



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 22, 2023 – 10:36 PM JST

PDB ID : 7XR1  
Title : Crystal structure of T2R-TTL-3a complex  
Authors : Lun, T.; Wu, C.Y.  
Deposited on : 2022-05-09  
Resolution : 2.81 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](mailto: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 : 2.36  
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

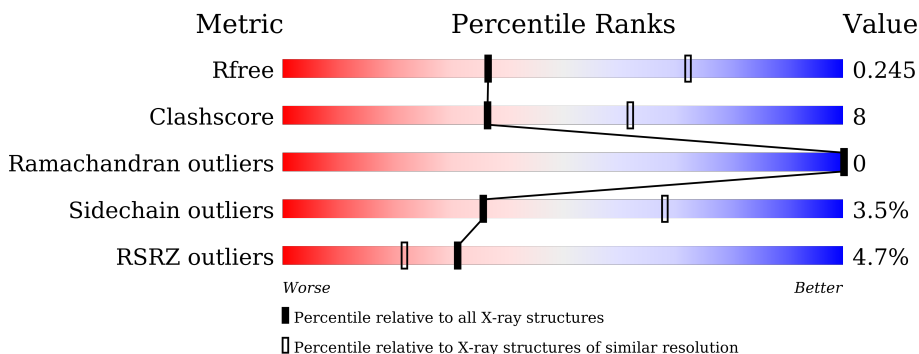
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.81 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

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

Mol	Chain	Length	Quality of chain
1	A	450	 % 81% 15% ..
1	C	450	 83% 14% ..
2	B	445	 % 73% 22% 5%
2	D	445	 4% 71% 22% • 6%
3	E	143	 3% 62% 22% • 14%
4	F	384	 18% 66% 23% • 10%

## 2 Entry composition i

There are 11 unique types of molecules in this entry. The entry contains 17617 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 Tubulin alpha-1B chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	437	Total	C	N	O	S	0	4	0
			3427	2170	580	653	24			
1	C	440	Total	C	N	O	S	0	9	0
			3468	2195	585	663	25			

- Molecule 2 is a protein called Tubulin beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	424	Total	C	N	O	S	0	3	0
			3356	2111	572	647	26			
2	D	420	Total	C	N	O	S	0	0	0
			3295	2072	558	639	26			

- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	E	123	Total	C	N	O	S	0	2	0
			1026	633	186	202	5			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	3	MET	-	initiating methionine	UNP P63042
E	4	ALA	-	expression tag	UNP P63042

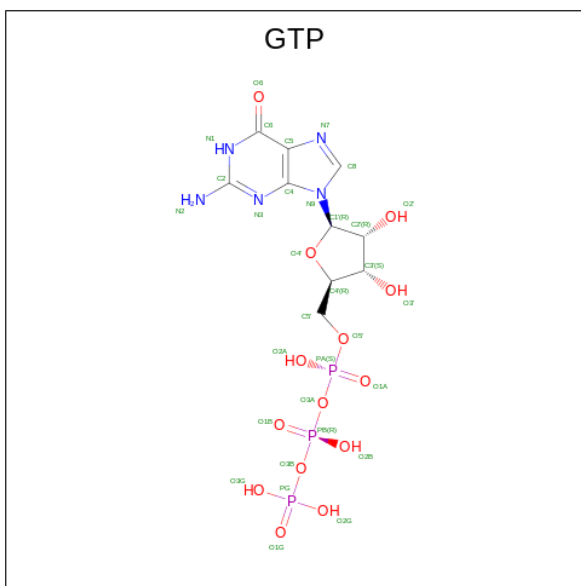
- Molecule 4 is a protein called TTL.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	F	346	Total	C	N	O	S	0	4	0
			2851	1830	487	519	15			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	379	HIS	-	expression tag	UNP E1BQ43
F	380	HIS	-	expression tag	UNP E1BQ43
F	381	HIS	-	expression tag	UNP E1BQ43
F	382	HIS	-	expression tag	UNP E1BQ43
F	383	HIS	-	expression tag	UNP E1BQ43
F	384	HIS	-	expression tag	UNP E1BQ43

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



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

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

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

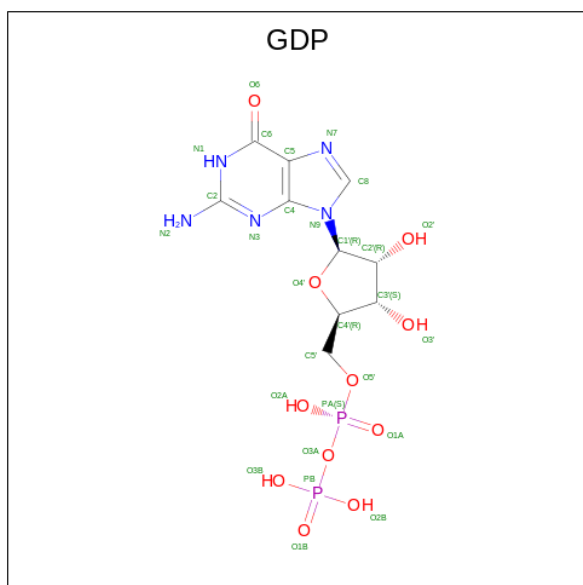
- Molecule 7 is CALCIUM ION (three-letter code: CA) (formula: Ca).

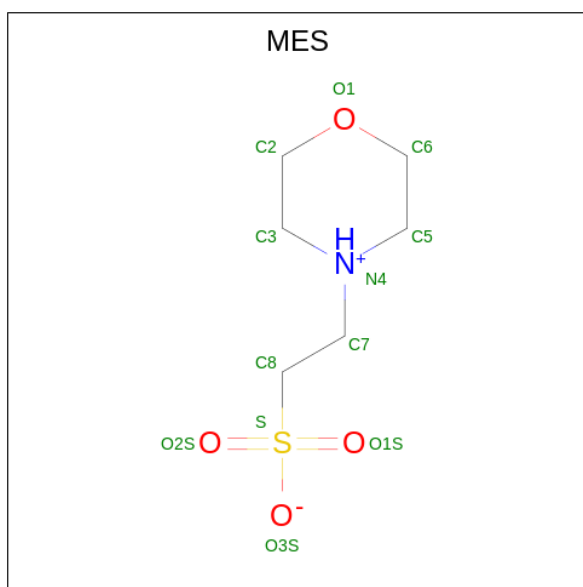
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Ca 1 1	0	0
7	C	1	Total Ca 1 1	0	0

- Molecule 8 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Cl 1 1	0	0

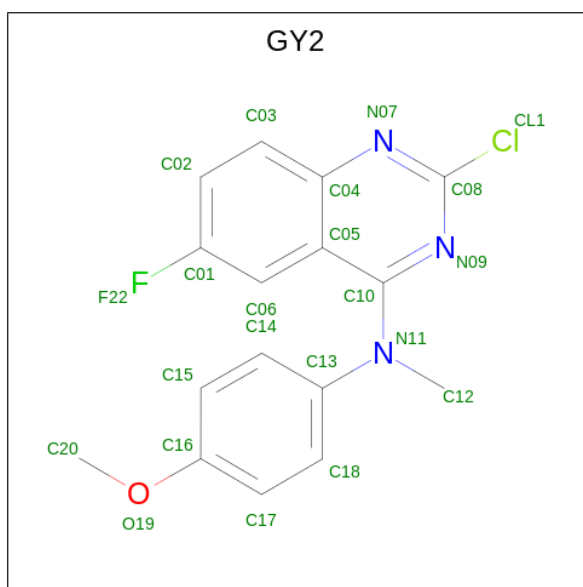
- Molecule 9 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C<sub>10</sub>H<sub>15</sub>N<sub>5</sub>O<sub>11</sub>P<sub>2</sub>).





Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	S			
10	B	1	Total	12	6	1	4	1	0	0
10	B	1	Total	12	6	1	4	1	0	0

- Molecule 11 is 2-chloranyl-6-fluoranyl-N-(4-methoxyphenyl)-N-methyl-quinazolin-4-amine (three-letter code: GY2) (formula:  $C_{16}H_{13}ClFN_3O$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	
			Total	C	Cl	F	N	O			
11	B	1	Total	22	16	1	1	3	1	0	0

*Continued on next page...*

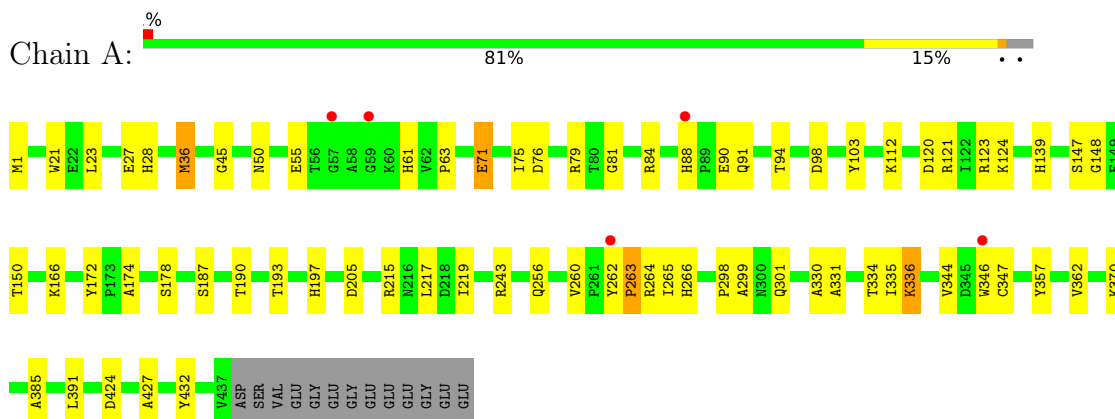
*Continued from previous page...*

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	Cl	F	N			O
11	D	1	22	16	1	1	3	1	0	0

