



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 22, 2026 – 06:08 PM JST

PDB ID : 9VAF / pdb_00009vaf
Title : Crystal structure of the PDZ tandem of syntenin
Authors : Ando, N.; Hanazono, Y.; Ito, N.; Hiroaki, H.
Deposited on : 2025-06-03
Resolution : 1.85 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

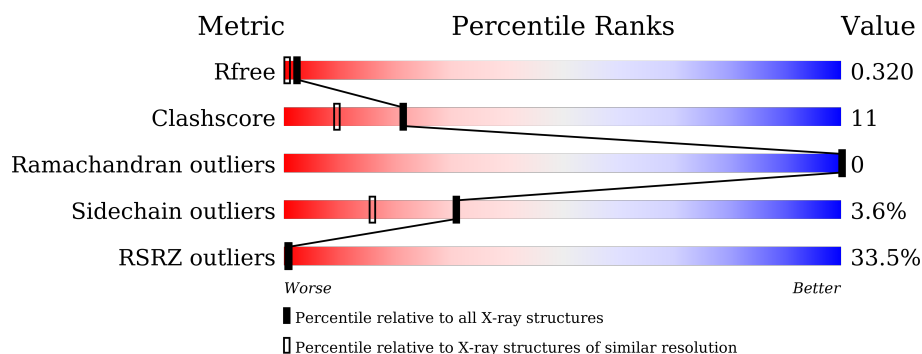
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.85 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}	180053	3428 (1.86-1.86)
Clashscore	190562	3579 (1.86-1.86)
Ramachandran outliers	187476	3553 (1.86-1.86)
Sidechain outliers	187428	3553 (1.86-1.86)
RSRZ outliers	180081	3429 (1.86-1.86)

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	166	<div> <div>25%</div> <div>82%</div> <div>17%</div> <div>.</div> </div>
1	B	166	<div> <div>42%</div> <div>73%</div> <div>25%</div> <div>.</div> </div>

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2590 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 Syntenin-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	165	Total	C	N	O	S	0	0	0
			1260	792	224	238	6			
1	B	166	Total	C	N	O	S	0	0	0
			1270	797	225	242	6			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	275	TYR	PHE	engineered mutation	UNP O00560
B	275	TYR	PHE	engineered mutation	UNP O00560

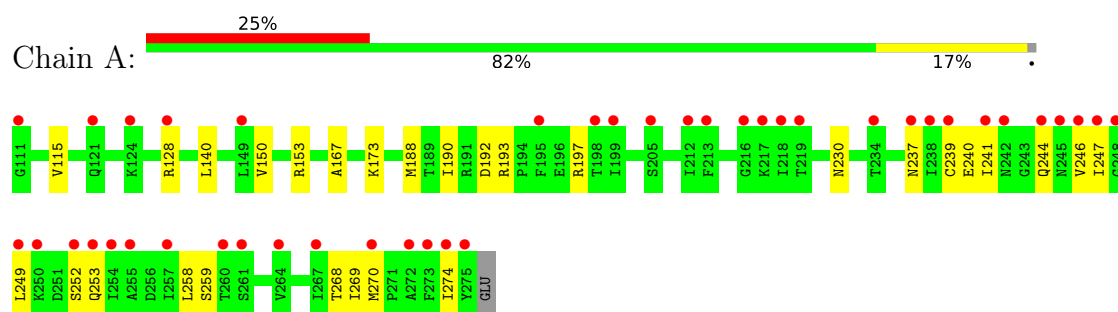
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	33	Total	O	0	0
			33	33		
2	B	27	Total	O	0	0
			27	27		

