



Full wwPDB NMR Structure Validation Report ⓘ

May 31, 2020 – 10:15 pm BST

PDB ID : 6FZK
Title : NMR structure of UB2H, regulatory domain of PBP1b from E. coli
Authors : Simorre, J.P.; Maya Martinez, R.C.; Bougault, C.; Egan, A.J.F.; Vollmer, W.
Deposited on : 2018-03-15

This is a Full wwPDB NMR Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/NMRValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

Cyrange : Kirchner and Güntert (2011)
NmrClust : Kelley et al. (1996)
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : 2.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

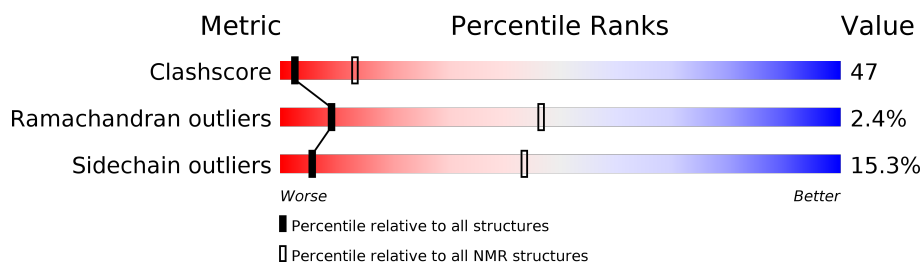
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 80%.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and a grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	114	

2 Ensemble composition and analysis

This entry contains 20 models. Model 4 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *lowest energy*.

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	Residue range (total)	Backbone RMSD (Å)	Medoid model
1	A:109-A:156, A:168-A:198 (79)	0.30	4

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 5 clusters and 2 single-model clusters were found.

Cluster number	Models
1	4, 9, 10, 11, 13, 14, 16, 18
2	7, 17, 20
3	5, 12, 19
4	3, 8
5	2, 15
Single-model clusters	1; 6

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1826 atoms, of which 904 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Penicillin-binding protein 1B.

Mol	Chain	Residues	Atoms						Trace
1	A	114	Total	C	H	N	O	S	0
			1826	568	904	178	168	8	

There are 21 discrepancies between the modelled and reference sequences:

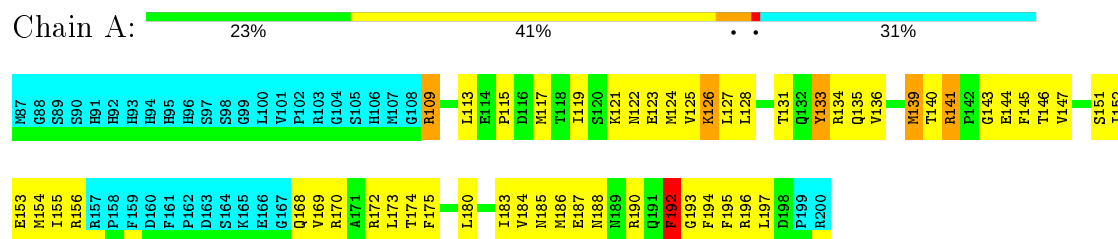
Chain	Residue	Modelled	Actual	Comment	Reference
A	87	MET	-	initiating methionine	UNP P02919
A	88	GLY	-	expression tag	UNP P02919
A	89	SER	-	expression tag	UNP P02919
A	90	SER	-	expression tag	UNP P02919
A	91	HIS	-	expression tag	UNP P02919
A	92	HIS	-	expression tag	UNP P02919
A	93	HIS	-	expression tag	UNP P02919
A	94	HIS	-	expression tag	UNP P02919
A	95	HIS	-	expression tag	UNP P02919
A	96	HIS	-	expression tag	UNP P02919
A	97	SER	-	expression tag	UNP P02919
A	98	SER	-	expression tag	UNP P02919
A	99	GLY	-	expression tag	UNP P02919
A	100	LEU	-	expression tag	UNP P02919
A	101	VAL	-	expression tag	UNP P02919
A	102	PRO	-	expression tag	UNP P02919
A	103	ARG	-	expression tag	UNP P02919
A	104	GLY	-	expression tag	UNP P02919
A	105	SER	-	expression tag	UNP P02919
A	106	HIS	-	expression tag	UNP P02919
A	107	MET	-	expression tag	UNP P02919

4 Residue-property plots

4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA and DNA chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

- Molecule 1: Penicillin-binding protein 1B

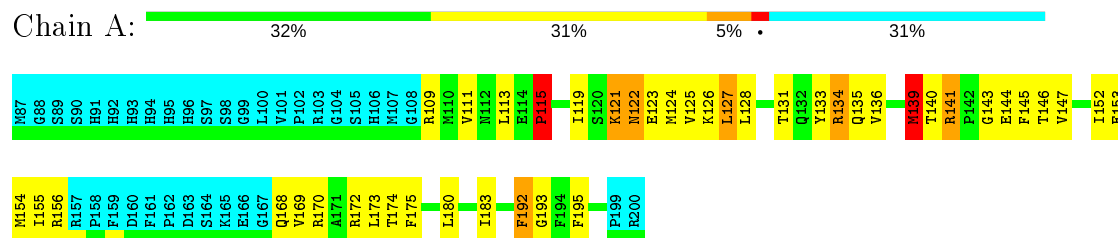


4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

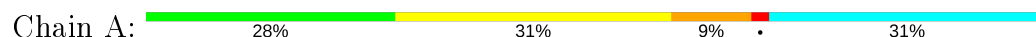
4.2.1 Score per residue for model 1

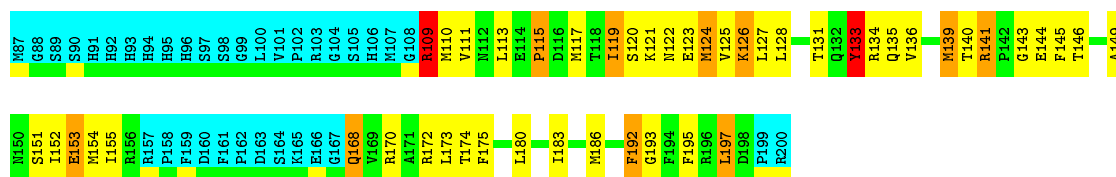
- Molecule 1: Penicillin-binding protein 1B



