



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 07:45 AM UTC

PDB ID : 7YCC / pdb_00007ycc
Title : KRas G12C in complex with Compound 5c
Authors : Amano, Y.
Deposited on : 2022-07-01
Resolution : 1.79 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

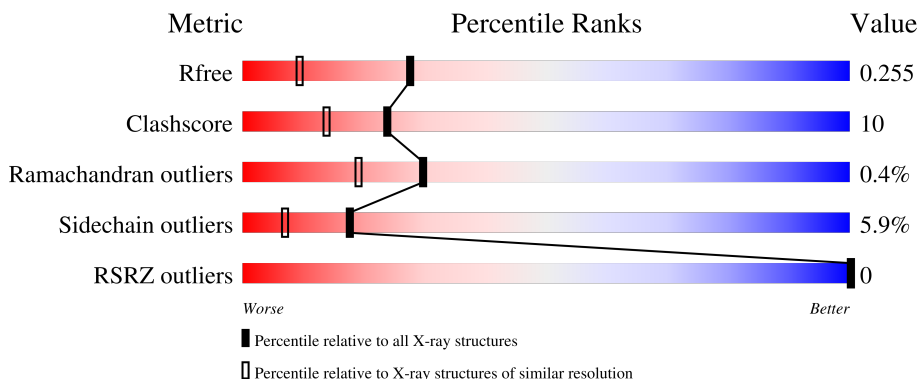
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.79 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	7662 (1.80-1.80)
Clashscore	190562	8479 (1.80-1.80)
Ramachandran outliers	187476	8391 (1.80-1.80)
Sidechain outliers	187428	8390 (1.80-1.80)
RSRZ outliers	180081	7663 (1.80-1.80)

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	170	 81% 15% . .
1	B	170	 75% 18% 5% .
1	C	170	 79% 14% . .

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 4375 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.

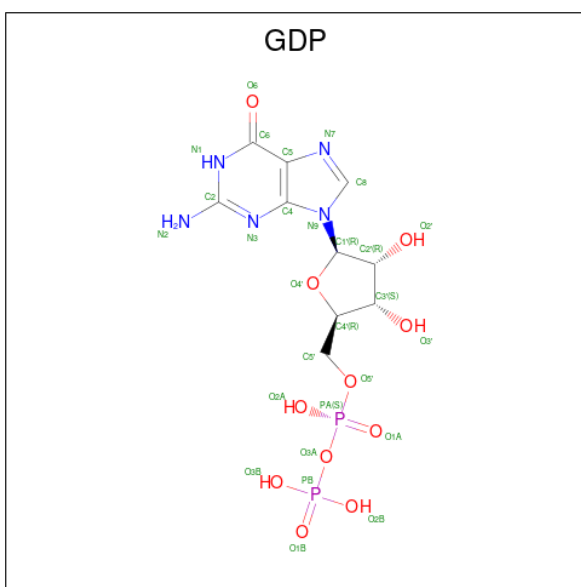
- Molecule 1 is a protein called Isoform 2B of GTPase KRas.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	165	Total	C	N	O	S	0	0	0
			1320	826	228	259	7			
1	B	166	Total	C	N	O	S	0	0	0
			1325	829	229	260	7			
1	C	163	Total	C	N	O	S	0	0	0
			1301	815	223	257	6			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP P01116-2
A	12	CYS	GLY	engineered mutation	UNP P01116-2
A	118	SER	CYS	engineered mutation	UNP P01116-2
B	0	GLY	-	expression tag	UNP P01116-2
B	12	CYS	GLY	engineered mutation	UNP P01116-2
B	118	SER	CYS	engineered mutation	UNP P01116-2
C	0	GLY	-	expression tag	UNP P01116-2
C	12	CYS	GLY	engineered mutation	UNP P01116-2
C	118	SER	CYS	engineered mutation	UNP P01116-2

- Molecule 2 is GUANOSINE-5'-DIPHOSPHATE (CCD ID: GDP) (formula: C₁₀H₁₅N₅O₁₁P₂).

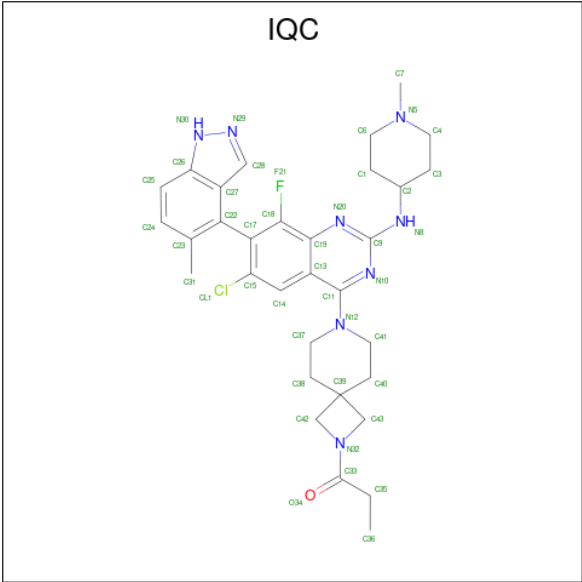


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			28	10	5	11	2		
2	B	1	Total	C	N	O	P	0	0
			28	10	5	11	2		
2	C	1	Total	C	N	O	P	0	0
			28	10	5	11	2		

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

- Molecule 4 is 1-[7-[6-chloranyl-8-fluoranyl-7-(5-methyl-1 {H}-indazol-4-yl)-2-[(1-methylpiperidin-4-yl)amino]quinazolin-4-yl]-2,7-diazaspiro[3.5]nonan-2-yl]propan-1-one (CCD ID: IQC) (formula: C₃₂H₃₈ClFN₈O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	A	1	Total	C	Cl	F	N	O	0	0
			43	32	1	1	8	1		
4	B	1	Total	C	Cl	F	N	O	0	0
			43	32	1	1	8	1		
4	C	1	Total	C	Cl	F	N	O	0	0
			43	32	1	1	8	1		

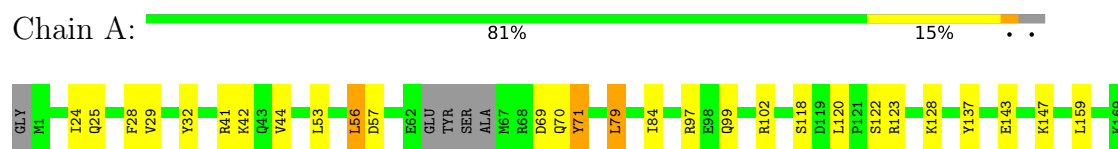
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	66	Total	O	0	0
			66	66		
5	B	76	Total	O	0	0
			76	76		
5	C	71	Total	O	0	0
			71	71		

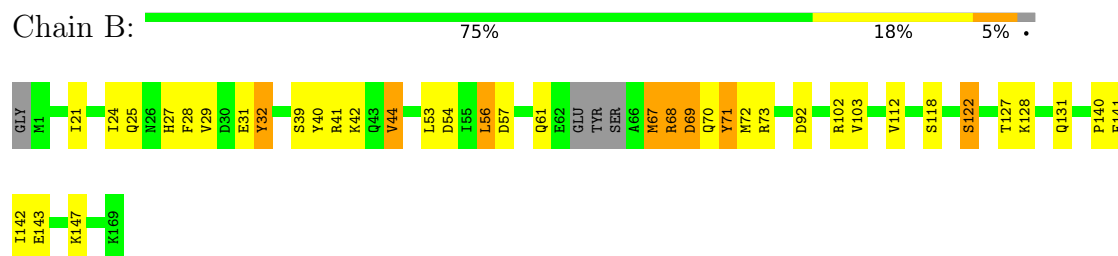
3 Residue-property plots [i](#)

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.

