



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 24, 2022 – 03:35 pm GMT

PDB ID : 6QQN
Title : Tubulin-TH588 complex
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Deposited on : 2019-02-18
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 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)
Xtriage (Phenix) : 1.13
EDS : 2.27
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0267
CCP4 : 7.1.010 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.27

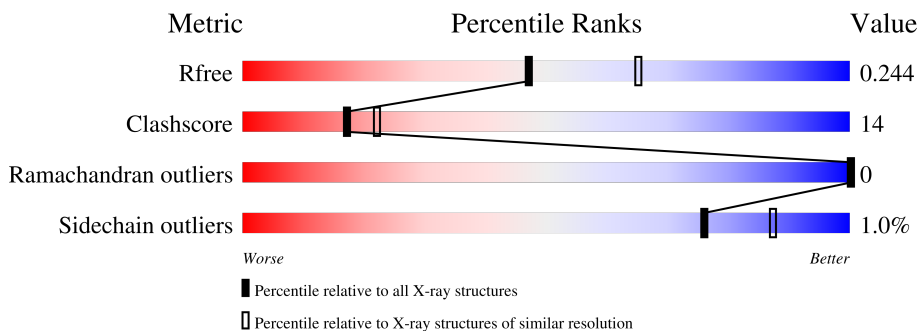
1 Overall quality at a glance

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}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	451	74% (green), 22% (yellow), . (grey)
1	C	451	75% (green), 22% (yellow), . (grey)
2	B	445	66% (green), 28% (yellow), . 5% (grey)
2	D	445	68% (green), 26% (yellow), . 5% (grey)
3	E	143	64% (green), 21% (yellow), 15% (grey)
4	F	384	56% (green), 26% (yellow), 18% (grey)

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
11	2GE	B	504	-	-	X	-

2 Entry composition i

There are 13 unique types of molecules in this entry. The entry contains 17568 atoms, of which 18 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	436	Total	C	N	O	S	0	0	0
			3409	2159	580	648	22			
1	C	440	Total	C	N	O	S	0	1	0
			3444	2180	585	657	22			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	423	Total	C	N	O	S	0	1	0
			3344	2102	572	643	27			
2	D	421	Total	C	N	O	S	0	2	0
			3326	2089	567	642	28			

- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
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	-	initiating methionine	UNP P63043
E	4	ALA	-	expression tag	UNP P63043

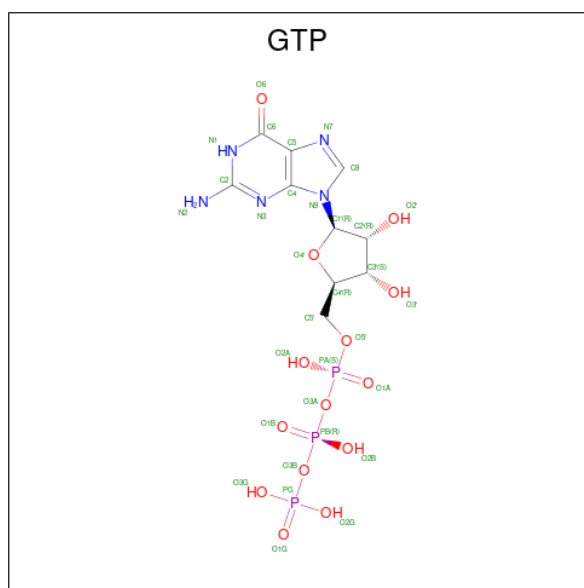
- Molecule 4 is a protein called Tubulin-Tyrosine Ligase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	F	314	Total	C	N	O	S	0	0	0
			2573	1659	437	464	13			

There are 6 discrepancies between the modelled and reference sequences:

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

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



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

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
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		

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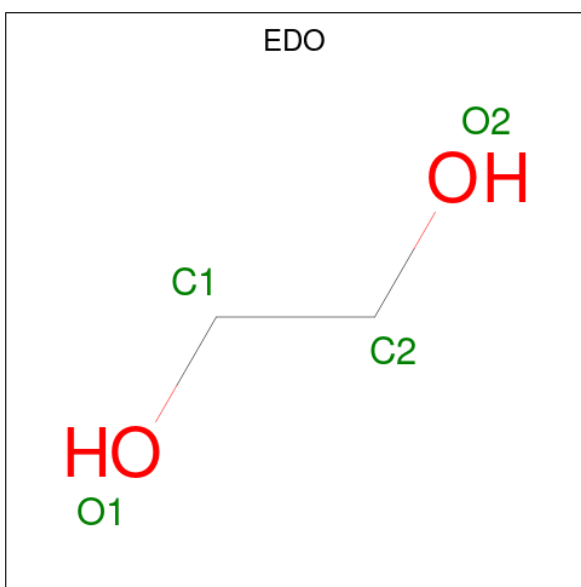
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	F	1	Total	Mg	0	0
			1	1		

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

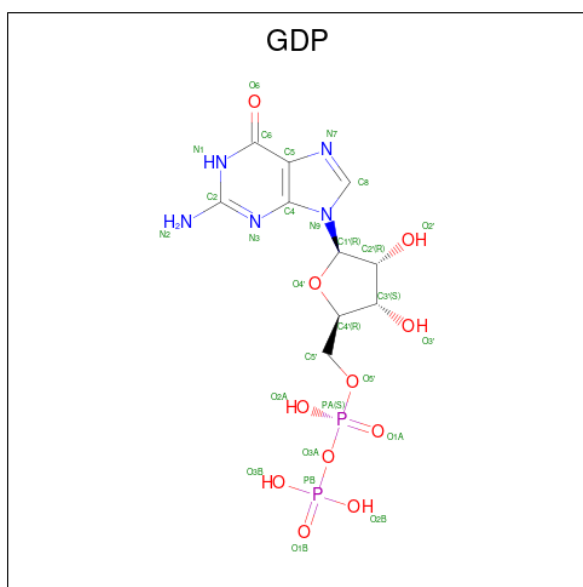
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Ca	0	0
			1	1		
7	B	2	Total	Ca	0	0
			2	2		
7	C	1	Total	Ca	0	0
			1	1		

- Molecule 8 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



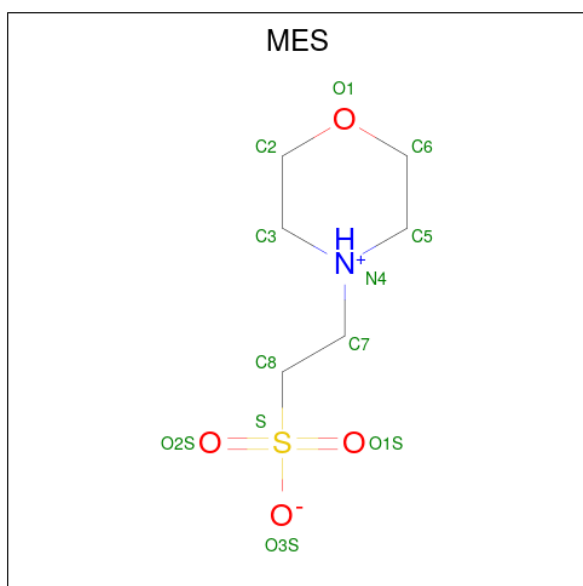
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	A	1	Total	C	H	O	0	0
			10	2	6	2		

- Molecule 9 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C₁₀H₁₅N₅O₁₁P₂).



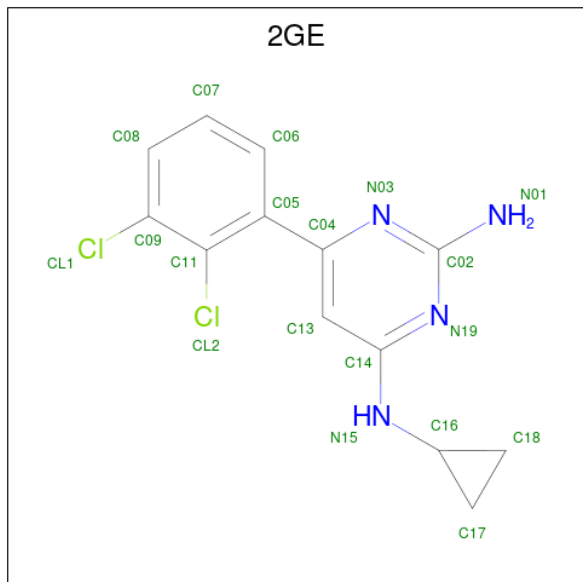
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
9	B	1	Total	C	N	O	P	0	0
			28	10	5	11	2		
9	D	1	Total	C	N	O	P	0	0
			28	10	5	11	2		

- Molecule 10 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (three-letter code: MES) (formula: C₆H₁₃NO₄S).



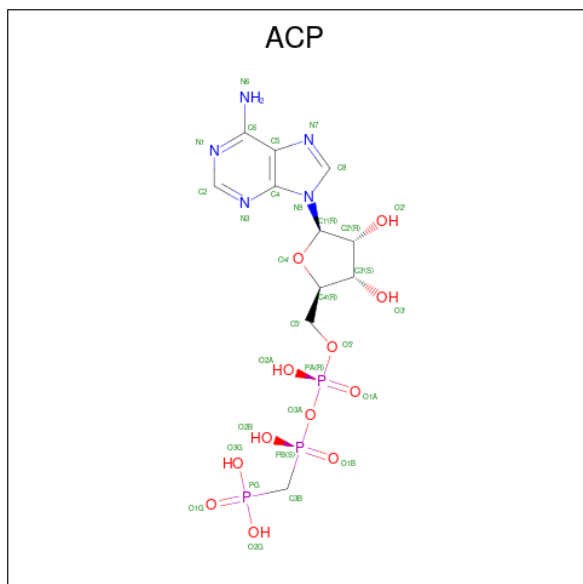
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
10	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 11 is N 4 -cyclopropyl-6-(2,3-dichlorophenyl)pyrimidine-2,4-diamine (three-letter code: 2GE) (formula: C₁₃H₁₂Cl₂N₄).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Cl	H	N		
11	B	1	31	13	2	12	4	0	0

- Molecule 12 is PHOSPHOMETHYLPHOSPHONIC ACID ADENYLATE ESTER (three-letter code: ACP) (formula: C₁₁H₁₈N₅O₁₂P₃).



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

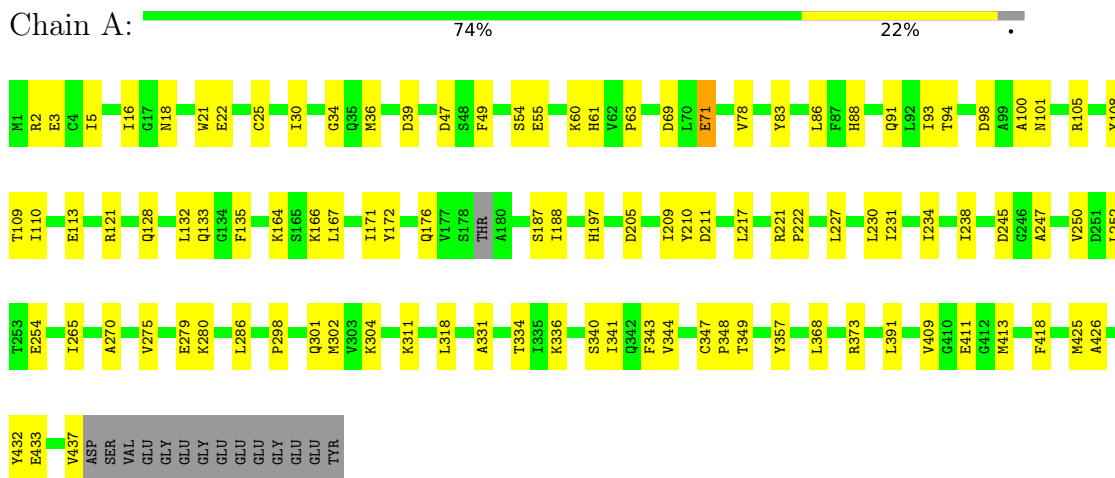
- Molecule 13 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
13	A	50	Total O 50 50	0	0
13	B	41	Total O 41 41	0	0
13	C	117	Total O 117 117	0	0
13	D	27	Total O 27 27	0	0
13	E	11	Total O 11 11	0	0
13	F	13	Total O 13 13	0	0

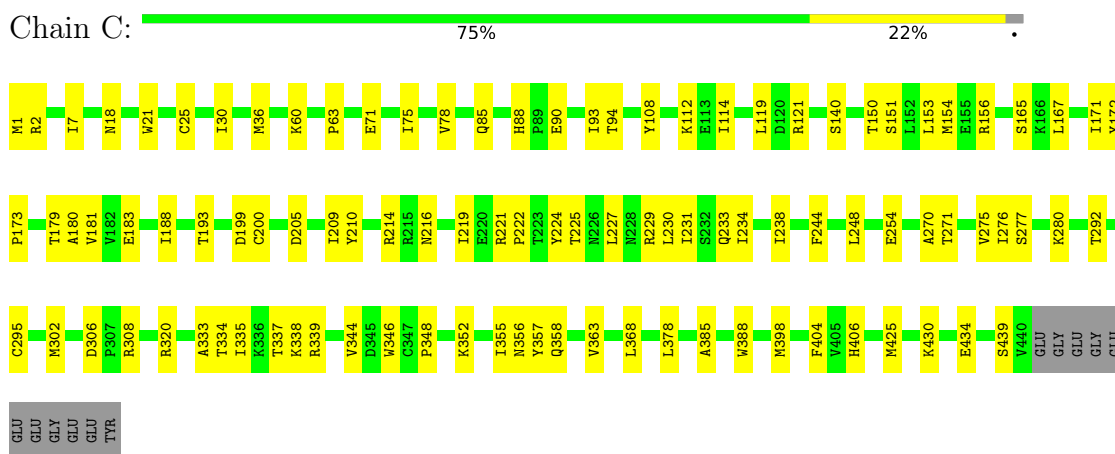
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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.