4.2.2 Score per residue for model 2

- Molecule 1: Penicillin-binding protein 1B

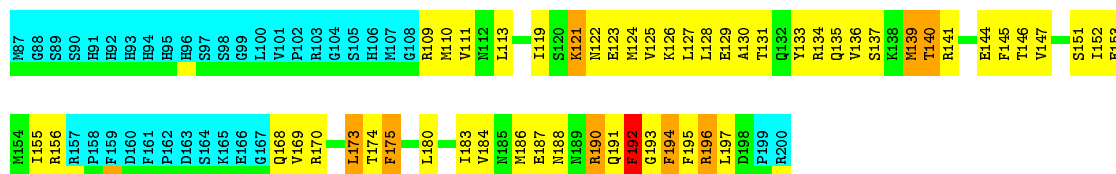




4.2.3 Score per residue for model 3

- Molecule 1: Penicillin-binding protein 1B

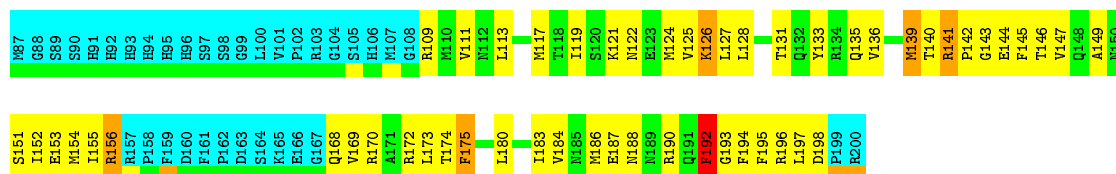
Chain A: 23% 39% 7% 31%



4.2.4 Score per residue for model 4 (medoid)

- Molecule 1: Penicillin-binding protein 1B

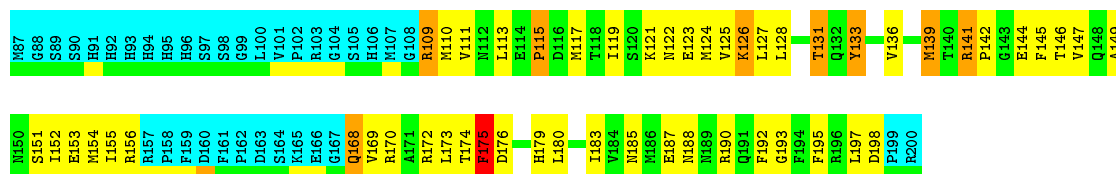
Chain A: 23% 41% 31%



4.2.5 Score per residue for model 5

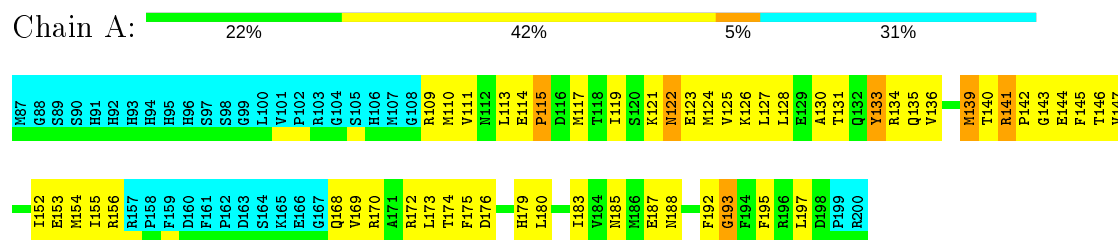
- Molecule 1: Penicillin-binding protein 1B

