



wwPDB X-ray Structure Validation Summary Report ⓘ

May 17, 2020 – 11:35 am BST

PDB ID : 1ORD
Title : CRYSTALLOGRAPHIC STRUCTURE OF A PLP-DEPENDENT ORNITHINE DECARBOXYLASE FROM LACTOBACILLUS 30A TO 3.1 ANGSTROMS RESOLUTION
Authors : Hackert, M.L.; Momany, C.; Ernst, S.; Ghosh, R.
Deposited on : 1995-02-08
Resolution : 3.00 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

<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)
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) : 2.11

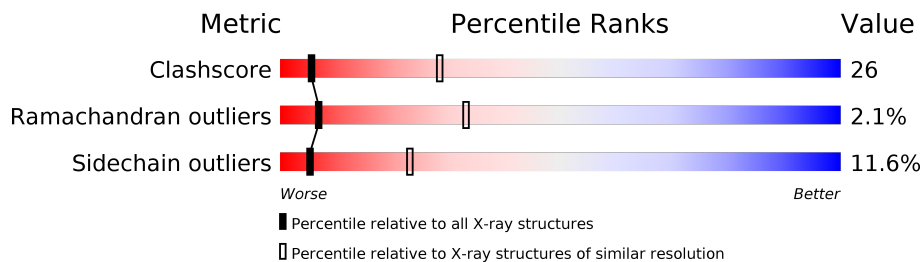
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)

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	730	
1	B	730	

2 Entry composition [i](#)

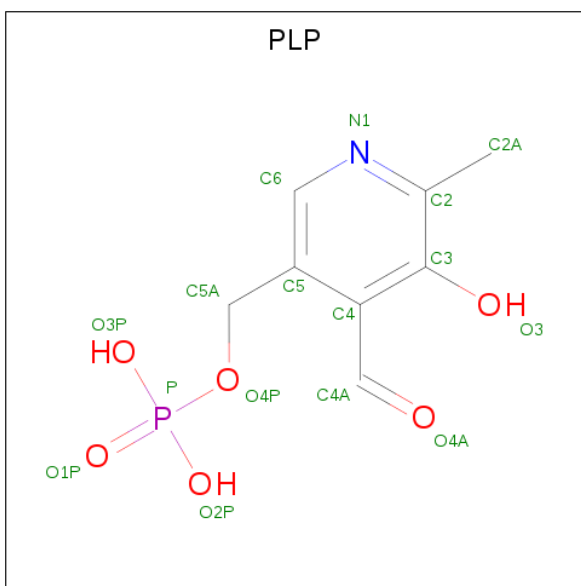
There are 3 unique types of molecules in this entry. The entry contains 14561 atoms, of which 2752 are hydrogens and 0 are deuteriums.

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 ORNITHINE DECARBOXYLASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	730	Total	C	H	N	O	S	0	0	0
			7105	3726	1269	982	1109	19			
1	B	730	Total	C	H	N	O	S	0	0	0
			7105	3726	1269	982	1109	19			

- Molecule 2 is PYRIDOXAL-5'-PHOSPHATE (three-letter code: PLP) (formula: C₈H₁₀NO₆P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
2	B	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 3 is water.

