Integrative Structure Validation Report

September 10, 2024 - 11:51 PM PDT

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	9A69
PDB-Dev ID	PDBDEV_00000302
Structure Title	Integrative model of MCPB-MCPC by crosslinking MS and deep learning
Structure Authors	Kolja Stahl; Oliver Brock; Juri Rappsilber

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

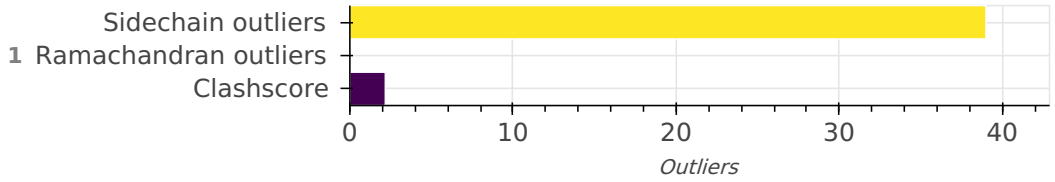
A user guide is available at https://pdb-dev.wwpdb.org/validation_help.html with specific help available everywhere you see the ? symbol.

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 1 unique models, with 2 subunits in each model. A total of 1 datasets or restraints were used to build this entry. Each model is represented by 0 rigid bodies and 2 flexible or non-rigid units.

Entry composition

There is 1 unique type of models in this entry. This model is titled None/None.

Model ID	Subunit number	Subunit ID	Subunit name	Chain ID	Chain ID [auth]	Total residues
1	1	1	MCPB_BACSU	A	A	662
1	2	2	MCPC_BACSU	B	B	655

Datasets used for modeling

There is 1 unique dataset used to build the models in this entry.

ID	Dataset type	Database name	Data access code
1	Crosslinking-MS data	PRIDE	PXD035508

Representation

This entry has only one representation and includes 0 rigid bodies and 2 flexible units.

Chain ID	Rigid bodies	Non-rigid segments

Chain ID	Rigid bodies	Non-rigid segments
A	-	1-662
B	-	1-655

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	AlphaLink2	AlphaLink2	None	1	False	False

There is 1 software package reported in this entry.

ID	Software name	Software version	Software classification	Software location
1	AlphaLink2	1.0	model building	https://github.com/Rappsilber-Laboratory/AlphaLink2

Data quality

Crosslinking-MS

Validation for this section is under development.

Model quality

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

Standard geometry: bond outliers

There are 10203 bond outliers in this entry. A summary is provided below, and a detailed list of outliers can be found here.

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
NZ--HZ2	1.01	0.89	106

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
CA--HA	1.09	0.97	1246
CB--HB3	1.09	0.97	956
CG--HG	1.09	0.97	103
CB--HB2	1.09	0.97	956
CG2--HG22	1.09	0.97	290
CE--HE2	1.09	0.97	149
CD1--HD12	1.09	0.97	210
CB--HB1	1.09	0.97	127
CD--HD3	1.09	0.97	154
CG1--HG13	1.09	0.97	195
CG2--HG23	1.09	0.97	290
CG--HG3	1.09	0.97	390
CD1--HD13	1.09	0.97	210
CD2--HD23	1.09	0.97	103
CG--HG2	1.09	0.97	390
CD2--HD22	1.09	0.97	103
CG2--HG21	1.09	0.97	290
OH--HH	0.96	0.84	27
OG--HG	0.96	0.84	132
CB--HB	1.09	0.97	290
CE--HE3	1.09	0.97	149
CE--HE1	1.09	0.97	43
CD--HD2	1.09	0.97	154

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
NZ--HZ3	1.01	0.89	106
CG1--HG12	1.09	0.97	195
CD1--HD11	1.09	0.97	210
CA--HA3	1.09	0.97	71
OG1--HG1	0.96	0.84	95
CG1--HG11	1.09	0.97	88
NZ--HZ1	1.01	0.89	106
CD2--HD21	1.09	0.97	103
CA--HA2	1.09	0.97	71
N--H1	1.01	0.89	2
N--H2	1.01	0.89	2
N--H3	1.01	0.89	2
N--H	1.01	0.86	1297
ND2--HD21	1.01	0.86	58
ND2--HD22	1.01	0.86	58
CD2--HD2	1.08	0.93	75
CE2--HE2	1.08	0.93	58
NH2--HH21	1.01	0.86	30
NE2--HE22	1.01	0.86	79
NE2--HE21	1.01	0.86	79
NH2--HH22	1.01	0.86	30
CZ--HZ	1.08	0.93	31
CH2--HH2	1.08	0.93	9
NE--HE	1.01	0.86	30

