



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 10, 2023 – 12:43 am GMT

PDB ID : 8CLF
Title : Z-SolQ2Br bound to tubulin (T2R-TTL) complex
Authors : Wranik, M.; Bertrand, Q.; Kepa, M.; Weinert, T.; Steinmetz, M.; Standfuss, J.
Deposited on : 2023-02-16
Resolution : 2.70 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

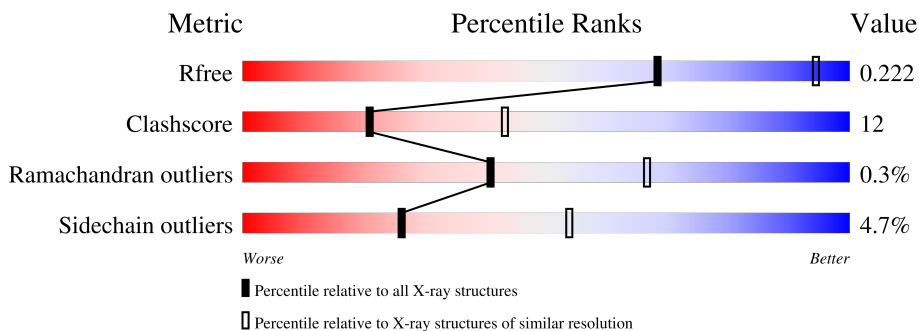
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)

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	440	72% (green), 26% (yellow), 2% (orange), 0% (red), 0% (grey)
1	C	440	82% (green), 18% (yellow), 0% (orange), 0% (red), 0% (grey)
2	B	431	70% (green), 27% (yellow), 3% (orange), 0% (red), 0% (grey)
2	D	431	68% (green), 29% (yellow), 3% (orange), 0% (red), 0% (grey)
3	E	121	78% (green), 21% (yellow), 1% (orange), 0% (red), 0% (grey)
4	F	320	69% (green), 29% (yellow), 2% (orange), 0% (red), 0% (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
9	V1O	B	503	-	-	X	-

2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 34805 atoms, of which 17172 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	6888	2204	3414	585	661	24	0	10	0
1	C	440	6884	2203	3405	586	666	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	428	6733	2148	3317	581	660	27	2	11	0
2	D	431	6705	2140	3299	580	658	28	0	4	0

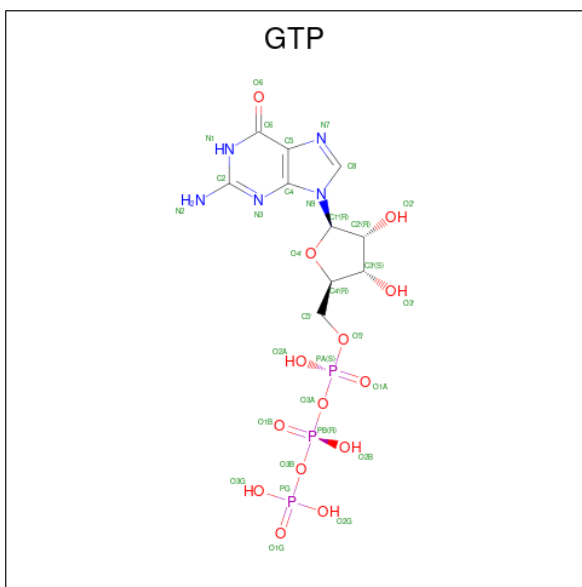
- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
3	E	121	2046	625	1035	182	198	6	0	2	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	5269	1707	2633	437	478	14	0	4	0

- Molecule 5 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: C₁₀H₁₆N₅O₁₄P₃).



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).

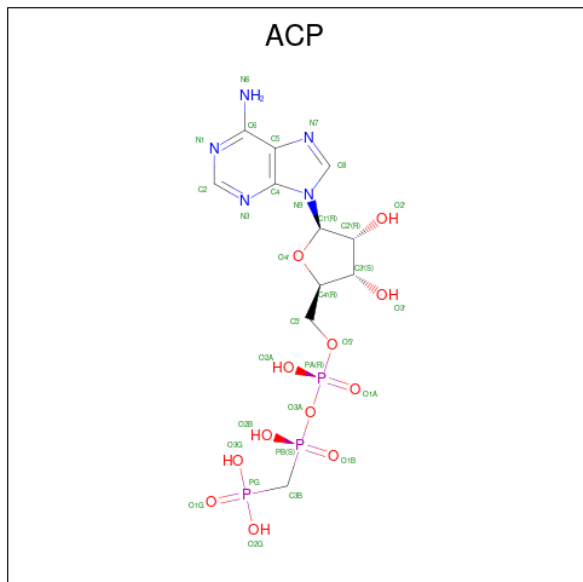
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
6	A	1	1	1	0	0
6	B	1	1	1	0	0
6	C	1	1	1	0	0
6	D	1	1	1	0	0

- 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: C₁₀H₁₅N₅O₁₁P₂).

- Molecule 10 is PHOSPHOMETHYLPHOSPHONIC ACID ADENYLATE ESTER (three-letter code: ACP) (formula: C₁₁H₁₈N₅O₁₂P₃).



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

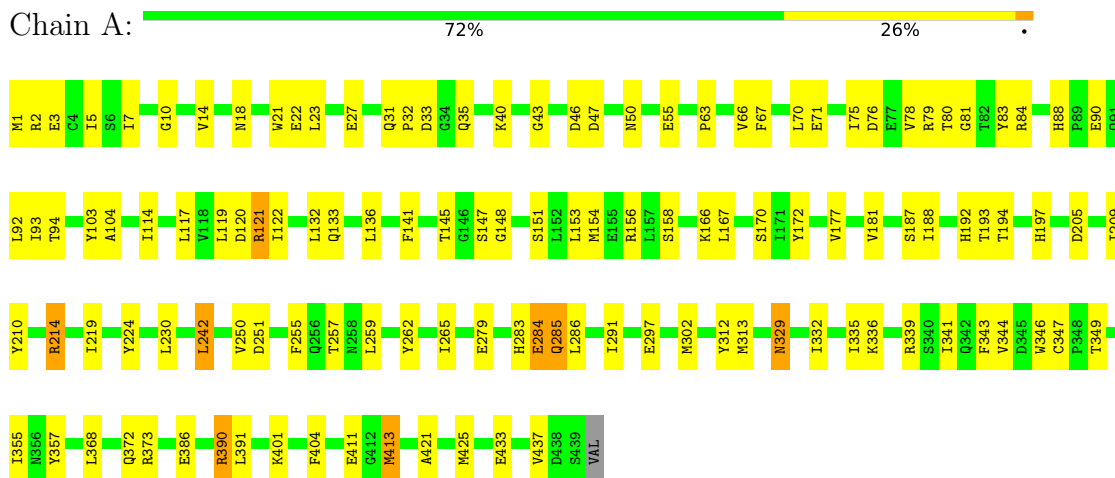
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	4	Total	O	0	0
			4	4		
11	B	6	Total	O	0	0
			6	6		
11	C	18	Total	O	0	0
			18	18		
11	D	1	Total	O	0	0
			1	1		
11	F	1	Total	O	0	0
			1	1		

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.

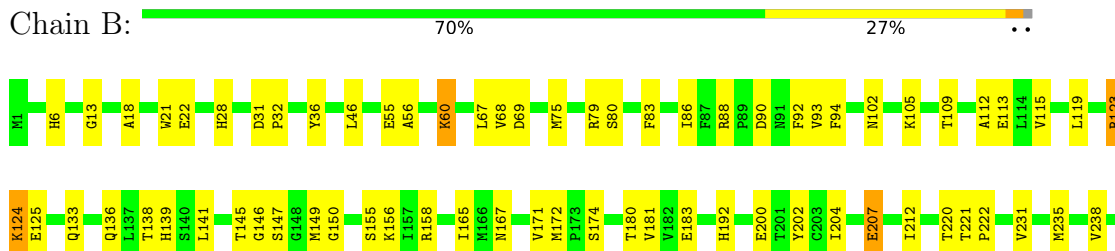
- Molecule 1: Tubulin alpha-1B chain

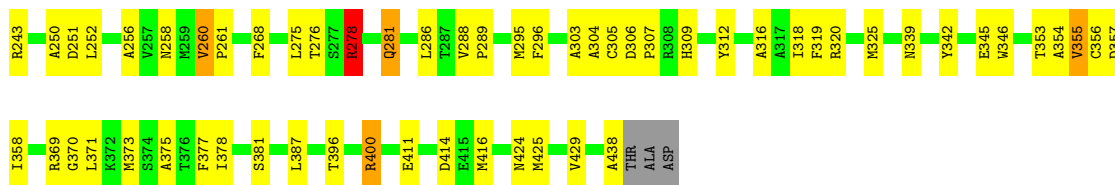


- Molecule 1: Tubulin alpha-1B chain

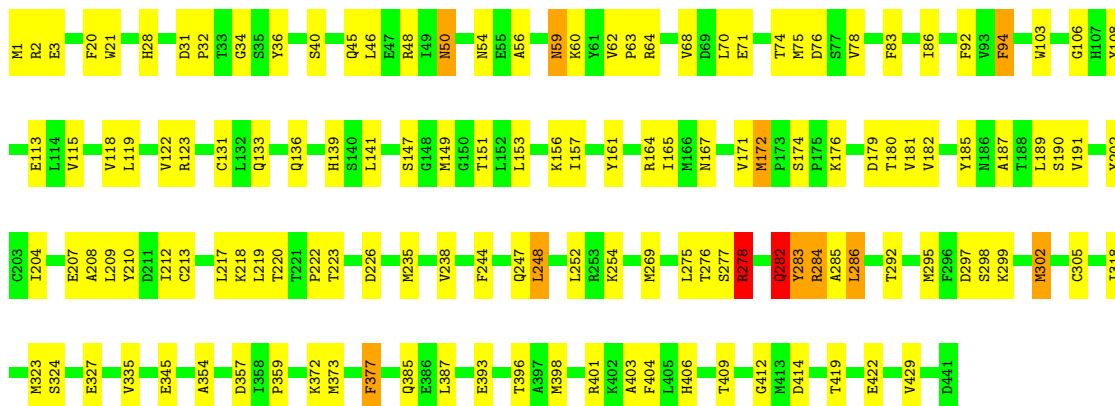


- Molecule 2: Tubulin beta-2B chain

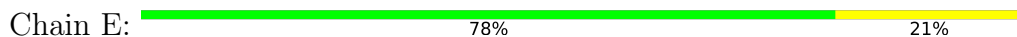




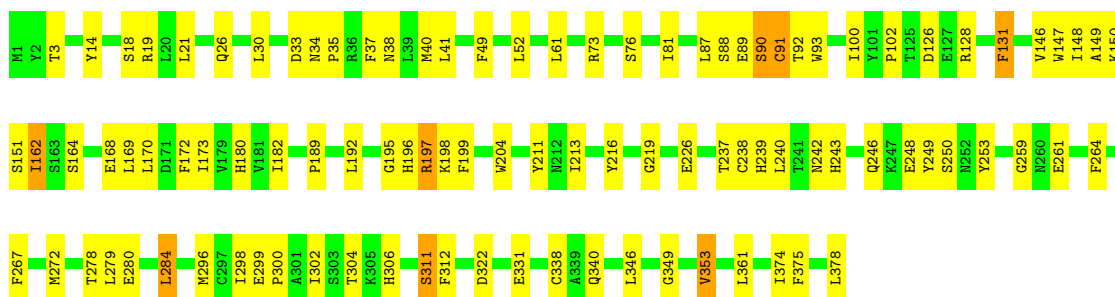
• Molecule 2: Tubulin beta-2B chain



• Molecule 3: Stathmin-4



• Molecule 4: Tubulin-Tyrosine Ligase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	106.65Å 160.33Å 180.95Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	15.35 – 2.70 15.37 – 2.03	Depositor EDS
% Data completeness (in resolution range)	99.9 (15.35-2.70) 56.8 (15.37-2.03)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1764.17 (at 2.03Å)	Xtrriage
Refinement program	PHENIX 1.20_4487	Depositor
R, R_{free}	0.168 , 0.217 0.181 , 0.222	Depositor DCC
R_{free} test set	1974 reflections (1.74%)	wwPDB-VP
Wilson B-factor (Å ²)	-9.9	Xtrriage
Anisotropy	-0.596	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 71.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.65	EDS
Total number of atoms	34805	wwPDB-VP
Average B, all atoms (Å ²)	85.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.49% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CA, GDP, MG, V1O, ACP, GTP