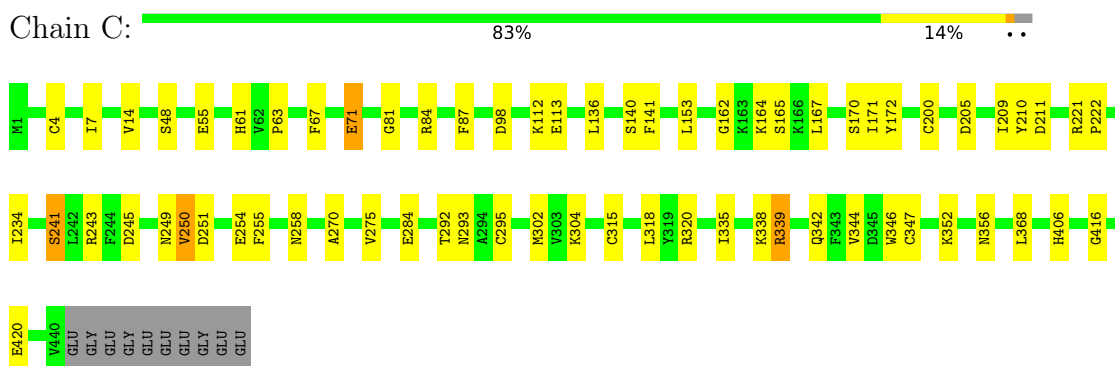
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

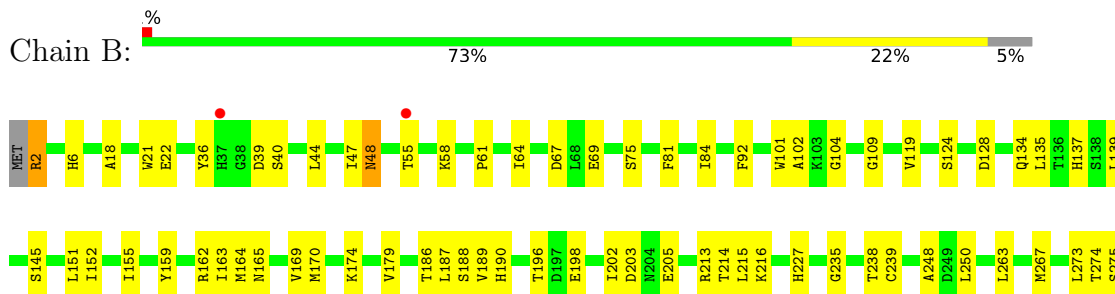
- Molecule 1: Tubulin alpha-1B chain



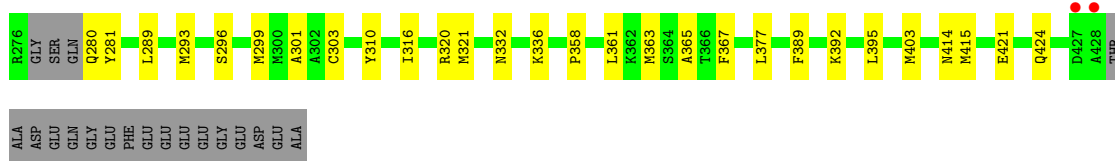
- Molecule 1: Tubulin alpha-1B chain



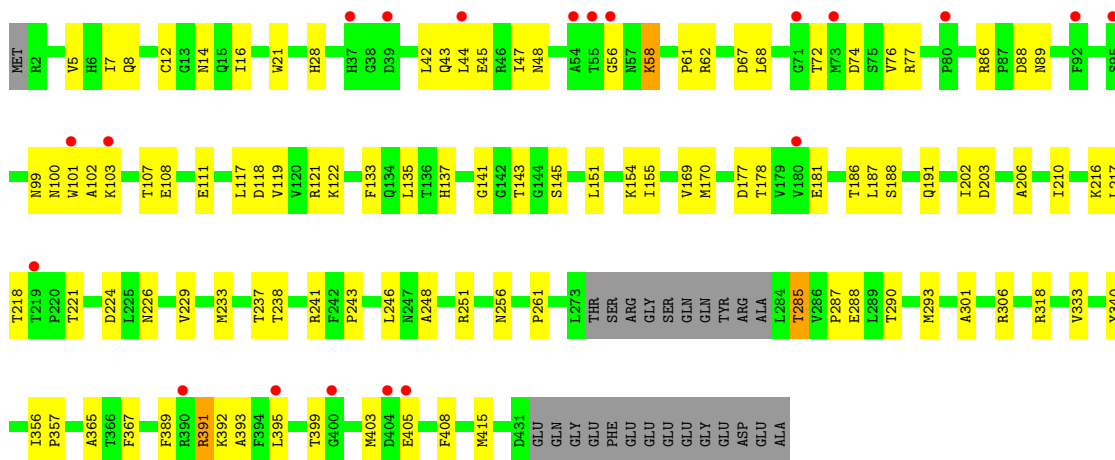
- Molecule 2: Tubulin beta chain



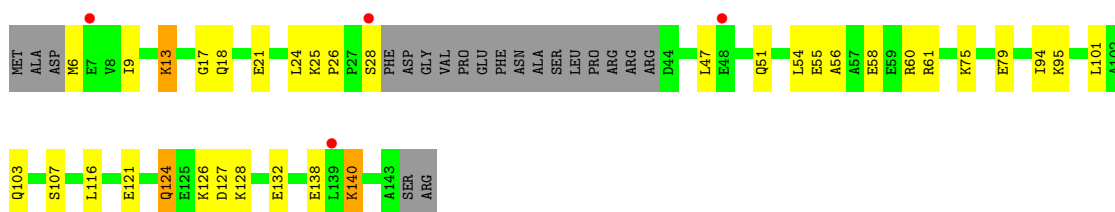




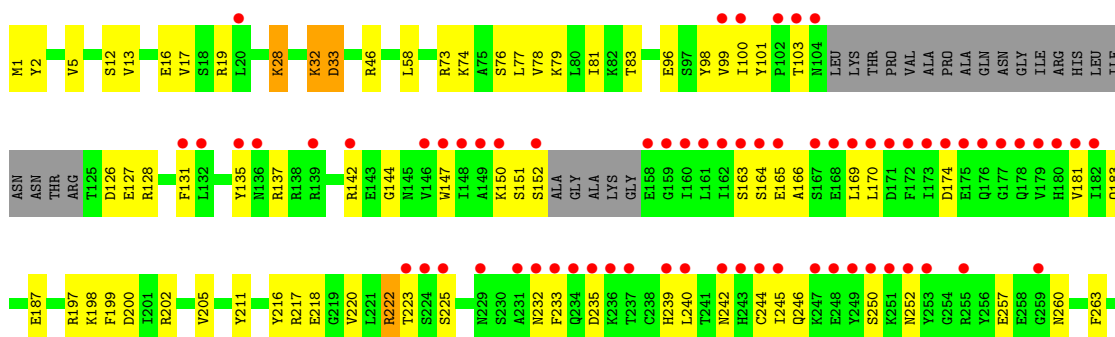
• Molecule 2: Tubulin beta chain

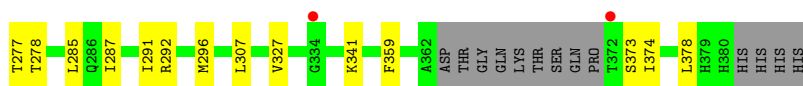


• Molecule 3: Stathmin-4



• Molecule 4: TTL





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	105.10Å 157.53Å 181.02Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	56.35 – 2.81 56.35 – 2.81	Depositor EDS
% Data completeness (in resolution range)	99.8 (56.35-2.81) 99.8 (56.35-2.81)	Depositor EDS
$R_{merge}$	0.31	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.19 (at 2.81Å)	Xtrriage
Refinement program	PHENIX 1.19_4092	Depositor
R, $R_{free}$	0.203 , 0.246 0.201 , 0.245	Depositor DCC
$R_{free}$ test set	2000 reflections (2.72%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	54.3	Xtrriage
Anisotropy	0.156	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 55.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	17617	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.65% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GY2, MG, GTP, MES, CA, CL, GDP

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	0.50	0/3517	0.66	0/4776
1	C	0.59	1/3570 (0.0%)	0.71	1/4847 (0.0%)
2	B	0.54	0/3436	0.71	2/4653 (0.0%)
2	D	0.48	0/3368	0.65	0/4564
3	E	0.55	0/1041	0.71	0/1382
4	F	0.45	0/2927	0.67	0/3955
All	All	0.52	1/17859 (0.0%)	0.68	3/24177 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	295	CYS	CB-SG	-5.09	1.73	1.81

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	299	MET	CA-CB-CG	-5.67	103.66	113.30
2	B	69	GLU	C-N-CD	5.21	139.33	128.40
1	C	318	LEU	CA-CB-CG	5.15	127.14	115.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3427	0	3341	46	0
1	C	3468	0	3388	36	0
2	B	3356	0	3237	60	0
2	D	3295	0	3166	64	0
3	E	1026	0	1042	22	0
4	F	2851	0	2826	53	0
5	A	32	0	12	0	0
5	C	32	0	12	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
7	A	1	0	0	0	0
7	C	1	0	0	0	0
8	A	1	0	0	0	0
9	B	28	0	12	0	0
9	D	28	0	11	2	0
10	B	24	0	24	1	0
11	B	22	0	0	0	0
11	D	22	0	0	1	0
All	All	17617	0	17071	274	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 8.

All (274) 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:E:13:LYS:HB2	3:E:18:GLN:HB3	1.59	0.84
1:A:71:GLU:HG2	1:A:98:ASP:HB3	1.60	0.81
2:D:99:ASN:HD22	2:D:178:THR:HG21	1.46	0.81
2:D:391:ARG:HD2	2:D:393:ALA:HB2	1.65	0.78
4:F:32:LYS:HG3	4:F:33:ASP:OD2	1.84	0.77
4:F:73:ARG:HG3	4:F:73:ARG:HH11	1.49	0.76
2:B:235:GLY:O	2:B:238:THR:HG22	1.86	0.75
4:F:101:TYR:N	4:F:126:ASP:OD2	2.14	0.75
2:D:100:ASN:HD22	2:D:103:LYS:H	1.32	0.75
4:F:263:PHE:CE2	4:F:341:LYS:HD3	2.24	0.73
4:F:78:VAL:HG21	4:F:181:VAL:HG21	1.72	0.69
2:D:226:ASN:ND2	9:D:501:GDP:O6	2.25	0.69
2:B:280:GLN:HG2	2:B:281:TYR:H	1.59	0.68
2:D:100:ASN:HD21	2:D:102:ALA:HB3	1.59	0.68
4:F:135:TYR:OH	4:F:165:GLU:HA	1.94	0.68

