

Integrative Structure Validation Report

July 22, 2024 - 04:58 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	9A2G
PDB-Dev ID	PDBDEV_00000165
Structure Title	Model of E. coli GroEL by in-cell photo-crosslinking MS and deep learning
Structure Authors	Stahl, K.; Graziadei, A.; Dau, T.; Brock, O.; Rappilber, J.

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

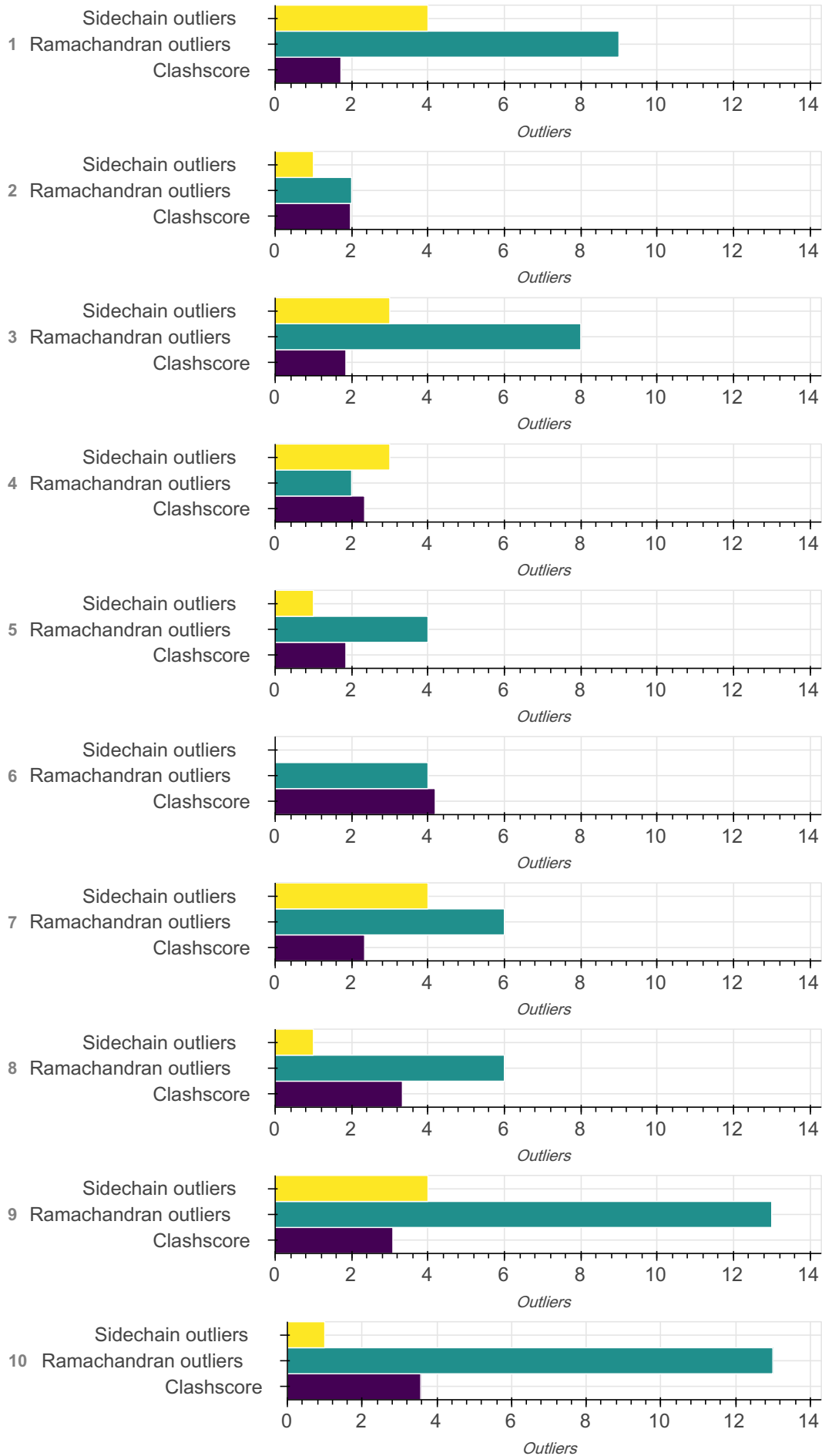
A user guide is available at https://pdb-dev.wwpdb.org/validation_help.html with specific help available everywhere you see the  symbol.