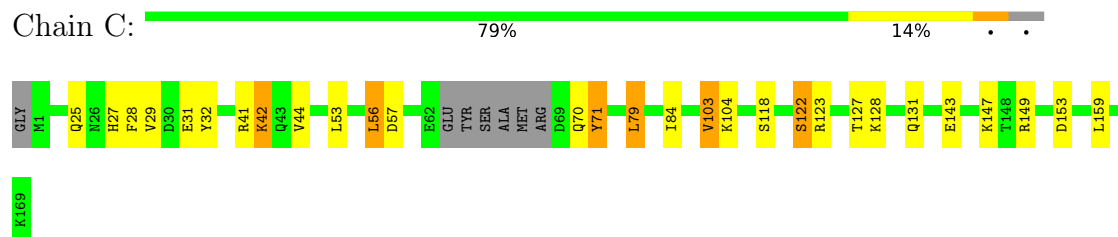
- Molecule 1: Isoform 2B of GTPase KRas



- Molecule 1: Isoform 2B of GTPase KRas



- Molecule 1: Isoform 2B of GTPase KRas



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	96.27Å 94.41Å 67.42Å 90.00° 91.49° 90.00°	Depositor
Resolution (Å)	33.72 – 1.79 33.72 – 1.79	Depositor EDS
% Data completeness (in resolution range)	94.1 (33.72-1.79) 94.1 (33.72-1.79)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	7.40 (at 1.79Å)	Xtriage
Refinement program	REFMAC 5.8.0257	Depositor
R, R_{free}	0.212 , 0.255 0.212 , 0.255	Depositor DCC
R_{free} test set	2709 reflections (4.80%)	wwPDB-VP
Wilson B-factor (Å ²)	27.6	Xtriage
Anisotropy	0.041	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 33.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.019 for -1/2*h-1/2*k+1,1/2*h+1/2*k+1,-1/2*h+1/2*k 0.017 for -1/2*h-1/2*k-l,1/2*h+1/2*k-l,1/2*h-1/2*k 0.017 for -1/2*h+1/2*k-l,-1/2*h+1/2*k+1,1/2*h+1/2*k 0.015 for -1/2*h+1/2*k+1,-1/2*h+1/2*k-l,-1/2*h-1/2*k 0.015 for k,h,-l 0.022 for -k,-h,-l 0.459 for -1/2*h+1/2*k+1,1/2*h-1/2*k+1,1/2*h+1/2*k 0.468 for -1/2*h-1/2*k+1,-1/2*h-1/2*k-l,1/2*h-1/2*k 0.019 for -1/2*h+1/2*k-l,1/2*h-1/2*k-l,-1/2*h-1/2*k 0.014 for -1/2*h-1/2*k-l,-1/2*h-1/2*k+1,-1/2*h+1/2*k 0.024 for -h,-k,l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	4375	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

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.

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.16% of the height of the origin peak. No significant pseudotranslation is detected.*

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: GDP, MG, IQC

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	0.62	0/1339	1.19	0/1803
1	B	0.62	0/1344	1.18	1/1810 (0.1%)
1	C	0.61	0/1320	1.16	0/1779
All	All	0.62	0/4003	1.18	1/5392 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	92	ASP	CA-CB-CG	5.33	117.93	112.60

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	1320	0	1308	21	0
1	B	1325	0	1313	39	0
1	C	1301	0	1286	20	0
2	A	28	0	12	0	0
2	B	28	0	12	0	0
2	C	28	0	12	0	0
3	A	1	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	1	0	0	0	0
4	A	43	0	0	1	0
4	B	43	0	0	1	0
4	C	43	0	0	1	0
5	A	66	0	0	3	0
5	B	76	0	0	12	1
5	C	71	0	0	2	0
All	All	4375	0	3943	82	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

All (82) 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:127:THR:HB	5:B:343:HOH:O	1.39	1.22
1:B:102:ARG:HB2	5:B:362:HOH:O	1.41	1.18
1:B:112:VAL:HG13	5:B:356:HOH:O	1.69	0.91
1:B:142:ILE:HG13	5:B:356:HOH:O	1.71	0.91
1:B:102:ARG:CB	5:B:362:HOH:O	2.05	0.91
1:B:71:TYR:HE1	5:B:326:HOH:O	1.63	0.80
1:B:42:LYS:HD3	1:B:44:VAL:HG13	1.72	0.70
1:C:56:LEU:HD12	1:C:71:TYR:CG	2.30	0.67
1:A:24:ILE:HG22	1:A:25:GLN:HG2	1.78	0.66
1:A:122:SER:HA	5:A:318:HOH:O	2.00	0.61
1:C:28:PHE:CG	1:C:147:LYS:HA	2.36	0.61
1:B:69:ASP:H	1:B:72:MET:H	1.49	0.60
1:B:69:ASP:HA	1:B:72:MET:HB2	1.83	0.60
1:B:56:LEU:HD12	1:B:71:TYR:CG	2.38	0.59
1:B:29:VAL:HG11	1:B:32:TYR:HB2	1.85	0.58
4:B:203:IQC:C37	4:B:203:IQC:C14	2.82	0.57
1:C:103:VAL:HG12	1:C:104:LYS:HD3	1.86	0.57
1:B:31:GLU:O	1:B:32:TYR:O	2.22	0.57
1:B:25:GLN:HB2	1:B:27:HIS:HD2	1.69	0.56
1:C:149:ARG:HH12	1:C:153:ASP:CG	2.14	0.56
1:C:56:LEU:HD12	1:C:71:TYR:CB	2.37	0.55
1:B:68:ARG:O	1:B:69:ASP:HB2	2.07	0.55
1:A:56:LEU:HD12	1:A:71:TYR:CG	2.42	0.55
1:A:56:LEU:CD2	1:A:56:LEU:C	2.81	0.54
1:B:122:SER:HA	5:B:333:HOH:O	2.07	0.54

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:127:THR:HG22	1:B:131:GLN:HE21	1.73	0.54
1:C:56:LEU:HD23	1:C:57:ASP:N	2.23	0.53
1:A:56:LEU:HD12	1:A:71:TYR:CB	2.38	0.53
1:B:71:TYR:CE1	5:B:326:HOH:O	2.47	0.53
1:C:42:LYS:HE3	5:C:350:HOH:O	2.08	0.53
1:B:28:PHE:CG	1:B:147:LYS:HA	2.44	0.53
1:C:56:LEU:C	1:C:56:LEU:CD2	2.82	0.53
1:B:56:LEU:CD2	1:B:56:LEU:C	2.82	0.52
1:A:118:SER:HB3	1:A:143:GLU:HG2	1.92	0.51
1:C:29:VAL:HG11	1:C:32:TYR:HB2	1.92	0.51
1:A:28:PHE:CG	1:A:147:LYS:HA	2.47	0.50
1:B:67:MET:O	1:B:68:ARG:C	2.54	0.50
1:A:29:VAL:HG11	1:A:32:TYR:HB2	1.94	0.50
1:A:79:LEU:HD13	1:A:159:LEU:HD22	1.93	0.50
1:A:41:ARG:HA	1:A:53:LEU:O	2.12	0.49
1:B:24:ILE:HG22	1:B:25:GLN:HG2	1.94	0.49
1:C:127:THR:HG22	1:C:131:GLN:HE21	1.78	0.49
1:B:102:ARG:CA	5:B:362:HOH:O	2.54	0.48
4:A:203:IQC:C14	4:A:203:IQC:C41	2.91	0.48
1:A:56:LEU:HD12	1:A:71:TYR:HB3	1.95	0.48
1:B:118:SER:HB3	1:B:143:GLU:HG2	1.96	0.48
1:A:29:VAL:HG13	5:A:354:HOH:O	2.13	0.47
1:C:122:SER:HA	5:C:322:HOH:O	2.14	0.47
1:B:127:THR:HG23	1:B:141:PHE:HE2	1.80	0.47
1:C:56:LEU:HD23	1:C:56:LEU:C	2.39	0.47
1:A:99:GLN:OE1	1:A:102:ARG:NH1	2.49	0.46
1:B:21:ILE:HD11	1:B:32:TYR:CD2	2.51	0.46
1:C:31:GLU:O	1:C:32:TYR:C	2.59	0.46
1:B:31:GLU:O	1:B:32:TYR:C	2.60	0.45
1:A:28:PHE:CD1	1:A:147:LYS:HA	2.52	0.45
4:C:203:IQC:C14	4:C:203:IQC:C37	2.95	0.45
1:C:84:ILE:HD12	1:C:123:ARG:HB3	1.98	0.45
1:A:120:LEU:HD23	1:A:120:LEU:HA	1.76	0.45
1:A:97:ARG:HD2	1:A:137:TYR:CD2	2.52	0.45
1:B:102:ARG:HG3	5:B:362:HOH:O	2.15	0.44
1:C:28:PHE:CD1	1:C:147:LYS:HA	2.53	0.44
1:C:25:GLN:HB2	1:C:27:HIS:HD2	1.82	0.44
1:B:56:LEU:HD23	1:B:57:ASP:N	2.33	0.44
1:A:84:ILE:HD12	1:A:123:ARG:HB3	1.98	0.43
1:A:56:LEU:HD23	1:A:57:ASP:N	2.33	0.43
1:B:28:PHE:CD1	1:B:147:LYS:HA	2.54	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:42:LYS:HE3	5:A:352:HOH:O	2.19	0.43
1:C:118:SER:HB3	1:C:143:GLU:HG2	2.00	0.42
1:B:24:ILE:HD11	1:B:40:TYR:HB3	2.01	0.42
1:B:140:PRO:HB2	5:B:356:HOH:O	2.17	0.42
1:B:41:ARG:HA	1:B:53:LEU:O	2.19	0.42
1:C:41:ARG:HA	1:C:53:LEU:O	2.19	0.42
1:B:56:LEU:C	1:B:56:LEU:HD23	2.45	0.42
1:C:79:LEU:HD13	1:C:159:LEU:HD22	2.02	0.42
1:B:68:ARG:HA	1:B:71:TYR:HB2	2.02	0.41
1:B:127:THR:CA	5:B:343:HOH:O	2.65	0.41
1:B:68:ARG:O	1:B:69:ASP:CB	2.69	0.41
1:C:56:LEU:HD12	1:C:71:TYR:HB3	2.03	0.41
1:B:39:SER:OG	1:B:54:ASP:OD1	2.39	0.41
1:A:25:GLN:OE1	1:B:21:ILE:HG12	2.21	0.41
1:A:29:VAL:CG1	1:A:32:TYR:HB2	2.51	0.40
1:B:69:ASP:O	1:B:73:ARG:HB2	2.22	0.40

