



Full wwPDB X-ray Structure Validation Report

Feb 26, 2014 – 06:47 PM GMT

PDB ID : 2Y00
Title : Salmonella enterica SadA 1049-1304 fused to GCN4 adaptors (SadAK9-cfI)
Authors : Hartmann, M.D.; Hernandez Alvarez, B.; Lupas, A.N.
Deposited on : 2012-10-20
Resolution : 2.80 Å(reported)

This is a full wwPDB validation report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

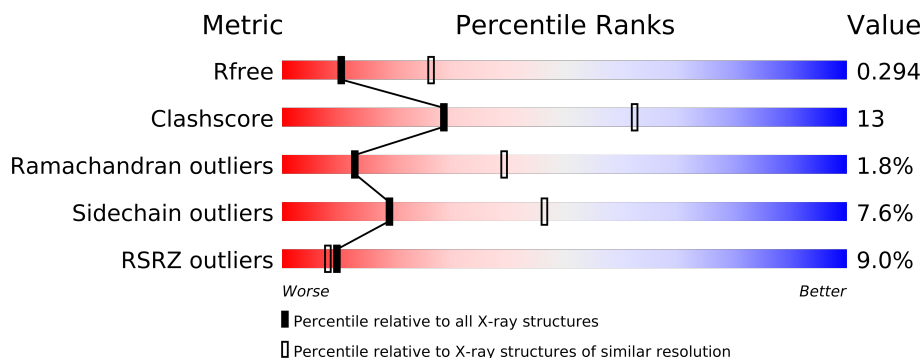
The following versions of software and data (see [references](#)) were used in the production of this report:

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 2.80 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}	66092	1799 (2.80-2.80)
Clashscore	79885	2295 (2.80-2.80)
Ramachandran outliers	78287	2252 (2.80-2.80)
Sidechain outliers	78261	2254 (2.80-2.80)
RSRZ outliers	66119	1802 (2.80-2.80)

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 ≥ 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	322	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 1989 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 GENERAL CONTROL PROTEIN GCN4, PUTATIVE INNER MEMBRANE PROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	276	Total	C	N	O	S	0	0	0
			1986	1194	357	430	5			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1023	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1027	ILE	VAL	ENGINEERED MUTATION	UNP P03069
A	1030	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1034	ILE	ASN	ENGINEERED MUTATION	UNP P03069
A	1037	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1041	ILE	VAL	ENGINEERED MUTATION	UNP P03069
A	1044	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1048	ILE	VAL	ENGINEERED MUTATION	UNP P03069
A	1308	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1312	ILE	VAL	ENGINEERED MUTATION	UNP P03069
A	1315	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1319	ILE	ASN	ENGINEERED MUTATION	UNP P03069
A	1322	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1326	ILE	VAL	ENGINEERED MUTATION	UNP P03069
A	1329	ILE	LEU	ENGINEERED MUTATION	UNP P03069
A	1333	ILE	VAL	ENGINEERED MUTATION	UNP P03069
A	1334	LYS	-	EXPRESSION TAG	UNP P03069
A	1335	LEU	-	EXPRESSION TAG	UNP P03069
A	1336	HIS	-	EXPRESSION TAG	UNP P03069
A	1337	HIS	-	EXPRESSION TAG	UNP P03069
A	1338	HIS	-	EXPRESSION TAG	UNP P03069
A	1339	HIS	-	EXPRESSION TAG	UNP P03069
A	1340	HIS	-	EXPRESSION TAG	UNP P03069
A	1341	HIS	-	EXPRESSION TAG	UNP P03069

- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Cl	0	0
			1	1		

- Molecule 3 is water.

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

4 Data and refinement statistics

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α , β , γ	54.00Å 54.00Å 306.98Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	34.53 – 2.80 31.99 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.4 (34.53-2.80) 99.9 (31.99-2.80)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.09 (at 2.81Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.221 , 0.297 0.231 , 0.294	Depositor DCC
R_{free} test set	622 reflections (5.29%)	DCC
Wilson B-factor (Å ²)	34.9	Xtriage
Anisotropy	0.362	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.25 , -2.1	EDS
Estimated twinning fraction	0.571 for H,K,L 0.429 for -H-K,K,-L 0.109 for h,-h-k,-l	Xtriage
Reported twinning fraction	0.571 for H,K,L 0.429 for -H-K,K,-L	Depositor
L-test for twinning	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	6 of 12379 reflections (0.048%)	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	1989	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.60% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CL

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	0/1998	0.60	0/2715

There are no bond length outliers.

There are no bond angle outliers.

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	1986	0	1925	49	0
2	A	1	0	0	0	0
3	A	2	0	0	0	0
All	All	1989	0	1925	49	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 13.

All (49) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:1110:ILE:HD13	1:A:1124:ILE:HD11	1.31	1.11

