Full wwPDB X-ray Structure Validation Report (i)

Dec 12, 2023 – 04:11 PM JST

PDB ID	:	8HQ5
Title	:	G6 in complex with CRM1-Ran-RanBP1
Authors	:	Sun, Q.; Lei, Y.
Deposited on	:	2022-12-13
Resolution	:	2.25 Å(reported)

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

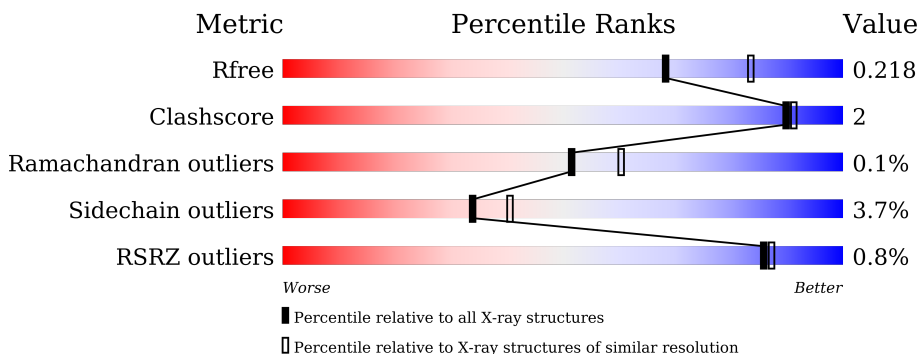|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.25 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	Percentile Ranks	Value
Rfree		0.218
Clashscore		2
Ramachandran outliers		0.1%
Sidechain outliers		3.7%
RSRZ outliers		0.8%

Worse   *Better*

▌Percentile relative to all X-ray structures

▯Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	1377 (2.26-2.26)
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)
RSRZ outliers	127900	1356 (2.26-2.26)

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	216	2% — 93% · ·
2	B	140	% — 84% · · 13%
3	C	1003	% — 91% 8% ·

2 Entry composition ⓘ

There are 11 unique types of molecules in this entry. The entry contains 11421 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 GTP-binding nuclear protein Ran.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	209	Total 1672	C 1079	N 286	O 301	S 6	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	69	LEU	GLN	engineered mutation	UNP P62826
A	182	ALA	LEU	engineered mutation	UNP P62826

- Molecule 2 is a protein called YRB1 isoform 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	122	Total 1000	C 633	N 175	O 187	S 5	0	0	0

- Molecule 3 is a protein called CRM1 isoform 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	994	Total 8043	C 5171	N 1324	O 1506	S 42	0	1	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-2	GLY	-	expression tag	UNP A0A6A5PZI8
C	-1	GLY	-	expression tag	UNP A0A6A5PZI8
C	0	SER	-	expression tag	UNP A0A6A5PZI8
C	27	GLU	SER	engineered mutation	UNP A0A6A5PZI8
C	49	GLU	GLN	engineered mutation	UNP A0A6A5PZI8
C	51	VAL	ALA	engineered mutation	UNP A0A6A5PZI8
C	?	-	VAL	deletion	UNP A0A6A5PZI8
C	?	-	GLN	deletion	UNP A0A6A5PZI8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	?	-	ARG	deletion	UNP A0A6A5PZI8
C	?	-	LEU	deletion	UNP A0A6A5PZI8
C	?	-	PRO	deletion	UNP A0A6A5PZI8
C	?	-	ALA	deletion	UNP A0A6A5PZI8
C	?	-	THR	deletion	UNP A0A6A5PZI8
C	?	-	GLU	deletion	UNP A0A6A5PZI8
C	?	-	MET	deletion	UNP A0A6A5PZI8
C	?	-	SER	deletion	UNP A0A6A5PZI8
C	?	-	PRO	deletion	UNP A0A6A5PZI8
C	?	-	LEU	deletion	UNP A0A6A5PZI8
C	?	-	ILE	deletion	UNP A0A6A5PZI8
C	?	-	GLN	deletion	UNP A0A6A5PZI8
C	?	-	LEU	deletion	UNP A0A6A5PZI8
C	?	-	SER	deletion	UNP A0A6A5PZI8
C	?	-	VAL	deletion	UNP A0A6A5PZI8
C	?	-	GLY	deletion	UNP A0A6A5PZI8
C	?	-	SER	deletion	UNP A0A6A5PZI8
C	?	-	GLN	deletion	UNP A0A6A5PZI8
C	?	-	ALA	deletion	UNP A0A6A5PZI8
C	?	-	ILE	deletion	UNP A0A6A5PZI8
C	?	-	SER	deletion	UNP A0A6A5PZI8
C	?	-	THR	deletion	UNP A0A6A5PZI8
C	?	-	GLY	deletion	UNP A0A6A5PZI8
C	?	-	SER	deletion	UNP A0A6A5PZI8
C	?	-	GLY	deletion	UNP A0A6A5PZI8
C	?	-	ALA	deletion	UNP A0A6A5PZI8
C	?	-	LEU	deletion	UNP A0A6A5PZI8
C	?	-	ASN	deletion	UNP A0A6A5PZI8
C	?	-	PRO	deletion	UNP A0A6A5PZI8
C	?	-	GLU	deletion	UNP A0A6A5PZI8
C	?	-	TYR	deletion	UNP A0A6A5PZI8
C	?	-	MET	deletion	UNP A0A6A5PZI8
C	?	-	LYS	deletion	UNP A0A6A5PZI8
C	?	-	ARG	deletion	UNP A0A6A5PZI8
C	?	-	PHE	deletion	UNP A0A6A5PZI8
C	?	-	VAL	deletion	UNP A0A6A5PZI8
C	?	-	LEU	deletion	UNP A0A6A5PZI8
C	?	-	VAL	deletion	UNP A0A6A5PZI8
C	?	-	VAL	deletion	UNP A0A6A5PZI8
C	?	-	GLU	deletion	UNP A0A6A5PZI8
C	?	-	ASN	deletion	UNP A0A6A5PZI8
C	?	-	ASP	deletion	UNP A0A6A5PZI8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	?	-	GLU	deletion	UNP A0A6A5PZI8
C	?	-	GLY	deletion	UNP A0A6A5PZI8
C	?	-	GLU	deletion	UNP A0A6A5PZI8
C	?	-	ILE	deletion	UNP A0A6A5PZI8
C	?	-	VAL	deletion	UNP A0A6A5PZI8
C	?	-	ARG	deletion	UNP A0A6A5PZI8
C	?	-	GLU	deletion	UNP A0A6A5PZI8
C	?	-	PHE	deletion	UNP A0A6A5PZI8
C	?	-	VAL	deletion	UNP A0A6A5PZI8
C	?	-	LYS	deletion	UNP A0A6A5PZI8
C	?	-	GLU	deletion	UNP A0A6A5PZI8
C	?	-	SER	deletion	UNP A0A6A5PZI8
C	?	-	ASP	deletion	UNP A0A6A5PZI8
C	?	-	THR	deletion	UNP A0A6A5PZI8
C	537	GLY	ASP	engineered mutation	UNP A0A6A5PZI8
C	539	CYS	THR	engineered mutation	UNP A0A6A5PZI8
C	540	GLU	VAL	engineered mutation	UNP A0A6A5PZI8
C	541	GLN	LYS	engineered mutation	UNP A0A6A5PZI8
C	553	ARG	SER	engineered mutation	UNP A0A6A5PZI8
C	561	GLU	GLN	engineered mutation	UNP A0A6A5PZI8
C	741	THR	ALA	engineered mutation	UNP A0A6A5PZI8
C	1022	CYS	TYR	engineered mutation	UNP A0A6A5PZI8

