Full wwPDB NMR Structure Validation Report ⓘ

Nov 1, 2021 – 05:11 PM EDT

PDB ID	:	2ROC
Title	:	Solution structure of Mcl-1 Complexed with Puma
Authors	:	Day, C.L.; Smits, C.; Fan, F.C.; Lee, E.F.; Fairlie, W.D.; Hinds, M.G.
Deposited on	:	2008-03-17

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:

|		
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	:	2.23.2
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.2

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 was not calculated.

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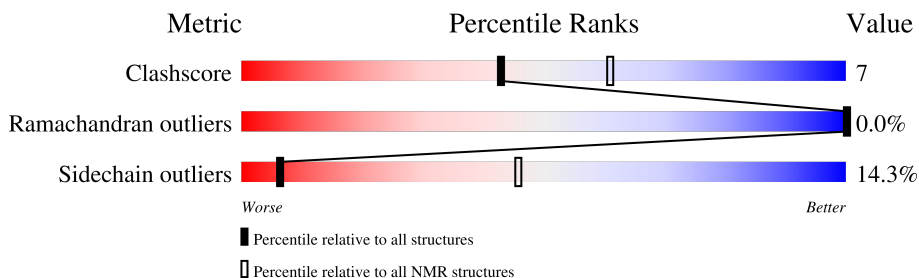
Metric	Whole archive (#Entries)	NMR archive (#Entries)
Clashscore	158937	12864
Ramachandran outliers	154571	11451
Sidechain outliers	154315	11428

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 <=5%

Mol	Chain	Length	Quality of chain
1	A	162	
2	B	27	

2 Ensemble composition and analysis ⓘ

This entry contains 20 models. Model 7 is the overall representative, medoid model (most similar to other models). The authors have identified model 1 as representative, based on the following criterion: *closest to the average*.

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:153-A:173, A:180-A:300, B:134-B:150 (159)	0.42	7

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 3 clusters and 5 single-model clusters were found.

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

3 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 3032 atoms, of which 1511 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Induced myeloid leukemia cell differentiation protein Mcl-1 homolog.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	162	2577	810	1289	236	240	2	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	147	GLY	-	expression tag	UNP P97287
A	148	PRO	-	expression tag	UNP P97287
A	149	LEU	-	expression tag	UNP P97287
A	150	GLY	-	expression tag	UNP P97287
A	151	SER	-	expression tag	UNP P97287

- Molecule 2 is a protein called Bcl-2-binding component 3.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
2	B	27	455	140	222	46	46	1	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	144	ILE	MET	engineered mutation	UNP Q99ML1
B	156	MET	-	expression tag	UNP Q99ML1

4 Residue-property plots ⓘ

4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide 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: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog
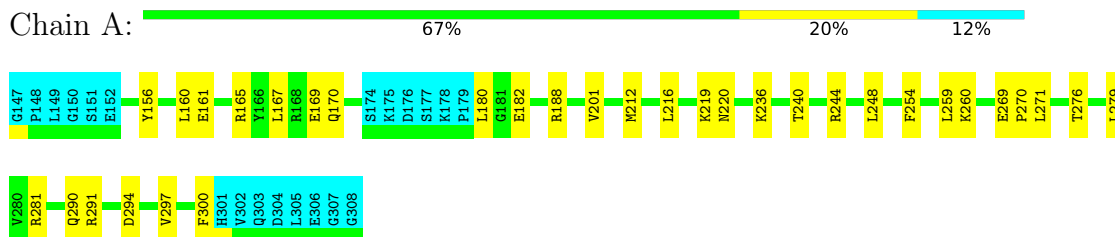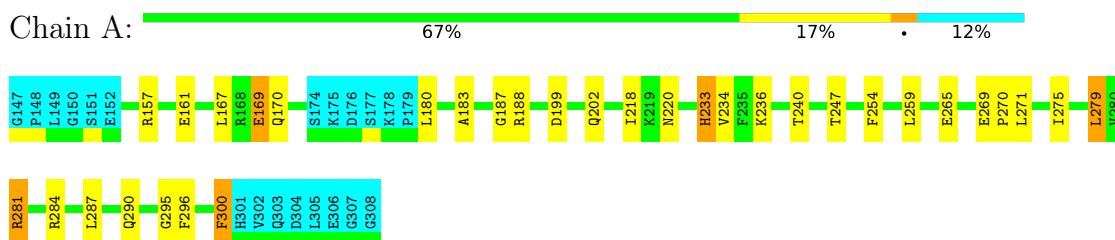

• Molecule 2: Bcl-2-binding component 3

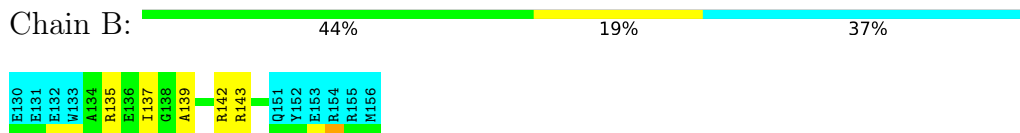## 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

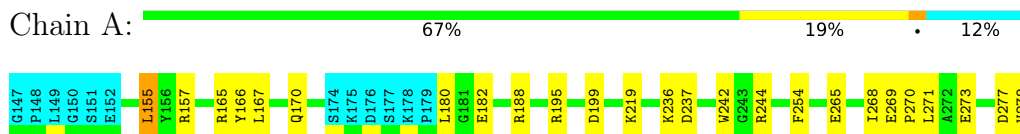• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

• Molecule 2: Bcl-2-binding component 3

Chain B: 44% 19% 37%

E130 E131 E132 W133 A134 R135 E136 I137 G138 A139 R142 R143 Q151 Y152 E153 R154 R155 M156

4.2.2 Score per residue for model 2

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A: 67% 19% • 12%

G147 P148 L149 G150 S151 E152 L155 Y156 R157 R165 Y166 L167 Q170 S174 K175 D176 S177 K178 P179 L180 G181 E182 R188 R195 D199 K219 K236 D237 W242 G243 R244 F254 E265 I268 E269 P270 L271 A272 E273 D277 V278 L279 V280 R281 T282 K283

Q290 R291 G292 W293 D294 F300 H301 V302 Q303 D304 L305 E306 G307 G308

• Molecule 2: Bcl-2-binding component 3

Chain B: 52% 11% 37%

E130 E131 E132 W133 I137 A145 L148 Q151 Y152 E153 R154 R155 M156

4.2.3 Score per residue for model 3

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A: 60% 24% • 12%

G147 P148 L149 G150 S151 E152 D153 D154 L155 Y156 R157 L160 R165 Y166 L167 R168 E169 Q170 A171 S174 K175 D176 S177 K178 P179 E182 A186 R189 A190 R203 T207 Q210 R214 E221 F227 K236 T240 N241 R244 L248 A253 F254 V255

A256 L259 F267 I268 E269 P270 L271 T276 L279 V280 R281 T282 K283 L287 Q290 W293 D294 G295 F296 V297 H301 V302 Q303 D304 L305 E306 G307 G308

