



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 13, 2017 – 05:23 PM EST

PDB ID : 5H74  
Title : Crystal structure of T2R-TTL-14b complex  
Authors : Wang, Y.; Yu, Y.; Chen, Q.; Yang, J.  
Deposited on : unknown  
Resolution : 2.60 Å(reported)

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

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

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20030345  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20030345

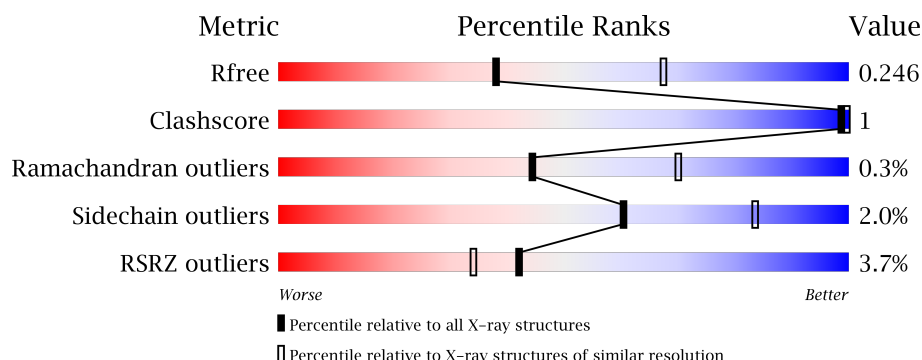
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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))
$R_{free}$	100719	2542 (2.60-2.60)
Clashscore	112137	2895 (2.60-2.60)
Ramachandran outliers	110173	2848 (2.60-2.60)
Sidechain outliers	110143	2848 (2.60-2.60)
RSRZ outliers	101464	2550 (2.60-2.60)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	450	<div> <div>2%</div> <div> <div></div> <div>94%</div> <div></div> </div> <div></div> </div>
1	C	450	<div> <div></div> <div>94%</div> <div></div> </div> <div></div>
2	B	445	<div> <div></div> <div>94%</div> <div></div> </div> <div></div>
2	D	445	<div> <div>4%</div> <div>91%</div> <div></div> </div> <div>5%</div>
3	E	143	<div> <div>3%</div> <div>82%</div> <div></div> </div> <div>15%</div>

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Mol	Chain	Length	Quality of chain
4	F	384	

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
10	7LG	D	503	-	-	-	X
9	MES	C	504	-	-	-	X

## 2 Entry composition

There are 12 unique types of molecules in this entry. The entry contains 17862 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	C	N	O	S	0	0	0
			3416	2163	581	650	22			
1	C	440	Total	C	N	O	S	0	0	0
			3437	2175	584	656	22			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	428	Total	C	N	O	S	0	0	0
			3369	2115	577	650	27			
2	D	424	Total	C	N	O	S	0	0	0
			3333	2093	568	645	27			

- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	121	Total	C	N	O	S	0	0	0
			1000	617	181	197	5			

There are 2 discrepancies between the modelled and reference sequences:

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

- Molecule 4 is a protein called Uncharacterized protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	334	Total	C	N	O	S	0	0	0
			2744	1761	470	499	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
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		
5	D	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	B	1	Total	Mg	0	0
			1	1		
6	A	1	Total	Mg	0	0
			1	1		
6	D	1	Total	Mg	0	0
			1	1		

