



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 15, 2017 – 02:30 am GMT

PDB ID : 4EB6  
Title : Tubulin-Vinblastine: Stathmin-like complex  
Authors : Ranaivoson, F.M.; Gigant, B.; Knossow, M.  
Deposited on : 2012-03-23  
Resolution : 3.47 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : trunk28620  
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) : recalc28949

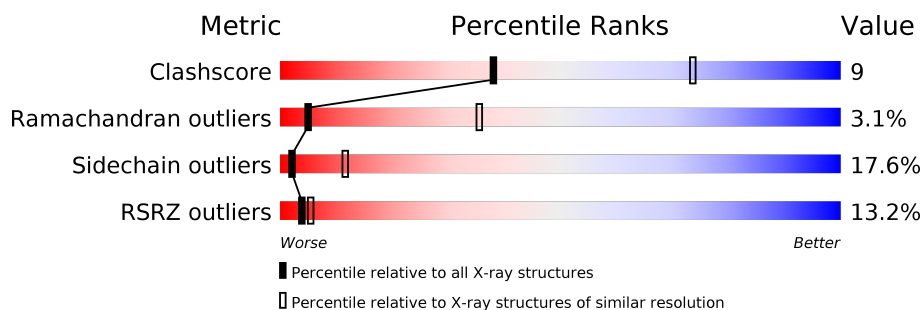
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.47 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))
Clashscore	112137	1096 (3.56-3.40)
Ramachandran outliers	110173	1063 (3.56-3.40)
Sidechain outliers	110143	1064 (3.56-3.40)
RSRZ outliers	101464	1019 (3.56-3.40)

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	451	<div> <div>17%</div> <div>63%</div> <div>28%</div> <div>• •</div> </div>
1	C	451	<div> <div>10%</div> <div>65%</div> <div>26%</div> <div>5%</div> <div>•</div> </div>
2	B	445	<div> <div>13%</div> <div>64%</div> <div>28%</div> <div>5%</div> <div>•</div> </div>
2	D	445	<div> <div>9%</div> <div>64%</div> <div>29%</div> <div>• •</div> </div>
3	E	142	<div> <div>18%</div> <div>68%</div> <div>21%</div> <div>• • 7%</div> </div>

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
6	SO4	A	504	-	-	-	X
6	SO4	D	502	-	-	-	X

## 2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 14918 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 chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	433	Total	C	N	O	S	0	1	0
			3399	2153	577	647	22			
1	C	432	Total	C	N	O	S	0	4	0
			3408	2161	576	648	23			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	232	SER	GLY	SEE REMARK 999	UNP D0VWZ0
A	340	SER	THR	SEE REMARK 999	UNP D0VWZ0
C	232	SER	GLY	SEE REMARK 999	UNP D0VWZ0
C	340	SER	THR	SEE REMARK 999	UNP D0VWZ0

- Molecule 2 is a protein called Tubulin beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	432	Total	C	N	O	S	0	2	0
			3400	2130	582	662	26			
2	D	432	Total	C	N	O	S	0	1	0
			3394	2127	580	661	26			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	317	THR	ALA	SEE REMARK 999	UNP D0VWY9
B	318	ILE	VAL	SEE REMARK 999	UNP D0VWY9
B	335	ILE	VAL	SEE REMARK 999	UNP D0VWY9
B	375	SER	ALA	SEE REMARK 999	UNP D0VWY9
D	317	THR	ALA	SEE REMARK 999	UNP D0VWY9
D	318	ILE	VAL	SEE REMARK 999	UNP D0VWY9
D	335	ILE	VAL	SEE REMARK 999	UNP D0VWY9
D	375	SER	ALA	SEE REMARK 999	UNP D0VWY9