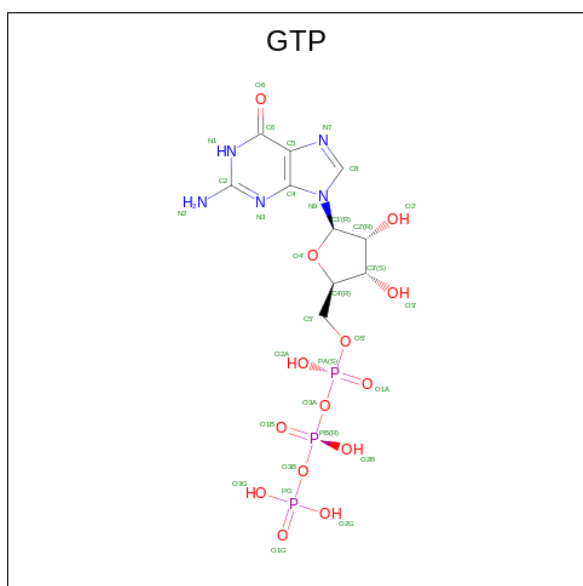- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	1	1	1	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

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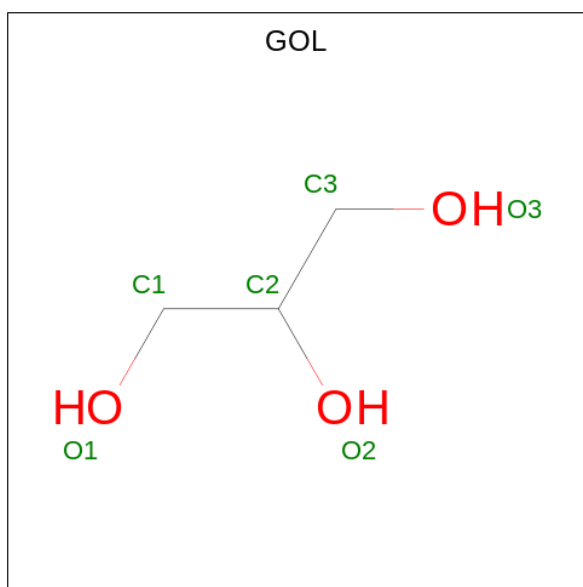
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0

• Molecule 6 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).

GTP

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total 32	C 10	N 5	O 14	P 3	0	0

• Molecule 7 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total 1	Cl 1	0	0
7	C	10	Total 10	Cl 10	0	0

• Molecule 8 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C_2H_6OS).

DMS
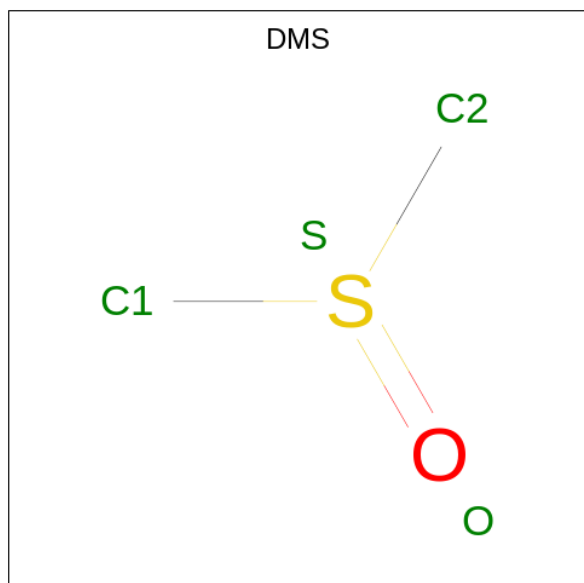
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	C	1	Total 4	C 2	O 1	S 1	0	0
8	C	1	Total 4	C 2	O 1	S 1	0	0

• Molecule 9 is 3[N-MORPHOLINO]PROPANE SULFONIC ACID (three-letter code: MPO) (formula: $C_7H_{15}NO_4S$).

