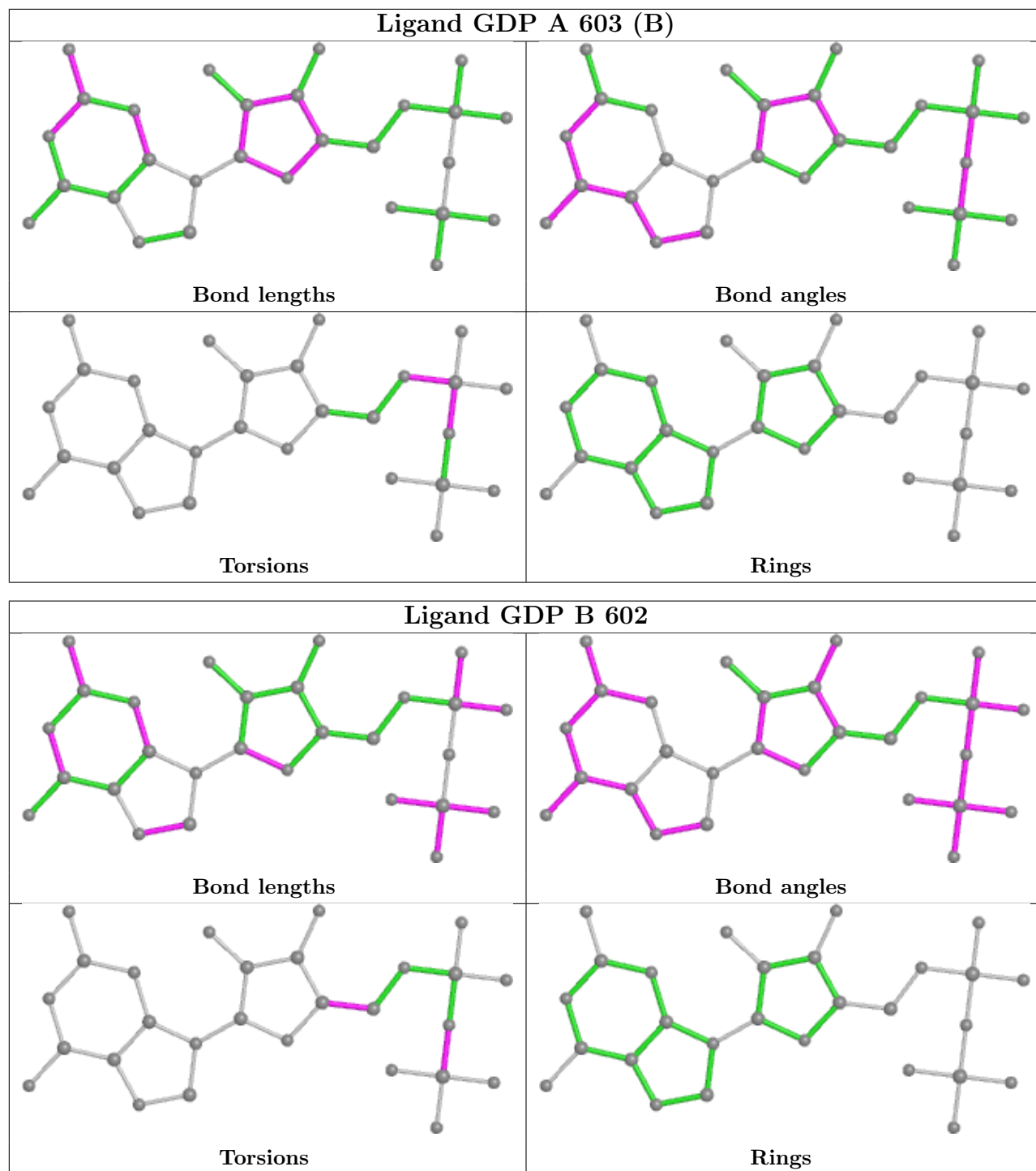
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	600	5GP	1	0
3	A	601	ATP	2	0

