



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2018 – 09:31 pm GMT

PDB ID : 2NXJ
Title : T.thermophilus ribosomal protein L11 methyltransferase (PrmA) in space group P 21 21 2
Authors : Demirci, H.; Gregory, S.T.; Dahlberg, A.E.; Jogl, G.
Deposited on : 2006-11-17
Resolution : 2.30 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : trunk30967
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Refmac : 5.8.0158
CCP4 : 7.0 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30967

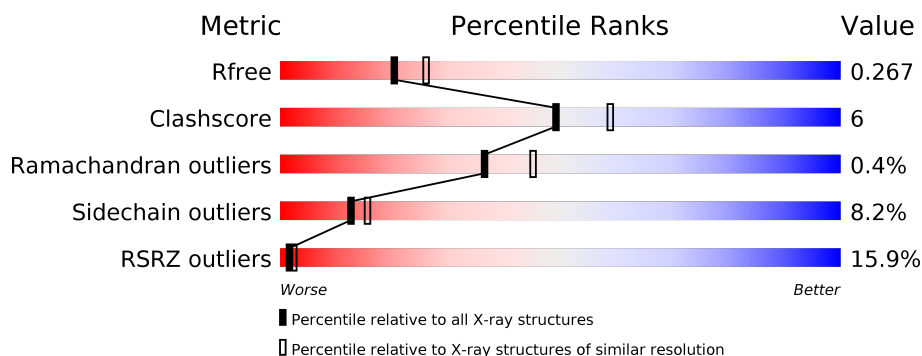
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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}	111664	4477 (2.30-2.30)
Clashscore	122126	5072 (2.30-2.30)
Ramachandran outliers	120053	5022 (2.30-2.30)
Sidechain outliers	120020	5021 (2.30-2.30)
RSRZ outliers	108989	4374 (2.30-2.30)

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 ≥ 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	254	
1	B	254	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 4089 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 Ribosomal protein L11 methyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	247	Total	C	N	O	S	0	0	0
			1911	1241	332	335	3			
1	B	244	Total	C	N	O	S	0	0	0
			1888	1228	327	330	3			

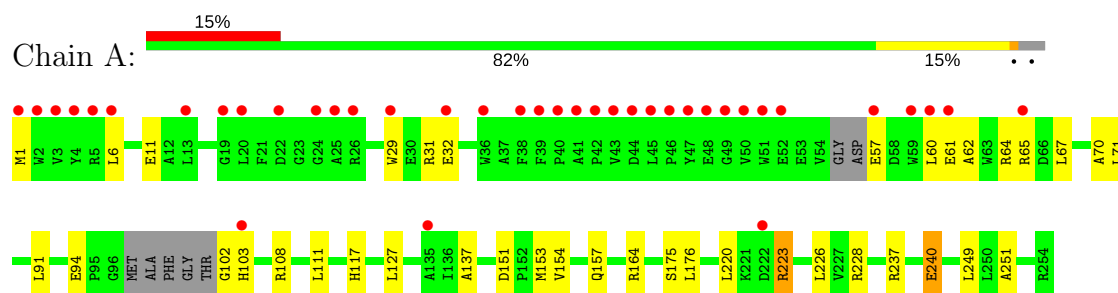
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	153	Total	O	0	0
			153	153		
2	B	137	Total	O	0	0
			137	137		

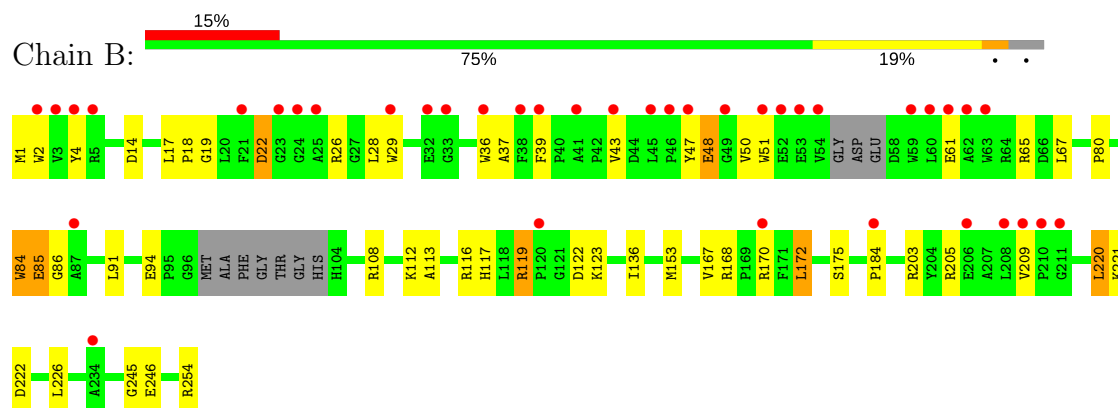
3 Residue-property plots [i](#)

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: Ribosomal protein L11 methyltransferase