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	0.29	0/3582	0.49	0/4864
1	C	0.33	0/3593	0.51	0/4878
2	B	0.36	0/3527	0.55	0/4776
2	D	0.33	0/3493	0.53	0/4733
3	E	0.25	0/1025	0.44	0/1359
4	F	0.34	0/2705	0.54	0/3653
All	All	0.32	0/17925	0.52	0/24263

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	2
2	B	0	2
2	D	0	1
All	All	0	7

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	121	ARG	Sidechain
1	A	214	ARG	Sidechain
2	B	123	ARG	Sidechain

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Mol	Chain	Res	Type	Group
2	B	278	ARG	Sidechain
1	C	243	ARG	Sidechain
1	C	320	ARG	Sidechain
2	D	278	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	3474	3414	3412	96	0
1	C	3479	3405	3392	47	0
2	B	3416	3317	3309	95	0
2	D	3406	3299	3298	106	0
3	E	1011	1035	1035	26	0
4	F	2636	2633	2632	68	0
5	A	32	12	12	1	0
5	C	32	12	12	1	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	1	0
9	B	24	7	0	9	0
10	F	31	14	14	2	0
11	A	4	0	0	0	0
11	B	6	0	0	0	0
11	C	18	0	0	0	0
11	D	1	0	0	1	0
11	F	1	0	0	0	0
All	All	17633	17172	17140	423	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 (423) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:13:GLY:HA2	2:B:138[B]:THR:HG22	1.47	0.93
2:D:181:VAL:O	2:D:398:MET:HE1	1.84	0.78
2:B:256:ALA:O	2:B:260:VAL:HG13	1.85	0.76
4:F:248:GLU:HG2	4:F:249:TYR:CD1	2.19	0.76
2:D:292:THR:HG22	2:D:335:VAL:HG21	1.68	0.75
1:A:79:ARG:HH22	1:A:94:THR:HG21	1.50	0.75
1:C:293[B]:ASN:OD1	1:C:335:ILE:HD11	1.87	0.75
1:A:93:ILE:HD11	1:A:121:ARG:HG3	1.69	0.74
2:B:83:PHE:O	2:B:86:ILE:HG22	1.87	0.74
4:F:3:THR:HG23	4:F:38:ASN:H	1.53	0.73
2:B:156:LYS:HE2	3:E:76:ARG:NE	2.03	0.73
2:D:180:THR:HG22	2:D:182:VAL:H	1.52	0.73
4:F:278:THR:HG22	4:F:280:GLU:H	1.53	0.72
2:B:268:PHE:HB3	2:B:378:ILE:CG2	2.19	0.72
2:D:133:GLN:HE21	2:D:252:LEU:H	1.36	0.72
2:B:6:HIS:CD2	2:B:21:TRP:HE1	2.08	0.72
1:A:343:PHE:HB2	1:A:349:THR:HG22	1.72	0.72
1:A:70:LEU:HD23	1:A:145:THR:OG1	1.90	0.71
2:B:378:ILE:N	2:B:378:ILE:HD12	2.05	0.71
2:D:180:THR:CG2	2:D:182:VAL:HG22	2.20	0.71
1:A:104:ALA:HB2	1:A:413:MET:HE3	1.73	0.71
2:B:325:MET:HG3	2:B:355:VAL:HG21	1.74	0.69
2:B:370:GLY:O	2:B:371:LEU:HD12	1.92	0.69
2:D:147:SER:O	2:D:151:THR:HG23	1.92	0.69
2:B:221:THR:HG23	2:B:221:THR:O	1.92	0.69
2:D:324:SER:OG	2:D:327:GLU:HB2	1.92	0.68
2:B:165:ILE:HG21	2:B:252:LEU:HB3	1.74	0.68
2:D:75:MET:HG2	2:D:92:PHE:HD2	1.58	0.68
2:D:118:VAL:HG11	2:D:153:LEU:HD21	1.75	0.67
1:C:119:LEU:HD11	1:C:156:ARG:HB3	1.77	0.67
4:F:100:ILE:HD13	4:F:173:ILE:HD13	1.76	0.67
2:D:286:LEU:HD13	2:D:373:MET:HG2	1.77	0.66
2:D:385:GLN:HB2	2:D:429:VAL:HG13	1.78	0.65
4:F:248:GLU:HG2	4:F:249:TYR:CE1	2.30	0.65
1:A:40:LYS:HE3	1:A:40:LYS:CA	2.26	0.65
1:A:104:ALA:HB2	1:A:413:MET:CE	2.27	0.65
1:A:386:GLU:O	1:A:390:ARG:HG3	1.97	0.65
4:F:298:ILE:HD12	4:F:302:ILE:HD13	1.78	0.65
2:B:378:ILE:HD12	2:B:378:ILE:H	1.61	0.64
4:F:149:ALA:O	4:F:150:LYS:HD2	1.97	0.63
1:A:286:LEU:HD22	1:A:286:LEU:H	1.63	0.63
1:A:339:ARG:HB2	1:A:341:ILE:HD11	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:174:SER:HB2	2:D:207:GLU:HB2	1.80	0.63
2:B:268:PHE:HB3	2:B:378:ILE:HG23	1.81	0.63
1:C:254:GLU:HG2	1:C:352:LYS:HE2	1.80	0.63
1:A:81:GLY:O	1:A:84:ARG:HG2	1.99	0.63
3:E:57:ALA:HA	3:E:60:ARG:NH1	2.12	0.63
1:A:344:VAL:HG22	1:A:347:CYS:HB2	1.82	0.62
2:D:56:ALA:HB3	2:D:60:LYS:HB2	1.81	0.62
4:F:149:ALA:HB2	4:F:182:ILE:HG12	1.82	0.62
1:A:285:GLN:HG3	1:A:372[B]:GLN:OE1	1.99	0.62
2:D:59:ASN:O	2:D:59:ASN:ND2	2.28	0.61
2:D:136:GLN:HA	2:D:167:ASN:O	2.00	0.61
1:A:40:LYS:HE3	1:A:40:LYS:HA	1.82	0.61
2:D:118:VAL:CG1	2:D:153:LEU:HD21	2.31	0.61
1:A:177:VAL:HG12	5:A:501:GTP:O2'	2.01	0.61
2:B:316:ALA:HB1	9:B:503:V1O:C16	2.31	0.61
1:A:2:ARG:HB3	1:A:133:GLN:HG2	1.83	0.61
2:B:378:ILE:HD11	9:B:503:V1O:BR	2.57	0.60
2:D:403:ALA:HB1	2:D:404:PHE:HD1	1.66	0.60
1:A:291:ILE:HD13	1:A:373:ARG:HG3	1.82	0.60
1:C:187:SER:HB3	1:C:391:LEU:HD21	1.83	0.60
4:F:148:ILE:HB	4:F:162:ILE:HG23	1.82	0.60
4:F:237:THR:HG21	4:F:249:TYR:O	2.01	0.60
2:B:119:LEU:HD11	2:B:156:LYS:HB3	1.82	0.60
1:C:93:ILE:HD11	1:C:121:ARG:HG3	1.84	0.60
1:A:21:TRP:CZ3	1:A:63:PRO:HB3	2.36	0.60
1:A:7:ILE:HG23	1:A:66[B]:VAL:HG13	1.84	0.59
1:A:279:GLU:HA	1:A:279:GLU:OE1	2.02	0.59
2:B:69:ASP:O	2:B:94:PHE:HA	2.03	0.59
2:D:171:VAL:HA	2:D:204:ILE:O	2.03	0.59
4:F:195:GLY:HA3	4:F:197:ARG:HD3	1.83	0.59
1:A:136[A]:LEU:HD23	1:A:167:LEU:HB2	1.84	0.59
2:D:20:PHE:HB2	2:D:235:MET:HE2	1.83	0.58
2:D:36:TYR:CE2	2:D:46:LEU:HD11	2.37	0.58
2:D:393:GLU:O	2:D:396:THR:HG22	2.02	0.58
2:D:179:ASP:HB2	8:D:501:GDP:H3'	1.85	0.58
1:A:166:LYS:HE2	1:A:197:HIS:O	2.03	0.58
1:A:336:LYS:C	1:A:336:LYS:HD3	2.23	0.58
4:F:3:THR:HG23	4:F:38:ASN:N	2.17	0.58
1:A:2:ARG:CB	1:A:133:GLN:HG2	2.33	0.58
4:F:100:ILE:HD11	4:F:180:HIS:HB2	1.84	0.58
2:B:318:ILE:HG12	9:B:503:V1O:BR	2.59	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:6:MET:HG2	3:E:24:LEU:CD2	2.34	0.58
2:D:223:THR:HG22	2:D:226:ASP:OD2	2.04	0.57
4:F:213:ILE:HG22	4:F:378[B]:LEU:HD12	1.84	0.57
1:A:336:LYS:HD3	1:A:336:LYS:O	2.04	0.57
4:F:374:ILE:HD11	4:F:375:PHE:CE2	2.40	0.57
2:D:164:ARG:HG2	2:D:164:ARG:HH11	1.67	0.57
2:D:209:LEU:HD21	2:D:302:MET:HG3	1.87	0.57
1:A:151:SER:HB2	1:A:193:THR:CG2	2.35	0.57
2:D:269[B]:MET:CE	2:D:305:CYS:HB2	2.35	0.57
2:D:180:THR:HG21	2:D:182:VAL:HG22	1.87	0.57
4:F:3:THR:OG1	4:F:30:LEU:HD11	2.04	0.57
2:B:13:GLY:CA	2:B:138[B]:THR:HG22	2.27	0.56
4:F:259:GLY:O	4:F:261:GLU:HG3	2.05	0.56
1:A:344:VAL:CG2	1:A:347:CYS:HB2	2.35	0.56
1:C:277:SER:OG	1:C:280:LYS:HG3	2.05	0.56
2:D:172:MET:HE2	2:D:172:MET:N	2.21	0.56
2:D:212:ILE:HG22	2:D:217:LEU:HD23	1.86	0.56
1:A:344:VAL:HG21	1:A:346:TRP:CE2	2.41	0.56
2:D:141:LEU:HD22	2:D:190:SER:HB3	1.87	0.56
3:E:9:ILE:HD13	3:E:23:ILE:HD12	1.87	0.56
2:B:295:MET:HE3	2:B:296:PHE:CE1	2.40	0.56
4:F:278:THR:HG22	4:F:280:GLU:N	2.19	0.56
2:D:113:GLU:OE2	2:D:113:GLU:HA	2.06	0.56
2:D:103:TRP:CE3	2:D:189:LEU:HD13	2.41	0.55
2:D:74:THR:O	2:D:78:VAL:HG13	2.06	0.55
4:F:304:THR:HG21	4:F:311:SER:HB2	1.87	0.55
2:B:102:ASN:HB3	2:B:105[A]:LYS:HG3	1.88	0.55
2:D:133:GLN:NE2	2:D:252:LEU:H	2.04	0.55
4:F:146:VAL:HG22	4:F:164:SER:OG	2.06	0.55
2:D:161:TYR:HB3	2:D:164:ARG:HG3	1.88	0.55
2:D:284:ARG:NH2	2:D:285:ALA:H	2.04	0.55
2:D:180:THR:HG22	2:D:182:VAL:HG22	1.88	0.55
2:B:202:TYR:CE1	2:B:238:VAL:HG21	2.42	0.55
4:F:280:GLU:HA	4:F:284[A]:LEU:HB2	1.89	0.55
2:D:75:MET:HG2	2:D:92:PHE:CD2	2.40	0.54
4:F:100:ILE:HD12	4:F:100:ILE:O	2.07	0.54
1:A:31:GLN:HB3	1:A:32:PRO:HD2	1.89	0.54
4:F:213:ILE:CG2	4:F:378[B]:LEU:HD12	2.38	0.54
2:B:86:ILE:HG12	2:B:86:ILE:O	2.08	0.54
2:B:31:ASP:HB2	2:B:32:PRO:CD	2.37	0.54
2:B:295:MET:SD	2:B:375:ALA:HB1	2.48	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:33:ASP:OD1	1:A:35:GLN:HG2	2.08	0.54