Chain A: 24% 38% 7% 31%



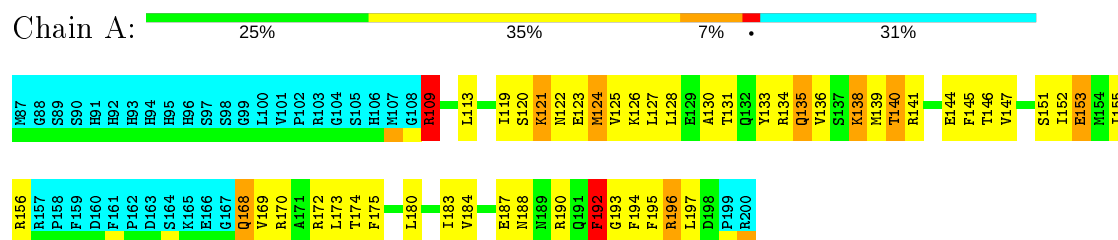
4.2.6 Score per residue for model 6

- Molecule 1: Penicillin-binding protein 1B



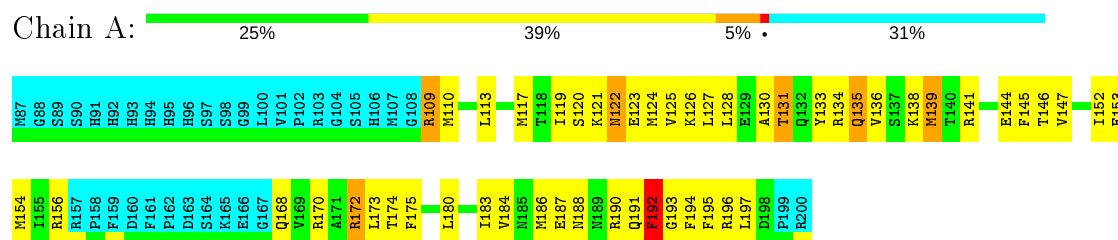
4.2.7 Score per residue for model 7

- Molecule 1: Penicillin-binding protein 1B



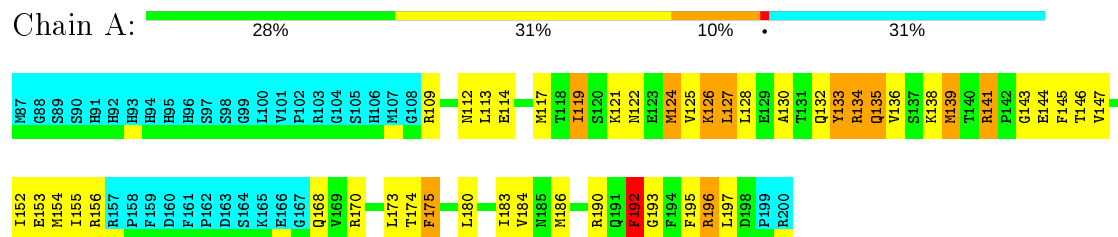
4.2.8 Score per residue for model 8

- Molecule 1: Penicillin-binding protein 1B



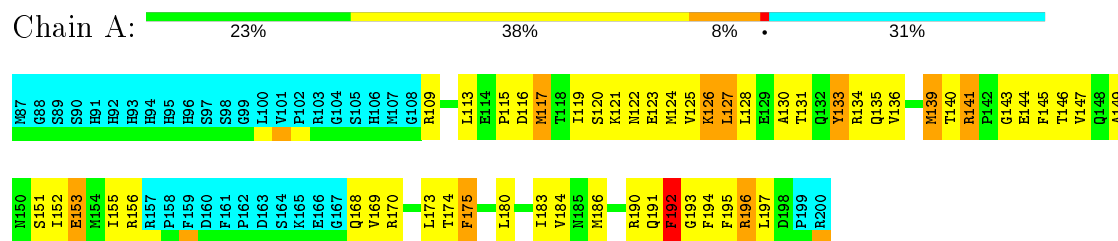
4.2.9 Score per residue for model 9

- Molecule 1: Penicillin-binding protein 1B



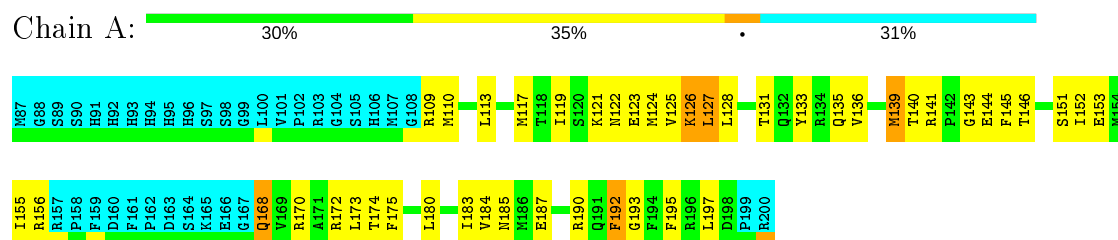
4.2.10 Score per residue for model 10

- Molecule 1: Penicillin-binding protein 1B



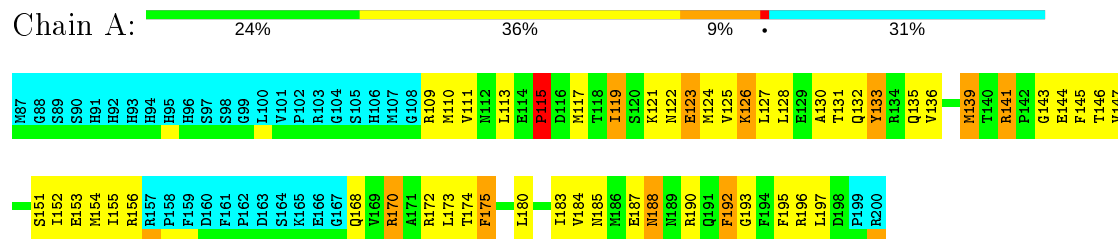
4.2.11 Score per residue for model 11

- Molecule 1: Penicillin-binding protein 1B



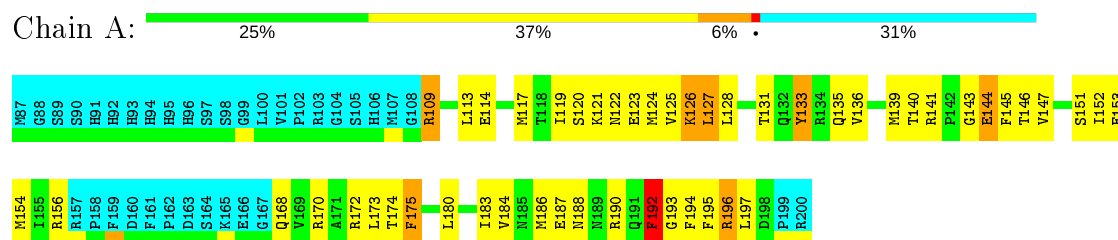
4.2.12 Score per residue for model 12

- Molecule 1: Penicillin-binding protein 1B



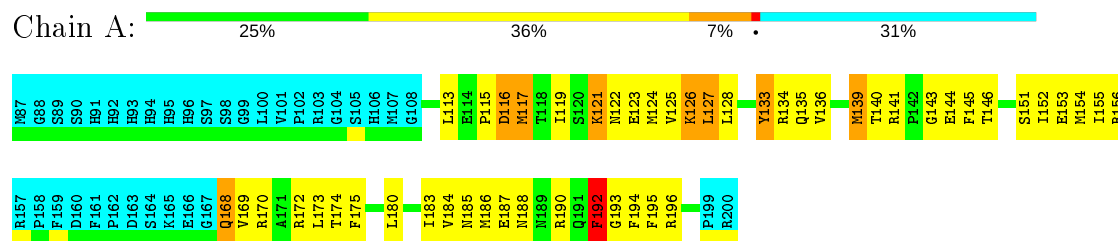
4.2.13 Score per residue for model 13

- Molecule 1: Penicillin-binding protein 1B



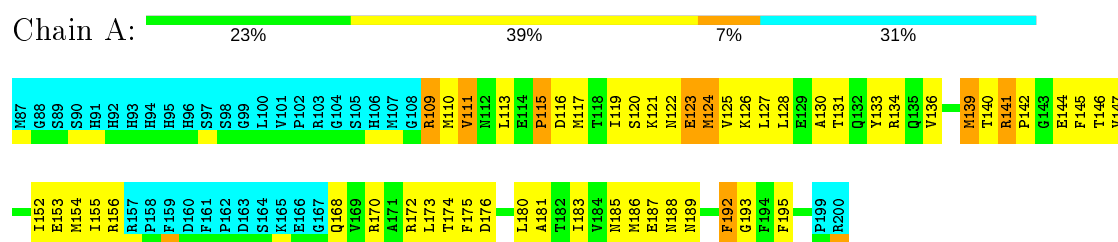
4.2.14 Score per residue for model 14

- Molecule 1: Penicillin-binding protein 1B



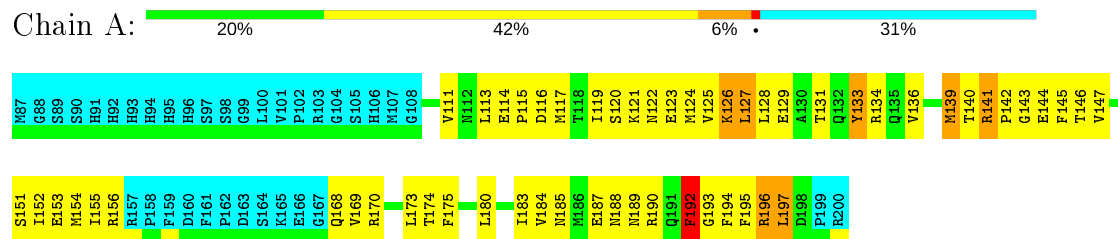
4.2.15 Score per residue for model 15

- Molecule 1: Penicillin-binding protein 1B



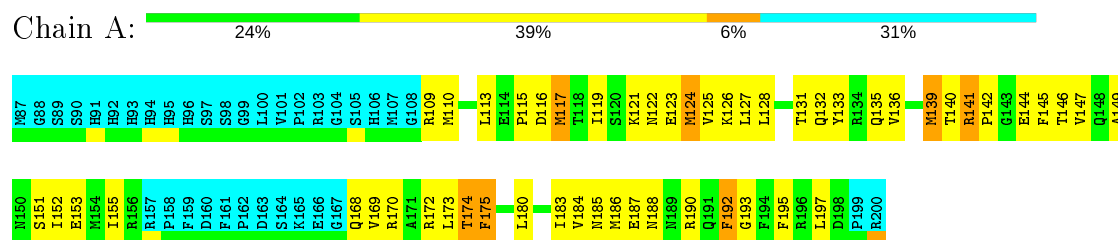
4.2.16 Score per residue for model 16

- Molecule 1: Penicillin-binding protein 1B



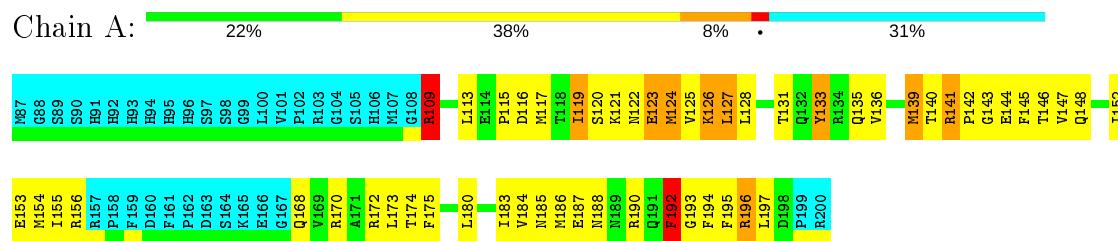
4.2.17 Score per residue for model 17

- Molecule 1: Penicillin-binding protein 1B



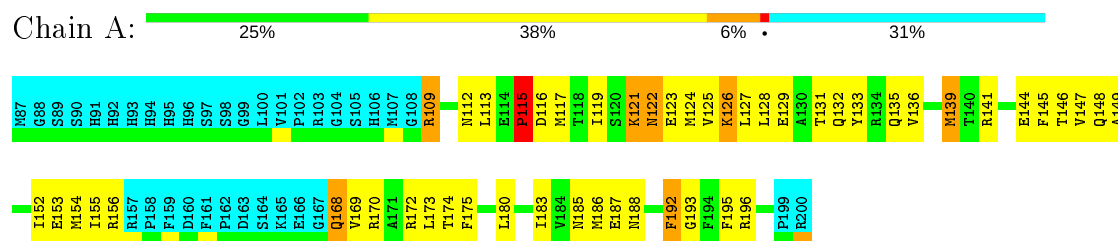
4.2.18 Score per residue for model 18

- Molecule 1: Penicillin-binding protein 1B



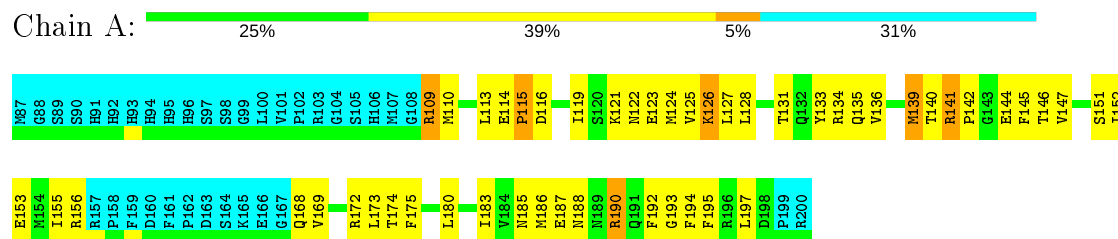
4.2.19 Score per residue for model 19

- Molecule 1: Penicillin-binding protein 1B



4.2.20 Score per residue for model 20

- Molecule 1: Penicillin-binding protein 1B



5 Refinement protocol and experimental data overview

The models were refined using the following method: *simulated annealing*.

