Full wwPDB X-ray Structure Validation Report ⓘ

Nov 17, 2024 – 04:03 PM EST

PDB ID	:	4KYI
Title	:	Crystal structure of the phospholipase VipD from Legionella pneumophila in complex with the human GTPase Rab5
Authors	:	Lucas, M.; Gaspar, A.H.; Pallara, C.; Rojas, A.L.; Fernandez-Recio, J.; Machner, M.P.; Hierro, A.
Deposited on	:	2013-05-29
Resolution	:	3.08 Å(reported)

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

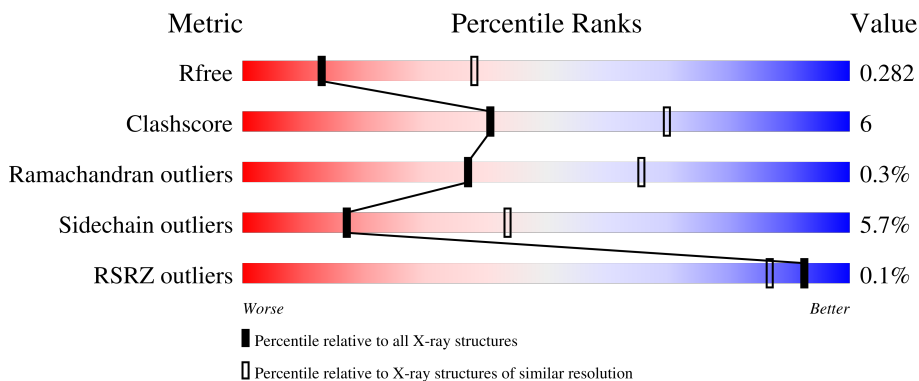|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance ⓘ

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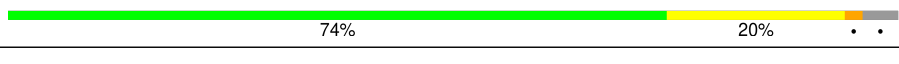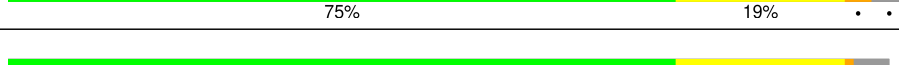*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.08 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		0.282
Clashscore		6
Ramachandran outliers		0.3%
Sidechain outliers		5.7%
RSRZ outliers		0.1%

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}	164625	1842 (3.10-3.06)
Clashscore	180529	1965 (3.10-3.06)
Ramachandran outliers	177936	1859 (3.10-3.06)
Sidechain outliers	177891	1858 (3.10-3.06)
RSRZ outliers	164620	1842 (3.10-3.06)

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	551	78% 17% • •
1	C	551	74% 20% • •
1	E	551	75% 19% • •
1	G	551	75% 19% • •

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Mol	Chain	Length	Quality of chain
2	B	170	80% 16% ·
2	D	170	79% 16% · ·
2	F	170	% 85% 11% ·
2	H	170	84% 12% · ·

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 21833 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 VipD.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	530	Total	C	N	O	S	0	0	0
			4140	2608	708	807	17			
1	C	527	Total	C	N	O	S	0	0	0
			4120	2596	705	802	17			
1	E	531	Total	C	N	O	S	0	0	0
			4145	2609	709	810	17			
1	G	528	Total	C	N	O	S	0	0	0
			4122	2594	705	806	17			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	14	GLY	-	expression tag	UNP Q5ZRP9
A	15	ALA	-	expression tag	UNP Q5ZRP9
A	16	MET	-	expression tag	UNP Q5ZRP9
A	17	GLY	-	expression tag	UNP Q5ZRP9
A	18	SER	-	expression tag	UNP Q5ZRP9
C	14	GLY	-	expression tag	UNP Q5ZRP9
C	15	ALA	-	expression tag	UNP Q5ZRP9
C	16	MET	-	expression tag	UNP Q5ZRP9
C	17	GLY	-	expression tag	UNP Q5ZRP9
C	18	SER	-	expression tag	UNP Q5ZRP9
E	14	GLY	-	expression tag	UNP Q5ZRP9
E	15	ALA	-	expression tag	UNP Q5ZRP9
E	16	MET	-	expression tag	UNP Q5ZRP9
E	17	GLY	-	expression tag	UNP Q5ZRP9
E	18	SER	-	expression tag	UNP Q5ZRP9
G	14	GLY	-	expression tag	UNP Q5ZRP9
G	15	ALA	-	expression tag	UNP Q5ZRP9
G	16	MET	-	expression tag	UNP Q5ZRP9
G	17	GLY	-	expression tag	UNP Q5ZRP9
G	18	SER	-	expression tag	UNP Q5ZRP9

- Molecule 2 is a protein called Ras-related protein Rab-5C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	164	Total 1283	C 820	N 215	O 242	S 6	0	0	0
2	D	164	Total 1283	C 820	N 215	O 242	S 6	0	0	0
2	F	164	Total 1283	C 820	N 215	O 242	S 6	0	0	0
2	H	164	Total 1283	C 820	N 215	O 242	S 6	0	0	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	13	GLY	-	expression tag	UNP P51148
B	14	ALA	-	expression tag	UNP P51148
B	15	MET	-	expression tag	UNP P51148
B	16	GLY	-	expression tag	UNP P51148
B	17	SER	-	expression tag	UNP P51148
B	80	LEU	GLN	engineered mutation	UNP P51148
D	13	GLY	-	expression tag	UNP P51148
D	14	ALA	-	expression tag	UNP P51148
D	15	MET	-	expression tag	UNP P51148
D	16	GLY	-	expression tag	UNP P51148
D	17	SER	-	expression tag	UNP P51148
D	80	LEU	GLN	engineered mutation	UNP P51148
F	13	GLY	-	expression tag	UNP P51148
F	14	ALA	-	expression tag	UNP P51148
F	15	MET	-	expression tag	UNP P51148
F	16	GLY	-	expression tag	UNP P51148
F	17	SER	-	expression tag	UNP P51148
F	80	LEU	GLN	engineered mutation	UNP P51148
H	13	GLY	-	expression tag	UNP P51148
H	14	ALA	-	expression tag	UNP P51148
H	15	MET	-	expression tag	UNP P51148
H	16	GLY	-	expression tag	UNP P51148
H	17	SER	-	expression tag	UNP P51148
H	80	LEU	GLN	engineered mutation	UNP P51148

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).

EDO

O2

OH

C1

C2

HO

O1

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	E	1	Total 4	C 2	O 2	0	0
3	G	1	Total 4	C 2	O 2	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

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

GOL

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

- Molecule 5 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula: $C_{10}H_{17}N_6O_{13}P_3$).

GNP
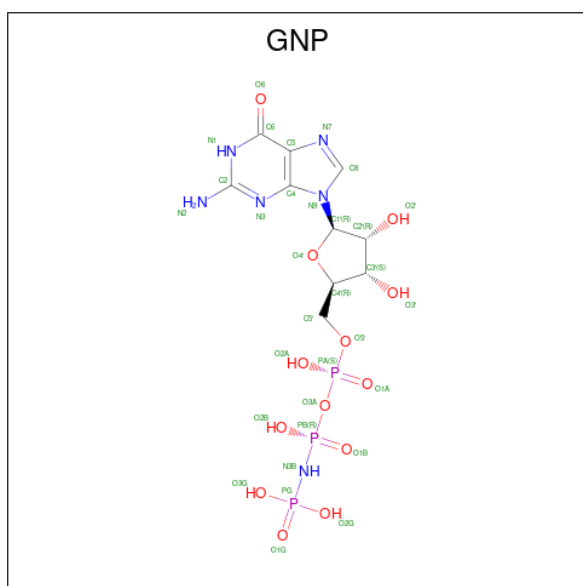
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
5	D	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
5	F	1	Total	C	N	O	P	0	0
			32	10	6	13	3		
5	H	1	Total	C	N	O	P	0	0
			32	10	6	13	3		

- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	1	Total	Mg	0	0
			1	1		
6	D	1	Total	Mg	0	0
			1	1		
6	F	1	Total	Mg	0	0
			1	1		
6	H	1	Total	Mg	0	0
			1	1		

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: VipD

Chain A:

- Molecule 1: VipD

Chain C:

- Molecule 1: VipD

Chain E:

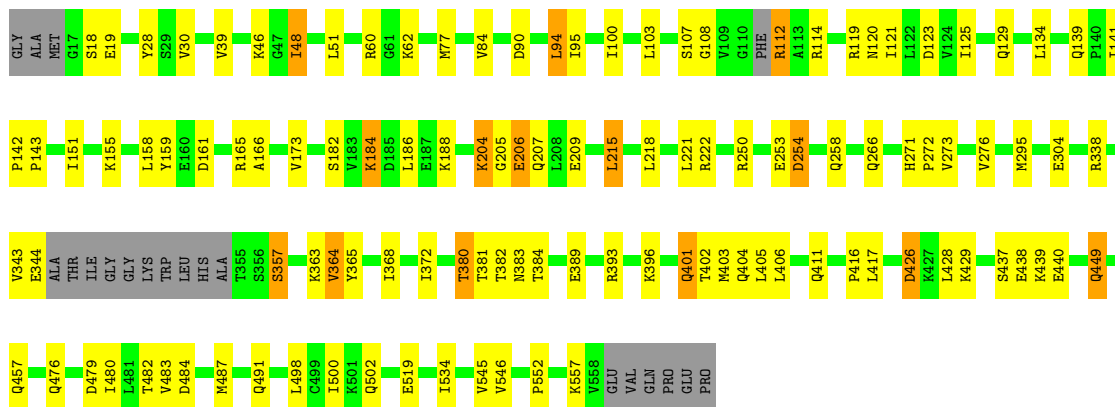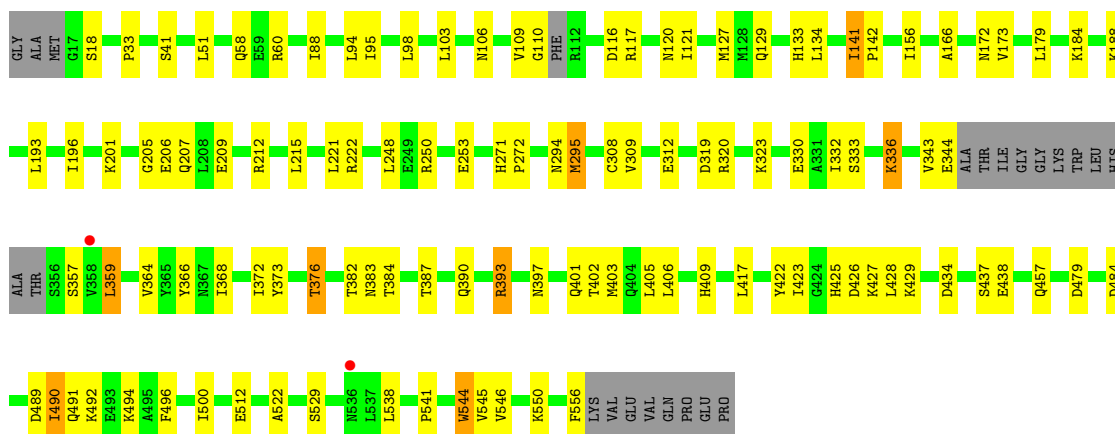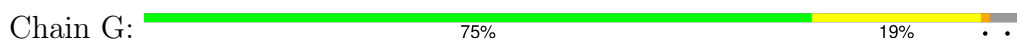GLY ALA MET G17 S18 E19 Y28 S29 V30 V39 K46 G47 I48 L51 R60 G61 K62 M77 V84 D90 L94 I95 I100 L103 S107 G108 V109 G110 PHE R112 A113 R114 R119 N120 I121 L122 D123 V124 I125 Q129 L134 V139 P140 I141

P142 P143 I151 K155 L158 Y159 E160 D161 R165 A166 V173 S182 V183 K184 D185 L186 E187 K188 K204 G205 E206 Q207 L208 E209 L215 L218 L221 R222 R250 E253 D254 Q258 Q266 H271 P272 V273 V276 M295 E304 R338

V343 E344 ALA THR ILE GLY GLY LYS TRP LEU HIS ALA T355 S356 S357 K363 V364 Y365 I368 I372 T380 T381 T382 N383 T384 E389 R393 K396 Q401 T402 M403 Q404 L405 L406 Q411 P416 L417 D426 K427 L428 K429 S437 E438 K439 E440 Q449

Q457 Q476 D479 I480 L481 T482 V483 D484 M487 Q491 L498 C499 I500 K501 Q502 E519 I534 V545 V546 P552 K557 V558 GLU VAL GLN PRO GLU PRO

• Molecule 1: VipD

Chain G: 75% 19% • •

GLY ALA MET G17 S18 P33 S41 L51 Q58 E59 R60 I88 L94 I95 L98 L103 N106 V109 G110 PHE R112 D116 R117 N120 I121 M127 M128 Q129 H133 L134 I141 P142 I156 A166 N172 V173 L179 K184 K188

L193 I196 K201 G205 E206 Q207 L208 E209 R212 L215 L221 R222 L248 E249 R250 E253 H271 P272 N294 M295 C308 V309 E312 D319 R320 K323 E330 A331 I332 S333 K336 V343 E344 ALA THR ILE GLY GLY LYS TRP LEU HIS

ALA THR S356 S357 V358 L359 V364 Y365 Y366 N367 I368 I372 Y373 T376 T382 N383 T384 T387 Q390 R393 N397 Q401 T402 M403 Q404 L405 L406 H409 L417 Y422 I423 G424 H425 D426 K427 L428 K429 D434 S437 E438 Q457 D479 D484

D489 I490 Q491 K492 E493 K494 A495 F496 I500 E512 A522 S529 N536 L537 L538 P541 W544 V545 V546 K550 F556 LYS VAL GLU VAL GLN PRO GLU PRO

• Molecule 2: Ras-related protein Rab-5C

Chain B: 80% 16% •

GLY ALA MET GLY LYS I19 K23 S35 S36 L37 R40 F41 V42 Q50 F58 Q61 D66 D67 E73 D76 R92 I127 V128 I129 D137 R142 A143 V144 Y152 N156 L159 E162 T163 S164 A165 M169 N170 V171 M176

K180 K181 L182

• Molecule 2: Ras-related protein Rab-5C

Chain D: 79% 16% • •

GLY ALA MET GLY LYS I19 C20 Q21 F22 K23 A31 V32 G33 K34 V42 G55 A56 A57 F58 Q61 K71 R92 G93 A94 K113 I129 N134 K135 R142 A143 V144 Q147 Q150 A151 Y152 L158 L159 E162 N170 E173 I174 I178

L182

• Molecule 2: Ras-related protein Rab-5C

Chain F:

• Molecule 2: Ras-related protein Rab-5C

Chain H:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	94.28Å 97.98Å 109.85Å 76.57° 80.71° 78.91°	Depositor
Resolution (Å)	29.83 – 3.08 29.83 – 3.08	Depositor EDS
% Data completeness (in resolution range)	97.6 (29.83-3.08) 97.5 (29.83-3.08)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	1.02 (at 3.06Å)	Xtriage
Refinement program	PHENIX 1.8.1_1168	Depositor
R, R_{free}	0.233 , 0.280 0.235 , 0.282	Depositor DCC
R_{free} test set	3408 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å^2)	85.7	Xtriage
Anisotropy	0.370	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.26 , 23.6	EDS
L-test for twinning[2]	$<|L|> = 0.49, <L^2> = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	21833	wwPDB-VP
Average B, all atoms (Å^2)	54.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.27% 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: GOL, MG, GNP, EDO

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	0.22	0/4202	0.39	0/5668
1	C	0.22	0/4182	0.38	0/5640
1	E	0.22	0/4205	0.39	0/5671
1	G	0.21	0/4182	0.38	0/5640
2	B	0.23	0/1305	0.39	0/1765
2	D	0.22	0/1305	0.38	0/1765
2	F	0.22	0/1305	0.37	0/1765
2	H	0.23	0/1305	0.39	0/1765
All	All	0.22	0/21991	0.38	0/29679

