Integrative Structure Validation Report

October 09, 2025 - 04:47 PM PDT

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

IHMValidation Version 3.0
Python-IHM Version 2.5
MolProbity Version 4.5.2
pyHMMER Version 0.11.1

PDB ID	9A6U | pdb_00009a6u
PDB-Dev ID	PDBDEV_00000323
Structure Title	Integrative model of RPOC-FLIF by crosslinking MS and deep learning
Structure Authors	Stahl, K.; Brock, O.; Rappsilber, J.
Deposited on	2024-01-23

This is a PDB-IHM Structure Validation Report.

We welcome your comments at helpdesk@pdb-ihm.org

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

List of references used to build this report is available here.

1. Overview

1.1. Summary

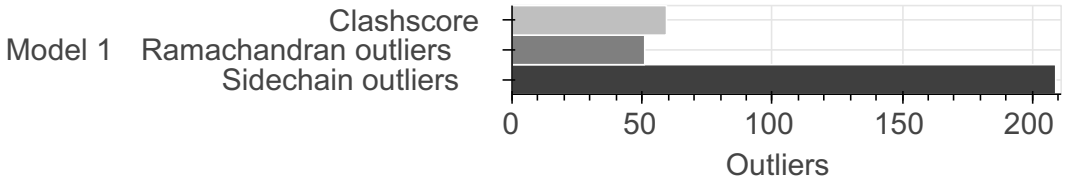
This entry consists of 1 model(s). A total of 1 dataset(s) were used to build this entry.

Name	Type	Count
Crosslinking-MS data	Experimental data	1

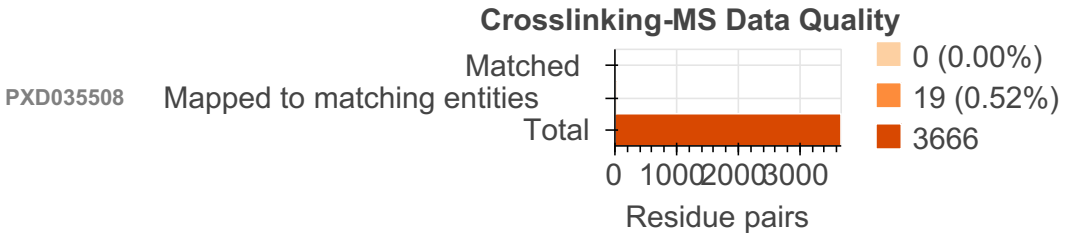
1.2. Overall quality

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

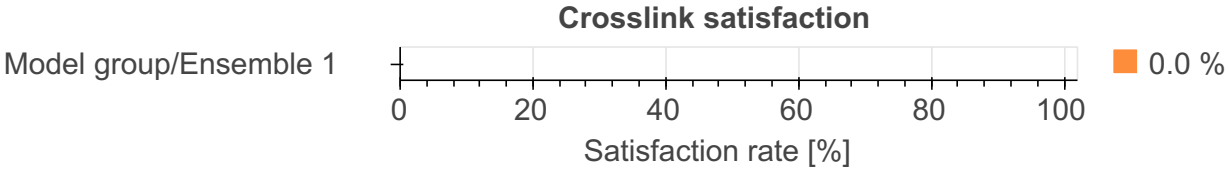
Model Quality: MolProbity Analysis



Data Quality



Fit to Data Used for Modeling



2. Model Details

2.1. Ensemble information

This entry consists of 0 distinct ensemble(s).

2.2. Representation

This entry has 1 representation(s).

ID	Model(s)	Entity ID	Molecule name	Chain(s) [auth]	Total residues	Rigid segments	Flexible segments	Model coverage/ Starting model coverage (%)	Scale
1	1	1	RPOC_BACSU	A	1199	-	1-1199	100.00 / 0.00	Atomic
		2	FLIF_BACSU	B	536	-	1-536	100.00 / 0.00	Atomic

2.3. 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

2.4. 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	Not available	1	False	False

There is 1 software package reported in this entry.

ID	Software name	Software version	Software classification	Software location
1	AlphaLink2	1.00	model building	https://github.com/Rappsilber-Laboratory/AlphaLink2

3. Data quality

3.2. Crosslinking-MS

At the moment, data validation is only available for crosslinking-MS data deposited as a fully compliant dataset in the PRIDE Crosslinking database. Correspondence between crosslinking-MS and entry entities is established using pyHMMER. Only residue pairs that passed the reported threshold are used for the analysis. The values in the report have to be interpreted in the context of the experiment (i.e. only a minor fraction of in-situ or in-vivo dataset can be used for modeling).

