



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 9, 2023 – 05:28 pm GMT

PDB ID : 8CLB  
Title : Colchicine bound to tubulin (T2R-TTL) complex  
Authors : Wranik, M.; Kepa, M.W.; Bertrand, Q.; Weinert, T.; Steinmetz, M.; Standfuss, J.  
Deposited on : 2023-02-16  
Resolution : 3.00 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467  
Mogul : 1.8.4, CSD as541be (2020)  
Xtrriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

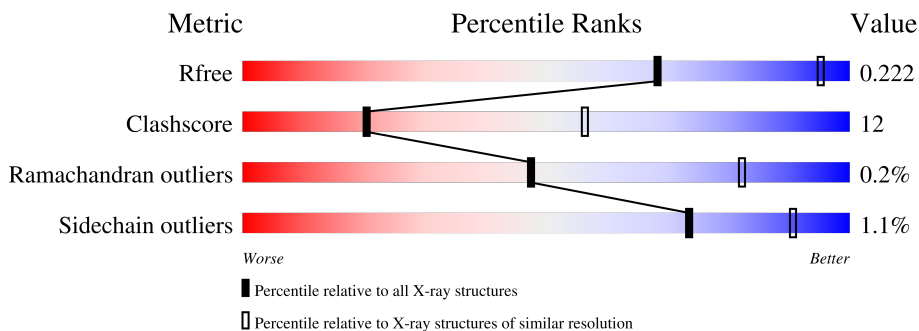
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)

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

Mol	Chain	Length	Quality of chain
1	A	440	72% (green), 27% (yellow)
1	C	440	77% (green), 22% (yellow)
2	B	431	76% (green), 23% (yellow), 1% (grey)
2	D	431	68% (green), 30% (yellow), 2% (grey)
3	E	121	79% (green), 21% (yellow), 0% (grey)
4	F	320	70% (green), 28% (yellow), 2% (grey)

## 2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 34597 atoms, of which 17054 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	H	N	O	S			
1	A	439	6913	2214	3431	582	661	25	0	13	0
1	C	440	6893	2205	3412	587	665	24	0	10	0

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

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
2	B	423	6646	2126	3271	569	653	27	1	9	0
2	D	421	6533	2091	3211	561	642	28	5	4	0

- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
3	E	121	2032	621	1026	182	198	5	0	1	0

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

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
4	F	320	5281	1711	2641	437	478	14	13	5	0

- Molecule 5 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: C<sub>10</sub>H<sub>16</sub>N<sub>5</sub>O<sub>14</sub>P<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
5	A	1	44	10	12	5	14	3	0	0
5	C	1	44	10	12	5	14	3	0	0

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

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

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

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

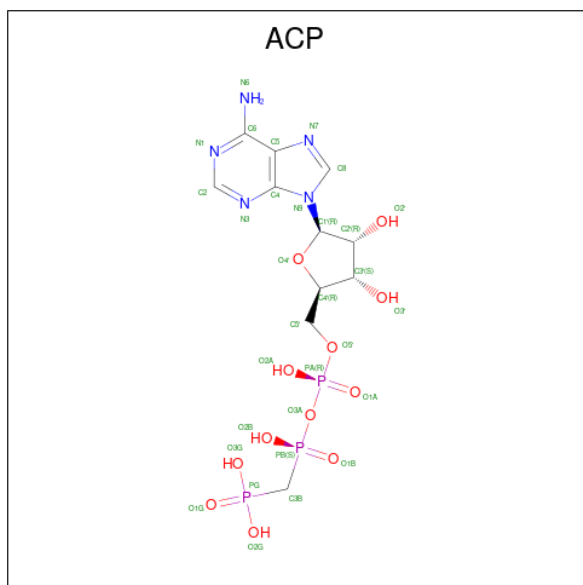
- Molecule 8 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C<sub>10</sub>H<sub>15</sub>N<sub>5</sub>O<sub>11</sub>P<sub>2</sub>).



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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
9	D	1	29	22	1	6	0	0

- Molecule 10 is PHOSPHOMETHYLPHOSPHONIC ACID ADENYLATE ESTER (three-letter code: ACP) (formula: C<sub>11</sub>H<sub>18</sub>N<sub>5</sub>O<sub>12</sub>P<sub>3</sub>).



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

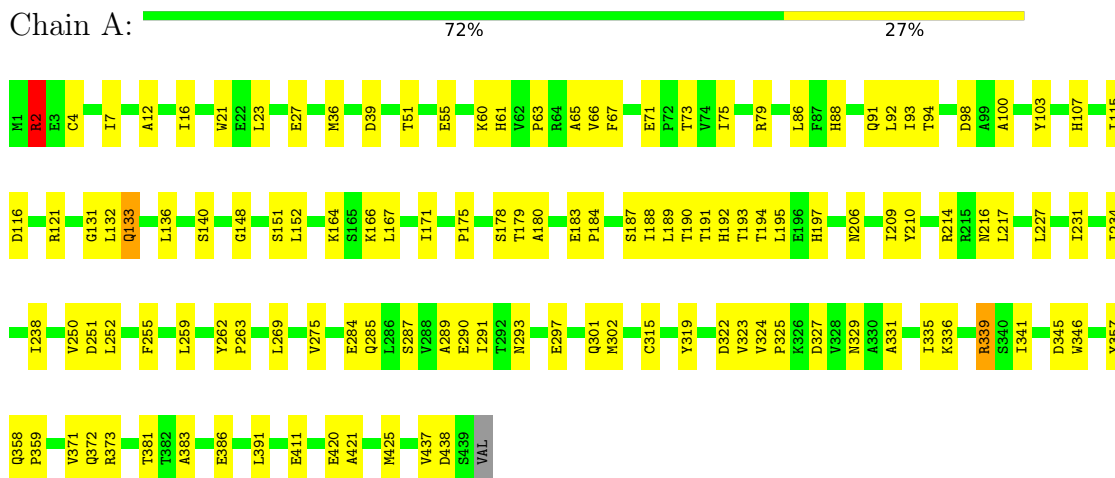
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	7	Total	O	0	0
			7	7		
11	B	5	Total	O	0	0
			5	5		
11	C	6	Total	O	0	0
			6	6		
11	D	1	Total	O	0	0
			1	1		
11	E	1	Total	O	0	0
			1	1		
11	F	2	Total	O	0	0
			2	2		

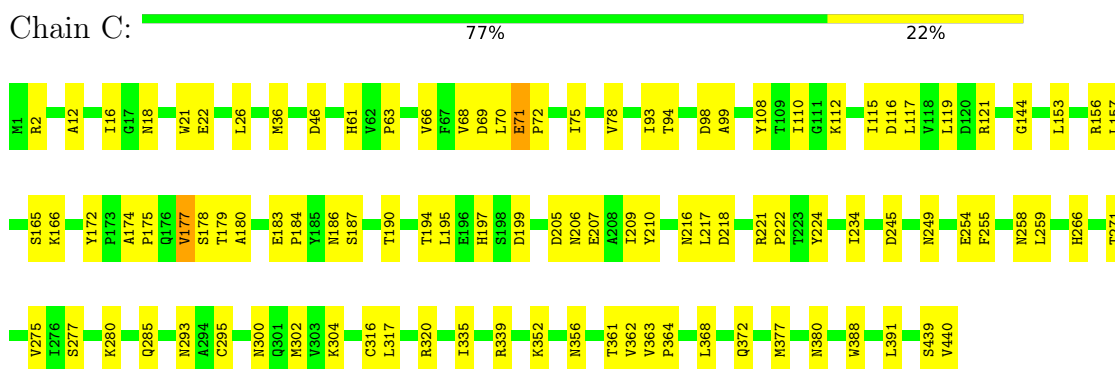
### 3 Residue-property plots [i](#)

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. 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.

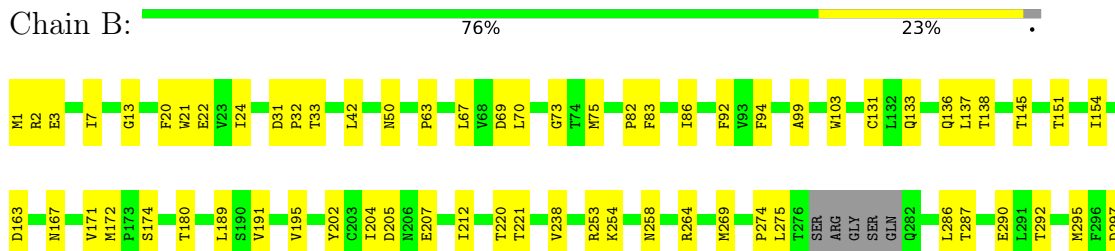
- Molecule 1: Tubulin alpha-1B chain



- Molecule 1: Tubulin alpha-1B chain



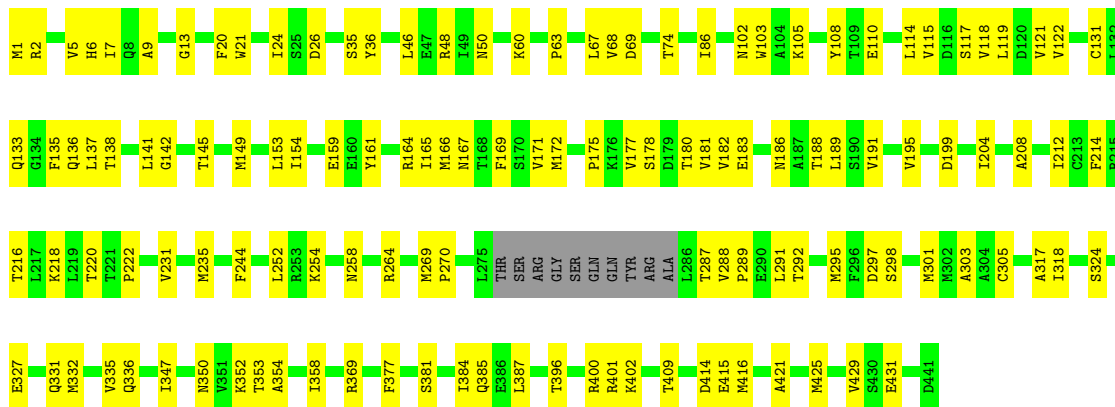
- Molecule 2: Tubulin beta-2B chain





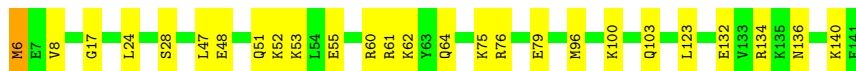
- Molecule 2: Tubulin beta-2B chain

Chain D: 68% 30%



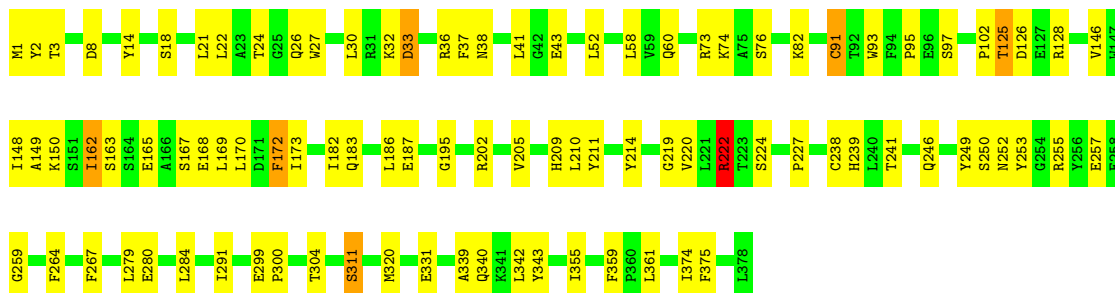
- Molecule 3: Stathmin-4

Chain E: 79% 21%



- Molecule 4: Tubulin-Tyrosine Ligase

Chain F: 70% 28%





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	106.71Å 160.61Å 180.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	15.18 – 3.00 15.22 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.8 (15.18-3.00) 69.5 (15.22-2.20)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.86 (at 2.20Å)	Xtrriage
Refinement program	PHENIX 1.20_4487	Depositor
R, $R_{free}$	0.163 , 0.214 0.176 , 0.222	Depositor DCC
$R_{free}$ test set	2000 reflections (1.83%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	67.3	Xtrriage
Anisotropy	0.031	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.44 , 72.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	34597	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	70.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.53% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GTP, MG, LOC, CA, ACP, 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	0.39	0/3599	0.54	0/4888
1	C	0.44	0/3589	0.56	0/4874
2	B	0.41	0/3473	0.57	0/4704
2	D	0.36	0/3407	0.53	0/4618
3	E	0.41	0/1017	0.51	0/1349
4	F	0.36	0/2712	0.54	0/3663
All	All	0.39	0/17797	0.55	0/24096

