



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 15, 2023 – 07:16 pm BST

PDB ID : 8B7B
Title : Tubulin - maytansinoid - 6 complex
Authors : Boiarska, Z.; Perez-Pena, H.; Abel, A.-C.; Marzullo, P.; Alvarez-Bernad, B.; Bonato, F.; Santini, B.; Horvath, D.; Lucena-Agell, D.; Vasile, F.; Sironi, M.; Diaz, J.F.; Steinmetz, M.O.; Prota, A.E.; Pieraccini, S.; Passarella, D.
Deposited on : 2022-09-29
Resolution : 2.25 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : 2.35
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35

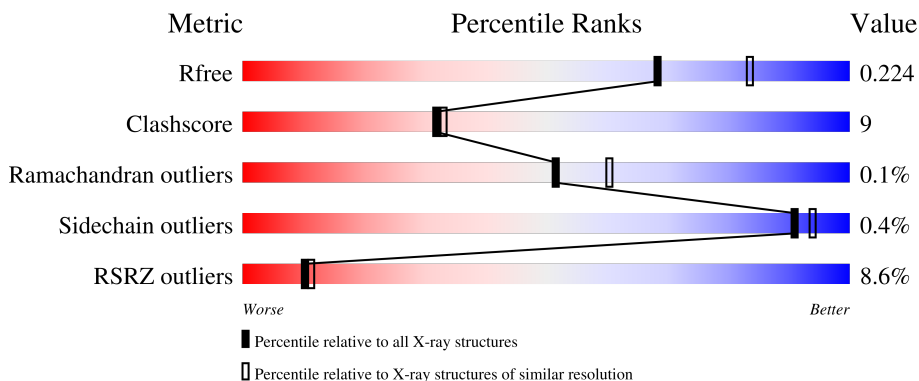
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

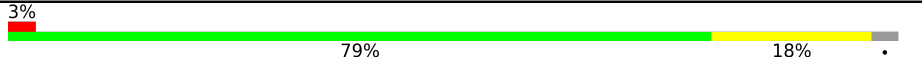



The reported resolution of this entry is 2.25 Å.

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



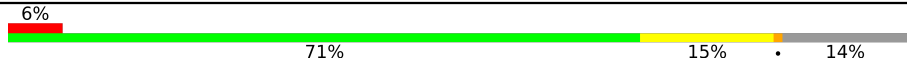

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1377 (2.26-2.26)
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)
RSRZ outliers	127900	1356 (2.26-2.26)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	451	 3% 79% 18% .
1	C	451	 % 80% 17% .
2	B	445	 4% 75% 21% .
2	D	445	 8% 71% 24% .

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	E	143	
4	F	384	

2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 18322 atoms, of which 8 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	438	Total	C	N	O	S	0	1	0
			3427	2169	582	653	23			
1	C	440	Total	C	N	O	S	0	8	0
			3478	2200	588	665	25			

- Molecule 2 is a protein called Tubulin beta-2B chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	425	Total	C	N	O	S	0	1	0
			3357	2109	574	647	27			
2	D	426	Total	C	N	O	S	0	1	0
			3354	2104	574	649	27			

- 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
			1029	634	187	203	5			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	3	MET	-	initiating methionine	UNP P63043
E	4	ALA	-	expression tag	UNP P63043

- Molecule 4 is a protein called Tubulin tyrosine ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	F	328	Total	C	N	O	S	0	1	0
			2704	1738	461	490	15			

There are 39 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	?	-	ALA	deletion	UNP A0A8V0Z8P0
F	?	-	GLU	deletion	UNP A0A8V0Z8P0
F	?	-	MET	deletion	UNP A0A8V0Z8P0
F	?	-	GLN	deletion	UNP A0A8V0Z8P0
F	?	-	GLN	deletion	UNP A0A8V0Z8P0
F	?	-	GLN	deletion	UNP A0A8V0Z8P0
F	?	-	LEU	deletion	UNP A0A8V0Z8P0
F	?	-	LEU	deletion	UNP A0A8V0Z8P0
F	?	-	GLU	deletion	UNP A0A8V0Z8P0
F	?	-	GLY	deletion	UNP A0A8V0Z8P0
F	?	-	ASP	deletion	UNP A0A8V0Z8P0
F	?	-	GLN	deletion	UNP A0A8V0Z8P0
F	?	-	THR	deletion	UNP A0A8V0Z8P0
F	?	-	LEU	deletion	UNP A0A8V0Z8P0
F	?	-	VAL	deletion	UNP A0A8V0Z8P0
F	?	-	LEU	deletion	UNP A0A8V0Z8P0
F	?	-	ALA	deletion	UNP A0A8V0Z8P0
F	?	-	SER	deletion	UNP A0A8V0Z8P0
F	?	-	SER	deletion	UNP A0A8V0Z8P0
F	?	-	THR	deletion	UNP A0A8V0Z8P0
F	?	-	HIS	deletion	UNP A0A8V0Z8P0
F	?	-	PRO	deletion	UNP A0A8V0Z8P0
F	?	-	GLU	deletion	UNP A0A8V0Z8P0
F	?	-	SER	deletion	UNP A0A8V0Z8P0
F	?	-	VAL	deletion	UNP A0A8V0Z8P0
F	?	-	ASP	deletion	UNP A0A8V0Z8P0
F	?	-	SER	deletion	UNP A0A8V0Z8P0
F	?	-	ASP	deletion	UNP A0A8V0Z8P0
F	?	-	LYS	deletion	UNP A0A8V0Z8P0
F	?	-	ASN	deletion	UNP A0A8V0Z8P0
F	?	-	HIS	deletion	UNP A0A8V0Z8P0
F	?	-	GLY	deletion	UNP A0A8V0Z8P0
F	?	-	PHE	deletion	UNP A0A8V0Z8P0
F	379	HIS	-	expression tag	UNP A0A8V0Z8P0
F	380	HIS	-	expression tag	UNP A0A8V0Z8P0
F	381	HIS	-	expression tag	UNP A0A8V0Z8P0
F	382	HIS	-	expression tag	UNP A0A8V0Z8P0
F	383	HIS	-	expression tag	UNP A0A8V0Z8P0
F	384	HIS	-	expression tag	UNP A0A8V0Z8P0

- 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
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
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		
6	D	1	Total	Mg	0	0
			1	1		
6	F	1	Total	Mg	0	0
			1	1		

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

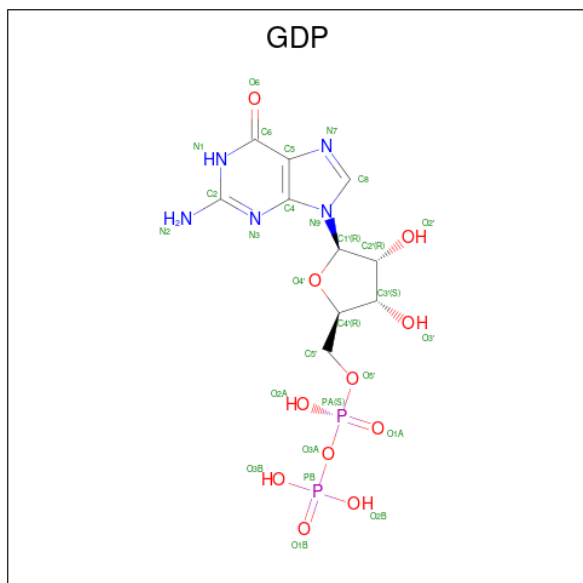
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Ca	0	0
			1	1		
7	B	2	Total	Ca	0	0
			2	2		

Continued on next page...

Continued from previous page...

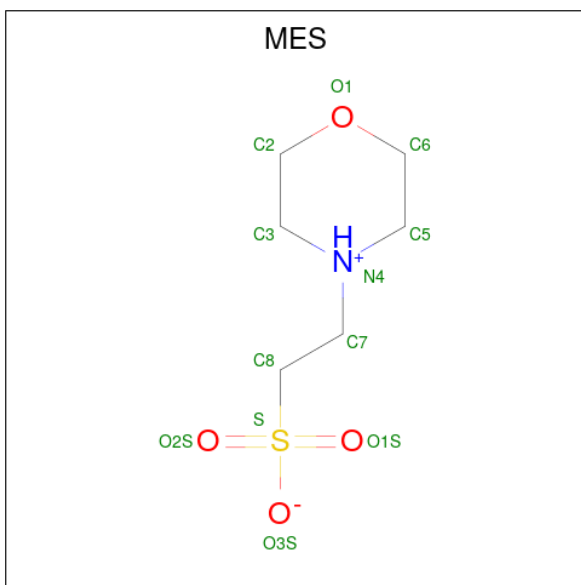
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	C	1	Total Ca 1 1	0	0
7	E	1	Total Ca 1 1	0	0

- Molecule 8 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).



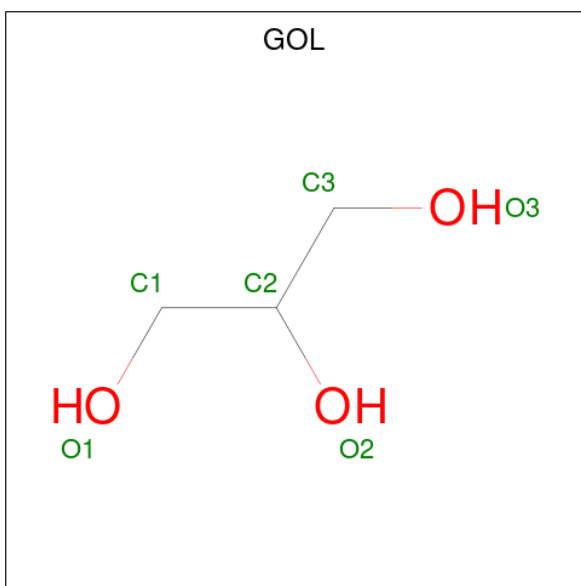
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	1	Total C N O P 28 10 5 11 2	0	0
8	D	1	Total C N O P 28 10 5 11 2	0	0

- Molecule 9 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: $C_6H_{13}NO_4S$).



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

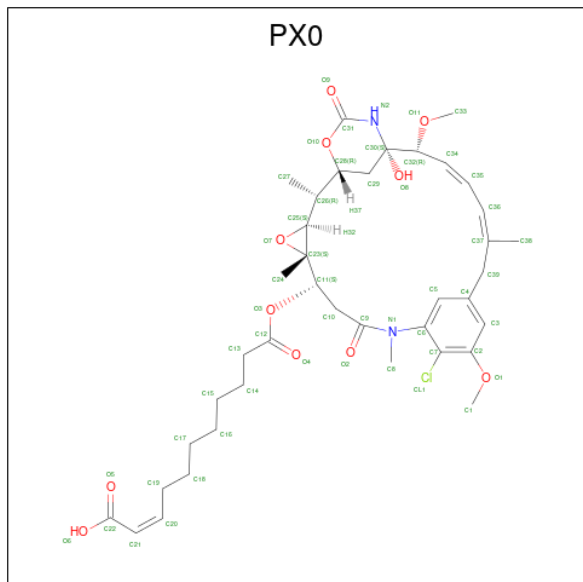
- Molecule 10 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
10	C	1	14	3	8	3	0	0

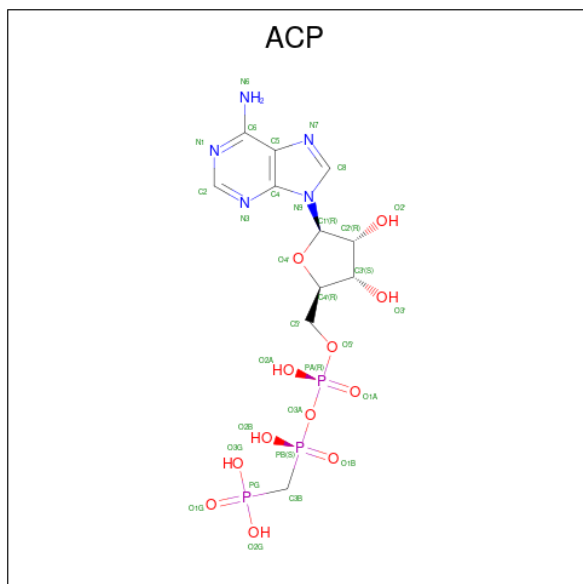
- Molecule 11 is ({Z})-11-[[(1 {R}, 2 {R}, 3 {S}, 5 {S}, 6 {S}, 16 {E}, 18 {E}, 20 {R}, 21 {S})-11-chloranyl-12,20-dimethoxy-2,5,9,16-tetramethyl-21-oxidanyl-8,23-bis(oxidanylidene)-4,24-dioxa-9,22-diazatetracyclo[19.3.1.1[^]{10,14}.0[^]{3,5}]hexacosa-10(26),11,13,16,18-

pentaen-6-yl]oxy]-11-oxidanylidene-undec-2-enoic acid (three-letter code: PX0) (formula: $C_{39}H_{53}ClN_2O_{11}$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Cl	N	O		
11	D	1	53	39	1	2	11	0	0

