Full wwPDB X-ray Structure Validation Report (i)

Jun 16, 2024 – 06:19 PM EDT

PDB ID	:	5J5O
Title	:	Translation initiation factor 4E in complex with m7GppppG mRNA 5' cap analog
Authors	:	Warminski, M.; Nowak, E.; Rydzik, A.M.; Kowalska, J.; Jemielity, J.; Nowotny, M.
Deposited on	:	2016-04-03
Resolution	:	1.87 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 (i) 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 (i)) were used in the production of this report:

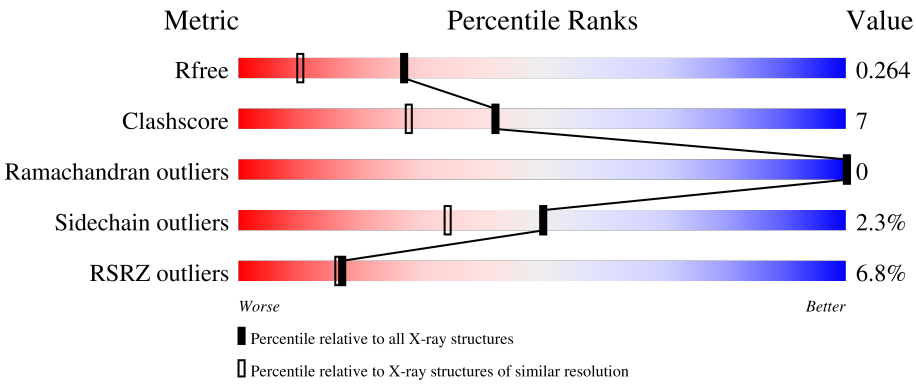
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.87 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	2469 (1.86-1.86)
Clashscore	141614	2625 (1.86-1.86)
Ramachandran outliers	138981	2592 (1.86-1.86)
Sidechain outliers	138945	2592 (1.86-1.86)
RSRZ outliers	127900	2436 (1.86-1.86)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	190	% 81% 14% • 5%
1	B	190	86% 9% 5%
1	C	190	12% 75% 18% • 6%
1	D	190	14% 71% 23% • 6%

2 Entry composition (i)

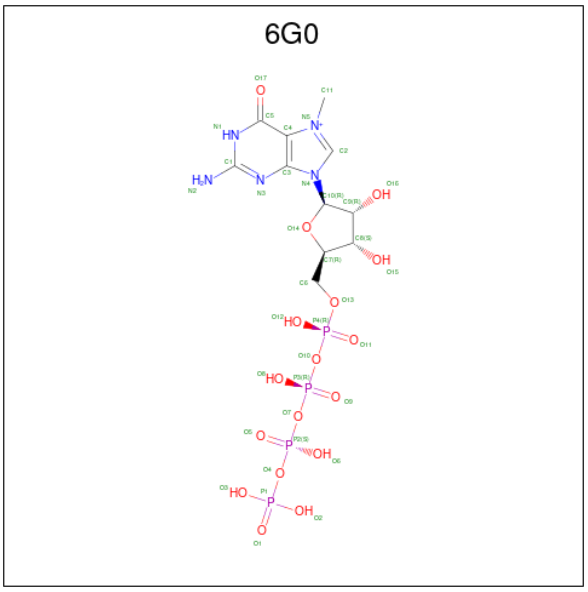
There are 4 unique types of molecules in this entry. The entry contains 6401 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Eukaryotic translation initiation factor 4E.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	181	1514	971	260	277	6	0	6	0
1	B	181	1496	963	253	274	6	0	5	0
1	C	179	1461	937	245	273	6	0	4	0
1	D	179	1409	894	244	265	6	0	5	0

- Molecule 2 is 5'-O-[(R)-hydroxy{[(R)-hydroxy{[(S)-hydroxy(phosphonooxy)phosphoryl]oxy}phosphoryl]oxy}phosphoryl]-7-methylguanosine (three-letter code: 6G0) (formula: $C_{11}H_{20}N_5O_{17}P_4$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	37	11	5	17	4	0	0

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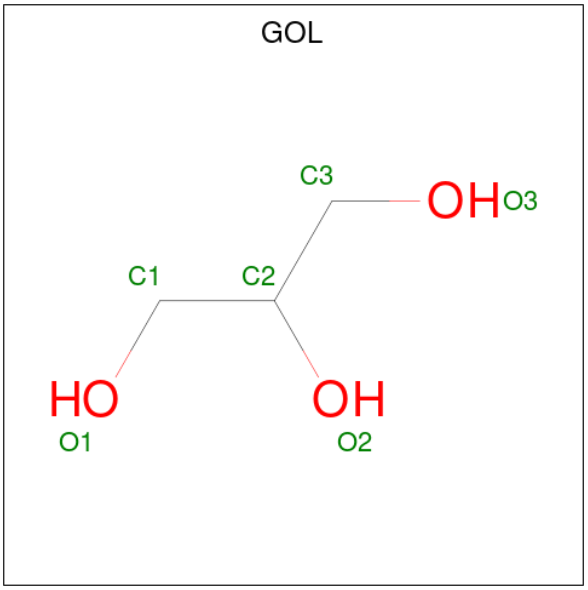
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	B	1	37	11	5	17	4	0	0
			Total	C	N	O	P		
2	C	1	37	11	5	17	4	0	0
			Total	C	N	O	P		
2	D	1	37	11	5	17	4	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
3	A	1	6	3	3	0	0
			Total	C	O		
3	B	1	6	3	3	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	134	136	136	0	2
			Total	O		
4	B	126	131	131	0	5
			Total	O		
4	C	52	53	53	0	1
			Total	O		
4	D	41	41	41	0	0

3 Residue-property plots (i)

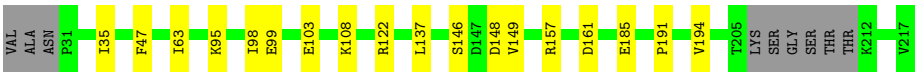
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Eukaryotic translation initiation factor 4E

Chain A:

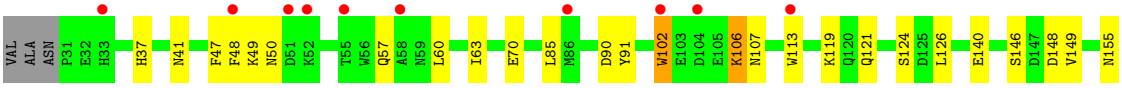
• Molecule 1: Eukaryotic translation initiation factor 4E

