



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 12, 2026 – 06:35 AM UTC

PDB ID : 6BR1 / pdb_00006br1
Title : Tubulin-RB3_SLD-TTL in complex with heterocyclic pyrimidine compound 4a
Authors : Kumar, G.; Wang, Y.; Li, W.; White, S.W.
Deposited on : 2017-11-29
Resolution : 2.30 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

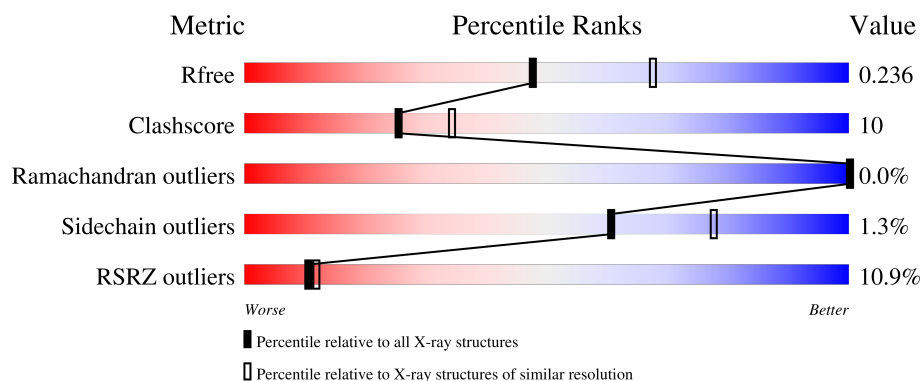
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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	450	4% 80%17%..
1	C	450	3% 82%15%.
2	B	445	7% 80%16%.
2	D	445	15% 77%17%5%
3	E	143	7% 62%21%.15%

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Mol	Chain	Length	Quality of chain
4	F	384	26% 63% 23% 14%

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 18174 atoms, of which 14 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
1	A	437	Total	C	N	O	S	0	0	0
			3416	2163	581	650	22			
1	C	440	Total	C	N	O	S	0	0	0
			3437	2175	584	656	22			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	427	Total	C	N	O	S	0	0	0
			3361	2110	576	649	26			
2	D	421	Total	C	N	O	S	0	0	0
			3305	2078	562	639	26			

- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	121	Total	C	N	O	S	0	0	0
			1000	617	181	197	5			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	3	MET	-	expression tag	UNP Q9H169
E	4	ALA	-	expression tag	UNP Q9H169

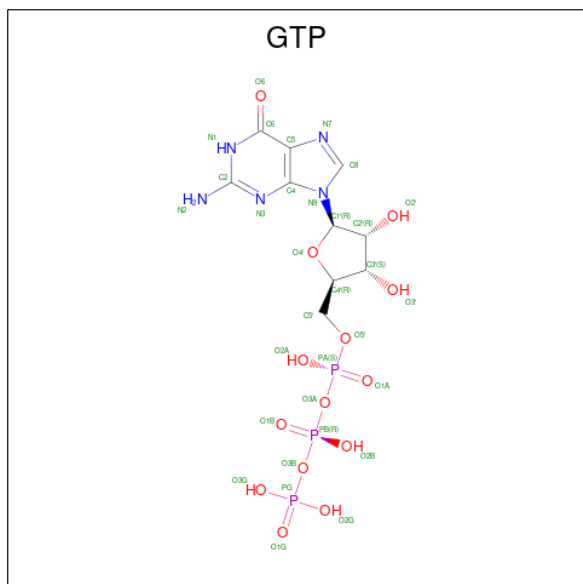
- Molecule 4 is a protein called Tubulin tyrosine ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	332	Total	C	N	O	S	0	0	0
			2717	1743	467	493	14			

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 (CCD ID: 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		

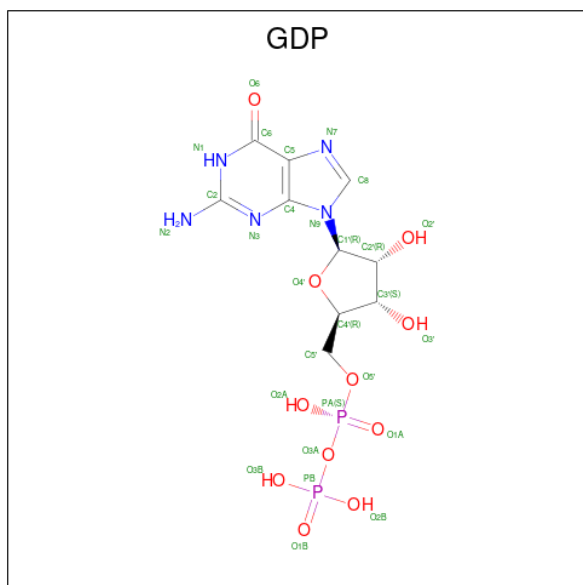
- Molecule 6 is CALCIUM ION (CCD ID: CA) (formula: Ca).

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

- Molecule 7 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

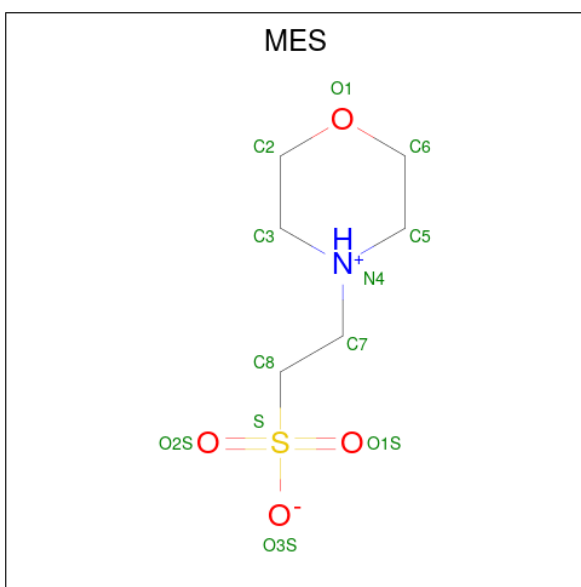
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Mg 1 1	0	0
7	B	1	Total Mg 1 1	0	0
7	C	1	Total Mg 1 1	0	0
7	F	1	Total Mg 1 1	0	0

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



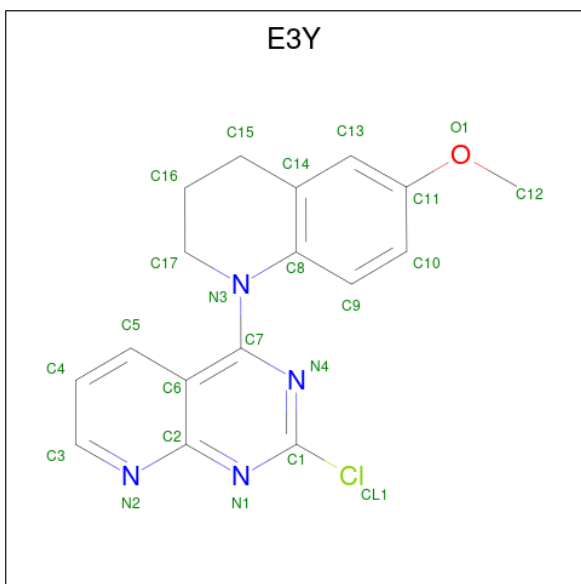
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	1	Total C N O P 28 10 5 11 2	0	0
8	D	1	Total C N O P 28 10 5 11 2	0	0

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



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

- Molecule 10 is 2-chloro-4-(6-methoxy-3,4-dihydroquinolin-1(2H)-yl)pyrido[2,3-d]pyrimidine (CCD ID: E3Y) (formula: C₁₇H₁₅ClN₄O) (labeled as "Ligand of Interest" by depositor).



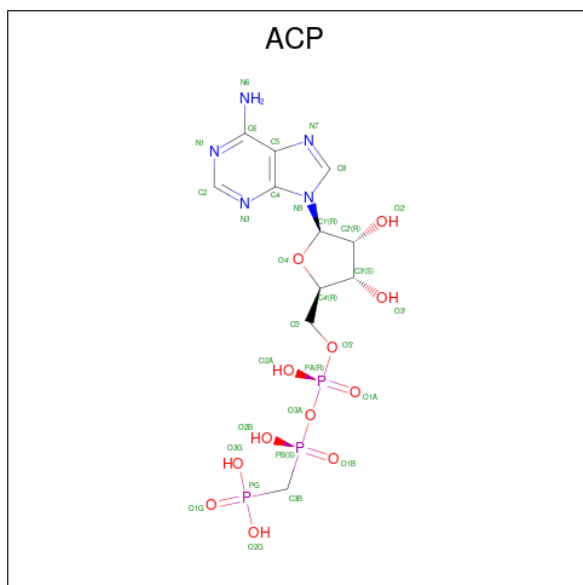
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
10	B	1	Total	C	Cl	N	O	0	0
			23	17	1	4	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
10	D	1	Total	C	Cl	N	O	0	0
			23	17	1	4	1		

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



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
11	F	1	Total	C	H	N	O	P	0	0
			45	11	14	5	12	3		

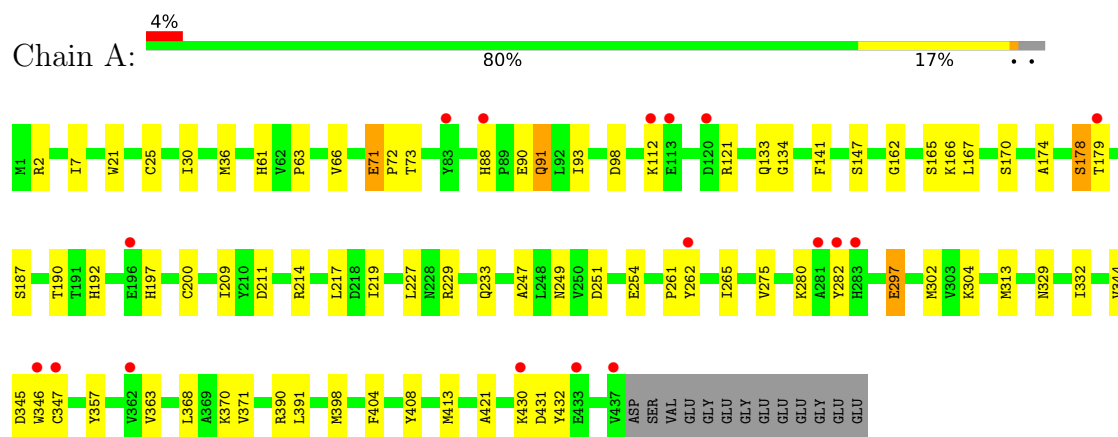
- Molecule 12 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	A	165	Total	O	0	0
			165	165		
12	B	127	Total	O	0	0
			127	127		
12	C	251	Total	O	0	0
			251	251		
12	D	62	Total	O	0	0
			62	62		
12	E	30	Total	O	0	0
			30	30		
12	F	62	Total	O	0	0
			62	62		

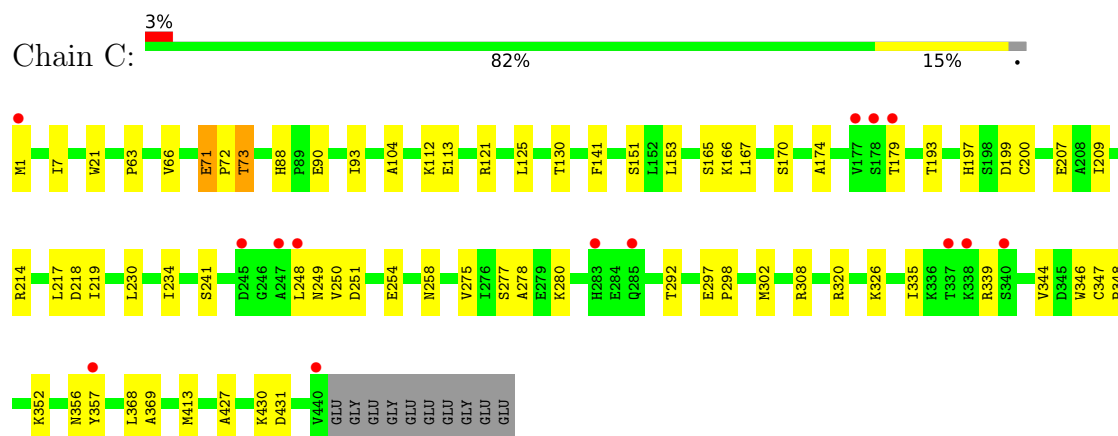
3 Residue-property plots [i](#)

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.