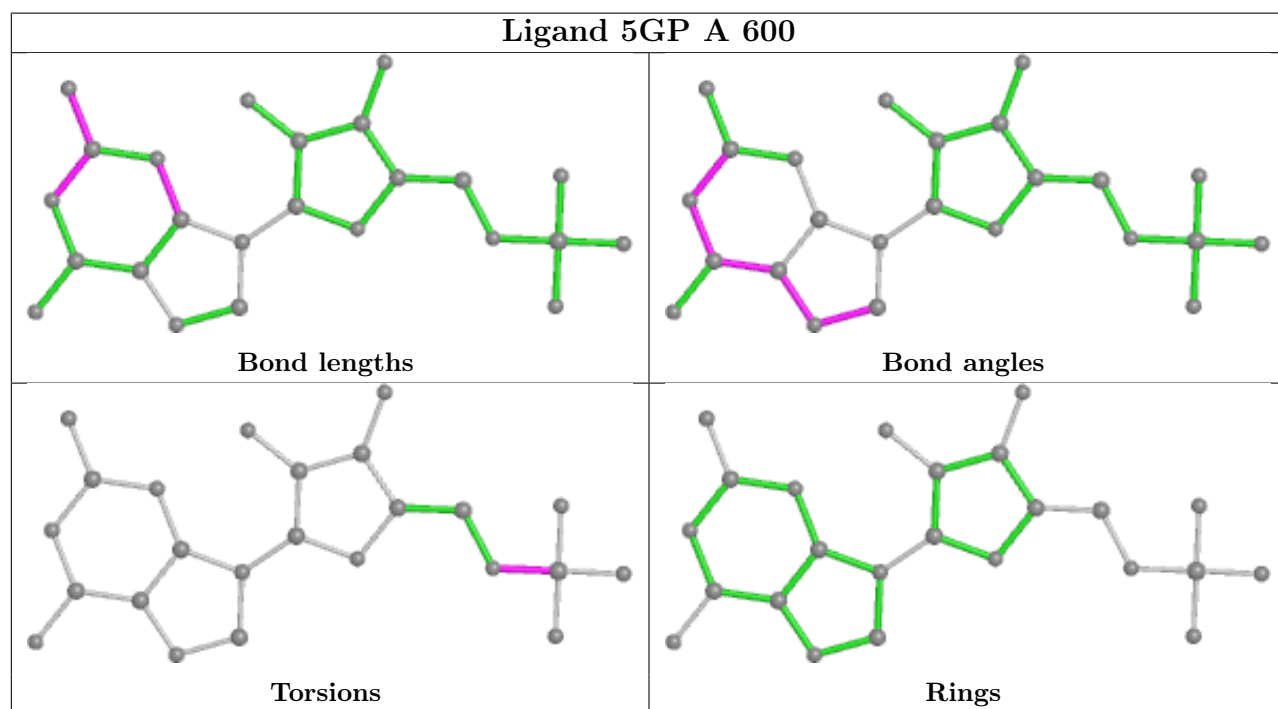
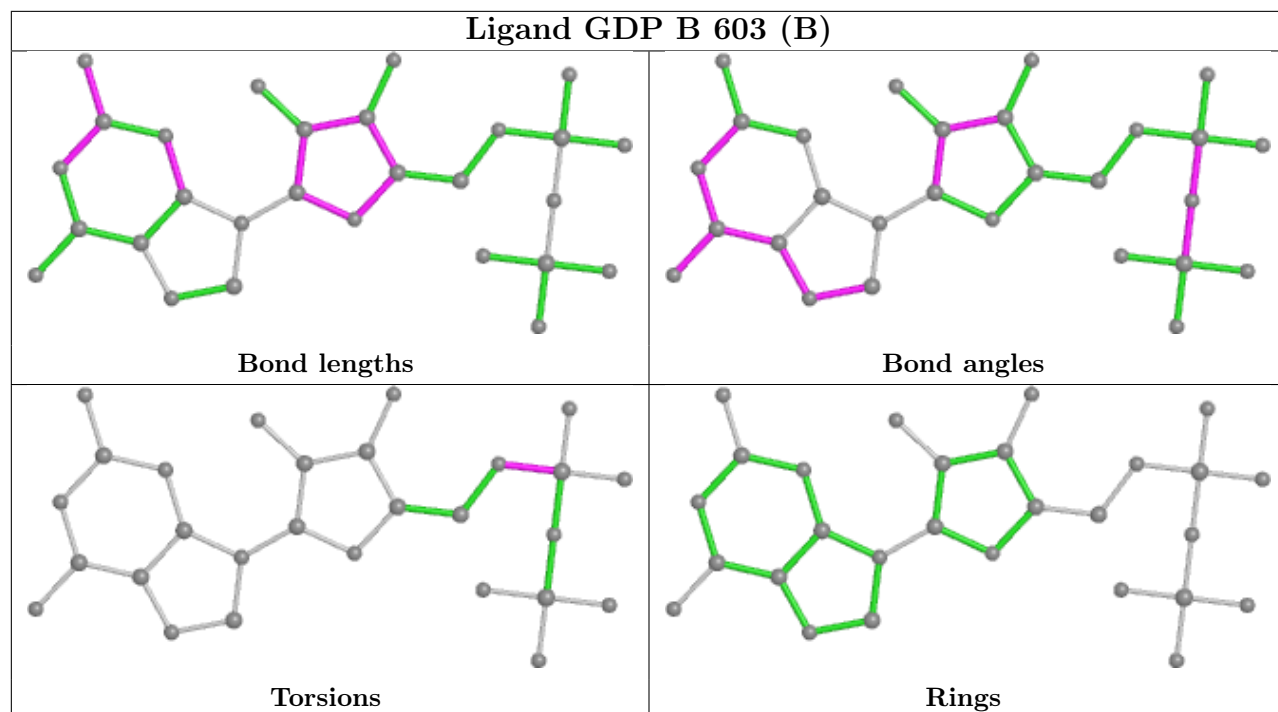
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