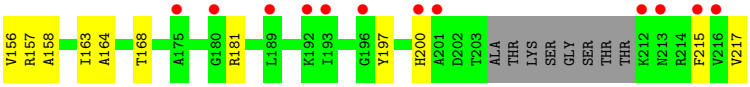
Chain B:



• Molecule 1: Eukaryotic translation initiation factor 4E

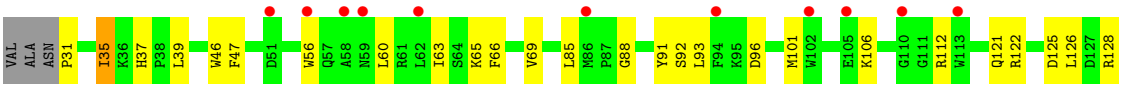
Chain C:

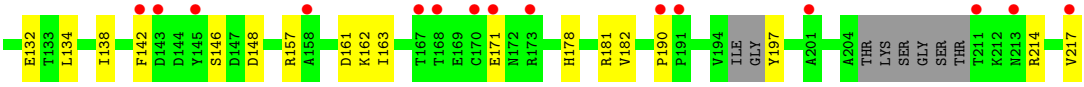




• Molecule 1: Eukaryotic translation initiation factor 4E

Chain D:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	37.99Å 38.03Å 146.64Å 88.55° 84.70° 76.67°	Depositor
Resolution (Å)	36.82 – 1.87 36.82 – 1.87	Depositor EDS
% Data completeness (in resolution range)	91.2 (36.82-1.87) 81.8 (36.82-1.87)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.63 (at 1.87Å)	Xtriage
Refinement program	PHENIX (1.10_2152: ???)	Depositor
R, R_{free}	0.221 , 0.263 0.221 , 0.264	Depositor DCC
R_{free} test set	2234 reflections (3.71%)	wwPDB-VP
Wilson B-factor (Å^2)	19.9	Xtriage
Anisotropy	0.420	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 47.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.43$, $< L^2 > = 0.25$	Xtriage
Estimated twinning fraction	0.064 for -h,-k,-h+l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	6401	wwPDB-VP
Average B, all atoms (Å^2)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.24% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, 6G0

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	0.47	1/1571 (0.1%)	0.65	0/2127
1	B	0.47	1/1546 (0.1%)	0.62	0/2094
1	C	0.33	0/1505	0.54	0/2045
1	D	0.34	0/1452	0.53	0/1973
All	All	0.41	2/6074 (0.0%)	0.59	0/8239

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	99	GLU	C-N	7.06	1.47	1.34
1	A	99	GLU	C-N	6.00	1.45	1.34

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	1514	0	1475	19	0
1	B	1496	0	1442	13	0
1	C	1461	0	1364	21	0
1	D	1409	0	1298	29	0
2	A	37	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	37	0	0	0	0
2	C	37	0	0	0	0
2	D	37	0	0	0	0
3	A	6	0	8	0	0
3	B	6	0	8	2	0
4	A	136	0	0	5	0
4	B	131	0	0	2	0
4	C	53	0	0	3	1
4	D	41	0	0	2	0
All	All	6401	0	5595	80	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 7.

