WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Oct 10, 2023 – 12:17 PM EDT

PDB ID	:	6XJR
Title	:	Crystal Structure of KPT-185 bound to CRM1 (E582K, 537-DLTVK-541 to GLCEQ)
Authors	:	Baumhardt, J.M.; Chook, Y.M.
Deposited on	:	2020-06-24
Resolution	:	1.94 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	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
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)	:	2.35.1

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 1.94 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		0.226
Clashscore		4
Ramachandran outliers		0.5%
Sidechain outliers		1.3%
RSRZ outliers		5.7%

Worse   Better

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
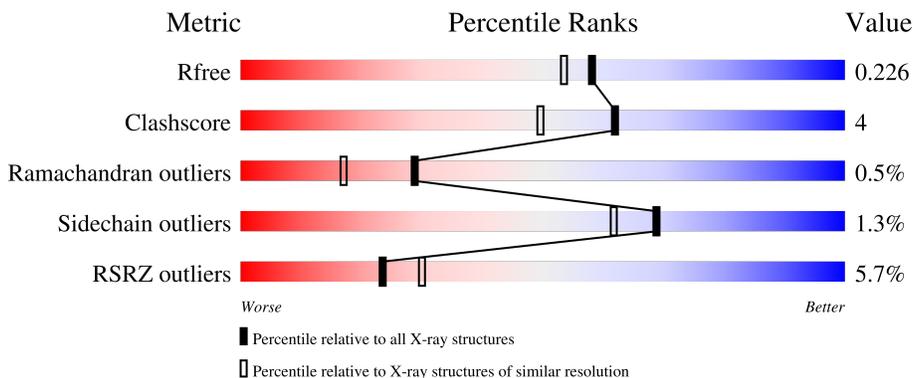
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4310 (1.96-1.92)
Clashscore	141614	1023 (1.94-1.94)
Ramachandran outliers	138981	1007 (1.94-1.94)
Sidechain outliers	138945	1007 (1.94-1.94)
RSRZ outliers	127900	4250 (1.96-1.92)

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	6% 90% 5% 5%
2	B	140	5% 83% · · 12%
3	C	1024	5% 91% 6% ··

2 Entry composition ⓘ

There are 7 unique types of molecules in this entry. The entry contains 23358 atoms, of which 11144 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	206	Total 3360	C 1083	H 1681	N 289	O 302	S 5	0	5	0

- Molecule 2 is a protein called Ran-specific GTPase-activating protein 1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	123	Total 2059	C 652	H 1030	N 181	O 191	S 5	0	3	0

- Molecule 3 is a protein called Exportin-1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
3	C	1010	Total 16722	C 5331	H 8421	N 1366	O 1559	S 45	0	42	0

There are 46 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-2	GLY	-	expression tag	UNP P30822
C	-1	GLY	-	expression tag	UNP P30822
C	0	SER	-	expression tag	UNP P30822
C	?	-	VAL	deletion	UNP P30822
C	?	-	GLN	deletion	UNP P30822
C	?	-	ARG	deletion	UNP P30822
C	?	-	LEU	deletion	UNP P30822
C	?	-	PRO	deletion	UNP P30822
C	?	-	ALA	deletion	UNP P30822
C	?	-	THR	deletion	UNP P30822
C	?	-	GLU	deletion	UNP P30822
C	?	-	MET	deletion	UNP P30822
C	?	-	SER	deletion	UNP P30822
C	?	-	PRO	deletion	UNP P30822

