



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 5, 2022 – 02:22 pm GMT

PDB ID : 8A0L
Title : Tubulin-CW1-complex
Authors : Prota, A.E.; Diaz, J.F.; Steinmetz, M.O.; Oliva, M.A.
Deposited on : 2022-05-28
Resolution : 2.00 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

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 : 2.31.3
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0267
CCP4 : 7.1.010 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

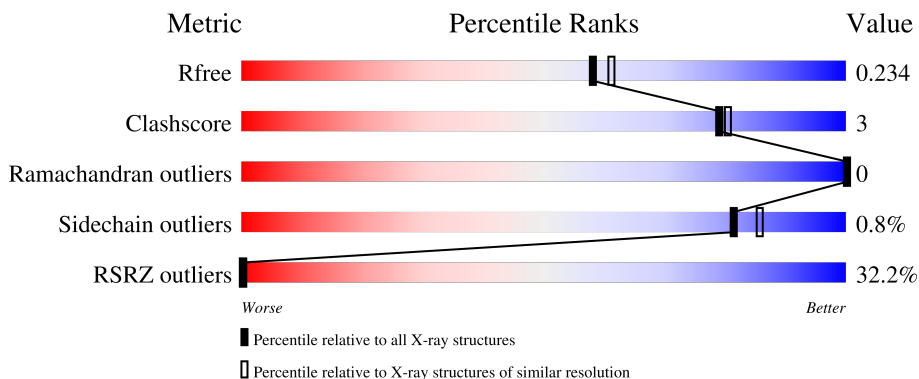
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	451	 26% 91% 6%
1	C	451	 13% 92% 6%
2	B	445	 14% 88% 8%
2	D	445	 34% 86% 10%
3	E	143	 24% 79% 7% 14%

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Mol	Chain	Length	Quality of chain
4	F	384	 <p>74% 80% 9% • 11%</p>

2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 18367 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Tubulin alpha-1B chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	437	Total	C	N	O	S	0	5	0
			3437	2180	582	652	23			
1	C	440	Total	C	N	O	S	0	7	0
			3465	2196	585	660	24			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	427	Total	C	N	O	S	0	9	0
			3398	2137	580	653	28			
2	D	427	Total	C	N	O	S	0	8	0
			3394	2136	576	652	30			

- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	E	123	Total	C	N	O	S	0	2	0
			1026	632	185	204	5			

There are 2 discrepancies between the modelled and reference sequences:

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

- Molecule 4 is a protein called Tubulin beta-2B chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	F	343	Total	C	N	O	S	0	2	0
			2814	1805	479	516	14			

There are 6 discrepancies between the modelled and reference sequences:

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

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



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

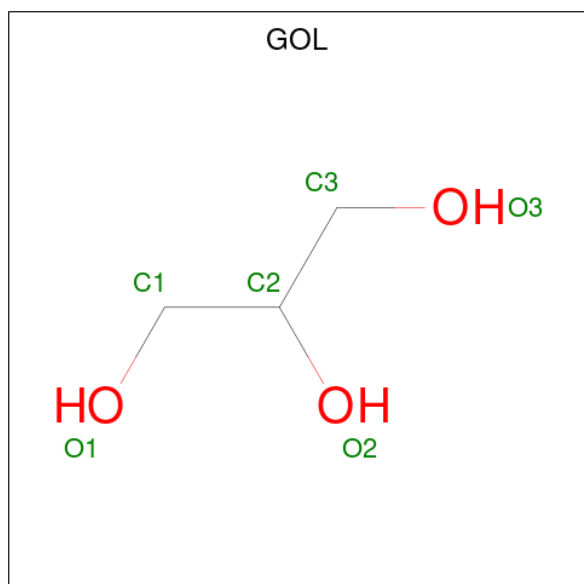
- Molecule 6 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

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

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

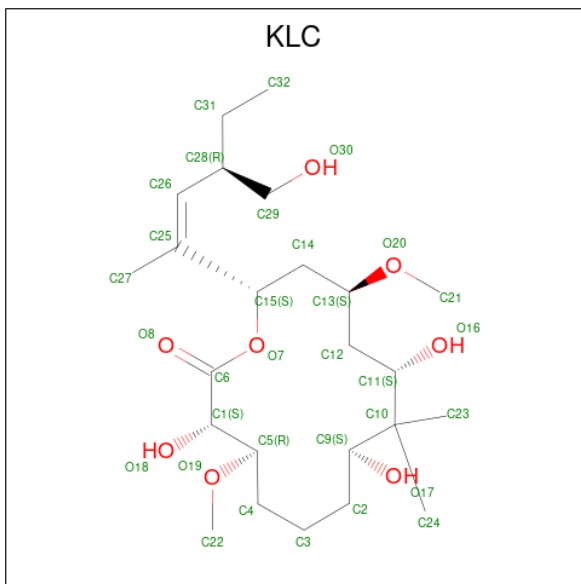
- Molecule 8 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total C O 6 3 3	0	0
8	A	1	Total C O 6 3 3	0	0

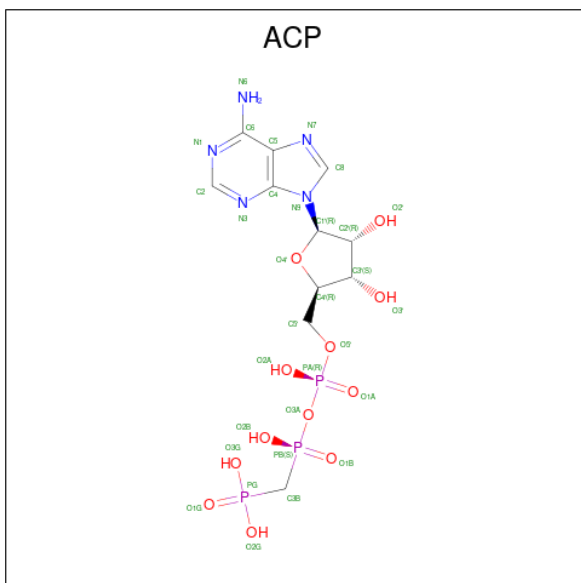
- Molecule 9 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C₁₀H₁₅N₅O₁₁P₂).

- Molecule 11 is (3 {S},4 {R},8 {S},10 {S},12 {S},14 {S})-14-[({Z},4 {R})-4-(hydroxymethyl)hex-2-en-2-yl]-4,12-dimethoxy-9,9-dimethyl-3,8,10-tris(oxidanyl)-1-oxacyclotetradecan-2-one (three-letter code: KLC) (formula: $C_{24}H_{44}O_8$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	B	1	Total	C O	0	0
			32	24 8		

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



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

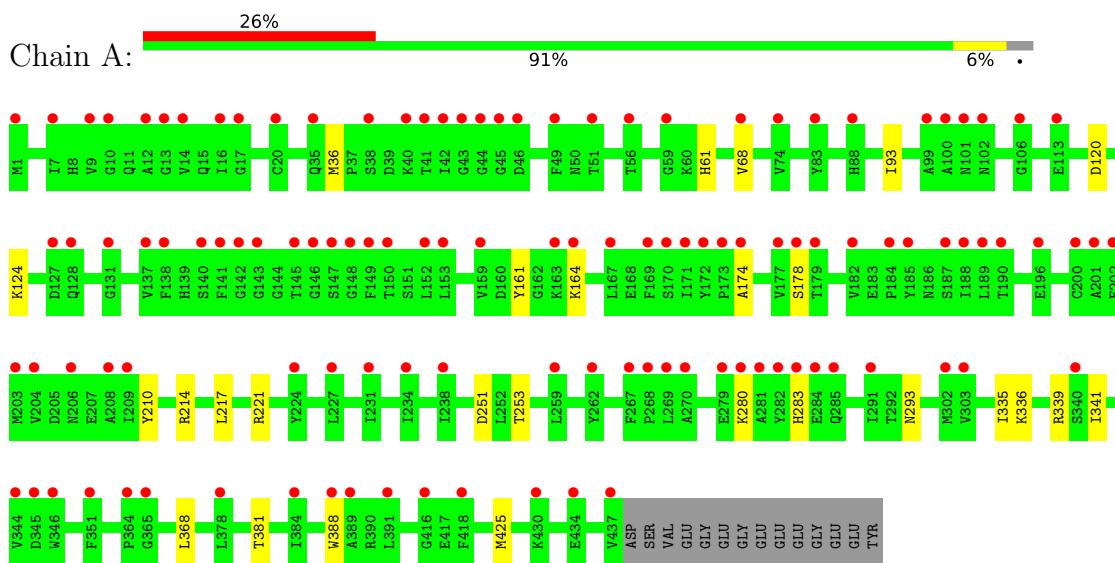
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	138	Total 138	O 138	0	0
13	B	129	Total 129	O 129	0	0
13	C	233	Total 233	O 233	0	0
13	D	68	Total 68	O 68	0	0
13	E	32	Total 32	O 32	0	0
13	F	18	Total 18	O 18	0	0

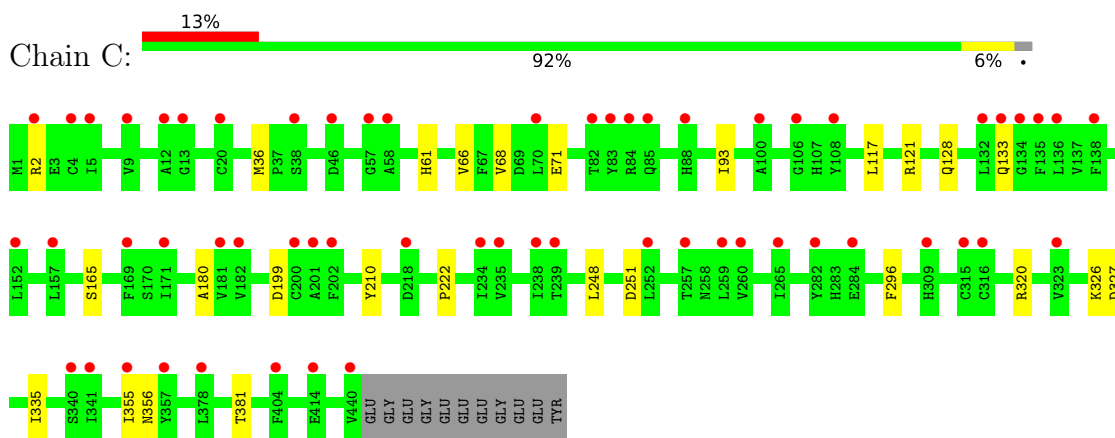
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

