



Full wwPDB NMR Structure Validation Report ⓘ

Mar 25, 2026 – 04:11 PM UTC

PDB ID : 5JTQ / pdb_00005jtq
BMRB ID : 30085
Title : The structure of chaperone SecB in complex with unstructured MBP binding site d
Authors : Huang, C.; Saio, T.; Rossi, P.; Kalodimos, C.G.
Deposited on : 2016-05-09

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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
wwPDB-RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
wwPDB-ShiftChecker : v1.2
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

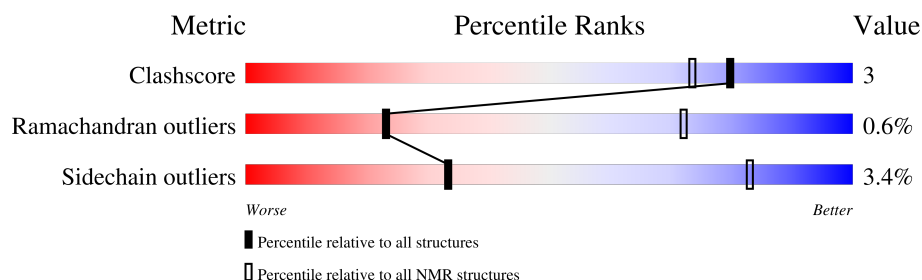
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 13%.

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	229148	14424
Ramachandran outliers	224038	12848
Sidechain outliers	223484	12823

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	155	 76% 5% 19%
1	B	155	 77% 6% 17%
1	C	155	 79% .. 19%
1	D	155	 75% 6% 19%
2	E	42	 100%
2	F	42	 100%

2 Ensemble composition and analysis

This entry contains 20 models. Model 9 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:10-A:134, B:9-B:136, C:9-C:134, D:9-D:133 (504)	0.97	9

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 4 single-model clusters were found.

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

3 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 10864 atoms, of which 5322 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Protein-export protein SecB.

Mol	Chain	Residues	Atoms						Trace
1	A	155	Total	C	H	N	O	S	0
			2367	762	1155	198	243	9	
1	B	155	Total	C	H	N	O	S	0
			2367	762	1155	198	243	9	
1	C	155	Total	C	H	N	O	S	0
			2367	762	1155	198	243	9	
1	D	155	Total	C	H	N	O	S	0
			2367	762	1155	198	243	9	

- Molecule 2 is a protein called Maltose-binding periplasmic protein.

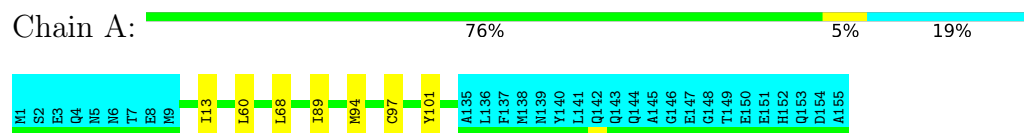
Mol	Chain	Residues	Atoms					Trace
2	E	42	Total	C	H	N	O	0
			698	232	351	53	62	
2	F	42	Total	C	H	N	O	0
			698	232	351	53	62	

4 Residue-property plots

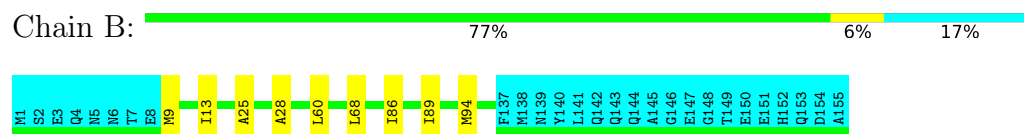
4.1 Average score per residue in the NMR ensemble

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.

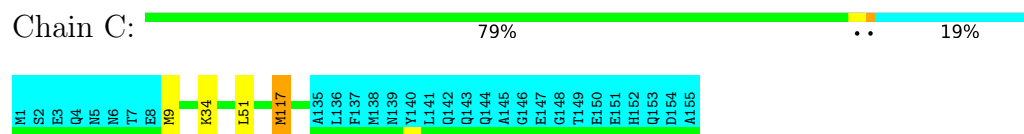
- Molecule 1: Protein-export protein SecB



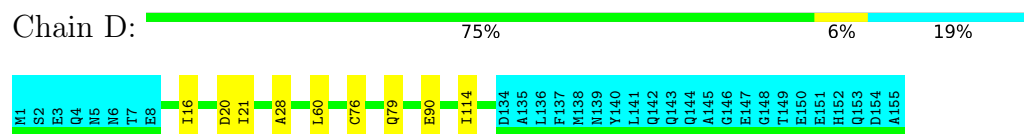
- Molecule 1: Protein-export protein SecB



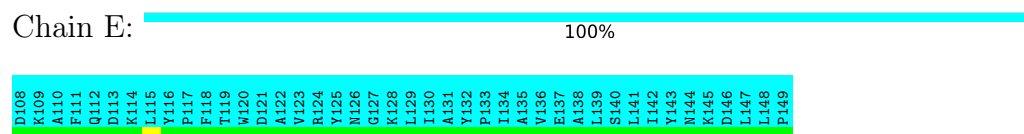
- Molecule 1: Protein-export protein SecB



- Molecule 1: Protein-export protein SecB

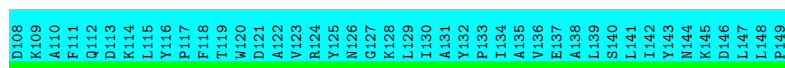


- Molecule 2: Maltose-binding periplasmic protein



- Molecule 2: Maltose-binding periplasmic protein

Chain F:  100%



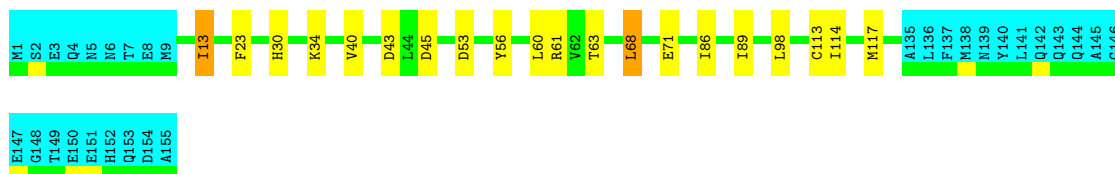
4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1

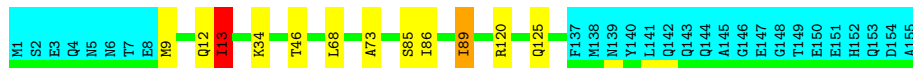
- Molecule 1: Protein-export protein SecB

Chain A:  68% 12% 19%



- Molecule 1: Protein-export protein SecB

Chain B:  75% 6% 17%



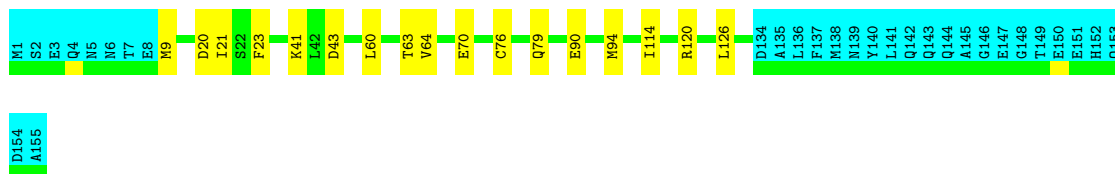
- Molecule 1: Protein-export protein SecB

Chain C:  73% 7% 19%



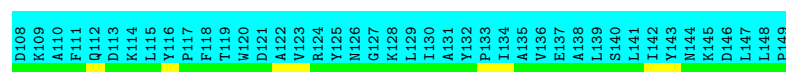
- Molecule 1: Protein-export protein SecB

Chain D:  70% 11% 19%



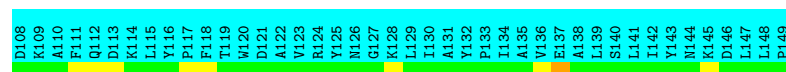
- Molecule 2: Maltose-binding periplasmic protein

Chain E:  100%



- Molecule 2: Maltose-binding periplasmic protein

Chain F: 100%



4.2.2 Score per residue for model 2

- Molecule 1: Protein-export protein SecB

Chain A: 70% 10% 19%



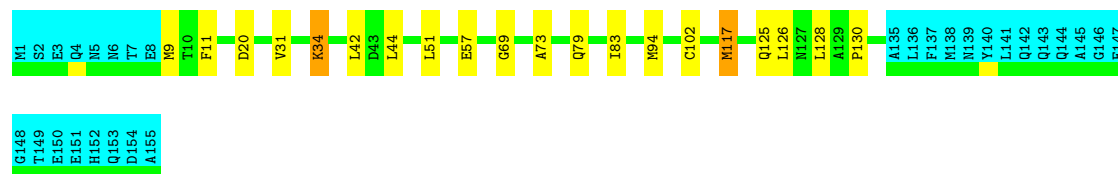
- Molecule 1: Protein-export protein SecB

