WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 6, 2023 – 03:28 PM EDT

PDB ID	:	1JKY
Title	:	Crystal Structure of the Anthrax Lethal Factor (LF): Wild-type LF Complexed with the N-terminal Sequence of MAPKK2
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Deposited on	:	2001-07-13
Resolution	:	3.90 Å(reported)

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 3.90 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	Percentile Ranks	Value
Clashscore		94
Ramachandran outliers		20.7%
Sidechain outliers		17.7%

Worse .... *Better*

■ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution
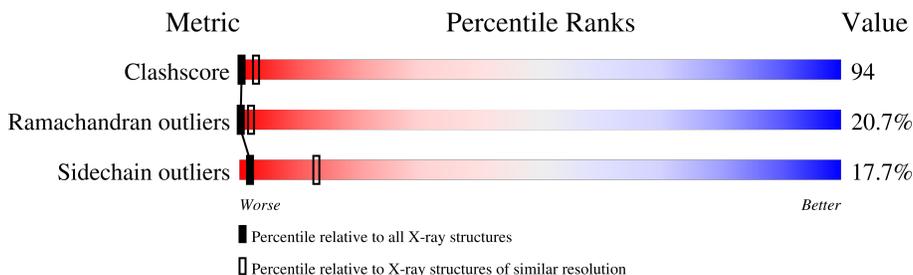
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	1004 (4.12-3.68)
Ramachandran outliers	138981	1021 (4.14-3.66)
Sidechain outliers	138945	1014 (4.14-3.66)

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 <=5%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	776	19% 52% 24% · ·
2	B	16	19% 25% 44% 12%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 5734 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 Factor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	748	Total	C	N	O	S	0	0	0
			5614	3526	953	1128	7			

- Molecule 2 is a protein called mitogen-activated protein kinase kinase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	16	Total	C	N	O	S	0	0	0
			120	76	24	19	1			

3 Residue-property plots ⓘ

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

Note EDS was not executed.

• Molecule 1: Lethal Factor

Chain A:

D693 D694 G697 Y698 L699 L700 D701 Q704 S705 D706 L707 V708 T709 N710 F714 I715 D716 I717 F718 E721 G722 S723 N724 Y728 G729 R730 T731 N732 E733 A734 E735 F736 F737 A738 E739 A740 F741 R742 L743 M744 H745 S746 T747 D748 R752 V755 Q756 K757 N758 A759 P760 K761 T762

F763 Q764 F765 I766 N767 D768 Q769 I770 K771 F772 I773 I774 N775 S776
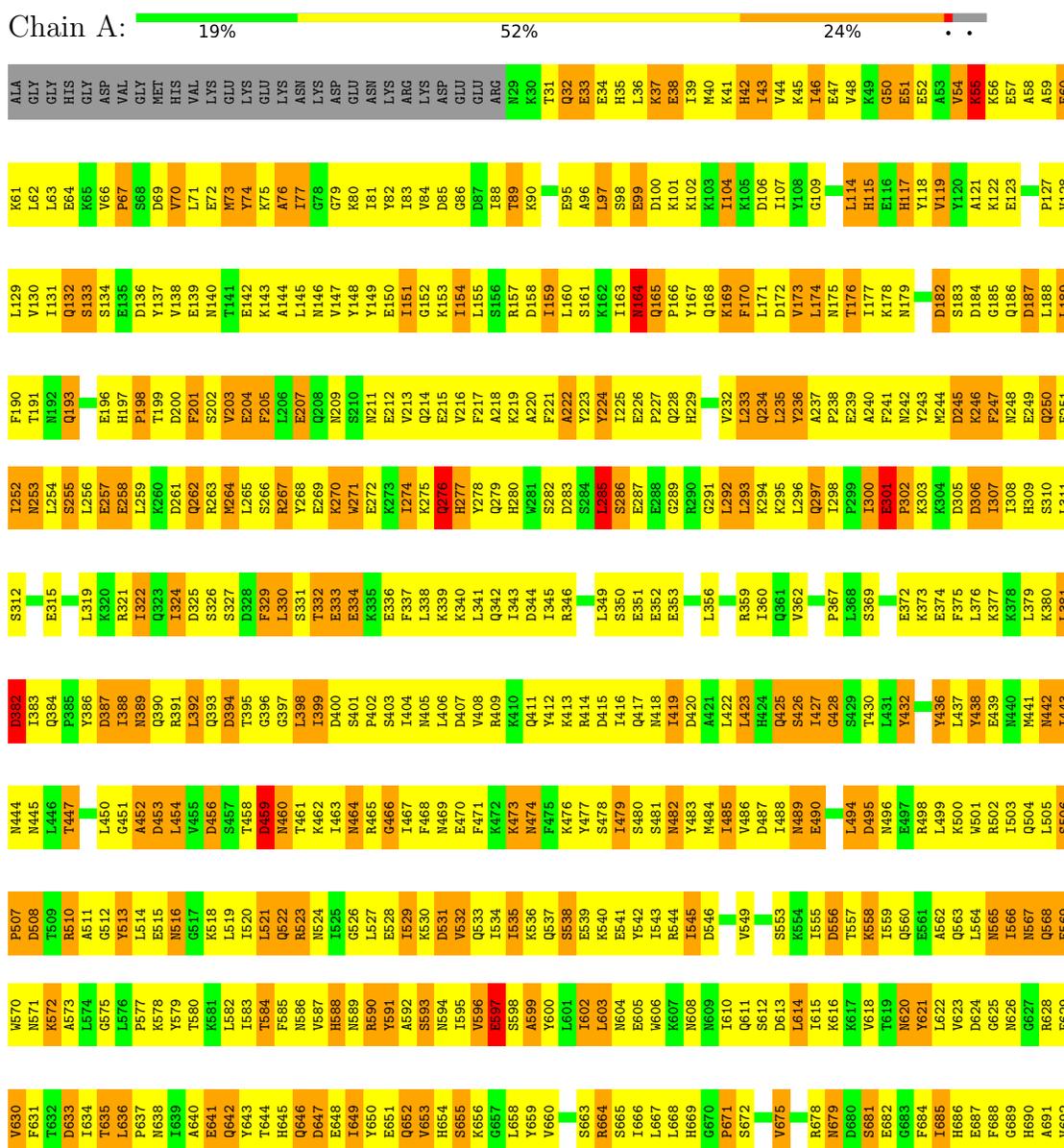
• Molecule 2: mitogen-activated protein kinase kinase 2