MPO
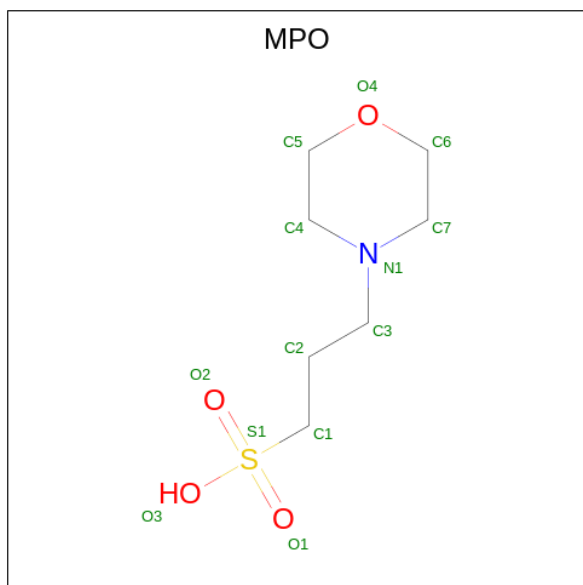
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
9	C	1	13	7	1	4	1	0	0

- Molecule 10 is 3-[(4-bromophenyl)carbonylamino]-4-[4-(5-chloranyl-2-methyl-phenyl)piperazin-1-yl]benzoic acid (three-letter code: MBI) (formula: $C_{25}H_{23}BrClN_3O_3$).

MBI
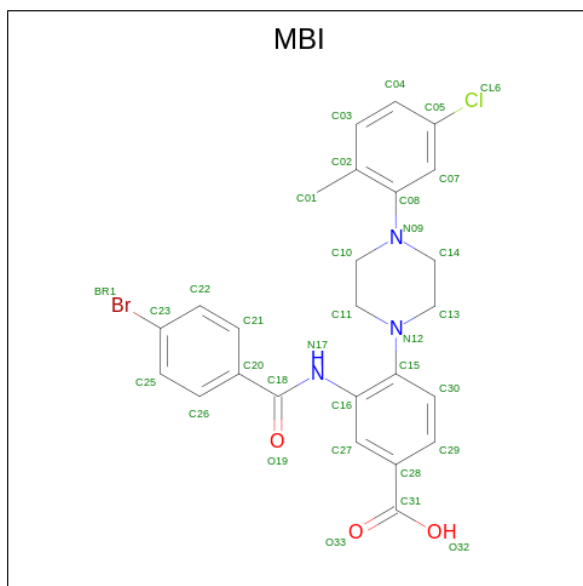
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	Br	C	Cl	N	O		
10	C	1	33	1	25	1	3	3	0	0

- Molecule 11 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	116	Total 116	O 116	0	0
11	B	29	Total 29	O 29	0	0
11	C	451	Total 451	O 451	0	0

3 Residue-property plots ⓘ

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.
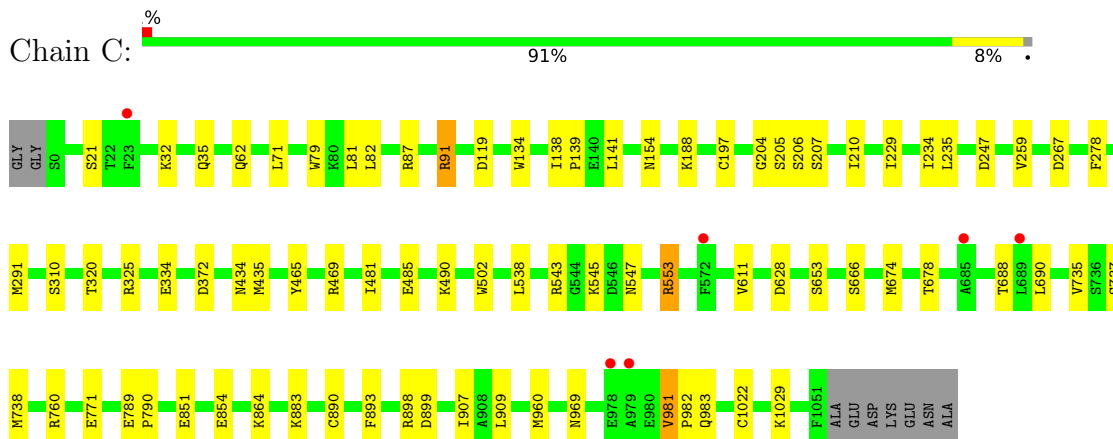
• Molecule 1: GTP-binding nuclear protein Ran

