

Integrative Structure Validation Report

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The following software was used in the production of this report:

Python-IHM Version 1.3

MolProbity Version 4.5.2

Integrative Modeling Validation Version 1.2

PDB ID	9A0A
PDB-Dev ID	PDBDEV_00000046
Structure Title	Protein motional details and dynamics of spectrin alpha chain
Structure Authors	Grohe K; Patel S; Hebrank C; Schafer LV; Linser R

This is a PDB-Dev IM Structure Validation Report for a publicly released PDB-Dev entry.

We welcome your comments at pdb-dev@mail.wwpdb.org

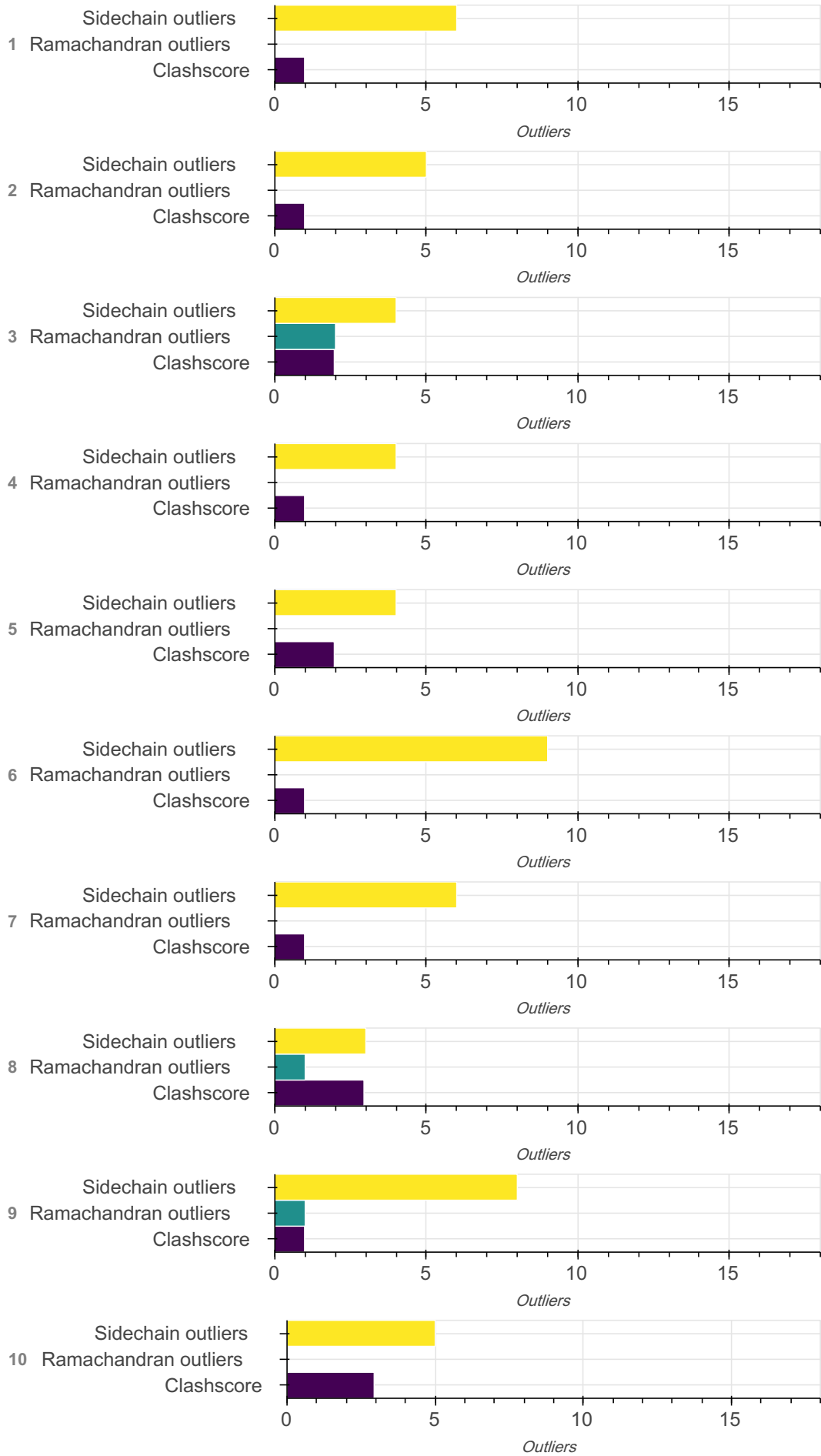
A user guide is available at https://pdb-dev.wwpdb.org/validation_help.html with specific help available everywhere you see the  symbol.