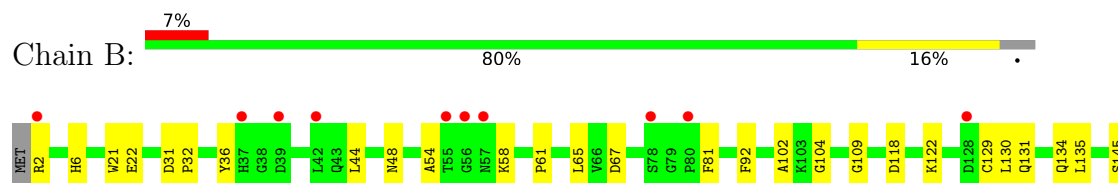
- Molecule 1: Tubulin alpha-1B chain

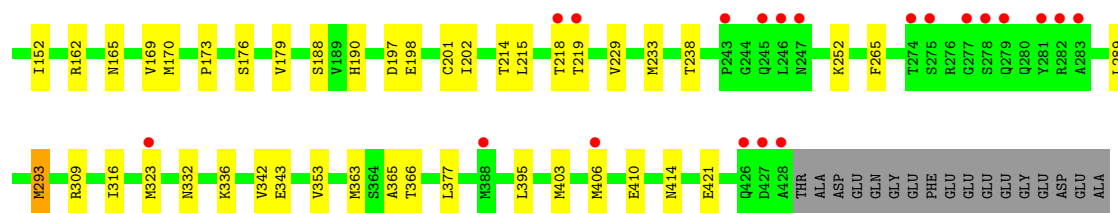


- Molecule 1: Tubulin alpha-1B chain

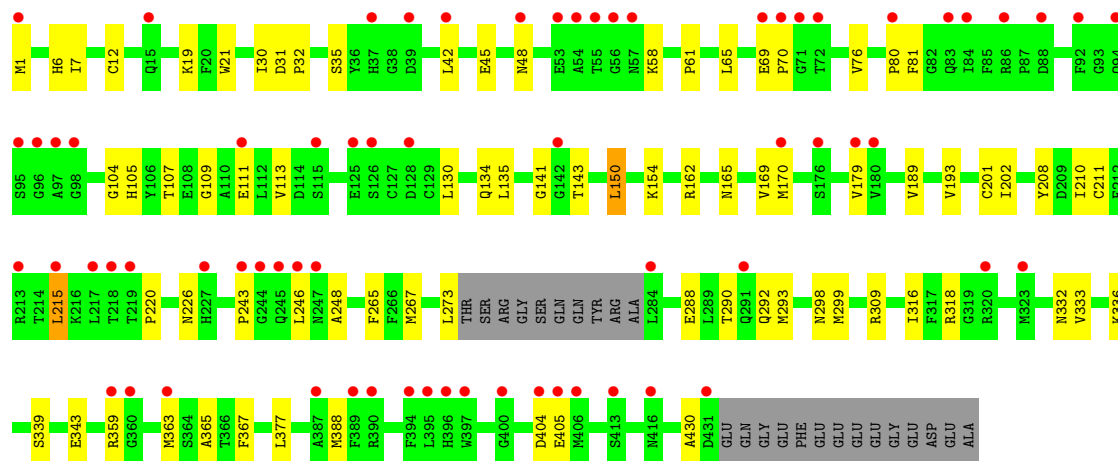
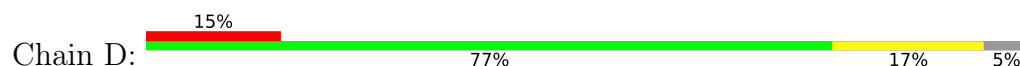


- Molecule 2: Tubulin beta-2B chain

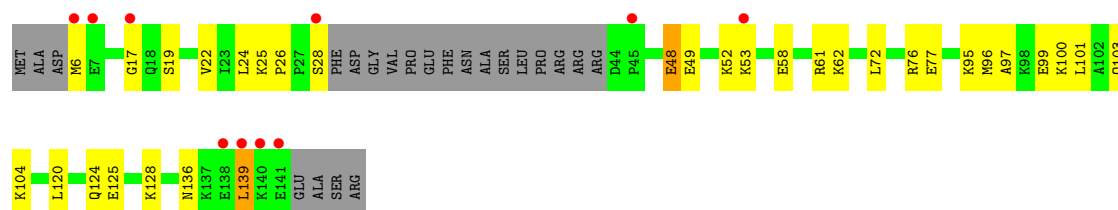




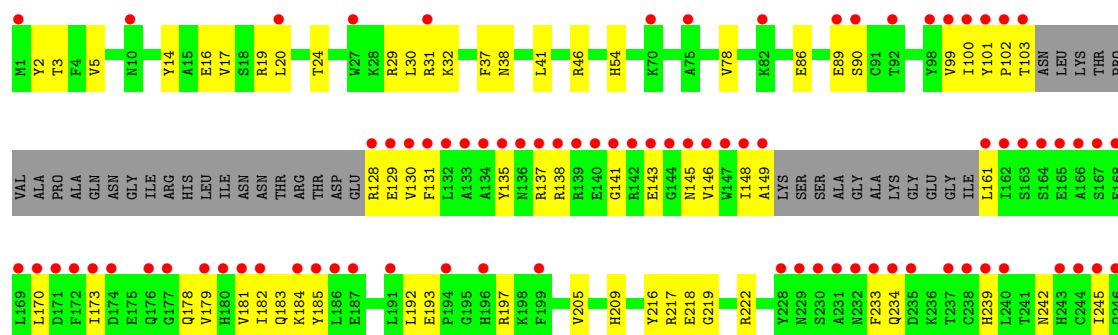
• Molecule 2: Tubulin beta-2B chain

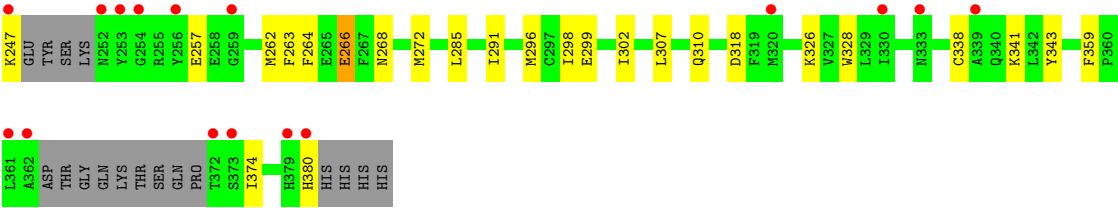


• Molecule 3: Stathmin-4



• 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	104.93Å 157.61Å 180.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.64 – 2.30 49.64 – 2.30	Depositor EDS
% Data completeness (in resolution range)	97.7 (49.64-2.30) 97.6 (49.64-2.30)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.89 (at 2.32Å)	Xtriage
Refinement program	PHENIX 1.11.1 _2575	Depositor
R, R_{free}	0.194 , 0.235 0.195 , 0.236	Depositor DCC
R_{free} test set	7577 reflections (5.70%)	wwPDB-VP
Wilson B-factor (Å ²)	31.5	Xtriage
Anisotropy	0.047	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 46.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	18174	wwPDB-VP
Average B, all atoms (Å ²)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.51% 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: ACP, MG, CA, MES, E3Y, GTP, 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	0.16	0/3494	0.39	0/4743
1	C	0.19	0/3515	0.41	0/4772
2	B	0.17	0/3436	0.37	0/4654
2	D	0.15	0/3378	0.35	0/4577
3	E	0.15	0/1008	0.29	0/1337
4	F	0.13	0/2779	0.34	0/3756
All	All	0.16	0/17610	0.37	0/23839

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	3416	0	3330	68	0
1	C	3437	0	3348	50	0
2	B	3361	0	3238	58	0
2	D	3305	0	3179	62	0
3	E	1000	0	1018	26	0
4	F	2717	0	2670	74	0
5	A	32	0	12	1	0

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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	C	1	0	0	0	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	F	1	0	0	0	0
8	B	28	0	12	0	0
8	D	28	0	12	4	0
9	B	24	0	24	2	0
10	B	23	0	0	0	0
10	D	23	0	0	0	0
11	F	31	14	13	2	0
12	A	165	0	0	3	0
12	B	127	0	0	3	0
12	C	251	0	0	2	0
12	D	62	0	0	0	0
12	E	30	0	0	0	0
12	F	62	0	0	2	0
All	All	18160	14	16868	329	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 10.