• Molecule 2: Bcl-2-binding component 3

Chain B: 48% 15% 37%

E130 E131 E132 W133 I137 A145 D146 D147 L148 N149 A150 Q151 Y152 E153 R154 R155 M156

4.2.4 Score per residue for model 4

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

60%   27%   •   12%
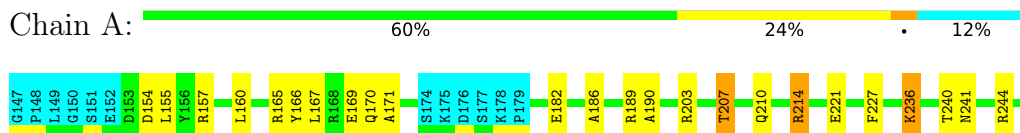
G147 P148 L149 G150 S151 E152 D153 D154 L155 Y156 L160 E161 I162 I163 Y166 Q170 S174 K175 D176 S177 K178 P179 L180 G181 E182 R189 L194 R195 V201 Q202 R203 E206 F209 Q210 G211 M212 L213 R214 K215 L216 K219 N220 D237 T240 R244 I249

A253 F254 H258 Q264 F267 I268 E269 P270 T276 D277 R281 T282 K283 R284 D285 V288 R291 Q292 W293 D294 V297 H301 V302 Q303 D304 L305 E306 G307 G308

• Molecule 2: Bcl-2-binding component 3

Chain B:

52%   11%   37%

E130 E131 E132 W133 A134 R135 E136 I137 A145 Q151 Y152 E153 R154 R155 M156

4.2.5 Score per residue for model 5

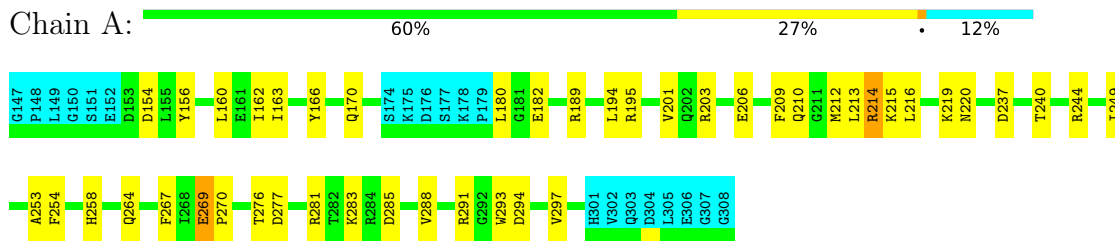• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

61%   25%   •   12%

G147 P148 L149 G150 S151 E152 Y156 R157 L160 I163 L167 R168 E169 S174 K175 D176 S177 K178 P179 L180 G181 E182 R189 T193 L194 V197 R203 L216 D217 I218 K219 N220 F227 D237 T240 N241 W242 G243 R244 I245 V246 T247 L248 I249 F254 V255

H258 L259 E269 P270 T276 L279 D285 V288 K289 Q290 G295 F296 V297 H301 V302 Q303 D304 L305 E306 G307 G308

• Molecule 2: Bcl-2-binding component 3

Chain B:

48%   7%   7%   37%

E130 E131 E132 W133 E136 Q140 R143 N149 A150 Q151 Y152 E153 R154 R155 M156

4.2.6 Score per residue for model 6

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

59%   23%   5%   12%
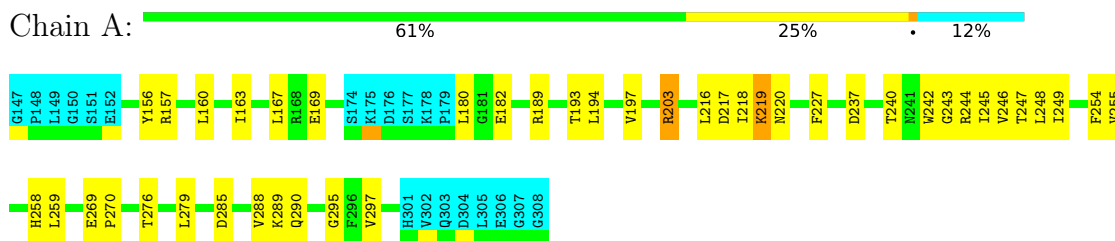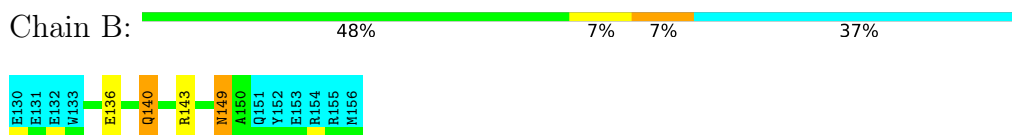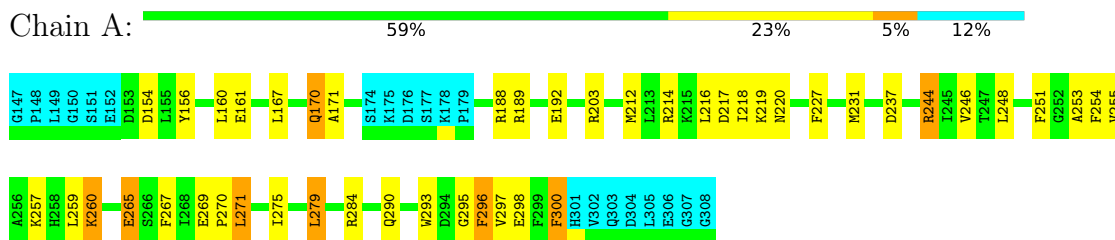
G147 P148 L149 G150 S151 E152 D153 D154 L155 Y156 L160 E161 L167 Q170 A171 S174 K175 D176 S177 R178 P179 R188 R189 E192 R203 M212 L213 R214 K215 L216 D217 I218 K219 N220 F227 M231 D237 R244 I245 V246 T247 L248 F251 G252 A253 F254 V255

A256 K257 H258 L259 K260 E265 S266 F267 I268 E269 P270 L271 I275 L279 R284 Q290 W293 D294 G295 F296 V297 E298 F299 F300 H301 V302 Q303 D304 L305 E306 G307 G308

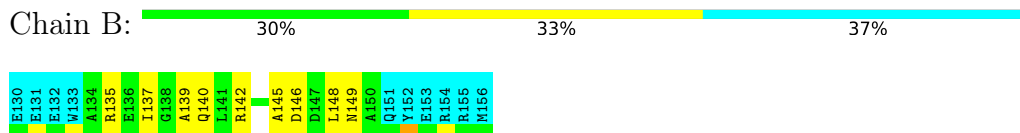• Molecule 2: Bcl-2-binding component 3

Chain B:

30%   33%   37%

4.2.7 Score per residue for model 7 (medoid)

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

58%   25%   •   12%

• Molecule 2: Bcl-2-binding component 3

Chain B:

37%   26%   37%

4.2.8 Score per residue for model 8

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

59%   25%   •   12%

• Molecule 2: Bcl-2-binding component 3

Chain B:

44%   19%   37%

4.2.9 Score per residue for model 9

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog
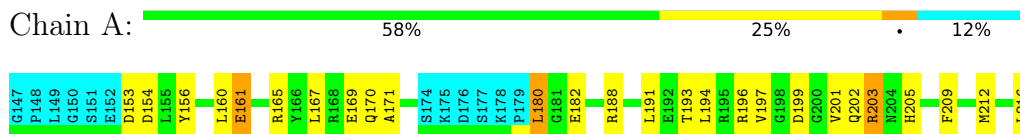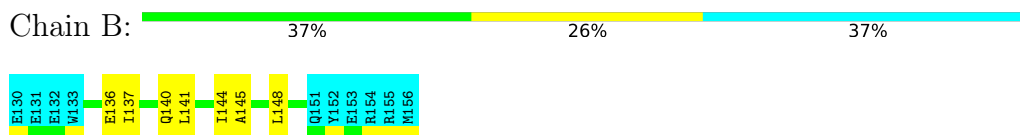
Chain A:

• Molecule 2: Bcl-2-binding component 3

Chain B:

4.2.10 Score per residue for model 10

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

• Molecule 2: Bcl-2-binding component 3

Chain B:

4.2.11 Score per residue for model 11

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog
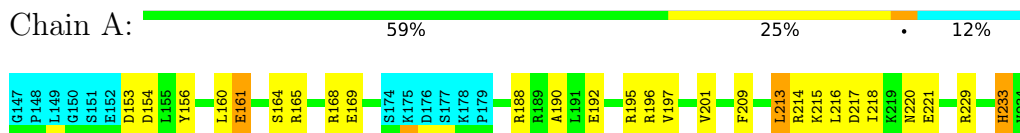
Chain A:

• Molecule 2: Bcl-2-binding component 3

Chain B:

4.2.12 Score per residue for model 12

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

• Molecule 2: Bcl-2-binding component 3

Chain B:

4.2.13 Score per residue for model 13

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

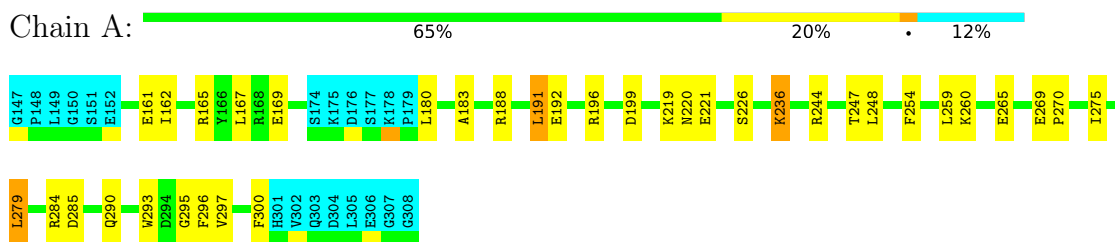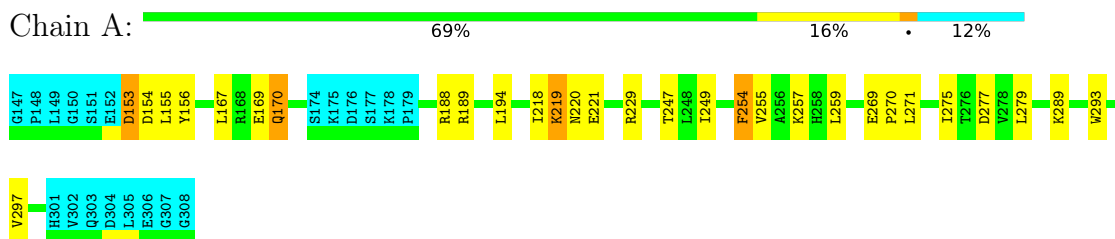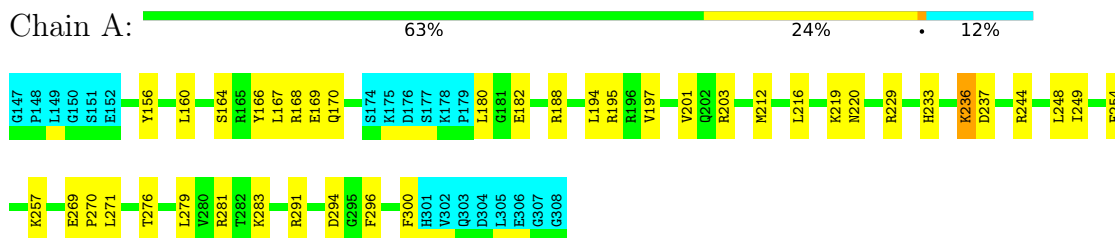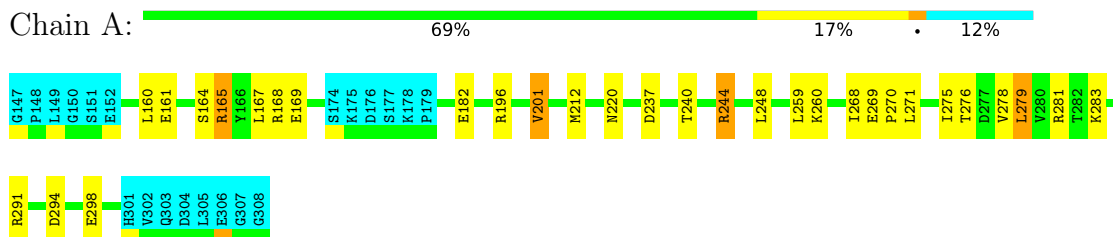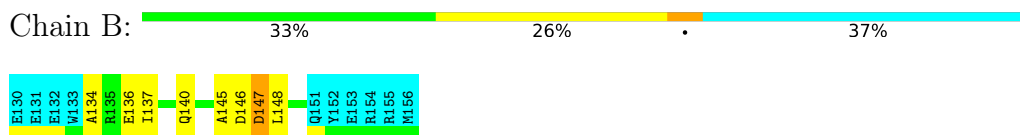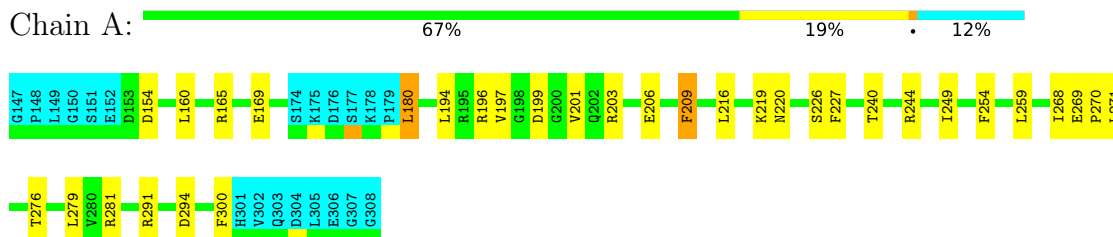• Molecule 2: Bcl-2-binding component 3

Chain B:

4.2.14 Score per residue for model 14

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

60%   23%   •   12%

G147 P148 L149 G150 S151 E152 D153 R157 E161 I162 R165 Y166 L167 S174 K175 D176 S177 K178 P179 E182 R189 A190 L191 E192 T193 L194 R195 R196 N204 H205 E206 T207 A208 M212 I218 K219 N220 F227 S228 R229 H233 K236 N241 W242 G243 R244 I245

V246 T247 L248 I249 F254 L259 V262 S266 E269 P270 R284 D285 W286 L287 Q290 W293 D294 V297 H301 V302 Q303 D304 L305 E306 G307 G308

- Molecule 2: Bcl-2-binding component 3

Chain B:

41%   19%   •   37%

E130 E131 E132 W133 A134 R135 E136 I137 Q140 L141 D147 L148 N149 A150 Q151 Y152 E153 R154 R155 M156

4.2.15   Score per residue for model 15

- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

65%   20%   •   12%

G147 P148 L149 G150 S151 E152 Q158 S159 L160 E161 R165 Y166 L167 R168 E169 S174 K175 D176 S177 K178 P179 L180 A183 R188 R196 D199 N204 M212 L216 D217 I218 K219 F227 S228 R229 T240 N241 W242 G243 R244 I245 V246 F254 V255 K260

E265 L271 I275 T276 L279 V280 R281 R284 D285 K289 Q290 F300 H301 V302 Q303 D304 L305 E306 G307 G308

- Molecule 2: Bcl-2-binding component 3

Chain B:

41%   15%   7%   37%

E130 E131 E132 W133 A134 R135 E136 I137 R142 R143 D147 Q151 Y152 E153 R154 R155 M156

4.2.16   Score per residue for model 16

- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

62%   24%   •   12%

G147 P148 L149 G150 S151 E152 Y156 L160 E161 I162 Y166 L167 S174 K175 D176 S177 K178 P179 L180 G181 E182 R188 R189 A190 L191 E192 T193 L194 R195 R196 A208 M212 L216 D217 I218 K219 S226 H233 V234 W242 G243 R244 I245 V246 T247 L248 F267 I268

E269 P270 L271 L279 K283 R284 Q290 R291 G292 W293 D294 G295 F296 V297 E298 H301 V302 Q303 D304 L305 E306 G307 G308

- Molecule 2: Bcl-2-binding component 3

Chain B:
41%　15%　7%　37%

E130 E131 E132 W133 A134 I137 Q140 L141 R142 A145 D146 Q151 Y152 E153 R154 R155 M156

4.2.17 Score per residue for model 17

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:
59%　27%　•　12%

G147 P148 L149 G150 S151 E152 D153 D154 L155 Y156 R157 L160 I163 S164 R165 Y166 L167 Q170 S174 K175 D176 S177 K178 P179 E182 R188 V197 G198 D199 G200 V201 Q202 R203 N204 H205 F209 M212 L213 I218 K219 N220 E221 V224 F227 K236 T247

F251 G252 A253 F254 V255 L259 E265 S266 F267 I268 E269 P270 T276 K283 R284 D285 W286 L287 V288 K289 Q290 R291 D294 H301 V302 Q303 D304 L305 E306 G307 G308

• Molecule 2: Bcl-2-binding component 3

Chain B:
44%　11%　7%　37%

E130 E131 E132 W133 I137 Q140 I144 D147 L148 Q151 Y152 E153 R154 R155 M156

4.2.18 Score per residue for model 18

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:
56%　30%　•　12%

G147 P148 L149 G150 S151 E152 D153 D154 L155 Y156 L167 S174 K175 D176 S177 K178 P179 L180 G181 E182 A183 R188 L191 E192 T193 L194 R195 R196 V197 V201 F209 Q210 G211 M212 L213 R214 K215 L216 D217 I218 K219 N220 K225 H233 K236 D237 T240 R244

L248 I249 F254 K257 H258 L259 K260 E269 P270 L271 T274 D277 V278 L279 V280 R281 T282 K283 R284 D285 W286 L287 V288 K289 W293 V297 F300 H301 V302 Q303 D304 L305 E306 G307 G308

• Molecule 2: Bcl-2-binding component 3

Chain B:
56%　7%　37%

E130 E131 E132 W133 I137 D147 Q151 Y152 E153 R154 R155 M156

4.2.19 Score per residue for model 19

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog
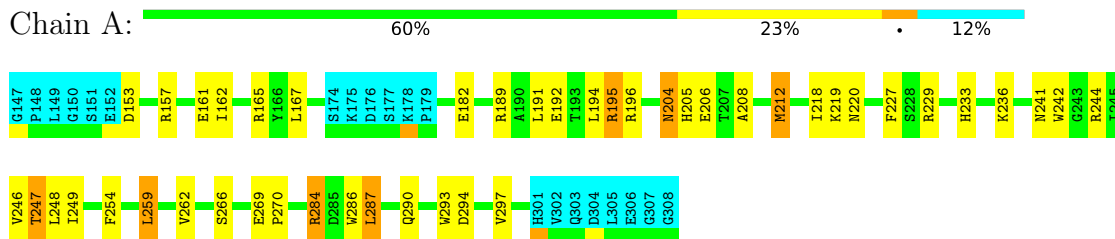
Chain A:
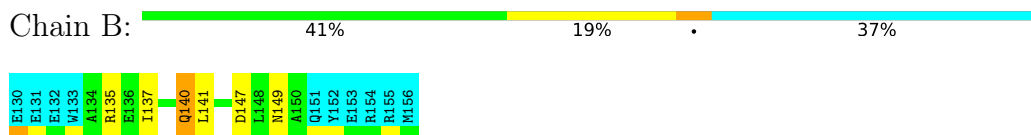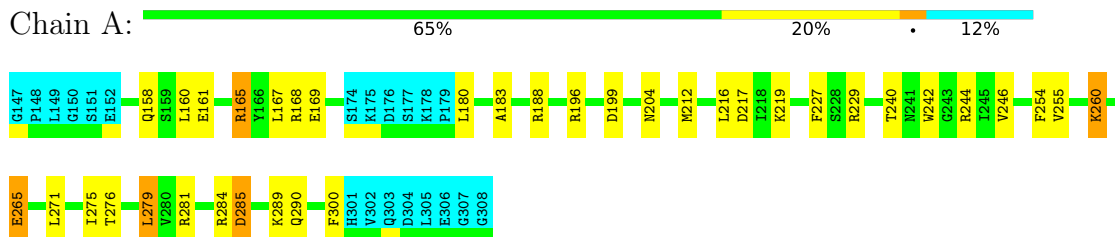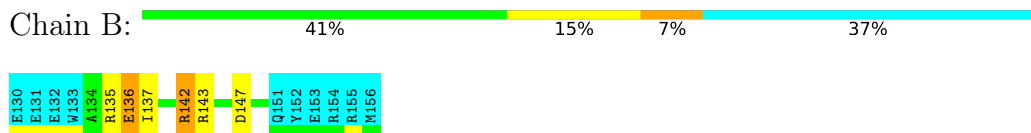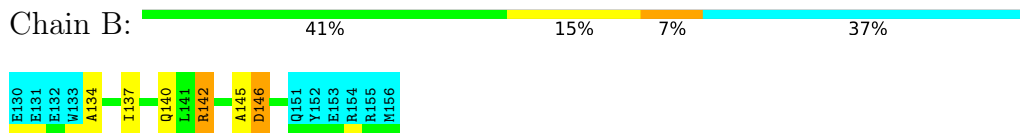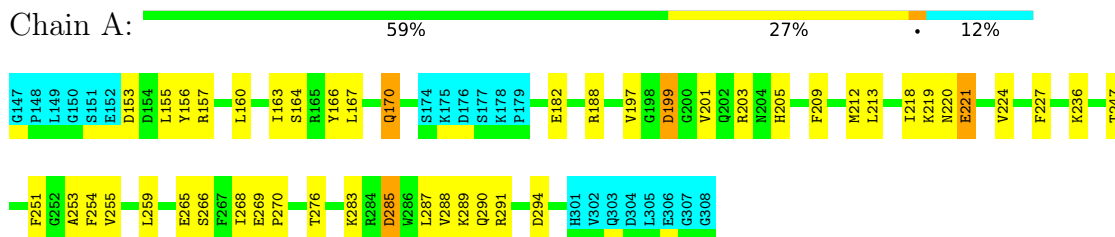