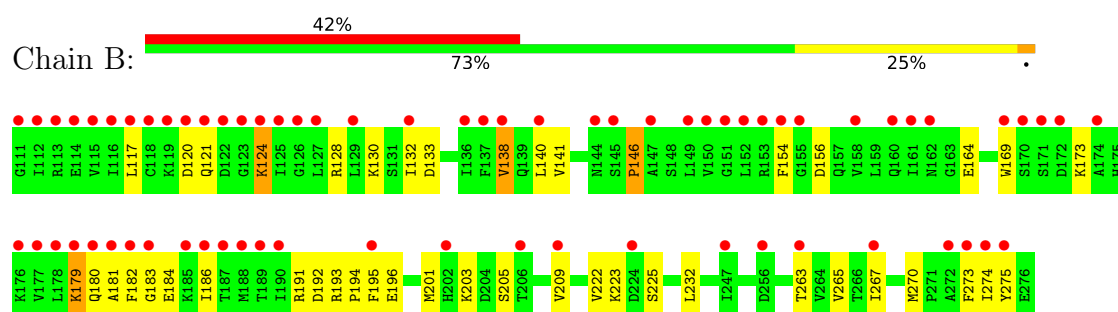
3 Residue-property plots

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: Syntenin-1



• Molecule 1: Syntenin-1



4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	56.68Å 56.68Å 149.56Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	41.03 – 1.85 41.03 – 1.85	Depositor EDS
% Data completeness (in resolution range)	100.0 (41.03-1.85) 94.9 (41.03-1.85)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.06 (at 1.86Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.271 , 0.321 0.271 , 0.320	Depositor DCC
R_{free} test set	1230 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	33.8	Xtriage
Anisotropy	0.408	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 39.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.034 for -h,-k,l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	2590	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.69% 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	0.33	0/1276	0.53	0/1718
1	B	0.28	0/1286	0.60	0/1730
All	All	0.30	0/2562	0.57	0/3448

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	1260	0	1294	20	0
1	B	1270	0	1300	39	0
2	A	33	0	0	1	0
2	B	27	0	0	0	0
All	All	2590	0	2594	56	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 11.