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
NH1--HH11	1.01	0.86	30
NH1--HH12	1.01	0.86	30
CD1--HD1	1.08	0.93	67
CE3--HE3	1.08	0.93	9
CE1--HE1	1.08	0.93	75
CZ2--HZ2	1.08	0.93	9
ND1--HD1	1.01	0.86	17
CZ3--HZ3	1.08	0.93	9
NE1--HE1	1.01	0.86	9

Standard geometry: angle outliers

There are 71 angle outliers in this entry. A summary is provided below, and a detailed list of outliers can be found here.

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
OE1-CD-NE2	122.60	117.01	1
CA-CB-CG	113.80	119.37	1
OE1-CD-NE2	122.60	117.42	1
OE1-CD-NE2	122.60	117.45	1
OE1-CD-NE2	122.60	117.46	1
OE1-CD-NE2	122.60	117.55	1
OE1-CD-NE2	122.60	117.57	1
OE1-CD-NE2	122.60	117.61	1
OE1-CD-NE2	122.60	117.66	2
OE1-CD-NE2	122.60	117.70	1
OE1-CD-NE2	122.60	117.72	1
OE1-CD-NE2	122.60	117.76	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
OE1-CD-NE2	122.60	117.78	1
OE1-CD-NE2	122.60	117.80	1
OE1-CD-NE2	122.60	117.81	1
OE1-CD-NE2	122.60	117.83	4
OE1-CD-NE2	122.60	117.84	1
CA-CB-CG	112.60	117.30	1
OE1-CD-NE2	122.60	117.90	1
OE1-CD-NE2	122.60	117.91	1
CB-CG-CD2	131.20	125.11	1
OD1-CG-ND2	122.60	117.95	1
OE1-CD-NE2	122.60	118.01	1
OE1-CD-NE2	122.60	118.06	1
OE1-CD-NE2	122.60	118.07	1
OE1-CD-NE2	122.60	118.08	2
CA-CB-CG	113.80	109.33	1
OE1-CD-NE2	122.60	118.13	1
OE1-CD-NE2	122.60	118.15	2
OE1-CD-NE2	122.60	118.16	1
CA-CB-CG	112.60	117.02	1
CB-CG-CD2	131.20	125.47	1
OE1-CD-NE2	122.60	118.21	1
OD1-CG-ND2	122.60	118.22	1
OE1-CD-NE2	122.60	118.22	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
OE1-CD-NE2	122.60	118.23	1
OE1-CD-NE2	122.60	118.25	1
OE1-CD-NE2	122.60	118.26	1
OE1-CD-NE2	122.60	118.28	1
OE1-CD-NE2	122.60	118.29	1
CB-CG-CD	112.60	119.90	1
OE1-CD-NE2	122.60	118.31	2
OE1-CD-NE2	122.60	118.32	1
OE1-CD-NE2	122.60	118.33	2
OE1-CD-NE2	122.60	118.37	1
OE1-CD-NE2	122.60	118.38	1
OE1-CD-NE2	122.60	118.39	1
OE1-CD-NE2	122.60	118.46	1
OE1-CD-NE2	122.60	118.48	3
CA-CB-CG	112.60	116.72	1
OE1-CD-NE2	122.60	118.49	1
OD1-CG-ND2	122.60	118.49	1
OD1-CG-ND2	122.60	118.51	1
OD1-CG-ND2	122.60	118.53	1
OE1-CD-NE2	122.60	118.54	2
OE1-CD-NE2	122.60	118.55	1
OE1-CD-NE2	122.60	118.56	1
OE1-CD-NE2	122.60	118.57	1
OE1-CD-NE2	122.60	118.60	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
HZ2-NZ-HZ3	95.40	109.00	1