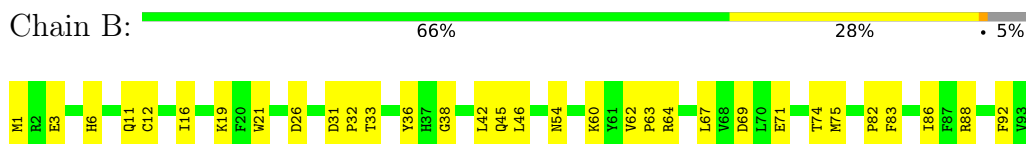
- Molecule 1: Tubulin alpha-1B chain

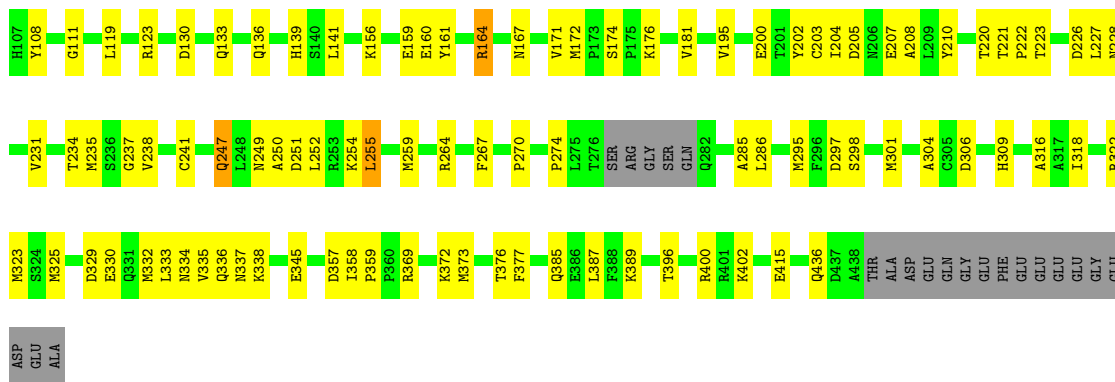


- Molecule 1: Tubulin alpha-1B chain



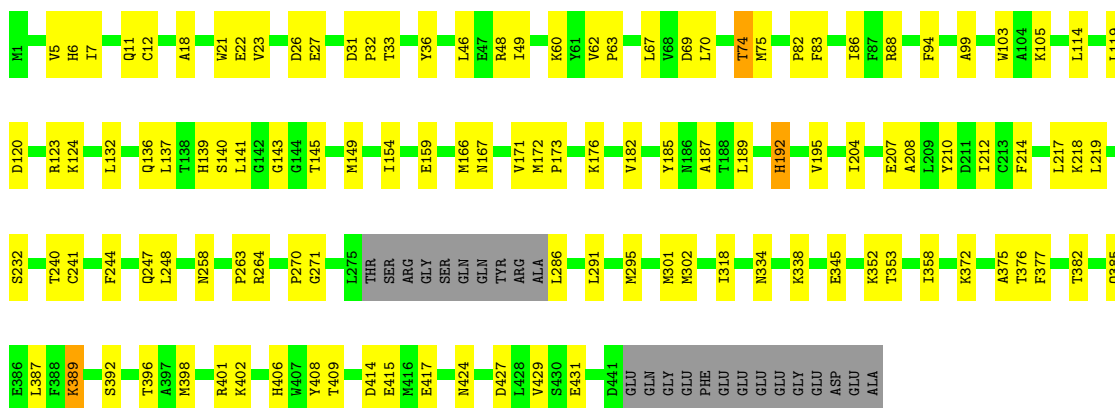
- Molecule 2: Tubulin beta-2B chain





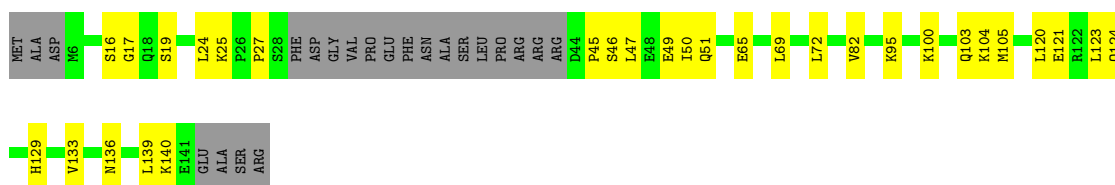
- Molecule 2: Tubulin beta-2B chain

Chain D: 68% 26% 5%



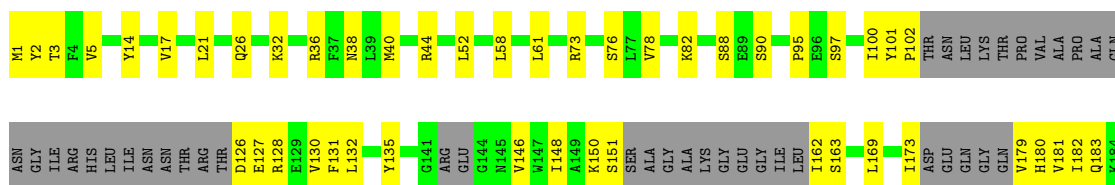
- Molecule 3: Stathmin-4

Chain E: 64% 21% 15%



- Molecule 4: Tubulin-Tyrosine Ligase

Chain F: 56% 26% 18%



Y185	L186	E187	K188	P189	L190	L191	H196	D200	V205	L206	H209	Y216	R217	E218	G219	V220	L221	R222	A231	ASN	PHE	GLN	ASP	ASP	LYS	T237	T241	N242	H243	CYS	ILE	GLN	LYS	GLU	TYR	SER	LYS	ASN	TYR	GLY	GLY	ARG	Y256	F263	E280	I283	L284	I287	I291
R292	M296	E299	P300	K305	H306	S311	F312	G313	L314	F319	M320	V321	D322	V327	I330	E331	A335	Q340	K341	L342	Y343	A344	E345	Q348	G349	I350	V353	F359	P360	L361	A362	ASP	THR	GLY	GLN	LYS	THR	SER	GLN	PRO	T372	L378	H379	H380	HIS	HIS			
HIS	HIS																																																

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	103.83Å 156.19Å 179.43Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.48 – 2.30 49.27 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (47.48-2.30) 100.0 (49.27-2.30)	Depositor EDS
R_{merge}	0.20	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.33 (at 2.29Å)	Xtriage
Refinement program	PHENIX (1.13_2998: ???)	Depositor
R, R_{free}	0.196 , 0.244 0.195 , 0.244	Depositor DCC
R_{free} test set	6477 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	56.9	Xtriage
Anisotropy	0.164	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	17568	wwPDB-VP
Average B, all atoms (Å ²)	72.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.38% 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, GDP, 2GE, MG, GTP, EDO, MES, CA

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	0/3486	0.41	0/4730
1	C	0.26	0/3522	0.43	0/4782
2	B	0.26	0/3418	0.43	0/4628
2	D	0.25	0/3399	0.41	0/4603
3	E	0.24	0/1008	0.35	0/1337
4	F	0.24	0/2630	0.40	0/3551
All	All	0.25	0/17463	0.41	0/23631

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	3409	0	3322	94	0
1	C	3444	0	3356	81	0
2	B	3344	0	3227	117	0
2	D	3326	0	3205	95	0
3	E	1000	0	1018	28	0
4	F	2573	0	2550	91	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	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
8	A	4	6	6	0	0
9	B	28	0	12	1	0
9	D	28	0	12	3	0
10	B	12	0	12	0	0
11	B	19	12	12	7	0
12	F	31	0	14	1	0
13	A	50	0	0	5	0
13	B	41	0	0	0	0
13	C	117	0	0	1	0
13	D	27	0	0	1	0
13	E	11	0	0	1	0
13	F	13	0	0	1	0
All	All	17550	18	16770	474	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 14.