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	C	0	3
2	B	0	1
2	D	0	1
4	F	0	1
All	All	0	8

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	2	ARG	Sidechain
1	A	339	ARG	Sidechain

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Mol	Chain	Res	Type	Group
2	B	264	ARG	Sidechain
1	C	2	ARG	Sidechain
1	C	221	ARG	Sidechain
1	C	339	ARG	Sidechain
2	D	401	ARG	Sidechain
4	F	222	ARG	Sidechain

## 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	3482	3431	3430	99	0
1	C	3481	3412	3409	68	0
2	B	3375	3271	3268	86	0
2	D	3322	3211	3210	104	0
3	E	1006	1026	1026	20	0
4	F	2640	2641	2641	68	0
5	A	32	12	12	0	0
5	C	32	12	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
7	A	1	0	0	0	0
7	C	1	0	0	0	0
8	B	28	12	12	0	0
8	D	28	12	12	2	0
9	B	29	0	25	2	0
9	D	29	0	25	5	0
10	F	31	14	14	1	0
11	A	7	0	0	0	0
11	B	5	0	0	0	0
11	C	6	0	0	0	0
11	D	1	0	0	0	0
11	E	1	0	0	0	0
11	F	2	0	0	0	0
All	All	17543	17054	17096	430	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 12.