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:LYS:HE2	1:A:197:HIS:O	1.94	0.67
1:A:45:GLY:O	1:A:50:ASN:ND2	2.28	0.66
2:D:238:THR:HG21	2:D:318:ARG:HD2	1.78	0.65
4:F:144:GLY:HA3	4:F:187:GLU:OE1	1.97	0.65
4:F:128:ARG:HE	4:F:170:LEU:HD23	1.61	0.64
2:D:102:ALA:HB2	2:D:403:MET:HE3	1.80	0.64
2:B:2:ARG:HD3	2:B:48:ASN:HD22	1.64	0.63
4:F:74:LYS:NZ	4:F:151:SER:O	2.32	0.63
1:C:234:ILE:HD13	1:C:302:MET:SD	2.39	0.63
1:A:90:GLU:O	1:A:121:ARG:HD2	1.99	0.62
1:C:162:GLY:HA2	3:E:94:ILE:HD11	1.81	0.62
1:C:4[A]:CYS:SG	1:C:136:LEU:HG	2.39	0.61
4:F:263:PHE:HE2	4:F:341:LYS:HD3	1.66	0.61
1:A:187:SER:HB3	1:A:391:LEU:HD21	1.81	0.61
2:D:5:VAL:HG12	2:D:62:ARG:HD3	1.83	0.61
2:B:293:MET:HG2	2:B:367:PHE:HB2	1.82	0.60
3:E:47:LEU:O	3:E:51:GLN:HG2	2.00	0.60
1:C:211[A]:ASP:OD2	1:C:304:LYS:NZ	2.33	0.60
1:A:88:HIS:N	1:A:91:GLN:OE1	2.28	0.60
1:A:336:LYS:HD3	3:E:24:LEU:HD13	1.82	0.59
2:D:285:THR:HG23	2:D:287:PRO:HD2	1.82	0.59
2:D:145:SER:HB2	2:D:188:SER:OG	2.02	0.59
2:D:356:ILE:HD12	2:D:357:PRO:HD2	1.85	0.59
2:B:389:PHE:O	2:B:392:LYS:HD3	2.03	0.58
2:D:206:ALA:O	2:D:210:ILE:HG13	2.04	0.58
3:E:6:MET:HG3	3:E:24:LEU:HD23	1.86	0.58
4:F:292:ARG:HG3	4:F:378:LEU:HB3	1.85	0.58
1:A:55:GLU:HG2	1:A:61:HIS:CD2	2.38	0.58
2:B:81:PHE:O	2:B:84:ILE:HG22	2.04	0.57
2:B:238:THR:CG2	2:B:316:ILE:HG21	2.34	0.57
4:F:5:VAL:HG13	4:F:32:LYS:HA	1.84	0.57
2:B:267:MET:HG3	2:B:301:ALA:HB3	1.86	0.57
2:D:72:THR:O	2:D:76:VAL:HG23	2.04	0.57
2:B:163:ILE:HG21	2:B:250:LEU:HB3	1.86	0.57
2:D:102:ALA:HB2	2:D:403:MET:CE	2.35	0.57
4:F:16:GLU:HG2	4:F:19:ARG:HH21	1.68	0.57
4:F:13:VAL:O	4:F:17:VAL:HG23	2.05	0.57
1:A:262:TYR:CE2	1:A:346:TRP:CZ2	2.93	0.57
3:E:51:GLN:O	3:E:55:GLU:HG3	2.05	0.57
2:B:190:HIS:CE1	2:B:414:ASN:HD22	2.23	0.56
2:D:117:LEU:HD11	2:D:154:LYS:HG2	1.86	0.56

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:205:VAL:HG21	4:F:291:ILE:HD13	1.86	0.56
4:F:225:SER:OG	4:F:252:ASN:OD1	2.22	0.56
3:E:140:LYS:HD2	3:E:140:LYS:O	2.06	0.56
1:A:103:TYR:CE2	1:A:148:GLY:HA2	2.41	0.56
1:A:357:TYR:CE2	3:E:17:GLY:HA2	2.42	0.55
1:A:147:SER:HB2	1:A:190:THR:HB	1.87	0.55
1:C:71:GLU:HG2	1:C:98:ASP:HB3	1.87	0.55
1:C:245:ASP:N	1:C:245:ASP:OD1	2.40	0.55
1:A:215:ARG:NH2	1:A:299:ALA:O	2.40	0.55
2:B:358:PRO:HG2	2:B:361:LEU:HD13	1.88	0.55
3:E:121:GLU:O	3:E:124:GLN:HG3	2.07	0.55
1:C:275:VAL:HG13	1:C:368:LEU:HD21	1.89	0.54
1:A:75:ILE:O	1:A:79:ARG:HG3	2.07	0.54
2:B:39:ASP:OD1	2:B:40:SER:N	2.39	0.54
3:E:25:LYS:NZ	3:E:28:SER:HB2	2.22	0.54
2:B:18:ALA:O	2:B:22:GLU:HG3	2.08	0.54
2:B:165:ASN:HD22	2:B:198:GLU:HG3	1.72	0.54
2:D:107:THR:O	2:D:111:GLU:HG3	2.08	0.54
2:D:246:LEU:CD1	2:D:248:ALA:HB2	2.39	0.53
4:F:197:ARG:NH2	4:F:257:GLU:OE2	2.38	0.53
1:C:81:GLY:O	1:C:84:ARG:HG2	2.09	0.53
4:F:100:ILE:HD12	4:F:128:ARG:HB3	1.90	0.53
2:B:6:HIS:CD2	2:B:21:TRP:HE1	2.26	0.53
4:F:79:LYS:O	4:F:83:THR:OG1	2.25	0.52
2:B:145:SER:HB2	2:B:188:SER:OG	2.10	0.52
4:F:223:THR:HG21	4:F:257:GLU:OE1	2.09	0.52
2:D:12:CYS:SG	2:D:16:ILE:HD12	2.51	0.51
2:D:306:ARG:HG2	2:D:340:TYR:CZ	2.45	0.51
4:F:200:ASP:OD1	4:F:222:ARG:HB2	2.10	0.51
2:D:5:VAL:HG12	2:D:62:ARG:CD	2.39	0.51
2:D:21:TRP:CZ3	2:D:61:PRO:HB3	2.46	0.51
2:D:56:GLY:O	2:D:58:LYS:HD3	2.09	0.51
2:B:139:LEU:HA	2:B:145:SER:HB3	1.92	0.51
2:D:221:THR:HG22	2:D:224:ASP:OD2	2.10	0.51
4:F:103:THR:HG22	4:F:174:ASP:HB3	1.92	0.51
2:B:203:ASP:HB2	2:B:301:ALA:HA	1.92	0.51
1:C:344:VAL:HG21	1:C:346:TRP:CE2	2.46	0.51
1:C:81:GLY:O	1:C:84:ARG:NH1	2.44	0.51
2:B:301:ALA:O	2:B:303:CYS:N	2.45	0.50
2:D:5:VAL:HG22	2:D:133:PHE:CD2	2.46	0.50
1:C:84:ARG:HG2	1:C:84:ARG:HH11	1.76	0.50

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:88:HIS:CD2	1:A:90:GLU:HG2	2.47	0.50
2:D:285:THR:HG22	2:D:288:GLU:CD	2.32	0.50
4:F:198:LYS:HG2	4:F:199:PHE:N	2.27	0.50
1:A:265:ILE:HG23	1:A:432:TYR:CZ	2.46	0.49
1:A:331:ALA:O	1:A:335:ILE:HG13	2.12	0.49
1:A:344:VAL:HG21	1:A:346:TRP:CZ2	2.47	0.49
2:D:68:LEU:HD12	2:D:143:THR:HG23	1.94	0.49
2:B:21:TRP:CZ3	2:B:61:PRO:HB3	2.48	0.49
2:B:174:LYS:HD2	2:B:205:GLU:HG3	1.95	0.49
2:B:238:THR:HG21	2:B:316:ILE:HG21	1.94	0.49
3:E:56:ALA:HB1	3:E:60:ARG:HH12	1.76	0.49
1:C:210:TYR:CZ	1:C:222:PRO:HD2	2.48	0.49
4:F:163:SER:OG	4:F:164:SER:N	2.43	0.49
2:D:7:ILE:O	2:D:135:LEU:HD12	2.13	0.49
4:F:150:LYS:HG2	4:F:151:SER:N	2.28	0.49
4:F:246:GLN:OE1	4:F:260:ASN:ND2	2.46	0.49
2:D:395:LEU:O	2:D:399:THR:HG22	2.13	0.48
2:B:104:GLY:O	2:B:109:GLY:HA3	2.13	0.48
2:B:170:MET:HE2	2:B:377:LEU:HD21	1.93	0.48
4:F:128:ARG:HH21	4:F:170:LEU:HB3	1.79	0.48
2:D:256:ASN:HB3	11:D:502:GY2:C16	2.44	0.48
3:E:95:LYS:HD2	3:E:95:LYS:HA	1.69	0.48
4:F:246:GLN:O	4:F:250:SER:HB3	2.13	0.48
2:B:61:PRO:CD	2:B:84:ILE:HG12	2.43	0.48
1:C:209:ILE:HD11	1:C:302:MET:SD	2.53	0.48
2:D:67:ASP:OD2	2:D:72:THR:HG21	2.13	0.48
1:C:140:SER:HA	1:C:171:ILE:HB	1.95	0.48
1:A:112:LYS:HG3	3:E:54:LEU:HD13	1.94	0.48
2:B:61:PRO:HD3	2:B:84:ILE:HG12	1.96	0.48
2:B:273:LEU:HD23	2:B:273:LEU:HA	1.62	0.48
1:A:265:ILE:HG23	1:A:432:TYR:CE1	2.49	0.47
2:B:165:ASN:ND2	2:B:198:GLU:HG3	2.29	0.47
2:D:237:THR:O	2:D:241:ARG:HG3	2.14	0.47
3:E:9:ILE:HG13	3:E:21:GLU:HB3	1.95	0.47
1:C:339:ARG:HH11	1:C:339:ARG:HG2	1.79	0.47
1:A:187:SER:CB	1:A:391:LEU:HD21	2.43	0.47
1:C:250:VAL:HG22	1:C:255:PHE:CZ	2.48	0.47
2:D:389:PHE:CE1	2:D:408:PHE:HB3	2.50	0.47
2:B:289:LEU:HG	2:B:365:ALA:HB2	1.95	0.47
2:D:117:LEU:HD11	2:D:154:LYS:CG	2.43	0.47
1:A:262:TYR:HE2	1:A:346:TRP:CZ2	2.33	0.47