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Chain	Residue	Modelled	Actual	Comment	Reference
C	?	-	LEU	deletion	UNP P30822
C	?	-	ILE	deletion	UNP P30822
C	?	-	GLN	deletion	UNP P30822
C	?	-	LEU	deletion	UNP P30822
C	?	-	SER	deletion	UNP P30822
C	?	-	VAL	deletion	UNP P30822
C	?	-	GLY	deletion	UNP P30822
C	?	-	SER	deletion	UNP P30822
C	?	-	GLN	deletion	UNP P30822
C	?	-	ALA	deletion	UNP P30822
C	?	-	ILE	deletion	UNP P30822
C	?	-	SER	deletion	UNP P30822
C	?	-	THR	deletion	UNP P30822
C	?	-	GLY	deletion	UNP P30822
C	?	-	SER	deletion	UNP P30822
C	?	-	GLY	deletion	UNP P30822
C	?	-	ALA	deletion	UNP P30822
C	?	-	LEU	deletion	UNP P30822
C	?	-	ASN	deletion	UNP P30822
C	?	-	PRO	deletion	UNP P30822
C	?	-	GLU	deletion	UNP P30822
C	?	-	TYR	deletion	UNP P30822
C	?	-	MET	deletion	UNP P30822
C	?	-	LYS	deletion	UNP P30822
C	?	-	ARG	deletion	UNP P30822
C	?	-	PHE	deletion	UNP P30822
C	537	GLY	ASP	engineered mutation	UNP P30822
C	539	CYS	THR	engineered mutation	UNP P30822
C	540	GLU	VAL	engineered mutation	UNP P30822
C	541	GLN	LYS	engineered mutation	UNP P30822
C	582	LYS	GLU	engineered mutation	UNP P30822
C	1022	CYS	TYR	conflict	UNP P30822

- Molecule 4 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula: $C_{10}H_{17}N_6O_{13}P_3$).

GNP
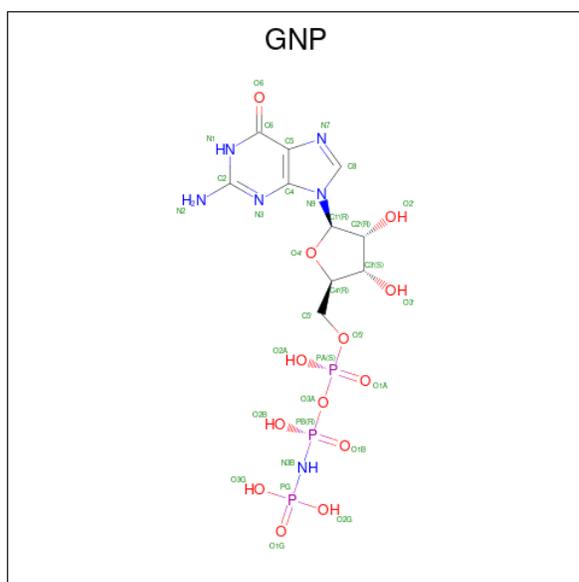
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	A	1	Total	C	H	N	O	P	0	0
			44	10	12	6	13	3		

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

- Molecule 6 is propan-2-yl 3-{3-[3-methoxy-5-(trifluoromethyl)phenyl]-1H-1,2,4-triazol-1-yl}propanoate (three-letter code: K85) (formula: $C_{16}H_{18}F_3N_3O_3$) (labeled as "Ligand of Interest" by depositor).

K85
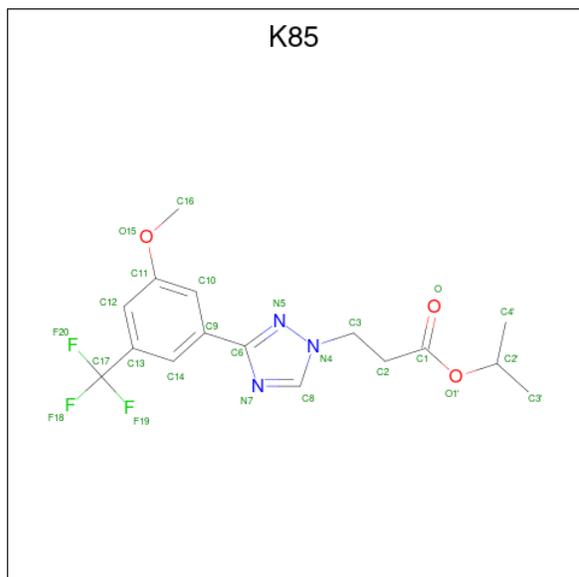
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	C	1	Total 25	C 16	F 3	N 3	O 3	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	207	Total 207	O 207	0	0
7	B	61	Total 61	O 61	0	0
7	C	879	Total 879	O 879	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:
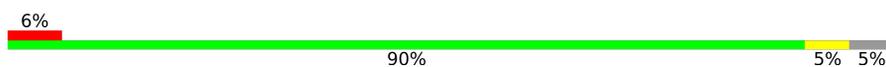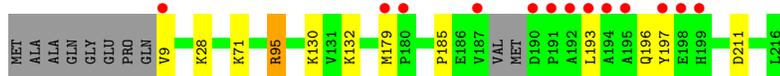
- Molecule 2: Ran-specific GTPase-activating protein 1

