WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Sep 20, 2023 – 07:09 pm BST

PDB ID	:	7YZ0
Title	:	Molecular snapshots of drug release from tubulin: 100 microseconds after photoactivation.
Authors	:	Wranik, M.; Weinert, T.; Standfuss, J.
Deposited on	:	2022-02-18
Resolution	:	2.20 Å(reported)

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
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)	:	2.35.1

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 2.20 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.
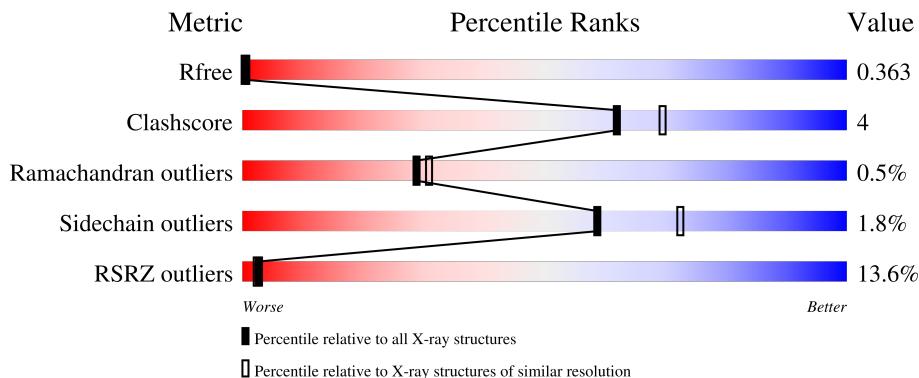
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 <=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	7% ... 87% ... 10% ·
2	B	445	21% ... 82% ... 13% · ·
3	F	169	7% ... 80% ... 11% · 8%
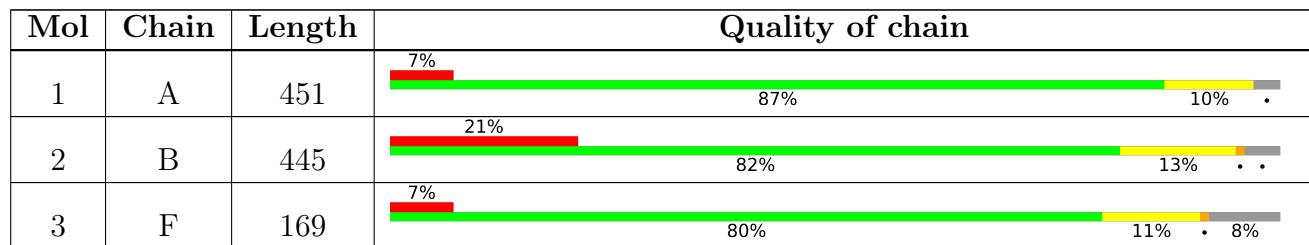
2 Entry composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 8262 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
1	A	437	Total 3412	C 2161	N 579	O 648	S 24	0	2	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	426	Total 3346	C 2101	N 570	O 647	S 28	0	2	0

- Molecule 3 is a protein called Designed Ankyrin Repeat Protein (DARPIN) D1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	155	Total 1154	C 727	N 198	O 226	S 3	0	0	0

- Molecule 4 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).
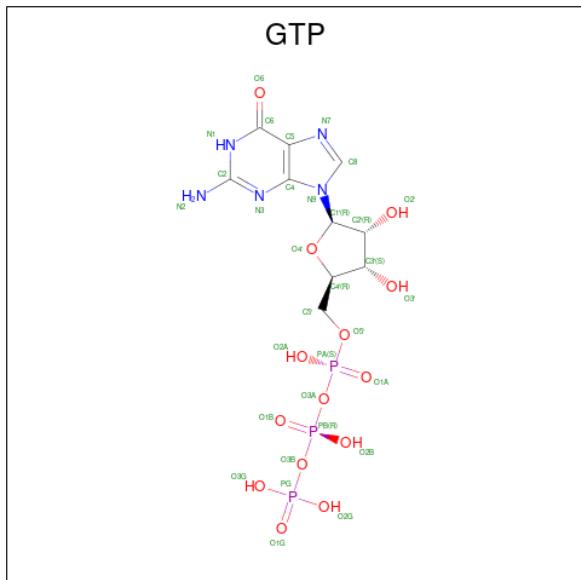
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
4	A	1	32	10	5	14	3	0	0