*Continued on next page...*



Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:346:TRP:CZ3	1:A:347:CYS:SG	3.06	0.47
3:E:75:LYS:O	3:E:79:GLU:HG3	2.15	0.47
2:B:67:ASP:O	2:B:92:PHE:HA	2.15	0.47
2:B:162:ARG:O	10:B:503:MES:H52	2.15	0.47
2:D:151:LEU:O	2:D:155:ILE:HG13	2.15	0.47
1:C:250:VAL:HG22	1:C:255:PHE:CE2	2.49	0.47
2:B:310:TYR:CE1	2:B:367:PHE:HZ	2.32	0.47
2:B:227:HIS:NE2	2:B:274:THR:HG23	2.30	0.46
2:D:43:GLN:O	2:D:47:ILE:HG23	2.16	0.46
2:D:290:THR:HG22	2:D:333:VAL:HG21	1.96	0.46
1:A:172:TYR:HB3	1:A:205:ASP:HA	1.98	0.46
2:B:263:LEU:HD21	2:B:421[B]:GLU:HB3	1.98	0.46
4:F:73:ARG:HG3	4:F:73:ARG:NH1	2.25	0.46
2:B:215:LEU:HD13	2:B:275:SER:HB2	1.97	0.46
2:D:191:GLN:HE22	3:E:126:LYS:NZ	2.13	0.46
2:D:293:MET:HG2	2:D:367:PHE:HB2	1.98	0.46
1:A:81:GLY:O	1:A:84:ARG:HD3	2.15	0.46
2:B:36:TYR:CE1	2:B:44:LEU:HD21	2.50	0.46
3:E:25:LYS:HD3	3:E:26:PRO:O	2.15	0.46
1:A:330:ALA:O	1:A:334:THR:HG22	2.16	0.46
2:D:44:LEU:O	2:D:47:ILE:HG13	2.15	0.46
2:D:74:ASP:HA	2:D:77:ARG:NH1	2.31	0.46
2:D:118:ASP:HA	2:D:121:ARG:NH1	2.30	0.46
2:D:141:GLY:HA3	9:D:501:GDP:O3A	2.16	0.46
4:F:16:GLU:HG2	4:F:19:ARG:NH2	2.31	0.46
2:B:179:VAL:HG22	1:C:258:ASN:OD1	2.16	0.46
2:D:229:VAL:O	2:D:233:MET:HG3	2.16	0.46
2:B:169:VAL:HA	2:B:202:ILE:O	2.15	0.45
2:D:42:LEU:HG	2:D:243:PRO:HG2	1.97	0.45
1:A:76:ASP:HA	1:A:79:ARG:HD2	1.98	0.45
2:B:64:ILE:HG12	2:B:119:VAL:HG12	1.98	0.45
2:B:321:MET:HB3	2:B:363:MET:SD	2.56	0.45
1:A:385:ALA:HB2	1:A:432:TYR:CG	2.51	0.45
1:A:27:GLU:OE1	1:A:243:ARG:NH2	2.45	0.45
1:A:362:VAL:HG21	1:A:370:LYS:HG3	1.98	0.45
3:E:58:GLU:HG3	3:E:61:ARG:NH2	2.32	0.45
1:A:1:MET:SD	1:A:1:MET:C	2.95	0.45
1:A:124:LYS:HA	1:A:124:LYS:HD2	1.74	0.45
1:A:123:ARG:HG3	1:A:123:ARG:HH11	1.81	0.45
1:A:260:VAL:HG11	1:A:266:HIS:HB3	1.99	0.45
1:A:298:PRO:HA	1:A:301:GLN:CD	2.37	0.45

Continued on next page...

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:167:LEU:HA	1:C:200:CYS:O	2.17	0.45
4:F:2:TYR:CZ	4:F:359:PHE:HB3	2.52	0.45
4:F:277:THR:HG22	4:F:278:THR:H	1.83	0.44
2:B:47:ILE:HD12	2:B:47:ILE:HA	1.83	0.44
2:B:216:LYS:HA	2:B:216:LYS:HD3	1.77	0.44
1:C:48:SER:HB3	1:C:243:ARG:O	2.17	0.44
1:C:270:ALA:O	1:C:302:MET:HB2	2.17	0.44
2:B:186:THR:HA	2:B:415:MET:CE	2.47	0.44
2:D:293:MET:SD	2:D:365:ALA:HB1	2.57	0.44
2:B:134:GLN:HA	2:B:165:ASN:O	2.18	0.44
2:B:395:LEU:HD23	2:B:395:LEU:HA	1.88	0.44
4:F:96:GLU:OE1	4:F:98:TYR:OH	2.29	0.44
2:B:159:TYR:HB3	2:B:162:ARG:HG2	2.00	0.44
2:D:101:TRP:CE3	2:D:187:LEU:HD13	2.53	0.44
4:F:32:LYS:HE3	4:F:33:ASP:OD2	2.18	0.44
4:F:166:ALA:HA	4:F:169:LEU:HD12	2.00	0.44
4:F:287:ILE:HG13	4:F:327:VAL:HG11	2.00	0.44
2:B:135:LEU:HD22	2:B:152:ILE:HD11	1.99	0.44
4:F:285:LEU:HA	4:F:285:LEU:HD12	1.85	0.44
2:B:189:VAL:HG11	2:B:415:MET:HG3	2.00	0.43
2:B:421[B]:GLU:O	2:B:424:GLN:HB3	2.18	0.43
1:C:55:GLU:HG2	1:C:61:HIS:CD2	2.53	0.43
1:C:84:ARG:HG2	1:C:84:ARG:NH1	2.33	0.43
2:B:280:GLN:CG	2:B:281:TYR:H	2.29	0.43
2:D:21:TRP:CE3	2:D:61:PRO:HB3	2.53	0.43
2:D:216:LYS:O	2:D:217:LEU:HD23	2.18	0.43
1:A:21:TRP:CZ3	1:A:63:PRO:HB3	2.53	0.43
4:F:1:MET:CE	4:F:28:LYS:HB3	2.49	0.43
4:F:244:CYS:SG	4:F:245:ILE:HG13	2.59	0.43
1:C:63:PRO:HG2	1:C:87:PHE:CE1	2.54	0.43
4:F:131:PHE:HE1	4:F:147:TRP:CZ3	2.37	0.42
4:F:150:LYS:HG2	4:F:151:SER:H	1.85	0.42
1:A:174:ALA:O	1:A:178:SER:HB3	2.19	0.42
1:C:14:VAL:HG13	1:C:67:PHE:HD2	1.84	0.42
1:C:320:ARG:HA	1:C:356:ASN:O	2.19	0.42
1:C:416:GLY:O	1:C:420[B]:GLU:HB2	2.19	0.42
2:D:170:MET:HE2	2:D:170:MET:H	1.84	0.42
2:B:102:ALA:HB2	2:B:403:MET:SD	2.59	0.42
4:F:220[A]:VAL:HG12	4:F:263:PHE:CE1	2.55	0.42
1:A:424:ASP:O	1:A:427:ALA:HB3	2.20	0.42
2:D:28:HIS:HA	2:D:43:GLN:HB3	2.01	0.42

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:233:PHE:HE1	4:F:239:HIS:CE1	2.36	0.42
1:A:36:MET:HB2	1:A:36:MET:HE2	1.82	0.42
2:B:213:ARG:O	2:B:216:LYS:HE3	2.19	0.42
2:D:122:LYS:HE3	2:D:122:LYS:HB3	1.83	0.42
2:D:392:LYS:HZ1	2:D:405:GLU:CD	2.22	0.42
1:C:293[A]:ASN:ND2	1:C:339:ARG:HH22	2.18	0.42
2:D:203:ASP:HB2	2:D:301:ALA:HA	2.01	0.42
2:B:239:CYS:O	2:B:248:ALA:HB3	2.20	0.42
4:F:74:LYS:NZ	4:F:150:LYS:HD3	2.35	0.42
4:F:77:LEU:O	4:F:81:ILE:HG13	2.19	0.42
1:A:23:LEU:HD12	1:A:23:LEU:HA	1.86	0.42
2:D:169:VAL:HA	2:D:202:ILE:O	2.20	0.42
4:F:99:VAL:HG12	4:F:127:GLU:OE1	2.19	0.42
4:F:307:LEU:HD12	4:F:307:LEU:HA	1.82	0.42
1:C:112:LYS:NZ	1:C:113:GLU:OE2	2.48	0.41
4:F:217:ARG:HG3	4:F:218:GLU:HG2	2.03	0.41
4:F:242:ASN:N	4:F:242:ASN:OD1	2.53	0.41
1:C:172:TYR:HB3	1:C:205:ASP:HA	2.02	0.41
1:A:217:LEU:HB3	1:A:219:ILE:HD12	2.01	0.41
3:E:128:LYS:O	3:E:132:GLU:HG3	2.20	0.41
3:E:101:LEU:HD12	3:E:101:LEU:HA	1.82	0.41
3:E:128:LYS:HE3	3:E:132:GLU:OE2	2.20	0.41
2:D:8:GLN:NE2	2:D:14:ASN:HA	2.36	0.41
4:F:217:ARG:NH1	4:F:374:ILE:HG22	2.36	0.41
2:B:2:ARG:HG3	2:B:2:ARG:NH1	2.36	0.41
2:D:100:ASN:ND2	2:D:102:ALA:HB3	2.32	0.41
4:F:58:LEU:HD23	4:F:58:LEU:HA	1.90	0.41
2:B:250:LEU:HD23	2:B:250:LEU:HA	1.85	0.41
2:B:151:LEU:O	2:B:155:ILE:HG13	2.21	0.41
2:B:164:MET:HG3	2:B:196:THR:HG22	2.03	0.41
2:B:170:MET:HE2	2:B:170:MET:HB3	1.66	0.41
1:C:254:GLU:HG2	1:C:352:LYS:HE2	2.02	0.41
1:C:406:HIS:CG	2:D:261:PRO:HD3	2.56	0.41
2:D:221:THR:HG23	2:D:224:ASP:H	1.84	0.41
2:D:293:MET:HE3	2:D:293:MET:HB3	1.89	0.41
1:A:36:MET:HB3	1:A:61:HIS:CE1	2.55	0.41
1:C:241:SER:HA	1:C:249:ASN:OD1	2.21	0.41
2:D:89:ASN:HA	2:D:119:VAL:HG11	2.03	0.41
1:A:79:ARG:NH2	1:A:94:THR:HG23	2.35	0.40
1:A:139:HIS:CD2	1:A:150:THR:HG21	2.56	0.40
2:D:178:THR:HB	2:D:181:GLU:HG2	2.04	0.40