All (80) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:LYS:NZ	4:A:401:HOH:O	2.16	0.78
1:D:65:LYS:NZ	1:D:96:ASP:OD2	2.20	0.73
1:D:132:GLU:OE1	4:D:401:HOH:O	2.14	0.65
1:D:181:ARG:HA	1:D:217:VAL:HG11	1.76	0.65
1:C:106:LYS:NZ	4:C:402:HOH:O	2.25	0.65
1:C:146:SER:O	1:C:149:VAL:HG12	1.97	0.64
1:A:65[B]:LYS:NZ	1:A:96:ASP:OD2	2.31	0.62
1:A:55[B]:THR:HG23	1:A:58:ALA:H	1.62	0.62
1:A:173:ARG:HG3	1:A:215:PHE:HE1	1.65	0.61
1:C:49:LYS:HD2	1:C:50:ASN:N	2.16	0.61
1:D:56:TRP:HZ3	1:D:101:MET:HE2	1.66	0.60
1:A:103:GLU:OE1	2:A:301:6G0:N2	2.35	0.59
1:D:47:PHE:HB2	1:D:63:ILE:HD11	1.85	0.58
1:C:41:ASN:ND2	1:C:140:GLU:OE1	2.28	0.58
1:C:119:LYS:HD3	1:C:158:ALA:O	2.04	0.58
1:B:95:LYS:HD2	3:B:302:GOL:H32	1.86	0.57
1:C:107:ASN:ND2	4:C:401:HOH:O	2.25	0.56
1:C:57:GLN:NE2	4:C:405:HOH:O	2.38	0.56
1:A:212:LYS:O	4:A:402:HOH:O	2.18	0.55
1:B:137:LEU:HD22	1:B:149:VAL:HG11	1.90	0.54
1:C:37:HIS:ND1	1:C:70:GLU:OE2	2.40	0.54
1:B:98:ILE:HD11	3:B:302:GOL:H31	1.88	0.53
1:A:50:ASN:ND2	4:A:411:HOH:O	2.36	0.52
1:C:85:LEU:HD11	1:C:91:TYR:CE2	2.44	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:37[A]:HIS:HB2	1:D:69:VAL:HG12	1.91	0.52
1:C:90:ASP:OD1	1:C:155:ASN:HA	2.10	0.52
1:C:47:PHE:HB2	1:C:63:ILE:HD11	1.92	0.51
1:A:47:PHE:HB2	1:A:63:ILE:HD11	1.90	0.51
1:D:46:TRP:HB2	1:D:92:SER:HB2	1.92	0.51
1:C:181:ARG:HA	1:C:217:VAL:HG21	1.92	0.51
1:D:126:LEU:HD12	1:D:163:ILE:HD11	1.92	0.51
1:A:51:ASP:HB3	1:A:59:ASN:HD21	1.76	0.50
1:A:57:GLN:NE2	1:A:57:GLN:H	2.08	0.50
1:D:37[B]:HIS:HB3	1:D:69:VAL:HG12	1.93	0.50
1:B:47:PHE:HB2	1:B:63:ILE:HD11	1.93	0.50
1:C:156:VAL:O	1:C:157:ARG:HG3	2.12	0.50
1:A:216:VAL:HG22	1:B:191:PRO:O	2.12	0.49
1:B:122:ARG:NH2	1:B:161:ASP:OD1	2.46	0.49
1:D:112:ARG:O	1:D:197:TYR:HA	2.13	0.49
1:D:35:ILE:HG13	1:D:35:ILE:O	2.13	0.49
1:C:197:TYR:HB3	1:C:215:PHE:HB2	1.94	0.49
1:D:88:GLY:HA2	1:D:157:ARG:HD3	1.95	0.48
1:D:171:GLU:OE2	1:D:214:ARG:NH1	2.47	0.48
1:C:106:LYS:HG3	1:C:168:THR:OG1	2.15	0.47
1:A:185:GLU:HG2	4:A:464:HOH:O	2.14	0.47
1:B:122:ARG:NH2	4:B:414:HOH:O	2.47	0.46
1:D:85:LEU:HD11	1:D:91:TYR:CE2	2.51	0.46
1:B:103:GLU:N	1:B:103:GLU:OE2	2.49	0.45
1:D:93:LEU:HD22	1:D:134:LEU:HD22	1.98	0.45
1:B:108:LYS:HB3	1:B:108:LYS:HE2	1.82	0.45
1:D:39:LEU:HD13	1:D:138:ILE:HB	1.98	0.45
1:A:177:THR:HG22	1:A:181:ARG:HD2	1.99	0.44
1:C:102:TRP:HD1	1:C:200:HIS:CG	2.35	0.44
1:A:173:ARG:HG3	1:A:215:PHE:CE1	2.50	0.44
1:B:185:GLU:HG2	4:B:475:HOH:O	2.17	0.44
1:A:108:LYS:HB2	1:A:108:LYS:HE2	1.74	0.44
1:C:121:GLN:HA	1:C:124:SER:OG	2.18	0.44
1:A:57:GLN:H	1:A:57:GLN:CD	2.21	0.44
1:D:37[B]:HIS:HB3	1:D:69:VAL:CG1	2.47	0.44
1:D:31:PRO:O	1:D:35:ILE:HG23	2.18	0.43
1:D:125:ASP:HA	1:D:128[B]:ARG:HG2	1.99	0.43
1:D:60:LEU:HA	1:D:60:LEU:HD23	1.74	0.43
1:D:162:LYS:HE3	1:D:162:LYS:HB2	1.75	0.43
1:A:31:PRO:O	1:A:35:ILE:HG13	2.19	0.43
1:C:126:LEU:HD12	1:C:163:ILE:HD11	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:122:ARG:NH2	1:B:157:ARG:O	2.52	0.42
1:D:66:PHE:HA	4:D:425:HOH:O	2.19	0.42
1:C:113:TRP:O	1:C:164:ALA:HA	2.19	0.42
1:D:142:PHE:CE1	1:D:182:VAL:HG13	2.55	0.42
1:D:37[A]:HIS:HB2	1:D:69:VAL:CG1	2.50	0.42
1:C:49:LYS:HD2	1:C:50:ASN:H	1.86	0.41
1:D:121:GLN:HG2	1:D:125:ASP:OD2	2.20	0.41
1:A:194:VAL:HG21	1:B:194:VAL:HG21	2.01	0.41
1:C:48:PHE:HE1	1:C:50:ASN:HA	1.86	0.41
1:D:178:HIS:O	1:D:182:VAL:HG12	2.21	0.41
1:D:122:ARG:NH2	1:D:161:ASP:OD2	2.54	0.40
1:D:56:TRP:CZ3	1:D:101:MET:HE2	2.53	0.40
1:D:106:LYS:HB3	1:D:106:LYS:HE2	1.66	0.40
1:A:52:LYS:HG3	4:A:501:HOH:O	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)
4:C:409:HOH:O	4:C:416:HOH:O[1_545]	2.09	0.11

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	183/190 (96%)	181 (99%)	2 (1%)	0	100	100
1	B	182/190 (96%)	176 (97%)	6 (3%)	0	100	100
1	C	179/190 (94%)	169 (94%)	10 (6%)	0	100	100
1	D	178/190 (94%)	169 (95%)	9 (5%)	0	100	100
All	All	722/760 (95%)	695 (96%)	27 (4%)	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	164/169 (97%)	160 (98%)	4 (2%)	49	33
1	B	158/169 (94%)	156 (99%)	2 (1%)	69	58
1	C	152/169 (90%)	148 (97%)	4 (3%)	46	30
1	D	142/169 (84%)	138 (97%)	4 (3%)	43	27
All	All	616/676 (91%)	602 (98%)	14 (2%)	50	34

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	GLN
1	A	148	ASP
1	A	173	ARG
1	A	199	SER
1	B	146	SER
1	B	148	ASP
1	C	60	LEU
1	C	102	TRP
1	C	106	LYS
1	C	148	ASP
1	D	35	ILE
1	D	146	SER
1	D	148	ASP
1	D	190	PRO

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	GLN
1	A	59	ASN
1	B	155	ASN

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Mol	Chain	Res	Type
1	B	213	ASN
1	C	80	GLN
1	C	155	ASN
1	D	80	GLN
1	D	198	GLN

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)

6 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	6G0	D	300	-	30,39,39	1.43	3 (10%)	32,63,63	1.22	3 (9%)
3	GOL	B	302	-	5,5,5	0.31	0	5,5,5	0.24	0
2	6G0	A	301	-	30,39,39	1.49	3 (10%)	32,63,63	1.11	4 (12%)
2	6G0	C	300	-	30,39,39	1.43	3 (10%)	32,63,63	1.21	4 (12%)
3	GOL	A	302	-	5,5,5	0.41	0	5,5,5	0.37	0
2	6G0	B	301	-	30,39,39	1.50	4 (13%)	32,63,63	1.07	2 (6%)

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	6G0	D	300	-	-	3/24/44/44	0/3/3/3
3	GOL	B	302	-	-	2/4/4/4	-
2	6G0	A	301	-	-	4/24/44/44	0/3/3/3
2	6G0	C	300	-	-	6/24/44/44	0/3/3/3
3	GOL	A	302	-	-	3/4/4/4	-
2	6G0	B	301	-	-	3/24/44/44	0/3/3/3