Chain B: 75% 6% 17%



- Molecule 1: Protein-export protein SecB

Chain C: 68% 12% 19%



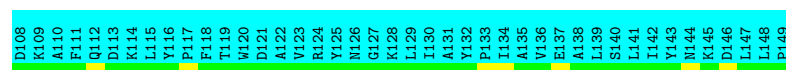
- Molecule 1: Protein-export protein SecB

Chain D: 72% 8% 19%

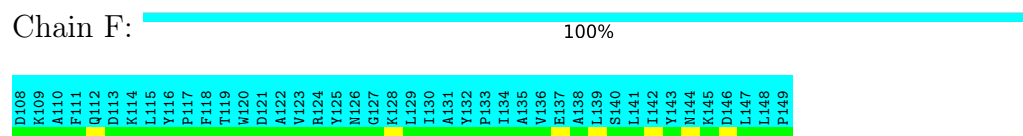


- Molecule 2: Maltose-binding periplasmic protein

Chain E: 100%

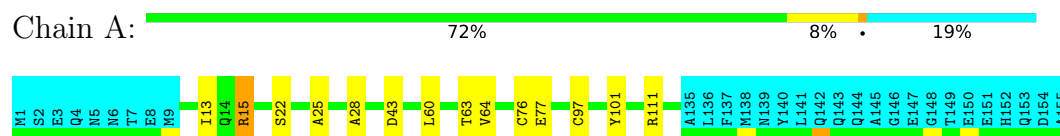


- Molecule 2: Maltose-binding periplasmic protein

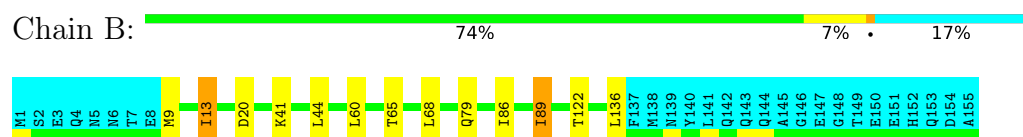


4.2.3 Score per residue for model 3

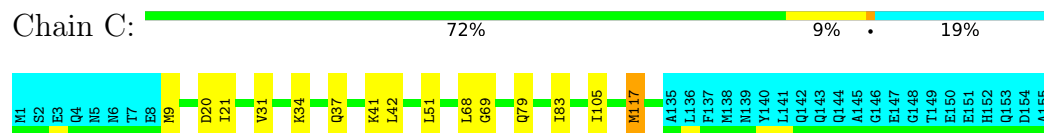
- Molecule 1: Protein-export protein SecB



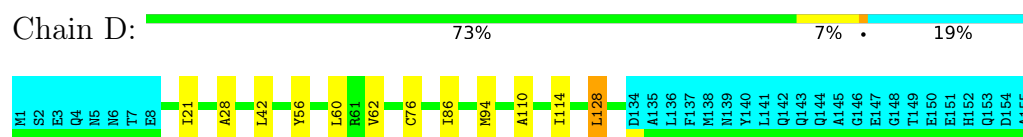
- Molecule 1: Protein-export protein SecB



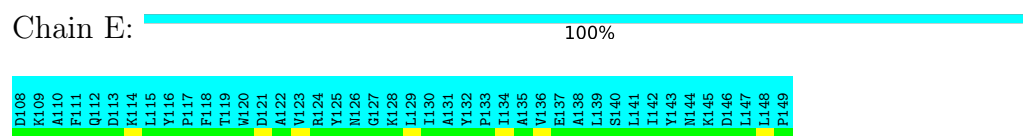
- Molecule 1: Protein-export protein SecB



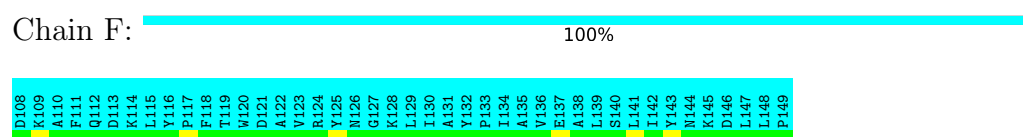
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein

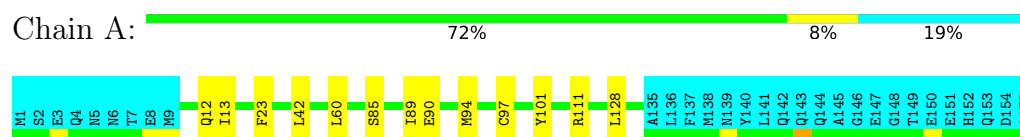


- Molecule 2: Maltose-binding periplasmic protein

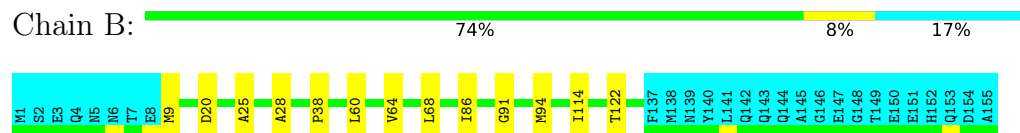


4.2.4 Score per residue for model 4

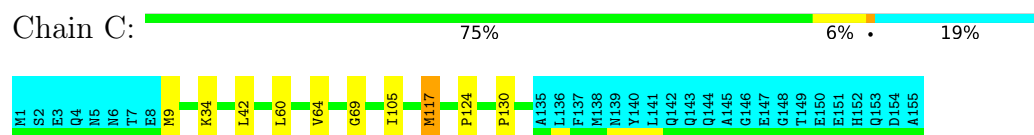
- Molecule 1: Protein-export protein SecB



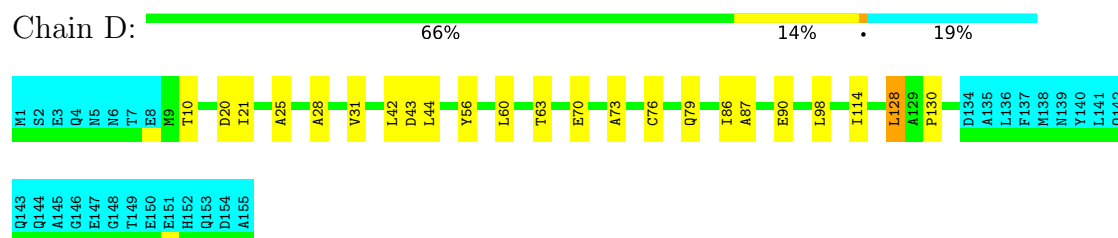
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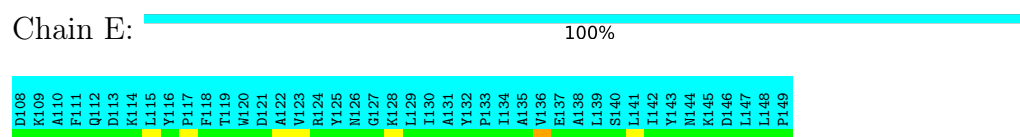
- Molecule 1: Protein-export protein SecB



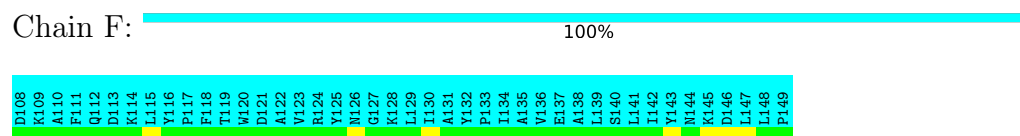
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein

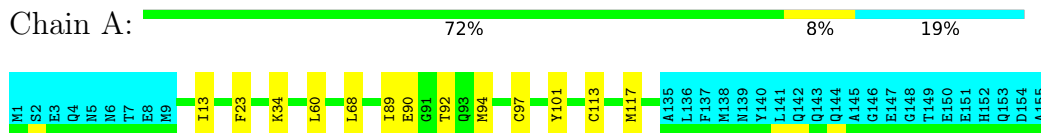


- Molecule 2: Maltose-binding periplasmic protein

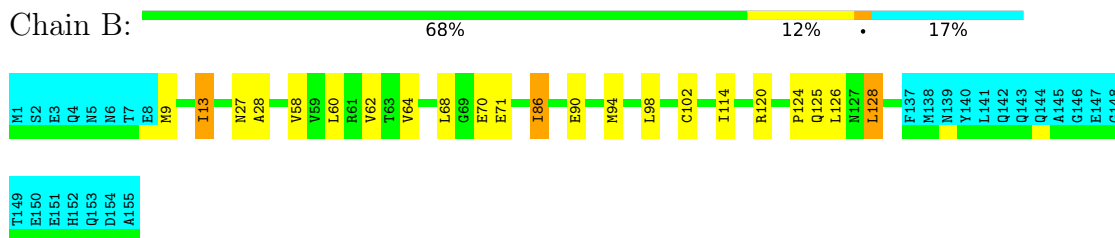


4.2.5 Score per residue for model 5

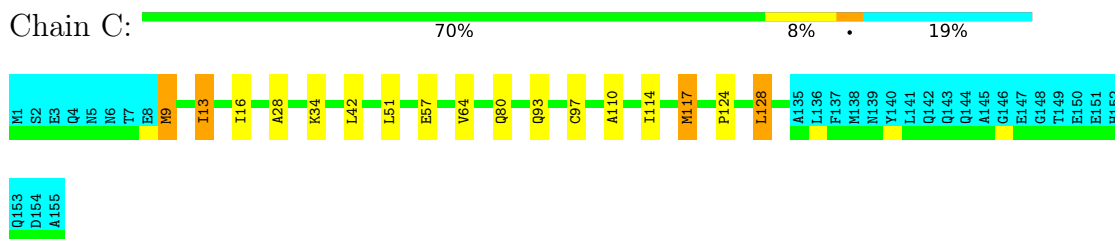
- Molecule 1: Protein-export protein SecB



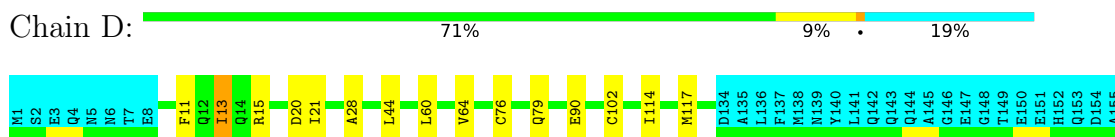
- Molecule 1: Protein-export protein SecB



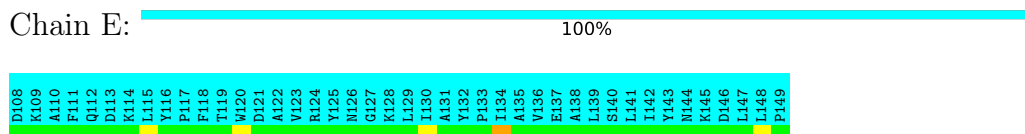
- Molecule 1: Protein-export protein SecB



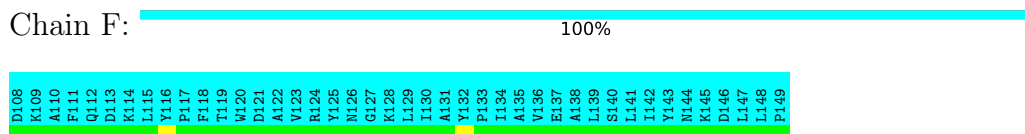
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein



- Molecule 2: Maltose-binding periplasmic protein



4.2.6 Score per residue for model 6

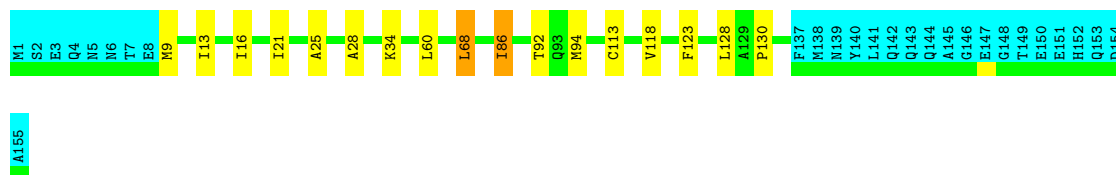
- Molecule 1: Protein-export protein SecB

Chain A:  77% 19%



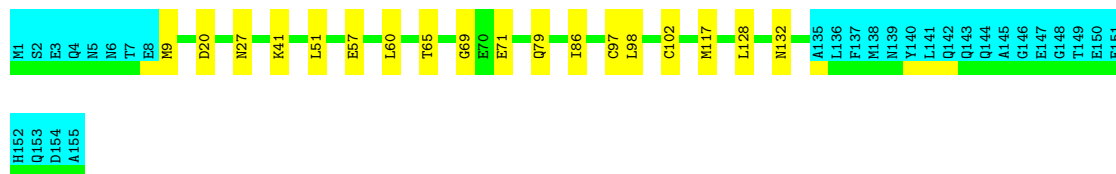
- Molecule 1: Protein-export protein SecB

Chain B:  72% 10% 17%



- Molecule 1: Protein-export protein SecB

Chain C:  70% 12% 19%

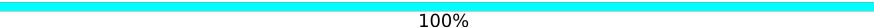


- Molecule 1: Protein-export protein SecB

Chain D:  73% 6% 19%

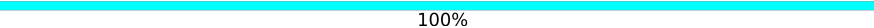


- Molecule 2: Maltose-binding periplasmic protein

Chain E:  100%



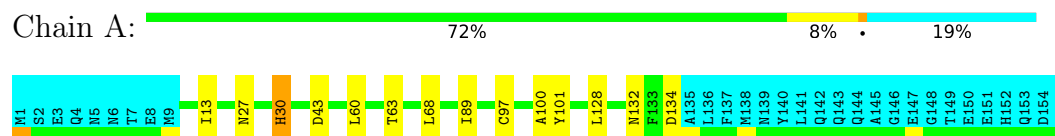
- Molecule 2: Maltose-binding periplasmic protein

Chain F:  100%

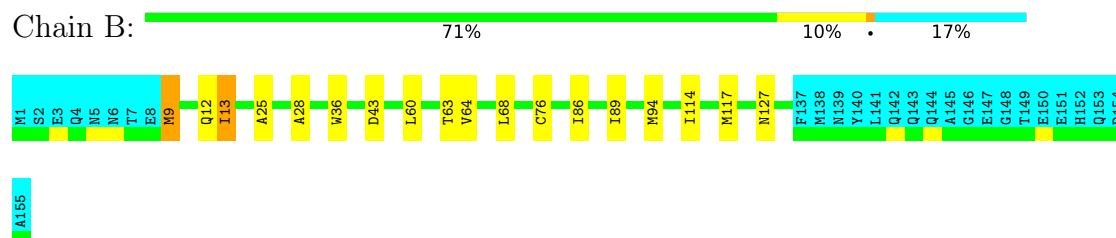


4.2.7 Score per residue for model 7

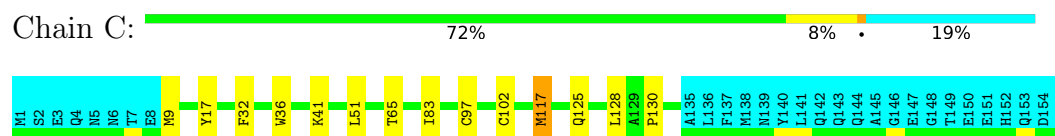
- Molecule 1: Protein-export protein SecB



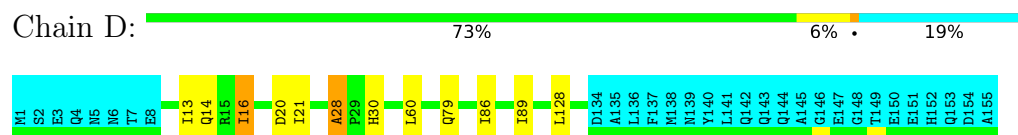
- Molecule 1: Protein-export protein SecB



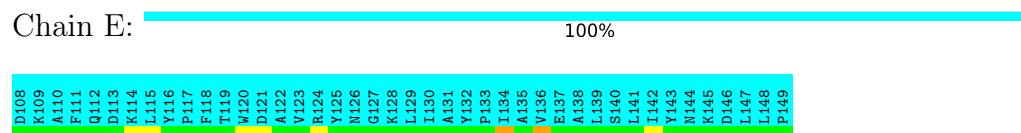
- Molecule 1: Protein-export protein SecB



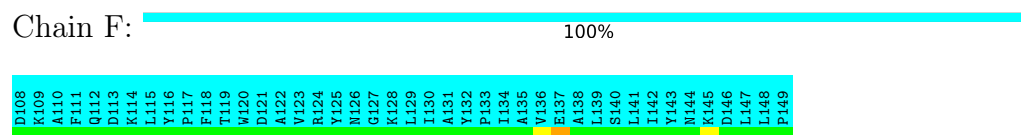
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein



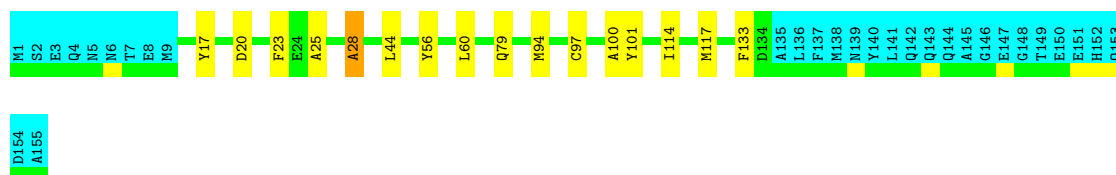
- Molecule 2: Maltose-binding periplasmic protein



4.2.8 Score per residue for model 8

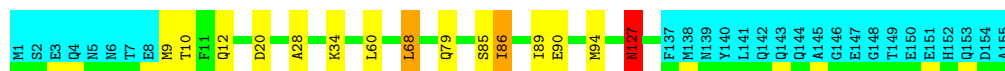
- Molecule 1: Protein-export protein SecB





- Molecule 1: Protein-export protein SecB

Chain B: 73% 8% 17%



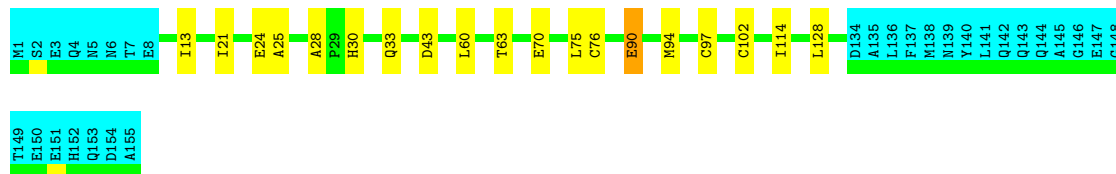
- Molecule 1: Protein-export protein SecB

Chain C: 73% 7% 19%



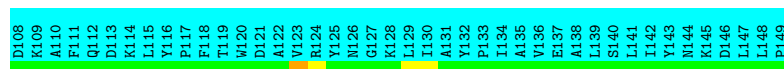
- Molecule 1: Protein-export protein SecB

Chain D: 68% 12% 19%



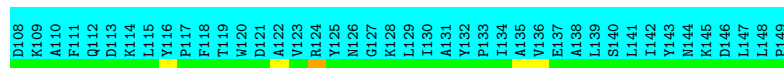
- Molecule 2: Maltose-binding periplasmic protein

Chain E: 100%



- Molecule 2: Maltose-binding periplasmic protein

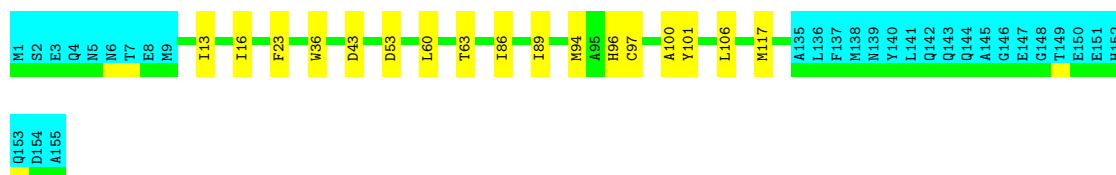
Chain F: 100%



4.2.9 Score per residue for model 9 (medoid)

- Molecule 1: Protein-export protein SecB

Chain A: 70% 11% 19%



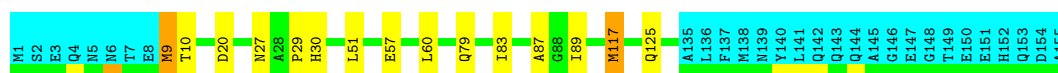
- Molecule 1: Protein-export protein SecB

Chain B: 74% 8% 17%



- Molecule 1: Protein-export protein SecB

Chain C: 72% 8% 19%



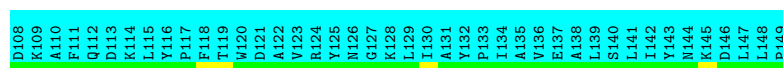
- Molecule 1: Protein-export protein SecB

Chain D: 76% 5% 19%



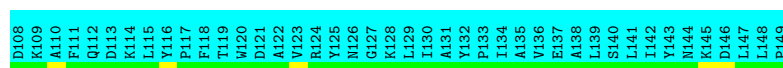
- Molecule 2: Maltose-binding periplasmic protein

Chain E: 100%



- Molecule 2: Maltose-binding periplasmic protein

Chain F: 100%



4.2.10 Score per residue for model 10

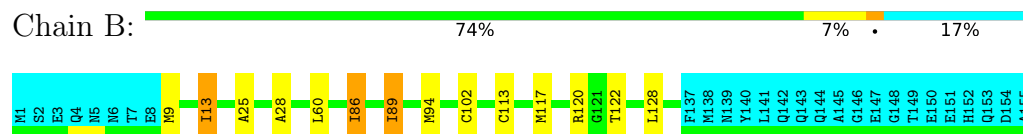
- Molecule 1: Protein-export protein SecB

Chain A: 70% 10% 19%

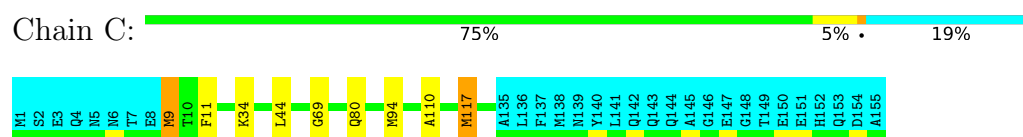


D154
A155

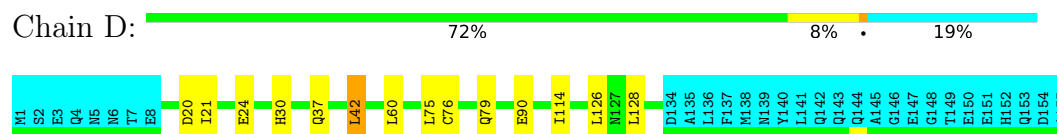
- Molecule 1: Protein-export protein SecB



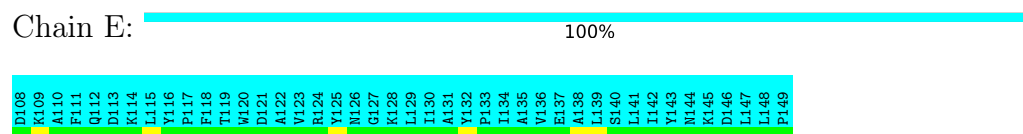
- Molecule 1: Protein-export protein SecB



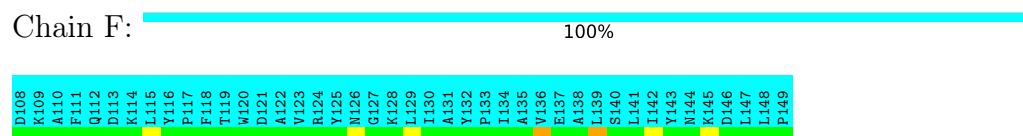
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein

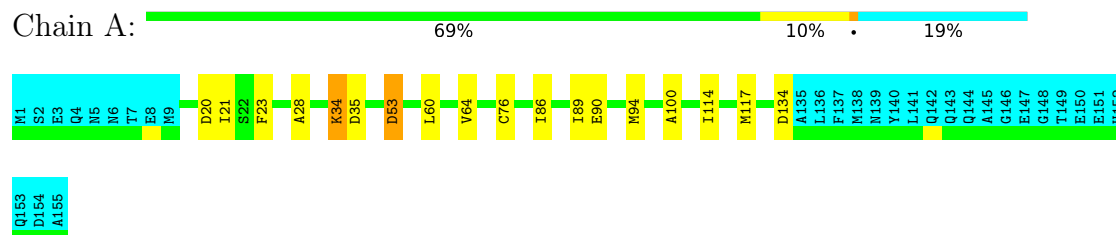


- Molecule 2: Maltose-binding periplasmic protein

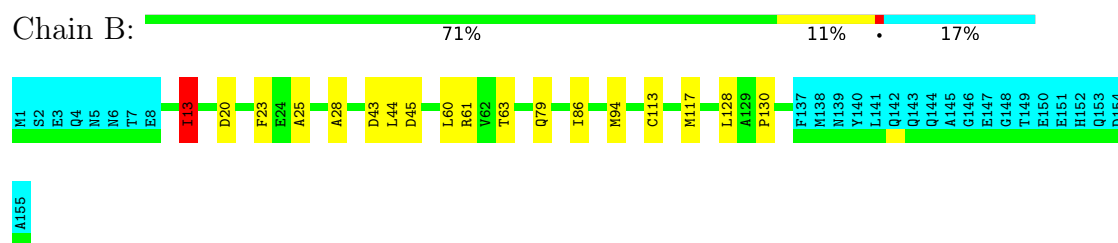


4.2.11 Score per residue for model 11

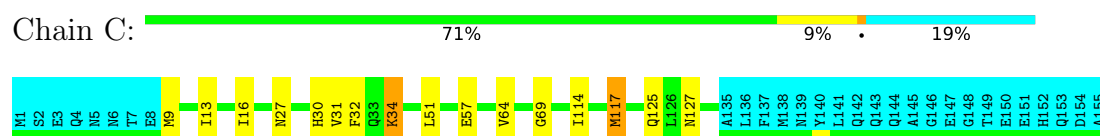
- Molecule 1: Protein-export protein SecB