Chain B:
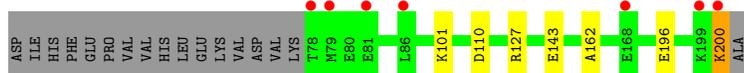
- Molecule 3: Exportin-1

Chain C:
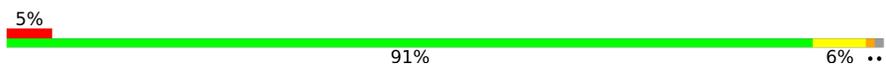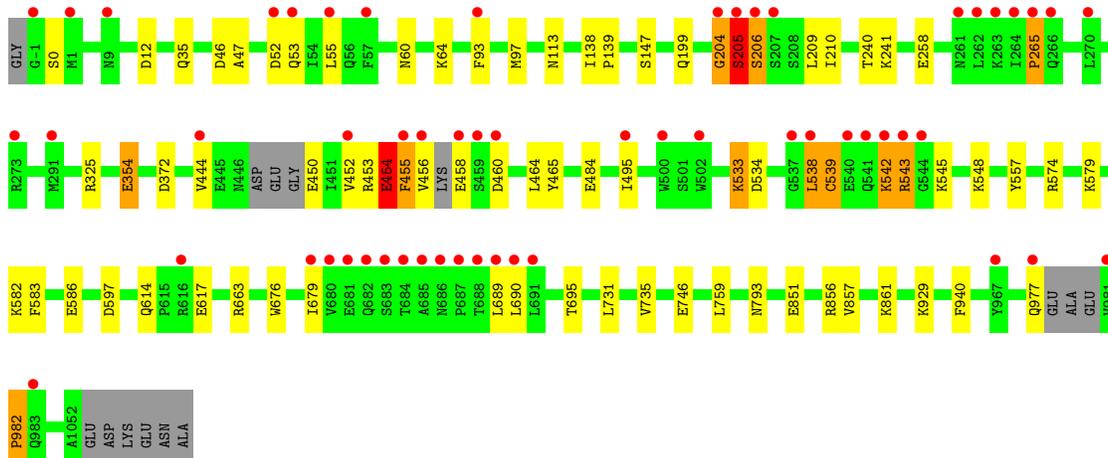
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α, β, γ	105.99Å　105.99Å　306.03Å 90.00°　　90.00°　　90.00°	Depositor
Resolution (Å)	38.25　–　1.94 38.25　–　1.94	Depositor EDS
% Data completeness (in resolution range)	89.9 (38.25-1.94) 89.9 (38.25-1.94)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.90 (at 1.94Å)	Xtriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.194　,　0.226 0.192　,　0.226	Depositor DCC
R_{free} test set	2000 reflections (1.72%)	wwPDB-VP
Wilson B-factor (Å^2)	18.8	Xtriage
Anisotropy	0.012	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.38 , 53.1	EDS
L-test for twinning[2]	$< |L| > = 0.48$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	23358	wwPDB-VP
Average B, all atoms (Å^2)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.59% 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: MG, K85, GNP

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	0.25	0/1738	0.45	0/2356
2	B	0.26	0/1059	0.46	0/1413
3	C	0.29	0/8598	0.45	1/11644 (0.0%)
All	All	0.28	0/11395	0.45	1/15413 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	454	GLU	N-CA-C	6.17	127.65	111.00

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	1679	1681	1657	11	0
2	B	1029	1030	1021	7	0
3	C	8301	8421	8251	78	0
4	A	32	12	12	1	0
5	A	1	0	0	0	0
6	C	25	0	16	5	0
7	A	207	0	0	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	61	0	0	1	0
7	C	879	0	0	23	1
All	All	12214	11144	10957	97	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 4.