4:F:374:ILE:HD11	4:F:375:PHE:CZ	2.43	0.54
1:A:172:TYR:HB3	1:A:205:ASP:HA	1.90	0.53
3:E:6:MET:HG2	3:E:24:LEU:HD22	1.90	0.53
2:B:319:PHE:HB2	2:B:355:VAL:HG12	1.90	0.53
4:F:49:PHE:HA	4:F:52:LEU:HD12	1.89	0.53
2:B:318:ILE:HA	2:B:354:ALA:O	2.09	0.53
1:C:154:MET:HG3	1:C:194[A]:THR:HG23	1.90	0.53
2:B:56:ALA:HB3	2:B:60:LYS:HG2	1.91	0.53
1:A:433:GLU:O	1:A:437:VAL:HB	2.08	0.53
2:B:67:LEU:N	2:B:67:LEU:HD12	2.24	0.53
2:B:69:ASP:HB2	2:B:75:MET:HE3	1.91	0.53
2:D:218:LYS:O	2:D:219:LEU:HD23	2.09	0.53
2:D:164:ARG:HG2	2:D:164:ARG:NH1	2.24	0.53
2:B:75:MET:HG3	2:B:94:PHE:HD1	1.75	0.53
2:B:158[B]:ARG:CZ	3:E:68:LEU:HD11	2.38	0.52
2:B:316:ALA:HB1	9:B:503:V1O:O3	2.08	0.52
4:F:61:LEU:HD11	4:F:312:PHE:HD1	1.74	0.52
2:D:34:GLY:CA	2:D:86:ILE:HD11	2.38	0.52
2:D:50:ASN:H	2:D:50:ASN:ND2	2.06	0.52
1:A:209:ILE:HG23	1:A:230:LEU:HD23	1.90	0.52
1:A:283:HIS:HD2	1:A:284:GLU:O	1.92	0.52
1:C:96:LYS:HB2	1:C:96:LYS:NZ	2.25	0.52
1:C:271:THR:HG23	1:C:300:ASN:O	2.10	0.52
2:D:286:LEU:HD12	2:D:286:LEU:O	2.09	0.52
4:F:128:ARG:CZ	4:F:170:LEU:HD22	2.40	0.52
1:C:21:TRP:CZ3	1:C:63:PRO:HB3	2.45	0.52
1:C:147:SER:HB2	1:C:190:THR:HB	1.91	0.52
4:F:100:ILE:HA	4:F:126:ASP:HB2	1.90	0.52
1:C:99:ALA:HB3	1:C:144:GLY:HA3	1.92	0.52
2:D:220:THR:O	2:D:222:PRO:HD3	2.09	0.52
2:B:124:LYS:HD3	2:B:125:GLU:HG2	1.92	0.51
2:B:200:GLU:OE2	2:B:256:ALA:HB2	2.10	0.51
2:D:21:TRP:CZ3	2:D:63:PRO:HB3	2.44	0.51
4:F:204:TRP:CZ2	4:F:338:CYS:HA	2.45	0.51
1:A:18:ASN:OD1	1:A:78:VAL:HG22	2.10	0.51
3:E:57:ALA:HA	3:E:60:ARG:HH11	1.75	0.51
4:F:242:ASN:O	4:F:246:GLN:HG2	2.11	0.51
1:C:192:HIS:HD1	1:C:424:ASP:CB	2.24	0.51
2:D:372:LYS:HD3	2:D:373:MET:HE3	1.93	0.51
2:B:22[A]:GLU:HG2	2:B:83:PHE:CD1	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:79:ARG:HG2	1:C:92:LEU:HD12	1.92	0.51
4:F:102:PRO:HB3	4:F:173:ILE:CG2	2.40	0.51
2:B:220:THR:O	2:B:222:PRO:HD3	2.11	0.51
2:D:20:PHE:HB2	2:D:235:MET:CE	2.41	0.51
2:D:75:MET:SD	2:D:94:PHE:HB3	2.51	0.51
2:D:248:LEU:HD12	2:D:354:ALA:HB2	1.93	0.51
4:F:168:GLU:O	4:F:172:PHE:HB2	2.11	0.51
2:B:67:LEU:HD22	2:B:92:PHE:CE2	2.46	0.50
2:B:105[A]:LYS:HA	2:B:109:THR:OG1	2.11	0.50
2:D:403:ALA:HB1	2:D:404:PHE:CD1	2.45	0.50
1:A:133:GLN:OE1	1:A:251:ASP:HB2	2.12	0.50
1:A:401:LYS:HE3	2:B:438:ALA:HB1	1.93	0.50
2:B:141:LEU:HD12	2:B:172:MET:SD	2.52	0.50
1:A:88:HIS:CE1	1:A:90:GLU:HG3	2.47	0.50
2:B:276:THR:HG21	2:B:371:LEU:HD11	1.93	0.50
2:B:306:ASP:HB3	2:B:309:HIS:ND1	2.25	0.50
3:E:9:ILE:HD13	3:E:23:ILE:CD1	2.40	0.50
2:B:180:THR:O	2:B:183:GLU:HG3	2.12	0.50
2:D:176:LYS:HD3	2:D:210:TYR:CD2	2.46	0.50
2:B:112:ALA:O	2:B:115:VAL:HG12	2.12	0.50
1:C:180:ALA:HB3	1:C:183:GLU:HG3	1.93	0.50
1:C:75:ILE:HD12	1:C:94:THR:HG22	1.93	0.50
1:C:245:ASP:N	1:C:245:ASP:OD1	2.42	0.50
1:C:176:GLN:HE22	1:C:207:GLU:HG3	1.77	0.50
1:A:265:ILE:O	1:A:265:ILE:HG22	2.12	0.49
1:A:297:GLU:OE2	4:F:306:HIS:ND1	2.44	0.49
1:C:177:VAL:HG12	1:C:177:VAL:O	2.12	0.49
2:B:174:SER:HB2	2:B:207:GLU:HB2	1.93	0.49
2:D:31:ASP:HB2	2:D:32:PRO:CD	2.42	0.49
3:E:81:GLU:O	3:E:84[B]:GLN:HG2	2.12	0.49
3:E:135:LYS:HE2	3:E:139:LEU:HD11	1.94	0.49
2:D:269[B]:MET:HE1	2:D:305:CYS:HB2	1.94	0.49
4:F:219:GLY:HA3	4:F:264:PHE:CZ	2.48	0.49
4:F:246:GLN:O	4:F:250:SER:OG	2.30	0.49
1:A:40:LYS:HE3	1:A:40:LYS:O	2.11	0.49
4:F:198:LYS:HG2	4:F:199:PHE:H	1.77	0.49
1:A:103:TYR:CD2	1:A:148:GLY:HA2	2.48	0.49
2:B:425:MET:O	2:B:429:VAL:HG23	2.12	0.49
1:C:210:TYR:CZ	1:C:222:PRO:HD2	2.47	0.49
2:B:318:ILE:CG1	9:B:503:VIO:BR	3.16	0.49
4:F:91:CYS:C	4:F:93:TRP:H	2.16	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:283:HIS:CD2	1:A:284:GLU:O	2.65	0.49
1:A:187:SER:HB3	1:A:391:LEU:HD21	1.95	0.48
4:F:14:TYR:HB3	4:F:41:LEU:HD13	1.95	0.48
4:F:49:PHE:HA	4:F:52:LEU:CD1	2.43	0.48
2:B:105[B]:LYS:HA	2:B:109:THR:OG1	2.13	0.48
1:C:63:PRO:HG2	1:C:87:PHE:CE1	2.48	0.48
1:C:183:GLU:N	1:C:184:PRO:CD	2.77	0.48
2:D:119:LEU:O	2:D:123:ARG:HG3	2.12	0.48
2:D:318:ILE:HG22	11:D:601:HOH:O	2.13	0.48
4:F:102:PRO:HB3	4:F:173:ILE:HG22	1.93	0.48
2:B:75:MET:HG3	2:B:94:PHE:CD1	2.48	0.48
2:B:105[A]:LYS:HE2	2:B:411:GLU:OE2	2.13	0.48
2:B:346:TRP:HE1	2:B:438:ALA:HB3	1.78	0.48
2:D:278:ARG:CZ	2:D:278:ARG:HB3	2.43	0.48
2:B:36:TYR:CZ	2:B:46:LEU:HD11	2.48	0.48
2:B:320:ARG:HA	2:B:356:CYS:O	2.13	0.48
2:B:378:ILE:CD1	9:B:503:V1O:BR	3.17	0.48
2:B:28:HIS:NE2	2:B:243:ARG:HD2	2.29	0.48
4:F:128:ARG:NH2	4:F:170:LEU:HD22	2.29	0.48
2:D:153:LEU:O	2:D:157:ILE:HD12	2.14	0.48
2:D:286:LEU:HD13	2:D:373:MET:CG	2.41	0.48
4:F:26:GLN:NE2	4:F:361:LEU:HD22	2.27	0.48
1:A:67:PHE:HB2	1:A:92:LEU:HD12	1.96	0.48
1:A:119:LEU:HD11	1:A:156:ARG:HB3	1.94	0.48
2:B:156:LYS:HE2	3:E:76:ARG:HE	1.75	0.48
2:B:369:ARG:HD2	2:B:370:GLY:N	2.29	0.48
2:D:213:CYS:HA	2:D:217:LEU:HB2	1.96	0.48
1:A:210:TYR:CE2	1:A:214:ARG:HD3	2.49	0.47
4:F:243:HIS:NE2	4:F:253:TYR:OH	2.46	0.47
1:A:355:ILE:O	3:E:17:GLY:HA3	2.13	0.47
1:C:282:TYR:O	1:C:283:HIS:CB	2.62	0.47
2:D:275:LEU:O	2:D:277:SER:N	2.47	0.47
1:A:114:ILE:HD12	1:A:117:LEU:HB3	1.96	0.47
1:A:329:ASN:HD21	3:E:8:VAL:HG21	1.80	0.47
2:D:31:ASP:HB2	2:D:32:PRO:HD2	1.95	0.47
2:B:318:ILE:HG23	9:B:503:V1O:BR	2.69	0.47
4:F:34:ASN:OD1	4:F:35:PRO:HD2	2.14	0.47
1:A:23:LEU:O	1:A:27:GLU:HG3	2.14	0.47
2:B:260:VAL:O	2:B:260:VAL:HG22	2.14	0.47
2:D:103:TRP:HD1	2:D:147:SER:OG	1.98	0.47
1:A:141:PHE:CE1	1:A:170:SER:HB3	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:250:ALA:HB1	9:B:503:V1O:C5	2.45	0.47
2:B:258:ASN:HB3	9:B:503:V1O:C11	2.43	0.47
1:C:192:HIS:CG	1:C:421:ALA:HA	2.50	0.47
1:C:343:PHE:HB2	1:C:349:THR:HG22	1.95	0.47
2:D:218:LYS:C	2:D:219:LEU:HD23	2.34	0.47
4:F:238:CYS:SG	4:F:239:HIS:CD2	3.08	0.47
1:A:357:TYR:OH	3:E:18:GLN:NE2	2.47	0.47
2:B:133:GLN:OE1	2:B:251:ASP:HB2	2.14	0.47
2:B:221:THR:O	2:B:221:THR:CG2	2.61	0.47
2:B:286:LEU:N	2:B:286:LEU:HD12	2.29	0.47
1:A:187:SER:CB	1:A:391:LEU:HD21	2.45	0.46
2:D:406:HIS:HA	2:D:409:THR:OG1	2.15	0.46
1:A:177:VAL:HG11	1:A:224:TYR:HE1	1.80	0.46
1:A:404:PHE:CD1	2:B:261:PRO:HA	2.50	0.46
2:B:88:ARG:HH11	2:B:88:ARG:HG2	1.79	0.46
2:D:165:ILE:HG21	2:D:252:LEU:HB3	1.97	0.46
2:D:282:GLN:C	2:D:284:ARG:H	2.19	0.46
1:C:177:VAL:HG11	1:C:224:TYR:CE1	2.51	0.46
2:D:108:TYR:O	3:E:134:ARG:HD3	2.14	0.46
2:D:185:TYR:OH	2:D:398:MET:HB3	2.15	0.46
2:B:146:GLY:O	2:B:150:GLY:HA3	2.16	0.46
1:C:66:VAL:HG12	1:C:68[A]:VAL:HG23	1.98	0.46
1:A:154:MET:HG3	1:A:194:THR:HG23	1.98	0.46
4:F:91:CYS:O	4:F:93:TRP:N	2.47	0.46
2:B:339:ASN:HB3	2:B:342:TYR:HD2	1.81	0.46
4:F:267:PHE:CD2	4:F:279:LEU:HD13	2.51	0.46
1:A:40:LYS:HA	1:A:40:LYS:CE	2.43	0.46
1:A:151:SER:HB2	1:A:193:THR:HG22	1.97	0.46
1:A:158:SER:OG	1:A:166:LYS:HE3	2.16	0.46
1:A:335:ILE:C	1:A:335:ILE:HD12	2.36	0.46
