



wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 3CEY
Title : Crystal structure of L3MBTL2
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Deposited on : 2008-02-29
Resolution : 2.20 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

A user guide is available at

<http://wwpdb.org/validation/2016/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
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20026688
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
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)	:	trunk26865

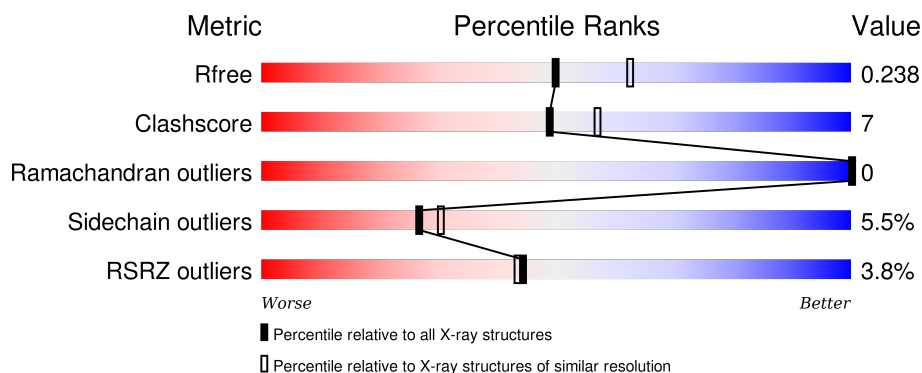
1 Overall quality at a glance

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}	91344	3774 (2.20-2.20)
Clashscore	102246	4477 (2.20-2.20)
Ramachandran outliers	100387	4404 (2.20-2.20)
Sidechain outliers	100360	4405 (2.20-2.20)
RSRZ outliers	91569	3781 (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 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	474	
1	B	474	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6346 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 Lethal(3)malignant brain tumor-like 2 protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	390	Total	C	N	O	S	0	0	0
			3068	2003	507	532	26			
1	B	396	Total	C	N	O	S	0	0	0
			3113	2027	519	541	26			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	152	MET	-	EXPRESSION TAG	UNP Q969R5
A	153	HIS	-	EXPRESSION TAG	UNP Q969R5
A	154	HIS	-	EXPRESSION TAG	UNP Q969R5
A	155	HIS	-	EXPRESSION TAG	UNP Q969R5
A	156	HIS	-	EXPRESSION TAG	UNP Q969R5
A	157	HIS	-	EXPRESSION TAG	UNP Q969R5
A	158	HIS	-	EXPRESSION TAG	UNP Q969R5
A	159	SER	-	EXPRESSION TAG	UNP Q969R5
A	160	SER	-	EXPRESSION TAG	UNP Q969R5
A	161	GLY	-	EXPRESSION TAG	UNP Q969R5
A	162	ARG	-	EXPRESSION TAG	UNP Q969R5
A	163	GLU	-	EXPRESSION TAG	UNP Q969R5
A	164	ASN	-	EXPRESSION TAG	UNP Q969R5
A	165	LEU	-	EXPRESSION TAG	UNP Q969R5
A	166	TYR	-	EXPRESSION TAG	UNP Q969R5
A	167	PHE	-	EXPRESSION TAG	UNP Q969R5
A	168	GLN	-	EXPRESSION TAG	UNP Q969R5
A	169	GLY	-	EXPRESSION TAG	UNP Q969R5
B	152	MET	-	EXPRESSION TAG	UNP Q969R5
B	153	HIS	-	EXPRESSION TAG	UNP Q969R5
B	154	HIS	-	EXPRESSION TAG	UNP Q969R5
B	155	HIS	-	EXPRESSION TAG	UNP Q969R5
B	156	HIS	-	EXPRESSION TAG	UNP Q969R5
B	157	HIS	-	EXPRESSION TAG	UNP Q969R5
B	158	HIS	-	EXPRESSION TAG	UNP Q969R5

