



# Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 01:44 AM GMT

PDB ID : 1TXD  
Title : Crystal Structure of the DH/PH domains of Leukemia-associated RhoGEF  
Authors : Kristelly, R.; Gao, G.; Tesmer, J.J.  
Deposited on : 2004-07-03  
Resolution : 2.13 Å(reported)

This is a full wwPDB 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 <http://wwpdb.org/ValidationPDFNotes.html>

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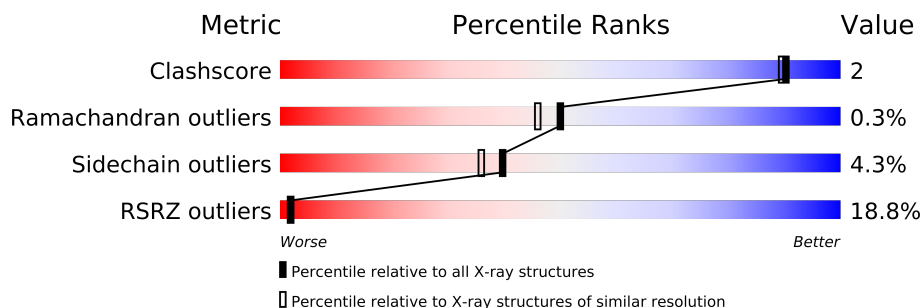
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance

The reported resolution of this entry is 2.13 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	79885	1302 (2.16-2.12)
Ramachandran outliers	78287	1281 (2.16-2.12)
Sidechain outliers	78261	1281 (2.16-2.12)
RSRZ outliers	66119	1116 (2.16-2.12)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	385	

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2972 atoms, of which 0 are hydrogen and 0 are deuterium.

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 Rho guanine nucleotide exchange factor 12.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	352	2881	1822	514	533	12	0	0	0

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	764	GLY	THR	CLONING ARTIFACT	UNP Q9NZN5
A	765	SER	ASP	CLONING ARTIFACT	UNP Q9NZN5
A	973	PHE	TYR	engineered	UNP Q9NZN5
A	1139	VAL	-	CLONING ARTIFACT	UNP Q9NZN5
A	1140	ASP	-	CLONING ARTIFACT	UNP Q9NZN5
A	1141	GLY	-	CLONING ARTIFACT	UNP Q9NZN5
A	1142	GLY	-	CLONING ARTIFACT	UNP Q9NZN5
A	1143	HIS	-	EXPRESSION TAG	UNP Q9NZN5
A	1144	HIS	-	EXPRESSION TAG	UNP Q9NZN5
A	1145	HIS	-	EXPRESSION TAG	UNP Q9NZN5
A	1146	HIS	-	EXPRESSION TAG	UNP Q9NZN5
A	1147	HIS	-	EXPRESSION TAG	UNP Q9NZN5
A	1148	HIS	-	EXPRESSION TAG	UNP Q9NZN5

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	91	Total	O	0	0
			91	91		



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	193.61 Å   45.86 Å   74.73 Å 90.00°   107.49°   90.00°	Depositor
Resolution (Å)	24.85 – 2.13 24.83 – 2.07	Depositor EDS
% Data completeness (in resolution range)	97.5 (24.85-2.13) 97.4 (24.83-2.07)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.05	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.25 (at 2.06 Å)	Xtriage
Refinement program	REFMAC 5.1.24	Depositor
R, $R_{free}$	0.235   ,   0.274 0.235   ,   (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	DCC
Wilson B-factor (Å <sup>2</sup> )	33.5	Xtriage
Anisotropy	0.377	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 45.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 37667 reflections	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	2972	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.66% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 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	0.77	1/2922 (0.0%)	0.89	9/3937 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	931	PRO	CG-CD	5.43	1.68	1.50

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	837	ASP	CB-CG-OD1	7.39	124.95	118.30
1	A	810	ASP	CB-CG-OD2	6.46	124.11	118.30
1	A	914	ASP	CB-CG-OD2	6.25	123.93	118.30
1	A	968	ARG	NE-CZ-NH2	-5.88	117.36	120.30
1	A	1014	ASP	CB-CG-OD2	5.37	123.13	118.30
1	A	936	ARG	NE-CZ-NH2	5.34	122.97	120.30
1	A	968	ARG	NE-CZ-NH1	5.23	122.92	120.30
1	A	922	ARG	NE-CZ-NH1	5.10	122.85	120.30
1	A	905	ASP	CB-CG-OD1	5.06	122.86	118.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2881	0	2972	12	0
2	A	91	0	0	0	0
All	All	2972	0	2972	12	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 2.