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 10 unique models, with 1 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 1 flexible or non-rigid units.

Entry composition

There are 10 unique types of models in this entry. These models are titled None, None, None, None, None, None, None, None, None, None respectively.

Model ID	Subunit number	Subunit ID	Subunit name	Chain ID	Chain ID [auth]	Total residues
1	1	1	P0A6F5	A	A	548
2	1	1	P0A6F5	A	A	548
3	1	1	P0A6F5	A	A	548
4	1	1	P0A6F5	A	A	548
5	1	1	P0A6F5	A	A	548
6	1	1	P0A6F5	A	A	548
7	1	1	P0A6F5	A	A	548
8	1	1	P0A6F5	A	A	548
9	1	1	P0A6F5	A	A	548
10	1	1	P0A6F5	A	A	548

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	jPOSTrepo	JPST001851

Representation ?

This entry has only one representation and includes 0 rigid bodies and 1 flexible units

Chain ID	Rigid bodies	Non-rigid segments
A	-	1-548

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	AlphaLink with 10 msa subsamples	AlphaLink	None	10	False	False

There is 1 software package reported in this entry.

ID	Software name	Software version	Software classification	Software location
1	AlphaLink	1.0	model building	https://github.com/lhatsk/AlphaLink

Data quality ?

Crosslinking-MS

Validation for this section is under development.

Model quality ?

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

Standard geometry: bond outliers?

There are 41180 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
OG1--HG1	0.96	0.84	330
CG2--HG23	1.09	0.97	1230
CE--HE2	1.09	0.97	630
CA--HA	1.09	0.97	4890
CD--HD3	1.09	0.97	760
CG--HG	1.09	0.97	420
NZ--HZ2	1.01	0.89	400
CG2--HG21	1.09	0.97	1230
CB--HB	1.09	0.97	1230
CG--HG3	1.09	0.97	1610
CB--HB2	1.09	0.97	3660
CG2--HG22	1.09	0.97	1230
CB--HB1	1.09	0.97	740
CG--HG2	1.09	0.97	1610
CB--HB3	1.09	0.97	3660
OG--HG	0.96	0.84	170
CD1--HD13	1.09	0.97	740
CG1--HG12	1.09	0.97	900
CG1--HG13	1.09	0.97	900
CG1--HG11	1.09	0.97	580
CD2--HD21	1.09	0.97	420
CD--HD2	1.09	0.97	760

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
CD2--HD23	1.09	0.97	420
CA--HA3	1.09	0.97	590
CD1--HD12	1.09	0.97	740
CD2--HD22	1.09	0.97	420
CA--HA2	1.09	0.97	590
NZ--HZ3	1.01	0.89	400
CE--HE3	1.09	0.97	630
CD1--HD11	1.09	0.97	740
NZ--HZ1	1.01	0.89	400
OH--HH	0.96	0.84	70
CE--HE1	1.09	0.97	230
N--H1	1.01	0.89	10
N--H3	1.01	0.89	10
N--H2	1.01	0.89	10
SG--HG	1.33	1.20	7
SG--HG	1.34	1.20	23
N--H	1.01	0.86	5330
NH1--HH12	1.01	0.86	220
NE2--HE21	1.01	0.86	160
NH2--HH21	1.01	0.86	220
NE2--HE22	1.01	0.86	160
CE1--HE1	1.08	0.93	150
CE2--HE2	1.08	0.93	140

Bond type	Observed distance (Å)	Ideal distance (Å)	Number of outliers
CD1--HD1	1.08	0.93	140
NH1--HH11	1.01	0.86	220
NH2--HH22	1.01	0.86	220
NE--HE	1.01	0.86	220
ND2--HD21	1.01	0.86	190
ND2--HD22	1.01	0.86	190
CD2--HD2	1.08	0.93	150
CZ--HZ	1.08	0.93	70
ND1--HD1	1.01	0.86	10

Standard geometry: angle outliers ?

