



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 04:40 AM UTC

PDB ID : 6SEQ / pdb_00006seq
Title : Lemur tyrosine kinase 3 (LMTK3)
Authors : Roe, S.M.; Owen, R.
Deposited on : 2019-07-30
Resolution : 2.10 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Xtrriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

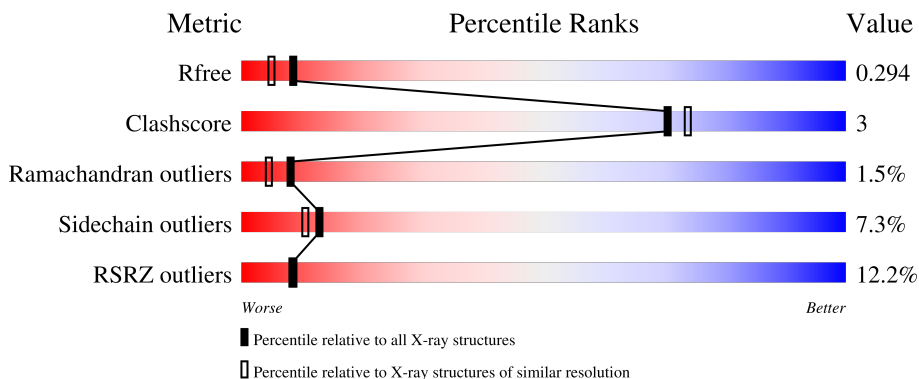
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	180053	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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 $\leq 5\%$. 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	1460	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2588 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 Serine/threonine-protein kinase LMTK3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	278	2234	1442	393	391	8	0	3	0

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	354	Total	O	0	0
			354	354		

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	45.59Å 64.00Å 134.67Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.39 – 2.10 46.39 – 2.10	Depositor EDS
% Data completeness (in resolution range)	89.8 (46.39-2.10) 89.8 (46.39-2.10)	Depositor EDS
R_{merge}	0.42	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.34 (at 2.10Å)	Xtrriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.194 , 0.262 0.221 , 0.294	Depositor DCC
R_{free} test set	1098 reflections (4.71%)	wwPDB-VP
Wilson B-factor (Å ²)	11.3	Xtrriage
Anisotropy	0.217	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 70.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.87	EDS
Total number of atoms	2588	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.82% 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, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality i

5.1 Standard geometry i

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	0.87	0/2302	1.30	15/3133 (0.5%)

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

There are no bond length outliers.

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	184	ASP	CA-C-N	9.18	134.59	120.82
1	A	184	ASP	C-N-CA	9.18	134.59	120.82
1	A	167	GLU	CA-C-N	6.89	129.37	120.56
1	A	167	GLU	C-N-CA	6.89	129.37	120.56
1	A	344	LEU	CA-C-N	5.70	126.60	121.82
1	A	344	LEU	C-N-CA	5.70	126.60	121.82
1	A	172	TRP	CA-C-N	5.43	129.79	120.72
1	A	172	TRP	C-N-CA	5.43	129.79	120.72
1	A	246	ASP	CA-CB-CG	5.35	117.95	112.60
1	A	254	GLN	CA-C-N	5.16	127.81	120.49
1	A	254	GLN	C-N-CA	5.16	127.81	120.49
1	A	216	SER	CA-C-N	5.06	131.20	121.54
1	A	216	SER	C-N-CA	5.06	131.20	121.54
1	A	289	HIS	CA-C-N	5.04	129.29	122.19
1	A	289	HIS	C-N-CA	5.04	129.29	122.19

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	184	ASP	Peptide

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	2234	0	2212	15	0
2	A	354	0	0	1	0
All	All	2588	0	2212	15	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 3.

All (15) 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:237:LEU:HG	1:A:239:MET:HE3	1.81	0.62
1:A:358:ARG:O	1:A:362:ILE:HG12	2.05	0.56
1:A:264:LEU:HD13	1:A:406:LYS:HB2	1.91	0.53
1:A:193:LYS:HB2	1:A:237:LEU:HB3	1.93	0.49
1:A:168:ILE:HD11	1:A:178:LEU:HB2	1.94	0.49
1:A:314:TYR:HB2	1:A:316:LEU:HD22	1.96	0.48
1:A:245:GLY:O	1:A:303:LEU:HD12	2.13	0.48
1:A:327:LEU:HB2	1:A:333:TRP:CZ3	2.50	0.47
1:A:370:TRP:CZ2	1:A:374:GLU:HG3	2.50	0.47
1:A:273:GLN:HB3	1:A:441:LEU:HD21	1.98	0.46
1:A:262:PRO:HG3	1:A:404:ARG:HB3	2.00	0.43
1:A:353:VAL:HG11	2:A:1787:HOH:O	2.18	0.42
1:A:343:LEU:HB3	1:A:353:VAL:HG13	2.01	0.41
1:A:344:LEU:HA	1:A:352:MET:O	2.20	0.41
1:A:162:LEU:HD11	1:A:192:VAL:HG21	2.02	0.40

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	275/1460 (19%)	259 (94%)	12 (4%)	4 (2%)	8 4

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	217	LEU
1	A	266	PRO
1	A	264	LEU
1	A	409	TYR

5.3.2 Protein sidechains [i](#)

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	236/1157 (20%)	219 (93%)	17 (7%)	13 11

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

Mol	Chain	Res	Type
1	A	162	LEU
1	A	202	LEU
1	A	217	LEU
1	A	226	LEU
1	A	303	LEU
1	A	316	LEU
1	A	322	LYS

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Mol	Chain	Res	Type
1	A	323	GLU
1	A	330	GLU
1	A	332	LEU
1	A	346	GLU
1	A	352	MET
1	A	356	GLN
1	A	372	LEU
1	A	393	VAL
1	A	407	LEU
1	A	415	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	189	GLN
1	A	300	ASN
1	A	320	ASN
1	A	356	GLN

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 oligosaccharides 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

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	278/1460 (19%)	0.75	34 (12%) 8 8	5, 19, 53, 82	3 (1%)

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	349	GLY	6.3
1	A	186	THR	4.6
1	A	262	PRO	4.4
1	A	353	VAL	4.4
1	A	185	TYR	4.0
1	A	182	PHE	4.0
1	A	347	LEU	3.9
1	A	354	VAL	3.8
1	A	266	PRO	3.8
1	A	160	GLN	3.7
1	A	352	MET	3.6
1	A	217	LEU	3.5
1	A	159	ARG	3.2
1	A	348	HIS	3.2
1	A	181	ILE	3.1
1	A	255	ARG	3.1
1	A	230	VAL	3.0
1	A	257	PRO	2.8
1	A	161	HIS	2.8
1	A	263	GLU	2.8
1	A	344	LEU	2.6
1	A	407	LEU	2.6
1	A	345	GLY	2.6
1	A	226	LEU	2.6
1	A	183	SER	2.5
1	A	408	PRO	2.3
1	A	264	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	415	ASP	2.2
1	A	405	LEU	2.2
1	A	409	TYR	2.2
1	A	209	SER	2.1
1	A	439	TYR	2.0
1	A	197	ALA	2.0
1	A	412	TYR	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 oligosaccharides 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.