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
5	A	1	1	1	0	0

- Molecule 6 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 7 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).
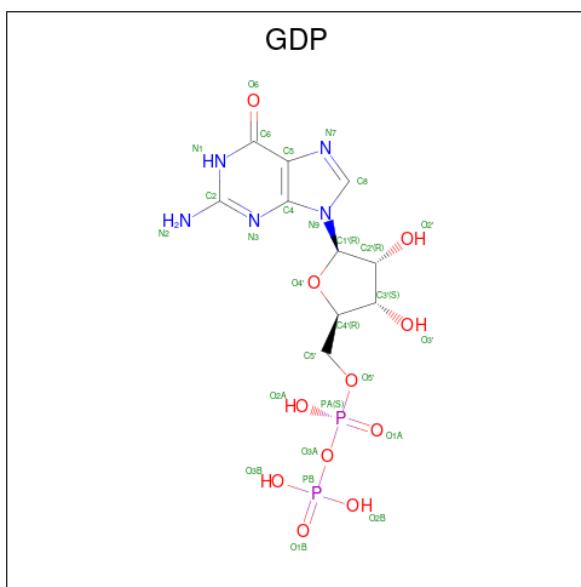
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
7	B	1	28	10	5	11	2	0	0

- Molecule 8 is Azo-Combretastatin A4 (trans) (three-letter code: VYT) (formula: $C_{16}H_{18}N_2O_5$).

VYT
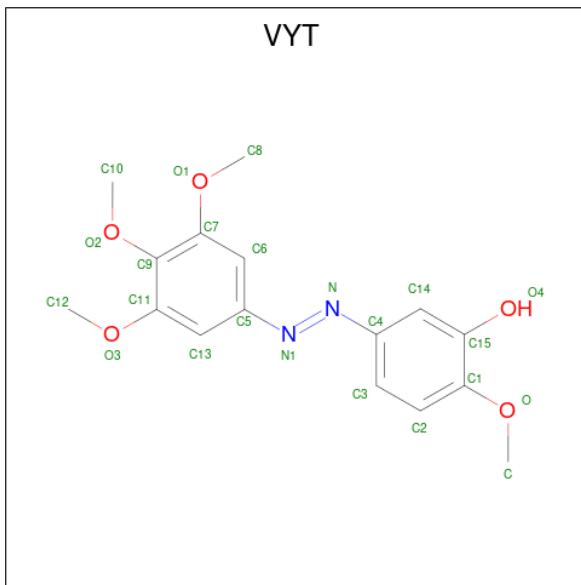
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
8	B	1	23	16	2	5	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	127	Total	O	0	0
			127	127		
9	B	94	Total	O	0	0
			94	94		
9	F	44	Total	O	0	0
			44	44		