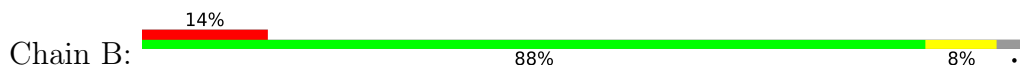
- Molecule 1: Tubulin alpha-1B chain

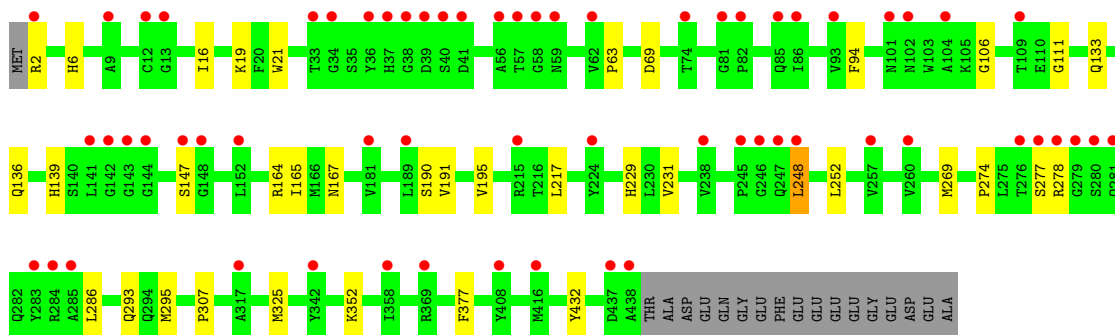


- Molecule 1: Tubulin alpha-1B chain

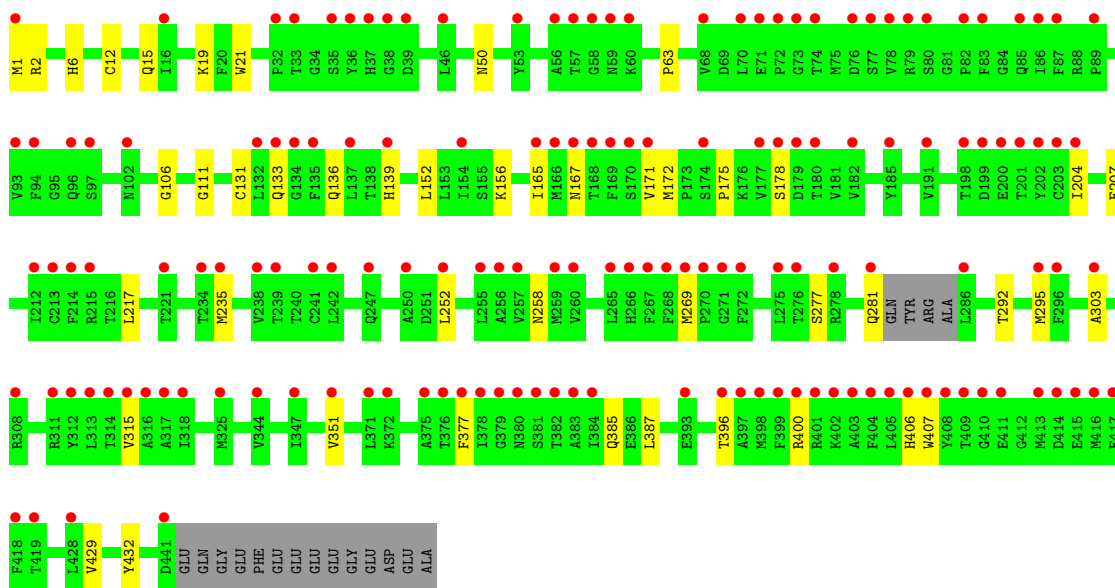
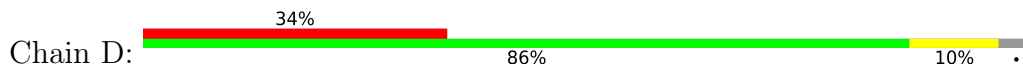


- Molecule 2: Tubulin beta-2B chain

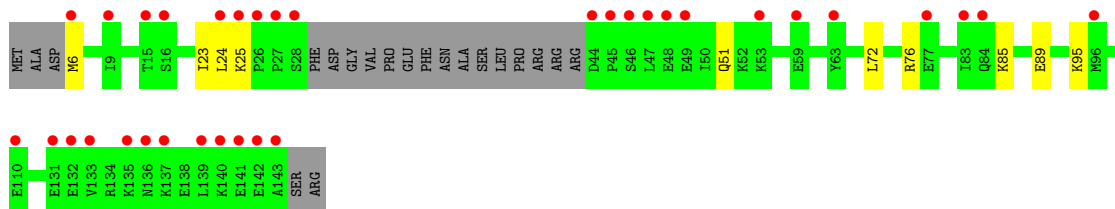
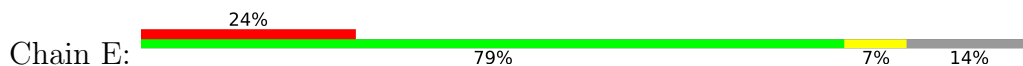




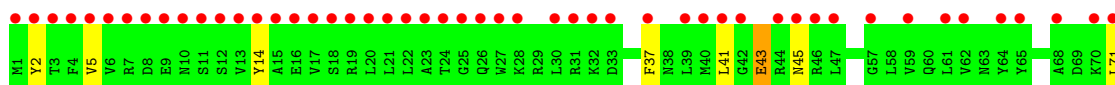
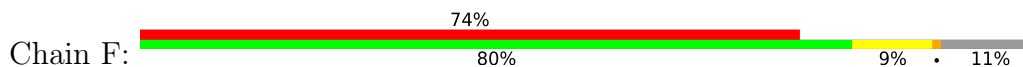
• Molecule 2: Tubulin beta-2B chain



• Molecule 3: Stathmin-4



• Molecule 4: Tubulin beta-2B chain



HIS	E324	L325	K326	V327	W328	L329	I330	E331	V332	N333	G334	A335	P336	A337	C338	A339	Q340	K341	L342	Y343	A344	E345	L346	C347	Q348	G349	I350	D352	V353	A354	I355	S356	S357	V358	F359	P360	L361	A362	ASP	THR	GLY	GLN	LYS	THR	SER	GLN	PRO	T372	S373	I374	F375	I376	K377	L378	H379	HIS	HIS	HIS	HIS
	Y256	E257	E258	G259	N260	E261	M262	F263	F264	E265	E266	F267	N268	Q269	Y270	L271	M272	D273	A274	T278	L279	S282	I283	L284	L285	Q286	I287	K288	H289	I290	I291	R292	S293	C294	L295	M296	C297	I298	E299	P300	A301	I302	K305	H306	F312	Q313	L314	F315	G316	F317	D318	F319	M320	V321	D322	E323			
	G195	H196	R197	K198	F199	D200	I201	R202	S203	W204	V205	L206	V207	D208	H209	L210	Y211	N212	I213	Y214	L215	Y216	R217	V220	L221	R222	T223	S224	S225	E226	P227	Y228	M229	S230	A231	N232	F233	Q234	D235	K236	T237	C238	H239	L240	T241	N242	H243	C244	I245	Q246	K247	E248	Y249	S250	K251	M252	Y253	R255	
	Y195	M196	R197	R198	F199	E140	G141	R142	E143	G144	N145	V146	W147	I148	A149	K150	S151	S152	A153	G154	ALA	LYS	GLY	GLU	GLY	I160	L161	S163	S164	E165	A166	S167	L169	L170	D171	F172	I173	D174	E175	Q176	G177	Q178	V179	H180	I182	Q183	K184	Y185	L186	E187	K188	Y189	S250	K251	M252	Y253	R255		
	C72	R73	K74	A75	S76	L77	V78	K79	L80	F85	E86	L87	S88	E89	S90	C91	T92	W93	F94	P95	E96	S97	Y98	V99	I100	P102	THR	ASN	ASN	LEU	LYS	THR	PRO	VAL	ALA	PRO	ALA	GLN	ASN	GLY	ILE	ARG	HIS	LEU	ILE	ASN	THR	ARG	T126	E127	R128	E129	V130	F131	L132	A133	A134		

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	104.63Å 156.56Å 179.32Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.51 – 2.00 49.62 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.8 (47.51-2.00) 100.0 (49.62-2.00)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.01 (at 2.00Å)	Xtriage
Refinement program	PHENIX 1.16_3549	Depositor
R, R_{free}	0.188 , 0.226 0.197 , 0.234	Depositor DCC
R_{free} test set	9918 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	44.3	Xtriage
Anisotropy	0.138	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	18367	wwPDB-VP
Average B, all atoms (Å ²)	66.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.42% 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: MG, ACP, GTP, GDP, KLC, CA, MES, GOL

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	0.30	0/3530	0.48	0/4793
1	C	0.34	0/3564	0.51	0/4841
2	B	0.32	0/3500	0.50	0/4740
2	D	0.29	0/3493	0.45	0/4730
3	E	0.29	0/1037	0.40	0/1376
4	F	0.26	0/2883	0.43	0/3894
All	All	0.30	0/18007	0.47	0/24374

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	3437	0	3368	14	0
1	C	3465	0	3393	15	0
2	B	3398	0	3302	22	0
2	D	3394	0	3295	27	0
3	E	1026	0	1041	5	0
4	F	2814	0	2788	16	0
5	A	32	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	32	0	12	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
6	D	1	0	0	0	0
7	A	2	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
8	A	12	0	16	1	0
9	B	28	0	12	0	0
9	D	28	0	12	1	0
10	B	12	0	12	2	0
11	B	32	0	0	1	0
12	F	31	0	14	1	0
13	A	138	0	0	0	0
13	B	129	0	0	1	0
13	C	233	0	0	4	0
13	D	68	0	0	2	0
13	E	32	0	0	0	0
13	F	18	0	0	0	0
All	All	18367	0	17277	98	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 3.