1:A:285:GLN:HE21	1:A:373:ARG:NH1	2.13	0.46
2:B:181:VAL:HG13	1:C:258:ASN:ND2	2.31	0.46
2:B:318:ILE:O	2:B:318:ILE:HD12	2.16	0.46
4:F:216:TYR:CE1	4:F:374:ILE:HD13	2.51	0.46
2:B:305:CYS:O	2:B:307:PRO:HD3	2.15	0.45
2:D:297:ASP:OD2	2:D:299:LYS:HB2	2.16	0.45
2:D:387:LEU:HD23	2:D:387:LEU:C	2.36	0.45
4:F:131:PHE:C	4:F:131:PHE:CD2	2.89	0.45
4:F:189:PRO:HA	4:F:322:ASP:HA	1.98	0.45
1:A:214:ARG:HG2	1:A:219:ILE:O	2.16	0.45
1:A:117:LEU:HD11	1:A:121:ARG:HH11	1.81	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:106:GLY:O	2:D:149:MET:HB2	2.17	0.45
2:B:212:ILE:HG23	2:B:275:LEU:HD13	1.98	0.45
2:D:180:THR:CG2	2:D:181:VAL:N	2.79	0.45
1:A:411:GLU:OE1	1:A:411:GLU:HA	2.17	0.45
2:B:18:ALA:O	2:B:22[A]:GLU:HG3	2.17	0.45
1:C:76:ASP:O	1:C:80:THR:HG23	2.16	0.45
1:C:344:VAL:HG21	1:C:346:TRP:CE2	2.52	0.45
2:D:141:LEU:HD12	2:D:172:MET:SD	2.56	0.45
2:D:401:ARG:O	2:D:401:ARG:HG3	2.15	0.45
2:B:171:VAL:HA	2:B:204:ILE:O	2.17	0.45
1:C:69:ASP:O	1:C:94:THR:HA	2.17	0.45
1:C:282:TYR:O	1:C:283:HIS:HB2	2.17	0.45
2:D:357:ASP:O	2:D:359:PRO:HD3	2.17	0.45
2:D:48:ARG:NH1	2:D:244:PHE:O	2.50	0.45
3:E:9:ILE:HG12	3:E:21:GLU:HB3	1.99	0.45
1:A:5:ILE:HD12	1:A:132:LEU:HD11	1.99	0.44
1:A:21:TRP:CE3	1:A:63:PRO:HB3	2.51	0.44
1:C:2:ARG:HA	1:C:131:GLY:O	2.17	0.44
4:F:151:SER:HB2	4:F:180:HIS:CD2	2.52	0.44
2:D:181:VAL:HG22	2:D:398:MET:HE1	2.00	0.44
2:D:282:GLN:C	2:D:284:ARG:N	2.70	0.44
4:F:18:SER:HA	4:F:21:LEU:HD12	1.99	0.44
2:B:358:ILE:HD13	2:B:358:ILE:N	2.32	0.44
2:B:303:ALA:O	2:B:305:CYS:N	2.50	0.44
2:B:414[A]:ASP:OD1	2:B:416:MET:HB2	2.18	0.44
1:A:3:GLU:O	1:A:133:GLN:HG3	2.17	0.44
1:A:114:ILE:HD12	1:A:114:ILE:O	2.18	0.44
1:A:312:TYR:O	1:A:344:VAL:HG13	2.16	0.44
1:A:332:ILE:HD13	3:E:22:VAL:HG11	2.00	0.44
2:B:278:ARG:H	2:B:278:ARG:HG2	1.52	0.44
2:D:292:THR:CG2	2:D:335:VAL:HG21	2.44	0.44
2:D:3:GLU:O	2:D:133:GLN:HB3	2.17	0.44
1:A:188:ILE:HG13	1:A:425:MET:HG3	2.00	0.44
4:F:299:GLU:N	4:F:300:PRO:HD2	2.33	0.44
2:B:88:ARG:HG2	2:B:88:ARG:NH1	2.33	0.43
2:B:396:THR:O	2:B:400:ARG:HB2	2.18	0.43
1:C:115:ILE:HG23	1:C:116:ASP:N	2.33	0.43
1:C:177:VAL:HG12	5:C:501:GTP:O2'	2.18	0.43
4:F:340:GLN:OE1	4:F:340:GLN:HA	2.17	0.43
1:A:262:TYR:CE1	1:A:346:TRP:CH2	3.06	0.43
4:F:331:GLU:CD	10:F:401:ACP:H3B1	2.39	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:400:ARG:HA	2:B:400:ARG:NE	2.34	0.43
2:D:56:ALA:HB2	2:D:62:VAL:HG23	2.01	0.43
4:F:81:ILE:O	4:F:87:LEU:O	2.35	0.43
1:C:204:VAL:HG11	1:C:231:ILE:HG12	2.00	0.43
3:E:14:CYS:SG	3:E:15:THR:N	2.91	0.43
1:A:329:ASN:OD1	1:A:329:ASN:N	2.51	0.43
2:D:1:MET:O	2:D:131:CYS:HB3	2.18	0.43
2:B:136:GLN:HA	2:B:167:ASN:O	2.19	0.43
2:D:118:VAL:O	2:D:122:VAL:HG23	2.19	0.43
1:C:90:GLU:CD	1:C:90:GLU:H	2.23	0.43
2:D:269[B]:MET:HE3	2:D:305:CYS:HB2	2.01	0.43
2:D:295:MET:HG2	2:D:377:PHE:HB2	2.01	0.43
3:E:6:MET:HE3	3:E:22:VAL:HG21	2.01	0.43
3:E:130:ALA:C	3:E:134:ARG:HH21	2.22	0.43
1:C:119:LEU:HD11	1:C:156:ARG:CB	2.47	0.42
2:D:28:HIS:HA	2:D:45:GLN:HB3	2.00	0.42
4:F:226:GLU:HB2	4:F:238:CYS:HB3	2.00	0.42
1:A:2:ARG:HB2	1:A:133:GLN:HG2	2.01	0.42
1:A:262:TYR:HE1	1:A:346:TRP:CH2	2.38	0.42
3:E:9:ILE:HG13	3:E:10:GLU:HG3	2.00	0.42
1:A:70:LEU:CD2	1:A:145:THR:HG23	2.49	0.42
1:A:153:LEU:HD12	1:A:153:LEU:O	2.19	0.42
1:A:192:HIS:CG	1:A:421:ALA:HA	2.54	0.42
1:A:242:LEU:HD12	1:A:242:LEU:HA	1.89	0.42
2:B:113:GLU:H	2:B:113:GLU:HG2	1.47	0.42
2:B:288:VAL:N	2:B:289:PRO:CD	2.82	0.42
4:F:100:ILE:CD1	4:F:173:ILE:HD13	2.47	0.42
1:A:22:GLU:HG3	1:A:83:TYR:CE1	2.55	0.42
1:A:347:CYS:C	3:E:27:PRO:HB3	2.40	0.42
2:D:34:GLY:HA2	2:D:86:ILE:HD11	2.01	0.42
2:D:208:ALA:O	2:D:212:ILE:HG13	2.19	0.42
4:F:102:PRO:HA	4:F:173:ILE:HG22	2.00	0.42
1:A:255:PHE:O	1:A:259:LEU:HB2	2.19	0.42
2:B:68:VAL:HA	2:B:93:VAL:O	2.19	0.42
2:D:48:ARG:HG3	2:D:48:ARG:HH11	1.84	0.42
2:D:187:ALA:O	2:D:191:VAL:HG23	2.19	0.42
4:F:349:GLY:O	4:F:353:VAL:HG13	2.19	0.42
1:A:141:PHE:O	1:A:147:SER:HB3	2.19	0.42
3:E:76:ARG:NH1	3:E:76:ARG:HG2	2.35	0.42
1:A:7:ILE:HG23	1:A:66[B]:VAL:CG1	2.50	0.42
1:A:7:ILE:HD13	1:A:122:ILE:HD11	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:75:ILE:HD12	1:A:94:THR:HG22	2.01	0.42
1:A:313:MET:HG2	1:A:346:TRP:CH2	2.55	0.42
2:B:345:GLU:OE2	2:B:345:GLU:N	2.48	0.42
3:E:6:MET:HE3	3:E:6:MET:HB3	1.84	0.42
2:B:123:ARG:O	2:B:124:LYS:C	2.58	0.41
1:A:31:GLN:HB3	1:A:32:PRO:CD	2.48	0.41
2:B:268:PHE:HB3	2:B:378:ILE:HG22	2.01	0.41
1:C:306:ASP:OD1	1:C:308:ARG:HG2	2.20	0.41
4:F:37:PHE:CE1	4:F:40:MET:HB2	2.55	0.41
1:C:101:ASN:HD21	2:D:254:LYS:HE2	1.84	0.41
2:D:48:ARG:NH1	2:D:48:ARG:HG3	2.35	0.41
2:D:202:TYR:CZ	2:D:238:VAL:CG1	3.03	0.41
2:B:231:VAL:O	2:B:235:MET:HG3	2.20	0.41
1:C:343:PHE:CB	1:C:349:THR:HG22	2.51	0.41
4:F:216:TYR:CD2	4:F:346:LEU:HD13	2.55	0.41
1:A:43:GLY:HA2	1:A:55:GLU:HB3	2.02	0.41
1:A:76:ASP:O	1:A:80[A]:THR:HG22	2.20	0.41
2:D:2:ARG:NE	2:D:2:ARG:HA	2.36	0.41
2:D:40:SER:O	2:D:45:GLN:HG3	2.20	0.41
2:D:54:ASN:OD1	2:D:64:ARG:NE	2.53	0.41
4:F:88:SER:C	4:F:90:SER:N	2.72	0.41
2:B:312:TYR:CD1	2:B:381:SER:HB2	2.55	0.41
1:C:96:LYS:HB2	1:C:96:LYS:HZ3	1.86	0.41
4:F:280:GLU:HA	4:F:284[B]:LEU:HB2	2.03	0.41
2:D:282:GLN:HB2	2:D:283:TYR:H	1.58	0.41
1:A:119:LEU:HD12	1:A:156:ARG:NH2	2.35	0.41
1:C:177:VAL:O	1:C:177:VAL:CG1	2.69	0.41
4:F:242:ASN:ND2	10:F:401:ACP:O2B	2.51	0.41
3:E:90:ASN:O	3:E:94:ILE:HG13	2.21	0.41
1:C:46:ASP:OD1	1:C:46:ASP:N	2.53	0.41
2:D:156:LYS:HD3	2:D:156:LYS:HA	1.90	0.41
2:D:419:THR:HA	2:D:422:GLU:HB3	2.03	0.41
4:F:73:ARG:HB2	4:F:76[B]:SER:OG	2.21	0.41
1:A:47:ASP:O	1:A:50:ASN:HB2	2.21	0.40
2:D:282:GLN:O	2:D:284:ARG:N	2.54	0.40
1:A:10:GLY:O	1:A:14:VAL:HG23	2.21	0.40
1:A:21:TRP:CH2	1:A:63:PRO:HB3	2.56	0.40
2:B:145:THR:O	2:B:149:MET:HB3	2.21	0.40
2:B:320:ARG:O	2:B:373:MET:HA	2.21	0.40
2:B:56:ALA:HB3	2:B:60:LYS:HD3	2.03	0.40
2:B:192:HIS:CE1	2:B:424[A]:ASN:OD1	2.75	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:335:ILE:HG22	1:C:341:ILE:HD11	2.04	0.40
2:D:412:GLY:O	3:E:136:ASN:ND2	2.50	0.40
4:F:149:ALA:CB	4:F:182:ILE:HG12	2.51	0.40
1:C:195:LEU:HD12	1:C:195:LEU:HA	1.78	0.40
2:D:86:ILE:HD12	2:D:86:ILE:HA	1.81	0.40
2:D:113:GLU:OE2	2:D:113:GLU:CA	2.68	0.40
2:D:115:VAL:O	2:D:119:LEU:HG	2.21	0.40
2:D:136:GLN:O	2:D:136:GLN:HG3	2.21	0.40
4:F:147:TRP:HB2	4:F:169:LEU:HD11	2.03	0.40
2:D:32:PRO:HA	2:D:83:PHE:CD1	2.56	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	447/440 (102%)	439 (98%)	8 (2%)	0	100	100
1	C	448/440 (102%)	433 (97%)	14 (3%)	1 (0%)	47	73
2	B	437/431 (101%)	421 (96%)	13 (3%)	3 (1%)	22	46
2	D	433/431 (100%)	403 (93%)	28 (6%)	2 (0%)	29	54
3	E	119/121 (98%)	117 (98%)	2 (2%)	0	100	100
4	F	309/320 (97%)	294 (95%)	14 (4%)	1 (0%)	41	66
All	All	2193/2183 (100%)	2107 (96%)	79 (4%)	7 (0%)	41	66