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 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
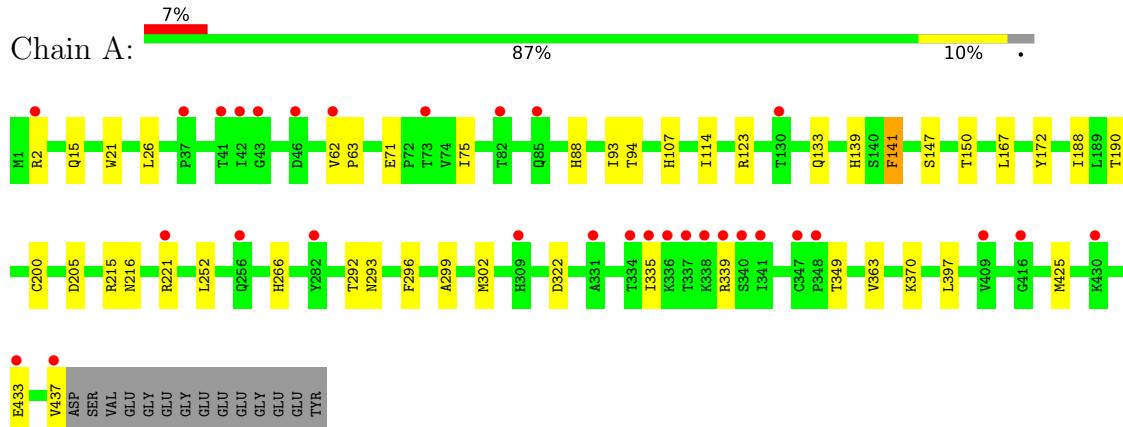
- Molecule 2: Tubulin beta-2B chain
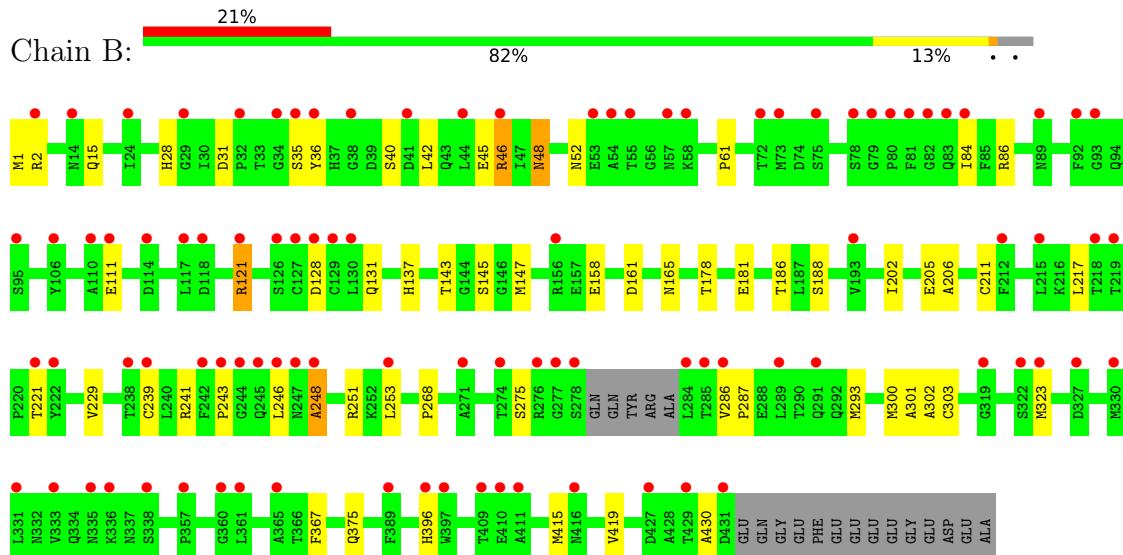
- Molecule 3: Designed Ankyrin Repeat Protein (DARPIN) D1
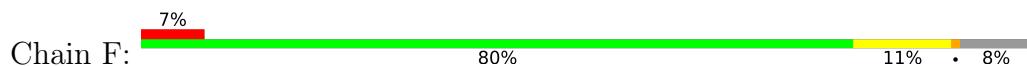
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	74.53Å 92.58Å 83.99Å 90.00° 96.71° 90.00°	Depositor
Resolution (Å)	9.49 – 2.20 9.49 – 2.20	Depositor EDS
% Data completeness (in resolution range)	92.5 (9.49-2.20) 92.5 (9.49-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.66 (at 2.21Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.305 , 0.363 0.305 , 0.363	Depositor DCC
R_{free} test set	1841 reflections (3.50%)	wwPDB-VP
Wilson B-factor (Å^2)	28.1	Xtriage
Anisotropy	0.253	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 82.5	EDS
L-test for twinning[2]	$< |L| > = 0.55, < L^2 > = 0.39$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.88	EDS
Total number of atoms	8262	wwPDB-VP
Average B, all atoms (Å^2)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.72% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: VYT, GDP, GTP, MG, CA