There are 168 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	137.31	1
CA-CB-CG	112.60	121.26	1
C-N-CA	121.70	136.13	1
OE1-CD-NE2	122.60	115.57	1
C-N-CA	121.70	133.25	1
OE1-CD-NE2	122.60	116.48	1
CA-C-N	116.20	127.96	1
O-C-N	123.00	113.62	1
C-N-CA	121.70	132.23	1
C-N-CA	121.70	132.04	1
C-N-CA	121.70	131.91	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
NE-CZ-NH2	119.20	124.22	1
C-N-CA	121.70	131.71	1
OE1-CD-NE2	122.60	117.06	1
C-N-CA	121.70	131.28	1
CA-CB-CG	112.60	117.92	1
OE1-CD-NE2	122.60	117.37	1
OE1-CD-NE2	122.60	117.44	2
NE-CZ-NH2	119.20	123.83	1
OE1-CD-NE2	122.60	117.48	1
CA-CB-CG	112.60	117.71	1
C-N-CA	121.70	130.89	1
OE1-CD-NE2	122.60	117.58	2
OE1-CD-NE2	122.60	117.61	1
CA-CB-CG	112.60	107.63	1
OE1-CD-NE2	122.60	117.63	1
OE1-CD-NE2	122.60	117.65	1
OE1-CD-NE2	122.60	117.67	1
C-N-CA	121.70	130.57	1
OE1-CD-NE2	122.60	117.69	1
OE1-CD-NE2	122.60	117.71	2
C-N-CA	121.70	130.47	1
C-N-CA	121.70	130.45	1
OE1-CD-NE2	122.60	117.74	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
C-N-CA	121.70	130.44	1
C-N-CA	121.70	130.43	1
OE1-CD-NE2	122.60	117.75	1
C-N-CA	121.70	130.38	1
N-CA-CB	110.50	102.31	1
OE1-CD-NE2	122.60	117.81	1
OE1-CD-NE2	122.60	117.82	1
C-N-CA	121.70	130.27	1
OE1-CD-NE2	122.60	117.84	1
OE1-CD-NE2	122.60	117.85	2
OE1-CD-NE2	122.60	117.87	1
OE1-CD-NE2	122.60	117.91	2
CA-CB-CG	112.60	117.27	1
C-N-CA	121.70	130.10	1
OE1-CD-NE2	122.60	117.94	1
OE1-CD-NE2	122.60	117.96	1
O-C-N	123.00	115.61	1
OE1-CD-NE2	122.60	118.00	1
CA-C-N	116.20	125.39	1
OE1-CD-NE2	122.60	118.01	1
OE1-CD-NE2	122.60	118.02	1
C-N-CA	121.70	129.90	1
OE1-CD-NE2	122.60	118.05	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
O-C-N	123.00	115.72	1
OE1-CD-NE2	122.60	118.06	1
N-CA-CB	110.50	102.82	1
OE1-CD-NE2	122.60	118.09	1
C-N-CA	121.70	129.79	1
OE1-CD-NE2	122.60	118.10	1
OD1-CG-ND2	122.60	118.13	1
CA-CB-CG	112.60	117.06	1
NH1-CZ-NH2	119.30	113.50	1
OE1-CD-NE2	122.60	118.14	1
OE1-CD-NE2	122.60	118.15	2
NE-CZ-NH2	119.20	123.20	1
OE1-CD-NE2	122.60	118.17	2
OE1-CD-NE2	122.60	118.18	1
O-C-N	123.00	115.95	1
OE1-CD-NE2	122.60	118.20	3
C-N-CA	121.70	129.62	1
OE1-CD-NE2	122.60	118.21	1
OE1-CD-NE2	122.60	118.22	4
CA-CB-CG	112.60	116.98	1
OE1-CD-NE2	122.60	118.23	1
C-N-CA	121.70	129.56	1
CB-CG-CD	112.60	105.21	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
OE1-CD-NE2	122.60	118.25	1
CD-NE-CZ	124.40	130.49	1
C-N-CA	121.70	129.51	1
N-CA-CB	110.50	103.13	1
OE1-CD-NE2	122.60	118.28	2
OE1-CD-NE2	122.60	118.29	1
C-N-CA	121.70	129.46	1
NH1-CZ-NH2	119.30	113.70	1
OE1-CD-NE2	122.60	118.30	1
OE1-CD-NE2	122.60	118.31	1
OE1-CD-NE2	122.60	118.34	1
OD1-CG-ND2	122.60	118.34	1
O-C-N	123.00	116.19	1
C-N-CA	121.70	129.36	1
OE1-CD-NE2	122.60	118.35	1
C-N-CA	121.70	129.34	1
CA-CB-CG	112.60	116.85	1
C-N-CA	121.70	129.33	1
C-N-CA	121.70	129.32	1
OE1-CD-NE2	122.60	118.37	1
C-CA-CB	110.10	118.13	1
OE1-CD-NE2	122.60	118.38	1
OE1-CD-NE2	122.60	118.39	2