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	4140	0	4187	45	0
1	C	4120	0	4166	65	0
1	E	4145	0	4192	61	0
1	G	4122	0	4163	58	0
2	B	1283	0	1282	18	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	1283	0	1282	21	0
2	F	1283	0	1282	15	0
2	H	1283	0	1282	15	0
3	A	8	0	12	1	0
3	B	8	0	12	1	0
3	E	4	0	6	0	0
3	G	4	0	6	2	0
4	A	12	0	16	0	0
4	E	6	0	8	1	0
5	B	32	0	13	0	0
5	D	32	0	13	4	0
5	F	32	0	13	1	0
5	H	32	0	13	1	0
6	B	1	0	0	0	0
6	D	1	0	0	0	0
6	F	1	0	0	0	0
6	H	1	0	0	0	0
All	All	21833	0	21948	279	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (279) 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:E:112:ARG:HD3	1:E:276:VAL:HG12	1.68	0.75
1:C:312:GLU:OE2	1:C:320:ARG:NH1	2.22	0.72
1:C:58:GLN:HG2	1:C:88:ILE:HD12	1.72	0.72
1:E:60:ARG:HG3	1:E:406:LEU:HD23	1.74	0.68
1:E:112:ARG:NH2	1:E:272:PRO:O	2.27	0.68
1:G:457:GLN:HG3	2:H:58:PHE:HE1	1.58	0.68
1:C:338:ARG:NH2	1:C:536:ASN:OD1	2.27	0.68
1:C:60:ARG:HG3	1:C:406:LEU:HD23	1.77	0.66
1:G:312:GLU:OE2	1:G:320:ARG:NH1	2.29	0.66
1:E:222:ARG:NH2	1:E:253:GLU:OE2	2.29	0.65
1:E:19:GLU:HG2	1:E:429:LYS:HG2	1.78	0.65
2:H:23:LYS:HA	2:H:73:GLU:HB2	1.78	0.64
1:E:479:ASP:OD2	2:F:92:ARG:NH1	2.30	0.64
1:C:359:LEU:HD13	1:C:538:LEU:HD22	1.80	0.64
1:E:90:ASP:HB3	1:E:173:VAL:HG21	1.80	0.63
1:E:28:TYR:OH	1:E:440:GLU:OE2	2.16	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:215:LEU:HB3	1:E:253:GLU:HA	1.81	0.62
1:G:215:LEU:HB3	1:G:253:GLU:HA	1.82	0.62
1:A:457:GLN:HG3	2:B:58:PHE:HE1	1.64	0.62
1:C:437:SER:HB3	1:C:438:GLU:HB2	1.82	0.62
1:E:30:VAL:HG21	1:E:411:GLN:HE21	1.64	0.62
1:E:487:MET:HB3	1:E:491:GLN:HG3	1.82	0.62
1:C:222:ARG:NH2	1:C:253:GLU:OE2	2.31	0.62
1:E:119:ARG:NH1	1:E:120:ASN:OD1	2.32	0.62
1:E:46:LYS:NZ	1:E:380:THR:O	2.33	0.62
1:G:103:LEU:HD22	1:G:121:ILE:HG13	1.82	0.62
1:G:250:ARG:NH1	3:G:601:EDO:O1	2.32	0.62
1:E:254:ASP:OD1	1:E:254:ASP:N	2.33	0.61
1:A:396:LYS:NZ	1:A:400:ASP:OD2	2.31	0.61
2:F:42:VAL:HG22	2:F:61:GLN:HB2	1.82	0.61
1:E:107:SER:OG	1:E:114:ARG:NH1	2.34	0.61
1:C:28:TYR:OH	1:C:440:GLU:OE2	2.12	0.61
1:A:60:ARG:HD2	1:A:406:LEU:HD23	1.83	0.60
1:E:161:ASP:OD1	1:E:165:ARG:NH1	2.34	0.59
2:B:142:ARG:NH1	2:B:144:VAL:O	2.35	0.59
1:A:479:ASP:OD2	2:B:92:ARG:NH1	2.35	0.59
1:A:484:ASP:OD2	2:B:92:ARG:NH2	2.35	0.59
1:C:116:ASP:O	1:C:120:ASN:ND2	2.36	0.59
1:C:487:MET:HB3	1:C:491:GLN:HG3	1.85	0.59
1:A:338:ARG:NH2	1:A:536:ASN:OD1	2.35	0.58
1:C:131:LYS:NZ	1:C:135:GLU:OE1	2.34	0.58
1:E:484:ASP:OD2	2:F:92:ARG:NH2	2.36	0.58
1:C:378:GLU:OE1	1:C:390:GLN:NE2	2.37	0.57
1:E:204:LYS:O	1:E:206:GLU:HB3	2.05	0.57
1:A:222:ARG:NH2	1:A:253:GLU:OE2	2.38	0.57
1:A:504:ASN:HD22	1:A:538:LEU:HD21	1.70	0.56
1:G:423:ILE:HG22	1:G:427:LYS:HB2	1.87	0.56
2:H:126:ASN:O	2:H:126:ASN:ND2	2.39	0.56
1:C:449:GLN:OE1	2:D:56:ALA:N	2.38	0.56
1:G:201:LYS:NZ	1:G:207:GLN:OE1	2.39	0.56
1:G:393:ARG:NH2	1:G:397:ASN:OD1	2.38	0.56
1:A:131:LYS:HG3	1:A:156:ILE:HG21	1.88	0.56
2:D:31:ALA:HA	5:D:301:GNP:H5'2	1.88	0.55
1:C:155:LYS:NZ	1:C:217:ASP:OD2	2.28	0.55
1:E:51:LEU:HB2	1:E:95:ILE:HG21	1.88	0.55
1:G:116:ASP:O	1:G:120:ASN:ND2	2.40	0.55
1:A:106:ASN:ND2	1:A:111:PHE:O	2.38	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:67:ASP:OD1	2:B:67:ASP:N	2.39	0.54
1:E:209:GLU:OE2	1:E:258:GLN:NE2	2.39	0.54
2:H:23:LYS:HB3	2:H:94:ALA:HA	1.90	0.54
1:A:280:ASN:OD1	1:A:281:ALA:N	2.41	0.54
2:F:102:ASP:OD2	2:F:104:THR:OG1	2.23	0.54
2:D:42:VAL:HG22	2:D:61:GLN:HB2	1.90	0.53
1:C:457:GLN:HG3	2:D:58:PHE:HE1	1.74	0.53
1:G:500:ILE:HG22	1:G:538:LEU:HD23	1.89	0.53
1:E:357:SER:O	4:E:602:GOL:O1	2.25	0.53
1:G:434:ASP:OD1	1:G:437:SER:N	2.40	0.53
1:C:423:ILE:N	1:C:424:GLY:HA2	2.24	0.53
1:E:18:SER:HB2	1:E:428:LEU:HD23	1.90	0.53
1:G:98:LEU:HD11	1:G:103:LEU:HD11	1.90	0.53
1:A:190:ASP:O	1:A:194:ASN:ND2	2.42	0.52
1:G:357:SER:OG	1:G:512:GLU:OE2	2.25	0.52
1:A:238:VAL:HG21	1:A:264:VAL:HB	1.91	0.52
2:H:26:LEU:O	2:H:77:THR:OG1	2.24	0.52
1:A:478:GLU:HG3	1:A:492:LYS:HE3	1.92	0.52
1:C:421:LEU:O	1:C:502:GLN:NE2	2.34	0.52
1:C:461:GLU:OE2	2:D:71:LYS:NZ	2.31	0.52
2:D:129:ILE:HB	2:D:158:LEU:HD22	1.91	0.52
1:E:103:LEU:HD22	1:E:121:ILE:HG13	1.92	0.52
1:E:343:VAL:HG23	1:E:344:GLU:HG3	1.92	0.52
1:E:426:ASP:OD2	1:E:426:ASP:N	2.43	0.52
1:G:18:SER:HB2	1:G:428:LEU:HD23	1.92	0.52
2:B:142:ARG:NH2	2:B:162:GLU:OE2	2.41	0.52
1:C:215:LEU:HB3	1:C:253:GLU:HA	1.92	0.52
1:G:484:ASP:OD2	2:H:92:ARG:NH2	2.43	0.52
1:G:545:VAL:HG23	1:G:546:VAL:HG13	1.92	0.52
1:C:457:GLN:HG3	2:D:58:PHE:CE1	2.45	0.52
1:G:309:VAL:HG22	1:G:372:ILE:HB	1.91	0.52
1:A:387:THR:HG23	1:A:390:GLN:H	1.74	0.51
1:G:250:ARG:HD2	3:G:601:EDO:O2	2.10	0.51
1:C:373:TYR:O	1:C:401:GLN:HG2	2.10	0.51
1:E:457:GLN:HG3	2:F:58:PHE:CE1	2.45	0.51
1:A:116:ASP:OD2	1:A:119:ARG:NH2	2.44	0.51
1:G:51:LEU:HB2	1:G:95:ILE:HG21	1.93	0.51
1:G:390:GLN:HA	1:G:393:ARG:HB2	1.91	0.51
1:G:129:GLN:O	1:G:133:HIS:ND1	2.40	0.51
1:G:382:THR:OG1	1:G:383:ASN:N	2.43	0.51
1:C:556:PHE:HD1	1:C:556:PHE:H	1.58	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:330:GLU:HA	1:G:333:SER:HB3	1.93	0.51
1:A:373:TYR:O	1:A:401:GLN:HG2	2.11	0.51
2:B:37:LEU:HD23	2:B:165:ALA:HB2	1.92	0.51
2:D:170:ASN:HA	2:D:173:GLU:HB2	1.91	0.51
1:E:364:VAL:HG13	1:E:502:GLN:HG2	1.91	0.51
1:E:482:THR:HG23	1:E:483:VAL:HG23	1.93	0.51
2:F:80:LEU:HD12	2:F:83:TYR:HE2	1.76	0.51
1:A:271:HIS:ND1	1:A:272:PRO:HD2	2.26	0.50
1:G:166:ALA:HB1	1:G:188:LYS:HB3	1.93	0.50
1:A:412:THR:O	1:A:548:LEU:HD11	2.12	0.50
2:D:34:LYS:NZ	5:D:301:GNP:O1B	2.37	0.50
1:C:18:SER:HB2	1:C:428:LEU:HD23	1.92	0.50
1:E:372:ILE:HG12	1:E:405:LEU:HD22	1.93	0.50
1:G:387:THR:O	1:G:390:GLN:HG2	2.11	0.50
2:H:38:VAL:HG11	2:H:59:LEU:HD13	1.92	0.50
1:A:362:GLU:OE2	1:A:501:LYS:NZ	2.40	0.50
1:E:94:LEU:HD11	1:E:125:ILE:HD13	1.94	0.50
1:G:368:ILE:HD12	1:G:368:ILE:H	1.77	0.50
2:B:164:SER:HB3	2:B:169:MET:HB3	1.94	0.50
2:D:23:LYS:HB3	2:D:94:ALA:HA	1.94	0.50
1:C:278:GLY:O	1:C:286:ILE:N	2.44	0.49
2:B:40:ARG:HG2	2:B:171:VAL:HG21	1.94	0.49
1:G:120:ASN:HB3	1:G:193:LEU:HD12	1.94	0.49
1:A:215:LEU:HD13	1:A:261:ILE:HG12	1.95	0.49
1:E:372:ILE:HD13	1:E:402:THR:HG23	1.94	0.49
2:H:34:LYS:NZ	5:H:301:GNP:O3G	2.40	0.49
1:E:401:GLN:NE2	1:E:404:GLN:OE1	2.46	0.49
2:H:57:ALA:HB3	2:H:76:ASP:HB3	1.94	0.49
1:A:28:TYR:CE1	1:A:416:PRO:HD3	2.48	0.48
1:C:184:LYS:H	1:C:184:LYS:HD2	1.78	0.48
1:C:368:ILE:HD12	1:C:368:ILE:H	1.76	0.48
1:E:383:ASN:OD1	1:E:384:THR:N	2.46	0.48
1:G:372:ILE:HD13	1:G:402:THR:HG23	1.95	0.48
1:A:30:VAL:HG22	1:A:411:GLN:HB2	1.95	0.48
1:C:366:TYR:HB2	1:C:422:TYR:CE2	2.49	0.48
1:E:437:SER:HB2	1:E:438:GLU:HB2	1.96	0.48
1:G:33:PRO:HG3	1:G:409:HIS:HB3	1.96	0.47
1:A:177:ILE:HG22	1:A:181:LYS:HE2	1.95	0.47
1:G:332:ILE:O	1:G:336:LYS:N	2.44	0.47
1:C:378:GLU:H	1:C:378:GLU:HG3	1.48	0.47
