



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 28, 2014 – 06:20 AM GMT

PDB ID : 4GMO
Title : Crystal structure of Syo1
Authors : Bange, G.; Sinning, I.
Deposited on : 2012-08-16
Resolution : 2.10 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>

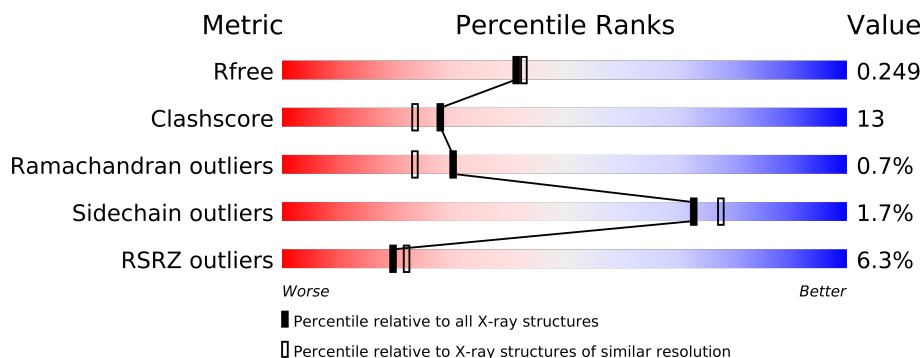
The following versions of software and data (see [references](#)) were used in the production of this report:

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 2.10 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}	66092	3012 (2.10-2.10)
Clashscore	79885	3649 (2.10-2.10)
Ramachandran outliers	78287	3610 (2.10-2.10)
Sidechain outliers	78261	3611 (2.10-2.10)
RSRZ outliers	66119	3013 (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 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	684	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 4548 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 Putative uncharacterized protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	556	Total	C	N	O	S	0	0	0
			4327	2756	745	815	11			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	677	GLY	-	EXPRESSION TAG	UNP G0S5S6
A	678	SER	-	EXPRESSION TAG	UNP G0S5S6
A	679	HIS	-	EXPRESSION TAG	UNP G0S5S6
A	680	HIS	-	EXPRESSION TAG	UNP G0S5S6
A	681	HIS	-	EXPRESSION TAG	UNP G0S5S6
A	682	HIS	-	EXPRESSION TAG	UNP G0S5S6
A	683	HIS	-	EXPRESSION TAG	UNP G0S5S6
A	684	HIS	-	EXPRESSION TAG	UNP G0S5S6

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	221	Total	O	0	0
			221	221		

4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	166.43Å 59.73Å 69.55Å 90.00° 97.71° 90.00°	Depositor
Resolution (Å)	40.45 – 2.10 40.45 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.8 (40.45-2.10) 99.7 (40.45-2.10)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.39 (at 2.10Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, R_{free}	0.219 , 0.256 0.214 , 0.249	Depositor DCC
R_{free} test set	1992 reflections (5.03%)	DCC
Wilson B-factor (Å ²)	34.4	Xtriage
Anisotropy	0.390	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 44.7	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	0 of 39668 reflections	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4548	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.73% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities 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	0.49	1/4404 (0.0%)	0.58	2/5991 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	46	PRO	N-CD	5.13	1.55	1.47

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	301	TYR	N-CA-C	-6.46	93.56	111.00
1	A	45	SER	C-N-CD	5.76	140.50	128.40

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	4327	0	4421	111	1
2	A	221	0	0	6	0
All	All	4548	0	4421	111	1

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

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:62:VAL:HG11	1:A:102:VAL:HG12	1.25	1.10
1:A:108:GLU:HG3	1:A:110:ASP:OD1	1.52	1.09
1:A:89:ASN:HD21	1:A:91:ASP:HB2	1.18	1.02
1:A:62:VAL:CG1	1:A:102:VAL:HG12	1.93	0.98
1:A:62:VAL:HG11	1:A:102:VAL:CG1	1.98	0.93
1:A:300:ARG:O	1:A:303:ASN:HB2	1.68	0.91
1:A:57:ALA:O	1:A:61:ILE:HG13	1.74	0.88
1:A:617:ASP:HB3	2:A:784:HOH:O	1.75	0.85
1:A:141:PRO:HG2	1:A:144:LYS:HD3	1.59	0.84
1:A:261:GLN:HG3	1:A:263:MET:CE	2.10	0.81
1:A:89:ASN:ND2	1:A:91:ASP:HB2	1.95	0.80
1:A:58:ILE:O	1:A:62:VAL:HB	1.81	0.78
1:A:551:PRO:N	2:A:862:HOH:O	2.15	0.78
1:A:47:ASP:HA	1:A:48:ALA:CB	2.17	0.75
1:A:206:ILE:HG21	1:A:248:MET:HB3	1.70	0.72
1:A:563:VAL:HG13	1:A:579:VAL:HG13	1.71	0.71
1:A:261:GLN:HG3	1:A:263:MET:HE1	1.72	0.70
1:A:62:VAL:CG1	1:A:102:VAL:CG1	2.63	0.70
1:A:50:SER:HA	1:A:53:THR:OG1	1.92	0.69
1:A:47:ASP:HA	1:A:48:ALA:HB2	1.73	0.69
1:A:108:GLU:HG2	2:A:911:HOH:O	1.91	0.69
1:A:485:ILE:O	1:A:489:LEU:HG	1.94	0.67
1:A:301:TYR:C	1:A:303:ASN:N	2.48	0.67
1:A:121:LEU:HB3	1:A:181:LYS:HZ2	1.61	0.65
1:A:301:TYR:C	1:A:303:ASN:H	2.00	0.65
1:A:282:THR:HG21	1:A:420:THR:HG22	1.77	0.65
1:A:65:ALA:O	1:A:69:LYS:HG2	1.96	0.65
1:A:433:ILE:HD12	1:A:439:LEU:HD13	1.80	0.64
1:A:44:LYS:O	1:A:45:SER:HB3	1.97	0.64
1:A:481:TRP:HA	1:A:485:ILE:HD12	1.81	0.63
1:A:141:PRO:HG2	1:A:144:LYS:CD	2.26	0.62
1:A:261:GLN:HG3	1:A:263:MET:HE2	1.80	0.62
1:A:52:THR:HA	1:A:95:ALA:HB2	1.80	0.62
1:A:145:LEU:HD11	2:A:732:HOH:O	2.00	0.61
1:A:657:ASP:OD1	1:A:658:GLU:N	2.33	0.61
1:A:61:ILE:HG22	1:A:67:CYS:HB3	1.84	0.59
1:A:29:ALA:O	1:A:33:GLU:HG3	2.01	0.59
1:A:71:LEU:O	1:A:76:VAL:HG23	2.03	0.59
1:A:490:GLU:O	1:A:491:ALA:CB	2.51	0.58
1:A:487:PRO:O	1:A:490:GLU:O	2.21	0.58
1:A:254:HIS:HE1	1:A:314:SER:OG	1.85	0.58
1:A:654:THR:O	1:A:657:ASP:OD1	2.21	0.58

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:71:LEU:HD22	1:A:76:VAL:HG21	1.86	0.57
1:A:479:LYS:HE3	1:A:483:LYS:HG3	1.87	0.57
1:A:300:ARG:C	1:A:303:ASN:H	2.09	0.56
1:A:524:HIS:HE1	1:A:578:GLU:OE1	1.89	0.56
1:A:57:ALA:O	1:A:61:ILE:CG1	2.53	0.55
1:A:47:ASP:CA	1:A:48:ALA:CB	2.84	0.55
1:A:54:ALA:O	1:A:58:ILE:HG13	2.07	0.55
1:A:121:LEU:HB3	1:A:181:LYS:NZ	2.21	0.54
1:A:300:ARG:HD3	1:A:303:ASN:ND2	2.22	0.54
1:A:264:ASP:CG	1:A:412:PRO:HD2	2.27	0.54
1:A:474:TYR:HB3	1:A:475:PRO:HD3	1.89	0.54
1:A:254:HIS:HD2	1:A:274:ASP:OD1	1.91	0.53
1:A:118:LEU:O	1:A:119:ASP:HB3	2.08	0.53
1:A:262:TRP:CD2	1:A:268:GLY:HA3	2.43	0.53
1:A:57:ALA:C	1:A:61:ILE:HG13	2.30	0.52
1:A:490:GLU:O	1:A:491:ALA:HB3	2.10	0.52
1:A:295:PHE:HB2	1:A:298:ASP:CB	2.40	0.52
1:A:300:ARG:O	1:A:303:ASN:CB	2.51	0.52
1:A:264:ASP:OD2	1:A:412:PRO:HD2	2.11	0.51
1:A:644:ILE:HD13	1:A:652:LEU:HG	1.93	0.51
1:A:273:CYS:O	1:A:276:ILE:HG12	2.12	0.50
1:A:301:TYR:O	1:A:303:ASN:N	2.44	0.49
1:A:37:LEU:N	1:A:38:PRO:CD	2.74	0.49
1:A:194:ALA:O	1:A:196:ILE:HG23	2.12	0.49
1:A:32:ARG:O	1:A:37:LEU:HG	2.13	0.48
1:A:289:VAL:HB	1:A:290:PRO:HD2	1.94	0.48
1:A:628:LYS:O	1:A:632:GLU:HG3	2.13	0.48
1:A:664:GLY:O	1:A:668:GLN:HG2	2.13	0.48
1:A:196:ILE:HD12	1:A:196:ILE:C	2.33	0.48
1:A:657:ASP:OD1	2:A:824:HOH:O	2.19	0.48
1:A:486:LEU:HD12	1:A:489:LEU:HD12	1.96	0.47
1:A:36:ILE:O	1:A:40:LEU:HG	2.15	0.47
1:A:300:ARG:HB3	1:A:303:ASN:HB2	1.95	0.47
1:A:500:THR:HA	1:A:555:LEU:HD13	1.97	0.47
1:A:577:ARG:O	1:A:581:VAL:HG23	2.15	0.47
1:A:247:VAL:HG21	1:A:304:ILE:HG23	1.97	0.47
1:A:301:TYR:O	1:A:302:ALA:C	2.49	0.46
1:A:108:GLU:CG	1:A:110:ASP:OD1	2.43	0.46
1:A:50:SER:CA	1:A:53:THR:OG1	2.62	0.46
1:A:622:TRP:CE2	1:A:675:PRO:HD3	2.51	0.46
1:A:640:LEU:HD12	1:A:640:LEU:C	2.37	0.45
1:A:64:ASP:HB3	1:A:67:CYS:HB2	1.99	0.45

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:646:LYS:HG2	1:A:653:ARG:HG2	1.99	0.44
1:A:461:PHE:CD1	1:A:470:HIS:HB2	2.53	0.44
1:A:233:ASP:O	1:A:237:LYS:HG3	2.18	0.44
1:A:637:MET:SD	1:A:640:LEU:HD21	2.58	0.43
1:A:37:LEU:HB2	1:A:38:PRO:HD3	2.00	0.43
1:A:47:ASP:CA	1:A:48:ALA:HB3	2.49	0.43
1:A:190:ARG:HE	1:A:190:ARG:HB2	1.71	0.43
1:A:190:ARG:HD2	2:A:857:HOH:O	2.19	0.42
1:A:52:THR:HA	1:A:95:ALA:CB	2.47	0.42
1:A:528:ILE:O	1:A:531:TYR:HB3	2.20	0.42
1:A:137:THR:O	1:A:141:PRO:HA	2.19	0.42
1:A:486:LEU:HA	1:A:489:LEU:HD12	2.01	0.42
1:A:170:ALA:C	1:A:171:ARG:HG2	2.40	0.42
1:A:47:ASP:CB	1:A:48:ALA:HB3	2.51	0.41
1:A:486:LEU:N	1:A:487:PRO:CD	2.83	0.41
1:A:474:TYR:HB3	1:A:475:PRO:CD	2.50	0.41
1:A:559:CYS:O	1:A:563:VAL:HB	2.20	0.41
1:A:48:ALA:HA	1:A:51:ARG:HG3	2.02	0.41
1:A:49:LYS:O	1:A:51:ARG:N	2.54	0.41
1:A:417:LEU:O	1:A:422:VAL:HG23	2.20	0.41
1:A:252:VAL:O	1:A:256:VAL:HG13	2.21	0.41
1:A:319:PHE:CE1	1:A:455:THR:HG21	2.55	0.41
1:A:666:PHE:O	1:A:670:LYS:HG2	2.20	0.41
1:A:287:HIS:CD2	1:A:301:TYR:OH	2.74	0.40
1:A:62:VAL:HG12	1:A:102:VAL:CG1	2.50	0.40
1:A:267:PRO:HB3	1:A:271:GLY:HA2	2.04	0.40
1:A:261:GLN:HG2	1:A:261:GLN:O	2.22	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:32:ARG:NH2	1:A:325:LYS:NZ[4_556]	1.36	0.84

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	550/684 (80%)	531 (96%)	15 (3%)	4 (1%)	30	23

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	48	ALA
1	A	302	ALA
1	A	491	ALA
1	A	45	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	473/583 (81%)	465 (98%)	8 (2%)	73	78

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	49	LYS
1	A	61	ILE
1	A	62	VAL
1	A	64	ASP
1	A	229	THR
1	A	537	GLN
1	A	563	VAL
1	A	592	ASN

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	89	ASN
1	A	254	HIS
1	A	265	HIS
1	A	287	HIS
1	A	524	HIS
1	A	576	ASN

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Mol	Chain	Res	Type
1	A	649	GLN

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, 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	556/684 (81%)	0.37	35 (6%) 19 22	22, 38, 67, 90	0

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	296	ASN	12.7
1	A	293	ALA	9.6
1	A	295	PHE	9.4
1	A	299	ALA	8.7
1	A	297	GLY	7.0
1	A	298	ASP	6.6
1	A	433	ILE	5.1
1	A	301	TYR	4.6
1	A	462	ALA	4.3
1	A	294	LYS	4.2
1	A	291	GLY	4.0
1	A	60	ASN	3.8
1	A	494	ALA	3.8
1	A	292	GLY	3.7
1	A	463	ASN	3.3
1	A	437	GLU	3.2
1	A	287	HIS	3.1
1	A	464	GLY	3.1
1	A	434	ASP	3.0
1	A	49	LYS	3.0
1	A	45	SER	2.8
1	A	300	ARG	2.8
1	A	431	LEU	2.7
1	A	492	ASP	2.7
1	A	33	GLU	2.7
1	A	50	SER	2.6
1	A	409	GLU	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	48	ALA	2.5
1	A	40	LEU	2.4
1	A	52	THR	2.3
1	A	657	ASP	2.3
1	A	436	ASP	2.2
1	A	304	ILE	2.2
1	A	408	LEU	2.1
1	A	290	PRO	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.