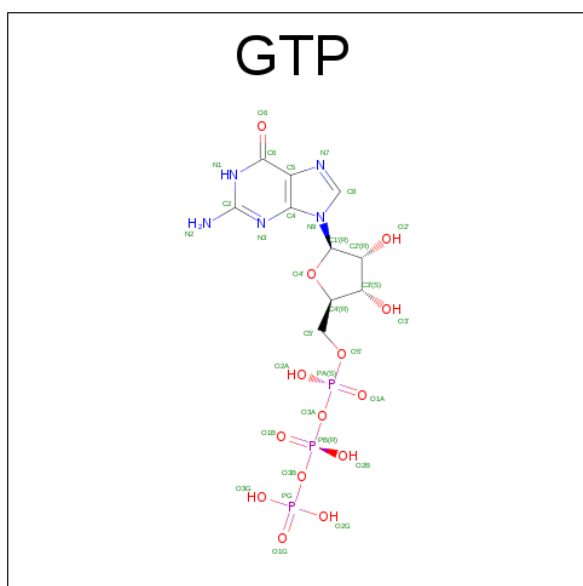
- Molecule 3 is a protein called Stathmin-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	132	Total	C	N	O	S	0	1	0
			1080	669	195	212	4			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	4	ALA	-	EXPRESSION TAG	UNP P63043
E	14	ALA	CYS	ENGINEERED MUTATION	UNP P63043
E	20	TRP	PHE	ENGINEERED MUTATION	UNP P63043

- 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
4	A	1	Total	C	N	O	P	0	0
			32	10	5	14	3		
4	C	1	Total	C	N	O	P	0	0
			32	10	5	14	3		

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

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

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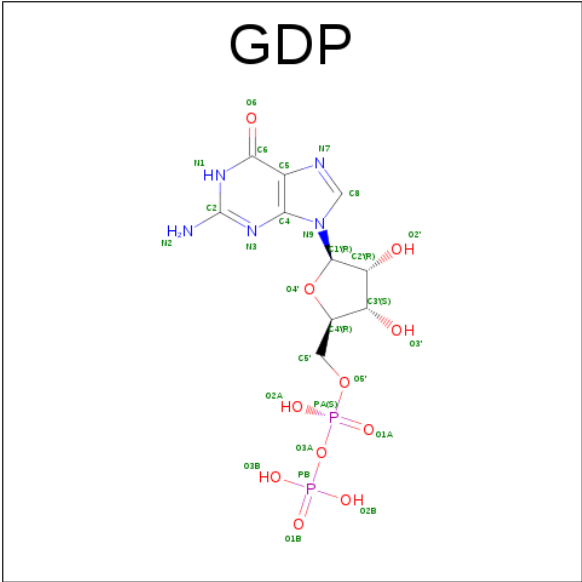
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	C	1	Total	Mg	0	0
			1	1		

- Molecule 6 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



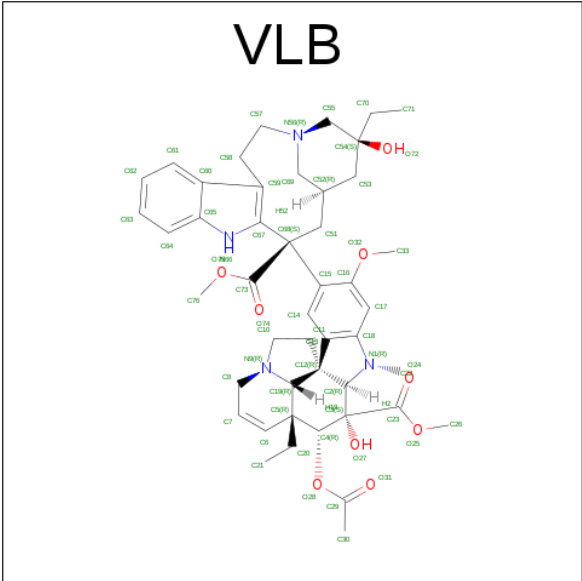
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	S	0	0
			5	4	1		
6	A	1	Total	O	S	0	0
			5	4	1		
6	B	1	Total	O	S	0	0
			5	4	1		
6	D	1	Total	O	S	0	0
			5	4	1		
6	D	1	Total	O	S	0	0
			5	4	1		

- Molecule 7 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
7	B	1	Total	C	N	O	P	0	0
			28	10	5	11	2		
7	D	1	Total	C	N	O	P	0	0
			28	10	5	11	2		

- Molecule 8 is (2ALPHA,2'BETA,3BETA,4ALPHA,5BETA)-VINCALEUKOBLASTINE (three-letter code: VLB) (formula: C<sub>46</sub>H<sub>58</sub>N<sub>4</sub>O<sub>9</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	C	1	Total	C	N	O	0	0
			59	46	4	9		

- Molecule 9 is water.