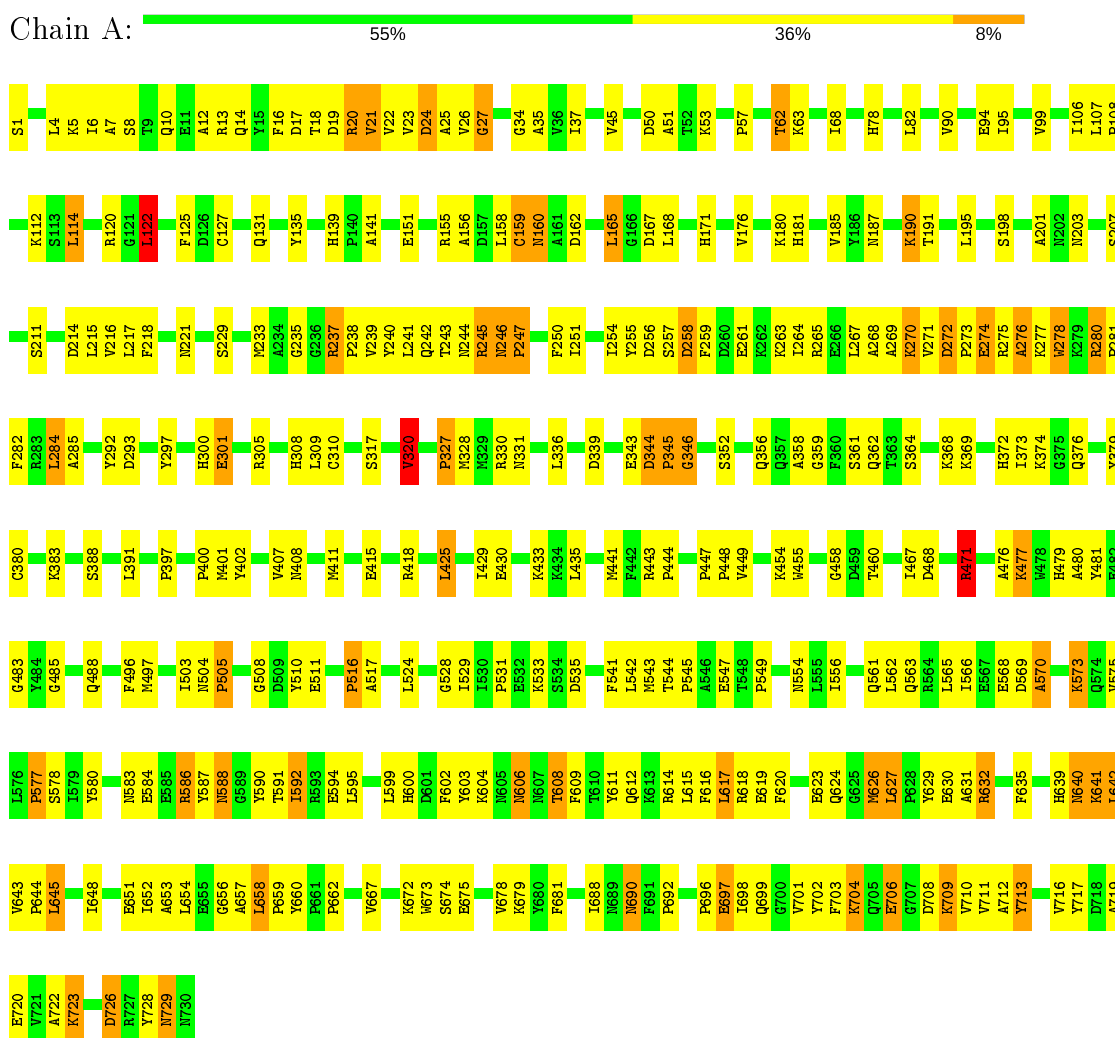
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	47	Total 141	H 94	O 47	0	0
3	B	60	Total 180	H 120	O 60	0	0

3 Residue-property plots

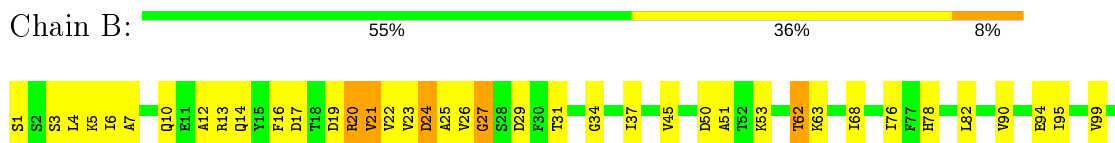
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according 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: ORNITHINE DECARBOXYLASE



- Molecule 1: ORNITHINE DECARBOXYLASE



K723	L642	L643	P644	L645	L648	E651	I652	A653	L654	A657	L658	P659	Y660	P661	K672	M673	S674	E675	K679	Y680	F681	I688	M689	N690	F691	P692	A695	P696	E697	I698	Q699	G700	Y701	Y702	F703	K704	Q705	E706	G707	D708	K709	V710	V711	A712	Y713	V716	Y717	D718	A719	E720	V721	A722	K729	R280	P281	F282	L284	A285	Y292	A299	H300	E301	V302	V303	K304	R305	H306	G307	H308	L309	C310	S317	K320	G321	I326	T329	E430	A431	K432	K433	M434	L435	M441	P447	P448	V449	V450	W455	G458	D459	T460	M465	D468	R471	A476	K477	W478	L479	A480	Y481	E482	G483	Y484	G485	Q488	Y489	Y490	P493	F496	I503	M504	P505	E506	T507	G508	D509	Y510	E511	P516	A517	G528	I529	I530	P531	E532	K533	S534	D535	F541	L542	M543	T544	E547	K551	I556	Q561	L562	Q563	R564	L565	I566	E567	E568	D569	A570	P571	L572	K573	T206	S211	D214	L215	V216	L217	F218	D219	R220	M221	M222	M228	S229	A230	M233	A234	G235	G236	R237	P238	V239	Y240	L241	Q242	T243	N244	R245	M246	P247	F250	Y255	D256	S257	D258	F259	D260	E261	K262	K263	I264	R265	E266	L267	A268	A269	K270	V271	D272	P273	E274	R275	A276	K277	W278	E103	P108	K112	S113	L114	Y117	R120	G121	L122	C127	P128	G129	H130	Q131	Y135	Y136	R137	K138	H139	P140	A141	E151	R155	C159	M160	L165	G166	D167	L168	H171	A175	V176	H181	V185	K190	T191	L195	S198	A201	T204	V205
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4 Data and refinement statistics