All (56) 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:A:115:VAL:HB	1:A:150:VAL:HG21	1.68	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:270:MET:HE3	1:B:273:PHE:CE1	2.22	0.73
1:B:270:MET:HE3	1:B:273:PHE:HE1	1.54	0.72
1:B:117:LEU:HB2	1:B:186:ILE:HD11	1.73	0.70
1:B:181:ALA:N	1:B:184:GLU:OE2	2.27	0.67
1:A:239:CYS:HB2	1:A:268:THR:HG22	1.77	0.66
1:B:203:LYS:HD2	1:B:263:THR:HA	1.81	0.63
1:B:130:LYS:CE	1:B:275:TYR:O	2.47	0.62
1:B:180:GLN:N	1:B:184:GLU:OE2	2.34	0.60
1:B:274:ILE:HD12	1:B:274:ILE:O	2.02	0.60
1:A:197:ARG:HD3	1:B:194:PRO:O	2.04	0.56
1:A:240:GLU:HB2	1:A:268:THR:HB	1.86	0.56
1:B:169:TRP:CD1	1:B:173:LYS:HE3	2.43	0.54
1:B:232:LEU:HD11	1:B:267:ILE:HD11	1.91	0.52
1:B:120:ASP:OD1	1:B:121:GLN:N	2.43	0.52
1:A:150:VAL:HG22	1:A:150:VAL:O	2.11	0.51
1:B:169:TRP:NE1	1:B:173:LYS:HE3	2.26	0.50
1:A:230:ASN:O	1:B:191:ARG:NH1	2.45	0.50
1:B:130:LYS:HE3	1:B:275:TYR:O	2.11	0.50
1:A:249:LEU:HD13	1:A:253:GLN:HB3	1.93	0.50
1:B:132:ILE:HG22	1:B:133:ASP:CG	2.37	0.49
1:B:181:ALA:HB3	1:B:184:GLU:HG2	1.94	0.49
1:B:193:ARG:HD2	1:B:196:GLU:OE1	2.12	0.49
1:A:153:ARG:NH2	1:A:247:ILE:HG12	2.28	0.48
1:B:128:ARG:HB3	1:B:140:LEU:HB2	1.94	0.48
1:B:191:ARG:HG2	1:B:194:PRO:HG3	1.96	0.48
1:B:195:PHE:HD2	1:B:273:PHE:CZ	2.31	0.48
1:A:244:GLN:CD	1:A:244:GLN:N	2.70	0.48
1:B:132:ILE:HG22	1:B:133:ASP:OD1	2.14	0.47
1:A:153:ARG:NE	1:A:153:ARG:HA	2.29	0.47
1:B:124:LYS:O	1:B:146:PRO:HG2	2.15	0.46
1:A:167:ALA:O	1:B:223:LYS:HE2	2.15	0.46
1:A:241:ILE:HD13	1:A:258:LEU:HG	1.97	0.46
1:B:270:MET:CE	1:B:273:PHE:HE1	2.25	0.46
1:B:201:MET:HE3	1:B:201:MET:HB2	1.80	0.46
1:A:270:MET:HE3	2:A:306:HOH:O	2.16	0.45
1:B:156:ASP:OD1	1:B:192:ASP:HA	2.17	0.45
1:B:209:VAL:HG11	1:B:265:VAL:CG2	2.47	0.45
1:B:267:ILE:O	1:B:267:ILE:HG13	2.17	0.45
1:B:138:VAL:HG21	1:B:141:VAL:HG23	1.99	0.45
1:B:182:PHE:CG	1:B:183:GLY:N	2.85	0.44
1:B:179:LYS:HD3	1:B:179:LYS:HA	1.59	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:209:VAL:HG11	1:B:265:VAL:HG22	1.98	0.44
1:B:222:VAL:HG12	1:B:225:SER:HB3	2.00	0.44
1:B:117:LEU:HB2	1:B:186:ILE:CD1	2.44	0.43
1:B:124:LYS:H	1:B:124:LYS:HG3	1.59	0.43
1:B:270:MET:CE	1:B:273:PHE:CE1	3.00	0.42
1:A:140:LEU:HD12	1:A:140:LEU:HA	1.88	0.42
1:A:192:ASP:O	1:A:193:ARG:C	2.63	0.42
1:A:246:VAL:O	1:A:246:VAL:HG23	2.20	0.42
1:A:188:MET:CE	1:A:190:ILE:HD11	2.50	0.41
1:B:130:LYS:NZ	1:B:275:TYR:O	2.53	0.41
1:B:154:PHE:CE1	1:B:274:ILE:HG12	2.56	0.41
1:A:115:VAL:HB	1:A:150:VAL:CG2	2.45	0.41
1:A:128:ARG:HE	1:A:128:ARG:HB2	1.69	0.40
1:A:237:ASN:O	1:A:269:ILE:HA	2.21	0.40

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	163/166 (98%)	158 (97%)	5 (3%)	0	100	100
1	B	164/166 (99%)	155 (94%)	9 (6%)	0	100	100
All	All	327/332 (98%)	313 (96%)	14 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	140/141 (99%)	136 (97%)	4 (3%)	37	22
1	B	141/141 (100%)	135 (96%)	6 (4%)	26	11
All	All	281/282 (100%)	271 (96%)	10 (4%)	31	16

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	173	LYS
1	A	252	SER
1	A	259	SER
1	A	274	ILE
1	B	124	LYS
1	B	138	VAL
1	B	146	PRO
1	B	164	GLU
1	B	179	LYS
1	B	205	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	244	GLN

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

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	165/166 (99%)	1.39	42 (25%) 1 1	23, 40, 64, 70	0
1	B	166/166 (100%)	1.92	69 (41%) 0 0	24, 44, 83, 88	0
All	All	331/332 (99%)	1.66	111 (33%) 1 1	23, 43, 74, 88	0

All (111) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	181	ALA	6.6
1	B	186	ILE	6.1
1	B	117	LEU	5.4
1	B	174	ALA	5.3
1	B	182	PHE	4.8
1	B	152	LEU	4.4
1	B	124	LYS	4.4
1	B	188	MET	4.3
1	B	116	ILE	4.3
1	B	125	ILE	4.2
1	B	178	LEU	4.1
1	A	247	ILE	4.1
1	A	257	ILE	4.1
1	A	275	TYR	4.1
1	B	140	LEU	4.1
1	B	177	VAL	4.0
1	B	129	LEU	3.9
1	B	123	GLY	3.8
1	A	199	ILE	3.7
1	B	138	VAL	3.7
1	B	161	ILE	3.6
1	A	273	PHE	3.6
1	A	264	VAL	3.6
1	A	249	LEU	3.6

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Mol	Chain	Res	Type	RSRZ
1	B	190	ILE	3.5
1	B	162	ASN	3.5
1	B	172	ASP	3.5
1	A	213	PHE	3.4
1	A	218	ILE	3.4
1	B	115	VAL	3.4
1	B	150	VAL	3.4
1	B	151	GLY	3.4
1	A	272	ALA	3.4
1	B	111	GLY	3.4
1	A	248	GLY	3.3
1	A	241	ILE	3.3
1	A	267	ILE	3.3
1	B	147	ALA	3.3
1	B	263	THR	3.1
1	A	149	LEU	3.1
1	B	171	SER	3.1
1	B	145	SER	3.0
1	B	187	THR	3.0
1	A	216	GLY	3.0
1	A	270	MET	3.0
1	B	132	ILE	3.0
1	A	246	VAL	3.0
1	B	158	VAL	2.9
1	A	252	SER	2.9
1	B	273	PHE	2.9
1	B	122	ASP	2.9
1	B	118	CYS	2.8
1	B	112	ILE	2.8
1	B	267	ILE	2.8
1	B	272	ALA	2.8
1	B	144	ASN	2.8
1	B	154	PHE	2.8
1	B	195	PHE	2.8
1	A	242	ASN	2.8
1	B	126	GLY	2.8
1	B	183	GLY	2.8
1	B	179	LYS	2.7
1	A	260	THR	2.7
1	B	155	GLY	2.7
1	A	250	LYS	2.7
1	B	185	LYS	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	256	ASP	2.6
1	A	274	ILE	2.6
1	B	274	ILE	2.6
1	A	128	ARG	2.5
1	B	127	LEU	2.5
1	B	136	ILE	2.5
1	B	202	HIS	2.5
1	A	205	SER	2.5
1	B	209	VAL	2.5
1	A	244	GLN	2.4
1	B	170	SER	2.4
1	B	224	ASP	2.4
1	B	114	GLU	2.4
1	B	169	TRP	2.4
1	B	121	GLN	2.4
1	B	180	GLN	2.4
1	B	119	LYS	2.4
1	B	120	ASP	2.3
1	A	239	CYS	2.3
1	A	212	ILE	2.3
1	A	111	GLY	2.3
1	A	195	PHE	2.3
1	A	238	ILE	2.2
1	A	121	GLN	2.2
1	A	254	ILE	2.2
1	B	113	ARG	2.2
1	A	234	THR	2.2
1	B	189	THR	2.2
1	A	261	SER	2.2
1	B	149	LEU	2.2
1	B	137	PHE	2.1
1	A	217	LYS	2.1
1	A	245	ASN	2.1
1	A	219	THR	2.1
1	B	153	ARG	2.1
1	A	253	GLN	2.1
1	A	237	ASN	2.1
1	B	160	GLN	2.1
1	A	255	ALA	2.1
1	A	124	LYS	2.0
1	B	176	LYS	2.0
1	A	198	THR	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	247	ILE	2.0
1	B	206	THR	2.0
1	B	275	TYR	2.0

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 oligosaccharides 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.