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	283	HIS
2	D	276	THR

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Mol	Chain	Res	Type
2	B	278	ARG
2	B	281	GLN
2	B	304	ALA
2	D	282	GLN
4	F	92	THR

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	380/371 (102%)	365 (96%)	15 (4%)	32	61
1	C	381/371 (103%)	368 (97%)	13 (3%)	37	66
2	B	380/372 (102%)	360 (95%)	20 (5%)	22	48
2	D	376/372 (101%)	354 (94%)	22 (6%)	19	43
3	E	111/109 (102%)	109 (98%)	2 (2%)	59	83
4	F	293/289 (101%)	275 (94%)	18 (6%)	18	41
All	All	1921/1884 (102%)	1831 (95%)	90 (5%)	26	54

All (90) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	46	ASP
1	A	71	GLU
1	A	120	ASP
1	A	181	VAL
1	A	242	LEU
1	A	250	VAL
1	A	257	THR
1	A	284	GLU
1	A	285	GLN
1	A	302	MET
1	A	329	ASN
1	A	368	LEU

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Mol	Chain	Res	Type
1	A	390	ARG
1	A	413	MET
2	B	55	GLU
2	B	60	LYS
2	B	79	ARG
2	B	80	SER
2	B	90	ASP
2	B	124	LYS
2	B	139	HIS
2	B	147[A]	SER
2	B	147[B]	SER
2	B	155	SER
2	B	207	GLU
2	B	260	VAL
2	B	278	ARG
2	B	281	GLN
2	B	353	THR
2	B	355	VAL
2	B	357	ASP
2	B	377	PHE
2	B	387	LEU
2	B	400	ARG
1	C	18	ASN
1	C	71	GLU
1	C	124	LYS
1	C	164	LYS
1	C	170	SER
1	C	178	SER
1	C	195	LEU
1	C	221	ARG
1	C	285	GLN
1	C	338	LYS
1	C	342	GLN
1	C	347	CYS
1	C	430	LYS
2	D	50	ASN
2	D	59	ASN
2	D	68	VAL
2	D	70	LEU
2	D	71	GLU
2	D	76	ASP
2	D	94	PHE

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Mol	Chain	Res	Type
2	D	139	HIS
2	D	172	MET
2	D	247	GLN
2	D	248	LEU
2	D	278	ARG
2	D	282	GLN
2	D	283	TYR
2	D	284	ARG
2	D	286	LEU
2	D	298	SER
2	D	302	MET
2	D	323	MET
2	D	345	GLU
2	D	377	PHE
2	D	414	ASP
3	E	14	CYS
3	E	103	GLN
4	F	19	ARG
4	F	33	ASP
4	F	89	GLU
4	F	90	SER
4	F	91	CYS
4	F	131	PHE
4	F	162	ILE
4	F	192	LEU
4	F	196	HIS
4	F	197	ARG
4	F	211	TYR
4	F	240	LEU
4	F	272	MET
4	F	284[A]	LEU
4	F	284[B]	LEU
4	F	296	MET
4	F	311	SER
4	F	353	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	HIS
1	A	283	HIS
1	A	285	GLN

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Mol	Chain	Res	Type
2	B	136	GLN
2	B	385	GLN
2	B	433	GLN
2	D	133	GLN
2	D	281	GLN
2	D	300	ASN
4	F	239	HIS

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 12 ligands modelled in this entry, 6 are monoatomic - leaving 6 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	GDP	D	501	6	24,30,30	0.99	3 (12%)	30,47,47	0.68	1 (3%)
9	V1O	B	503	-	25,25,25	0.35	0	33,33,33	1.94	2 (6%)
10	ACP	F	401	-	27,33,33	0.92	1 (3%)	32,52,52	0.85	2 (6%)
5	GTP	C	501	-	26,34,34	1.01	2 (7%)	32,54,54	0.69	1 (3%)
5	GTP	A	501	6	26,34,34	1.00	2 (7%)	32,54,54	0.69	1 (3%)
8	GDP	B	501	6	24,30,30	1.00	2 (8%)	30,47,47	0.66	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. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	GDP	D	501	6	-	5/12/32/32	0/3/3/3
9	V1O	B	503	-	-	12/14/14/14	0/2/2/2
10	ACP	F	401	-	-	8/15/38/38	0/3/3/3
5	GTP	C	501	-	-	5/18/38/38	0/3/3/3
5	GTP	A	501	6	-	4/18/38/38	0/3/3/3
8	GDP	B	501	6	-	4/12/32/32	0/3/3/3

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	B	501	GDP	C5-C6	-2.73	1.41	1.47
8	D	501	GDP	C5-C6	-2.69	1.41	1.47
5	C	501	GTP	C5-C6	-2.69	1.42	1.47
5	A	501	GTP	C5-C6	-2.67	1.42	1.47
10	F	401	ACP	PB-O2B	-2.51	1.50	1.56
5	C	501	GTP	C8-N7	-2.14	1.31	1.35
8	D	501	GDP	C8-N7	-2.09	1.31	1.35
8	B	501	GDP	C8-N7	-2.09	1.31	1.35
5	A	501	GTP	C8-N7	-2.09	1.31	1.35
8	D	501	GDP	C5-C4	-2.00	1.38	1.43

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	B	503	V1O	C1-C2-C15	-7.79	111.03	121.53
9	B	503	V1O	C1-C2-C3	7.02	130.99	121.53
10	F	401	ACP	O1G-PG-C3B	-2.33	106.22	111.24
10	F	401	ACP	C5-C6-N6	2.28	123.82	120.35
5	C	501	GTP	O6-C6-C5	2.07	128.41	124.37
5	A	501	GTP	O6-C6-C5	2.04	128.37	124.37
8	D	501	GDP	O6-C6-C5	2.04	128.35	124.37
8	B	501	GDP	O6-C6-C5	2.03	128.34	124.37

There are no chirality outliers.