Chain B: 19%   25%   44%   12%

M1 L2 A3 R4 R5 K6 P7 V8 L9 P10 A11 L12 T13 I14 N15 P16
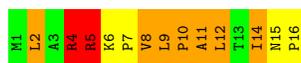
4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	I 41 3 2	Depositor
Cell constants a, b, c, α, β, γ	330.70Å 330.70Å 330.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.60 – 3.90	Depositor
% Data completeness (in resolution range)	85.0 (50.60-3.90)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
Refinement program	REFMAC, CNS	Depositor
R, R_{free}	0.296 , 0.316	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	5734	wwPDB-VP
Average B, all atoms (Å^2)	118.0	wwPDB-VP

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	0.44	0/5710	0.74	0/7771
2	B	0.64	0/122	1.41	2/164 (1.2%)
All	All	0.44	0/5832	0.76	2/7935 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	5	ARG	N-CA-C	7.81	132.10	111.00
2	B	14	ILE	N-CA-C	5.32	125.35	111.00

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	5614	0	5058	1010	0
2	B	120	0	131	20	0
All	All	5734	0	5189	1025	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 94.

The worst 5 of 1025 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:427:ILE:HG23	1:A:428:GLY:H	1.07	1.19
1:A:324:ILE:HG23	1:A:325:ASP:H	1.13	1.10
2:B:5:ARG:O	2:B:5:ARG:HG3	1.29	1.09
1:A:229:HIS:HA	1:A:232:VAL:HG12	1.31	1.08
1:A:628:ARG:H	1:A:665:SER:HB3	1.19	1.07

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	746/776 (96%)	376 (50%)	219 (29%)	151 (20%)	0	2
2	B	14/16 (88%)	5 (36%)	3 (21%)	6 (43%)	0	0
All	All	760/792 (96%)	381 (50%)	222 (29%)	157 (21%)	0	2

5 of 157 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	55	LYS
1	A	70	VAL
1	A	97	LEU
1	A	114	LEU
1	A	119	VAL

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	553/710 (78%)	457 (83%)	96 (17%)	2	13
2	B	12/14 (86%)	8 (67%)	4 (33%)	0	1
All	All	565/724 (78%)	465 (82%)	100 (18%)	2	13

5 of 100 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	506	SER
1	A	584	THR
2	B	9	LEU
1	A	510	ARG
1	A	538	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 31 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	469	ASN
1	A	710	ASN
1	A	504	GLN
1	A	756	GLN
1	A	638	ASN

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 monosaccharides 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 ⓘ

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section is therefore empty.

6.4 Ligands ⓘ

EDS was not executed - this section is therefore empty.

6.5 Other polymers ⓘ

EDS was not executed - this section is therefore empty.