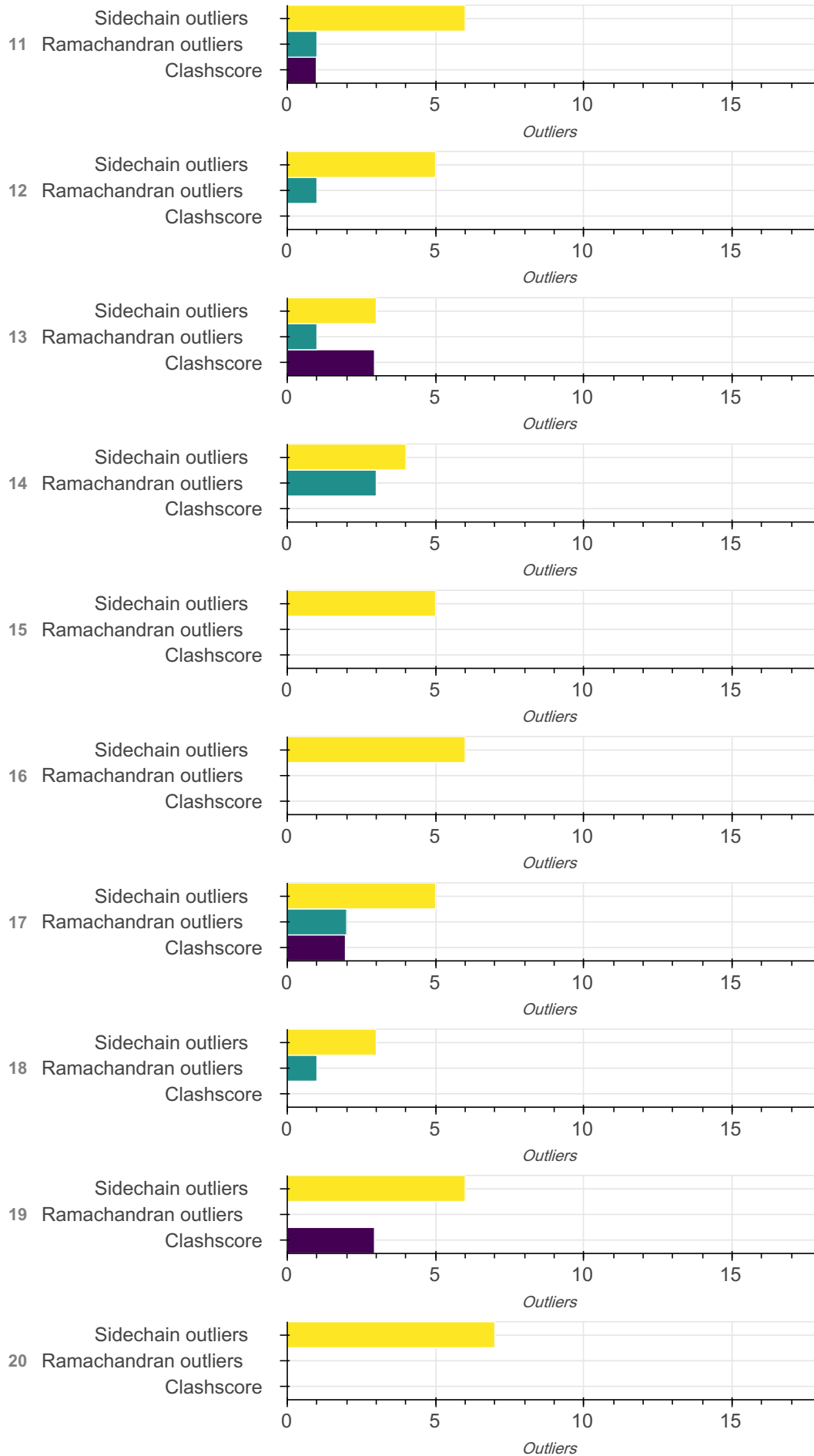
List of references used to build this report is available [here](#).