Of the 750 calculated structures, 20 were deposited, based on the following criterion: 20.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
ARIA	structure calculation	2.3
CNS	refinement	1.2
UNIO	structure calculation	2.0.2

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 6 of this report.

Chemical shift file(s)	input_cs.cif
Number of chemical shift lists	1
Total number of shifts	1098
Number of shifts mapped to atoms	1098
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	80%

No validations of the models with respect to experimental NMR restraints is performed at this time.

COVALENT-GEOMETRY INFOmissingINFO

5.1 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in each chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	A	647	651	650	61±8
All	All	12940	13020	13000	1213

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 47.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:133:TYR:CE1	1:A:144:GLU:HG2	0.89	2.02	7	4
1:A:170:ARG:HG2	1:A:186:MET:HE3	0.88	1.45	13	2
1:A:121:LYS:HA	1:A:124:MET:SD	0.87	2.09	18	2
1:A:122:ASN:O	1:A:125:VAL:HG12	0.85	1.71	6	20
1:A:145:PHE:HB2	1:A:153:GLU:O	0.79	1.78	10	15
1:A:121:LYS:HG2	1:A:147:VAL:HG21	0.77	1.56	5	14
1:A:124:MET:HG3	1:A:152:ILE:HG21	0.75	1.56	15	2
1:A:115:PRO:CD	1:A:193:GLY:HA2	0.74	2.11	5	2
1:A:109:ARG:HA	1:A:122:ASN:O	0.74	1.83	17	4
1:A:113:LEU:HB2	1:A:195:PHE:O	0.74	1.82	4	19
1:A:113:LEU:HD13	1:A:173:LEU:HD21	0.73	1.58	13	2
1:A:133:TYR:CE1	1:A:144:GLU:HG3	0.73	2.17	12	10
1:A:124:MET:SD	1:A:152:ILE:HD12	0.73	2.24	11	2
1:A:136:VAL:HG12	1:A:145:PHE:O	0.73	1.83	3	16
1:A:124:MET:O	1:A:128:LEU:HG	0.73	1.82	4	20
1:A:113:LEU:HD12	1:A:195:PHE:HB3	0.72	1.61	13	5
1:A:156:ARG:HG2	1:A:197:LEU:HD22	0.72	1.62	5	1
1:A:155:ILE:HA	1:A:169:VAL:O	0.71	1.84	19	11
1:A:156:ARG:O	1:A:168:GLN:HA	0.71	1.85	4	15
1:A:127:LEU:HD13	1:A:197:LEU:HD13	0.71	1.61	8	1
1:A:128:LEU:HB3	1:A:145:PHE:CE2	0.69	2.23	10	20
1:A:127:LEU:HG	1:A:197:LEU:HD13	0.69	1.63	7	5
1:A:125:VAL:HG13	1:A:126:LYS:HE3	0.69	1.64	6	4
1:A:124:MET:SD	1:A:128:LEU:HD21	0.68	2.28	2	1
1:A:136:VAL:HG23	1:A:146:THR:HG22	0.68	1.64	2	4
1:A:172:ARG:O	1:A:183:ILE:HA	0.68	1.87	6	15
1:A:109:ARG:HB2	1:A:126:LYS:CG	0.67	2.19	18	2
1:A:124:MET:SD	1:A:173:LEU:HD23	0.67	2.30	1	6
1:A:124:MET:SD	1:A:173:LEU:HD22	0.67	2.29	13	1
1:A:135:GLN:HG3	1:A:147:VAL:O	0.67	1.90	12	7
1:A:170:ARG:HG2	1:A:186:MET:CE	0.66	2.21	3	4
1:A:147:VAL:HG23	1:A:152:ILE:HG12	0.66	1.66	10	15
1:A:133:TYR:CD1	1:A:144:GLU:HG2	0.65	2.26	7	3
1:A:126:LYS:CE	1:A:126:LYS:HA	0.65	2.21	4	9
1:A:124:MET:SD	1:A:152:ILE:HD13	0.65	2.32	15	3
1:A:115:PRO:HD3	1:A:183:ILE:HD12	0.64	1.70	20	5
1:A:127:LEU:HD23	1:A:128:LEU:HD23	0.64	1.69	11	8
1:A:128:LEU:HD22	1:A:145:PHE:CD2	0.64	2.27	17	13
1:A:113:LEU:HD21	1:A:173:LEU:HD21	0.63	1.70	7	5
1:A:184:VAL:HA	1:A:190:ARG:O	0.63	1.92	14	13
1:A:133:TYR:CG	1:A:144:GLU:HA	0.63	2.28	13	10
1:A:111:VAL:HG12	1:A:127:LEU:N	0.63	2.07	6	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:119:ILE:HG22	1:A:180:LEU:HB2	0.63	1.70	2	16
1:A:127:LEU:CG	1:A:197:LEU:HD13	0.63	2.24	7	6
1:A:124:MET:HG3	1:A:152:ILE:HD12	0.62	1.71	6	2
1:A:196:ARG:HD3	1:A:196:ARG:N	0.62	2.10	10	3
1:A:133:TYR:CZ	1:A:144:GLU:HG3	0.62	2.29	9	8
1:A:172:ARG:CB	1:A:184:VAL:HB	0.62	2.24	8	1
1:A:140:THR:O	1:A:141:ARG:HD3	0.61	1.96	1	2
1:A:119:ILE:CG2	1:A:180:LEU:HB2	0.60	2.26	17	17
1:A:156:ARG:O	1:A:156:ARG:HD3	0.60	1.95	19	1
1:A:121:LYS:O	1:A:125:VAL:HB	0.60	1.95	15	12
1:A:113:LEU:HB2	1:A:195:PHE:HB3	0.60	1.73	2	8
1:A:128:LEU:HD22	1:A:145:PHE:CG	0.60	2.32	12	18
1:A:115:PRO:HD3	1:A:183:ILE:CD1	0.60	2.26	20	4
1:A:155:ILE:HG22	1:A:168:GLN:HG2	0.59	1.73	5	1
1:A:113:LEU:HB3	1:A:183:ILE:CD1	0.59	2.27	20	3
1:A:113:LEU:HA	1:A:117:MET:CE	0.59	2.27	8	6
1:A:151:SER:HA	1:A:173:LEU:O	0.59	1.98	20	13
1:A:124:MET:HE2	1:A:124:MET:HA	0.59	1.75	14	1
1:A:183:ILE:HB	1:A:192:PHE:CB	0.59	2.27	19	13
1:A:124:MET:CE	1:A:173:LEU:HD23	0.59	2.28	7	5
1:A:109:ARG:HB3	1:A:126:LYS:CG	0.59	2.27	9	2
1:A:110:MET:H	1:A:123:GLU:HA	0.58	1.59	3	6
1:A:139:MET:SD	1:A:146:THR:HG23	0.58	2.38	20	4
1:A:136:VAL:HG13	1:A:146:THR:HG22	0.58	1.74	6	11
1:A:133:TYR:HB2	1:A:143:GLY:O	0.58	1.97	10	6
1:A:113:LEU:HD11	1:A:127:LEU:CD1	0.58	2.28	13	2
1:A:124:MET:CG	1:A:152:ILE:HD13	0.58	2.29	15	3
1:A:113:LEU:HD23	1:A:173:LEU:HD11	0.58	1.74	9	1
1:A:170:ARG:HG2	1:A:186:MET:HE2	0.58	1.76	3	1
1:A:153:GLU:HG2	1:A:186:MET:SD	0.58	2.39	10	6
1:A:117:MET:SD	1:A:180:LEU:HB3	0.58	2.39	14	2
1:A:124:MET:O	1:A:127:LEU:HB3	0.57	1.99	16	18
1:A:124:MET:SD	1:A:128:LEU:HD11	0.57	2.39	15	3
1:A:124:MET:HA	1:A:124:MET:CE	0.57	2.30	4	2
1:A:170:ARG:CG	1:A:186:MET:HE3	0.57	2.26	13	1
1:A:155:ILE:HG23	1:A:168:GLN:HG3	0.57	1.74	12	2
1:A:185:ASN:OD1	1:A:187:GLU:HG2	0.57	1.99	12	7
1:A:133:TYR:CE2	1:A:144:GLU:HG3	0.57	2.34	9	2
1:A:119:ILE:HD13	1:A:124:MET:HE2	0.56	1.76	8	2
1:A:139:MET:HB2	1:A:144:GLU:CD	0.56	2.20	13	1
1:A:154:MET:O	1:A:170:ARG:HA	0.56	2.01	12	9