• Molecule 2: Bcl-2-binding component 3

Chain B:
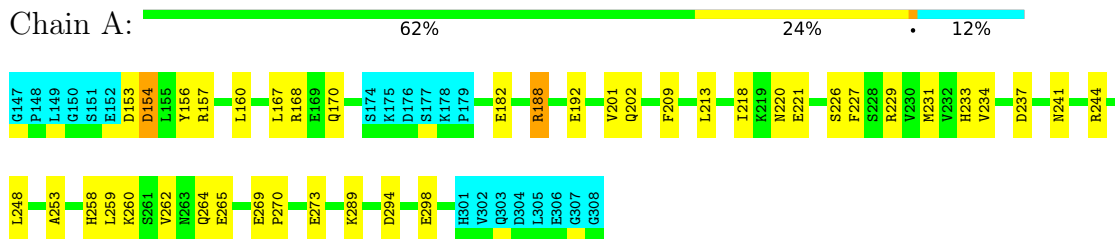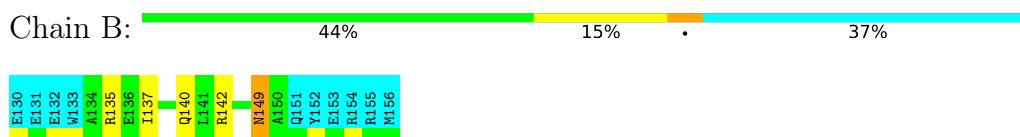
4.2.20 Score per residue for model 20

• Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1 homolog

Chain A:

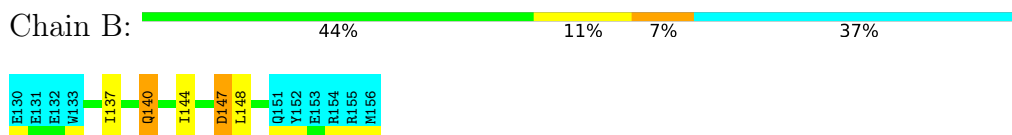• Molecule 2: Bcl-2-binding component 3

Chain B:
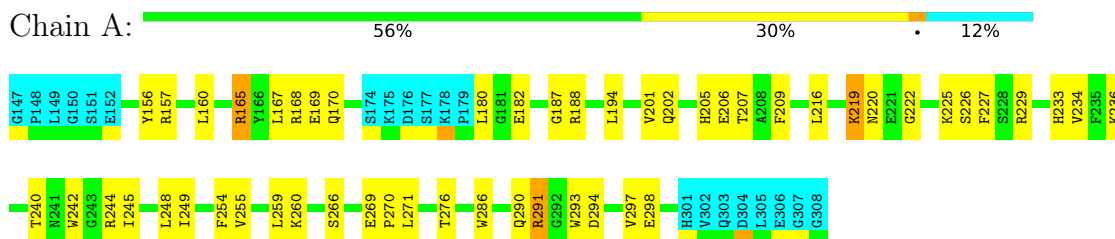
5 Refinement protocol and experimental data overview ⓘ

The models were refined using the following method: *DGSA-distance geometry simulated annealing.*

Of the 256 calculated structures, 20 were deposited, based on the following criterion: *structures with the least restraint violations.*

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

Software name	Classification	Version
CYANA	structure solution	2.1
X-PLOR NIH	refinement	

No chemical shift data was provided.

6 Model quality (i)

6.1 Standard geometry (i)

There are no covalent bond-length or bond-angle outliers.

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

6.2 Too-close contacts (i)

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	1145	1153	1150	18±5
2	B	131	134	134	3±2
All	All	25520	25740	25680	364

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 7.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models Worst	Total
1:A:189:ARG:HG2	1:A:297:VAL:HG11	0.90	1.40	6	2
1:A:165:ARG:HH12	1:A:191:LEU:HD13	0.82	1.33	14	1
1:A:218:ILE:HB	1:A:259:LEU:HD21	0.81	1.52	8	8
1:A:170:GLN:HG2	1:A:253:ALA:HB1	0.77	1.55	19	5
1:A:247:THR:HB	2:B:141:LEU:HG	0.75	1.55	14	1
1:A:160:LEU:HA	1:A:276:THR:HG21	0.74	1.58	12	9
1:A:194:LEU:HD12	1:A:246:VAL:HG12	0.71	1.62	7	1
1:A:291:ARG:HB3	1:A:294:ASP:HB2	0.71	1.62	20	5
1:A:186:ALA:HA	1:A:189:ARG:HD3	0.71	1.62	3	1
1:A:242:TRP:HB3	1:A:300:PHE:HE1	0.68	1.48	7	2
1:A:203:ARG:HH11	1:A:203:ARG:HA	0.68	1.48	5	1
1:A:212:MET:HG2	2:B:137:ILE:HD12	0.68	1.65	11	2
1:A:153:ASP:HB3	1:A:156:TYR:HB3	0.68	1.65	8	5

