

# Integrative Structure Validation Report

September 10, 2024 - 10:51 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	9A57
PDB-Dev ID	PDBDEV_00000264
Structure Title	Integrative model of RPOC-NUSG 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)*

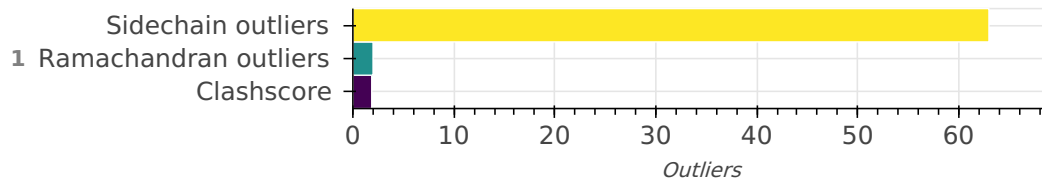
*A user guide is available at [https://pdb-dev.wwpdb.org/validation\\_help.html](https://pdb-dev.wwpdb.org/validation_help.html) with specific help available everywhere you see the  symbol.*

*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	RPOC_BACSU	A	A	1199
1	2	2	NUSG_BACSU	B	B	177

## 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	-	1-1199
B	-	1-177

## 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 11109 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	984

<b>Bond type</b>	<b>Observed distance (Å)</b>	<b>Ideal distance (Å)</b>	<b>Number of outliers</b>
CA--HA	1.09	0.97	1272
CB--HB	1.09	0.97	288
CD1--HD11	1.09	0.97	208
CG1--HG12	1.09	0.97	208
CG2--HG23	1.09	0.97	288
CG1--HG13	1.09	0.97	208
CB--HB1	1.09	0.97	86
CD2--HD22	1.09	0.97	125
CG2--HG21	1.09	0.97	288
CA--HA2	1.09	0.97	104
NZ--HZ3	1.01	0.89	110
CB--HB3	1.09	0.97	984
CG--HG3	1.09	0.97	465
CG--HG2	1.09	0.97	465
CD--HD3	1.09	0.97	261
CD1--HD12	1.09	0.97	208
CD1--HD13	1.09	0.97	208
CG1--HG11	1.09	0.97	125
NZ--HZ2	1.01	0.89	110
CD--HD2	1.09	0.97	261
CG--HG	1.09	0.97	125
CG2--HG22	1.09	0.97	288
NZ--HZ1	1.01	0.89	110

<b>Bond type</b>	<b>Observed distance (Å)</b>	<b>Ideal distance (Å)</b>	<b>Number of outliers</b>
CD2--HD21	1.09	0.97	125
CE--HE3	1.09	0.97	151
CE--HE2	1.09	0.97	151
CE--HE1	1.09	0.97	41
CD2--HD23	1.09	0.97	125
OH--HH	0.96	0.84	36
OG1--HG1	0.96	0.84	80
CA--HA3	1.09	0.97	104
OG--HG	0.96	0.84	59
N--H3	1.01	0.89	2
N--H2	1.01	0.89	2
N--H1	1.01	0.89	2
SG--HG	1.33	1.20	2
SG--HG	1.34	1.20	9
N--H	1.01	0.86	1312
NH2--HH21	1.01	0.86	89
NH1--HH11	1.01	0.86	89
NE2--HE21	1.01	0.86	46
CZ3--HZ3	1.08	0.93	9
NH2--HH22	1.01	0.86	89
NE--HE	1.01	0.86	89
CE1--HE1	1.08	0.93	102
NH1--HH12	1.01	0.86	89
ND2--HD21	1.01	0.86	54

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
CD1--HD1	1.08	0.93	89
CZ--HZ	1.08	0.93	44
ND2--HD22	1.01	0.86	54
NE2--HE22	1.01	0.86	46
CD2--HD2	1.08	0.93	102
CE2--HE2	1.08	0.93	80
CE3--HE3	1.08	0.93	9
ND1--HD1	1.01	0.86	20
CZ2--HZ2	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	2

#### Standard geometry: angle outliers

There are 42 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
NE-CZ-NH2	119.20	128.34	1
NH1-CZ-NH2	119.30	107.23	1
CA-CB-CG	112.60	118.87	1
CA-CB-CG	112.60	118.36	1
OD1-CG-ND2	122.60	116.95	1
CA-CB-CG	112.60	118.23	1
OE1-CD-NE2	122.60	117.42	1
CB-CG-CD2	131.20	124.80	1
CA-CB-CG	112.60	117.46	1