Overall quality

This validation report contains model quality assessments for all structures, data quality assessment for SAS datasets and fit to model assessments for SAS datasets. Data quality and fit to model assessments for other datasets and model uncertainty are under development. Number of plots is limited to 256.

Model Quality: MolProbity Analysis





Ensemble information

This entry consists of 0 distinct ensemble(s).

Summary

This entry consists of 20 unique models, with 1 subunits in each model. A total of 3 datasets or restraints were used to build this entry. Each model is represented by 0 rigid bodies and 3 flexible or non-rigid units.

Entry composition

There are 20 unique types of models in this entry. These models are titled Final model of replica 1, Final model of replica 2, Final model of replica 3, Final model of replica 4, Final model of replica 5, Final model of replica 6, Final model of replica 7, Final model of replica 8, Final model of replica 9, Final model of replica 10, Final model of replica 11, Final model of replica 12, Final model of replica 13, Final model of replica 14, Final model of replica 15, Final model of replica 16, Final model of replica 17, Final model of replica 18, Final model of replica 19, Final model of replica 20 respectively.

Model ID	Subunit number	Subunit ID	Subunit name	Chain ID	Chain ID [auth]	Total residues
1	1	1	spectrin alpha chain	A	A	62
2	1	1	spectrin alpha chain	A	A	62
3	1	1	spectrin alpha chain	A	A	62
4	1	1	spectrin alpha chain	A	A	62
5	1	1	spectrin alpha chain	A	A	62
6	1	1	spectrin alpha chain	A	A	62
7	1	1	spectrin alpha chain	A	A	62
8	1	1	spectrin alpha chain	A	A	62

Model ID	Subunit number	Subunit ID	Subunit name	Chain ID	Chain ID [auth]	Total residues
9	1	1	spectrin alpha chain	A	A	62
10	1	1	spectrin alpha chain	A	A	62
11	1	1	spectrin alpha chain	A	A	62
12	1	1	spectrin alpha chain	A	A	62
13	1	1	spectrin alpha chain	A	A	62
14	1	1	spectrin alpha chain	A	A	62
15	1	1	spectrin alpha chain	A	A	62
16	1	1	spectrin alpha chain	A	A	62
17	1	1	spectrin alpha chain	A	A	62
18	1	1	spectrin alpha chain	A	A	62
19	1	1	spectrin alpha chain	A	A	62
20	1	1	spectrin alpha chain	A	A	62

Datasets used for modeling

There are 3 unique datasets used to build the models in this entry.

ID	Dataset type	Database name	Data access code
1	Experimental model	PDB	2NUZ

ID	Dataset type	Database name	Data access code
2	Experimental model	PDB	6SCW
3	NMR data	BMRB	34420

Representation ?

This entry has only one representation and includes 0 rigid bodies and 3 flexible units

Chain ID	Rigid bodies	Non-rigid segments
A	-	1-6, 7-61, 62-62

Methodology and software ?

This entry is a result of 1 distinct protocol(s).

Step number	Protocol ID	Method name	Method type	Method description	Number of computed models	Multi state modeling	Multi scale modeling
1	1	Restrained Molecular Dynamics Simulation	modeling	None	200000	False	False

There is 1 software package reported in this entry.

