



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 09:03 AM UTC

PDB ID : 4JEH / pdb_00004jeh
Title : Crystal Structure of Munc18a and Syntaxin1 lacking N-peptide complex
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Deposited on : 2013-02-27
Resolution : 2.50 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

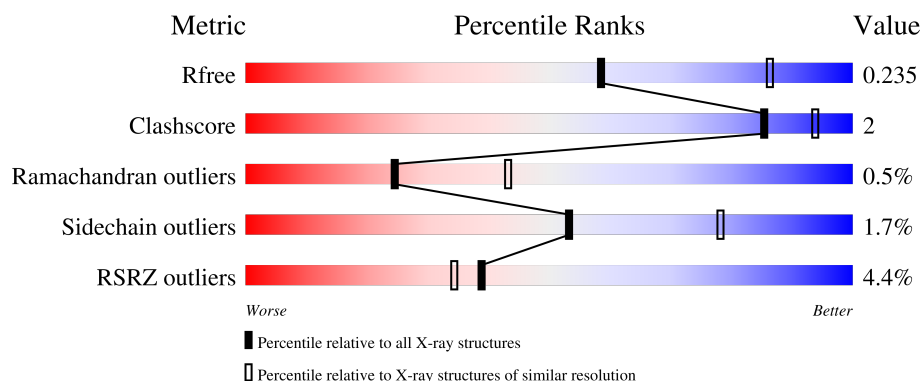
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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 $\leq 5\%$. 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	608	4% 81% 10% 9%
2	B	243	4% 79% 11% 9%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6317 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 Syntaxin-binding protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	556	Total	C	N	O	S	0	0	0
			4457	2827	756	849	25			

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-13	MET	-	initiating methionine	UNP P61765
A	-12	ARG	-	expression tag	UNP P61765
A	-11	GLY	-	expression tag	UNP P61765
A	-10	SER	-	expression tag	UNP P61765
A	-9	HIS	-	expression tag	UNP P61765
A	-8	HIS	-	expression tag	UNP P61765
A	-7	HIS	-	expression tag	UNP P61765
A	-6	HIS	-	expression tag	UNP P61765
A	-5	HIS	-	expression tag	UNP P61765
A	-4	HIS	-	expression tag	UNP P61765
A	-3	GLY	-	expression tag	UNP P61765
A	-2	SER	-	expression tag	UNP P61765
A	-1	VAL	-	expression tag	UNP P61765
A	0	ASP	-	expression tag	UNP P61765

- Molecule 2 is a protein called Syntaxin-1A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	221	Total	C	N	O	S	0	0	0
			1791	1098	314	368	11			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	24	MET	VAL	conflict	UNP P32851

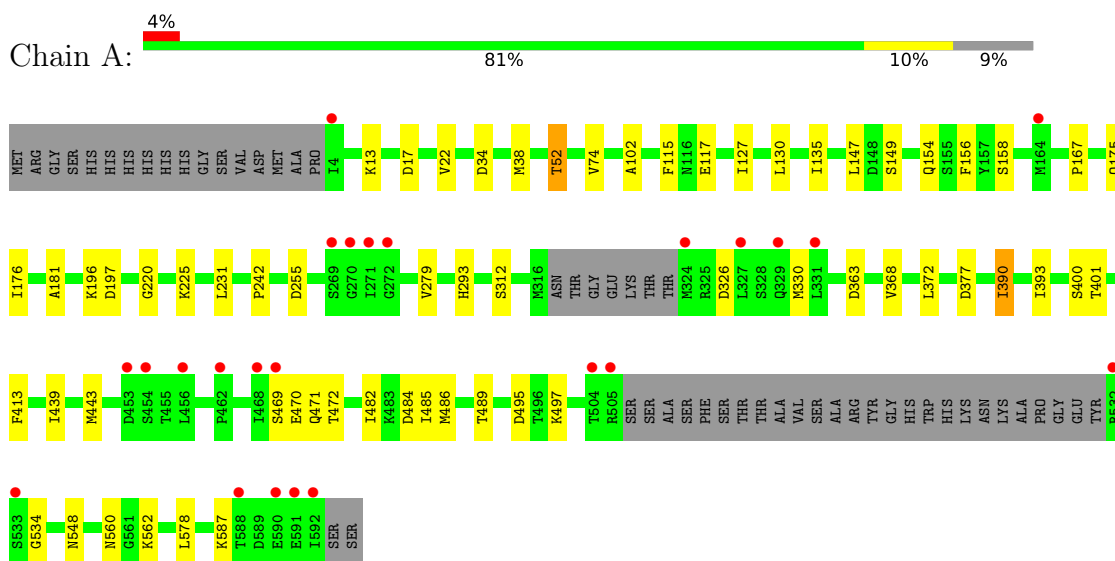
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	51	Total 51	O 51	0	0
3	B	18	Total 18	O 18	0	0