All (97) 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:456:VAL:CG2	3:C:458:GLU:N	2.00	1.24
3:C:456:VAL:HG22	3:C:458:GLU:N	1.58	1.13
3:C:456:VAL:HG21	3:C:458:GLU:N	1.72	1.05
3:C:456:VAL:CG2	3:C:458:GLU:HB2	2.01	0.91
2:B:196:GLU:O	2:B:200:LYS:NZ	2.05	0.89
3:C:982:PRO:O	7:C:1201:HOH:O	1.98	0.82
3:C:542:LYS:C	3:C:543:ARG:HD3	2.00	0.82
3:C:450:GLU:N	7:C:1211:HOH:O	2.16	0.78
3:C:205[A]:SER:OG	3:C:206[A]:SER:N	2.17	0.78
3:C:199:GLN:NE2	7:C:1212:HOH:O	2.17	0.78
3:C:542:LYS:O	3:C:548:LYS:NZ	2.16	0.77
3:C:113[A]:ASN:OD1	7:C:1202:HOH:O	2.05	0.73
3:C:851:GLU:OE2	7:C:1203:HOH:O	2.06	0.73
3:C:597:ASP:OD1	7:C:1204:HOH:O	2.08	0.71
1:A:9:VAL:N	7:A:404:HOH:O	2.22	0.71
1:A:211:ASP:OD2	7:A:401:HOH:O	2.09	0.70
3:C:47:ALA:N	7:C:1219:HOH:O	2.25	0.70
3:C:455:PHE:O	3:C:456:VAL:HG12	1.91	0.70
3:C:484:GLU:OE1	7:C:1205:HOH:O	2.08	0.70
3:C:545:LYS:HA	3:C:548:LYS:HB2	1.74	0.69
3:C:258:GLU:OE1	7:C:1206:HOH:O	2.10	0.69
2:B:110:ASP:OD2	7:B:301:HOH:O	2.11	0.69
3:C:929:LYS:NZ	7:C:1220:HOH:O	2.25	0.68
3:C:12:ASP:OD1	7:C:1208:HOH:O	2.12	0.67
3:C:746:GLU:OE1	7:C:1207:HOH:O	2.11	0.67
3:C:456:VAL:HG21	3:C:458:GLU:HB2	1.75	0.66
3:C:456:VAL:CG2	3:C:458:GLU:CB	2.73	0.66
3:C:265:PRO:O	7:C:1209:HOH:O	2.14	0.65
3:C:456:VAL:HG22	3:C:458:GLU:CA	2.28	0.64
3:C:456:VAL:CG2	3:C:458:GLU:CA	2.76	0.64
3:C:456:VAL:HG23	3:C:458:GLU:HB2	1.77	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:53:GLN:OE1	7:C:1210:HOH:O	2.15	0.63
3:C:453:ARG:NE	7:C:1226:HOH:O	2.32	0.62
3:C:60:ASN:N	7:C:1225:HOH:O	2.32	0.62
3:C:583:PHE:CE1	6:C:1101:K85:H14	2.37	0.59
3:C:456:VAL:HG13	3:C:456:VAL:O	2.04	0.56
3:C:542:LYS:C	3:C:543:ARG:CD	2.73	0.56
3:C:793:ASN:OD1	7:C:1213:HOH:O	2.18	0.55
4:A:301:GNP:O1A	7:A:402:HOH:O	2.18	0.55
3:C:679:ILE:HD11	3:C:695:THR:HG23	1.87	0.55
3:C:0:SER:O	3:C:0:SER:OG	2.25	0.54
2:B:101:LYS:HG3	2:B:101:LYS:O	2.08	0.53
3:C:586:GLU:OE2	6:C:1101:K85:H13	2.09	0.52
3:C:46:ASP:N	7:C:1219:HOH:O	2.34	0.52
1:A:132:LYS:NZ	7:A:405:HOH:O	2.26	0.51
3:C:52:ASP:HA	3:C:93:PHE:CZ	2.45	0.51
3:C:548:LYS:HG2	6:C:1101:K85:H18	1.92	0.50
3:C:465:TYR:OH	3:C:557:TYR:OH	2.25	0.50