ID	Software name	Software version	Software classification	Software location
1	GROMACS	2019.2	model building	http://www.gromacs.org

Data quality ?

NMR

Validation for this section is under development.

Model quality ?

For models with atomic structures, molprobtity analysis is performed. For models with coarse-grained or multi-scale structures, excluded volume analysis is performed.

Standard geometry: bond outliers ?

Bond length outliers can not be evaluated for this model

Standard geometry: angle outliers ?

Bond angle outliers do not exist or can not be evaluated for this model

Too-close contacts ?

The following all-atom clashscore is based on a MolProbity analysis. All-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The table below contains clashscores for all the models in this entry.

Model ID	Clash score	Number of clashes
1	0.98	1
2	0.98	1
3	1.96	2
4	0.98	1
5	1.96	2
6	0.98	1
7	0.98	1
8	2.94	3
9	0.98	1
10	2.94	3
11	0.98	1
12	0.00	0
13	2.94	3
14	0.00	0
15	0.00	0
16	0.00	0
17	1.96	2

Model ID	Clash score	Number of clashes
18	0.00	0
19	2.94	3
20	0.00	0

All 25 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Model ID	Atom-1	Atom-2	Clash overlap (Å)
1	A:21:ARG:C	A:22:GLU:HG3	0.440
2	A:22:GLU:HA	A:52:PHE:O	0.442
3	A:42:TRP:CZ2	A:60:LYS:HE3	0.484
3	A:42:TRP:CH2	A:60:LYS:HE3	0.415
4	A:9:VAL:HG22	A:58:VAL:HG12	0.431
5	A:36:SER:HG	A:42:TRP:CG	0.663
5	A:9:VAL:HG21	A:33:LEU:HG	0.426
6	A:25:MET:HE1	A:58:VAL:HG13	0.445
7	A:8:LEU:HD21	A:32:THR:HG22	0.424
8	A:43:LYS:HE2	A:52:PHE:CE1	0.480
8	A:43:LYS:HE3	A:52:PHE:CZ	0.465
8	A:43:LYS:CE	A:52:PHE:CZ	0.421
9	A:11:ALA:HB2	A:25:MET:HG3	0.470
10	A:36:SER:HG	A:42:TRP:CG	0.456
10	A:45:GLU:C	A:45:GLU:CD	0.408
10	A:5:GLY:HA3	A:32:THR:HG23	0.401
11	A:42:TRP:CD1	A:55:ALA:HB2	0.408
13	A:17:GLU:C	A:17:GLU:CD	0.498

Model ID	Atom-1	Atom-2	Clash overlap (Å)
13	A:31:LEU:HD22	A:44:VAL:HG21	0.415
13	A:36:SER:HA	A:42:TRP:CD1	0.401
17	A:54:PRO:HG2	A:57:TYR:CD1	0.467
17	A:34:LEU:HD12	A:45:GLU:HB2	0.466
19	A:34:LEU:HD13	A:45:GLU:HB2	0.459
19	A:43:LYS:HE3	A:52:PHE:CD1	0.447
19	A:23:VAL:CG1	A:46:VAL:HG22	0.410

Torsion angles: Protein backbone

In the following table, Ramachandran outliers are listed. The Analysed column shows the number of residues for which the backbone conformation was analysed.

Model ID	Analysed	Favored	Allowed	Outliers
1	60	55	5	0
2	60	52	8	0
3	60	56	2	2
4	60	54	6	0
5	60	56	4	0
6	60	56	4	0
7	60	55	5	0
8	60	51	8	1
9	60	53	6	1
10	60	56	4	0
11	60	55	4	1
12	60	54	5	1
13	60	53	6	1

Model ID	Analyzed	Favored	Allowed	Outliers
14	60	54	3	3
15	60	56	4	0
16	60	58	2	0
17	60	54	4	2
18	60	55	4	1
19	60	53	7	0
20	60	54	6	0

Detailed list of outliers are tabulated below.