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:186:THR:HA	2:D:415:MET:HE1	2.02	0.40
1:A:263:PRO:O	1:A:266:HIS:HD2	2.05	0.40
2:D:47:ILE:HD12	2:D:48:ASN:N	2.36	0.40
2:D:107:THR:HG22	2:D:108:GLU:N	2.36	0.40
4:F:216:TYR:CE2	4:F:218:GLU:HB2	2.55	0.40
1:A:28:HIS:CE1	1:A:243:ARG:HB3	2.57	0.40
1:C:292:THR:HG22	1:C:335:ILE:CD1	2.52	0.40
3:E:116:LEU:HD23	3:E:116:LEU:HA	1.95	0.40
1:C:7:ILE:HD13	1:C:153:LEU:HD21	2.04	0.40
1:C:141:PHE:CE1	1:C:170:SER:HB3	2.57	0.40
2:B:101:TRP:CE3	2:B:187:LEU:HD13	2.56	0.40
2:B:332:ASN:O	2:B:336:LYS:HB2	2.21	0.40
4:F:202:ARG:HB3	4:F:220[A]:VAL:HG22	2.02	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	439/450 (98%)	416 (95%)	23 (5%)	0	100	100
1	C	446/450 (99%)	436 (98%)	10 (2%)	0	100	100
2	B	423/445 (95%)	408 (96%)	15 (4%)	0	100	100
2	D	416/445 (94%)	401 (96%)	15 (4%)	0	100	100
3	E	121/143 (85%)	118 (98%)	3 (2%)	0	100	100
4	F	342/384 (89%)	325 (95%)	17 (5%)	0	100	100
All	All	2187/2317 (94%)	2104 (96%)	83 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	371/378 (98%)	361 (97%)	10 (3%)	44 77
1	C	379/378 (100%)	363 (96%)	16 (4%)	30 62
2	B	369/383 (96%)	358 (97%)	11 (3%)	41 73
2	D	362/383 (94%)	352 (97%)	10 (3%)	43 76
3	E	112/127 (88%)	105 (94%)	7 (6%)	18 44
4	F	314/342 (92%)	296 (94%)	18 (6%)	20 49
All	All	1907/1991 (96%)	1835 (96%)	72 (4%)	36 65

All (72) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	MET
1	A	71	GLU
1	A	120[A]	ASP
1	A	120[B]	ASP
1	A	193[A]	THR
1	A	193[B]	THR
1	A	256	GLN
1	A	263	PRO
1	A	264	ARG
1	A	336	LYS
2	B	2	ARG
2	B	48	ASN
2	B	55	THR
2	B	58	LYS
2	B	75	SER
2	B	124	SER
2	B	128	ASP
2	B	137	HIS
2	B	214	THR
2	B	296	SER
2	B	320	ARG
1	C	71	GLU

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	C	164	LYS
1	C	165[A]	SER
1	C	165[B]	SER
1	C	221	ARG
1	C	241	SER
1	C	250	VAL
1	C	251	ASP
1	C	284	GLU
1	C	315[A]	CYS
1	C	315[B]	CYS
1	C	338	LYS
1	C	339	ARG
1	C	342	GLN
1	C	347[A]	CYS
1	C	347[B]	CYS
2	D	45	GLU
2	D	58	LYS
2	D	86	ARG
2	D	88	ASP
2	D	137	HIS
2	D	177	ASP
2	D	218	THR
2	D	251	ARG
2	D	285	THR
2	D	391	ARG
3	E	13	LYS
3	E	103	GLN
3	E	107	SER
3	E	124	GLN
3	E	127	ASP
3	E	138	GLU
3	E	140	LYS
4	F	12	SER
4	F	28	LYS
4	F	32	LYS
4	F	33	ASP
4	F	46	ARG
4	F	76	SER
4	F	137	ARG
4	F	142	ARG
4	F	152	SER
4	F	183	GLN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
4	F	211	TYR
4	F	222	ARG
4	F	232	ASN
4	F	235	ASP
4	F	240	LEU
4	F	296[A]	MET
4	F	296[B]	MET
4	F	373	SER

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

Mol	Chain	Res	Type
1	A	88	HIS
2	B	165	ASN
1	C	133	GLN
2	D	11	GLN
2	D	48	ASN
2	D	99	ASN
2	D	100	ASN
2	D	384	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 14 ligands modelled in this entry, 6 are monoatomic - leaving 8 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
11	GY2	D	502	-	24,24,24	1.64	4 (16%)	32,34,34	2.89	11 (34%)
9	GDP	B	501	6	24,30,30	1.13	2 (8%)	30,47,47	1.14	5 (16%)
5	GTP	A	501	6	26,34,34	1.19	2 (7%)	32,54,54	1.57	7 (21%)
5	GTP	C	501	6	26,34,34	1.22	2 (7%)	32,54,54	1.42	3 (9%)
10	MES	B	504	2	12,12,12	2.16	2 (16%)	14,16,16	1.95	4 (28%)
10	MES	B	503	-	12,12,12	2.38	1 (8%)	14,16,16	2.08	4 (28%)
11	GY2	B	505	-	24,24,24	1.61	5 (20%)	32,34,34	2.47	10 (31%)
9	GDP	D	501	-	24,30,30	0.91	1 (4%)	30,47,47	2.26	8 (26%)

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
11	GY2	D	502	-	-	0/10/10/10	0/3/3/3
9	GDP	B	501	6	-	5/12/32/32	0/3/3/3
5	GTP	A	501	6	-	8/18/38/38	0/3/3/3
5	GTP	C	501	6	-	9/18/38/38	0/3/3/3
10	MES	B	504	2	-	2/6/14/14	0/1/1/1
10	MES	B	503	-	-	5/6/14/14	0/1/1/1
11	GY2	B	505	-	-	0/10/10/10	0/3/3/3
9	GDP	D	501	-	-	4/12/32/32	0/3/3/3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	B	503	MES	C8-S	-7.92	1.66	1.77
10	B	504	MES	C8-S	-6.39	1.68	1.77
11	D	502	GY2	C08-N07	4.60	1.33	1.30
11	B	505	GY2	C08-N07	4.60	1.33	1.30
5	A	501	GTP	C5-C6	-3.80	1.39	1.47
5	C	501	GTP	C5-C6	-3.70	1.39	1.47

*Continued on next page...*



Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	B	504	MES	O2S-S	3.32	1.54	1.45
11	D	502	GY2	C05-C04	-3.16	1.37	1.42
9	B	501	GDP	C2'-C1'	-2.91	1.49	1.53
11	B	505	GY2	C10-N11	2.65	1.45	1.39
11	D	502	GY2	C10-N11	2.64	1.45	1.39
11	B	505	GY2	C05-C04	-2.48	1.38	1.42
11	D	502	GY2	C02-C01	2.39	1.41	1.37
11	B	505	GY2	C06-C01	2.25	1.39	1.36
9	D	501	GDP	C2-N3	2.19	1.38	1.33
9	B	501	GDP	O6-C6	2.08	1.27	1.23
5	C	501	GTP	C2'-C1'	-2.07	1.50	1.53
5	A	501	GTP	C5-C4	-2.04	1.37	1.43
11	B	505	GY2	C03-C02	2.03	1.40	1.36

All (52) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	D	502	GY2	N07-C08-N09	-10.76	119.78	130.62
11	B	505	GY2	N07-C08-N09	-9.92	120.63	130.62
11	D	502	GY2	CL1-C08-N07	6.58	121.32	115.70
9	D	501	GDP	C2-N1-C6	-6.20	113.69	125.10
9	D	501	GDP	O6-C6-C5	-5.20	114.22	124.37
9	D	501	GDP	C5-C6-N1	4.77	122.37	113.95
10	B	503	MES	O3S-S-C8	4.49	113.03	105.77
10	B	503	MES	C5-N4-C3	4.23	118.35	108.83
11	B	505	GY2	CL1-C08-N07	4.21	119.30	115.70
11	D	502	GY2	C05-C04-N07	-4.13	118.43	122.81
10	B	504	MES	C5-N4-C3	3.74	117.25	108.83
5	C	501	GTP	C8-N7-C5	3.71	110.06	102.99
11	B	505	GY2	C08-N09-C10	3.59	121.69	111.04
9	D	501	GDP	O4'-C1'-C2'	-3.57	101.71	106.93
5	A	501	GTP	PA-O3A-PB	-3.49	120.85	132.83
11	D	502	GY2	C02-C01-C06	-3.48	119.39	123.23
11	D	502	GY2	C08-N09-C10	3.46	121.30	111.04
11	B	505	GY2	CL1-C08-N09	3.44	120.06	115.15
5	A	501	GTP	N2-C2-N1	3.43	124.01	116.71
11	D	502	GY2	C06-C05-C10	-3.36	121.41	124.94
5	A	501	GTP	C8-N7-C5	3.25	109.17	102.99
5	C	501	GTP	PA-O3A-PB	-3.23	121.75	132.83
11	D	502	GY2	C03-C04-N07	3.11	123.43	118.69
10	B	504	MES	C7-N4-C3	3.10	119.16	111.23
9	D	501	GDP	C8-N7-C5	3.06	108.82	102.99

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	D	501	GDP	N2-C2-N3	-3.05	113.79	119.74
11	B	505	GY2	C05-C04-N07	-2.99	119.64	122.81
10	B	504	MES	O2S-S-C8	2.97	110.49	106.92
11	D	502	GY2	C01-C06-C05	2.95	121.11	118.80
5	C	501	GTP	PB-O3B-PG	-2.91	122.85	132.83
11	B	505	GY2	N09-C10-N11	2.86	119.09	116.09
11	D	502	GY2	F22-C01-C02	2.74	123.19	118.54
11	D	502	GY2	N09-C10-N11	2.68	118.89	116.09
5	A	501	GTP	C2-N1-C6	-2.66	120.19	125.10
10	B	504	MES	C7-N4-C5	2.65	118.01	111.23
5	A	501	GTP	O6-C6-C5	-2.65	119.19	124.37
11	D	502	GY2	CL1-C08-N09	2.63	118.90	115.15
10	B	503	MES	C7-N4-C5	2.61	117.91	111.23
11	B	505	GY2	C02-C01-C06	-2.60	120.36	123.23
5	A	501	GTP	C5-C6-N1	2.50	118.37	113.95
11	B	505	GY2	C01-C06-C05	2.43	120.70	118.80
10	B	503	MES	C7-N4-C3	2.34	117.22	111.23
9	D	501	GDP	O6-C6-N1	2.33	123.40	120.65
9	B	501	GDP	C5-C6-N1	2.33	118.06	113.95
9	D	501	GDP	PA-O3A-PB	-2.29	124.95	132.83
5	A	501	GTP	PB-O3B-PG	-2.27	125.05	132.83
9	B	501	GDP	PA-O3A-PB	-2.18	125.35	132.83
11	B	505	GY2	C06-C05-C10	-2.16	122.67	124.94
9	B	501	GDP	C8-N7-C5	2.11	107.02	102.99
9	B	501	GDP	O2B-PB-O3A	2.10	111.69	104.64
11	B	505	GY2	C18-C13-N11	2.07	123.35	120.46
9	B	501	GDP	O3'-C3'-C4'	-2.02	105.21	111.05

