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PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Dec 1, 2025 – 04:30 PM JST

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PDB ID	:	9VBS / pdb_00009vbs
Title	:	Crystal structure of the coiled-coil of ALLO-1a
Authors	:	Noda, N.N.
Deposited on	:	2025-06-04
Resolution	:	2.40 Å(reported)

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 2.40 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	Percentile Ranks	Value
Rfree		0.274
Clashscore		3
Ramachandran outliers		0.5%
Sidechain outliers		8.2%
RSRZ outliers		12.5%

Worse   *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
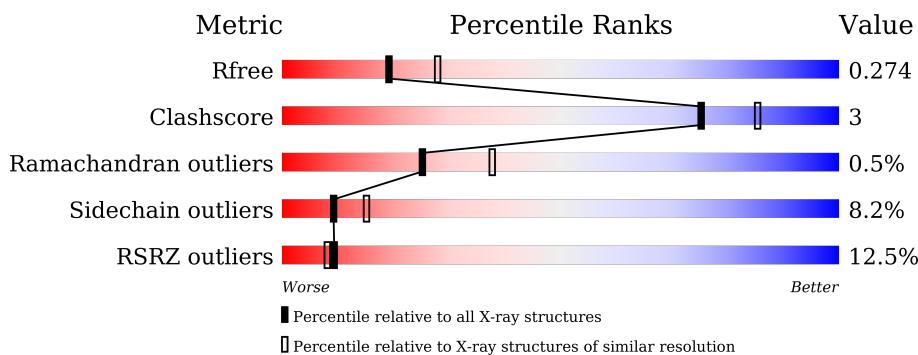
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	164625	4642 (2.40-2.40)
Clashscore	180529	5218 (2.40-2.40)
Ramachandran outliers	177936	5158 (2.40-2.40)
Sidechain outliers	177891	5159 (2.40-2.40)
RSRZ outliers	164620	4642 (2.40-2.40)

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	116	7% / 54% / 9% / 37%
1	B	116	9% / 50% / 11% • / 38%
1	C	116	8% / 54% / 6% • / 39%
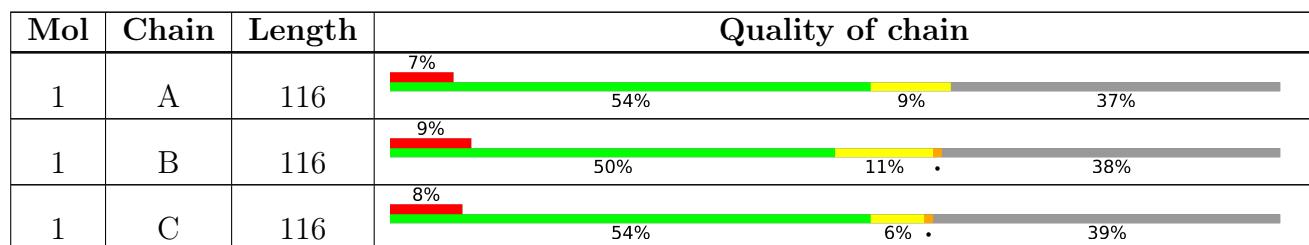
2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 1722 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 Isoform a of Allophagy receptor allo-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	73	Total	C	N	O	S	0	0	0
			583	352	105	124	2			
1	B	72	Total	C	N	O	S	0	0	0
			565	342	99	122	2			
1	C	71	Total	C	N	O	S	0	0	0
			563	342	99	120	2			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	273	GLY	-	expression tag	UNP Q9U389
A	274	PRO	-	expression tag	UNP Q9U389
A	282	MET	LEU	engineered mutation	UNP Q9U389
B	273	GLY	-	expression tag	UNP Q9U389
B	274	PRO	-	expression tag	UNP Q9U389
B	282	MET	LEU	engineered mutation	UNP Q9U389
C	273	GLY	-	expression tag	UNP Q9U389
C	274	PRO	-	expression tag	UNP Q9U389
C	282	MET	LEU	engineered mutation	UNP Q9U389

- Molecule 2 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	8	Total	O	0	0
			8	8		
2	B	3	Total	O	0	0
			3	3		