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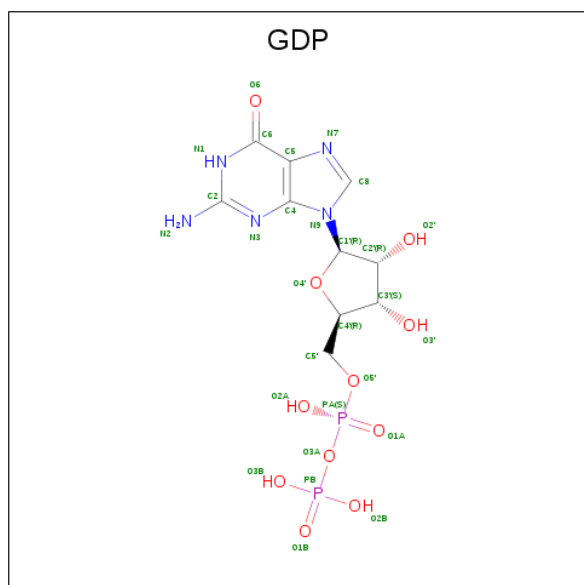
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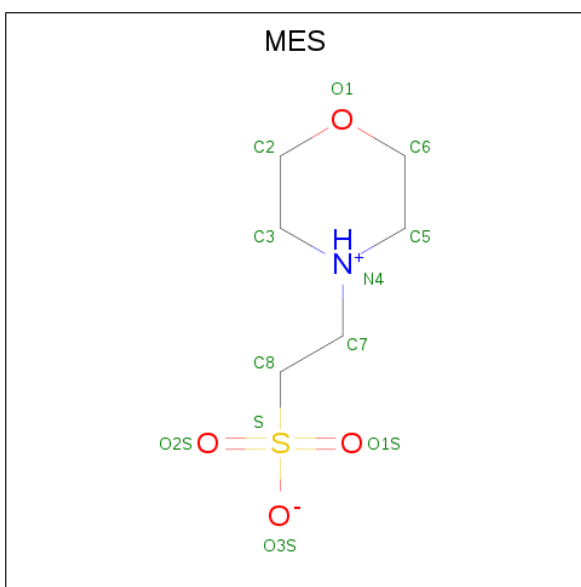
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	C	1	Total	Mg	0	0
			1	1		

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

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

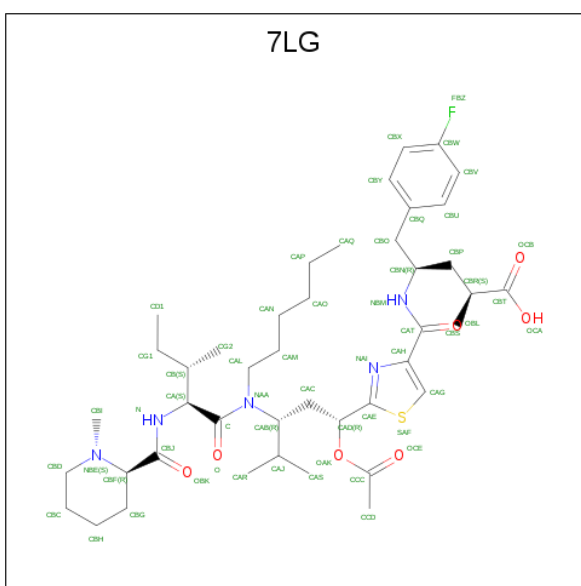
- Molecule 8 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C<sub>10</sub>H<sub>15</sub>N<sub>5</sub>O<sub>11</sub>P<sub>2</sub>).





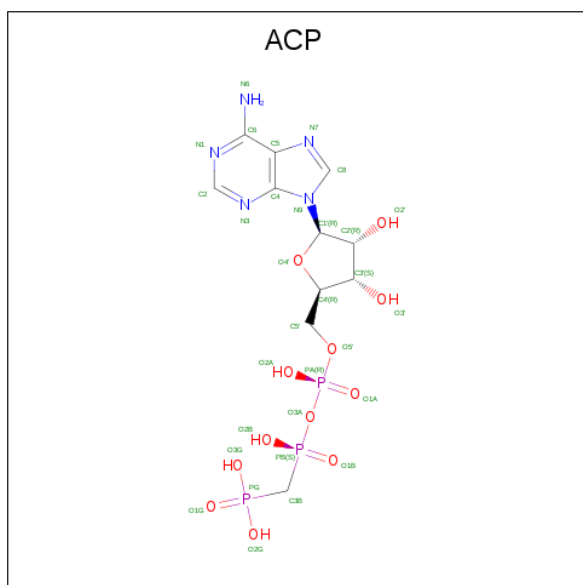
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
9	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
9	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
9	C	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 10 is (2 {S},4 {R})-4-[[2-[(1 {R},3 {R})-1-acetyloxy-3-[hexyl-[(2 {S},3 {S})-3-methyl-2-[[[(2 {R})-1-methylpiperidin-2-yl]carbonylamino]pentanoyl]amino]-4-methyl-pentyl]-1,3-thiazol-4-yl]carbonylamino]-5-(4-fluorophenyl)-2-methyl-pentanoic acid (three-letter code: 7LG) (formula: C<sub>43</sub>H<sub>66</sub>FN<sub>5</sub>O<sub>7</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
10	B	1	Total	C	F	N	O	S	
			57	43	1	5	7	1	0
10	D	1	Total	C	F	N	O	S	
			57	43	1	5	7	1	0

- Molecule 11 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
11	F	1	Total	C	N	O	P		
			31	11	5	12	3	0	0

- Molecule 12 is water.