3:C:35:GLN:NE2	7:C:1229:HOH:O	2.36	0.49
3:C:325:ARG:NH1	7:C:1235:HOH:O	2.38	0.49
3:C:452:VAL:HG22	3:C:453:ARG:H	1.77	0.49
3:C:205[A]:SER:N	7:C:1239:HOH:O	2.39	0.49
3:C:456:VAL:HG21	3:C:458:GLU:CB	2.41	0.49
3:C:539:CYS:O	3:C:548:LYS:NZ	2.42	0.49
3:C:460:ASP:OD1	3:C:460:ASP:N	2.46	0.47
3:C:534:ASP:O	3:C:538:LEU:HD22	2.15	0.46
3:C:548:LYS:CG	6:C:1101:K85:H18	2.45	0.46
3:C:55:LEU:HD13	3:C:97:MET:SD	2.54	0.46
3:C:444:VAL:HG21	3:C:454:GLU:HB3	1.97	0.46
3:C:579:LYS:HD2	3:C:582:LYS:HE2	1.97	0.46
3:C:533:LYS:HG3	3:C:534:ASP:N	2.30	0.45
3:C:545:LYS:NZ	3:C:586:GLU:OE1	2.50	0.45
3:C:543:ARG:CD	3:C:543:ARG:N	2.80	0.45
3:C:55:LEU:HD12	3:C:93:PHE:CZ	2.51	0.45
1:A:185:PRO:HG2	2:B:162:ALA:HB1	1.98	0.45
3:C:676:TRP:HA	3:C:679:ILE:HG22	1.98	0.44
3:C:689:LEU:HD13	3:C:695:THR:HG21	1.99	0.44
3:C:495:ILE:HD11	3:C:534:ASP:HB3	2.00	0.44
3:C:204[B]:GLY:HA3	3:C:210:ILE:HD11	1.99	0.43
1:A:193:LEU:HG	1:A:196:GLN:HB3	2.00	0.43
3:C:857:VAL:HG12	3:C:861:LYS:HE2	2.00	0.43
3:C:204[A]:GLY:HA2	3:C:210:ILE:HD11	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:101:LYS:O	2:B:101:LYS:CG	2.66	0.43
2:B:143:GLU:OE2	2:B:143:GLU:N	2.50	0.43
1:A:71:LYS:NZ	7:A:416:HOH:O	2.52	0.42
3:C:354:GLU:HG2	3:C:354:GLU:O	2.19	0.42
3:C:452:VAL:HG13	3:C:453:ARG:N	2.33	0.42
3:C:240:THR:OG1	3:C:241:LYS:N	2.51	0.42
1:A:95:ARG:CD	1:A:130:LYS:HB3	2.50	0.41
3:C:444:VAL:O	3:C:452:VAL:N	2.39	0.41
3:C:583:PHE:CD1	6:C:1101:K85:H14	2.55	0.41
1:A:179:MET:O	2:B:127:ARG:NH2	2.44	0.41
3:C:456:VAL:HG22	3:C:456:VAL:O	2.21	0.41
3:C:205[A]:SER:HB3	3:C:209:LEU:HD23	2.02	0.41
1:A:95:ARG:HD2	1:A:130:LYS:HB3	2.02	0.41
3:C:55:LEU:O	3:C:64:LYS:NZ	2.46	0.41
3:C:372:ASP:OD2	7:C:1214:HOH:O	2.22	0.41
3:C:735[B]:VAL:HG13	3:C:759:LEU:HB3	2.02	0.41
1:A:95:ARG:CZ	1:A:95:ARG:H	2.33	0.41
3:C:690:LEU:HD21	3:C:731:LEU:HD11	2.02	0.41
1:A:28:LYS:NZ	7:A:415:HOH:O	2.52	0.41
3:C:543:ARG:HD3	3:C:543:ARG:N	2.36	0.41
3:C:614:GLN:HB2	3:C:617:GLU:HG3	2.03	0.40
3:C:138:ILE:HB	3:C:139:PRO:HD3	2.02	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)
7:C:1339:HOH:O	7:C:1789:HOH:O[6_445]	2.03	0.17