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Chain	Residue	Modelled	Actual	Comment	Reference
B	159	SER	-	EXPRESSION TAG	UNP Q969R5
B	160	SER	-	EXPRESSION TAG	UNP Q969R5
B	161	GLY	-	EXPRESSION TAG	UNP Q969R5
B	162	ARG	-	EXPRESSION TAG	UNP Q969R5
B	163	GLU	-	EXPRESSION TAG	UNP Q969R5
B	164	ASN	-	EXPRESSION TAG	UNP Q969R5
B	165	LEU	-	EXPRESSION TAG	UNP Q969R5
B	166	TYR	-	EXPRESSION TAG	UNP Q969R5
B	167	PHE	-	EXPRESSION TAG	UNP Q969R5
B	168	GLN	-	EXPRESSION TAG	UNP Q969R5
B	169	GLY	-	EXPRESSION TAG	UNP Q969R5

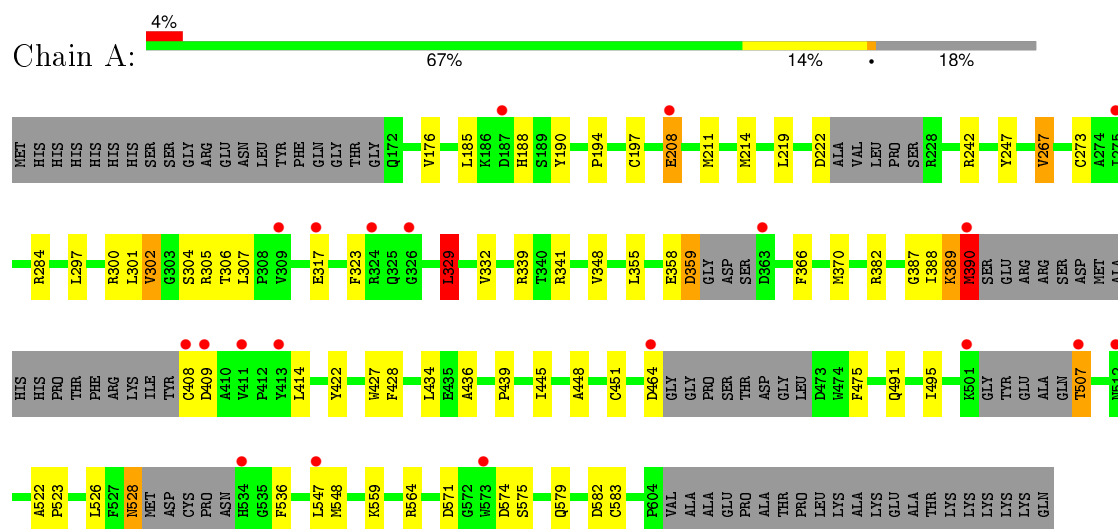
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	76	Total O 76 76	0	0
2	B	89	Total O 89 89	0	0

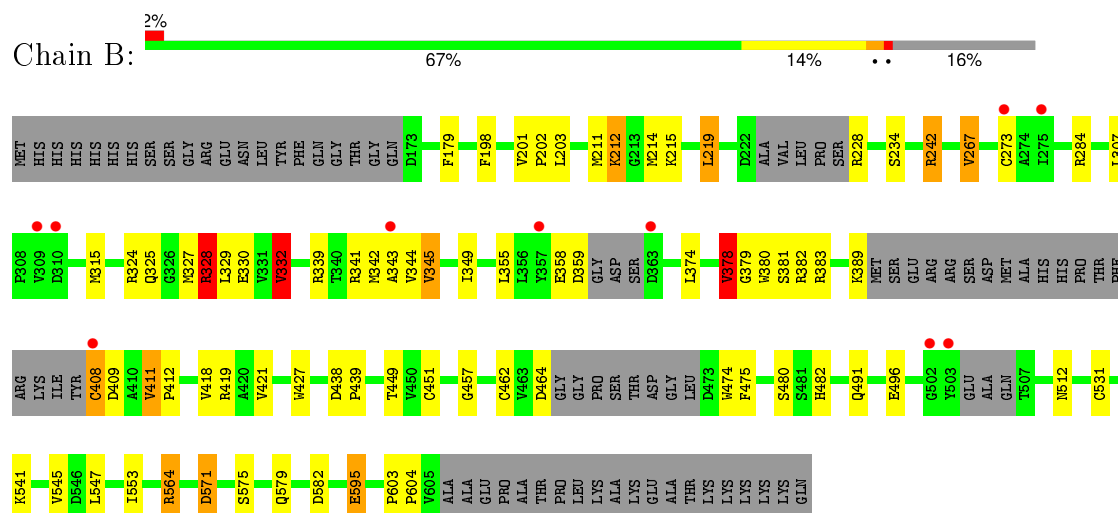
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: Lethal(3)malignant brain tumor-like 2 protein