- Molecule 12 is PHOSPHOMETHYLPHOSPHONIC ACID ADENYLATE ESTER (three-letter code: ACP) (formula: $C_{11}H_{18}N_5O_{12}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
12	F	1	31	11	5	12	3	0	0

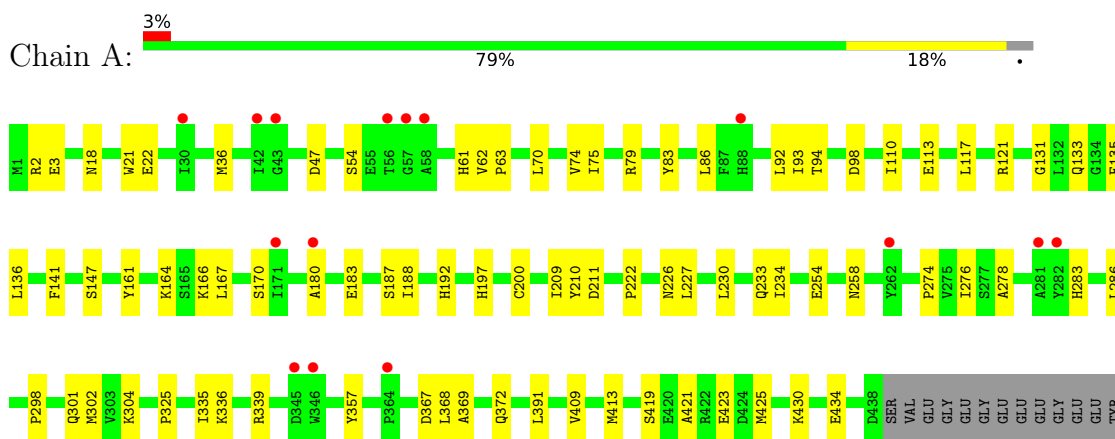
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	123	Total 123	O 123	0	0
13	B	187	Total 187	O 187	0	0
13	C	280	Total 280	O 280	0	0
13	D	83	Total 83	O 83	0	0
13	E	26	Total 26	O 26	0	0
13	F	34	Total 34	O 34	0	0

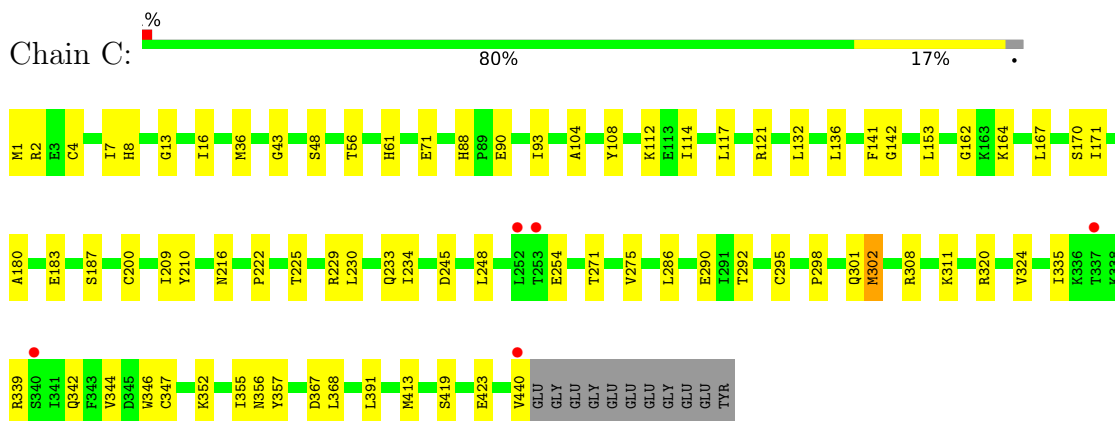
3 Residue-property plots [i](#)

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.

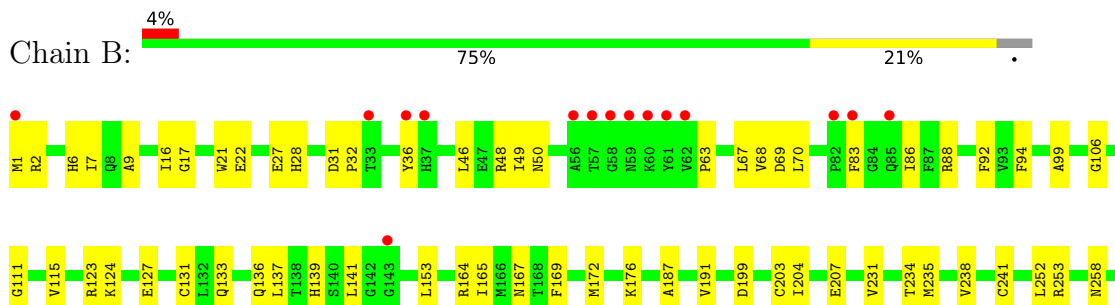
- Molecule 1: Tubulin alpha-1B chain

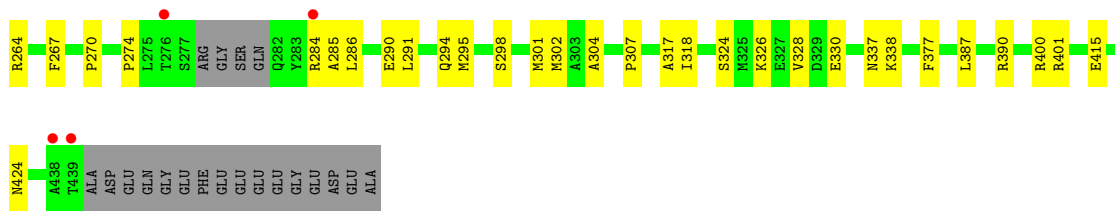


- Molecule 1: Tubulin alpha-1B chain

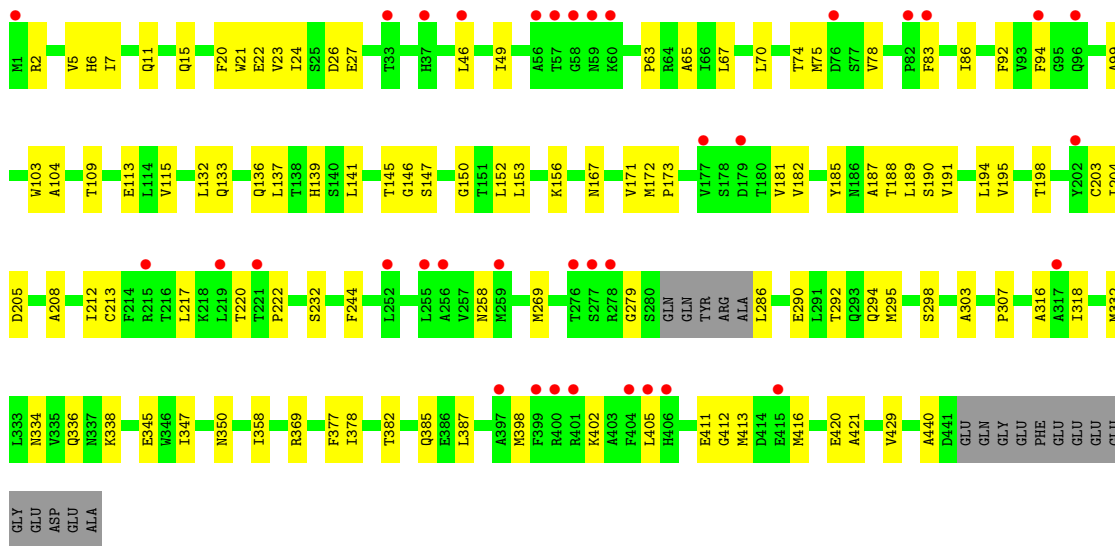


- Molecule 2: Tubulin beta-2B chain

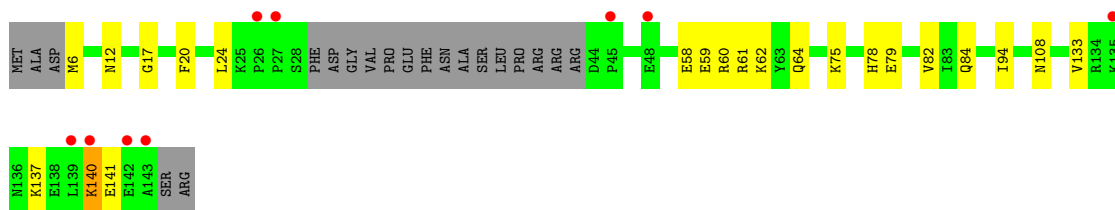




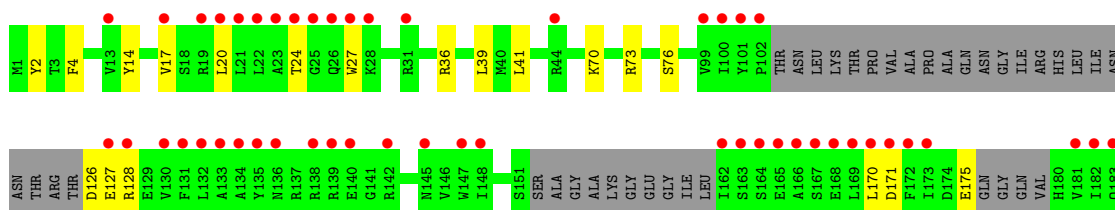
• Molecule 2: Tubulin beta-2B chain

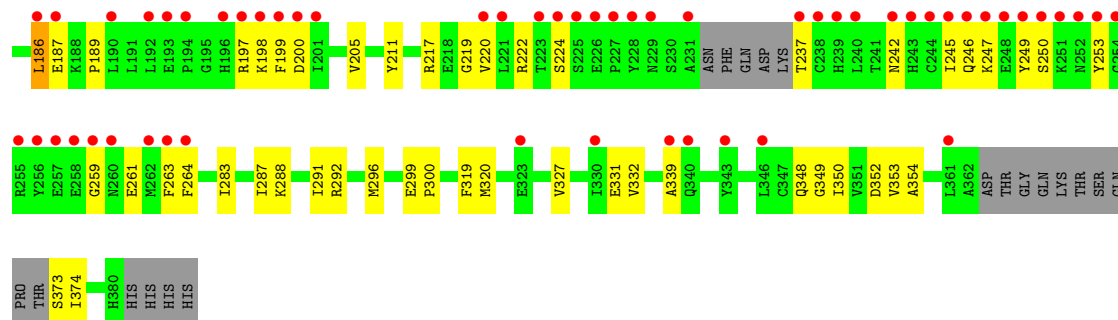


• Molecule 3: Stathmin-4



• Molecule 4: Tubulin tyrosine ligase





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	104.08Å 155.64Å 181.92Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.83 – 2.25 47.83 – 2.25	Depositor EDS
% Data completeness (in resolution range)	99.3 (47.83-2.25) 99.3 (47.83-2.25)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.07 (at 2.24Å)	Xtrriage
Refinement program	PHENIX 1.20_4459	Depositor
R, R_{free}	0.184 , 0.224 0.182 , 0.224	Depositor DCC
R_{free} test set	6998 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	49.7	Xtrriage
Anisotropy	0.239	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 49.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	18322	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.61% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: PX0, MES, GOL, CA, GDP, MG, GTP, ACP

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.25	0/3508	0.47	0/4762
1	C	0.26	0/3574	0.47	0/4852
2	B	0.25	0/3431	0.47	0/4646
2	D	0.24	0/3427	0.46	0/4640
3	E	0.24	0/1041	0.41	0/1382
4	F	0.24	0/2768	0.46	0/3735
All	All	0.25	0/17749	0.46	0/24017

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 [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	3339	52	0
1	C	3478	0	3392	57	0
2	B	3357	0	3239	73	0
2	D	3354	0	3234	76	0
3	E	1029	0	1041	18	0
4	F	2704	0	2675	42	0
5	A	32	0	12	1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
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
6	D	1	0	0	0	0
6	F	1	0	0	0	0
7	A	1	0	0	0	0
7	B	2	0	0	0	0
7	C	1	0	0	0	0
7	E	1	0	0	0	0
8	B	28	0	12	0	0
8	D	28	0	12	2	0
9	B	12	0	12	5	0
10	C	6	8	8	0	0
11	D	53	0	0	0	0
12	F	31	0	14	0	0
13	A	123	0	0	2	0
13	B	187	0	0	11	0
13	C	280	0	0	3	0
13	D	83	0	0	2	0
13	E	26	0	0	3	0
13	F	34	0	0	1	0
All	All	18314	8	17002	309	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 9.