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:191:LEU:O	1:A:195:ARG:HG3	0.67	1.89	16	1
1:A:161:GLU:HG2	1:A:183:ALA:HB2	0.67	1.66	1	1
1:A:269:GLU:HB2	1:A:270:PRO:HD3	0.66	1.67	9	18
1:A:171:ALA:HA	1:A:257:LYS:HG2	0.64	1.68	6	1
1:A:241:ASN:HB2	1:A:244:ARG:HG3	0.64	1.70	3	1
1:A:165:ARG:NH1	1:A:191:LEU:HD13	0.64	2.07	14	1
1:A:201:VAL:HB	1:A:205:HIS:NE2	0.62	2.08	20	2
1:A:244:ARG:HA	2:B:145:ALA:HB1	0.62	1.71	20	11
1:A:244:ARG:O	1:A:248:LEU:HG	0.62	1.94	11	6
1:A:212:MET:SD	2:B:137:ILE:HA	0.62	2.35	7	2
1:A:285:ASP:HA	1:A:288:VAL:HG22	0.62	1.71	17	2
1:A:226:SER:HA	1:A:229:ARG:HE	0.61	1.55	19	1
1:A:155:LEU:HG	1:A:287:LEU:HD11	0.61	1.72	17	1
1:A:216:LEU:HD11	2:B:137:ILE:HG21	0.61	1.71	15	7
1:A:153:ASP:HB3	1:A:156:TYR:CB	0.60	2.25	8	1
1:A:168:ARG:HH12	1:A:265:GLU:HG3	0.60	1.57	15	1
1:A:169:GLU:HG3	1:A:170:GLN:N	0.60	2.11	20	3
1:A:156:TYR:O	1:A:160:LEU:HB2	0.59	1.97	5	8
1:A:241:ASN:HB2	1:A:244:ARG:HD2	0.59	1.73	14	1
1:A:194:LEU:HD21	1:A:249:ILE:HG21	0.58	1.74	5	9
1:A:212:MET:HG3	2:B:137:ILE:HG13	0.58	1.75	12	1
1:A:248:LEU:HD23	1:A:279:LEU:HD12	0.58	1.75	6	2
1:A:162:ILE:HG23	1:A:191:LEU:HG	0.57	1.76	9	1
1:A:290:GLN:O	1:A:295:GLY:HA3	0.57	2.00	16	4
1:A:153:ASP:O	1:A:157:ARG:HG2	0.57	1.99	19	1
1:A:201:VAL:HG22	2:B:148:LEU:HD13	0.57	1.77	17	2
1:A:212:MET:SD	2:B:140:GLN:HB3	0.56	2.40	6	2
1:A:259:LEU:HB3	1:A:268:ILE:HG12	0.56	1.78	12	3
1:A:290:GLN:HB3	1:A:295:GLY:HA3	0.55	1.76	5	2
1:A:234:VAL:HG21	1:A:248:LEU:HD21	0.55	1.79	16	1
1:A:275:ILE:O	1:A:279:LEU:HB2	0.55	2.02	1	7
1:A:165:ARG:HH11	1:A:180:LEU:HG	0.54	1.61	13	1
1:A:201:VAL:HG13	2:B:148:LEU:HD13	0.54	1.78	12	1
1:A:180:LEU:HG	1:A:187:GLY:C	0.54	2.23	1	2
1:A:219:LYS:HA	1:A:219:LYS:HE3	0.53	1.80	5	2
1:A:226:SER:O	1:A:229:ARG:HG2	0.53	2.03	7	1
1:A:163:ILE:HD12	1:A:276:THR:HG23	0.53	1.79	4	3
1:A:227:PHE:CE1	1:A:255:VAL:HG21	0.53	2.39	20	3
1:A:234:VAL:HA	2:B:142:ARG:HG3	0.53	1.81	16	3
1:A:165:ARG:HH11	1:A:165:ARG:HB2	0.53	1.63	12	1
1:A:278:VAL:HA	1:A:281:ARG:HG2	0.53	1.81	12	2