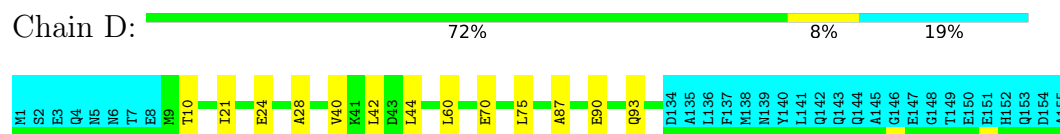
- Molecule 1: Protein-export protein SecB



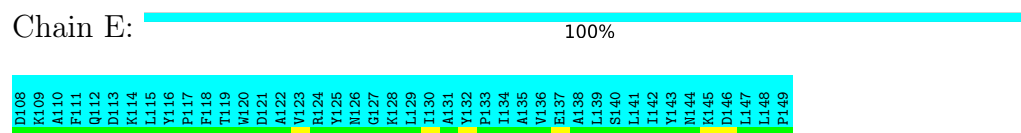
- Molecule 1: Protein-export protein SecB



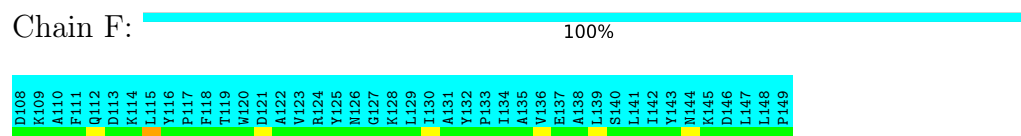
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein

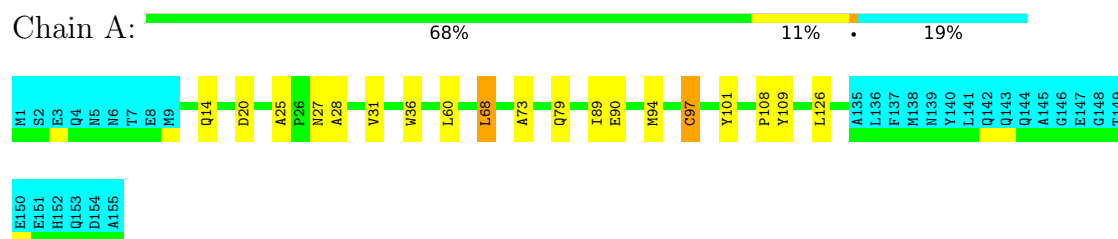


- Molecule 2: Maltose-binding periplasmic protein

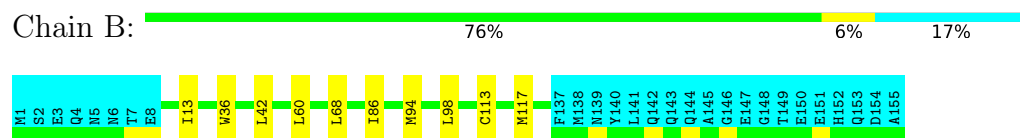


4.2.12 Score per residue for model 12

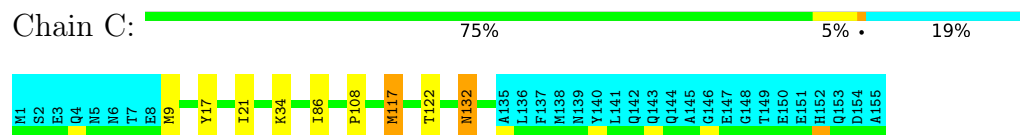
- Molecule 1: Protein-export protein SecB



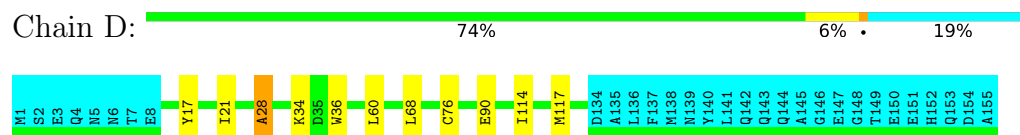
- Molecule 1: Protein-export protein SecB



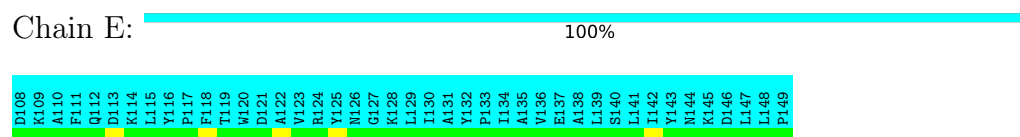
- Molecule 1: Protein-export protein SecB



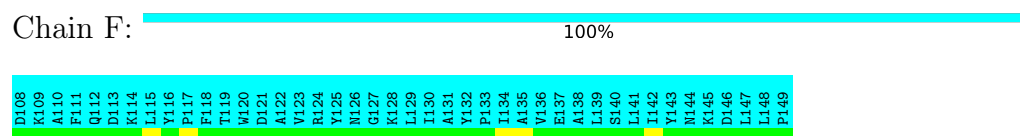
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein

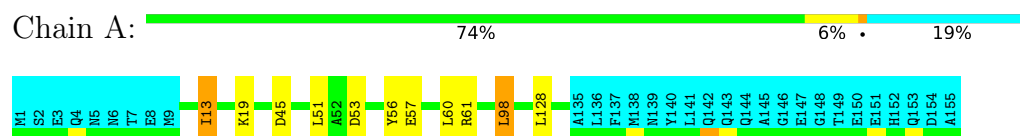


- Molecule 2: Maltose-binding periplasmic protein

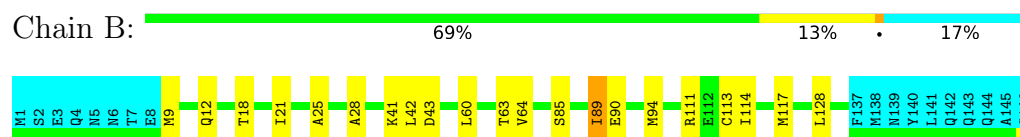


4.2.13 Score per residue for model 13

- Molecule 1: Protein-export protein SecB



- Molecule 1: Protein-export protein SecB





- Molecule 1: Protein-export protein SecB

Chain C: 76% 19%



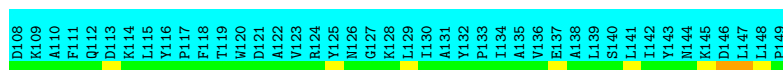
- Molecule 1: Protein-export protein SecB

Chain D: 75% 19%



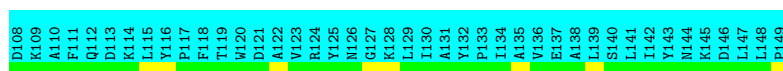
- Molecule 2: Maltose-binding periplasmic protein

Chain E: 100%



- Molecule 2: Maltose-binding periplasmic protein

Chain F: 100%



4.2.14 Score per residue for model 14

- Molecule 1: Protein-export protein SecB

Chain A: 68% 19% 11%



- Molecule 1: Protein-export protein SecB

Chain B: 68% 17% 14%



G148
T149
E150
E151
H152
Q153
D154
A155

- Molecule 1: Protein-export protein SecB

Chain C: 71% 9% 19%

M1 S2 E3 Q4 N5 N6 T7 T8 M9 T10 F11 D20 N27 V40 K41 L42 L51 E57 V64 T72 Q79 C102 F103 M104 I114 M117 M132 A135 L136 F137 M138 M139 Y140 L141 Q142 Q143 Q144 A145 G146 E147 G148 T149 E150 E151 H152 Q153 D154

A155

- Molecule 1: Protein-export protein SecB

Chain D: 74% 6% 19%

M1 S2 E3 Q4 N5 N6 T7 T8 E8 I16 D20 I21 L60 C76 Q79 E90 M94 A100 I114 D134 A135 L136 F137 M138 M139 Y140 L141 Q142 Q143 Q144 A145 G146 E147 G148 T149 E150 H151 H152 Q153 D154 A155