All (38) torsion outliers are listed below:

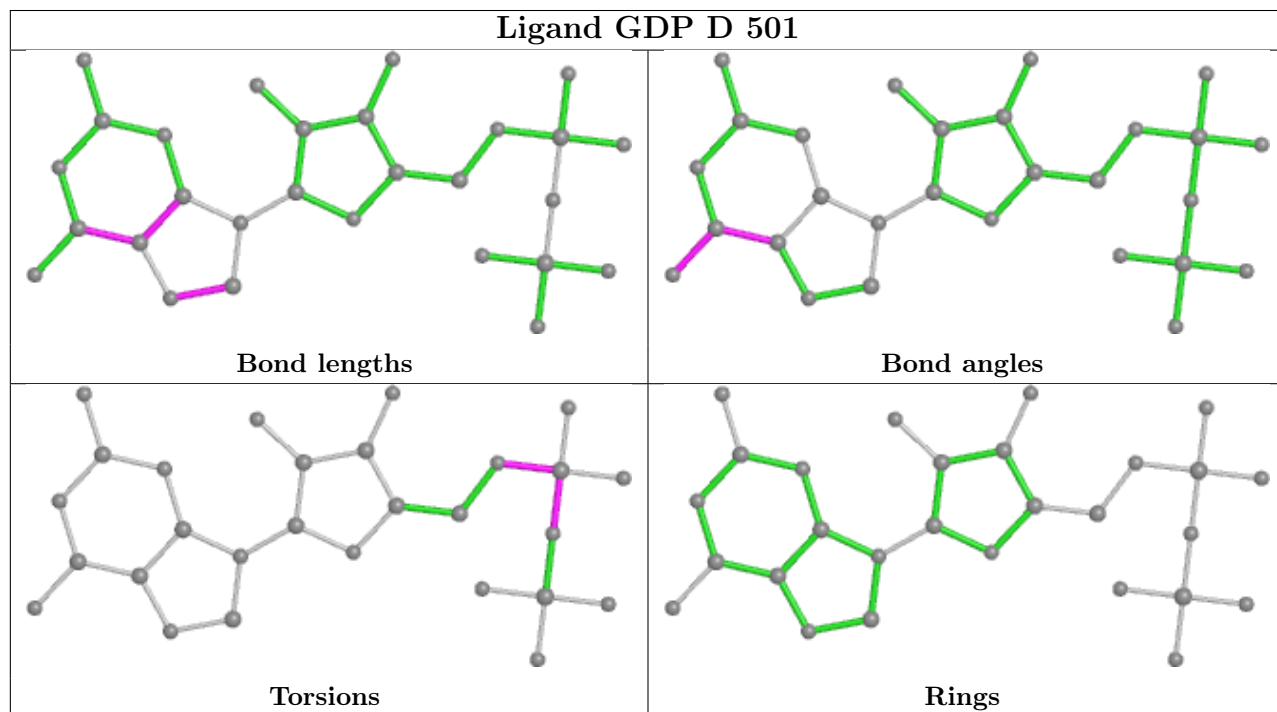
Mol	Chain	Res	Type	Atoms
5	A	501	GTP	C5'-O5'-PA-O1A
5	C	501	GTP	C5'-O5'-PA-O1A
8	B	501	GDP	C5'-O5'-PA-O1A
8	D	501	GDP	C5'-O5'-PA-O1A
10	F	401	ACP	PG-C3B-PB-O1B
10	F	401	ACP	PG-C3B-PB-O2B
10	F	401	ACP	PG-C3B-PB-O3A
9	B	503	V1O	C6-N-N1-C7
9	B	503	V1O	C2-C3-O-C4
10	F	401	ACP	O4'-C4'-C5'-O5'
9	B	503	V1O	C14-C6-N-N1
9	B	503	V1O	C13-C7-N1-N
9	B	503	V1O	C14-C15-O3-C16
9	B	503	V1O	C5-C6-N-N1
9	B	503	V1O	C8-C7-N1-N
10	F	401	ACP	C3'-C4'-C5'-O5'
9	B	503	V1O	C12-C10-O2-C11
9	B	503	V1O	C5-C3-O-C4
9	B	503	V1O	C2-C15-O3-C16
9	B	503	V1O	C9-C10-O2-C11
8	D	501	GDP	PB-O3A-PA-O1A
9	B	503	V1O	BR-C-C1-C2
5	A	501	GTP	C5'-O5'-PA-O3A
8	D	501	GDP	C5'-O5'-PA-O3A
5	C	501	GTP	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
8	B	501	GDP	PB-O3A-PA-O2A
8	D	501	GDP	PB-O3A-PA-O2A
5	C	501	GTP	C5'-O5'-PA-O3A
8	B	501	GDP	C5'-O5'-PA-O3A
10	F	401	ACP	C5'-O5'-PA-O3A
5	A	501	GTP	PB-O3A-PA-O2A
5	C	501	GTP	PB-O3A-PA-O1A
10	F	401	ACP	C5'-O5'-PA-O1A
10	F	401	ACP	C5'-O5'-PA-O2A

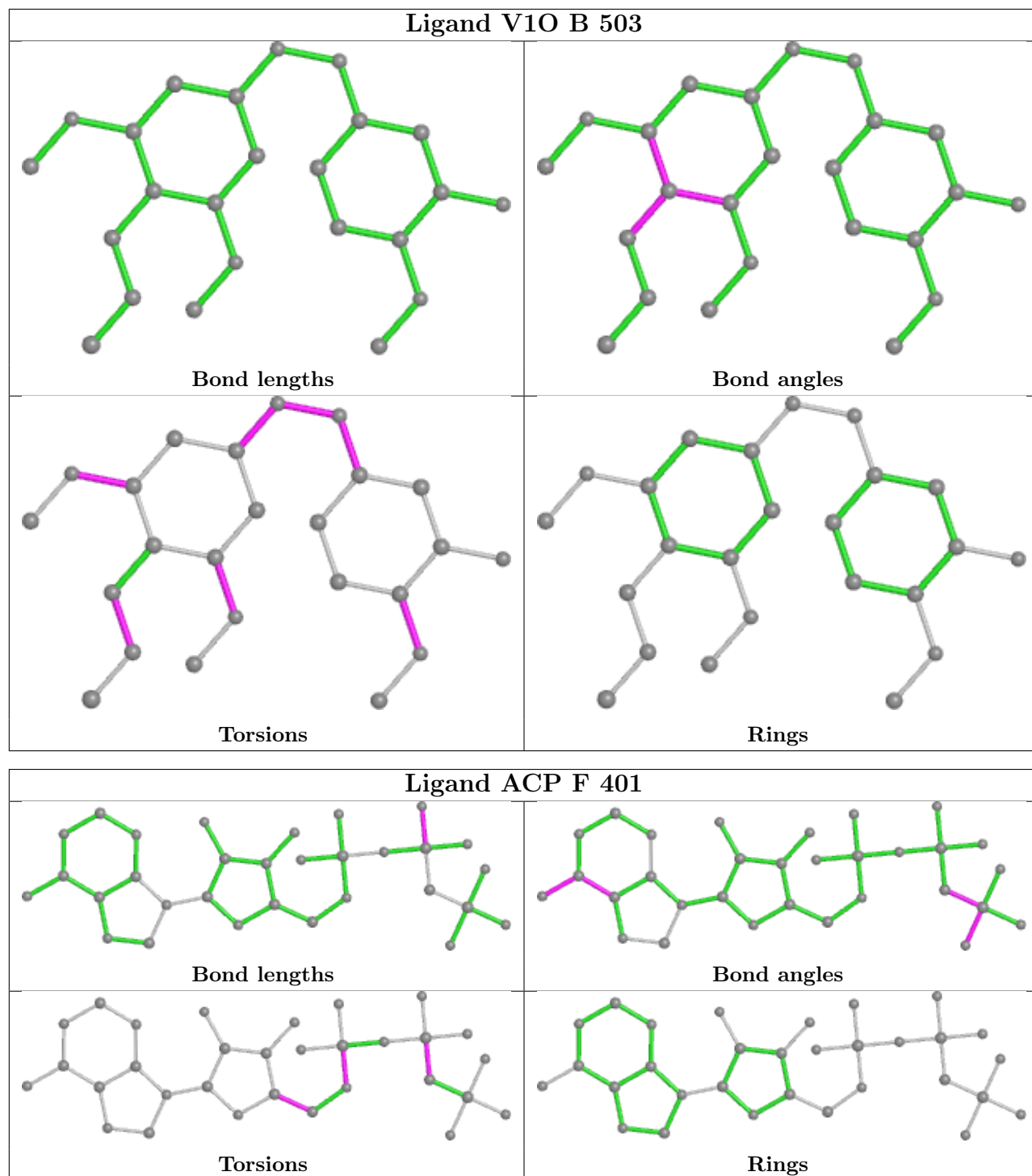
There are no ring outliers.