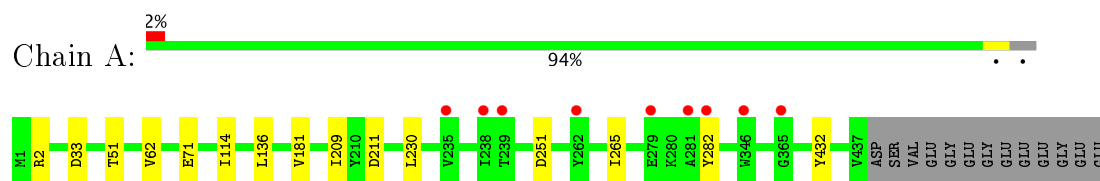
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	A	64	Total	O		
			64	64	0	0
12	B	67	Total	O		
			67	67	0	0
12	C	87	Total	O		
			87	87	0	0
12	D	12	Total	O		
			12	12	0	0
12	E	6	Total	O		
			6	6	0	0
12	F	16	Total	O		
			16	16	0	0



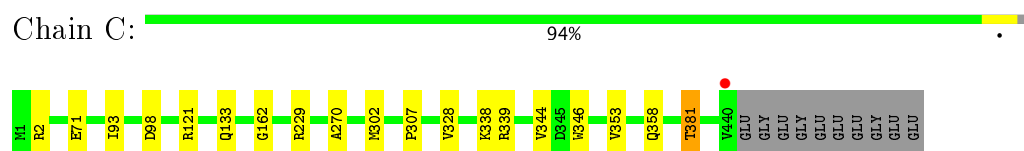
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

