

# 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	9A67
PDB-Dev ID	PDBDEV_00000300
Structure Title	Integrative model of FLIF-YLXF 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](mailto:pdb-dev@mail.wwpdb.org)*

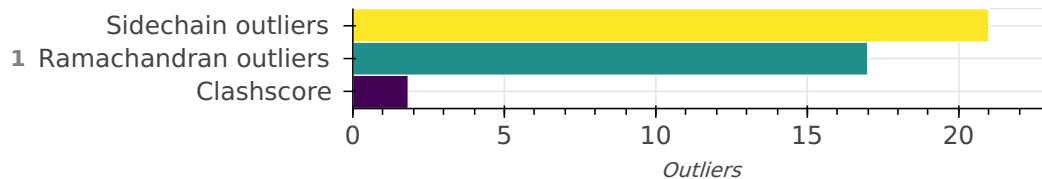
*A user guide is available at [https://pdb-dev.wwpdb.org/validation\\_help.html](https://pdb-dev.wwpdb.org/validation_help.html) with specific help available everywhere you see the  symbol.*

*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	FLIF_BACSU	A	A	536
1	2	2	YLXF_BACSU	B	B	204

## 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	-	1-536
B	-	1-204

## 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	<a href="#">AlphaLink2</a>	1.0	model building	<a href="https://github.com/Rappsilber-Laboratory/AlphaLink2">https://github.com/Rappsilber-Laboratory/AlphaLink2</a>

## 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 5756 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--HZ3	1.01	0.89	74

<b>Bond type</b>	<b>Observed distance (Å)</b>	<b>Ideal distance (Å)</b>	<b>Number of outliers</b>
CD1--HD11	1.09	0.97	117
CB--HB3	1.09	0.97	555
CD2--HD22	1.09	0.97	57
CA--HA	1.09	0.97	700
CE--HE2	1.09	0.97	94
CG2--HG23	1.09	0.97	145
CG--HG2	1.09	0.97	237
CD1--HD12	1.09	0.97	117
CA--HA3	1.09	0.97	40
OG--HG	0.96	0.84	68
CB--HB2	1.09	0.97	555
CG--HG3	1.09	0.97	237
NZ--HZ2	1.01	0.89	74
CG2--HG21	1.09	0.97	145
OG1--HG1	0.96	0.84	36
CG1--HG13	1.09	0.97	109
CG2--HG22	1.09	0.97	145
OH--HH	0.96	0.84	18
CG1--HG12	1.09	0.97	109
CD--HD3	1.09	0.97	111
CE--HE3	1.09	0.97	94
NZ--HZ1	1.01	0.89	74
CG--HG	1.09	0.97	57

<b>Bond type</b>	<b>Observed distance (Å)</b>	<b>Ideal distance (Å)</b>	<b>Number of outliers</b>
CD1--HD13	1.09	0.97	117
CE--HE1	1.09	0.97	20
CB--HB	1.09	0.97	145
CG1--HG11	1.09	0.97	49
CD--HD2	1.09	0.97	111
CB--HB1	1.09	0.97	60
CD2--HD23	1.09	0.97	57
CD2--HD21	1.09	0.97	57
CA--HA2	1.09	0.97	40
N--H1	1.01	0.89	2
N--H3	1.01	0.89	2
N--H2	1.01	0.89	2
ND2--HD21	1.01	0.86	43
CE1--HE1	1.08	0.93	35
N--H	1.01	0.86	716
CD1--HD1	1.08	0.93	35
NE2--HE22	1.01	0.86	38
NH1--HH12	1.01	0.86	15
NE2--HE21	1.01	0.86	38
NE--HE	1.01	0.86	15
CE3--HE3	1.08	0.93	4
NH1--HH11	1.01	0.86	15
NH2--HH21	1.01	0.86	15
CE2--HE2	1.08	0.93	31

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
ND2--HD22	1.01	0.86	43
CD2--HD2	1.08	0.93	35
CH2--HH2	1.08	0.93	4
CZ--HZ	1.08	0.93	13
NH2--HH22	1.01	0.86	15
ND1--HD1	1.01	0.86	4
CZ3--HZ3	1.08	0.93	4
CZ2--HZ2	1.08	0.93	4
NE1--HE1	1.01	0.86	4

### Standard geometry: angle outliers?

There are 78 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
CA-CB-CG	112.60	121.39	1
C-N-CA	121.70	135.92	1
C-N-CA	121.70	135.04	1
C-N-CA	121.70	134.40	1
C-N-CA	121.70	133.91	1
CA-CB-CG2	110.50	121.54	1
C-N-CA	121.70	133.25	1
C-CA-CB	110.50	119.38	1
CA-CB-CG	112.60	118.46	1
C-N-CA	121.70	131.78	1
O-C-N	123.00	114.08	1
C-N-CA	121.70	131.41	1

