Integrative Structure Validation Report

October 09, 2025 - 04:37 PM PDT

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

IHMValidation Version 3.0
Python-IHM Version 2.5
EMDB validation analysis Version 0.0.1.dev127
ChimeraX Version 1.9
Chimera Version 1.19
MapQ Version 1.8.1

PDB ID	8ZZ3 | pdb_00008zz3
PDB-Dev ID	PDBDEV_00000003
Structure Title	Molecular architecture of the yeast Mediator complex
Structure Authors	Robinson, P.J.; Trnka, M.J.; Pellarin, R.; Greenberg, C.H.; Bushnell, D.A.; Davis, R.; Burlingame, A.L.; Sali, A.; Kornberg, R.D.
Deposited on	2016-08-31

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 4 model(s). A total of 16 dataset(s) were used to build this entry.

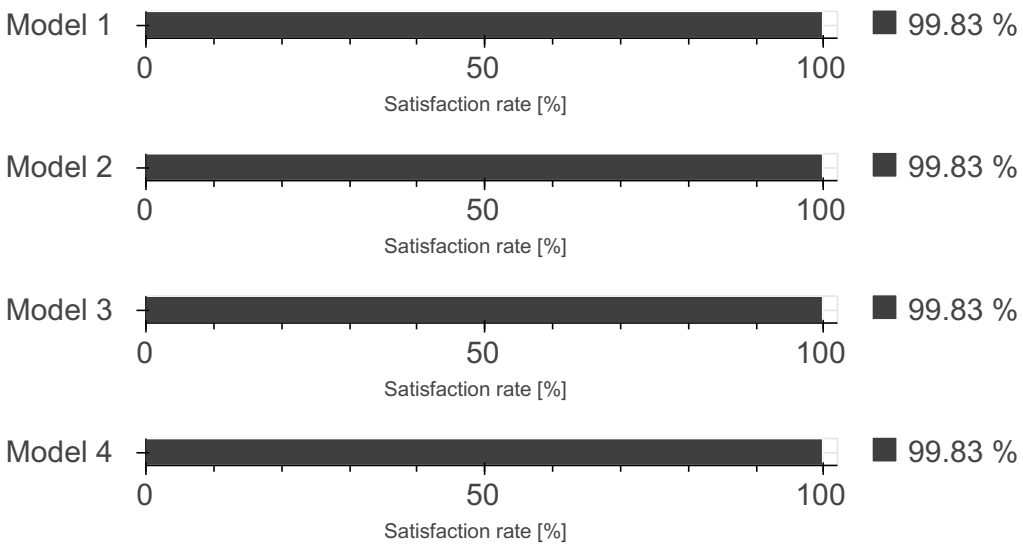
Name	Type	Count
3DEM volume	Experimental data	5

Name	Type	Count
Crosslinking-MS data	Experimental data	1
Mass Spectrometry data	Experimental data	1
Experimental model	Starting model	6
Comparative model	Starting model	3

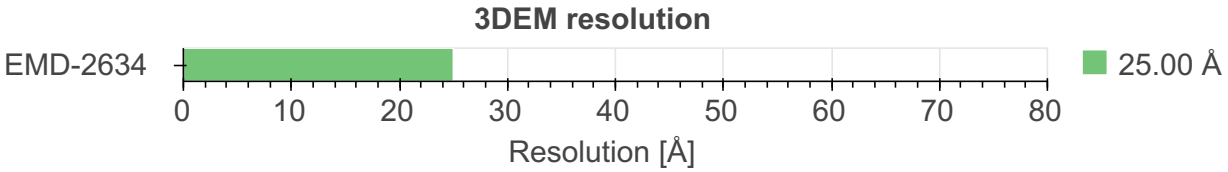
1.2. Overall quality

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.