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%)	201 (97%)	6 (3%)	0	100	100
2	B	124/140 (89%)	115 (93%)	9 (7%)	0	100	100
3	C	1044/1024 (102%)	1007 (96%)	27 (3%)	10 (1%)	15	6
All	All	1375/1380 (100%)	1323 (96%)	42 (3%)	10 (1%)	29	11

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	205[A]	SER
3	C	205[B]	SER
3	C	454	GLU
3	C	455	PHE
3	C	204[A]	GLY
3	C	204[B]	GLY
3	C	206[A]	SER
3	C	206[B]	SER
3	C	982	PRO
3	C	265	PRO

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	183/185 (99%)	181 (99%)	2 (1%)	73	67
2	B	108/121 (89%)	107 (99%)	1 (1%)	78	75
3	C	959/933 (103%)	944 (98%)	15 (2%)	62	52
All	All	1250/1239 (101%)	1232 (99%)	18 (1%)	69	58

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	95	ARG
1	A	197	TYR
2	B	200	LYS

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Mol	Chain	Res	Type
3	C	147[A]	SER
3	C	147[B]	SER
3	C	205[A]	SER
3	C	205[B]	SER
3	C	354	GLU
3	C	533	LYS
3	C	538	LEU
3	C	539	CYS
3	C	542	LYS
3	C	543	ARG
3	C	574	ARG
3	C	663	ARG
3	C	856	ARG
3	C	940	PHE
3	C	977	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 3 ligands modelled in this entry, 1 is monoatomic - leaving 2 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	GNP	A	301	5	29,34,34	5.09	15 (51%)	33,54,54	1.82	8 (24%)
6	K85	C	1101	3	25,26,26	1.20	3 (12%)	32,37,37	1.91	3 (9%)

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	GNP	A	301	5	-	7/14/38/38	0/3/3/3
6	K85	C	1101	3	-	2/21/21/21	0/2/2/2

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	301	GNP	O4'-C1'	15.01	1.62	1.41
4	A	301	GNP	C2'-C1'	-14.62	1.31	1.53
4	A	301	GNP	C2-N2	10.45	1.54	1.33
4	A	301	GNP	PB-O3A	7.17	1.68	1.59
4	A	301	GNP	PB-O1B	5.68	1.55	1.46
4	A	301	GNP	O4'-C4'	-5.37	1.33	1.45
4	A	301	GNP	O2'-C2'	4.08	1.52	1.43
4	A	301	GNP	PG-O1G	4.06	1.52	1.46
4	A	301	GNP	O3'-C3'	-3.06	1.35	1.43
6	C	1101	K85	O1'-C2'	-2.99	1.40	1.47
4	A	301	GNP	C5-C4	-2.68	1.33	1.40
4	A	301	GNP	PB-N3B	2.65	1.70	1.63
4	A	301	GNP	PA-O5'	2.49	1.69	1.59
4	A	301	GNP	PG-N3B	2.40	1.69	1.63
4	A	301	GNP	O6-C6	-2.39	1.18	1.24
4	A	301	GNP	C5-C6	-2.32	1.37	1.41
6	C	1101	K85	C8-N4	-2.15	1.31	1.33
6	C	1101	K85	O1'-C1	2.10	1.40	1.34

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	C	1101	K85	N5-C6-N7	-8.42	107.74	114.72

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	301	GNP	N3-C2-N1	-5.29	120.16	127.22
4	A	301	GNP	C2-N3-C4	4.22	120.18	115.36
6	C	1101	K85	O1'-C1-C2	3.61	119.29	111.50
4	A	301	GNP	N2-C2-N3	2.97	122.63	117.79
4	A	301	GNP	C1'-N9-C4	-2.92	121.50	126.64
4	A	301	GNP	PB-O3A-PA	-2.82	122.70	132.62
6	C	1101	K85	N7-C8-N4	-2.53	108.59	112.21
4	A	301	GNP	C5-C6-N1	-2.53	119.97	123.43
4	A	301	GNP	C2-N1-C6	2.53	119.95	115.93
4	A	301	GNP	C3'-C2'-C1'	2.30	104.44	100.98

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	301	GNP	PG-N3B-PB-O1B
4	A	301	GNP	PG-N3B-PB-O3A
4	A	301	GNP	C5'-O5'-PA-O3A
4	A	301	GNP	C3'-C4'-C5'-O5'
4	A	301	GNP	O4'-C4'-C5'-O5'
6	C	1101	K85	C10-C11-O15-C16
6	C	1101	K85	C12-C11-O15-C16
4	A	301	GNP	C5'-O5'-PA-O1A
4	A	301	GNP	C5'-O5'-PA-O2A

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	301	GNP	1	0
6	C	1101	K85	5	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 GNP A 301