Chain A:
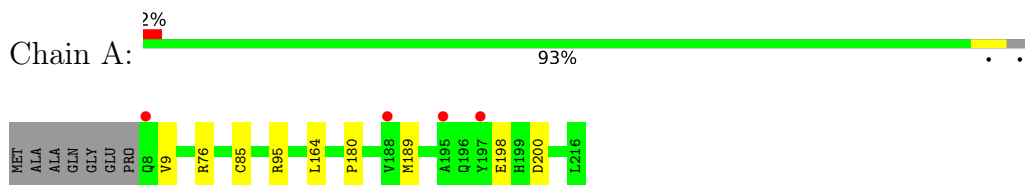
• Molecule 2: YRB1 isoform 1

Chain B:
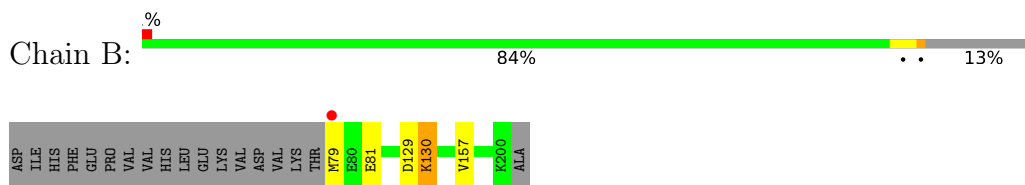
• Molecule 3: CRM1 isoform 1

Chain C:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α, β, γ	105.58Å　　105.58Å　　304.91Å 90.00°　　　90.00°　　　90.00°	Depositor
Resolution (Å)	50.01　–　2.25 99.77　–　2.25	Depositor EDS
% Data completeness (in resolution range)	98.3 (50.01-2.25) 98.3 (99.77-2.25)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.18 (at 2.25Å)	Xtriage
Refinement program	REFMAC 5	Depositor
R, R_{free}	0.175　,　0.209 0.188　,　0.218	Depositor DCC
R_{free} test set	4006 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å^2)	51.3	Xtriage
Anisotropy	0.242	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 48.5	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	11421	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.76% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: DMS, CL, GTP, MG, GOL, MBI, MPO

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	0.65	0/1713	0.78	0/2322
2	B	0.66	0/1017	0.83	0/1357
3	C	0.67	0/8199	0.75	0/11110
All	All	0.67	0/10929	0.76	0/14789

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 ⓘ

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	1672	0	1674	3	0
2	B	1000	0	1001	3	0
3	C	8043	0	8134	34	0
4	A	1	0	0	0	0
5	A	6	0	8	0	0
5	C	6	0	8	1	0
6	A	32	0	12	0	0
7	A	1	0	0	0	0
7	C	10	0	0	0	0
8	C	8	0	12	0	0

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W O R L D W I D E
PDB
PROTEIN DATA BANK

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	C	13	0	14	1	0
10	C	33	0	0	1	0
11	A	116	0	0	1	0
11	B	29	0	0	0	0
11	C	451	0	0	6	0
All	All	11421	0	10863	40	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 2.

All (40) 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)
3:C:553:ARG:HB2	3:C:553:ARG:HH21	1.45	0.81
3:C:197[A]:CYS:SG	11:C:1225:HOH:O	2.43	0.76
3:C:82:LEU:O	3:C:87:ARG:NH1	2.23	0.72
3:C:502:TRP:HE1	3:C:547:ASN:HD22	1.45	0.64
3:C:735:VAL:HA	3:C:738:MET:HE3	1.81	0.61
3:C:502:TRP:HE1	3:C:547:ASN:ND2	2.01	0.58
3:C:435:MET:HE1	3:C:465:TYR:CD1	2.38	0.57
3:C:435:MET:HE1	3:C:465:TYR:CE1	2.42	0.55
2:B:129:ASP:O	2:B:130:LYS:HG2	2.06	0.54
3:C:553:ARG:HB2	3:C:553:ARG:NH2	2.19	0.53
1:A:180:PRO:HB3	2:B:79:MET:HG3	1.91	0.53
1:A:95:ARG:HD2	11:A:514:HOH:O	2.08	0.53
3:C:434:ASN:OD1	5:C:1109:GOL:H31	2.09	0.52
3:C:981:VAL:HG22	3:C:982:PRO:HD2	1.91	0.52
3:C:229:ILE:HG22	3:C:235:LEU:HG	1.94	0.50
3:C:79:TRP:NE1	3:C:87:ARG:HD2	2.27	0.49
3:C:91:ARG:HG3	3:C:134:TRP:CH2	2.47	0.49
3:C:325:ARG:NH2	11:C:1215:HOH:O	2.45	0.48
3:C:119:ASP:OD2	3:C:154:ASN:ND2	2.47	0.46
3:C:883:LYS:HD2	11:C:1543:HOH:O	2.16	0.46
3:C:206:SER:O	3:C:210:ILE:HG12	2.16	0.45
3:C:1029:LYS:NZ	11:C:1211:HOH:O	2.43	0.45
3:C:320:THR:HB	9:C:1114:MPO:H61	1.98	0.45
1:A:85:CYS:HB2	1:A:164:LEU:HD22	2.00	0.43
3:C:229:ILE:HA	3:C:234:ILE:CG2	2.49	0.43
3:C:469:ARG:NH2	11:C:1204:HOH:O	2.35	0.43
10:C:1115:MBI:C13	10:C:1115:MBI:N17	2.82	0.43
3:C:789:GLU:HB3	3:C:790:PRO:HD3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:674:MET:O	3:C:678:THR:HG23	2.19	0.42
3:C:138:ILE:HB	3:C:139:PRO:HD3	2.02	0.42
3:C:204:GLY:HA2	3:C:210:ILE:HD11	2.02	0.41
3:C:141:LEU:C	3:C:141:LEU:HD23	2.40	0.41
3:C:864:LYS:HA	3:C:907:ILE:HG12	2.02	0.41
2:B:129:ASP:HB3	2:B:130:LYS:HD2	2.03	0.41
3:C:960:MET:HG2	3:C:1022:CYS:O	2.20	0.41
3:C:235:LEU:HD21	3:C:259:VAL:HG11	2.02	0.41
3:C:690:LEU:HB3	3:C:738:MET:CE	2.50	0.41
3:C:890:CYS:O	3:C:893:PHE:HB2	2.21	0.40
3:C:481:ILE:O	3:C:485:GLU:HG3	2.21	0.40
3:C:62:GLN:NE2	11:C:1217:HOH:O	2.46	0.40

There are no symmetry-related clashes.