All (98) 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:147[A]:SER:HG	2:B:190:SER:HG	1.28	0.77
2:B:229:HIS:HB2	2:B:278:ARG:HE	1.53	0.73
4:F:71:LEU:HD11	4:F:294:CYS:HB3	1.69	0.73
2:B:269:MET:HE1	2:B:307:PRO:HG3	1.73	0.70
2:D:2:ARG:HB3	2:D:133:GLN:HG3	1.76	0.67
1:A:335:ILE:HG23	1:A:339:ARG:HG3	1.78	0.66
2:B:432:TYR:OH	13:B:601:HOH:O	2.11	0.65
2:D:175:PRO:HA	2:D:178:SER:HB2	1.78	0.64
4:F:314:LEU:HD22	4:F:350:ILE:HD11	1.80	0.64
1:C:128:GLN:NE2	13:C:602:HOH:O	2.21	0.62
1:C:2:ARG:NH2	1:C:251:ASP:OD2	2.32	0.62
2:D:281:GLN:NE2	13:D:602:HOH:O	2.25	0.61
4:F:185:TYR:OH	4:F:239:HIS:ND1	2.29	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:210:TYR:CE2	1:A:214:ARG:HD2	2.40	0.56
2:D:432:TYR:OH	13:D:601:HOH:O	2.17	0.55
2:D:2:ARG:NH1	2:D:131:CYS:O	2.39	0.55
1:A:251:ASP:OD1	1:A:253:THR:OG1	2.24	0.54
1:A:221:ARG:HG3	2:B:325:MET:HG2	1.89	0.54
2:D:136:GLN:HA	2:D:167:ASN:O	2.08	0.54
2:D:6:HIS:CD2	2:D:21:TRP:HE1	2.26	0.54
2:B:293:GLN:NE2	11:B:505:KLC:O16	2.40	0.54
1:A:161:TYR:HB3	1:A:164:LYS:HD3	1.89	0.53
2:B:274:PRO:HB3	2:B:286:LEU:HD22	1.91	0.53
2:B:16[A]:ILE:HD13	2:B:231:VAL:HG11	1.91	0.53
2:D:1:MET:SD	2:D:50:ASN:HB2	2.50	0.52
2:B:69:ASP:O	2:B:94:PHE:HA	2.09	0.52
1:A:336:LYS:NZ	1:A:341:ILE:O	2.42	0.52
4:F:136:ASN:O	4:F:140:GLU:HG2	2.10	0.51
2:B:6:HIS:CD2	2:B:21:TRP:HE1	2.27	0.51
2:D:172:MET:HG3	2:D:387:LEU:HD11	1.92	0.51
2:D:12:CYS:HB2	9:D:501:GDP:C8	2.45	0.51
2:D:269[A]:MET:HG3	2:D:303:ALA:HB3	1.92	0.50
1:C:327:ASP:OD2	13:C:601:HOH:O	2.19	0.50
1:C:66:VAL:HG12	1:C:68[B]:VAL:HG23	1.93	0.50
1:A:280:LYS:O	1:A:283:HIS:NE2	2.45	0.50
1:C:93:ILE:HD11	1:C:121:ARG:HG3	1.95	0.49
4:F:14:TYR:HB3	4:F:41:LEU:HD13	1.95	0.49
2:B:229:HIS:HB2	2:B:278:ARG:NE	2.25	0.49
1:C:133:GLN:NE2	13:C:608:HOH:O	2.46	0.49
1:C:248:LEU:HD13	1:C:355:ILE:HD12	1.94	0.49
1:A:217:LEU:HD21	1:A:368:LEU:HD23	1.94	0.48
2:D:315:VAL:HB	2:D:351:VAL:HG22	1.94	0.48
1:C:117:LEU:HD11	1:C:121:ARG:NH2	2.30	0.47
2:D:106:GLY:O	2:D:111:GLY:HA3	2.14	0.47
4:F:282:SER:HB2	4:F:325:LEU:HD13	1.97	0.46
1:A:68[B]:VAL:HG12	1:A:93:ILE:HB	1.98	0.46
3:E:24:LEU:O	3:E:25:LYS:HD2	2.16	0.46
3:E:72:LEU:O	3:E:76:ARG:HG2	2.16	0.46
2:D:165:ILE:HG21	2:D:252:LEU:HB3	1.98	0.45
4:F:43:GLU:HG3	4:F:45:ASN:O	2.15	0.45
2:B:165:ILE:HG21	2:B:252:LEU:HB3	1.99	0.45
1:C:320:ARG:HA	1:C:356:ASN:O	2.17	0.45
2:B:106:GLY:O	2:B:111:GLY:HA3	2.16	0.45
1:A:36:MET:HB3	1:A:61:HIS:CE1	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:295:MET:HE2	2:B:377:PHE:HB2	2.00	0.44
2:D:217:LEU:HA	2:D:277:SER:HB3	2.00	0.44
2:D:385:GLN:HB2	2:D:429:VAL:HG13	1.99	0.44
2:B:248:LEU:HD21	2:B:352:LYS:HB3	1.99	0.44
2:D:235:MET:HB3	2:D:235:MET:HE2	1.89	0.44
1:C:165:SER:HA	1:C:199:ASP:OD2	2.17	0.44
3:E:85:LYS:NZ	3:E:89:GLU:OE2	2.49	0.44
4:F:242:ASN:ND2	12:F:401:ACP:H3B1	2.31	0.44
1:A:174:ALA:O	1:A:178:SER:HB3	2.18	0.43
2:B:136:GLN:HA	2:B:167:ASN:O	2.18	0.43
2:B:191:VAL:O	2:B:195[A]:VAL:HG23	2.18	0.43
4:F:161:LEU:HD22	4:F:172:PHE:CG	2.53	0.43
1:A:120:ASP:OD2	1:A:124:LYS:NZ	2.47	0.43
2:B:19:LYS:HE2	2:B:278:ARG:NH2	2.33	0.43
1:C:36:MET:HB3	1:C:61:HIS:CE1	2.53	0.43
2:D:295[B]:MET:HG2	2:D:377:PHE:HB2	2.01	0.43
3:E:95:LYS:HE2	3:E:95:LYS:HB3	1.88	0.43
2:B:2:ARG:N	2:B:133:GLN:HG2	2.34	0.42
4:F:5:VAL:HG13	4:F:37:PHE:HB3	2.01	0.42
2:D:295[B]:MET:CG	2:D:377:PHE:HB2	2.48	0.42
3:E:6:MET:HA	3:E:23:ILE:O	2.19	0.42
2:B:21:TRP:CZ3	2:B:63:PRO:HB3	2.54	0.42
2:D:406:HIS:CD2	2:D:407[B]:TRP:HD1	2.37	0.42
4:F:160:ILE:HD12	4:F:240:LEU:HD13	2.02	0.42
4:F:290:ILE:HG21	4:F:329:LEU:HB2	2.02	0.42
1:C:326:LYS:NZ	13:C:613:HOH:O	2.53	0.42
2:D:171:VAL:HA	2:D:204:ILE:O	2.20	0.42
2:B:217:LEU:HD13	2:B:277:SER:HB3	2.01	0.42
2:D:19:LYS:HA	2:D:19:LYS:HD3	1.90	0.41
4:F:217:ARG:NH1	4:F:345:GLU:OE2	2.53	0.41
1:A:293:ASN:ND2	1:A:339:ARG:HH21	2.18	0.41
2:D:396:THR:O	2:D:400:ARG:HB2	2.19	0.41
2:D:292:THR:O	2:D:295[A]:MET:HG2	2.21	0.41
2:D:21:TRP:CZ3	2:D:63:PRO:HB3	2.56	0.41
4:F:292:ARG:HD3	4:F:378:LEU:HB3	2.03	0.41
2:B:164:ARG:O	10:B:504:MES:H52	2.20	0.41
1:A:388:TRP:CE3	1:A:425:MET:HE1	2.55	0.41
4:F:2:TYR:CZ	4:F:359:PHE:HB3	2.56	0.41
1:C:180:ALA:HA	2:D:258:ASN:OD1	2.21	0.41
1:C:296:PHE:CD1	1:C:335:ILE:HD13	2.57	0.40
4:F:169:LEU:O	4:F:173:ILE:HG13	2.22	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:A:505:GOL:H11	10:B:504:MES:O1S	2.21	0.40
1:C:210:TYR:CZ	1:C:222:PRO:HD2	2.57	0.40
2:D:152:LEU:O	2:D:156:LYS:HG2	2.21	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	440/451 (98%)	436 (99%)	4 (1%)	0	100	100
1	C	445/451 (99%)	435 (98%)	10 (2%)	0	100	100
2	B	434/445 (98%)	427 (98%)	7 (2%)	0	100	100
2	D	431/445 (97%)	424 (98%)	7 (2%)	0	100	100
3	E	121/143 (85%)	120 (99%)	1 (1%)	0	100	100
4	F	337/384 (88%)	324 (96%)	13 (4%)	0	100	100
All	All	2208/2319 (95%)	2166 (98%)	42 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	373/379 (98%)	372 (100%)	1 (0%)	92	95
1	C	378/379 (100%)	376 (100%)	2 (0%)	88	92
2	B	378/383 (99%)	376 (100%)	2 (0%)	88	92
2	D	377/383 (98%)	374 (99%)	3 (1%)	81	86
3	E	112/127 (88%)	111 (99%)	1 (1%)	78	83
4	F	310/342 (91%)	303 (98%)	7 (2%)	50	53
All	All	1928/1993 (97%)	1912 (99%)	16 (1%)	81	86

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	381	THR
2	B	139	HIS
2	B	248	LEU
1	C	71	GLU
1	C	381	THR
2	D	15	GLN
2	D	139	HIS
2	D	207	GLU
3	E	51	GLN
4	F	43	GLU
4	F	73	ARG
4	F	139	ARG
4	F	200	ASP
4	F	217	ARG
4	F	238	CYS
4	F	253	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	301	GLN
2	D	247	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 17 ligands modelled in this entry, 8 are monoatomic - leaving 9 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
12	ACP	F	401	-	27,33,33	2.36	7 (25%)	32,52,52	1.73	5 (15%)
9	GDP	D	501	6	24,30,30	0.96	1 (4%)	30,47,47	1.05	3 (10%)
8	GOL	A	506	-	5,5,5	0.79	0	5,5,5	1.14	0
8	GOL	A	505	-	5,5,5	0.99	0	5,5,5	0.84	0
9	GDP	B	501	6	24,30,30	0.95	1 (4%)	30,47,47	1.20	5 (16%)
11	KLC	B	505	-	31,32,32	0.85	0	31,44,44	1.72	4 (12%)
5	GTP	C	501	6	26,34,34	1.14	2 (7%)	32,54,54	1.31	5 (15%)
10	MES	B	504	-	12,12,12	2.34	1 (8%)	14,16,16	1.97	8 (57%)
5	GTP	A	501	6	26,34,34	1.13	2 (7%)	32,54,54	1.29	5 (15%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	ACP	F	401	-	-	1/15/38/38	0/3/3/3
9	GDP	D	501	6	-	3/12/32/32	0/3/3/3
8	GOL	A	506	-	-	3/4/4/4	-
8	GOL	A	505	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	GDP	B	501	6	-	5/12/32/32	0/3/3/3
11	KLC	B	505	-	-	8/54/54/54	0/0/1/1
5	GTP	C	501	6	-	5/18/38/38	0/3/3/3
10	MES	B	504	-	-	2/6/14/14	0/1/1/1
5	GTP	A	501	6	-	7/18/38/38	0/3/3/3

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	B	504	MES	C8-S	-7.81	1.66	1.77
12	F	401	ACP	PB-O3A	7.38	1.66	1.58
12	F	401	ACP	C4-N3	4.84	1.42	1.35
12	F	401	ACP	PG-O3G	4.17	1.64	1.54
12	F	401	ACP	C2-N3	4.03	1.38	1.32
12	F	401	ACP	C2-N1	3.92	1.41	1.33
5	A	501	GTP	C5-C6	-3.91	1.39	1.47
5	C	501	GTP	C5-C6	-3.89	1.39	1.47
9	D	501	GDP	C6-N1	-2.45	1.34	1.37
9	B	501	GDP	C6-N1	-2.43	1.34	1.37
12	F	401	ACP	O4'-C1'	2.18	1.44	1.41
12	F	401	ACP	C8-N7	2.13	1.38	1.34
5	A	501	GTP	C2-N3	2.12	1.38	1.33
5	C	501	GTP	C2-N3	2.07	1.38	1.33

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	F	401	ACP	N3-C2-N1	-5.85	119.54	128.68
11	B	505	KLC	C15-O7-C6	5.43	127.02	116.67
12	F	401	ACP	C5-C6-N6	4.41	127.05	120.35
11	B	505	KLC	O7-C15-C14	4.00	115.48	106.64
11	B	505	KLC	O19-C5-C1	3.43	116.42	107.78
11	B	505	KLC	C24-C10-C23	-3.30	104.82	109.19
10	B	504	MES	C5-N4-C3	3.27	116.19	108.83
5	C	501	GTP	C5-C6-N1	2.96	119.19	113.95
5	C	501	GTP	C8-N7-C5	2.96	108.63	102.99
9	B	501	GDP	C5-C6-N1	2.77	118.84	113.95
5	A	501	GTP	C5-C6-N1	2.75	118.80	113.95
5	A	501	GTP	C8-N7-C5	2.74	108.22	102.99
12	F	401	ACP	C4-C5-N7	-2.71	106.58	109.40
10	B	504	MES	C7-N4-C3	2.59	117.86	111.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	501	GTP	C2-N1-C6	-2.53	120.44	125.10
10	B	504	MES	C7-N4-C5	2.52	117.69	111.23
9	B	501	GDP	O6-C6-C5	-2.49	119.50	124.37
9	D	501	GDP	PA-O3A-PB	-2.45	124.44	132.83
10	B	504	MES	C6-O1-C2	2.44	118.05	109.89
5	C	501	GTP	PA-O3A-PB	-2.40	124.58	132.83
9	D	501	GDP	C8-N7-C5	2.39	107.53	102.99
10	B	504	MES	O3S-S-C8	2.38	109.61	105.77
5	C	501	GTP	PB-O3B-PG	-2.38	124.68	132.83
9	B	501	GDP	PA-O3A-PB	-2.37	124.68	132.83
5	A	501	GTP	C2-N1-C6	-2.37	120.73	125.10
5	A	501	GTP	N2-C2-N1	2.36	121.73	116.71
5	A	501	GTP	PA-O3A-PB	-2.31	124.92	132.83
12	F	401	ACP	C2-N1-C6	2.29	122.67	118.75
9	B	501	GDP	O2B-PB-O3A	2.27	112.23	104.64
10	B	504	MES	O2S-S-C8	2.25	109.62	106.92
10	B	504	MES	C6-C5-N4	-2.22	106.74	110.10
9	B	501	GDP	C8-N7-C5	2.18	107.15	102.99
9	D	501	GDP	C5-C6-N1	2.16	117.77	113.95
10	B	504	MES	C2-C3-N4	-2.10	106.92	110.10
12	F	401	ACP	C5-C6-N1	-2.05	115.70	120.35

There are no chirality outliers.