PXD035508

Number of entities in the crosslinking-MS dataset:	810
Number of entities in the entry:	2

Matching entities:

Entity ID	Molecule name	Crosslinking-MS Entity ID	E-value	Exact match
1	RPOC_BACSU	dbseq_P37871_target	0.00	True
2	FLIF_BACSU	dbseq_P23447_target	0.00	True

Residue pairs stats:

Source	Total	In matched entities	Total matched
9A6U	1	1 (100.00%)	0 (0.00%)
PXD035508	3666	19 (0.52%)	0 (0.00%)

4. 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.

4.1b. MolProbity Analysis

Excluded volume satisfaction for the models in the entry are listed below. The Analysed column shows the number of particle-partice or particle-atom pairs for which excluded volume was analysed.

Standard geometry: bond outliers

There are 2355 bond length outliers in this entry (17.07% of 13794 assessed bonds). A summary is provided below. The output is limited to 100 rows.

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	483	GLU	C-N	84.23	2.51	1.33	1	1
B	476	ALA	C-N	76.99	2.41	1.33	1	1
B	332	ASP	C-N	72.46	2.34	1.33	1	1
B	6	MET	C-N	63.14	2.21	1.33	1	1
B	83	THR	C-N	62.92	2.21	1.33	1	1
B	309	GLN	C-N	57.23	2.13	1.33	1	1
B	494	ASN	C-N	56.82	2.12	1.33	1	1
B	340	ASN	C-N	56.02	2.11	1.33	1	1
B	454	ILE	C-N	55.83	2.11	1.33	1	1
B	280	ASN	C-N	55.72	2.11	1.33	1	1
B	496	PRO	C-N	55.19	2.10	1.33	1	1
B	458	VAL	C-N	50.47	0.62	1.33	1	1
B	528	LEU	C-N	48.19	2.00	1.33	1	1
B	485	GLU	C-N	48.12	2.00	1.33	1	1
B	335	ASN	C-N	48.06	2.00	1.33	1	1
B	383	THR	C-N	48.02	2.00	1.33	1	1
B	529	LEU	C-N	47.35	1.99	1.33	1	1
B	515	GLU	C-N	46.76	1.98	1.33	1	1
B	354	ARG	C-N	46.12	1.97	1.33	1	1
B	526	ALA	C-N	46.10	1.97	1.33	1	1
B	16	TRP	C-N	45.82	1.97	1.33	1	1
B	355	ILE	C-N	45.58	1.97	1.33	1	1
B	449	PRO	C-N	45.38	1.96	1.33	1	1
B	491	GLU	C-N	45.23	2.06	1.34	1	1
B	14	GLU	CD-OE2	43.95	2.08	1.25	1	1
B	20	SER	C-N	43.51	1.94	1.33	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	329	TYR	C-N	42.70	1.93	1.33	1	1
B	473	LYS	C-N	41.97	1.92	1.33	1	1
B	417	SER	C-N	41.78	1.91	1.33	1	1
B	378	PRO	C-N	41.57	1.91	1.33	1	1
B	536	ASP	CG-OD2	41.32	2.03	1.25	1	1
B	326	VAL	C-N	41.17	1.91	1.33	1	1
B	452	ALA	C-N	40.63	1.90	1.33	1	1
B	478	GLU	C-N	40.11	1.89	1.33	1	1
B	372	GLN	C-N	39.66	1.88	1.33	1	1
B	203	VAL	C-N	39.53	0.71	1.34	1	1
B	356	HIS	C-N	39.51	1.88	1.33	1	1