All (474) 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)
4:F:173:ILE:HD12	4:F:180:HIS:HB2	1.32	1.07
2:B:62:VAL:HG11	2:B:88:ARG:HG3	1.41	1.00
2:B:176:LYS:HE2	2:B:207:GLU:HG3	1.54	0.90
2:D:62:VAL:HG11	2:D:88:ARG:HG3	1.53	0.90
2:D:406:HIS:HA	2:D:409:THR:HG22	1.54	0.89
4:F:102:PRO:HB3	4:F:173:ILE:HG12	1.54	0.88
4:F:127:GLU:HB3	4:F:130:VAL:HG22	1.56	0.86
1:C:270:ALA:HB3	1:C:302:MET:HE2	1.55	0.85
1:A:217:LEU:HD21	1:A:368:LEU:HD23	1.61	0.82
2:B:181:VAL:HG23	1:C:348:PRO:HG2	1.62	0.82
4:F:100:ILE:HG23	4:F:128:ARG:HB2	1.63	0.80
1:A:18:ASN:HD21	1:A:78:VAL:HG22	1.44	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:146:VAL:HG13	4:F:185:TYR:HB3	1.64	0.79
4:F:78:VAL:HG21	4:F:181:VAL:HG21	1.64	0.78
2:B:249:ASN:HB3	2:B:255:LEU:HB3	1.65	0.78
1:A:209:ILE:HG22	1:A:227:LEU:HD22	1.67	0.77
2:B:396:THR:HG22	2:B:400:ARG:HD2	1.66	0.77
4:F:280:GLU:HA	4:F:284:LEU:HB2	1.67	0.77
4:F:296:MET:HE1	4:F:380:HIS:HB3	1.66	0.77
2:B:202:TYR:CE2	2:B:270:PRO:HB3	2.20	0.76
1:C:276:ILE:HG13	1:C:280:LYS:HE2	1.65	0.76
4:F:150:LYS:HD3	4:F:151:SER:H	1.49	0.75
2:B:306:ASP:HB3	2:B:309:HIS:ND1	2.01	0.75
3:E:120:LEU:O	3:E:124:GLN:HG2	1.86	0.74
1:A:280:LYS:HG3	13:A:601:HOH:O	1.88	0.73
1:A:36:MET:HG2	1:A:61:HIS:CE1	2.24	0.73
1:A:110:ILE:O	1:A:113:GLU:HG2	1.89	0.72
1:C:234:ILE:HG21	1:C:302:MET:SD	2.29	0.72
2:D:136:GLN:HA	2:D:167:ASN:O	1.90	0.72
4:F:217:ARG:NH2	4:F:345:GLU:OE2	2.23	0.72
2:D:270:PRO:HG2	2:D:302:MET:HB2	1.72	0.71
1:A:221:ARG:HH11	2:B:325:MET:HB3	1.55	0.71
2:B:176:LYS:CE	2:B:207:GLU:HG3	2.20	0.71
4:F:127:GLU:HB3	4:F:130:VAL:CG2	2.20	0.70
2:D:240:THR:HB	2:D:318:ILE:HD13	1.71	0.70
4:F:14:TYR:HA	4:F:17:VAL:HG22	1.74	0.70
1:A:209:ILE:HD11	1:A:302:MET:CE	2.22	0.70
1:A:270:ALA:HB3	1:A:302:MET:HG2	1.72	0.69
1:C:238:ILE:CD1	1:C:378:LEU:HD21	2.23	0.69
2:D:83:PHE:O	2:D:86:ILE:HG22	1.93	0.68
2:B:316:ALA:HB1	11:B:504:2GE:H3	1.75	0.68
2:D:159:GLU:HB3	3:E:123:LEU:HD13	1.76	0.68
1:A:209:ILE:HD11	1:A:302:MET:HE1	1.73	0.68
2:B:119:LEU:HD11	2:B:156:LYS:HB3	1.74	0.68
2:B:172:MET:HG3	2:B:387:LEU:HD11	1.76	0.68
2:B:400:ARG:HH12	1:C:439:SER:HB3	1.58	0.68
2:B:338:LYS:HZ1	4:F:1:MET:HB3	1.59	0.67
1:A:109:THR:OG1	1:A:411:GLU:HG3	1.94	0.67
3:E:24:LEU:O	3:E:25:LYS:HG3	1.95	0.67
4:F:200:ASP:HB3	4:F:222:ARG:HB2	1.76	0.67
2:B:202:TYR:HB2	11:B:504:2GE:CL1	2.32	0.66
1:A:100:ALA:HA	2:B:254:LYS:HG2	1.76	0.66
1:C:234:ILE:HD13	1:C:302:MET:SD	2.35	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:167:LEU:HD22	1:C:200:CYS:HB3	1.77	0.66
2:D:23:VAL:HG21	2:D:232:SER:OG	1.95	0.66
4:F:95:PRO:HG2	4:F:183:GLN:OE1	1.95	0.66
2:D:21:TRP:CZ3	2:D:63:PRO:HB3	2.31	0.66
2:B:247:GLN:HA	2:B:250:ALA:HB2	1.78	0.66
1:A:3:GLU:O	1:A:133:GLN:HG2	1.97	0.65
4:F:5:VAL:CG2	4:F:32:LYS:HA	2.27	0.65
1:A:336:LYS:HG3	3:E:24:LEU:HD23	1.79	0.65
3:E:129:HIS:O	3:E:133:VAL:HG23	1.97	0.65
2:B:400:ARG:HH12	1:C:439:SER:CB	2.10	0.64
2:D:48:ARG:NH2	2:D:241[B]:CYS:O	2.30	0.64
2:D:214:PHE:O	2:D:218:LYS:HA	1.97	0.64
4:F:73:ARG:HB2	4:F:76:SER:OG	1.97	0.64
4:F:292:ARG:HD3	4:F:378:LEU:HB3	1.78	0.64
1:A:221:ARG:NH1	2:B:325:MET:HB3	2.12	0.64
1:A:234:ILE:HD13	1:A:302:MET:SD	2.37	0.64
2:D:286:LEU:HD11	2:D:372:LYS:HE2	1.77	0.64
2:B:71:GLU:HG3	2:B:98:GLY:HA2	1.80	0.64
2:D:241[B]:CYS:SG	2:D:318:ILE:HD12	2.38	0.64
2:B:202:TYR:CZ	2:B:270:PRO:HB3	2.33	0.63
2:D:33:THR:HG22	2:D:60:LYS:NZ	2.13	0.63
2:D:318:ILE:CG2	2:D:376:THR:HB	2.27	0.63
4:F:292:ARG:HB3	4:F:296:MET:HE3	1.80	0.63
1:C:108:TYR:CE1	3:E:105:MET:HE1	2.33	0.63
1:C:334:THR:CG2	1:C:338:LYS:HE2	2.27	0.63
2:B:202:TYR:CZ	2:B:238:VAL:HG11	2.33	0.63
2:D:154:ILE:HG23	2:D:166:MET:HG2	1.81	0.63
4:F:101:TYR:CE2	4:F:126:ASP:HB2	2.34	0.63
1:A:279:GLU:HB2	13:A:601:HOH:O	1.99	0.62
2:B:83:PHE:O	2:B:86:ILE:HG22	2.00	0.62
1:C:320:ARG:HA	1:C:356:ASN:O	1.99	0.62
1:A:18:ASN:ND2	1:A:78:VAL:HG22	2.13	0.61
2:B:195:VAL:HG13	2:B:264[A]:ARG:HG2	1.81	0.60
4:F:287:ILE:HD13	4:F:327:VAL:HG11	1.83	0.60
2:B:36:TYR:CD1	2:B:46:LEU:HD21	2.35	0.60
1:A:270:ALA:HB3	1:A:302:MET:CG	2.31	0.60
2:D:291:LEU:HD22	2:D:375:ALA:CB	2.32	0.60
4:F:200:ASP:O	4:F:221:LEU:HA	2.01	0.60
4:F:200:ASP:HB2	4:F:241:THR:OG1	2.01	0.60
2:B:26:ASP:OD2	2:B:369:ARG:HD3	2.02	0.60
1:A:30:ILE:HD11	1:A:36:MET:HE1	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:340:SER:O	1:A:341:ILE:HD13	2.02	0.59
2:D:48:ARG:NH2	2:D:241[A]:CYS:O	2.36	0.59
2:B:259:MET:HG3	11:B:504:2GE:N01	2.17	0.59
2:D:271:GLY:HA3	2:D:301:MET:HE2	1.85	0.59
2:D:240:THR:HB	2:D:318:ILE:CD1	2.32	0.59
2:B:334:ASN:O	2:B:338:LYS:HG2	2.03	0.58
1:C:248:LEU:HD23	1:C:357:TYR:CE2	2.38	0.58
2:D:295:MET:CG	2:D:377:PHE:HB2	2.32	0.58
2:B:42:LEU:HD22	2:B:358:ILE:HD11	1.85	0.58
2:B:338:LYS:NZ	4:F:1:MET:HB3	2.18	0.58
4:F:100:ILE:CD1	4:F:128:ARG:HA	2.32	0.58
1:A:302:MET:HE3	1:A:302:MET:HA	1.86	0.58
4:F:287:ILE:HD12	4:F:319:PHE:CD2	2.38	0.58
2:B:333:LEU:HD22	4:F:36:ARG:HH22	1.67	0.58
1:C:277:SER:OG	1:C:280:LYS:HD3	2.03	0.58
2:D:143:GLY:HA3	9:D:501:GDP:O3A	2.03	0.58
4:F:169:LEU:HD13	4:F:182:ILE:CD1	2.33	0.58
2:D:21:TRP:CE3	2:D:63:PRO:HB3	2.38	0.57
1:A:166:LYS:HE2	1:A:197:HIS:O	2.04	0.57
2:D:392:SER:O	2:D:396:THR:HG23	2.04	0.57
4:F:150:LYS:CD	4:F:151:SER:H	2.17	0.57
1:C:216:ASN:O	1:C:280:LYS:NZ	2.37	0.57
1:A:343:PHE:CD1	1:A:349:THR:HG23	2.39	0.57
2:B:167:ASN:ND2	2:B:252:LEU:HD22	2.19	0.57
4:F:82:LYS:NZ	4:F:127:GLU:OE1	2.37	0.56
2:B:181:VAL:HG23	1:C:348:PRO:CG	2.34	0.56
1:A:25:CYS:SG	1:A:86:LEU:HD11	2.45	0.56
1:A:69:ASP:O	1:A:94:THR:HA	2.05	0.56
2:B:295:MET:HG2	2:B:377:PHE:HB2	1.87	0.56
1:A:98:ASP:HB2	5:A:501:GTP:O1G	2.04	0.56
1:A:211:ASP:OD2	1:A:304:LYS:NZ	2.28	0.56
2:B:285:ALA:CB	2:B:372:LYS:HD3	2.35	0.56
3:E:136:ASN:OD1	3:E:140:LYS:HE2	2.05	0.56
4:F:186:LEU:HD21	4:F:322:ASP:HB3	1.88	0.56
2:D:217:LEU:HB2	2:D:219:LEU:HD13	1.88	0.56
4:F:101:TYR:CD2	4:F:126:ASP:HB2	2.41	0.56
2:B:259:MET:HG3	11:B:504:2GE:H5	1.69	0.56
4:F:146:VAL:CG1	4:F:187:GLU:HG2	2.36	0.56
4:F:296:MET:CE	4:F:380:HIS:HB3	2.36	0.56
1:A:21:TRP:CZ3	1:A:63:PRO:HB3	2.41	0.55
2:B:223:THR:HG23	2:B:226:ASP:H	1.72	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:248:LEU:HD23	2:D:353:THR:O	2.05	0.55
2:D:345:GLU:OE1	2:D:345:GLU:N	2.21	0.55
4:F:320:MET:HB2	4:F:330:ILE:HD11	1.88	0.55
4:F:169:LEU:HD13	4:F:182:ILE:HD12	1.88	0.55
1:A:245:ASP:HB3	3:E:16:SER:OG	2.07	0.55
1:A:22:GLU:HG3	1:A:83:TYR:CE1	2.41	0.55
4:F:17:VAL:O	4:F:21:LEU:HG	2.06	0.55
2:B:295:MET:CG	2:B:377:PHE:HB2	2.37	0.55
4:F:263:PHE:CE2	4:F:341:LYS:HD3	2.42	0.55
4:F:102:PRO:HD3	4:F:173:ILE:HD11	1.88	0.55
2:D:172:MET:HG3	2:D:387:LEU:HD11	1.88	0.55
2:B:69:ASP:O	2:B:94:PHE:HA	2.07	0.54
2:B:176:LYS:HE2	2:B:207:GLU:CG	2.32	0.54
1:C:181[A]:VAL:HG21	1:C:404:PHE:CZ	2.42	0.54
1:C:210:TYR:CZ	1:C:222:PRO:HD2	2.42	0.54
2:D:18:ALA:O	2:D:22:GLU:HG3	2.07	0.54
4:F:131:PHE:HD2	4:F:132:LEU:HD12	1.72	0.54
4:F:340:GLN:HA	4:F:343:TYR:HD2	1.72	0.54
1:C:271:THR:HG21	1:C:295:CYS:O	2.08	0.54
1:A:108:TYR:CE2	1:A:413:MET:HG3	2.43	0.54
2:D:286:LEU:CD1	2:D:372:LYS:HE2	2.37	0.54
1:C:93:ILE:HD11	1:C:121:ARG:HG3	1.89	0.54
2:B:301:MET:CE	2:B:301:MET:HA	2.38	0.53
1:C:234:ILE:O	1:C:238:ILE:HG12	2.08	0.53
2:D:171:VAL:HA	2:D:204:ILE:O	2.08	0.53
2:D:173:PRO:HG3	2:D:187:ALA:HB2	1.91	0.53
2:D:406:HIS:HA	2:D:409:THR:CG2	2.32	0.53
1:C:21:TRP:CZ3	1:C:63:PRO:HB3	2.44	0.53
4:F:150:LYS:HD3	4:F:151:SER:N	2.22	0.53
2:B:67:LEU:N	2:B:67:LEU:HD12	2.24	0.53
4:F:14:TYR:HD1	4:F:17:VAL:HG21	1.72	0.53
4:F:44:ARG:HH11	4:F:335:ALA:HB1	1.73	0.53
2:B:141:LEU:HD12	2:B:172:MET:SD	2.48	0.53
2:B:402:LYS:HE2	2:B:415:GLU:OE1	2.09	0.53
1:C:173:PRO:HB3	1:C:183:GLU:OE1	2.09	0.53
1:C:229:ARG:NE	1:C:363:VAL:HG21	2.24	0.53
4:F:340:GLN:OE1	4:F:340:GLN:N	2.33	0.53
1:A:209:ILE:CD1	1:A:302:MET:HE1	2.37	0.53
2:B:12:CYS:HB2	9:B:501:GDP:C8	2.44	0.53
1:A:209:ILE:HG22	1:A:227:LEU:CD2	2.36	0.53
2:D:141:LEU:HD12	2:D:172:MET:SD	2.48	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:242:ASN:ND2	12:F:701:ACP:H3B2	2.23	0.53
4:F:292:ARG:HB3	4:F:296:MET:CE	2.38	0.53
2:D:124:LYS:C	2:D:124:LYS:HD3	2.29	0.53
1:A:34:GLY:O	1:A:61:HIS:N	2.33	0.53
2:B:62:VAL:CG1	2:B:88:ARG:HG3	2.27	0.53
1:C:140:SER:HA	1:C:171:ILE:HB	1.91	0.52
2:B:106:GLY:O	2:B:111:GLY:HA3	2.09	0.52
2:D:145:THR:HB	9:D:501:GDP:O2B	2.10	0.52
3:E:45:PRO:HA	3:E:49:GLU:OE1	2.09	0.52
2:B:332:MET:O	2:B:336:GLN:HG2	2.09	0.52
1:A:93:ILE:HD11	1:A:121:ARG:HG3	1.91	0.52
1:A:357:TYR:CZ	3:E:17:GLY:HA2	2.44	0.52
2:B:318:ILE:N	2:B:318:ILE:HD12	2.24	0.52
1:C:172:TYR:HB3	1:C:205:ASP:HA	1.92	0.52
2:D:103:TRP:CE3	2:D:189:LEU:HD13	2.45	0.52
2:B:33:THR:O	2:B:60:LYS:HE3	2.10	0.52
2:B:75:MET:HE3	2:B:92:PHE:CD2	2.45	0.52
2:B:82:PRO:O	2:B:83:PHE:HB2	2.10	0.52
4:F:100:ILE:HD13	4:F:128:ARG:HA	1.91	0.52
2:B:67:LEU:HD22	2:B:92:PHE:CE2	2.44	0.52
2:B:251:ASP:O	2:B:255:LEU:HG	2.10	0.52
4:F:292:ARG:HH11	4:F:296:MET:HE1	1.75	0.52
1:A:187:SER:HB3	1:A:391:LEU:HD21	1.91	0.51
1:C:244:PHE:CZ	1:C:358:GLN:HG2	2.45	0.51
4:F:97:SER:OG	4:F:183:GLN:HB3	2.10	0.51
1:A:132:LEU:O	1:A:164:LYS:HE3	2.10	0.51
2:B:119:LEU:HD11	2:B:156:LYS:CB	2.40	0.51
2:B:208:ALA:HB2	2:B:304:ALA:H	1.74	0.51
4:F:292:ARG:HH11	4:F:296:MET:CE	2.24	0.51
2:D:192:HIS:O	2:D:195:VAL:HG12	2.10	0.51
2:B:252:LEU:HA	2:B:255:LEU:HD11	1.91	0.51
2:D:176:LYS:HD3	2:D:210:TYR:CD2	2.46	0.51
2:D:240:THR:CG2	2:D:318:ILE:HD11	2.41	0.51
1:A:286:LEU:O	1:A:373:ARG:NH1	2.42	0.51
2:B:205:ASP:OD2	2:B:304:ALA:HB3	2.10	0.51
2:B:357:ASP:O	2:B:359:PRO:HD3	2.11	0.51
2:D:295:MET:HG2	2:D:377:PHE:HB2	1.92	0.51
4:F:148:ILE:HD12	4:F:162:ILE:HG12	1.92	0.51
1:A:88:HIS:O	1:A:91:GLN:HG2	2.09	0.51
2:B:75:MET:HE3	2:B:92:PHE:HD2	1.76	0.51
2:B:274:PRO:HB3	2:B:286:LEU:HD11	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:82:PRO:O	2:D:83:PHE:HB2	2.11	0.51
1:A:101:ASN:OD1	2:B:254:LYS:HE2	2.11	0.51
2:B:71:GLU:HG3	2:B:98:GLY:CA	2.41	0.51
2:B:136:GLN:HA	2:B:167:ASN:O	2.11	0.51
1:C:238:ILE:HD12	1:C:378:LEU:HD21	1.93	0.50
1:C:292:THR:HG22	1:C:335:ILE:CD1	2.42	0.50
2:D:31:ASP:HB2	2:D:32:PRO:HD2	1.93	0.50
4:F:2:TYR:CE1	4:F:359:PHE:HB3	2.47	0.50
1:C:406:HIS:CD2	2:D:263:PRO:HD3	2.47	0.50
2:D:6:HIS:CD2	2:D:21:TRP:HE1	2.30	0.50
1:C:229:ARG:CD	1:C:363:VAL:HG21	2.42	0.50
1:C:406:HIS:CG	2:D:263:PRO:HD3	2.47	0.50
4:F:314:LEU:HD22	4:F:350:ILE:HD11	1.93	0.50
1:A:71:GLU:HG2	1:A:98:ASP:HB3	1.93	0.49
2:D:385:GLN:HB2	2:D:429:VAL:HG13	1.93	0.49
4:F:296:MET:HE1	4:F:380:HIS:CB	2.41	0.49
1:A:188:ILE:HG13	1:A:425:MET:HG3	1.93	0.49
1:C:276:ILE:HD11	1:C:280:LYS:C	2.32	0.49
1:A:34:GLY:HA2	1:A:86:LEU:CD2	2.43	0.49
1:A:55:GLU:HA	1:A:60:LYS:O	2.12	0.49
2:B:19:LYS:NZ	2:B:19:LYS:HB3	2.27	0.49
1:C:385:ALA:HA	1:C:388:TRP:CD1	2.46	0.49
2:D:31:ASP:HB2	2:D:32:PRO:CD	2.42	0.49
1:A:318:LEU:HD13	13:A:605:HOH:O	2.12	0.49
2:B:274:PRO:HB3	2:B:286:LEU:CD1	2.43	0.49
2:D:33:THR:HG22	2:D:60:LYS:HZ1	1.77	0.49
2:D:120:ASP:OD1	2:D:123:ARG:NH1	2.45	0.49
1:A:280:LYS:N	13:A:601:HOH:O	2.45	0.49
1:C:238:ILE:HD11	1:C:378:LEU:HD21	1.93	0.49
1:C:93:ILE:HG22	1:C:114:ILE:HD11	1.94	0.49
3:E:65:GLU:HG3	3:E:69:LEU:HD23	1.95	0.49
1:A:109:THR:HG1	1:A:411:GLU:HG3	1.77	0.49
1:A:311:LYS:HE3	1:A:344:VAL:HG12	1.95	0.49
2:B:208:ALA:HB2	2:B:304:ALA:N	2.28	0.49
2:B:123:ARG:NH1	2:B:160:GLU:OE2	2.45	0.49
4:F:131:PHE:CD2	4:F:132:LEU:HD12	2.48	0.49
1:A:2:ARG:HB2	1:A:133:GLN:NE2	2.28	0.49
1:A:265:ILE:HG23	1:A:432:TYR:CE1	2.47	0.48
1:C:334:THR:HG23	1:C:338:LYS:HE2	1.95	0.48
2:D:67:LEU:N	2:D:67:LEU:HD12	2.28	0.48
2:D:99:ALA:O	2:D:105:LYS:HD2	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:38:GLY:HA3	2:B:45:GLN:OE1	2.12	0.48
2:B:54:ASN:OD1	2:B:64:ARG:NH2	2.44	0.48
2:D:382:THR:O	2:D:385:GLN:HG2	2.12	0.48
1:C:180:ALA:O	1:C:183:GLU:HG3	2.14	0.48
4:F:216:TYR:CZ	4:F:218:GLU:HB2	2.48	0.48
2:B:174:SER:CB	2:B:207:GLU:HB2	2.43	0.48
2:B:16:ILE:HD11	2:B:228:ASN:OD1	2.14	0.48
1:A:413:MET:HE2	1:A:418:PHE:CE2	2.48	0.48
1:A:30:ILE:HD11	1:A:36:MET:CE	2.43	0.48
2:D:248:LEU:HD23	2:D:353:THR:C	2.34	0.48
2:D:414:ASP:OD1	2:D:415:GLU:N	2.46	0.48
3:E:65:GLU:HG3	3:E:69:LEU:CD2	2.43	0.48
4:F:131:PHE:CE1	4:F:182:ILE:HD13	2.48	0.48
2:D:36:TYR:CD1	2:D:46:LEU:HD21	2.49	0.48
2:B:11:GLN:HA	2:B:74:THR:HG21	1.95	0.47
1:A:36:MET:HE3	1:A:49:PHE:CE1	2.49	0.47
1:A:54:SER:O	1:A:61:HIS:HA	2.14	0.47
2:B:204:ILE:HD13	2:B:231:VAL:HG13	1.95	0.47
4:F:146:VAL:HG12	4:F:187:GLU:HG2	1.96	0.47
2:B:3:GLU:OE2	2:B:130:ASP:N	2.46	0.47
2:D:12:CYS:HB2	9:D:501:GDP:C8	2.48	0.47
4:F:191:LEU:HD12	4:F:196:HIS:CE1	2.50	0.47
1:A:409:VAL:HA	1:A:413:MET:O	2.14	0.47
1:C:188:ILE:HG13	1:C:425:MET:HG3	1.96	0.47
2:B:141:LEU:HD12	2:B:172:MET:HE1	1.97	0.47
1:C:270:ALA:HB3	1:C:302:MET:CE	2.35	0.47
4:F:88:SER:C	4:F:90:SER:H	2.18	0.47
1:A:210:TYR:OH	1:A:221:ARG:HD2	2.15	0.47
2:B:1:MET:HB3	2:B:3:GLU:OE2	2.15	0.47
1:C:209:ILE:HG23	1:C:230:LEU:HD23	1.96	0.47
4:F:132:LEU:HD12	4:F:132:LEU:N	2.29	0.47
1:C:151:SER:HB3	1:C:193:THR:HG21	1.96	0.47
1:C:430:LYS:NZ	1:C:434:GLU:OE2	2.45	0.47
2:D:185:TYR:OH	2:D:398:MET:O	2.33	0.47
1:C:344:VAL:HG21	1:C:346:TRP:CE2	2.50	0.46
1:C:119:LEU:HD11	1:C:156:ARG:HB3	1.95	0.46
2:D:12:CYS:HB3	2:D:140:SER:HB3	1.97	0.46
2:D:291:LEU:HD22	2:D:375:ALA:HB2	1.96	0.46
1:A:210:TYR:CD1	1:A:222:PRO:HG2	2.50	0.46
1:A:247:ALA:HB3	3:E:19:SER:OG	2.15	0.46
1:C:88:HIS:HE1	1:C:90:GLU:HG3	1.80	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:101:TYR:HD1	4:F:179:VAL:HG22	1.79	0.46
2:D:195:VAL:HG11	2:D:424:ASN:OD1	2.15	0.46
2:B:161:TYR:HB3	2:B:164:ARG:HG3	1.96	0.46
1:C:181[A]:VAL:O	1:C:398:MET:HE1	2.15	0.46
2:B:202:TYR:HE2	2:B:234:THR:CG2	2.29	0.46
1:C:7:ILE:HG21	1:C:153:LEU:HD21	1.97	0.46
4:F:26:GLN:NE2	4:F:361:LEU:HD22	2.30	0.46
4:F:61:LEU:HD11	4:F:312:PHE:HD2	1.81	0.46
4:F:283:ILE:HG23	4:F:327:VAL:CG2	2.46	0.46
2:B:210:TYR:CE1	2:B:222:PRO:HD2	2.51	0.46
1:A:227:LEU:O	1:A:231:ILE:HG13	2.15	0.46
2:B:255:LEU:HD13	11:B:504:2GE:N03	2.30	0.46
1:C:275:VAL:HG13	1:C:368:LEU:HD21	1.97	0.46
1:C:30:ILE:HG12	1:C:36:MET:HE3	1.98	0.45
1:C:88:HIS:CE1	1:C:90:GLU:HG3	2.51	0.45
1:A:270:ALA:O	1:A:302:MET:HG2	2.17	0.45
2:B:119:LEU:HD11	2:B:156:LYS:HG2	1.99	0.45
1:A:349:THR:HB	3:E:25:LYS:HB2	1.99	0.45
1:C:333:ALA:O	1:C:337:THR:HG23	2.16	0.45
2:D:291:LEU:HD22	2:D:375:ALA:HB3	1.99	0.45
1:A:433:GLU:O	1:A:437:VAL:HG23	2.16	0.45
2:B:396:THR:O	2:B:400:ARG:HG3	2.17	0.45
1:C:179:THR:HG21	2:D:247:GLN:HE21	1.81	0.45
2:B:345:GLU:OE1	2:B:345:GLU:N	2.39	0.45
2:D:12:CYS:CB	2:D:140:SER:HB3	2.47	0.45
4:F:287:ILE:HG23	4:F:319:PHE:CE2	2.51	0.45
2:B:241:CYS:SG	11:B:504:2GE:N15	2.81	0.45
2:D:69:ASP:O	2:D:94:PHE:HA	2.16	0.45
2:D:248:LEU:HD21	2:D:352:LYS:HB3	1.99	0.45
4:F:132:LEU:HD12	4:F:132:LEU:H	1.80	0.45
2:B:309:HIS:O	2:B:436:GLN:NE2	2.50	0.45
1:C:165:SER:HA	1:C:199:ASP:OD2	2.17	0.45
1:A:105:ARG:HA	1:A:411:GLU:HG2	1.99	0.45
2:B:159:GLU:HB2	3:E:72:LEU:HD13	1.98	0.45
1:C:254:GLU:HG2	1:C:352:LYS:HE2	1.99	0.45
2:D:427:ASP:O	2:D:431:GLU:HG3	2.17	0.45
4:F:146:VAL:HG12	4:F:187:GLU:CG	2.47	0.45
2:D:114:LEU:HD21	2:D:149:MET:SD	2.57	0.44
2:D:264:ARG:HH12	2:D:424:ASN:HD21	1.65	0.44
4:F:283:ILE:HG23	4:F:327:VAL:HG21	1.99	0.44
2:B:255:LEU:HB2	11:B:504:2GE:N01	2.32	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:60:LYS:HE2	1:C:85:GLN:O	2.18	0.44
4:F:100:ILE:HG12	4:F:128:ARG:HA	1.99	0.44
4:F:189:PRO:HA	4:F:322:ASP:HA	1.98	0.44
1:A:167:LEU:HD13	1:A:252:LEU:HD22	2.00	0.44
2:B:330:GLU:O	2:B:334:ASN:HB2	2.18	0.44
1:C:227:LEU:O	1:C:231:ILE:HG13	2.17	0.44
4:F:206:LEU:HD23	4:F:353:VAL:CG2	2.48	0.44
1:C:2:ARG:HA	1:C:2:ARG:NE	2.32	0.44
4:F:216:TYR:CE2	4:F:218:GLU:HB2	2.53	0.44
4:F:283:ILE:O	4:F:287:ILE:HG12	2.17	0.44
2:B:203:CYS:SG	2:B:267:PHE:HB3	2.58	0.44
3:E:139:LEU:HD23	3:E:139:LEU:C	2.38	0.44
1:A:331:ALA:O	1:A:334:THR:HG22	2.18	0.44
2:D:33:THR:HG22	2:D:60:LYS:HZ2	1.81	0.44
3:E:47:LEU:O	3:E:51:GLN:HG2	2.18	0.44
2:B:231:VAL:O	2:B:235:MET:HG3	2.18	0.43
4:F:220:VAL:HG12	4:F:263:PHE:CD1	2.53	0.43
1:A:36:MET:HG3	1:A:39:ASP:HB2	2.00	0.43
1:A:217:LEU:HD21	1:A:368:LEU:CD2	2.41	0.43
2:D:247:GLN:O	2:D:247:GLN:HG2	2.18	0.43
1:A:30:ILE:HG12	1:A:36:MET:HE2	2.00	0.43
4:F:146:VAL:HG12	4:F:187:GLU:OE2	2.19	0.43
2:B:171:VAL:HA	2:B:204:ILE:O	2.17	0.43
1:C:75:ILE:HD12	1:C:94:THR:HG22	2.00	0.43
1:C:335:ILE:O	1:C:339:ARG:HB3	2.18	0.43
1:A:36:MET:HG3	1:A:36:MET:O	2.18	0.43
2:B:167:ASN:OD1	2:B:200:GLU:HB2	2.18	0.43
1:A:128:GLN:O	1:A:128:GLN:HG3	2.18	0.43
1:A:209:ILE:HG23	1:A:230:LEU:HD23	2.00	0.43
2:D:46:LEU:HA	2:D:49:ILE:HB	2.00	0.43
2:B:174:SER:HB2	2:B:207:GLU:HB2	2.01	0.43
2:D:23:VAL:O	2:D:27:GLU:HG3	2.19	0.43
4:F:3:THR:O	4:F:38:ASN:HB2	2.17	0.43
1:A:426:ALA:HA	13:A:628:HOH:O	2.19	0.43
2:B:31:ASP:HB2	2:B:32:PRO:HD2	2.01	0.43
2:B:332:MET:O	2:B:335:VAL:HG12	2.19	0.43
2:B:345:GLU:HG3	13:F:811:HOH:O	2.18	0.43
2:B:387:LEU:C	2:B:387:LEU:HD23	2.39	0.43
1:C:209:ILE:HG22	1:C:227:LEU:HD22	2.01	0.43
1:C:225:THR:OG1	13:C:601:HOH:O	2.21	0.43
2:D:417:GLU:OE1	3:E:129:HIS:NE2	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:132:LEU:HA	4:F:135:TYR:HB3	2.01	0.43
1:A:270:ALA:CB	1:A:302:MET:HG2	2.45	0.43
1:A:275:VAL:HG13	1:A:368:LEU:HD21	2.01	0.43
1:C:1:MET:O	1:C:2:ARG:HB2	2.18	0.43
1:A:16:ILE:HD13	1:A:171:ILE:HD11	2.01	0.43
2:B:385:GLN:OE1	2:B:389:LYS:HE3	2.19	0.43
1:C:21:TRP:CE3	1:C:63:PRO:HB3	2.54	0.43
2:D:318:ILE:HG22	2:D:376:THR:HB	1.98	0.43
2:D:431:GLU:OE1	13:D:601:HOH:O	2.21	0.43
4:F:205:VAL:HG21	4:F:291:ILE:HD13	2.01	0.43
2:D:119:LEU:O	2:D:123:ARG:HG3	2.19	0.42
4:F:340:GLN:HA	4:F:343:TYR:CD2	2.54	0.42
4:F:102:PRO:HB3	4:F:173:ILE:CG1	2.38	0.42
2:D:75:MET:CE	2:D:94:PHE:HD2	2.33	0.42
4:F:305:LYS:HE2	4:F:306:HIS:NE2	2.33	0.42
1:A:234:ILE:O	1:A:238:ILE:HG13	2.20	0.42
2:B:42:LEU:H	2:B:42:LEU:HD12	1.84	0.42
2:B:181:VAL:HG23	1:C:348:PRO:CD	2.49	0.42
2:D:11:GLN:HA	2:D:74:THR:HG21	2.00	0.42
2:B:337:ASN:ND2	4:F:58:LEU:HD21	2.34	0.42
1:A:348:PRO:HB3	3:E:27:PRO:HD3	2.01	0.42
2:B:297:ASP:OD1	2:B:298:SER:N	2.53	0.42
2:B:323:MET:HB3	2:B:373:MET:HE2	2.01	0.42
2:B:6:HIS:CD2	2:B:21:TRP:HE1	2.37	0.42
1:C:334:THR:HG22	1:C:338:LYS:HE2	2.02	0.42
2:D:70:LEU:H	2:D:145:THR:HG21	1.84	0.42
1:A:172:TYR:HB3	1:A:205:ASP:HA	2.02	0.42
1:A:187:SER:CB	1:A:391:LEU:HD21	2.49	0.42
1:A:357:TYR:CE2	3:E:17:GLY:HA2	2.54	0.42
2:B:21:TRP:CZ3	2:B:63:PRO:HB3	2.55	0.42
1:C:224:TYR:HE2	2:D:247:GLN:OE1	2.02	0.42
1:C:280:LYS:HE2	1:C:280:LYS:HB2	1.80	0.42
2:D:385:GLN:O	2:D:389:LYS:HB2	2.20	0.42
4:F:299:GLU:HB3	4:F:300:PRO:HD3	2.02	0.42
1:A:16:ILE:CD1	1:A:171:ILE:HD11	2.49	0.42
2:B:220:THR:O	2:B:221:THR:HB	2.20	0.42
1:C:108:TYR:O	1:C:112:LYS:HG2	2.20	0.42
1:C:306:ASP:OD1	1:C:308:ARG:HG2	2.19	0.42
1:A:34:GLY:O	1:A:60:LYS:HA	2.20	0.41
1:C:25:CYS:HB3	1:C:30:ILE:O	2.20	0.41
2:D:218:LYS:HA	2:D:218:LYS:HD2	1.80	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:387:LEU:HD23	2:D:387:LEU:C	2.40	0.41
1:A:250:VAL:HG22	1:A:254:GLU:OE1	2.20	0.41
2:B:195:VAL:CG1	2:B:264[A]:ARG:HG2	2.47	0.41
3:E:46:SER:O	3:E:50:ILE:HG13	2.20	0.41
4:F:220:VAL:HG12	4:F:263:PHE:CE1	2.55	0.41
1:A:210:TYR:CE1	1:A:222:PRO:HG2	2.55	0.41
2:D:398:MET:HA	2:D:401:ARG:HE	1.85	0.41
2:B:237:GLY:HA3	2:B:376:THR:OG1	2.21	0.41
2:D:244:PHE:CE1	2:D:358:ILE:HD12	2.56	0.41
3:E:65:GLU:O	3:E:69:LEU:HD23	2.21	0.41
4:F:209:HIS:HA	4:F:311:SER:O	2.20	0.41
2:B:227:LEU:O	2:B:231:VAL:HG23	2.20	0.41
1:C:180:ALA:HA	2:D:258:ASN:OD1	2.21	0.41
1:C:233:GLN:HG3	1:C:368:LEU:CD1	2.50	0.41
3:E:100:LYS:HE3	3:E:100:LYS:HB2	1.85	0.41
1:C:214:ARG:HG2	1:C:219:ILE:O	2.21	0.41
1:C:248:LEU:HD23	1:C:357:TYR:HE2	1.84	0.41
4:F:146:VAL:HG12	4:F:187:GLU:CD	2.41	0.41
4:F:150:LYS:CG	4:F:151:SER:H	2.34	0.41
1:A:36:MET:CG	1:A:39:ASP:HB2	2.51	0.41
1:A:47:ASP:OD1	1:A:47:ASP:N	2.54	0.41
2:B:108:TYR:CG	3:E:82:VAL:HG11	2.56	0.41
2:B:181:VAL:CG2	1:C:348:PRO:HD2	2.50	0.41
1:C:385:ALA:HA	1:C:388:TRP:HD1	1.86	0.41
2:D:7:ILE:O	2:D:137:LEU:HA	2.21	0.41
2:D:33:THR:HG22	2:D:33:THR:O	2.20	0.41
2:D:208:ALA:O	2:D:212:ILE:HG13	2.20	0.41
4:F:40:MET:HE3	4:F:52:LEU:HD21	2.02	0.41
2:D:5:VAL:HG23	2:D:132:LEU:CD1	2.51	0.41
2:D:334:ASN:OD1	2:D:338:LYS:HE3	2.20	0.41
3:E:121:GLU:HA	3:E:124:GLN:HG2	2.02	0.41
2:B:133:GLN:OE1	2:B:252:LEU:N	2.51	0.40
2:B:234:THR:O	2:B:238:VAL:HG13	2.21	0.40
2:B:285:ALA:HB2	2:B:372:LYS:HD3	2.02	0.40
1:C:248:LEU:HB3	1:C:355:ILE:HB	2.02	0.40
1:A:5:ILE:O	1:A:135:PHE:HA	2.21	0.40
1:A:34:GLY:HA2	1:A:86:LEU:HD23	2.02	0.40
1:A:209:ILE:CG2	1:A:227:LEU:HD22	2.42	0.40
1:A:234:ILE:HD13	1:A:302:MET:CE	2.51	0.40
2:D:114:LEU:HD23	2:D:114:LEU:H	1.86	0.40
2:D:389:LYS:HD3	2:D:429:VAL:HG11	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:163:SER:HB2	4:F:169:LEU:CD2	2.51	0.40
2:B:119:LEU:HD11	2:B:156:LYS:CG	2.51	0.40
2:D:182:VAL:HG22	2:D:408:TYR:OH	2.22	0.40
1:A:298:PRO:HA	1:A:301:GLN:CD	2.41	0.40
1:A:347:CYS:C	3:E:27:PRO:HB3	2.41	0.40
1:C:150:THR:O	1:C:154:MET:HG2	2.22	0.40
3:E:95:LYS:HD2	13:E:205:HOH:O	2.20	0.40
3:E:103:GLN:HG3	3:E:104:LYS:N	2.36	0.40
2:B:31:ASP:HB2	2:B:32:PRO:CD	2.51	0.40
1:C:18:ASN:OD1	1:C:78:VAL:HG22	2.22	0.40
1:C:75:ILE:HB	1:C:94:THR:CG2	2.51	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	432/451 (96%)	423 (98%)	9 (2%)	0	100	100
1	C	439/451 (97%)	426 (97%)	13 (3%)	0	100	100
2	B	420/445 (94%)	407 (97%)	13 (3%)	0	100	100
2	D	419/445 (94%)	404 (96%)	15 (4%)	0	100	100
3	E	117/143 (82%)	116 (99%)	1 (1%)	0	100	100
4	F	298/384 (78%)	284 (95%)	14 (5%)	0	100	100
All	All	2125/2319 (92%)	2060 (97%)	65 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	367/379 (97%)	365 (100%)	2 (0%)	88	95
1	C	372/379 (98%)	370 (100%)	2 (0%)	88	95
2	B	367/383 (96%)	361 (98%)	6 (2%)	62	78
2	D	366/383 (96%)	359 (98%)	7 (2%)	57	73
3	E	109/127 (86%)	109 (100%)	0	100	100
4	F	283/342 (83%)	281 (99%)	2 (1%)	84	92
All	All	1864/1993 (94%)	1845 (99%)	19 (1%)	76	87