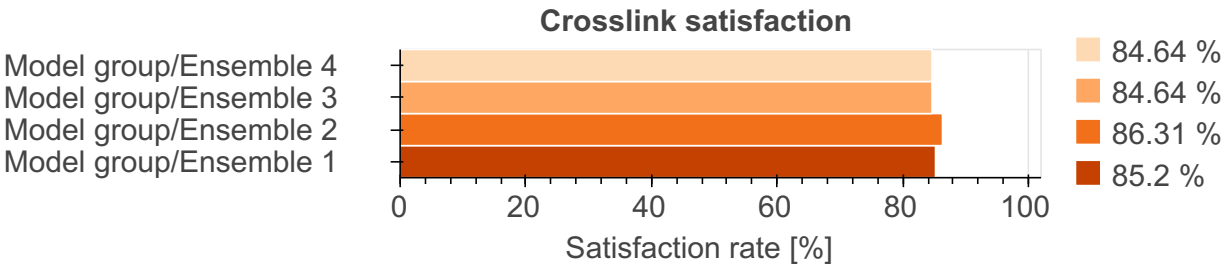
Model Quality: Excluded Volume Analysis



Data Quality



Fit to Data Used for Modeling



2. Model Details

2.1. Ensemble information

This entry consists of 4 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	1-4	1	med6	A	295	-	1-60, 61-82, 83-192, 193-295	100.00 / 57.63	Multiscale: Coarse-grained: 1 - 20 residue(s) per bead
		2	med8	B	223	-	1-22, 23-173, 174-181, 182-214, 215-223	100.00 / 82.51	Multiscale: Coarse-grained: 1 - 20 residue(s) per bead
		3	med11	C	115	-	1-3, 4-115	100.00 / 97.39	Multiscale: Coarse-grained: 1 - 3 residue(s) per bead
		4	med17	D	687	-	1-122, 123-181, 182-371, 372-377, 378-661, 662-669, 670-687	100.00 / 71.62	Multiscale: Coarse-grained: 1 - 20 residue(s) per bead
		5	med18	E	307	-	1, 2-110, 111-157, 158-301, 302-307	100.00 / 82.41	Multiscale: Coarse-grained: 1 - 20 residue(s) per bead
		6	med20	F	210	-	1, 2-210	100.00 / 99.52	Coarse-grained: 1 residue(s) per bead
		7	med22	G	121	-	1-121	100.00 / 100.00	Coarse-grained: 1 residue(s) per bead
		8	med4	H	284	37-127	1-36, 128-284	100.00 / 32.04	Multiscale: Coarse-grained: 1 - 20 residue(s) per bead
		9	med7	I	222	12-84, 112-206	1-11, 85-111, 207-222	100.00 / 75.68	Multiscale: Coarse-grained: 1 - 20 residue(s) per bead
		10	med9	J	149	65-149	1-64	100.00 / 57.05	Multiscale: Coarse-grained: 1 - 20 residue(s) per bead
		11	med31	K	127	19-110	1-18, 111-127	100.00 / 72.44	Multiscale: Coarse-grained: 1 - 18 residue(s) per bead

ID	Model(s)	Entity ID	Molecule name	Chain(s) [auth]	Total residues	Rigid segments	Flexible segments	Model coverage/ Starting model coverage (%)	Scale
		12	med21	L	140	2-128	1, 129-140	100.00 / 90.71	Multiscale: Coarse-grained: 1 - 12 residue(s) per bead
		13	med10	M	157	-	1-157	100.00 / 0.00	Multiscale: Coarse-grained: 17 - 20 residue(s) per bead
		14	med1	N	566	-	1-566	100.00 / 0.00	Multiscale: Coarse-grained: 6 - 20 residue(s) per bead
		15	med14	O	1082	-	1-1082	100.00 / 0.00	Multiscale: Coarse-grained: 11 - 40 residue(s) per bead
		16	med19	P	220	-	1-220	100.00 / 0.00	Coarse-grained: 20 residue(s) per bead
		17	med2	Q	436	-	1-436	100.00 / 0.00	Multiscale: Coarse-grained: 36 - 40 residue(s) per bead
		18	med3	R	401	-	1-401	100.00 / 0.00	Multiscale: Coarse-grained: 1 - 40 residue(s) per bead
		19	med5	S	1146	-	1-1146	100.00 / 0.00	Multiscale: Coarse-grained: 26 - 40 residue(s) per bead
		20	med15	T	1094	-	1-1094	100.00 / 0.00	Multiscale: Coarse-grained: 14 - 40 residue(s) per bead
		21	med16	U	986	8-49, 94-150, 165-174, 231-406, 437-476, 503-538	50-93, 151-164, 175-230, 407-436, 477-502, 539-986	99.29 / 36.87	Multiscale: Coarse-grained: 1 - 40 residue(s) per bead

2.3. Datasets used for modeling

There are 16 unique datasets used to build the models in this entry.