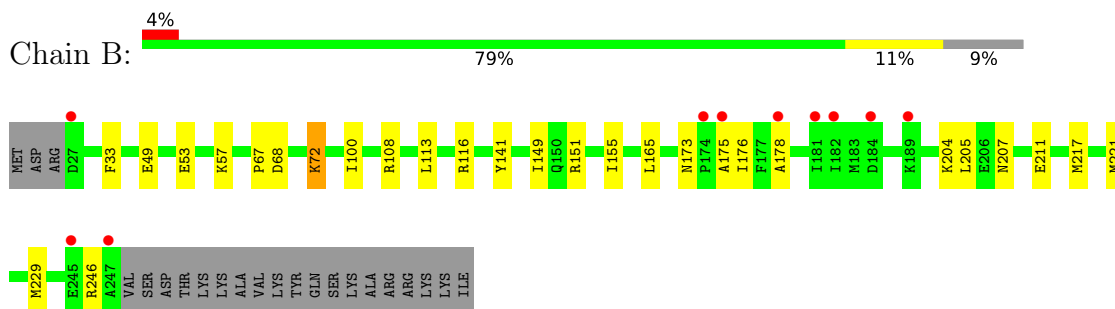
3 Residue-property plots [i](#)

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: Syntaxin-binding protein 1



- Molecule 2: Syntaxin-1A



4 Data and refinement statistics

Property	Value	Source
Space group	I 4 2 2	Depositor
Cell constants a, b, c, α , β , γ	154.91Å 154.91Å 150.32Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	32.64 – 2.50 32.64 – 2.50	Depositor EDS
% Data completeness (in resolution range)	(Not available) (32.64-2.50) 99.6 (32.64-2.50)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.86 (at 2.51Å)	Xtriage
Refinement program	BUSTER-TNT BUSTER 2.8.0, BUSTER 2.8.0	Depositor
R, R_{free}	0.184 , 0.223 0.193 , 0.235	Depositor DCC
R_{free} test set	1999 reflections (6.27%)	wwPDB-VP
Wilson B-factor (Å ²)	45.7	Xtriage
Anisotropy	0.456	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 53.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.012 for l,-k,h 0.012 for -h,-l,-k	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6317	wwPDB-VP
Average B, all atoms (Å ²)	59.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.61% 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	0.84	0/4535	1.37	26/6121 (0.4%)
2	B	0.85	1/1809 (0.1%)	1.52	12/2419 (0.5%)
All	All	0.84	1/6344 (0.0%)	1.42	38/8540 (0.4%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	229	MET	SD-CE	-5.88	1.64	1.79