All (36) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	501	GTP	C5'-O5'-PA-O1A
5	A	501	GTP	C5'-O5'-PA-O2A
5	C	501	GTP	C5'-O5'-PA-O1A
5	C	501	GTP	C5'-O5'-PA-O2A
8	A	505	GOL	O1-C1-C2-O2
8	A	505	GOL	O1-C1-C2-C3
9	B	501	GDP	C5'-O5'-PA-O1A
9	B	501	GDP	C5'-O5'-PA-O2A
9	D	501	GDP	C5'-O5'-PA-O1A
9	D	501	GDP	C5'-O5'-PA-O2A
11	B	505	KLC	C3-C4-C5-C1
11	B	505	KLC	C9-C10-C11-O16
11	B	505	KLC	C11-C10-C9-O17
11	B	505	KLC	C9-C2-C3-C4
11	B	505	KLC	C15-C25-C26-C28
11	B	505	KLC	C27-C25-C26-C28

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Mol	Chain	Res	Type	Atoms
11	B	505	KLC	C13-C14-C15-O7
5	A	501	GTP	PB-O3B-PG-O3G
8	A	506	GOL	O1-C1-C2-C3
8	A	506	GOL	C1-C2-C3-O3
10	B	504	MES	C7-C8-S-O3S
5	A	501	GTP	PB-O3B-PG-O1G
5	C	501	GTP	PB-O3B-PG-O1G
9	B	501	GDP	PB-O3A-PA-O2A
5	A	501	GTP	PB-O3B-PG-O2G
5	C	501	GTP	PB-O3B-PG-O3G
5	A	501	GTP	C5'-O5'-PA-O3A
5	C	501	GTP	C5'-O5'-PA-O3A
9	B	501	GDP	C5'-O5'-PA-O3A
9	D	501	GDP	C5'-O5'-PA-O3A
12	F	401	ACP	C5'-O5'-PA-O3A
5	A	501	GTP	PB-O3A-PA-O2A
9	B	501	GDP	PB-O3A-PA-O1A
10	B	504	MES	C7-C8-S-O2S
8	A	506	GOL	O1-C1-C2-O2
11	B	505	KLC	C12-C13-C14-C15

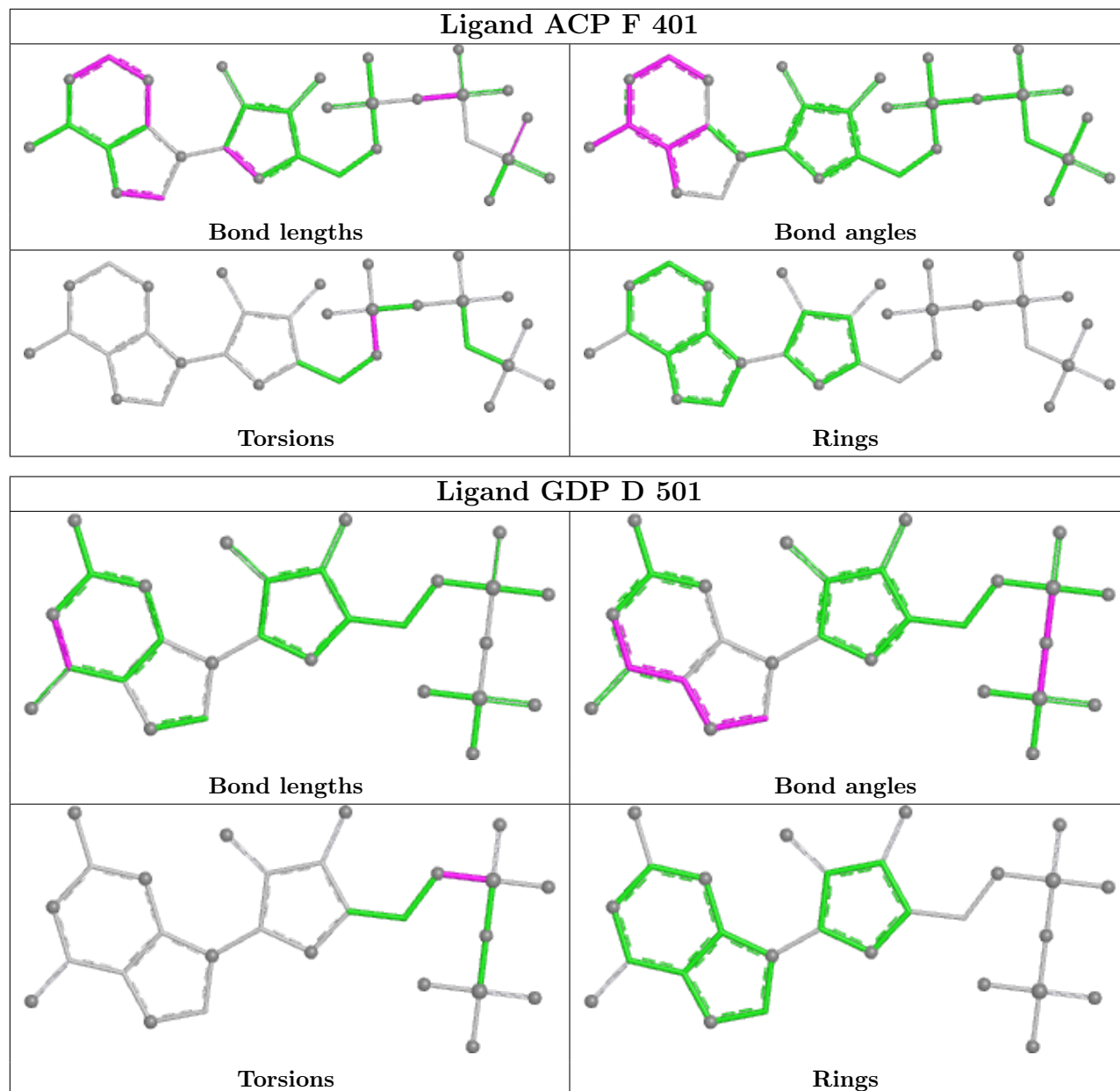
There are no ring outliers.

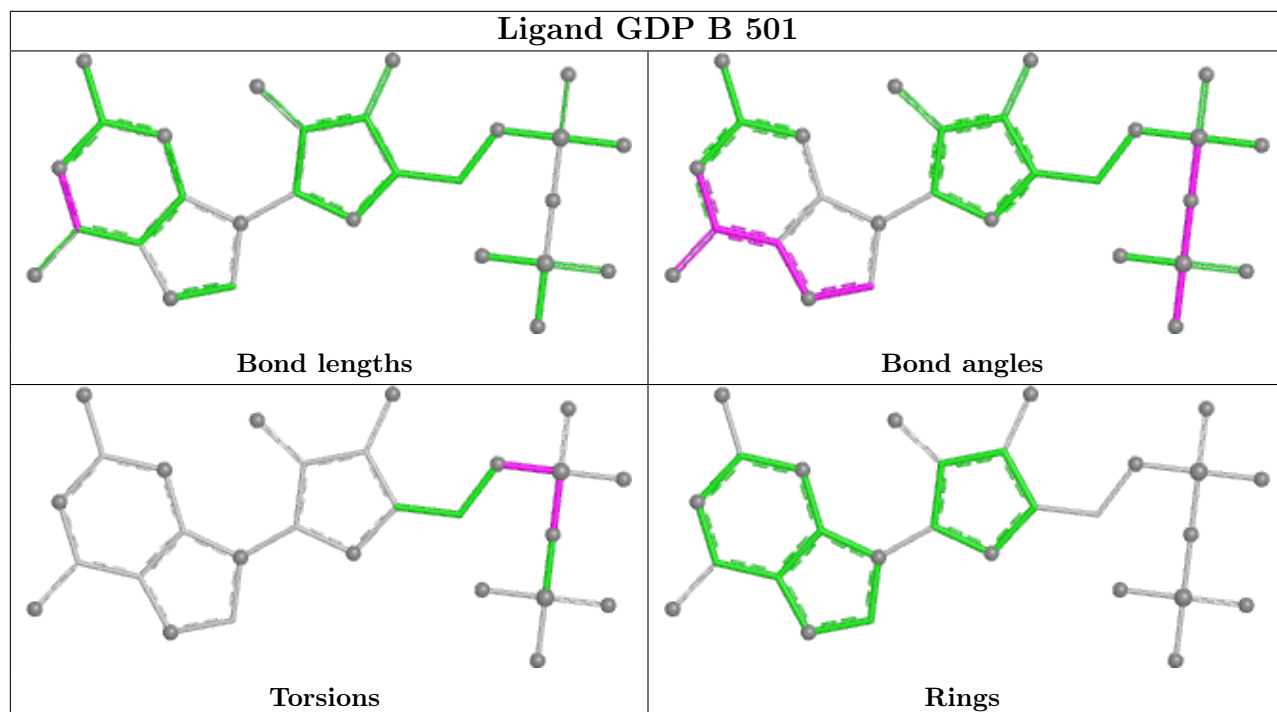
5 monomers are involved in 5 short contacts:

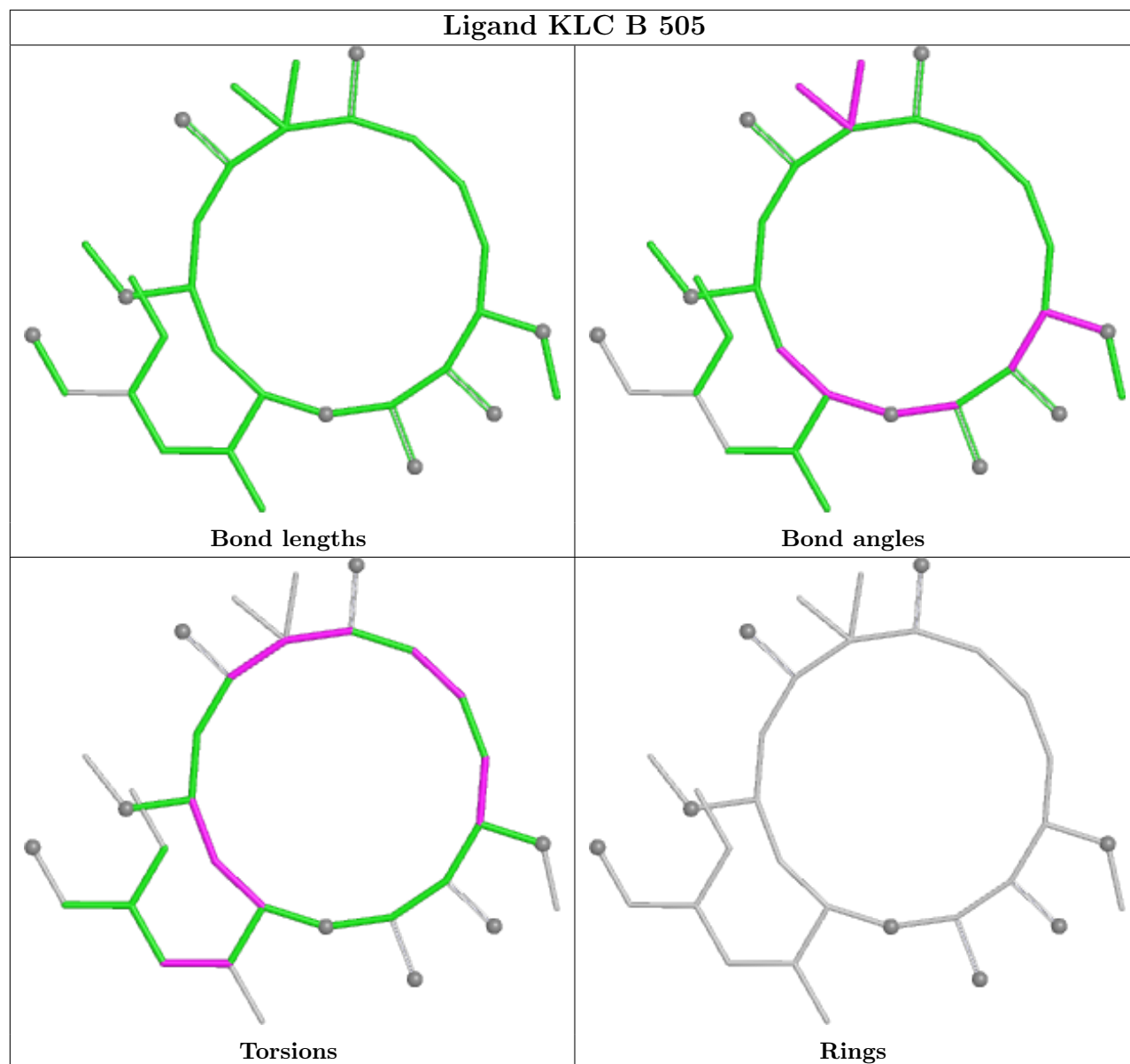
Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	F	401	ACP	1	0
9	D	501	GDP	1	0
8	A	505	GOL	1	0
11	B	505	KLC	1	0
10	B	504	MES	2	0