B	521	LYS	C-N	39.42	1.97	1.34	1	1
B	15	PHE	C-N	38.88	0.78	1.33	1	1
B	489	PRO	C-N	38.25	1.86	1.33	1	1
B	29	SER	C-N	37.61	1.86	1.33	1	1
B	342	GLU	C-N	37.60	1.86	1.33	1	1
B	32	ALA	C-N	37.38	1.85	1.33	1	1
B	176	SER	C-N	37.12	1.85	1.33	1	1
B	493	ILE	C-N	36.92	1.85	1.33	1	1
B	341	TYR	C-N	36.59	1.84	1.33	1	1
B	331	ALA	C-N	36.39	1.84	1.33	1	1
B	470	LEU	C-N	36.34	1.84	1.33	1	1
B	418	ASP	CG-OD2	35.71	1.93	1.25	1	1
B	518	ALA	C-N	35.38	1.82	1.33	1	1
B	370	GLY	C-N	35.27	1.82	1.33	1	1
B	443	GLU	C-N	35.21	1.82	1.33	1	1
B	271	THR	C-N	34.96	1.82	1.33	1	1
B	382	ASN	CG-ND2	34.67	2.06	1.33	1	1
B	1	MET	C-N	34.50	1.81	1.33	1	1
B	525	PHE	C-N	33.68	0.86	1.33	1	1
B	73	LYS	C-N	33.35	1.80	1.33	1	1
B	22	LEU	C-N	33.31	1.80	1.33	1	1
B	424	LYS	C-N	33.17	1.79	1.33	1	1
B	507	GLU	C-N	33.03	1.79	1.33	1	1
B	414	GLN	C-N	33.02	0.87	1.33	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	421	ILE	C-N	32.73	1.79	1.33	1	1
B	307	THR	C-N	32.36	1.78	1.33	1	1
B	364	TYR	C-N	32.26	1.78	1.33	1	1
B	291	LYS	C-N	32.25	1.78	1.33	1	1
B	382	ASN	C-N	32.08	1.78	1.33	1	1
B	135	ALA	C-N	32.08	1.78	1.33	1	1
B	174	SER	C-N	32.04	1.78	1.33	1	1
B	408	LYS	C-N	31.64	1.77	1.33	1	1
B	252	HIS	CG-CD2	31.56	1.01	1.35	1	1
B	17	LYS	C-N	31.30	1.77	1.33	1	1
B	343	LYS	C-N	30.88	1.76	1.33	1	1
B	403	ARG	NE-CZ	30.86	1.67	1.33	1	1
B	224	SER	C-N	30.55	1.76	1.33	1	1
B	335	ASN	CG-OD1	30.45	1.81	1.23	1	1
B	197	HIS	C-N	30.15	0.91	1.33	1	1
B	502	GLU	C-N	30.09	1.75	1.33	1	1
B	279	GLU	C-N	29.99	1.75	1.33	1	1
B	287	GLU	C-N	29.98	1.82	1.34	1	1
B	407	ASP	C-N	29.92	1.75	1.33	1	1
B	341	TYR	CG-CD2	29.76	2.01	1.39	1	1
B	353	ASN	C-N	29.70	1.74	1.33	1	1
B	379	ASP	CG-OD2	29.37	1.81	1.25	1	1
B	479	ASP	C-N	29.29	1.74	1.33	1	1
B	446	SER	C-N	29.18	1.74	1.33	1	1
B	312	GLY	C-N	28.69	1.73	1.33	1	1
B	392	ASP	CG-OD2	28.39	1.79	1.25	1	1
B	14	GLU	CD-OE1	28.37	0.71	1.25	1	1
B	338	SER	C-N	28.34	1.73	1.33	1	1
B	301	ALA	C-N	28.31	0.93	1.33	1	1
B	106	LYS	C-N	28.17	0.93	1.33	1	1
B	520	ASP	C-N	28.10	0.94	1.33	1	1
B	501	GLU	C-N	28.05	1.72	1.33	1	1
B	481	PHE	C-N	27.97	1.72	1.33	1	1
B	530	ARG	C-N	27.76	1.72	1.33	1	1
B	24	LYS	C-N	27.56	1.71	1.33	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	509	VAL	C-N	27.54	1.71	1.33	1	1
B	72	LYS	C-N	27.43	1.71	1.33	1	1
B	141	SER	C-N	27.31	1.71	1.33	1	1
B	357	LYS	C-N	27.22	1.71	1.33	1	1