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$>5	RMSZ	#$|Z|$>5
1	A	0.24	0/3496	0.46	0/4748
2	B	0.24	0/3428	0.45	0/4641
3	F	0.23	0/1170	0.40	0/1590
All	All	0.24	0/8094	0.45	0/10979

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	3412	0	3318	28	0
2	B	3346	0	3216	34	0
3	F	1154	0	1156	12	0
4	A	32	0	12	1	0
5	A	1	0	0	0	0
6	A	1	0	0	0	0
7	B	28	0	12	0	0
8	B	23	0	0	1	0
9	A	127	0	0	4	0
9	B	94	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	F	44	0	0	0	0
All	All	8262	0	7714	69	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 4.

All (69) 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:268:PRO:HG2	2:B:300:MET:HB2	1.69	0.73
2:B:161:ASP:O	2:B:251:ARG:NH2	2.24	0.70
2:B:293:MET:HG2	2:B:367:PHE:HB2	1.74	0.69
2:B:48:ASN:OD1	2:B:48:ASN:N	2.26	0.68
1:A:172:TYR:HB3	1:A:205:ASP:HA	1.75	0.67
2:B:396:HIS:NE2	3:F:57:TYR:OH	2.28	0.67
2:B:52:ASN:HD22	2:B:86:ARG:HH12	1.45	0.64
2:B:2:ARG:NH2	2:B:128:ASP:OD2	2.32	0.62
2:B:145:SER:OG	2:B:188:SER:OG	2.17	0.62
1:A:2:ARG:O	1:A:133:GLN:NE2	2.36	0.58
2:B:165:ASN:ND2	9:B:617:HOH:O	2.37	0.57
3:F:27:ASP:N	3:F:27:ASP:OD1	2.39	0.55
3:F:121:ALA:HB1	3:F:161:LEU:HD21	1.89	0.55
1:A:26:LEU:HD12	1:A:363:VAL:HG12	1.89	0.55
1:A:123:ARG:NH1	9:A:608:HOH:O	2.35	0.54
2:B:36:TYR:OH	2:B:40:SER:O	2.25	0.54
2:B:121:ARG:NE	2:B:158:GLU:OE1	2.42	0.52
1:A:293:ASN:O	1:A:339:ARG:NH1	2.43	0.52
2:B:251:ARG:NH1	9:B:623:HOH:O	2.43	0.52
1:A:370:LYS:NZ	9:A:610:HOH:O	2.36	0.51
2:B:31:ASP:OD1	2:B:35:SER:N	2.42	0.51
2:B:1:MET:HA	2:B:131:GLN:HB3	1.94	0.50
2:B:143:THR:HG23	2:B:147:MET:HE2	1.94	0.50
3:F:60:LEU:HD11	3:F:98:VAL:HG21	1.92	0.50
1:A:62:VAL:HG11	1:A:88:HIS:CD2	2.47	0.50
1:A:433:GLU:HA	1:A:437:VAL:HG12	1.94	0.49
3:F:133:LEU:HD11	3:F:165:LEU:HD23	1.94	0.49
1:A:215:ARG:NH1	9:A:617:HOH:O	2.45	0.49
1:A:215:ARG:NH2	1:A:299:ALA:O	2.44	0.49
1:A:93:ILE:HG22	1:A:114:ILE:HD11	1.94	0.49
2:B:45:GLU:O	2:B:46[B]:ARG:HG2	2.13	0.49
