



# Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 08:00 pm BST

PDB ID : 3ZYK  
Title : Structure of CALM (PICALM) ANTH domain  
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Deposited on : 2011-08-23  
Resolution : 1.80 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](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.

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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  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

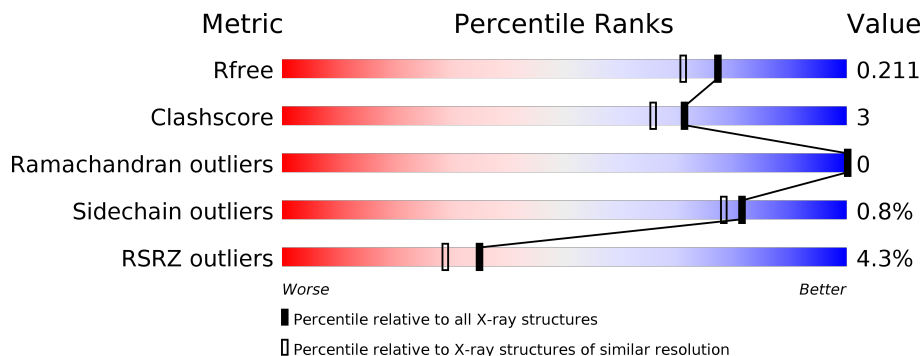
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.80 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))
$R_{free}$	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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  $\geq 3$ , 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  $\leq 5\%$ . 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	296	
1	B	296	

## 2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 4832 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 PHOSPHATIDYLINOSITOL-BINDING CLATHRIN ASSEMBLY PROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	269	2222	1416	383	408	15	0	12	0
1	B	268	2195	1398	377	406	14	0	9	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-6	GLY	-	expression tag	UNP O55012
A	-5	SER	-	expression tag	UNP O55012
A	-4	PRO	-	expression tag	UNP O55012
A	-3	ILE	-	expression tag	UNP O55012
A	-2	GLY	-	expression tag	UNP O55012
A	-1	ILE	-	expression tag	UNP O55012
A	0	HIS	-	expression tag	UNP O55012
B	-6	GLY	-	expression tag	UNP O55012
B	-5	SER	-	expression tag	UNP O55012
B	-4	PRO	-	expression tag	UNP O55012
B	-3	ILE	-	expression tag	UNP O55012
B	-2	GLY	-	expression tag	UNP O55012
B	-1	ILE	-	expression tag	UNP O55012
B	0	HIS	-	expression tag	UNP O55012

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	264	Total 264	O 264	0	0
2	B	151	Total 151	O 151	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	73.54Å 78.31Å 120.22Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	40.01 – 1.80 62.73 – 1.80	Depositor EDS
% Data completeness (in resolution range)	98.6 (40.01-1.80) 98.6 (62.73-1.80)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.46 (at 1.80Å)	Xtrriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, $R_{free}$	0.182 , 0.216 0.177 , 0.211	Depositor DCC
$R_{free}$ test set	3237 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	25.8	Xtrriage
Anisotropy	0.404	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 56.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	4832	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.84% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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	0.48	0/2294	0.57	0/3085
1	B	0.43	0/2258	0.54	0/3040
All	All	0.46	0/4552	0.55	0/6125

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 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	2222	0	2289	17	0
1	B	2195	0	2248	14	0
2	A	264	0	0	7	0
2	B	151	0	0	4	0
All	All	4832	0	4537	31	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 (31) 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:48[B]:CYS:SG	1:A:54:VAL:HG11	2.42	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:18:THR:O	1:B:22:VAL:HG23	2.03	0.58
1:A:256[A]:GLN:HG3	2:A:2228:HOH:O	2.03	0.58
1:A:228:ASN:HB2	2:A:2204:HOH:O	2.04	0.57
1:A:173[A]:ASN:ND2	2:A:2174:HOH:O	2.39	0.54
1:A:55:ASN:ND2	2:A:2042:HOH:O	2.26	0.54
1:B:256[A]:GLN:HG3	2:B:2147:HOH:O	2.10	0.52
1:A:51:GLU:O	1:A:92:ARG:NH2	2.43	0.51
1:A:254:ALA:HB1	1:A:259:ILE:HD12	1.93	0.50
1:A:106:LEU:O	1:A:125[B]:ARG:HG2	2.13	0.49
1:A:107:SER:O	1:A:125[B]:ARG:HD2	2.14	0.48
1:A:225:MET:HE3	1:A:230:CYS:HA	1.95	0.47
1:B:150:ARG:NH2	1:B:206:ARG:HG2	2.29	0.47
1:B:72:TRP:CD1	1:B:117:GLY:HA2	2.50	0.47
1:A:21:ALA:HB3	2:A:2001:HOH:O	2.14	0.46
1:A:129[B]:ARG:HG3	2:A:2108:HOH:O	2.15	0.46
1:B:206:ARG:HD2	2:B:2138:HOH:O	2.17	0.45
1:A:244[B]:MET:HE2	2:A:2220:HOH:O	2.16	0.45
1:B:188:LEU:HD12	1:B:257:VAL:HG11	1.99	0.45
1:B:188:LEU:HB3	1:B:194:ASN:OD1	2.17	0.44
1:B:254:ALA:HB1	1:B:259:ILE:HD12	1.99	0.44
1:B:106:LEU:O	1:B:125[B]:ARG:HG2	2.17	0.44
1:B:55:ASN:OD1	1:B:58:GLN:HG3	2.18	0.43
1:B:129[B]:ARG:HG3	2:B:2084:HOH:O	2.17	0.43
1:A:121:SER:O	1:A:125[A]:ARG:HG3	2.18	0.43
1:A:188:LEU:HD12	1:A:257:VAL:HG11	2.00	0.43
1:B:107:SER:O	1:B:125[B]:ARG:HD2	2.19	0.43
1:B:40:LYS:HE3	1:B:41:HIS:CE1	2.53	0.43
1:A:222:TYR:HA	1:A:225:MET:HE2	2.02	0.41
1:A:45:LEU:O	1:A:48[A]:CYS:HB2	2.21	0.41
1:B:202:LYS:HD3	2:B:2137:HOH:O	2.22	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	279/296 (94%)	274 (98%)	5 (2%)	0	100	100
1	B	275/296 (93%)	270 (98%)	5 (2%)	0	100	100
All	All	554/592 (94%)	544 (98%)	10 (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	252/261 (97%)	250 (99%)	2 (1%)	81	78
1	B	248/261 (95%)	246 (99%)	2 (1%)	81	78
All	All	500/522 (96%)	496 (99%)	4 (1%)	81	78

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	76	PHE
1	A	211	TYR
1	B	76	PHE
1	B	211	TYR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

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

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	269/296 (90%)	-0.22	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	14, 27, 59, 102	0
1	B	268/296 (90%)	0.25	23 (8%) <span style="border: 1px solid red; padding: 2px;">10</span> <span style="border: 1px solid red; padding: 2px;">8</span>	15, 32, 82, 129	0
All	All	537/592 (90%)	0.02	23 (4%) <span style="border: 1px solid red; padding: 2px;">35</span> <span style="border: 1px solid red; padding: 2px;">29</span>	14, 29, 77, 129	0

All (23) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	283	ALA	8.1
1	B	282	LEU	7.7
1	B	278	LEU	6.1
1	B	228	ASN	5.6
1	B	274	LEU	5.0
1	B	223	PHE	4.8
1	B	225	MET	4.2
1	B	285	LEU	4.0
1	B	277	ALA	3.5
1	B	273	SER	3.4
1	B	149	LYS	3.1
1	B	222	TYR	3.1
1	B	270	ALA	3.1
1	B	280	GLN	3.0
1	B	284	SER	2.7
1	B	227	LYS	2.7
1	B	276	ASP	2.5
1	B	152	ALA	2.4
1	B	218	LEU	2.4
1	B	153	ASP	2.2
1	B	271	PRO	2.1
1	B	237	TYR	2.1
1	B	275	LEU	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 carbohydrates 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.