



Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 05:13 am BST

PDB ID : 1LME
Title : Crystal Structure of Peptide Deformylase from *Thermotoga maritima*
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Deposited on : 2002-05-01
Resolution : 2.20 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
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (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) : 2.11

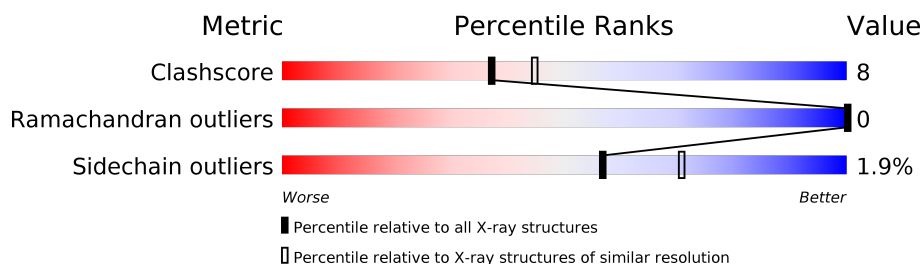
1 Overall quality at a glance

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))
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (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 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	176	
1	B	176	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2570 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 peptide deformylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	154	Total	C	N	O	S	0	0	0
			1266	805	223	233	5			
1	B	147	Total	C	N	O	S	0	0	0
			1201	765	207	224	5			

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	MET	-	SEE REMARK 999	UNP P96113
A	-10	GLY	-	SEE REMARK 999	UNP P96113
A	-9	SER	-	SEE REMARK 999	UNP P96113
A	-8	ASP	-	SEE REMARK 999	UNP P96113
A	-7	LYS	-	SEE REMARK 999	UNP P96113
A	-6	ILE	-	SEE REMARK 999	UNP P96113
A	-5	HIS	-	SEE REMARK 999	UNP P96113
A	-4	HIS	-	SEE REMARK 999	UNP P96113
A	-3	HIS	-	SEE REMARK 999	UNP P96113
A	-2	HIS	-	SEE REMARK 999	UNP P96113
A	-1	HIS	-	SEE REMARK 999	UNP P96113
A	0	HIS	-	SEE REMARK 999	UNP P96113
A	87	OCS	CYS	MODIFIED RESIDUE	UNP P96113
B	-11	MET	-	SEE REMARK 999	UNP P96113
B	-10	GLY	-	SEE REMARK 999	UNP P96113
B	-9	SER	-	SEE REMARK 999	UNP P96113
B	-8	ASP	-	SEE REMARK 999	UNP P96113
B	-7	LYS	-	SEE REMARK 999	UNP P96113
B	-6	ILE	-	SEE REMARK 999	UNP P96113
B	-5	HIS	-	SEE REMARK 999	UNP P96113
B	-4	HIS	-	SEE REMARK 999	UNP P96113
B	-3	HIS	-	SEE REMARK 999	UNP P96113
B	-2	HIS	-	SEE REMARK 999	UNP P96113
B	-1	HIS	-	SEE REMARK 999	UNP P96113
B	0	HIS	-	SEE REMARK 999	UNP P96113

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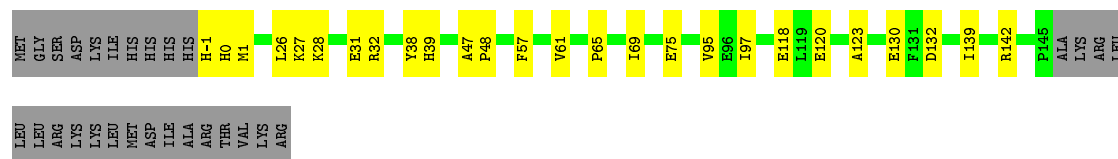
Chain	Residue	Modelled	Actual	Comment	Reference
B	87	OCS	CYS	MODIFIED RESIDUE	UNP P96113

- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	52	Total O 52 52	0	0
2	B	51	Total O 51 51	0	0

Note EDS was not executed.

- Chain A:  65% 22% 1% 12%



4 Data and refinement statistics

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

Property	Value	Source
Space group	P 3 2 2 1	Depositor
Cell constants a, b, c, α , β , γ	65.05 Å 65.05 Å 151.37 Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	45.19 – 2.20	Depositor
% Data completeness (in resolution range)	99.8 (45.19-2.20)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.07	Depositor
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.198 , 0.249	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2570	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: OCS

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	0.49	0/1286	0.68	0/1734
1	B	0.53	0/1217	0.69	0/1641
All	All	0.51	0/2503	0.69	0/3375

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.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	40	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	1266	0	1245	25	0
1	B	1201	0	1189	14	0
2	A	52	0	0	3	0
2	B	51	0	0	0	0
All	All	2570	0	2434	38	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 8.