ID	Dataset type	Database name	Data access code
1	Experimental model	PDB	pdb_00004gwp
2	Comparative model	Not available	10.1093/nar/gkt704
3	Comparative model	Zenodo	10.5281/zenodo.802915
4	Experimental model	PDB	pdb_00003fbi

ID	Dataset type	Database name	Data access code
5	Experimental model	Zenodo	10.5281/zenodo.802915
6	Experimental model	PDB	pdb_00001ykh
7	Experimental model	Zenodo	10.5281/zenodo.802915
8	Experimental model	PDB	pdb_00004bzk
9	Comparative model	Zenodo	10.5281/zenodo.802915
10	Mass Spectrometry data	MASSIVE	MSV000079237
11	Crosslinking-MS data	Zenodo	10.5281/zenodo.802915
12	3DEM volume	EMDB	EMD-2634
13	3DEM volume	Zenodo	10.5281/zenodo.802915
14	3DEM volume	Zenodo	10.5281/zenodo.802915
15	3DEM volume	Zenodo	10.5281/zenodo.802915
16	3DEM volume	Zenodo	10.5281/zenodo.802915

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	Sampling	Replica exchange monte carlo	Not available	20000	False	True

There are 5 software packages reported in this entry.

ID	Software name	Software version	Software classification	Software location
1	Integrative Modeling Platform (IMP)	develop-0a5706e202	integrative model building	https://integrativemodeling.org
2	IMP PMI module	67456c0	integrative model building	https://integrativemodeling.org
3	Protein Prospector	5.13.1	mass spectrometry	http://prospector.ucsf.edu/
4	Situs	2.70	density map fitting	http://situs.biomachina.org/
5	Phyre2	2.00	protein homology modeling	http://www.sbg.bio.ic.ac.uk/~phyre2/

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).

Crosslinking-MS dataset is not available in the PRIDE Crosslinking database.

3.3. 3DEM

This section describes quality of the 3DEM datasets

EMD-2634

3.3.1. Experimental information

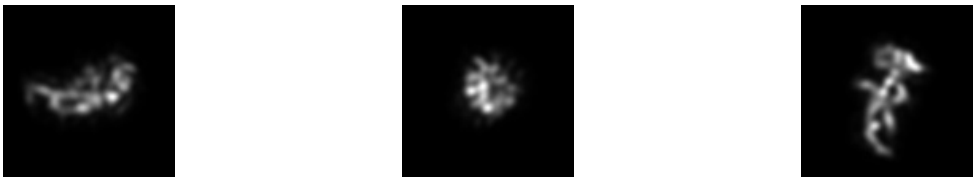
EM reconstruction method:	SINGLE PARTICLE
Resolution:	25.00 Å
Recommended level:	0.350
Estimated volume:	2252.18 nm^3
Specimen preparation:	Preparation ID 1 Vitrification
Map-only validation report:	wwPDB validation report

3.3.2. Map visualisation

This section contains visualisations of the EMDB entry EMD-2634. These allow visual inspection of the internal detail of the map and identification of artifacts. Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

3.3.2.1. Orthogonal projections

Primary map

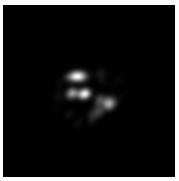


X **Y** **Z**

The images above show the map projected in three orthogonal directions.

3.3.2.2. Central slices

Primary map

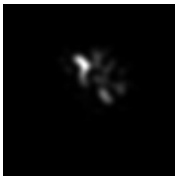
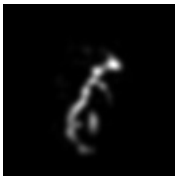




X Index: 54 **Y Index: 54** **Z Index: 54**

The images above show central slices of the map in three orthogonal directions.

3.3.2.3. Largest variance slices

Primary map

X Index: 55 **Y Index: 69** **Z Index: 51**

The images above show the largest variance slices of the map in three orthogonal directions.