Standard geometry: angle outliers

There are 2205 bond angle outliers in this entry (11.84% of 18621 assessed bonds). A summary is provided below. The output is limited to 100 rows.

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	293	ASN	OD1-CG-ND2	43.99	166.59	122.60	1	1
B	382	ASN	OD1-CG-ND2	43.11	79.49	122.60	1	1
B	340	ASN	OD1-CG-ND2	41.96	164.56	122.60	1	1
B	476	ALA	O-C-N	38.68	61.11	123.00	1	1
B	31	LEU	O-C-N	38.45	61.48	123.00	1	1
B	335	ASN	OD1-CG-ND2	37.42	85.18	122.60	1	1
B	484	TYR	O-C-N	32.76	70.58	123.00	1	1
B	15	PHE	O-C-N	32.58	70.87	123.00	1	1
B	298	ALA	O-C-N	31.72	72.24	123.00	1	1
A	1199	GLU	CA-C-OXT	31.43	26.70	121.00	1	1
B	8	MET	O-C-N	30.24	74.62	123.00	1	1
B	519	LYS	O-C-N	30.14	74.77	123.00	1	1
B	481	PHE	O-C-N	30.12	74.81	123.00	1	1
B	482	GLU	O-C-N	30.10	74.84	123.00	1	1
B	329	TYR	O-C-N	28.73	77.04	123.00	1	1
B	311	ASP	O-C-N	28.24	77.82	123.00	1	1
B	294	MET	O-C-N	28.20	77.88	123.00	1	1
B	326	VAL	O-C-N	28.19	77.90	123.00	1	1
B	477	GLN	O-C-N	27.91	78.35	123.00	1	1
B	325	ASP	O-C-N	27.68	78.71	123.00	1	1
B	303	LYS	O-C-N	27.47	79.06	123.00	1	1
B	31	LEU	CA-C-N	27.24	170.67	116.20	1	1
B	465	VAL	O-C-N	26.83	80.07	123.00	1	1
B	478	GLU	C-N-CA	26.60	169.58	121.70	1	1
B	506	ALA	O-C-N	25.98	81.43	123.00	1	1
B	480	GLU	O-C-N	25.90	81.55	123.00	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	494	ASN	O-C-N	25.66	81.94	123.00	1	1
B	91	GLN	O-C-N	25.24	82.62	123.00	1	1
B	451	TRP	C-N-CA	25.04	166.78	121.70	1	1
B	489	PRO	O-C-N	24.62	83.61	123.00	1	1
B	473	LYS	O-C-N	24.57	83.69	123.00	1	1
B	526	ALA	O-C-N	24.42	83.93	123.00	1	1
B	536	ASP	CB-CG-OD1	24.18	174.00	118.40	1	1
B	534	ALA	C-N-CA	24.10	165.07	121.70	1	1
B	484	TYR	CA-C-N	23.89	163.98	116.20	1	1
B	387	SER	O-C-N	23.75	85.00	123.00	1	1
B	344	ASN	OD1-CG-ND2	23.61	146.21	122.60	1	1
B	423	ASN	OD1-CG-ND2	23.03	99.57	122.60	1	1
B	450	LEU	O-C-N	22.94	86.30	123.00	1	1
B	475	ARG	NE-CZ-NH2	22.92	98.57	119.20	1	1
B	301	ALA	O-C-N	22.87	86.41	123.00	1	1
B	531	SER	O-C-N	22.75	159.39	123.00	1	1
B	498	ILE	O-C-N	22.53	86.96	123.00	1	1
B	533	LEU	O-C-N	22.43	87.11	123.00	1	1
B	525	PHE	O-C-N	22.41	87.15	123.00	1	1
B	301	ALA	CA-C-N	22.38	160.96	116.20	1	1
B	486	TYR	O-C-N	22.35	87.24	123.00	1	1
B	494	ASN	OD1-CG-ND2	22.32	100.28	122.60	1	1
B	447	GLY	O-C-N	22.23	87.43	123.00	1	1
B	413	ASN	O-C-N	22.09	87.65	123.00	1	1
B	79	SER	O-C-N	22.00	87.81	123.00	1	1
B	15	PHE	CA-C-N	21.86	159.91	116.20	1	1
B	14	GLU	CG-CD-OE1	21.84	168.64	118.40	1	1
B	37	ILE	O-C-N	21.84	88.06	123.00	1	1
B	18	ASN	O-C-N	21.83	88.07	123.00	1	1
B	528	LEU	O-C-N	21.56	88.51	123.00	1	1
B	79	SER	C-N-CA	21.55	160.49	121.70	1	1
B	31	LEU	C-N-CA	21.49	160.38	121.70	1	1
B	502	GLU	O-C-N	21.45	88.67	123.00	1	1
B	86	SER	O-C-N	21.44	88.70	123.00	1	1
B	363	PRO	O-C-N	21.40	88.75	123.00	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	117	GLN	OE1-CD-NE2	21.18	143.78	122.60	1	1
B	32	ALA	O-C-N	21.08	156.72	123.00	1	1
B	475	ARG	CD-NE-CZ	20.99	95.01	124.40	1	1
B	87	VAL	O-C-N	20.83	89.67	123.00	1	1
B	472	ARG	O-C-N	20.74	89.81	123.00	1	1
B	1	MET	O-C-N	20.69	89.89	123.00	1	1
B	315	ASN	O-C-N	20.50	90.20	123.00	1	1
B	477	GLN	CG-CD-NE2	20.42	85.77	116.40	1	1
B	379	ASP	CA-CB-CG	20.27	92.33	112.60	1	1
B	72	LYS	O-C-N	20.16	90.74	123.00	1	1
B	382	ASN	CB-CG-OD1	20.11	161.02	120.80	1	1
B	418	ASP	CA-CB-CG	20.09	92.51	112.60	1	1
B	18	ASN	OD1-CG-ND2	20.03	142.63	122.60	1	1
B	476	ALA	C-N-CA	19.78	157.30	121.70	1	1
B	479	ASP	O-C-N	19.71	91.47	123.00	1	1
B	510	ARG	O-C-N	19.70	91.48	123.00	1	1
B	536	ASP	O-C-OXT	19.69	177.06	118.00	1	1
B	110	ILE	O-C-N	19.67	91.53	123.00	1	1
B	488	VAL	O-C-N	19.61	91.62	123.00	1	1
B	29	SER	CA-C-N	19.58	155.36	116.20	1	1
B	88	PRO	O-C-N	19.53	91.75	123.00	1	1
B	22	LEU	CA-C-N	19.39	154.99	116.20	1	1
B	491	GLU	O-C-N	19.39	91.98	123.00	1	1
B	294	MET	CA-C-N	19.15	154.50	116.20	1	1
B	105	PRO	O-C-N	19.12	92.40	123.00	1	1
B	24	LYS	O-C-N	19.12	92.41	123.00	1	1
B	418	ASP	CB-CG-OD1	19.06	162.23	118.40	1	1
B	280	ASN	O-C-N	19.05	92.51	123.00	1	1
B	422	ASN	CA-CB-CG	19.03	93.57	112.60	1	1
B	4	THR	O-C-N	19.02	92.56	123.00	1	1
B	44	PHE	C-N-CA	18.98	87.54	121.70	1	1
B	88	PRO	C-N-CA	18.96	155.82	121.70	1	1
B	531	SER	CA-C-N	18.95	78.29	116.20	1	1
B	338	SER	O-C-N	18.86	92.82	123.00	1	1
B	303	LYS	CA-C-N	18.85	153.91	116.20	1	1