1:E:368:ILE:H	1:E:368:ILE:HD12	1.80	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:205:GLY:N	1:G:206:GLU:OE1	2.42	0.47
1:G:271:HIS:ND1	1:G:272:PRO:HD2	2.29	0.47
2:H:27:LEU:HD12	2:H:119:LEU:HD11	1.96	0.47
1:C:461:GLU:OE1	1:C:469:SER:OG	2.33	0.47
2:H:42:VAL:HG12	2:H:43:LYS:HG3	1.96	0.47
1:C:120:ASN:HB3	1:C:193:LEU:HD12	1.96	0.47
1:C:100:ILE:HD12	1:C:100:ILE:H	1.80	0.46
2:D:113:LYS:HG2	2:D:152:TYR:CZ	2.50	0.46
1:E:338:ARG:NH1	1:E:519:GLU:OE2	2.49	0.46
1:C:59:GLU:OE2	1:C:399:TYR:OH	2.27	0.46
2:B:23:LYS:HA	2:B:73:GLU:HB2	1.97	0.46
1:A:202:GLY:O	1:A:205:GLY:N	2.45	0.46
1:C:387:THR:O	1:C:390:GLN:HG2	2.16	0.46
1:A:214:THR:HA	1:A:260:SER:HA	1.97	0.46
1:A:312:GLU:OE2	1:A:320:ARG:NH1	2.49	0.46
2:D:33:GLY:HA3	2:D:134:ASN:ND2	2.31	0.46
1:G:312:GLU:O	1:G:376:THR:OG1	2.33	0.46
1:G:343:VAL:HA	1:G:344:GLU:HA	1.55	0.46
1:G:457:GLN:HG3	2:H:58:PHE:CE1	2.45	0.46
2:F:46:PHE:O	2:F:47:HIS:ND1	2.49	0.46
1:A:417:LEU:HD12	1:A:485:ALA:HB2	1.97	0.45
1:C:469:SER:HB3	2:D:21:GLN:HE22	1.81	0.45
1:C:311:ALA:HB1	1:C:376:THR:HG23	1.97	0.45
1:E:271:HIS:ND1	1:E:272:PRO:HD2	2.31	0.45
1:A:457:GLN:HG3	2:B:58:PHE:CE1	2.48	0.45
1:C:310:LYS:HD3	1:C:373:TYR:HE1	1.82	0.45
1:E:28:TYR:CE1	1:E:416:PRO:HD3	2.52	0.45
1:G:196:ILE:O	1:G:212:ARG:NH1	2.42	0.45
1:G:222:ARG:NH2	1:G:253:GLU:OE2	2.48	0.45
1:G:172:ASN:OD1	1:G:173:VAL:N	2.50	0.45
1:E:449:GLN:OE1	2:F:56:ALA:N	2.50	0.45
2:D:21:GLN:HG2	2:D:71:LYS:HB3	1.98	0.45
1:G:437:SER:HA	1:G:438:GLU:HA	1.84	0.45
1:A:482:THR:HG23	1:A:483:VAL:HG23	1.98	0.45
1:C:238:VAL:HG23	1:C:251:TYR:HB2	1.99	0.45
1:C:270:ALA:O	1:C:288:ASP:N	2.50	0.45
1:C:304:GLU:HB3	1:C:368:ILE:HD13	2.00	0.45
1:A:127:MET:O	1:A:131:LYS:HB2	2.17	0.44
1:G:58:GLN:HG2	1:G:88:ILE:HD12	2.00	0.44
1:G:541:PRO:O	1:G:544:TRP:HD1	2.00	0.44
1:G:359:LEU:HD22	1:G:359:LEU:HA	1.80	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:373:TYR:O	1:G:401:GLN:HG2	2.17	0.44
1:A:254:ASP:OD1	1:A:254:ASP:N	2.51	0.44
2:B:127:ILE:HG23	2:B:129:ILE:HG13	1.99	0.44
1:G:206:GLU:OE1	1:G:206:GLU:N	2.48	0.44
1:G:490:ILE:HD12	1:G:550:LYS:HA	2.00	0.44
1:C:376:THR:HB	1:C:380:THR:OG1	2.17	0.44
1:E:343:VAL:HA	1:E:344:GLU:HA	1.51	0.44
1:G:109:VAL:HA	1:G:110:GLY:HA3	1.47	0.44
1:A:309:VAL:HG22	1:A:372:ILE:HB	2.00	0.44
1:A:552:PRO:O	1:A:554:GLN:N	2.44	0.44
2:B:152:TYR:O	2:B:156:ASN:ND2	2.33	0.44
1:E:151:ILE:O	1:E:155:LYS:HG3	2.18	0.44
1:C:123:ASP:HB3	1:C:159:TYR:HE2	1.83	0.43
1:E:139:GLN:HG2	1:E:141:ILE:HG13	2.00	0.43
2:B:42:VAL:HA	2:B:61:GLN:HE21	1.83	0.43
2:B:66:ASP:OD1	2:B:67:ASP:N	2.51	0.43
1:C:192:ALA:O	1:C:195:SER:OG	2.30	0.43
1:E:84:VAL:HG13	1:E:129:GLN:HG2	1.99	0.43
1:G:141:ILE:HA	1:G:142:PRO:HD2	1.87	0.43
1:A:332:ILE:HD13	1:A:556:PHE:HA	1.99	0.43
1:A:372:ILE:HD13	1:A:402:THR:HG23	1.99	0.43
1:E:107:SER:HA	1:E:108:GLY:HA2	1.71	0.43
2:F:47:HIS:HB2	2:F:50:GLN:HG3	1.99	0.43
1:G:366:TYR:HB2	1:G:422:TYR:CE2	2.53	0.43
1:G:491:GLN:HA	1:G:494:LYS:HD3	2.00	0.43
1:A:214:THR:OG1	1:A:217:ASP:OD1	2.30	0.43
1:A:378:GLU:O	1:A:383:ASN:ND2	2.50	0.43
1:C:488:ASP:OD1	1:C:489:ASP:N	2.51	0.43
1:C:486:LYS:HD2	1:C:486:LYS:H	1.83	0.43
1:E:166:ALA:HB1	1:E:188:LYS:HB3	2.01	0.43
2:F:64:CYS:SG	2:H:69:THR:OG1	2.75	0.43
1:C:134:LEU:HD23	1:C:134:LEU:HA	1.82	0.43
1:C:416:PRO:O	1:C:420:ILE:HG12	2.18	0.43
2:B:35:SER:OG	2:B:76:ASP:OD2	2.36	0.43
2:D:147:GLN:HA	2:D:150:GLN:HB3	2.00	0.43
1:E:123:ASP:HB3	1:E:159:TYR:HE2	1.83	0.43
1:E:30:VAL:HG22	1:E:411:GLN:HB2	2.01	0.42
1:G:295:MET:SD	1:G:308:CYS:HB3	2.59	0.42
1:E:437:SER:HA	1:E:438:GLU:HA	1.78	0.42
1:A:547:SER:OG	1:A:548:LEU:N	2.53	0.42
2:B:50:GLN:HE21	2:B:50:GLN:HB3	1.69	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:134:LEU:HD23	1:E:134:LEU:HA	1.89	0.42
1:G:134:LEU:HD12	1:G:156:ILE:HD12	2.02	0.42
1:C:93:LYS:NZ	1:C:174:ASP:OD2	2.43	0.42
1:E:94:LEU:HD23	1:E:173:VAL:HG13	2.02	0.42
1:C:125:ILE:HG12	1:C:176:ILE:HD13	2.01	0.42
1:A:415:HIS:CG	1:A:416:PRO:HD2	2.54	0.42
1:E:545:VAL:HG23	1:E:546:VAL:HG13	2.02	0.42
2:F:165:ALA:N	5:F:301:GNP:O6	2.50	0.42
1:G:489:ASP:HA	1:G:492:LYS:NZ	2.34	0.42
1:C:222:ARG:O	1:C:230:LYS:NZ	2.49	0.42
1:E:396:LYS:HE2	1:E:396:LYS:HB3	1.84	0.42
2:B:176:MET:O	2:B:180:LYS:HG2	2.20	0.42
1:C:22:LYS:HG2	1:C:28:TYR:CE2	2.55	0.42
1:C:210:ASN:HA	1:C:211:PRO:HD2	1.87	0.41
2:F:26:LEU:O	2:F:77:THR:OG1	2.27	0.41
1:G:117:ARG:O	1:G:121:ILE:HG12	2.20	0.41
1:A:245:LYS:NZ	3:A:602:EDO:H22	2.35	0.41
2:D:142:ARG:HH22	2:D:162:GLU:CD	2.24	0.41
1:C:51:LEU:HD21	1:C:92:LYS:HA	2.01	0.41
1:E:476:GLN:O	1:E:480:ILE:HG13	2.21	0.41
1:A:123:ASP:HB3	1:A:159:TYR:HE2	1.84	0.41
1:A:385:SER:HA	1:A:386:PRO:HD3	1.84	0.41
1:E:364:VAL:HG12	1:E:365:TYR:CD2	2.55	0.41
2:F:69:THR:OG1	2:H:64:CYS:SG	2.71	0.41
1:C:449:GLN:HE21	1:C:449:GLN:HB2	1.64	0.41
1:G:522:ALA:HB2	1:G:529:SER:HB2	2.02	0.41
1:A:480:ILE:HD11	3:B:303:EDO:H11	2.03	0.41
2:D:135:LYS:HG2	5:D:301:GNP:C5	2.50	0.41
1:A:141:ILE:HA	1:A:142:PRO:HD2	1.68	0.41
1:C:415:HIS:HB2	1:C:491:GLN:NE2	2.35	0.41
1:G:184:LYS:H	1:G:184:LYS:HD2	1.85	0.41
1:G:319:ASP:OD1	1:G:323:LYS:NZ	2.53	0.41
1:G:434:ASP:O	2:H:82:ARG:NH2	2.54	0.41
1:C:271:HIS:CG	1:C:272:PRO:HD2	2.56	0.41
1:C:415:HIS:CG	1:C:416:PRO:HD2	2.56	0.41
1:C:447:HIS:ND1	1:C:485:ALA:HB2	2.35	0.41
1:E:142:PRO:HA	1:E:143:PRO:HD3	1.83	0.41
1:E:182:SER:OG	1:E:184:LYS:HD2	2.21	0.41
1:E:500:ILE:HD13	1:E:534:ILE:HG23	2.02	0.41
1:C:454:LEU:O	1:C:458:ILE:HG13	2.21	0.41
1:C:548:LEU:HD12	1:C:548:LEU:HA	1.79	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:34:LYS:NZ	5:D:301:GNP:O3G	2.40	0.41
2:D:92:ARG:HB3	2:D:92:ARG:NH1	2.36	0.41
2:D:142:ARG:NH1	2:D:144:VAL:O	2.52	0.41
1:E:48:ILE:H	1:E:48:ILE:HG12	1.61	0.41
1:E:498:LEU:O	1:E:502:GLN:HG3	2.21	0.41
2:F:80:LEU:HB2	2:F:83:TYR:CD2	2.56	0.41
1:C:48:ILE:H	1:C:48:ILE:HG12	1.70	0.41
1:C:313:ALA:O	1:C:317:PHE:N	2.50	0.41
2:D:174:ILE:O	2:D:178:ILE:HG13	2.20	0.41
1:C:204:LYS:HD2	1:C:204:LYS:HA	1.88	0.40
1:E:393:ARG:HG2	1:E:396:LYS:HE2	2.02	0.40
1:C:90:ASP:HB3	1:C:173:VAL:HG21	2.03	0.40
1:G:60:ARG:HD2	1:G:406:LEU:HD23	2.03	0.40
1:E:271:HIS:CD2	1:E:273:VAL:HB	2.57	0.40
1:C:166:ALA:HB1	1:C:188:LYS:HB3	2.04	0.40
1:C:552:PRO:O	1:C:554:GLN:N	2.53	0.40
2:F:42:VAL:HA	2:F:61:GLN:HE21	1.86	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	526/551 (96%)	508 (97%)	16 (3%)	2 (0%)	30	60
1	C	523/551 (95%)	505 (97%)	17 (3%)	1 (0%)	44	72
1	E	525/551 (95%)	503 (96%)	20 (4%)	2 (0%)	30	60
1	G	522/551 (95%)	499 (96%)	22 (4%)	1 (0%)	44	72
2	B	162/170 (95%)	152 (94%)	10 (6%)	0	100	100
2	D	162/170 (95%)	152 (94%)	8 (5%)	2 (1%)	11	35
2	F	162/170 (95%)	151 (93%)	11 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	H	162/170 (95%)	149 (92%)	13 (8%)	0	100	100
All	All	2744/2884 (95%)	2619 (95%)	117 (4%)	8 (0%)	37	66