3.3.2.4 Orthogonal standard-deviation projections (false-color)

Primary map

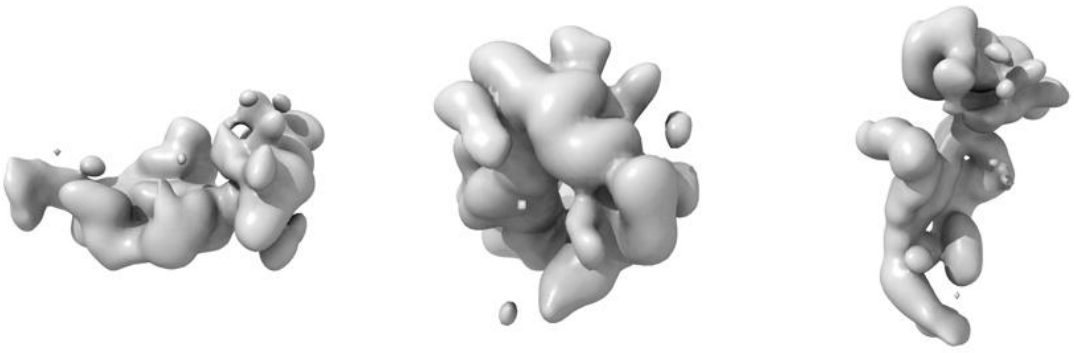


X **Y** **Z**

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

3.3.2.5. Orthogonal surface views

Primary map



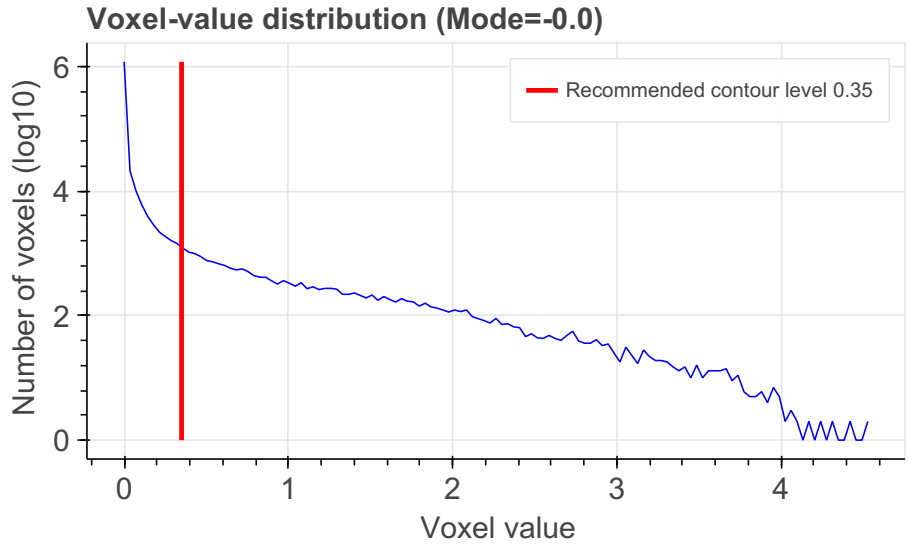
X **Y** **Z**

The images above show the 3D surface view of the map at the recommended contour level 0.350 . These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

3.3.3. Map analysis

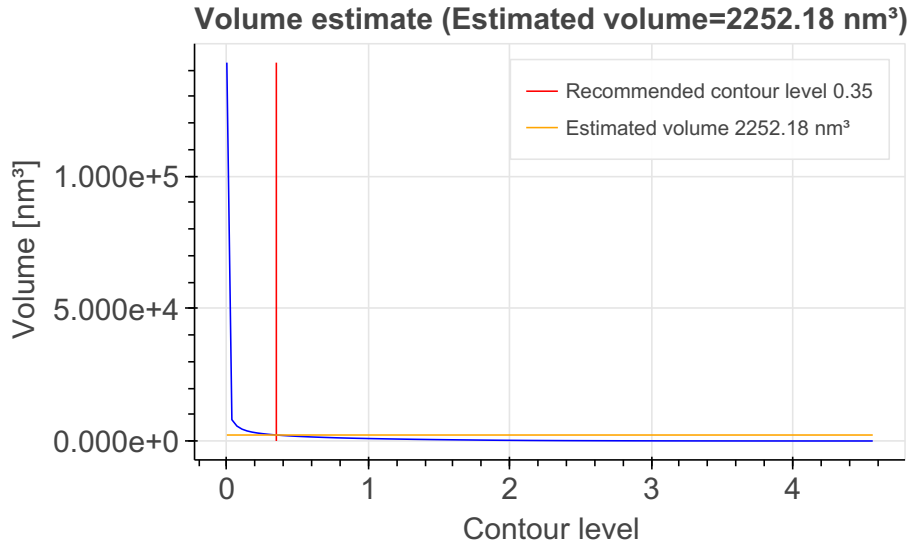
This section contains the results of statistical analysis of the map.