All (1) 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)
5:B:348:HOH:O	5:B:348:HOH:O[2_454]	1.83	0.37

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	161/170 (95%)	156 (97%)	5 (3%)	0	100	100
1	B	162/170 (95%)	152 (94%)	8 (5%)	2 (1%)	10	3
1	C	159/170 (94%)	153 (96%)	6 (4%)	0	100	100
All	All	482/510 (94%)	461 (96%)	19 (4%)	2 (0%)	30	19

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	32	TYR
1	B	69	ASP

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	147/150 (98%)	140 (95%)	7 (5%)	23	11
1	B	147/150 (98%)	137 (93%)	10 (7%)	14	5
1	C	145/150 (97%)	136 (94%)	9 (6%)	16	6
All	All	439/450 (98%)	413 (94%)	26 (6%)	18	7

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	44	VAL
1	A	56	LEU
1	A	69	ASP
1	A	70	GLN
1	A	71	TYR
1	A	79	LEU
1	A	128	LYS
1	B	44	VAL
1	B	56	LEU
1	B	61	GLN
1	B	67	MET
1	B	68	ARG
1	B	70	GLN
1	B	71	TYR
1	B	103	VAL
1	B	122	SER
1	B	128	LYS
1	C	42	LYS
1	C	44	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	56	LEU
1	C	70	GLN
1	C	71	TYR
1	C	79	LEU
1	C	103	VAL
1	C	122	SER
1	C	128	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	43	GLN
1	A	70	GLN
1	B	27	HIS
1	B	166	HIS
1	C	27	HIS
1	C	43	GLN
1	C	70	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 9 ligands modelled in this entry, 3 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond

length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	IQC	C	203	-	49,49,49	1.51	8 (16%)	59,74,74	3.39	25 (42%)
4	IQC	A	203	-	49,49,49	1.39	7 (14%)	59,74,74	3.09	23 (38%)
2	GDP	B	201	3	29,30,30	1.53	1 (3%)	45,47,47	1.42	6 (13%)
4	IQC	B	203	-	49,49,49	1.36	7 (14%)	59,74,74	3.17	27 (45%)
2	GDP	C	201	3	29,30,30	1.33	1 (3%)	45,47,47	1.28	4 (8%)
2	GDP	A	201	3	29,30,30	1.44	1 (3%)	45,47,47	1.48	9 (20%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	IQC	C	203	-	-	7/16/50/50	0/7/7/7
4	IQC	A	203	-	-	5/16/50/50	1/7/7/7
2	GDP	B	201	3	-	1/16/32/32	0/3/3/3
4	IQC	B	203	-	-	7/16/50/50	0/7/7/7
2	GDP	C	201	3	-	1/16/32/32	0/3/3/3
2	GDP	A	201	3	-	0/16/32/32	0/3/3/3

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	201	GDP	PA-O3A	7.00	1.67	1.59
2	A	201	GDP	PA-O3A	6.70	1.66	1.59
2	C	201	GDP	PA-O3A	5.90	1.65	1.59
4	C	203	IQC	C40-C41	3.50	1.62	1.52
4	C	203	IQC	C2-N8	-3.47	1.38	1.46
4	B	203	IQC	N30-N29	-3.26	1.34	1.36
4	A	203	IQC	N30-N29	-2.97	1.34	1.36
4	C	203	IQC	N30-N29	-2.90	1.34	1.36
4	A	203	IQC	C38-C37	2.88	1.60	1.52
4	B	203	IQC	C40-C41	2.87	1.60	1.52
4	A	203	IQC	C9-N8	2.84	1.38	1.34
4	C	203	IQC	C41-N12	2.80	1.51	1.46
4	C	203	IQC	C28-N29	2.76	1.34	1.32

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	203	IQC	C28-N29	2.55	1.34	1.32
4	B	203	IQC	C28-N29	2.50	1.34	1.32
4	B	203	IQC	C11-C13	-2.47	1.39	1.43
4	A	203	IQC	C11-C13	-2.44	1.39	1.43
4	C	203	IQC	C38-C37	-2.43	1.45	1.52
4	C	203	IQC	C11-C13	-2.25	1.39	1.43
4	A	203	IQC	C40-C41	-2.22	1.45	1.52
4	B	203	IQC	C1-C2	-2.20	1.47	1.52
4	A	203	IQC	C42-C39	-2.16	1.52	1.54
4	B	203	IQC	C4-N5	2.15	1.51	1.46
4	C	203	IQC	C11-N10	-2.11	1.29	1.32
4	B	203	IQC	C19-N20	-2.00	1.33	1.37

All (94) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	203	IQC	N10-C11-N12	-10.71	109.51	117.17
4	C	203	IQC	C9-N8-C2	10.15	140.10	124.32
4	C	203	IQC	C3-C2-N8	9.84	126.62	110.77
4	B	203	IQC	N10-C11-N12	-8.85	110.84	117.17
4	A	203	IQC	C38-C37-N12	-8.62	94.91	110.53
4	C	203	IQC	C40-C41-N12	-8.57	95.02	110.53
4	B	203	IQC	C40-C41-N12	-8.41	95.29	110.53
4	B	203	IQC	C1-C2-N8	8.37	124.25	110.77
4	A	203	IQC	C40-C41-N12	8.17	125.34	110.53
4	A	203	IQC	N10-C11-N12	-7.89	111.53	117.17
4	A	203	IQC	N8-C9-N20	-5.86	107.88	117.09
4	A	203	IQC	N8-C9-N10	5.85	126.28	117.09
4	B	203	IQC	C4-N5-C6	5.79	118.75	109.54
4	B	203	IQC	C38-C37-N12	5.71	120.87	110.53
4	C	203	IQC	C38-C37-N12	5.59	120.66	110.53
4	C	203	IQC	C13-C11-N12	5.56	130.71	121.18
4	B	203	IQC	C3-C2-N8	5.50	119.63	110.77
4	B	203	IQC	N8-C9-N20	-5.32	108.72	117.09
4	A	203	IQC	C1-C2-N8	5.17	119.10	110.77
4	B	203	IQC	C13-C11-N12	4.84	129.46	121.18
4	C	203	IQC	C4-N5-C6	4.78	117.15	109.54
4	C	203	IQC	C36-C35-C33	-4.73	104.41	112.69
4	A	203	IQC	C13-C11-N12	4.69	129.22	121.18
4	A	203	IQC	C7-N5-C4	4.64	119.48	110.63
4	C	203	IQC	C41-N12-C11	4.61	132.12	116.86
4	B	203	IQC	C27-C22-C23	-4.52	116.14	119.71