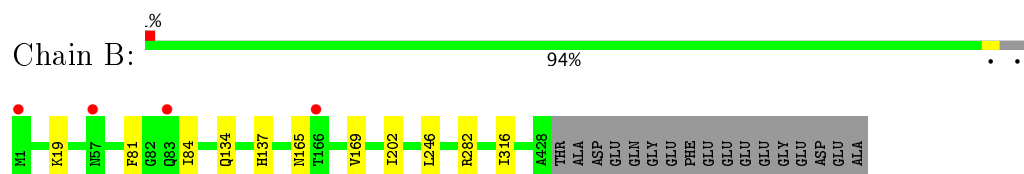
- Molecule 1: Tubulin alpha-1B chain



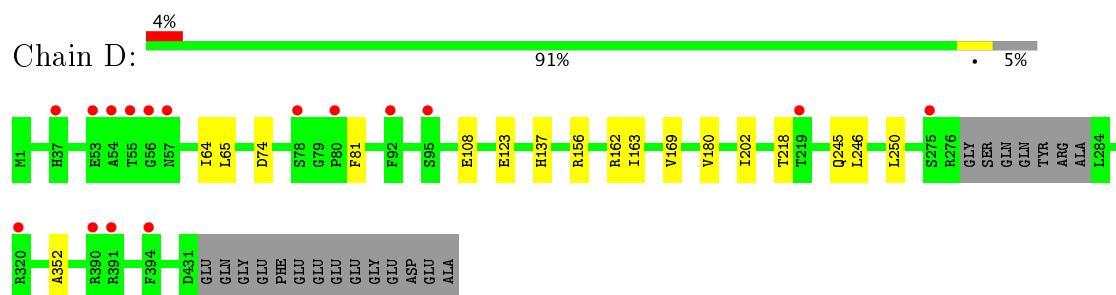
- Molecule 1: Tubulin alpha-1B chain



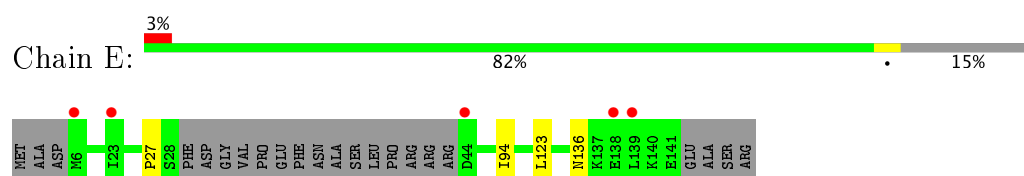
- Molecule 2: Tubulin beta-2B chain



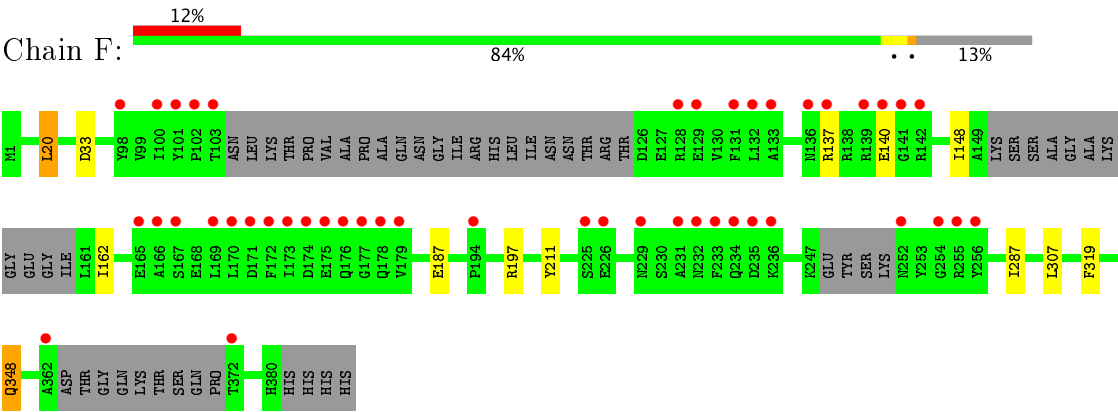
- Molecule 2: Tubulin beta-2B chain



- Molecule 3: Stathmin-4



● Molecule 4: Uncharacterized protein



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	104.41Å 154.03Å 185.65Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.60 35.46 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.7 (50.00-2.60) 99.8 (35.46-2.60)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.38 (at 2.61Å)	Xtriage
Refinement program	REFMAC 5.8.0135	Depositor
R, $R_{free}$	0.201 , 0.248 0.202 , 0.246	Depositor DCC
$R_{free}$ test set	4588 reflections (5.22%)	DCC
Wilson B-factor (Å <sup>2</sup> )	42.5	Xtriage
Anisotropy	0.386	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 31.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	17862	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	50.0	wwPDB-VP

Xtriage'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.*

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

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

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GDP, MG, CA, GTP, ACP, MES, 7LG

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	0.40	0/3494	0.61	0/4743
1	C	0.40	0/3515	0.63	0/4772
2	B	0.40	0/3444	0.61	0/4664
2	D	0.40	0/3406	0.60	0/4613
3	E	0.41	0/1008	0.59	0/1337
4	F	0.40	0/2806	0.59	0/3791
All	All	0.40	0/17673	0.61	0/23920

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3416	0	3331	3	0
1	C	3437	0	3348	8	0
2	B	3369	0	3250	3	0
2	D	3333	0	3214	4	0
3	E	1000	0	1018	1	0
4	F	2744	0	2709	3	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
5	D	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	1	0	0	0	0
7	C	1	0	0	0	0
8	B	28	0	12	0	0
9	B	24	0	26	0	0
9	C	12	0	13	0	0
10	B	57	0	0	0	0
10	D	57	0	0	0	0
11	F	31	0	14	0	0
12	A	64	0	0	0	0
12	B	67	0	0	0	0
12	C	87	0	0	0	0
12	D	12	0	0	0	0
12	E	6	0	0	0	0
12	F	16	0	0	0	0
All	All	17862	0	16971	21	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 1.

