



wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 3A8P
Title : Crystal structure of the Tiam2 PHCCE_x domain
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Deposited on : 2009-10-07
Resolution : 2.10 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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 : 2.36
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) : 2.36

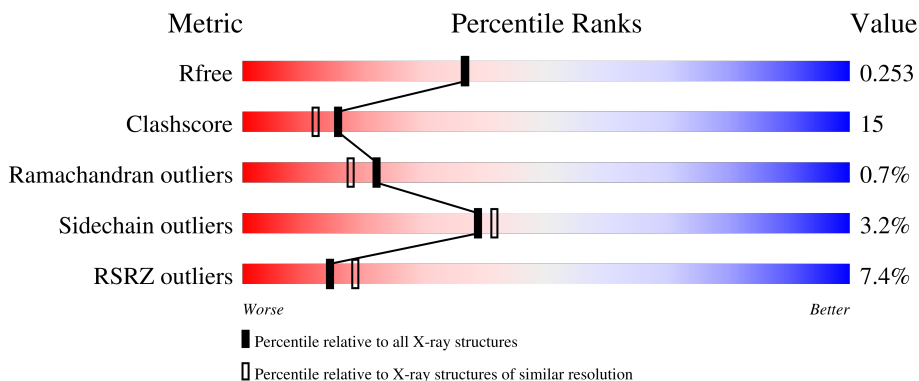
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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 $\leq 5\%$. 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	263	 5% 66% 21% 12%
1	B	263	 5% 65% 21% 12%
1	C	263	 8% 66% 19% 13%
1	D	263	 8% 62% 24% 13%

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 7754 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 T-lymphoma invasion and metastasis-inducing protein 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	232	1856	1184	331	329	12	0	0	0
1	B	231	1853	1182	330	329	12	0	0	0
1	C	229	1839	1175	328	324	12	0	0	0
1	D	228	1823	1163	327	321	12	0	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	495	GLY	-	expression tag	UNP Q6ZPF3
A	496	PRO	-	expression tag	UNP Q6ZPF3
A	497	LEU	-	expression tag	UNP Q6ZPF3
A	498	GLY	-	expression tag	UNP Q6ZPF3
A	499	SER	-	expression tag	UNP Q6ZPF3
B	495	GLY	-	expression tag	UNP Q6ZPF3
B	496	PRO	-	expression tag	UNP Q6ZPF3
B	497	LEU	-	expression tag	UNP Q6ZPF3
B	498	GLY	-	expression tag	UNP Q6ZPF3
B	499	SER	-	expression tag	UNP Q6ZPF3
C	495	GLY	-	expression tag	UNP Q6ZPF3
C	496	PRO	-	expression tag	UNP Q6ZPF3
C	497	LEU	-	expression tag	UNP Q6ZPF3
C	498	GLY	-	expression tag	UNP Q6ZPF3
C	499	SER	-	expression tag	UNP Q6ZPF3
D	495	GLY	-	expression tag	UNP Q6ZPF3
D	496	PRO	-	expression tag	UNP Q6ZPF3
D	497	LEU	-	expression tag	UNP Q6ZPF3
D	498	GLY	-	expression tag	UNP Q6ZPF3
D	499	SER	-	expression tag	UNP Q6ZPF3

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	126	Total 126	O 126	0	0
2	B	75	Total 75	O 75	0	0
2	C	90	Total 90	O 90	0	0
2	D	92	Total 92	O 92	0	0

R740
D741
ASP
SER
THR
LEU
LEU
LEU
LEU
LEU
LEU
THR
GLN
ARG
GLY
LYS

- Molecule 1: T-lymphoma invasion and metastasis-inducing protein 2

Chain D:  8% 62% 24% 13%

GLY
PRO
LEU
GLY
SER
LYS
LEU
LEU
GLU
Q562
F512
F513
F514
K514
Q520
K521
E522
R523
K524
L525
E526
L527
V528
A529
R530
M533
K534
Q535
Y536
Y537
M537
C543
L546
F547
Y548
E548
THR
TYR
GLY
LYS
ASN
SER
THR
THR
GLU
GLN
ASN
SER
SER
ALA
P562
R563
C564
K582
L588
Q599
Q603