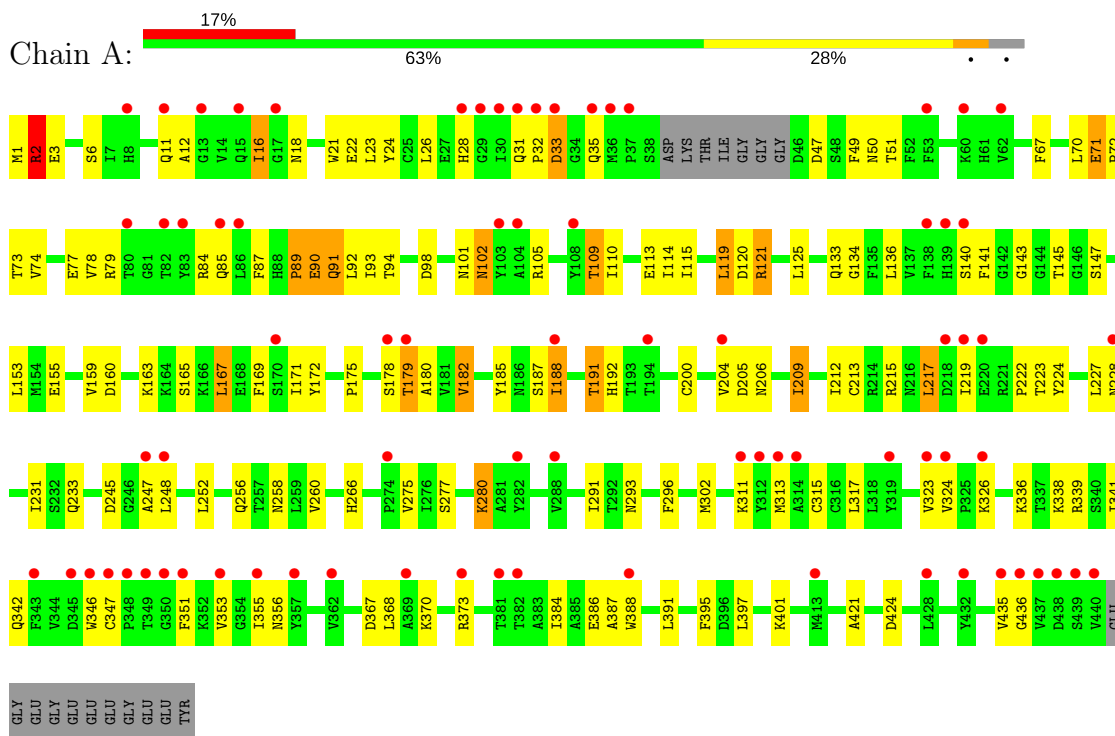
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	5	Total 5	O 5	0	0
9	B	3	Total 3	O 3	0	0
9	C	13	Total 13	O 13	0	0
9	D	9	Total 9	O 9	0	0
9	E	1	Total 1	O 1	0	0