All (329) 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:170:MET:HE2	2:D:377:LEU:HD21	1.42	0.99
4:F:149:ALA:HB3	4:F:161:LEU:HB3	1.48	0.95
1:C:71:GLU:OE2	1:C:73:THR:HB	1.66	0.93
1:C:241:SER:HA	1:C:249:ASN:HD21	1.33	0.90
1:C:71:GLU:HG2	1:C:72:PRO:HD2	1.54	0.89
2:B:170:MET:HE2	2:B:377:LEU:HD21	1.53	0.87
2:B:238:THR:HB	2:B:316:ILE:HD13	1.57	0.84
2:B:238:THR:HB	2:B:316:ILE:CD1	2.08	0.83
4:F:102:PRO:HB3	4:F:173:ILE:HG22	1.63	0.81
4:F:209:HIS:HB2	4:F:310:GLN:HG3	1.61	0.80
2:D:290:THR:HG22	2:D:333:VAL:HG21	1.65	0.78
1:A:71:GLU:HG2	1:A:72:PRO:HD2	1.66	0.78
4:F:3:THR:HG23	4:F:38:ASN:H	1.49	0.78
1:C:427:ALA:O	1:C:430:LYS:HG3	1.85	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:36:TYR:CZ	2:B:44:LEU:HD11	2.21	0.76
3:E:97:ALA:HA	3:E:100:LYS:HE3	1.69	0.75
1:A:211:ASP:OD1	1:A:304:LYS:NZ	2.20	0.73
4:F:209:HIS:HB2	4:F:310:GLN:CG	2.18	0.73
1:A:71:GLU:OE1	1:A:73:THR:OG1	2.03	0.72
1:C:71:GLU:HG2	1:C:72:PRO:CD	2.19	0.72
2:B:316:ILE:CG2	2:B:366:THR:HB	2.19	0.72
3:E:62:LYS:HA	3:E:62:LYS:HE2	1.71	0.71
1:A:88:HIS:O	1:A:91:GLN:HG2	1.91	0.71
2:D:134:GLN:HA	2:D:165:ASN:O	1.91	0.70
4:F:128:ARG:HD3	4:F:170:LEU:CD1	2.21	0.70
4:F:197:ARG:NH1	4:F:257:GLU:OE1	2.23	0.70
1:A:345:ASP:HB3	3:E:28:SER:HB3	1.74	0.70
4:F:128:ARG:HD3	4:F:170:LEU:HD13	1.74	0.70
4:F:247:LYS:H	4:F:247:LYS:HD3	1.56	0.70
2:D:290:THR:CG2	2:D:333:VAL:HG21	2.23	0.69
2:B:170:MET:HG3	2:B:377:LEU:HD11	1.75	0.69
2:D:143:THR:HB	8:D:501:GDP:O1B	1.92	0.68
2:D:179:VAL:O	2:D:388:MET:HE1	1.93	0.68
1:C:249:ASN:ND2	1:C:356:ASN:OD1	2.26	0.68
4:F:3:THR:HG23	4:F:38:ASN:N	2.09	0.67
2:D:35:SER:OG	2:D:58:LYS:HE2	1.93	0.67
1:A:297:GLU:HG3	12:F:541:HOH:O	1.95	0.66
2:B:170:MET:HE2	2:B:377:LEU:CD2	2.24	0.66
3:E:100:LYS:HD2	3:E:101:LEU:N	2.11	0.65
2:D:104:GLY:O	2:D:109:GLY:HA3	1.96	0.65
2:D:170:MET:HG3	2:D:377:LEU:HD11	1.78	0.65
3:E:139:LEU:HD13	3:E:139:LEU:O	1.97	0.65
1:A:229:ARG:HD3	1:A:363:VAL:HG21	1.79	0.64
2:D:141:GLY:HA3	8:D:501:GDP:O3A	1.97	0.64
2:D:107:THR:O	2:D:111:GLU:HG3	1.97	0.64
1:A:71:GLU:HG2	1:A:72:PRO:CD	2.28	0.64
1:C:88:HIS:HE1	1:C:90:GLU:HG3	1.62	0.64
2:B:293:MET:HE3	2:B:365:ALA:HB1	1.80	0.64
2:D:208:TYR:CE2	2:D:220:PRO:HD2	2.33	0.63
4:F:31:ARG:HH21	4:F:32:LYS:HG3	1.61	0.63
1:C:88:HIS:CE1	1:C:90:GLU:HG3	2.34	0.63
3:E:52:LYS:HG3	3:E:53:LYS:N	2.13	0.63
2:D:80:PRO:O	2:D:81:PHE:HB2	1.98	0.62
1:C:248:LEU:HD12	1:C:357:TYR:OH	1.98	0.62
4:F:192:LEU:HD13	4:F:262:MET:HE1	1.81	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:275:VAL:HG13	1:C:368:LEU:HD21	1.82	0.62
4:F:182:ILE:HD12	4:F:182:ILE:O	2.01	0.61
2:D:293:MET:CG	2:D:367:PHE:HB2	2.29	0.61
2:B:406:MET:HE3	2:B:410:GLU:HG3	1.82	0.61
2:B:421:GLU:OE2	12:B:601:HOH:O	2.16	0.61
2:D:170:MET:CE	2:D:377:LEU:HD21	2.27	0.61
2:B:170:MET:CE	2:B:377:LEU:HD21	2.28	0.61
2:D:293:MET:HG2	2:D:367:PHE:HB2	1.83	0.61
4:F:222:ARG:NH1	4:F:318:ASP:OD2	2.34	0.60
2:D:21:TRP:CZ3	2:D:61:PRO:HB3	2.36	0.60
1:C:250:VAL:HG11	1:C:352:LYS:HE3	1.83	0.60
2:B:48:ASN:OD1	12:B:602:HOH:O	2.16	0.60
4:F:205:VAL:HG21	4:F:291:ILE:HD13	1.85	0.59
2:D:45:GLU:OE1	2:D:243:PRO:HG3	2.01	0.59
4:F:146:VAL:HG21	4:F:233:PHE:CE2	2.38	0.59
1:A:262:TYR:HE2	1:A:346:TRP:CZ2	2.20	0.59
1:A:112:LYS:HE2	3:E:61:ARG:NH2	2.18	0.59
2:B:134:GLN:HA	2:B:165:ASN:O	2.03	0.58
1:C:104:ALA:HB2	1:C:413:MET:SD	2.44	0.58
1:C:218:ASP:OD2	1:C:280:LYS:NZ	2.26	0.58
2:D:309:ARG:NH1	2:D:339:SER:O	2.36	0.58
4:F:137:ARG:HH11	4:F:141:GLY:H	1.51	0.58
2:D:404:ASP:OD2	2:D:405:GLU:N	2.36	0.58
1:A:166:LYS:HE2	1:A:197:HIS:O	2.03	0.58
1:A:398:MET:HE3	1:A:404:PHE:CD2	2.38	0.58
1:A:247:ALA:HB3	3:E:19:SER:OG	2.03	0.58
2:B:135:LEU:HD23	2:B:152:ILE:HD11	1.86	0.58
1:C:93:ILE:HD11	1:C:121:ARG:HG3	1.85	0.58
1:A:214:ARG:HG2	1:A:219:ILE:O	2.03	0.58
2:B:238:THR:CG2	2:B:316:ILE:HD11	2.33	0.58
2:B:118:ASP:O	2:B:122:LYS:HE2	2.03	0.57
2:B:67:ASP:O	2:B:92:PHE:HA	2.05	0.57
2:D:211:CYS:HA	2:D:215:LEU:HD23	1.87	0.57
2:D:1:MET:HB2	2:D:48:ASN:HD22	1.69	0.57
2:D:246:LEU:HD12	2:D:246:LEU:O	2.05	0.57
1:C:179:THR:HG21	12:C:676:HOH:O	2.03	0.56
2:D:105:HIS:O	2:D:150:LEU:HD13	2.05	0.56
3:E:62:LYS:HE2	3:E:62:LYS:CA	2.34	0.56
4:F:135:TYR:O	4:F:138:ARG:HB2	2.04	0.56
4:F:184:LYS:O	11:F:402:ACP:N6	2.38	0.56
1:A:88:HIS:CE1	1:A:90:GLU:HB2	2.41	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:219:GLY:HA3	4:F:264:PHE:CZ	2.41	0.56
4:F:197:ARG:HH12	4:F:257:GLU:CD	2.14	0.56
2:B:36:TYR:CE1	2:B:44:LEU:HD11	2.40	0.56
1:A:430:LYS:HD2	1:A:431:ASP:N	2.20	0.55
1:A:90:GLU:HG2	1:A:121:ARG:HD2	1.89	0.55
2:D:273:LEU:HD11	2:D:298:ASN:HA	1.89	0.55
4:F:102:PRO:HG3	4:F:178:GLN:O	2.07	0.55
1:A:249:ASN:N	1:A:254:GLU:OE2	2.39	0.54
2:B:197:ASP:OD1	9:B:502:MES:H62	2.07	0.54
4:F:137:ARG:HD2	4:F:137:ARG:O	2.07	0.54
1:C:292:THR:HG22	1:C:335:ILE:CD1	2.38	0.54
2:B:309:ARG:NH2	2:B:342:VAL:HA	2.22	0.54
2:D:246:LEU:HD13	2:D:248:ALA:HB2	1.88	0.54
1:A:280:LYS:HE3	1:A:282:TYR:O	2.07	0.54
1:C:320:ARG:HA	1:C:356:ASN:O	2.07	0.54
4:F:129:GLU:HG2	4:F:130:VAL:N	2.22	0.54
2:B:6:HIS:CD2	2:B:21:TRP:HE1	2.25	0.54
4:F:16:GLU:OE1	4:F:19:ARG:NH1	2.40	0.54
4:F:20:LEU:O	4:F:24:THR:HG23	2.06	0.54
4:F:138:ARG:HB3	4:F:145:ASN:CG	2.32	0.54
2:B:293:MET:CE	2:B:365:ALA:HB1	2.38	0.53
2:D:343:GLU:CG	2:D:430:ALA:HB2	2.38	0.53
3:E:72:LEU:O	3:E:76:ARG:HG2	2.07	0.53
1:A:233:GLN:HG3	1:A:368:LEU:CD1	2.38	0.53
1:C:174:ALA:HB1	1:C:207:GLU:HB2	1.90	0.53
1:A:262:TYR:CE2	1:A:346:TRP:CZ2	2.96	0.53
2:B:238:THR:HG21	2:B:316:ILE:HD11	1.91	0.53
1:A:370:LYS:HE2	1:A:371:VAL:O	2.08	0.53
1:A:398:MET:HE3	1:A:404:PHE:HD2	1.74	0.53
2:D:1:MET:HB2	2:D:48:ASN:ND2	2.23	0.53
3:E:25:LYS:HG2	3:E:26:PRO:O	2.07	0.53
1:A:261:PRO:HD2	12:A:645:HOH:O	2.09	0.52
4:F:247:LYS:HD3	4:F:247:LYS:N	2.24	0.52
4:F:100:ILE:HD12	4:F:128:ARG:N	2.24	0.52
4:F:101:TYR:HE1	4:F:179:VAL:HG21	1.75	0.52
2:D:65:LEU:CD2	2:D:76:VAL:HG11	2.38	0.52
2:D:113:VAL:HG21	2:D:150:LEU:HD23	1.90	0.52
2:D:226:ASN:OD1	8:D:501:GDP:N1	2.24	0.52
4:F:209:HIS:CB	4:F:310:GLN:HG3	2.38	0.52
1:A:90:GLU:HG2	1:A:121:ARG:CD	2.40	0.52
1:C:249:ASN:HD22	1:C:356:ASN:CG	2.16	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:65:LEU:HD23	2:D:76:VAL:HG11	1.91	0.52
2:D:169:VAL:HA	2:D:202:ILE:O	2.10	0.52
1:A:233:GLN:HG3	1:A:368:LEU:HD12	1.91	0.52
2:B:21:TRP:CZ3	2:B:61:PRO:HB3	2.46	0.51
2:B:104:GLY:O	2:B:109:GLY:HA3	2.10	0.51
2:B:332:ASN:ND2	2:B:336:LYS:HE2	2.26	0.51
1:A:21:TRP:CZ3	1:A:63:PRO:HB3	2.46	0.51
4:F:262:MET:HG3	4:F:266:GLU:OE2	2.11	0.51
1:C:277:SER:OG	1:C:280:LYS:HG3	2.11	0.51
3:E:125:GLU:OE1	3:E:128:LYS:HE2	2.11	0.51
1:C:335:ILE:HG23	1:C:339:ARG:HG3	1.92	0.51
4:F:318:ASP:OD2	11:F:402:ACP:O1G	2.29	0.51
1:A:174:ALA:O	1:A:178:SER:HB3	2.11	0.51
2:B:179:VAL:HG12	1:C:348:PRO:HG2	1.92	0.50
2:B:238:THR:CB	2:B:316:ILE:CD1	2.87	0.50
1:C:1:MET:HB3	1:C:130:THR:OG1	2.10	0.50
1:C:427:ALA:HA	1:C:430:LYS:HG3	1.92	0.50
1:A:187:SER:HB3	1:A:391:LEU:HD21	1.93	0.50
1:C:21:TRP:CZ3	1:C:63:PRO:HB3	2.46	0.50
1:C:214:ARG:HG2	1:C:219:ILE:O	2.10	0.50
1:A:209:ILE:HD11	1:A:302:MET:SD	2.51	0.50
2:B:289:LEU:HD12	2:B:363:MET:HE2	1.92	0.50
1:C:230:LEU:O	1:C:234:ILE:HD12	2.12	0.50
2:B:309:ARG:NH2	2:B:343:GLU:OE1	2.38	0.50
2:B:201:CYS:SG	2:B:265:PHE:HB3	2.52	0.50
4:F:205:VAL:CG2	4:F:291:ILE:HD13	2.41	0.50
4:F:3:THR:HG23	4:F:37:PHE:HA	1.95	0.49
4:F:129:GLU:HG2	4:F:130:VAL:H	1.77	0.49
1:A:344:VAL:CG2	1:A:347:CYS:HB2	2.42	0.49
2:D:267:MET:HE1	2:D:299:MET:HG3	1.93	0.49
3:E:6:MET:HE2	3:E:24:LEU:HD21	1.93	0.49
3:E:120:LEU:O	3:E:124:GLN:HG2	2.12	0.49
4:F:247:LYS:H	4:F:247:LYS:CD	2.26	0.49
1:A:344:VAL:HG21	1:A:346:TRP:CZ2	2.46	0.49
2:B:145:SER:OG	2:B:188:SER:OG	2.29	0.49
2:B:145:SER:HG	2:B:188:SER:HG	1.58	0.48
3:E:6:MET:HE2	3:E:24:LEU:CD2	2.42	0.48
4:F:137:ARG:NH2	4:F:143:GLU:OE2	2.46	0.48
1:C:209:ILE:HD11	1:C:302:MET:SD	2.53	0.48
2:B:323:MET:HG3	2:B:353:VAL:HG21	1.94	0.48
1:C:112:LYS:NZ	1:C:113:GLU:OE2	2.46	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:1:MET:CB	2:D:48:ASN:ND2	2.77	0.48
2:D:7:ILE:O	2:D:135:LEU:HA	2.14	0.48
2:B:173:PRO:HA	2:B:176:SER:HB2	1.96	0.48
3:E:96:MET:O	3:E:100:LYS:HG3	2.13	0.48
2:B:22:GLU:HG2	2:B:81:PHE:CD1	2.49	0.48
4:F:192:LEU:HD13	4:F:262:MET:CE	2.44	0.48
4:F:245:ILE:CG2	4:F:245:ILE:O	2.62	0.48
1:A:344:VAL:HG23	1:A:347:CYS:HB2	1.96	0.47
2:B:214:THR:HG22	2:B:215:LEU:HD23	1.95	0.47
1:C:427:ALA:C	1:C:430:LYS:HG3	2.39	0.47
1:A:93:ILE:HD11	1:A:121:ARG:HG3	1.96	0.47
1:A:430:LYS:HD2	1:A:430:LYS:C	2.39	0.47
1:C:254:GLU:HG2	1:C:352:LYS:HE2	1.96	0.47
1:C:427:ALA:HA	1:C:430:LYS:CG	2.44	0.47
3:E:58:GLU:HG3	3:E:61:ARG:NH2	2.30	0.47
4:F:184:LYS:HD2	4:F:185:TYR:N	2.28	0.47
1:A:179:THR:HG21	12:A:638:HOH:O	2.14	0.47
1:A:187:SER:CB	1:A:391:LEU:HD21	2.44	0.47
1:A:332:ILE:HG22	3:E:6:MET:HE1	1.97	0.47
2:D:19:LYS:NZ	2:D:226:ASN:HB2	2.30	0.47
2:D:31:ASP:HB2	2:D:32:PRO:CD	2.45	0.47
1:A:2:ARG:HB3	1:A:133:GLN:HG2	1.97	0.47
2:B:2:ARG:NH1	2:B:129:CYS:SG	2.88	0.47
3:E:58:GLU:HG3	3:E:61:ARG:HH21	1.80	0.47
3:E:48:GLU:HG2	3:E:49:GLU:N	2.30	0.47
2:D:318:ARG:O	2:D:363:MET:HA	2.15	0.47
1:A:265:ILE:HG23	1:A:432:TYR:CE1	2.50	0.47
2:B:135:LEU:CD2	2:B:152:ILE:HD11	2.44	0.47
2:B:219:THR:HG21	1:C:326:LYS:HA	1.97	0.46
1:A:71:GLU:HG2	1:A:72:PRO:N	2.30	0.46
4:F:78:VAL:HG21	4:F:181:VAL:HG11	1.97	0.46
2:B:252:LYS:NZ	12:B:605:HOH:O	2.34	0.46
2:D:21:TRP:CH2	2:D:61:PRO:HB3	2.50	0.46
2:D:215:LEU:N	2:D:215:LEU:HD22	2.30	0.46
4:F:193:GLU:OE1	4:F:193:GLU:HA	2.15	0.46
4:F:146:VAL:HG21	4:F:233:PHE:CZ	2.49	0.46
4:F:14:TYR:HB3	4:F:41:LEU:HD13	1.97	0.46
1:C:298:PRO:HG2	1:C:308:ARG:NH2	2.30	0.46
4:F:217:ARG:NH2	4:F:374:ILE:HG22	2.31	0.46
1:A:408:TYR:HB3	1:A:413:MET:HE2	1.97	0.46
2:D:6:HIS:CD2	2:D:21:TRP:HE1	2.34	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:377:LEU:C	2:D:377:LEU:HD23	2.40	0.46
1:A:209:ILE:HG22	1:A:227:LEU:HD22	1.97	0.46
2:B:31:ASP:HB2	2:B:32:PRO:CD	2.46	0.46
1:A:344:VAL:HG21	1:A:346:TRP:CE2	2.51	0.45
2:D:208:TYR:HE2	2:D:220:PRO:HD2	1.78	0.45
2:D:343:GLU:HG2	2:D:430:ALA:HB2	1.99	0.45
4:F:216:TYR:CZ	4:F:218:GLU:HB2	2.52	0.45
1:A:88:HIS:N	1:A:91:GLN:OE1	2.45	0.45
1:A:398:MET:CE	1:A:404:PHE:CD2	2.98	0.45
2:B:31:ASP:HB2	2:B:32:PRO:HD2	1.99	0.45
4:F:14:TYR:HA	4:F:17:VAL:HB	1.98	0.45
4:F:29:ARG:HH21	4:F:31:ARG:HH22	1.65	0.45
2:B:54:ALA:HB3	2:B:58:LYS:HB2	1.98	0.45
2:B:65:LEU:N	2:B:65:LEU:HD12	2.32	0.45
2:B:316:ILE:HG23	2:B:366:THR:HB	1.99	0.45
4:F:326:LYS:HD2	4:F:328:TRP:CE2	2.51	0.45
1:A:141:PHE:O	1:A:147:SER:HB3	2.17	0.45
1:A:192:HIS:CG	1:A:421:ALA:HA	2.52	0.45
1:C:166:LYS:HE2	1:C:197:HIS:O	2.17	0.45
1:C:217:LEU:HD21	1:C:368:LEU:HD23	1.98	0.45
1:A:147:SER:HB2	1:A:190:THR:HB	1.98	0.45
2:B:130:LEU:O	2:B:162:ARG:NH1	2.40	0.45
4:F:46:ARG:NH2	4:F:46:ARG:HB3	2.31	0.45
1:A:265:ILE:HG23	1:A:432:TYR:CZ	2.51	0.45
1:A:2:ARG:CB	1:A:133:GLN:HG2	2.47	0.44
1:C:71:GLU:HG2	1:C:72:PRO:N	2.32	0.44
4:F:131:PHE:CZ	4:F:182:ILE:HD13	2.52	0.44
1:A:7:ILE:HG12	1:A:66:VAL:CG1	2.47	0.44
1:A:167:LEU:HG	1:A:200:CYS:HB3	2.00	0.44
1:A:217:LEU:HD21	1:A:368:LEU:HD23	1.98	0.44
2:D:267:MET:HE2	2:D:267:MET:HB3	1.74	0.44
2:D:31:ASP:HB2	2:D:32:PRO:HD2	1.99	0.44
2:D:189:VAL:O	2:D:193:VAL:HG23	2.17	0.44
4:F:99:VAL:O	4:F:100:ILE:HD13	2.18	0.44
1:A:262:TYR:CE2	1:A:346:TRP:CH2	3.06	0.44
2:B:169:VAL:HA	2:B:202:ILE:O	2.17	0.44
2:B:332:ASN:CG	2:B:336:LYS:HE2	2.43	0.44
4:F:268:ASN:O	4:F:272:MET:HG3	2.18	0.44
2:B:190:HIS:ND1	2:B:414:ASN:ND2	2.66	0.43
2:D:42:LEU:N	2:D:42:LEU:HD12	2.32	0.43
2:D:65:LEU:N	2:D:65:LEU:HD12	2.33	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:297:GLU:HB3	12:C:606:HOH:O	2.18	0.43
9:B:503:MES:H51	9:B:503:MES:H81	1.47	0.43
4:F:128:ARG:HD3	4:F:170:LEU:HD11	1.99	0.43
1:A:346:TRP:CZ3	1:A:347:CYS:SG	3.08	0.43
1:A:390:ARG:HD2	4:F:54:HIS:CD2	2.52	0.43
1:C:7:ILE:HG21	1:C:153:LEU:HD21	2.01	0.43
2:D:19:LYS:HZ2	2:D:226:ASN:HB2	1.83	0.43
2:D:130:LEU:O	2:D:162:ARG:NH1	2.48	0.43
2:B:44:LEU:N	2:B:44:LEU:HD12	2.34	0.43
1:A:141:PHE:CE1	1:A:170:SER:HB3	2.54	0.43
3:E:25:LYS:HB3	3:E:25:LYS:HE2	1.75	0.43
4:F:242:ASN:OD1	4:F:242:ASN:N	2.51	0.43
1:A:357:TYR:CE2	3:E:17:GLY:HA2	2.54	0.43
2:B:102:ALA:HB2	2:B:403:MET:SD	2.59	0.43
4:F:5:VAL:HG12	4:F:30:LEU:HB2	2.01	0.43
3:E:124:GLN:HA	3:E:124:GLN:NE2	2.33	0.43
1:A:98:ASP:HB2	5:A:501:GTP:O3G	2.18	0.42
1:C:174:ALA:CB	1:C:207:GLU:HB2	2.49	0.42
4:F:296:MET:HE2	4:F:380:HIS:HB2	2.02	0.42
4:F:296:MET:HE1	4:F:299:GLU:OE2	2.19	0.42
1:A:25:CYS:HB3	1:A:30:ILE:O	2.19	0.42
2:D:316:ILE:O	2:D:365:ALA:HA	2.20	0.42
4:F:32:LYS:HB3	4:F:32:LYS:HE2	1.74	0.42
1:A:329:ASN:OD1	3:E:22:VAL:HG21	2.19	0.42
2:D:12:CYS:HB2	8:D:501:GDP:C8	2.54	0.42
4:F:338:CYS:HB3	4:F:343:TYR:CE2	2.55	0.42
2:B:179:VAL:HG22	1:C:258:ASN:OD1	2.19	0.42
1:C:430:LYS:HD2	1:C:431:ASP:N	2.35	0.42
1:A:275:VAL:HG13	1:A:368:LEU:HD21	2.01	0.42
2:B:2:ARG:HB3	2:B:131:GLN:CG	2.50	0.42
3:E:103:GLN:HG3	3:E:104:LYS:N	2.35	0.42
4:F:86:GLU:OE1	4:F:86:GLU:N	2.36	0.42
2:B:377:LEU:C	2:B:377:LEU:HD23	2.45	0.41
2:D:69:GLU:HA	2:D:70:PRO:HD3	1.92	0.41
4:F:148:ILE:HG22	4:F:183:GLN:O	2.20	0.41
1:C:167:LEU:HG	1:C:200:CYS:HB3	2.01	0.41
2:D:359:ARG:HA	2:D:359:ARG:HD3	1.87	0.41
1:C:151:SER:HB2	1:C:193:THR:CG2	2.50	0.41
4:F:185:TYR:OH	4:F:239:HIS:ND1	2.33	0.41
1:C:21:TRP:CE3	1:C:63:PRO:HB3	2.56	0.41
1:C:141:PHE:CE1	1:C:170:SER:HB3	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:165:SER:HA	1:C:199:ASP:OD2	2.21	0.41
1:C:278:ALA:HA	1:C:369:ALA:HB2	2.01	0.41
2:D:293:MET:SD	2:D:365:ALA:HB1	2.60	0.41
1:A:398:MET:CE	1:A:404:PHE:HD2	2.33	0.41
4:F:285:LEU:HB2	12:F:531:HOH:O	2.21	0.41
2:B:229:VAL:O	2:B:233:MET:HG3	2.21	0.41
2:D:210:ILE:HG22	2:D:215:LEU:CD2	2.50	0.41
4:F:209:HIS:HB2	4:F:310:GLN:HG2	2.01	0.41
4:F:216:TYR:CE2	4:F:218:GLU:HB2	2.55	0.41
4:F:298:ILE:HD12	4:F:302:ILE:HD13	2.02	0.41
2:B:197:ASP:C	2:B:198:GLU:HG3	2.46	0.41
1:C:66:VAL:HG23	1:C:125:LEU:CD1	2.51	0.41
2:D:201:CYS:SG	2:D:265:PHE:HB3	2.61	0.41
2:D:215:LEU:HD22	2:D:215:LEU:H	1.85	0.41
2:D:332:ASN:OD1	2:D:336:LYS:HE2	2.21	0.41
4:F:263:PHE:CZ	4:F:341:LYS:HD3	2.56	0.41
4:F:31:ARG:HA	4:F:31:ARG:NH1	2.36	0.41
4:F:31:ARG:NE	4:F:32:LYS:H	2.19	0.41
1:A:251:ASP:HB2	12:A:698:HOH:O	2.20	0.40
4:F:263:PHE:CE2	4:F:341:LYS:HD3	2.57	0.40
1:A:36:MET:HB3	1:A:61:HIS:CE1	2.56	0.40
1:C:344:VAL:HG21	1:C:346:TRP:CE2	2.56	0.40
2:D:288:GLU:O	2:D:292:GLN:HG3	2.22	0.40
3:E:95:LYS:O	3:E:99:GLU:HG3	2.21	0.40
1:A:134:GLY:HA3	1:A:165:SER:O	2.21	0.40
4:F:2:TYR:CZ	4:F:359:PHE:HB3	2.56	0.40
1:A:265:ILE:HG21	1:A:313:MET:HE1	2.04	0.40
2:B:395:LEU:HA	2:B:395:LEU:HD12	1.89	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	435/450 (97%)	428 (98%)	6 (1%)	1 (0%)	43	55
1	C	438/450 (97%)	429 (98%)	9 (2%)	0	100	100
2	B	425/445 (96%)	418 (98%)	7 (2%)	0	100	100
2	D	417/445 (94%)	408 (98%)	9 (2%)	0	100	100
3	E	117/143 (82%)	115 (98%)	2 (2%)	0	100	100
4	F	322/384 (84%)	303 (94%)	19 (6%)	0	100	100
All	All	2154/2317 (93%)	2101 (98%)	52 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	162	GLY