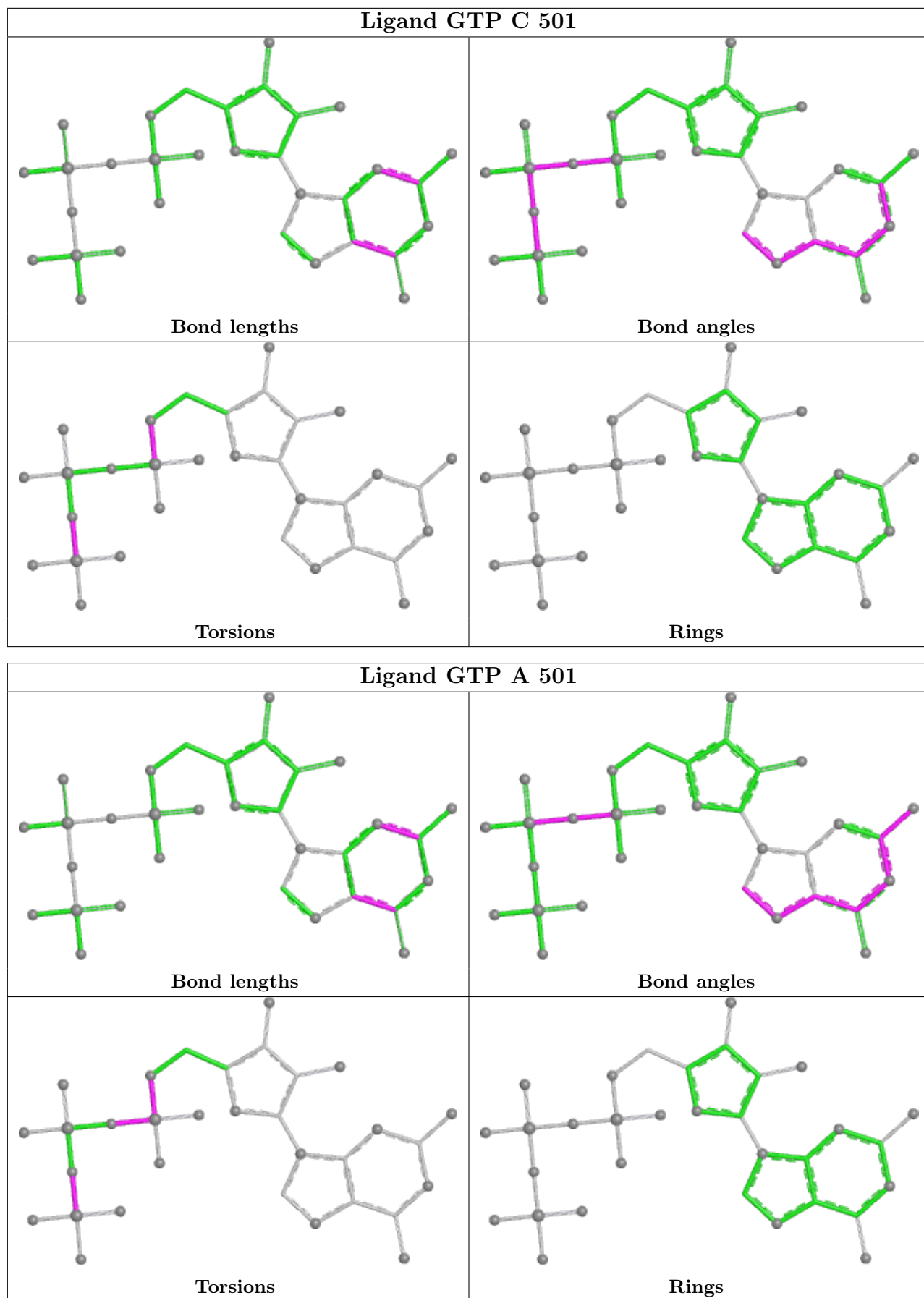
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

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

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	437/451 (96%)	1.50	117 (26%) 0 0	35, 54, 87, 163	0
1	C	440/451 (97%)	1.08	59 (13%) 3 2	31, 43, 70, 120	0
2	B	427/445 (95%)	1.28	62 (14%) 2 2	31, 50, 85, 151	0
2	D	427/445 (95%)	1.78	153 (35%) 0 0	38, 64, 98, 128	0
3	E	123/143 (86%)	1.51	34 (27%) 0 0	40, 65, 105, 145	0
4	F	343/384 (89%)	5.19	283 (82%) 0 0	58, 114, 170, 211	0
All	All	2197/2319 (94%)	2.00	708 (32%) 0 0	31, 58, 131, 211	0

All (708) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	F	17	VAL	17.9
4	F	130	VAL	17.8
4	F	362	ALA	15.9
4	F	20	LEU	15.8
4	F	250	SER	15.8
4	F	179	VAL	15.6
4	F	99	VAL	15.4
4	F	173	ILE	14.7
4	F	161	LEU	13.5
4	F	152	SER	13.1
4	F	151	SER	12.8
4	F	131	PHE	12.8
4	F	129	GLU	12.6
4	F	253	TYR	12.5
4	F	231	ALA	12.5
4	F	249	TYR	12.3
4	F	358	VAL	12.3
4	F	169	LEU	12.2
1	A	282	TYR	11.7

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Mol	Chain	Res	Type	RSRZ
4	F	90	SER	11.7
4	F	244	CYS	11.4
4	F	135	TYR	11.3
4	F	190	LEU	11.2
4	F	148	ILE	11.1
4	F	337	ALA	10.8
2	B	280	SER	10.8
4	F	137	ARG	10.3
4	F	22	LEU	10.1
4	F	361	LEU	9.9
4	F	254	GLY	9.9
4	F	136	ASN	9.8
4	F	206	LEU	9.8
4	F	185	TYR	9.7
4	F	346	LEU	9.7
4	F	200	ASP	9.6
4	F	21	LEU	9.6
4	F	13	VAL	9.6
4	F	140	GLU	9.6
4	F	243	HIS	9.5
4	F	143	GLU	9.3
2	B	281	GLN	9.2
4	F	176	GLN	9.2
4	F	256	TYR	9.1
4	F	134	ALA	9.1
4	F	100	ILE	9.0
2	B	277	SER	9.0
4	F	376	ILE	8.9
4	F	27	TRP	8.9
4	F	227	PRO	8.8
2	B	279	GLY	8.7
4	F	372	THR	8.7
4	F	174	ASP	8.6
4	F	101	TYR	8.6
4	F	4	PHE	8.5
4	F	149	ALA	8.5
4	F	252	ASN	8.4
2	D	401	ARG	8.4
2	D	407[A]	TRP	8.3
1	C	440	VAL	8.3
4	F	24	THR	8.3
4	F	224	SER	8.2

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Mol	Chain	Res	Type	RSRZ
4	F	196	HIS	8.2
4	F	320	MET	8.1
2	B	59	ASN	8.1
4	F	89	GLU	8.1
4	F	166	ALA	8.1
3	E	143	ALA	8.0
4	F	181	VAL	8.0
4	F	359	PHE	7.9
4	F	133	ALA	7.9
4	F	245	ILE	7.8
4	F	132	LEU	7.8
4	F	144	GLY	7.8
4	F	163	SER	7.7
2	B	278	ARG	7.7
4	F	1	MET	7.7
4	F	162	ILE	7.6
1	A	281	ALA	7.6
4	F	287	ILE	7.6
4	F	31	ARG	7.6
4	F	76[A]	SER	7.5
4	F	271	LEU	7.5
4	F	251	LYS	7.4
4	F	332	VAL	7.4
4	F	77	LEU	7.4
4	F	191	LEU	7.4
4	F	375	PHE	7.4
4	F	44	ARG	7.4
4	F	165	GLU	7.4
1	C	340	SER	7.3
4	F	168	GLU	7.3
4	F	238	CYS	7.3
4	F	360	PRO	7.3
2	B	437	ASP	7.3
4	F	102	PRO	7.2
4	F	178	GLN	7.2
4	F	197	ARG	7.2
4	F	142	ARG	7.1
4	F	228	TYR	7.1
4	F	341	LYS	7.1
4	F	14	TYR	7.1
2	D	57	THR	7.0
4	F	128	ARG	7.0

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Mol	Chain	Res	Type	RSRZ
4	F	330	ILE	6.9
4	F	236	LYS	6.9
4	F	223	THR	6.9
4	F	195	GLY	6.9
4	F	25	GLY	6.8
4	F	96	GLU	6.8
4	F	194	PRO	6.8
4	F	199	PHE	6.7
4	F	232	ASN	6.7
4	F	126	ASP	6.7
4	F	170	LEU	6.7
4	F	344	ALA	6.7
4	F	312	PHE	6.6
4	F	78	VAL	6.6
4	F	225	SER	6.6
4	F	138	ARG	6.6
4	F	9	GLU	6.5
4	F	210	LEU	6.5
2	B	58	GLY	6.5
4	F	201	ILE	6.5
4	F	153	ALA	6.3
4	F	71	LEU	6.3
4	F	343	TYR	6.2
2	D	82	PRO	6.2
4	F	351	VAL	6.2
1	A	171	ILE	6.1
2	D	415	GLU	6.1
4	F	127	GLU	6.1
1	A	42	ILE	6.1
4	F	15	ALA	6.1
1	A	46	ASP	6.0
4	F	270	TYR	6.0
2	B	57	THR	6.0
4	F	172	PHE	6.0
4	F	68	ALA	5.9
2	D	37	HIS	5.9
2	D	418	PHE	5.9
4	F	263	PHE	5.9
4	F	230	SER	5.9
4	F	339	ALA	5.8
4	F	16	GLU	5.8
3	E	27	PRO	5.8

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Mol	Chain	Res	Type	RSRZ
4	F	338	CYS	5.8
4	F	98	TYR	5.8
4	F	6	VAL	5.8
4	F	189	PRO	5.8
4	F	182	ILE	5.8
4	F	239	HIS	5.8
1	A	9	VAL	5.7
4	F	187	GLU	5.7
4	F	306	HIS	5.7
4	F	226	GLU	5.6
2	B	284	ARG	5.6
4	F	348	GLN	5.6
4	F	248	GLU	5.6
1	A	41	THR	5.6
2	D	378	ILE	5.6
4	F	259	GLY	5.6
4	F	164	SER	5.6
4	F	203	SER	5.6
4	F	331	GLU	5.5
2	B	36	TYR	5.5
4	F	70	LYS	5.5
4	F	316	GLY	5.5
4	F	274	ALA	5.5
2	B	38	GLY	5.5
3	E	140	LYS	5.5
2	D	400	ARG	5.5
2	D	179	ASP	5.4
2	D	268	PHE	5.4
2	D	78	VAL	5.4
4	F	350	ILE	5.4
4	F	349	GLY	5.4
3	E	132	GLU	5.4
4	F	257	GLU	5.4
4	F	73	ARG	5.4
4	F	258	GLU	5.4
4	F	352	ASP	5.4
4	F	267	PHE	5.3
4	F	211	TYR	5.3
2	D	384	ILE	5.3
4	F	2	TYR	5.3
4	F	255	ARG	5.3
2	D	408	TYR	5.3