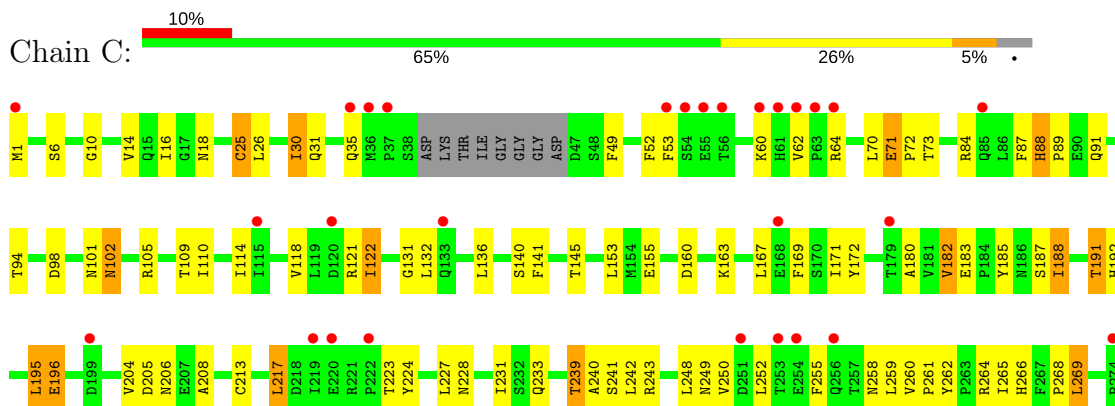
### 3 Residue-property plots [i](#)

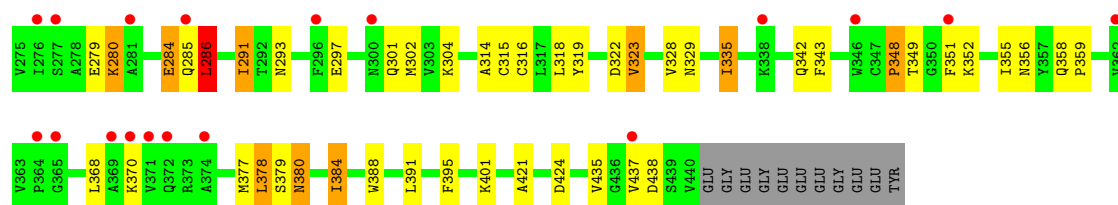
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are 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 chain