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	368/378 (97%)	364 (99%)	4 (1%)	65	81
1	C	371/378 (98%)	367 (99%)	4 (1%)	65	81
2	B	369/383 (96%)	367 (100%)	2 (0%)	81	90
2	D	362/383 (94%)	358 (99%)	4 (1%)	65	81
3	E	109/127 (86%)	105 (96%)	4 (4%)	30	45
4	F	296/342 (86%)	290 (98%)	6 (2%)	48	67
All	All	1875/1991 (94%)	1851 (99%)	24 (1%)	61	77

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	GLU
1	A	91	GLN
1	A	178	SER
1	A	297	GLU

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Mol	Chain	Res	Type
2	B	218	THR
2	B	293	MET
1	C	71	GLU
1	C	73	THR
1	C	251	ASP
1	C	347	CYS
2	D	30	ILE
2	D	150	LEU
2	D	154	LYS
2	D	215	LEU
3	E	48	GLU
3	E	77	GLU
3	E	136	ASN
3	E	139	LEU
4	F	89	GLU
4	F	90	SER
4	F	103	THR
4	F	234	GLN
4	F	266	GLU
4	F	307	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	216	ASN
1	A	309	HIS
2	B	99	ASN
2	B	245	GLN
2	B	291	GLN
2	B	329	GLN
2	B	347	ASN
1	C	107	HIS
1	C	249	ASN
1	C	256	GLN
1	C	356	ASN
2	D	37	HIS
2	D	48	ASN
2	D	165	ASN
4	F	306	HIS
4	F	333	ASN
4	F	379	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 15 ligands modelled in this entry, 6 are monoatomic - leaving 9 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	$\# Z > 2$
9	MES	B	503	-	12,12,12	2.34	1 (8%)	15,16,16	1.88	2 (13%)
8	GDP	D	501	-	29,30,30	1.21	4 (13%)	45,47,47	1.78	7 (15%)
10	E3Y	D	502	-	26,26,26	0.94	2 (7%)	32,37,37	1.55	5 (15%)
5	GTP	C	501	7	33,34,34	0.90	2 (6%)	50,54,54	1.52	10 (20%)
5	GTP	A	501	7	33,34,34	0.94	2 (6%)	50,54,54	1.51	10 (20%)
11	ACP	F	402	7	31,33,33	3.24	12 (38%)	47,52,52	2.02	12 (25%)
10	E3Y	B	505	-	26,26,26	0.93	2 (7%)	32,37,37	1.53	4 (12%)
9	MES	B	502	-	12,12,12	2.28	1 (8%)	15,16,16	1.78	3 (20%)
8	GDP	B	501	7	29,30,30	1.11	2 (6%)	45,47,47	1.76	7 (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
9	MES	B	503	-	-	1/6/14/14	0/1/1/1
8	GDP	D	501	-	-	5/16/32/32	0/3/3/3
10	E3Y	D	502	-	-	1/6/16/16	0/4/4/4
5	GTP	C	501	7	-	6/22/38/38	0/3/3/3
5	GTP	A	501	7	-	6/22/38/38	0/3/3/3
11	ACP	F	402	7	-	8/19/38/38	0/3/3/3
10	E3Y	B	505	-	-	2/6/16/16	0/4/4/4
9	MES	B	502	-	-	4/6/14/14	0/1/1/1
8	GDP	B	501	7	-	4/16/32/32	0/3/3/3

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	F	402	ACP	O4'-C1'	8.75	1.62	1.42
9	B	503	MES	C8-S	-7.82	1.66	1.77
9	B	502	MES	C8-S	-7.61	1.66	1.77
11	F	402	ACP	C2'-C1'	-7.17	1.31	1.53
11	F	402	ACP	PB-O3A	6.65	1.65	1.58
11	F	402	ACP	O4'-C4'	-6.36	1.30	1.45
11	F	402	ACP	PA-O3A	5.86	1.65	1.59
11	F	402	ACP	C6-N6	4.46	1.45	1.34
10	D	502	E3Y	C1-N1	3.32	1.32	1.30
10	B	505	E3Y	C1-N1	3.25	1.32	1.30
8	D	501	GDP	C5-C4	3.15	1.47	1.38
8	B	501	GDP	C5-C4	3.07	1.47	1.38
11	F	402	ACP	C5-C4	-2.92	1.33	1.39
11	F	402	ACP	O2'-C2'	2.74	1.49	1.43
11	F	402	ACP	O3'-C3'	-2.68	1.36	1.43
11	F	402	ACP	C5-N7	-2.59	1.34	1.39
8	D	501	GDP	C6-N1	-2.36	1.34	1.38
8	D	501	GDP	PA-O3A	2.31	1.62	1.59
10	B	505	E3Y	C7-N3	2.25	1.44	1.39
10	D	502	E3Y	C7-N3	2.21	1.44	1.39
5	A	501	GTP	PB-O3B	2.14	1.61	1.59
8	B	501	GDP	C6-N1	-2.13	1.34	1.38
11	F	402	ACP	C8-N9	-2.11	1.34	1.37
11	F	402	ACP	PB-O2B	-2.08	1.51	1.56
5	C	501	GTP	C2-N3	2.06	1.38	1.33
5	C	501	GTP	PB-O3B	2.06	1.61	1.59
8	D	501	GDP	C5-N7	-2.02	1.35	1.39
5	A	501	GTP	C2-N3	2.01	1.38	1.33