3.3.3.1. Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

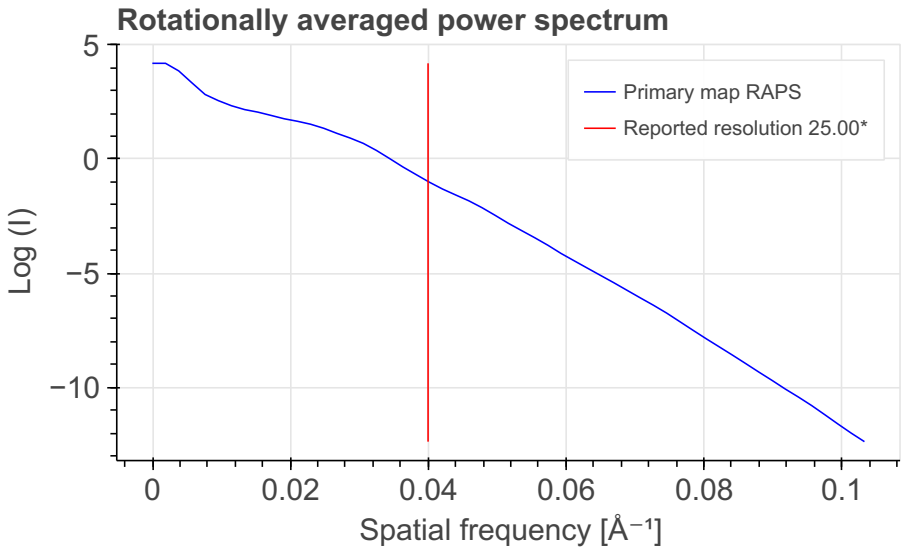
3.3.3.2. Volume estimate



The volume at the recommended contour level is 2252.18 nm³.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

3.3.3.3. Rotationally averaged power spectrum



*Reported resolution corresponds to spatial frequency of 0.040 Å⁻¹

3.3.4. Fourier-Shell correlation

3.3.4.2. Resolution estimates

Resolution estimate (Å)	Estimation criterion (FSC cut-off)			
	0.143	0.5	Half-bit	Other
Reported by author	-	-	-	25.00

Author-provided FSC curve is not available.

3.4. Mass Spectrometry

Validation for this section is under development.

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.

4.1a. Excluded Volume 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.

Model ID	Analysed	Number of violations	Excluded Volume Satisfaction (%)
1	3673405	6332	99.83
2	3673405	6318	99.83
3	3673405	6347	99.83

Model ID	Analysed	Number of violations	Excluded Volume Satisfaction (%)
4	3673405	6337	99.83

5. Fit to Data Used for Modeling Assessment

5.2. Crosslinking-MS

5.2.1. Restraint types

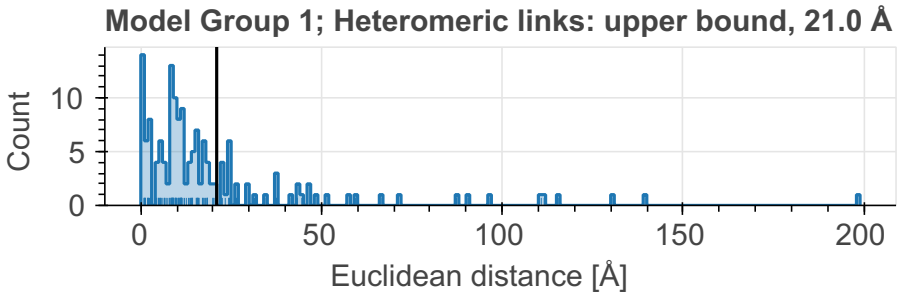
This table summarizes information about crosslinker(s) used for data generation, and how crosslinking information was translated into actual modeling restraints. Restraints assigned "by-residue" are interpreted as between CA atoms. Restraints between coarse-grained beads are indicated as "coarse-grained".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

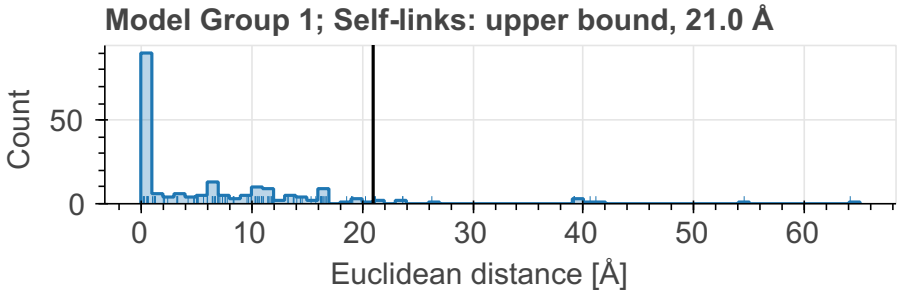
There are 359 crosslinking restraints combined in 359 restraint groups.