All (309) 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)
2:D:295:MET:HE2	2:D:377:PHE:HB2	1.46	0.97
2:B:294:GLN:NE2	13:B:603:HOH:O	2.17	0.78
2:B:83:PHE:O	2:B:86:ILE:HG22	1.84	0.77
2:B:2:ARG:HB3	2:B:133:GLN:CG	2.18	0.74
2:B:415:GLU:OE1	13:B:601:HOH:O	2.06	0.73
1:C:254:GLU:HG2	1:C:352:LYS:HE2	1.73	0.70
4:F:288:LYS:O	4:F:292:ARG:HG2	1.91	0.70
1:C:48:SER:OG	1:C:245:ASP:HB2	1.92	0.69
3:E:84:GLN:HG2	13:E:309:HOH:O	1.92	0.69
2:B:424:ASN:HB3	13:B:619:HOH:O	1.91	0.69
2:D:136:GLN:HA	2:D:167:ASN:O	1.91	0.69

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:176:LYS:HD2	2:B:207:GLU:HG3	1.74	0.68
2:B:48:ARG:NH2	2:B:241:CYS:O	2.27	0.68
1:C:4[A]:CYS:SG	1:C:136:LEU:HG	2.34	0.68
1:C:367:ASP:OD2	13:C:601:HOH:O	2.12	0.67
2:D:172:MET:HG3	2:D:387:LEU:HD11	1.76	0.67
2:D:2:ARG:HB3	2:D:133:GLN:CG	2.25	0.66
1:C:93:ILE:HD11	1:C:121:ARG:HG3	1.76	0.65
2:B:88:ARG:NH1	2:B:124:LYS:HE2	2.11	0.65
1:A:113:GLU:HG3	13:A:714:HOH:O	1.97	0.64
1:A:166:LYS:HE2	1:A:197:HIS:O	1.98	0.64
4:F:20:LEU:O	4:F:24:THR:HG23	1.97	0.64
1:C:292:THR:HG22	1:C:335:ILE:CD1	2.28	0.64
2:B:172:MET:HG3	2:B:387:LEU:HD11	1.80	0.63
1:A:187:SER:HB3	1:A:391:LEU:HD21	1.78	0.63
2:B:274:PRO:HB3	2:B:286:LEU:HD22	1.79	0.63
2:D:345:GLU:HG2	2:D:440:ALA:HB2	1.81	0.63
2:D:83:PHE:O	2:D:86:ILE:HG22	1.99	0.62
1:C:93:ILE:HG22	1:C:114:ILE:HD11	1.82	0.62
2:B:136:GLN:HA	2:B:167:ASN:O	1.99	0.62
4:F:14:TYR:HB3	4:F:41:LEU:HD13	1.79	0.62
1:C:132:LEU:O	1:C:164:LYS:NZ	2.28	0.61
3:E:75:LYS:NZ	3:E:79:GLU:OE2	2.27	0.61
1:A:209:ILE:HD11	1:A:302:MET:SD	2.41	0.61
1:C:320:ARG:HA	1:C:356:ASN:O	2.00	0.61
2:B:253[A]:ARG:NH1	9:B:504:MES:O3S	2.34	0.61
1:C:298:PRO:HG2	1:C:308:ARG:NH2	2.16	0.61
2:B:285:ALA:HA	13:B:628:HOH:O	2.00	0.60
1:C:254:GLU:HG2	1:C:352:LYS:CE	2.31	0.60
3:E:12:ASN:HB3	13:E:317:HOH:O	2.03	0.59
1:A:36:MET:HB3	1:A:61:HIS:CE1	2.38	0.58
2:D:21:TRP:CE3	2:D:63:PRO:HB3	2.38	0.58
2:D:347:ILE:HG22	2:D:350:ASN:HB3	1.85	0.58
2:D:145:THR:HB	8:D:501:GDP:O2B	2.03	0.57
2:B:270:PRO:HG2	2:B:302:MET:HB2	1.87	0.57
4:F:349:GLY:O	4:F:353:VAL:HG22	2.03	0.57
2:D:141:LEU:HA	2:D:147:SER:HB3	1.85	0.57
2:B:2:ARG:HA	2:B:131:CYS:O	2.05	0.57
1:A:79:ARG:HG2	1:A:92:LEU:HD12	1.87	0.57
2:B:36:TYR:CD1	2:B:46:LEU:HD21	2.41	0.56
1:A:419:SER:O	1:A:423:GLU:HG3	2.05	0.56
1:C:248:LEU:HD12	1:C:357:TYR:OH	2.06	0.56