All (430) 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:128:ARG:HE	4:F:170:LEU:HD22	1.37	0.88
1:A:381:THR:HG22	1:A:383:ALA:H	1.41	0.86
2:D:118:VAL:HG21	2:D:153:LEU:HD21	1.56	0.84
2:D:175:PRO:HA	2:D:178:SER:HB2	1.56	0.83
4:F:125:THR:HG22	4:F:126:ASP:HA	1.61	0.82
4:F:149:ALA:HB2	4:F:182:ILE:HG12	1.63	0.81
2:B:1:MET:N	2:B:131:CYS:HB3	1.96	0.80
1:A:166:LYS:HE2	1:A:197:HIS:O	1.84	0.78
1:C:75:ILE:HD12	1:C:94:THR:HG22	1.66	0.78
1:A:2:ARG:NH2	1:A:250[A]:VAL:HG13	2.00	0.77
1:A:357:TYR:CE2	3:E:17:GLY:HA2	2.21	0.76
2:B:75:MET:CE	2:B:94:PHE:HB3	2.15	0.76
2:B:136:GLN:HA	2:B:167:ASN:O	1.86	0.76
4:F:339:ALA:HB3	4:F:342:LEU:HD13	1.68	0.76
2:B:1:MET:H2	2:B:131:CYS:HB3	1.51	0.76
1:C:177:VAL:HG21	1:C:206:ASN:HB3	1.69	0.74
1:A:2:ARG:HH21	1:A:250[A]:VAL:HG13	1.53	0.74
1:A:75:ILE:HG23	1:A:92:LEU:HD12	1.69	0.73
4:F:202:ARG:HB3	4:F:220:VAL:HG12	1.71	0.72
1:C:18:ASN:HD21	1:C:78:VAL:HG22	1.54	0.72
1:A:67:PHE:HB2	1:A:92:LEU:HD13	1.71	0.72
2:D:385:GLN:HB2	2:D:429:VAL:HG13	1.70	0.72
1:C:119:LEU:HD11	1:C:156:ARG:HB3	1.71	0.71
1:A:297:GLU:HG2	1:A:339:ARG:HH22	1.55	0.71
2:B:83:PHE:O	2:B:86:ILE:HG22	1.90	0.71
1:C:93:ILE:HD11	1:C:121:ARG:HG3	1.71	0.70
2:D:142:GLY:HA3	8:D:501:GDP:H4'	1.74	0.69
1:C:70:LEU:HD13	1:C:110:ILE:CG2	2.22	0.69
3:E:48:GLU:HG2	3:E:52:LYS:HE3	1.75	0.69
1:A:63:PRO:CG	1:A:86:LEU:HD21	2.23	0.68
1:A:329:ASN:HB3	3:E:6:MET:HE1	1.75	0.68
1:A:93:ILE:HD11	1:A:121:ARG:HG3	1.74	0.68
2:B:75:MET:HE3	2:B:94:PHE:HB3	1.76	0.67
1:C:175:PRO:HA	1:C:179:THR:CG2	2.25	0.67
2:D:63:PRO:HD3	2:D:86:ILE:HG12	1.75	0.67
4:F:219:GLY:HA3	4:F:264:PHE:CZ	2.30	0.67
4:F:320:MET:HE1	10:F:401:ACP:N3	2.09	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:105:LYS:HD3	2:D:110:GLU:HG3	1.78	0.66
2:D:191:VAL:HG11	2:D:425:MET:HE2	1.78	0.66
1:A:4:CYS:SG	1:A:252:LEU:HD21	2.35	0.66
1:A:371:VAL:HG12	1:A:373:ARG:H	1.61	0.66
2:B:75:MET:HE2	2:B:94:PHE:HB3	1.79	0.65
1:A:21:TRP:CZ3	1:A:63:PRO:HB3	2.31	0.64
2:D:171:VAL:HA	2:D:204:ILE:O	1.98	0.64
2:D:292:THR:HG22	2:D:335:VAL:HG21	1.78	0.64
2:D:2:ARG:HB3	2:D:133:GLN:HE21	1.63	0.63
2:D:214:PHE:O	2:D:218:LYS:HA	1.99	0.63
2:D:103:TRP:CE3	2:D:189:LEU:HD13	2.34	0.63
2:D:204:ILE:HD13	2:D:231:VAL:HG13	1.79	0.63
4:F:128:ARG:NE	4:F:170:LEU:HD22	2.12	0.63
1:C:175:PRO:HA	1:C:179:THR:HG21	1.81	0.63
4:F:209:HIS:CD2	4:F:210:LEU:HG	2.35	0.62
1:A:293:ASN:ND2	1:A:339:ARG:HH21	1.98	0.62
4:F:246:GLN:O	4:F:253:TYR:HB2	1.98	0.62
2:B:287:THR:HG22	2:B:290:GLU:CG	2.29	0.62
1:C:216:ASN:HB3	1:C:275:VAL:O	2.00	0.62
4:F:374:ILE:HD11	4:F:375:PHE:CE2	2.34	0.62
1:A:357:TYR:CD2	3:E:17:GLY:HA2	2.34	0.62
2:B:317:ALA:C	2:B:318:ILE:HD12	2.19	0.62
2:B:287:THR:HG23	2:B:290:GLU:H	1.63	0.61
2:D:118:VAL:CG2	2:D:153:LEU:HD21	2.29	0.61
1:C:12:ALA:O	1:C:16:ILE:HG12	2.00	0.61
2:B:352:LYS:HG2	9:B:503:LOC:H18B	1.83	0.61
2:D:269[B]:MET:CE	2:D:305:CYS:HB2	2.30	0.61
2:D:269[B]:MET:HE1	2:D:305:CYS:HB2	1.83	0.61
9:B:503:LOC:O1	9:B:503:LOC:H20	2.01	0.61
2:B:67:LEU:HD22	2:B:92:PHE:CE2	2.36	0.60
2:D:141:LEU:HD12	2:D:172:MET:HE3	1.81	0.60
1:A:63:PRO:HG2	1:A:86:LEU:HD21	1.83	0.60
1:A:209[B]:ILE:CD1	1:A:231:ILE:HD11	2.32	0.60
1:C:165:SER:HA	1:C:199:ASP:OD2	2.02	0.60
1:A:285:GLN:HG3	1:A:372[B]:GLN:OE1	2.01	0.60
2:B:274:PRO:HB3	2:B:286:LEU:HD12	1.84	0.60
2:B:306:ASP:HB3	2:B:309:HIS:ND1	2.17	0.60
2:B:191:VAL:O	2:B:195:VAL:HG23	2.02	0.60
4:F:91:CYS:SG	4:F:93:TRP:CD2	2.96	0.59
4:F:165:GLU:HG2	4:F:167:SER:H	1.68	0.59
4:F:14:TYR:HB3	4:F:41:LEU:HD13	1.85	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:190:THR:O	1:A:194:THR:HG22	2.03	0.58
1:C:180:ALA:HB1	2:D:258:ASN:OD1	2.03	0.58
2:B:370:GLY:O	2:B:371:LEU:HD23	2.03	0.58
1:A:324:VAL:HG23	1:A:327:ASP:H	1.68	0.58
2:D:188:THR:HG22	2:D:421:ALA:HB1	1.86	0.58
2:D:6:HIS:CD2	2:D:21:TRP:HE1	2.22	0.58
4:F:148:ILE:HB	4:F:162:ILE:HG23	1.85	0.58
2:D:396:THR:O	2:D:400:ARG:HB2	2.04	0.57
2:B:400:ARG:HD2	1:C:439:SER:HB3	1.87	0.57
1:C:166:LYS:HE2	1:C:197:HIS:O	2.04	0.57
1:C:271:THR:HG23	1:C:300:ASN:O	2.04	0.57
2:B:163:ASP:O	2:B:253:ARG:NH2	2.37	0.57
1:A:322:ASP:O	1:A:373:ARG:NH1	2.36	0.57
2:D:20:PHE:CZ	2:D:24:ILE:HD13	2.39	0.57
1:C:440:VAL:HG12	1:C:440:VAL:O	2.05	0.57
2:B:292:THR:HG22	2:B:319:PHE:CZ	2.40	0.56
1:A:227:LEU:O	1:A:231:ILE:HG13	2.06	0.56
2:D:318:ILE:HG13	2:D:354:ALA:HB3	1.87	0.56
3:E:96:MET:O	3:E:100:LYS:HB2	2.06	0.56
2:B:13:GLY:HA2	2:B:138[B]:THR:HG22	1.87	0.56
2:D:358:ILE:O	2:D:358:ILE:HG13	2.04	0.56
2:D:141:LEU:HD12	2:D:172:MET:CE	2.35	0.56
1:C:75:ILE:HD12	1:C:94:THR:CG2	2.35	0.56
1:A:7:ILE:HG23	1:A:66[B]:VAL:HG13	1.87	0.56
2:D:180:THR:HG22	2:D:181:VAL:N	2.20	0.56
2:D:220:THR:O	2:D:222:PRO:HD3	2.06	0.56
4:F:202:ARG:HB3	4:F:220:VAL:CG1	2.36	0.56
2:D:118:VAL:O	2:D:122:VAL:HG13	2.05	0.56
2:B:308:ARG:HG2	2:B:342:TYR:CE2	2.41	0.55
1:C:209:ILE:HD11	1:C:302:MET:SD	2.46	0.55
2:D:244:PHE:CZ	2:D:358:ILE:HD11	2.40	0.55
4:F:214:TYR:HB3	4:F:375:PHE:HB3	1.87	0.55
2:B:174:SER:HB2	2:B:207:GLU:HB2	1.87	0.55
2:B:1:MET:HE1	2:B:50[B]:ASN:HB2	1.88	0.55
1:C:18:ASN:ND2	1:C:78:VAL:HG22	2.20	0.55
1:A:100:ALA:HA	2:B:254:LYS:HG3	1.89	0.55
1:A:325:PRO:O	1:A:329:ASN:ND2	2.40	0.55
1:A:206:ASN:OD1	1:A:209[B]:ILE:HD11	2.07	0.55
4:F:149:ALA:CB	4:F:182:ILE:HG12	2.35	0.55
1:A:79:ARG:HH22	1:A:94:THR:HG21	1.71	0.54
1:C:361:THR:HG22	1:C:362:VAL:N	2.22	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:21:TRP:CZ3	1:C:63:PRO:HB3	2.42	0.54
2:D:69:ASP:HA	2:D:145:THR:HG21	1.90	0.54
1:A:88:HIS:N	1:A:91:GLN:OE1	2.36	0.54
1:A:167:LEU:HD22	1:A:252:LEU:HD12	1.89	0.54
3:E:60:ARG:O	3:E:64:GLN:HG3	2.08	0.54
2:B:151:THR:HA	2:B:154:ILE:HD12	1.90	0.54
9:D:503:LOC:O1	9:D:503:LOC:H20	2.08	0.54
3:E:51:GLN:O	3:E:55:GLU:HG3	2.08	0.54
2:D:332:MET:O	2:D:336:GLN:HG3	2.07	0.53
2:B:22[A]:GLU:OE2	2:B:82:PRO:HG2	2.08	0.53
4:F:21:LEU:HD22	4:F:27:TRP:CD2	2.43	0.53
1:A:291:ILE:HD13	1:A:373:ARG:HG3	1.90	0.53
1:C:218:ASP:OD2	1:C:280:LYS:HE3	2.09	0.53
1:C:259:LEU:O	1:C:380:ASN:ND2	2.39	0.53
2:D:115:VAL:O	2:D:119:LEU:HG	2.08	0.53
1:A:289:ALA:HA	1:A:331:ALA:HB2	1.91	0.53
2:B:292:THR:HG22	2:B:319:PHE:HZ	1.74	0.53
1:C:254:GLU:HG2	1:C:352:LYS:HE2	1.90	0.53
2:D:108:TYR:O	3:E:134:ARG:NH1	2.41	0.53
1:A:151:SER:HB2	1:A:193:THR:CG2	2.37	0.53
1:A:437:VAL:HG12	1:A:438:ASP:N	2.23	0.53
4:F:74:LYS:HE3	4:F:331:GLU:OE1	2.09	0.53
2:D:20:PHE:CD1	2:D:235:MET:HE2	2.43	0.53
2:D:141:LEU:HD12	2:D:172:MET:SD	2.49	0.53
2:D:9:ALA:O	2:D:13:GLY:HA3	2.08	0.53
4:F:8:ASP:HB2	4:F:43:GLU:HA	1.91	0.53
1:A:103:TYR:CE1	1:A:148:GLY:HA2	2.44	0.53
1:C:70:LEU:HD13	1:C:110:ILE:HG22	1.89	0.53
2:B:22[B]:GLU:HG3	2:B:83:PHE:CE1	2.44	0.52
1:C:190:THR:O	1:C:194[B]:THR:HG23	2.09	0.52
2:D:288:VAL:HG12	2:D:331:GLN:HG3	1.91	0.52
2:B:220:THR:HG23	2:B:221:THR:HG22	1.91	0.52
2:D:103:TRP:HB2	2:D:186:ASN:OD1	2.09	0.52
4:F:73:ARG:HB2	4:F:76[B]:SER:OG	2.09	0.52
2:D:2:ARG:HB3	2:D:133:GLN:NE2	2.24	0.52
1:A:21:TRP:CE3	1:A:63:PRO:HB3	2.44	0.52
2:B:286:LEU:HD22	2:B:290:GLU:CB	2.39	0.52
2:B:295:MET:SD	2:B:375:ALA:HB1	2.49	0.52
1:C:187:SER:HB3	1:C:391:LEU:HD21	1.91	0.52
1:C:317:LEU:HD23	1:C:377:MET:HG3	1.92	0.52
2:B:69:ASP:HA	2:B:145:THR:HG21	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:183:GLU:OE2	8:D:501:GDP:H3'	2.10	0.51
4:F:146:VAL:HG23	4:F:187:GLU:OE2	2.10	0.51
1:A:285:GLN:HG3	1:A:372[B]:GLN:CD	2.30	0.51
1:C:36:MET:HB3	1:C:61:HIS:CE1	2.45	0.51
2:D:324:SER:OG	2:D:327:GLU:HB2	2.10	0.51
2:B:286:LEU:HD22	2:B:290:GLU:HB3	1.92	0.51
1:C:69:ASP:O	1:C:94:THR:HA	2.10	0.51
2:D:165:ILE:HA	2:D:199:ASP:OD2	2.10	0.51
2:B:346:TRP:HE1	2:B:438:ALA:CB	2.24	0.51
2:B:31:ASP:OD2	2:B:33:THR:HG22	2.10	0.51
1:C:293[B]:ASN:CG	1:C:335:ILE:HD11	2.31	0.51
2:D:26:ASP:OD2	2:D:369:ARG:HD3	2.11	0.51
2:D:269[A]:MET:CE	2:D:305:CYS:HB2	2.41	0.51
2:D:180:THR:HG22	2:D:182:VAL:H	1.74	0.51
1:A:71:GLU:HG2	1:A:98:ASP:HB3	1.93	0.51
4:F:32:LYS:HG3	4:F:33:ASP:N	2.25	0.50
1:C:271:THR:HG21	1:C:295[B]:CYS:HA	1.93	0.50
2:D:352:LYS:HG3	9:D:503:LOC:C16	2.42	0.50
4:F:21:LEU:HD22	4:F:27:TRP:CE2	2.46	0.50
1:A:79:ARG:HH22	1:A:94:THR:CG2	2.25	0.50
1:A:107:HIS:CD2	1:A:152:LEU:HB2	2.46	0.50
1:A:191:THR:O	1:A:195:LEU:HB2	2.12	0.50
2:B:238:VAL:HG22	2:B:378:ILE:HD11	1.94	0.50
2:D:1:MET:O	2:D:131:CYS:HB3	2.11	0.50
2:B:7:ILE:O	2:B:137:LEU:HA	2.12	0.50
2:B:269:MET:HE1	2:B:301:MET:HG3	1.94	0.50
1:C:115:ILE:HG23	1:C:116:ASP:N	2.26	0.50
1:C:210:TYR:CE1	1:C:222:PRO:HD2	2.46	0.50
3:E:132:GLU:O	3:E:136:ASN:HB2	2.11	0.50
1:A:79:ARG:NH2	1:A:94:THR:HG21	2.26	0.50
2:B:1:MET:HB2	2:B:3:GLU:OE2	2.12	0.50
1:C:175:PRO:HA	1:C:179:THR:HG22	1.94	0.50
2:B:137:LEU:CD2	2:B:154:ILE:HD11	2.42	0.50
4:F:148:ILE:HG12	4:F:150:LYS:HG2	1.92	0.50
2:D:287:THR:OG1	2:D:289:PRO:HD2	2.11	0.49
2:B:137:LEU:HD23	2:B:154:ILE:HD11	1.94	0.49
2:B:180:THR:HA	1:C:258:ASN:HD21	1.75	0.49
2:B:385:GLN:HB2	2:B:429:VAL:HG13	1.95	0.49
1:C:46:ASP:OD1	1:C:46:ASP:N	2.43	0.49
2:D:67:LEU:N	2:D:67:LEU:HD12	2.27	0.49
2:B:1:MET:HE1	2:B:50[A]:ASN:HB3	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:20:PHE:O	2:D:24:ILE:HG12	2.13	0.49
2:B:67:LEU:N	2:B:67:LEU:HD12	2.27	0.49
1:A:36:MET:HB3	1:A:61:HIS:NE2	2.27	0.49
4:F:304:THR:HG21	4:F:311:SER:HB2	1.95	0.49
1:C:119:LEU:HD11	1:C:156:ARG:CB	2.42	0.49
2:B:287:THR:HG22	2:B:290:GLU:HG3	1.92	0.49
2:B:295:MET:CG	2:B:377:PHE:HB2	2.43	0.49
4:F:339:ALA:HB3	4:F:342:LEU:CD1	2.39	0.49
2:D:138:THR:HG22	2:D:169:PHE:HB2	1.95	0.49
2:D:297:ASP:OD1	2:D:298:SER:N	2.46	0.49
1:A:93:ILE:CD1	1:A:121:ARG:HG3	2.41	0.49
1:A:103:TYR:CD1	1:A:148:GLY:HA2	2.48	0.49
1:A:103:TYR:CD2	1:A:189:LEU:HD13	2.48	0.49
2:B:70:LEU:HD12	2:B:99:ALA:HB2	1.95	0.49