- Molecule 2: Maltose-binding periplasmic protein

Chain E: 100%

D108 K109 A110 F111 Q112 D113 K114 L115 Y116 P117 F118 T119 W120 D121 A122 V123 R124 Y125 N126 G127 K128 L129 I130 I131 Y132 P133 I134 A135 V136 E137 A138 L139 S140 L141 I142 Y143 M144 K145 D146 L147 L148 P149

- Molecule 2: Maltose-binding periplasmic protein

Chain F: 100%

D108 K109 A110 F111 Q112 D113 K114 L115 Y116 P117 F118 T119 W120 D121 A122 V123 R124 Y125 N126 G127 K128 L129 I130 I131 Y132 P133 I134 A135 V136 E137 A138 L139 S140 L141 I142 Y143 M144 K145 D146 L147 L148 P149

4.2.15 Score per residue for model 15

- Molecule 1: Protein-export protein SecB

Chain A: 71% 10% 19%

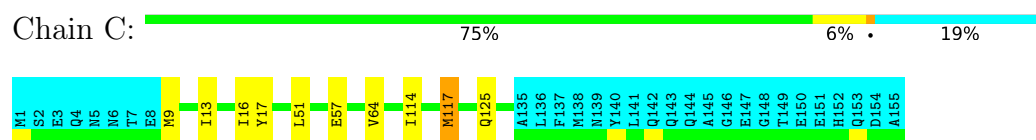
M1 S2 E3 Q4 N5 N6 T7 T8 M9 I13 Q14 R15 I16 D20 A25 A28 L42 A47 V59 L60 V64 Q79 I86 I89 M94 E112 C113 I114 F137 M138 M139 Y140 L141 Q142 Q143 Q144 A145 G146 E147 G148 T149 E150 E151 H152 Q153 D154 A155

- Molecule 1: Protein-export protein SecB

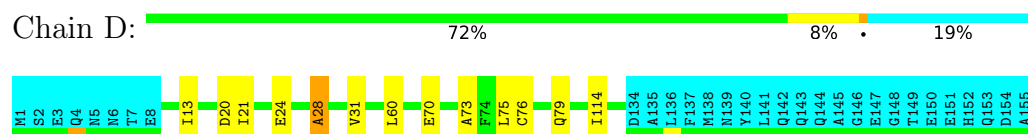
Chain B: 72% 10% 17%

M1 S2 E3 Q4 N5 N6 T7 T8 M9 I13 Q14 D20 A25 A28 L42 A47 V59 L60 V64 Q79 I86 I89 M94 E112 C113 I114 F137 M138 M139 Y140 L141 Q142 Q143 Q144 A145 G146 E147 G148 T149 E150 E151 H152 Q153 D154 A155

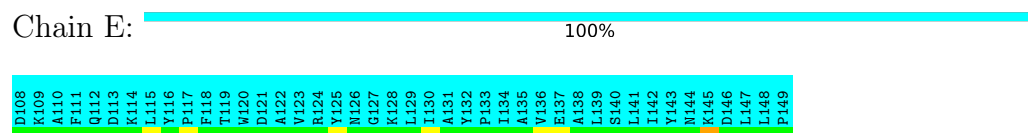
- Molecule 1: Protein-export protein SecB



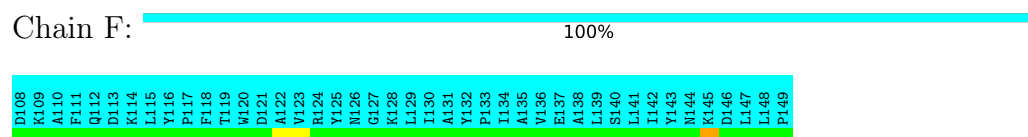
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein

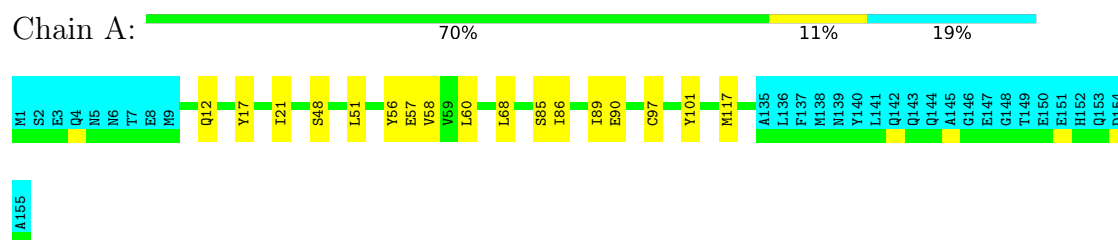


- Molecule 2: Maltose-binding periplasmic protein

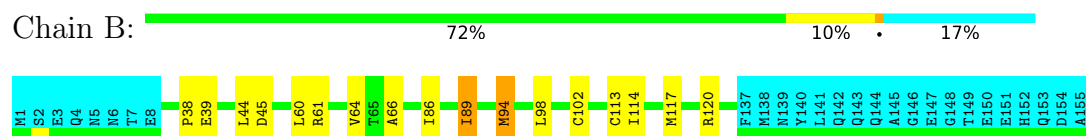


4.2.16 Score per residue for model 16

- Molecule 1: Protein-export protein SecB



- Molecule 1: Protein-export protein SecB



- Molecule 1: Protein-export protein SecB





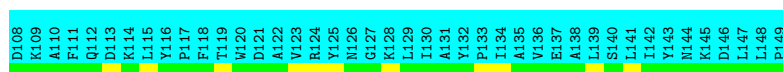
- Molecule 1: Protein-export protein SecB

Chain D: 74% 7% 19%



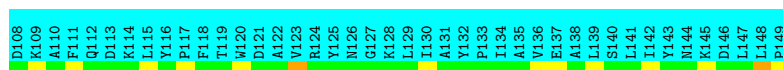
- Molecule 2: Maltose-binding periplasmic protein

Chain E: 100%



- Molecule 2: Maltose-binding periplasmic protein

Chain F: 100%



4.2.17 Score per residue for model 17

- Molecule 1: Protein-export protein SecB

Chain A: 76% 5% 19%



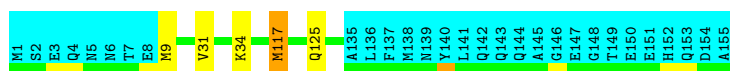
- Molecule 1: Protein-export protein SecB

Chain B: 72% 11% 17%

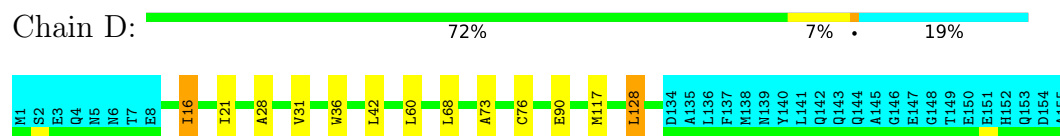


- Molecule 1: Protein-export protein SecB

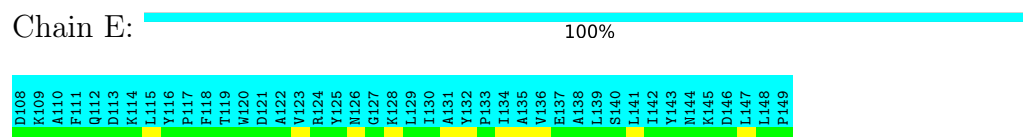
Chain C: 78% 1% 19%



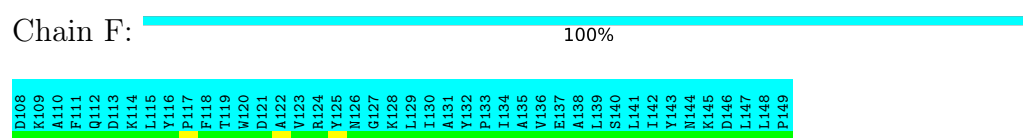
- Molecule 1: Protein-export protein SecB



- Molecule 2: Maltose-binding periplasmic protein

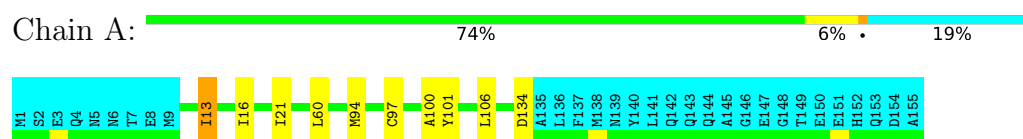


- Molecule 2: Maltose-binding periplasmic protein

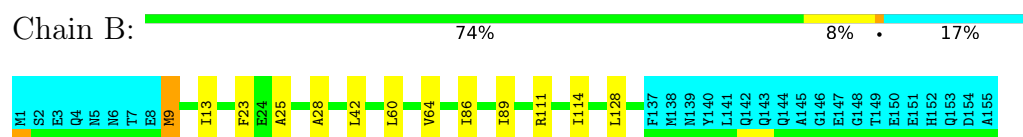


4.2.18 Score per residue for model 18

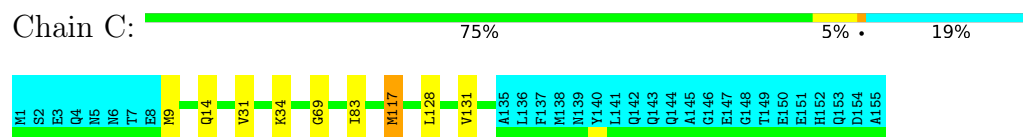
- Molecule 1: Protein-export protein SecB