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	300	6G0	O17-C5	5.08	1.33	1.23
2	A	301	6G0	O17-C5	5.05	1.33	1.23
2	B	301	6G0	O17-C5	5.01	1.33	1.23
2	C	300	6G0	O17-C5	4.98	1.33	1.23
2	C	300	6G0	P1-O1	3.49	1.61	1.50
2	A	301	6G0	P1-O1	3.48	1.61	1.50
2	B	301	6G0	P1-O1	3.48	1.61	1.50
2	D	300	6G0	P1-O1	3.45	1.61	1.50
2	B	301	6G0	C4-C5	-2.56	1.39	1.45
2	C	300	6G0	C4-C5	-2.41	1.39	1.45
2	B	301	6G0	O14-C10	2.31	1.44	1.41
2	A	301	6G0	C4-C5	-2.27	1.39	1.45
2	D	300	6G0	C4-C5	-2.26	1.39	1.45

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	301	6G0	P3-O7-P2	-3.53	120.72	132.83
2	D	300	6G0	P2-O4-P1	-3.23	121.75	132.83
2	D	300	6G0	P3-O7-P2	-3.08	122.25	132.83
2	A	301	6G0	P2-O4-P1	-3.03	122.42	132.83
2	C	300	6G0	P2-O4-P1	-2.92	122.81	132.83
2	C	300	6G0	P3-O7-P2	-2.87	122.98	132.83
2	A	301	6G0	P4-O10-P3	-2.53	124.15	132.83
2	D	300	6G0	P4-O10-P3	-2.39	124.61	132.83
2	A	301	6G0	P3-O7-P2	-2.33	124.84	132.83
2	C	300	6G0	P4-O10-P3	-2.25	125.10	132.83
2	C	300	6G0	C1-N1-C5	-2.19	121.07	125.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	301	6G0	O2-P1-O4	2.14	111.82	104.64
2	A	301	6G0	C1-N1-C5	-2.02	121.38	125.10

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	300	6G0	P3-O10-P4-O13
3	A	302	GOL	O1-C1-C2-O2
3	A	302	GOL	O1-C1-C2-C3
3	B	302	GOL	O1-C1-C2-C3
3	B	302	GOL	O1-C1-C2-O2
2	C	300	6G0	O13-C6-C7-C8
2	C	300	6G0	O13-C6-C7-O14
2	D	300	6G0	O13-C6-C7-O14
2	D	300	6G0	O13-C6-C7-C8
2	A	301	6G0	P3-O7-P2-O6
2	B	301	6G0	P1-O4-P2-O6
2	C	300	6G0	P1-O4-P2-O5
2	A	301	6G0	P1-O4-P2-O6
2	B	301	6G0	P3-O7-P2-O6
2	C	300	6G0	P3-O7-P2-O6
2	D	300	6G0	P4-O10-P3-O9
2	A	301	6G0	P4-O10-P3-O9
2	A	301	6G0	P1-O4-P2-O5
2	B	301	6G0	P3-O7-P2-O5
2	C	300	6G0	P3-O7-P2-O5
3	A	302	GOL	C1-C2-C3-O3

There are no ring outliers.

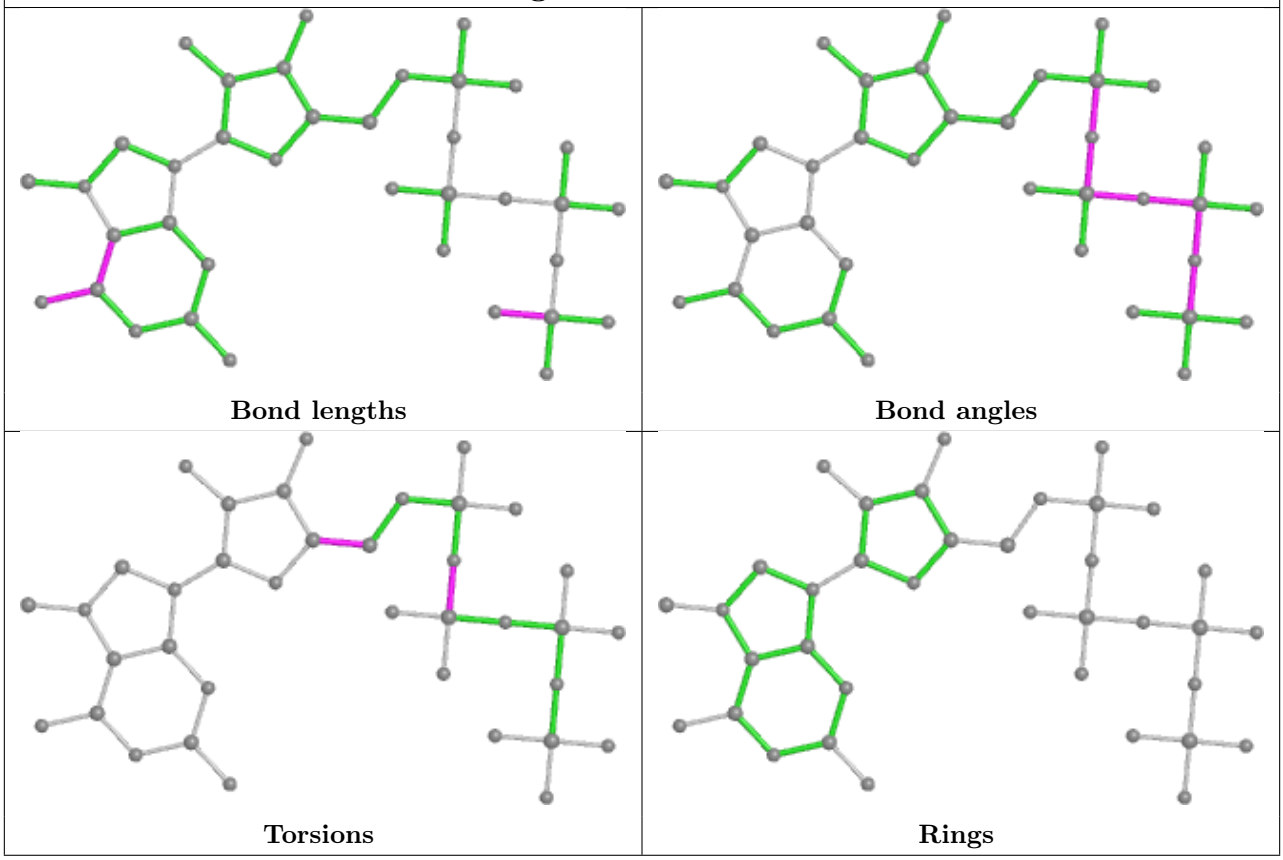
2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	302	GOL	2	0
2	A	301	6G0	1	0

