

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	9A6Y
PDB-Dev ID	PDBDEV_00000327
Structure Title	Integrative model of RPOE-RPOC 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

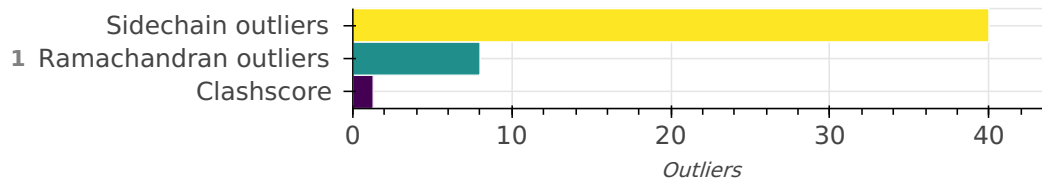
A user guide is available at https://pdb-dev.wwpdb.org/validation_help.html with specific help available everywhere you see the  symbol.

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	RPOE_BACSU	A	A	173
1	2	2	RPOC_BACSU	B	B	1199

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	-	1-173
B	-	1-1199

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

Standard geometry: bond outliers ?

There are 10992 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
CB--HB2	1.09	0.97	1013

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
CA--HA2	1.09	0.97	95
CG--HG3	1.09	0.97	468
CA--HA3	1.09	0.97	95
CD1--HD13	1.09	0.97	222
CD2--HD23	1.09	0.97	138
CG2--HG22	1.09	0.97	264
CA--HA	1.09	0.97	1277
CD1--HD12	1.09	0.97	222
CD--HD2	1.09	0.97	247
CD2--HD22	1.09	0.97	138
CG2--HG23	1.09	0.97	264
CG--HG	1.09	0.97	138
CG1--HG12	1.09	0.97	192
CD--HD3	1.09	0.97	247
CB--HB3	1.09	0.97	1013
CG1--HG13	1.09	0.97	192
CG2--HG21	1.09	0.97	264
CG--HG2	1.09	0.97	468
CD2--HD21	1.09	0.97	138
CB--HB	1.09	0.97	264
OH--HH	0.96	0.84	35
OG--HG	0.96	0.84	55
CE--HE2	1.09	0.97	139

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
CB--HB1	1.09	0.97	91
NZ--HZ1	1.01	0.89	103
CE--HE3	1.09	0.97	139
CD1--HD11	1.09	0.97	222
CE--HE1	1.09	0.97	36
NZ--HZ2	1.01	0.89	103
CG1--HG11	1.09	0.97	108
OG1--HG1	0.96	0.84	72
NZ--HZ3	1.01	0.89	103
N--H3	1.01	0.89	2
N--H1	1.01	0.89	2
N--H2	1.01	0.89	2
SG--HG	1.34	1.20	11
N--H	1.01	0.86	1312
NE2--HE21	1.01	0.86	51
CZ--HZ	1.08	0.93	41
NH2--HH21	1.01	0.86	86
ND2--HD22	1.01	0.86	49
NH1--HH11	1.01	0.86	86
NH2--HH22	1.01	0.86	86
CD2--HD2	1.08	0.93	99
NH1--HH12	1.01	0.86	86
ND2--HD21	1.01	0.86	49
NE2--HE22	1.01	0.86	51

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
CZ2--HZ2	1.08	0.93	9
CE1--HE1	1.08	0.93	99
NE--HE	1.01	0.86	86
ND1--HD1	1.01	0.86	19
CZ3--HZ3	1.08	0.93	9
CD1--HD1	1.08	0.93	85
CE2--HE2	1.08	0.93	76
CE3--HE3	1.08	0.93	9
CH2--HH2	1.08	0.93	9
NE1--HE1	1.01	0.86	9
NE2--HE2	1.01	0.86	4

Standard geometry: angle outliers?