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:402:LYS:HB3	2:D:405:LEU:HD12	1.87	0.56
2:D:411:GLU:HA	3:E:137:LYS:HD2	1.87	0.56
4:F:70:LYS:HA	4:F:76:SER:HB3	1.88	0.55
1:A:209:ILE:HG23	1:A:230:LEU:HD23	1.88	0.55
2:D:21:TRP:CZ3	2:D:63:PRO:HB3	2.41	0.55
2:D:23:VAL:HG21	2:D:232:SER:HB2	1.87	0.55
4:F:200:ASP:OD1	4:F:222:ARG:HB2	2.05	0.55
2:B:338:LYS:HE3	13:B:731:HOH:O	2.07	0.55
1:A:21:TRP:CZ3	1:A:63:PRO:HB3	2.41	0.55
1:A:98:ASP:HB2	5:A:501:GTP:O2G	2.07	0.54
2:D:298:SER:HB3	2:D:307:PRO:HD2	1.90	0.54
4:F:217:ARG:NH2	4:F:374:ILE:HA	2.22	0.54
1:A:188:ILE:HG13	1:A:425:MET:HG3	1.88	0.54
2:B:326:LYS:O	2:B:330:GLU:HG3	2.07	0.54
2:D:269:MET:HG3	2:D:303:ALA:HB3	1.90	0.54
1:A:180:ALA:O	1:A:183:GLU:HG3	2.08	0.54
1:A:209:ILE:HG22	1:A:227:LEU:HD22	1.90	0.53
2:D:191:VAL:O	2:D:195:VAL:HG23	2.08	0.53
1:A:93:ILE:HD11	1:A:121:ARG:HG3	1.90	0.53
2:B:106:GLY:O	2:B:111:GLY:HA3	2.07	0.53
1:A:233:GLN:HG3	1:A:368:LEU:CD1	2.39	0.53
1:A:254:GLU:HG2	1:A:258:ASN:ND2	2.23	0.53
4:F:242:ASN:HD22	4:F:245:ILE:HD12	1.73	0.53
2:D:109:THR:O	2:D:113:GLU:HG2	2.09	0.53
1:A:135:PHE:O	1:A:136:LEU:HD23	2.10	0.52
4:F:350:ILE:O	4:F:354:ALA:HB3	2.08	0.52
2:B:2:ARG:HB3	2:B:133:GLN:HG3	1.89	0.52
1:C:209:ILE:CD1	1:C:302:MET:HE3	2.40	0.52
2:D:115:VAL:HG23	2:D:153:LEU:HD23	1.91	0.52
1:C:36:MET:HB3	1:C:61:HIS:CE1	2.45	0.52
2:B:69:ASP:O	2:B:94:PHE:HA	2.10	0.52
3:E:108:ASN:HB2	13:E:311:HOH:O	2.10	0.52
1:A:335:ILE:HG23	1:A:339:ARG:HG3	1.90	0.52
2:B:164:ARG:O	9:B:504:MES:H71	2.09	0.52
2:D:334:ASN:OD1	2:D:338:LYS:HE3	2.08	0.52
4:F:259:GLY:O	4:F:261:GLU:HG3	2.10	0.52
1:A:22:GLU:HG3	1:A:83:TYR:CE2	2.45	0.52
2:B:264:ARG:HD2	13:B:727:HOH:O	2.10	0.52
3:E:6:MET:HG2	3:E:24:LEU:CD2	2.39	0.51
2:D:11:GLN:O	2:D:15:GLN:HG2	2.10	0.51
2:D:67:LEU:HD22	2:D:92:PHE:CE2	2.45	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:382:THR:O	2:D:385:GLN:HG2	2.10	0.51
4:F:14:TYR:HA	4:F:17:VAL:HB	1.91	0.51
2:B:390:ARG:NH1	13:B:602:HOH:O	2.17	0.51
2:B:165:ILE:HG21	2:B:252:LEU:HB3	1.91	0.51
4:F:198:LYS:HG2	4:F:199:PHE:H	1.75	0.51
1:C:292:THR:HG22	1:C:335:ILE:HD12	1.92	0.51
13:B:751:HOH:O	1:C:2:ARG:HD2	2.10	0.51
1:C:117:LEU:HD11	1:C:121:ARG:NH2	2.26	0.51
1:A:180:ALA:HA	2:B:258:ASN:OD1	2.11	0.51
2:D:152:LEU:O	2:D:156:LYS:HG2	2.11	0.51
3:E:58:GLU:HG2	3:E:62:LYS:HE3	1.92	0.51
2:D:147:SER:HB2	2:D:190:SER:OG	2.10	0.50
2:B:298:SER:HA	2:B:301:MET:CG	2.41	0.50
2:D:172:MET:HE3	2:D:203:CYS:CB	2.42	0.50
4:F:242:ASN:O	4:F:246:GLN:HG2	2.12	0.50
1:A:211:ASP:OD2	1:A:304:LYS:NZ	2.31	0.50
2:B:21:TRP:CZ3	2:B:63:PRO:HB3	2.47	0.50
2:D:20:PHE:CZ	2:D:24:ILE:HD13	2.47	0.50
2:D:286:LEU:HD12	2:D:290:GLU:OE1	2.11	0.50
2:B:203:CYS:SG	2:B:267:PHE:HB3	2.51	0.50
1:A:21:TRP:CE3	1:A:63:PRO:HB3	2.47	0.49
1:C:234:ILE:HD11	1:C:302:MET:HE1	1.94	0.49
2:D:2:ARG:HB3	2:D:133:GLN:HG3	1.93	0.49
2:D:290:GLU:O	2:D:294:GLN:HG3	2.12	0.49
4:F:348:GLN:NE2	4:F:352:ASP:OD1	2.45	0.49
1:A:430:LYS:O	1:A:434:GLU:HG3	2.11	0.49
2:B:295:MET:CG	2:B:377:PHE:HB2	2.42	0.49
4:F:211:TYR:HE1	4:F:296[B]:MET:HE2	1.77	0.49
1:A:83:TYR:HB3	1:A:86:LEU:HD12	1.95	0.49
3:E:140:LYS:NZ	3:E:140:LYS:HB3	2.28	0.49
1:A:167:LEU:HG	1:A:200:CYS:HB3	1.95	0.49
4:F:287:ILE:HG23	4:F:319:PHE:CE2	2.48	0.49
1:C:210:TYR:CZ	1:C:222:PRO:HD2	2.47	0.49
2:B:6:HIS:CD2	2:B:21:TRP:HE1	2.30	0.49
2:D:103:TRP:CE3	2:D:189:LEU:HD13	2.48	0.49
1:A:3:GLU:O	1:A:133:GLN:HG2	2.12	0.48
2:B:298:SER:HA	2:B:301:MET:HG3	1.95	0.48
3:E:60:ARG:O	3:E:64:GLN:HG3	2.12	0.48
4:F:220:VAL:HG11	4:F:339:ALA:HB2	1.95	0.48
2:B:67:LEU:N	2:B:67:LEU:HD12	2.28	0.48
2:D:171:VAL:HA	2:D:204:ILE:O	2.13	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:108:TYR:O	1:C:112:LYS:HG2	2.13	0.48
4:F:331:GLU:HG2	4:F:332:VAL:N	2.28	0.48
2:D:205:ASP:HB3	2:D:303:ALA:HA	1.96	0.48
1:A:336:LYS:HG2	3:E:24:LEU:HD13	1.96	0.48
2:D:213:CYS:HA	2:D:217:LEU:HB2	1.95	0.48
1:C:88:HIS:CE1	1:C:90:GLU:HG3	2.49	0.48
2:B:231:VAL:O	2:B:235:MET:HG3	2.13	0.48
4:F:73:ARG:HB2	4:F:76:SER:HB2	1.95	0.48
4:F:246:GLN:O	4:F:250:SER:HB3	2.13	0.48
1:A:161:TYR:HB3	1:A:164:LYS:HD3	1.96	0.48
1:A:187:SER:CB	1:A:391:LEU:HD21	2.44	0.48
2:B:50:ASN:OD1	2:B:50:ASN:N	2.44	0.48
1:C:271:THR:HG21	1:C:295:CYS:O	2.12	0.48
4:F:171:ASP:O	4:F:175:GLU:HG3	2.14	0.48
1:A:276:ILE:HD12	1:A:283:HIS:NE2	2.28	0.48
2:B:317:ALA:C	2:B:318:ILE:HD12	2.34	0.48
2:D:173:PRO:HG3	2:D:187:ALA:HB2	1.96	0.47
2:D:194:LEU:HD22	2:D:198:THR:HG21	1.97	0.47
2:B:253[A]:ARG:NH1	9:B:504:MES:O1S	2.35	0.47
2:D:115:VAL:HG23	2:D:153:LEU:CD2	2.45	0.47
2:D:316:ALA:HB3	2:D:378:ILE:HB	1.97	0.47
1:C:216:ASN:HB3	1:C:275:VAL:O	2.14	0.47
2:B:16:ILE:HG13	2:B:17:GLY:N	2.29	0.47
2:B:46:LEU:HA	2:B:49:ILE:HB	1.96	0.47
1:C:180:ALA:O	1:C:183:GLU:HG3	2.15	0.47
1:C:286:LEU:HA	1:C:290:GLU:OE1	2.14	0.47
1:C:419:SER:O	1:C:423:GLU:HG3	2.15	0.47
2:D:74:THR:HB	13:D:607:HOH:O	2.14	0.47
2:D:146:GLY:O	2:D:150:GLY:HA3	2.15	0.47
1:A:54:SER:O	1:A:61:HIS:HA	2.15	0.47
1:C:344:VAL:HG21	1:C:346:TRP:CE2	2.50	0.47
1:C:16:ILE:CD1	1:C:171:ILE:HD11	2.45	0.47
1:C:209:ILE:HG23	1:C:230:LEU:HD23	1.97	0.47
1:A:62:VAL:HG13	1:A:86:LEU:O	2.15	0.47
2:B:253[A]:ARG:NH1	9:B:504:MES:S	2.86	0.47
2:D:318:ILE:N	2:D:318:ILE:HD12	2.29	0.46
2:D:220:THR:C	2:D:222:PRO:HD3	2.35	0.46
1:A:141:PHE:O	1:A:147:SER:HB3	2.15	0.46
2:D:46:LEU:HA	2:D:49:ILE:HB	1.98	0.46
2:D:188:THR:HG22	2:D:421:ALA:HB1	1.97	0.46
2:B:187:ALA:O	2:B:191:VAL:HG23	2.15	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:67:LEU:N	2:D:67:LEU:HD12	2.31	0.46
4:F:217:ARG:NH2	4:F:373:SER:O	2.47	0.46
2:D:172:MET:CE	2:D:203:CYS:HA	2.45	0.46
2:B:141:LEU:HD12	2:B:172:MET:SD	2.56	0.46
2:B:70:LEU:HD12	2:B:99:ALA:HB2	1.98	0.46
1:C:440:VAL:HG12	1:C:440:VAL:O	2.16	0.46
2:D:182:VAL:O	2:D:185:TYR:HB2	2.16	0.46
4:F:187:GLU:C	4:F:189:PRO:HD3	2.36	0.45
4:F:299:GLU:HB3	4:F:300:PRO:HD3	1.97	0.45
2:B:199:ASP:OD1	9:B:504:MES:H62	2.16	0.45
2:B:337:ASN:OD1	4:F:36:ARG:HD3	2.17	0.45
1:C:88:HIS:HE1	1:C:90:GLU:HG3	1.81	0.45
2:D:2:ARG:HH21	2:D:133:GLN:HA	1.82	0.45
2:D:26:ASP:OD2	2:D:369:ARG:HD2	2.16	0.45
4:F:220:VAL:HG12	4:F:263:PHE:CE1	2.52	0.45
4:F:237:THR:HG21	4:F:249:TYR:O	2.16	0.45
2:D:75:MET:SD	2:D:94:PHE:HB3	2.56	0.45
2:D:181:VAL:HG22	2:D:398:MET:SD	2.56	0.45
4:F:247:LYS:HB2	4:F:253:TYR:CE1	2.50	0.45
1:A:409:VAL:HA	1:A:413:MET:O	2.16	0.45
1:C:234:ILE:CD1	1:C:302:MET:HE1	2.47	0.45
1:C:311:LYS:HE2	1:C:342[B]:GLN:NE2	2.31	0.45
2:D:23:VAL:O	2:D:27:GLU:HG3	2.17	0.45
1:C:298:PRO:HA	1:C:301:GLN:OE1	2.16	0.45
2:D:6:HIS:CD2	2:D:21:TRP:HE1	2.34	0.45
4:F:2:TYR:HB2	4:F:27:TRP:CD2	2.52	0.45
2:D:11:GLN:HB3	8:D:501:GDP:O2A	2.16	0.45
2:B:31:ASP:HB2	2:B:32:PRO:CD	2.47	0.45
2:B:2:ARG:HB3	2:B:133:GLN:HG2	1.96	0.44
2:B:22:GLU:HG2	2:B:83:PHE:CD1	2.52	0.44
4:F:128:ARG:NH1	4:F:170:LEU:HD22	2.31	0.44
1:C:324:VAL:HG22	13:C:604:HOH:O	2.18	0.44
2:D:5:VAL:HG23	2:D:132:LEU:HD11	2.00	0.44
2:D:104:ALA:HB2	2:D:413:MET:SD	2.56	0.44
1:C:162:GLY:HA2	3:E:94:ILE:HD11	1.98	0.44
1:C:234:ILE:HG12	1:C:302:MET:CE	2.48	0.44
2:D:220:THR:O	2:D:222:PRO:HD3	2.17	0.44
2:D:244:PHE:CE1	2:D:358:ILE:HD12	2.53	0.44
2:D:385:GLN:HB2	2:D:429:VAL:HG13	1.98	0.44
1:A:75:ILE:HB	1:A:94:THR:CG2	2.47	0.44
2:B:234:THR:O	2:B:238:VAL:HG13	2.18	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:415:GLU:HG3	13:B:703:HOH:O	2.16	0.44
2:D:416:MET:O	2:D:420:GLU:HG3	2.18	0.44
2:B:28:HIS:HB3	2:B:49:ILE:HD13	1.99	0.44
1:C:8:HIS:HB3	1:C:13:GLY:O	2.18	0.44
2:D:167:ASN:ND2	13:D:609:HOH:O	2.50	0.44
2:B:123:ARG:O	2:B:127:GLU:HG3	2.18	0.43
2:B:286:LEU:HD23	2:B:291:LEU:HD23	2.00	0.43
1:C:117:LEU:HD11	1:C:121:ARG:CZ	2.48	0.43
1:C:339:ARG:HD3	1:C:339:ARG:HA	1.91	0.43
2:D:332:MET:O	2:D:336:GLN:HG3	2.18	0.43
4:F:14:TYR:OH	13:F:501:HOH:O	2.19	0.43
2:B:295:MET:HG2	2:B:377:PHE:HB2	1.99	0.43
1:A:141:PHE:CE1	1:A:170:SER:HB3	2.53	0.43
2:B:115:VAL:HG23	2:B:153:LEU:HD23	2.00	0.43
2:B:284:ARG:NH2	2:B:290:GLU:OE2	2.51	0.43
1:C:275:VAL:HG13	1:C:368:LEU:HD21	2.00	0.43
1:A:47:ASP:OD1	1:A:47:ASP:N	2.50	0.43
1:A:210:TYR:CZ	1:A:222:PRO:HD2	2.53	0.43
1:C:167:LEU:HG	1:C:200:CYS:HB3	2.01	0.43
2:B:204:ILE:HD13	2:B:231:VAL:HG13	2.01	0.43
2:B:298:SER:HB3	2:B:307:PRO:HD2	1.99	0.43
1:C:233:GLN:HG3	1:C:368:LEU:CD1	2.49	0.43
4:F:217:ARG:CZ	4:F:374:ILE:HA	2.48	0.43
1:A:74:VAL:HB	13:A:606:HOH:O	2.18	0.43
1:C:141:PHE:CE1	1:C:170:SER:HB3	2.53	0.43
2:B:1:MET:HG2	2:B:50:ASN:ND2	2.34	0.43
1:C:248:LEU:HD13	1:C:355:ILE:HD12	2.01	0.43
3:E:137:LYS:HA	3:E:140:LYS:HE2	2.01	0.43
2:B:2:ARG:NE	2:B:133:GLN:HG2	2.33	0.43
2:B:88:ARG:HH12	2:B:124:LYS:HE2	1.82	0.43
2:B:400:ARG:HG3	2:B:401:ARG:HG2	2.01	0.43
2:D:22:GLU:HG2	2:D:83:PHE:CD1	2.54	0.43
1:C:234:ILE:HD12	1:C:234:ILE:N	2.34	0.42
2:D:2:ARG:HB3	2:D:133:GLN:HG2	1.99	0.42
2:D:172:MET:HE3	2:D:203:CYS:HB3	2.01	0.42
1:A:22:GLU:HG3	1:A:83:TYR:HE2	1.84	0.42
1:A:117:LEU:O	1:A:121:ARG:HG2	2.19	0.42
1:A:274:PRO:HB3	1:A:286:LEU:HD12	1.99	0.42
2:B:27:GLU:HG2	13:B:709:HOH:O	2.19	0.42
1:C:142:GLY:HA3	1:C:183:GLU:OE1	2.19	0.42
2:D:7:ILE:O	2:D:137:LEU:HA	2.19	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:208:ALA:O	2:D:212:ILE:HG13	2.19	0.42
1:A:226:ASN:ND2	1:A:367:ASP:OD2	2.51	0.42
1:A:234:ILE:HD12	1:A:234:ILE:N	2.34	0.42
1:A:357:TYR:CE2	3:E:17:GLY:HA2	2.54	0.42
2:B:9:ALA:HA	2:B:68:VAL:O	2.19	0.42
2:B:286:LEU:HD23	2:B:291:LEU:CD2	2.50	0.42
2:D:292:THR:O	2:D:295:MET:HG2	2.19	0.42
3:E:58:GLU:HG3	3:E:61:ARG:HH21	1.84	0.42
4:F:73:ARG:HB2	4:F:76:SER:CB	2.50	0.42
1:C:2:ARG:HA	1:C:2:ARG:NE	2.35	0.42
2:D:345:GLU:CG	2:D:440:ALA:HB2	2.47	0.42
4:F:283:ILE:HG23	4:F:327:VAL:CG2	2.50	0.42
2:B:286:LEU:HD12	2:B:290:GLU:OE1	2.20	0.42
2:D:412:GLY:C	3:E:133:VAL:HG13	2.39	0.42
1:A:70:LEU:HD13	1:A:110:ILE:CG2	2.50	0.42
4:F:197:ARG:HB2	4:F:224:SER:O	2.19	0.42
2:D:6:HIS:HD2	2:D:65:ALA:HB1	1.84	0.42
4:F:126:ASP:OD1	4:F:127:GLU:N	2.52	0.42
2:B:7:ILE:O	2:B:137:LEU:HA	2.20	0.42
1:C:229:ARG:NH1	13:C:626:HOH:O	2.53	0.42
4:F:219:GLY:HA3	4:F:264:PHE:CZ	2.55	0.42
1:A:298:PRO:HA	1:A:301:GLN:CD	2.40	0.41
1:A:278:ALA:HA	1:A:369:ALA:HB2	2.01	0.41
2:B:169:PHE:CE2	2:B:238:VAL:HG21	2.55	0.41
1:C:254:GLU:HG2	1:C:352:LYS:NZ	2.36	0.41
2:D:387:LEU:HD23	2:D:387:LEU:C	2.40	0.41
4:F:128:ARG:HH12	4:F:170:LEU:HB3	1.86	0.41
1:A:325:PRO:HB3	3:E:20:PHE:CE1	2.56	0.41
1:A:372:GLN:HA	1:A:372:GLN:OE1	2.21	0.41
1:C:43:GLY:HA2	1:C:56:THR:O	2.20	0.41
2:D:70:LEU:HD12	2:D:99:ALA:HB2	2.02	0.41
4:F:4:PHE:HA	4:F:39:LEU:O	2.20	0.41
1:C:346:TRP:CZ3	1:C:347[B]:CYS:SG	3.14	0.41
1:A:192:HIS:CG	1:A:421:ALA:HA	2.56	0.41
1:C:104:ALA:HB2	1:C:413:MET:SD	2.60	0.41
2:D:74:THR:O	2:D:78:VAL:HG23	2.21	0.41
2:D:181:VAL:HG22	2:D:398:MET:CE	2.51	0.41
3:E:137:LYS:O	3:E:141:GLU:HG3	2.21	0.41
4:F:205:VAL:HG21	4:F:291:ILE:HD13	2.01	0.41
1:C:7:ILE:HG21	1:C:153:LEU:HD21	2.03	0.41
1:C:180:ALA:HA	2:D:258:ASN:OD1	2.20	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:78:HIS:O	3:E:82:VAL:HG23	2.20	0.41
2:B:324:SER:O	2:B:328:VAL:HG23	2.21	0.40
4:F:220:VAL:HG12	4:F:263:PHE:CD1	2.57	0.40
2:B:67:LEU:HD22	2:B:92:PHE:CE2	2.56	0.40
1:A:2:ARG:HB3	1:A:131:GLY:O	2.21	0.40
2:B:2:ARG:HD2	2:B:131:CYS:SG	2.61	0.40
2:B:304:ALA:N	13:B:624:HOH:O	2.55	0.40
1:C:187:SER:HB3	1:C:391:LEU:HD21	2.03	0.40
2:B:274:PRO:HB3	2:B:286:LEU:CD2	2.47	0.40
1:C:225:THR:O	1:C:229:ARG:HG2	2.21	0.40
4:F:186:LEU:HD12	4:F:320:MET:HB3	2.03	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	437/451 (97%)	427 (98%)	10 (2%)	0	100	100
1	C	446/451 (99%)	437 (98%)	9 (2%)	0	100	100
2	B	422/445 (95%)	412 (98%)	10 (2%)	0	100	100
2	D	423/445 (95%)	410 (97%)	12 (3%)	1 (0%)	47	55
3	E	121/143 (85%)	120 (99%)	1 (1%)	0	100	100
4	F	317/384 (83%)	303 (96%)	13 (4%)	1 (0%)	41	46
All	All	2166/2319 (93%)	2109 (97%)	55 (2%)	2 (0%)	51	60