All (21) 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)
1:A:265:ILE:HG23	1:A:432:TYR:CE1	2.37	0.59
2:D:246:LEU:HD12	2:D:352:ALA:HB2	1.91	0.52
2:D:64:ILE:HD11	2:D:123:GLU:HG3	1.91	0.51
2:B:134:GLN:HA	2:B:165:ASN:O	2.09	0.51
2:D:163:ILE:HG21	2:D:250:LEU:HB3	1.92	0.51
1:C:307:PRO:HB3	1:C:381:THR:HG21	1.92	0.51
1:C:71:GLU:HB2	1:C:98:ASP:HB3	1.93	0.51
2:B:169:VAL:HA	2:B:202:ILE:O	2.15	0.46
4:F:287:ILE:HG23	4:F:319:PHE:CE2	2.50	0.46
1:C:344:VAL:HG21	1:C:346:TRP:CE2	2.51	0.45
4:F:20:LEU:HD11	4:F:348:GLN:HG2	1.98	0.44
1:C:162:GLY:HA2	3:E:94:ILE:HD11	1.99	0.44
1:A:209:ILE:HG23	1:A:230:LEU:HD23	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:169:VAL:HA	2:D:202:ILE:O	2.19	0.42
1:C:93:ILE:HD11	1:C:121:ARG:HG3	2.00	0.42
1:A:2:ARG:O	1:A:51:THR:HG23	2.20	0.41
1:C:270:ALA:HB3	1:C:302:MET:CE	2.50	0.41
2:B:81:PHE:O	2:B:84:ILE:HG22	2.21	0.41
4:F:148:ILE:HD13	4:F:162:ILE:HG12	2.02	0.41
1:C:328:VAL:HG11	1:C:353:VAL:HG11	2.03	0.41
1:C:270:ALA:HB3	1:C:302:MET:HE2	2.03	0.41

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	435/450 (97%)	427 (98%)	7 (2%)	1 (0%)	51	76
1	C	438/450 (97%)	425 (97%)	11 (2%)	2 (0%)	32	58
2	B	426/445 (96%)	417 (98%)	9 (2%)	0	100	100
2	D	420/445 (94%)	407 (97%)	12 (3%)	1 (0%)	51	76
3	E	117/143 (82%)	115 (98%)	0	2 (2%)	11	21
4	F	324/384 (84%)	309 (95%)	15 (5%)	0	100	100
All	All	2160/2317 (93%)	2100 (97%)	54 (2%)	6 (0%)	44	70

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	338	LYS
3	E	136	ASN
1	A	282	TYR
1	C	339	ARG

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Mol	Chain	Res	Type
3	E	27	PRO
2	D	81	PHE

### 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	368/378 (97%)	360 (98%)	8 (2%)	57	81
1	C	371/378 (98%)	366 (99%)	5 (1%)	73	90
2	B	370/383 (97%)	365 (99%)	5 (1%)	71	89
2	D	367/383 (96%)	358 (98%)	9 (2%)	53	79
3	E	109/127 (86%)	108 (99%)	1 (1%)	82	93
4	F	301/342 (88%)	292 (97%)	9 (3%)	46	74
All	All	1886/1991 (95%)	1849 (98%)	37 (2%)	60	83

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	33	ASP
1	A	62	VAL
1	A	71	GLU
1	A	114	ILE
1	A	136	LEU
1	A	181	VAL
1	A	211	ASP
1	A	251	ASP
2	B	19	LYS
2	B	137	HIS
2	B	246	LEU
2	B	282	ARG
2	B	316	ILE
1	C	2	ARG
1	C	133	GLN
1	C	229	ARG

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Mol	Chain	Res	Type
1	C	358	GLN
1	C	381	THR
2	D	65	LEU
2	D	74	ASP
2	D	108	GLU
2	D	137	HIS
2	D	156	ARG
2	D	162	ARG
2	D	180	VAL
2	D	218	THR
2	D	245	GLN
3	E	123	LEU
4	F	20	LEU
4	F	33	ASP
4	F	137	ARG
4	F	140	GLU
4	F	187	GLU
4	F	197	ARG
4	F	211	TYR
4	F	307	LEU
4	F	348	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	11	GLN
1	A	406	HIS
2	B	15	GLN
2	B	245	GLN
2	D	8	GLN
4	F	252	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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



## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

Of 16 ligands modelled in this entry, 6 are monoatomic - leaving 10 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	GTP	A	501	6	27,34,34	1.11	3 (11%)	27,54,54	1.94	6 (22%)
8	GDP	B	501	-	25,30,30	1.11	2 (8%)	26,47,47	2.07	6 (23%)
9	MES	B	503	-	12,12,12	1.87	1 (8%)	14,16,16	8.16	6 (42%)
9	MES	B	504	-	12,12,12	2.27	1 (8%)	14,16,16	1.81	2 (14%)
10	7LG	B	505	-	51,59,59	1.45	4 (7%)	59,80,80	2.04	7 (11%)
5	GTP	C	501	6	27,34,34	1.08	2 (7%)	27,54,54	2.09	6 (22%)
9	MES	C	504	-	12,12,12	2.08	1 (8%)	14,16,16	1.72	3 (21%)
5	GTP	D	501	6	27,34,34	1.18	3 (11%)	27,54,54	2.06	6 (22%)
10	7LG	D	503	-	51,59,59	1.54	5 (9%)	59,80,80	1.51	10 (16%)
11	ACP	F	401	-	27,33,33	1.77	7 (25%)	30,52,52	1.66	3 (10%)