- Molecule 1: Ribosomal protein L11 methyltransferase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	124.19Å 153.62Å 33.26Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.30 47.34 – 2.30	Depositor EDS
% Data completeness (in resolution range)	96.9 (30.00-2.30) 96.8 (47.34-2.30)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.43 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.208 , 0.276 0.204 , 0.267	Depositor DCC
R_{free} test set	1447 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	35.4	Xtriage
Anisotropy	0.866	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 53.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.43$, $\langle L^2 \rangle = 0.26$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	4089	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 22.77 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 5.3274e-03.*

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

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	0.73	0/1965	0.82	1/2677 (0.0%)
1	B	0.72	0/1941	0.81	4/2645 (0.2%)
All	All	0.73	0/3906	0.81	5/5322 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	226	LEU	CA-CB-CG	6.90	131.17	115.30
1	B	220	LEU	CA-CB-CG	6.40	130.02	115.30
1	B	86	GLY	N-CA-C	6.36	129.01	113.10
1	B	226	LEU	CA-CB-CG	5.26	127.40	115.30
1	B	172	LEU	CA-CB-CG	5.15	127.14	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	84	TRP	Peptide

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	1911	0	1913	25	0
1	B	1888	0	1897	25	0
2	A	153	0	0	7	2
2	B	137	0	0	6	0
All	All	4089	0	3810	49	2

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 6.

All (49) 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:127:LEU:HD13	2:A:371:HOH:O	1.73	0.87
1:A:117:HIS:NE2	1:A:240:GLU:OE2	2.11	0.84
1:A:70:ALA:HB1	1:A:103:HIS:CD2	2.15	0.80
1:A:164:ARG:NH1	1:B:153:MET:O	2.14	0.78
1:B:1:MET:HA	1:B:39:PHE:O	1.91	0.70
1:A:151:ASP:O	1:A:154:VAL:HG22	1.95	0.67
1:B:168:ARG:HB2	2:B:370:HOH:O	1.96	0.66
1:A:102:GLY:HA3	2:A:376:HOH:O	1.98	0.64
1:B:84:TRP:HA	1:B:85:GLU:HG3	1.79	0.62
1:B:123:LYS:HE3	2:B:287:HOH:O	1.99	0.62
1:B:28:LEU:HA	1:B:36:TRP:O	2.00	0.61
1:B:203:ARG:HG2	2:B:333:HOH:O	2.00	0.61
1:B:113:ALA:O	1:B:117:HIS:HD2	1.84	0.60
1:B:47:TYR:O	1:B:48:GLU:HB2	2.01	0.60
1:B:80:PRO:HG2	1:B:94:GLU:HG2	1.85	0.58
1:B:168:ARG:NH1	2:B:359:HOH:O	2.37	0.57
1:A:228:ARG:HD2	2:A:322:HOH:O	2.04	0.57
1:A:102:GLY:HA2	2:A:396:HOH:O	2.05	0.57
1:A:175:SER:OG	1:A:176:LEU:N	2.35	0.56
1:A:60:LEU:C	1:A:62:ALA:H	2.09	0.56
1:A:70:ALA:HB1	1:A:103:HIS:CG	2.42	0.54
1:A:61:GLU:HA	1:A:64:ARG:HB2	1.90	0.54
1:A:153:MET:HE1	2:B:327:HOH:O	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:19:GLY:HA3	1:B:47:TYR:OH	2.10	0.52
1:B:2:TRP:HE3	1:B:51:TRP:HB3	1.76	0.50
1:A:57:GLU:HA	1:A:60:LEU:HD12	1.94	0.49
1:B:136:ILE:HG23	1:B:167:VAL:HG21	1.95	0.49
1:B:184:PRO:HG2	1:B:209:VAL:HG12	1.96	0.48
1:A:70:ALA:HB2	1:A:103:HIS:HB2	1.95	0.47
1:B:116:ARG:HB2	1:B:117:HIS:CD2	2.50	0.46
1:B:61:GLU:HG2	2:B:387:HOH:O	2.15	0.46
1:A:103:HIS:NE2	1:A:108:ARG:HD3	2.30	0.46
1:B:108:ARG:O	1:B:112:LYS:HG3	2.16	0.45
1:A:70:ALA:CB	1:A:103:HIS:HB2	2.46	0.45
1:A:223:ARG:NH2	2:A:381:HOH:O	2.49	0.45
1:A:108:ARG:HD3	2:A:344:HOH:O	2.17	0.45
1:B:119:ARG:HD3	1:B:122:ASP:OD2	2.17	0.44
1:A:71:LEU:O	1:A:108:ARG:NH1	2.50	0.44
1:A:103:HIS:NE2	1:A:108:ARG:CD	2.82	0.43
1:A:240:GLU:HG3	1:A:251:ALA:HB3	2.01	0.43
1:A:94:GLU:HB3	1:A:157:GLN:NE2	2.34	0.43
2:A:356:HOH:O	1:B:153:MET:HE1	2.18	0.42
1:B:14:ASP:HA	1:B:17:LEU:HG	2.01	0.42
1:B:4:TYR:HB3	1:B:37:ALA:HB3	2.01	0.42
1:B:18:PRO:O	1:B:22:ASP:HB2	2.21	0.41
1:B:2:TRP:CE3	1:B:51:TRP:HB3	2.55	0.41
1:A:61:GLU:HG3	1:A:65:ARG:HD3	2.02	0.41
1:A:111:LEU:CD2	1:A:137:ALA:CB	2.99	0.41
1:B:221:LYS:HE3	1:B:245:GLY:O	2.21	0.41