2:B:346:TRP:HE1	2:B:438:ALA:HB3	1.78	0.49
1:C:186:ASN:O	1:C:190:THR:HG22	2.12	0.49
2:D:5:VAL:HB	2:D:135:PHE:CD2	2.48	0.49
1:A:255:PHE:O	1:A:259:LEU:HB2	2.13	0.48
2:B:274:PRO:HB3	2:B:286:LEU:CD1	2.42	0.48
2:B:318:ILE:HD12	2:B:318:ILE:N	2.28	0.48
1:C:99:ALA:HB3	1:C:144:GLY:HA3	1.95	0.48
1:C:271:THR:HG21	1:C:295[A]:CYS:HA	1.94	0.48
4:F:102:PRO:HB3	4:F:173:ILE:CG2	2.44	0.48
4:F:205:VAL:CG2	4:F:291:ILE:HD13	2.43	0.48
2:B:191:VAL:HG11	2:B:425:MET:HE2	1.96	0.48
2:B:202:TYR:CZ	2:B:238:VAL:HG11	2.49	0.48
1:C:108:TYR:O	1:C:112:LYS:HG2	2.13	0.48
2:B:21:TRP:CZ3	2:B:63:PRO:HB3	2.48	0.48
1:C:174:ALA:HB1	1:C:207:GLU:HB2	1.95	0.48
1:A:252:LEU:HD22	1:A:252:LEU:H	1.78	0.48
2:B:171:VAL:HA	2:B:204:ILE:O	2.14	0.48
2:D:258:ASN:HB3	9:D:503:LOC:C16	2.43	0.48
2:D:287:THR:CB	2:D:289:PRO:HD2	2.44	0.48
1:A:136[A]:LEU:HD23	1:A:167:LEU:HB2	1.94	0.48
1:A:180:ALA:HB1	2:B:258:ASN:OD1	2.12	0.48
1:A:339:ARG:HB2	1:A:341:ILE:HD11	1.96	0.48
1:C:70:LEU:HD13	1:C:110:ILE:HG21	1.93	0.48
4:F:102:PRO:HA	4:F:173:ILE:HG22	1.96	0.48
4:F:168:GLU:OE1	4:F:168:GLU:N	2.39	0.48
1:A:188:ILE:HG13	1:A:425:MET:HG3	1.96	0.47
1:A:336:LYS:HD3	1:A:336:LYS:O	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:20:PHE:CZ	2:B:24:ILE:HD13	2.49	0.47
2:B:31:ASP:CG	2:B:33:THR:HG22	2.34	0.47
2:D:172:MET:HE2	2:D:387:LEU:HD21	1.96	0.47
2:D:347:ILE:HG22	2:D:350:ASN:HB3	1.95	0.47
2:B:357:ASP:O	2:B:359:PRO:HD3	2.14	0.47
2:D:269[A]:MET:HE1	2:D:305:CYS:HB2	1.97	0.47
4:F:250:SER:C	4:F:253:TYR:H	2.17	0.47
1:A:115:ILE:HG23	1:A:116:ASP:N	2.30	0.47
4:F:3:THR:HB	4:F:30:LEU:HD11	1.97	0.47
1:A:2:ARG:O	1:A:51[A]:THR:HG22	2.14	0.47
2:D:191:VAL:HB	2:D:425:MET:CE	2.45	0.47
2:D:191:VAL:O	2:D:195:VAL:HG23	2.14	0.47
1:A:383:ALA:O	1:A:386:GLU:HG3	2.14	0.47
1:A:209[B]:ILE:HG13	1:A:227:LEU:HD22	1.96	0.47
1:C:71:GLU:HG2	1:C:98:ASP:HB3	1.96	0.47
4:F:36:ARG:HA	4:F:58:LEU:CD1	2.44	0.47
1:A:71:GLU:OE1	1:A:73:THR:HG22	2.15	0.46
2:D:177:VAL:HG12	2:D:177:VAL:O	2.15	0.46
2:D:381:SER:O	2:D:384[B]:ILE:HG22	2.15	0.46
2:D:402:LYS:HE2	2:D:415:GLU:OE2	2.14	0.46
1:A:91:GLN:C	1:A:92:LEU:HD22	2.36	0.46
1:A:175:PRO:HA	1:A:179:THR:OG1	2.15	0.46
2:D:136:GLN:HA	2:D:167:ASN:O	2.15	0.46
4:F:148:ILE:HG23	4:F:148:ILE:O	2.16	0.46
1:A:269:LEU:HD11	1:A:301:GLN:HB3	1.97	0.46
2:D:295:MET:HG3	2:D:377:PHE:HB2	1.97	0.46
2:B:1:MET:HE1	2:B:50[B]:ASN:CB	2.45	0.46
2:B:103:TRP:CE3	2:B:189:LEU:HD13	2.50	0.46
4:F:280:GLU:HA	4:F:284[B]:LEU:HB2	1.97	0.46
1:A:192:HIS:CG	1:A:421:ALA:HA	2.51	0.46
1:C:363:VAL:HG23	1:C:364:PRO:HD2	1.97	0.46
2:D:36:TYR:CD1	2:D:46:LEU:HD21	2.50	0.46
1:C:249:ASN:ND2	1:C:356[A]:ASN:OD1	2.49	0.46
2:D:159:GLU:HG3	3:E:123:LEU:HD13	1.98	0.46
2:B:75:MET:HG2	2:B:94:PHE:CD2	2.51	0.46
2:B:287:THR:CG2	2:B:290:GLU:H	2.28	0.46
2:D:154:ILE:HG23	2:D:166:MET:HG2	1.98	0.46
4:F:253:TYR:OH	4:F:259:GLY:HA2	2.17	0.45
1:A:335:ILE:C	1:A:335:ILE:HD12	2.37	0.45
2:D:115:VAL:HG23	2:D:153:LEU:CD2	2.47	0.45
2:D:7:ILE:O	2:D:137:LEU:HA	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:414:ASP:OD2	2:D:416:MET:HB2	2.16	0.45
4:F:186:LEU:HD12	4:F:320:MET:HG2	1.99	0.45
1:A:187:SER:HB3	1:A:391:LEU:HD21	1.98	0.45
4:F:195:GLY:O	4:F:227:PRO:HB3	2.16	0.45
1:A:75:ILE:HD12	1:A:94:THR:HG22	1.98	0.45
1:A:341:ILE:N	1:A:341:ILE:HD12	2.32	0.45
2:B:335:VAL:O	2:B:339:ASN:ND2	2.41	0.45
1:C:217:LEU:HD21	1:C:368:LEU:HD23	1.99	0.45
2:D:409:THR:O	3:E:140:LYS:HE3	2.17	0.45
2:B:172:MET:HG3	2:B:387:LEU:HD11	1.99	0.45
2:B:212:ILE:HG23	2:B:275:LEU:HD13	1.99	0.45
2:D:161:TYR:HB3	2:D:164:ARG:CG	2.47	0.45
2:D:301:MET:C	2:D:303:ALA:H	2.20	0.45
1:A:23:LEU:O	1:A:27:GLU:HG3	2.17	0.45
4:F:253:TYR:CZ	4:F:259:GLY:HA2	2.52	0.45
4:F:267:PHE:CD2	4:F:279:LEU:HD13	2.51	0.45
1:C:177:VAL:CG2	1:C:206:ASN:HB3	2.45	0.45
2:D:244:PHE:CZ	2:D:358:ILE:CD1	3.00	0.45
4:F:165:GLU:HB3	4:F:168:GLU:OE2	2.17	0.45
1:A:2:ARG:NE	1:A:251:ASP:HB3	2.32	0.44
4:F:168:GLU:HG2	4:F:169:LEU:N	2.32	0.44
4:F:202:ARG:NH2	4:F:222:ARG:HH12	2.15	0.44
2:B:1:MET:HE1	2:B:50[A]:ASN:CB	2.46	0.44
4:F:37:PHE:O	4:F:60:GLN:HG2	2.18	0.44
1:A:12:ALA:HB3	1:A:140:SER:HB3	2.00	0.44
2:D:119:LEU:O	2:D:122:VAL:HG22	2.18	0.44
3:E:53:LYS:HE2	3:E:53:LYS:HB3	1.84	0.44
1:C:285:GLN:OE1	1:C:372:GLN:NE2	2.50	0.44
2:D:258:ASN:O	9:D:503:LOC:H18A	2.18	0.44
1:A:75:ILE:CG2	1:A:92:LEU:HD12	2.45	0.44
1:A:287:SER:OG	1:A:290:GLU:HG3	2.17	0.44
2:B:69:ASP:O	2:B:94:PHE:HA	2.18	0.44
1:C:172:TYR:HB3	1:C:205:ASP:HA	2.00	0.44
2:D:295:MET:CG	2:D:377:PHE:HB2	2.48	0.44
2:B:42:LEU:HD12	2:B:358:ILE:HD11	1.99	0.44
2:B:172:MET:HE2	2:B:172:MET:HB3	1.92	0.44
3:E:6:MET:HG2	3:E:24:LEU:CD2	2.48	0.44
4:F:205:VAL:HG21	4:F:291:ILE:HD13	2.00	0.44
4:F:299:GLU:N	4:F:300:PRO:HD2	2.33	0.44
2:D:117:SER:O	2:D:121:VAL:HG23	2.17	0.44
2:D:48:ARG:HD3	2:D:48:ARG:HA	1.77	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:148:ILE:HG13	4:F:162:ILE:HG12	1.98	0.43
1:C:183:GLU:N	1:C:184:PRO:CD	2.82	0.43
1:C:234:ILE:HD12	1:C:234:ILE:N	2.33	0.43
3:E:48:GLU:O	3:E:52:LYS:HG3	2.18	0.43
1:A:217:LEU:HD21	1:A:275:VAL:HG12	2.00	0.43
1:A:210:TYR:CE2	1:A:214:ARG:HD2	2.53	0.43
2:B:2:ARG:HB3	2:B:133:GLN:NE2	2.33	0.43
2:B:21:TRP:CE3	2:B:63:PRO:HB3	2.53	0.43
2:B:295:MET:HG2	2:B:377:PHE:HB2	2.01	0.43
2:D:35:SER:OG	2:D:60:LYS:HE3	2.17	0.43
4:F:82:LYS:NZ	4:F:97:SER:O	2.48	0.43
1:A:234:ILE:O	1:A:238:ILE:HG13	2.19	0.43
1:A:411:GLU:O	3:E:61:ARG:HD3	2.18	0.43
2:B:63:PRO:HD3	2:B:86:ILE:HG12	2.00	0.43
2:B:275:LEU:HD23	2:B:275:LEU:HA	1.76	0.43
2:B:287:THR:HG22	2:B:290:GLU:CB	2.48	0.43
2:B:385:GLN:OE1	2:B:389:LYS:HE3	2.19	0.43
4:F:37:PHE:HZ	4:F:52:LEU:CD2	2.32	0.43
4:F:238:CYS:HG	4:F:239:HIS:CE1	2.35	0.43
4:F:172:PHE:HD1	4:F:172:PHE:O	2.01	0.43
4:F:284[A]:LEU:HD12	4:F:284[A]:LEU:HA	1.78	0.43
2:B:305:CYS:O	2:B:307:PRO:HD3	2.19	0.43
1:C:388:TRP:HA	1:C:388:TRP:CE3	2.54	0.43
4:F:2:TYR:CE1	4:F:359:PHE:HB3	2.53	0.43
1:A:55:GLU:HA	1:A:60:LYS:O	2.18	0.43
2:B:287:THR:HG22	2:B:290:GLU:HB2	2.00	0.43
1:A:209[A]:ILE:HD11	1:A:302[A]:MET:SD	2.59	0.42
3:E:75:LYS:O	3:E:79:GLU:HG3	2.19	0.42
2:B:286:LEU:HD23	2:B:286:LEU:HA	1.84	0.42
2:D:9:ALA:HA	2:D:68:VAL:O	2.19	0.42
1:A:100:ALA:HA	2:B:254:LYS:CG	2.49	0.42
1:A:285:GLN:OE1	1:A:285:GLN:N	2.51	0.42
1:A:262:TYR:HE2	1:A:346:TRP:CH2	2.37	0.42
2:B:297:ASP:OD1	2:B:298:SER:N	2.53	0.42
1:C:72:PRO:CG	2:D:1:MET:CE	2.96	0.42
2:D:114:LEU:HG	2:D:114:LEU:O	2.18	0.42
2:D:208:ALA:O	2:D:212:ILE:HG13	2.19	0.42
4:F:18:SER:O	4:F:22:LEU:HG	2.19	0.42
1:A:39:ASP:OD2	1:A:61:HIS:HE1	2.03	0.42
2:D:50:ASN:HD22	2:D:50:ASN:H	1.68	0.42
2:D:212:ILE:O	2:D:216:THR:HB	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:24:THR:HG22	4:F:26:GLN:HG3	2.02	0.42
2:D:317:ALA:O	2:D:353:THR:HA	2.20	0.42
2:B:20:PHE:CE2	2:B:24:ILE:HD13	2.55	0.42
1:A:93:ILE:HD11	1:A:121:ARG:CG	2.45	0.42
1:A:319:TYR:HB3	1:A:323:VAL:HG21	2.01	0.42
1:A:345:ASP:HB3	3:E:28:SER:HB2	2.01	0.42
1:C:277:SER:OG	1:C:280:LYS:HG3	2.20	0.42
2:D:292:THR:CG2	2:D:335:VAL:HG21	2.46	0.42
3:E:76:ARG:HA	3:E:76:ARG:HD3	1.89	0.42
2:D:264:ARG:NE	2:D:431:GLU:OE2	2.52	0.41
1:A:216:ASN:HD22	1:A:275:VAL:HB	1.86	0.41
2:B:31:ASP:HB2	2:B:32:PRO:CD	2.49	0.41
2:D:102:ASN:HD22	2:D:105:LYS:HG3	1.84	0.41
2:D:165:ILE:HG21	2:D:252:LEU:HB3	2.02	0.41
3:E:47:LEU:HD23	3:E:47:LEU:O	2.21	0.41
4:F:21:LEU:HD21	4:F:355:ILE:HG21	2.03	0.41
4:F:38:ASN:O	4:F:60:GLN:HA	2.20	0.41
4:F:95:PRO:HB2	4:F:183:GLN:CG	2.50	0.41
1:A:209[A]:ILE:HG22	1:A:227:LEU:CD2	2.49	0.41
1:C:22:GLU:O	1:C:26:LEU:HG	2.20	0.41
1:C:117:LEU:HD21	1:C:121:ARG:NH2	2.35	0.41
1:C:178:SER:HB2	1:C:224:TYR:OH	2.20	0.41
1:C:361:THR:CG2	1:C:362:VAL:N	2.84	0.41
1:C:153:LEU:O	1:C:157:LEU:HG	2.20	0.41
2:D:414:ASP:N	2:D:414:ASP:OD1	2.53	0.41
1:A:16:ILE:CD1	1:A:171:ILE:HD11	2.50	0.41
1:A:151:SER:HB2	1:A:193:THR:HG22	2.00	0.41
1:A:209[A]:ILE:HG22	1:A:227:LEU:HD22	2.01	0.41
1:C:72:PRO:HG2	2:D:1:MET:CE	2.51	0.41
1:C:255:PHE:CD1	1:C:316:CYS:HB3	2.56	0.41
4:F:168:GLU:O	4:F:172:PHE:HB2	2.21	0.41
1:C:304:LYS:HE3	1:C:304:LYS:HB2	1.95	0.41
2:D:115:VAL:HG23	2:D:153:LEU:HD23	2.02	0.41
2:D:172:MET:HG3	2:D:387:LEU:HD11	2.02	0.41
2:D:270:PRO:HA	2:D:377:PHE:O	2.20	0.41
4:F:224:SER:HB2	4:F:241:THR:HG22	2.03	0.41
1:A:132:LEU:O	1:A:164:LYS:NZ	2.51	0.41
1:A:358:GLN:HA	1:A:359:PRO:HD3	1.95	0.41
2:D:291:LEU:HD12	2:D:291:LEU:HA	1.86	0.41
1:A:209[B]:ILE:HD13	1:A:231:ILE:HD11	2.02	0.41
1:A:262:TYR:HA	1:A:263:PRO:HD3	1.92	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:437:VAL:CG1	1:A:438:ASP:N	2.84	0.41
1:C:72:PRO:HG2	2:D:1:MET:HE1	2.03	0.41
3:E:6:MET:HE3	3:E:6:MET:HB3	1.84	0.41
4:F:24:THR:CG2	4:F:361:LEU:HD13	2.50	0.41
1:C:66:VAL:HG12	1:C:68[A]:VAL:HG23	2.02	0.41
4:F:252:ASN:ND2	4:F:255:ARG:HD2	2.36	0.41
4:F:279:LEU:HG	4:F:284[B]:LEU:HG	2.03	0.41
4:F:340:GLN:HA	4:F:343:TYR:HD2	1.86	0.41
2:B:312:TYR:CE1	2:B:377:PHE:HZ	2.39	0.40
2:D:235:MET:HE2	2:D:235:MET:HB3	1.94	0.40
1:A:133:GLN:HB2	1:A:252:LEU:HD23	2.04	0.40
1:A:183:GLU:N	1:A:184:PRO:CD	2.85	0.40
1:A:192:HIS:NE2	1:A:420[A]:GLU:HG2	2.36	0.40
4:F:24:THR:HG23	4:F:361:LEU:HD13	2.03	0.40
1:C:195:LEU:HD12	1:C:266:HIS:CE1	2.57	0.40
2:D:387:LEU:HD23	2:D:387:LEU:C	2.41	0.40
4:F:24:THR:HG22	4:F:26:GLN:H	1.86	0.40
1:A:21:TRP:CZ2	1:A:65:ALA:HB2	2.57	0.40
2:D:145:THR:O	2:D:149:MET:HB3	2.20	0.40
2:D:254:LYS:HG2	9:D:503:LOC:H10	2.04	0.40
2:B:205:ASP:HB3	2:B:303:ALA:HA	2.03	0.40
2:D:287:THR:HB	2:D:289:PRO:HD2	2.03	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	450/440 (102%)	431 (96%)	17 (4%)	2 (0%)	34 72
1	C	448/440 (102%)	432 (96%)	15 (3%)	1 (0%)	47 82
2	B	428/431 (99%)	406 (95%)	21 (5%)	1 (0%)	47 82