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	GLU
1	A	176	GLN
2	B	139	HIS
2	B	164	ARG
2	B	247	GLN
2	B	255	LEU
2	B	322	ARG
2	B	329	ASP
1	C	71	GLU
1	C	221	ARG
2	D	26	ASP
2	D	74	THR
2	D	139	HIS
2	D	192	HIS
2	D	207	GLU
2	D	389	LYS
2	D	402	LYS
4	F	331	GLU
4	F	348	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	258	ASN
2	B	282	GLN
2	D	247	GLN
3	E	18	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 17 ligands modelled in this entry, 9 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
9	GDP	B	501	6	24,30,30	1.17	2 (8%)	31,47,47	1.87	7 (22%)
5	GTP	C	501	6	26,34,34	1.02	1 (3%)	33,54,54	1.74	8 (24%)
10	MES	B	503	-	12,12,12	2.21	1 (8%)	14,16,16	1.87	2 (14%)
11	2GE	B	504	-	21,21,21	1.27	1 (4%)	27,30,30	2.07	8 (29%)
5	GTP	A	501	6	26,34,34	0.95	1 (3%)	33,54,54	1.68	7 (21%)
9	GDP	D	501	6	24,30,30	1.16	2 (8%)	31,47,47	1.91	7 (22%)
12	ACP	F	701	6	27,33,33	1.48	6 (22%)	32,52,52	1.69	4 (12%)
8	EDO	A	504	-	3,3,3	0.46	0	2,2,2	0.33	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	GDP	B	501	6	-	3/12/32/32	0/3/3/3
5	GTP	C	501	6	-	9/18/38/38	0/3/3/3
10	MES	B	503	-	-	0/6/14/14	0/1/1/1
11	2GE	B	504	-	-	4/8/10/10	0/3/3/3
5	GTP	A	501	6	-	8/18/38/38	0/3/3/3
9	GDP	D	501	6	-	4/12/32/32	0/3/3/3
12	ACP	F	701	6	-	4/15/38/38	0/3/3/3
8	EDO	A	504	-	-	0/1/1/1	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	B	503	MES	C8-S	-7.38	1.67	1.77
9	B	501	GDP	C5-C6	4.08	1.48	1.41
9	D	501	GDP	C5-C6	4.04	1.48	1.41
12	F	701	ACP	PB-O3A	3.35	1.62	1.58
5	C	501	GTP	C6-N1	3.27	1.38	1.33
11	B	504	2GE	C02-N01	3.21	1.40	1.33
5	A	501	GTP	C6-N1	3.03	1.38	1.33
12	F	701	ACP	PG-O2G	2.88	1.61	1.54
12	F	701	ACP	PG-O3G	2.79	1.61	1.54
12	F	701	ACP	O4'-C1'	2.78	1.45	1.41
9	D	501	GDP	C5-C4	2.36	1.47	1.40
12	F	701	ACP	C8-N7	-2.31	1.30	1.34
9	B	501	GDP	C5-C4	2.30	1.47	1.40
12	F	701	ACP	PB-O2B	2.15	1.61	1.56