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	203	IQC	C4-N5-C6	4.51	116.72	109.54
4	A	203	IQC	C3-C2-C1	4.40	118.41	110.80
4	A	203	IQC	C3-C2-N8	4.21	117.56	110.77
4	C	203	IQC	C11-C13-C19	4.18	119.56	115.66
4	A	203	IQC	C36-C35-C33	-4.17	105.39	112.69
4	C	203	IQC	C27-C22-C23	-4.15	116.43	119.71
4	B	203	IQC	C1-C6-N5	4.04	116.41	111.20
4	B	203	IQC	C9-N8-C2	4.03	130.59	124.32
2	A	201	GDP	N2-C2-N3	4.02	127.51	119.67
4	B	203	IQC	C41-N12-C11	4.01	130.13	116.86
4	A	203	IQC	C37-N12-C11	3.87	129.66	116.86
4	B	203	IQC	C26-N30-N29	3.76	113.37	111.52
4	A	203	IQC	C27-C28-N29	3.66	112.87	111.34
4	B	203	IQC	N8-C9-N10	3.56	122.69	117.09
4	A	203	IQC	C27-C22-C23	-3.49	116.95	119.71
4	B	203	IQC	C11-C13-C19	3.48	118.91	115.66
4	A	203	IQC	C28-N29-N30	-3.40	104.25	106.02
4	A	203	IQC	C17-C22-C23	3.38	125.34	120.20
4	B	203	IQC	C14-C15-CL1	-3.31	115.88	119.19
2	A	201	GDP	O2A-PA-O3A	3.30	116.18	107.27
4	C	203	IQC	C7-N5-C6	3.27	116.87	110.63
4	B	203	IQC	C17-C22-C23	3.20	125.06	120.20
2	B	201	GDP	N2-C2-N3	3.18	125.89	119.67
4	B	203	IQC	C7-N5-C4	3.13	116.61	110.63
2	C	201	GDP	N2-C2-N3	3.05	125.62	119.67
2	C	201	GDP	O3A-PA-O1A	-3.05	101.54	110.70
4	A	203	IQC	C26-N30-N29	3.00	112.99	111.52
2	B	201	GDP	C2-N1-C6	2.97	130.50	125.11
4	B	203	IQC	C24-C23-C22	2.92	121.86	118.78
4	C	203	IQC	C14-C15-C17	-2.88	121.50	122.48
4	C	203	IQC	C26-N30-N29	2.84	112.91	111.52
4	B	203	IQC	C28-N29-N30	-2.83	104.55	106.02
2	C	201	GDP	O2A-PA-O3A	2.80	114.83	107.27
4	A	203	IQC	C11-C13-C19	2.75	118.22	115.66
2	A	201	GDP	N2-C2-N1	-2.71	111.04	116.76
4	C	203	IQC	C31-C23-C22	-2.71	118.36	121.37
4	B	203	IQC	C3-C2-C1	2.57	115.23	110.80
4	A	203	IQC	O34-C33-N32	2.55	126.67	122.12
4	B	203	IQC	C31-C23-C22	-2.51	118.58	121.37
2	A	201	GDP	O3A-PA-O1A	-2.49	103.20	110.70
4	C	203	IQC	C24-C23-C22	2.46	121.38	118.78
4	C	203	IQC	C41-C40-C39	-2.44	104.38	113.13

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	203	IQC	C3-C4-N5	2.43	114.33	111.20
4	B	203	IQC	C6-C1-C2	-2.42	106.84	110.67
4	C	203	IQC	C17-C22-C23	2.38	123.82	120.20
4	C	203	IQC	C28-N29-N30	-2.37	104.79	106.02
2	A	201	GDP	O5'-C5'-C4'	-2.30	101.17	108.99
2	C	201	GDP	O3'-C3'-C4'	-2.28	104.52	111.08
4	A	203	IQC	C35-C33-N32	-2.28	114.37	117.89
4	A	203	IQC	C1-C6-N5	2.28	114.14	111.20
2	B	201	GDP	C5-C6-N1	-2.27	107.49	113.25
4	B	203	IQC	C4-C3-C2	-2.26	107.10	110.67
4	C	203	IQC	C17-C18-C19	-2.26	122.32	124.07
4	A	203	IQC	C27-C22-C17	-2.21	117.70	121.17
4	C	203	IQC	N8-C9-N20	-2.19	113.65	117.09
4	B	203	IQC	C24-C25-C26	-2.18	115.36	119.57
4	C	203	IQC	C1-C2-N8	2.18	114.28	110.77
2	A	201	GDP	C2-N1-C6	2.18	129.06	125.11
2	B	201	GDP	O5'-PA-O1A	-2.15	100.43	108.94
2	A	201	GDP	O3B-PB-O1B	2.14	119.18	110.83
4	B	203	IQC	C36-C35-C33	-2.08	109.05	112.69
2	A	201	GDP	O2A-PA-O1A	2.08	122.11	112.44
4	C	203	IQC	C24-C25-C26	-2.07	115.58	119.57
4	C	203	IQC	F21-C18-C17	-2.05	117.38	120.16
2	A	201	GDP	C2'-C3'-C4'	2.05	106.57	102.61
2	B	201	GDP	O3A-PA-O1A	2.04	116.83	110.70
4	C	203	IQC	C6-C1-C2	-2.01	107.50	110.67
2	B	201	GDP	O3B-PB-O2B	2.01	115.34	107.80

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	203	IQC	N32-C33-C35-C36
4	A	203	IQC	C3-C2-N8-C9
4	B	203	IQC	N20-C9-N8-C2
4	B	203	IQC	N10-C9-N8-C2
4	B	203	IQC	C3-C2-N8-C9
4	C	203	IQC	N20-C9-N8-C2
4	C	203	IQC	N10-C9-N8-C2
4	C	203	IQC	C1-C2-N8-C9
4	A	203	IQC	C13-C11-N12-C41
4	B	203	IQC	C13-C11-N12-C37
4	C	203	IQC	C13-C11-N12-C37

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
4	B	203	IQC	N32-C33-C35-C36
4	C	203	IQC	N32-C33-C35-C36
4	A	203	IQC	N10-C11-N12-C41
4	B	203	IQC	N10-C11-N12-C37
2	B	201	GDP	PA-O3A-PB-O1B
4	C	203	IQC	N10-C11-N12-C37
4	B	203	IQC	O34-C33-C35-C36
4	C	203	IQC	O34-C33-C35-C36
4	A	203	IQC	O34-C33-C35-C36
2	C	201	GDP	PA-O3A-PB-O3B

All (1) ring outliers are listed below:

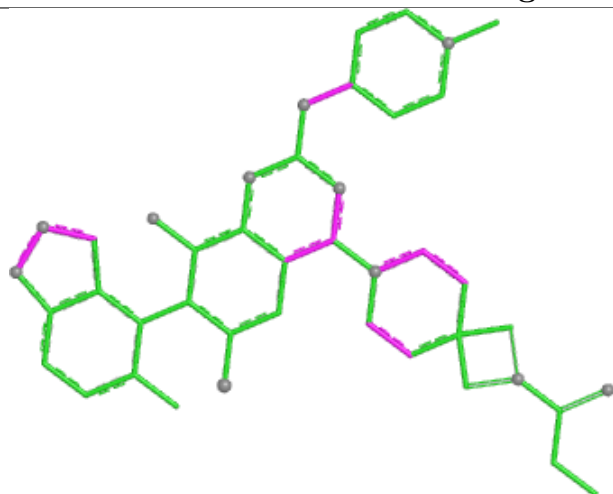
Mol	Chain	Res	Type	Atoms
4	A	203	IQC	C1-C2-C3-C4-C6-N5