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:136:VAL:CG1	1:A:146:THR:HG22	0.56	2.30	15	10
1:A:156:ARG:NH1	1:A:198:ASP:HB3	0.56	2.14	5	1
1:A:124:MET:SD	1:A:152:ILE:HB	0.56	2.41	13	1
1:A:183:ILE:HB	1:A:192:PHE:HB2	0.56	1.76	12	7
1:A:124:MET:SD	1:A:152:ILE:HG21	0.56	2.41	2	1
1:A:155:ILE:HG12	1:A:170:ARG:HG3	0.56	1.78	2	7
1:A:111:VAL:HG11	1:A:127:LEU:N	0.55	2.16	15	1
1:A:195:PHE:C	1:A:196:ARG:HD2	0.55	2.22	12	3
1:A:127:LEU:HA	1:A:197:LEU:CD1	0.55	2.32	16	2
1:A:155:ILE:CG2	1:A:168:GLN:HG3	0.55	2.31	4	10
1:A:126:LYS:HA	1:A:126:LYS:CE	0.55	2.32	5	4
1:A:152:ILE:O	1:A:173:LEU:HB2	0.55	2.02	6	14
1:A:196:ARG:H	1:A:196:ARG:HD3	0.55	1.62	16	1
1:A:124:MET:HE2	1:A:128:LEU:HD21	0.55	1.78	18	1
1:A:117:MET:SD	1:A:180:LEU:HD22	0.55	2.42	17	3
1:A:133:TYR:CD1	1:A:144:GLU:HA	0.55	2.36	13	16
1:A:156:ARG:HG2	1:A:197:LEU:CD2	0.54	2.31	5	1
1:A:127:LEU:HD12	1:A:128:LEU:HD23	0.54	1.77	2	3
1:A:113:LEU:HD22	1:A:195:PHE:HB3	0.54	1.78	9	3
1:A:120:SER:H	1:A:123:GLU:HB2	0.54	1.62	15	5
1:A:175:PHE:HA	1:A:180:LEU:HA	0.54	1.79	20	19
1:A:127:LEU:CD1	1:A:128:LEU:HD23	0.54	2.32	2	4
1:A:121:LYS:HA	1:A:124:MET:HE3	0.54	1.80	2	1
1:A:124:MET:CG	1:A:152:ILE:HD12	0.54	2.32	6	2
1:A:110:MET:HB3	1:A:123:GLU:CG	0.54	2.32	2	2
1:A:121:LYS:HA	1:A:124:MET:CE	0.54	2.33	2	1
1:A:124:MET:HG2	1:A:128:LEU:HD21	0.54	1.78	15	1
1:A:115:PRO:HD3	1:A:193:GLY:CA	0.53	2.33	6	1
1:A:127:LEU:HA	1:A:197:LEU:HD12	0.53	1.79	16	2
1:A:124:MET:CE	1:A:128:LEU:HD11	0.53	2.33	15	3
1:A:139:MET:HB3	1:A:146:THR:CG2	0.53	2.33	5	9
1:A:187:GLU:HG3	1:A:188:ASN:N	0.53	2.18	7	14
1:A:115:PRO:CD	1:A:193:GLY:HA3	0.53	2.34	6	1
1:A:109:ARG:HD3	1:A:109:ARG:O	0.53	2.03	18	1
1:A:136:VAL:CG2	1:A:146:THR:HG22	0.53	2.34	4	2
1:A:196:ARG:N	1:A:196:ARG:HD3	0.53	2.19	16	1
1:A:133:TYR:HB3	1:A:145:PHE:CD2	0.53	2.38	9	14
1:A:128:LEU:HA	1:A:131:THR:HG22	0.53	1.79	1	6
1:A:121:LYS:HG2	1:A:147:VAL:CG2	0.53	2.33	10	3
1:A:119:ILE:HG13	1:A:123:GLU:CB	0.53	2.34	16	8
1:A:156:ARG:C	1:A:156:ARG:HD3	0.53	2.24	19	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:195:PHE:C	1:A:196:ARG:HD3	0.53	2.23	13	1
1:A:126:LYS:HE2	1:A:126:LYS:HA	0.52	1.79	4	3
1:A:113:LEU:CD1	1:A:195:PHE:HB3	0.52	2.33	13	1
1:A:170:ARG:HB3	1:A:186:MET:HB2	0.52	1.79	9	8
1:A:122:ASN:HA	1:A:125:VAL:HB	0.52	1.81	7	11
1:A:141:ARG:HG3	1:A:144:GLU:CD	0.52	2.25	12	8
1:A:126:LYS:HA	1:A:126:LYS:HE2	0.52	1.82	11	3
1:A:127:LEU:CD2	1:A:197:LEU:HD13	0.52	2.35	3	1
1:A:136:VAL:HG11	1:A:139:MET:HB2	0.52	1.82	15	9
1:A:127:LEU:HG	1:A:197:LEU:CD1	0.52	2.35	10	2
1:A:115:PRO:HA	1:A:180:LEU:CD2	0.51	2.35	19	5
1:A:139:MET:O	1:A:139:MET:HG2	0.51	2.04	18	2
1:A:138:LYS:C	1:A:138:LYS:HD2	0.51	2.26	7	1
1:A:113:LEU:CD2	1:A:195:PHE:HB3	0.51	2.35	9	5
1:A:136:VAL:HG23	1:A:146:THR:CG2	0.51	2.36	1	1
1:A:109:ARG:CB	1:A:126:LYS:HG2	0.51	2.34	18	1
1:A:113:LEU:HG	1:A:173:LEU:HD21	0.51	1.82	10	1
1:A:119:ILE:HA	1:A:123:GLU:OE1	0.51	2.06	5	1
1:A:140:THR:C	1:A:141:ARG:HD3	0.51	2.25	1	2
1:A:113:LEU:CB	1:A:195:PHE:HB3	0.51	2.35	2	4
1:A:145:PHE:HA	1:A:154:MET:HA	0.51	1.83	16	14
1:A:175:PHE:CD1	1:A:175:PHE:N	0.51	2.79	5	6
1:A:117:MET:CE	1:A:180:LEU:HD13	0.50	2.36	4	5
1:A:145:PHE:HA	1:A:153:GLU:O	0.50	2.07	11	3
1:A:115:PRO:CD	1:A:193:GLY:CA	0.50	2.89	6	1
1:A:139:MET:SD	1:A:145:PHE:HA	0.50	2.46	12	4
1:A:111:VAL:HG12	1:A:124:MET:HE1	0.50	1.84	12	2
1:A:127:LEU:HA	1:A:197:LEU:HD11	0.50	1.82	2	1
1:A:110:MET:O	1:A:123:GLU:HB3	0.50	2.06	20	1
1:A:146:THR:OG1	1:A:153:GLU:HB2	0.50	2.06	19	4
1:A:113:LEU:CG	1:A:173:LEU:HD21	0.50	2.37	10	1
1:A:127:LEU:HD11	1:A:154:MET:SD	0.50	2.46	16	3
1:A:121:LYS:HA	1:A:152:ILE:HD11	0.50	1.82	3	5
1:A:117:MET:HE3	1:A:180:LEU:HD13	0.50	1.81	4	6
1:A:120:SER:O	1:A:124:MET:SD	0.50	2.70	7	1
1:A:119:ILE:HD13	1:A:124:MET:HE3	0.50	1.82	11	1
1:A:141:ARG:HG2	1:A:144:GLU:CD	0.50	2.27	1	2
1:A:125:VAL:HG13	1:A:126:LYS:CE	0.49	2.37	17	5
1:A:113:LEU:HD21	1:A:124:MET:SD	0.49	2.47	19	1
1:A:113:LEU:HB3	1:A:183:ILE:HD13	0.49	1.83	6	3
1:A:113:LEU:HB2	1:A:195:PHE:CB	0.49	2.36	6	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:140:THR:O	1:A:141:ARG:HD2	0.49	2.06	20	3
1:A:196:ARG:O	1:A:197:LEU:HD23	0.49	2.08	13	1
1:A:156:ARG:HB2	1:A:195:PHE:CZ	0.49	2.42	12	1
1:A:133:TYR:CE1	1:A:136:VAL:HB	0.49	2.43	20	14
1:A:133:TYR:OH	1:A:136:VAL:HG11	0.49	2.07	9	1
1:A:120:SER:O	1:A:124:MET:HG2	0.49	2.08	8	2
1:A:196:ARG:HD3	1:A:196:ARG:H	0.49	1.68	10	1
1:A:196:ARG:N	1:A:196:ARG:CD	0.49	2.75	9	1
1:A:115:PRO:HA	1:A:180:LEU:HD23	0.49	1.84	20	5
1:A:196:ARG:N	1:A:196:ARG:HD2	0.49	2.22	9	2
1:A:136:VAL:HG21	1:A:139:MET:CB	0.48	2.38	2	4
1:A:124:MET:HA	1:A:124:MET:HE2	0.48	1.85	4	1
1:A:122:ASN:O	1:A:125:VAL:CG1	0.48	2.61	16	16
1:A:124:MET:CG	1:A:128:LEU:HD21	0.48	2.39	15	1
1:A:115:PRO:HD2	1:A:193:GLY:HA2	0.48	1.85	15	5
1:A:175:PHE:N	1:A:175:PHE:CD1	0.48	2.82	13	5
1:A:133:TYR:HB3	1:A:145:PHE:CE2	0.48	2.43	12	3
1:A:146:THR:O	1:A:152:ILE:HA	0.47	2.09	14	1
1:A:128:LEU:HD22	1:A:145:PHE:CD1	0.47	2.44	16	2
1:A:113:LEU:HD12	1:A:113:LEU:N	0.47	2.23	10	3