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	501	GTP	C5'-O5'-PA-O1A
9	B	501	GDP	C5'-O5'-PA-O1A
9	B	501	GDP	C5'-O5'-PA-O2A
9	D	501	GDP	C5'-O5'-PA-O1A
9	D	501	GDP	C5'-O5'-PA-O2A
10	B	503	MES	C8-C7-N4-C5
10	B	503	MES	C7-C8-S-O1S
10	B	503	MES	C7-C8-S-O3S
10	B	504	MES	C8-C7-N4-C3
10	B	504	MES	C8-C7-N4-C5

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
5	C	501	GTP	C3'-C4'-C5'-O5'
10	B	503	MES	C8-C7-N4-C3
5	C	501	GTP	O4'-C4'-C5'-O5'
5	C	501	GTP	PB-O3B-PG-O1G
9	D	501	GDP	PA-O3A-PB-O3B
5	A	501	GTP	C5'-O5'-PA-O3A
9	D	501	GDP	C5'-O5'-PA-O3A
5	A	501	GTP	C5'-O5'-PA-O2A
5	C	501	GTP	C5'-O5'-PA-O1A
5	C	501	GTP	C5'-O5'-PA-O2A
10	B	503	MES	C7-C8-S-O2S
5	A	501	GTP	PB-O3A-PA-O2A
5	C	501	GTP	PB-O3A-PA-O2A
9	B	501	GDP	PB-O3A-PA-O2A
5	A	501	GTP	PB-O3B-PG-O2G
5	A	501	GTP	PB-O3B-PG-O3G
5	C	501	GTP	PB-O3B-PG-O2G
5	C	501	GTP	PB-O3B-PG-O3G
5	C	501	GTP	C5'-O5'-PA-O3A
9	B	501	GDP	C5'-O5'-PA-O3A
5	A	501	GTP	PB-O3A-PA-O1A
9	B	501	GDP	PB-O3A-PA-O1A
5	A	501	GTP	PB-O3B-PG-O1G

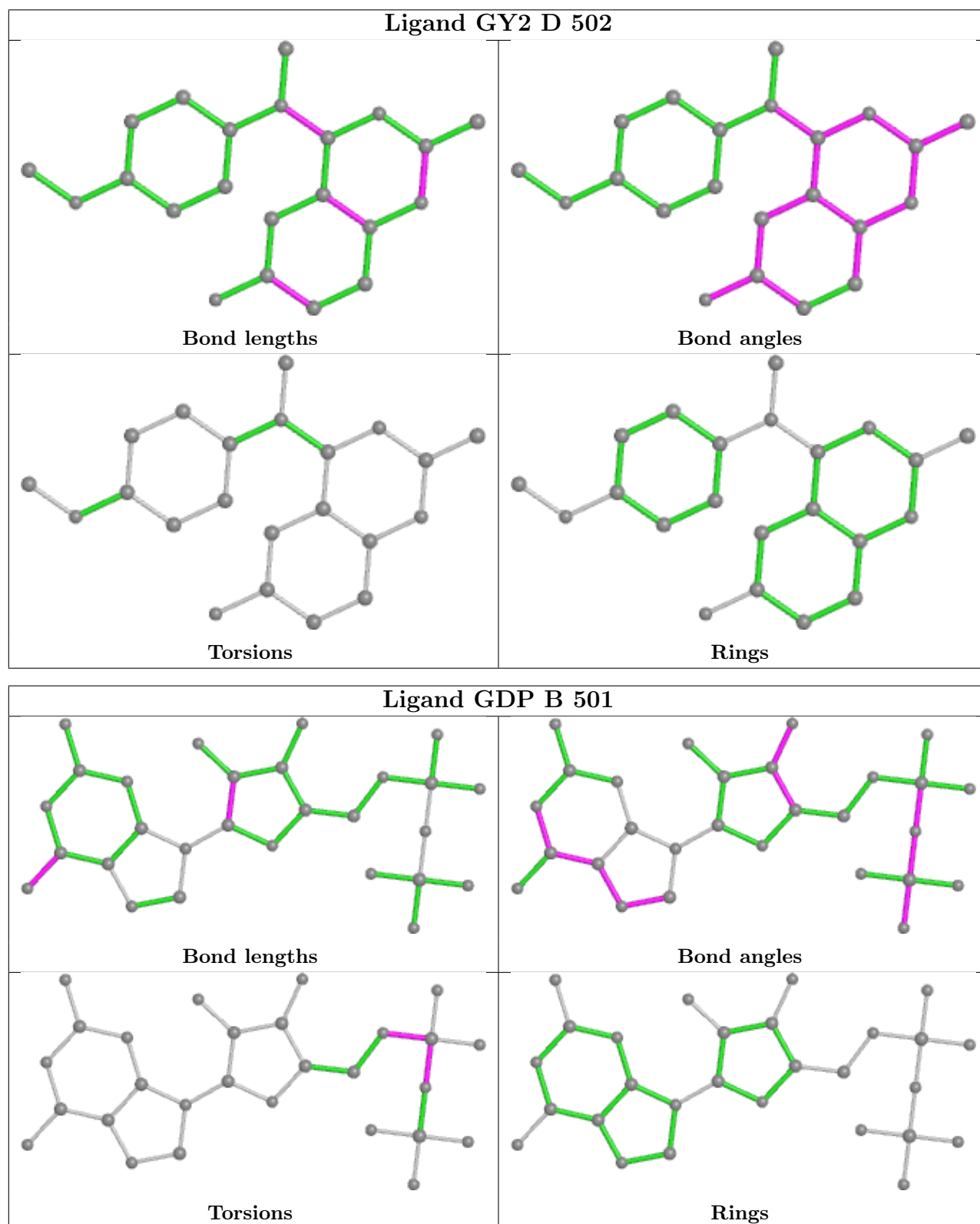
There are no ring outliers.

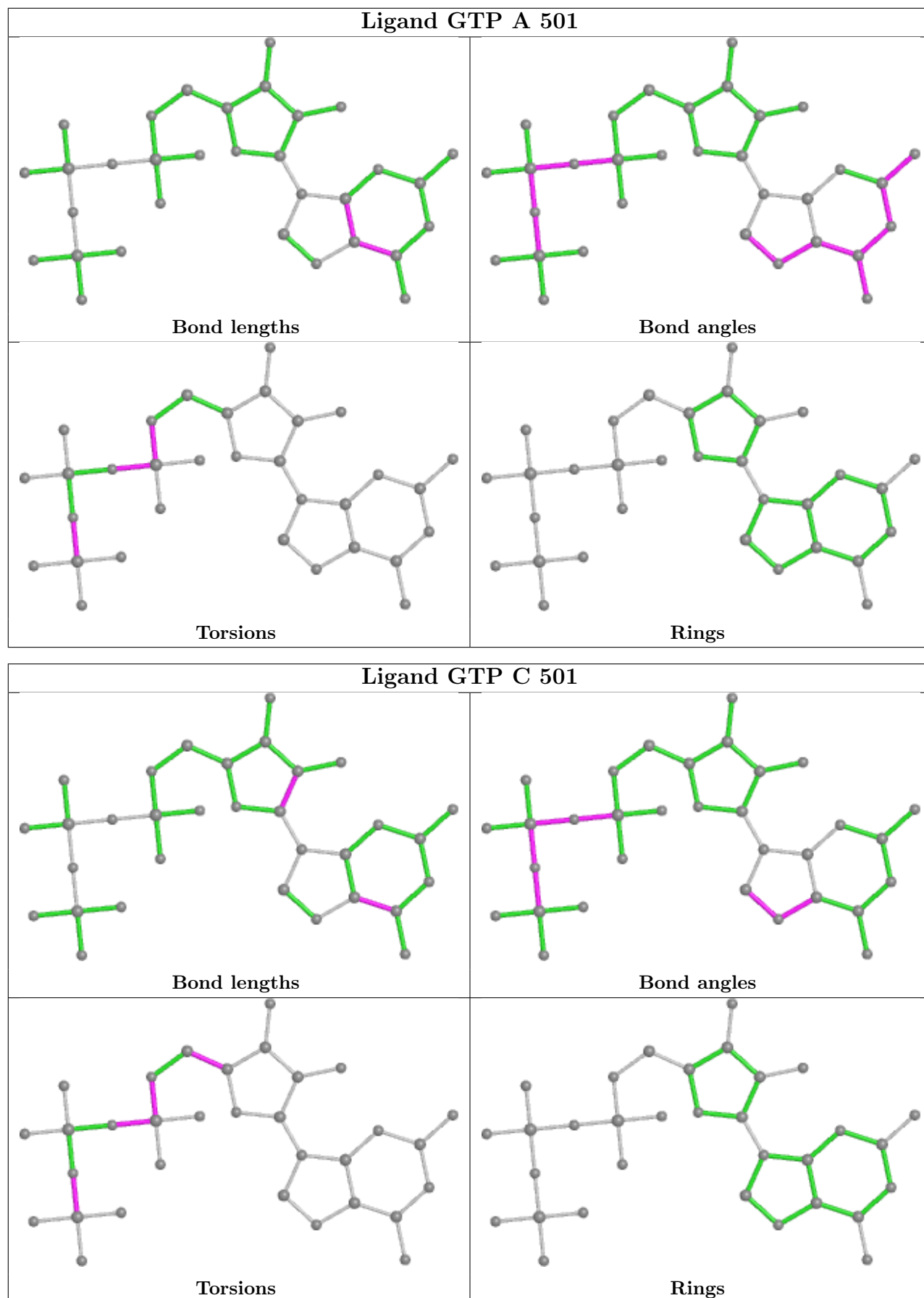
3 monomers are involved in 4 short contacts:

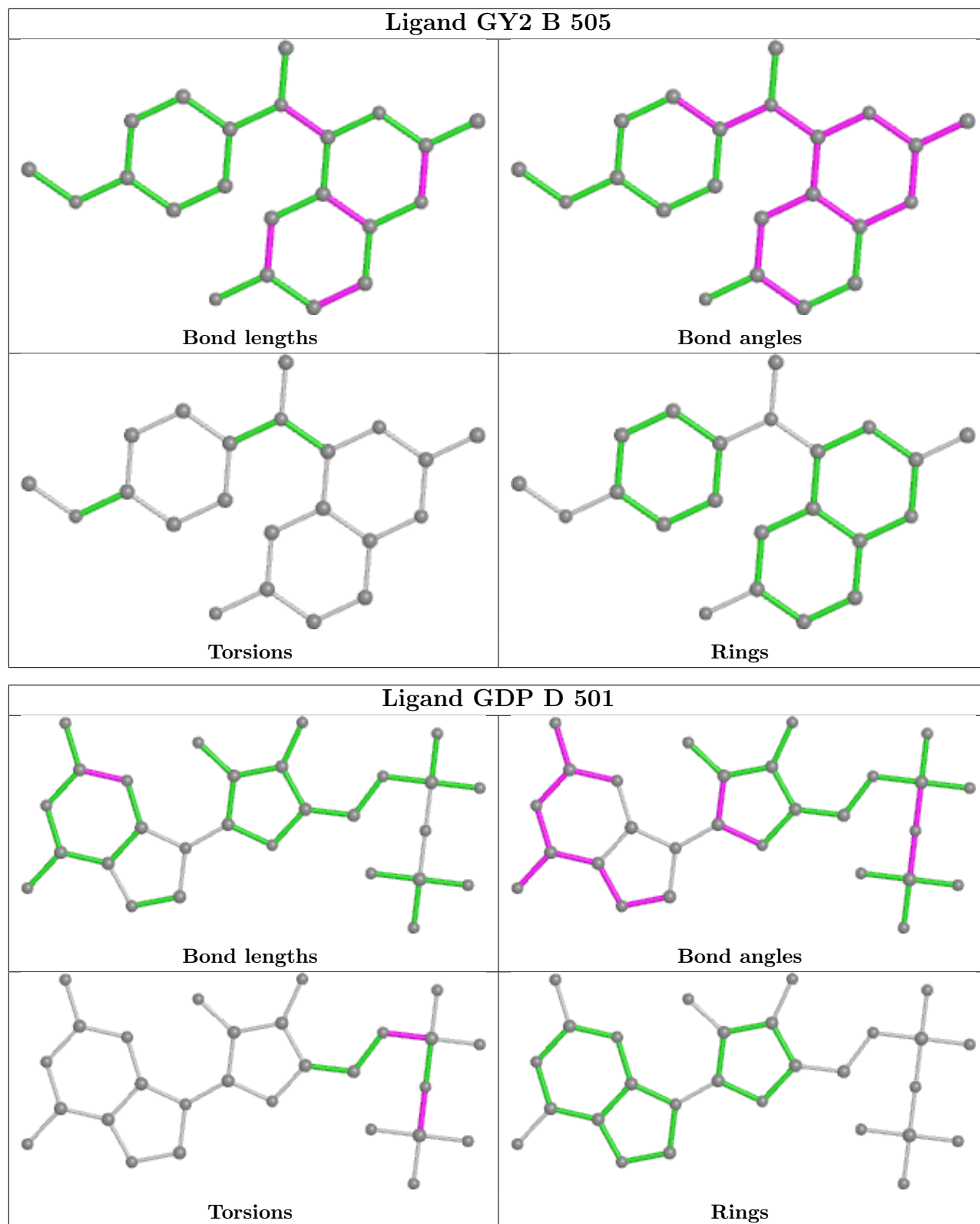
Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	D	502	GY2	1	0
10	B	503	MES	1	0
9	D	501	GDP	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier.

The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.







## 5.7 Other polymers [\(i\)](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	437/450 (97%)	-0.23	5 (1%) 80 75	25, 40, 65, 81	0
1	C	440/450 (97%)	-0.37	0 100 100	16, 32, 53, 69	0
2	B	424/445 (95%)	-0.19	4 (0%) 84 80	20, 40, 71, 104	1 (0%)
2	D	420/445 (94%)	0.16	20 (4%) 30 21	26, 58, 88, 107	1 (0%)
3	E	123/143 (86%)	0.09	4 (3%) 46 36	29, 54, 90, 116	0
4	F	346/384 (90%)	0.78	70 (20%) 1 0	31, 63, 127, 145	0
All	All	2190/2317 (94%)	0.00	103 (4%) 31 22	16, 45, 92, 145	2 (0%)

All (103) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	F	169	LEU	7.0
2	D	55	THR	5.6
4	F	172	PHE	5.3
4	F	161	LEU	5.2
4	F	149	ALA	5.2
4	F	240	LEU	5.1
4	F	167	SER	5.1
4	F	160	ILE	5.0
4	F	244	CYS	4.8
4	F	182	ILE	4.8
4	F	135	TYR	4.7
4	F	231	ALA	4.7
2	B	55	THR	4.6
4	F	225	SER	4.4
4	F	234	GLN	4.4
4	F	249	TYR	4.4
4	F	103	THR	4.3
4	F	232	ASN	4.3
4	F	248	GLU	4.2

*Continued on next page...*



*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
4	F	132	LEU	4.2
4	F	251	LYS	4.2
4	F	102	PRO	4.2
4	F	142	ARG	4.1
4	F	233	PHE	4.1
4	F	173	ILE	4.1
4	F	243	HIS	4.1
4	F	250	SER	4.1
4	F	253	TYR	4.0
4	F	171	ASP	4.0
4	F	100	ILE	3.9
4	F	139	ARG	3.9
4	F	242	ASN	3.8
4	F	147	TRP	3.8
4	F	239	HIS	3.8
2	D	37	HIS	3.7
4	F	175	GLU	3.7
4	F	236	LYS	3.6
4	F	252	ASN	3.6
4	F	177	GLY	3.6
2	B	428	ALA	3.6
4	F	229	ASN	3.5
1	A	262	TYR	3.4
4	F	20	LEU	3.4
4	F	247	LYS	3.4
3	E	139	LEU	3.4
4	F	224	SER	3.4
2	D	95	SER	3.3
4	F	159	GLY	3.3
4	F	245	ILE	3.3
4	F	163	SER	3.2
4	F	150	LYS	3.2
4	F	99	VAL	3.1
2	D	73	MET	3.1
4	F	259	GLY	3.1
2	D	405	GLU	3.1
4	F	165	GLU	3.0
4	F	148	ILE	3.0
4	F	146	VAL	3.0
2	D	395	LEU	3.0
4	F	162	ILE	2.9
4	F	104	ASN	2.9

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
4	F	168	GLU	2.9
4	F	235	ASP	2.9
2	D	54	ALA	2.9
4	F	176	GLN	2.8
2	D	390	ARG	2.8
4	F	372	THR	2.8
4	F	164	SER	2.8
4	F	131	PHE	2.7
4	F	152	SER	2.7
2	D	404	ASP	2.7
2	D	180	VAL	2.7
1	A	88	HIS	2.7
4	F	180	HIS	2.7
2	D	71	GLY	2.7
4	F	255[A]	ARG	2.7
2	D	39	ASP	2.7
2	D	101	TRP	2.6
3	E	7	GLU	2.6
2	D	56	GLY	2.6
4	F	136	ASN	2.6
2	D	92	PHE	2.6
4	F	237	THR	2.5
4	F	178	GLN	2.5
1	A	57	GLY	2.5
4	F	158	GLU	2.5
4	F	170	LEU	2.5
2	B	427	ASP	2.5
4	F	223	THR	2.5
2	D	400	GLY	2.4
4	F	179	VAL	2.4
4	F	181	VAL	2.4
2	D	80	PRO	2.3
1	A	59	GLY	2.3
3	E	48	GLU	2.2
4	F	174	ASP	2.2
2	B	37	HIS	2.2
4	F	334	GLY	2.2
3	E	28	SER	2.1
2	D	219	THR	2.1
2	D	103	LYS	2.1
1	A	346	TRP	2.1
2	D	44	LEU	2.1

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

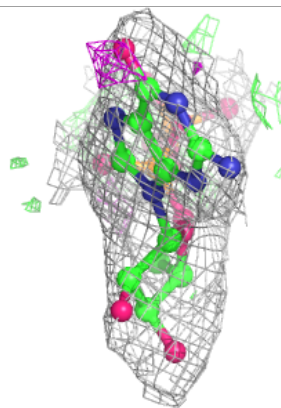
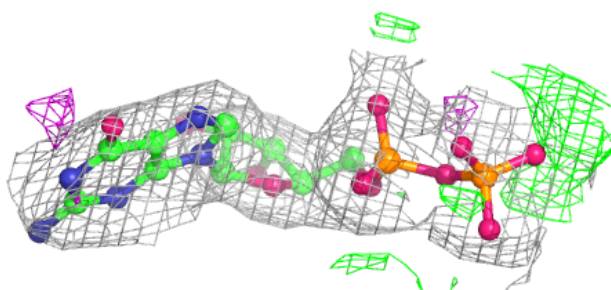
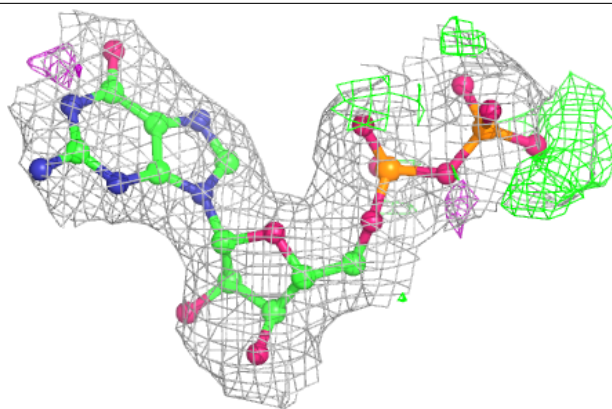
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
6	MG	B	502	1/1	0.89	0.33	33,33,33,33	0
8	CL	A	504	1/1	0.90	0.13	77,77,77,77	0
6	MG	C	502	1/1	0.93	0.42	36,36,36,36	0
9	GDP	D	501	28/28	0.93	0.16	46,57,67,71	0
10	MES	B	504	12/12	0.93	0.20	52,61,76,79	0
11	GY2	D	502	22/22	0.93	0.23	28,42,55,188	0
11	GY2	B	505	22/22	0.95	0.21	28,35,45,138	0
7	CA	C	503	1/1	0.95	0.08	43,43,43,43	0
6	MG	A	502	1/1	0.97	0.56	34,34,34,34	0
5	GTP	A	501	32/32	0.97	0.18	24,31,39,43	0
10	MES	B	503	12/12	0.97	0.21	31,48,66,72	0
9	GDP	B	501	28/28	0.98	0.14	21,28,32,41	0
5	GTP	C	501	32/32	0.98	0.16	23,27,31,34	0
7	CA	A	503	1/1	0.98	0.05	68,68,68,68	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.