3 monomers are involved in 3 short contacts:

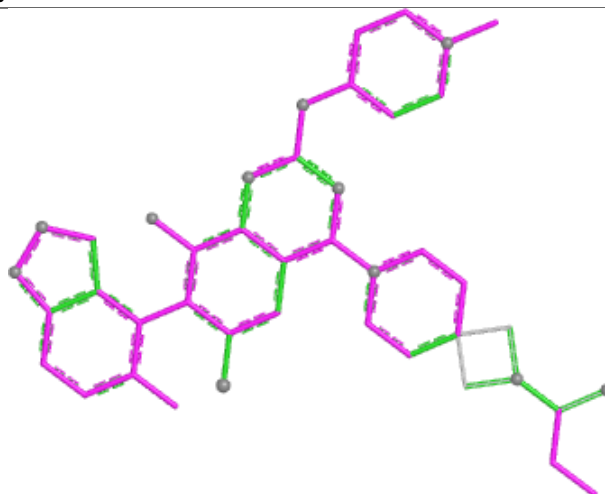
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	203	IQC	1	0
4	A	203	IQC	1	0
4	B	203	IQC	1	0

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.

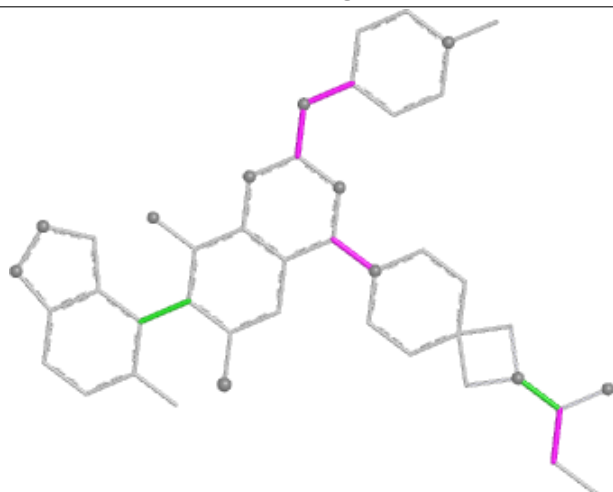
Ligand IQC C 203



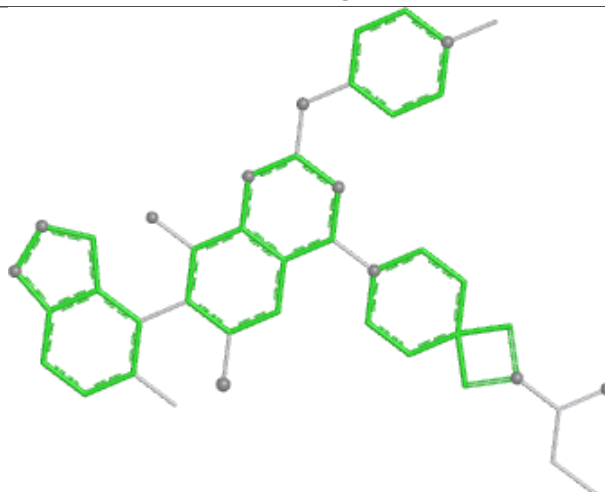
Bond lengths



Bond angles

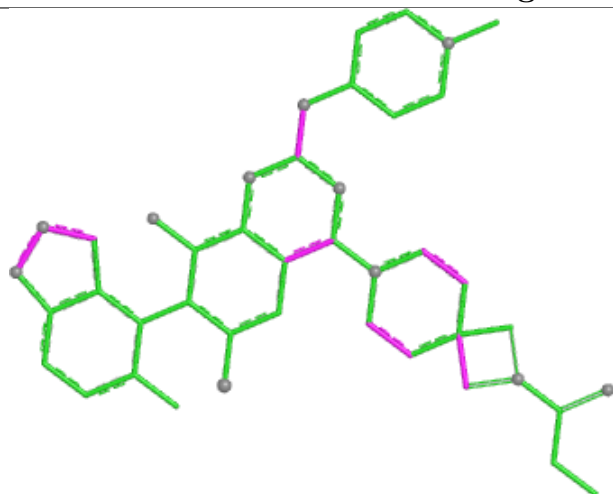


Torsions

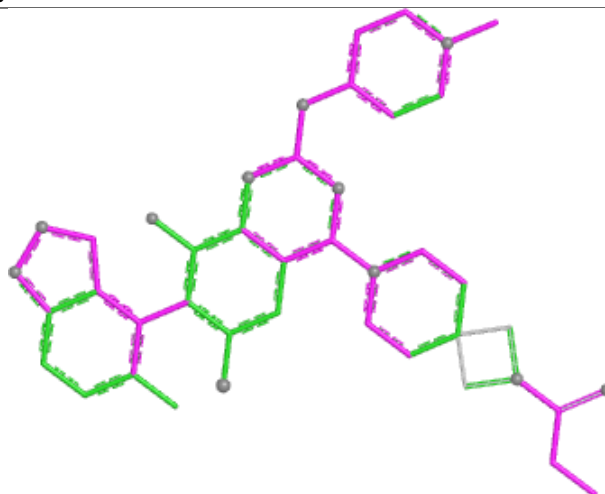


Rings

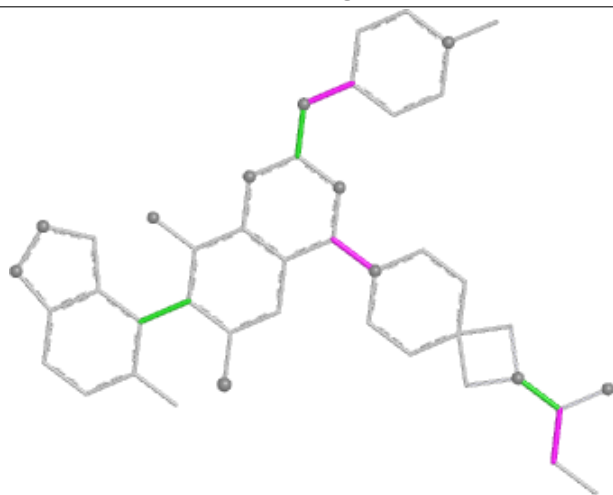
Ligand IQC A 203



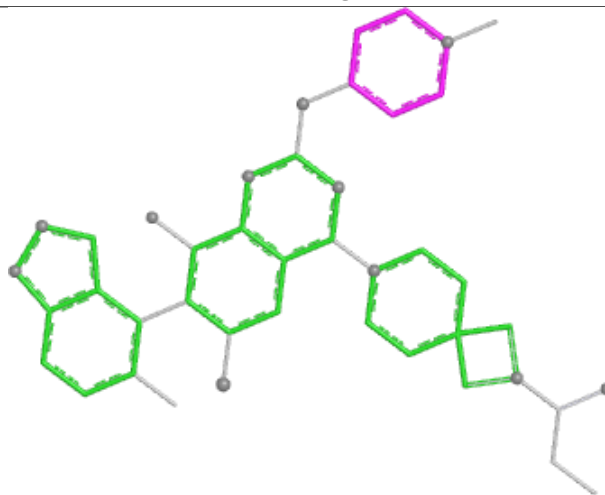
Bond lengths



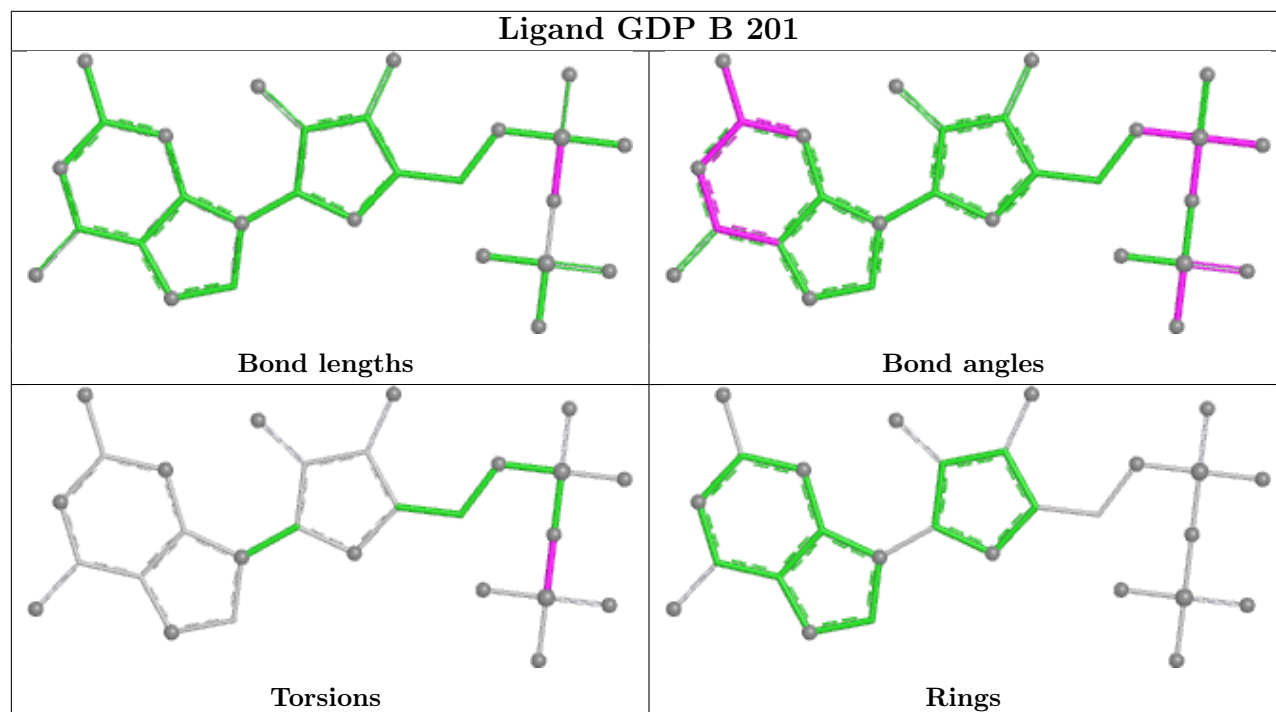
Bond angles



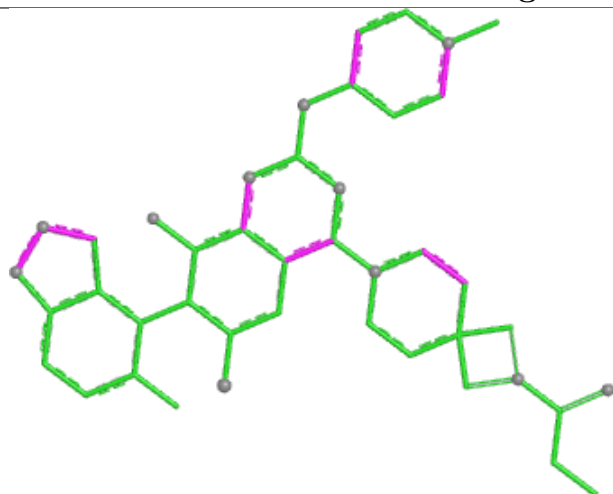
Torsions