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Mol	Chain	Res	Type	RSRZ
4	F	139	ARG	5.2
2	D	315	VAL	5.2
4	F	237	THR	5.2
2	D	405	LEU	5.2
4	F	62	VAL	5.2
4	F	186	LEU	5.2
2	D	202	TYR	5.1
4	F	92	THR	5.1
4	F	291	ILE	5.1
2	D	269[A]	MET	5.1
4	F	167[A]	SER	5.1
2	D	58	GLY	5.1
4	F	340	GLN	5.1
4	F	11	SER	5.1
4	F	357	SER	5.1
4	F	247	LYS	5.0
1	A	231	ILE	5.0
4	F	229	ASN	5.0
2	D	83	PHE	5.0
2	B	40	SER	5.0
1	A	44	GLY	5.0
2	D	180	THR	5.0
4	F	23	ALA	5.0
4	F	41	LEU	5.0
1	A	346	TRP	4.9
4	F	295	LEU	4.9
4	F	28	LYS	4.9
2	D	317	ALA	4.9
4	F	177	GLY	4.9
4	F	198	LYS	4.9
4	F	160	ILE	4.9
1	A	280	LYS	4.9
4	F	324	GLU	4.9
4	F	91	CYS	4.8
2	D	77	SER	4.8
4	F	37	PHE	4.8
1	C	341	ILE	4.8
3	E	26	PRO	4.8
4	F	141	GLY	4.7
4	F	233	PHE	4.7
2	B	37	HIS	4.7
4	F	235	ASP	4.7

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Mol	Chain	Res	Type	RSRZ
1	A	141	PHE	4.7
2	B	82	PRO	4.7
4	F	87	LEU	4.7
4	F	353	VAL	4.7
4	F	314	LEU	4.6
2	D	416	MET	4.6
2	B	276	THR	4.6
4	F	3	THR	4.6
4	F	378	LEU	4.6
1	A	201	ALA	4.6
4	F	45	ASN	4.5
4	F	188	LYS	4.5
4	F	264	PHE	4.5
4	F	46	ARG	4.5
2	B	33	THR	4.5
4	F	47	LEU	4.5
1	A	16	ILE	4.5
4	F	61	LEU	4.5
4	F	64	TYR	4.5
4	F	180	HIS	4.4
2	D	414	ASP	4.4
1	A	262	TYR	4.4
4	F	342	LEU	4.4
2	D	403	ALA	4.4
4	F	317	PHE	4.4
4	F	241	THR	4.4
1	A	345	ASP	4.3
2	D	238	VAL	4.3
4	F	125	THR	4.3
4	F	297	CYS	4.3
2	D	85	GLN	4.3
1	A	172	TYR	4.3
4	F	220	VAL	4.3
2	D	270	PRO	4.2
1	C	238	ILE	4.2
4	F	212	ASN	4.2
3	E	25	LYS	4.2
1	A	204	VAL	4.2
1	A	416	GLY	4.2
3	E	141	GLU	4.1
4	F	272	MET	4.1
4	F	240	LEU	4.1

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Mol	Chain	Res	Type	RSRZ
3	E	139	LEU	4.1
4	F	5	VAL	4.1
4	F	273	ASP	4.1
4	F	246	GLN	4.1
4	F	234	GLN	4.0
2	D	201	THR	4.0
4	F	283	ILE	4.0
2	B	247	GLN	4.0
1	A	209	ILE	4.0
1	A	173	PRO	4.0
4	F	42	GLY	4.0
4	F	192	LEU	4.0
1	A	177	VAL	4.0
2	D	260	VAL	4.0
4	F	146	VAL	4.0
4	F	150	LYS	3.9
1	A	202	PHE	3.9
4	F	32	LYS	3.9
3	E	48	GLU	3.9
3	E	46	SER	3.9
4	F	290	ILE	3.9
4	F	183	GLN	3.9
2	D	409	THR	3.9
1	A	140	SER	3.9
2	D	33	THR	3.8
4	F	214	TYR	3.8
2	D	94	PHE	3.8
4	F	319	PHE	3.8
4	F	321	VAL	3.8
2	D	281	GLN	3.8
2	D	255	LEU	3.8
2	D	170	SER	3.8
4	F	260	ASN	3.8
4	F	145	ASN	3.8
4	F	221	LEU	3.8
2	D	215	ARG	3.8
2	B	144	GLY	3.8
1	A	88	HIS	3.8
2	D	257	VAL	3.8
2	D	35	SER	3.7
2	D	185	TYR	3.7
1	A	182	VAL	3.7

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Mol	Chain	Res	Type	RSRZ
4	F	278	THR	3.7
1	A	189	LEU	3.7
2	B	248	LEU	3.7
2	D	377	PHE	3.7
3	E	133	VAL	3.7
4	F	207	VAL	3.7
2	D	265	LEU	3.7
2	D	80	SER	3.7
4	F	40	MET	3.6
1	A	45	GLY	3.6
4	F	147	TRP	3.6
1	A	38	SER	3.6
2	D	38	GLY	3.6
4	F	328	TRP	3.6
4	F	10	ASN	3.6
2	D	256	ALA	3.6
2	D	379	GLY	3.6
4	F	209	HIS	3.6
1	A	12	ALA	3.6
2	D	399	PHE	3.5
4	F	8	ASP	3.5
2	D	318	ILE	3.5
2	D	372	LYS	3.5
2	B	81	GLY	3.5
1	A	437	VAL	3.5
4	F	7	ARG	3.5
2	D	271	GLY	3.5
4	F	26	GLN	3.5
4	F	323	GLU	3.5
2	D	419	THR	3.5
3	E	9	ILE	3.5
4	F	18	SER	3.5
2	D	276	THR	3.5
1	A	7	ILE	3.5
4	F	213	ILE	3.4
2	D	203	CYS	3.4
2	D	60	LYS	3.4
2	D	102	ASN	3.4
2	D	406	HIS	3.4
4	F	379	HIS	3.4
2	D	97	SER	3.4
2	D	178	SER	3.4

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Mol	Chain	Res	Type	RSRZ
4	F	204	TRP	3.4
3	E	44	ASP	3.4
4	F	333	ASN	3.4
2	D	234	THR	3.4
1	A	224	TYR	3.4
3	E	45	PRO	3.3
4	F	12	SER	3.3
4	F	93	TRP	3.3
4	F	356	SER	3.3
1	A	83	TYR	3.3
2	D	39	ASP	3.3
4	F	335	ALA	3.3
1	A	169	PHE	3.3
2	D	32	PRO	3.3
4	F	322	ASP	3.3
1	A	128	GLN	3.3
2	B	34	GLY	3.3
1	A	150	THR	3.3
1	A	364	PRO	3.3
2	D	165	ILE	3.3
2	D	182	VAL	3.3
2	B	283	TYR	3.3
3	E	131	GLU	3.3
2	B	246	GLY	3.2
4	F	293	SER	3.2
2	D	441	ASP	3.2
1	A	143	GLY	3.2
1	A	418	PHE	3.2
4	F	80	LEU	3.2
1	A	302	MET	3.2
1	C	83	TYR	3.2
3	E	77	GLU	3.2
1	A	188	ILE	3.2
1	C	5	ILE	3.2
1	A	146	GLY	3.2
2	D	137	LEU	3.2
2	D	252	LEU	3.2
4	F	305	LYS	3.2
1	A	285	GLN	3.2
1	A	203	MET	3.2
4	F	72	CYS	3.1
1	A	303	VAL	3.1

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Mol	Chain	Res	Type	RSRZ
2	D	221	THR	3.1
2	D	278	ARG	3.1
2	D	241[A]	CYS	3.1
1	A	138	PHE	3.1
1	A	384	ILE	3.1
3	E	47	LEU	3.1
4	F	261	GLU	3.1
3	E	63	TYR	3.1
4	F	313	GLN	3.1
2	D	272	PHE	3.1
2	D	382	THR	3.1
1	A	174	ALA	3.1
1	A	378	LEU	3.1
1	A	283	HIS	3.1
2	B	56	ALA	3.1
2	B	215	ARG	3.1
4	F	75	ALA	3.1
1	A	170	SER	3.0
1	A	14	VAL	3.0
2	D	242	LEU	3.0
1	A	43	GLY	3.0
1	A	142	GLY	3.0
1	A	190	THR	3.0
2	D	239	THR	3.0
2	D	259	MET	3.0
1	C	201	ALA	3.0
2	D	86	ILE	3.0
2	D	87	PHE	3.0
1	C	82	THR	3.0
1	A	10	GLY	3.0
2	B	62	VAL	3.0
2	D	177	VAL	3.0
2	D	397	ALA	3.0
4	F	336	PRO	3.0
1	C	357	TYR	3.0
2	B	143	GLY	3.0
2	D	200	GLU	3.0
2	B	9	ALA	3.0
1	C	252	LEU	2.9
4	F	285	LEU	2.9
2	D	166	MET	2.9
1	A	167	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
2	D	204	ILE	2.9
1	A	340	SER	2.9
2	D	398	MET	2.9
1	A	270	ALA	2.9
2	B	438	ALA	2.9
1	A	179	THR	2.9
2	D	76	ASP	2.9
2	D	286	LEU	2.9
4	F	242	ASN	2.9
4	F	292	ARG	2.9
1	C	106	GLY	2.9
4	F	279	LEU	2.9
4	F	265	GLU	2.9
4	F	298	ILE	2.9
2	D	312	TYR	2.9
1	C	133	GLN	2.9
1	C	100	ALA	2.9
2	D	36	TYR	2.8
3	E	15	THR	2.8
4	F	154	GLY	2.8
4	F	282	SER	2.8
2	D	56	ALA	2.8
4	F	208	ASP	2.8
2	D	59	ASN	2.8
4	F	85	PRO	2.8
1	A	227	LEU	2.8
2	D	212	ILE	2.8
2	D	213	CYS	2.8
2	D	96	GLN	2.8
1	C	257	THR	2.8
4	F	215	LEU	2.8
2	D	295[A]	MET	2.8
1	A	68[A]	VAL	2.8
2	B	260	VAL	2.8
4	F	184	LYS	2.7
2	B	142	GLY	2.7
3	E	24	LEU	2.7
2	B	342	TYR	2.7
2	D	376	THR	2.7
2	D	89	PRO	2.7
2	D	154	ILE	2.7
1	A	365	GLY	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	100	ALA	2.7
2	D	93	VAL	2.7
4	F	86	GLU	2.7
3	E	83	ILE	2.7
2	D	402	LYS	2.7
2	B	285	ALA	2.7
1	C	4	CYS	2.7
2	B	141	LEU	2.7
2	D	275	LEU	2.7
2	D	167	ASN	2.7
4	F	355	ILE	2.7
2	D	383	ALA	2.7
1	A	127	ASP	2.7
2	D	71	GLU	2.7
2	D	73	GLY	2.7
1	C	136	LEU	2.7
2	B	41	ASP	2.6
1	A	59	GLY	2.6
2	D	380	ASN	2.6
2	D	168	THR	2.6
3	E	28	SER	2.6
2	D	316	ALA	2.6
1	A	13	GLY	2.6
2	D	169	PHE	2.6
4	F	95	PRO	2.6
3	E	59	GLU	2.6
4	F	345	GLU	2.6
1	A	268	PRO	2.6
2	B	147[A]	SER	2.6
1	A	159	VAL	2.6
4	F	175	GLU	2.6
2	D	313	LEU	2.6
2	D	325	MET	2.6
4	F	294	CYS	2.6
4	F	19	ARG	2.6
1	C	58	ALA	2.6
2	B	317	ALA	2.6
4	F	354	ALA	2.6
1	C	260	VAL	2.6
2	D	404	PHE	2.5
2	D	371	LEU	2.5
2	D	381	SER	2.5