1:A:196:ARG:HD2	1:A:196:ARG:H	0.47	1.68	18	1
1:A:124:MET:HE2	1:A:173:LEU:HD23	0.47	1.85	7	1
1:A:115:PRO:HA	1:A:180:LEU:CD1	0.47	2.40	2	1
1:A:114:GLU:O	1:A:117:MET:HG2	0.47	2.10	6	4
1:A:111:VAL:HB	1:A:197:LEU:HD12	0.47	1.84	5	1
1:A:173:LEU:HD12	1:A:173:LEU:N	0.47	2.24	6	2
1:A:124:MET:HG3	1:A:152:ILE:HD13	0.47	1.86	18	2
1:A:136:VAL:CG1	1:A:139:MET:HB3	0.47	2.39	14	3
1:A:124:MET:SD	1:A:127:LEU:HD13	0.47	2.48	10	1
1:A:175:PHE:HD1	1:A:175:PHE:N	0.47	2.08	5	5
1:A:185:ASN:CG	1:A:187:GLU:HG2	0.47	2.30	18	3
1:A:173:LEU:CD1	1:A:173:LEU:N	0.47	2.78	6	1
1:A:119:ILE:HD11	1:A:124:MET:CE	0.47	2.40	4	2
1:A:154:MET:HE1	1:A:197:LEU:HD21	0.47	1.87	18	1
1:A:109:ARG:HB2	1:A:126:LYS:HG2	0.47	1.86	18	1
1:A:113:LEU:HD13	1:A:173:LEU:HD11	0.47	1.86	18	1
1:A:172:ARG:HB2	1:A:186:MET:SD	0.47	2.50	4	1
1:A:155:ILE:HG12	1:A:170:ARG:CG	0.47	2.40	7	7
1:A:183:ILE:HD12	1:A:193:GLY:HA2	0.47	1.85	6	1
1:A:194:PHE:HB2	1:A:196:ARG:HD3	0.47	1.87	4	1
1:A:124:MET:HE3	1:A:124:MET:HA	0.46	1.86	9	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:136:VAL:HG21	1:A:139:MET:HB2	0.46	1.87	4	3
1:A:127:LEU:HD23	1:A:197:LEU:HG	0.46	1.87	2	1
1:A:127:LEU:HD22	1:A:197:LEU:HD12	0.46	1.87	6	1
1:A:124:MET:HG3	1:A:127:LEU:CB	0.46	2.40	9	1
1:A:128:LEU:HD13	1:A:145:PHE:CZ	0.46	2.46	15	1
1:A:109:ARG:HB2	1:A:126:LYS:HG3	0.46	1.86	18	1
1:A:185:ASN:HB3	1:A:190:ARG:HG2	0.46	1.86	20	1
1:A:176:ASP:HB3	1:A:179:HIS:CD2	0.46	2.46	6	2
1:A:147:VAL:CG2	1:A:152:ILE:HG12	0.46	2.41	18	2
1:A:139:MET:HA	1:A:144:GLU:OE1	0.46	2.10	20	1
1:A:147:VAL:HG22	1:A:148:GLN:N	0.46	2.26	19	1
1:A:119:ILE:HG23	1:A:175:PHE:CE2	0.46	2.46	8	1
1:A:115:PRO:HD3	1:A:193:GLY:HA2	0.46	1.86	5	2
1:A:124:MET:CE	1:A:127:LEU:HD22	0.46	2.41	10	1
1:A:115:PRO:CG	1:A:193:GLY:HA2	0.45	2.40	2	1
1:A:124:MET:HG3	1:A:124:MET:O	0.45	2.10	17	1
1:A:127:LEU:HD13	1:A:197:LEU:CD1	0.45	2.35	8	1
1:A:141:ARG:O	1:A:155:ILE:HD12	0.45	2.11	5	1
1:A:115:PRO:O	1:A:116:ASP:HB3	0.45	2.12	17	8
1:A:117:MET:HE2	1:A:180:LEU:HD13	0.45	1.86	17	1
1:A:119:ILE:HG23	1:A:175:PHE:CZ	0.45	2.47	2	3
1:A:119:ILE:HG21	1:A:124:MET:HE1	0.45	1.89	3	1
1:A:172:ARG:HB3	1:A:184:VAL:HB	0.45	1.87	11	3
1:A:133:TYR:CB	1:A:144:GLU:HA	0.45	2.41	13	1
1:A:113:LEU:HD22	1:A:195:PHE:CD1	0.45	2.45	5	1
1:A:124:MET:HG2	1:A:152:ILE:HG21	0.45	1.87	10	1
1:A:170:ARG:HB3	1:A:186:MET:CE	0.45	2.42	17	2
1:A:134:ARG:HD2	1:A:135:GLN:N	0.45	2.27	8	1
1:A:126:LYS:CA	1:A:126:LYS:CE	0.45	2.94	16	1
1:A:133:TYR:HE1	1:A:136:VAL:CB	0.45	2.25	20	3
1:A:176:ASP:HB2	1:A:181:ALA:HB2	0.45	1.87	15	1
1:A:133:TYR:CD1	1:A:144:GLU:HG3	0.45	2.46	10	4
1:A:110:MET:HB3	1:A:123:GLU:HG2	0.45	1.88	5	1
1:A:173:LEU:N	1:A:173:LEU:CD1	0.45	2.80	3	5
1:A:173:LEU:HB3	1:A:180:LEU:CD1	0.45	2.41	10	2
1:A:124:MET:SD	1:A:154:MET:HE1	0.45	2.52	12	1
1:A:127:LEU:C	1:A:127:LEU:HD13	0.45	2.32	7	1
1:A:139:MET:HG2	1:A:139:MET:O	0.44	2.09	6	5
1:A:113:LEU:HD12	1:A:195:PHE:CD1	0.44	2.47	19	2
1:A:127:LEU:HG	1:A:197:LEU:HD12	0.44	1.88	10	1
1:A:156:ARG:HB2	1:A:195:PHE:CE1	0.44	2.48	12	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:121:LYS:HD2	1:A:121:LYS:H	0.44	1.71	8	2
1:A:195:PHE:CE1	1:A:197:LEU:HD21	0.44	2.47	7	1
1:A:134:ARG:HD3	1:A:135:GLN:N	0.44	2.27	1	1
1:A:156:ARG:O	1:A:156:ARG:HG3	0.44	2.12	5	1
1:A:110:MET:HB3	1:A:123:GLU:HG3	0.44	1.89	20	2
1:A:127:LEU:HD23	1:A:197:LEU:CG	0.44	2.42	2	1
1:A:175:PHE:N	1:A:175:PHE:HD1	0.44	2.11	13	2
1:A:133:TYR:CE1	1:A:144:GLU:CG	0.44	2.94	20	2
1:A:183:ILE:O	1:A:191:GLN:HA	0.44	2.13	10	3
1:A:183:ILE:HB	1:A:192:PHE:HB3	0.44	1.89	5	2
1:A:192:PHE:O	1:A:194:PHE:N	0.44	2.50	8	9
1:A:113:LEU:HA	1:A:117:MET:HE1	0.44	1.88	14	3
1:A:124:MET:SD	1:A:152:ILE:CG2	0.44	3.06	2	1
1:A:126:LYS:CE	1:A:126:LYS:CA	0.43	2.95	19	3
1:A:121:LYS:CA	1:A:124:MET:SD	0.43	2.97	18	1
1:A:119:ILE:CG1	1:A:123:GLU:HB3	0.43	2.43	11	1
1:A:113:LEU:HD11	1:A:124:MET:SD	0.43	2.53	12	1
1:A:133:TYR:CE1	1:A:136:VAL:HG13	0.43	2.48	4	2
1:A:109:ARG:NH1	1:A:125:VAL:HG21	0.43	2.28	2	1
1:A:124:MET:HE1	1:A:128:LEU:HD11	0.43	1.90	15	1
1:A:141:ARG:HG2	1:A:144:GLU:OE1	0.43	2.13	1	1
1:A:144:GLU:HG3	1:A:145:PHE:N	0.43	2.27	13	1
1:A:151:SER:HB2	1:A:153:GLU:OE2	0.43	2.14	13	1
1:A:119:ILE:HG12	1:A:124:MET:SD	0.43	2.53	20	1
1:A:124:MET:HG2	1:A:127:LEU:CB	0.43	2.43	13	1
1:A:128:LEU:HD22	1:A:145:PHE:CE1	0.43	2.49	16	1
1:A:117:MET:CE	1:A:119:ILE:HD13	0.43	2.44	12	1
1:A:154:MET:HE3	1:A:173:LEU:HD13	0.43	1.89	4	1
1:A:113:LEU:CD1	1:A:113:LEU:N	0.43	2.81	10	1
1:A:187:GLU:CG	1:A:188:ASN:N	0.43	2.82	15	5
1:A:133:TYR:CG	1:A:134:ARG:N	0.43	2.87	2	9
1:A:144:GLU:CG	1:A:145:PHE:N	0.43	2.82	13	1
1:A:117:MET:HG3	1:A:180:LEU:HB3	0.43	1.91	5	2
1:A:139:MET:HG3	1:A:144:GLU:HB3	0.43	1.90	2	2
1:A:113:LEU:CD2	1:A:173:LEU:HD21	0.43	2.44	4	1
1:A:113:LEU:N	1:A:113:LEU:CD1	0.42	2.82	4	3
1:A:124:MET:CE	1:A:173:LEU:HD22	0.42	2.44	10	1
1:A:175:PHE:CE1	1:A:180:LEU:HD12	0.42	2.49	10	1
1:A:141:ARG:HG3	1:A:144:GLU:OE1	0.42	2.14	12	1
1:A:173:LEU:N	1:A:173:LEU:HD12	0.42	2.29	1	1
1:A:119:ILE:HG13	1:A:123:GLU:HB2	0.42	1.90	16	3