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	2.17	44

All 44 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:428:ILE:HG23	B:576:LEU:HD22	0.892
1	A:428:ILE:HG22	A:586:LEU:HD11	0.742
1	A:455:SER:HB2	B:551:MET:HE1	0.689
1	A:102:TYR:CD1	A:112:ILE:HD11	0.665
1	A:393:PHE:CD1	A:621:ILE:HD11	0.658
1	A:470:LEU:HD22	B:534:ILE:HG23	0.647
1	A:393:PHE:HD1	A:621:ILE:HD11	0.631
1	A:165:MET:HE2	A:186:ILE:HD12	0.579
1	A:250:LYS:HE2	A:269:TYR:CE1	0.573
1	A:400:GLN:HE21	B:604:ILE:HG23	0.571
1	B:440:LEU:HD12	B:566:LEU:HD12	0.569
1	A:428:ILE:HG23	B:576:LEU:CD2	0.560
1	A:347:MET:SD	B:341:MET:HE1	0.551
1	B:468:THR:HG21	B:534:ILE:CG2	0.537
1	A:85:ALA:HB1	A:95:ILE:HD11	0.534
1	B:94:ILE:HA	B:97:ILE:HD12	0.530

Model ID	Atom-1	Atom-2	Clash overlap (Å)
1	A:404:VAL:HG11	A:611:ALA:HB2	0.514
1	A:418:LEU:HD21	A:596:LEU:HD23	0.512
1	B:90:PHE:CZ	B:109:ILE:HD12	0.512
1	A:319:THR:HG22	A:324:ASP:HB3	0.498
1	A:225:LEU:HD23	A:229:TRP:CH2	0.496
1	A:550:MET:HE3	B:457:VAL:HG22	0.491
1	A:156:PRO:HB3	A:165:MET:HE1	0.490
1	A:390:ILE:HG23	A:621:ILE:HG23	0.484
1	A:7:TRP:CZ2	A:15:LYS:HE2	0.476
1	B:415:ILE:HG22	B:587:ILE:HD11	0.473
1	B:148:TRP:CZ3	B:164:ALA:HB2	0.471
1	A:557:GLU:HA	A:557:GLU:OE2	0.462
1	A:455:SER:CB	B:551:MET:HE1	0.452
1	A:393:PHE:CZ	B:387:VAL:HG13	0.450
1	A:586:LEU:HD23	A:589:MET:CE	0.450
1	A:453:MET:HE1	A:561:GLY:HA3	0.449
1	B:468:THR:HG21	B:534:ILE:HG22	0.448
1	B:468:THR:HG21	B:534:ILE:HG21	0.437
1	B:132:SER:HA	B:137:LYS:HE3	0.435
1	A:481:LEU:HD11	A:533:ILE:HG22	0.433
1	B:108:TYR:CE2	B:179:SER:HB2	0.433
1	A:156:PRO:HB3	A:165:MET:CE	0.426
1	A:165:MET:HE3	A:166:VAL:N	0.413

Model ID	Atom-1	Atom-2	Clash overlap (Å)
1	A:7:TRP:CE2	A:15:LYS:HE2	0.408
1	B:384:ILE:HA	B:384:ILE:HD13	0.405
1	A:71:ALA:HB1	A:151:ILE:HD13	0.403
1	B:440:LEU:HD11	B:562:THR:HG22	0.403
1	A:659:PHE:CE2	B:348:MET:CE	0.402

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	Analyzed	Favored	Allowed	Outliers
1	1313	1303	10	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	1119	1037	43	39

Detailed list of outliers are tabulated below.

Model ID	Chain	Residue ID	Residue type
1	A	3	THR
1	A	8	LEU
1	A	25	LEU
1	A	39	SER
1	A	241	LEU
1	A	288	LEU
1	A	301	PHE
1	A	310	LEU

Model ID	Chain	Residue ID	Residue type
1	A	313	LEU
1	A	327	GLU
1	A	354	LEU
1	A	385	HIS
1	A	410	GLN
1	A	543	GLU
1	A	565	THR
1	A	614	SER
1	B	1	MET
1	B	26	LEU
1	B	28	SER
1	B	227	THR
1	B	230	THR
1	B	271	SER
1	B	279	LEU
1	B	283	LEU
1	B	307	LEU
1	B	350	GLU
1	B	363	SER
1	B	384	ILE
1	B	408	LEU
1	B	444	LEU
1	B	464	LEU
1	B	488	LEU

Model ID	Chain	Residue ID	Residue type
1	B	501	GLU
1	B	526	HIS
1	B	533	LEU
1	B	536	LEU
1	B	557	SER
1	B	647	MET
1	B	650	ILE

Fit of model to data used for modeling

Crosslinking-MS

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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