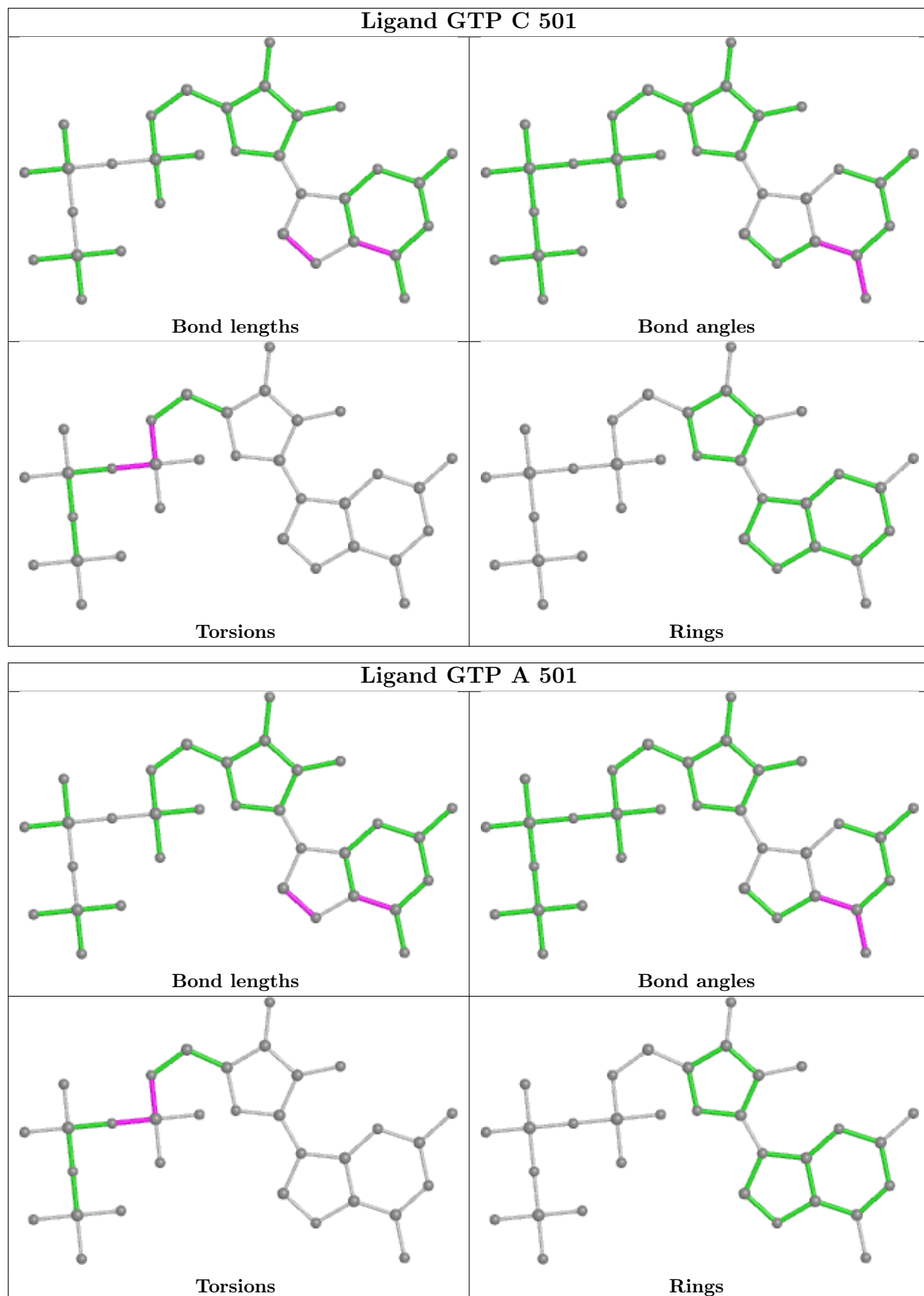
5 monomers are involved in 14 short contacts:

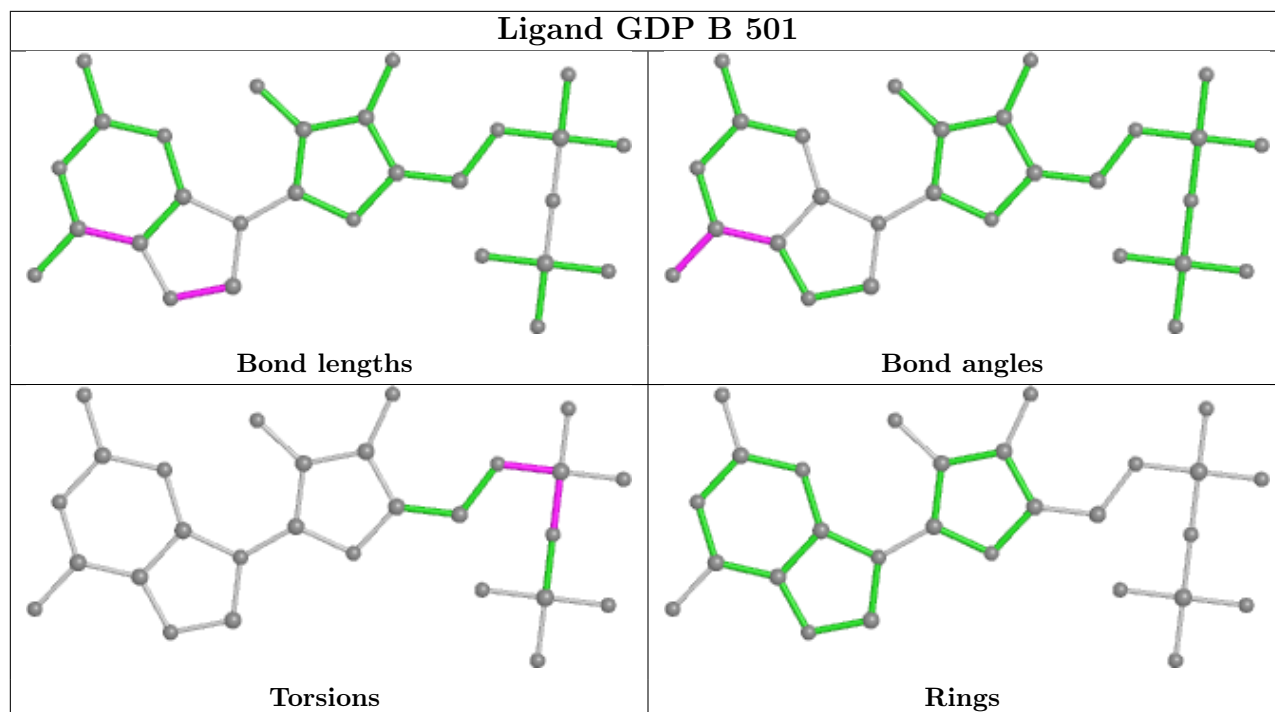
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	D	501	GDP	1	0
9	B	503	V1O	9	0
10	F	401	ACP	2	0
5	C	501	GTP	1	0
5	A	501	GTP	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

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	31.51
1	F	362:ALA	C	373:SER	N	19.14
1	F	102:PRO	C	125:THR	N	12.94
1	F	151:SER	C	162:ILE	N	12.03
1	F	136:ASN	C	144:GLY	N	10.25
1	F	173:ILE	C	179:VAL	N	8.39
1	F	231:ALA	C	235:ASP	N	6.80

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.

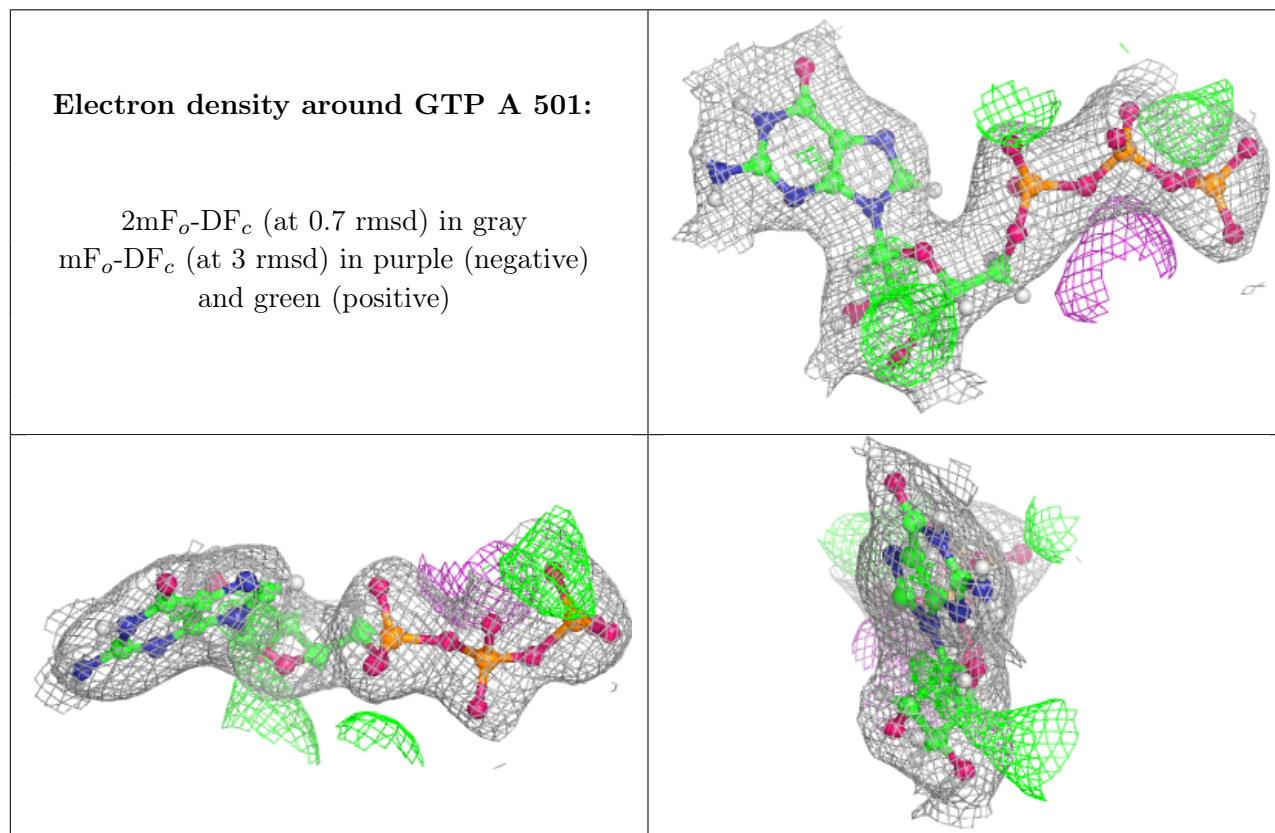
6.3 Carbohydrates [i](#)