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:310:HOH:O	2:A:404:HOH:O[1_556]	2.15	0.05
2:A:341:HOH:O	2:A:406:HOH:O[4_555]	2.18	0.02

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	241/254 (95%)	222 (92%)	18 (8%)	1 (0%)	36	45
1	B	238/254 (94%)	223 (94%)	14 (6%)	1 (0%)	36	45
All	All	479/508 (94%)	445 (93%)	32 (7%)	2 (0%)	36	45

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	48	GLU
1	A	32	GLU

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	185/189 (98%)	173 (94%)	12 (6%)	19	25
1	B	183/189 (97%)	165 (90%)	18 (10%)	9	10
All	All	368/378 (97%)	338 (92%)	30 (8%)	12	15

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	6	LEU
1	A	11	GLU
1	A	29	TRP
1	A	31	ARG
1	A	67	LEU
1	A	91	LEU
1	A	220	LEU
1	A	223	ARG
1	A	237	ARG

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Mol	Chain	Res	Type
1	A	240	GLU
1	A	249	LEU
1	B	22	ASP
1	B	26	ARG
1	B	29	TRP
1	B	43	VAL
1	B	50	VAL
1	B	65	ARG
1	B	67	LEU
1	B	85	GLU
1	B	91	LEU
1	B	119	ARG
1	B	170	ARG
1	B	172	LEU
1	B	175	SER
1	B	205	ARG
1	B	220	LEU
1	B	222	ASP
1	B	246	GLU
1	B	254	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	157	GLN

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 carbohydrates in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

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	247/254 (97%)	1.03	39 (15%) 2 2	22, 36, 89, 95	0
1	B	244/254 (96%)	1.14	39 (15%) 1 2	25, 43, 90, 95	0
All	All	491/508 (96%)	1.09	78 (15%) 2 2	22, 39, 90, 95	0

All (78) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	51	TRP	8.4
1	A	50	VAL	7.6
1	B	2	TRP	7.1
1	B	43	VAL	7.0
1	A	48	GLU	6.6
1	A	51	TRP	6.5
1	A	103	HIS	6.5
1	B	32	GLU	6.1
1	A	2	TRP	6.0
1	A	45	LEU	6.0
1	B	60	LEU	5.9
1	B	49	GLY	5.6
1	A	42	PRO	5.5
1	B	59	TRP	5.5
1	B	33	GLY	4.8
1	B	24	GLY	4.7
1	B	54	VAL	4.7
1	A	60	LEU	4.6
1	A	46	PRO	4.5
1	B	63	TRP	4.5
1	A	40	PRO	4.5
1	B	41	ALA	4.5
1	A	44	ASP	4.4
1	B	39	PHE	4.3

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Mol	Chain	Res	Type	RSRZ
1	A	43	VAL	4.3
1	A	49	GLY	4.1
1	A	36	TRP	4.1
1	B	46	PRO	3.9
1	B	4	TYR	3.8
1	B	21	PHE	3.7
1	A	3	VAL	3.6
1	B	36	TRP	3.6
1	B	38	PHE	3.5
1	A	4	TYR	3.4
1	A	6	LEU	3.4
1	B	52	GLU	3.4
1	A	13	LEU	3.4
1	B	3	VAL	3.3
1	A	41	ALA	3.3
1	B	210	PRO	3.2
1	B	209	VAL	3.2
1	B	53	GLU	3.2
1	A	5	ARG	3.1
1	A	24	GLY	3.1
1	A	61	GLU	3.1
1	A	38	PHE	3.0
1	B	62	ALA	2.9
1	A	52	GLU	2.9
1	A	26	ARG	2.9
1	B	29	TRP	2.9
1	B	61	GLU	2.9
1	B	23	GLY	2.8
1	B	184	PRO	2.8
1	A	1	MET	2.7
1	B	206	GLU	2.7
1	A	32	GLU	2.7
1	B	47	TYR	2.7
1	A	19	GLY	2.6
1	A	39	PHE	2.5
1	B	208	LEU	2.5
1	B	25	ALA	2.4
1	B	211	GLY	2.4
1	A	47	TYR	2.4
1	A	29	TRP	2.4
1	A	59	TRP	2.4
1	B	170	ARG	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	25	ALA	2.3
1	A	222	ASP	2.3
1	B	120	PRO	2.2
1	B	87	ALA	2.2
1	A	22	ASP	2.2
1	A	135	ALA	2.2
1	A	57	GLU	2.2
1	A	65	ARG	2.2
1	B	45	LEU	2.1
1	B	234	ALA	2.1
1	A	20	LEU	2.1
1	B	5	ARG	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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.