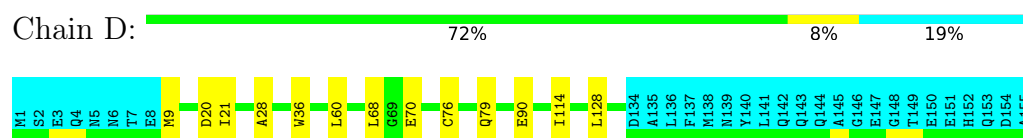
- Molecule 1: Protein-export protein SecB



- Molecule 1: Protein-export protein SecB

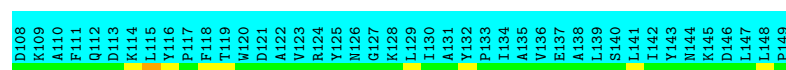


- Molecule 1: Protein-export protein SecB

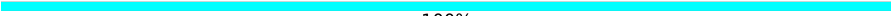


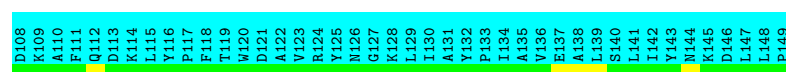
- Molecule 2: Maltose-binding periplasmic protein

Chain E:  100%



- Molecule 2: Maltose-binding periplasmic protein

Chain F:  100%



4.2.19 Score per residue for model 19

- Molecule 1: Protein-export protein SecB

Chain A:  72% 8% 19%



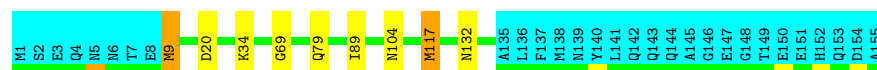
- Molecule 1: Protein-export protein SecB

Chain B:  73% 10% 17%



- Molecule 1: Protein-export protein SecB

Chain C:  75% 5% 19%



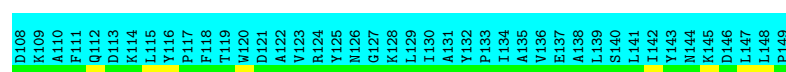
- Molecule 1: Protein-export protein SecB

Chain D:  72% 8% 19%



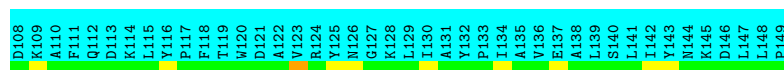
- Molecule 2: Maltose-binding periplasmic protein

Chain E:  100%



- Molecule 2: Maltose-binding periplasmic protein

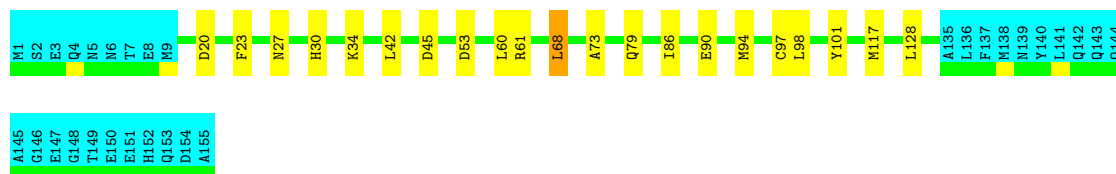
Chain F:  100%



4.2.20 Score per residue for model 20

- Molecule 1: Protein-export protein SecB

Chain A:  67% 13% 19%



- Molecule 1: Protein-export protein SecB

Chain B:  75% 8% 17%



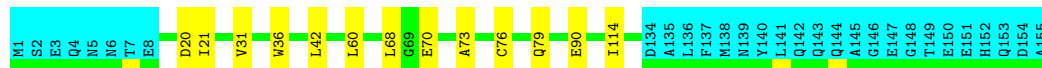
- Molecule 1: Protein-export protein SecB

Chain C:  72% 8% 19%



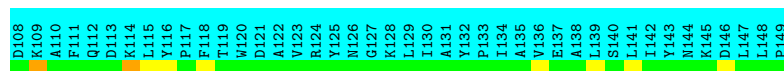
- Molecule 1: Protein-export protein SecB

Chain D:  72% 8% 19%



- Molecule 2: Maltose-binding periplasmic protein

Chain E:  100%



- Molecule 2: Maltose-binding periplasmic protein

Chain F:  100%

D108	K109	A110	F111	Q112	D113	K114	L115	Y116	P117	F118	T119	H120	D121	A122	V123	R124	Y125	N126	G127	K128	L129	I130	A131	Y132	P133	I134	A135	V136	E137	A138	L139	S140	L141	I142	Y143	N144	K145	D146	L147	L148	P149
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

5 Refinement protocol and experimental data overview

The models were refined using the following method: *molecular dynamics*.

Of the 100 calculated structures, 20 were deposited, based on the following criterion: *target function*.

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

Software name	Classification	Version
CNS	refinement	
CYANA	structure calculation	

The following table shows chemical shift validation statistics as aggregates over all chemical shift files. Detailed validation can be found in section 7 of this report.

Chemical shift file(s)	working_cs.cif
Number of chemical shift lists	6
Total number of shifts	4726
Number of shifts mapped to atoms	4726
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	13%

6 Model quality i

6.1 Standard geometry i

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the (average) root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#Z>5	RMSZ	#Z>5
1	A	1.22±0.02	1±1/996 (0.1± 0.1%)	0.91±0.02	0±0/1359 (0.0± 0.0%)
1	B	1.20±0.02	1±1/1017 (0.1± 0.1%)	0.91±0.01	0±0/1387 (0.0± 0.0%)
1	C	1.19±0.02	0±1/1004 (0.0± 0.1%)	0.91±0.02	0±0/1369 (0.0± 0.0%)
1	D	1.19±0.02	1±1/996 (0.1± 0.1%)	0.91±0.01	0±0/1358 (0.0± 0.0%)
All	All	1.20	62/80260 (0.1%)	0.91	5/109460 (0.0%)

All unique bond outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)	Models	
								Worst	Total
1	D	28	ALA	C-N	7.72	1.39	1.33	12	13
1	B	89	ILE	CA-CB	6.35	1.60	1.54	15	5
1	C	28	ALA	C-N	6.25	1.40	1.34	8	4
1	A	28	ALA	C-N	5.99	1.40	1.34	8	2
1	B	13	ILE	CA-CB	5.80	1.60	1.53	1	5
1	B	86	ILE	CA-CB	5.75	1.61	1.53	8	2
1	B	28	ALA	C-N	5.54	1.39	1.34	9	2
1	A	13	ILE	CA-CB	5.53	1.59	1.53	4	9
1	D	13	ILE	CA-CB	5.50	1.59	1.53	19	7
1	D	86	ILE	CA-CB	5.38	1.60	1.53	7	2
1	B	55	VAL	CA-CB	5.31	1.59	1.53	19	1
1	A	102	CYS	C-N	5.25	1.40	1.33	17	1
1	B	122	THR	CA-CB	5.19	1.60	1.53	4	2
1	D	16	ILE	CA-CB	5.18	1.60	1.54	14	3
1	C	40	VAL	CA-CB	5.16	1.58	1.53	8	1
1	D	102	CYS	C-N	5.05	1.40	1.33	16	1
1	A	16	ILE	CA-CB	5.02	1.60	1.53	19	1
1	B	102	CYS	C-N	5.02	1.40	1.34	10	1

All unique angle outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	A	30	HIS	CA-CB-CG	5.94	119.74	113.80	1	1
1	D	30	HIS	CA-CB-CG	5.62	119.42	113.80	13	3
1	B	127	ASN	CA-CB-CG	5.18	117.78	112.60	8	1

There are no chirality outliers.

There are no planarity outliers.