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	D	421/431 (98%)	400 (95%)	20 (5%)	1 (0%)	47	82
3	E	118/121 (98%)	116 (98%)	2 (2%)	0	100	100
4	F	310/320 (97%)	288 (93%)	22 (7%)	0	100	100
All	All	2175/2183 (100%)	2073 (95%)	97 (4%)	5 (0%)	47	82

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	177	VAL
1	A	178	SER
2	D	74	THR
2	B	73	GLY
1	A	131	GLY

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	382/371 (103%)	379 (99%)	3 (1%)	81	93
1	C	381/371 (103%)	379 (100%)	2 (0%)	88	96
2	B	374/372 (100%)	374 (100%)	0	100	100
2	D	367/372 (99%)	367 (100%)	0	100	100
3	E	110/109 (101%)	106 (96%)	4 (4%)	35	70
4	F	294/289 (102%)	282 (96%)	12 (4%)	30	67
All	All	1908/1884 (101%)	1887 (99%)	21 (1%)	73	90

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	ARG
1	A	133	GLN
1	A	284	GLU

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Mol	Chain	Res	Type
1	C	71	GLU
1	C	245	ASP
3	E	6	MET
3	E	8	VAL
3	E	62	LYS
3	E	103	GLN
4	F	1	MET
4	F	33	ASP
4	F	91	CYS
4	F	125	THR
4	F	162	ILE
4	F	163	SER
4	F	172	PHE
4	F	211	TYR
4	F	222	ARG
4	F	249	TYR
4	F	257	GLU
4	F	311	SER

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

Mol	Chain	Res	Type
1	A	293	ASN
2	B	167	ASN
2	D	136	GLN
2	D	167	ASN
4	F	333	ASN

### 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 13 ligands modelled in this entry, 6 are monoatomic - leaving 7 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	GTP	A	501	6	26,34,34	1.00	2 (7%)	32,54,54	0.72	1 (3%)
10	ACP	F	401	-	27,33,33	0.91	1 (3%)	32,52,52	0.97	3 (9%)
8	GDP	B	501	6	24,30,30	1.00	2 (8%)	30,47,47	0.65	1 (3%)
9	LOC	D	503	-	31,31,31	1.03	2 (6%)	44,44,44	1.60	5 (11%)
5	GTP	C	501	6	26,34,34	1.01	2 (7%)	32,54,54	0.69	1 (3%)
9	LOC	B	503	-	31,31,31	1.00	2 (6%)	44,44,44	1.48	6 (13%)
8	GDP	D	501	6	24,30,30	1.00	3 (12%)	30,47,47	0.68	1 (3%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GTP	A	501	6	-	4/18/38/38	0/3/3/3
10	ACP	F	401	-	-	6/15/38/38	0/3/3/3
8	GDP	B	501	6	-	4/12/32/32	0/3/3/3
9	LOC	D	503	-	-	4/12/25/25	0/3/3/3
5	GTP	C	501	6	-	5/18/38/38	0/3/3/3
9	LOC	B	503	-	-	2/12/25/25	0/3/3/3
8	GDP	D	501	6	-	5/12/32/32	0/3/3/3

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	D	503	LOC	C20-C21	3.66	1.42	1.37
9	B	503	LOC	C20-C21	3.44	1.42	1.37
9	D	503	LOC	C22-C21	-2.96	1.46	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	D	501	GDP	C5-C6	-2.78	1.41	1.47
5	C	501	GTP	C5-C6	-2.72	1.41	1.47
8	B	501	GDP	C5-C6	-2.69	1.41	1.47
9	B	503	LOC	C22-C21	-2.68	1.46	1.50
5	A	501	GTP	C5-C6	-2.67	1.42	1.47
10	F	401	ACP	PB-O2B	-2.44	1.50	1.56
5	C	501	GTP	C8-N7	-2.15	1.31	1.35
8	D	501	GDP	C8-N7	-2.12	1.31	1.35
8	B	501	GDP	C8-N7	-2.11	1.31	1.35
5	A	501	GTP	C8-N7	-2.10	1.31	1.35
8	D	501	GDP	C5-C4	-2.01	1.37	1.43

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	D	503	LOC	O6-C17-C16	7.19	116.57	109.56
9	B	503	LOC	O6-C17-C16	6.66	116.05	109.56
9	D	503	LOC	C14-C11-N1	-4.10	111.11	114.34
9	D	503	LOC	O6-C17-C19	-3.54	116.73	122.30
9	B	503	LOC	C14-C11-N1	-3.48	111.60	114.34
9	B	503	LOC	O6-C17-C19	-3.34	117.04	122.30
9	B	503	LOC	C9-C10-C11	-2.76	108.68	112.21
9	D	503	LOC	C9-C10-C11	-2.75	108.69	112.21
9	D	503	LOC	C14-C15-C16	-2.68	128.52	133.89
10	F	401	ACP	O1G-PG-C3B	-2.53	105.80	111.24
10	F	401	ACP	C3'-C2'-C1'	2.43	104.63	100.98
10	F	401	ACP	C5-C6-N6	2.19	123.67	120.35
9	B	503	LOC	C14-C15-C16	-2.15	129.59	133.89
9	B	503	LOC	C20-C21-C14	-2.11	122.39	124.83
8	D	501	GDP	O6-C6-C5	2.09	128.46	124.37
5	C	501	GTP	O6-C6-C5	2.06	128.39	124.37
5	A	501	GTP	O6-C6-C5	2.06	128.39	124.37
8	B	501	GDP	O6-C6-C5	2.05	128.37	124.37

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	501	GTP	C5'-O5'-PA-O1A
5	C	501	GTP	C5'-O5'-PA-O1A
8	B	501	GDP	C5'-O5'-PA-O1A
8	D	501	GDP	C5'-O5'-PA-O1A

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Mol	Chain	Res	Type	Atoms
9	B	503	LOC	C19-C17-O6-C18
9	B	503	LOC	C16-C17-O6-C18
9	D	503	LOC	C19-C17-O6-C18
9	D	503	LOC	C16-C17-O6-C18
10	F	401	ACP	PG-C3B-PB-O1B
10	F	401	ACP	PG-C3B-PB-O2B
10	F	401	ACP	PG-C3B-PB-O3A
10	F	401	ACP	C5'-O5'-PA-O3A
9	D	503	LOC	C3-C5-O3-C6
10	F	401	ACP	PB-O3A-PA-O5'
9	D	503	LOC	C7-C5-O3-C6
8	D	501	GDP	C5'-O5'-PA-O3A
8	D	501	GDP	PB-O3A-PA-O2A
5	A	501	GTP	C5'-O5'-PA-O2A
5	C	501	GTP	C5'-O5'-PA-O2A
8	B	501	GDP	C5'-O5'-PA-O2A
8	D	501	GDP	C5'-O5'-PA-O2A
10	F	401	ACP	C5'-O5'-PA-O1A
5	A	501	GTP	PB-O3B-PG-O3G
5	C	501	GTP	PB-O3B-PG-O3G
5	A	501	GTP	C5'-O5'-PA-O3A
5	C	501	GTP	C5'-O5'-PA-O3A
8	B	501	GDP	C5'-O5'-PA-O3A
5	C	501	GTP	PB-O3A-PA-O1A
8	B	501	GDP	PB-O3A-PA-O2A
8	D	501	GDP	PB-O3A-PA-O1A