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	207/216 (96%)	202 (98%)	5 (2%)	0	100	100
2	B	120/140 (86%)	115 (96%)	5 (4%)	0	100	100
3	C	993/1003 (99%)	967 (97%)	25 (2%)	1 (0%)	51	60
All	All	1320/1359 (97%)	1284 (97%)	35 (3%)	1 (0%)	51	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	205	SER

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	180/184 (98%)	175 (97%)	5 (3%)	43	52
2	B	104/121 (86%)	101 (97%)	3 (3%)	42	51
3	C	911/915 (100%)	875 (96%)	36 (4%)	31	37
All	All	1195/1220 (98%)	1151 (96%)	44 (4%)	34	40

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	VAL
1	A	76	ARG
1	A	189	MET
1	A	198	GLU
1	A	200	ASP
2	B	81	GLU
2	B	130	LYS
2	B	157	VAL
3	C	21	SER
3	C	32	LYS
3	C	35	GLN
3	C	71	LEU
3	C	81	LEU
3	C	91	ARG
3	C	188	LYS
3	C	207	SER
3	C	247	ASP
3	C	267	ASP
3	C	278	PHE
3	C	291	MET
3	C	310	SER
3	C	334	GLU
3	C	372	ASP
3	C	490	LYS
3	C	538	LEU
3	C	543	ARG

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Mol	Chain	Res	Type
3	C	545	LYS
3	C	553	ARG
3	C	611	VAL
3	C	628	ASP
3	C	653	SER
3	C	666	SER
3	C	688	THR
3	C	737	SER
3	C	760	ARG
3	C	771	GLU
3	C	851	GLU
3	C	854	GLU
3	C	898	ARG
3	C	899	ASP
3	C	909	LEU
3	C	969	ASN
3	C	981	VAL
3	C	983	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	541	GLN
3	C	547	ASN
3	C	569	HIS
3	C	588	HIS
3	C	1010	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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 19 ligands modelled in this entry, 12 are monoatomic - leaving 7 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
8	DMS	C	1106	-	3,3,3	0.22	0	3,3,3	0.13	0
10	MBI	C	1115	-	36,36,36	1.82	8 (22%)	50,51,51	1.98	12 (24%)
5	GOL	A	302	-	5,5,5	0.18	0	5,5,5	0.36	0
8	DMS	C	1105	-	3,3,3	0.26	0	3,3,3	0.10	0
9	MPO	C	1114	-	13,13,13	1.26	1 (7%)	17,17,17	1.17	2 (11%)
6	GTP	A	303	4	26,34,34	0.94	1 (3%)	32,54,54	0.90	1 (3%)
5	GOL	C	1109	-	5,5,5	0.19	0	5,5,5	0.61	0

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
10	MBI	C	1115	-	-	4/20/30/30	0/4/4/4
5	GOL	A	302	-	-	2/4/4/4	-
9	MPO	C	1114	-	-	4/7/15/15	0/1/1/1
6	GTP	A	303	4	-	3/18/38/38	0/3/3/3
5	GOL	C	1109	-	-	1/4/4/4	-

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	C	1115	MBI	BR1-C23	5.32	2.01	1.90
10	C	1115	MBI	C18-N17	4.42	1.47	1.35
9	C	1114	MPO	O2-S1	4.21	1.57	1.45
10	C	1115	MBI	C15-N12	3.96	1.50	1.41
10	C	1115	MBI	C16-N17	3.14	1.47	1.41
10	C	1115	MBI	C20-C18	2.97	1.56	1.50
6	A	303	GTP	C5-C6	-2.93	1.41	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	C	1115	MBI	C08-N09	2.40	1.46	1.41
10	C	1115	MBI	C28-C31	2.16	1.54	1.49
10	C	1115	MBI	C25-C23	2.01	1.42	1.38

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
10	C	1115	MBI	C02-C08-N09	7.89	125.78	118.78
10	C	1115	MBI	C07-C08-N09	-5.16	114.89	122.52
10	C	1115	MBI	BR1-C23-C25	4.06	125.20	119.30
10	C	1115	MBI	C01-C02-C03	-3.21	114.05	120.31
10	C	1115	MBI	C25-C23-C22	-3.02	116.43	121.34
9	C	1114	MPO	O3-S1-O2	-2.59	104.94	111.27
10	C	1115	MBI	C21-C22-C23	2.53	122.48	119.19
10	C	1115	MBI	C01-C02-C08	2.45	125.73	122.24
10	C	1115	MBI	C13-N12-C15	-2.44	110.48	116.27
9	C	1114	MPO	O3-S1-O1	2.37	117.06	111.27
10	C	1115	MBI	C07-C08-C02	-2.32	119.33	121.82
10	C	1115	MBI	O32-C31-C28	2.23	120.63	114.85
10	C	1115	MBI	C03-C02-C08	2.19	120.20	117.44
10	C	1115	MBI	C14-C13-N12	2.19	114.95	110.70
6	A	303	GTP	O6-C6-C5	2.14	128.55	124.37