Ligand K85 C 1101
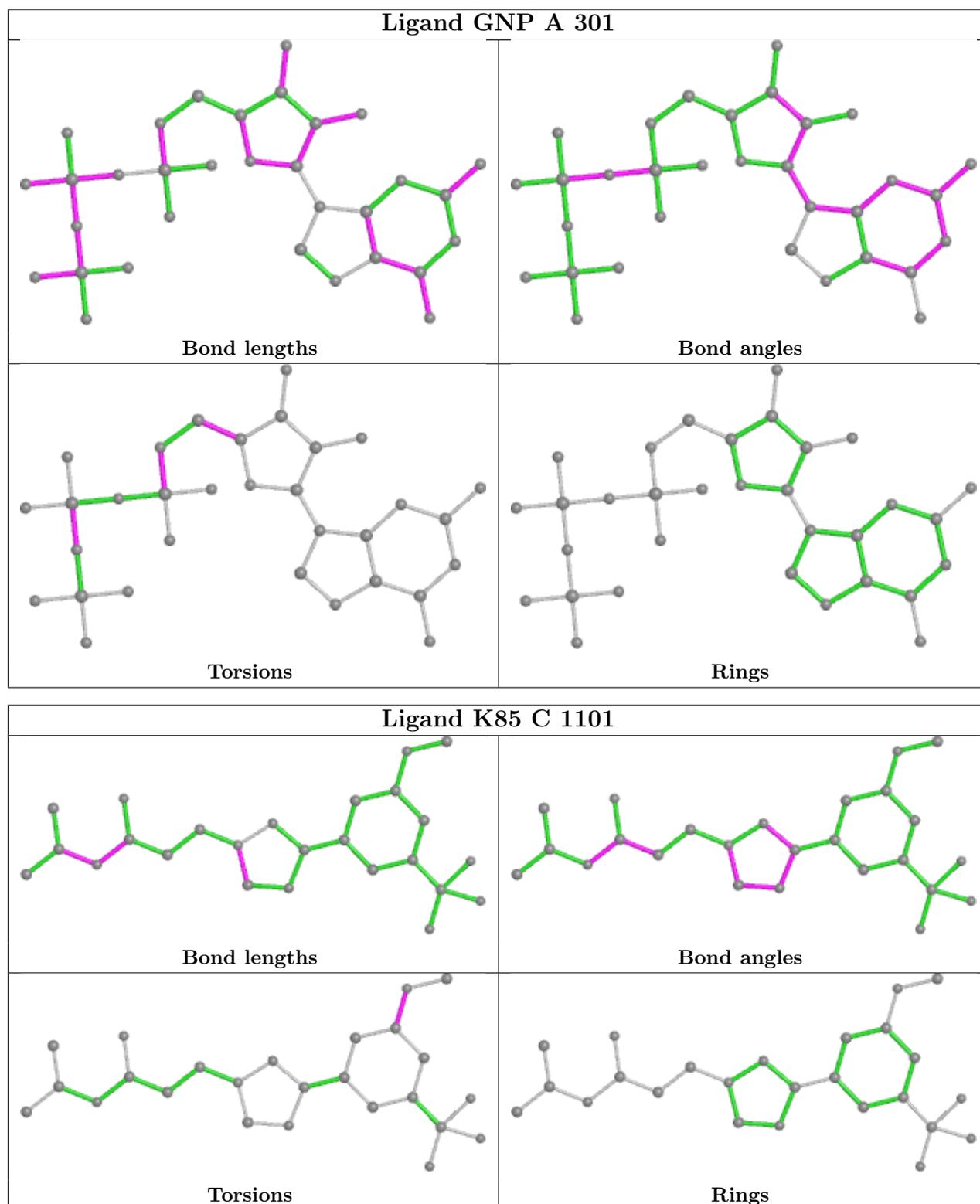
5.7 Other polymers ⓘ

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(Å^2)	Q<0.9
1	A	206/216 (95%)	0.11	13 (6%)	20	26	7, 21, 88, 124	0
2	B	123/140 (87%)	0.43	7 (5%)	23	30	21, 38, 75, 127	0
3	C	1010/1024 (98%)	0.18	56 (5%)	25	31	6, 27, 67, 135	0
All	All	1339/1380 (97%)	0.19	76 (5%)	23	30	6, 28, 69, 135	0

All (76) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	-1	GLY	11.6
3	C	684	THR	9.7
3	C	689	LEU	9.7
2	B	79	MET	7.6
1	A	195	ALA	6.7
3	C	691	LEU	6.7
1	A	193	LEU	6.2
1	A	194	ALA	6.2
3	C	264	ILE	6.1
3	C	685	ALA	6.0
3	C	455	PHE	5.5
3	C	205[A]	SER	5.4
3	C	206[A]	SER	5.2
3	C	690	LEU	5.1
2	B	199	LYS	5.1
3	C	688	THR	4.7
3	C	683	SER	4.6
3	C	538	LEU	4.4
3	C	686	ASN	4.2
1	A	197	TYR	4.2
2	B	78	THR	4.1
1	A	179	MET	4.0
3	C	57	PHE	4.0