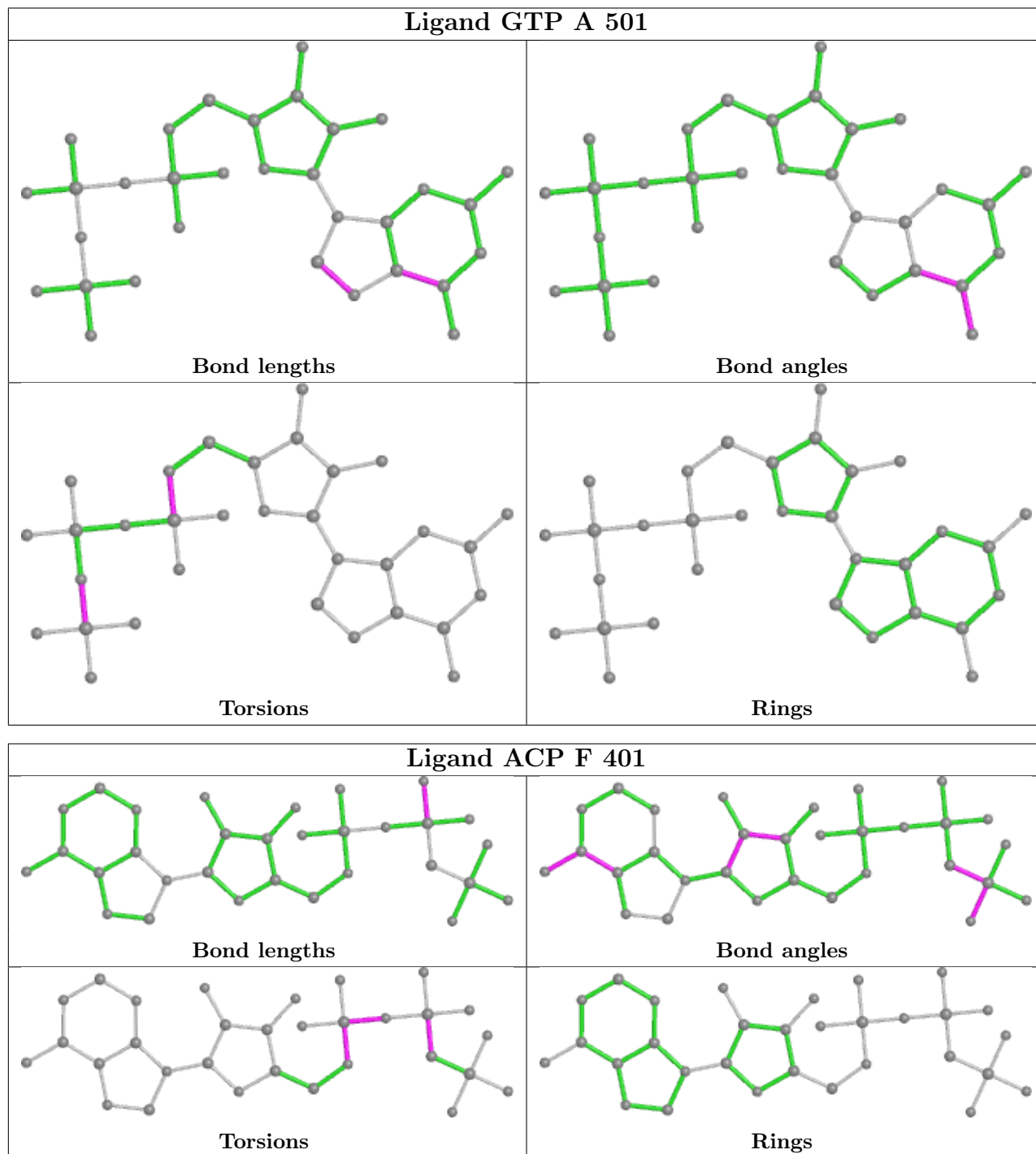
There are no ring outliers.

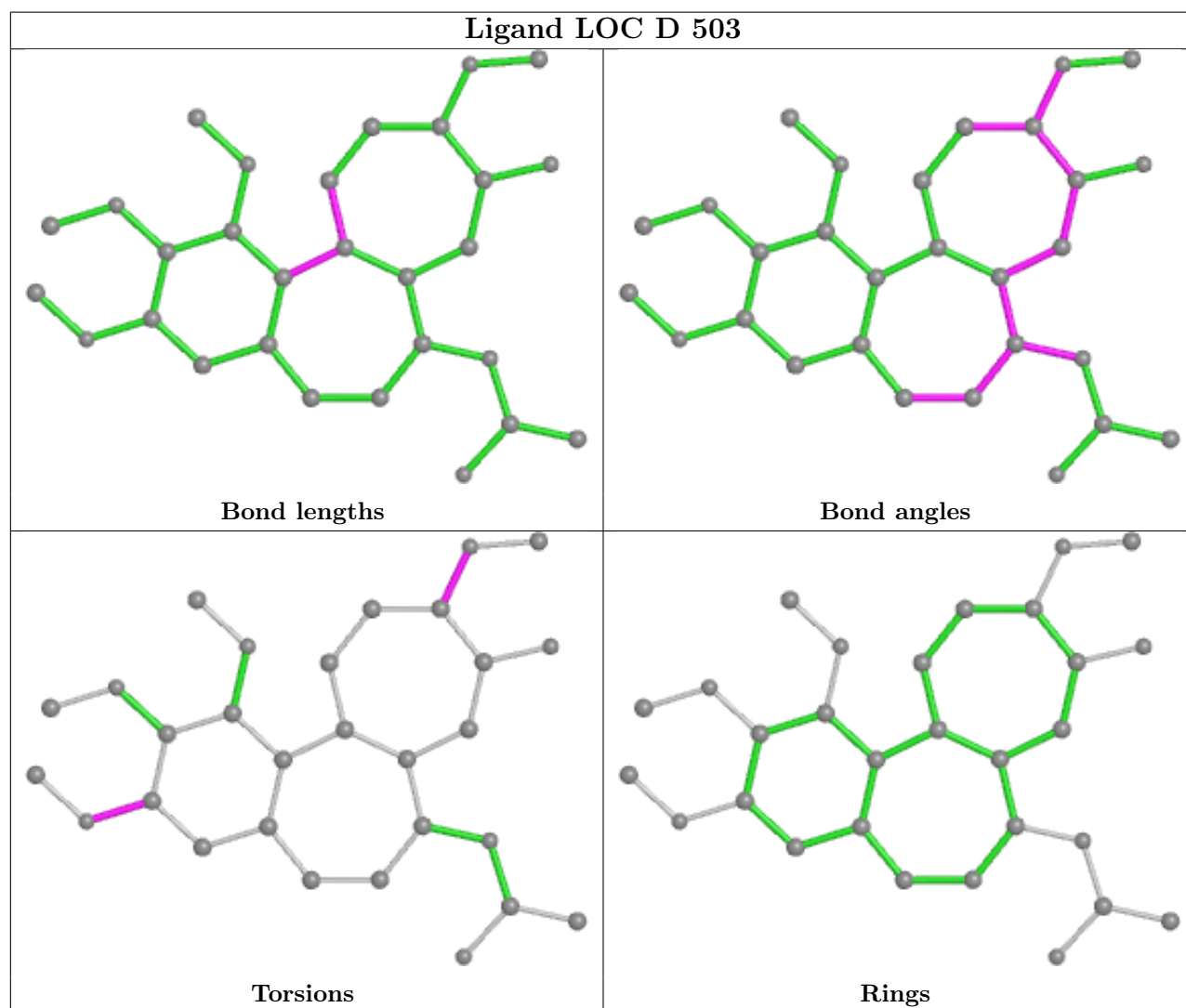
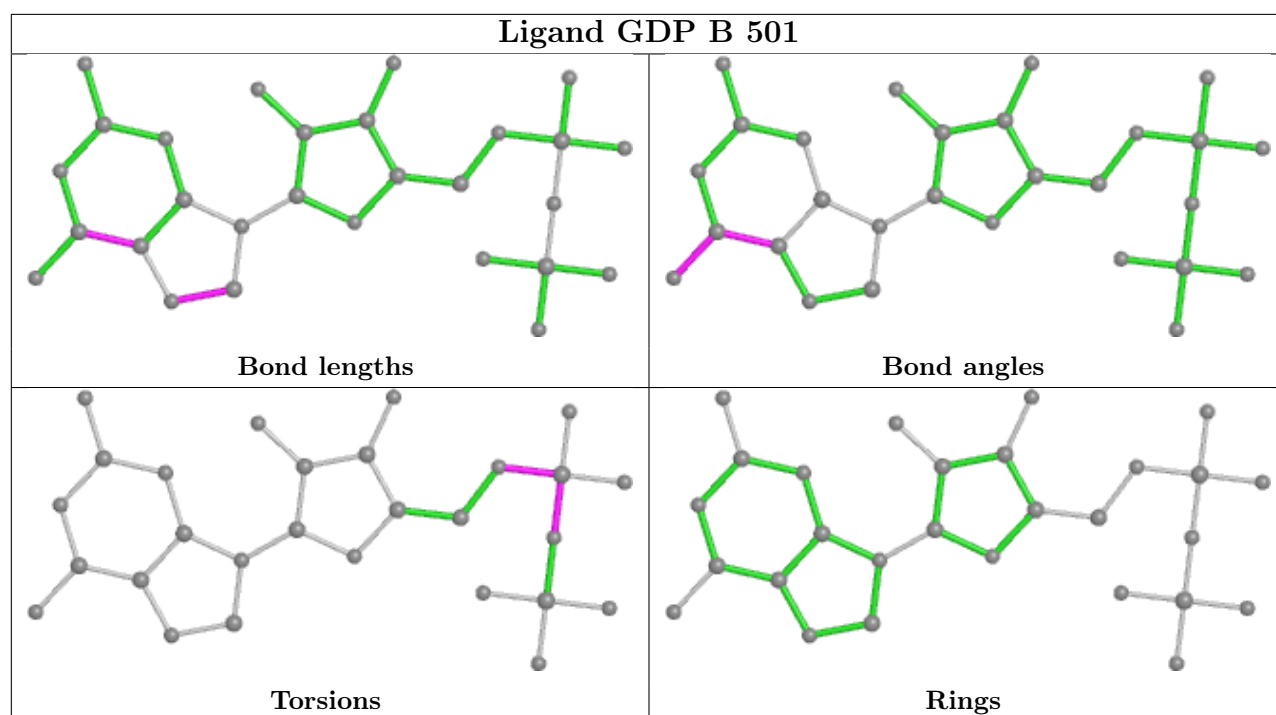
4 monomers are involved in 10 short contacts:

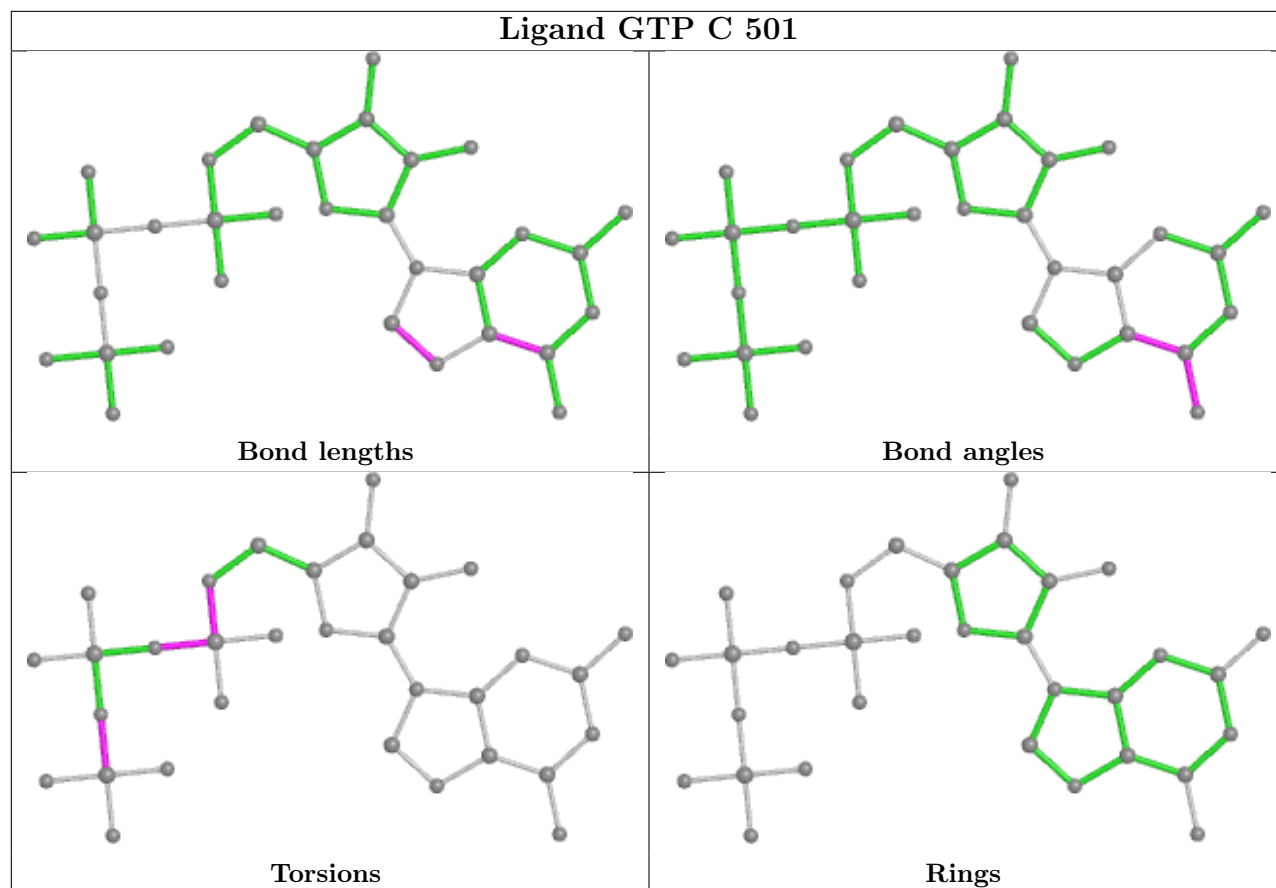
Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	F	401	ACP	1	0
9	D	503	LOC	5	0
9	B	503	LOC	2	0
8	D	501	GDP	2	0