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
CA-C-N	116.20	124.63	1
OE1-CD-NE2	122.60	118.40	1
O-C-N	123.00	116.31	1
OE1-CD-NE2	122.60	118.43	1
C-N-CA	121.70	129.19	1
CB-CG-CD	112.60	105.53	1
CG-CD-CE	111.30	101.78	1
OD1-CG-ND2	122.60	118.46	1
N-CA-CB	111.50	104.48	1
CB-CG-CD2	131.20	125.83	1
OE1-CD-NE2	122.60	118.48	2
CA-CB-CG	112.60	116.72	1
OE1-CD-NE2	122.60	118.49	1
C-N-CA	121.70	129.10	1
C-N-CA	121.70	129.09	1
OE1-CD-NE2	122.60	118.50	1
CG-CD-CE	111.30	120.73	1
C-N-CA	121.70	129.05	1
C-N-CA	121.70	129.04	1
CA-N-CD	112.00	106.29	1
OE1-CD-NE2	122.60	118.53	1
OD1-CG-ND2	122.60	118.54	1
OE1-CD-NE2	122.60	118.55	2

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
OD1-CG-ND2	122.60	118.56	1
OE1-CD-NE2	122.60	118.56	1
OD1-CG-ND2	122.60	118.57	1
CG-CD-CE	111.30	102.05	1
OE1-CD-NE2	122.60	118.58	1
OE1-CD-NE2	122.60	118.59	2
C-N-CA	121.70	128.91	1
OE1-CD-NE2	122.60	118.60	1
HZ1-NZ-HZ2	96.98	109.00	1
C-N-H	112.16	124.30	1
C-N-H	112.10	124.30	1
C-N-H	111.96	124.30	1
C-N-H	111.63	124.30	1
C-N-H	111.21	124.30	1
C-N-H	111.08	124.30	1
CG-ND2-HD21	106.76	120.00	1
C-N-H	110.95	124.30	1
C-N-H	110.81	124.30	1
C-N-H	110.55	124.30	1
C-N-H	110.00	124.30	1
C-N-H	109.31	124.30	1
C-N-H	108.75	124.30	1
C-N-H	108.72	124.30	1

Angle type	Observed angle (°)	Ideal angle (°)	Number of outliers
C-N-H	107.21	124.30	1
HH11-NH1-HH12	102.91	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	1.72	14
2	1.97	16
3	1.85	15
4	2.34	19
5	1.85	15
6	4.19	34
7	2.34	19
8	3.33	27
9	3.08	25
10	3.57	29

All 213 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:233:MET:CE	A:263:VAL:HG21	0.681
1	A:233:MET:HE2	A:263:VAL:HG21	0.642
1	A:332:ILE:HG23	A:333:ILE:HG13	0.596
1	A:225:LYS:HE3	A:303:GLU:HB2	0.523
1	A:160:LYS:HE2	A:164:GLU:OE1	0.515
1	A:332:ILE:HG23	A:333:ILE:CG1	0.484

Model ID	Atom-1	Atom-2	Clash overlap (Å)
1	A:172:GLU:HB3	A:373:ALA:HB1	0.477
1	A:332:ILE:HG23	A:333:ILE:CD1	0.472
1	A:193:MET:SD	A:332:ILE:HG22	0.435
1	A:16:MET:HB3	A:514:MET:HE1	0.433
1	A:393:LYS:HE3	A:397:GLU:OE1	0.428
1	A:13:ARG:HD3	A:104:LEU:HD22	0.415
1	A:9:GLY:H	A:12:ALA:HB3	0.411
1	A:124:VAL:HG21	A:508:ALA:HB2	0.408
2	A:17:LEU:HD21	A:104:LEU:CD1	0.651
2	A:17:LEU:HD21	A:104:LEU:HD12	0.551
2	A:299:THR:HG22	A:307:MET:HE1	0.547
2	A:299:THR:CG2	A:307:MET:HE1	0.514
2	A:23:LEU:HD13	A:60:ILE:HG21	0.504
2	A:207:LYS:HE3	A:214:GLU:OE2	0.477
2	A:305:ILE:HD11	A:307:MET:HE2	0.472
2	A:221:LEU:HD22	A:233:MET:HE1	0.441
2	A:198:GLY:HA3	A:277:LYS:HB3	0.437
2	A:23:LEU:HD11	A:57:ALA:HA	0.435
2	A:77:VAL:HG12	A:92:ALA:HB1	0.435
2	A:76:GLU:OE1	A:80:LYS:HE3	0.435
2	A:528:ASP:C	A:530:ALA:H	0.432
2	A:248:LEU:HD22	A:323:VAL:HG11	0.423
2	A:240:VAL:HG11	A:247:LEU:HB2	0.419

Model ID	Atom-1	Atom-2	Clash overlap (Å)
2	A:28:LYS:HG2	A:94:VAL:HG22	0.407
3	A:54:VAL:HG22	A:89:THR:HG21	0.616
3	A:299:THR:CG2	A:307:MET:HE1	0.545
3	A:233:MET:SD	A:309:LEU:HD21	0.535
3	A:38:VAL:HG21	A:56:VAL:HG21	0.515
3	A:248:LEU:HD13	A:325:ILE:HD11	0.503
3	A:221:LEU:HD22	A:233:MET:HE1	0.488
3	A:124:VAL:HG21	A:508:ALA:HB2	0.451
3	A:58:ARG:HA	A:75:LYS:HE3	0.450
3	A:248:LEU:HD22	A:323:VAL:HG11	0.443
3	A:77:VAL:HG12	A:92:ALA:HB1	0.442
3	A:7:LYS:HE3	A:15:LYS:HD2	0.414
3	A:221:LEU:HD21	A:309:LEU:HD11	0.414
3	A:169:VAL:HB	A:173:GLY:HA3	0.411
3	A:3:ALA:CB	A:524:LEU:HD12	0.402
3	A:168:LYS:HD3	A:189:VAL:HG21	0.402
4	A:31:LEU:HD12	A:90:THR:HG22	0.646
4	A:77:VAL:HG21	A:510:VAL:HB	0.632
4	A:27:VAL:HA	A:38:VAL:HG21	0.568
4	A:40:LEU:H	A:57:ALA:HB2	0.564
4	A:194:GLN:HE21	A:329:THR:HG21	0.563
4	A:266:THR:HG22	A:273:VAL:H	0.544
4	A:6:VAL:CG1	A:520:MET:HE3	0.537

Model ID	Atom-1	Atom-2	Clash overlap (Å)
4	A:54:VAL:HG21	A:87:ASP:OD1	0.512
4	A:30:THR:HG21	A:38:VAL:HG23	0.498
4	A:279:PRO:HG2	A:288:MET:HG2	0.497
4	A:6:VAL:HG11	A:520:MET:HE3	0.496
4	A:353:ILE:HG23	A:362:ARG:HG3	0.459
4	A:73:MET:HE3	A:513:LEU:HD23	0.443
4	A:221:LEU:HD13	A:233:MET:HE1	0.440
4	A:77:VAL:HG21	A:510:VAL:CB	0.437
4	A:76:GLU:OE1	A:80:LYS:HE3	0.415
4	A:124:VAL:HG21	A:508:ALA:HB2	0.412
4	A:27:VAL:HG12	A:90:THR:HG23	0.406
4	A:266:THR:CG2	A:273:VAL:H	0.401
5	A:20:VAL:HG21	A:514:MET:HE1	0.744
5	A:16:MET:SD	A:514:MET:HE3	0.609
5	A:54:VAL:HG22	A:89:THR:HG21	0.556
5	A:23:LEU:HD11	A:57:ALA:HA	0.543
5	A:7:LYS:HE2	A:66:PHE:CE2	0.523
5	A:221:LEU:HD22	A:233:MET:HE1	0.481
5	A:20:VAL:CG2	A:514:MET:HE1	0.477
5	A:197:ARG:HD3	A:326:ASN:O	0.455
5	A:3:ALA:CB	A:524:LEU:HD12	0.453
5	A:420:ILE:HD12	A:451:LEU:HD23	0.450
5	A:7:LYS:HE2	A:66:PHE:CD2	0.427