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	377	ASP	CA-CB-CG	6.53	119.13	112.60
2	B	204	LYS	CA-C-N	6.32	129.03	120.44
2	B	204	LYS	C-N-CA	6.32	129.03	120.44
1	A	255	ASP	CA-CB-CG	6.10	118.70	112.60
1	A	34	ASP	CA-CB-CG	6.08	118.68	112.60
2	B	68	ASP	CA-C-N	5.87	128.14	120.28
2	B	68	ASP	C-N-CA	5.87	128.14	120.28
1	A	363	ASP	CA-C-N	5.75	128.25	120.38
1	A	363	ASP	C-N-CA	5.75	128.25	120.38
1	A	548	ASN	CA-CB-CG	5.62	118.22	112.60
2	B	53	GLU	CA-C-N	5.53	127.73	120.60
2	B	53	GLU	C-N-CA	5.53	127.73	120.60
1	A	439	ILE	CA-C-N	5.47	127.54	120.70
1	A	439	ILE	C-N-CA	5.47	127.54	120.70
1	A	390	ILE	CA-C-N	5.44	123.67	120.24
1	A	390	ILE	C-N-CA	5.44	123.67	120.24
1	A	181	ALA	CA-C-N	5.41	127.53	120.28
1	A	181	ALA	C-N-CA	5.41	127.53	120.28
1	A	495	ASP	CA-CB-CG	5.38	117.98	112.60
1	A	312	SER	CA-C-N	5.34	127.43	120.28
1	A	312	SER	C-N-CA	5.34	127.43	120.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	167	PRO	CA-C-N	5.30	127.24	120.56
1	A	167	PRO	C-N-CA	5.30	127.24	120.56
1	A	52	THR	N-CA-C	-5.26	106.86	113.28
2	B	72	LYS	CA-C-N	5.16	127.15	120.44
2	B	72	LYS	C-N-CA	5.16	127.15	120.44
2	B	149	ILE	CA-C-N	5.14	127.48	120.54
2	B	149	ILE	C-N-CA	5.14	127.48	120.54
2	B	57	LYS	CA-C-N	5.11	127.09	120.44
2	B	57	LYS	C-N-CA	5.11	127.09	120.44
1	A	587	LYS	CA-C-N	5.09	128.55	121.02
1	A	587	LYS	C-N-CA	5.09	128.55	121.02
1	A	117	GLU	CA-C-N	5.06	127.06	120.28
1	A	117	GLU	C-N-CA	5.06	127.06	120.28
1	A	484	ASP	CA-CB-CG	5.06	117.66	112.60
1	A	330	MET	N-CA-C	-5.04	107.10	113.20
1	A	400	SER	CA-C-N	5.01	127.31	120.54
1	A	400	SER	C-N-CA	5.01	127.31	120.54

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	4457	0	4549	18	0
2	B	1791	0	1766	10	0
3	A	51	0	0	1	0
3	B	18	0	0	0	0
All	All	6317	0	6315	28	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 2.