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	382	THR
1	G	106	ASN
1	A	553	ALA
2	D	92	ARG
1	E	552	PRO
2	D	55	GLY
1	E	205	GLY
1	A	379	VAL

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	451/466 (97%)	425 (94%)	26 (6%)	17	43
1	C	448/466 (96%)	413 (92%)	35 (8%)	10	33
1	E	452/466 (97%)	417 (92%)	35 (8%)	10	33
1	G	449/466 (96%)	422 (94%)	27 (6%)	16	42
2	B	134/137 (98%)	132 (98%)	2 (2%)	60	78
2	D	134/137 (98%)	132 (98%)	2 (2%)	60	78
2	F	134/137 (98%)	132 (98%)	2 (2%)	60	78
2	H	134/137 (98%)	130 (97%)	4 (3%)	36	62
All	All	2336/2412 (97%)	2203 (94%)	133 (6%)	17	43

All (133) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	VAL
1	A	39	VAL
1	A	48	ILE
1	A	51	LEU
1	A	55	GLN
1	A	88	ILE
1	A	158	LEU
1	A	171	ASN
1	A	184	LYS
1	A	204	LYS
1	A	209	GLU
1	A	215	LEU
1	A	221	LEU
1	A	254	ASP
1	A	295	MET
1	A	342	LEU
1	A	343	VAL
1	A	381	THR
1	A	393	ARG
1	A	403	MET
1	A	406	LEU
1	A	417	LEU
1	A	426	ASP
1	A	449	GLN
1	A	490	ILE
1	A	492	LYS
2	B	137	ASP
2	B	159	LEU
1	C	48	ILE
1	C	62	LYS
1	C	94	LEU
1	C	127	MET
1	C	134	LEU
1	C	158	LEU
1	C	165	ARG
1	C	171	ASN
1	C	179	LEU
1	C	218	LEU
1	C	238	VAL
1	C	248	LEU
1	C	254	ASP
1	C	304	GLU
1	C	338	ARG

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Mol	Chain	Res	Type
1	C	358	VAL
1	C	378	GLU
1	C	380	THR
1	C	387	THR
1	C	393	ARG
1	C	403	MET
1	C	406	LEU
1	C	417	LEU
1	C	430	ASP
1	C	435	GLU
1	C	439	LYS
1	C	449	GLN
1	C	464	ASP
1	C	479	ASP
1	C	486	LYS
1	C	490	ILE
1	C	496	PHE
1	C	538	LEU
1	C	550	LYS
1	C	556	PHE
2	D	92	ARG
2	D	159	LEU
1	E	39	VAL
1	E	48	ILE
1	E	62	LYS
1	E	77	MET
1	E	94	LEU
1	E	100	ILE
1	E	112	ARG
1	E	158	LEU
1	E	184	LYS
1	E	186	LEU
1	E	204	LYS
1	E	206	GLU
1	E	207	GLN
1	E	215	LEU
1	E	218	LEU
1	E	221	LEU
1	E	250	ARG
1	E	254	ASP
1	E	266	GLN
1	E	295	MET

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Mol	Chain	Res	Type
1	E	304	GLU
1	E	357	SER
1	E	363	LYS
1	E	364	VAL
1	E	380	THR
1	E	381	THR
1	E	382	THR
1	E	389	GLU
1	E	401	GLN
1	E	403	MET
1	E	417	LEU
1	E	426	ASP
1	E	439	LYS
1	E	449	GLN
1	E	557	LYS
2	F	59	LEU
2	F	141	LYS
1	G	41	SER
1	G	94	LEU
1	G	127	MET
1	G	141	ILE
1	G	179	LEU
1	G	209	GLU
1	G	221	LEU
1	G	248	LEU
1	G	294	ASN
1	G	295	MET
1	G	336	LYS
1	G	359	LEU
1	G	364	VAL
1	G	376	THR
1	G	384	THR
1	G	393	ARG
1	G	403	MET
1	G	405	LEU
1	G	417	LEU
1	G	425	HIS
1	G	426	ASP
1	G	429	LYS
1	G	479	ASP
1	G	490	ILE
1	G	496	PHE