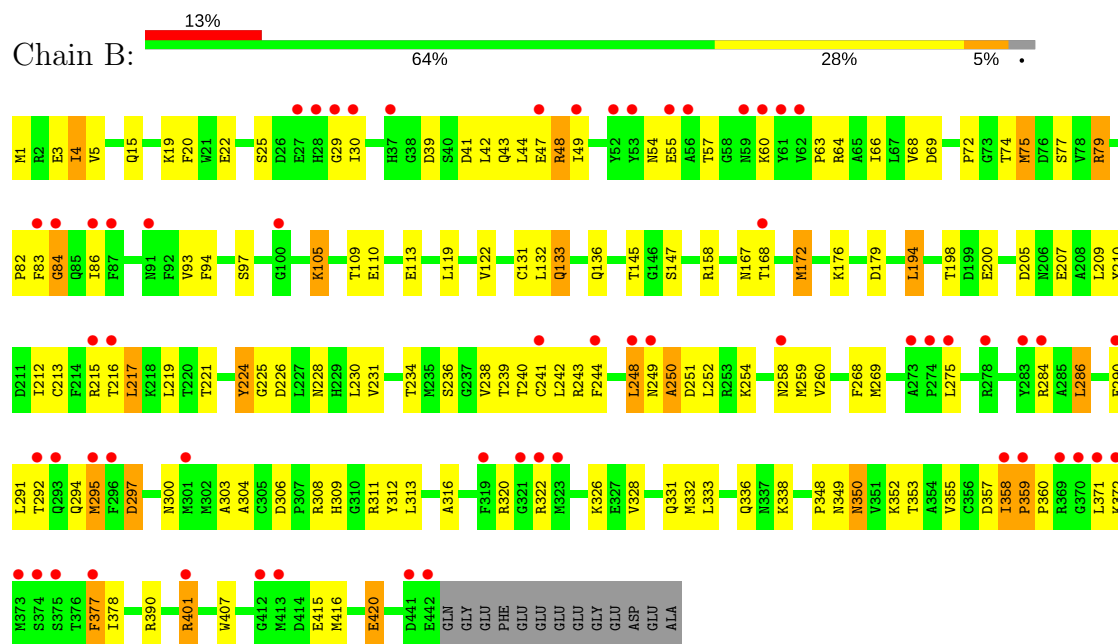


#### • Molecule 1: Tubulin alpha chain

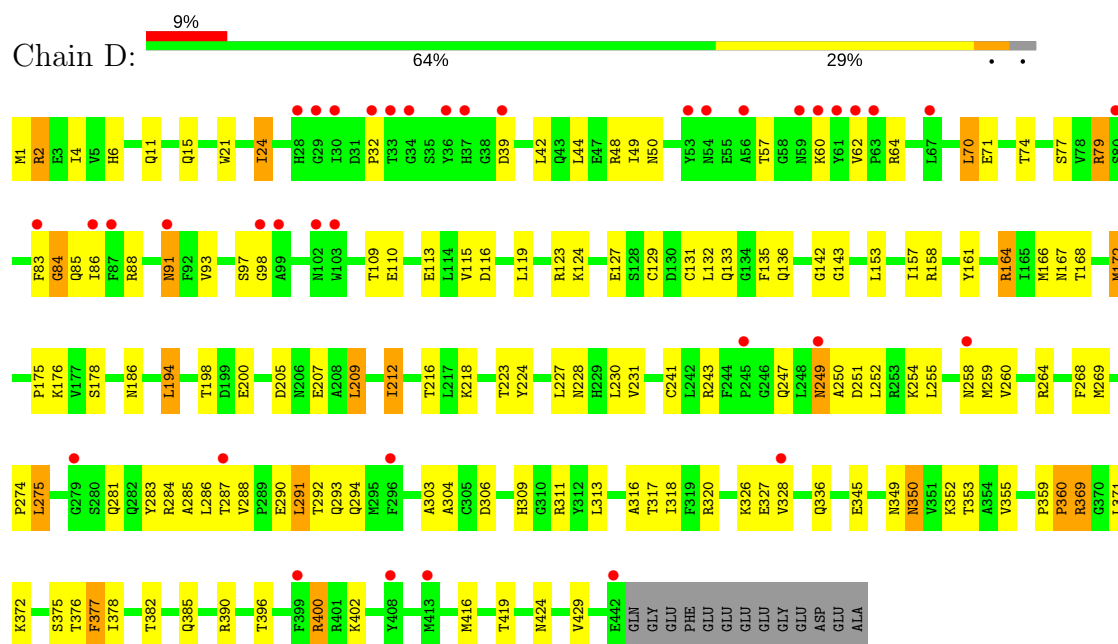




• Molecule 2: Tubulin beta chain

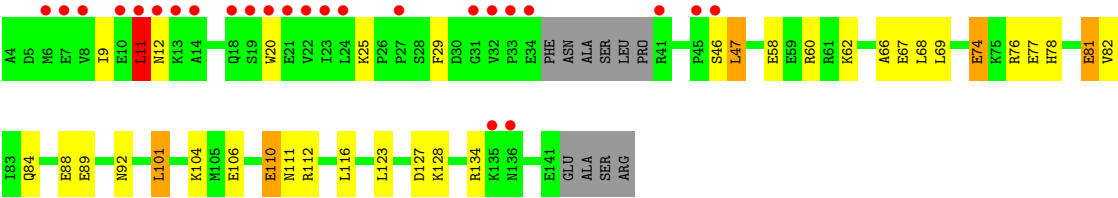


• Molecule 2: Tubulin beta chain



• Molecule 3: Stathmin-4





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	64.69Å 129.68Å 252.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.06 – 3.47 43.06 – 3.47	Depositor EDS
% Data completeness (in resolution range)	(Not available) (43.06-3.47) 99.2 (43.06-3.47)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.17 (at 3.48Å)	Xtriage
Refinement program	BUSTER 2.8.0	Depositor
R, $R_{free}$	0.213 , 0.253 (Not available) , (Not available)	Depositor DCC
$R_{free}$ test set	NotAvailable	DCC
Wilson B-factor (Å <sup>2</sup> )	119.2	Xtriage
Anisotropy	0.677	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 140.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.42$ , $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	14918	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	174.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.88% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GDP, GTP, MG, VLB, SO4