2:B:211:CYS:HB3	2:B:217:LEU:HD12	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:23:ARG:NH1	3:F:57:TYR:OH	2.46	0.48
1:A:15:GLN:NE2	4:A:501:GTP:O6	2.46	0.48
2:B:253:LEU:HD13	8:B:502:VYT:C6	2.42	0.48
2:B:45:GLU:O	2:B:46[C]:ARG:HG2	2.13	0.48
1:A:107:HIS:NE2	9:A:601:HOH:O	2.29	0.47
2:B:28:HIS:CE1	2:B:241:ARG:HB3	2.50	0.47
2:B:61:PRO:HD2	2:B:84:ILE:O	2.15	0.47
3:F:18:LEU:HD11	3:F:30:VAL:HG13	1.98	0.46
1:A:188:ILE:HG23	1:A:425:MET:HG3	1.97	0.46
1:A:397:LEU:HD22	2:B:430:ALA:HB1	1.99	0.45
3:F:40:VAL:HG13	3:F:66:LEU:HD22	1.98	0.45
2:B:375:GLN:HB2	2:B:419:VAL:HG13	1.98	0.44
2:B:396:HIS:CE1	3:F:57:TYR:HH	2.36	0.44
1:A:21:TRP:CZ3	1:A:63:PRO:HB3	2.53	0.43
1:A:292:THR:HG22	1:A:335:ILE:HD12	2.01	0.43
2:B:186:THR:HG23	2:B:415:MET:HE1	1.98	0.43
1:A:167:LEU:HG	1:A:200:CYS:HB3	2.00	0.43
2:B:301:ALA:O	2:B:303:CYS:N	2.51	0.43
3:F:164:ILE:O	3:F:167:LYS:HG3	2.17	0.43
1:A:221:ARG:CD	2:B:323:MET:HB3	2.49	0.43
1:A:215:ARG:NH1	1:A:216:ASN:OD1	2.51	0.43
1:A:139:HIS:CD2	1:A:150:THR:HG21	2.52	0.43
1:A:147:SER:HB2	1:A:190:THR:HB	2.00	0.43
2:B:202:ILE:HD13	2:B:229:VAL:HG13	2.02	0.42
1:A:167:LEU:HD13	1:A:252:LEU:HD22	2.02	0.42
2:B:239:CYS:O	2:B:248:ALA:HB2	2.20	0.41
1:A:75:ILE:HD12	1:A:94:THR:HG22	2.02	0.41
1:A:141:PHE:HD1	1:A:141:PHE:HA	1.76	0.41
2:B:286:VAL:HB	2:B:287:PRO:HD3	2.02	0.41
1:A:200:CYS:HA	1:A:266:HIS:HB2	2.01	0.41
2:B:15:GLN:NE2	9:B:618:HOH:O	2.37	0.41
2:B:206:ALA:HB2	2:B:302:ALA:N	2.36	0.41
1:A:221:ARG:HD2	2:B:323:MET:HB3	2.03	0.41
1:A:296:PHE:HB2	1:A:339:ARG:NH1	2.36	0.40
2:B:178:THR:HB	2:B:181:GLU:HG3	2.02	0.40
3:F:43:THR:HG22	3:F:49:THR:HG22	2.03	0.40
3:F:23:ARG:HG3	3:F:57:TYR:CE1	2.57	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	437/451 (97%)	420 (96%)	15 (3%)	2 (0%)	29	31
2	B	424/445 (95%)	409 (96%)	12 (3%)	3 (1%)	22	22
3	F	153/169 (90%)	151 (99%)	2 (1%)	0	100	100
All	All	1014/1065 (95%)	980 (97%)	29 (3%)	5 (0%)	29	31

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	243	PRO
2	B	275	SER
1	A	322	ASP
1	A	349	THR
2	B	248	ALA

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	367/379 (97%)	363 (99%)	4 (1%)	73	85
2	B	368/383 (96%)	358 (97%)	10 (3%)	44	57
3	F	120/132 (91%)	117 (98%)	3 (2%)	47	60
All	All	855/894 (96%)	838 (98%)	17 (2%)	59	69

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	GLU
1	A	141	PHE
1	A	302[A]	MET
1	A	302[B]	MET
2	B	42	LEU
2	B	46[B]	ARG
2	B	46[C]	ARG
2	B	48	ASN
2	B	111	GLU
2	B	121	ARG
2	B	137	HIS
2	B	205	GLU
2	B	221	THR
2	B	246	LEU
3	F	27	ASP
3	F	31	ARG
3	F	144	LYS

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	128	GLN
2	B	52	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 5 ligands modelled in this entry, 2 are monoatomic - leaving 3 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	VYT	B	502	-	24,24,24	0.22	0	32,32,32	0.20	0
7	GDP	B	501	-	24,30,30	0.94	1 (4%)	30,47,47	1.26	4 (13%)
4	GTP	A	501	5	26,34,34	1.12	2 (7%)	32,54,54	1.51	7 (21%)

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	VYT	B	502	-	-	0/13/13/13	0/2/2/2
7	GDP	B	501	-	-	4/12/32/32	0/3/3/3
4	GTP	A	501	5	-	6/18/38/38	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	501	GTP	C5-C6	-3.95	1.39	1.47
7	B	501	GDP	C6-N1	-2.33	1.34	1.37
4	A	501	GTP	C2-N3	2.20	1.38	1.33

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	501	GTP	C5-C6-N1	3.22	119.63	113.95
4	A	501	GTP	PB-O3B-PG	-3.16	122.00	132.83
4	A	501	GTP	C8-N7-C5	3.05	108.81	102.99
4	A	501	GTP	C2-N1-C6	-2.83	119.89	125.10
7	B	501	GDP	PA-O3A-PB	-2.81	123.19	132.83
4	A	501	GTP	PA-O3A-PB	-2.79	123.26	132.83
7	B	501	GDP	C3'-C2'-C1'	2.76	105.13	100.98
4	A	501	GTP	C3'-C2'-C1'	2.59	104.88	100.98
7	B	501	GDP	C8-N7-C5	2.31	107.39	102.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	B	501	GDP	C5-C6-N1	2.31	118.02	113.95
4	A	501	GTP	O6-C6-C5	-2.14	120.19	124.37

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	501	GTP	PB-O3B-PG-O2G
4	A	501	GTP	C5'-O5'-PA-O1A
4	A	501	GTP	C5'-O5'-PA-O2A
7	B	501	GDP	C5'-O5'-PA-O1A
7	B	501	GDP	C5'-O5'-PA-O2A
4	A	501	GTP	C4'-C5'-O5'-PA
4	A	501	GTP	PB-O3A-PA-O1A
4	A	501	GTP	C5'-O5'-PA-O3A
7	B	501	GDP	C5'-O5'-PA-O3A
7	B	501	GDP	PB-O3A-PA-O2A

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	B	502	VYT	1	0
4	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 then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand GDP B 501