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:139:MET:HB3	1:A:146:THR:HG23	0.42	1.91	10	3
1:A:111:VAL:O	1:A:111:VAL:HG23	0.42	2.14	6	1
1:A:183:ILE:CD1	1:A:193:GLY:HA2	0.42	2.45	6	1
1:A:133:TYR:HE1	1:A:136:VAL:HB	0.42	1.73	3	3
1:A:141:ARG:HE	1:A:144:GLU:CD	0.42	2.17	15	1
1:A:125:VAL:HG13	1:A:126:LYS:N	0.42	2.29	7	8
1:A:172:ARG:HB2	1:A:184:VAL:HB	0.42	1.88	8	1
1:A:185:ASN:HB3	1:A:190:ARG:CG	0.42	2.45	20	1
1:A:133:TYR:CE1	1:A:144:GLU:HB2	0.42	2.49	13	1
1:A:127:LEU:O	1:A:130:ALA:HB3	0.42	2.14	6	1
1:A:114:GLU:H	1:A:117:MET:CE	0.42	2.27	9	1
1:A:140:THR:N	1:A:144:GLU:OE1	0.42	2.52	7	1
1:A:109:ARG:CB	1:A:126:LYS:CG	0.42	2.95	18	1
1:A:196:ARG:H	1:A:196:ARG:CD	0.42	2.28	7	1
1:A:136:VAL:HG11	1:A:139:MET:CB	0.42	2.45	14	1
1:A:196:ARG:O	1:A:196:ARG:HD2	0.42	2.14	14	1
1:A:156:ARG:NH1	1:A:197:LEU:HA	0.42	2.30	8	1
1:A:113:LEU:HD22	1:A:117:MET:HE1	0.42	1.92	2	1
1:A:168:GLN:HG2	1:A:169:VAL:N	0.41	2.30	7	1
1:A:119:ILE:HG13	1:A:123:GLU:HB3	0.41	1.92	11	2
1:A:127:LEU:HD13	1:A:127:LEU:C	0.41	2.36	2	1
1:A:145:PHE:CD1	1:A:145:PHE:C	0.41	2.93	20	2
1:A:141:ARG:CG	1:A:144:GLU:HG2	0.41	2.45	10	1
1:A:142:PRO:HB3	1:A:168:GLN:NE2	0.41	2.30	5	1
1:A:155:ILE:CG1	1:A:170:ARG:HG3	0.41	2.45	4	1
1:A:127:LEU:O	1:A:131:THR:HB	0.41	2.15	5	1
1:A:139:MET:SD	1:A:153:GLU:HB3	0.41	2.55	3	1
1:A:115:PRO:HA	1:A:180:LEU:HD12	0.41	1.91	2	1
1:A:125:VAL:CG1	1:A:126:LYS:N	0.41	2.83	5	2
1:A:113:LEU:N	1:A:113:LEU:HD12	0.41	2.30	14	1
1:A:127:LEU:O	1:A:131:THR:N	0.41	2.51	8	1
1:A:114:GLU:H	1:A:117:MET:HE2	0.41	1.75	6	1
1:A:110:MET:O	1:A:126:LYS:HB2	0.41	2.15	6	1
1:A:148:GLN:HA	1:A:148:GLN:OE1	0.41	2.15	18	1
1:A:140:THR:HA	1:A:155:ILE:CD1	0.41	2.46	3	1
1:A:113:LEU:HD11	1:A:127:LEU:HD11	0.41	1.93	13	1
1:A:119:ILE:HD11	1:A:124:MET:HE3	0.41	1.92	12	1
1:A:115:PRO:HG2	1:A:193:GLY:N	0.41	2.31	1	1
1:A:170:ARG:HB3	1:A:186:MET:HE2	0.41	1.93	17	1
1:A:185:ASN:O	1:A:189:ASN:N	0.40	2.48	16	2
1:A:112:ASN:C	1:A:113:LEU:HD12	0.40	2.36	9	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:139:MET:HB2	1:A:144:GLU:HB3	0.40	1.91	11	1
1:A:139:MET:HG3	1:A:144:GLU:CB	0.40	2.46	4	1
1:A:185:ASN:HB3	1:A:187:GLU:HG2	0.40	1.92	11	1
1:A:112:ASN:O	1:A:117:MET:HE1	0.40	2.16	19	1
1:A:109:ARG:CB	1:A:126:LYS:HG3	0.40	2.46	10	1
1:A:128:LEU:HD13	1:A:145:PHE:CE1	0.40	2.51	6	1
1:A:127:LEU:C	1:A:127:LEU:HD23	0.40	2.37	15	1
1:A:172:ARG:HE	1:A:174:THR:HG23	0.40	1.77	17	1
1:A:126:LYS:HA	1:A:126:LYS:HE3	0.40	1.92	12	1
1:A:122:ASN:N	1:A:122:ASN:OD1	0.40	2.55	1	1