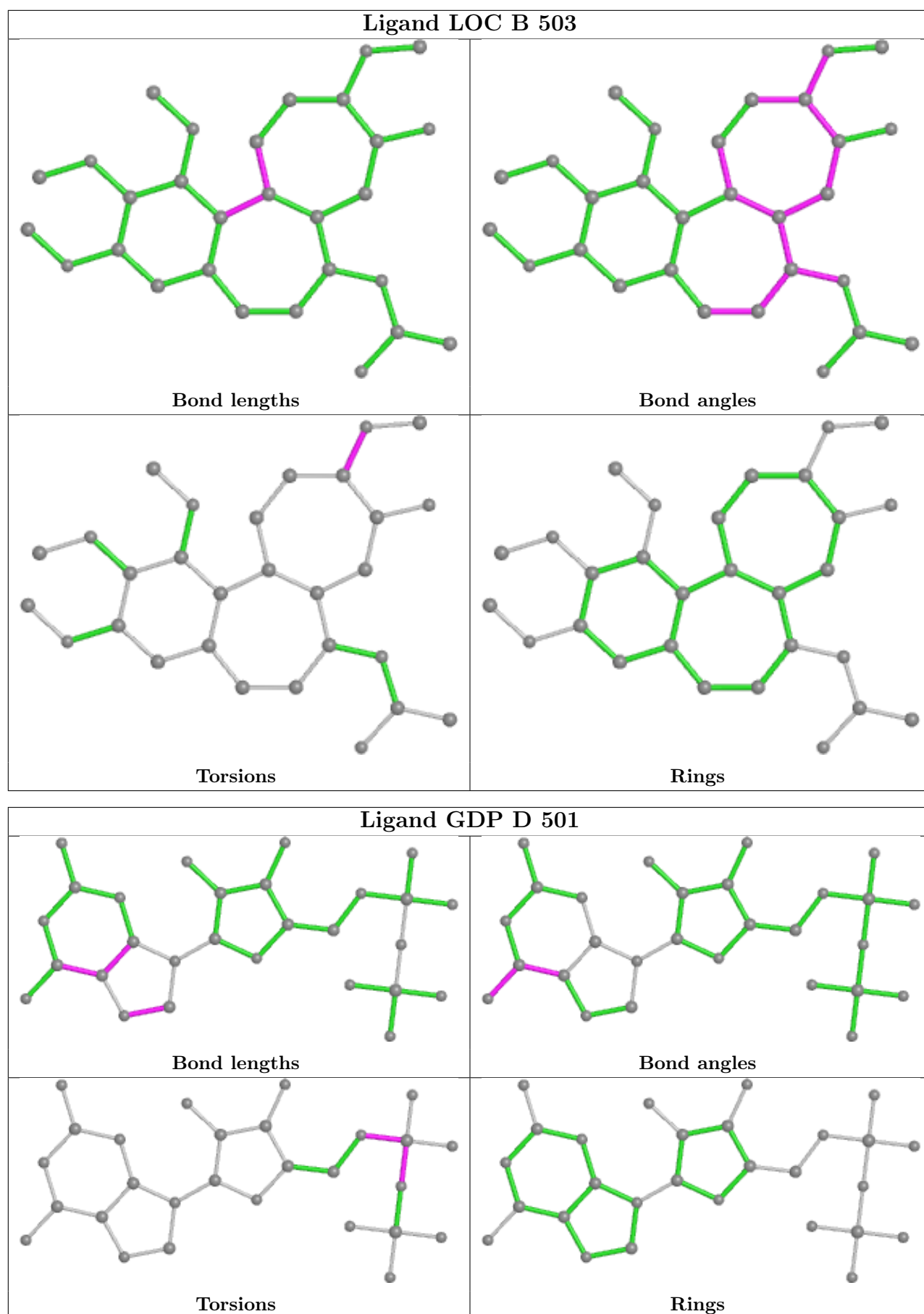
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
4	F	6
3	E	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	E	28:SER	C	44:ASP	N	32.70
1	F	362:ALA	C	373:SER	N	19.68
1	F	102:PRO	C	125:THR	N	12.42
1	F	151:SER	C	162:ILE	N	11.70
1	F	136:ASN	C	144:GLY	N	11.08
1	F	173:ILE	C	179:VAL	N	8.40
1	F	231:ALA	C	235:ASP	N	6.52



## 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.

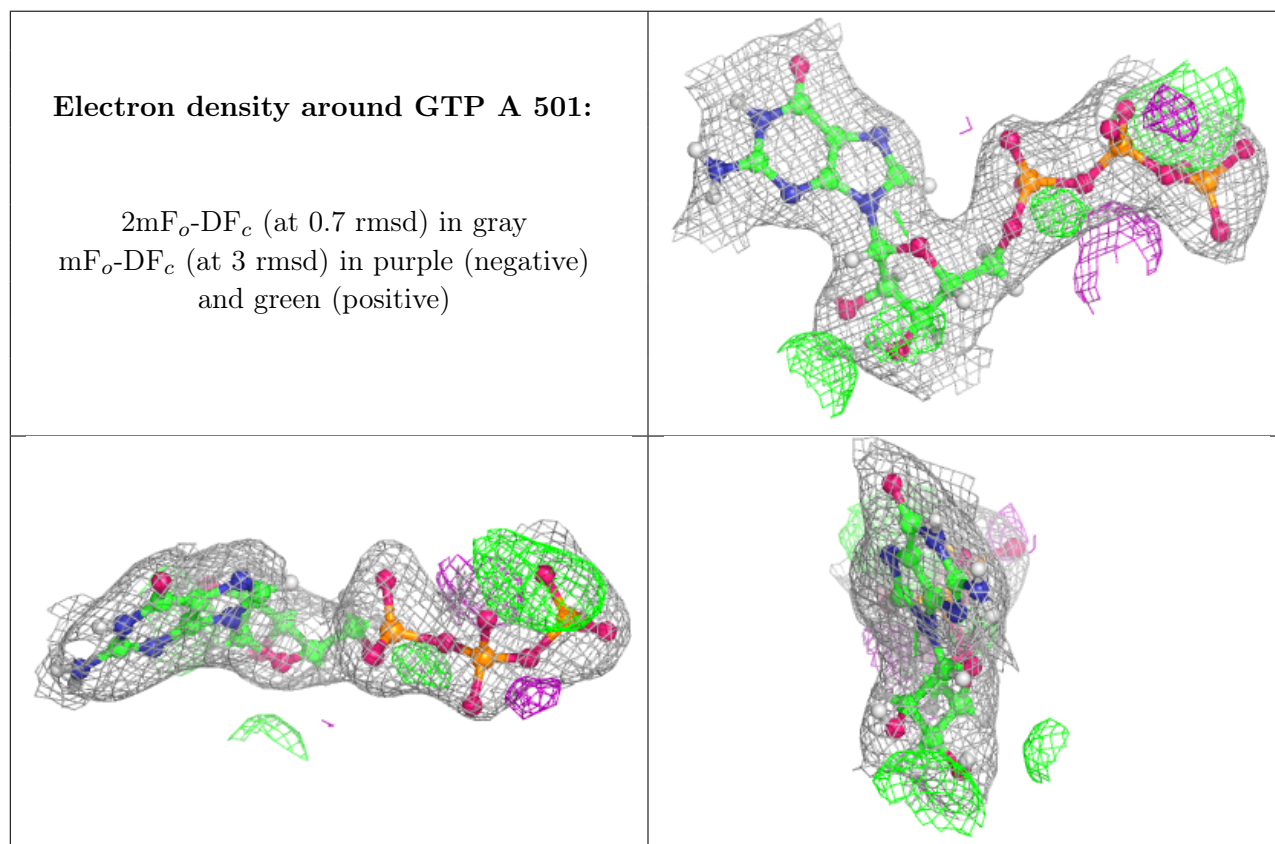
### 6.3 Carbohydrates [i](#)

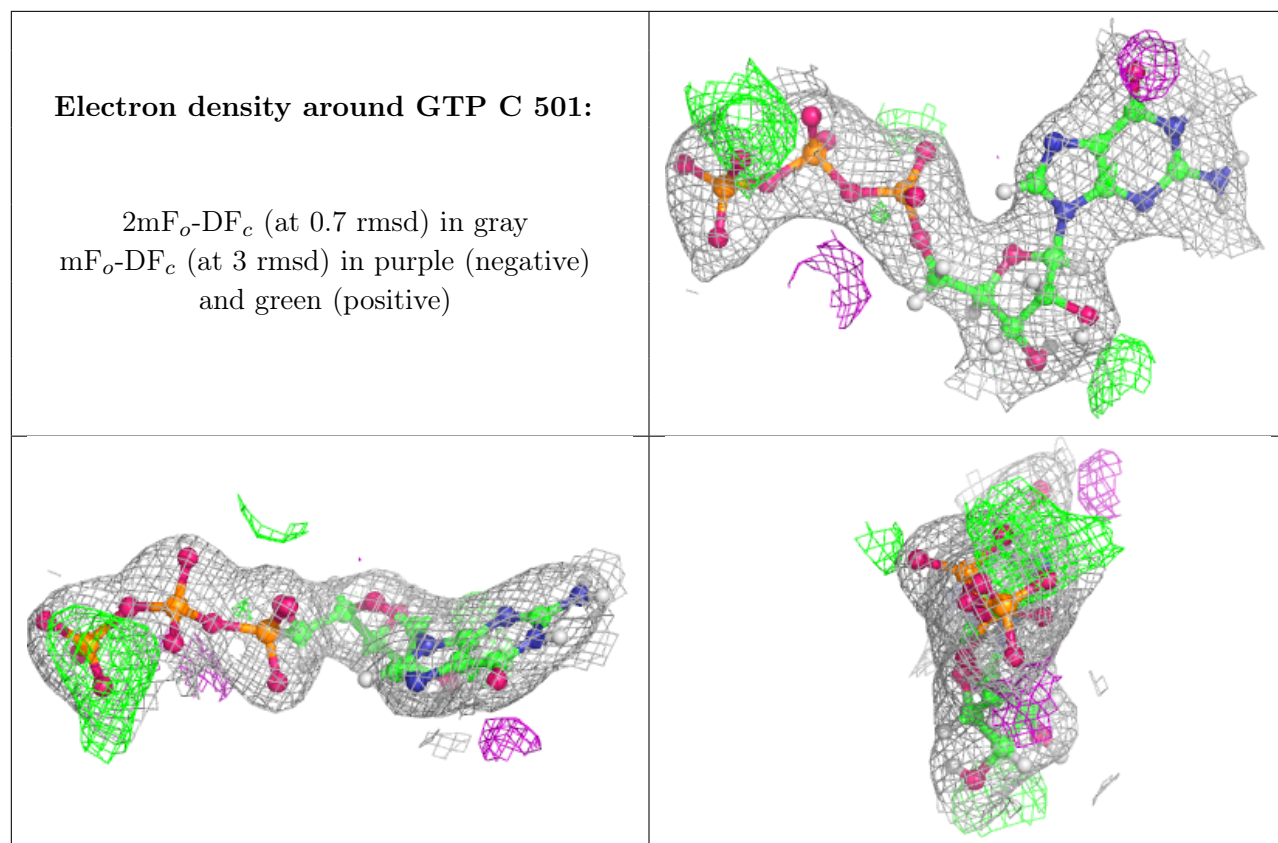
Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands [i](#)