Bond lengths

Bond angles

Torsions

Rings

Ligand GTP A 501

Bond lengths

Bond angles

Torsions

Rings
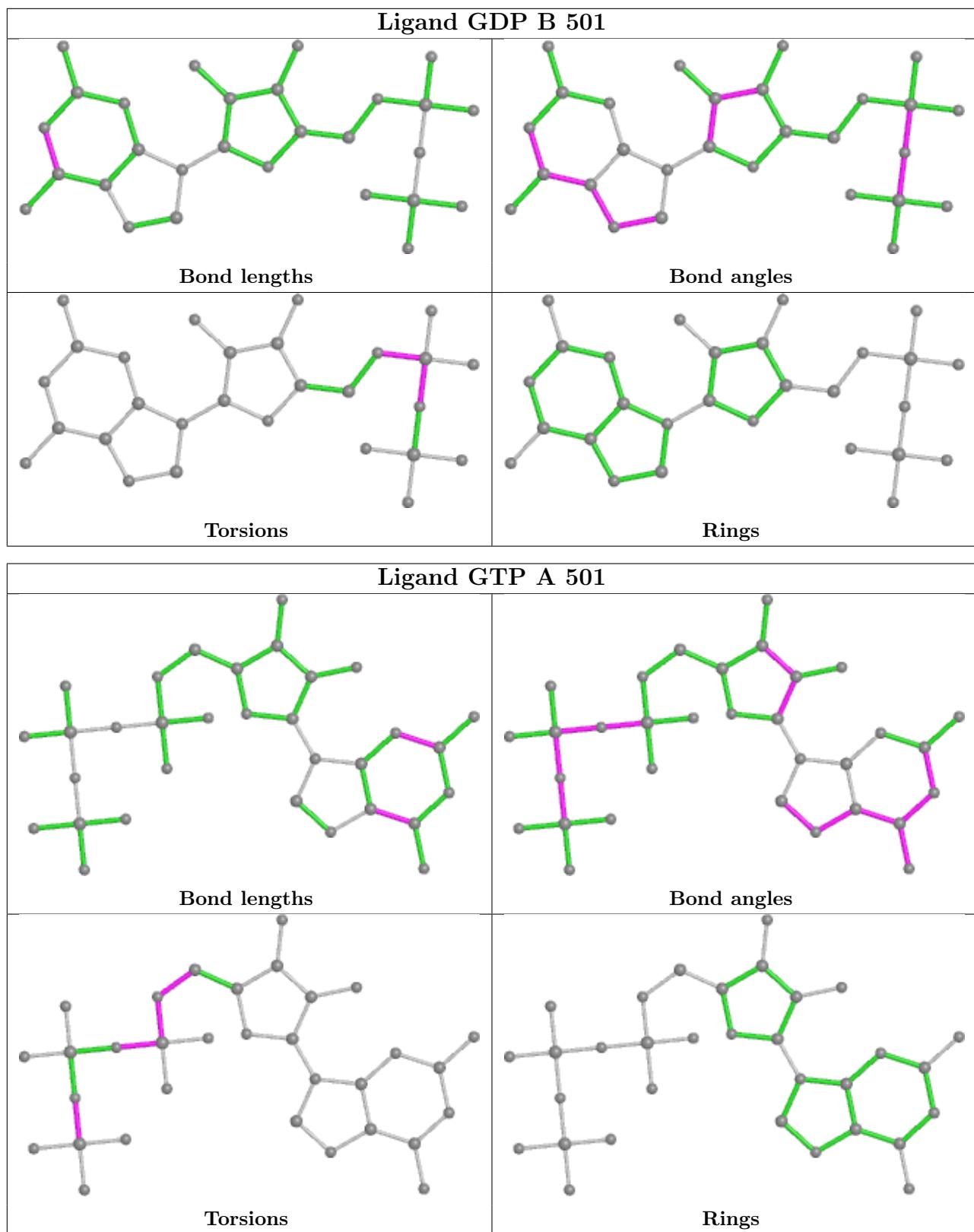
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	437/451 (96%)	0.70	31 (7%)	16	14	15, 28, 48, 77	0
2	B	426/445 (95%)	1.34	95 (22%)	0	0	20, 39, 66, 77	0
3	F	155/169 (91%)	0.67	12 (7%)	13	12	20, 30, 47, 66	0
All	All	1018/1065 (95%)	0.96	138 (13%)	3	2	15, 32, 61, 77	0

All (138) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	73	MET	11.1
1	A	339	ARG	9.0
2	B	93	GLY	7.8
2	B	79	GLY	7.5
2	B	322	SER	6.1
2	B	95	SER	6.1
2	B	127	CYS	6.0
2	B	126	SER	5.6
2	B	36	TYR	5.6
2	B	92	PHE	5.5
2	B	431	ASP	5.4
1	A	437	VAL	5.3
2	B	32	PRO	5.2
2	B	284	LEU	5.0
2	B	110	ALA	4.9
2	B	114	ASP	4.9
2	B	41	ASP	4.6
1	A	335	ILE	4.6
1	A	338	LYS	4.5
3	F	167	LYS	4.5
1	A	336	LYS	4.4
2	B	319	GLY	4.2
2	B	323	MET	4.1