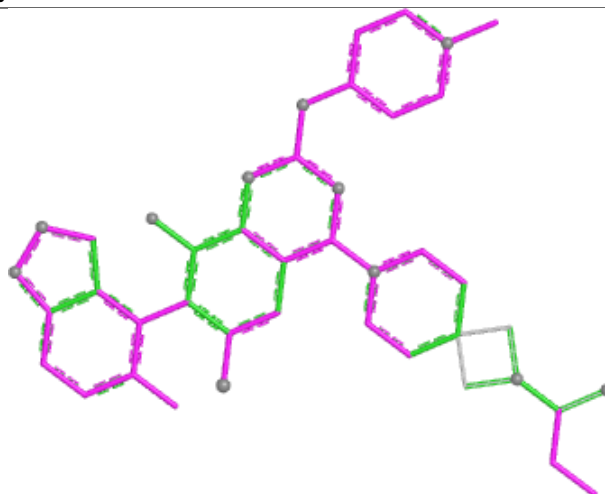
Rings



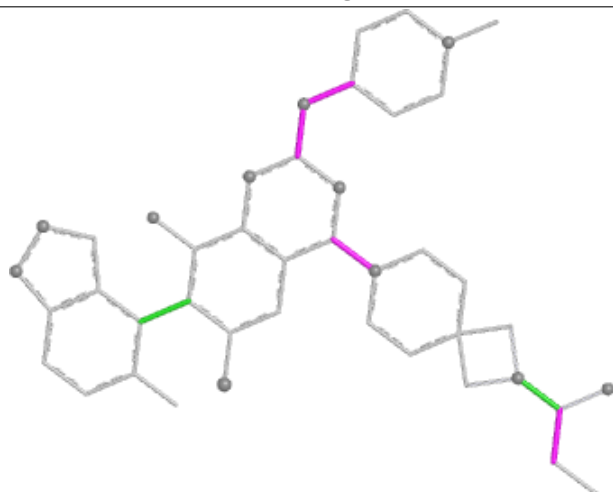
Ligand IQC B 203



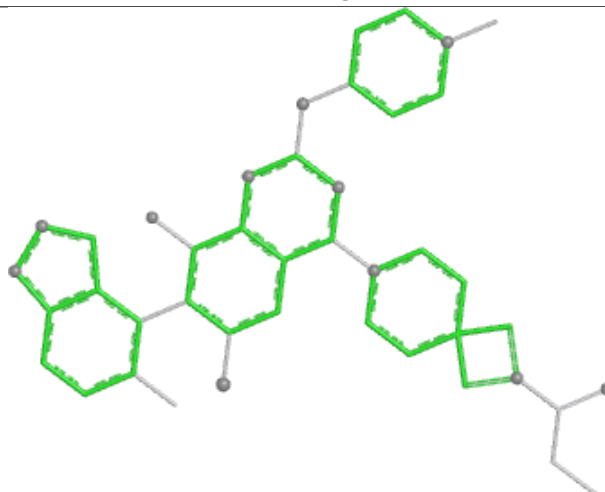
Bond lengths



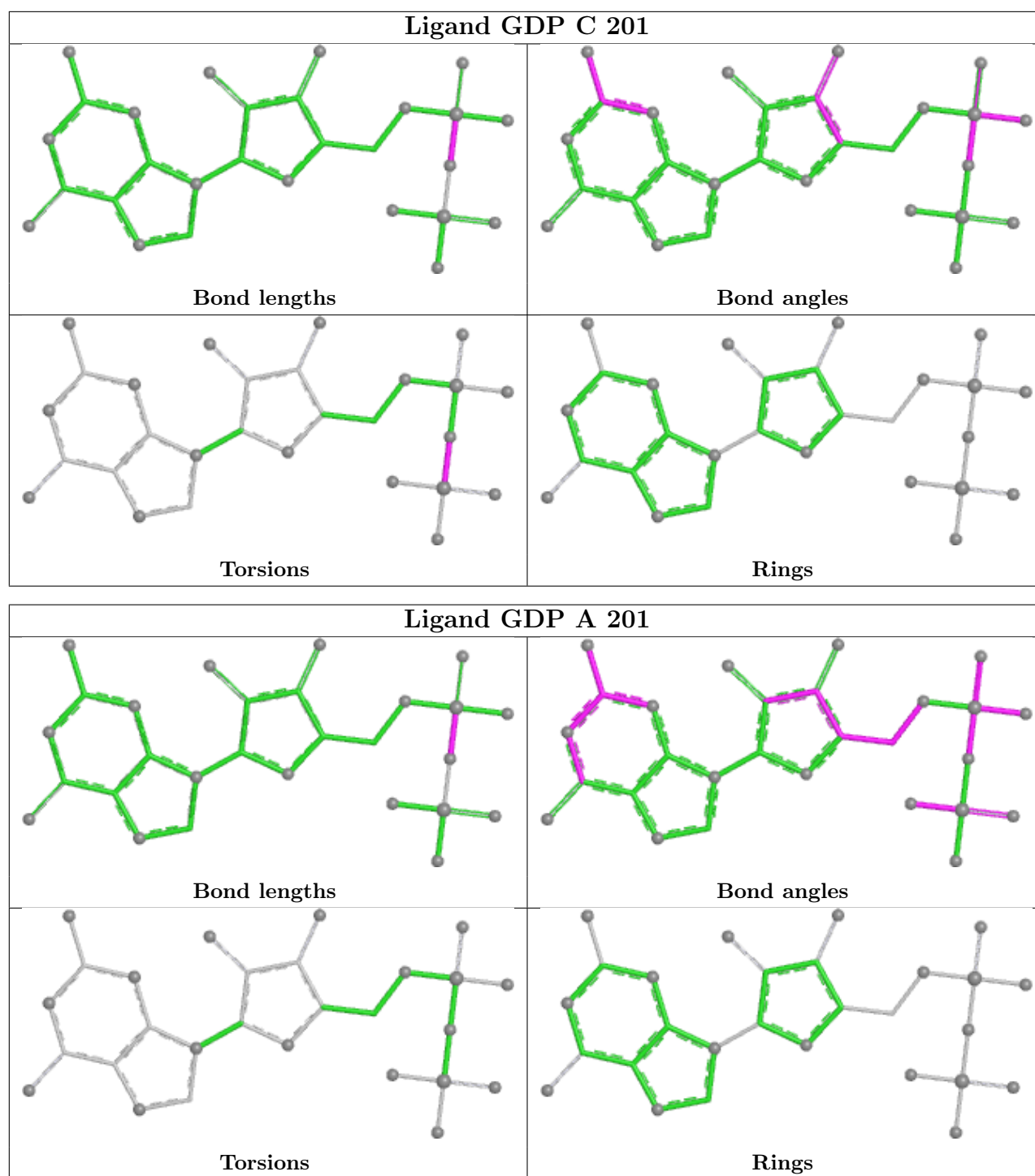
Bond angles



Torsions



Rings



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	165/170 (97%)	-0.72	0 100 100	17, 31, 61, 98	0
1	B	166/170 (97%)	-0.68	0 100 100	17, 31, 63, 89	0
1	C	163/170 (95%)	-0.72	0 100 100	16, 30, 58, 84	0
All	All	494/510 (96%)	-0.71	0 100 100	16, 31, 61, 98	0

There are no RSRZ outliers to report.

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 oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	MG	B	202	1/1	0.98	0.06	31,31,31,31	0
3	MG	C	202	1/1	0.98	0.06	31,31,31,31	0