All (38) 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:102:ARG:HG2	1:A:120:GLU:HB3	1.48	0.94
1:B:0:HIS:O	1:B:32:ARG:HD2	1.90	0.71
1:B:97:ILE:HD11	1:B:139:ILE:HB	1.76	0.66
1:B:-1:HIS:CE1	1:B:28:LYS:HE3	2.34	0.62
1:A:61:VAL:HG11	1:A:123:ALA:HA	1.86	0.58
1:A:102:ARG:CG	1:A:120:GLU:HB3	2.29	0.57
1:A:0:HIS:O	1:A:32:ARG:HD2	2.05	0.57
1:A:79:GLU:HG2	1:A:101:LYS:HD2	1.86	0.57
1:A:6:VAL:HG22	2:A:201:HOH:O	2.05	0.56
1:A:74:LEU:C	1:A:75:GLU:HG2	2.25	0.56
1:B:38:TYR:OH	1:B:65:PRO:HD3	2.06	0.55
1:A:53:SER:HB3	2:A:175:HOH:O	2.07	0.54
1:A:29:THR:O	1:A:33:MET:HG2	2.08	0.53
1:A:2:TYR:OH	1:A:29:THR:HG23	2.09	0.52
1:A:26:LEU:HD21	1:A:69:ILE:HD13	1.92	0.52
1:B:-1:HIS:HE1	1:B:28:LYS:HE3	1.73	0.50
1:A:75:GLU:HG3	1:A:104:LYS:HB3	1.93	0.50
1:A:17:LYS:O	1:A:54:GLN:HA	2.12	0.49
1:B:26:LEU:HD21	1:B:69:ILE:HD13	1.95	0.49
1:A:87:OCS:C	1:A:87:OCS:OD3	2.60	0.48
1:B:1:MET:SD	1:B:39:HIS:CG	3.07	0.48
1:A:38:TYR:OH	1:A:65:PRO:HD3	2.14	0.48
1:B:27:LYS:O	1:B:31:GLU:HG3	2.15	0.47
1:B:28:LYS:HD2	1:B:31:GLU:OE1	2.15	0.46
1:A:68:VAL:CG1	1:A:71:PRO:HB3	2.46	0.45
1:A:27:LYS:O	1:A:31:GLU:HG3	2.16	0.45
1:B:57:PHE:CG	1:B:130:GLU:HB3	2.52	0.45
1:B:47:ALA:HB3	1:B:48:PRO:HD3	1.99	0.44
1:A:111:ARG:CD	2:A:213:HOH:O	2.66	0.44
1:A:0:HIS:ND1	1:A:35:GLU:OE1	2.45	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:76:ILE:HG23	1:A:100:SER:CB	2.49	0.42
1:A:20:THR:O	1:B:75:GLU:HA	2.19	0.42
1:A:99:ARG:HG3	1:A:125:ARG:HG3	2.02	0.42
1:B:132:ASP:OD1	1:B:142:ARG:NH2	2.53	0.41
1:B:61:VAL:HG11	1:B:123:ALA:HA	2.02	0.41
1:A:76:ILE:CG2	1:A:100:SER:HB2	2.51	0.40
1:A:108:GLN:HA	1:A:113:GLU:O	2.20	0.40
1:A:97:ILE:HD11	1:A:139:ILE:HB	2.04	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	151/176 (86%)	148 (98%)	3 (2%)	0	100	100
1	B	144/176 (82%)	142 (99%)	2 (1%)	0	100	100
All	All	295/352 (84%)	290 (98%)	5 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	136/155 (88%)	134 (98%)	2 (2%)	65	78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	129/155 (83%)	126 (98%)	3 (2%)	50	63
All	All	265/310 (86%)	260 (98%)	5 (2%)	57	71

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	75	GLU
1	A	92	GLU
1	B	95	VAL
1	B	118	GLU
1	B	120	GLU

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	-4	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
1	OCS	A	87	1	7,8,9	1.09	1 (14%)	6,11,13	7.22	4 (66%)
1	OCS	B	87	1	7,8,9	0.97	0	6,11,13	6.80	4 (66%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	OCS	A	87	1	-	1/4/7/9	-
1	OCS	B	87	1	-	1/4/7/9	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	87	OCS	OD3-SG	-2.14	1.38	1.45

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	87	OCS	OD3-SG-CB	-11.31	93.50	106.94
1	A	87	OCS	OD1-SG-CB	10.75	119.71	106.94
1	B	87	OCS	OD3-SG-CB	-10.54	94.42	106.94
1	B	87	OCS	OD2-SG-CB	9.97	121.63	105.74
1	A	87	OCS	OD2-SG-CB	7.82	118.20	105.74
1	B	87	OCS	OD1-SG-CB	7.61	115.99	106.94
1	B	87	OCS	OD3-SG-OD1	-2.13	106.57	113.95
1	A	87	OCS	OD3-SG-OD1	-2.06	106.82	113.95

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	87	OCS	N-CA-CB-SG
1	B	87	OCS	N-CA-CB-SG

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	87	OCS	1	0

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 ⓘ

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.