Chain	Res	Type	Atoms	|Z|	Observed (Å)	Ideal (Å)	Model ID (Worst)	Models (Total)
B	456	GLY	O-C-N	18.80	92.92	123.00	1	1
B	503	ASN	O-C-N	18.73	93.02	123.00	1	1
A	1198	VAL	O-C-N	18.60	93.24	123.00	1	1
B	393	ASP	O-C-N	18.57	93.30	123.00	1	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 atomic models in this entry.

Model ID	Clash score	Number of clashes
1	59.37	1616

There are 1616 clashes. The table below contains the detailed list of all clashes based on a MolProbity analysis. Bad clashes are >= 0.4 Angstrom. The output is limited to 100 rows.

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
B:220:TYR:CD2	B:220:TYR:CG	1.69	1	1
B:525:PHE:CD2	B:525:PHE:CG	1.67	1	1
B:251:LYS:CD	B:251:LYS:CG	1.64	1	1
B:469:MET:CB	B:469:MET:CG	1.63	1	1
B:391:GLN:CB	B:391:GLN:CG	1.63	1	1
B:329:TYR:CD1	B:329:TYR:CG	1.62	1	1
B:455:VAL:CB	B:455:VAL:CG1	1.62	1	1
B:198:LEU:CD2	B:198:LEU:CG	1.62	1	1
B:216:GLN:CB	B:216:GLN:CG	1.62	1	1
B:529:LEU:CD2	B:529:LEU:CG	1.61	1	1
B:11:LYS:CB	B:11:LYS:CG	1.61	1	1
B:336:THR:CB	B:336:THR:CG2	1.61	1	1
B:488:VAL:CB	B:488:VAL:CG2	1.61	1	1
B:241:ILE:CB	B:241:ILE:CG1	1.61	1	1
B:83:THR:CB	B:83:THR:CG2	1.60	1	1
B:11:LYS:CD	B:11:LYS:CE	1.60	1	1
B:471:ILE:CG2	B:472:ARG:HG3	1.60	1	1
B:61:GLU:CB	B:61:GLU:CG	1.60	1	1
B:516:LYS:CD	B:516:LYS:CE	1.59	1	1
B:179:LEU:CD2	B:179:LEU:CG	1.59	1	1
B:454:ILE:CB	B:454:ILE:CG2	1.59	1	1
B:463:ILE:CD1	B:463:ILE:CG1	1.59	1	1