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
5	GTP	A	501	6	-	0/18/38/38	0/3/3/3
8	GDP	B	501	-	-	0/12/32/32	0/3/3/3
9	MES	B	503	-	-	0/6/14/14	0/1/1/1
9	MES	B	504	-	-	0/6/14/14	0/1/1/1
10	7LG	B	505	-	-	0/56/79/79	1/3/3/3
5	GTP	C	501	6	-	0/18/38/38	0/3/3/3
9	MES	C	504	-	-	0/6/14/14	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GTP	D	501	6	-	0/18/38/38	0/3/3/3
10	7LG	D	503	-	-	0/56/79/79	1/3/3/3
11	ACP	F	401	-	-	0/15/38/38	0/3/3/3

All (29) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	B	504	MES	C8-S	-7.56	1.66	1.77
9	C	504	MES	C8-S	-6.83	1.67	1.77
10	D	503	7LG	CAH-CAT	-6.13	1.36	1.50
9	B	503	MES	C8-S	-5.97	1.68	1.77
10	B	505	7LG	CAH-CAT	-5.95	1.36	1.50
10	D	503	7LG	CBO-CBQ	-4.17	1.41	1.51
10	B	505	7LG	CBO-CBQ	-4.04	1.41	1.51
10	D	503	7LG	CAE-SAF	-3.16	1.63	1.73
11	F	401	ACP	PG-O2G	-2.67	1.48	1.54
10	B	505	7LG	CAE-SAF	-2.12	1.66	1.73
5	A	501	GTP	O4'-C1'	2.01	1.44	1.41
10	D	503	7LG	CAC-CAB	2.07	1.56	1.53
11	F	401	ACP	PB-O2B	2.20	1.61	1.56
11	F	401	ACP	C2-N3	2.22	1.35	1.32
5	D	501	GTP	PG-O3B	2.34	1.63	1.60
10	D	503	7LG	CBG-CBF	2.52	1.58	1.53
10	B	505	7LG	CBG-CBF	2.77	1.58	1.53
8	B	501	GDP	C5-C4	2.84	1.46	1.40
11	F	401	ACP	PG-O3G	2.88	1.61	1.54
11	F	401	ACP	PB-O3A	2.89	1.61	1.58
5	D	501	GTP	C5-C4	2.98	1.47	1.40
5	C	501	GTP	C5-C4	2.99	1.47	1.40
5	C	501	GTP	C6-C5	3.04	1.47	1.41
5	A	501	GTP	C5-C4	3.07	1.47	1.40
5	A	501	GTP	C6-C5	3.23	1.47	1.41
11	F	401	ACP	C5-C4	3.26	1.47	1.40
5	D	501	GTP	C6-C5	3.38	1.47	1.41
8	B	501	GDP	C6-C5	3.42	1.47	1.41
11	F	401	ACP	PG-O1G	5.33	1.61	1.50