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	F	186	LEU
2	D	279	GLY

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	370/379 (98%)	369 (100%)	1 (0%)	92	95
1	C	379/379 (100%)	376 (99%)	3 (1%)	81	88
2	B	369/383 (96%)	368 (100%)	1 (0%)	92	95
2	D	369/383 (96%)	368 (100%)	1 (0%)	92	95
3	E	112/127 (88%)	110 (98%)	2 (2%)	59	68
4	F	297/342 (87%)	297 (100%)	0	100	100
All	All	1896/1993 (95%)	1888 (100%)	8 (0%)	91	94

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	ASN
2	B	139	HIS
1	C	1	MET
1	C	71	GLU
1	C	302	MET
2	D	139	HIS
3	E	59	GLU
3	E	140	LYS

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

Mol	Chain	Res	Type
2	B	294	GLN
2	B	424	ASN
1	C	11	GLN
2	D	50	ASN
2	D	247	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 18 ligands modelled in this entry, 10 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
8	GDP	B	501	6	24,30,30	0.94	1 (4%)	30,47,47	1.09	3 (10%)
8	GDP	D	501	6	24,30,30	0.96	1 (4%)	30,47,47	1.24	4 (13%)
12	ACP	F	401	6	27,33,33	0.82	1 (3%)	32,52,52	1.36	2 (6%)
9	MES	B	504	-	12,12,12	2.14	1 (8%)	14,16,16	2.08	5 (35%)
11	PX0	D	503	-	54,56,56	0.77	2 (3%)	62,80,80	0.94	5 (8%)
5	GTP	C	501	6	26,34,34	1.13	2 (7%)	32,54,54	1.33	5 (15%)
10	GOL	C	504	-	5,5,5	0.78	0	5,5,5	1.03	0
5	GTP	A	501	6	26,34,34	1.13	2 (7%)	32,54,54	1.33	5 (15%)

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
8	GDP	B	501	6	-	3/12/32/32	0/3/3/3
8	GDP	D	501	6	-	1/12/32/32	0/3/3/3
12	ACP	F	401	6	-	3/15/38/38	0/3/3/3
9	MES	B	504	-	-	3/6/14/14	0/1/1/1
11	PX0	D	503	-	-	11/57/84/84	0/2/4/4
5	GTP	C	501	6	-	8/18/38/38	0/3/3/3
10	GOL	C	504	-	-	2/4/4/4	-
5	GTP	A	501	6	-	5/18/38/38	0/3/3/3

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	B	504	MES	C8-S	-7.14	1.67	1.77
5	A	501	GTP	C5-C6	-4.01	1.39	1.47
5	C	501	GTP	C5-C6	-4.00	1.39	1.47
11	D	503	PX0	C35-C36	-3.39	1.33	1.43
12	F	401	ACP	PB-O3A	3.16	1.61	1.58
11	D	503	PX0	O6-C22	-2.62	1.23	1.30
8	D	501	GDP	C6-N1	-2.48	1.34	1.37
8	B	501	GDP	C6-N1	-2.32	1.34	1.37
5	A	501	GTP	C2-N3	2.12	1.38	1.33
5	C	501	GTP	C2-N3	2.05	1.38	1.33

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	F	401	ACP	PB-O3A-PA	-6.94	110.55	132.56
9	B	504	MES	O1S-S-C8	4.15	111.91	106.92
9	B	504	MES	C5-N4-C3	3.78	117.33	108.83
8	D	501	GDP	PA-O3A-PB	-3.77	119.90	132.83
5	C	501	GTP	C8-N7-C5	3.10	108.90	102.99
11	D	503	PX0	O10-C31-N2	3.04	124.44	118.78
5	A	501	GTP	C5-C6-N1	3.01	119.27	113.95
5	A	501	GTP	C8-N7-C5	3.00	108.70	102.99
5	C	501	GTP	C5-C6-N1	2.89	119.06	113.95
9	B	504	MES	C6-C5-N4	-2.86	105.76	110.10
5	A	501	GTP	PA-O3A-PB	-2.72	123.48	132.83
5	C	501	GTP	PA-O3A-PB	-2.66	123.70	132.83
5	C	501	GTP	PB-O3B-PG	-2.63	123.81	132.83
8	B	501	GDP	PA-O3A-PB	-2.61	123.87	132.83
5	A	501	GTP	C2-N1-C6	-2.58	120.35	125.10

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	D	503	PX0	C5-C6-C7	-2.52	119.32	122.53
5	C	501	GTP	C2-N1-C6	-2.51	120.47	125.10
11	D	503	PX0	O1-C2-C7	2.44	118.42	115.53
8	B	501	GDP	C5-C6-N1	2.43	118.25	113.95
8	D	501	GDP	C8-N7-C5	2.42	107.60	102.99
5	A	501	GTP	PB-O3B-PG	-2.41	124.57	132.83
9	B	504	MES	O3S-S-C8	2.41	109.66	105.77
9	B	504	MES	C7-N4-C5	2.39	117.34	111.23
8	D	501	GDP	C3'-C2'-C1'	2.36	104.54	100.98
8	B	501	GDP	C8-N7-C5	2.30	107.37	102.99
12	F	401	ACP	C5-C6-N6	2.29	123.83	120.35
8	D	501	GDP	C5-C6-N1	2.26	117.94	113.95
11	D	503	PX0	C28-C26-C25	2.23	116.91	111.19
11	D	503	PX0	O9-C31-N2	-2.12	118.28	123.58

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	501	GTP	C5'-O5'-PA-O1A
5	A	501	GTP	C5'-O5'-PA-O2A
5	C	501	GTP	C5'-O5'-PA-O1A
5	C	501	GTP	C5'-O5'-PA-O2A
8	B	501	GDP	C5'-O5'-PA-O1A
8	B	501	GDP	C5'-O5'-PA-O2A
9	B	504	MES	C8-C7-N4-C5
10	C	504	GOL	C1-C2-C3-O3
11	D	503	PX0	C23-C11-O3-C12
11	D	503	PX0	C25-C26-C28-C29
11	D	503	PX0	C25-C26-C28-O10
11	D	503	PX0	C27-C26-C28-C29
11	D	503	PX0	C27-C26-C28-O10
11	D	503	PX0	C30-C32-O11-C33
12	F	401	ACP	C5'-O5'-PA-O3A
11	D	503	PX0	C10-C11-O3-C12
10	C	504	GOL	O2-C2-C3-O3
11	D	503	PX0	C11-C10-C9-N1
12	F	401	ACP	C5'-O5'-PA-O2A
9	B	504	MES	C7-C8-S-O2S
9	B	504	MES	C7-C8-S-O3S
5	C	501	GTP	PB-O3A-PA-O2A
5	C	501	GTP	C4'-C5'-O5'-PA

Continued on next page...

Continued from previous page...