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Mol	Chain	Res	Type	RSRZ
2	B	80	PRO	4.1
2	B	360	GLY	4.1
2	B	277	GLY	4.0
2	B	29	GLY	3.9
2	B	248	ALA	3.9
2	B	244	GLY	3.8
2	B	409	THR	3.8
1	A	37	PRO	3.8
1	A	73	THR	3.7
1	A	341	ILE	3.6
2	B	82	GLY	3.5
1	A	41	THR	3.5
2	B	75	SER	3.4
2	B	212	PHE	3.4
2	B	397	TRP	3.3
2	B	46[B]	ARG	3.3
1	A	334	THR	3.3
1	A	43	GLY	3.3
2	B	58	LYS	3.2
2	B	219	THR	3.2
2	B	245	GLN	3.2
2	B	291	GLN	3.2
2	B	72	THR	3.1
1	A	309	HIS	3.1
2	B	276	ARG	3.1
1	A	348	PRO	3.1
2	B	335	ASN	3.0
1	A	42	ILE	3.0
1	A	331	ALA	3.0
2	B	34	GLY	3.0
2	B	274	THR	3.0
2	B	130	LEU	2.9
2	B	222	TYR	2.9
1	A	85	GLN	2.9
2	B	336	LYS	2.9
3	F	65	VAL	2.9
2	B	83	GLN	2.9
1	A	409	VAL	2.9
1	A	347	CYS	2.8
2	B	218	THR	2.8
2	B	411	ALA	2.8
2	B	253	LEU	2.8

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Mol	Chain	Res	Type	RSRZ
2	B	361	LEU	2.8
2	B	57	ASN	2.8
2	B	429	THR	2.8
2	B	84	ILE	2.8
2	B	117	LEU	2.8
2	B	286	VAL	2.7
1	A	340	SER	2.7
1	A	2	ARG	2.7
2	B	129[A]	CYS	2.7
1	A	430	LYS	2.7
2	B	35	SER	2.7
2	B	285	THR	2.7
2	B	89	ASN	2.6
2	B	193	VAL	2.6
2	B	243	PRO	2.6
2	B	427	ASP	2.6
3	F	28	ASP	2.5
2	B	242	PHE	2.5
2	B	121	ARG	2.5
2	B	327	ASP	2.5
2	B	78	SER	2.4
2	B	331	LEU	2.4
2	B	111	GLU	2.4
2	B	246	LEU	2.4
2	B	2	ARG	2.4
2	B	38	GLY	2.4
2	B	416	ASN	2.4
3	F	13	ASP	2.4
2	B	54	ALA	2.4
2	B	14	ASN	2.4
2	B	289	LEU	2.3
2	B	55	THR	2.3
3	F	148	THR	2.3
2	B	410	GLU	2.3
2	B	338	SER	2.3
2	B	239	CYS	2.2
2	B	128	ASP	2.2
2	B	333	VAL	2.2
3	F	145	PHE	2.2
3	F	162	ALA	2.2
2	B	396	HIS	2.2
2	B	215	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	221	ARG	2.2
2	B	238	THR	2.2
2	B	24	ILE	2.2
1	A	46	ASP	2.2
2	B	81	PHE	2.1
2	B	389	PHE	2.1
2	B	271	ALA	2.1
1	A	337	THR	2.1
2	B	221	THR	2.1
2	B	156	ARG	2.1
3	F	32	ILE	2.1
2	B	118	ASP	2.1
1	A	282	TYR	2.1
2	B	330	MET	2.1
2	B	44	LEU	2.1
3	F	31	ARG	2.1
1	A	416	GLY	2.1
2	B	278	SER	2.1
2	B	357	PRO	2.1
3	F	150	PHE	2.1
1	A	256	GLN	2.0
1	A	130	THR	2.0
2	B	53	GLU	2.0
3	F	163	GLU	2.0
1	A	82	THR	2.0
2	B	365	ALA	2.0
1	A	62	VAL	2.0
2	B	106	TYR	2.0
2	B	247	ASN	2.0
1	A	433	GLU	2.0
3	F	166	GLN	2.0

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

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

## 6.3　Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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
8	VYT	B	502	23/23	0.73	0.27	36,45,59,61	0
4	GTP	A	501	32/32	0.90	0.16	13,20,26,33	0
6	CA	A	503	1/1	0.92	0.06	32,32,32,32	0
7	GDP	B	501	28/28	0.93	0.14	23,31,35,37	0
5	MG	A	502	1/1	0.98	0.17	5,5,5,5	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 GTP A 501:

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

Electron density around GDP B 501:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.