All (12) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:769:TRP:CD1	1:A:793:ASN:ND2	2.61	0.68
1:A:1020:MET:HE2	1:A:1041:LEU:HD22	1.86	0.58
1:A:930:ILE:N	1:A:931:PRO:CD	2.67	0.57
1:A:1095:LYS:HG2	1:A:1117:VAL:HG22	1.91	0.53
1:A:869:LEU:O	1:A:873:SER:OG	2.24	0.53
1:A:841:LEU:C	1:A:841:LEU:HD23	2.30	0.51
1:A:945:ASP:OD2	1:A:968:ARG:NH2	2.44	0.50
1:A:1085:VAL:O	1:A:1135:LYS:NZ	2.45	0.48
1:A:793:ASN:OD1	1:A:853:ARG:NH2	2.46	0.48
1:A:991:GLN:NE2	1:A:1014:ASP:HA	2.30	0.47
1:A:809:LEU:HD23	1:A:809:LEU:HA	1.81	0.43
1:A:769:TRP:CZ3	1:A:778:LEU:HD11	2.55	0.42

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone ⓘ

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	344/385 (89%)	331 (96%)	12 (4%)	1 (0%)	50 46

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	767	PRO

### 5.3.2 Protein sidechains ⓘ

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	326/354 (92%)	312 (96%)	14 (4%)	40 36

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	840	GLN
1	A	854	LYS
1	A	859	SER
1	A	864	ILE
1	A	958	GLU
1	A	1017	LYS
1	A	1018	ARG
1	A	1092	THR
1	A	1095	LYS
1	A	1101	SER
1	A	1103	SER
1	A	1120	LYS
1	A	1121	THR
1	A	1136	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1031	ASN
1	A	1094	ASN

### 5.3.3 RNA ⓘ

There are no RNA chains in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.



## 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 ⓘ

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	352/385 (91%)	1.06	66 (18%) 2 2	10, 31, 69, 83	0

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1138	SER	8.0
1	A	1034	LYS	7.7
1	A	1048	VAL	6.3
1	A	1054	ASP	6.3
1	A	1047	LEU	6.2
1	A	1033	ASP	5.7
1	A	999	LEU	5.7
1	A	771	GLN	5.5
1	A	953	TRP	5.4
1	A	1041	LEU	5.4
1	A	1135	LYS	5.3
1	A	1112	LEU	5.3
1	A	1104	ASP	5.1
1	A	1040	THR	5.0
1	A	1007	VAL	4.9
1	A	1092	THR	4.9
1	A	768	ASN	4.6
1	A	1049	LEU	4.6
1	A	1011	ARG	4.6
1	A	1134	VAL	4.5
1	A	1055	ASP	4.5
1	A	1032	ARG	4.4
1	A	769	TRP	4.3
1	A	772	LEU	4.2
1	A	1117	VAL	4.2
1	A	1076	PHE	4.2
1	A	1053	GLN	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	1137	GLN	4.0
1	A	770	GLN	4.0
1	A	1136	GLU	3.9
1	A	1050	LEU	3.9
1	A	1008	GLU	3.8
1	A	1061	CYS	3.7
1	A	1035	THR	3.5
1	A	998	SER	3.4
1	A	857	GLU	3.4
1	A	773	VAL	3.4
1	A	1010	LEU	3.3
1	A	797	TYR	3.3
1	A	1105	ASN	3.2
1	A	1056	ARG	3.1
1	A	767	PRO	3.1
1	A	1039	TYR	3.1
1	A	1099	VAL	3.1
1	A	997	SER	2.9
1	A	1091	ALA	2.9
1	A	1133	SER	2.7
1	A	775	ARG	2.7
1	A	954	PRO	2.7
1	A	1042	LEU	2.7
1	A	1123	TRP	2.5
1	A	1024	GLY	2.4
1	A	1060	ARG	2.4
1	A	1116	THR	2.3
1	A	1009	GLU	2.3
1	A	1096	ALA	2.3
1	A	1127	ILE	2.3
1	A	996	THR	2.3
1	A	1026	LEU	2.3
1	A	1058	VAL	2.2
1	A	1075	THR	2.2
1	A	1052	LYS	2.2
1	A	1129	ARG	2.2
1	A	1078	PRO	2.1
1	A	1028	TRP	2.1
1	A	1059	LEU	2.1

## 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 6.4 Ligands ⓘ

There are no ligands in this entry.

## 6.5 Other polymers ⓘ

There are no such residues in this entry.