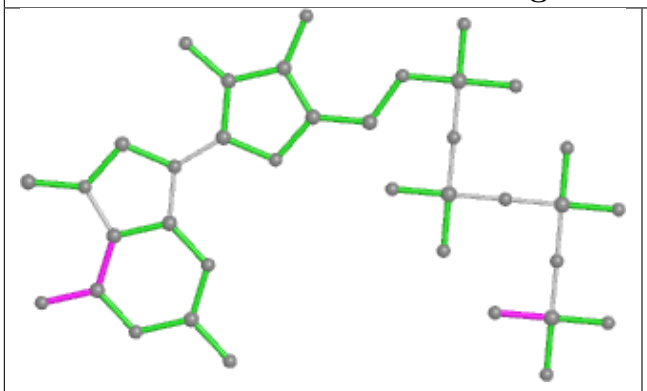
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

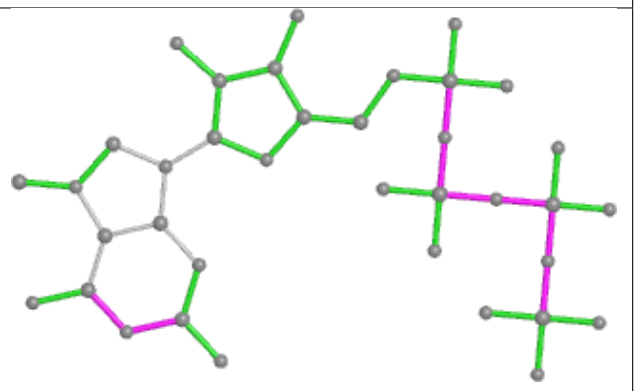
Ligand 6G0 D 300



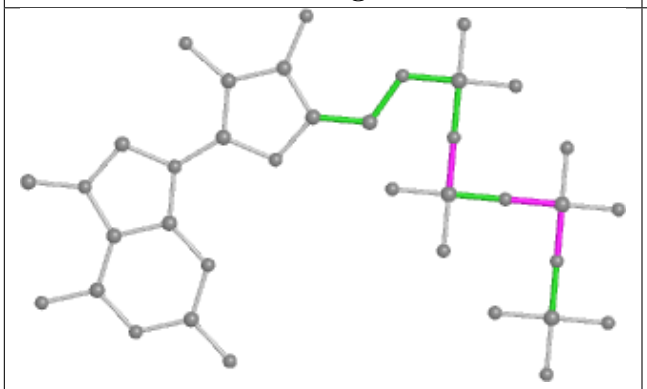
Ligand 6G0 A 301



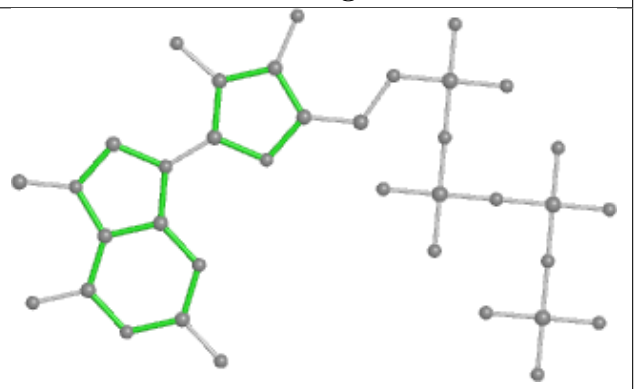
Bond lengths



Bond angles

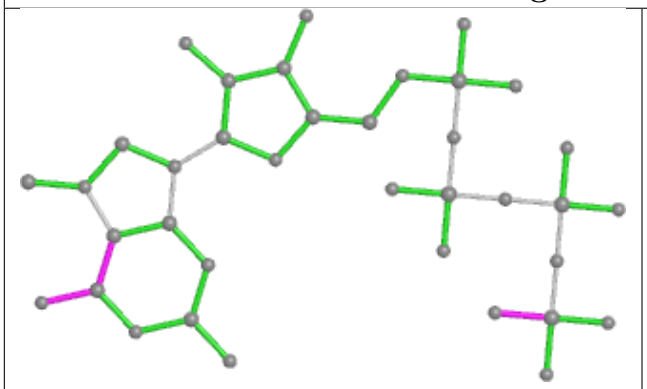


Torsions

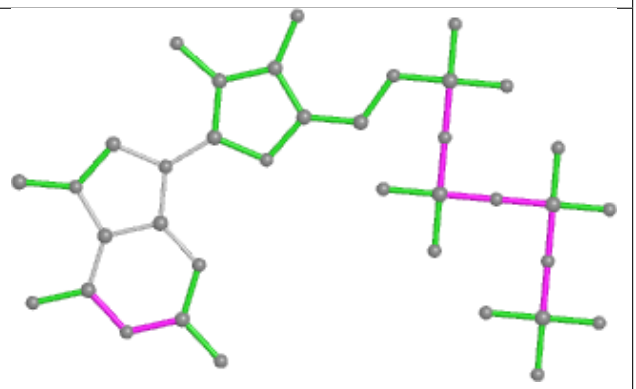


Rings

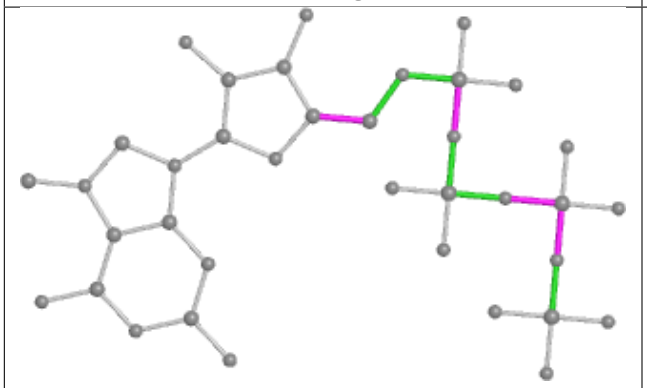
Ligand 6G0 C 300



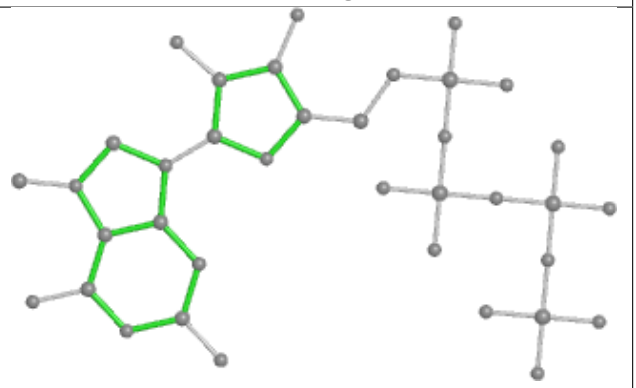
Bond lengths



Bond angles

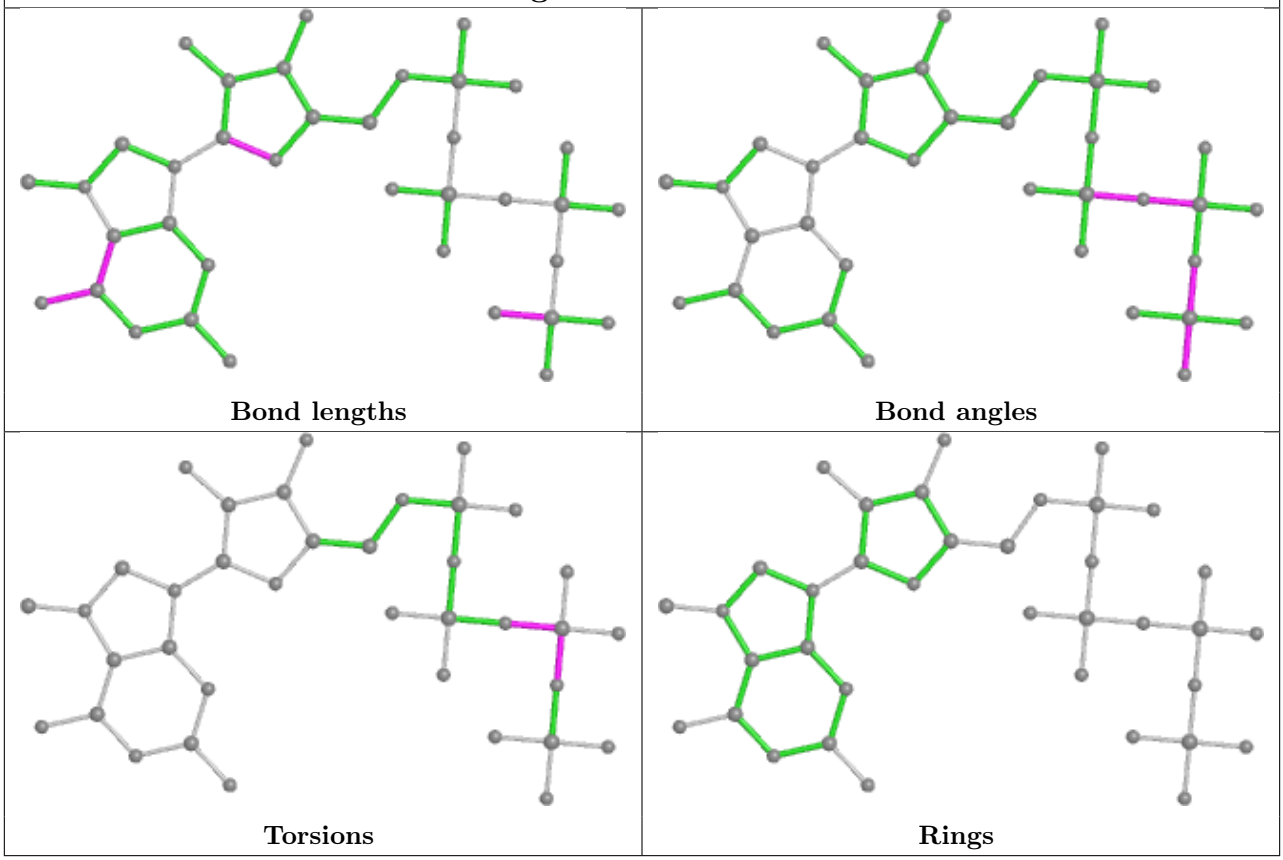


Torsions



Rings

Ligand 6G0 B 301



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	181/190 (95%)	-0.34	1 (0%) 89 89	12, 21, 38, 68	0
1	B	181/190 (95%)	-0.27	0 100 100	11, 21, 38, 66	0
1	C	179/190 (94%)	0.70	22 (12%) 4 4	22, 46, 88, 102	0
1	D	179/190 (94%)	0.80	26 (14%) 2 2	20, 48, 82, 101	0