4	IQC	A	203	43/43	0.98	0.05	32,38,47,54	0
4	IQC	B	203	43/43	0.98	0.05	29,40,54,58	0
4	IQC	C	203	43/43	0.98	0.05	31,39,51,57	0

Continued on next page...

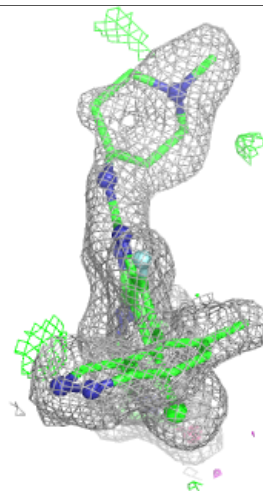
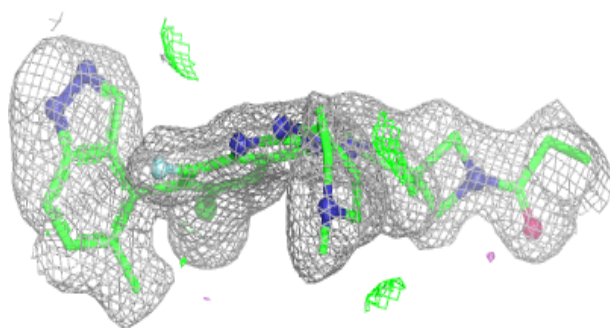
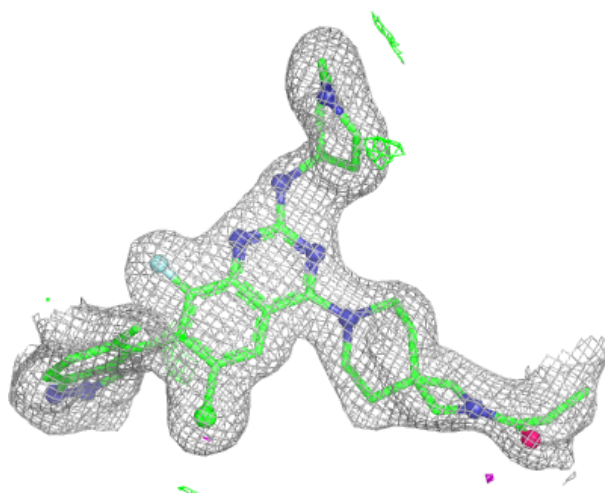
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	GDP	B	201	28/28	0.99	0.03	24,28,32,35	0
2	GDP	C	201	28/28	0.99	0.03	23,28,33,36	0
3	MG	A	202	1/1	0.99	0.03	31,31,31,31	0
2	GDP	A	201	28/28	0.99	0.03	23,28,35,38	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.

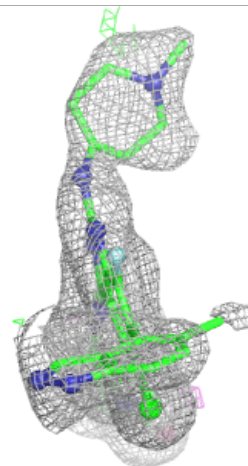
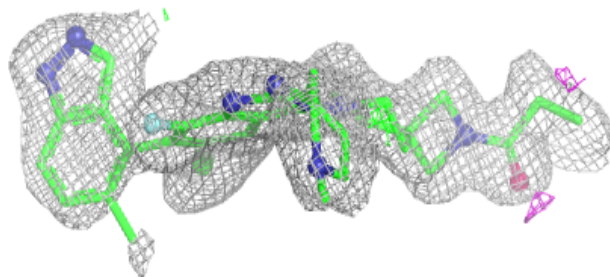
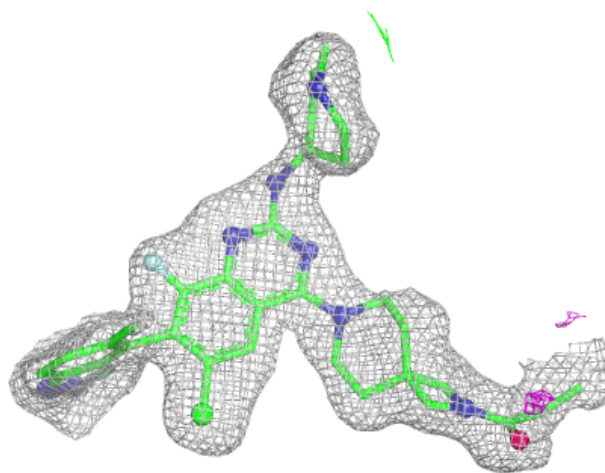
Electron density around IQC A 203:

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



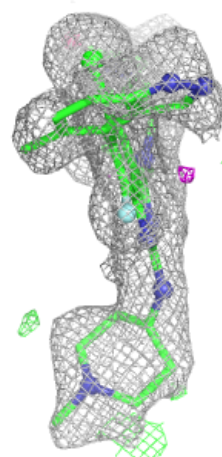
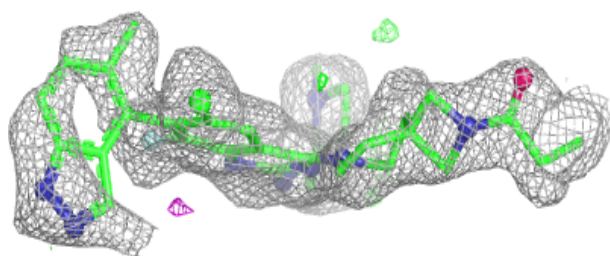
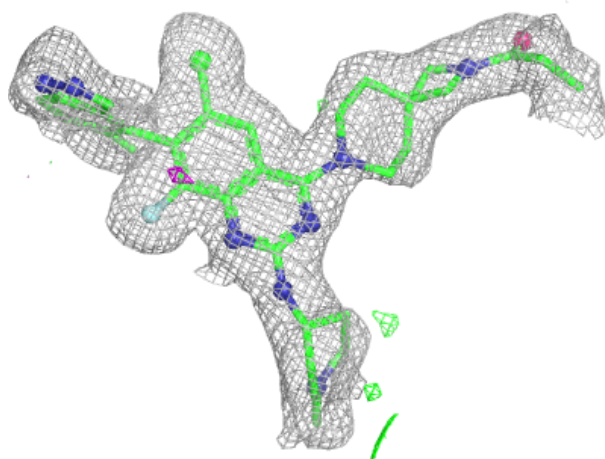
Electron density around IQC B 203:

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



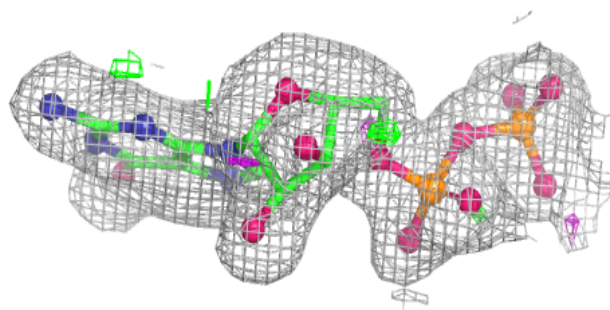
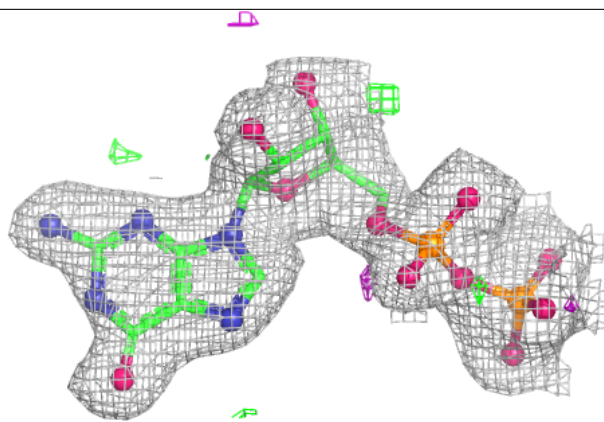
Electron density around IQC C 203:

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

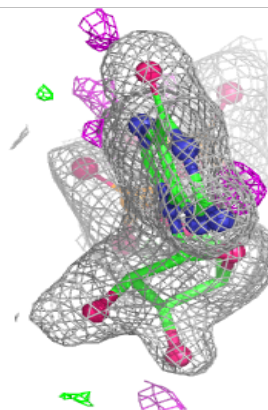
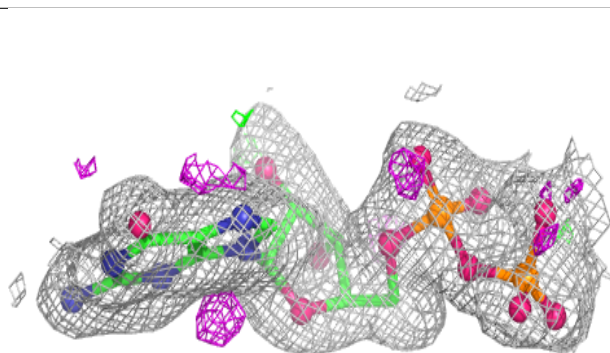
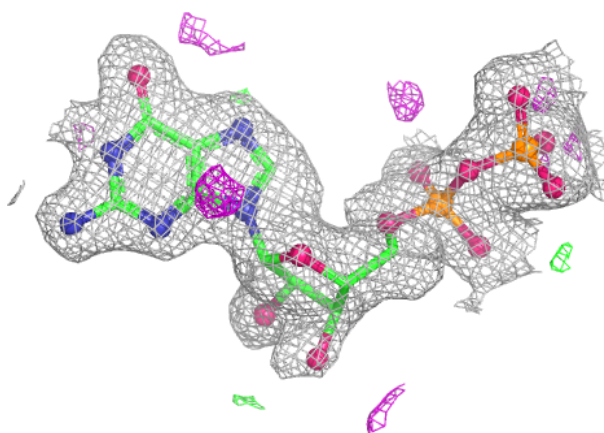


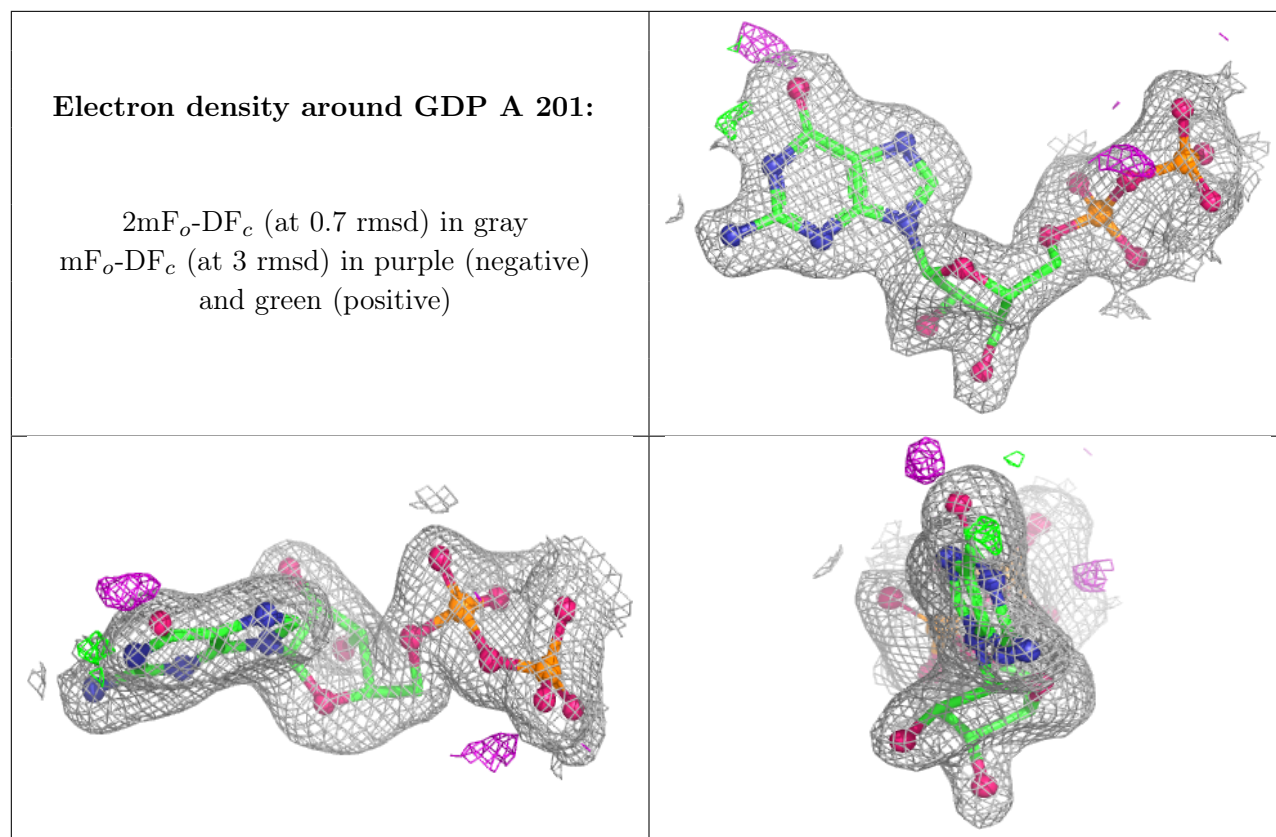
Electron density around GDP B 201:

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

**Electron density around GDP C 201:**

$2mF_o-DF_c$ (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.