There are 82 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
C-N-CA	121.70	138.21	1
C-N-CA	121.70	136.55	1
CA-CB-CG	112.60	119.04	1
C-N-CA	121.70	133.19	1
O-C-N	123.00	113.01	1
C-N-CA	121.70	132.90	1
C-N-CA	121.70	132.70	1
CA-CB-CG	112.60	118.29	1
CA-CB-CG	112.60	118.18	1
CA-C-N	116.20	127.10	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
CA-CB-CG	112.60	118.02	1
O-C-N	123.00	114.37	1
CA-C-N	116.20	126.91	1
CA-CB-CG	112.60	117.87	1
C-N-CA	121.70	131.18	1
CA-CB-CG1	110.40	119.31	1
OD1-CG-ND2	122.60	117.40	1
O-C-N	123.00	114.68	1
O-C-N	123.00	114.70	1
CA-CB-CG1	110.40	119.17	1
C-N-CA	121.70	130.90	1
OE1-CD-NE2	122.60	117.57	1
NE-CZ-NH2	119.20	123.71	1
CB-CG-CD2	131.20	124.72	1
OE1-CD-NE2	122.60	117.79	1
CB-CG-CD2	131.20	125.01	1
OE1-CD-NE2	122.60	117.85	1
OE1-CD-NE2	122.60	117.86	1
CB-CG-CD2	131.20	125.08	1
OE1-CD-NE2	122.60	117.90	1
OE1-CD-NE2	122.60	117.92	1
NE-CZ-NH2	119.20	115.00	1
O-C-N	123.00	115.54	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
CB-CG-CA-CB-CG1	110.40	118.29	1
CA-CB-CG	112.60	117.24	1
OE1-CD-NE2	122.60	117.97	1
OE1-CD-NE2	122.60	117.99	1
OE1-CD-NE2	122.60	118.00	1
CA-CB-CG	112.60	117.13	1
N-CA-C	111.00	123.57	1
OE1-CD-CA-C-N	116.20	125.01	1
OE1-CD-OE1-CD-NE2	122.60	118.22	1
OD1-CG-ND2	122.60	118.22	1
OD1-CG-ND2	122.60	118.23	1
OE1-CD-NE2	122.60	118.24	1
C-N-CA	121.70	129.49	1
N-CA-C	111.00	123.10	1
NE-CZ-NH2	119.20	123.09	1
OE1-CD-NE2	122.60	118.30	1
OE1-CD-NE2	122.60	118.34	1
CB-CG-CD2	131.20	125.67	1
CB-CG-CD2	131.20	125.71	1
OE1-CD-NE2	122.60	118.38	1
CA-C-N	116.20	124.60	1
C-N-CA	121.70	129.25	1
OE1-CD-NE2	122.60	118.42	1
OE1-CD-NE2	122.60	118.45	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
OE1-CD-NE2	122.60	118.46	1
OE1-CD-NE2	122.60	118.47	1
OE1-CD-NE2	122.60	118.49	3
OD1-CG-ND2	122.60	118.50	1
OE1-CD-NE2	122.60	118.50	1
OD1-CG-ND2	122.60	118.51	1
OE1-CD-NE2	122.60	118.52	1
OE1-CD-NE2	122.60	118.54	1
CB-CG-NE-CZ-CA-CB-CG	112.60	116.64	1
CA-CB-CG	112.60	116.63	1
OE1-CD-NE2	122.60	118.58	1
OE1-CD-NE2	122.60	118.59	1
C-N-H	112.09	124.30	1
HZ2-NZ-HZ3	96.75	109.00	1
HH21-NH2-HH22	107.66	120.00	1
C-N-H	111.95	124.30	1
C-N-H	111.22	124.30	1
C-N-H	110.82	124.30	1
HZ1-NZ-HZ3	95.42	109.00	1
C-N-H	110.67	124.30	1
C-N-H	108.92	124.30	1
C-N-H	108.30	124.30	1
C-N-H	107.20	124.30	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	1.28	28

All 28 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	B:808:ALA:CB	B:383:ILE:HG23	0.620
1	B:814:ARG:HH12	B:428:PRO:HG2	0.614
1	B:371:MET:CE	B:779:SER:HA	0.585
1	B:405:ILE:HG23	A:173:LYS:HB2	0.574
1	B:751:MET:HE2	B:383:ILE:HG23	0.568
1	A:172:ILE:HG22	B:321:LYS:HE2	0.560
1	B:371:MET:HE3	B:723:LEU:HD22	0.554
1	B:803:ARG:NH1	B:741:PHE:CE1	0.531
1	B:317:SER:HB3	B:615:PHE:CD2	0.529
1	B:506:ARG:HH21	B:749:GLY:HA2	0.523
1	B:720:LEU:HD11	B:587:GLU:OE1	0.520
1	B:503:THR:HG21	B:321:LYS:CE	0.495
1	B:747:MET:HE2	B:741:PHE:CD2	0.472
1	B:583:LYS:HE2	B:450:PHE:CE2	0.456
1	B:317:SER:HB3	B:782:GLY:HA3	0.428
1	B:808:ALA:HB2	B:723:LEU:CD2	0.414
1	B:726:ILE:HG21	A:158:ILE:HG12	0.413
1	B:806:ASP:CG	B:476:ALA:HA	0.405

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	1368	1309	51	8

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	1186	1062	84	40

Detailed list of outliers are tabulated below.

Model ID	Chain	Residue ID	Residue type
1	A	1	MET
1	A	3	ILE
1	A	37	LEU
1	A	43	LEU
1	A	46	VAL
1	A	62	LEU
1	A	64	ILE
1	A	124	ASP
1	A	153	ILE
1	A	158	ILE
1	A	172	ILE
1	B	1	MET
1	B	2	LEU
1	B	107	PHE

Model ID	Chain	Residue ID	Residue type
1	B	108	LYS
1	B	125	LEU
1	B	159	LEU
1	B	195	LEU
1	B	234	ILE
1	B	287	MET
1	B	357	LEU
1	B	381	HIS
1	B	408	HIS
1	B	497	LEU
1	B	504	LEU
1	B	666	LEU
1	B	716	LEU
1	B	737	ASN
1	B	761	LEU
1	B	780	THR
1	B	806	ASP
1	B	807	VAL
1	B	824	ILE
1	B	953	LEU
1	B	1040	LEU
1	B	1130	THR
1	B	1167	ILE

Model ID	Chain	Residue ID	Residue type
1	B	1171	VAL
1	B	1177	MET
1	B	1178	MET

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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