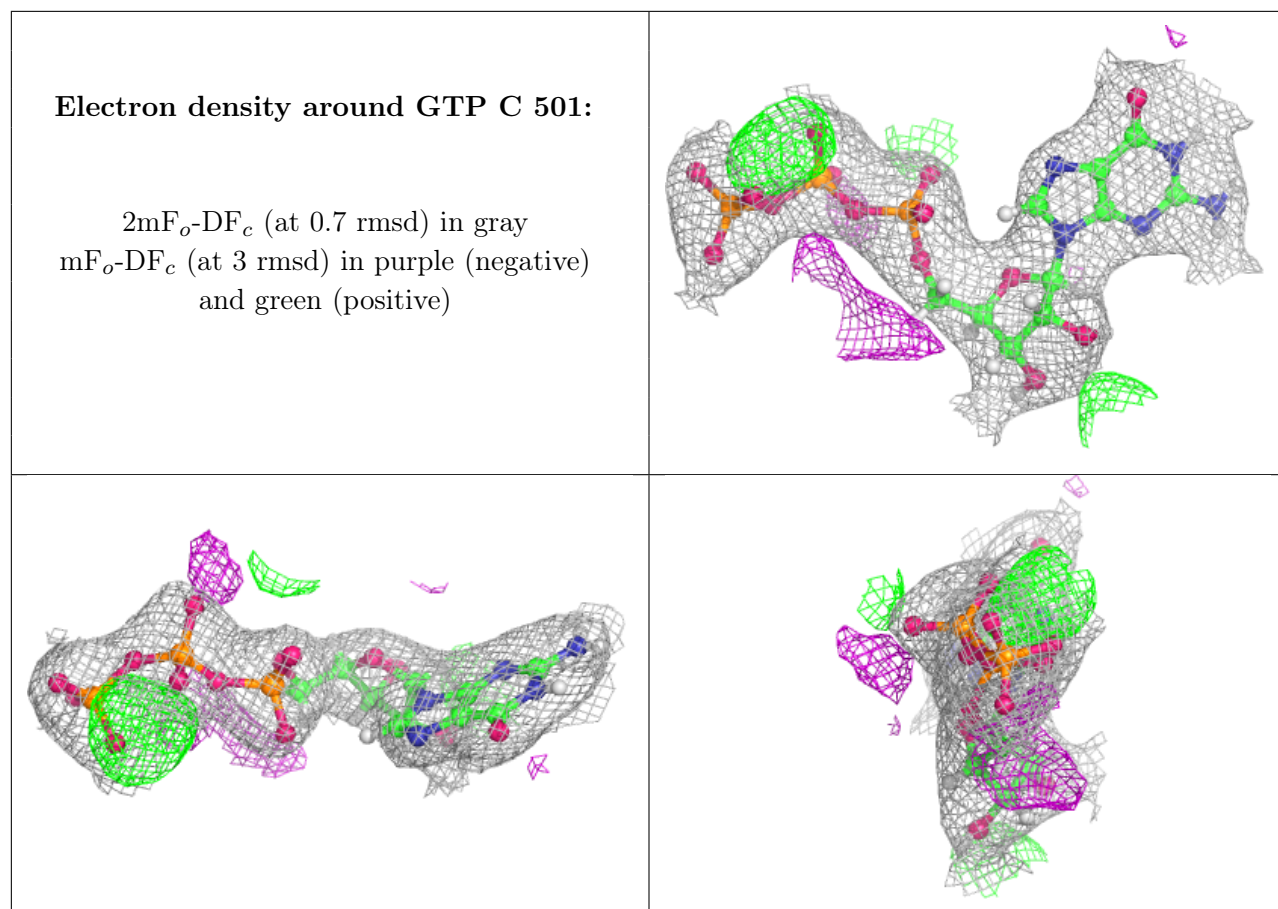
Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands [i](#)

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

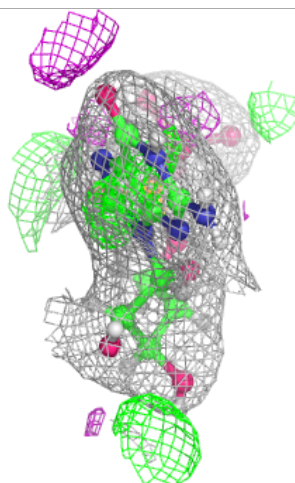
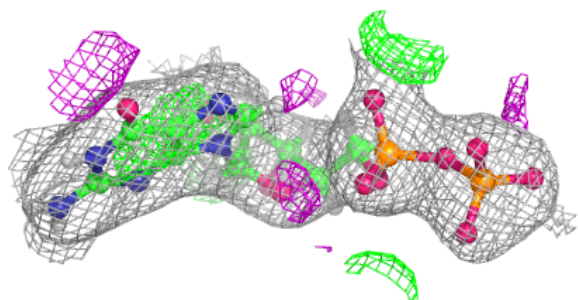
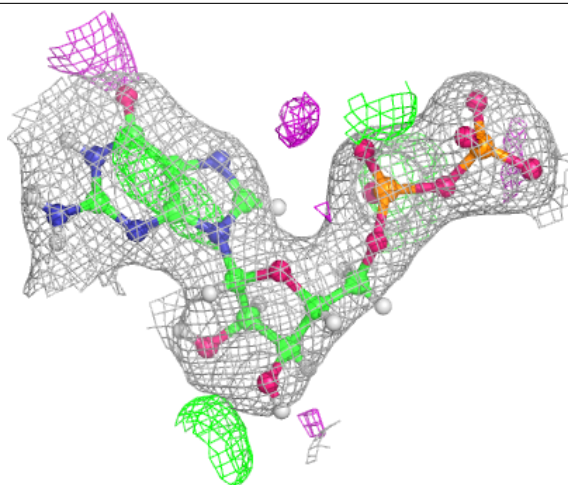
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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





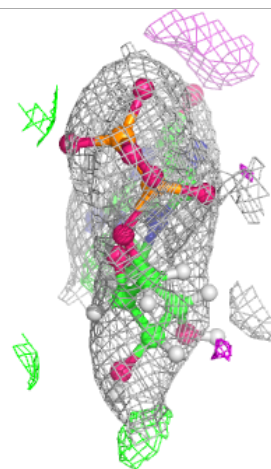
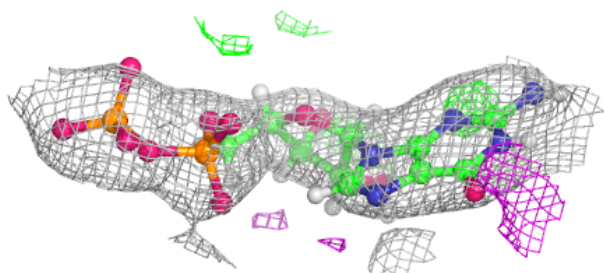
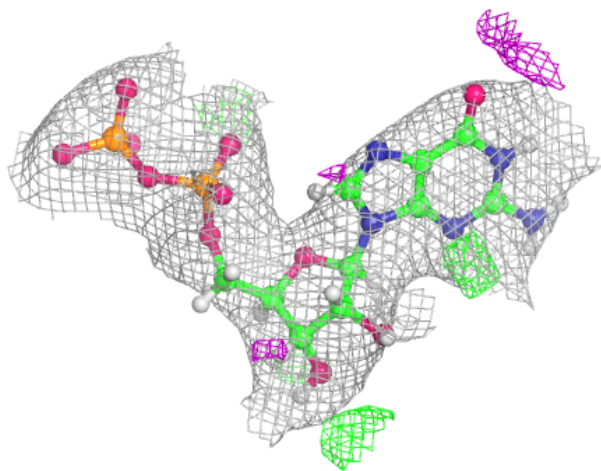
Electron density around GDP B 501:

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



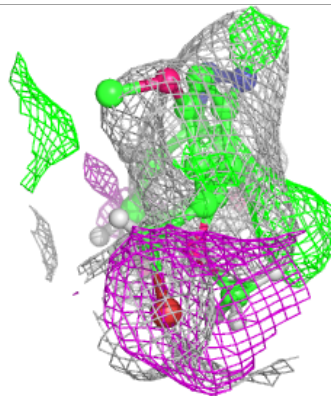
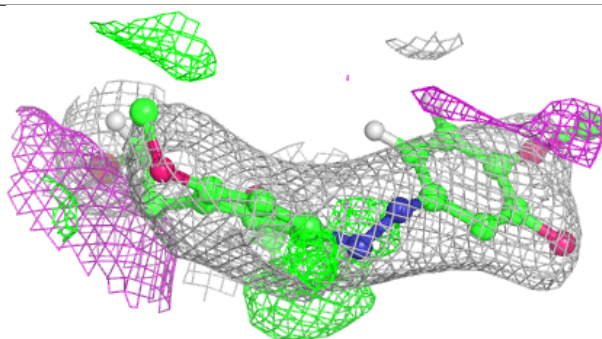
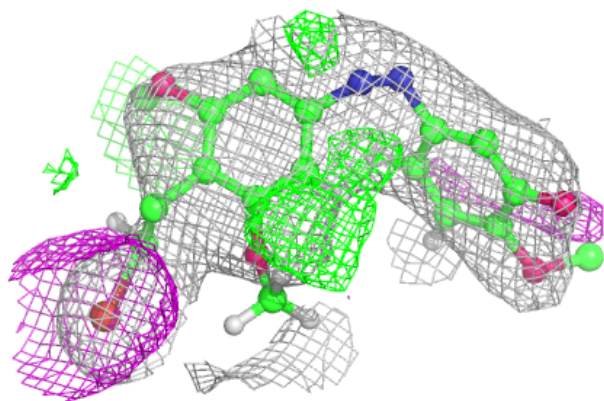
Electron density around GDP D 501:

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

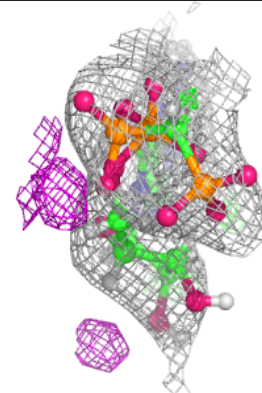
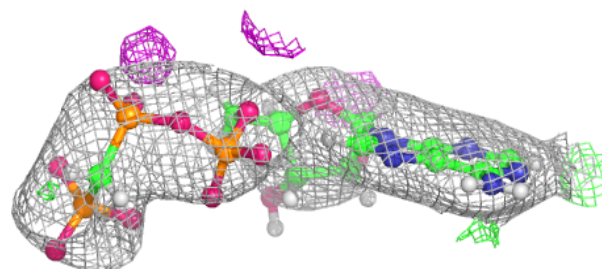
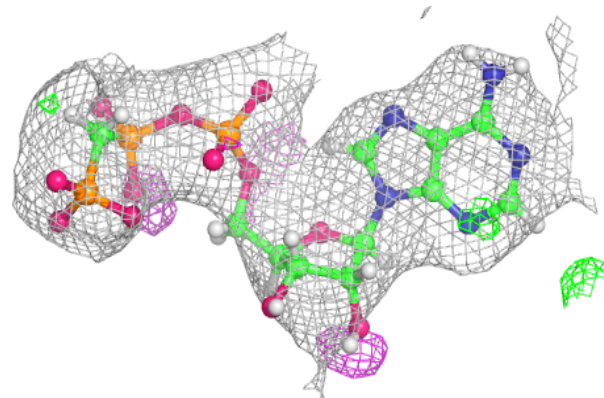


Electron density around V1O B 503:

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

**Electron density around ACP F 401:**

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



6.5 Other polymers

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