There are no chirality outliers.
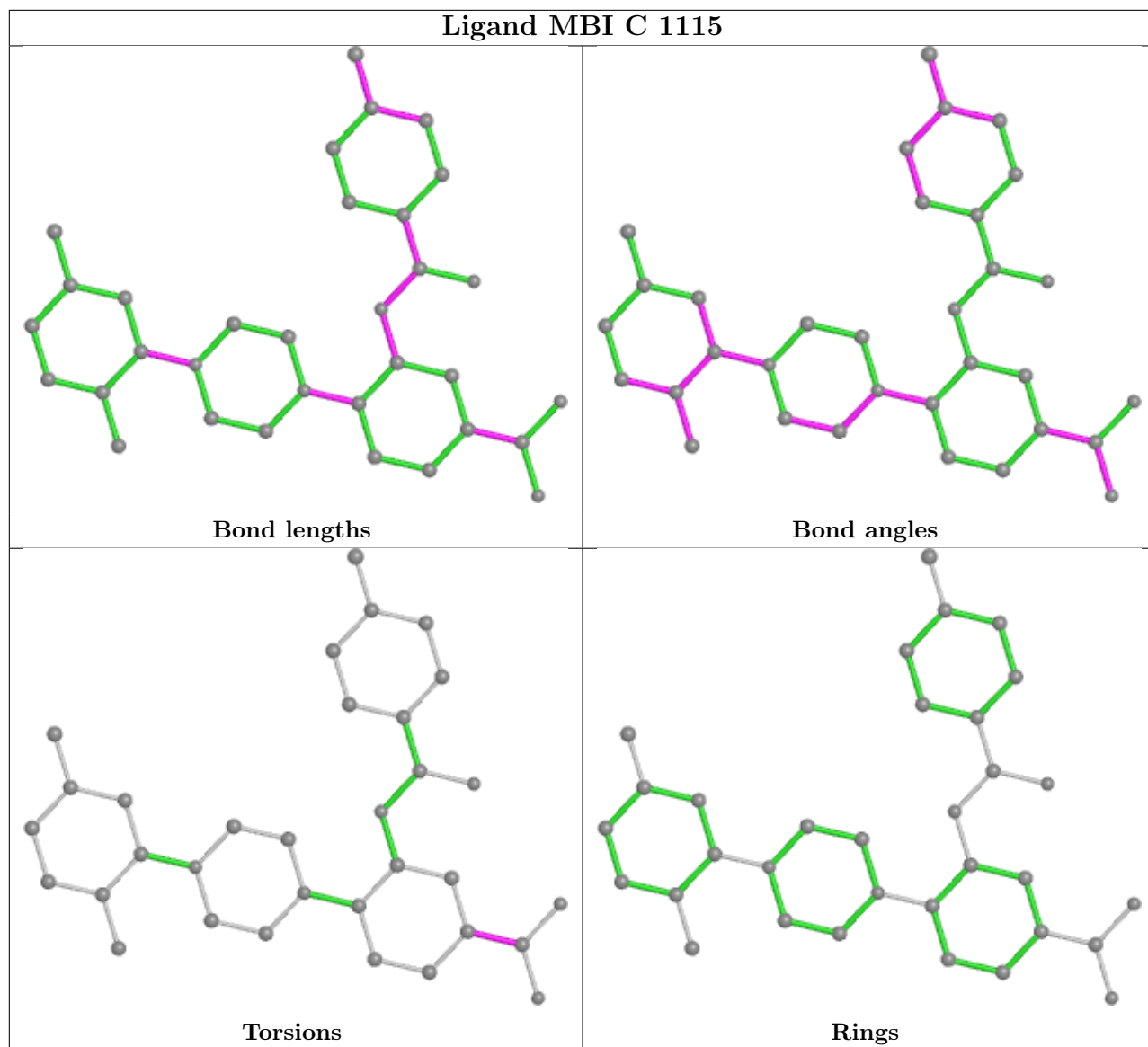
All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	C	1115	MBI	C27-C28-C31-O32
10	C	1115	MBI	C27-C28-C31-O33
10	C	1115	MBI	C29-C28-C31-O32
10	C	1115	MBI	C29-C28-C31-O33
9	C	1114	MPO	C2-C3-N1-C7
9	C	1114	MPO	C2-C3-N1-C4
5	A	302	GOL	C1-C2-C3-O3
9	C	1114	MPO	C2-C1-S1-O2
6	A	303	GTP	O4'-C4'-C5'-O5'
6	A	303	GTP	PA-O3A-PB-O2B
9	C	1114	MPO	C2-C1-S1-O3
5	A	302	GOL	O2-C2-C3-O3
6	A	303	GTP	PA-O3A-PB-O1B
5	C	1109	GOL	C1-C2-C3-O3

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	C	1115	MBI	1	0
9	C	1114	MPO	1	0
5	C	1109	GOL	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 MBI C 1115