- Molecule 1: Lethal(3)malignant brain tumor-like 2 protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	55.64Å 55.94Å 329.09Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	35.91 – 2.20 35.91 – 2.20	Depositor EDS
% Data completeness (in resolution range)	87.7 (35.91-2.20) 87.7 (35.91-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.79 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.210 , 0.252 0.200 , 0.238	Depositor DCC
R_{free} test set	2390 reflections (5.36%)	DCC
Wilson B-factor (Å ²)	55.7	Xtriage
Anisotropy	0.061	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 48.1	EDS
Estimated twinning fraction	0.048 for k,h,-l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Outliers	1 of 46991 reflections (0.002%)	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6346	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.52% 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, 0.375 respectively for untwinned datasets, and 0.333, 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	1.32	23/3159 (0.7%)	0.95	10/4301 (0.2%)
1	B	1.28	30/3206 (0.9%)	1.01	10/4367 (0.2%)
All	All	1.30	53/6365 (0.8%)	0.98	20/8668 (0.2%)

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	A	0	1
1	B	0	1
All	All	0	2

The worst 5 of 53 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	359	ASP	C-O	27.71	1.76	1.23
1	A	390	MET	C-O	22.01	1.65	1.23
1	A	358	GLU	CD-OE1	21.35	1.49	1.25
1	B	212	LYS	CE-NZ	20.06	1.99	1.49
1	B	212	LYS	CD-CE	14.53	1.87	1.51

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	328	ARG	NE-CZ-NH2	-18.32	111.14	120.30
1	A	305	ARG	NE-CZ-NH1	-18.07	111.27	120.30
1	B	359	ASP	CB-CG-OD2	-15.29	104.54	118.30
1	B	242	ARG	NE-CZ-NH1	11.01	125.81	120.30
1	B	564	ARG	NE-CZ-NH2	-10.77	114.91	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	208	GLU	Peptide
1	B	328	ARG	Sidechain

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	3068	0	2911	48	0
1	B	3113	0	2951	40	0
2	A	76	0	0	2	0
2	B	89	0	0	4	0
All	All	6346	0	5862	87	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 7.

The worst 5 of 87 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:389:LYS:CE	1:A:389:LYS:NZ	1.69	1.55
1:A:389:LYS:CD	1:A:389:LYS:CE	1.85	1.53
1:B:212:LYS:CD	1:B:212:LYS:CE	1.87	1.49
1:A:390:MET:CE	1:A:390:MET:SD	2.12	1.38
1:A:390:MET:O	1:A:390:MET:C	1.65	1.34

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	376/474 (79%)	366 (97%)	10 (3%)	0	100	100
1	B	384/474 (81%)	371 (97%)	13 (3%)	0	100	100
All	All	760/948 (80%)	737 (97%)	23 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	315/413 (76%)	298 (95%)	17 (5%)	27	31
1	B	320/413 (78%)	302 (94%)	18 (6%)	26	29
All	All	635/826 (77%)	600 (94%)	35 (6%)	27	30

5 of 35 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	548	MET
1	B	267	VAL
1	B	531	CYS
1	A	571	ASP
1	B	211	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	206	GLN
1	B	579	GLN
1	B	482	HIS
1	A	528	ASN
1	B	444	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](#)

There are no ligands in this entry.

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	390/474 (82%)	0.16	20 (5%) 32 31	20, 36, 46, 56	0
1	B	396/474 (83%)	0.14	10 (2%) 61 60	17, 36, 52, 63	0
All	All	786/948 (82%)	0.15	30 (3%) 44 43	17, 36, 50, 63	0

The worst 5 of 30 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	408	CYS	6.2
1	A	413	TYR	4.1
1	A	275	ILE	3.8
1	B	408	CYS	3.7
1	B	502	GLY	3.4

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.