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
B:450:LEU:CD2	B:450:LEU:CG	1.59	1	1
B:390:ARG:CD	B:390:ARG:CG	1.58	1	1
B:394:ILE:CD1	B:394:ILE:CG1	1.58	1	1
B:201:LYS:CD	B:201:LYS:CG	1.58	1	1
B:404:THR:CB	B:404:THR:CG2	1.58	1	1
B:28:VAL:CB	B:28:VAL:CG2	1.57	1	1
B:521:LYS:CD	B:521:LYS:CG	1.57	1	1
B:279:GLU:CD	B:279:GLU:CG	1.57	1	1
B:493:ILE:CD1	B:493:ILE:CG1	1.57	1	1
B:274:ILE:CD1	B:274:ILE:CG1	1.57	1	1
B:10:ASN:CB	B:10:ASN:CG	1.57	1	1
A:726:ILE:CG2	A:741:PHE:CE1	1.56	1	1
A:328:ARG:NH2	A:1139:PHE:CE1	1.56	1	1
B:181:ILE:CD1	B:181:ILE:CG1	1.56	1	1
B:2:ASN:CB	B:2:ASN:CG	1.56	1	1
B:34:ILE:CB	B:34:ILE:CG2	1.56	1	1
B:460:ILE:CD1	B:460:ILE:CG1	1.56	1	1
B:12:THR:CB	B:12:THR:CG2	1.55	1	1
B:21:LYS:CD	B:21:LYS:CG	1.55	1	1
B:76:ASN:CB	B:76:ASN:CG	1.55	1	1
B:203:VAL:C	B:204:PRO:CD	1.55	1	1
B:49:LYS:CD	B:49:LYS:CG	1.55	1	1
B:488:VAL:CB	B:488:VAL:CG1	1.55	1	1
B:309:GLN:CD	B:309:GLN:CG	1.55	1	1
A:596:LEU:CD2	A:596:LEU:CG	1.55	1	1
B:198:LEU:CD1	B:198:LEU:CG	1.55	1	1
A:43:LYS:CE	A:43:LYS:NZ	1.55	1	1
A:285:LYS:CE	A:285:LYS:NZ	1.54	1	1
A:649:LYS:CE	A:649:LYS:NZ	1.54	1	1
B:459:LEU:CB	B:459:LEU:CG	1.54	1	1
B:468:ILE:CD1	B:468:ILE:CG1	1.54	1	1
B:516:LYS:CD	B:516:LYS:CG	1.54	1	1
B:35:ILE:CD1	B:35:ILE:CG1	1.53	1	1
A:558:LEU:CD1	A:558:LEU:CG	1.53	1	1
B:61:GLU:CD	B:61:GLU:CG	1.53	1	1

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
A:1161:LEU:HD23	A:1171:VAL:CG1	1.53	1	1
B:93:ASP:CB	B:93:ASP:CG	1.53	1	1
B:519:LYS:CD	B:519:LYS:CE	1.52	1	1
B:21:LYS:N	B:484:TYR:CE1	1.52	1	1
B:303:LYS:CE	B:303:LYS:NZ	1.52	1	1
B:251:LYS:CE	B:251:LYS:NZ	1.52	1	1
A:414:ARG:HH12	A:447:ASN:C	1.52	1	1
A:589:LYS:CE	A:589:LYS:NZ	1.52	1	1
B:77:GLU:CD	B:77:GLU:CG	1.52	1	1
B:464:ILE:CG2	B:465:VAL:HG23	1.52	1	1
B:52:PRO:CB	B:52:PRO:CG	1.52	1	1
B:533:LEU:CD2	B:533:LEU:CG	1.52	1	1
B:25:ILE:CD1	B:25:ILE:CG1	1.51	1	1
B:89:GLU:CB	B:89:GLU:CG	1.51	1	1
B:293:ASN:CB	B:293:ASN:CG	1.51	1	1
B:343:LYS:CD	B:343:LYS:CG	1.51	1	1
B:471:ILE:HG22	B:472:ARG:CB	1.51	1	1
B:458:VAL:HG12	B:459:LEU:CB	1.51	1	1
B:306:GLU:CD	B:306:GLU:CG	1.50	1	1
B:533:LEU:CB	B:533:LEU:CG	1.50	1	1
B:31:LEU:CB	B:31:LEU:CG	1.50	1	1
B:308:TYR:C	B:309:GLN:N	1.50	1	1
B:291:LYS:CE	B:291:LYS:NZ	1.50	1	1
B:117:GLN:CD	B:117:GLN:CG	1.50	1	1
B:477:GLN:CB	B:477:GLN:CG	1.50	1	1
B:528:LEU:CD1	B:528:LEU:CG	1.50	1	1
B:20:SER:N	B:484:TYR:CZ	1.50	1	1
B:502:GLU:CD	B:502:GLU:CG	1.50	1	1
B:512:LYS:CB	B:512:LYS:CG	1.49	1	1
A:726:ILE:HG21	A:741:PHE:CE1	1.49	1	1
B:468:ILE:CB	B:468:ILE:CG2	1.49	1	1
B:127:GLU:C	B:128:PHE:N	1.49	1	1
B:465:VAL:CB	B:465:VAL:CG1	1.49	1	1
B:347:LYS:CE	B:347:LYS:NZ	1.49	1	1
B:391:GLN:CD	B:391:GLN:CG	1.49	1	1