Bond lengths

Bond angles

Torsions

Rings

Ligand GTP A 303

Bond lengths

Bond angles

Torsions

Rings
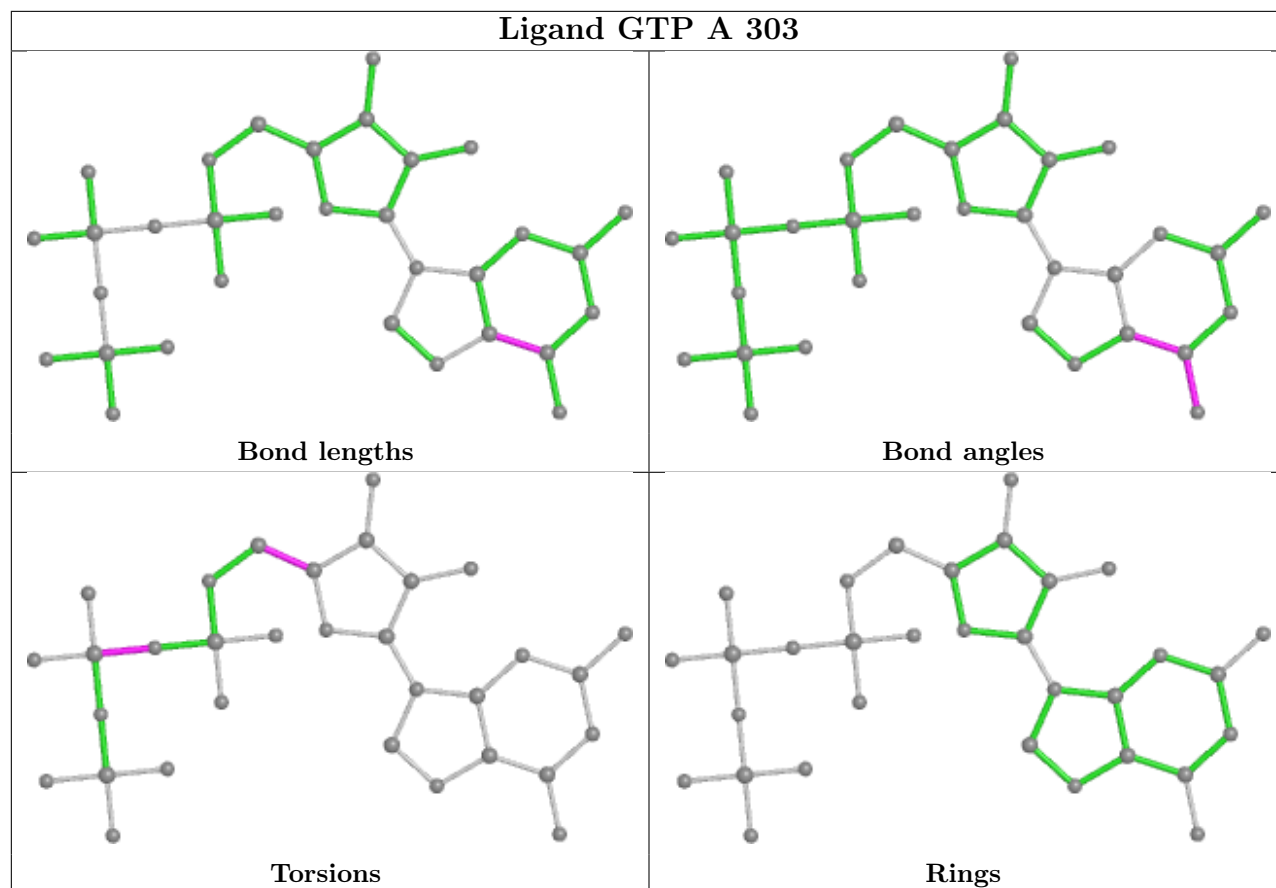
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6　Fit of model and data ⓘ

6.1　Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å²)	Q<0.9
1	A	209/216 (96%)	-0.02	4 (1%)	66	69	38, 53, 111, 131	0
2	B	122/140 (87%)	-0.02	1 (0%)	86	87	53, 66, 97, 113	0
3	C	994/1003 (99%)	-0.04	6 (0%)	89	89	38, 57, 88, 129	0
All	All	1325/1359 (97%)	-0.04	11 (0%)	86	87	38, 58, 92, 131	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	8	GLN	3.9
3	C	689	LEU	3.6
1	A	188	VAL	2.8
3	C	572	PHE	2.5
3	C	978	GLU	2.2
1	A	195	ALA	2.2
3	C	979	ALA	2.2
2	B	79	MET	2.1
3	C	685	ALA	2.1
3	C	23	PHE	2.0
1	A	197	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 ⓘ

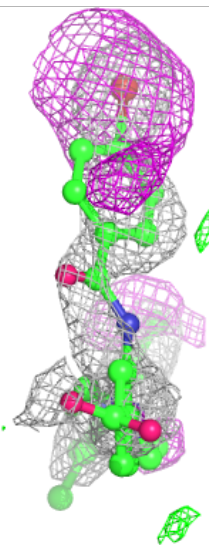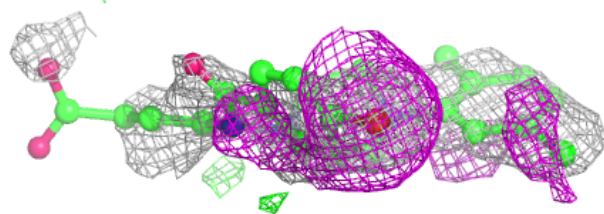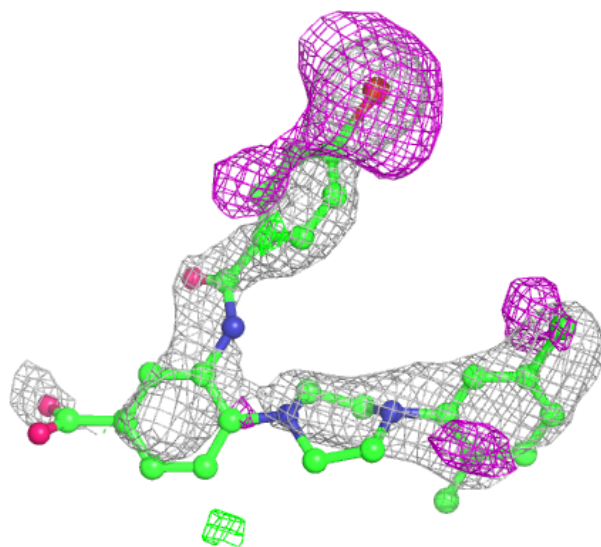There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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.