Model ID	Atom-1	Atom-2	Clash overlap (Å)
5	A:16:MET:HE3	A:520:MET:SD	0.418
5	A:58:ARG:HA	A:75:LYS:HE3	0.412
5	A:325:ILE:HG12	A:330:THR:HG23	0.404
5	A:248:LEU:HD22	A:323:VAL:HG11	0.401
6	A:17:LEU:HD21	A:104:LEU:CD1	0.666
6	A:194:GLN:HE21	A:330:THR:HG21	0.634
6	A:233:MET:HE1	A:249:ILE:CD1	0.607
6	A:194:GLN:NE2	A:330:THR:HG21	0.603
6	A:54:VAL:HG22	A:89:THR:HB	0.600
6	A:17:LEU:HD21	A:104:LEU:HD12	0.570
6	A:263:VAL:HG22	A:267:MET:HE2	0.567
6	A:58:ARG:HA	A:75:LYS:HE3	0.547
6	A:254:VAL:HG11	A:259:LEU:CB	0.528
6	A:233:MET:HE1	A:249:ILE:HD11	0.524
6	A:193:MET:CB	A:295:LEU:HD22	0.489
6	A:107:VAL:HG12	A:524:LEU:HD11	0.480
6	A:299:THR:CG2	A:307:MET:HE1	0.472
6	A:169:VAL:HG23	A:173:GLY:HA3	0.470
6	A:254:VAL:HG11	A:259:LEU:HB2	0.470
6	A:27:VAL:CG1	A:90:THR:HG23	0.468
6	A:128:VAL:HG22	A:501:ARG:HG3	0.459
6	A:27:VAL:HG12	A:90:THR:HG23	0.451
6	A:198:GLY:HA2	A:277:LYS:O	0.444

Model ID	Atom-1	Atom-2	Clash overlap (Å)
6	A:193:MET:HB2	A:295:LEU:HD22	0.437
6	A:194:GLN:HE21	A:330:THR:CG2	0.432
6	A:300:VAL:O	A:305:ILE:HD11	0.431
6	A:172:GLU:O	A:370:ALA:HA	0.431
6	A:8:PHE:CG	A:519:CYS:HB3	0.429
6	A:128:VAL:HG13	A:501:ARG:HD2	0.423
6	A:54:VAL:HG22	A:89:THR:CB	0.421
6	A:29:VAL:HG12	A:36:ARG:HH21	0.419
6	A:207:LYS:HE3	A:214:GLU:OE2	0.418
6	A:31:LEU:HD13	A:90:THR:HG22	0.415
6	A:514:MET:HE2	A:520:MET:HE2	0.415
6	A:169:VAL:CG2	A:173:GLY:HA3	0.411
6	A:128:VAL:HG13	A:501:ARG:CD	0.409
6	A:248:LEU:HD22	A:323:VAL:HG11	0.401
6	A:528:ASP:C	A:530:ALA:H	0.401
7	A:16:MET:HB3	A:514:MET:HE3	0.754
7	A:29:VAL:CG2	A:90:THR:HG21	0.709
7	A:199:TYR:CE1	A:202:PRO:HD3	0.689
7	A:40:LEU:HD12	A:56:VAL:HA	0.666
7	A:168:LYS:CD	A:189:VAL:HG21	0.647
7	A:168:LYS:HD3	A:189:VAL:HG21	0.574
7	A:26:ALA:HB1	A:40:LEU:HD23	0.570
7	A:248:LEU:HD22	A:323:VAL:HG11	0.555