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	0/3479	0.72	1/4723 (0.0%)
1	C	0.40	0/3495	0.73	1/4745 (0.0%)
2	B	0.40	0/3485	0.73	0/4720
2	D	0.41	0/3471	0.73	0/4701
3	E	0.40	0/1095	0.68	0/1459
All	All	0.40	0/15025	0.73	2/20348 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	89	PRO	N-CA-C	5.41	126.17	112.10
1	C	348	PRO	C-N-CA	5.20	134.70	121.70

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	3399	0	3312	54	0
1	C	3408	0	3322	61	0
2	B	3400	0	3266	68	0
2	D	3394	0	3268	62	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	E	1080	0	1077	10	0
4	A	32	0	12	4	0
4	C	32	0	12	3	0
5	A	1	0	0	0	0
5	C	1	0	0	0	0
6	A	10	0	0	0	0
6	B	5	0	0	0	0
6	D	10	0	0	0	0
7	B	28	0	12	0	0
7	D	28	0	12	2	0
8	C	59	0	58	13	0
9	A	5	0	0	0	0
9	B	3	0	0	0	0
9	C	13	0	0	0	0
9	D	9	0	0	0	0
9	E	1	0	0	0	0
All	All	14918	0	14351	255	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 9.

The worst 5 of 255 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)
8:C:503:VLB:H303	8:C:503:VLB:H213	1.50	0.93
2:B:212:ILE:HA	2:B:217:LEU:HG	1.55	0.86
2:B:221:THR:HA	8:C:503:VLB:H761	1.61	0.83
8:C:503:VLB:H582	8:C:503:VLB:H511	1.64	0.78
2:B:5:VAL:HG12	2:B:64:ARG:HG2	1.67	0.77

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	430/451 (95%)	374 (87%)	43 (10%)	13 (3%)	5	36
1	C	432/451 (96%)	382 (88%)	35 (8%)	15 (4%)	4	33
2	B	432/445 (97%)	380 (88%)	38 (9%)	14 (3%)	5	34
2	D	431/445 (97%)	385 (89%)	33 (8%)	13 (3%)	5	36
3	E	129/142 (91%)	114 (88%)	13 (10%)	2 (2%)	11	49
All	All	1854/1934 (96%)	1635 (88%)	162 (9%)	57 (3%)	5	35

5 of 57 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	32	PRO
1	A	89	PRO
1	A	179	THR
1	A	245	ASP
2	B	215	ARG

### 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	368/379 (97%)	295 (80%)	73 (20%)	1	7
1	C	370/379 (98%)	311 (84%)	59 (16%)	3	16
2	B	375/385 (97%)	313 (84%)	62 (16%)	2	14
2	D	374/385 (97%)	313 (84%)	61 (16%)	3	15
3	E	114/125 (91%)	89 (78%)	25 (22%)	1	5
All	All	1601/1653 (97%)	1321 (82%)	280 (18%)	2	12

5 of 280 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	353	THR

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Mol	Chain	Res	Type
1	C	122	ILE
3	E	47	LEU
2	B	371	LEU
1	C	49	PHE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 46 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	436	GLN
1	C	139	HIS
2	D	436	GLN
1	C	8	HIS
1	C	101	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 2 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
4	GTP	A	501	5	27,34,34	1.46	6 (22%)	27,54,54	2.06	7 (25%)
6	SO4	A	503	-	4,4,4	0.23	0	6,6,6	0.05	0
6	SO4	A	504	-	4,4,4	0.18	0	6,6,6	0.07	0
7	GDP	B	501	-	25,30,30	1.43	3 (12%)	26,47,47	1.98	6 (23%)
6	SO4	B	502	-	4,4,4	0.20	0	6,6,6	0.07	0
4	GTP	C	501	5	27,34,34	1.42	4 (14%)	27,54,54	2.06	8 (29%)
8	VLB	C	503	-	64,67,67	1.58	11 (17%)	73,108,108	2.53	20 (27%)
7	GDP	D	501	-	25,30,30	1.75	5 (20%)	26,47,47	2.14	7 (26%)
6	SO4	D	502	-	4,4,4	0.20	0	6,6,6	0.06	0
6	SO4	D	503	-	4,4,4	0.19	0	6,6,6	0.08	0