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	F	701	ACP	PB-O3A-PA	-6.28	112.64	132.56
5	C	501	GTP	N3-C2-N1	-5.47	119.93	127.22
11	B	504	2GE	C11-C09-CL1	-5.32	115.34	120.52
5	A	501	GTP	N3-C2-N1	-5.07	120.46	127.22
11	B	504	2GE	C05-C11-CL2	4.97	123.99	119.66
9	B	501	GDP	C2-N3-C4	4.94	121.00	115.36
10	B	503	MES	C5-N4-C3	4.72	119.45	108.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	D	501	GDP	C2-N3-C4	4.67	120.69	115.36
9	D	501	GDP	C2-N1-C6	4.05	122.37	115.93
9	D	501	GDP	C5-C6-N1	-4.03	117.92	123.43
12	F	701	ACP	N3-C2-N1	-3.95	122.51	128.68
9	D	501	GDP	C4-C5-C6	-3.94	117.04	120.80
5	C	501	GTP	C2-N3-C4	3.94	119.86	115.36
9	B	501	GDP	C2-N1-C6	3.94	122.18	115.93
9	B	501	GDP	C4-C5-C6	-3.91	117.07	120.80
5	A	501	GTP	C2-N3-C4	3.91	119.82	115.36
9	B	501	GDP	C5-C6-N1	-3.88	118.12	123.43
9	B	501	GDP	N3-C2-N1	-3.35	122.75	127.22
9	D	501	GDP	N3-C2-N1	-3.25	122.88	127.22
11	B	504	2GE	C04-N03-C02	3.25	118.19	116.34
5	C	501	GTP	C5-C6-N1	-3.13	119.16	123.43
9	D	501	GDP	PA-O3A-PB	-3.08	122.27	132.83
5	A	501	GTP	C5-C6-N1	-3.04	119.27	123.43
9	B	501	GDP	C4-C5-N7	-3.03	106.25	109.40
10	B	503	MES	O1S-S-C8	2.91	110.42	106.92
5	C	501	GTP	PB-O3B-PG	-2.87	122.96	132.83
11	B	504	2GE	C04-C05-C11	2.82	125.10	120.97
5	C	501	GTP	C2-N1-C6	2.81	120.40	115.93
12	F	701	ACP	C3'-C2'-C1'	2.75	105.12	100.98
11	B	504	2GE	N01-C02-N19	2.72	121.48	117.25
5	A	501	GTP	C2-N1-C6	2.63	120.11	115.93
9	B	501	GDP	PA-O3A-PB	-2.58	123.97	132.83
5	A	501	GTP	PB-O3B-PG	-2.57	123.99	132.83
9	D	501	GDP	C4-C5-N7	-2.52	106.78	109.40
11	B	504	2GE	C09-C11-CL2	-2.49	116.82	120.02
11	B	504	2GE	N01-C02-N03	-2.41	113.51	117.25
5	A	501	GTP	O3G-PG-O3B	2.32	112.41	104.64
12	F	701	ACP	PA-O5'-C5'	-2.31	108.15	121.68
5	A	501	GTP	PA-O3A-PB	-2.19	125.32	132.83
5	C	501	GTP	O3G-PG-O3B	2.05	111.51	104.64
11	B	504	2GE	C08-C09-CL1	2.04	122.50	118.41
5	C	501	GTP	N2-C2-N1	2.02	120.39	117.25
5	C	501	GTP	PA-O3A-PB	-2.00	125.96	132.83