Torsion angles: Protein sidechains ?

In the following table, sidechain outliers are listed. The Analysed column shows the number of residues for which the sidechain conformation was analysed.

Model ID	Analyzed	Favored	Allowed	Outliers
1	56	42	8	6
2	56	44	7	5
3	56	50	2	4
4	56	46	6	4
5	56	43	9	4
6	56	40	7	9
7	56	43	7	6
8	56	49	4	3
9	56	44	4	8
10	56	44	7	5
11	56	44	6	6
12	56	45	6	5
13	56	41	12	3

Model ID	Analyzed	Favored	Allowed	Outliers
14	56	41	11	4
15	56	45	6	5
16	56	42	8	6
17	56	42	9	5
18	56	45	8	3
19	56	44	6	6
20	56	45	4	7

Detailed list of outliers are tabulated below.

Model ID	Chain	Residue ID	Residue type
1	A	1	MET
1	A	6	LYS
1	A	23	VAL
1	A	31	LEU
1	A	45	GLU
1	A	50	GLN
2	A	16	GLN
2	A	18	LYS
2	A	26	LYS
2	A	43	LYS
2	A	59	LYS
3	A	23	VAL
3	A	27	LYS
3	A	45	GLU

Model ID	Chain	Residue ID	Residue type
3	A	58	VAL
4	A	6	LYS
4	A	17	GLU
4	A	25	MET
4	A	37	THR
5	A	17	GLU
5	A	27	LYS
5	A	43	LYS
5	A	60	LYS
6	A	1	MET
6	A	17	GLU
6	A	23	VAL
6	A	26	LYS
6	A	39	LYS
6	A	40	ASP
6	A	43	LYS
6	A	46	VAL
6	A	60	LYS
7	A	1	MET
7	A	16	GLN
7	A	27	LYS
7	A	43	LYS
7	A	49	ARG

Model ID	Chain	Residue ID	Residue type
7	A	59	LYS
8	A	6	LYS
8	A	39	LYS
8	A	62	ASP
9	A	1	MET
9	A	4	THR
9	A	18	LYS
9	A	26	LYS
9	A	31	LEU
9	A	37	THR
9	A	42	TRP
9	A	60	LYS
10	A	3	GLU
10	A	6	LYS
10	A	25	MET
10	A	43	LYS
10	A	47	ASN
11	A	1	MET
11	A	18	LYS
11	A	21	ARG
11	A	27	LYS
11	A	31	LEU
11	A	43	LYS

Model ID	Chain	Residue ID	Residue type
12	A	1	MET
12	A	21	ARG
12	A	43	LYS
12	A	45	GLU
12	A	59	LYS
13	A	16	GLN
13	A	18	LYS
13	A	39	LYS
14	A	1	MET
14	A	17	GLU
14	A	18	LYS
14	A	59	LYS
15	A	1	MET
15	A	30	ILE
15	A	43	LYS
15	A	47	ASN
15	A	60	LYS
16	A	3	GLU
16	A	6	LYS
16	A	17	GLU
16	A	27	LYS
16	A	37	THR
16	A	39	LYS

Model ID	Chain	Residue ID	Residue type
17	A	1	MET
17	A	23	VAL
17	A	27	LYS
17	A	31	LEU
17	A	59	LYS
18	A	26	LYS
18	A	30	ILE
18	A	50	GLN
19	A	1	MET
19	A	6	LYS
19	A	18	LYS
19	A	21	ARG
19	A	45	GLU
19	A	59	LYS
20	A	6	LYS
20	A	20	PRO
20	A	27	LYS
20	A	31	LEU
20	A	33	LEU
20	A	39	LYS
20	A	43	LYS

Fit of model to data used for modeling ?

NMR

Validation for this section is under development.

Fit of model to data used for validation ?

Validation for this section is under development.

Acknowledgements

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