All	All	720/760 (94%)	0.22	49 (6%) 17 16	11, 31, 77, 102	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	201	ALA	5.6
1	D	110	GLY	5.1
1	D	213	ASN	4.4
1	D	211	THR	4.4
1	C	189	LEU	4.3
1	C	216	VAL	4.1
1	D	145	TYR	4.0
1	D	170	CYS	3.7
1	D	171	GLU	3.7
1	D	168	THR	3.7
1	C	102	TRP	3.3
1	D	190	PRO	3.3
1	D	59	ASN	3.2
1	C	213	ASN	3.2
1	C	215	PHE	3.2
1	C	113	TRP	3.2
1	D	51	ASP	3.1
1	C	196	GLY	3.0
1	C	58	ALA	3.0
1	C	175	ALA	3.0
1	D	217	VAL	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	86	MET	2.9
1	D	191	PRO	2.9
1	C	52	LYS	2.8
1	D	58	ALA	2.8
1	C	33	HIS	2.7
1	C	180	GLY	2.7
1	C	212	LYS	2.6
1	C	86	MET	2.6
1	C	55	THR	2.6
1	D	113	TRP	2.6
1	C	193	ILE	2.6
1	C	201	ALA	2.5
1	C	192	LYS	2.4
1	D	142	PHE	2.4
1	A	31	PRO	2.3
1	D	102	TRP	2.3
1	D	158	ALA	2.3
1	D	143	ASP	2.3
1	D	173	ARG	2.3
1	D	56	TRP	2.2
1	C	48	PHE	2.2
1	C	104	ASP	2.1
1	D	105[A]	GLU	2.1
1	D	62	LEU	2.1
1	D	167	THR	2.0
1	C	200	HIS	2.0
1	D	94	PHE	2.0
1	C	51	ASP	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

