



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 3, 2024 – 03:21 PM EST

PDB ID : 1LBI  
Title : LAC REPRESSOR  
Authors : Lewis, M.; Chang, G.; Horton, N.C.; Kercher, M.A.; Pace, H.C.; Lu, P.  
Deposited on : 1996-02-17  
Resolution : 2.70 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

<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>.

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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  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

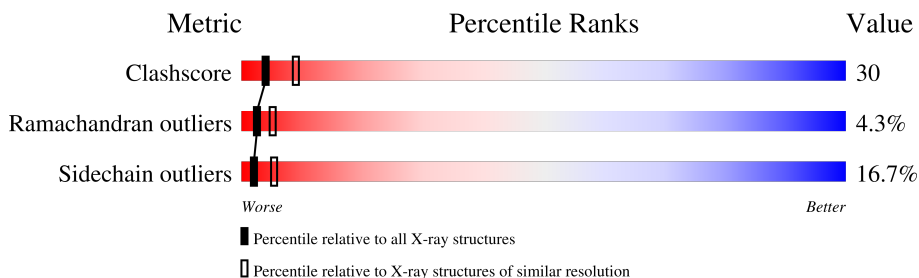
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)

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  $\geq 3$ , 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  $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	360	
1	B	360	
1	C	360	
1	D	360	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 8872 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.

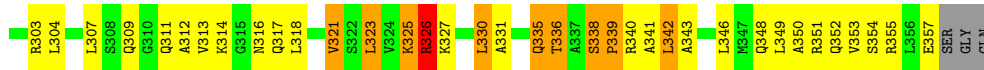
- Molecule 1 is a protein called LAC REPRESSOR.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	296	2218	1383	396	428	11	0	0	0
1	B	296	2218	1383	396	428	11	0	0	0
1	C	296	2218	1383	396	428	11	0	0	0
1	D	296	2218	1383	396	428	11	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

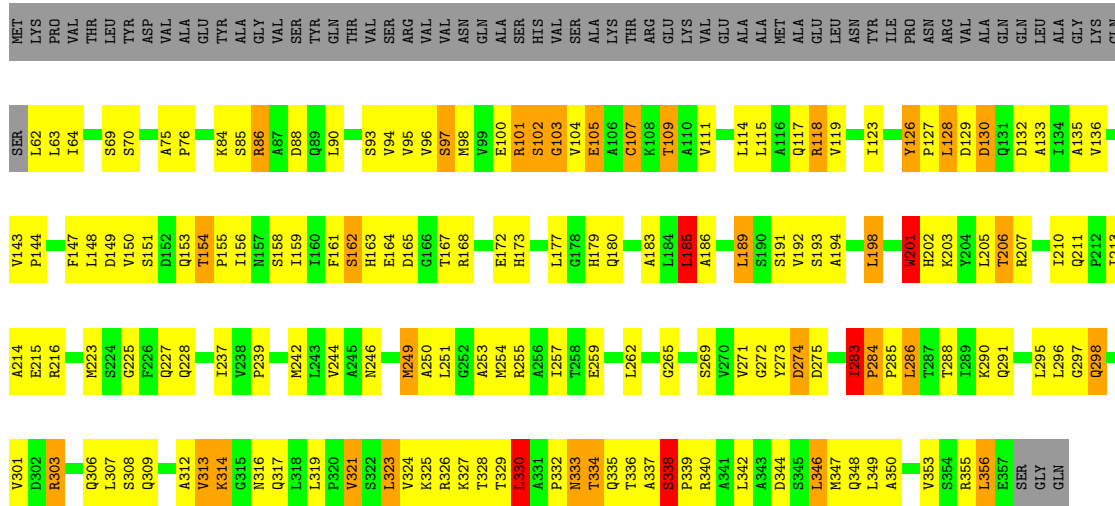
Chain	Residue	Modelled	Actual	Comment	Reference
A	109	THR	ALA	conflict	UNP P03023
A	286	LEU	SER	conflict	UNP P03023
B	109	THR	ALA	conflict	UNP P03023
B	286	LEU	SER	conflict	UNP P03023
C	109	THR	ALA	conflict	UNP P03023
C	286	LEU	SER	conflict	UNP P03023
D	109	THR	ALA	conflict	UNP P03023
D	286	LEU	SER	conflict	UNP P03023