Model ID	Atom-1	Atom-2	Clash overlap (Å)
7	A:168:LYS:HD2	A:189:VAL:HG21	0.534
7	A:199:TYR:CZ	A:202:PRO:HG3	0.503
7	A:20:VAL:HG21	A:514:MET:HE1	0.488
7	A:52:ASP:HA	A:398:ASP:OD2	0.463
7	A:199:TYR:CZ	A:202:PRO:CG	0.455
7	A:38:VAL:HB	A:54:VAL:HG22	0.450
7	A:199:TYR:OH	A:202:PRO:HG3	0.448
7	A:40:LEU:CD1	A:56:VAL:HA	0.442
7	A:214:GLU:CD	A:322:ARG:HH21	0.442
7	A:47:PRO:HB3	A:55:SER:HB3	0.435
7	A:353:ILE:HG23	A:362:ARG:HG3	0.406
8	A:40:LEU:HD12	A:57:ALA:HB2	0.989
8	A:193:MET:HE1	A:291:ASP:HB3	0.718
8	A:168:LYS:CD	A:189:VAL:HG21	0.651
8	A:174:VAL:HG23	A:370:ALA:CB	0.634
8	A:200:LEU:HD21	A:213:VAL:CG2	0.630
8	A:26:ALA:HB1	A:40:LEU:HD21	0.579
8	A:168:LYS:HD3	A:189:VAL:HG21	0.578
8	A:168:LYS:HD2	A:189:VAL:HG21	0.575
8	A:77:VAL:HG21	A:510:VAL:HB	0.553
8	A:26:ALA:HB1	A:40:LEU:CD2	0.546
8	A:200:LEU:HD21	A:213:VAL:HG23	0.530
8	A:230:ILE:HD12	A:233:MET:HE2	0.530

Model ID	Atom-1	Atom-2	Clash overlap (Å)
8	A:233:MET:HE1	A:249:ILE:HD13	0.518
8	A:193:MET:HE1	A:291:ASP:CB	0.496
8	A:262:LEU:HD22	A:273:VAL:HG11	0.490
8	A:200:LEU:HD21	A:213:VAL:HG21	0.486
8	A:233:MET:HE1	A:249:ILE:CD1	0.484
8	A:230:ILE:HG21	A:261:THR:HG21	0.465
8	A:190:VAL:HG13	A:331:THR:HG21	0.459
8	A:23:LEU:HD13	A:60:ILE:HD12	0.457
8	A:195:PHE:CZ	A:330:THR:HB	0.454
8	A:13:ARG:HD3	A:104:LEU:HD22	0.453
8	A:240:VAL:HG11	A:247:LEU:HB2	0.448
8	A:124:VAL:HG21	A:508:ALA:HB2	0.436
8	A:40:LEU:HD12	A:57:ALA:CB	0.412
8	A:230:ILE:HD11	A:262:LEU:HD21	0.408
8	A:325:ILE:HG12	A:330:THR:HG23	0.407
9	A:8:PHE:CD2	A:519:CYS:HA	0.567
9	A:31:LEU:HD21	A:90:THR:HG21	0.542
9	A:199:TYR:CD1	A:254:VAL:HG11	0.514
9	A:204:PHE:CE1	A:264:VAL:CG2	0.510
9	A:77:VAL:HG12	A:92:ALA:HB1	0.493
9	A:16:MET:HB3	A:514:MET:HE3	0.488
9	A:85:ALA:HB3	A:499:VAL:HG22	0.481
9	A:40:LEU:HB2	A:57:ALA:H	0.480