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:233:HIS:CE1	2:B:135:ARG:HA	0.52	2.40	8	2
1:A:201:VAL:HG12	1:A:209:PHE:HE2	0.52	1.65	13	3
1:A:248:LEU:HD23	1:A:279:LEU:HG	0.52	1.80	12	2
1:A:161:GLU:OE2	1:A:165:ARG:HD2	0.52	2.05	7	2
1:A:254:PHE:HD1	1:A:257:LYS:HE3	0.52	1.63	6	1
1:A:242:TRP:HB3	1:A:300:PHE:CE1	0.51	2.36	7	2
1:A:161:GLU:HB2	1:A:183:ALA:HB2	0.51	1.81	15	1
1:A:161:GLU:O	1:A:165:ARG:HG2	0.51	2.06	8	1
1:A:197:VAL:O	1:A:201:VAL:HG23	0.51	2.06	17	4
2:B:142:ARG:NH1	2:B:142:ARG:HB3	0.51	2.21	15	1
1:A:248:LEU:HD12	1:A:279:LEU:HD21	0.51	1.83	18	2
1:A:293:TRP:O	1:A:297:VAL:HG23	0.50	2.05	3	6
1:A:170:GLN:HG3	1:A:253:ALA:HB1	0.50	1.83	3	1
1:A:291:ARG:HD3	1:A:294:ASP:OD2	0.50	2.06	11	2
1:A:212:MET:HG2	2:B:137:ILE:HG23	0.50	1.84	6	1
1:A:212:MET:SD	2:B:140:GLN:HG2	0.50	2.47	17	1
2:B:139:ALA:HA	2:B:142:ARG:HE	0.50	1.67	6	1
1:A:215:LYS:HB3	2:B:137:ILE:HD11	0.50	1.83	18	1
1:A:153:ASP:OD2	1:A:284:ARG:HD3	0.50	2.05	14	1
1:A:170:GLN:O	1:A:257:LYS:HG2	0.49	2.08	11	1
1:A:233:HIS:O	1:A:236:LYS:HG2	0.49	2.08	11	1
2:B:143:ARG:CZ	2:B:143:ARG:HA	0.49	2.37	13	1
1:A:219:LYS:HE3	1:A:219:LYS:HA	0.49	1.84	20	1
1:A:222:GLY:HA2	1:A:225:LYS:HE2	0.49	1.84	20	1
1:A:197:VAL:O	1:A:201:VAL:HG22	0.49	2.06	8	2
1:A:237:ASP:OD1	2:B:142:ARG:HD2	0.49	2.07	19	1
1:A:226:SER:HA	1:A:229:ARG:NH1	0.49	2.21	20	1
2:B:139:ALA:O	2:B:143:ARG:HD3	0.49	2.08	1	1
1:A:180:LEU:HD13	1:A:188:ARG:HA	0.49	1.84	2	3
1:A:241:ASN:HD22	2:B:149:ASN:ND2	0.49	2.06	3	1
1:A:213:LEU:HD21	1:A:258:HIS:HB2	0.49	1.83	19	2
2:B:136:GLU:HG3	2:B:137:ILE:N	0.49	2.23	15	1
2:B:142:ARG:HB3	2:B:142:ARG:HH11	0.49	1.68	15	1
1:A:234:VAL:HG21	1:A:248:LEU:HD11	0.48	1.83	20	1
1:A:236:LYS:HG2	1:A:236:LYS:O	0.48	2.07	3	3
1:A:180:LEU:HD12	1:A:188:ARG:HE	0.48	1.67	16	1
1:A:210:GLN:O	1:A:214:ARG:HG2	0.48	2.07	4	1
1:A:202:GLN:HB3	1:A:203:ARG:NH2	0.48	2.24	7	1
1:A:166:TYR:O	1:A:169:GLU:HG2	0.48	2.09	3	2
1:A:170:GLN:HG3	1:A:257:LYS:HE3	0.48	1.85	7	1
1:A:162:ILE:HA	1:A:165:ARG:NH2	0.48	2.24	14	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:162:ILE:HG12	1:A:180:LEU:CD2	0.47	2.39	4	2
1:A:255:VAL:O	1:A:259:LEU:HG	0.47	2.09	5	2
2:B:137:ILE:O	2:B:141:LEU:HB2	0.47	2.09	14	2
1:A:286:TRP:O	1:A:290:GLN:HG2	0.47	2.08	20	1
1:A:244:ARG:HH12	2:B:146:ASP:CG	0.47	2.13	16	1
1:A:212:MET:CG	2:B:137:ILE:HG13	0.47	2.40	16	1
1:A:216:LEU:HG	2:B:137:ILE:HG12	0.47	1.84	18	1
1:A:213:LEU:HD11	1:A:255:VAL:HA	0.47	1.86	17	1
1:A:192:GLU:HA	1:A:195:ARG:NH1	0.47	2.24	14	1
1:A:260:LYS:O	1:A:260:LYS:HD3	0.47	2.10	18	1
1:A:246:VAL:HG11	1:A:296:PHE:CE1	0.46	2.45	8	1
1:A:241:ASN:HB3	2:B:149:ASN:OD1	0.46	2.11	19	1
1:A:216:LEU:HD13	2:B:137:ILE:HG12	0.46	1.87	16	1
1:A:212:MET:HB2	2:B:137:ILE:HG13	0.46	1.88	18	1
1:A:240:THR:HB	1:A:286:TRP:CD1	0.46	2.46	18	1
1:A:190:ALA:HB2	1:A:293:TRP:HB3	0.46	1.87	3	2
1:A:180:LEU:HD23	1:A:188:ARG:HA	0.46	1.87	1	1
1:A:195:ARG:HH11	1:A:195:ARG:HB2	0.46	1.70	14	1
1:A:233:HIS:O	1:A:236:LYS:HB3	0.46	2.11	18	1
1:A:235:PHE:HB3	1:A:283:LYS:HE2	0.46	1.87	8	1
1:A:218:ILE:HB	1:A:259:LEU:HD11	0.46	1.87	14	1
1:A:171:ALA:HB2	1:A:256:ALA:HB1	0.46	1.88	3	1
1:A:193:THR:O	1:A:197:VAL:HG22	0.46	2.10	5	1
1:A:155:LEU:HD11	1:A:287:LEU:HD23	0.46	1.86	18	1
1:A:296:PHE:O	1:A:300:PHE:HB2	0.45	2.11	9	4
1:A:277:ASP:O	1:A:281:ARG:HB2	0.45	2.10	18	2
1:A:156:TYR:CE1	1:A:160:LEU:HD13	0.45	2.47	8	1
2:B:136:GLU:O	2:B:140:GLN:HB2	0.45	2.12	5	1
1:A:208:ALA:O	1:A:212:MET:HG3	0.45	2.12	16	1
1:A:164:SER:O	1:A:168:ARG:HG3	0.45	2.11	11	2
1:A:180:LEU:HG	1:A:187:GLY:CA	0.45	2.41	20	1
1:A:221:GLU:O	1:A:224:VAL:HG22	0.45	2.12	17	1
1:A:294:ASP:O	1:A:298:GLU:HG2	0.45	2.11	20	1
1:A:197:VAL:HG11	1:A:300:PHE:CE2	0.45	2.47	13	1
1:A:233:HIS:HA	1:A:236:LYS:HG2	0.45	1.87	20	1
1:A:229:ARG:O	1:A:233:HIS:HB2	0.45	2.11	20	3
1:A:211:GLY:O	1:A:214:ARG:HG3	0.45	2.11	18	1
1:A:267:PHE:O	1:A:271:LEU:HB2	0.44	2.12	16	3
1:A:166:TYR:CE1	1:A:195:ARG:HG2	0.44	2.47	4	2
1:A:244:ARG:HA	2:B:145:ALA:CB	0.44	2.42	3	3
1:A:204:ASN:HD22	1:A:205:HIS:N	0.44	2.11	14	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:242:TRP:O	1:A:246:VAL:HG23	0.44	2.13	14	1
1:A:180:LEU:HG	1:A:187:GLY:HA3	0.44	1.90	20	1
1:A:166:TYR:CE1	1:A:195:ARG:HA	0.44	2.47	2	2
1:A:293:TRP:O	1:A:297:VAL:HG13	0.44	2.13	18	4
1:A:213:LEU:CD1	1:A:255:VAL:HA	0.44	2.42	17	1
1:A:237:ASP:OD1	2:B:142:ARG:HD3	0.44	2.13	6	1
1:A:207:THR:O	1:A:210:GLN:HG2	0.44	2.12	3	1
1:A:284:ARG:HA	1:A:287:LEU:HD12	0.44	1.90	14	1
1:A:215:LYS:HD2	2:B:137:ILE:HD11	0.43	1.90	4	1
2:B:136:GLU:HG2	2:B:140:GLN:NE2	0.43	2.28	12	1
1:A:189:ARG:HG3	1:A:297:VAL:HG21	0.43	1.90	5	1
1:A:244:ARG:O	1:A:248:LEU:HB2	0.43	2.13	19	1
1:A:160:LEU:HD12	1:A:276:THR:HG21	0.43	1.90	20	1
1:A:285:ASP:O	1:A:289:LYS:HG3	0.43	2.13	5	1
1:A:242:TRP:CZ3	1:A:245:ILE:HD12	0.43	2.48	20	1
1:A:244:ARG:CA	2:B:145:ALA:HB1	0.43	2.43	3	1
1:A:208:ALA:HB1	2:B:140:GLN:HG2	0.43	1.89	14	1
1:A:214:ARG:HH11	1:A:214:ARG:HA	0.43	1.74	3	1
1:A:166:TYR:O	1:A:170:GLN:HB3	0.43	2.14	17	1
1:A:192:GLU:O	1:A:196:ARG:HG3	0.43	2.13	8	1
1:A:165:ARG:O	1:A:169:GLU:HG2	0.43	2.12	7	1
1:A:251:PHE:O	1:A:255:VAL:HG23	0.43	2.14	17	2
1:A:165:ARG:O	1:A:169:GLU:HG3	0.43	2.13	13	1
1:A:274:THR:O	1:A:278:VAL:HG23	0.43	2.14	18	1
1:A:236:LYS:O	1:A:236:LYS:HG2	0.42	2.13	9	1
1:A:262:VAL:HG23	1:A:264:GLN:HG3	0.42	1.90	19	1
1:A:227:PHE:HE1	1:A:255:VAL:HG21	0.42	1.74	3	1
1:A:190:ALA:O	1:A:194:LEU:HB2	0.42	2.15	16	1
1:A:205:HIS:NE2	2:B:144:ILE:HG21	0.42	2.29	7	1
1:A:212:MET:SD	2:B:137:ILE:HD12	0.42	2.53	7	1
1:A:291:ARG:HB3	1:A:294:ASP:HB3	0.42	1.90	13	1
1:A:217:ASP:OD1	1:A:258:HIS:NE2	0.42	2.49	5	1
1:A:161:GLU:O	1:A:165:ARG:HB2	0.42	2.14	12	2
1:A:269:GLU:HB2	1:A:270:PRO:CD	0.42	2.45	17	1
1:A:254:PHE:HA	1:A:257:LYS:HD3	0.42	1.90	10	1
1:A:216:LEU:HD11	2:B:137:ILE:HG13	0.42	1.89	4	1
1:A:209:PHE:O	1:A:213:LEU:HB2	0.42	2.15	8	1
1:A:281:ARG:HD2	1:A:281:ARG:N	0.42	2.30	1	1
1:A:180:LEU:HD11	1:A:191:LEU:HD22	0.42	1.92	7	1
1:A:242:TRP:O	1:A:246:VAL:HG12	0.42	2.14	15	2
1:A:285:ASP:O	1:A:289:LYS:HG2	0.42	2.14	15	1