There are no chirality outliers.

All (32) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	501	GTP	PB-O3B-PG-O3G

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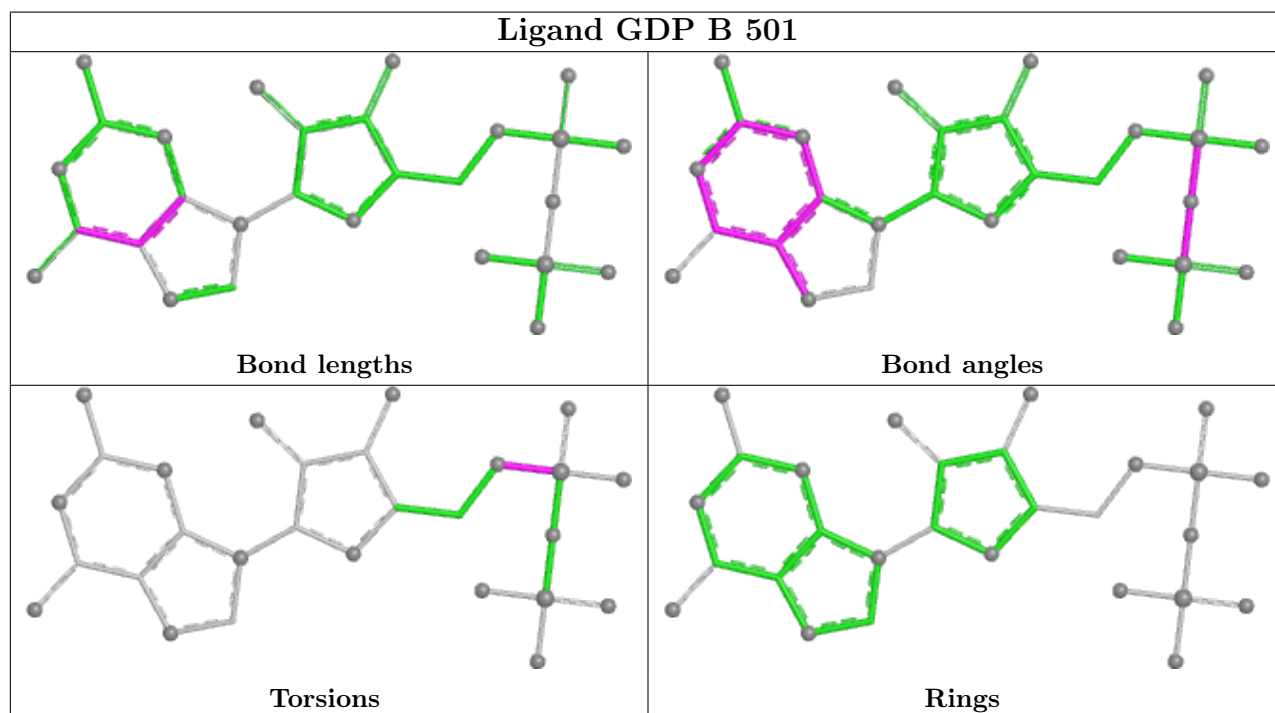
Mol	Chain	Res	Type	Atoms
5	A	501	GTP	C5'-O5'-PA-O1A
5	A	501	GTP	C5'-O5'-PA-O2A
5	C	501	GTP	PB-O3B-PG-O2G
5	C	501	GTP	PB-O3B-PG-O3G
5	C	501	GTP	C5'-O5'-PA-O1A
5	C	501	GTP	C5'-O5'-PA-O2A
9	B	501	GDP	C5'-O5'-PA-O1A
9	B	501	GDP	C5'-O5'-PA-O2A
9	D	501	GDP	C5'-O5'-PA-O1A
9	D	501	GDP	C5'-O5'-PA-O2A
11	B	504	2GE	C13-C14-N15-C16
11	B	504	2GE	N19-C14-N15-C16
12	F	701	ACP	C5'-O5'-PA-O2A
12	F	701	ACP	C5'-O5'-PA-O3A
5	A	501	GTP	PB-O3B-PG-O2G
11	B	504	2GE	C13-C04-C05-C11
12	F	701	ACP	C5'-O5'-PA-O1A
12	F	701	ACP	PB-C3B-PG-O2G
5	A	501	GTP	PB-O3A-PA-O2A
5	A	501	GTP	C4'-C5'-O5'-PA
5	C	501	GTP	PB-O3A-PA-O2A
5	A	501	GTP	PB-O3B-PG-O1G
5	C	501	GTP	PB-O3B-PG-O1G
11	B	504	2GE	N03-C04-C05-C11
9	D	501	GDP	PA-O3A-PB-O2B
5	A	501	GTP	C5'-O5'-PA-O3A
5	C	501	GTP	C5'-O5'-PA-O3A
9	B	501	GDP	C5'-O5'-PA-O3A
9	D	501	GDP	C5'-O5'-PA-O3A
5	C	501	GTP	C4'-C5'-O5'-PA
5	C	501	GTP	PB-O3A-PA-O1A

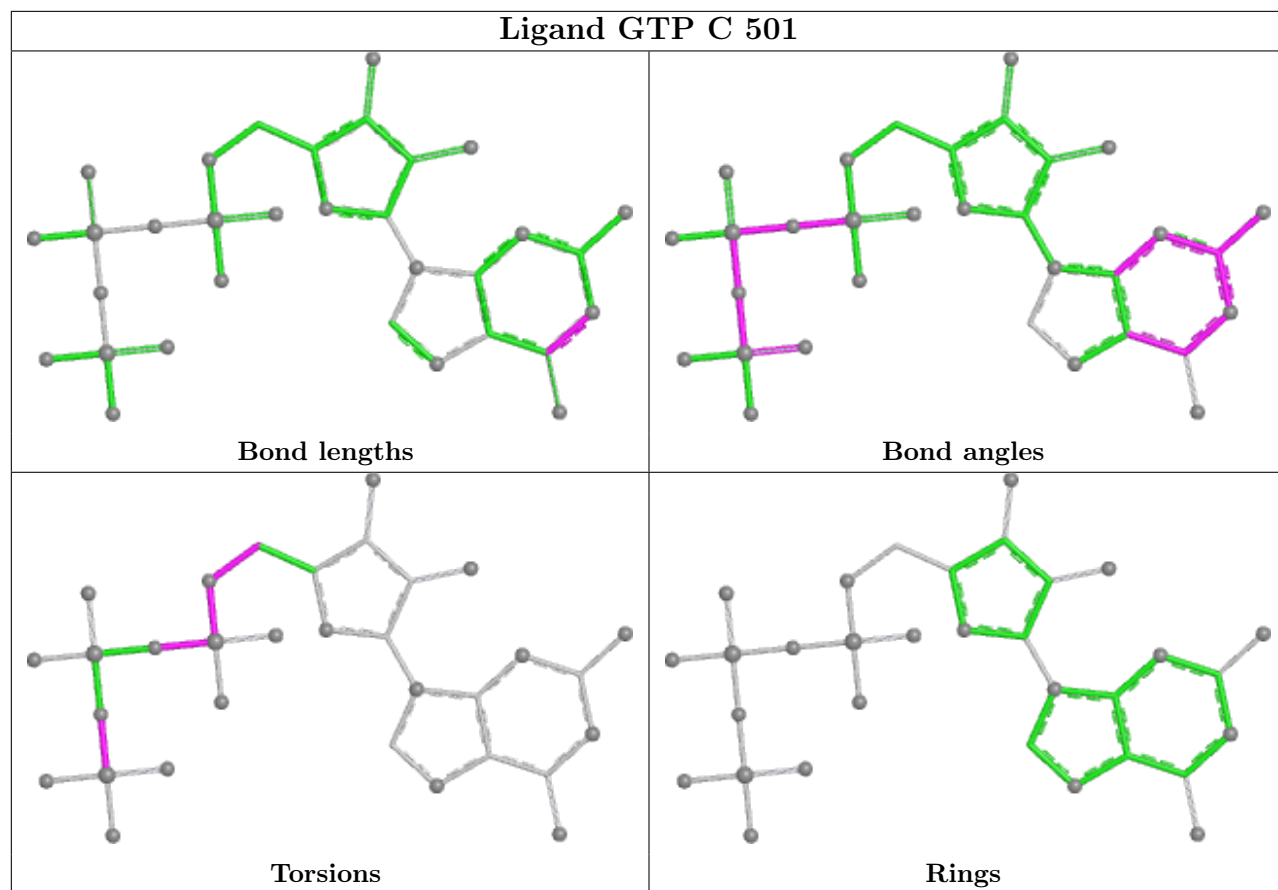
There are no ring outliers.

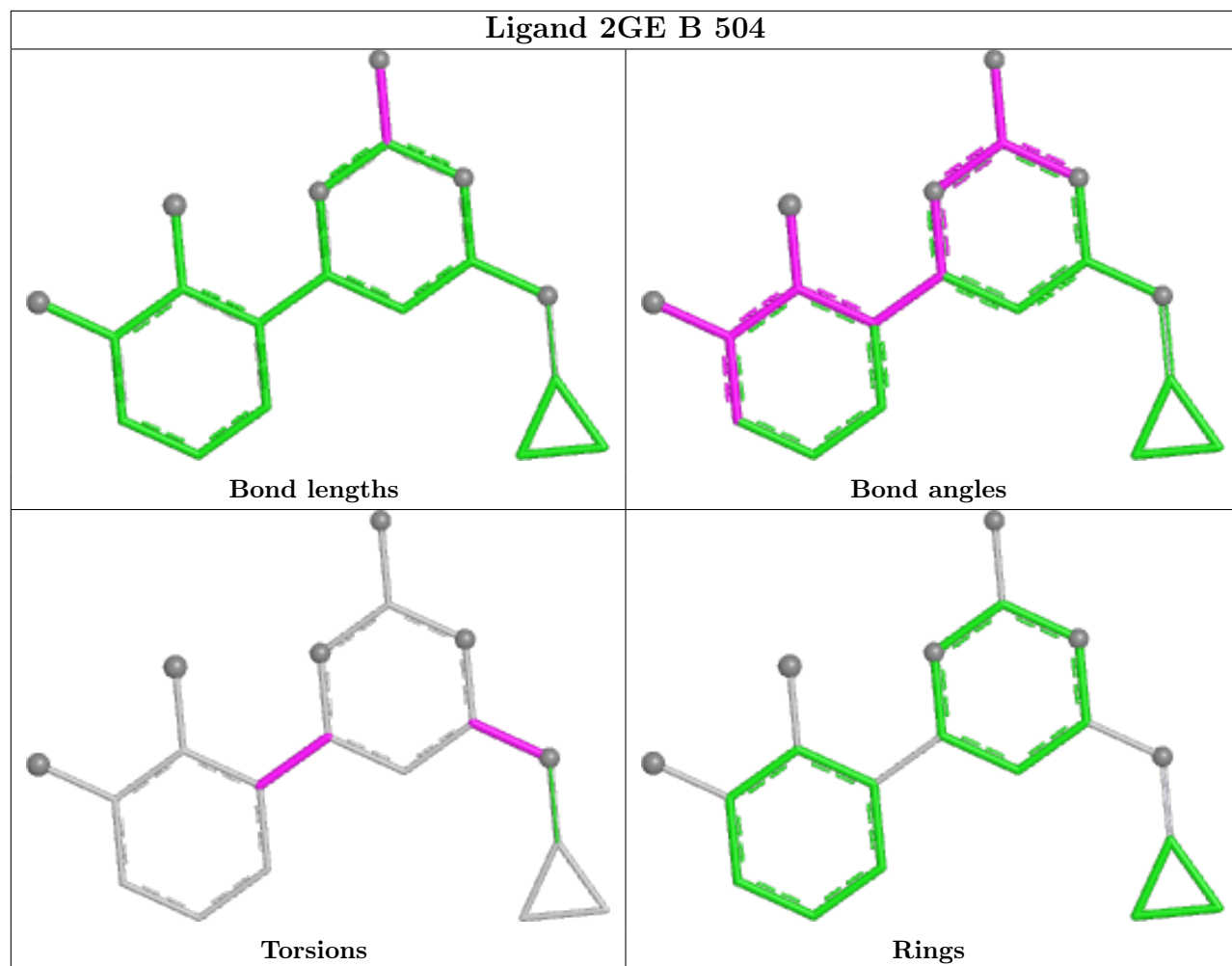
5 monomers are involved in 13 short contacts:

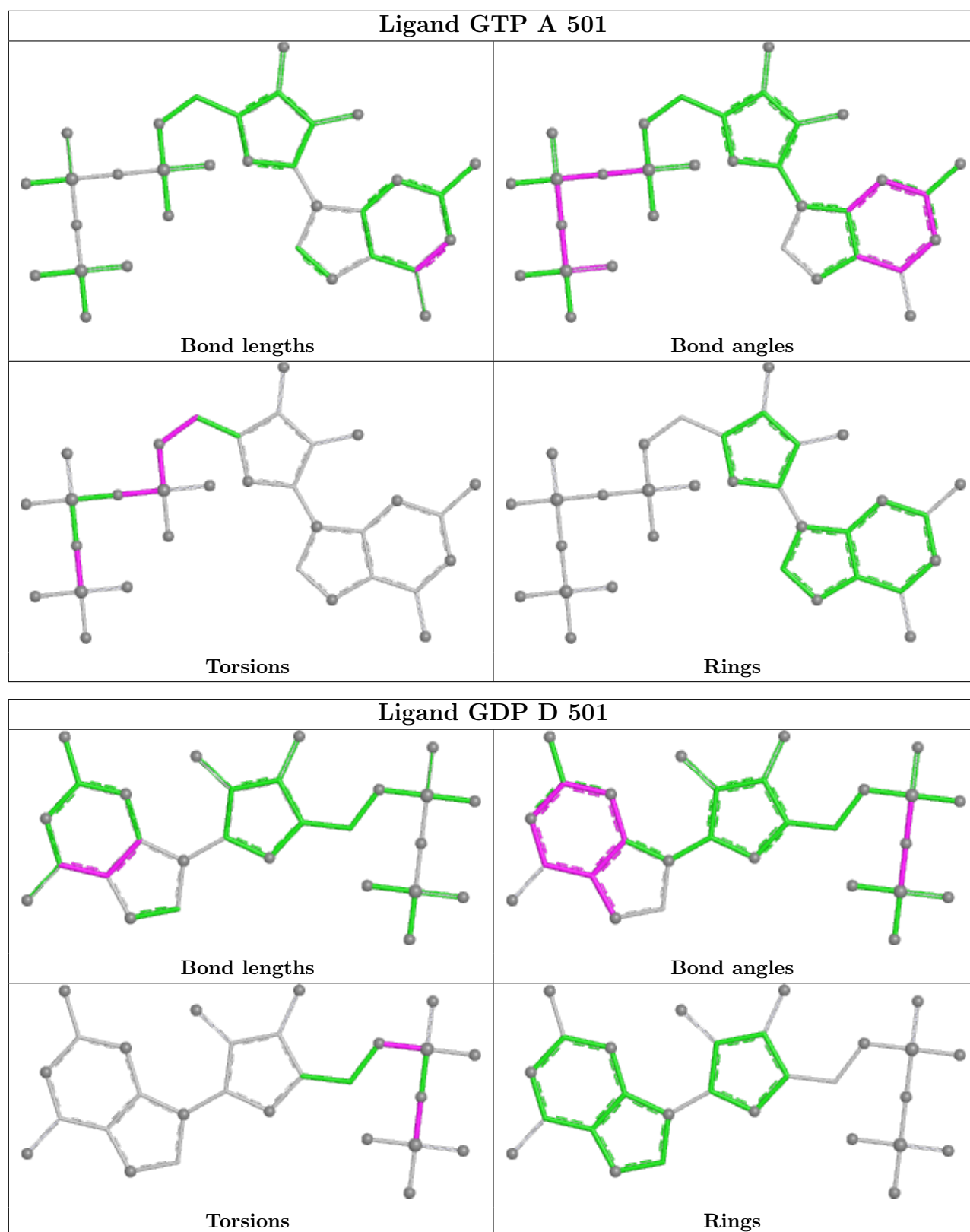
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	B	501	GDP	1	0
11	B	504	2GE	7	0
5	A	501	GTP	1	0
9	D	501	GDP	3	0
12	F	701	ACP	1	0

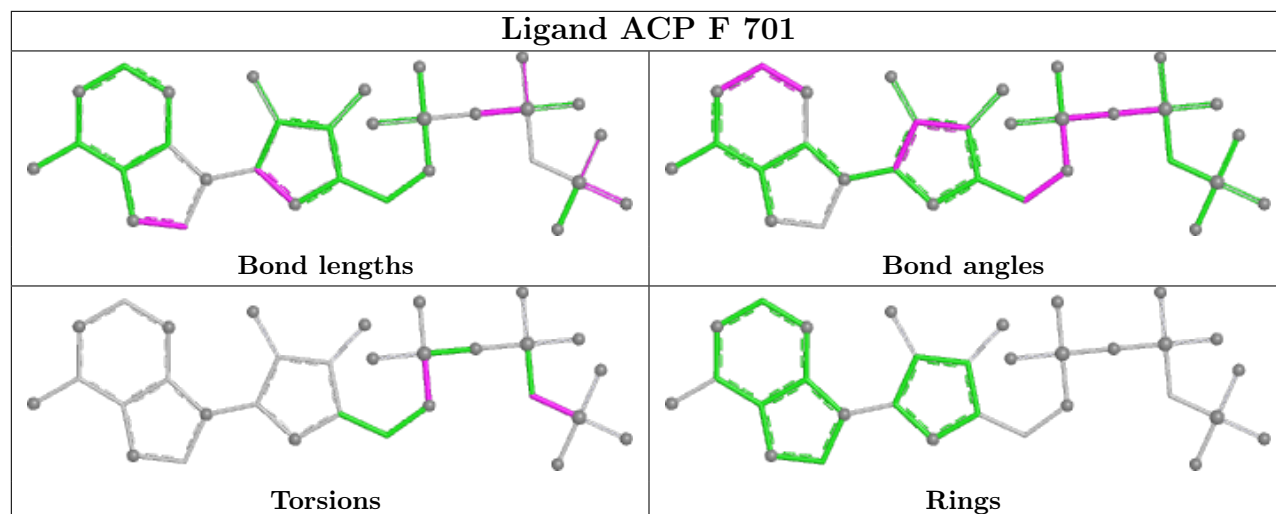
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

6.1 Protein, DNA and RNA chains [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

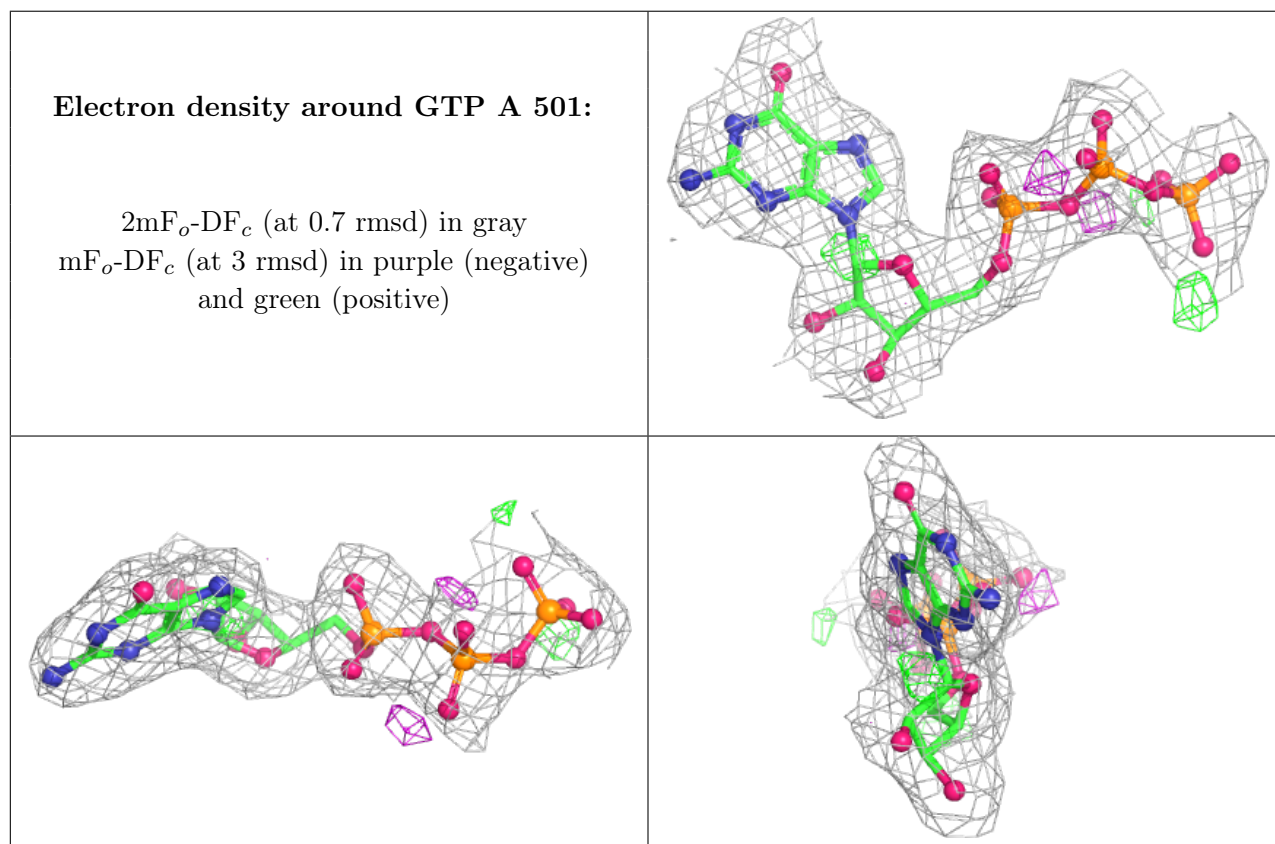
6.3 Carbohydrates [i](#)