L606
E607
A622
L633
L634
T638
R639
L642
Q643
K650
M651
K652
K653
M654
A655
E656
L657
Q658
L659
V662
S663
D664
P665
K666
M667
R668
K669
A670
I671
Q674
I675
R676
Q677
W678
E679
E683
K684
E703
K708
S709
L710
R716
P717
L720
R724
L725

Q726
V727
V730
D741
ASP
SER
THR
LEU
LEU
ARG
ARG
LYS
LEU
LEU
THR
THR
LEU
GLN
ARG
ARG
GLY
LYS

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	46.69Å 104.79Å 115.97Å 90.00° 80.55° 90.00°	Depositor
Resolution (Å)	29.81 – 2.10 37.76 – 2.08	Depositor EDS
% Data completeness (in resolution range)	98.7 (29.81-2.10) 97.7 (37.76-2.08)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.15 (at 2.08Å)	Xtrriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.211 , 0.253 0.211 , 0.253	Depositor DCC
R_{free} test set	6524 reflections (10.11%)	wwPDB-VP
Wilson B-factor (Å ²)	30.5	Xtrriage
Anisotropy	0.546	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 53.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.024 for h,-k,h-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	7754	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.22% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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

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	0.35	0/1893	0.54	0/2548
1	B	0.34	0/1890	0.55	0/2544
1	C	0.33	0/1876	0.53	0/2525
1	D	0.33	0/1859	0.53	0/2500
All	All	0.34	0/7518	0.54	0/10117

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

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	1856	0	1901	49	0
1	B	1853	0	1901	62	0
1	C	1839	0	1892	49	0
1	D	1823	0	1875	62	0
2	A	126	0	0	2	0
2	B	75	0	0	0	0
2	C	90	0	0	2	0
2	D	92	0	0	3	0
All	All	7754	0	7569	219	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 15.

The worst 5 of 219 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:C:520:GLN:HG3	1:C:521:LYS:H	1.30	0.94
1:A:664:ASP:HB2	1:A:667:ASN:HB2	1.51	0.93
1:D:650:LYS:O	1:D:653:LYS:HG2	1.78	0.82
1:B:662:VAL:HG13	1:B:668:ARG:NH1	1.95	0.80
1:C:520:GLN:CG	1:C:521:LYS:H	1.94	0.80

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	228/263 (87%)	225 (99%)	3 (1%)	0	100	100
1	B	227/263 (86%)	222 (98%)	3 (1%)	2 (1%)	17	12
1	C	225/263 (86%)	214 (95%)	9 (4%)	2 (1%)	17	12
1	D	224/263 (85%)	217 (97%)	5 (2%)	2 (1%)	17	12
All	All	904/1052 (86%)	878 (97%)	20 (2%)	6 (1%)	22	18

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	530	ARG
1	C	529	ALA
1	C	665	PRO
1	B	529	ALA
1	D	664	ASP

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	204/233 (88%)	198 (97%)	6 (3%)	42	46
1	B	205/233 (88%)	199 (97%)	6 (3%)	42	46
1	C	203/233 (87%)	198 (98%)	5 (2%)	47	52
1	D	201/233 (86%)	192 (96%)	9 (4%)	27	27
All	All	813/932 (87%)	787 (97%)	26 (3%)	39	41

5 of 26 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	647	MET
1	D	530	ARG
1	D	669	LYS
1	C	664	ASP
1	D	543	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	674	GLN
1	D	574	GLN
1	D	686	HIS
1	D	599	GLN
1	C	686	HIS

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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, 95th 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 ²)	Q<0.9
1	A	232/263 (88%)	0.32	14 (6%) 21 27	22, 32, 59, 72	0
1	B	231/263 (87%)	0.37	12 (5%) 27 32	20, 37, 66, 80	0
1	C	229/263 (87%)	0.51	22 (9%) 8 10	24, 37, 73, 88	0
1	D	228/263 (86%)	0.47	20 (8%) 10 12	22, 35, 68, 83	0
All	All	920/1052 (87%)	0.42	68 (7%) 14 18	20, 35, 68, 88	0

The worst 5 of 68 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	659	LEU	6.8
1	D	665	PRO	6.7
1	A	504	VAL	6.6
1	C	665	PRO	6.1
1	D	666	LYS	5.8

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 monosaccharides 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.