<b>Angle type</b>	<b>Observed angle (°)</b>	<b>Ideal angle (°)</b>	<b>Number of outliers</b>
C-N-CA	121.70	131.38	1
O-C-N	123.00	114.41	1
OE1-CD-NE2	122.60	117.29	1
CA-CB-CG1	110.40	119.20	1
CA-CB-CG	114.10	124.42	1
OE1-CD-NE2	122.60	117.46	1
N-CA-CB	110.50	101.82	1
N-CA-CB	110.40	102.77	1
C-N-CA	121.70	130.68	1
OG1-CB-CG2	109.30	99.38	1
CA-C-N	116.20	126.06	1
OE1-CD-NE2	122.60	117.68	1
C-N-CA	121.70	130.55	1
O-C-N	123.00	115.22	1
OE1-CD-NE2	122.60	117.77	1
OE1-CD-NE2	122.60	117.79	1
N-CA-CB	110.50	102.35	1
CA-C-N	116.20	125.71	1
C-N-CA	121.70	113.16	1
OE1-CD-NE2	122.60	117.93	1
OE1-CD-NE2	122.60	117.96	1
O-C-N	123.00	115.64	1
CA-CB-CG	113.80	118.39	1

<b>Angle type</b>	<b>Observed angle (°)</b>	<b>Ideal angle (°)</b>	<b>Number of outliers</b>
OE1-CD-NE2	122.60	118.02	1
OE1-CD-NE2	122.60	118.11	1
OE1-CD-NE2	122.60	118.13	1
OE1-CD-NE2	122.60	118.14	1
N-CA-C	112.10	123.24	1
OE1-CD-NE2	122.60	118.16	2
N-CA-CB	110.50	103.02	1
C-CA-CB	110.10	118.46	1
CA-CB-CG	112.60	117.00	1
CA-C-N	116.90	123.48	1
C-N-CA	121.70	129.59	1
CA-C-N	116.20	124.92	1
CA-CB-CG	112.60	116.90	1
N-CA-C	111.00	123.02	1
CA-CB-CG	112.60	116.88	1
C-N-CA	121.70	129.38	1
OE1-CD-NE2	122.60	118.37	1
OD1-CG-ND2	122.60	118.38	1
CA-C-N	116.20	124.64	1
CA-C-N	116.20	124.56	1
O-C-N	123.00	116.33	1
C-N-CA	121.70	129.15	1
OD1-CG-ND2	122.60	118.47	1
OE1-CD-NE2	122.60	118.47	1



Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
O-C-N	123.00	116.41	1
N-CA-C	111.00	122.51	1
OE1-CD-NE2	122.60	118.51	1
N-CA-CB	110.50	103.59	1
C-N-CA	121.70	129.01	1
CA-CB-CG	113.90	121.18	1
CA-C-N	116.20	124.28	1
OE1-CD-NE2	122.60	118.56	1
OE1-CD-NE2	122.60	118.59	1
C-CA-CB	110.10	117.71	1
OE1-CD-NE2	122.60	118.60	1
C-N-H	111.19	124.30	1
C-N-H	110.97	124.30	1
C-N-H	110.66	124.30	1
C-N-H	109.83	124.30	1
C-N-H	109.76	124.30	1
C-N-H	108.95	124.30	1
C-N-H	108.69	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	1.83	21

All 21 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:23:MET:HA	B:58:VAL:HG13	0.664
1	A:177:ILE:HD11	A:199:VAL:HG21	0.656
1	B:151:MET:HE1	B:159:ILE:HD12	0.614
1	B:19:ILE:HA	B:57:LEU:HD21	0.594
1	B:19:ILE:O	B:57:LEU:HD21	0.552
1	A:133:VAL:HG22	A:159:LEU:HD12	0.532
1	A:534:ALA:HB1	A:535:GLU:HA	0.501
1	A:177:ILE:CD1	A:199:VAL:HG21	0.500
1	B:26:LEU:HB2	B:58:VAL:HG11	0.491
1	B:58:VAL:HG12	B:59:PRO:CA	0.487
1	A:242:LYS:HE3	A:246:GLU:OE1	0.456
1	B:22:LEU:HB3	B:57:LEU:HD22	0.453
1	B:22:LEU:HB3	B:57:LEU:HD13	0.446
1	B:23:MET:O	B:58:VAL:HG13	0.439
1	A:505:THR:HG22	A:506:ALA:N	0.436
1	B:2:SER:H	B:87:LYS:HD3	0.431
1	A:495:LEU:HB3	A:496:PRO:CD	0.430
1	A:495:LEU:HB3	A:496:PRO:CG	0.419
1	A:140:LEU:HD21	A:199:VAL:HG22	0.418
1	A:149:GLY:HA3	A:185:TYR:CD1	0.418
1	A:499:ASN:HB3	A:500:GLU:HG3	0.401

### 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	736	663	56	17

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	640	574	45	21

Detailed list of outliers are tabulated below.

Model ID	Chain	Residue ID	Residue type
1	A	4	THR
1	A	16	TRP
1	A	209	ASP
1	A	226	SER
1	A	466	LEU
1	A	488	VAL
1	A	498	ILE
1	A	502	GLU
1	A	505	THR
1	A	507	GLU
1	A	524	ASP
1	A	525	PHE
1	A	533	LEU
1	B	23	MET
1	B	25	LEU
1	B	53	VAL

Model ID	Chain	Residue ID	Residue type
1	B	57	LEU
1	B	79	LEU
1	B	93	LEU
1	B	128	HIS
1	B	129	THR

### 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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