All (28) 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:242:PRO:HB2	1:A:578:LEU:HD22	1.72	0.72
1:A:293:HIS:HE1	3:A:613:HOH:O	1.73	0.71
1:A:482:ILE:HG13	1:A:486:MET:HE3	1.78	0.65
2:B:175:ALA:HB1	2:B:178:ALA:HB3	1.80	0.63
2:B:173:ASN:HB3	2:B:176:ILE:HB	1.80	0.62
2:B:141:TYR:HD1	2:B:205:LEU:HD13	1.70	0.57
1:A:154:GLN:O	1:A:158:SER:HB3	2.07	0.54
1:A:156:PHE:HZ	1:A:197:ASP:HB3	1.73	0.53
1:A:485:ILE:O	1:A:489:THR:HG22	2.11	0.49
1:A:372:LEU:HD21	1:A:390:ILE:HD11	1.94	0.48
2:B:217:MET:HG3	2:B:221:MET:HE2	1.94	0.47
1:A:102:ALA:HB3	1:A:127:ILE:HD13	1.97	0.47
1:A:115:PHE:HE1	1:A:130:LEU:HD21	1.79	0.47
2:B:108:ARG:HG2	2:B:246:ARG:NH1	2.30	0.46
1:A:220:GLY:HA2	1:A:225:LYS:HB3	1.99	0.45
2:B:207:ASN:O	2:B:211:GLU:HB2	2.16	0.45
1:A:13:LYS:HD3	1:A:135:ILE:HD11	1.98	0.45
1:A:22:VAL:HG21	1:A:74:VAL:HG21	1.98	0.44
1:A:147:LEU:HD11	1:A:176:ILE:HG13	2.00	0.43
1:A:147:LEU:HD22	1:A:175:GLN:HB3	1.99	0.43
1:A:560:ASN:OD1	1:A:562:LYS:HG2	2.17	0.43
2:B:67:PRO:HG2	2:B:72:LYS:HE3	1.99	0.42
2:B:151:ARG:O	2:B:155:ILE:HG12	2.19	0.42
2:B:100:ILE:HG23	2:B:113:LEU:HD11	2.02	0.41
1:A:13:LYS:O	1:A:17:ASP:HB2	2.21	0.41
1:A:368:VAL:HG21	1:A:393:ILE:HD11	2.03	0.41
2:B:33:PHE:CZ	2:B:116:ARG:HA	2.56	0.41
1:A:413:PHE:HZ	1:A:443:MET:HE3	1.86	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	550/608 (90%)	527 (96%)	19 (4%)	4 (1%)	18	34
2	B	219/243 (90%)	214 (98%)	5 (2%)	0	100	100
All	All	769/851 (90%)	741 (96%)	24 (3%)	4 (0%)	24	43

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	471	GLN
1	A	469	SER
1	A	534	GLY
1	A	470	GLU

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	503/545 (92%)	493 (98%)	10 (2%)	48	75
2	B	202/222 (91%)	200 (99%)	2 (1%)	68	86
All	All	705/767 (92%)	693 (98%)	12 (2%)	53	78

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	38	MET
1	A	52	THR
1	A	149	SER
1	A	196	LYS
1	A	231	LEU
1	A	279	VAL
1	A	326	ASP
1	A	401	THR
1	A	472	THR
1	A	497	LYS
2	B	49	GLU
2	B	165	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	35	GLN
1	A	62	ASN
1	A	143	GLN
1	A	175	GLN
1	A	329	GLN
1	A	338	GLN
2	B	58	HIS
2	B	66	ASN
2	B	135	ASN
2	B	150	GLN
2	B	190	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

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, 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	556/608 (91%)	-0.00	24 (4%) 40 35	29, 53, 99, 125	0
2	B	221/243 (90%)	0.09	10 (4%) 38 33	34, 56, 108, 126	0
All	All	777/851 (91%)	0.03	34 (4%) 39 34	29, 54, 102, 126	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	182	ILE	5.1
1	A	468	ILE	4.5
1	A	456	LEU	3.6
1	A	504	THR	3.5
1	A	271	ILE	3.5
1	A	327	LEU	3.5
1	A	462	PRO	3.3
2	B	181	ILE	3.1
1	A	588	THR	3.0
1	A	270	GLY	2.9
1	A	331	LEU	2.8
1	A	533	SER	2.7
1	A	272	GLY	2.7
1	A	592	ILE	2.7
2	B	245	GLU	2.6
1	A	324	MET	2.4
1	A	591	GLU	2.3
1	A	164	MET	2.3
2	B	247	ALA	2.3
2	B	175	ALA	2.2
1	A	4	ILE	2.2
1	A	269	SER	2.2
1	A	590	GLU	2.2
1	A	454	SER	2.2

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Mol	Chain	Res	Type	RSRZ
2	B	27	ASP	2.2
1	A	532	ARG	2.2
2	B	189	LYS	2.2
1	A	505	ARG	2.1
1	A	453	ASP	2.1
2	B	174	PRO	2.1
2	B	184	ASP	2.1
1	A	469	SER	2.1
1	A	329	GLN	2.0
2	B	178	ALA	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.