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Mol	Chain	Res	Type
1	G	544	TRP
1	G	556	PHE
2	H	19	ILE
2	H	54	ILE
2	H	82	ARG
2	H	126	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	390	GLN
1	C	172	ASN
1	C	271	HIS
2	D	95	GLN
1	E	401	GLN
1	E	411	GLN
2	F	61	GLN
1	G	139	GLN
1	G	411	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 17 ligands modelled in this entry, 4 are monoatomic - leaving 13 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
5	GNP	D	301	6	29,34,34	2.19	8 (27%)	33,54,54	2.37	7 (21%)
3	EDO	E	601	-	3,3,3	0.42	0	2,2,2	0.38	0
4	GOL	E	602	-	5,5,5	0.38	0	5,5,5	0.32	0
4	GOL	A	604	-	5,5,5	0.38	0	5,5,5	0.33	0
3	EDO	A	602	-	3,3,3	0.42	0	2,2,2	0.37	0
3	EDO	G	601	-	3,3,3	0.41	0	2,2,2	0.39	0
3	EDO	B	303	-	3,3,3	0.42	0	2,2,2	0.43	0
4	GOL	A	603	-	5,5,5	0.37	0	5,5,5	0.27	0
5	GNP	H	301	6	29,34,34	2.22	8 (27%)	33,54,54	2.40	7 (21%)
5	GNP	F	301	6	29,34,34	2.18	8 (27%)	33,54,54	2.38	7 (21%)
3	EDO	A	601	-	3,3,3	0.43	0	2,2,2	0.41	0
5	GNP	B	301	6	29,34,34	2.18	8 (27%)	33,54,54	2.38	7 (21%)
3	EDO	B	302	-	3,3,3	0.41	0	2,2,2	0.37	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
5	GNP	D	301	6	-	4/14/38/38	0/3/3/3
3	EDO	E	601	-	-	0/1/1/1	-
4	GOL	E	602	-	-	2/4/4/4	-
4	GOL	A	604	-	-	2/4/4/4	-
3	EDO	A	602	-	-	0/1/1/1	-
3	EDO	G	601	-	-	0/1/1/1	-
3	EDO	B	303	-	-	0/1/1/1	-
4	GOL	A	603	-	-	2/4/4/4	-
5	GNP	H	301	6	-	2/14/38/38	0/3/3/3
5	GNP	F	301	6	-	7/14/38/38	0/3/3/3
3	EDO	A	601	-	-	0/1/1/1	-
5	GNP	B	301	6	-	4/14/38/38	0/3/3/3
3	EDO	B	302	-	-	0/1/1/1	-

All (32) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	H	301	GNP	PA-O3A	-6.68	1.52	1.59
5	D	301	GNP	PA-O3A	-6.54	1.52	1.59
5	B	301	GNP	PA-O3A	-6.53	1.52	1.59
5	F	301	GNP	PA-O3A	-6.50	1.52	1.59
5	H	301	GNP	PB-O3A	-5.48	1.52	1.59
5	F	301	GNP	PB-O3A	-5.38	1.52	1.59
5	D	301	GNP	PB-O3A	-5.34	1.52	1.59
5	B	301	GNP	PB-O3A	-5.33	1.52	1.59
5	D	301	GNP	C6-N1	3.93	1.39	1.33
5	H	301	GNP	C6-N1	3.87	1.39	1.33
5	B	301	GNP	C6-N1	3.79	1.39	1.33
5	F	301	GNP	C6-N1	3.79	1.39	1.33
5	B	301	GNP	PG-O1G	3.43	1.51	1.46
5	F	301	GNP	PG-O1G	3.39	1.51	1.46
5	D	301	GNP	PG-O1G	3.37	1.51	1.46
5	H	301	GNP	PG-O1G	3.35	1.51	1.46
5	B	301	GNP	PB-O2B	-3.29	1.48	1.56
5	H	301	GNP	PB-O2B	-3.28	1.48	1.56
5	D	301	GNP	PB-O2B	-3.27	1.48	1.56
5	F	301	GNP	PB-O2B	-3.19	1.48	1.56
5	D	301	GNP	C8-N7	-2.18	1.30	1.34
5	H	301	GNP	C8-N7	-2.18	1.30	1.34
5	H	301	GNP	PG-O3G	-2.15	1.51	1.56
5	B	301	GNP	PG-O3G	-2.14	1.51	1.56
5	F	301	GNP	C8-N7	-2.13	1.30	1.34
5	F	301	GNP	PG-O2G	-2.12	1.51	1.56
5	B	301	GNP	C8-N7	-2.11	1.30	1.34
5	F	301	GNP	PG-O3G	-2.10	1.51	1.56
5	H	301	GNP	PG-O2G	-2.09	1.51	1.56
5	D	301	GNP	PG-O2G	-2.09	1.51	1.56
5	B	301	GNP	PG-O2G	-2.06	1.51	1.56
5	D	301	GNP	PG-O3G	-2.05	1.51	1.56

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	H	301	GNP	C5-C6-N1	-8.79	111.67	123.42
5	D	301	GNP	C5-C6-N1	-8.76	111.71	123.42
5	B	301	GNP	C5-C6-N1	-8.72	111.76	123.42
5	F	301	GNP	C5-C6-N1	-8.61	111.91	123.42
5	H	301	GNP	C2-N1-C6	6.35	124.79	115.96
5	B	301	GNP	C2-N1-C6	6.29	124.71	115.96
5	D	301	GNP	C2-N1-C6	6.27	124.69	115.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	F	301	GNP	C2-N1-C6	6.27	124.68	115.96
5	H	301	GNP	O2B-PB-O1B	3.90	118.24	109.87
5	B	301	GNP	O2B-PB-O1B	3.84	118.11	109.87
5	F	301	GNP	O2B-PB-O1B	3.79	118.00	109.87
5	D	301	GNP	O2B-PB-O1B	3.76	117.93	109.87
5	F	301	GNP	C2-N3-C4	-3.48	111.73	115.48
5	D	301	GNP	C2-N3-C4	-3.47	111.75	115.48
5	H	301	GNP	C2-N3-C4	-3.45	111.76	115.48
5	H	301	GNP	O3G-PG-O1G	-3.44	104.83	113.45
5	B	301	GNP	O3G-PG-O1G	-3.44	104.83	113.45
5	D	301	GNP	O3G-PG-O1G	-3.36	105.03	113.45
5	B	301	GNP	C2-N3-C4	-3.32	111.91	115.48
5	F	301	GNP	O3G-PG-O1G	-3.31	105.14	113.45
5	H	301	GNP	O2G-PG-O3G	3.21	116.21	107.59
5	F	301	GNP	O2G-PG-O3G	3.13	116.00	107.59
5	D	301	GNP	O2G-PG-O3G	3.10	115.92	107.59
5	B	301	GNP	O2G-PG-O3G	3.06	115.83	107.59
5	H	301	GNP	N3-C2-N1	-2.43	124.12	127.21
5	B	301	GNP	N3-C2-N1	-2.41	124.14	127.21
5	F	301	GNP	N3-C2-N1	-2.40	124.16	127.21
5	D	301	GNP	N3-C2-N1	-2.35	124.22	127.21

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	603	GOL	O1-C1-C2-O2
4	A	603	GOL	O1-C1-C2-C3
4	A	604	GOL	O1-C1-C2-C3
5	B	301	GNP	PG-N3B-PB-O1B
5	B	301	GNP	PA-O3A-PB-O2B
5	D	301	GNP	PG-N3B-PB-O1B
5	D	301	GNP	PG-N3B-PB-O3A
5	D	301	GNP	PA-O3A-PB-O2B
5	F	301	GNP	PB-N3B-PG-O1G
5	F	301	GNP	PG-N3B-PB-O1B
5	F	301	GNP	PA-O3A-PB-O2B
5	F	301	GNP	C5'-O5'-PA-O3A
5	F	301	GNP	C5'-O5'-PA-O2A
5	H	301	GNP	PG-N3B-PB-O1B
5	H	301	GNP	PG-N3B-PB-O3A
4	E	602	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	E	602	GOL	O1-C1-C2-C3
4	A	604	GOL	O1-C1-C2-O2
5	B	301	GNP	C5'-O5'-PA-O3A
5	F	301	GNP	C5'-O5'-PA-O1A
5	B	301	GNP	PA-O3A-PB-O1B
5	D	301	GNP	PA-O3A-PB-O1B
5	F	301	GNP	PA-O3A-PB-O1B

There are no ring outliers.

7 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	D	301	GNP	4	0
4	E	602	GOL	1	0
3	A	602	EDO	1	0
3	G	601	EDO	2	0
3	B	303	EDO	1	0
5	H	301	GNP	1	0
5	F	301	GNP	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 GNP D 301