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: Isoform a of Allophagy receptor allo-1
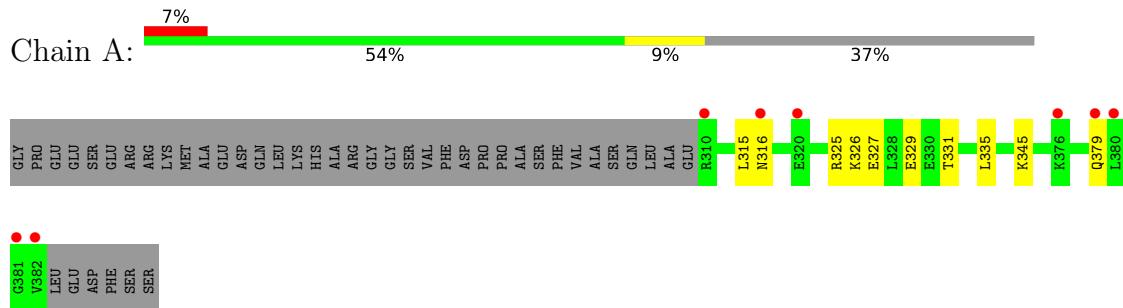
Chain A:

• Molecule 1: Isoform a of Allophagy receptor allo-1

Chain B:

• Molecule 1: Isoform a of Allophagy receptor allo-1

Chain C:
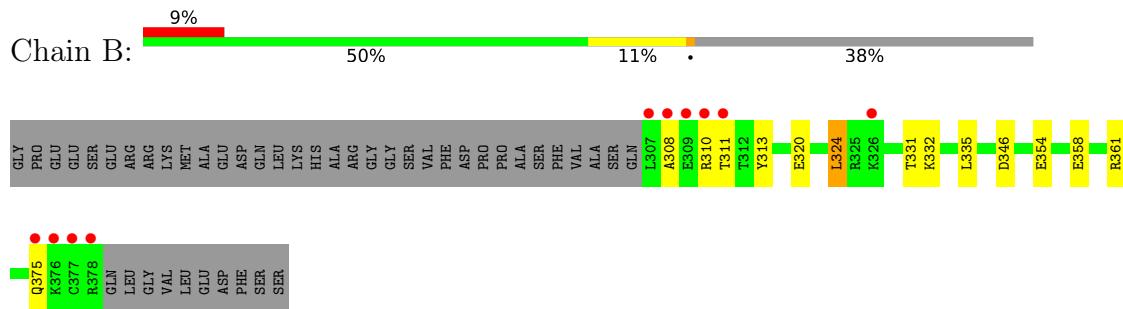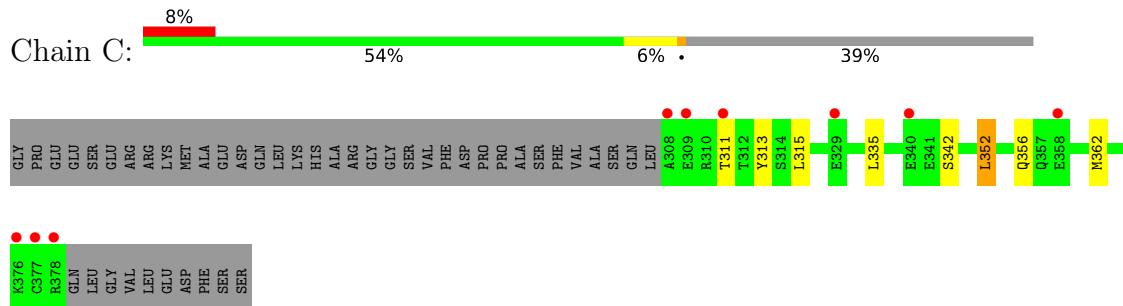
4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants	92.30Å 239.30Å 71.40Å	Depositor
a, b, c, α, β, γ	90.00° 90.00° 90.00°	
Resolution (Å)	46.15 – 2.40	Depositor
	46.15 – 2.40	EDS
% Data completeness	99.2 (46.15-2.40)	Depositor
(in resolution range)	99.6 (46.15-2.40)	EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$< I/\sigma(I) >$ [1]	1.33 (at 2.39Å)	Xtriage
Refinement program	PHENIX (1.12_2829: ???)	Depositor
R, R_{free}	0.236 , 0.263	Depositor
	0.244 , 0.274	DCC
R_{free} test set	1564 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	54.3	Xtriage
Anisotropy	0.377	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 64.2	EDS
L-test for twinning[2]	$< |L| > = 0.51, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	1722	wwPDB-VP
Average B, all atoms (Å^2)	88.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 25.63 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.0604e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[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	0.18	0/585	0.34	0/782
1	B	0.20	0/567	0.37	0/761
1	C	0.21	0/565	0.35	0/757
All	All	0.20	0/1717	0.36	0/2300