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Mol	Chain	Res	Type	RSRZ
3	E	142	GLU	2.5
2	B	148	GLY	2.5
1	C	200	CYS	2.5
4	F	65	TYR	2.5
1	A	391	LEU	2.5
1	A	434	GLU	2.5
1	C	46	ASP	2.5
2	D	1	MET	2.5
2	D	311[A]	ARG	2.5
2	B	257	VAL	2.5
1	A	153	LEU	2.5
1	C	132	LEU	2.5
2	D	70	LEU	2.5
1	A	17	GLY	2.5
2	D	266	HIS	2.5
1	A	178	SER	2.5
1	C	355	ILE	2.5
3	E	135	LYS	2.5
1	A	259	LEU	2.5
1	C	378	LEU	2.5
2	D	46	LEU	2.5
4	F	30	LEU	2.5
4	F	33	ASP	2.5
2	B	358	ILE	2.5
2	D	375	ALA	2.5
1	A	106	GLY	2.5
1	A	137	VAL	2.5
1	C	181[A]	VAL	2.5
2	B	13	GLY	2.5
2	D	235	MET	2.5
2	D	267	PHE	2.5
1	A	1	MET	2.4
1	A	388	TRP	2.4
1	A	269	LEU	2.4
2	D	214	PHE	2.4
1	A	131	GLY	2.4
1	A	148	GLY	2.4
2	D	134	GLY	2.4
2	D	417	GLU	2.4
2	B	2	ARG	2.4
2	B	181	VAL	2.4
4	F	269	GLN	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	152	LEU	2.4
1	C	135	PHE	2.4
2	D	135	PHE	2.4
2	D	250	ALA	2.4
2	B	416	MET	2.4
3	E	110	GLU	2.4
2	D	171	VAL	2.4
1	A	351	PHE	2.4
1	A	389	ALA	2.4
1	C	38	SER	2.4
1	C	2	ARG	2.4
2	D	16	ILE	2.4
1	A	196	GLU	2.4
1	A	284	GLU	2.4
4	F	94	PHE	2.4
1	A	279	GLU	2.4
1	C	134	GLY	2.4
1	A	101	ASN	2.3
1	C	284	GLU	2.3
1	A	344	VAL	2.3
2	D	428	LEU	2.3
1	C	169	PHE	2.3
4	F	217	ARG	2.3
2	D	191	VAL	2.3
1	C	57	GLY	2.3
2	B	74	THR	2.3
2	D	132	LEU	2.3
3	E	53	LYS	2.3
4	F	171	ASP	2.3
2	D	308	ARG	2.3
2	D	296	PHE	2.3
2	D	174	SER	2.3
1	C	218	ASP	2.3
2	B	86	ILE	2.3
1	C	316	CYS	2.3
3	E	16[A]	SER	2.3
4	F	373	SER	2.3
1	A	185	TYR	2.3
1	C	108	TYR	2.3
1	A	49	PHE	2.3
1	C	88	HIS	2.3
2	B	369	ARG	2.3

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Mol	Chain	Res	Type	RSRZ
4	F	222	ARG	2.3
1	C	235	VAL	2.3
4	F	327	VAL	2.3
2	B	104	ALA	2.3
2	D	74	THR	2.3
1	C	85	GLN	2.2
1	A	99	ALA	2.2
1	A	145	THR	2.2
1	A	164	LYS	2.2
1	C	239	THR	2.2
2	D	68	VAL	2.2
1	A	291	ILE	2.2
2	D	347	ILE	2.2
1	A	40	LYS	2.2
1	C	404	PHE	2.2
3	E	137	LYS	2.2
1	A	51[A]	THR	2.2
1	A	187	SER	2.2
1	C	234	ILE	2.2
4	F	302	ILE	2.2
2	D	393	GLU	2.2
2	D	411	GLU	2.2
1	A	430	LYS	2.2
4	F	300	PRO	2.2
1	C	202	PHE	2.2
1	A	208	ALA	2.2
4	F	57	GLY	2.2
1	A	206	ASN	2.2
1	C	70	LEU	2.2
2	B	189	LEU	2.2
1	A	56	THR	2.2
2	B	109	THR	2.2
2	B	224	TYR	2.2
2	D	53	TYR	2.2
2	D	133	GLN	2.2
1	A	20	CYS	2.2
1	A	200	CYS	2.2
1	A	74	VAL	2.2
1	C	265	ILE	2.2
3	E	6	MET	2.2
2	D	198	THR	2.2
4	F	289	HIS	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	282	TYR	2.2
1	A	267	PHE	2.2
2	B	39	ASP	2.2
1	C	9	VAL	2.2
1	C	182	VAL	2.2
2	B	85	GLN	2.2
1	C	157	LEU	2.1
4	F	329	LEU	2.1
1	A	149	PHE	2.1
1	C	138	PHE	2.1
1	C	315[A]	CYS	2.1
1	C	84	ARG	2.1
1	C	171	ILE	2.1
1	C	12	ALA	2.1
2	D	303	ALA	2.1
2	D	79	ARG	2.1
2	D	139	HIS	2.1
1	A	163	LYS	2.1
2	D	247	GLN	2.1
2	D	413	MET	2.1
3	E	96	MET	2.1
4	F	315	PHE	2.1
1	C	323	VAL	2.1
2	B	93	VAL	2.1
1	A	234	ILE	2.1
1	A	238	ILE	2.1
4	F	347	CYS	2.1
1	C	152	LEU	2.1
1	A	113	GLU	2.1
2	D	72	PRO	2.1
1	C	13	GLY	2.1
4	F	216	TYR	2.1
2	D	351	VAL	2.1
4	F	59	VAL	2.1
1	A	147	SER	2.1
2	D	199	ASP	2.1
3	E	136	ASN	2.1
1	A	184	PRO	2.1
1	C	259	LEU	2.1
2	B	152	LEU	2.1
2	B	245	PRO	2.1
2	D	396	THR	2.0

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Mol	Chain	Res	Type	RSRZ
1	A	35	GLN	2.0
2	B	238	VAL	2.0
1	C	414	GLU	2.0
3	E	49	GLU	2.0
2	B	101	ASN	2.0
2	D	314	THR	2.0
2	B	408	TYR	2.0
2	D	344	VAL	2.0
2	D	410	GLY	2.0
3	E	84[A]	GLN	2.0
4	F	318	ASP	2.0
1	A	102	ASN	2.0
2	B	102	ASN	2.0
4	F	39	LEU	2.0
1	C	309	HIS	2.0
1	C	20	CYS	2.0
2	B	12	CYS	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

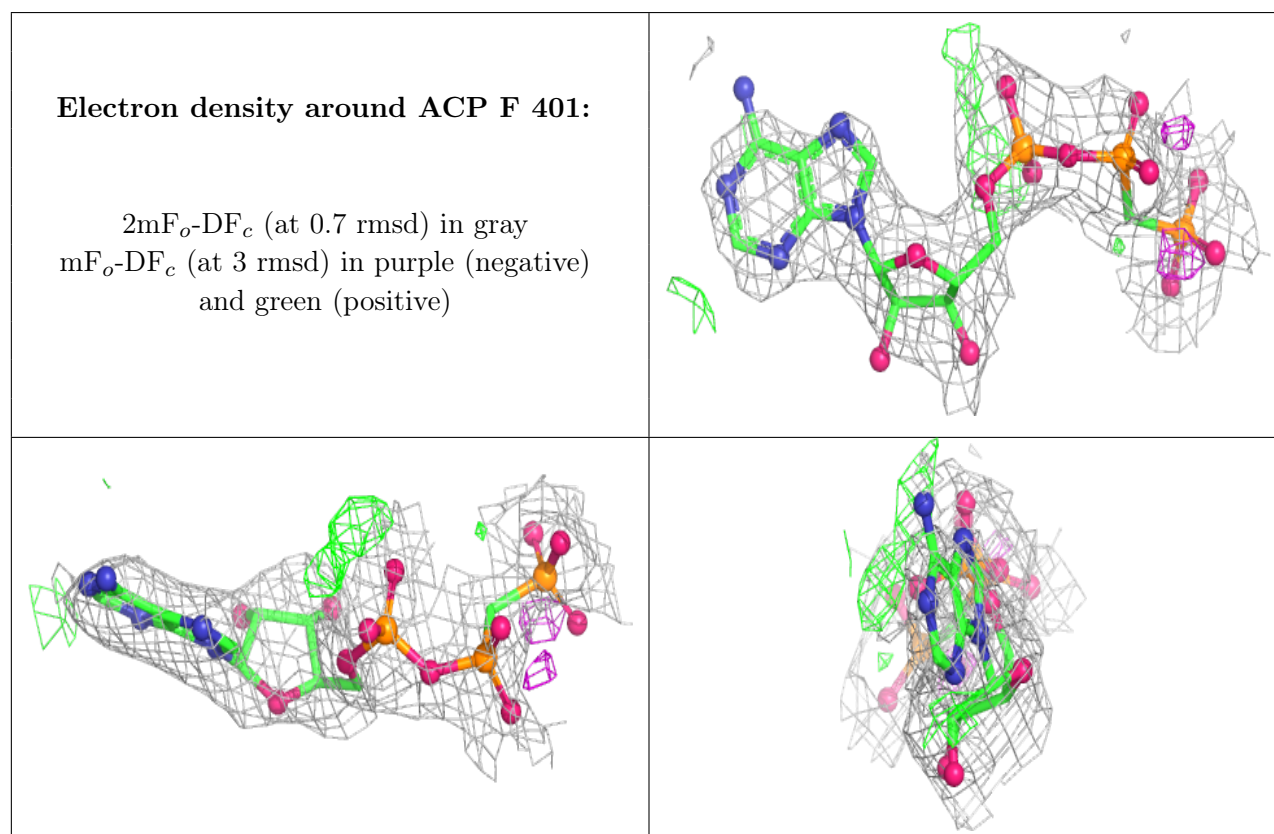
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
7	CA	B	503	1/1	0.69	0.22	95,95,95,95	0
12	ACP	F	401	31/31	0.75	0.27	92,113,142,145	0
8	GOL	A	505	6/6	0.79	0.24	79,80,87,92	0
10	MES	B	504	12/12	0.85	0.18	64,74,90,98	0
8	GOL	A	506	6/6	0.88	0.17	58,67,78,86	0
11	KLC	B	505	32/32	0.89	0.20	48,62,70,73	0