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

Property	Value	Source
Space group	P 6	Depositor
Cell constants a, b, c, α , β , γ	195.60Å 195.60Å 97.60Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	(Not available) – 3.00	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-3.00)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.219 , 0.268	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	14561	wwPDB-VP
Average B, all atoms (Å ²)	16.0	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: PLP

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	0.75	0/5985	0.88	7/8118 (0.1%)
1	B	0.78	0/5985	0.89	9/8118 (0.1%)
All	All	0.77	0/11970	0.88	16/16236 (0.1%)

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	2
1	B	0	1
All	All	0	3

There are no bond length outliers.

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	27	GLY	N-CA-C	-7.66	93.96	113.10
1	B	27	GLY	N-CA-C	-7.24	95.01	113.10
1	B	239	VAL	N-CA-C	-6.45	93.60	111.00
1	A	122	LEU	CA-CB-CG	6.11	129.36	115.30
1	B	471	ARG	NE-CZ-NH1	6.00	123.30	120.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	402	TYR	Sidechain

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Mol	Chain	Res	Type	Group
1	A	713	TYR	Sidechain
1	B	713	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	5836	1269	5623	295	0
1	B	5836	1269	5623	307	0
2	A	15	0	7	0	0
2	B	15	0	7	0	0
3	A	47	94	0	5	0
3	B	60	120	0	3	0
All	All	11809	2752	11260	589	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 26.

The worst 5 of 589 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:B:269:ALA:HA	1:B:275:ARG:NH2	1.83	0.92
1:B:612:GLN:HA	1:B:615:LEU:HD12	1.57	0.86
1:B:273:PRO:O	1:B:277:LYS:HB2	1.74	0.86
1:B:20:ARG:HA	1:B:20:ARG:HE	1.39	0.85
1:B:269:ALA:HA	1:B:275:ARG:CZ	2.06	0.84

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	728/730 (100%)	642 (88%)	70 (10%)	16 (2%)	6	31
1	B	728/730 (100%)	643 (88%)	70 (10%)	15 (2%)	7	33
All	All	1456/1460 (100%)	1285 (88%)	140 (10%)	31 (2%)	7	33

5 of 31 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	25	ALA
1	A	339	ASP
1	A	376	GLN
1	B	339	ASP
1	B	376	GLN

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	617/617 (100%)	544 (88%)	73 (12%)	5	22
1	B	617/617 (100%)	547 (89%)	70 (11%)	6	24
All	All	1234/1234 (100%)	1091 (88%)	143 (12%)	5	23

5 of 143 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	659	PRO
1	B	50	ASP
1	B	641	LYS
1	A	675	GLU
1	A	728	TYR

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

Mol	Chain	Res	Type
1	B	10	GLN
1	B	187	ASN
1	B	607	ASN
1	B	101	ASN
1	B	202	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](#)

2 ligands 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$
2	PLP	A	731	1	15,15,16	2.00	3 (20%)	20,22,23	1.74	6 (30%)
2	PLP	B	731	1	15,15,16	2.21	5 (33%)	20,22,23	1.45	2 (10%)

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
2	PLP	A	731	1	-	4/6/6/8	0/1/1/1
2	PLP	B	731	1	-	4/6/6/8	0/1/1/1

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	731	PLP	C2A-C2	4.65	1.58	1.50
2	B	731	PLP	C6-N1	3.95	1.42	1.34
2	B	731	PLP	C2-N1	3.83	1.41	1.33
2	A	731	PLP	C2-N1	3.59	1.40	1.33
2	B	731	PLP	C4A-C4	3.41	1.58	1.51

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	731	PLP	O3P-P-O4P	3.35	115.64	106.73
2	A	731	PLP	C6-C5-C4	3.01	120.53	118.16
2	B	731	PLP	C2A-C2-N1	2.82	123.18	117.67
2	B	731	PLP	C2A-C2-C3	-2.58	117.70	120.89
2	A	731	PLP	C2A-C2-C3	-2.58	117.70	120.89

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	731	PLP	C5A-O4P-P-O3P
2	B	731	PLP	C5A-O4P-P-O3P
2	A	731	PLP	C5A-O4P-P-O1P
2	B	731	PLP	C5A-O4P-P-O1P
2	A	731	PLP	C4-C5-C5A-O4P

There are no ring outliers.

No monomer is involved in short contacts.

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.