All (55) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	B	503	MES	O2S-S-C8	-20.73	88.98	106.79
9	B	503	MES	O3S-S-O2S	-12.85	81.91	111.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	B	503	MES	O2S-S-O1S	-9.15	82.14	113.86
11	F	401	ACP	N3-C2-N1	-6.84	122.90	128.86
10	B	505	7LG	CAM-CAL-NAA	-5.28	106.53	113.48
5	C	501	GTP	C6-C5-C4	-5.02	115.86	120.84
10	D	503	7LG	CAM-CAL-NAA	-4.72	107.27	113.48
8	B	501	GDP	C6-C5-C4	-4.44	116.43	120.84
5	A	501	GTP	C6-C5-C4	-4.17	116.70	120.84
8	B	501	GDP	C5-C6-N1	-4.17	117.55	123.48
5	D	501	GTP	C5-C6-N1	-4.05	117.72	123.48
5	D	501	GTP	C6-C5-C4	-4.04	116.83	120.84
5	C	501	GTP	N3-C2-N1	-3.80	121.90	127.46
5	C	501	GTP	C5-C6-N1	-3.76	118.14	123.48
5	A	501	GTP	C5-C6-N1	-3.72	118.19	123.48
5	D	501	GTP	N3-C2-N1	-3.63	122.16	127.46
8	B	501	GDP	N3-C2-N1	-3.53	122.30	127.46
10	D	503	7LG	CAH-CAG-SAF	-3.38	107.63	111.79
10	B	505	7LG	CAM-CAN-CAO	-3.27	97.59	114.45
5	A	501	GTP	N3-C2-N1	-3.10	122.93	127.46
11	F	401	ACP	PA-O3A-PB	-2.88	123.12	132.39
5	D	501	GTP	C4-C5-N7	-2.78	106.73	109.41
11	F	401	ACP	C4-C5-N7	-2.74	106.76	109.41
5	A	501	GTP	C4-C5-N7	-2.59	106.91	109.41
10	B	505	7LG	CBX-CBW-CBV	-2.45	119.45	122.86
10	B	505	7LG	CAH-CAG-SAF	-2.36	108.89	111.79
10	D	503	7LG	CBC-CBH-CBG	-2.35	106.56	111.42
10	D	503	7LG	CBX-CBW-CBV	-2.33	119.61	122.86
10	D	503	7LG	CAM-CAN-CAO	-2.16	103.33	114.45
5	C	501	GTP	C1'-N9-C4	-2.09	123.02	126.64
10	D	503	7LG	CBO-CBN-NBM	-2.05	106.47	110.47
8	B	501	GDP	C4-C5-N7	-2.04	107.44	109.41
10	B	505	7LG	CBY-CBX-CBW	2.14	120.60	118.35
9	C	504	MES	O3S-S-C8	2.37	108.97	106.06
10	D	503	7LG	CAH-CAT-NBM	2.44	120.17	115.20
9	B	504	MES	O1S-S-C8	2.58	109.01	106.79
10	D	503	7LG	CAD-OAK-CCC	3.07	120.02	117.26
10	D	503	7LG	OAK-CCC-CCD	3.07	116.86	111.10
10	D	503	7LG	CBP-CBN-NBM	3.27	118.71	110.59
9	C	504	MES	O1S-S-C8	3.59	109.87	106.79
5	A	501	GTP	C2-N3-C4	3.69	119.47	115.16
9	C	504	MES	O2S-S-C8	3.83	110.08	106.79
10	B	505	7LG	OAK-CCC-CCD	3.94	118.50	111.10
8	B	501	GDP	C2-N3-C4	4.30	120.17	115.16

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	501	GTP	C2-N3-C4	4.39	120.29	115.16
5	D	501	GTP	C2-N3-C4	4.63	120.56	115.16
5	A	501	GTP	C6-N1-C2	4.66	122.77	116.06
5	D	501	GTP	C6-N1-C2	4.86	123.06	116.06
5	C	501	GTP	C6-N1-C2	4.95	123.18	116.06
8	B	501	GDP	C6-N1-C2	4.99	123.24	116.06
9	B	504	MES	O3S-S-C8	5.18	112.43	106.06
9	B	503	MES	O3S-S-O1S	5.79	124.65	111.37
9	B	503	MES	O3S-S-C8	6.75	114.36	106.06
10	B	505	7LG	CAD-OAK-CCC	11.46	127.58	117.26
9	B	503	MES	O1S-S-C8	12.97	117.94	106.79

There are no chirality outliers.

There are no torsion outliers.

All (2) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	B	505	7LG	CBC-CBD-CBF-CBG-CBH-NBE
10	D	503	7LG	CBC-CBD-CBF-CBG-CBH-NBE

No monomer is involved in short contacts.