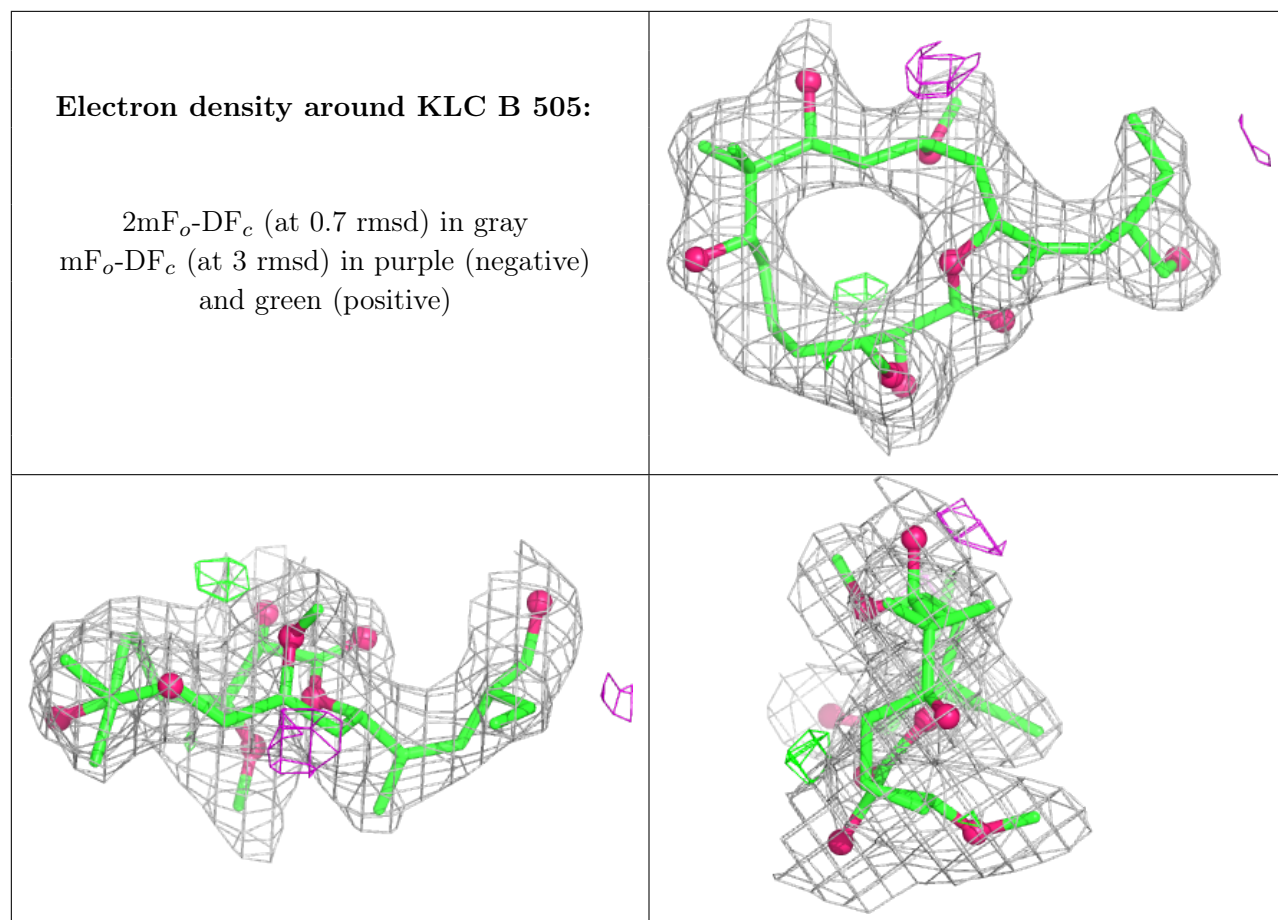
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	MG	D	502	1/1	0.90	0.09	55,55,55,55	0
7	CA	A	504	1/1	0.90	0.18	99,99,99,99	0
9	GDP	D	501	28/28	0.92	0.15	49,58,67,73	0
6	MG	A	502	1/1	0.93	0.13	38,38,38,38	0
5	GTP	A	501	32/32	0.95	0.22	32,37,42,46	0
5	GTP	C	501	32/32	0.96	0.17	27,34,38,40	0
7	CA	A	503	1/1	0.96	0.08	70,70,70,70	0
6	MG	C	502	1/1	0.97	0.11	34,34,34,34	0
9	GDP	B	501	28/28	0.97	0.17	28,35,39,40	0
6	MG	B	502	1/1	0.97	0.21	32,32,32,32	0
7	CA	C	503	1/1	0.99	0.06	55,55,55,55	0

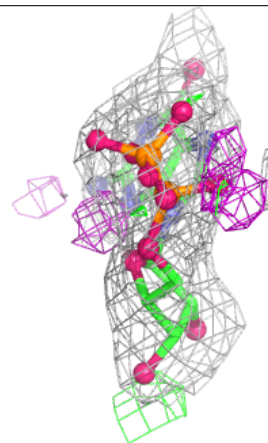
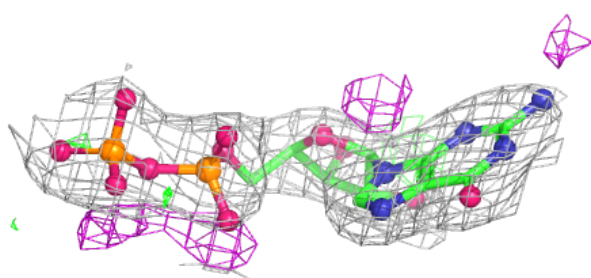
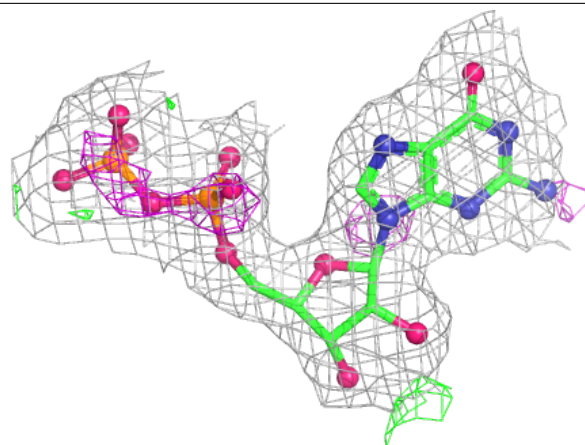
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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





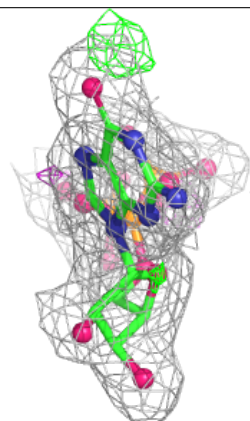
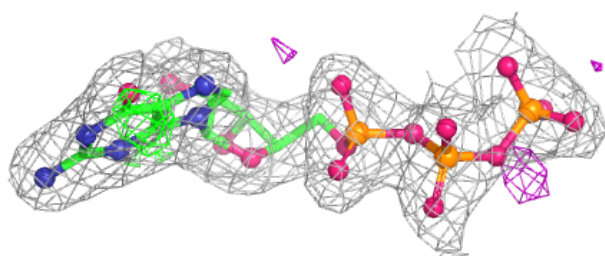
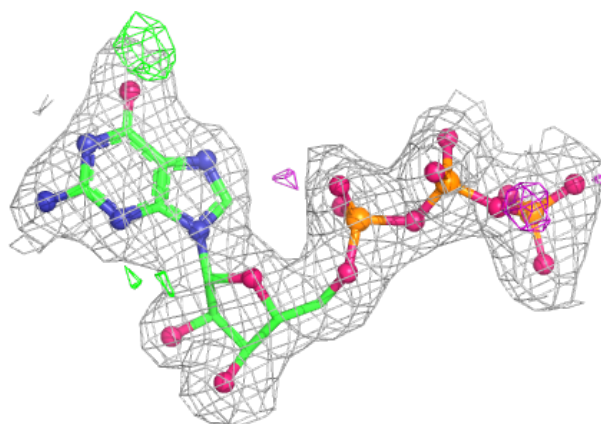
Electron density around GDP D 501:

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

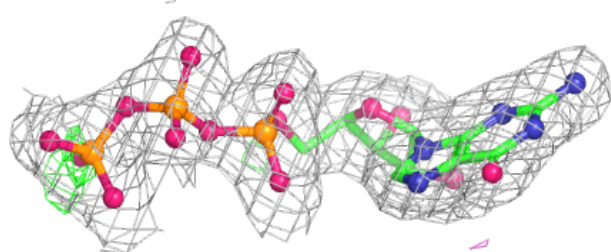
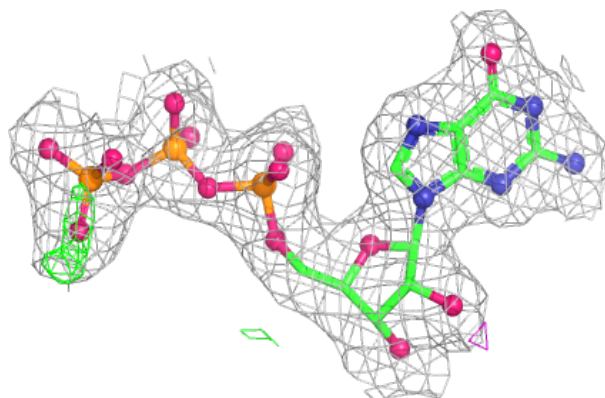


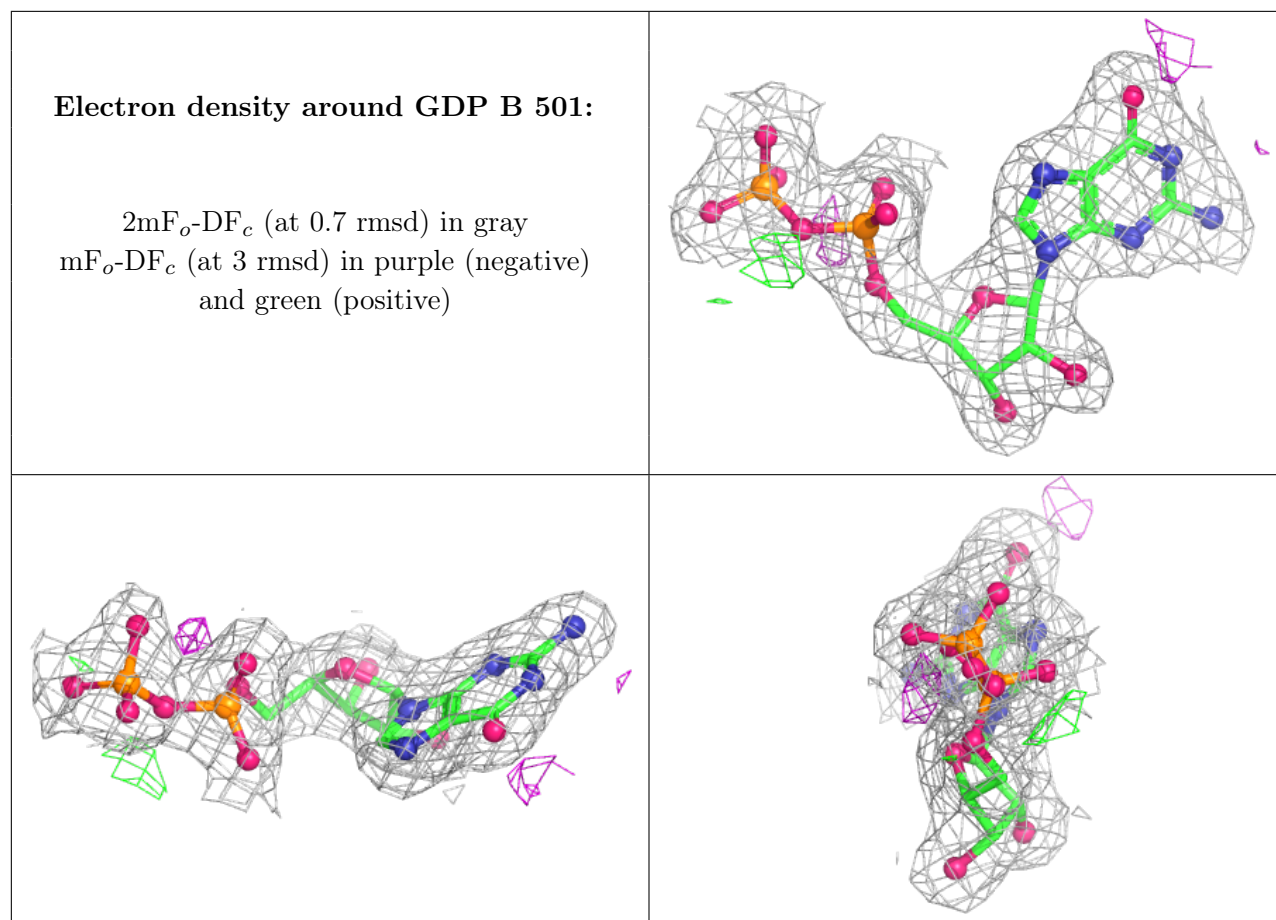
Electron density around GTP A 501:

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

**Electron density around GTP C 501:**

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





6.5 Other polymers [i](#)

There are no such residues in this entry.