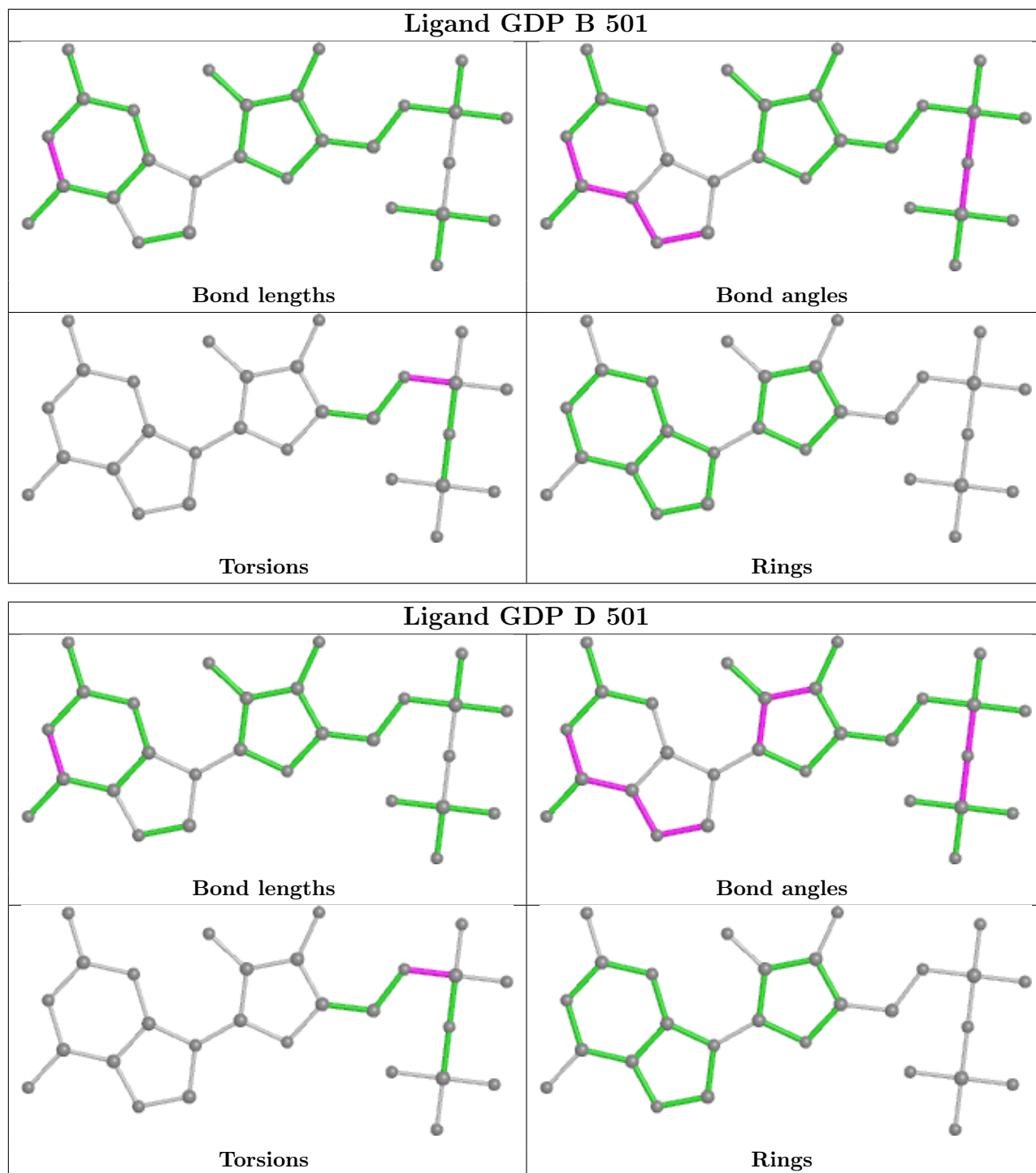
Mol	Chain	Res	Type	Atoms
5	C	501	GTP	PB-O3B-PG-O1G
11	D	503	PX0	C14-C15-C16-C17
11	D	503	PX0	C11-C10-C9-O2
11	D	503	PX0	C18-C19-C20-C21
5	A	501	GTP	PB-O3B-PG-O2G
5	C	501	GTP	PB-O3B-PG-O2G
5	C	501	GTP	PB-O3B-PG-O3G
5	A	501	GTP	C5'-O5'-PA-O3A
5	C	501	GTP	C5'-O5'-PA-O3A
8	B	501	GDP	C5'-O5'-PA-O3A
8	D	501	GDP	C5'-O5'-PA-O3A
5	A	501	GTP	PB-O3A-PA-O2A
12	F	401	ACP	C5'-O5'-PA-O1A

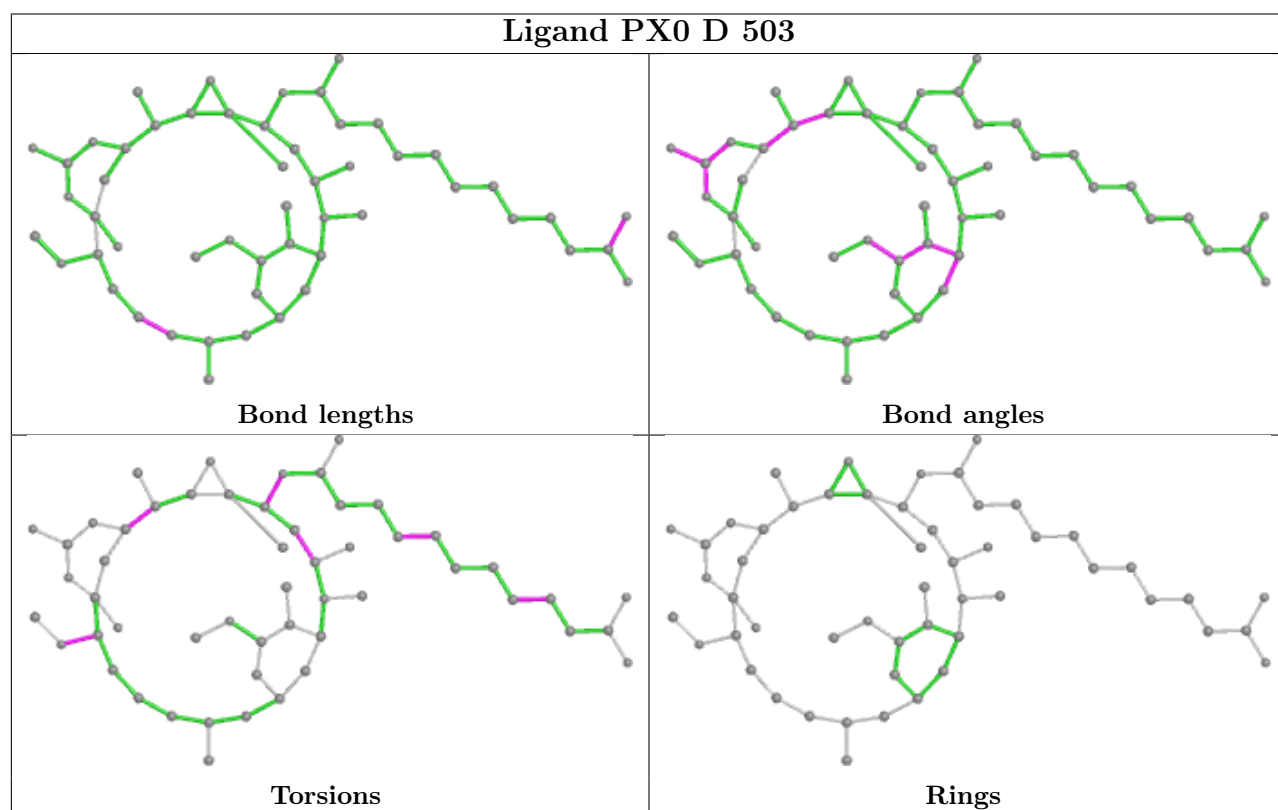
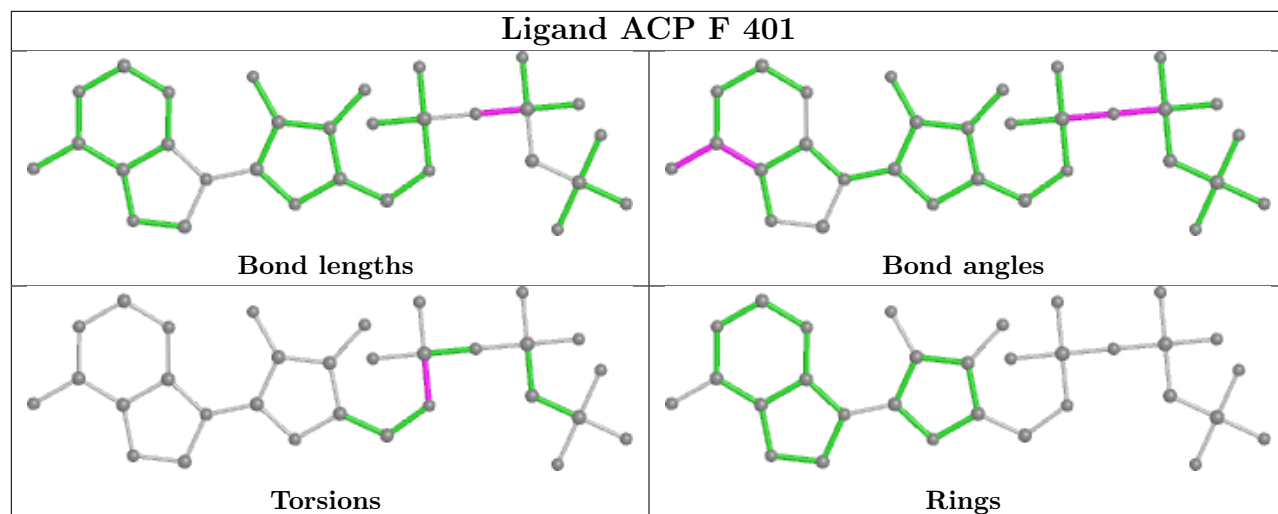
There are no ring outliers.

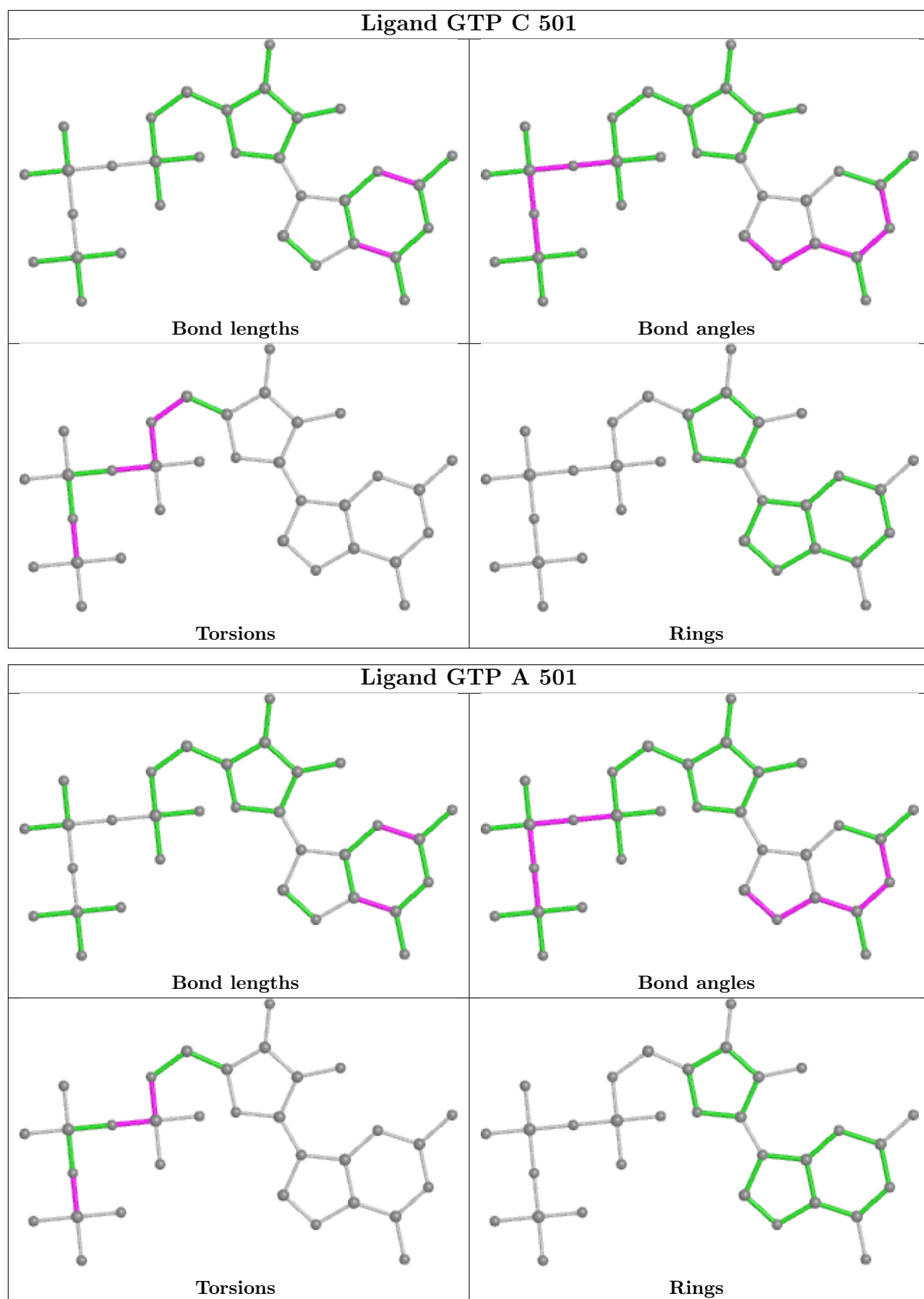
3 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	D	501	GDP	2	0
9	B	504	MES	5	0
5	A	501	GTP	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 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 [i](#)