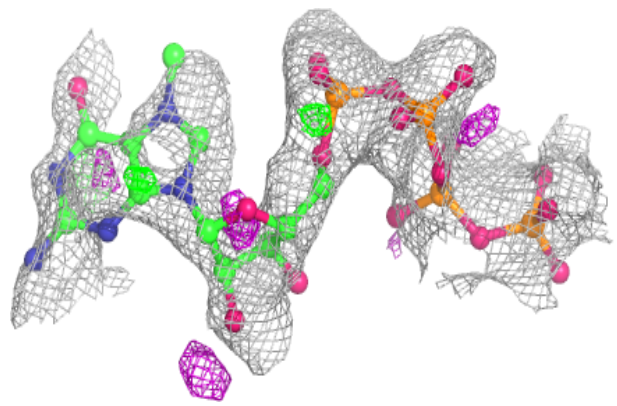
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

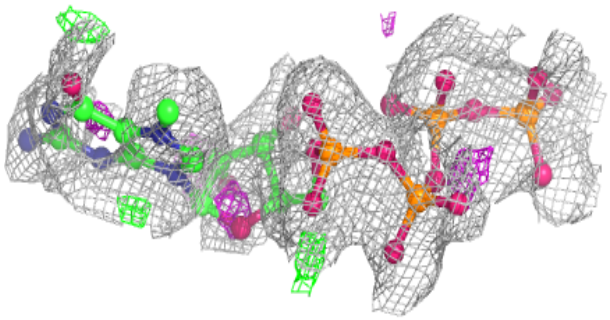
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	6G0	D	300	37/37	0.76	0.21	47,75,89,93	0
2	6G0	C	300	37/37	0.88	0.17	28,61,80,83	0
3	GOL	B	302	6/6	0.94	0.09	25,33,35,42	0
3	GOL	A	302	6/6	0.96	0.08	27,31,32,33	0
2	6G0	A	301	37/37	0.97	0.07	14,21,52,60	0
2	6G0	B	301	37/37	0.97	0.08	8,19,51,61	0

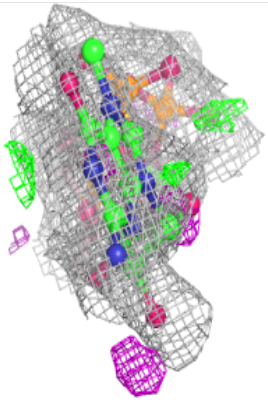
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 6G0 D 300:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