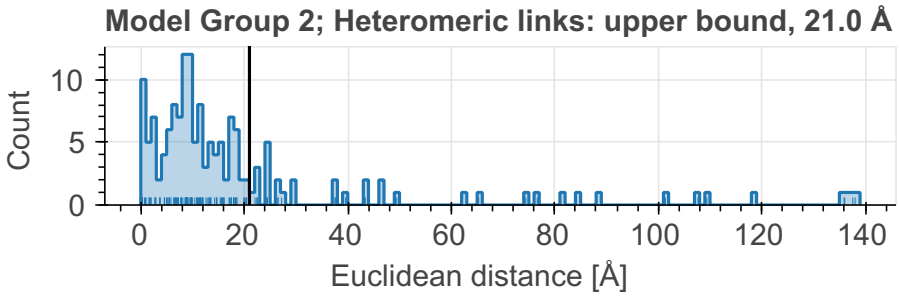
Linker	Residue 1	Atom 1	Residue 2	Atom 2	Restraint type	Distance, Å	Count
DSS	LYS	coarse-grained	LYS	coarse-grained	upper bound	21.00	225
DSS	LYS	coarse-grained	MET	coarse-grained	upper bound	21.00	22
DSS	LYS	CA	LYS	CA	upper bound	21.00	86
DSS	GLU	CA	LYS	CA	upper bound	21.00	3
DSS	LYS	CA	VAL	CA	upper bound	21.00	6
DSS	ILE	CA	LYS	CA	upper bound	21.00	4
DSS	LEU	CA	LYS	CA	upper bound	21.00	5
DSS	ILE	CA	VAL	CA	upper bound	21.00	1
DSS	GLU	CA	VAL	CA	upper bound	21.00	2
DSS	ALA	CA	ILE	CA	upper bound	21.00	1
DSS	LYS	CA	MET	CA	upper bound	21.00	1
DSS	LYS	coarse-grained	THR	coarse-grained	upper bound	21.00	2
DSS	LYS	coarse-grained	SER	coarse-grained	upper bound	21.00	1

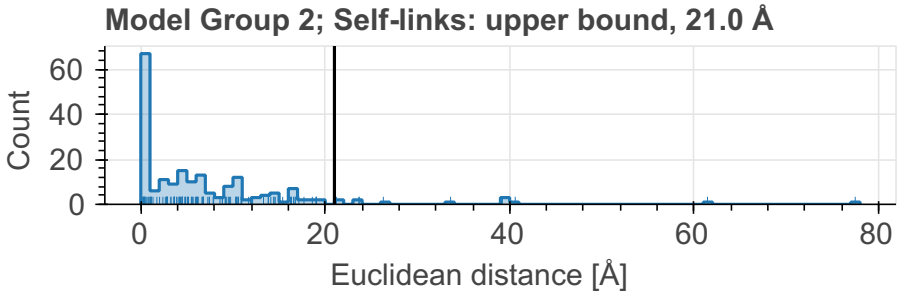
Distograms of individual restraints

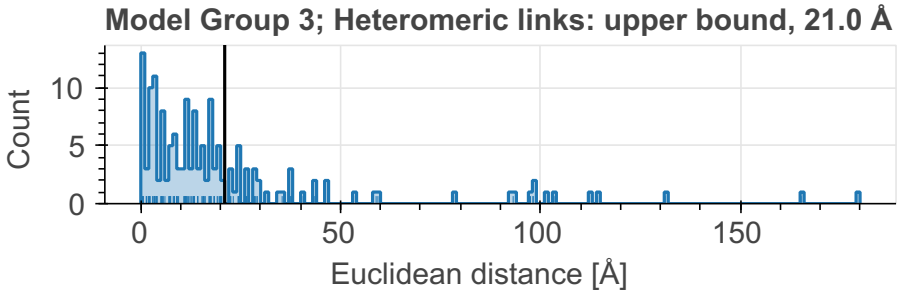
Distograms (i.e., histogram plots of distances) provide an overview of distributions of distances between residues for which chemical crosslinks were identified. The shift of the distogram relative to the threshold value may indicate a poor model. Restraints with identical thresholds are grouped into 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.

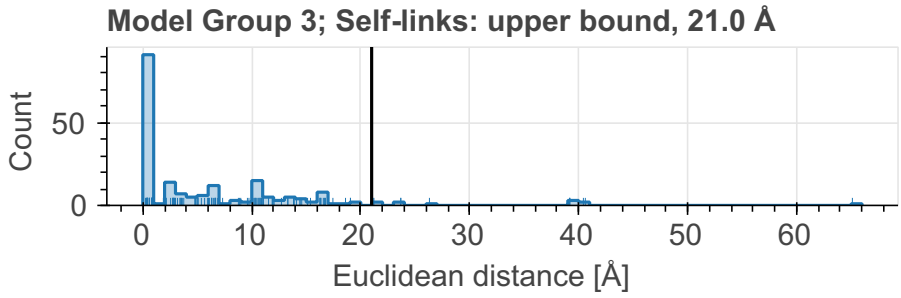

Model Group 1; Heteromeric links: upper bound, 21.0 Å
Count
0
5
10
0
50
100
150
200
Euclidean distance [Å]