All (60) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	D	501	GDP	C5-C4-N3	-6.00	118.84	128.39
8	B	501	GDP	C5-C4-N3	-6.00	118.84	128.39
11	F	402	ACP	N3-C2-N1	-5.64	120.05	128.58
8	B	501	GDP	C2-N3-C4	5.19	121.25	112.30
8	D	501	GDP	C2-N3-C4	5.09	121.06	112.30
10	D	502	E3Y	N1-C1-N4	-5.06	125.56	130.58
10	B	505	E3Y	N1-C1-N4	-5.03	125.59	130.58
11	F	402	ACP	N6-C6-N1	-4.96	107.34	118.38
11	F	402	ACP	C5-C4-N3	-4.94	119.91	126.72
5	A	501	GTP	C5-C4-N3	-4.50	121.23	128.39
9	B	503	MES	C5-N4-C3	4.48	118.50	108.84
5	C	501	GTP	C5-C4-N3	-4.44	121.32	128.39
5	A	501	GTP	C2-N3-C4	4.44	119.95	112.30
8	B	501	GDP	N9-C4-N3	4.41	134.76	125.95
11	F	402	ACP	N9-C8-N7	-4.30	107.84	113.94
8	D	501	GDP	N9-C4-N3	4.24	134.43	125.95
5	C	501	GTP	C2-N3-C4	4.24	119.59	112.30
10	B	505	E3Y	C1-N1-C2	4.16	117.58	114.18
10	D	502	E3Y	C1-N1-C2	4.13	117.55	114.18
9	B	502	MES	C5-N4-C3	4.10	117.67	108.84
11	F	402	ACP	C5-C6-N6	3.85	132.81	123.29
8	B	501	GDP	C6-C5-N7	3.46	136.59	130.29
8	D	501	GDP	C6-C5-N7	3.46	136.58	130.29
11	F	402	ACP	C2-N3-C4	3.34	119.98	111.83
5	C	501	GTP	N9-C8-N7	-3.13	107.60	113.40
10	D	502	E3Y	C8-N3-C7	3.08	124.88	119.21
11	F	402	ACP	N3-C4-N9	3.06	132.38	127.17
9	B	503	MES	C6-C5-N4	-3.03	105.52	110.12
10	B	505	E3Y	C8-N3-C7	3.02	124.78	119.21
11	F	402	ACP	C5-N7-C8	2.93	108.05	103.45
5	C	501	GTP	N9-C4-N3	2.92	131.79	125.95
10	D	502	E3Y	C1-N4-C7	2.90	119.63	111.13
9	B	502	MES	O3S-S-C8	2.89	111.65	106.00
10	B	505	E3Y	C1-N4-C7	2.87	119.53	111.13
5	C	501	GTP	C8-N7-C5	2.75	109.16	104.26
5	A	501	GTP	N9-C8-N7	-2.69	108.41	113.40
8	D	501	GDP	C4-C5-N7	-2.66	106.45	110.67
11	F	402	ACP	C3'-C2'-C1'	2.63	106.44	101.46
5	C	501	GTP	C2-N1-C6	-2.62	120.35	125.11
5	A	501	GTP	C2-N1-C6	-2.56	120.46	125.11
5	A	501	GTP	N9-C4-N3	2.56	131.07	125.95
8	B	501	GDP	C4-C5-N7	-2.56	106.62	110.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	501	GTP	C8-N7-C5	2.50	108.72	104.26
11	F	402	ACP	C4-N9-C8	2.43	108.29	105.74
5	C	501	GTP	C5-C6-N1	2.42	119.41	113.25
8	B	501	GDP	O6-C6-C5	-2.41	120.17	126.53
9	B	502	MES	C6-C5-N4	-2.35	106.54	110.12
5	C	501	GTP	O2B-PB-O3B	2.30	113.49	107.27
5	A	501	GTP	C5-C6-N1	2.27	119.04	113.25
8	D	501	GDP	O2A-PA-O3A	2.26	113.39	107.27
5	A	501	GTP	O6-C6-C5	-2.22	120.68	126.53
5	A	501	GTP	O2G-PG-O3B	2.19	111.98	104.64
11	F	402	ACP	C6-C5-C4	2.19	120.17	117.18
5	A	501	GTP	O2B-PB-O3B	2.19	113.19	107.27
11	F	402	ACP	C4-C5-N7	-2.17	108.10	110.58
10	D	502	E3Y	CL1-C1-N1	2.11	117.47	115.72
8	B	501	GDP	C5-C6-N1	2.05	118.47	113.25
5	C	501	GTP	O6-C6-C5	-2.04	121.14	126.53
5	C	501	GTP	O3G-PG-O3B	2.04	111.47	104.64
8	D	501	GDP	O6-C6-C5	-2.00	121.24	126.53

There are no chirality outliers.

All (37) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	501	GTP	PB-O3B-PG-O2G
5	A	501	GTP	C5'-O5'-PA-O3A
5	A	501	GTP	C5'-O5'-PA-O1A
5	A	501	GTP	C5'-O5'-PA-O2A
5	C	501	GTP	PB-O3B-PG-O3G
5	C	501	GTP	C5'-O5'-PA-O3A
5	C	501	GTP	C5'-O5'-PA-O1A
5	C	501	GTP	C5'-O5'-PA-O2A
8	B	501	GDP	C5'-O5'-PA-O3A
8	B	501	GDP	C5'-O5'-PA-O1A
8	B	501	GDP	C5'-O5'-PA-O2A
8	D	501	GDP	C5'-O5'-PA-O3A
8	D	501	GDP	C5'-O5'-PA-O1A
8	D	501	GDP	C5'-O5'-PA-O2A
9	B	502	MES	C8-C7-N4-C5
9	B	502	MES	C7-C8-S-O2S
9	B	502	MES	C7-C8-S-O3S
9	B	503	MES	C8-C7-N4-C5
11	F	402	ACP	PB-C3B-PG-O1G

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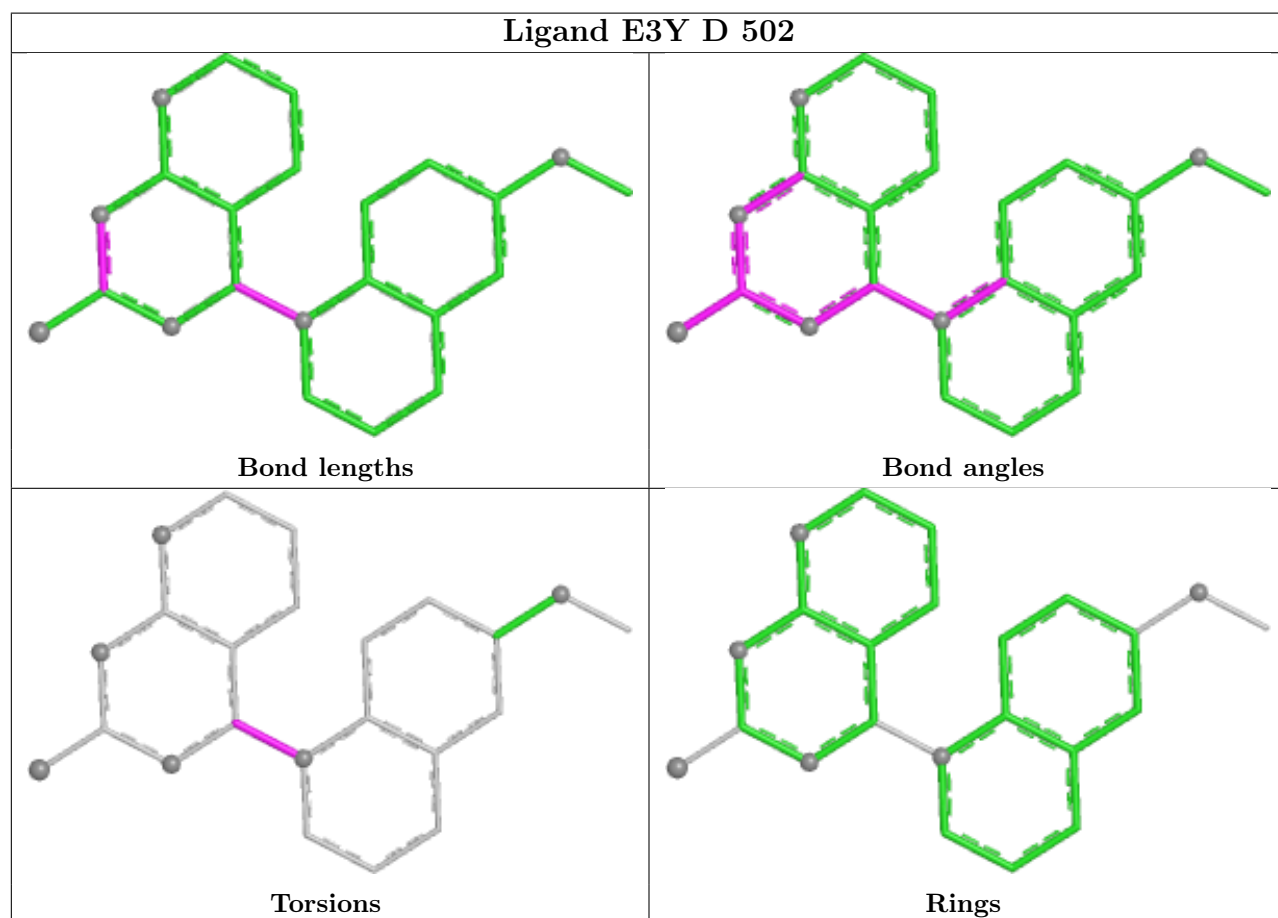
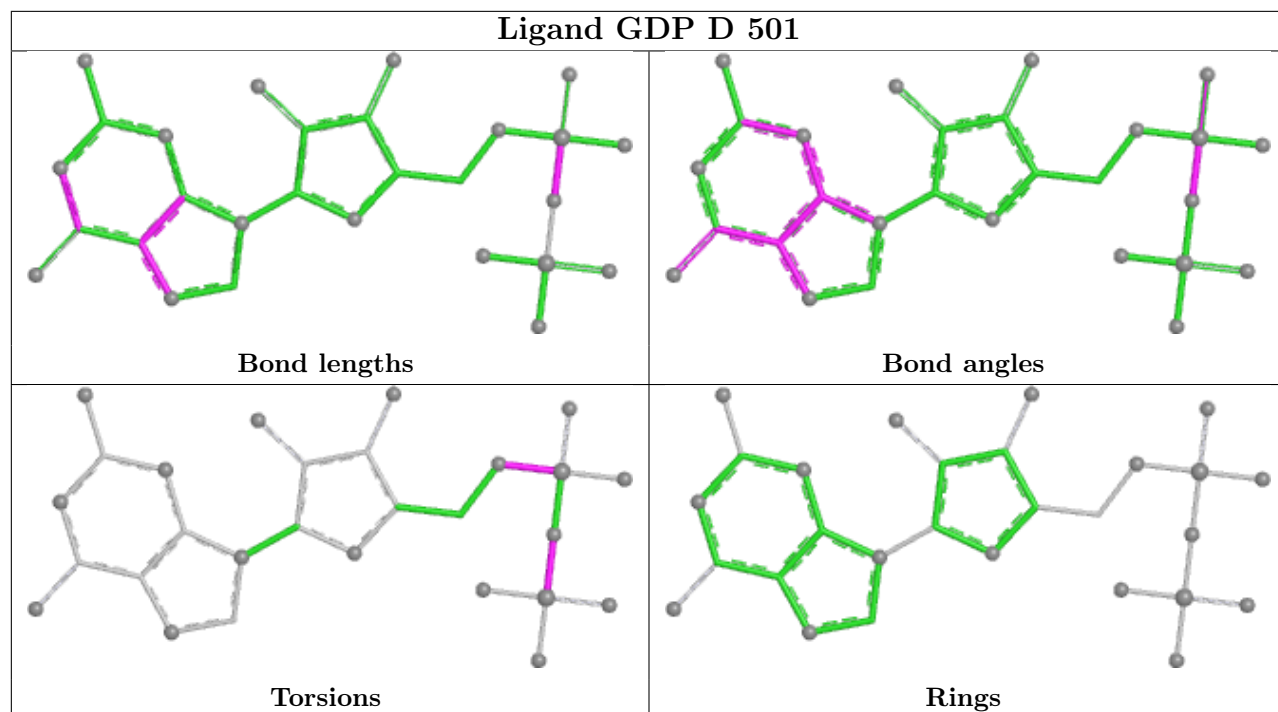
Mol	Chain	Res	Type	Atoms
11	F	402	ACP	PB-C3B-PG-O2G
11	F	402	ACP	PG-C3B-PB-O1B
11	F	402	ACP	PG-C3B-PB-O2B
11	F	402	ACP	PG-C3B-PB-O3A
10	D	502	E3Y	N4-C7-N3-C17
10	B	505	E3Y	N4-C7-N3-C17
8	D	501	GDP	PA-O3A-PB-O1B
9	B	502	MES	C7-C8-S-O1S
8	D	501	GDP	PA-O3A-PB-O2B
11	F	402	ACP	PB-C3B-PG-O3G
5	A	501	GTP	PB-O3B-PG-O3G
5	C	501	GTP	PB-O3B-PG-O2G
11	F	402	ACP	PB-O3A-PA-O1A
11	F	402	ACP	PB-O3A-PA-O2A
5	A	501	GTP	PB-O3A-PA-O2A
10	B	505	E3Y	C6-C7-N3-C17
5	C	501	GTP	PB-O3A-PA-O2A
8	B	501	GDP	PB-O3A-PA-O2A

There are no ring outliers.

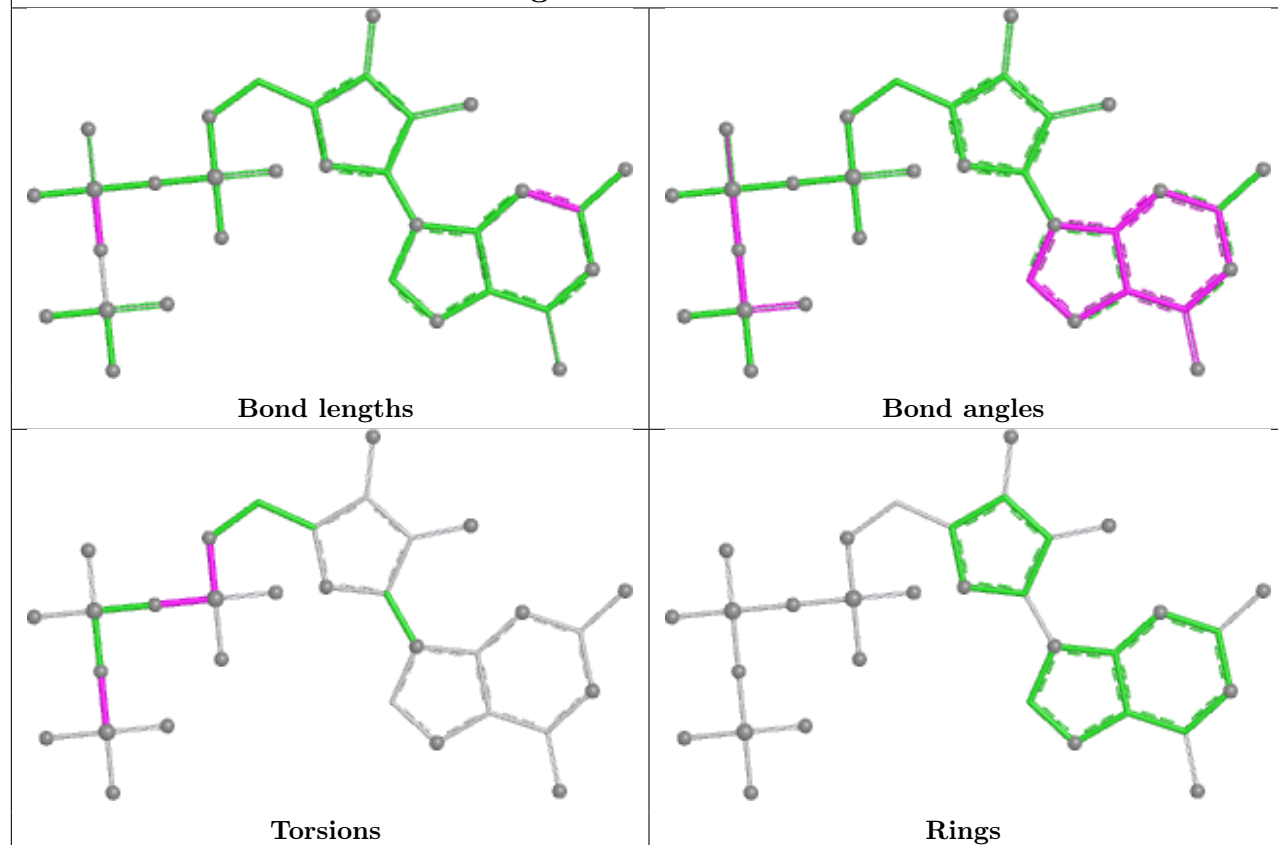
5 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	B	503	MES	1	0
8	D	501	GDP	4	0
5	A	501	GTP	1	0
11	F	402	ACP	2	0
9	B	502	MES	1	0

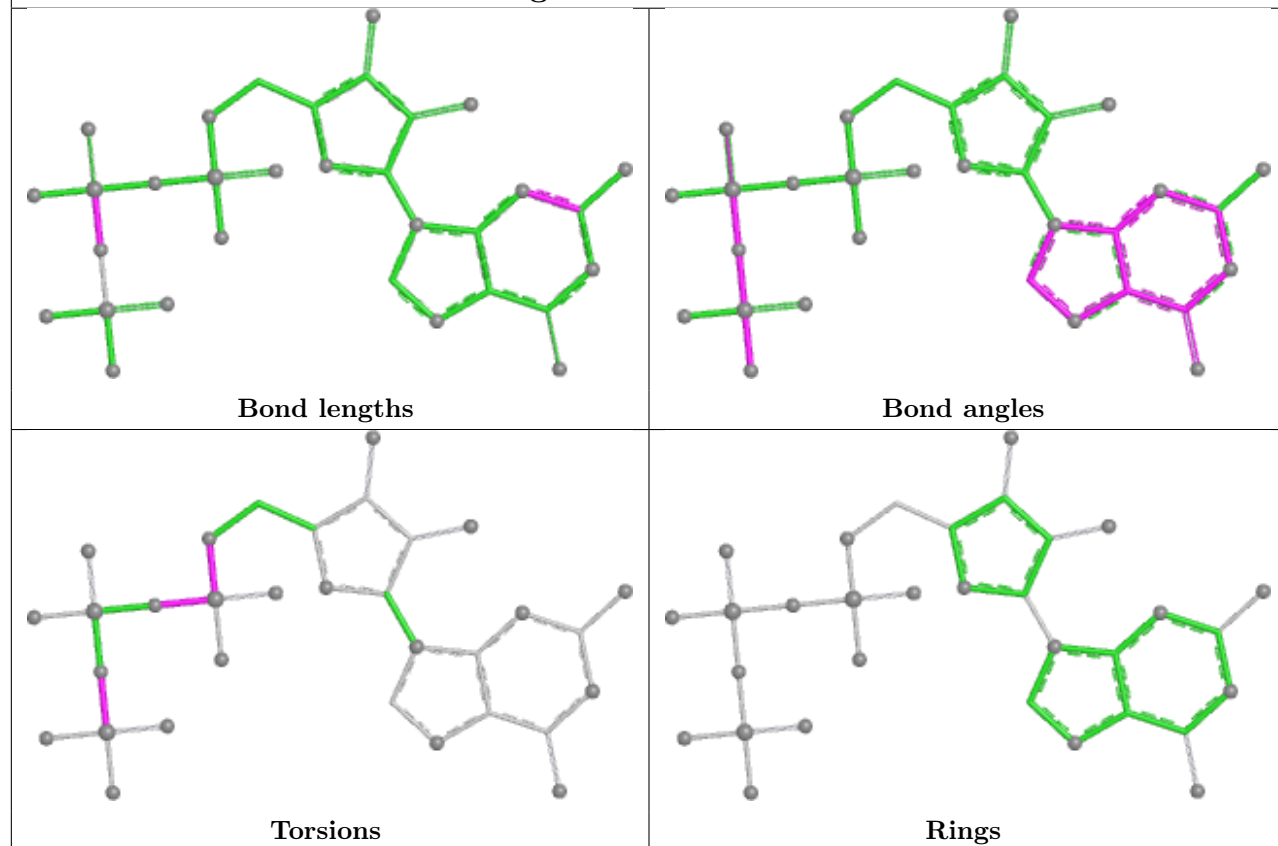
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.



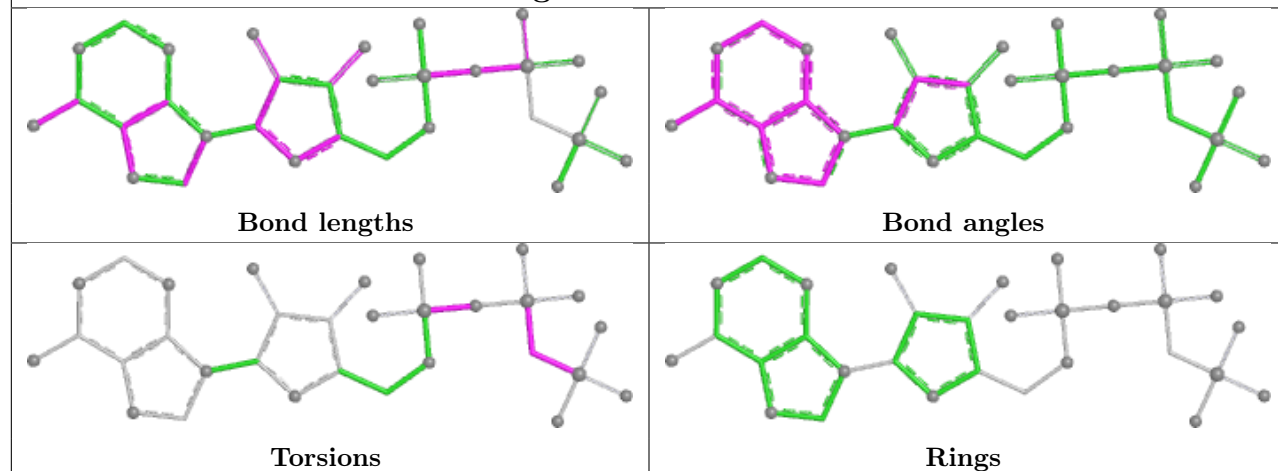
Ligand GTP C 501



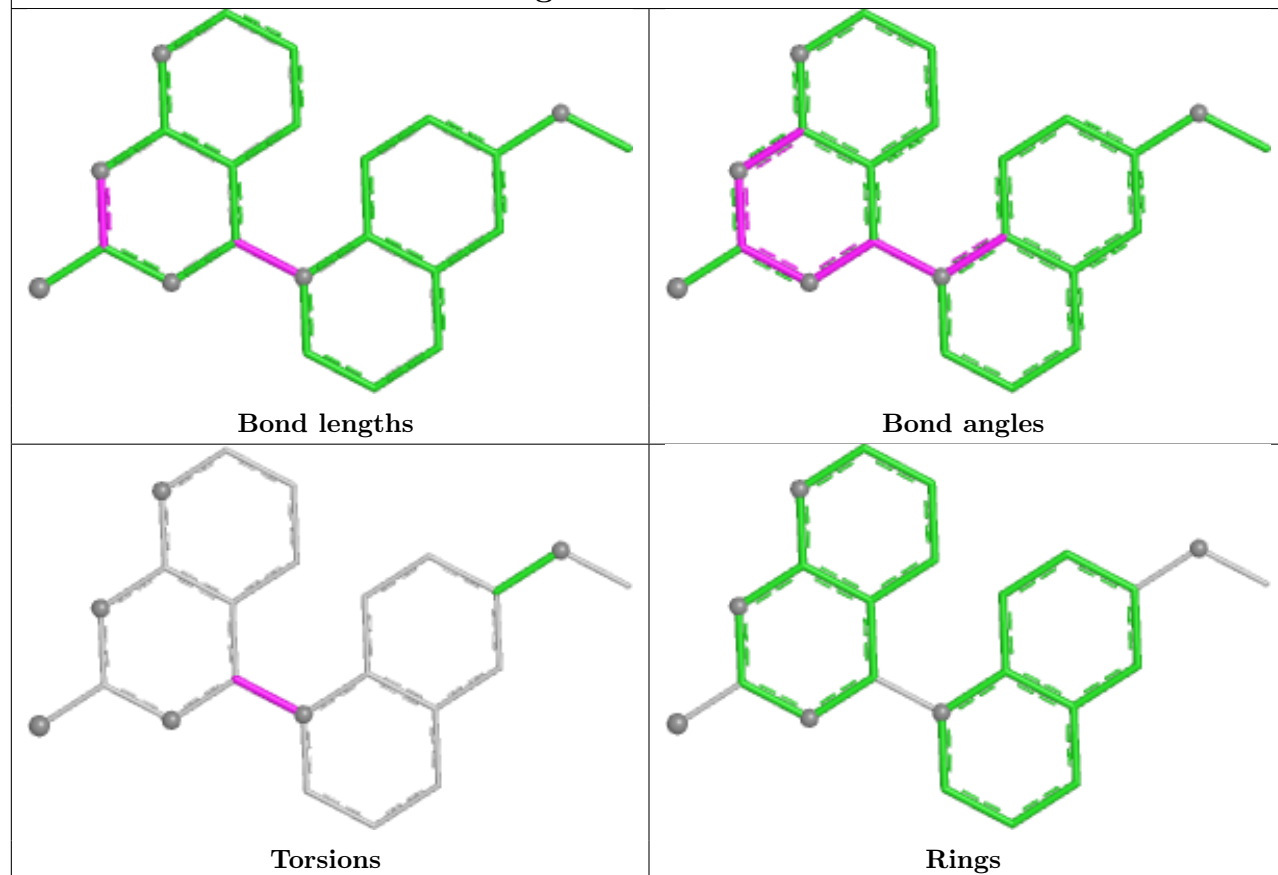
Ligand GTP A 501

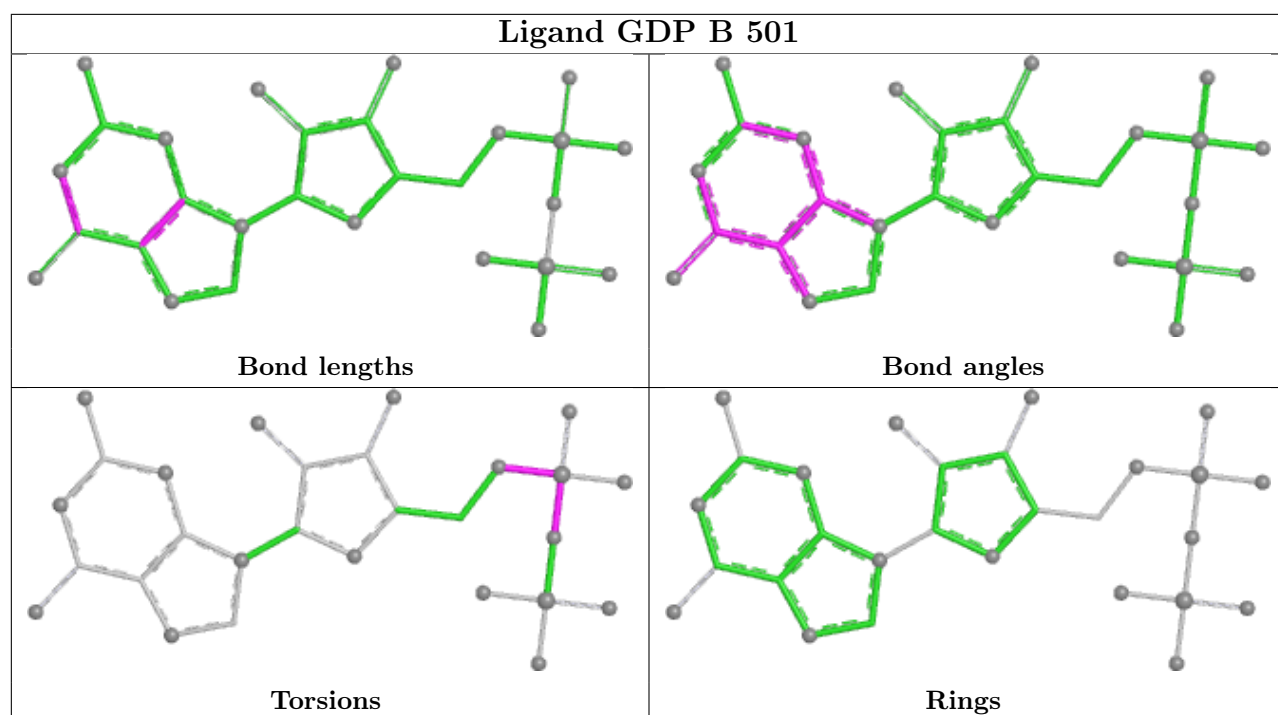


Ligand ACP F 402



Ligand E3Y B 505





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	437/450 (97%)	0.18	17 (3%) 43 45	22, 39, 67, 86	0
1	C	440/450 (97%)	-0.10	14 (3%) 50 52	16, 28, 54, 89	0
2	B	427/445 (95%)	0.29	30 (7%) 22 24	16, 36, 73, 123	0
2	D	421/445 (94%)	0.91	68 (16%) 4 5	26, 55, 93, 131	0
3	E	121/143 (84%)	0.71	10 (8%) 17 19	25, 52, 87, 116	0
4	F	332/384 (86%)	1.44	99 (29%) 1 1	28, 63, 131, 170	0
All	All	2178/2317 (94%)	0.51	238 (10%) 10 12	16, 43, 93, 170	0

All (238) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	F	161	LEU	8.1
2	D	219	THR	6.6
4	F	170	LEU	6.1
1	A	437	VAL	5.9
4	F	245	ILE	5.9
4	F	180	HIS	5.9
1	A	179	THR	5.8
4	F	149	ALA	5.7
2	D	247	ASN	5.4
2	D	55	THR	5.3
1	C	440	VAL	5.3
2	D	96	GLY	5.3
4	F	186	LEU	5.2
4	F	181	VAL	5.2
4	F	130	VAL	5.1
2	D	397	TRP	5.0
2	B	218	THR	5.0
4	F	172	PHE	5.0
4	F	233	PHE	5.0

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Mol	Chain	Res	Type	RSRZ
4	F	162	ILE	5.0
4	F	182	ILE	4.9
2	D	1	MET	4.8
4	F	148	ILE	4.8
2	D	92	PHE	4.7
4	F	99	VAL	4.7
2	D	95	SER	4.7
2	D	245	GLN	4.6
4	F	166	ALA	4.6
4	F	163	SER	4.5
4	F	179	VAL	4.4
1	C	340	SER	4.4
4	F	131	PHE	4.4
4	F	372	THR	4.4
4	F	132	LEU	4.3
4	F	379	HIS	4.3
2	B	428	ALA	4.3
4	F	146	VAL	4.2
2	D	39	ASP	4.2
4	F	171	ASP	4.2
1	A	262	TYR	4.2
4	F	362	ALA	4.2
4	F	103	THR	4.2
1	C	1	MET	4.1
2	D	69	GLU	4.1
2	D	54	ALA	4.1
4	F	141	GLY	4.1
4	F	135	TYR	4.0
3	E	139	LEU	3.9
4	F	239	HIS	3.9
4	F	173	ILE	3.9
2	B	57	ASN	3.9
4	F	100	ILE	3.8
1	A	282	TYR	3.8
2	D	394	PHE	3.8
2	B	243	PRO	3.7
4	F	167	SER	3.7
4	F	169	LEU	3.7
4	F	134	ALA	3.7
4	F	194	PRO	3.6
4	F	147	TRP	3.6
2	D	406	MET	3.6

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Mol	Chain	Res	Type	RSRZ
4	F	164	SER	3.5
2	D	246	LEU	3.5
2	D	284	LEU	3.5
4	F	165	GLU	3.5
2	B	278	SER	3.5
3	E	141	GLU	3.5
4	F	237	THR	3.4
4	F	82	LYS	3.4
2	D	111	GLU	3.4
1	C	245	ASP	3.4
2	B	247	ASN	3.4
2	B	279	GLN	3.4
4	F	259	GLY	3.4
2	D	94	GLN	3.3
4	F	252	ASN	3.3
2	D	323	MET	3.3
4	F	101	TYR	3.3
1	C	357	TYR	3.3
1	A	281	ALA	3.2
2	B	388	MET	3.2
3	E	6	MET	3.2
2	D	56	GLY	3.2
4	F	187	GLU	3.2
2	D	37	HIS	3.2
4	F	128	ARG	3.2
4	F	75	ALA	3.2
4	F	228	TYR	3.2
2	B	277	GLY	3.2
2	B	245	GLN	3.2
4	F	244	CYS	3.2
4	F	253	TYR	3.2
1	A	112	LYS	3.1
2	D	42	LEU	3.1
4	F	229	ASN	3.1
2	B	55	THR	3.1
2	D	244	GLY	3.1
1	A	346	TRP	3.1
4	F	243	HIS	3.0
4	F	380	HIS	3.0
4	F	361	LEU	3.0
4	F	185	TYR	3.0
4	F	234	GLN	3.0

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Mol	Chain	Res	Type	RSRZ
2	B	323	MET	3.0
1	C	177	VAL	3.0
2	D	80	PRO	3.0
2	D	359	ARG	3.0
3	E	28	SER	3.0
4	F	133	ALA	2.9
4	F	231	ALA	2.9
4	F	137	ARG	2.9
4	F	144	GLY	2.9
4	F	142	ARG	2.9
1	A	120	ASP	2.9
4	F	90	SER	2.9
4	F	240	LEU	2.9
4	F	1	MET	2.9
2	D	48	ASN	2.9
4	F	136	ASN	2.9
1	A	88	HIS	2.8
2	D	360	GLY	2.8
2	D	218	THR	2.8
2	D	431	ASP	2.8
4	F	177	GLY	2.8
2	B	39	ASP	2.8
1	C	178	SER	2.8
4	F	230	SER	2.8
4	F	98	TYR	2.8
1	C	247	ALA	2.8
4	F	339	ALA	2.8
2	D	57	ASN	2.7
3	E	140	LYS	2.7
4	F	232	ASN	2.7
1	A	430	LYS	2.6
4	F	10	ASN	2.6
4	F	333	ASN	2.6
4	F	247	LYS	2.6
4	F	129	GLU	2.6
1	A	362	VAL	2.6
2	D	227	HIS	2.6
2	D	396	HIS	2.6
2	D	404	ASP	2.6
4	F	139	ARG	2.6
4	F	235	ASP	2.6
4	F	320	MET	2.6

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Mol	Chain	Res	Type	RSRZ
4	F	168	GLU	2.5
3	E	45	PRO	2.5
1	A	196	GLU	2.5
2	D	363	MET	2.5
4	F	102	PRO	2.5
2	B	219	THR	2.5
2	D	98	GLY	2.5
4	F	254	GLY	2.5
1	A	113	GLU	2.5
4	F	176	GLN	2.5
2	D	86	ARG	2.4
2	D	320	ARG	2.4
1	C	337	THR	2.4
2	D	115	SER	2.4
2	D	413	SER	2.4
2	D	97	ALA	2.4
2	D	72	THR	2.4
2	D	126	SER	2.4
2	B	37	HIS	2.4
2	B	2	ARG	2.4
4	F	199	PHE	2.4
4	F	191	LEU	2.4
3	E	7	GLU	2.4
2	B	281	TYR	2.3
3	E	53	LYS	2.3
2	D	180	VAL	2.3
1	C	283	HIS	2.3
4	F	143	GLU	2.3
2	B	426	GLN	2.3
2	D	217	LEU	2.3
1	A	347	CYS	2.3
4	F	174	ASP	2.3
2	D	170	MET	2.3
2	B	283	ALA	2.3
2	B	274	THR	2.3
2	B	78	SER	2.3
2	D	213	ARG	2.2
2	D	390	ARG	2.2
1	C	179	THR	2.2
3	E	138	GLU	2.2
4	F	184	LYS	2.2
2	B	427	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
4	F	238	CYS	2.2
2	D	400	GLY	2.2
4	F	140	GLU	2.2
2	D	291	GLN	2.2
4	F	246	GLN	2.2
2	D	395	LEU	2.2
2	D	128	ASP	2.2
2	B	406	MET	2.2
2	D	83	GLN	2.2
4	F	373	SER	2.2
4	F	92	THR	2.2
2	D	70	PRO	2.1
2	D	243	PRO	2.1
1	A	283	HIS	2.1
2	B	56	GLY	2.1
2	D	142	GLY	2.1
3	E	17	GLY	2.1
2	D	387	ALA	2.1
4	F	138	ARG	2.1
1	A	83	TYR	2.1
2	D	215	LEU	2.1
4	F	330	ILE	2.1
2	D	405	GLU	2.1
4	F	89	GLU	2.1
1	C	285	GLN	2.1
2	B	80	PRO	2.1
2	D	389	PHE	2.1
2	D	176	SER	2.1
2	B	42	LEU	2.1
2	B	246	LEU	2.1
2	B	128	ASP	2.1
4	F	256	TYR	2.1
2	D	15	GLN	2.1
2	B	275	SER	2.1
1	A	433	GLU	2.1
2	D	125	GLU	2.1
1	C	248	LEU	2.1
2	D	84	ILE	2.1
2	D	88	ASP	2.1
2	D	179	VAL	2.1
1	C	338	LYS	2.0
4	F	70	LYS	2.0

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Mol	Chain	Res	Type	RSRZ
4	F	196	HIS	2.0
2	D	416	ASN	2.0
4	F	20	LEU	2.0
4	F	31	ARG	2.0
2	D	71	GLY	2.0
4	F	27	TRP	2.0
2	D	53	GLU	2.0
4	F	145	ASN	2.0
2	B	282	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 oligosaccharides 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	ACP	F	402	31/31	0.82	0.14	68,87,102,121	0
8	GDP	D	501	28/28	0.84	0.12	45,55,66,69	0
7	MG	F	401	1/1	0.87	0.10	71,71,71,71	0
9	MES	B	503	12/12	0.89	0.15	54,58,69,72	0
10	E3Y	D	502	23/23	0.93	0.09	25,34,51,60	0
9	MES	B	502	12/12	0.95	0.09	34,44,52,56	0
7	MG	B	504	1/1	0.96	0.06	23,23,23,23	0
10	E3Y	B	505	23/23	0.96	0.06	26,30,34,50	0
5	GTP	A	501	32/32	0.98	0.05	21,25,30,30	0
8	GDP	B	501	28/28	0.98	0.06	16,26,31,33	0
6	CA	A	502	1/1	0.99	0.05	59,59,59,59	0
6	CA	C	502	1/1	0.99	0.03	34,34,34,34	0
7	MG	A	503	1/1	0.99	0.03	23,23,23,23	0
5	GTP	C	501	32/32	0.99	0.05	21,22,28,31	0

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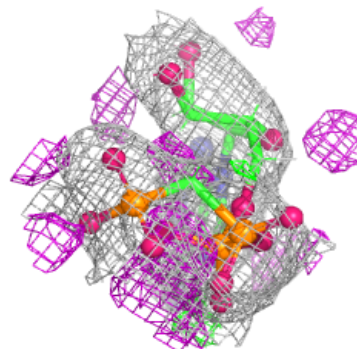
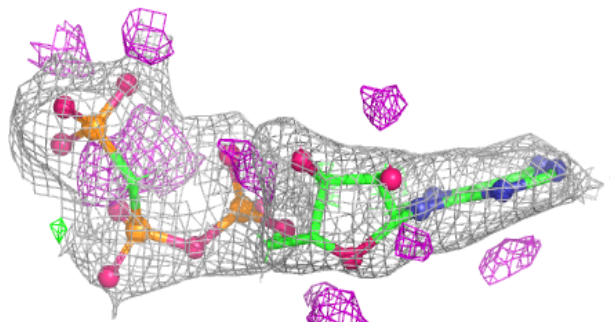
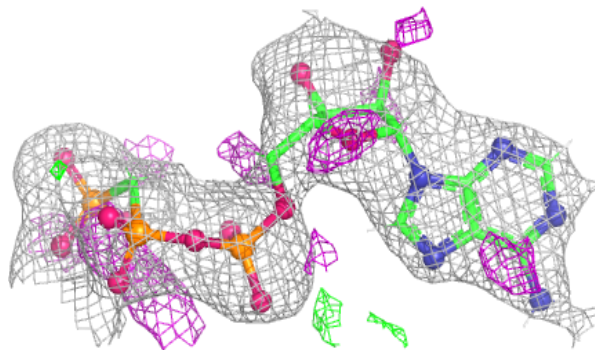
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	MG	C	503	1/1	1.00	0.02	22,22,22,22	0

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.

