wwPDB X-ray Structure Validation Summary Report (i)

May 13, 2025 – 04:44 pm BST

PDB ID	:	9HDB / pdb_00009hdb
Title	:	Sla1 SH3_3 domain (residues 355-414)
Authors	:	Draper-Barr, G.; Defelipe, L.A.; Ruiz-Carillo, D.; Garcia-Alai, M.M.
Deposited on	:	2024-11-12
Resolution	:	1.49 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 (i) 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 (1)) were used in the production of this report:

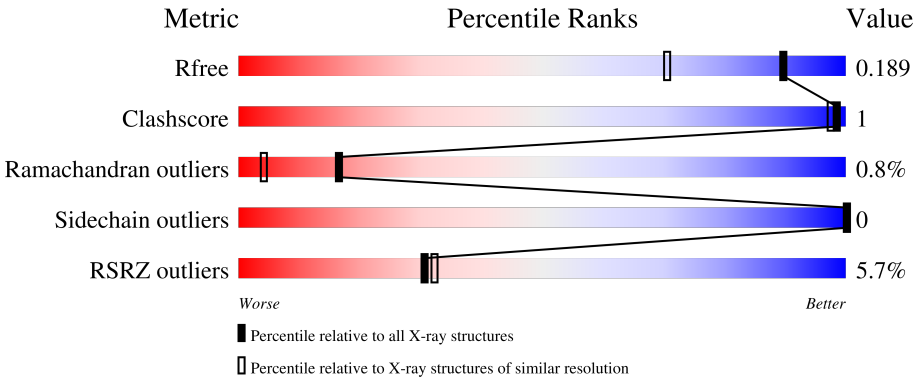
MolProbity	:	4-5-2 with Phenix2.0rc1
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

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 1.49 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}	164625	3717 (1.50-1.50)
Clashscore	180529	4048 (1.50-1.50)
Ramachandran outliers	177936	3970 (1.50-1.50)
Sidechain outliers	177891	3967 (1.50-1.50)
RSRZ outliers	164620	3718 (1.50-1.50)

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 <=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	64	6% 91% · 8%
1	B	64	5% 92% 5% ·

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 2085 atoms, of which 986 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 Actin cytoskeleton-regulatory complex protein SLA1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	B	64	Total	C	H	N	O	S	10	2	0
			1032	326	518	85	99	4			
1	A	59	Total	C	H	N	O	S	11	0	0
			942	302	468	77	92	3			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	GLY	-	expression tag	UNP P32790
B	2	ALA	-	expression tag	UNP P32790
B	3	MET	-	expression tag	UNP P32790
B	4	ALA	-	expression tag	UNP P32790
A	1	GLY	-	expression tag	UNP P32790
A	2	ALA	-	expression tag	UNP P32790
A	3	MET	-	expression tag	UNP P32790
A	4	ALA	-	expression tag	UNP P32790

- Molecule 2 is water.

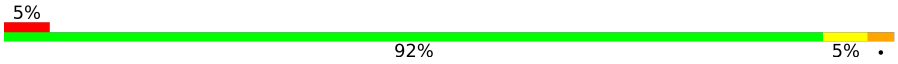
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	66	Total	O	0	0
			66	66		
2	A	45	Total	O	0	0
			45	45		

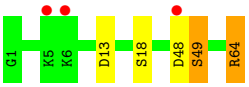
3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

• Molecule 1: Actin cytoskeleton-regulatory complex protein SLA1

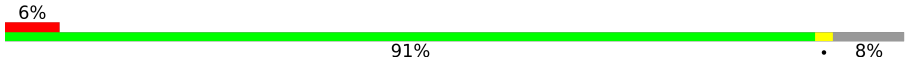
Chain B:

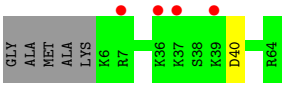




• Molecule 1: Actin cytoskeleton-regulatory complex protein SLA1

Chain A:





4 Data and refinement statistics (i)

Property	Value
Space group	P 21 21 21
Cell constants a, b, c, α, β, γ	38.53Å 50.42Å 51.97Å 90.00° 90.00° 90.00°
Resolution (Å)	36.21 – 1.49 36.19 – 1.49
% Data completeness (in resolution range)	99.9 (36.21-1.49) 99.9 (36.19-1.49)
R_{merge}	0.08
R_{sym}	(Not available)
$< I/\sigma(I) >$ [1]	3.29 (at 1.49Å)
Refinement program	REFMAC 5.8.0430 (refmacat 0.4.88), REFMAC 5.8.0430 (refmacat 0.4.
R, R_{free}	0.143 , 0.190 0.142 , 0.189
R_{free} test set	848 reflections (4.97%)
Wilson B-factor (Å^2)	16.4
Anisotropy	0.376
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.42 , 42.9
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$
Estimated twinning fraction	0.009 for -h,l,k
F_o,F_c correlation	0.97
Total number of atoms	2085
Average B, all atoms (Å^2)	19.0

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.62% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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	0.97	0/483	1.13	1/648 (0.2%)
1	B	1.02	1/532 (0.2%)	1.19	3/710 (0.4%)
All	All	0.99	1/1015 (0.1%)	1.16	4/1358 (0.3%)

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	B	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	18	SER	CA-CB	-5.02	1.45	1.53

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	64	ARG	CG-CD-NE	-6.84	96.96	112.00
1	A	40	ASP	CA-CB-CG	5.29	117.89	112.60
1	B	13	ASP	CA-CB-CG	5.08	117.68	112.60
1	B	64	ARG	CB-CG-CD	-5.07	99.64	111.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	64	ARG	Sidechain

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	474	468	465	0	0
1	B	514	518	504	1	0
2	A	45	0	0	0	0
2	B	66	0	0	0	0
All	All	1099	986	969	1	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 1.

All (1) 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:48:ASP:O	1:B:49:SER:CB	2.65	0.44

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	57/64 (89%)	57 (100%)	0	0	100 100
1	B	64/64 (100%)	63 (98%)	0	1 (2%)	8 1
All	All	121/128 (94%)	120 (99%)	0	1 (1%)	16 4

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	49	SER

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	52/55 (94%)	52 (100%)	0	100	100
1	B	57/55 (104%)	57 (100%)	0	100	100
All	All	109/110 (99%)	109 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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

5.3.3 RNA

There are no RNA molecules 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 oligosaccharides 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 (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^{th} 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	59/64 (92%)	-0.27	4 (6%)	25	25	11, 15, 26, 28	4 (6%)
1	B	64/64 (100%)	-0.34	3 (4%)	37	39	7, 16, 25, 29	5 (7%)
All	All	123/128 (96%)	-0.31	7 (5%)	30	32	7, 16, 26, 29	9 (7%)

The worst 5 of 7 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	37	LYS	5.0
1	B	5	LYS	3.1
1	A	39	LYS	3.0
1	B	48	ASP	3.0
1	A	36	LYS	2.8

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 monosaccharides 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.