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Mol	Chain	Res	Type	RSRZ
3	C	543	ARG	3.8
3	C	204[A]	GLY	3.8
3	C	687	PRO	3.8
1	A	192	ALA	3.6
1	A	190	ASP	3.5
3	C	456	VAL	3.5
3	C	541	GLN	3.4
1	A	187	VAL	3.4
3	C	270	LEU	3.4
1	A	180	PRO	3.3
3	C	679	ILE	3.3
3	C	93	PHE	3.2
3	C	261	ASN	3.2
3	C	458	GLU	3.2
3	C	682	GLN	3.1
3	C	983	GLN	3.1
3	C	263	LYS	3.0
3	C	9	ASN	3.0
3	C	291[A]	MET	2.9
3	C	680	VAL	2.9
3	C	266	GLN	2.9
1	A	198	GLU	2.8
3	C	452	VAL	2.8
1	A	191	PRO	2.8
3	C	53	GLN	2.7
2	B	81	GLU	2.7
3	C	616	ARG	2.7
3	C	262	LEU	2.7
3	C	544	GLY	2.6
3	C	681	GLU	2.6
3	C	207[A]	SER	2.6
3	C	967	TYR	2.6
3	C	495	ILE	2.6
3	C	265	PRO	2.6
2	B	200	LYS	2.5
3	C	52	ASP	2.5
3	C	540	GLU	2.5
3	C	500	TRP	2.4
2	B	168	GLU	2.4
3	C	542	LYS	2.4
2	B	86	LEU	2.4
3	C	444	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
3	C	977	GLN	2.3
1	A	9	VAL	2.3
3	C	460	ASP	2.3
3	C	1	MET	2.2
3	C	55	LEU	2.2
3	C	537	GLY	2.2
3	C	502	TRP	2.1
3	C	459	SER	2.1
3	C	981	VAL	2.0
1	A	199	HIS	2.0
3	C	273	ARG	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
6	K85	C	1101	25/25	0.89	0.25	58,66,84,86	0
4	GNP	A	301	32/32	0.92	0.14	2,3,8,13	0
5	MG	A	302	1/1	0.96	0.10	18,18,18,18	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 K85 C 1101:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
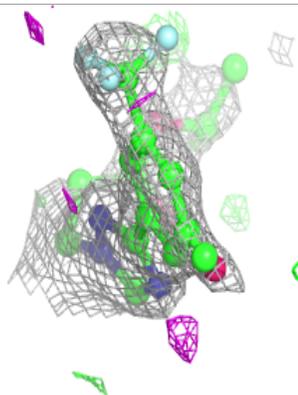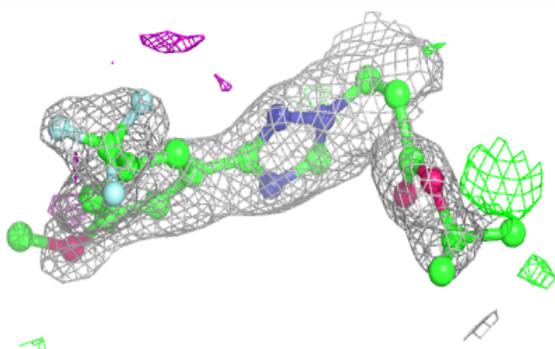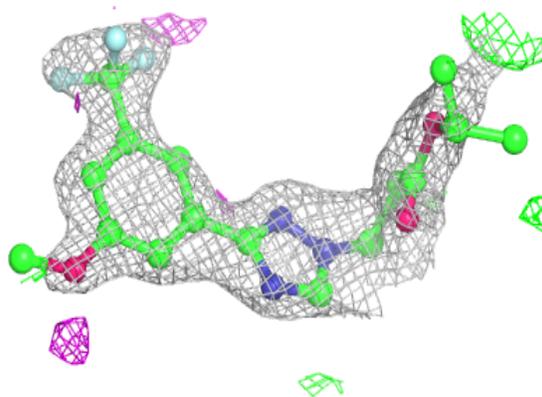
Electron density around GNP A 301:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.