## 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 ⓘ

### 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	437/450 (97%)	-0.16	9 (2%) 64 58	26, 42, 65, 114	0
1	C	440/450 (97%)	-0.42	1 (0%) 94 95	23, 36, 57, 89	0
2	B	428/445 (96%)	-0.28	4 (0%) 84 81	24, 37, 67, 95	0
2	D	424/445 (95%)	0.19	16 (3%) 41 33	33, 56, 86, 112	0
3	E	121/143 (84%)	0.28	5 (4%) 38 30	36, 57, 85, 101	0
4	F	334/384 (86%)	0.43	46 (13%) 3 2	34, 65, 118, 141	0
All	All	2184/2317 (94%)	-0.05	81 (3%) 42 34	23, 46, 87, 141	0

All (81) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	F	372	THR	6.4
4	F	137	ARG	5.9
1	A	282	TYR	5.6
2	D	55	THR	5.1
4	F	175	GLU	5.0
4	F	177	GLY	4.9
4	F	140	GLU	4.6
4	F	234	GLN	4.6
4	F	255	ARG	4.5
2	D	80	PRO	4.3
2	D	391	ARG	4.3
4	F	232	ASN	4.1
4	F	178	GLN	4.0
4	F	236	LYS	3.7
2	D	57	ASN	3.7
4	F	103	THR	3.7
4	F	141	GLY	3.6
4	F	142	ARG	3.5
4	F	170	LEU	3.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	D	320	ARG	3.5
4	F	166	ALA	3.5
4	F	169	LEU	3.5
3	E	6	MET	3.5
2	D	56	GLY	3.5
2	D	390	ARG	3.5
4	F	101	TYR	3.5
4	F	256	TYR	3.4
4	F	171	ASP	3.4
2	D	92	PHE	3.3
4	F	167	SER	3.3
2	B	1	MET	3.3
4	F	133	ALA	3.3
1	A	235	VAL	3.2
2	D	53	GLU	3.2
4	F	174	ASP	3.2
1	C	440	VAL	3.1
4	F	235	ASP	3.1
1	A	281	ALA	3.1
1	A	279	GLU	3.1
2	D	95	SER	3.1
4	F	136	ASN	3.0
4	F	176	GLN	2.9
4	F	233	PHE	2.9
4	F	173	ILE	2.9
4	F	128	ARG	2.9
2	D	54	ALA	2.8
3	E	138	GLU	2.8
3	E	44	ASP	2.8
4	F	179	VAL	2.7
4	F	165	GLU	2.7
4	F	139	ARG	2.7
4	F	231	ALA	2.7
4	F	98	TYR	2.6
1	A	346	TRP	2.6
4	F	102	PRO	2.5
1	A	262	TYR	2.5
2	D	219	THR	2.5
4	F	132	LEU	2.5
1	A	365	GLY	2.5
4	F	194	PRO	2.5
4	F	131	PHE	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	238	ILE	2.4
2	B	83	GLN	2.4
4	F	226	GLU	2.4
2	D	78	SER	2.3
3	E	139	LEU	2.3
2	D	394	PHE	2.3
2	D	275	SER	2.3
1	A	239	THR	2.3
4	F	252	ASN	2.3
2	D	37	HIS	2.2
4	F	229	ASN	2.2
4	F	172	PHE	2.2
4	F	225	SER	2.2
2	B	57	ASN	2.2
4	F	100	ILE	2.2
4	F	129	GLU	2.2
2	B	166	THR	2.1
4	F	362	ALA	2.1
3	E	23	ILE	2.1
4	F	254	GLY	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
9	MES	C	504	12/12	0.70	0.49	14.09	104,108,127,129	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
10	7LG	D	503	57/57	0.86	0.37	3.34	70,74,87,91	0
10	7LG	B	505	57/57	0.94	0.17	1.40	31,36,44,47	0
9	MES	B	504	12/12	0.91	0.18	0.93	61,65,74,74	0
8	GDP	B	501	28/28	0.98	0.16	0.16	25,28,30,31	0
9	MES	B	503	12/12	0.94	0.17	0.13	68,69,70,71	0
5	GTP	D	501	32/32	0.92	0.18	0.01	44,49,80,86	0
11	ACP	F	401	31/31	0.87	0.17	-0.89	77,86,112,116	0
5	GTP	A	501	32/32	0.98	0.12	-0.93	27,29,32,32	0
5	GTP	C	501	32/32	0.98	0.11	-1.13	25,26,29,29	0
7	CA	A	503	1/1	0.97	0.06	-2.00	58,58,58,58	0
7	CA	C	503	1/1	0.93	0.07	-4.02	46,46,46,46	0
6	MG	D	502	1/1	0.87	0.21	-	71,71,71,71	0
6	MG	A	502	1/1	0.98	0.05	-	34,34,34,34	0
6	MG	B	502	1/1	0.97	0.22	-	38,38,38,38	0
6	MG	C	502	1/1	0.87	0.12	-	36,36,36,36	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.