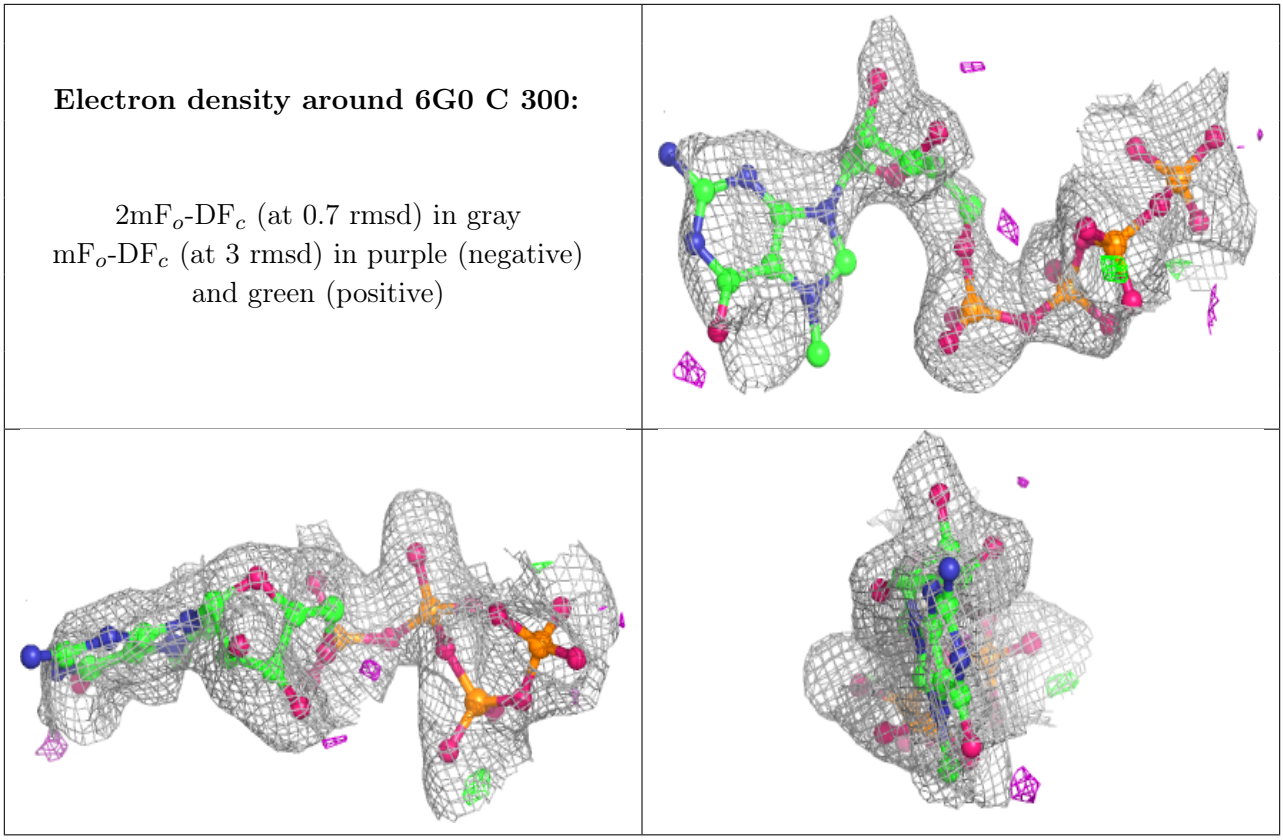






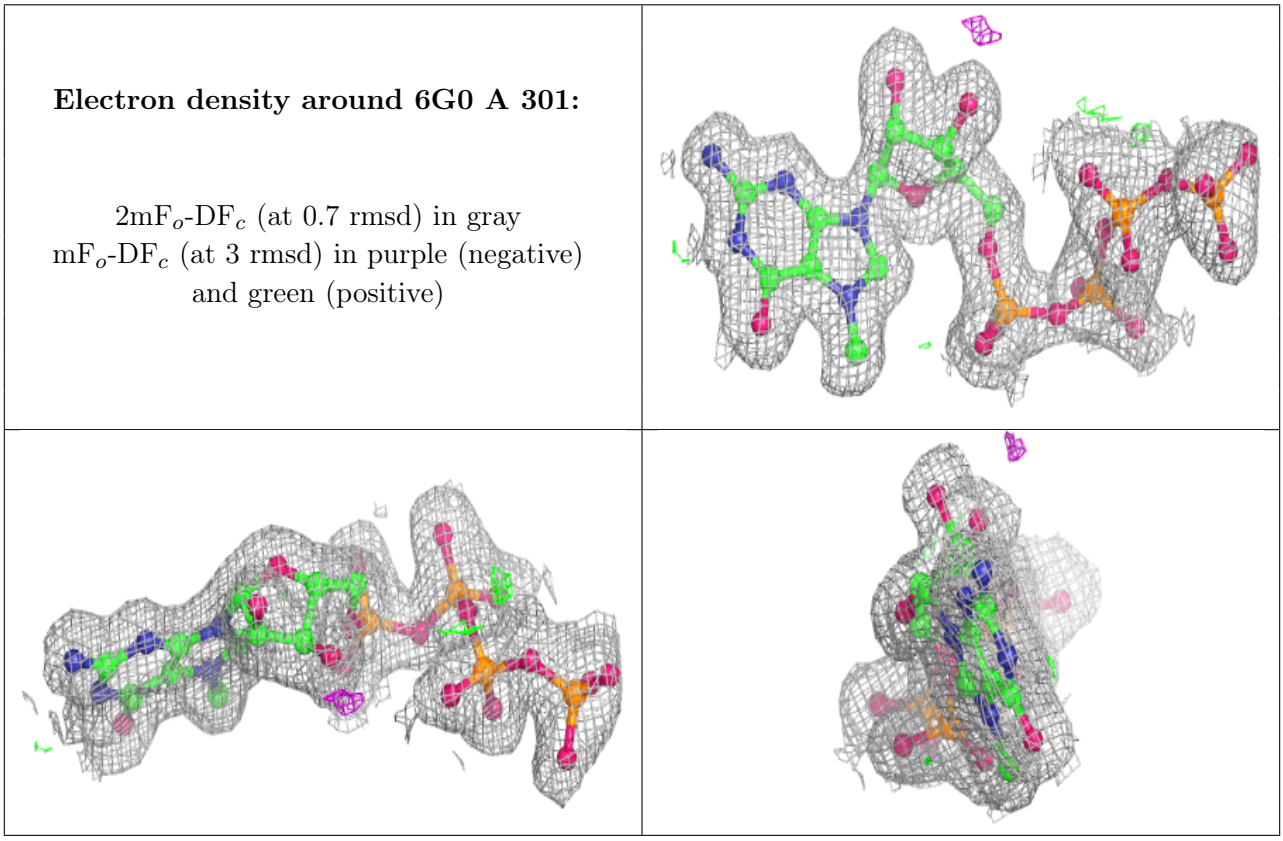
Electron density around 6G0 C 300:

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



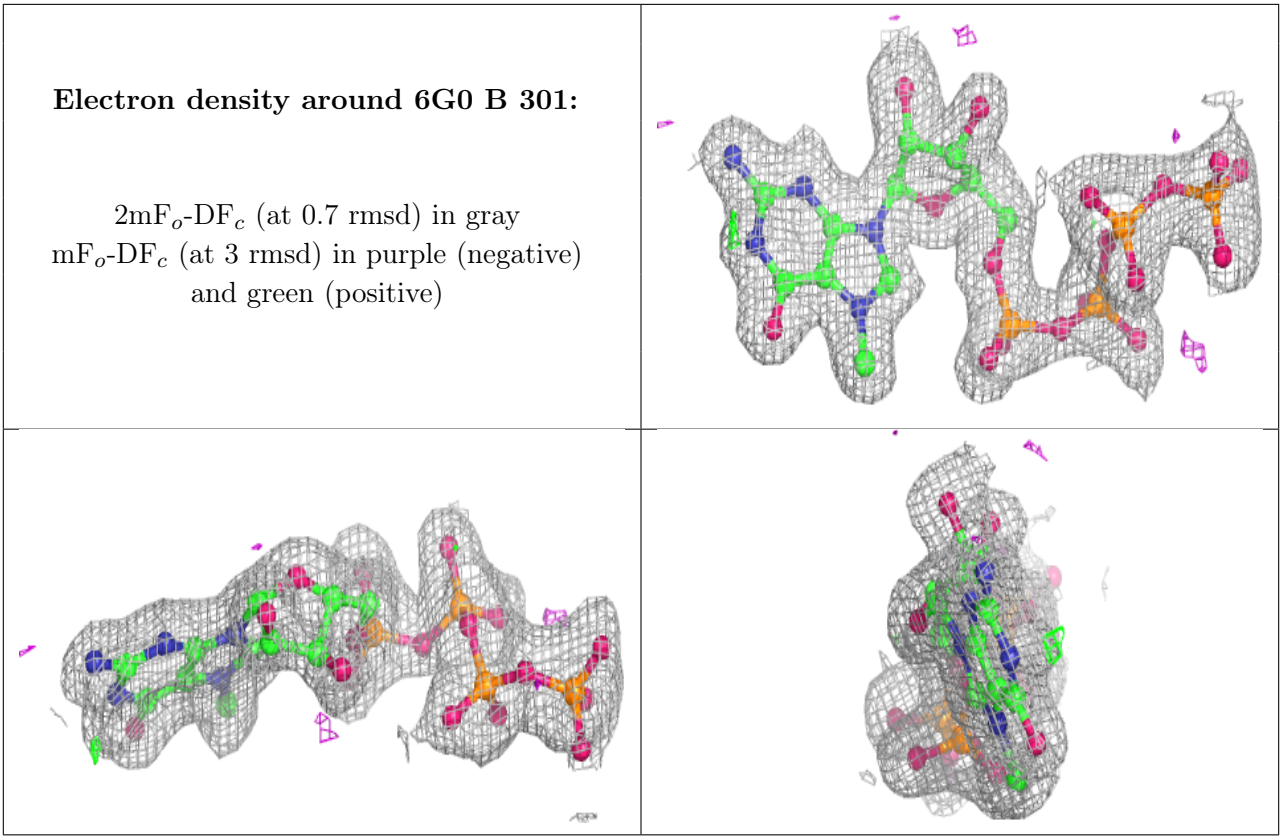
Electron density around 6G0 A 301:

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



Electron density around 6G0 B 301:

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.