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	438/451 (97%)	0.14	15 (3%) 45 47	40, 59, 90, 144	0
1	C	440/451 (97%)	-0.05	5 (1%) 80 82	36, 49, 73, 129	0
2	B	425/445 (95%)	0.13	19 (4%) 33 36	37, 54, 87, 133	0
2	D	426/445 (95%)	0.34	36 (8%) 10 12	47, 75, 114, 146	0
3	E	123/143 (86%)	0.39	9 (7%) 15 15	52, 74, 112, 147	0
4	F	328/384 (85%)	1.28	104 (31%) 0 0	54, 86, 147, 180	0
All	All	2180/2319 (94%)	0.32	188 (8%) 10 11	36, 63, 115, 180	0

All (188) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	F	173	ILE	10.4
1	A	282	TYR	8.5
4	F	249	TYR	8.5
2	B	57	THR	7.9
4	F	132	LEU	7.4
4	F	251	LYS	7.3
4	F	100	ILE	6.8
4	F	131	PHE	6.7
4	F	253	TYR	6.3
4	F	244	CYS	5.9
4	F	101	TYR	5.8
4	F	256	TYR	5.7
4	F	130	VAL	5.7
2	D	405	LEU	5.5
4	F	239	HIS	5.5
4	F	250	SER	5.4
4	F	136	ASN	5.4
4	F	133	ALA	5.2
4	F	134	ALA	5.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
4	F	99	VAL	5.0
3	E	27	PRO	5.0
2	D	177	VAL	4.9
4	F	224	SER	4.9
4	F	225	SER	4.8
4	F	135	TYR	4.8
4	F	192	LEU	4.8
4	F	172	PHE	4.7
2	B	1	MET	4.7
4	F	169	LEU	4.6
2	D	277	SER	4.5
2	B	59	ASN	4.4
4	F	245	ILE	4.4
2	D	37	HIS	4.3
2	B	276	THR	4.3
2	D	57	THR	4.3
2	D	401	ARG	4.3
4	F	259	GLY	4.2
4	F	246	GLN	4.2
4	F	240	LEU	4.2
4	F	255	ARG	4.2
4	F	252	ASN	4.2
4	F	163	SER	4.1
4	F	147	TRP	4.1
4	F	142	ARG	4.1
3	E	26	PRO	4.1
4	F	223	THR	4.1
4	F	194	PRO	4.0
4	F	128	ARG	4.0
4	F	170	LEU	4.0
2	B	33	THR	4.0
4	F	199	PHE	3.9
3	E	143	ALA	3.9
4	F	182	ILE	3.8
1	C	440	VAL	3.7
4	F	243	HIS	3.7
4	F	198	LYS	3.7
4	F	254	GLY	3.7
4	F	197	ARG	3.6
2	B	60	LYS	3.6
4	F	258	GLU	3.6
4	F	260	ASN	3.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
4	F	167	SER	3.5
4	F	257	GLU	3.5
2	B	37	HIS	3.5
2	B	56	ALA	3.5
2	D	58	GLY	3.4
2	D	1	MET	3.4
4	F	248	GLU	3.4
2	D	400	ARG	3.4
3	E	139	LEU	3.4
4	F	27	TRP	3.4
3	E	142	GLU	3.4
1	A	262	TYR	3.4
4	F	242	ASN	3.4
4	F	238	CYS	3.4
1	A	346	TRP	3.3
4	F	262	MET	3.3
4	F	162	ILE	3.3
4	F	164	SER	3.3
4	F	361	LEU	3.2
4	F	231	ALA	3.2
4	F	181	VAL	3.2
2	B	61	TYR	3.1
1	C	252	LEU	3.1
1	A	364	PRO	3.1
4	F	168	GLU	3.1
4	F	13	VAL	3.0
2	B	36	TYR	3.0
4	F	139	ARG	3.0
1	A	42	ILE	3.0
4	F	263	PHE	3.0
2	B	439	THR	3.0
2	D	221	THR	3.0
2	D	415	GLU	2.9
1	A	57	GLY	2.9
4	F	17	VAL	2.9
4	F	22	LEU	2.9
4	F	28	LYS	2.9
2	B	284	ARG	2.9
1	A	88	HIS	2.9
2	D	83	PHE	2.9
2	D	59	ASN	2.9
1	A	43	GLY	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
2	B	58	GLY	2.8
4	F	127	GLU	2.8
2	B	438	ALA	2.8
2	D	278	ARG	2.8
4	F	196	HIS	2.8
4	F	330	ILE	2.8
4	F	148	ILE	2.8
4	F	102	PRO	2.8
4	F	247	LYS	2.8
2	D	56	ALA	2.7
4	F	19	ARG	2.7
4	F	25	GLY	2.7
4	F	190	LEU	2.7
1	A	56	THR	2.7
4	F	343	TYR	2.7
2	D	96	GLN	2.7
2	B	82	PRO	2.7
4	F	31	ARG	2.7
2	D	46	LEU	2.7
4	F	21	LEU	2.7
1	C	253	THR	2.6
2	D	404	PHE	2.6
4	F	186	LEU	2.6
4	F	220	VAL	2.6
2	D	256	ALA	2.5
4	F	20	LEU	2.5
4	F	221	LEU	2.5
2	B	62	VAL	2.5
2	D	406	HIS	2.5
4	F	145	ASN	2.5
4	F	226	GLU	2.5
1	A	58	ALA	2.5
4	F	26	GLN	2.5
1	C	340	SER	2.4
2	D	94	PHE	2.4
2	D	399	PHE	2.4
1	A	171	ILE	2.4
4	F	23	ALA	2.4
4	F	323	GLU	2.4
4	F	201	ILE	2.4
2	D	252	LEU	2.4
2	D	255	LEU	2.4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
4	F	166	ALA	2.4
4	F	171	ASP	2.4
4	F	264	PHE	2.4
4	F	346	LEU	2.4
2	B	143	GLY	2.3
2	D	219	LEU	2.3
2	D	60	LYS	2.3
3	E	140	LYS	2.3
4	F	193	GLU	2.3
4	F	140	GLU	2.3
1	A	345	ASP	2.3
4	F	200	ASP	2.3
4	F	228	TYR	2.3
4	F	340	GLN	2.3
2	D	179	ASP	2.3
1	A	180	ALA	2.3
4	F	187	GLU	2.2
2	B	85	GLN	2.2
4	F	138	ARG	2.2
2	D	76	ASP	2.2
1	A	30	ILE	2.2
4	F	24	THR	2.2
4	F	165	GLU	2.2
3	E	45	PRO	2.2
2	D	397	ALA	2.2
1	A	281	ALA	2.2
2	D	82	PRO	2.2
2	B	83	PHE	2.1
2	D	276	THR	2.1
3	E	135	LYS	2.1
4	F	183	GLN	2.1
2	D	317	ALA	2.1
2	D	259	MET	2.1
3	E	48	GLU	2.1
4	F	229	ASN	2.1
4	F	339	ALA	2.1
2	D	202	TYR	2.1
1	C	337	THR	2.1
2	D	33	THR	2.1
4	F	227	PRO	2.1
4	F	44	ARG	2.0
4	F	237	THR	2.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
2	D	215	ARG	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

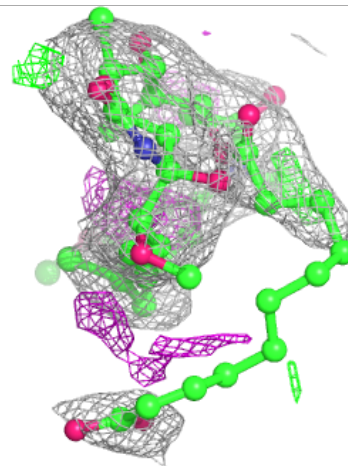
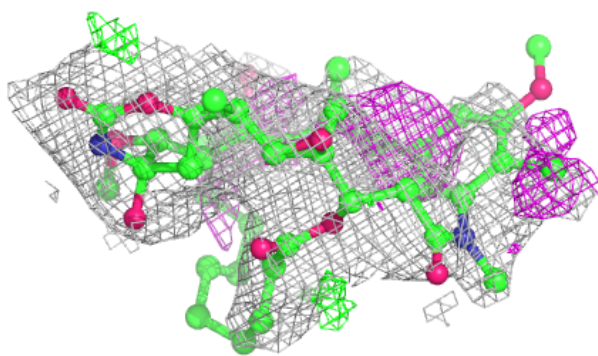
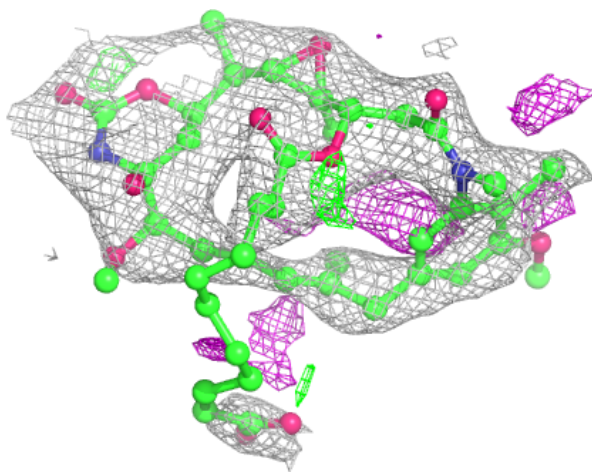
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
11	PX0	D	503	53/53	0.83	0.32	67,94,109,114	0
7	CA	E	201	1/1	0.85	0.16	106,106,106,106	0
10	GOL	C	504	6/6	0.89	0.23	66,82,98,99	0
7	CA	B	505	1/1	0.89	0.05	106,106,106,106	0
12	ACP	F	401	31/31	0.92	0.14	85,96,111,118	0
8	GDP	D	501	28/28	0.93	0.13	66,71,89,108	0
7	CA	A	503	1/1	0.96	0.03	79,79,79,79	0
7	CA	B	503	1/1	0.96	0.11	93,93,93,93	0
9	MES	B	504	12/12	0.97	0.11	37,54,61,63	0
6	MG	F	402	1/1	0.97	0.07	92,92,92,92	0
6	MG	B	502	1/1	0.98	0.18	41,41,41,41	0
5	GTP	A	501	32/32	0.98	0.21	36,44,53,55	0
7	CA	C	503	1/1	0.98	0.09	66,66,66,66	0
6	MG	A	502	1/1	0.98	0.17	42,42,42,42	0
8	GDP	B	501	28/28	0.98	0.22	36,43,47,50	0
5	GTP	C	501	32/32	0.99	0.16	32,39,48,52	0
6	MG	C	502	1/1	0.99	0.10	40,40,40,40	0
6	MG	D	502	1/1	0.99	0.04	65,65,65,65	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.