Atom 1	Atom 2	Clash(Å)	Model ID (Worst)	Models (Total)
B:447:GLY:C	B:448:ILE:N	1.49	1	1
B:180:GLN:C	B:181:ILE:N	1.49	1	1
B:471:ILE:CG2	B:472:ARG:CG	1.48	1	1
B:458:VAL:CG1	B:459:LEU:HB2	1.48	1	1
B:464:ILE:HG23	B:465:VAL:CG2	1.48	1	1
B:238:GLN:C	B:239:GLN:N	1.48	1	1
B:374:MET:CE	B:374:MET:SD	1.48	1	1
B:391:GLN:CD	B:391:GLN:NE2	1.48	1	1

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	1699	1504	144	51

There are 51 unique backbone outliers. Detailed list of outliers are tabulated below.

Chain	Res	Type	Models (Total)
A	2	LEU	1
A	3	ASP	1
A	67	ARG	1
A	545	LYS	1
A	736	GLY	1
A	948	ASP	1
A	1186	VAL	1
A	1193	ASP	1
A	1198	VAL	1
B	22	LEU	1
B	33	ALA	1
B	45	ALA	1
B	56	ASP	1
B	73	LYS	1
B	80	ASN	1
B	103	GLY	1
B	107	THR	1
B	108	GLY	1
B	110	ILE	1

Chain	Res	Type	Models (Total)
B	225	ASP	1
B	289	VAL	1
B	291	LYS	1
B	294	MET	1
B	299	VAL	1
B	325	ASP	1
B	326	VAL	1
B	363	PRO	1
B	387	SER	1
B	388	THR	1
B	415	ASN	1
B	418	ASP	1
B	434	GLY	1
B	438	LEU	1
B	449	PRO	1
B	450	LEU	1
B	460	ILE	1
B	462	ALA	1
B	463	ILE	1
B	464	ILE	1
B	465	VAL	1
B	467	ILE	1
B	468	ILE	1
B	470	LEU	1
B	471	ILE	1
B	479	ASP	1
B	488	VAL	1
B	489	PRO	1
B	493	ILE	1
B	521	LYS	1
B	522	PRO	1
B	525	PHE	1

Torsion angles : Protein sidechains

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

Model ID	Analysed	Favored	Allowed	Outliers
1	1495	1078	208	209

There are 209 unique sidechain outliers. Detailed list of outliers are tabulated below. The output is limited to 100 rows.

Chain	Res	Type	Models (Total)
A	1	MET	1
A	2	LEU	1
A	55	THR	1
A	76	ASP	1
A	78	CYS	1
A	83	THR	1
A	87	VAL	1
A	88	ARG	1
A	102	SER	1
A	107	PHE	1
A	125	LEU	1
A	126	GLU	1
A	133	SER	1
A	135	VAL	1
A	137	THR	1
A	149	LEU	1
A	159	LEU	1
A	169	SER	1
A	170	MET	1
A	187	GLU	1
A	190	MET	1
A	193	GLU	1
A	195	LEU	1
A	197	THR	1
A	198	SER	1
A	204	THR	1
A	210	LEU	1
A	214	GLU	1
A	231	LEU	1
A	251	THR	1
A	252	SER	1

Chain	Res	Type	Models (Total)
A	287	MET	1
A	319	MET	1
A	327	PHE	1
A	345	VAL	1
A	352	MET	1
A	357	LEU	1
A	363	LEU	1
A	364	GLU	1
A	373	GLU	1
A	381	HIS	1
A	382	ASN	1
A	385	SER	1
A	408	HIS	1
A	412	LEU	1
A	427	GLU	1
A	429	THR	1
A	431	VAL	1
A	438	LEU	1
A	444	THR	1
A	449	ASP	1
A	474	LEU	1
A	488	VAL	1
A	489	VAL	1
A	490	THR	1
A	497	LEU	1
A	504	LEU	1
A	519	THR	1
A	523	LEU	1
A	524	LEU	1
A	531	VAL	1
A	537	VAL	1
A	547	VAL	1
A	548	THR	1
A	551	GLU	1
A	580	GLU	1

Chain	Res	Type	Models (Total)
A	582	THR	1
A	584	SER	1
A	634	THR	1
A	639	MET	1
A	646	LEU	1
A	651	SER	1
A	657	THR	1
A	666	LEU	1
A	692	ILE	1
A	706	SER	1
A	716	LEU	1
A	737	ASN	1
A	761	LEU	1
A	765	SER	1
A	774	LEU	1
A	780	THR	1
A	781	HIS	1
A	787	LEU	1
A	810	ASP	1
A	813	ILE	1
A	815	GLU	1
A	816	THR	1
A	821	ASP	1
A	833	THR	1
A	834	GLU	1
A	869	ASP	1
A	874	LEU	1
A	883	GLU	1
A	899	CYS	1
A	932	THR	1
A	936	MET	1
A	938	THR	1
A	959	LEU	1
A	971	ILE	1