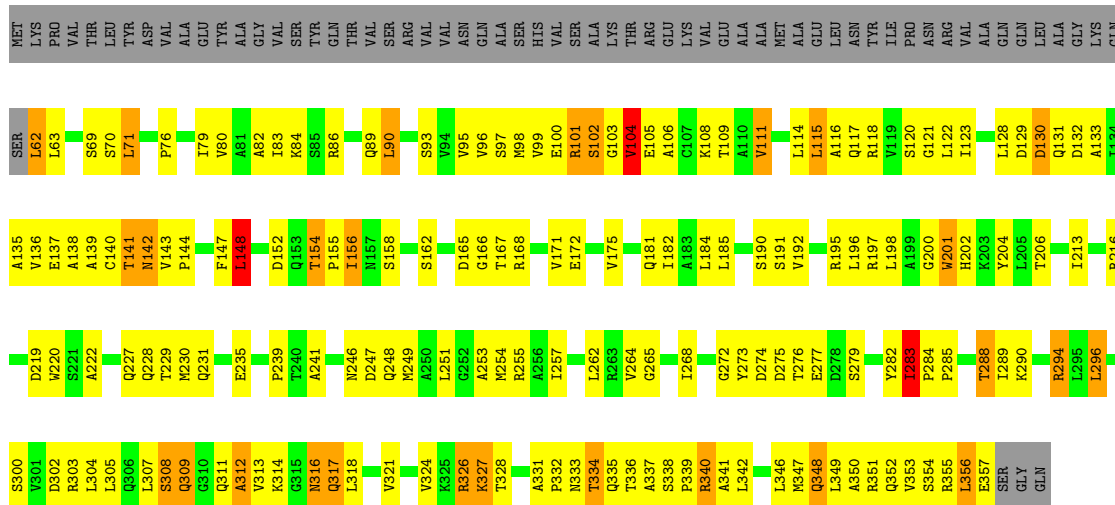
### • Molecule 1: LAC REPRESSOR

Chain C: 37% 36% 9% 18%



### • Molecule 1: LAC REPRESSOR

Chain D: 34% 39% 8% 18%



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	160.30Å 73.30Å 147.80Å 90.00° 120.30° 90.00°	Depositor
Resolution (Å)	15.00 – 2.70	Depositor
% Data completeness (in resolution range)	(Not available) (15.00-2.70)	Depositor
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, $R_{free}$	0.250 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	8872	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

## 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	0.78	0/2247	1.04	4/3055 (0.1%)
1	B	0.82	0/2247	1.11	10/3055 (0.3%)
1	C	0.84	1/2247 (0.0%)	1.04	9/3055 (0.3%)
1	D	0.85	0/2247	0.99	3/3055 (0.1%)
All	All	0.82	1/8988 (0.0%)	1.05	26/12220 (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	C	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	201	TRP	CB-CG	6.07	1.61	1.50

The worst 5 of 26 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	283	ILE	C-N-CD	-19.64	77.40	120.60
1	B	283	ILE	C-N-CA	10.29	165.20	122.00
1	C	330	LEU	CA-CB-CG	7.59	132.76	115.30
1	C	283	ILE	C-N-CD	7.05	143.21	128.40
1	B	336	THR	N-CA-C	-6.62	93.13	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	126	TYR	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	2218	0	2269	158	0
1	B	2218	0	2269	140	0
1	C	2218	0	2269	148	0
1	D	2218	0	2269	145	0
All	All	8872	0	9076	544	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 30.

The worst 5 of 544 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:144:PRO:HG2	1:A:308:SER:HA	1.24	1.13
1:A:115:LEU:HD11	1:A:143:VAL:HG11	1.18	1.10
1:C:283:ILE:HG22	1:C:284:PRO:HD3	1.43	1.01
1:B:189:LEU:HD13	1:B:217:GLU:HG3	1.40	0.99
1:A:144:PRO:HB3	1:A:307:LEU:HD22	1.44	0.98

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	294/360 (82%)	244 (83%)	32 (11%)	18 (6%)	1 2
1	B	294/360 (82%)	247 (84%)	31 (10%)	16 (5%)	2 3
1	C	294/360 (82%)	260 (88%)	26 (9%)	8 (3%)	5 12
1	D	294/360 (82%)	247 (84%)	38 (13%)	9 (3%)	4 9
All	All	1176/1440 (82%)	998 (85%)	127 (11%)	51 (4%)	2 5

5 of 51 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	141	THR
1	A	142	ASN
1	A	162	SER
1	A	274	ASP
1	A	277	GLU

### 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	243/295 (82%)	208 (86%)	35 (14%)	3 8
1	B	243/295 (82%)	203 (84%)	40 (16%)	2 5
1	C	243/295 (82%)	201 (83%)	42 (17%)	2 5
1	D	243/295 (82%)	198 (82%)	45 (18%)	1 4
All	All	972/1180 (82%)	810 (83%)	162 (17%)	2 5

5 of 162 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	355	ARG
1	D	277	GLU
1	D	71	LEU
1	D	154	THR
1	D	316	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 32 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	234	ASN
1	D	309	GLN
1	B	125	ASN
1	B	113	ASN
1	D	333	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 monosaccharides 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

### 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.