Model ID	Atom-1	Atom-2	Clash overlap (Å)
9	A:204:PHE:CE1	A:264:VAL:HG21	0.464
9	A:256:GLY:HA2	A:259:LEU:H	0.460
9	A:200:LEU:HD21	A:213:VAL:HG23	0.451
9	A:8:PHE:HB2	A:519:CYS:SG	0.450
9	A:8:PHE:CG	A:519:CYS:HA	0.448
9	A:30:THR:OG1	A:38:VAL:HG22	0.435
9	A:23:LEU:HD11	A:40:LEU:HD13	0.430
9	A:16:MET:CB	A:514:MET:HE3	0.429
9	A:267:MET:HE3	A:271:VAL:HG22	0.426
9	A:187:LEU:HD11	A:377:ALA:HB1	0.425
9	A:193:MET:HE1	A:291:ASP:HB3	0.422
9	A:198:GLY:HA3	A:277:LYS:HB3	0.422
9	A:85:ALA:CB	A:499:VAL:HG22	0.416
9	A:291:ASP:CG	A:368:ARG:HH21	0.412
9	A:31:LEU:HD11	A:90:THR:CG2	0.406
9	A:207:LYS:HE3	A:214:GLU:OE2	0.405
9	A:240:VAL:HG11	A:247:LEU:HB2	0.403
10	A:40:LEU:HD11	A:56:VAL:O	0.715
10	A:73:MET:HE3	A:513:LEU:HD23	0.660
10	A:198:GLY:HA3	A:277:LYS:H	0.650
10	A:248:LEU:HD22	A:323:VAL:HG11	0.639
10	A:30:THR:HG22	A:36:ARG:O	0.585
10	A:73:MET:CE	A:513:LEU:HD23	0.567

Model ID	Atom-1	Atom-2	Clash overlap (Å)
10	A:200:LEU:HD11	A:213:VAL:CG2	0.545
10	A:39:VAL:HG13	A:47:PRO:HB2	0.537
10	A:200:LEU:HD11	A:213:VAL:HG23	0.535
10	A:39:VAL:HG13	A:47:PRO:CB	0.529
10	A:248:LEU:HD13	A:325:ILE:HD11	0.528
10	A:30:THR:CG2	A:38:VAL:HG23	0.511
10	A:58:ARG:HA	A:75:LYS:HE3	0.504
10	A:3:ALA:CB	A:524:LEU:HD12	0.473
10	A:207:LYS:HE3	A:214:GLU:OE2	0.468
10	A:233:MET:SD	A:309:LEU:HD21	0.467
10	A:3:ALA:HB1	A:524:LEU:HD12	0.461
10	A:39:VAL:CG1	A:47:PRO:CB	0.461
10	A:240:VAL:HG11	A:247:LEU:HB2	0.444
10	A:39:VAL:CG1	A:47:PRO:HB3	0.434
10	A:16:MET:HB3	A:514:MET:HE3	0.428
10	A:299:THR:HG21	A:307:MET:HE1	0.428
10	A:27:VAL:HG12	A:90:THR:HG23	0.427
10	A:124:VAL:HG21	A:508:ALA:HB2	0.424
10	A:187:LEU:HD11	A:377:ALA:HB1	0.422
10	A:221:LEU:HD22	A:233:MET:HE1	0.418
10	A:221:LEU:HD21	A:309:LEU:HD11	0.417
10	A:39:VAL:CG1	A:47:PRO:HB2	0.416
10	A:174:VAL:HG21	A:194:GLN:HB2	0.403

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	546	504	33	9
2	546	526	18	2
3	546	516	22	8
4	546	524	20	2
5	546	520	22	4
6	546	525	17	4
7	546	519	21	6
8	546	516	24	6
9	546	515	18	13
10	546	513	20	13

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	Analysed	Favored	Allowed	Outliers
1	415	404	7	4
2	415	409	5	1
3	415	410	2	3
4	415	406	6	3
5	415	410	4	1
6	415	407	8	0
7	415	405	6	4

Model ID	Analyzed	Favored	Allowed	Outliers
8	415	408	6	1
9	415	402	9	4
10	415	407	7	1

Detailed list of outliers are tabulated below.

Model ID	Chain	Residue ID	Residue type
1	A	30	THR
1	A	50	THR
1	A	333	ILE
1	A	334	ASP
2	A	531	ASP
3	A	48	THR
3	A	50	THR
3	A	541	MET
4	A	31	LEU
4	A	43	SER
4	A	52	ASP
5	A	193	MET
7	A	30	THR
7	A	48	THR
7	A	199	TYR
7	A	531	ASP
8	A	31	LEU
9	A	55	SER

Model ID	Chain	Residue ID	Residue type
9	A	254	VAL
9	A	389	MET
9	A	531	ASP
10	A	541	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.

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