Bond lengths

Bond angles

Torsions

Rings

Ligand GNP H 301

Bond lengths

Bond angles

Torsions

Rings

Ligand GNP F 301

Bond lengths

Bond angles

Torsions

Rings

Ligand GNP B 301

Bond lengths

Bond angles

Torsions

Rings
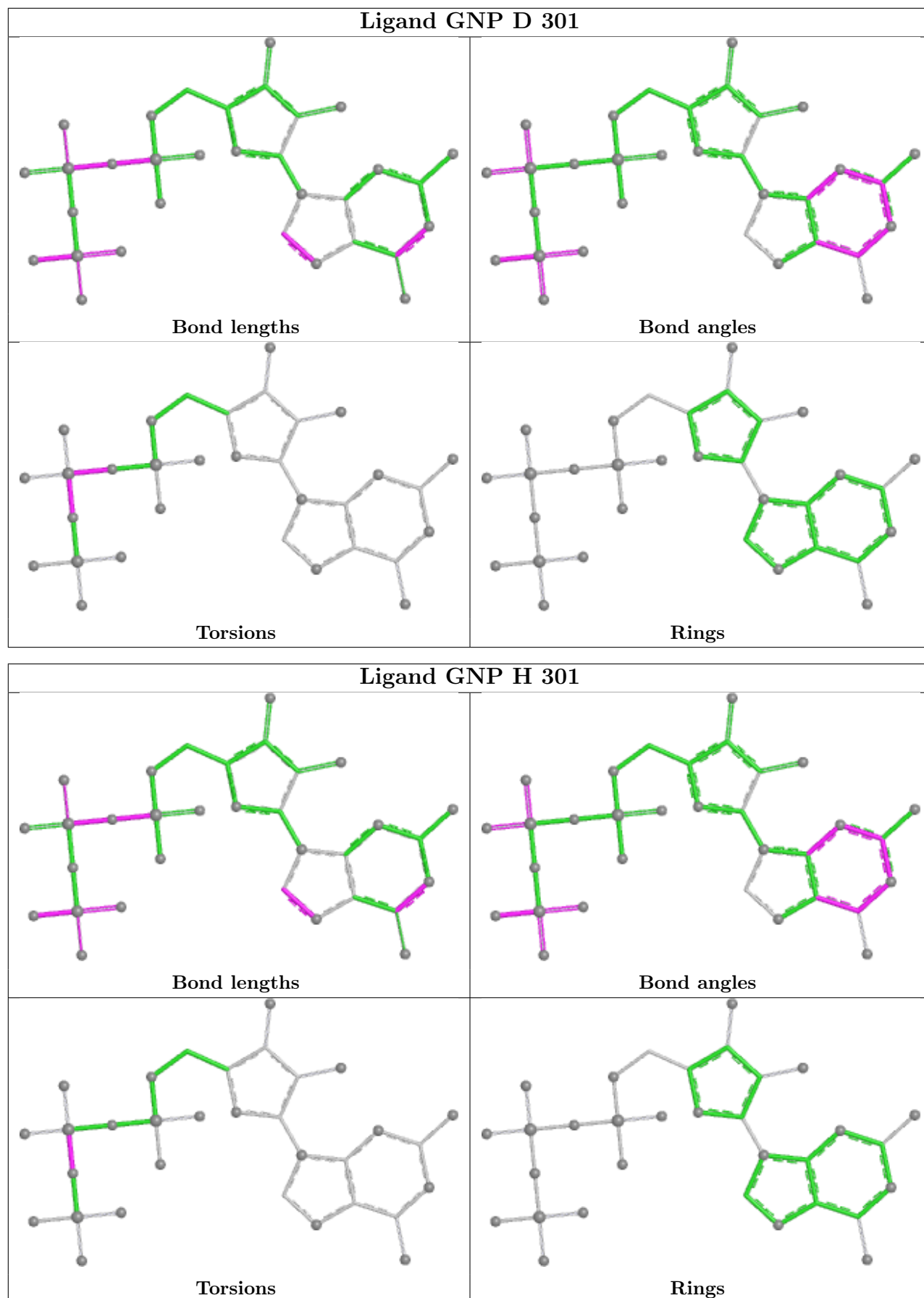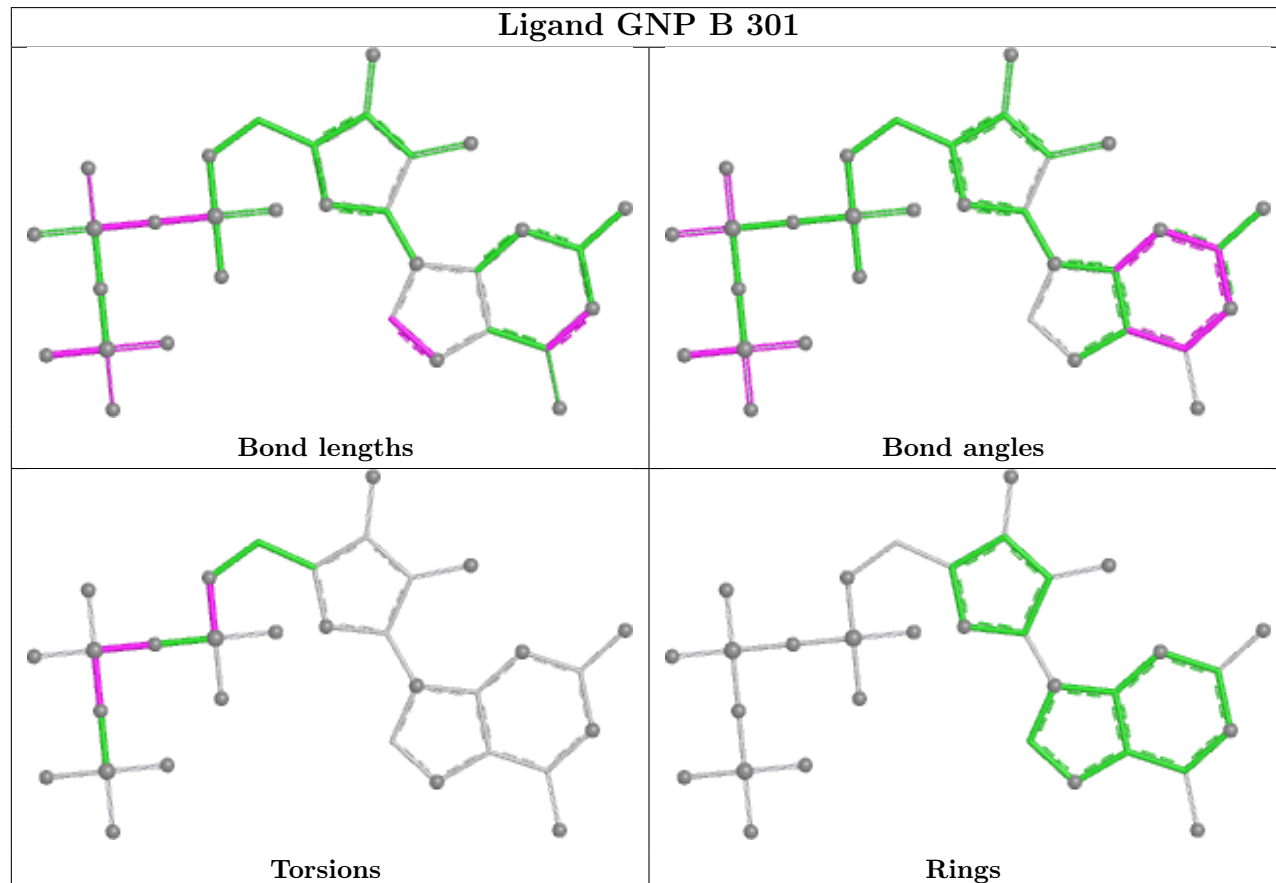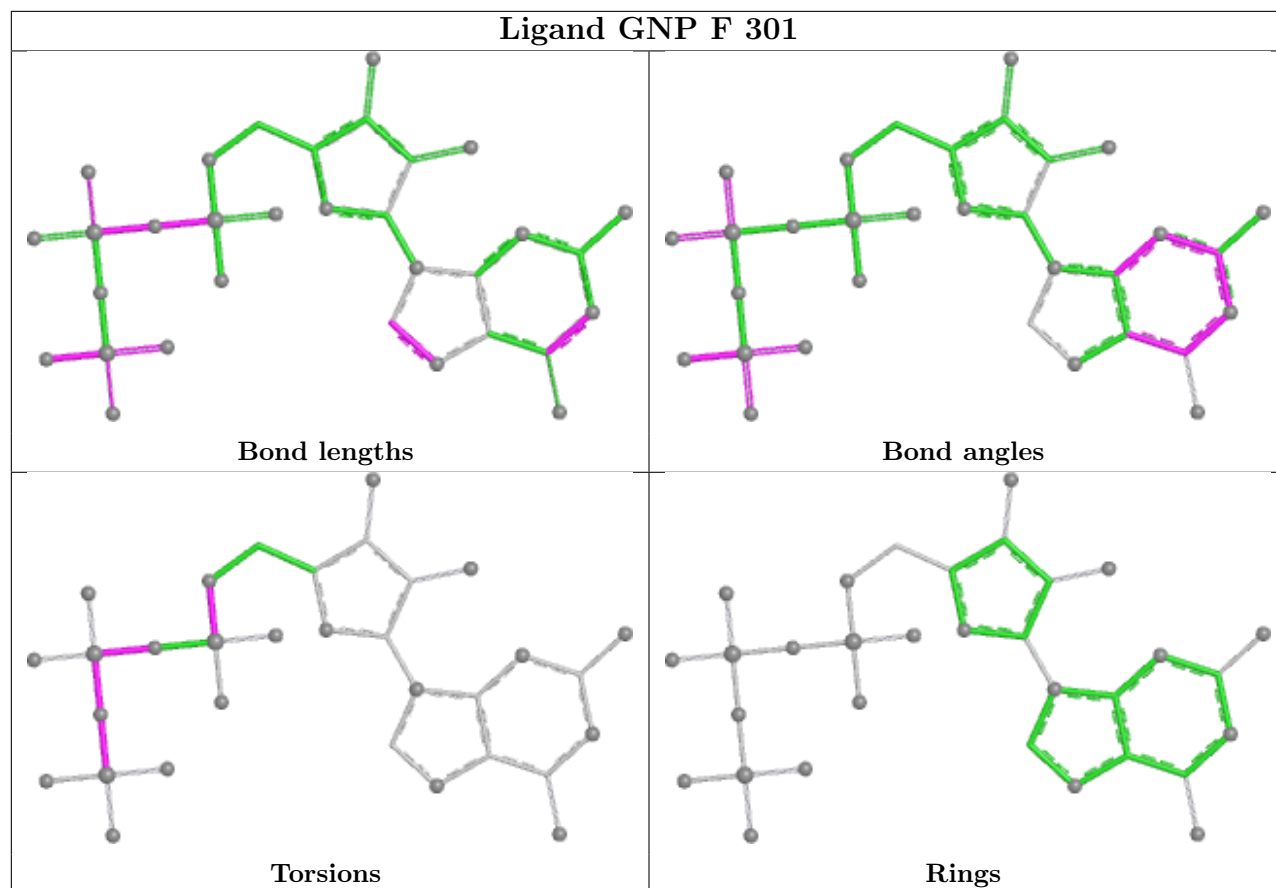
5.7 Other polymers ⓘ