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:1110:ILE:HD13	1:A:1124:ILE:CD1	1.88	1.04
1:A:1074:ALA:HB1	1:A:1079:SER:OG	1.60	1.00
1:A:1110:ILE:HB	1:A:1124:ILE:HD12	1.57	0.86
1:A:1073:LEU:HD21	1:A:1075:VAL:CG2	2.09	0.83
1:A:1073:LEU:HD21	1:A:1075:VAL:HG21	1.72	0.70
1:A:1320:TYR:O	1:A:1324:ASN:ND2	2.24	0.70
1:A:1123:SER:O	1:A:1124:ILE:HD13	1.93	0.69
1:A:1073:LEU:HD11	1:A:1075:VAL:HG23	1.76	0.68
1:A:1219:ILE:HG23	1:A:1222:ILE:HD12	1.77	0.67
1:A:1073:LEU:HD21	1:A:1075:VAL:HG23	1.77	0.66
1:A:1077:THR:N	1:A:1091:ASP:OD1	2.28	0.66
1:A:1197:SER:O	1:A:1201:LEU:HD13	2.00	0.62
1:A:1110:ILE:HG22	1:A:1112:ILE:HG13	1.83	0.61
1:A:1110:ILE:CD1	1:A:1124:ILE:CD1	2.71	0.61
1:A:1128:ASN:HD22	1:A:1164:ARG:NH2	2.01	0.59
1:A:1075:VAL:HG12	1:A:1076:GLY:N	2.18	0.58
1:A:1082:MET:HE3	1:A:1096:ILE:HG12	1.87	0.57
1:A:1101:LEU:HD21	1:A:1103:MET:HG3	1.87	0.56
1:A:1252:SER:HB2	1:A:1266:THR:HG23	1.87	0.56
1:A:1073:LEU:CG	1:A:1075:VAL:HG23	2.38	0.54
1:A:1128:ASN:ND2	1:A:1164:ARG:NH2	2.56	0.54
1:A:1270:ALA:HB2	1:A:1277:SER:HB3	1.90	0.53
1:A:1082:MET:CE	1:A:1096:ILE:HG12	2.38	0.52
1:A:1257:ALA:HB3	1:A:1271:ASP:HA	1.91	0.52
1:A:1078:ASP:O	1:A:1092:ALA:HA	2.09	0.52
1:A:1073:LEU:CD1	1:A:1075:VAL:HG23	2.39	0.52
1:A:1073:LEU:CD2	1:A:1075:VAL:HG23	2.40	0.51
1:A:1114:SER:O	1:A:1129:GLY:N	2.43	0.51
1:A:1190:GLN:O	1:A:1191:VAL:C	2.48	0.50
1:A:1319:ILE:HA	1:A:1322:ILE:HD12	1.94	0.49
1:A:1110:ILE:CG2	1:A:1112:ILE:HD11	2.42	0.49
1:A:1172:GLY:H	1:A:1183:GLN:NE2	2.10	0.49
1:A:1204:GLN:O	1:A:1208:LEU:HD13	2.14	0.48
1:A:1099:ASN:HB3	1:A:1115:ASN:HD22	1.78	0.48
1:A:1219:ILE:HG23	1:A:1222:ILE:CD1	2.44	0.47
1:A:1287:ILE:HG22	1:A:1290:VAL:CG2	2.44	0.47
1:A:1140:TYR:CE1	1:A:1142:ALA:HB2	2.51	0.46
1:A:1252:SER:CB	1:A:1266:THR:HG23	2.45	0.46
1:A:1086:THR:O	1:A:1086:THR:HG22	2.15	0.46
1:A:1172:GLY:H	1:A:1183:GLN:HE22	1.64	0.46
1:A:1138:THR:O	1:A:1139:ASP:C	2.53	0.45
1:A:1128:ASN:HD22	1:A:1128:ASN:N	2.14	0.45

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:1128:ASN:O	1:A:1128:ASN:ND2	2.50	0.45
1:A:1217:ASN:HD22	1:A:1217:ASN:N	2.15	0.43
1:A:1292:ALA:HB1	1:A:1304:GLN:CD	2.39	0.43
1:A:1250:ILE:HD12	1:A:1264:LEU:HD13	2.00	0.42
1:A:1248:VAL:HG12	1:A:1249:ALA:N	2.37	0.40
1:A:1073:LEU:CD2	1:A:1075:VAL:CG2	2.92	0.40

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	274/322 (85%)	235 (86%)	34 (12%)	5 (2%)	13	39

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1104	ALA
1	A	1171	ALA
1	A	1219	ILE
1	A	1335	LEU
1	A	1107	ILE

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	211/257 (82%)	195 (92%)	16 (8%)	19	46

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1077	THR
1	A	1105	ASP
1	A	1107	ILE
1	A	1128	ASN
1	A	1203	THR
1	A	1217	ASN
1	A	1228	THR
1	A	1239	ASP
1	A	1246	ASP
1	A	1252	SER
1	A	1259	GLU
1	A	1288	THR
1	A	1312	ILE
1	A	1314	GLU
1	A	1335	LEU
1	A	1336	HIS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1099	ASN
1	A	1108	ASN
1	A	1115	ASN
1	A	1119	ASN
1	A	1128	ASN
1	A	1183	GLN
1	A	1217	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 ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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, 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	276/322 (85%)	0.17	25 (9%) 9 8	2, 30, 88, 90	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1269	VAL	4.8
1	A	1224	THR	4.4
1	A	1236	ASP	4.2
1	A	1218	GLY	3.8
1	A	1262	VAL	3.1
1	A	1255	ILE	3.0
1	A	1239	ASP	2.9
1	A	1225	THR	2.9
1	A	1252	SER	2.8
1	A	1243	GLN	2.7
1	A	1227	SER	2.7
1	A	1282	THR	2.6
1	A	1256	ALA	2.6
1	A	1296	ASN	2.5
1	A	1248	VAL	2.5
1	A	1219	ILE	2.5
1	A	1235	THR	2.5
1	A	1232	LYS	2.4
1	A	1233	THR	2.3
1	A	1257	ALA	2.3
1	A	1287	ILE	2.1
1	A	1228	THR	2.1
1	A	1253	GLY	2.0
1	A	1277	SER	2.0
1	A	1303	ALA	2.0

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

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors(Å ²)	Q<0.9
2	CL	A	2337	1/1	0.03	-8.17	31,31,31,31	1

6.5 Other polymers

There are no such residues in this entry.