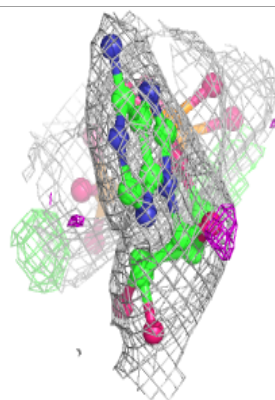
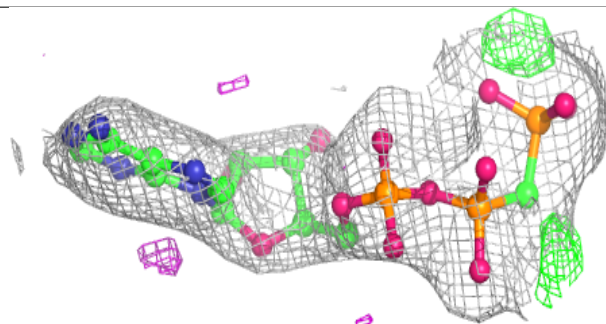
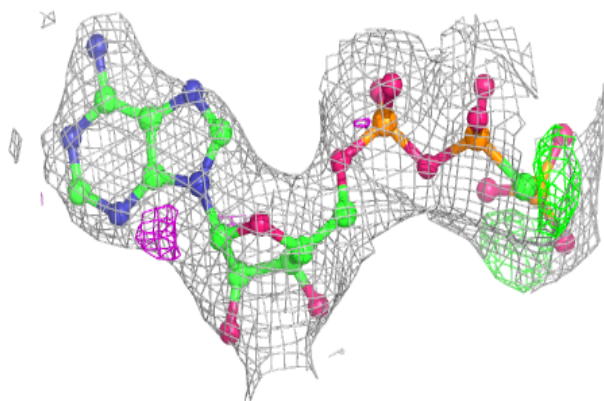
Electron density around PX0 D 503:

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

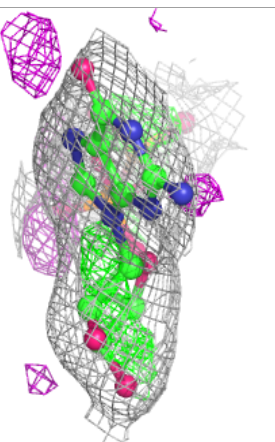
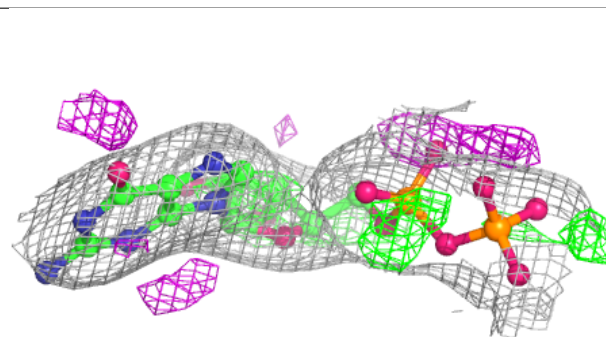
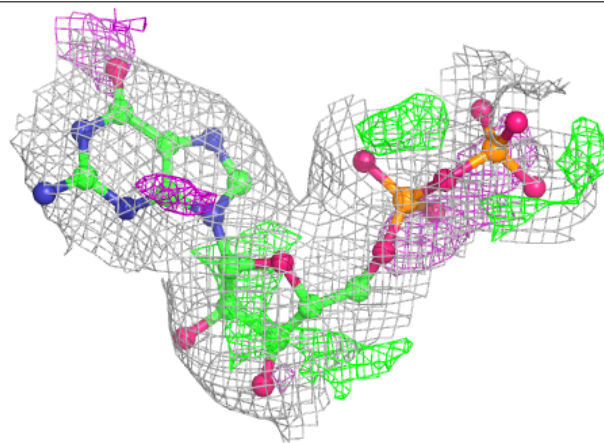


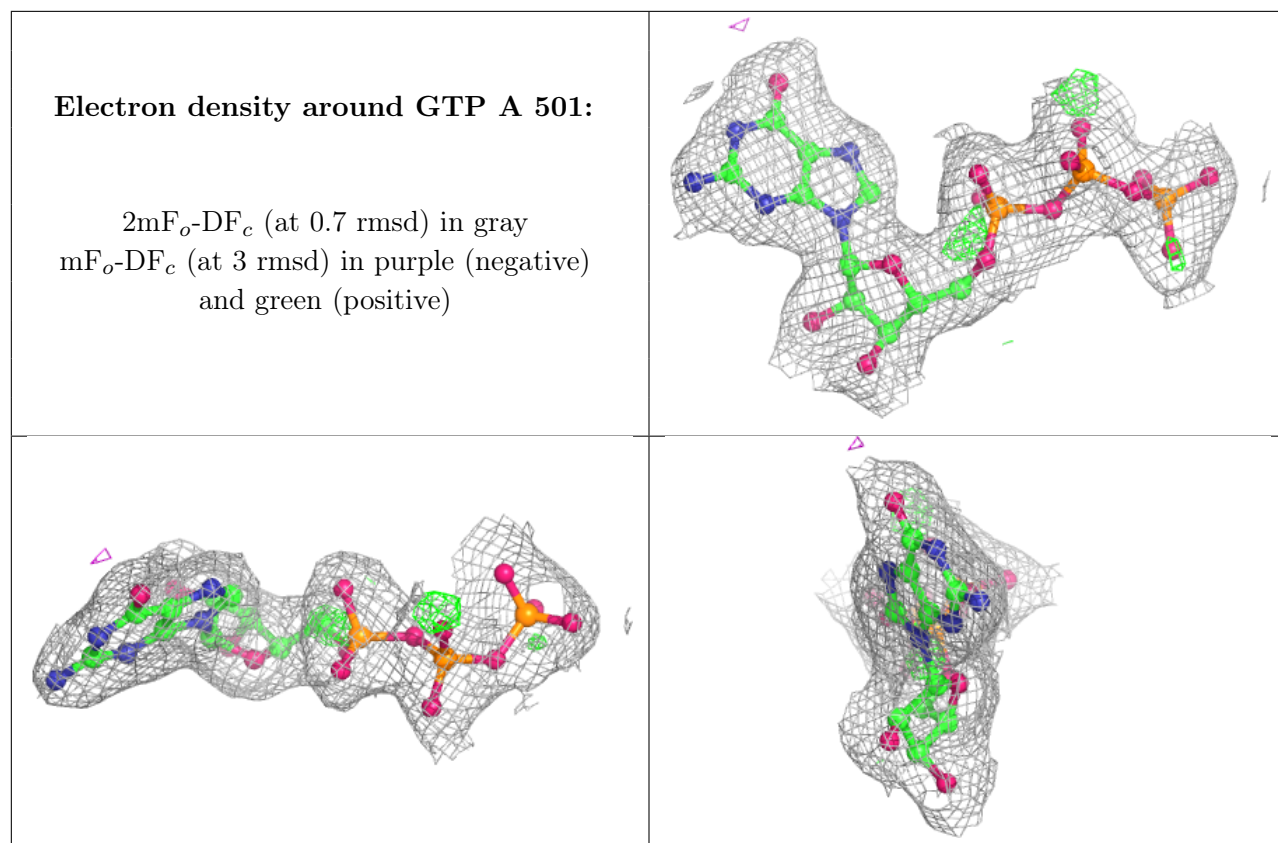
Electron density around ACP F 401:

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

**Electron density around GDP D 501:**

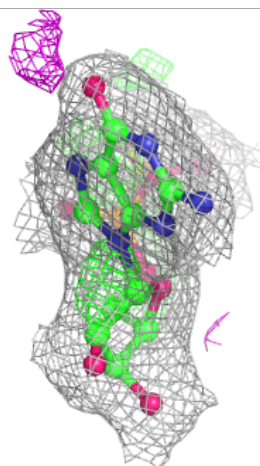
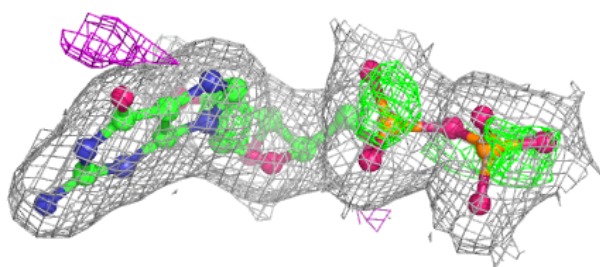
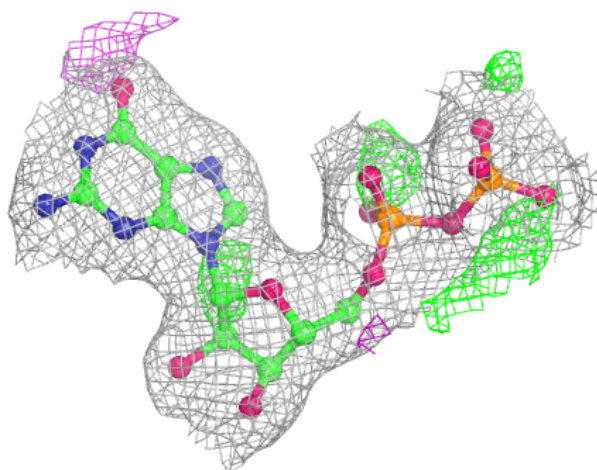
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

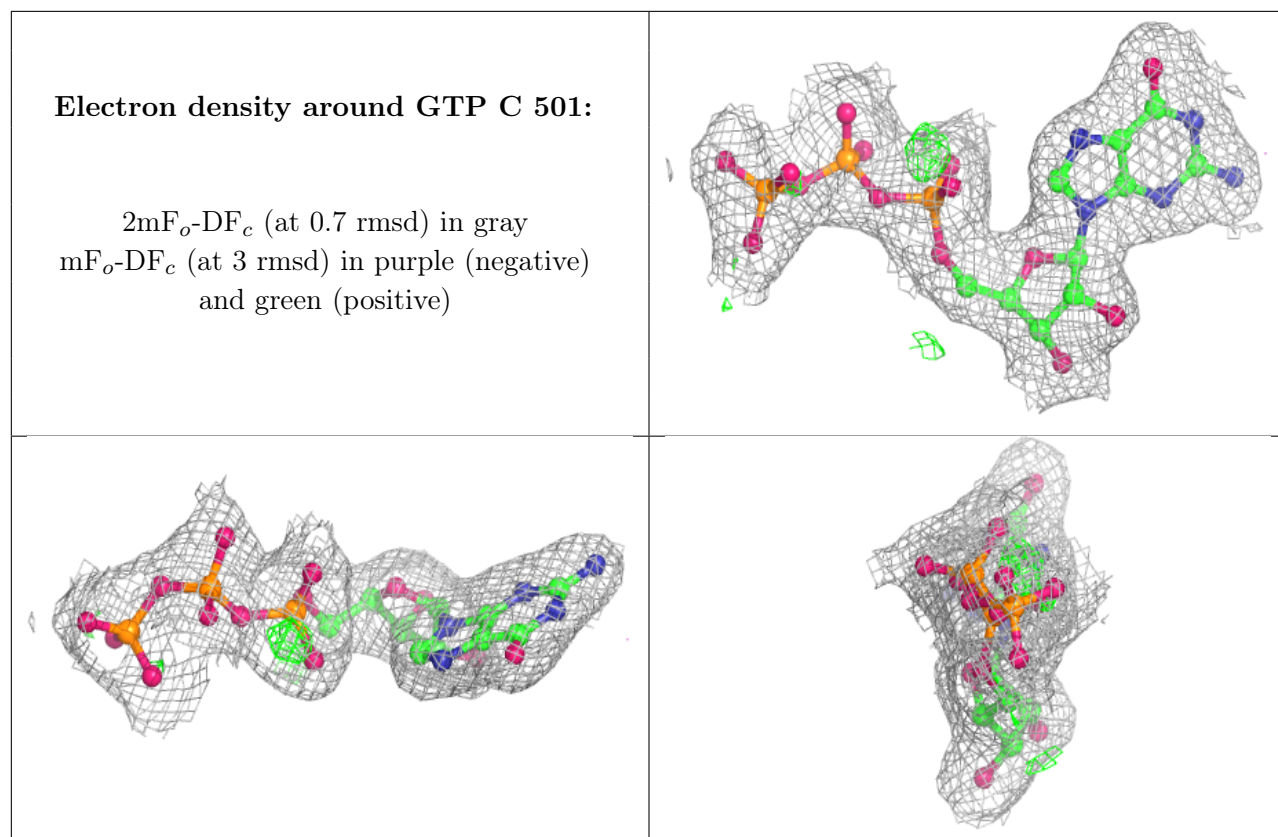




Electron density around GDP B 501:

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





6.5 Other polymers [i](#)

There are no such residues in this entry.