5. Fit to Data Used for Modeling Assessment

5.2. Crosslinking-MS

5.2.1. Restraint types

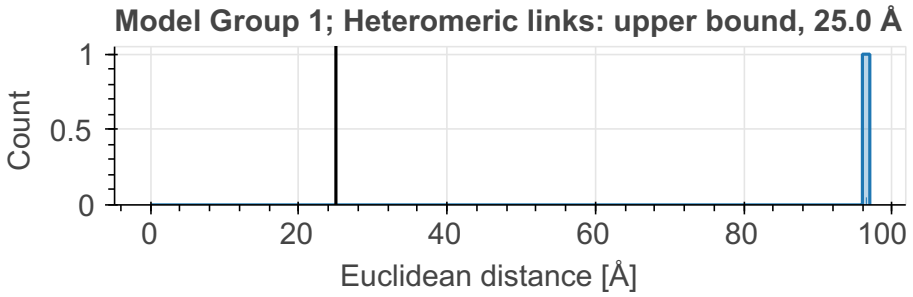
This table summarizes information about crosslinker(s) used for data generation, and how crosslinking information was translated into actual modeling restraints. Restraints assigned "by-residue" are interpreted as between CA atoms. Restraints between coarse-grained beads are indicated as "coarse-grained". Restraint group represents a set of crosslinking restraints applied collectively in the modeling.

There are 1 crosslinking restraints combined in 1 restraint groups.

Linker	Residue 1	Atom 1	Residue 2	Atom 2	Restraint type	Distance, Å	Count
SDA	LYS	CA	LYS	CA	upper bound	25.00	1

Distograms of individual restraints

Distograms (i.e., histogram plots of distances) provide an overview of distributions of distances between residues for which chemical crosslinks were identified. The shift of the distogram relative to the threshold value may indicate a poor model. Restraints with identical thresholds are grouped into one plot. Only the best distance per restraint per model group/ensemble is plotted. Inter- and intramolecular (including self-links) restraints are also grouped into one plot. Distance for a restraint between coarse-grained beads is calculated as a minimal distance between shells; if beads intersect, the distance will be reported as 0.0. A bead with the highest available resolution for a given residue is used for the assessment.



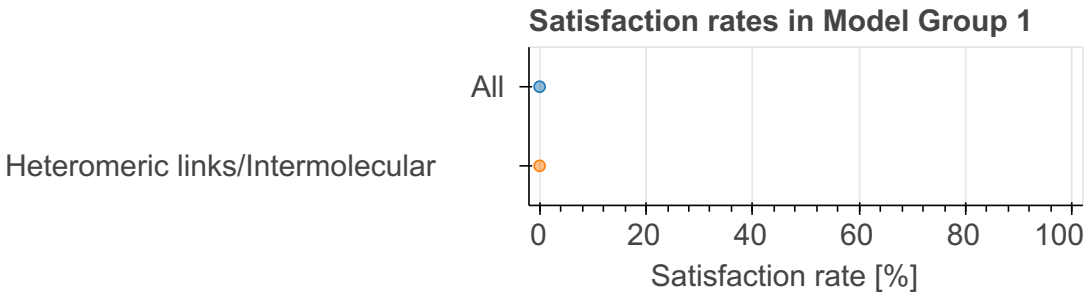
5.2.2. Satisfaction of restraints

Satisfaction of restraints is calculated on a restraint group (a set of crosslinking restraints applied collectively in the modeling) level. Satisfaction of a restraint group depends on satisfaction of individual restraints in the group and the conditionality (all/any). A restraint group is considered satisfied, if the condition was met in at least one model of the model group/ensemble. The number of measured restraints can be smaller than the total number of restraint groups if crosslinks involve non-modeled residues. Only deposited models are used for validation right now.

State group	State	Model group	# of Deposited models/Total	Restraint group type	Satisfied (%)	Violated (%)	Count (Total=1)
1	1	1	1/1	All	0.00	100.00	1
				Heteromeric links/ Intermolecular	0.00	100.00	1

Per-model satisfaction rates in ensembles

Every point represents one model in a model group/ensemble. Where possible, boxplots with quartile marks are also plotted.



6. Fit to Data Used for Validation Assessment

Validation for this section is under development.

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