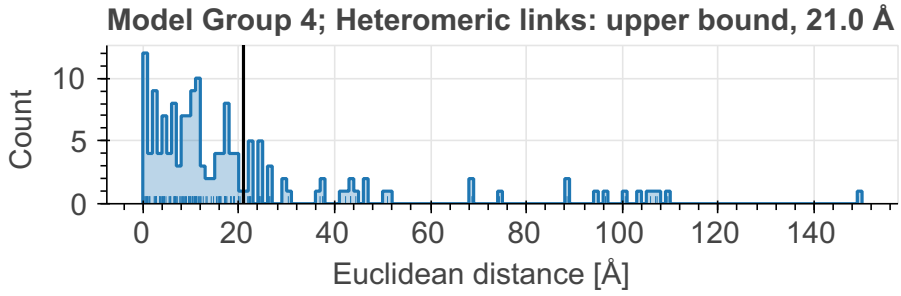

Model Group 1; Self-links: upper bound, 21.0 Å
Count
0
50
0
10
20
30
40
50
60
Euclidean distance [Å]

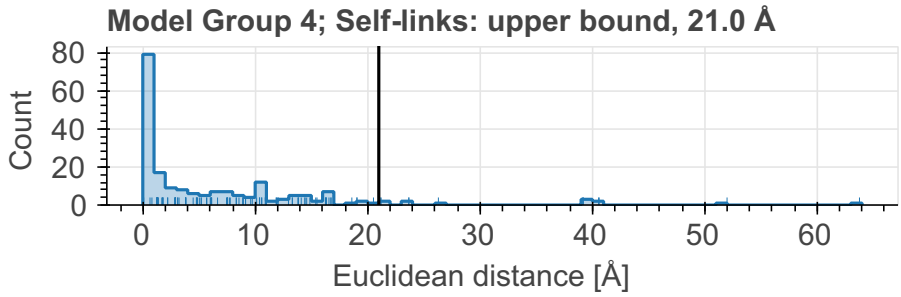

Model Group 2; Heteromeric links: upper bound, 21.0 Å
Count
0
5
10
0
20
40
60
80
100
120
140
Euclidean distance [Å]


Model Group 2; Self-links: upper bound, 21.0 Å
Count
0
20
40
60
0
20
40
60
80
Euclidean distance [Å]


Model Group 3; Heteromeric links: upper bound, 21.0 Å
Count
0
5
10
0
50
100
150
Euclidean distance [Å]







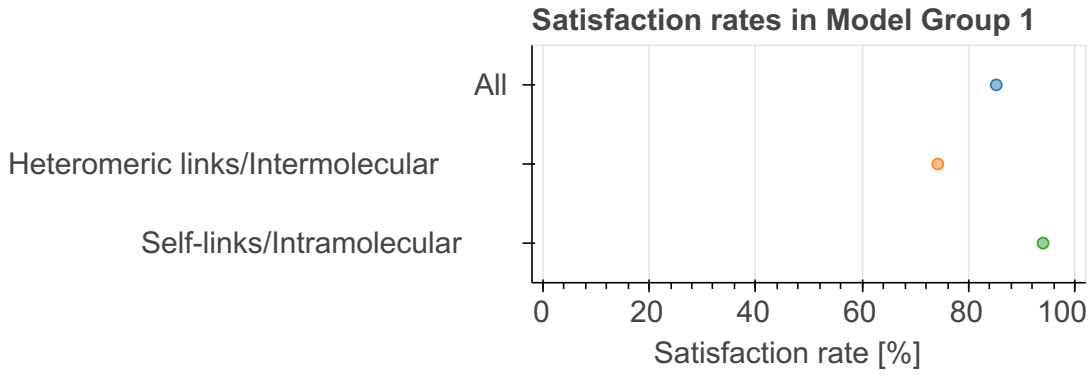
5.2.2. Satisfaction of restraints

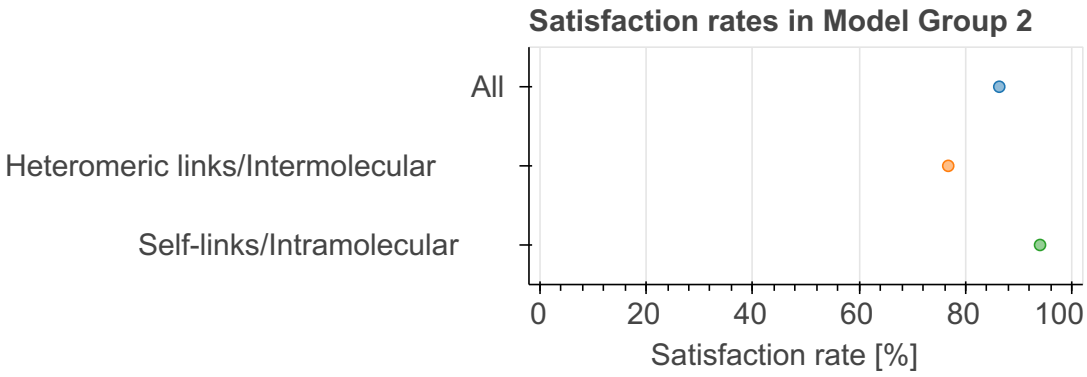
Satisfaction of restraints is calculated on a restraint group (a set of crosslinking restraints applied collectively in the modeling) level. Satisfaction of a restraint group depends on satisfaction of individual restraints in the group and the conditionality (all/any). A restraint group is considered 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.