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
4	GTP	A	501	5	-	0/18/38/38	0/3/3/3
6	SO4	A	503	-	-	0/0/0/0	0/0/0/0
6	SO4	A	504	-	-	0/0/0/0	0/0/0/0
7	GDP	B	501	-	-	0/12/32/32	0/3/3/3
6	SO4	B	502	-	-	0/0/0/0	0/0/0/0
4	GTP	C	501	5	-	0/18/38/38	0/3/3/3
8	VLB	C	503	-	-	0/38/131/131	0/7/9/9
7	GDP	D	501	-	-	0/12/32/32	0/3/3/3
6	SO4	D	502	-	-	0/0/0/0	0/0/0/0
6	SO4	D	503	-	-	0/0/0/0	0/0/0/0

The worst 5 of 29 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	C	503	VLB	C5-C6	-4.55	1.42	1.51
8	C	503	VLB	C8-C7	-3.25	1.39	1.49
7	D	501	GDP	C8-N7	-2.93	1.29	1.34
8	C	503	VLB	C18-N1	-2.65	1.34	1.39
8	C	503	VLB	C30-C29	-2.38	1.41	1.49

The worst 5 of 48 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	C	503	VLB	C33-O32-C16	-6.46	108.23	117.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	C	503	VLB	O32-C16-C17	-5.91	114.21	124.17
7	D	501	GDP	N3-C2-N1	-5.19	119.88	127.46
4	A	501	GTP	N3-C2-N1	-4.55	120.81	127.46
4	C	501	GTP	N3-C2-N1	-4.46	120.94	127.46

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 22 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	501	GTP	4	0
4	C	501	GTP	3	0
8	C	503	VLB	13	0
7	D	501	GDP	2	0

## 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, 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	433/451 (96%)	0.90	77 (17%) 2 2	125, 187, 248, 265	0
1	C	432/451 (95%)	0.67	46 (10%) 7 8	105, 169, 233, 267	0
2	B	432/445 (97%)	0.70	60 (13%) 3 5	107, 165, 243, 269	2 (0%)
2	D	432/445 (97%)	0.50	38 (8%) 11 12	73, 142, 234, 251	2 (0%)
3	E	132/142 (92%)	0.99	25 (18%) 1 2	139, 209, 254, 266	0
All	All	1861/1934 (96%)	0.71	246 (13%) 4 5	73, 170, 244, 269	4 (0%)

The worst 5 of 246 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	61	HIS	11.1
1	A	313	MET	7.9
3	E	22	VAL	7.4
2	B	274	PRO	7.2
3	E	23	ILE	7.1

### 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
6	SO4	D	502	5/5	0.80	0.48	2.29	219,223,224,224	0
6	SO4	A	504	5/5	0.66	0.48	1.80	246,250,251,251	0
6	SO4	D	503	5/5	0.85	0.23	-0.28	159,164,165,165	0
4	GTP	A	501	32/32	0.97	0.31	-0.33	140,148,158,159	0
4	GTP	C	501	32/32	0.95	0.28	-0.34	134,138,144,149	0
8	VLB	C	503	59/59	0.90	0.26	-0.34	154,159,166,170	0
7	GDP	D	501	28/28	0.97	0.16	-0.99	113,117,125,130	0
7	GDP	B	501	28/28	0.98	0.21	-1.04	126,131,138,140	0
6	SO4	A	503	5/5	0.67	0.45	-	232,237,238,238	0
6	SO4	B	502	5/5	0.84	0.19	-	243,248,249,249	0
5	MG	C	502	1/1	0.98	0.22	-	121,121,121,121	0
5	MG	A	502	1/1	0.98	0.30	-	116,116,116,116	0

## 6.5 Other polymers

There are no such residues in this entry.