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(Å^2)	Q<0.9
1	A	530/551 (96%)	-0.68	0	100	100	1, 36, 77, 137	0
1	C	527/551 (95%)	-0.53	0	100	100	5, 57, 109, 169	0
1	E	531/551 (96%)	-0.67	0	100	100	0, 32, 79, 118	0
1	G	528/551 (95%)	-0.42	2 (0%)	89	77	14, 59, 112, 142	0
2	B	164/170 (96%)	-0.47	0	100	100	16, 58, 89, 151	0
2	D	164/170 (96%)	-0.45	0	100	100	25, 73, 108, 133	0
2	F	164/170 (96%)	-0.27	1 (0%)	85	72	22, 72, 108, 149	0
2	H	164/170 (96%)	-0.54	0	100	100	26, 60, 99, 130	0
All	All	2772/2884 (96%)	-0.54	3 (0%)	92	87	0, 52, 102, 169	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	536	ASN	3.1
1	G	358	VAL	2.5
2	F	101	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 (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	EDO	A	602	4/4	0.48	0.11	55,55,55,55	0
3	EDO	G	601	4/4	0.64	0.20	84,84,84,84	0
4	GOL	A	604	6/6	0.64	0.17	78,78,78,78	0
3	EDO	A	601	4/4	0.67	0.23	58,58,58,58	0
4	GOL	E	602	6/6	0.68	0.15	66,66,66,66	0
3	EDO	E	601	4/4	0.75	0.08	56,56,56,56	0
4	GOL	A	603	6/6	0.79	0.13	59,59,59,59	0
3	EDO	B	302	4/4	0.83	0.18	45,45,45,45	0
3	EDO	B	303	4/4	0.88	0.17	41,41,41,41	0
5	GNP	F	301	32/32	0.89	0.08	81,81,81,81	0
5	GNP	B	301	32/32	0.90	0.08	72,72,72,72	0
6	MG	F	302	1/1	0.90	0.12	54,54,54,54	0
5	GNP	D	301	32/32	0.93	0.05	80,80,80,80	0
5	GNP	H	301	32/32	0.94	0.06	63,63,63,63	0
6	MG	B	304	1/1	0.95	0.07	36,36,36,36	0
6	MG	H	302	1/1	0.98	0.06	35,35,35,35	0
6	MG	D	302	1/1	1.00	0.02	36,36,36,36	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 GNP F 301:

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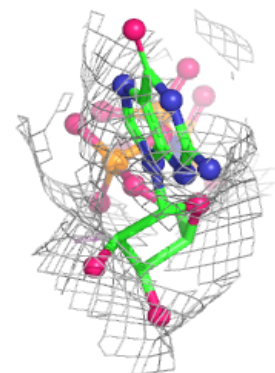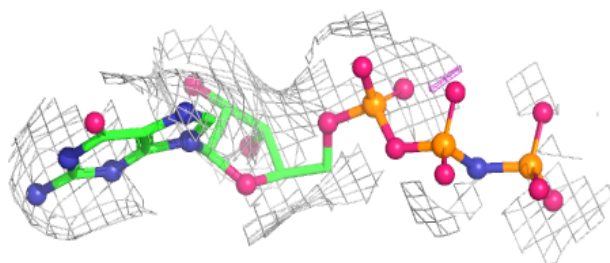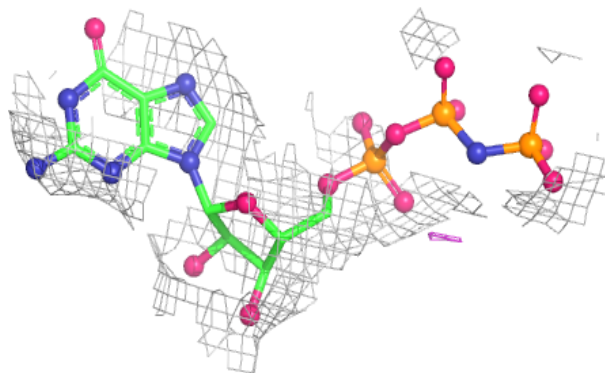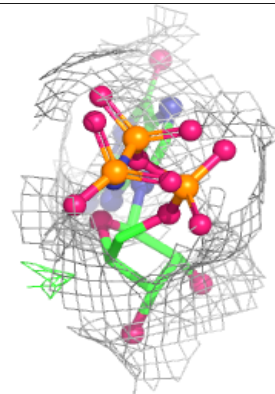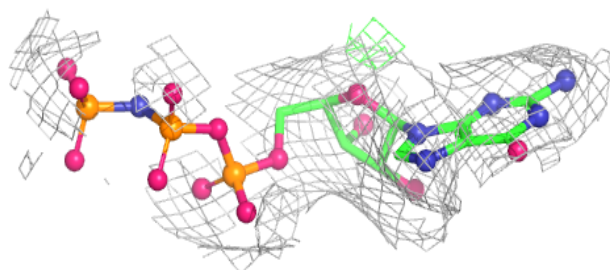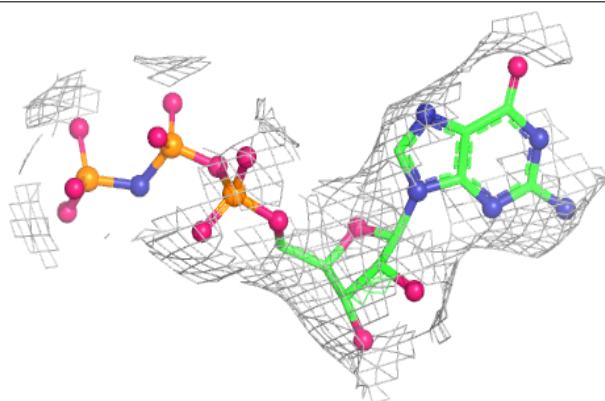and green (positive)
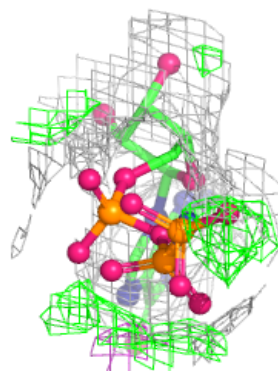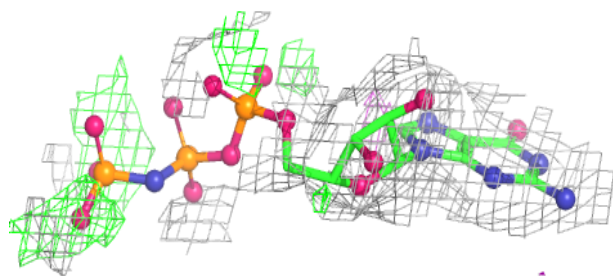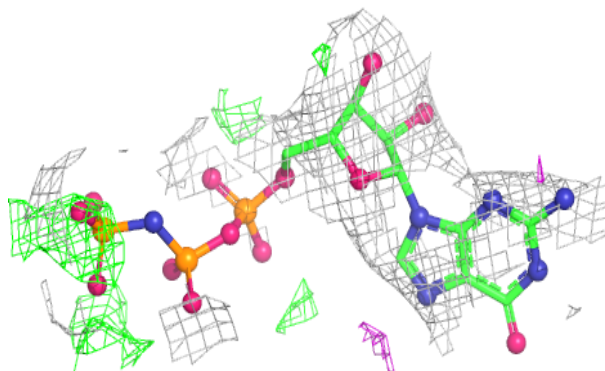
Electron density around GNP B 301:

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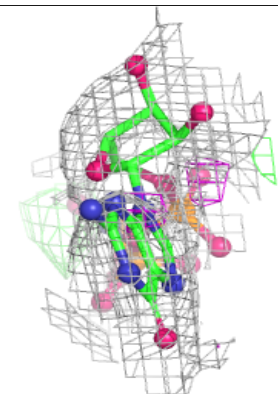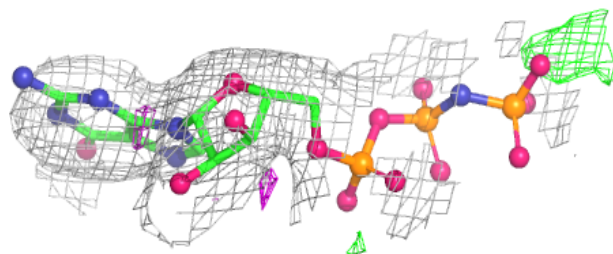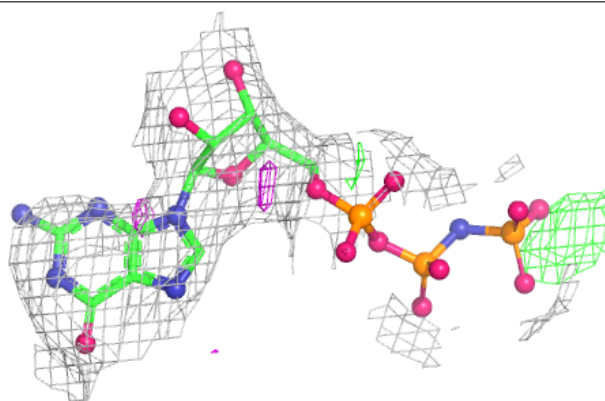
Electron density around GNP D 301:

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

Electron density around GNP H 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.