<b>Angle type</b>	<b>Observed angle (°)</b>	<b>Ideal angle (°)</b>	<b>Number of outliers</b>
OE1-CD-NE2	122.60	117.77	1
OE1-CD-NE2	122.60	117.81	1
CA-CB-CG	112.60	117.39	1
OE1-CD-NE2	122.60	117.83	1
OE1-CD-NE2	122.60	117.85	1
OE1-CD-OD1-CG-ND2	122.60	117.86	1
OE1-CD-OE1-CD-NE2	122.60	117.89	1
OE1-CD-NE2	122.60	117.90	1
OE1-CD-NE2	122.60	118.00	1
OE1-CD-NE2	122.60	118.01	1
OE1-CD-NE2	122.60	118.05	1
OE1-CD-NE2	122.60	118.10	1
OE1-CD-NE2	122.60	118.12	2
CB-CG-CD2	131.20	125.43	1
NE-CZ-NH2	119.20	123.17	1
OE1-CD-NE2	122.60	118.22	1
OE1-CD-OE1-CD-NE2	122.60	118.34	1
OE1-CD-NE2	122.60	118.34	1
OE1-CD-NE2	122.60	118.41	1
CA-CB-CG	112.60	116.73	1
OE1-CD-NE2	122.60	118.48	1
CB-CG-CD2	131.20	125.85	1
CB-CG-OE1-CD-NE2	122.60	118.49	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
OE1-CD-NE2	122.60	118.50	2
CB-CG-CD2	131.20	125.87	1
OE1-CD-NE2	122.60	118.53	1
CB-CG-CD2	131.20	125.91	1
OD1-CG-ND2	122.60	118.58	1
CB-CG-CD2	131.20	125.98	1
HZ1-NZ-HZ2	96.12	109.00	1
HH21-NH2-HH22	106.52	120.00	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	1.87	41

All 41 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:808:ALA:HB2	A:316:LEU:HD21	0.695
1	A:808:ALA:CB	A:321:LYS:HE2	0.688
1	A:978:VAL:CG2	A:741:PHE:CE1	0.656
1	A:234:ILE:HD11	B:74:ASP:HB3	0.641
1	A:317:SER:HB3	A:741:PHE:CE2	0.610
1	A:720:LEU:HD11	A:383:ILE:HG23	0.602
1	B:31:MET:HE1	B:78:VAL:HG22	0.557
1	A:726:ILE:HG21	A:495:MET:HE1	0.556
1	A:371:MET:CE	B:78:VAL:HG22	0.552



Model ID	Atom-1	Atom-2	Clash overlap (Å)
1	A:978:VAL:HG22	A:316:LEU:CD2	0.531
1	B:29:MET:CE	A:644:LYS:HA	0.527
1	A:441:LEU:HD21	A:723:LEU:HD22	0.514
1	B:29:MET:HE1	A:596:LEU:CD1	0.513
1	A:234:ILE:HD11	A:615:PHE:CD2	0.512
1	A:495:MET:HE3	A:87:VAL:HG22	0.489
1	A:506:ARG:HH21	A:723:LEU:CD2	0.488
1	A:559:ILE:HD11	A:235:PRO:HD2	0.482
1	A:503:THR:HG21	A:741:PHE:CD2	0.481
1	A:978:VAL:HG23	A:768:ARG:HH11	0.475
1	A:84:ARG:O	A:565:LEU:HD11	0.467
1	A:506:ARG:HE	B:23:GLU:OE1	0.459
1	A:234:ILE:HG22	A:321:LYS:CE	0.451
1	A:726:ILE:HG21	A:762:PRO:HG3	0.442
1	A:663:ILE:HB	A:596:LEU:HD11	0.437
1	A:539:VAL:HG21	A:591:PRO:CD	0.427
1	B:19:LYS:HE3	B:81:ASN:C	0.419
1	A:317:SER:HB3	A:614:PRO:HG2	0.418
1	A:705:TRP:CD2	A:803:ARG:HH21	0.414
1	A:895:PRO:HA	A:591:PRO:HD3	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	Analyzed	Favored	Allowed	Outliers
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Model ID	Analyzed	Favored	Allowed	Outliers
1	1372	1330	40	2

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	1057	66	63

Detailed list of outliers are tabulated below.

Model ID	Chain	Residue ID	Residue type
1	A	2	LEU
1	A	76	ASP
1	A	107	PHE
1	A	125	LEU
1	A	135	VAL
1	A	159	LEU
1	A	187	GLU
1	A	195	LEU
1	A	204	THR
1	A	327	PHE
1	A	345	VAL
1	A	357	LEU
1	A	363	LEU
1	A	373	GLU
1	A	431	VAL
1	A	438	LEU

<b>Model ID</b>	<b>Chain</b>	<b>Residue ID</b>	<b>Residue type</b>
1	A	444	THR
1	A	449	ASP
1	A	453	ASP
1	A	474	LEU
1	A	488	VAL
1	A	497	LEU
1	A	504	LEU
1	A	519	THR
1	A	524	LEU
1	A	531	VAL
1	A	551	GLU
1	A	580	GLU
1	A	583	LYS
1	A	634	THR
1	A	641	ASP
1	A	646	LEU
1	A	692	ILE
1	A	716	LEU
1	A	761	LEU
1	A	765	SER
1	A	780	THR
1	A	809	GLN
1	A	816	THR

<b>Model ID</b>	<b>Chain</b>	<b>Residue ID</b>	<b>Residue type</b>
1	A	869	ASP
1	A	912	ASP
1	A	932	THR
1	A	938	THR
1	A	974	ILE
1	A	977	THR
1	A	999	THR
1	A	1003	THR
1	A	1006	TYR
1	A	1041	THR
1	A	1042	THR
1	A	1171	VAL
1	A	1177	MET
1	A	1192	THR
1	B	10	THR
1	B	31	MET
1	B	35	ILE
1	B	43	GLU
1	B	45	GLU
1	B	46	THR
1	B	69	ILE
1	B	120	THR
1	B	133	ILE

Model ID	Chain	Residue ID	Residue type
1	B	174	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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