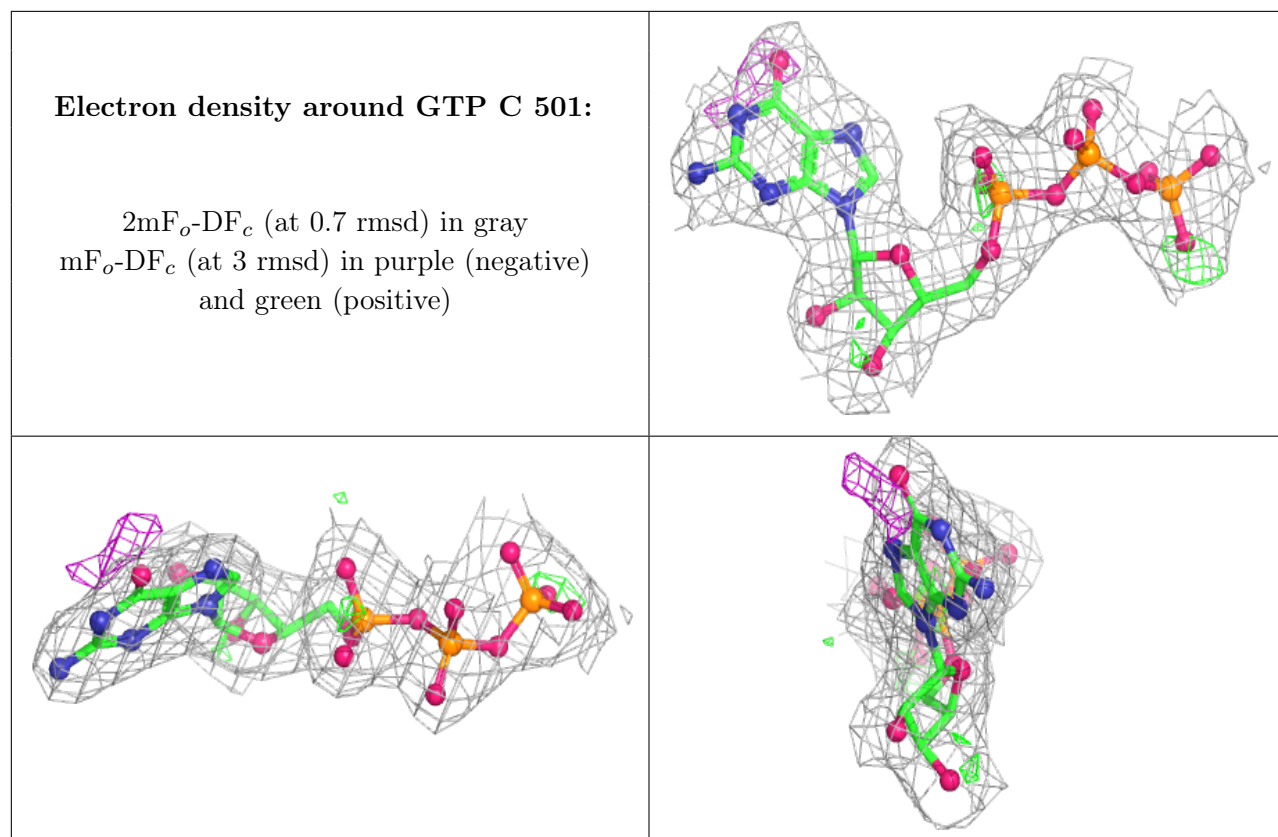
Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

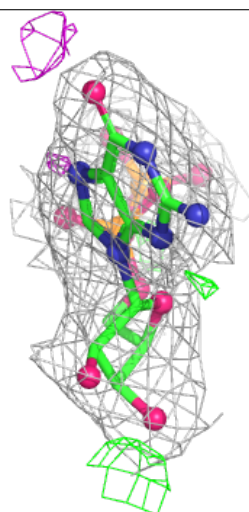
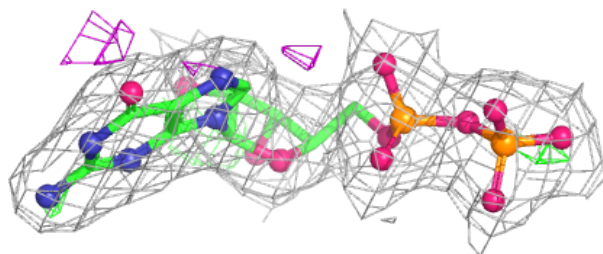
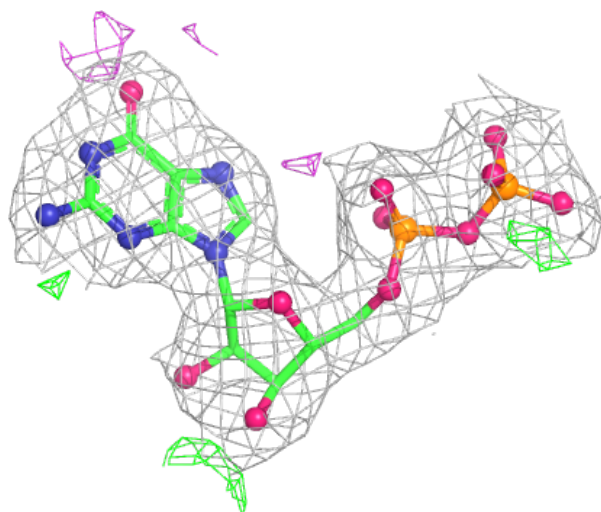
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.





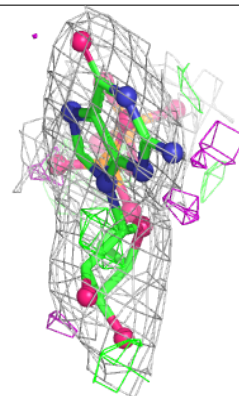
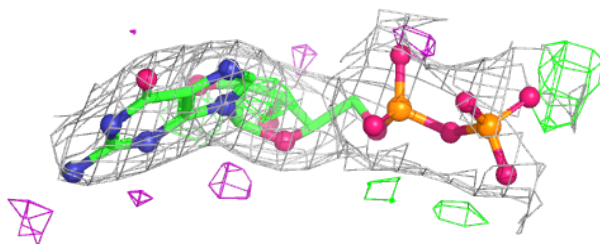
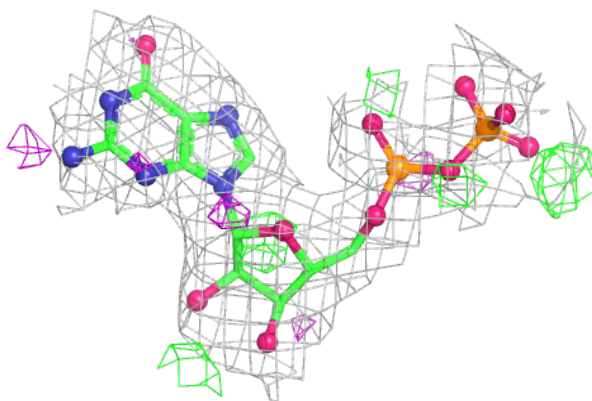
Electron density around GDP B 501:

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

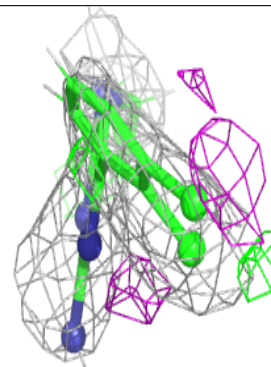
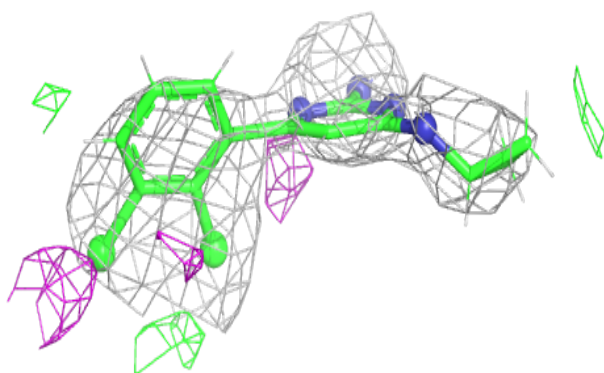
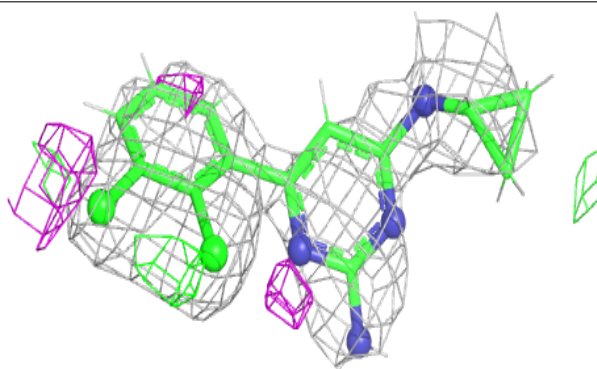


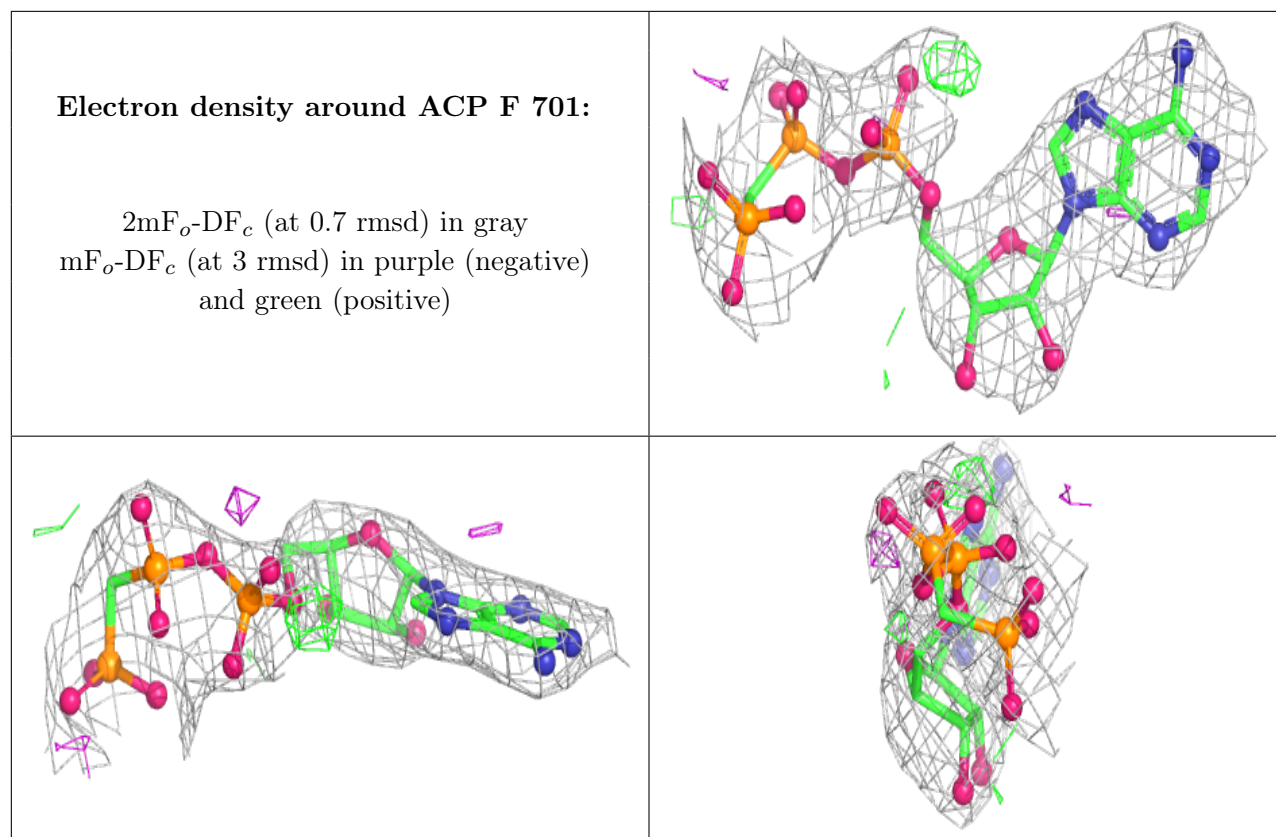
Electron density around GDP D 501:

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

**Electron density around 2GE B 504:**

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





6.5 Other polymers [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.