5.2 Torsion angles ⓘ

5.2.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all NMR entries. The Analysed column shows the number of residues for which the backbone conformation was analysed and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	79/114 (69%)	67±2 (85±3%)	10±2 (13±2%)	2±1 (2±1%)	9	46
All	All	1580/2280 (69%)	1337 (85%)	205 (13%)	38 (2%)	9	46

All 6 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	193	GLY	12
1	A	109	ARG	10
1	A	115	PRO	8
1	A	149	ALA	6
1	A	168	GLN	1
1	A	116	ASP	1

5.2.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all NMR entries. The Analysed column shows the number of residues for which the sidechain conformation

was analysed and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	72/102 (71%)	61±2 (85±3%)	11±2 (15±3%)	6	43
All	All	1440/2040 (71%)	1220 (85%)	220 (15%)	6	43

All 38 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	141	ARG	20
1	A	174	THR	20
1	A	139	MET	18
1	A	126	LYS	14
1	A	192	PHE	14
1	A	131	THR	12
1	A	135	GLN	12
1	A	140	THR	10
1	A	109	ARG	9
1	A	127	LEU	8
1	A	196	ARG	7
1	A	124	MET	6
1	A	121	LYS	5
1	A	111	VAL	5
1	A	168	GLN	5
1	A	123	GLU	4
1	A	175	PHE	4
1	A	132	GLN	4
1	A	119	ILE	4
1	A	122	ASN	4
1	A	129	GLU	3
1	A	153	GLU	3
1	A	138	LYS	3
1	A	197	LEU	3
1	A	117	MET	3
1	A	134	ARG	3
1	A	190	ARG	3
1	A	115	PRO	3
1	A	194	PHE	2
1	A	114	GLU	1
1	A	172	ARG	1
1	A	137	SER	1
1	A	188	ASN	1
1	A	173	LEU	1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Models (Total)
1	A	144	GLU	1
1	A	156	ARG	1
1	A	170	ARG	1
1	A	185	ASN	1

5.2.3 RNA [i](#)

There are no RNA molecules in this entry.

5.3 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.4 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.5 Ligand geometry [i](#)

There are no ligands in this entry.

5.6 Other polymers [i](#)

There are no such molecules in this entry.

5.7 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 80% for the well-defined parts and 67% for the entire structure.

6.1 Chemical shift list 1

File name: input_cs.cif

Chemical shift list name: *UB2H_dep_2018.str*

6.1.1 Bookkeeping

The following table shows the results of parsing the chemical shift list and reports the number of nuclei with statistically unusual chemical shifts.

Total number of shifts	1098
Number of shifts mapped to atoms	1098
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	0

6.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction \pm precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	95	-0.02 ± 0.16	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	89	-0.23 ± 0.20	None needed (< 0.5 ppm)
$^{13}\text{C}'$	85	-0.12 ± 0.19	None needed (< 0.5 ppm)
^{15}N	85	-1.23 ± 0.40	Should be applied

6.1.3 Completeness of resonance assignments

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 80%, i.e. 832 atoms were assigned a chemical shift out of a possible 1039. 12 out of 12 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	370/391 (95%)	147/156 (94%)	152/158 (96%)	71/77 (92%)
Sidechain	410/587 (70%)	250/344 (73%)	160/205 (78%)	0/38 (0%)

Continued on next page...

Continued from previous page...

	Total	¹ H	¹³ C	¹⁵ N
Aromatic	52/61 (85%)	28/33 (85%)	24/26 (92%)	0/2 (0%)
Overall	832/1039 (80%)	425/533 (80%)	336/389 (86%)	71/117 (61%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 67%, i.e. 989 atoms were assigned a chemical shift out of a possible 1474. 12 out of 14 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹ H	¹³ C	¹⁵ N
Backbone	439/558 (79%)	174/222 (78%)	180/228 (79%)	85/108 (79%)
Sidechain	485/781 (62%)	298/465 (64%)	187/268 (70%)	0/48 (0%)
Aromatic	65/135 (48%)	35/71 (49%)	30/48 (62%)	0/16 (0%)
Overall	989/1474 (67%)	507/758 (67%)	397/544 (73%)	85/172 (49%)

6.1.4 Statistically unusual chemical shifts ⓘ

There are no statistically unusual chemical shifts.

6.1.5 Random Coil Index (RCI) plots ⓘ

The image below reports *random coil index* values for the protein chains in the structure. The height of each bar gives a probability of a given residue to be disordered, as predicted from the available chemical shifts and the amino acid sequence. A value above 0.2 is an indication of significant predicted disorder. The colour of the bar shows whether the residue is in the well-defined core (black) or in the ill-defined residue ranges (cyan), as described in section 2 on ensemble composition.

Random coil index (RCI) for chain A:

