Full wwPDB X-ray Structure Validation Report ⓘ

May 25, 2020 – 03:44 am BST

PDB ID	:	1AUV
Title	:	STRUCTURE OF THE C DOMAIN OF SYNAPSIN IA FROM BOVINE BRAIN
Authors	:	Esser, L.; Wang, C.; Deisenhofer, J.
Deposited on	:	1997-09-02
Resolution	:	2.15 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 following versions of software and data (see references ⓘ) were used in the production of this report:

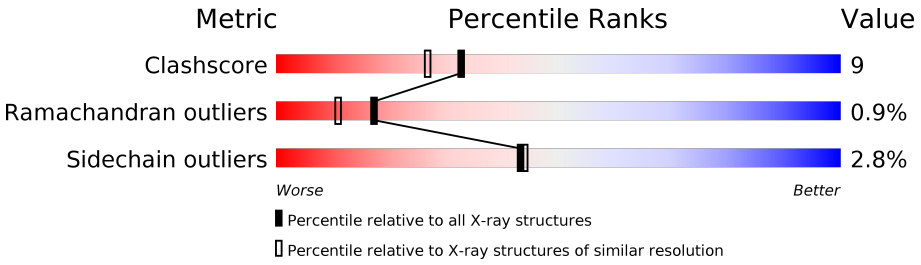
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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))
Clashscore	141614	1585 (2.16-2.16)
Ramachandran outliers	138981	1560 (2.16-2.16)
Sidechain outliers	138945	1559 (2.16-2.16)

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 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%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	311	73% 19% • 6%
1	B	311	77% 17% 6%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 4797 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 SYNAPSIN IA.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	292	Total	C	N	O	S	Se	104	0	0
			2317	1478	400	426	3	10			
1	B	293	Total	C	N	O	S	Se	97	0	0
			2319	1479	401	426	3	10			

There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	165	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	192	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	232	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	258	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	270	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	277	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	327	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	343	MSE	MET	CONFLICT	UNP P17599
A	349	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	392	MSE	MET	MODIFIED RESIDUE	UNP P17599
A	414	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	165	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	192	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	232	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	258	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	270	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	277	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	327	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	343	MSE	MET	CONFLICT	UNP P17599
B	349	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	392	MSE	MET	MODIFIED RESIDUE	UNP P17599
B	414	MSE	MET	MODIFIED RESIDUE	UNP P17599

- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	85	Total O 85 85	0	0
2	B	76	Total O 76 76	0	0

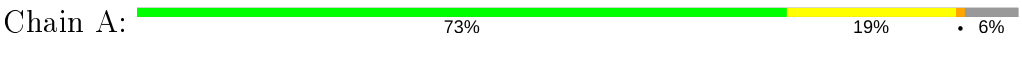
3 Residue-property plots (i)

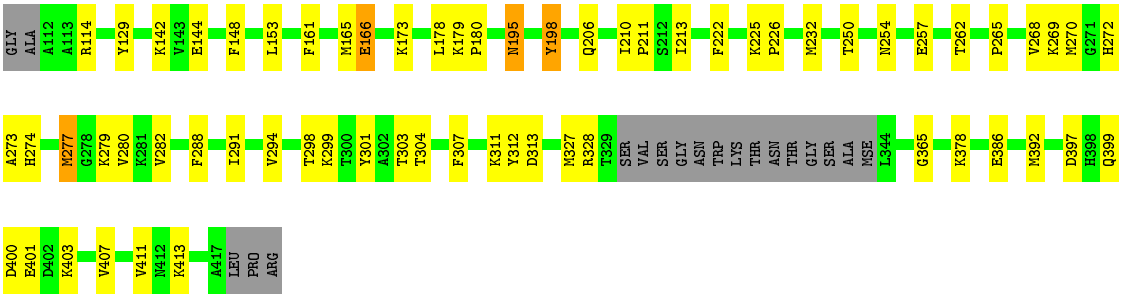
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according 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. 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.

Note EDS was not executed.

- Molecule 1: SYNAPSIN IA

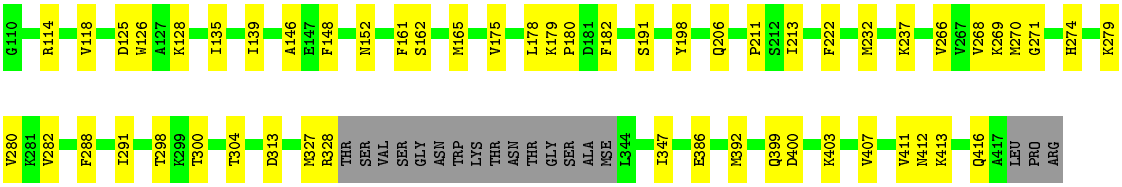
Chain A:





- Molecule 1: SYNAPSIN IA

Chain B:



4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α, β, γ	76.40Å 76.40Å 180.94Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.15	Depositor
% Data completeness (in resolution range)	81.4 (30.00-2.15)	Depositor
R_{merge}	0.05	Depositor
R_{sym}	0.05	Depositor
Refinement program	X-PLOR 3.851	Depositor
R, R_{free}	0.199 , 0.255	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	4797	wwPDB-VP
Average B, all atoms (Å^2)	37.0	wwPDB-VP

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	0.61	0/2356	0.77	0/3166
1	B	0.63	1/2358 (0.0%)	0.78	0/3168
All	All	0.62	1/4714 (0.0%)	0.77	0/6334

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	270	MSE	CG-SE	-5.55	1.76	1.95

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	198	TYR	Sidechain

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	2317	0	2309	43	0
1	B	2319	0	2310	34	0
2	A	85	0	0	2	0
2	B	76	0	0	2	0
All	All	4797	0	4619	77	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 9.

All (77) 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:165:MSE:HE3	1:A:178:LEU:HD11	1.26	1.16
1:B:213:ILE:HD11	1:B:413:LYS:HG3	1.53	0.89
1:A:232:MSE:HE1	1:A:386:GLU:HA	1.55	0.88
1:A:213:ILE:HD11	1:A:413:LYS:HG3	1.54	0.87
1:B:232:MSE:HE1	1:B:386:GLU:HA	1.65	0.79
1:A:144:GLU:HB3	1:A:165:MSE:HE1	1.64	0.78
1:B:269:LYS:HE2	1:B:279:LYS:HE2	1.71	0.73
1:A:270:MSE:HE3	1:A:298:THR:HG21	1.71	0.72
1:B:268:VAL:HG22	1:B:304:THR:HG22	1.71	0.72
1:B:327:MSE:HE3	1:B:347:ILE:HG21	1.72	0.71
1:A:165:MSE:CE	1:A:178:LEU:HD11	2.15	0.70
1:A:313:ASP:HB2	1:A:328:ARG:HB3	1.78	0.66
1:A:165:MSE:HE3	1:A:178:LEU:CD1	2.17	0.66
1:B:412:ASN:O	1:B:416:GLN:HG3	1.99	0.63
1:A:265:PRO:HG2	1:A:307:PHE:HB3	1.80	0.62
1:A:274:HIS:O	1:A:277:MSE:SE	2.67	0.62
1:B:313:ASP:HB2	1:B:328:ARG:HB3	1.85	0.58
1:A:365:GLY:HA2	2:A:2071:HOH:O	2.03	0.58
1:A:274:HIS:H	1:A:277:MSE:HE2	1.68	0.57
1:B:162:SER:HB2	2:B:2136:HOH:O	2.04	0.57
1:A:294:VAL:O	1:A:298:THR:HG23	2.04	0.57
1:A:311:LYS:HG3	1:A:378:LYS:HA	1.88	0.55
1:A:282:VAL:HG11	1:A:288:PHE:HA	1.88	0.54
1:A:232:MSE:CE	1:A:386:GLU:HA	2.34	0.54
1:A:407:VAL:O	1:A:411:VAL:HG23	2.08	0.53
1:B:191:SER:OG	1:B:274:HIS:HE1	1.92	0.53
1:A:144:GLU:HG3	1:A:178:LEU:HD22	1.91	0.53
1:B:232:MSE:CE	1:B:386:GLU:HA	2.37	0.52
1:A:311:LYS:HE3	1:A:378:LYS:HA	1.92	0.52
1:B:161:PHE:HE2	1:B:180:PRO:HD2	1.76	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:161:PHE:HE2	1:A:180:PRO:HD2	1.77	0.49
1:A:280:VAL:HG11	1:A:291:ILE:CD1	2.43	0.48
1:A:392:MSE:HG3	1:A:392:MSE:O	2.12	0.48
1:B:280:VAL:HG11	1:B:291:ILE:CD1	2.42	0.48
1:B:191:SER:CB	1:B:274:HIS:HE1	2.27	0.48
1:A:129:TYR:CZ	1:A:403:LYS:HD3	2.49	0.48
1:B:125:ASP:OD2	1:B:128:LYS:HB2	2.14	0.48
1:A:282:VAL:HG11	1:A:288:PHE:CA	2.43	0.48
1:B:282:VAL:HG11	1:B:288:PHE:CA	2.44	0.48
1:A:206:GLN:HA	1:A:206:GLN:HE21	1.77	0.48
1:B:407:VAL:O	1:B:411:VAL:HG23	2.14	0.47
1:A:148:PHE:HB3	1:A:198:TYR:CD1	2.49	0.47
1:A:280:VAL:HG11	1:A:291:ILE:HD12	1.98	0.46
1:B:206:GLN:HE21	1:B:206:GLN:HA	1.81	0.46
1:B:399:GLN:O	1:B:403:LYS:HG3	2.16	0.46
1:B:392:MSE:O	1:B:392:MSE:HG3	2.15	0.45
1:A:268:VAL:HG22	1:A:304:THR:HG22	1.98	0.45
1:B:148:PHE:HB3	1:B:198:TYR:CG	2.52	0.45
1:B:280:VAL:HG11	1:B:291:ILE:HD12	1.98	0.44
1:A:269:LYS:HG2	1:A:279:LYS:HG2	1.99	0.44
1:B:135:ILE:HB	1:B:139:ILE:HB	1.99	0.44
1:A:153:LEU:C	1:A:153:LEU:HD12	2.38	0.44
1:A:210:ILE:HA	1:A:211:PRO:HD3	1.89	0.44
1:A:312:TYR:CE1	1:A:327:MSE:HE2	2.52	0.44
1:B:182:PHE:CD2	1:B:211:PRO:HB2	2.53	0.43
1:B:282:VAL:HG11	1:B:288:PHE:HA	2.01	0.43
1:B:237:LYS:CE	2:B:2105:HOH:O	2.67	0.42
1:B:298:THR:OG1	1:B:300:THR:HG22	2.19	0.42
1:A:273:ALA:HB3	1:A:277:MSE:O	2.18	0.42
1:A:161:PHE:CZ	1:A:179:LYS:HG3	2.54	0.42
1:A:250:THR:O	1:A:303:THR:HA	2.20	0.42
1:B:114:ARG:HG2	1:B:139:ILE:HG21	2.01	0.42
1:B:146:ALA:HB2	1:B:165:MSE:SE	2.69	0.42
1:A:165:MSE:HG2	1:A:166:GLU:HG3	2.00	0.42
1:A:225:LYS:HG3	1:A:272:HIS:ND1	2.34	0.42
1:A:226:PRO:HG2	1:A:301:TYR:CE1	2.54	0.41
1:B:161:PHE:CZ	1:B:179:LYS:HG3	2.55	0.41
1:B:118:VAL:HG11	1:B:126:TRP:CD1	2.55	0.41
1:B:282:VAL:CG2	1:B:291:ILE:HG13	2.50	0.41
1:A:299:LYS:HE3	2:A:2081:HOH:O	2.20	0.41
1:A:312:TYR:CZ	1:A:327:MSE:HE2	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:272:HIS:NE2	1:A:274:HIS:HE1	2.19	0.41
1:B:165:MSE:O	1:B:175:VAL:HA	2.20	0.41
1:A:399:GLN:O	1:A:403:LYS:HG3	2.21	0.41
1:B:266:VAL:CG2	1:B:304:THR:HB	2.52	0.40
1:A:206:GLN:NE2	1:A:206:GLN:HA	2.36	0.40
1:B:191:SER:HB2	1:B:274:HIS:HE1	1.85	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	288/311 (93%)	272 (94%)	12 (4%)	4 (1%)	11 5
1	B	289/311 (93%)	274 (95%)	14 (5%)	1 (0%)	41 37
All	All	577/622 (93%)	546 (95%)	26 (4%)	5 (1%)	17 11

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	166	GLU
1	A	195	ASN
1	B	271	GLY
1	A	173	LYS
1	A	262	THR

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	252/255 (99%)	242 (96%)	10 (4%)	31	29
1	B	251/255 (98%)	247 (98%)	4 (2%)	62	67
All	All	503/510 (99%)	489 (97%)	14 (3%)	43	44

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	114	ARG
1	A	142	LYS
1	A	195	ASN
1	A	222	PHE
1	A	254	ASN
1	A	257	GLU
1	A	277	MSE
1	A	397	ASP
1	A	400	ASP
1	A	401	GLU
1	B	152	ASN
1	B	178	LEU
1	B	222	PHE
1	B	400	ASP

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	136	HIS
1	A	206	GLN
1	A	398	HIS
1	A	416	GLN
1	B	136	HIS
1	B	206	GLN
1	B	274	HIS

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 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

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.