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	**Total**
1:A:155:LEU:CG	1:A:287:LEU:HD11	0.42	2.42	17	1
1:A:227:PHE:O	1:A:231:MET:HG3	0.41	2.15	19	1
1:A:160:LEU:HD12	1:A:276:THR:CG2	0.41	2.45	17	1
1:A:265:GLU:HG2	1:A:268:ILE:HD12	0.41	1.92	17	1
1:A:212:MET:CB	2:B:137:ILE:HG13	0.41	2.45	18	1
1:A:188:ARG:NH1	1:A:192:GLU:HB2	0.41	2.30	19	1
1:A:277:ASP:OD2	1:A:281:ARG:HD2	0.41	2.15	2	1
1:A:231:MET:HE1	1:A:275:ILE:O	0.41	2.16	6	1
1:A:205:HIS:CD2	2:B:144:ILE:HG23	0.41	2.50	17	1
1:A:264:GLN:HB3	1:A:267:PHE:HD2	0.41	1.75	4	1
1:A:246:VAL:HG21	1:A:300:PHE:CE2	0.41	2.51	6	1
1:A:193:THR:HG21	1:A:300:PHE:HB3	0.41	1.91	7	1
1:A:240:THR:HB	1:A:286:TRP:CE2	0.41	2.50	7	1
1:A:155:LEU:HD21	1:A:292:GLY:HA3	0.41	1.93	2	1
1:A:199:ASP:O	1:A:203:ARG:HG2	0.41	2.15	17	1
1:A:269:GLU:O	1:A:273:GLU:HG2	0.41	2.15	19	1
1:A:260:LYS:HZ3	1:A:265:GLU:CD	0.41	2.18	15	2
1:A:243:GLY:O	1:A:246:VAL:HG22	0.41	2.16	5	1
1:A:242:TRP:HB2	2:B:149:ASN:HD21	0.40	1.77	5	1
1:A:171:ALA:O	1:A:260:LYS:HG2	0.40	2.16	7	1
1:A:291:ARG:HD3	1:A:298:GLU:OE1	0.40	2.16	16	1
1:A:160:LEU:CA	1:A:276:THR:HG21	0.40	2.38	12	1
1:A:265:GLU:HA	1:A:268:ILE:HD12	0.40	1.94	2	1
1:A:161:GLU:OE1	1:A:183:ALA:HB2	0.40	2.16	9	1
1:A:285:ASP:HA	1:A:288:VAL:CG2	0.40	2.46	4	1
1:A:243:GLY:HA3	2:B:149:ASN:HB2	0.40	1.94	8	1
1:A:164:SER:O	1:A:168:ARG:HB2	0.40	2.17	8	1
1:A:180:LEU:HB3	1:A:183:ALA:HB3	0.40	1.94	18	1

6.3 Torsion angles ⓘ

6.3.1 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	142/162 (88%)	136±2 (96±1%)	6±1 (4±1%)	0±0 (0±0%)	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	17/27 (63%)	17±0 (100±0%)	0±0 (0±0%)	0±0 (0±0%)	100	100
All	All	3180/3780 (84%)	3064 (96%)	115 (4%)	1 (0%)	100	100

All 1 unique Ramachandran outliers are listed below.

Mol	Chain	Res	Type	Models (Total)
1	A	292	GLY	1

6.3.2   Protein sidechains (i)

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	120/136 (88%)	103±4 (86±3%)	17±4 (14±3%)	6	45
2	B	12/22 (55%)	11±1 (88±10%)	1±1 (12±10%)	8	51
All	All	2640/3160 (84%)	2263 (86%)	377 (14%)	6	46

All 81 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	167	LEU	17
1	A	220	ASN	16
1	A	254	PHE	14
1	A	219	LYS	14
1	A	271	LEU	13
1	A	182	GLU	13
1	A	279	LEU	11
1	A	240	THR	10
1	A	188	ARG	10
1	A	283	LYS	8
1	A	154	ASP	8
1	A	260	LYS	8
1	A	199	ASP	7
1	A	236	LYS	7
1	A	284	ARG	7
1	A	237	ASP	7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Models (Total)
1	A	203	ARG	7
1	A	157	ARG	6
1	A	247	THR	6
1	A	265	GLU	6
1	A	281	ARG	6
1	A	221	GLU	6
2	B	140	GLN	6
1	A	196	ARG	6
1	A	233	HIS	5
1	A	165	ARG	5
1	A	214	ARG	5
1	A	294	ASP	5
1	A	227	PHE	5
2	B	149	ASN	5
1	A	161	GLU	5
1	A	217	ASP	5
1	A	209	PHE	5
1	A	287	LEU	4
1	A	300	PHE	4
1	A	170	GLN	4
1	A	290	GLN	4
1	A	291	ARG	4
1	A	206	GLU	4
1	A	180	LEU	4
2	B	143	ARG	4
1	A	192	GLU	4
1	A	289	LYS	4
2	B	147	ASP	4
1	A	202	GLN	3
1	A	155	LEU	3
1	A	189	ARG	3
1	A	244	ARG	3
1	A	298	GLU	3
2	B	146	ASP	3
1	A	226	SER	3
2	B	136	GLU	3
1	A	259	LEU	3
1	A	285	ASP	3
1	A	266	SER	3
1	A	207	THR	2
1	A	269	GLU	2
2	B	135	ARG	2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Models (Total)
1	A	216	LEU	2
1	A	277	ASP	2
1	A	191	LEU	2
1	A	204	ASN	2
1	A	212	MET	2
2	B	142	ARG	2
1	A	168	ARG	2
1	A	169	GLU	1
1	A	273	GLU	1
1	A	245	ILE	1
1	A	296	PHE	1
1	A	213	LEU	1
1	A	215	LYS	1
1	A	153	ASP	1
1	A	201	VAL	1
1	A	195	ARG	1
1	A	229	ARG	1
1	A	262	VAL	1
1	A	286	TRP	1
1	A	158	GLN	1
1	A	164	SER	1
1	A	225	LYS	1
1	A	257	LYS	1

6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.6 Ligand geometry ⓘ

There are no ligands in this entry.

WORLDWIDE
wwPDB
PROTEIN DATA BANK

6.7　Other polymers ⓘ

There are no such molecules in this entry.

6.8　Polymer linkage issues ⓘ

There are no chain breaks in this entry.

7 Chemical shift validation ⓘ

No chemical shift data were provided