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	583	0	578	4	0
1	B	565	0	550	8	0
1	C	563	0	557	2	0
2	A	8	0	0	0	0
2	B	3	0	0	0	0
All	All	1722	0	1685	10	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 3.

All (10) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:311:THR:HG22	1:C:313:TYR:H	1.52	0.73
1:B:311:THR:HG22	1:B:313:TYR:H	1.59	0.68
1:A:327:GLU:OE2	1:B:332:LYS:NZ	2.28	0.54
1:B:320:GLU:O	1:B:324:LEU:HB2	2.15	0.47
1:A:331:THR:HG22	1:B:331:THR:HG22	1.96	0.46
1:C:352:LEU:HD12	1:C:352:LEU:HA	1.81	0.44
1:A:345:LYS:NZ	1:B:346:ASP:OD1	2.50	0.43
1:B:310:ARG:HD3	1:B:310:ARG:HA	1.78	0.42
1:B:358:GLU:OE1	1:B:361:ARG:NH2	2.35	0.41
1:A:325:ARG:HG3	1:B:324:LEU:HD11	2.03	0.41

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	71/116 (61%)	70 (99%)	1 (1%)	0	100	100
1	B	70/116 (60%)	69 (99%)	0	1 (1%)	9	13
1	C	69/116 (60%)	69 (100%)	0	0	100	100
All	All	210/348 (60%)	208 (99%)	1 (0%)	1 (0%)	25	38

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	308	ALA

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	67/104 (64%)	61 (91%)	6 (9%)	8	12
1	B	64/104 (62%)	60 (94%)	4 (6%)	15	25
1	C	64/104 (62%)	58 (91%)	6 (9%)	7	11
All	All	195/312 (62%)	179 (92%)	16 (8%)	9	15

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

Mol	Chain	Res	Type
1	A	315	LEU
1	A	316	ASN
1	A	326	LYS
1	A	329	GLU
1	A	335	LEU
1	A	379	GLN
1	B	324	LEU
1	B	335	LEU
1	B	354	GLU
1	B	375	GLN
1	C	315	LEU
1	C	335	LEU
1	C	342	SER
1	C	352	LEU
1	C	356	GLN
1	C	362	MET

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

Mol	Chain	Res	Type
1	A	375	GLN
1	A	379	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	73/116 (62%)	0.99	8 (10%)	12	10	58, 90, 130, 155	0
1	B	72/116 (62%)	0.92	10 (13%)	7	7	58, 85, 123, 137	0
1	C	71/116 (61%)	1.13	9 (12%)	9	8	55, 84, 110, 131	0
All	All	216/348 (62%)	1.02	27 (12%)	9	8	55, 86, 124, 155	0

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	307	LEU	8.6
1	A	382	VAL	8.3
1	C	378	ARG	7.8
1	C	309	GLU	5.7
1	B	378	ARG	5.0
1	C	308	ALA	4.7
1	B	308	ALA	4.2
1	A	381	GLY	3.7
1	C	376	LYS	3.7
1	B	309	GLU	3.6
1	C	311	THR	3.5
1	A	380	LEU	3.4
1	C	358	GLU	3.4
1	C	329	GLU	3.2
1	B	326	LYS	3.0
1	A	310	ARG	2.9
1	A	379	GLN	2.8
1	A	376	LYS	2.8
1	C	377	CYS	2.8
1	B	375	GLN	2.6
1	C	340	GLU	2.5
1	B	311	THR	2.4
1	A	316	ASN	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	377	CYS	2.2
1	A	320	GLU	2.1
1	B	376	LYS	2.1
1	B	310	ARG	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 oligosaccharides 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.