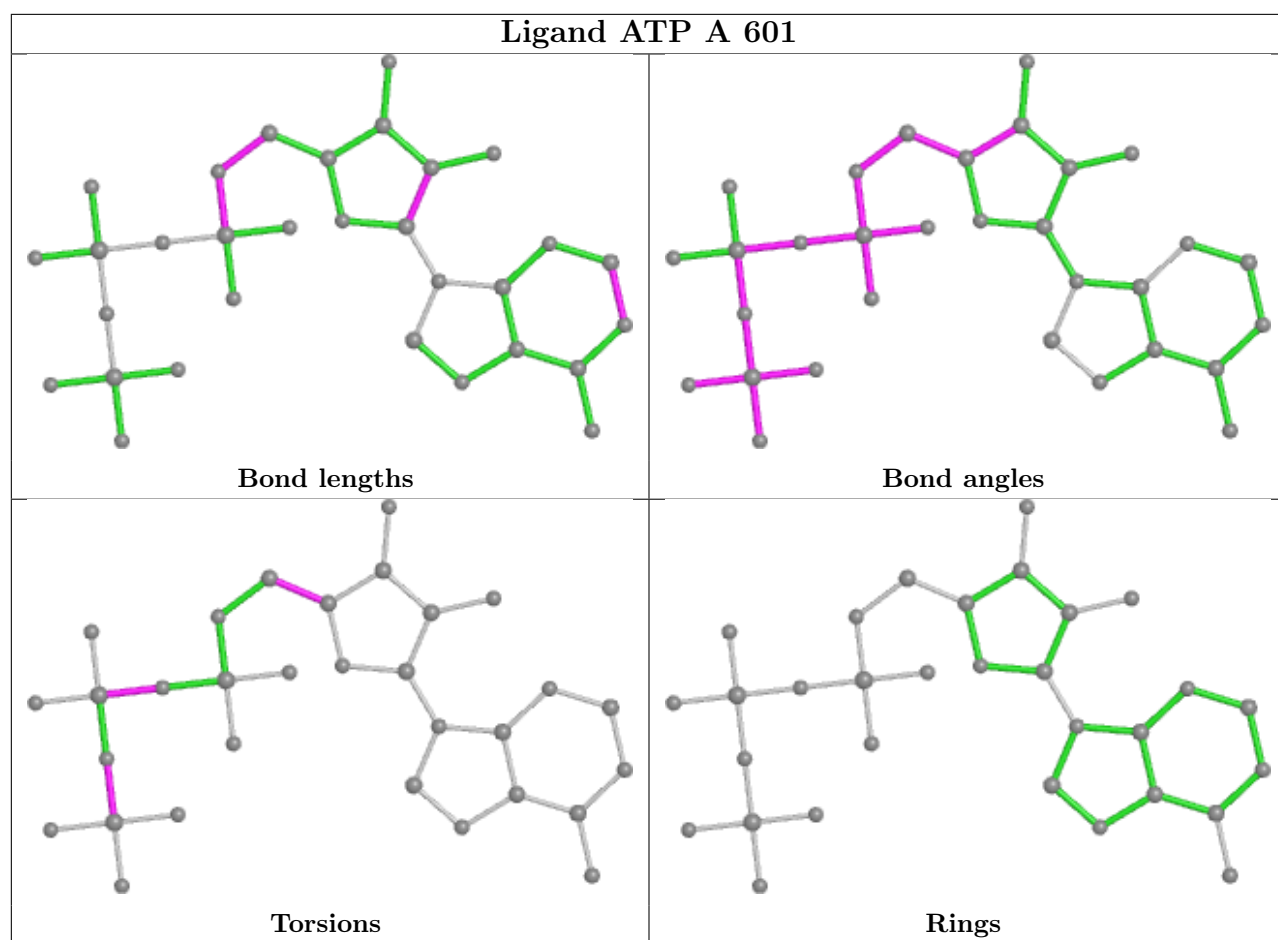












## 5.7 Other polymers [i](#)

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

### 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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	488/523 (93%)	0.47	34 (6%) 16 13	41, 72, 111, 151	0
1	B	489/523 (93%)	0.40	28 (5%) 23 20	41, 72, 115, 149	0
All	All	977/1046 (93%)	0.43	62 (6%) 20 16	41, 72, 113, 151	0

All (62) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	513	LEU	7.3
1	A	513	LEU	5.4
1	A	413	THR	5.3
1	B	512	ASN	5.2
1	B	340	MET	4.9
1	A	503	SER	4.7
1	A	339	VAL	4.7
1	A	340	MET	4.6
1	A	404	PHE	4.5
1	B	420	ILE	4.5
1	A	194	ILE	4.2
1	A	414	TYR	4.2
1	A	454	VAL	4.1
1	B	407	ASP	4.0
1	A	420	ILE	3.6
1	B	447	ALA	3.6
1	A	520	LEU	3.4
1	A	453	SER	3.3
1	A	343	GLY	3.3
1	B	414	TYR	3.3
1	B	404	PHE	3.3
1	A	504	ALA	3.2
1	B	515	SER	3.2
1	B	504	ALA	3.2

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Mol	Chain	Res	Type	RSRZ
1	A	447	ALA	3.2
1	A	510	VAL	3.2
1	B	171	PHE	3.1
1	A	452	GLY	2.9
1	B	335	ILE	2.9
1	A	338	GLU	2.8
1	A	334	CYS	2.8
1	B	507	GLU	2.8
1	B	341	ALA	2.8
1	B	521	PHE	2.6
1	B	450	VAL	2.6
1	A	30	SER	2.6
1	A	500	ARG	2.6
1	A	133	VAL	2.6
1	A	505	GLN	2.5
1	B	29	ASP	2.5
1	B	30	SER	2.5
1	B	339	VAL	2.5
1	A	512	ASN	2.4
1	B	471	LEU	2.4
1	B	520	LEU	2.4
1	A	335	ILE	2.3
1	B	510	VAL	2.3
1	A	121	ILE	2.3
1	A	514	HIS	2.3
1	A	393	LEU	2.3
1	A	336	THR	2.2
1	B	514	HIS	2.2
1	B	463	TYR	2.2
1	A	333	ILE	2.2
1	B	500	ARG	2.2
1	A	515	SER	2.2
1	A	264	ALA	2.1
1	B	334	CYS	2.1
1	B	36	LEU	2.1
1	B	203	LEU	2.1
1	A	455	ILE	2.0
1	A	466	TYR	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains

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

### 6.3 Carbohydrates [i](#)

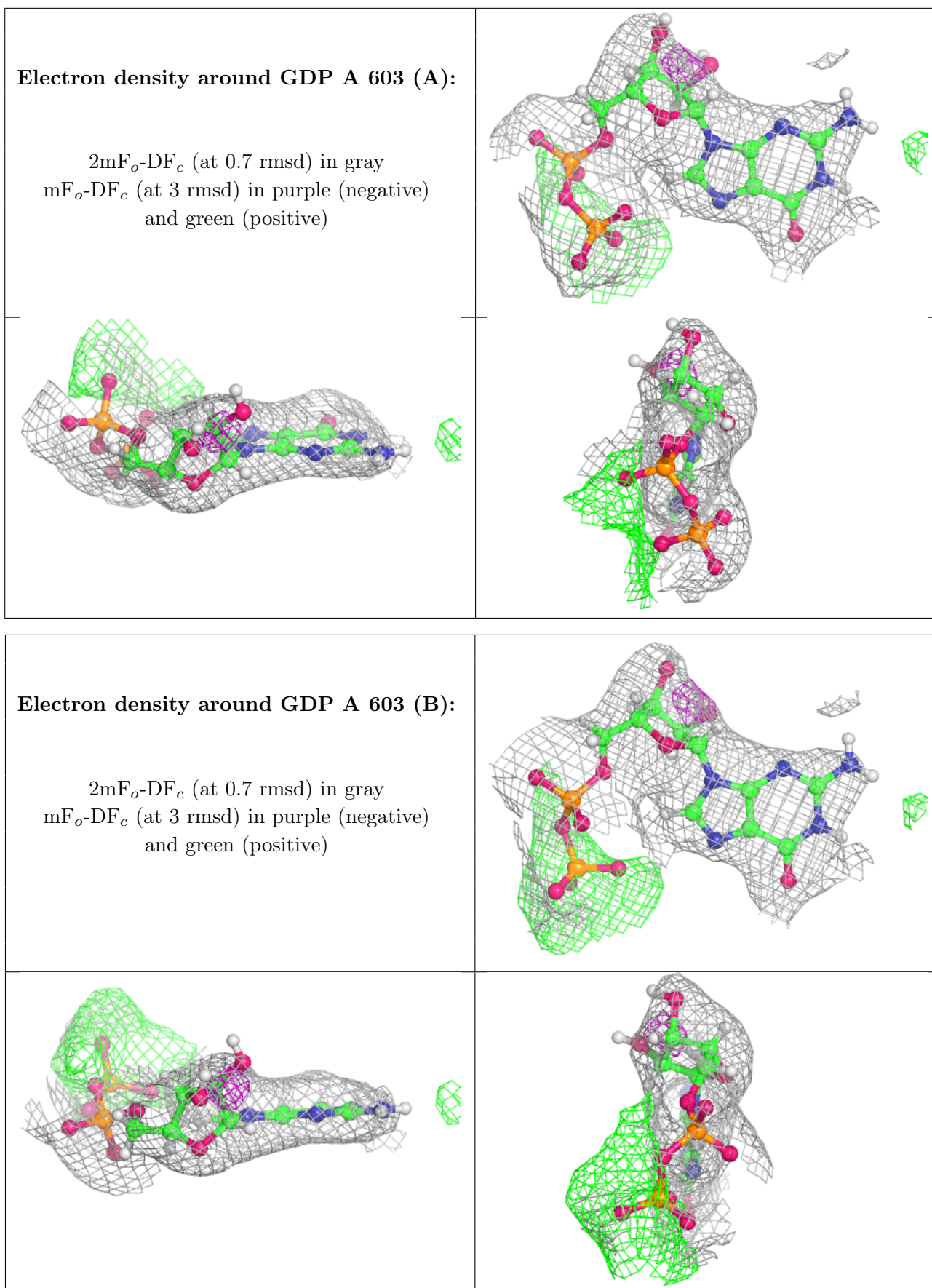
There are no monosaccharides in this entry.

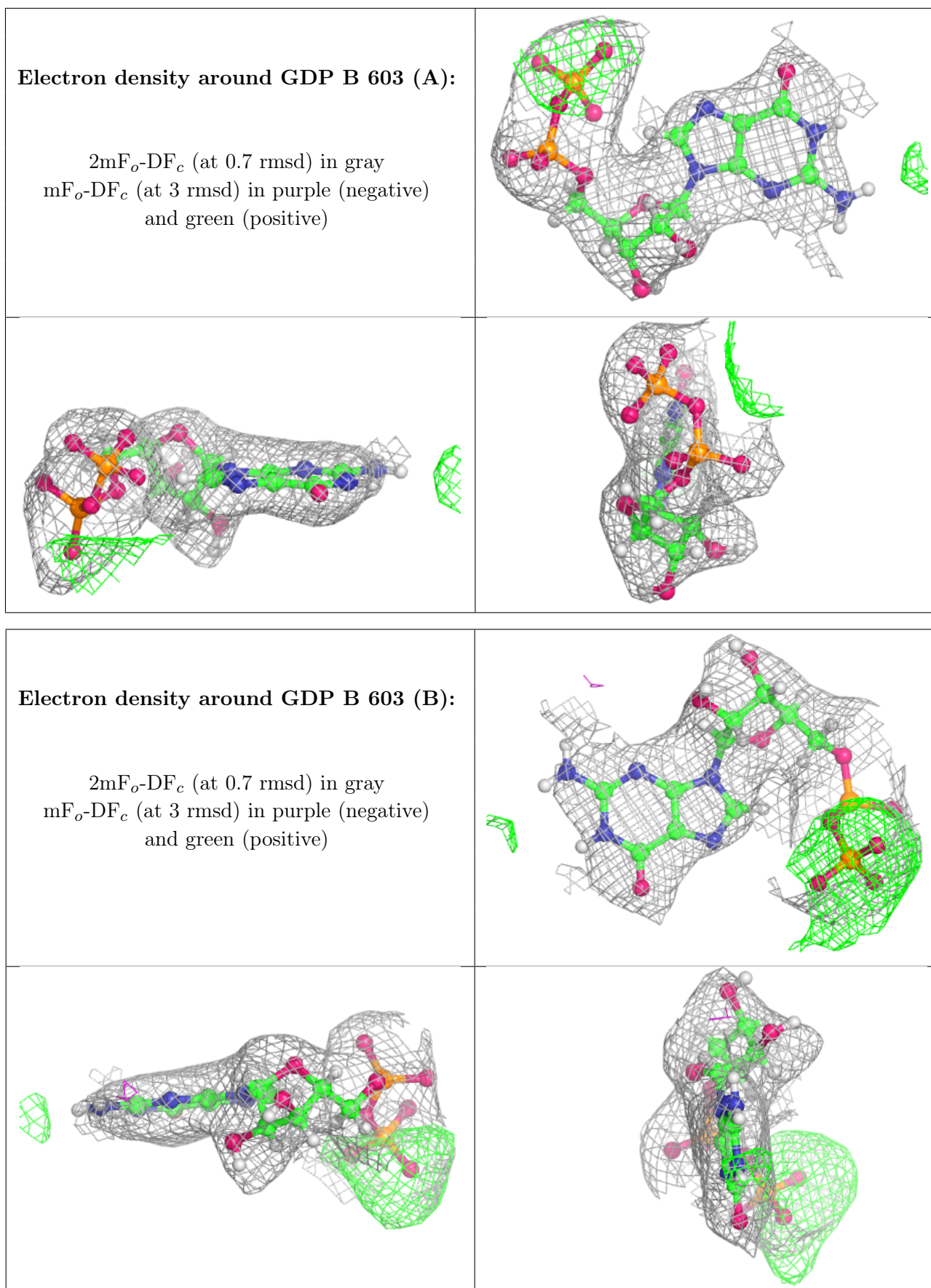
### 6.4 Ligands [i](#)

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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
4	GDP	A	603[A]	28/28	0.82	0.20	67,71,87,88	40
4	GDP	A	603[B]	28/28	0.82	0.20	66,71,86,87	40
4	GDP	B	603[A]	28/28	0.85	0.19	64,70,85,85	40
4	GDP	B	603[B]	28/28	0.85	0.19	59,70,85,85	40
2	5GP	B	600	24/24	0.88	0.22	56,76,96,98	35
2	5GP	A	600	24/24	0.91	0.15	59,85,108,110	0
4	GDP	B	602	28/28	0.94	0.16	56,64,76,77	0
3	ATP	B	601	31/31	0.94	0.16	64,68,80,81	0
4	GDP	A	602	28/28	0.94	0.15	67,69,82,82	0
3	ATP	A	601	31/31	0.95	0.15	67,69,83,84	0
5	ACT	A	604	4/4	0.95	0.09	59,60,71,71	0

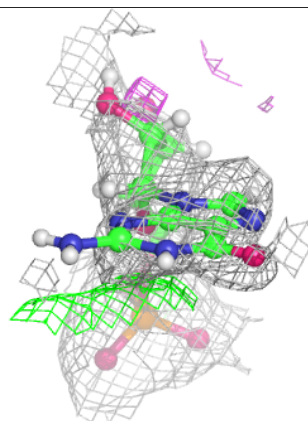
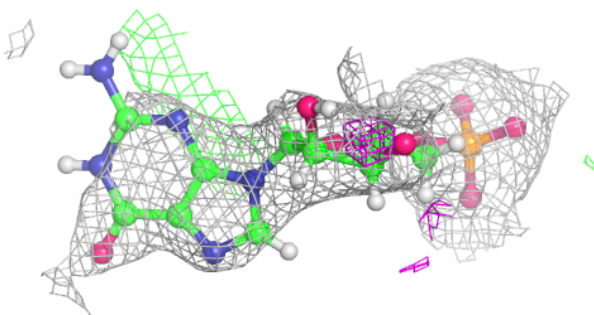
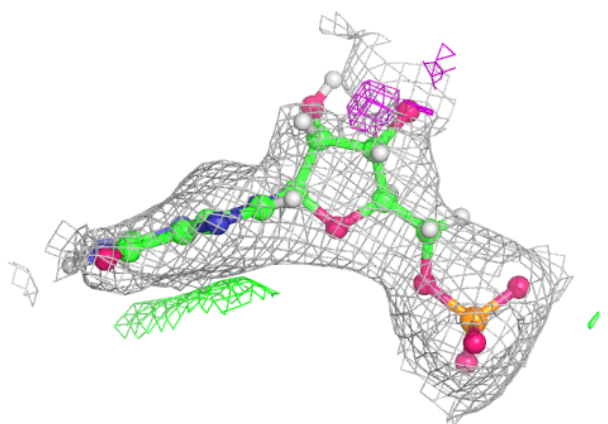
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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



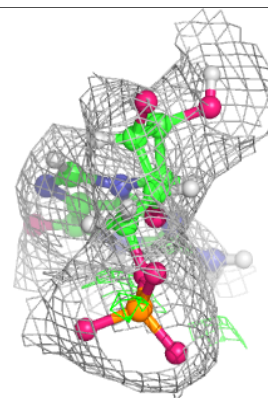
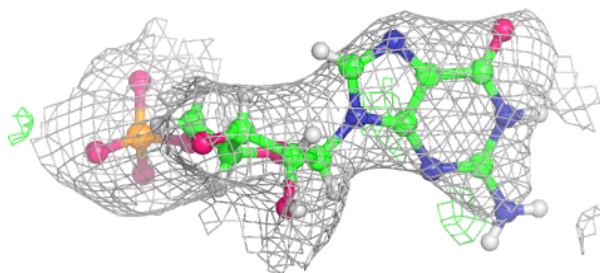
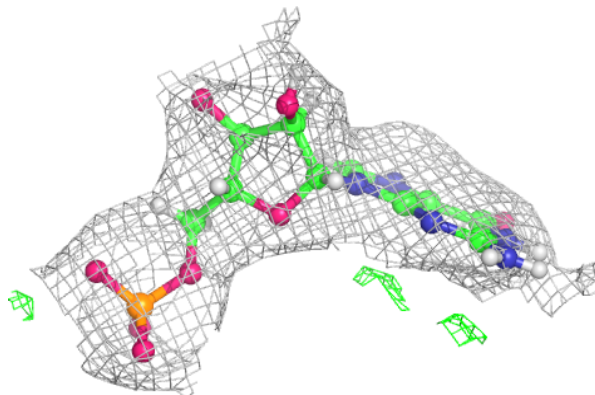


**Electron density around 5GP B 600:**

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

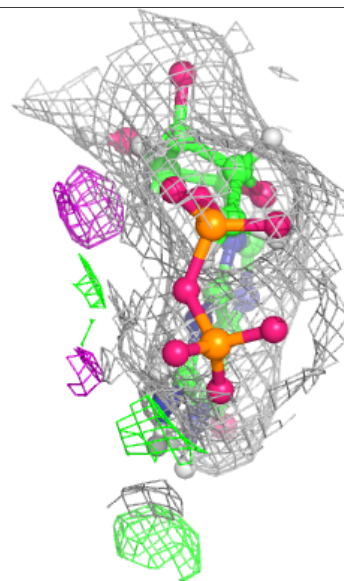
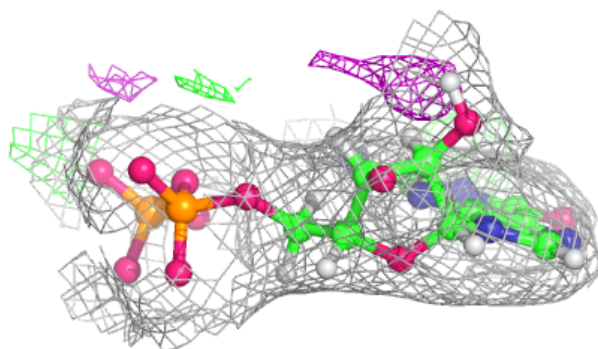
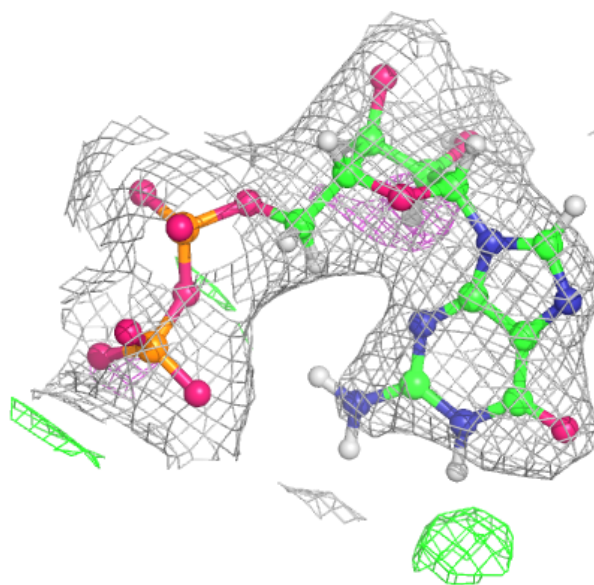
**Electron density around 5GP A 600:**

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



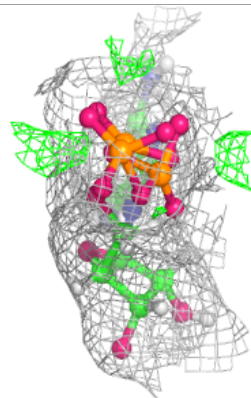
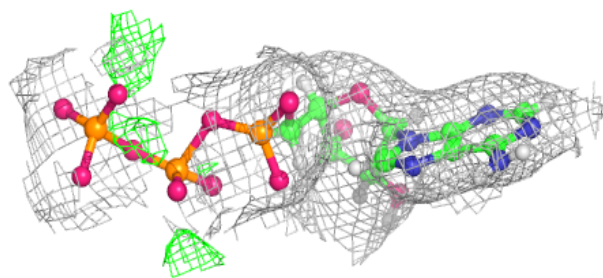
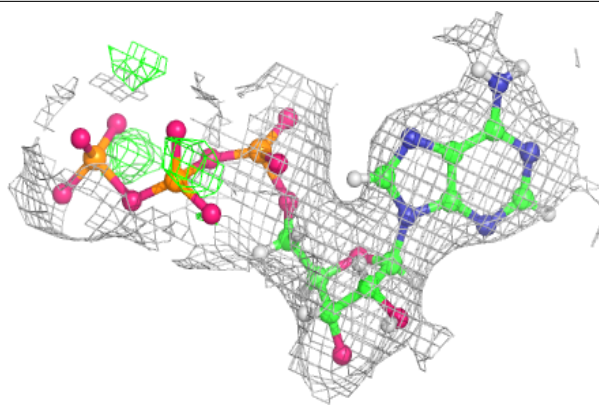
**Electron density around GDP B 602:**

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



**Electron density around ATP B 601:**

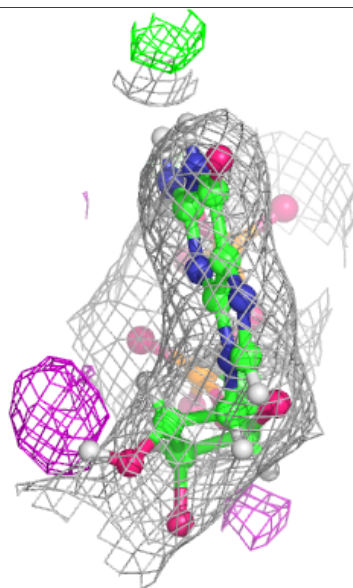
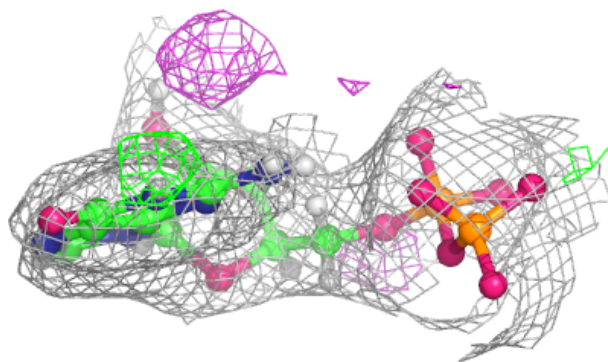
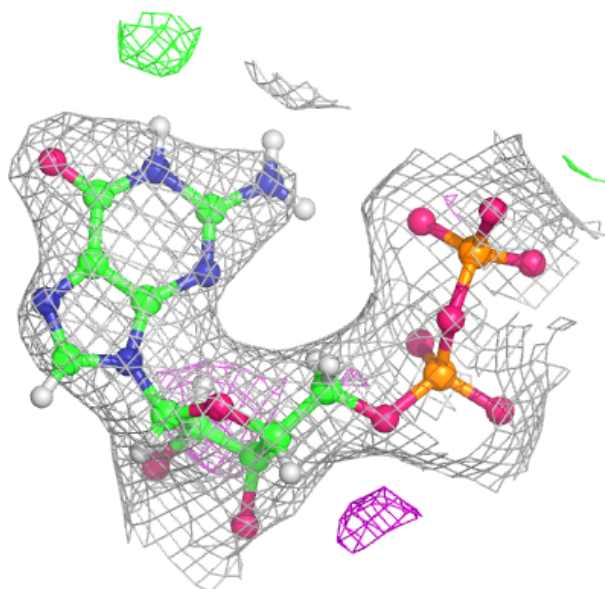
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

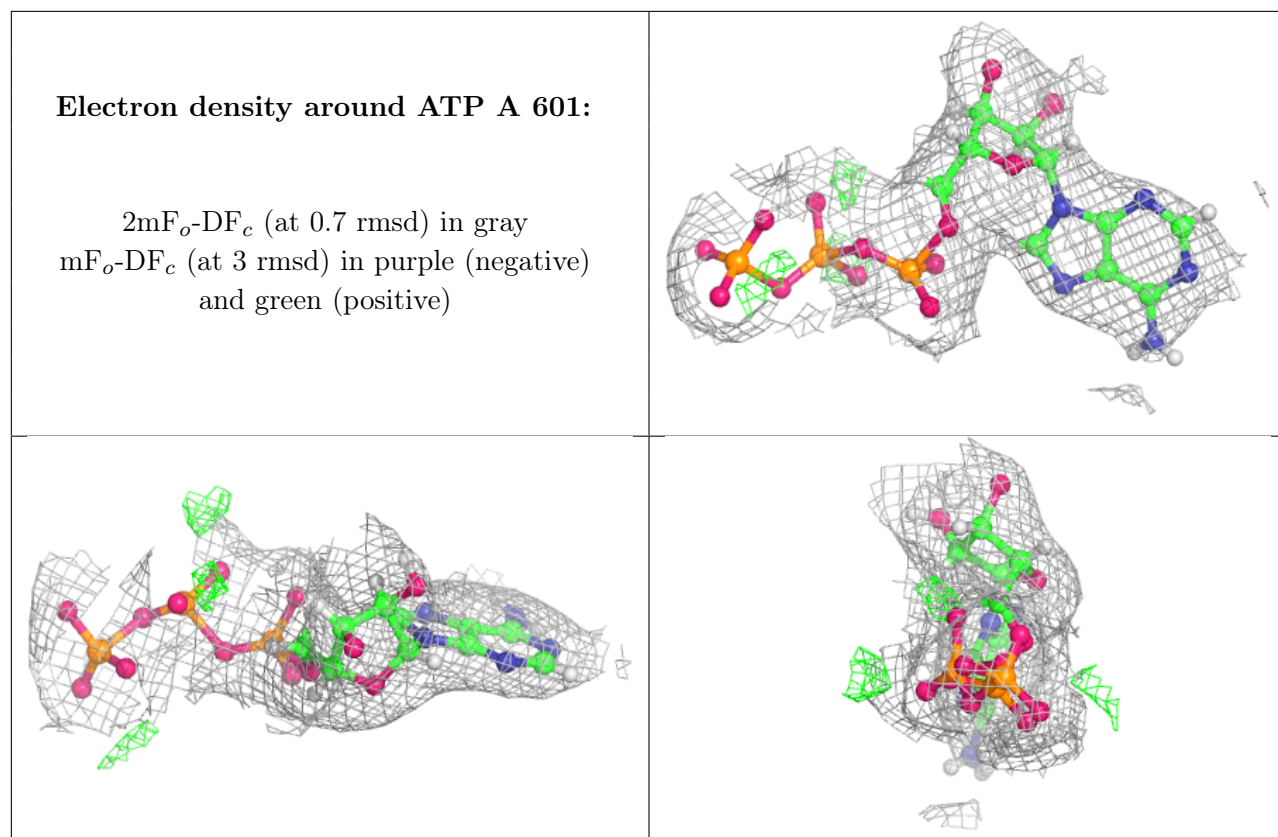




**Electron density around GDP A 602:**

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





## 6.5 Other polymers [i](#)

There are no such residues in this entry.