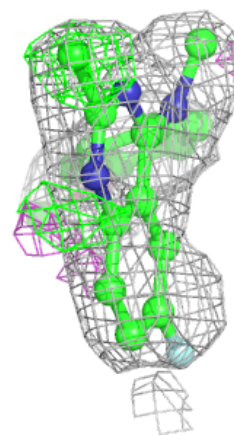
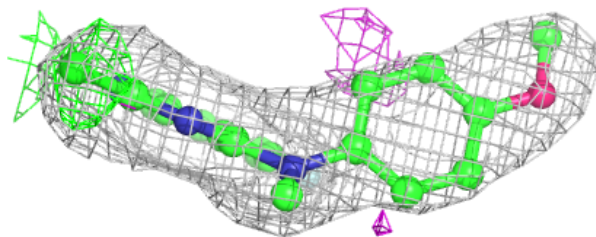
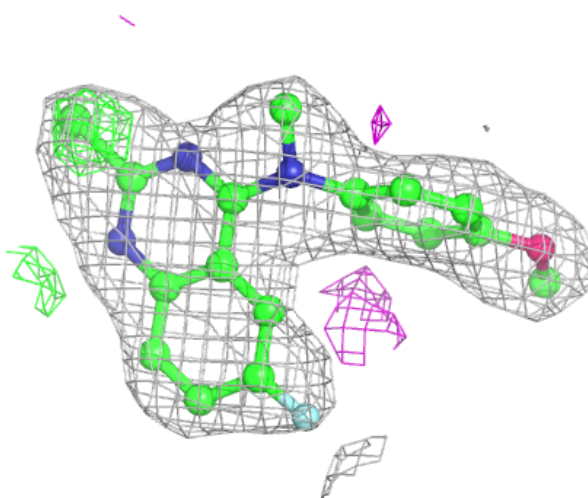
**Electron density around GDP D 501:**

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



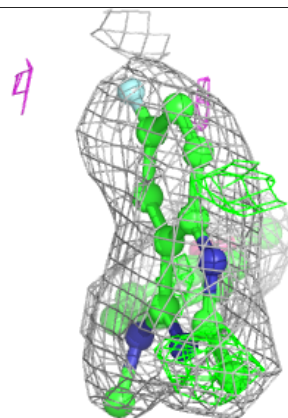
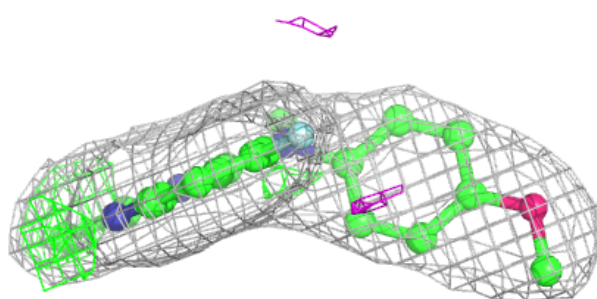
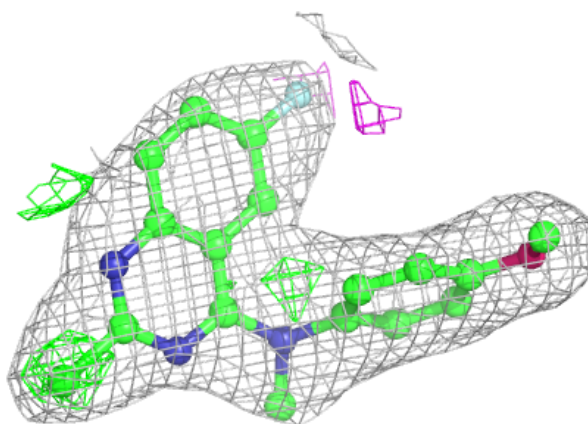
**Electron density around GY2 D 502:**

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

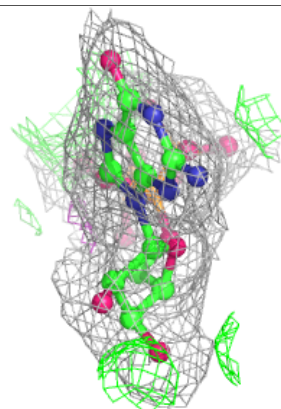
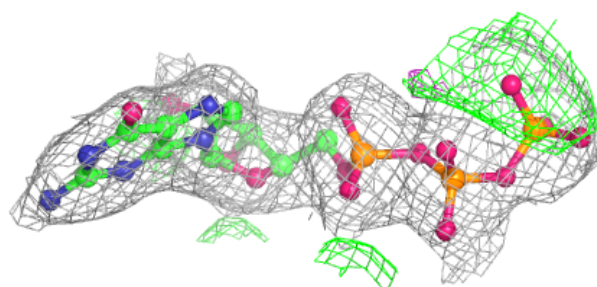
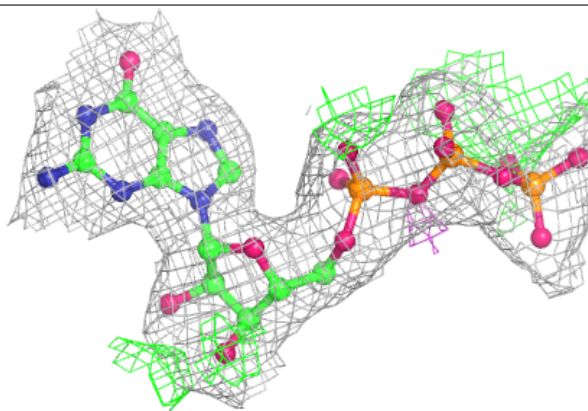


**Electron density around GY2 B 505:**

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

**Electron density around GTP A 501:**

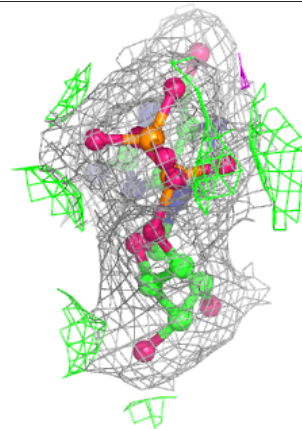
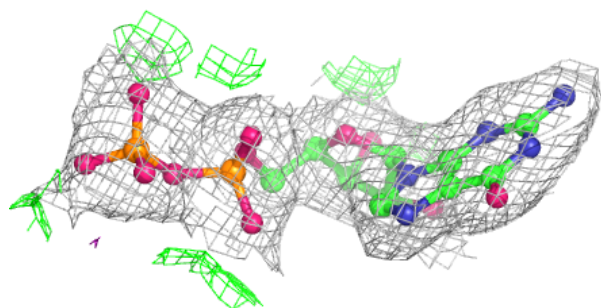
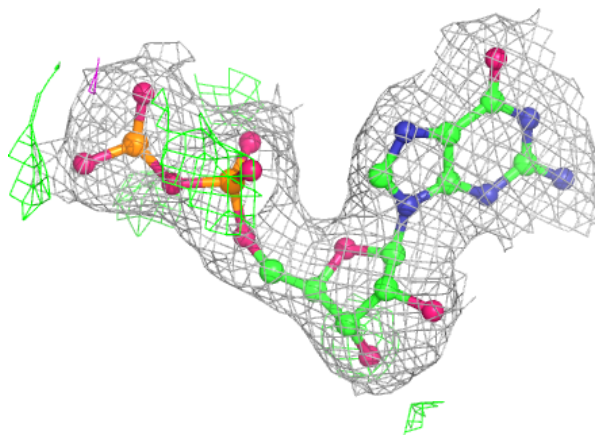
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



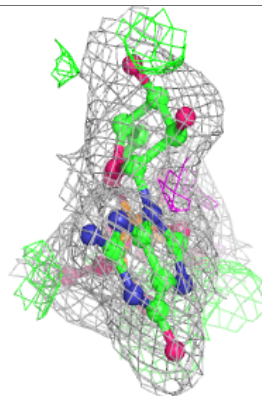
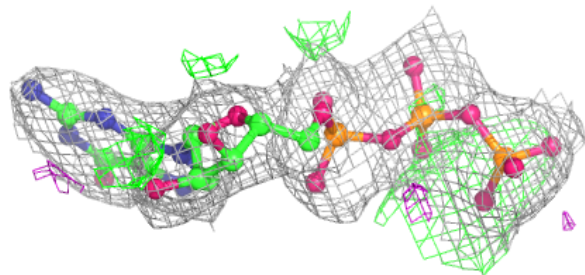
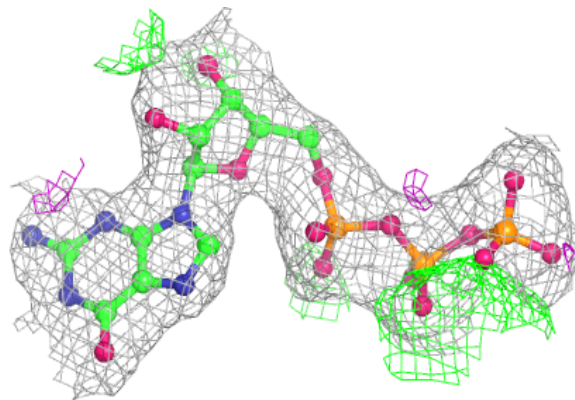


**Electron density around GDP B 501:**

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

**Electron density around GTP C 501:**

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



## 6.5 Other polymers [i](#)

There are no such residues in this entry.