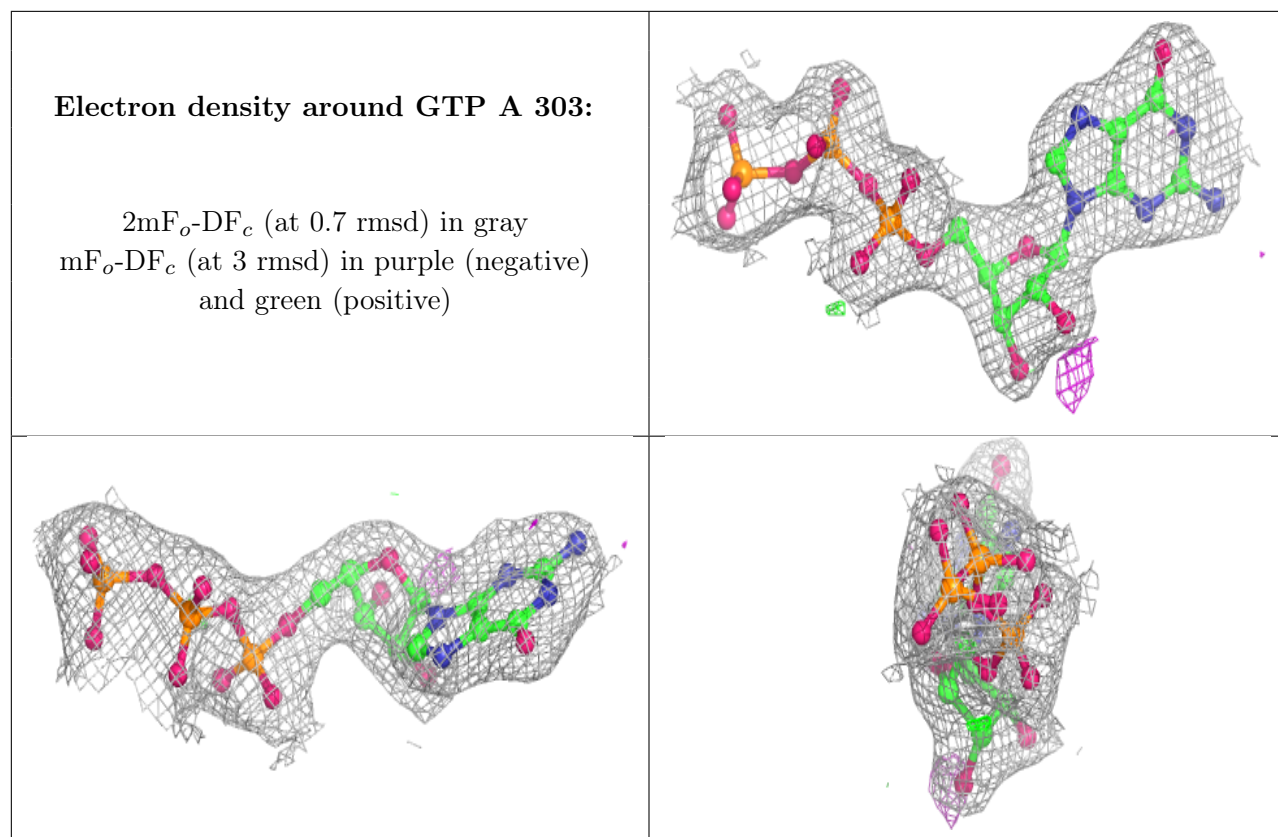| Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	GOL	C	1109	6/6	0.73	0.22	71,77,80,80	0
5	GOL	A	302	6/6	0.74	0.24	68,87,88,88	0
7	CL	C	1103	1/1	0.75	0.26	92,92,92,92	0
7	CL	C	1101	1/1	0.77	0.09	93,93,93,93	0
7	CL	C	1104	1/1	0.79	0.14	99,99,99,99	0
7	CL	A	304	1/1	0.82	0.16	89,89,89,89	0
7	CL	C	1112	1/1	0.82	0.15	93,93,93,93	0
10	MBI	C	1115	33/33	0.85	0.35	84,100,123,126	0
7	CL	C	1113	1/1	0.89	0.08	92,92,92,92	0
8	DMS	C	1106	4/4	0.89	0.27	99,102,102,103	0
7	CL	C	1102	1/1	0.89	0.20	78,78,78,78	0
7	CL	C	1107	1/1	0.90	0.17	88,88,88,88	0
7	CL	C	1108	1/1	0.90	0.10	105,105,105,105	0
9	MPO	C	1114	13/13	0.92	0.18	62,70,74,74	0
8	DMS	C	1105	4/4	0.95	0.18	110,115,117,118	0
7	CL	C	1110	1/1	0.96	0.13	99,99,99,99	0
7	CL	C	1111	1/1	0.98	0.19	71,71,71,71	0
6	GTP	A	303	32/32	0.99	0.13	42,44,47,49	0
4	MG	A	301	1/1	0.99	0.07	46,46,46,46	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 MBI C 1115:

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

Electron density around GTP A 303:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.