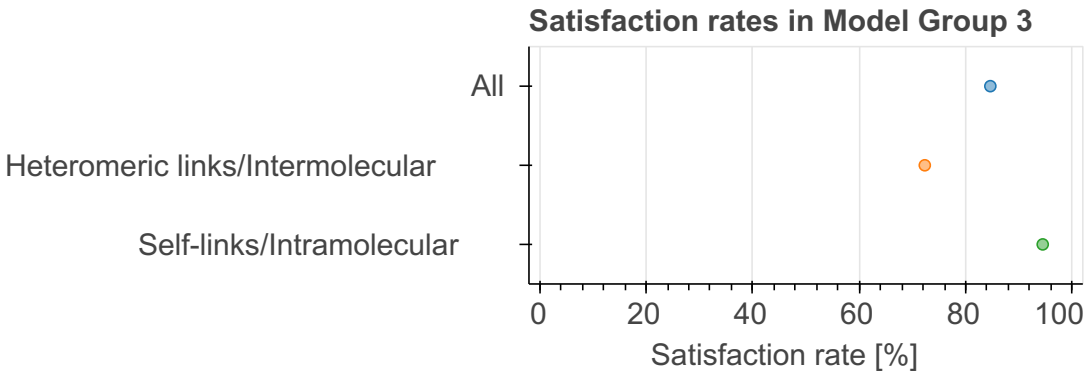
State group	State	Model group	# of Deposited models/Total	Restraint group type	Satisfied (%)	Violated (%)	Count (Total=359)
1	1	1	1/142	All	85.20	14.80	358
				Heteromeric links/ Intermolecular	74.21	25.79	159
				Self-links/ Intramolecular	93.97	6.03	199
1	1	2	1/192	All	86.31	13.69	358
				Heteromeric links/ Intermolecular	76.73	23.27	159
				Self-links/ Intramolecular	93.97	6.03	199
1	1	3	1/39	All	84.64	15.36	358
				Heteromeric links/ Intermolecular	72.33	27.67	159
				Self-links/ Intramolecular	94.47	5.53	199
1	1	4	1/126	All	84.64	15.36	358
				Heteromeric links/ Intermolecular	72.96	27.04	159
				Self-links/ Intramolecular	93.97	6.03	199

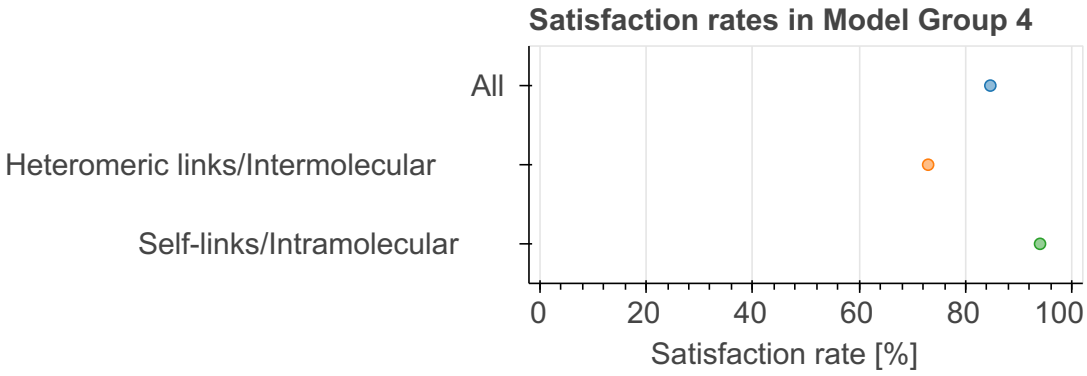
Per-model satisfaction rates in ensembles

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









5.3. 3DEM

This section describes fit of models to the 3DEM data. Only results for the representative model, selected as a first model with the largest number of asymmetric units.

3DEM validation for coarse-grained structures is under development.

5.4. Mass Spectrometry

Validation for this section is under development.

6. Fit to Data Used for Validation Assessment

Validation for this section is under development.

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