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

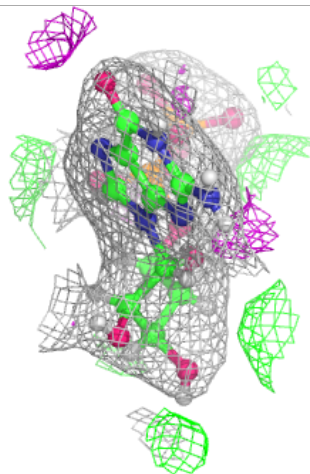
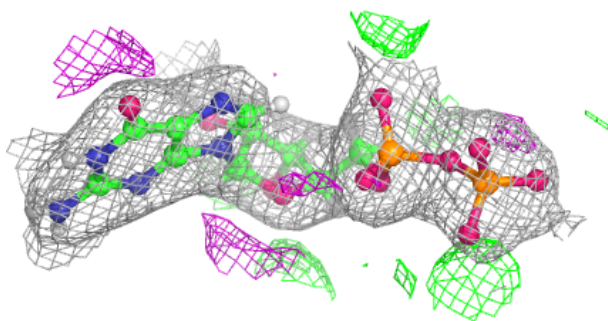
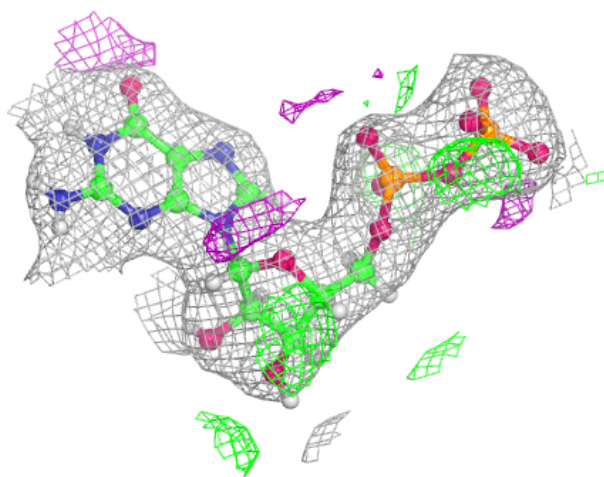
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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





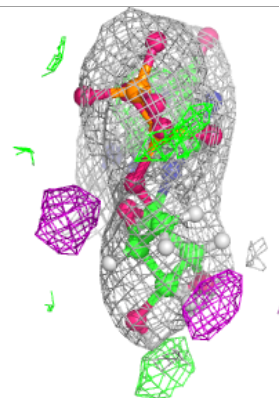
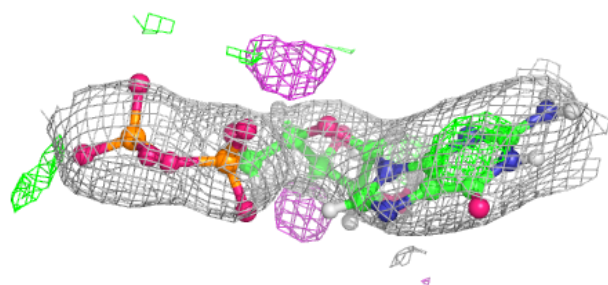
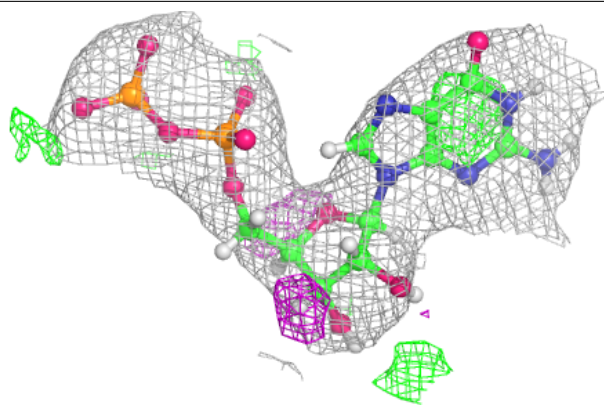
**Electron density around GDP B 501:**

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

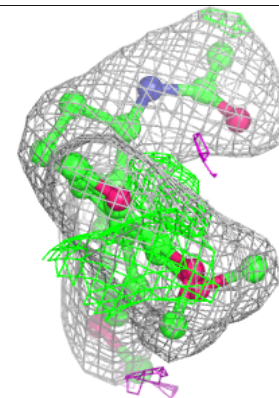
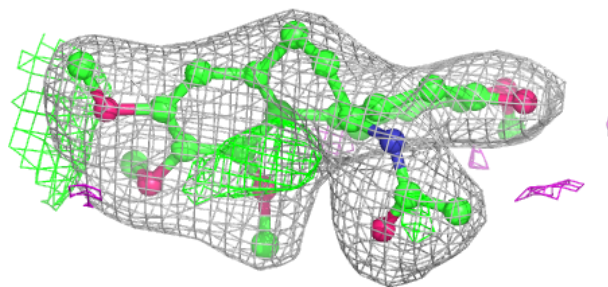
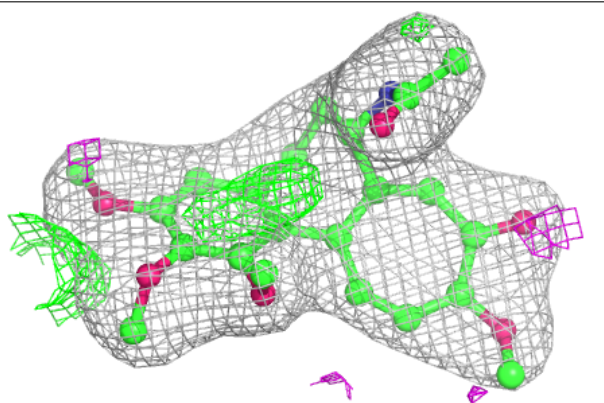


**Electron density around GDP D 501:**

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

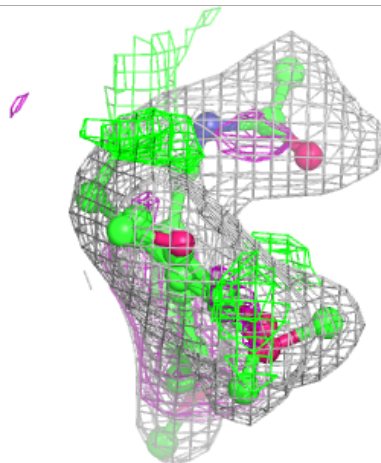
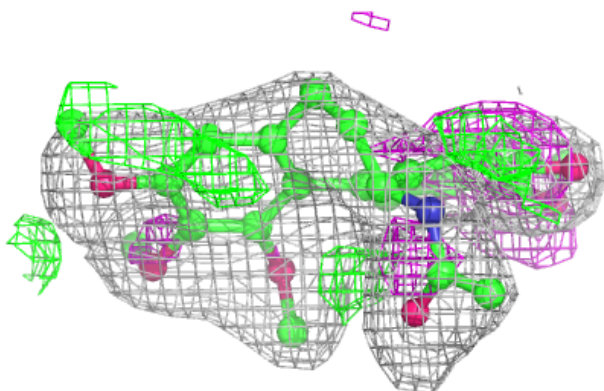
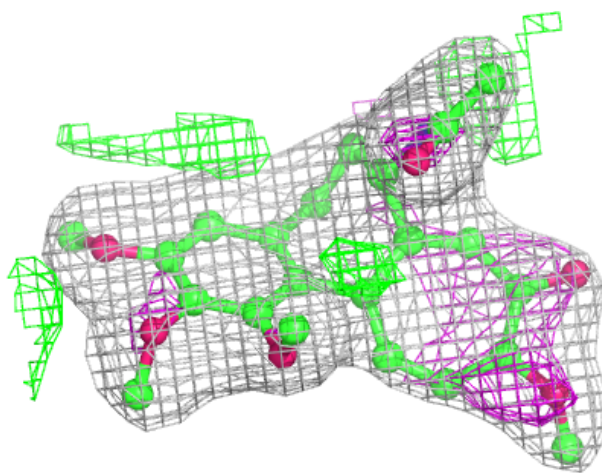
**Electron density around LOC B 503:**

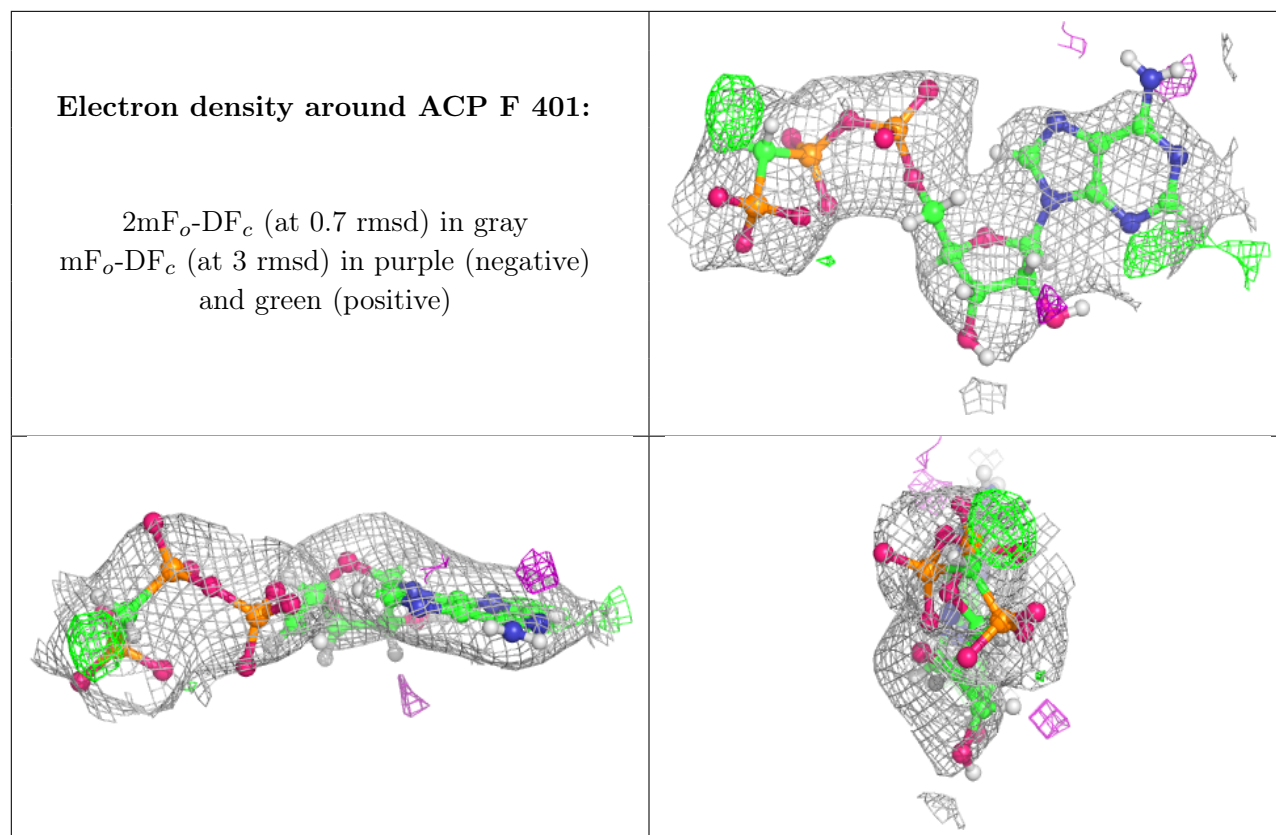
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around LOC D 503:**

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





## 6.5 Other polymers [i](#)

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