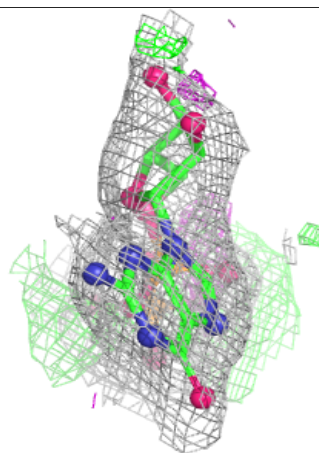
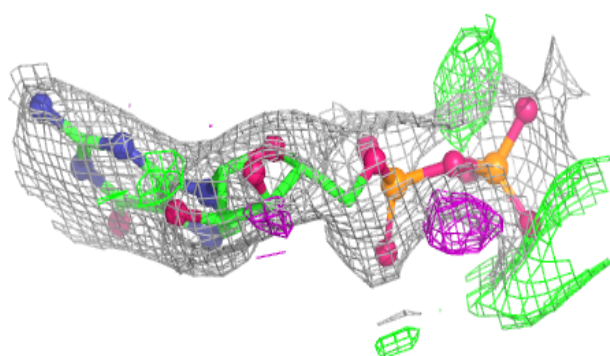
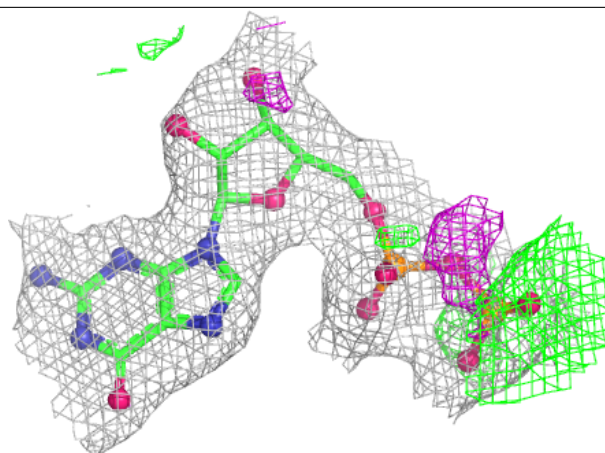
Electron density around ACP F 402:

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



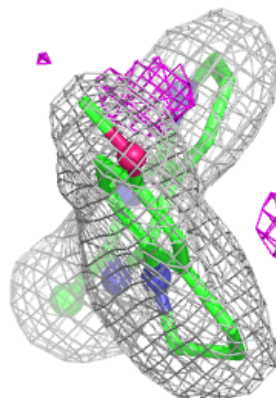
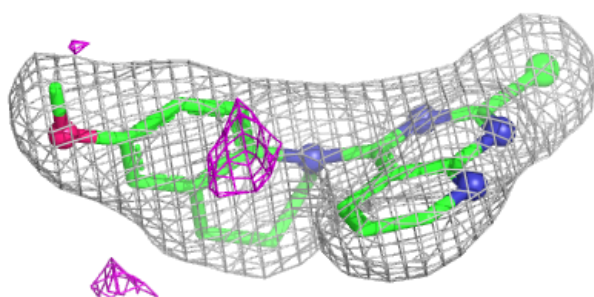
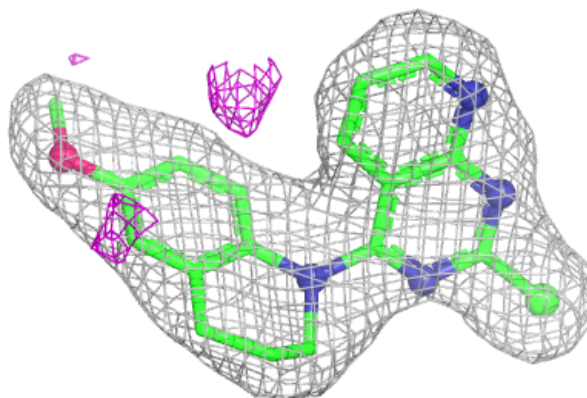
Electron density around GDP D 501:

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

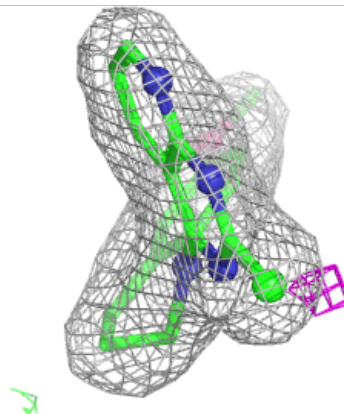
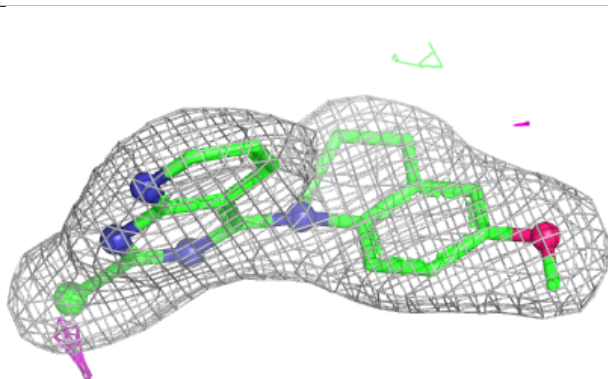
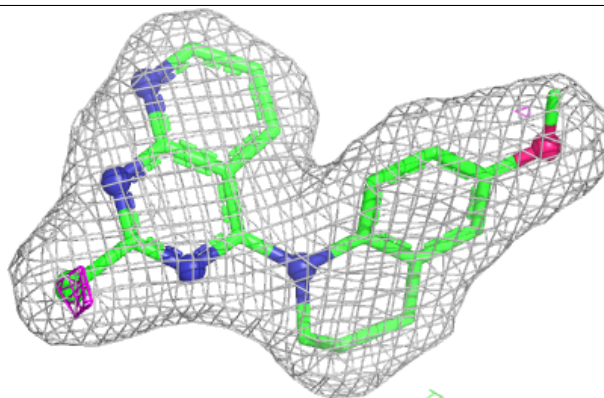


Electron density around E3Y D 502:

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

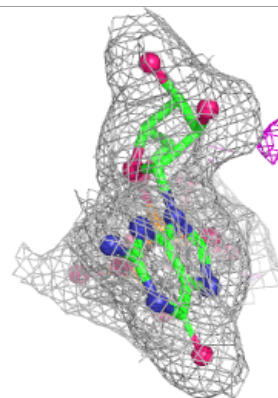
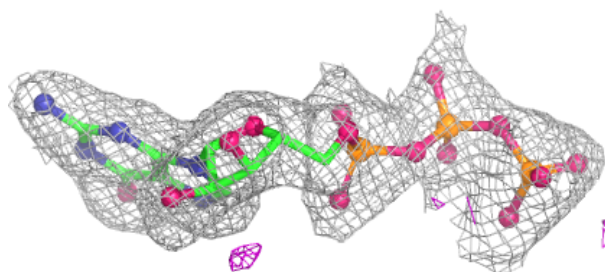
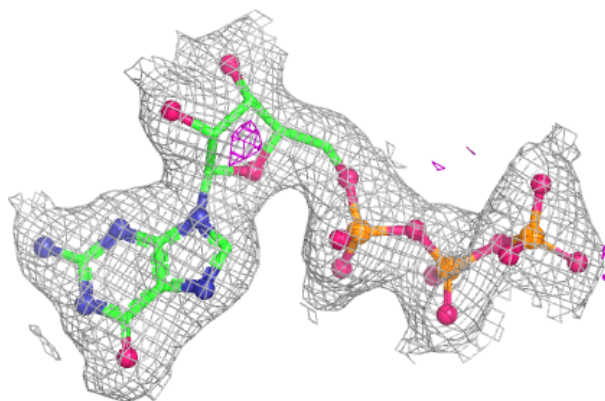
**Electron density around E3Y B 505:**

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



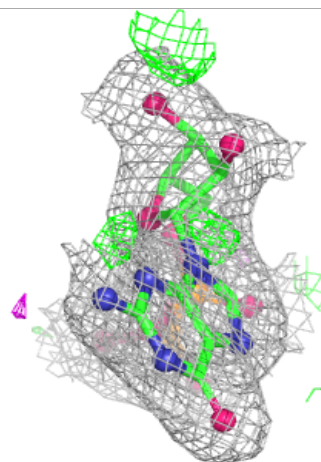
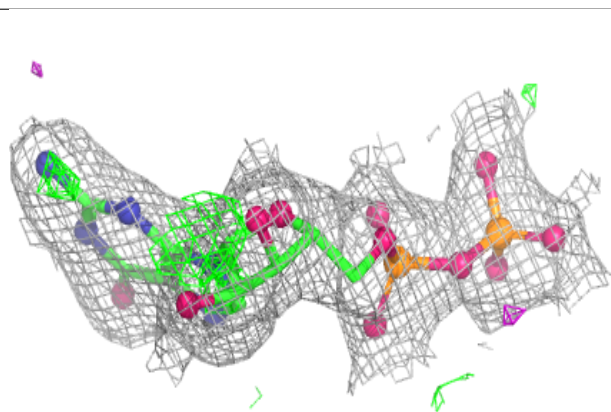
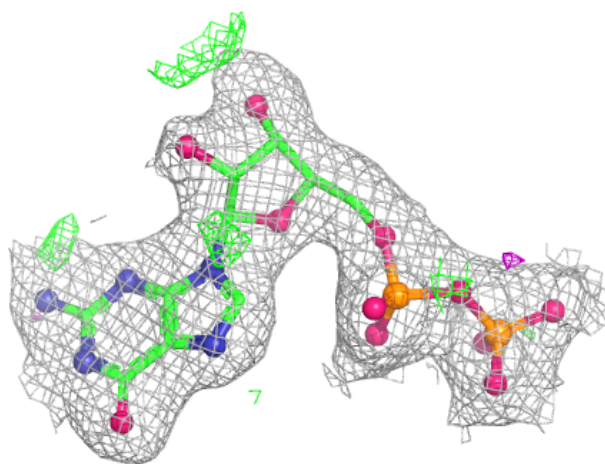
Electron density around GTP A 501:

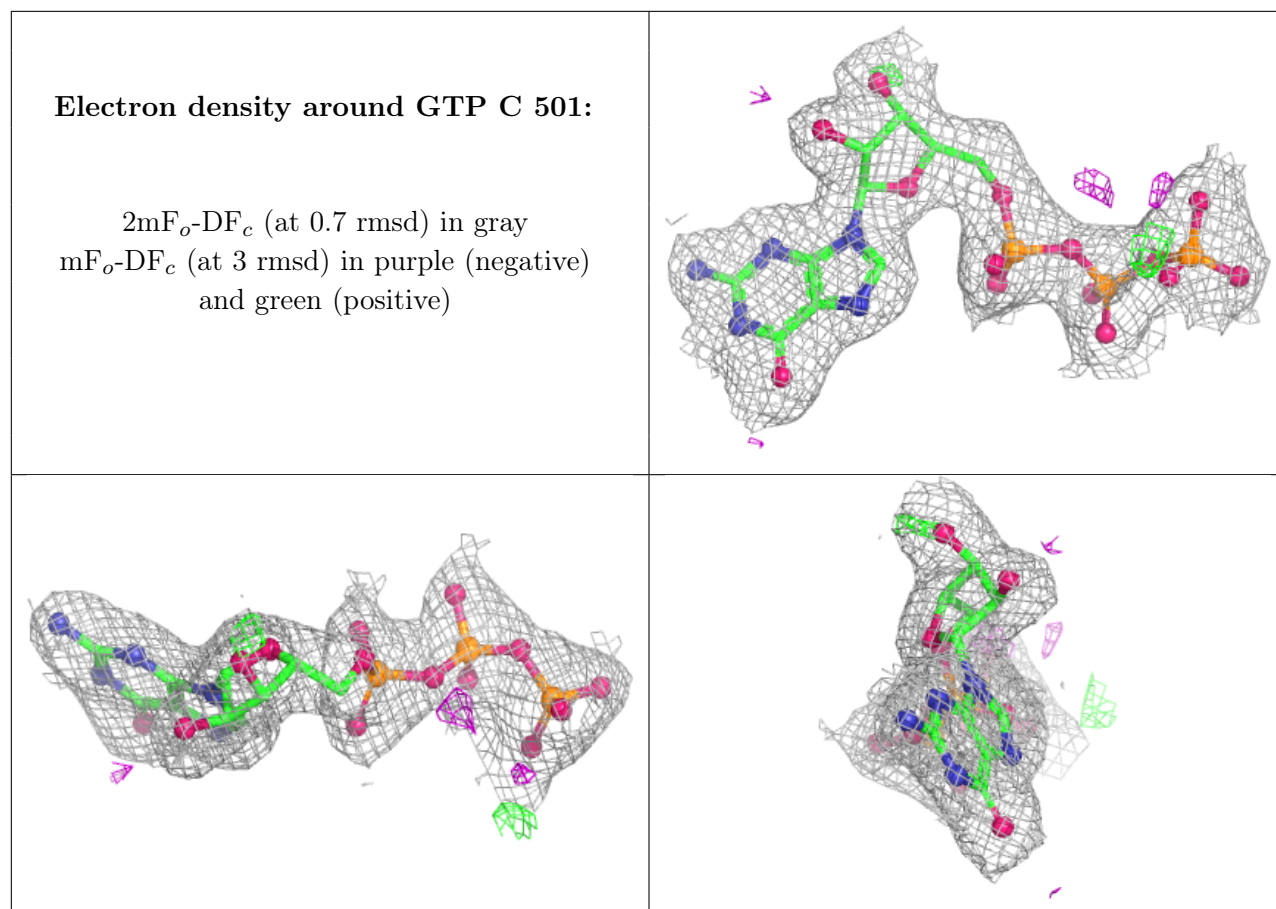
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



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)





6.5 Other polymers ⓘ

There are no such residues in this entry.