6.2 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	973	946	944	6±2
1	B	994	971	969	6±2
1	C	981	955	953	6±2
1	D	973	951	949	5±2
2	E	0	0	0	0±0
2	F	0	0	0	0±0
All	All	78420	76460	76300	413

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 3.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:B:25:ALA:HB1	1:B:28:ALA:HB2	0.78	1.54	18	7
1:D:76:CYS:SG	1:D:114:ILE:HG12	0.67	2.30	10	12
1:C:117:MET:HE3	1:D:21:ILE:HD13	0.66	1.68	4	18
1:D:25:ALA:HB1	1:D:28:ALA:HB2	0.63	1.70	2	4
1:A:20:ASP:HB2	1:A:79:GLN:HB2	0.62	1.72	10	2
1:B:25:ALA:CB	1:B:28:ALA:HB2	0.61	2.26	6	9
1:B:43:ASP:HB2	1:B:63:THR:HB	0.59	1.74	11	3
1:A:23:PHE:HB2	1:A:117:MET:SD	0.59	2.37	5	7
1:B:36:TRP:HB2	1:B:68:LEU:HD21	0.59	1.74	20	2
1:A:97:CYS:HA	1:A:101:TYR:HB3	0.58	1.74	4	16
1:B:64:VAL:HG21	1:B:114:ILE:HG21	0.58	1.75	18	9

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:51:LEU:HD11	1:A:57:GLU:HB2	0.58	1.74	14	3
1:D:43:ASP:HB2	1:D:63:THR:HB	0.58	1.76	4	4
1:B:89:ILE:HD13	1:B:94:MET:SD	0.58	2.39	15	2
1:C:9:MET:SD	1:C:11:PHE:HB2	0.57	2.39	10	1
1:A:43:ASP:HB2	1:A:63:THR:HB	0.57	1.74	3	5
1:A:100:ALA:HB1	1:A:134:ASP:HA	0.57	1.75	18	3
1:A:15:ARG:HD2	1:B:122:THR:HG21	0.56	1.76	10	1
1:A:114:ILE:HA	1:A:117:MET:HE2	0.55	1.78	8	2
1:B:40:VAL:HG11	1:B:126:LEU:HD21	0.55	1.77	14	1
1:D:20:ASP:HB3	1:D:79:GLN:HB2	0.55	1.77	5	12
1:C:20:ASP:HB3	1:C:79:GLN:HB2	0.54	1.79	19	8
1:B:97:CYS:SG	1:B:102:CYS:SG	0.54	3.05	14	1
1:B:86:ILE:HB	1:B:89:ILE:HD11	0.54	1.79	1	3
1:D:31:VAL:HG21	1:D:73:ALA:HA	0.53	1.80	15	4
1:B:98:LEU:HA	1:B:102:CYS:SG	0.53	2.43	5	1
1:A:68:LEU:H	1:A:68:LEU:HD23	0.53	1.62	12	2
1:A:86:ILE:HG12	1:A:98:LEU:HD11	0.53	1.80	1	1
1:D:97:CYS:SG	1:D:102:CYS:SG	0.53	3.06	8	1
1:C:64:VAL:HG23	1:C:114:ILE:HD13	0.53	1.81	14	4
1:B:111:ARG:HG3	1:B:128:LEU:HB2	0.53	1.81	13	2
1:B:89:ILE:HD11	1:B:93:GLN:HB2	0.52	1.82	9	1
1:B:125:GLN:HB3	1:C:124:PRO:HA	0.52	1.81	5	1
1:B:25:ALA:HB3	1:B:28:ALA:HB2	0.52	1.82	10	1
1:B:42:LEU:HD12	1:B:64:VAL:HG22	0.52	1.80	18	1
1:B:45:ASP:HB3	1:B:61:ARG:HB3	0.52	1.82	11	3
1:C:97:CYS:SG	1:C:102:CYS:SG	0.52	3.07	6	2
1:A:20:ASP:HB3	1:A:79:GLN:HB2	0.52	1.81	12	3
1:A:25:ALA:HB1	1:A:28:ALA:HB2	0.51	1.82	12	5
1:C:34:LYS:HE3	1:C:73:ALA:HA	0.51	1.82	2	2
1:C:51:LEU:HD11	1:C:57:GLU:HB2	0.51	1.82	11	8
1:B:62:VAL:HG11	1:B:128:LEU:HD11	0.51	1.82	5	1
1:C:31:VAL:HA	1:C:34:LYS:HE2	0.50	1.82	18	3
1:A:45:ASP:HB3	1:A:61:ARG:HB2	0.50	1.83	20	4
1:D:42:LEU:HD11	1:D:128:LEU:HD21	0.50	1.83	4	1
1:C:37:GLN:HB3	1:C:68:LEU:HD13	0.50	1.81	3	1
1:D:76:CYS:SG	1:D:117:MET:HE3	0.50	2.46	2	3
1:C:41:LYS:HB2	1:C:65:THR:HB	0.49	1.84	6	2
1:B:36:TRP:HB3	1:B:68:LEU:HD21	0.49	1.84	12	2
1:C:61:ARG:HG2	1:C:79:GLN:HG2	0.49	1.83	1	1
1:B:9:MET:HB3	1:B:89:ILE:HG23	0.49	1.84	7	1
1:B:125:GLN:HB3	1:C:125:GLN:HE21	0.49	1.68	9	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:B:31:VAL:HG21	1:B:73:ALA:HA	0.49	1.85	17	1
1:D:42:LEU:HD22	1:D:128:LEU:HD11	0.49	1.84	17	1
1:C:51:LEU:HD11	1:C:83:ILE:HD12	0.49	1.83	7	6
1:C:9:MET:HE1	1:C:97:CYS:SG	0.49	2.48	5	1
1:C:60:LEU:H	1:C:60:LEU:HD23	0.49	1.68	13	1
1:A:21:ILE:HD13	1:B:117:MET:SD	0.48	2.48	10	2
1:C:10:THR:HB	1:C:87:ALA:HB3	0.48	1.83	9	2
1:A:34:LYS:HD3	1:A:68:LEU:HD21	0.48	1.85	1	1
1:C:31:VAL:HA	1:C:34:LYS:HE3	0.48	1.84	3	2
1:C:9:MET:HE2	1:C:89:ILE:HD13	0.48	1.86	19	1
1:A:16:ILE:HG23	1:A:106:LEU:HD23	0.48	1.86	9	4
1:C:13:ILE:HD11	1:C:16:ILE:HG13	0.48	1.84	8	4
1:A:15:ARG:HH11	1:A:83:ILE:HD12	0.48	1.67	14	1
1:C:27:ASN:HB3	1:C:30:HIS:HB2	0.47	1.86	11	1
1:D:10:THR:HB	1:D:87:ALA:HB3	0.47	1.85	11	2
1:C:9:MET:HG2	1:C:89:ILE:HB	0.47	1.86	9	1
1:C:42:LEU:H	1:C:42:LEU:HD23	0.47	1.69	3	1
1:D:76:CYS:SG	1:D:114:ILE:HG23	0.47	2.49	2	3
1:D:56:TYR:HB2	1:D:86:ILE:HD13	0.47	1.86	4	2
1:B:47:ALA:HB3	1:B:59:VAL:HB	0.47	1.87	15	1
1:A:34:LYS:NZ	1:A:71:GLU:HG3	0.47	2.25	1	1
1:B:13:ILE:H	1:B:13:ILE:HD13	0.47	1.70	1	3
1:B:34:LYS:HB3	1:B:68:LEU:HD22	0.47	1.87	6	1
1:B:86:ILE:HG21	1:B:94:MET:SD	0.47	2.50	19	1
1:B:39:GLU:O	1:B:66:ALA:HA	0.46	2.09	16	3
1:B:20:ASP:HB3	1:B:79:GLN:HB2	0.46	1.86	8	5
1:A:94:MET:SD	1:A:98:LEU:HG	0.46	2.50	2	1
1:D:86:ILE:HG21	1:D:94:MET:HG2	0.46	1.86	3	1
1:B:12:GLN:HB3	1:B:85:SER:HB2	0.46	1.86	13	3
1:D:90:GLU:HA	1:D:94:MET:HB2	0.46	1.87	8	2
1:B:130:PRO:HG3	1:D:16:ILE:HD13	0.46	1.86	19	1
1:A:128:LEU:H	1:A:128:LEU:HD23	0.46	1.71	7	1
1:D:42:LEU:HD23	1:D:42:LEU:H	0.46	1.71	11	1
1:D:36:TRP:HB3	1:D:68:LEU:HD11	0.46	1.86	18	4
1:A:64:VAL:HB	1:A:76:CYS:HB2	0.46	1.86	3	2
1:A:13:ILE:HD12	1:A:13:ILE:H	0.46	1.71	15	1
1:A:114:ILE:O	1:A:118:VAL:HG23	0.46	2.11	14	1
1:C:17:TYR:HE2	1:D:28:ALA:HB1	0.45	1.71	12	2
1:A:108:PRO:HB2	1:C:108:PRO:HG2	0.45	1.88	12	1
1:B:118:VAL:HG22	1:B:123:PHE:HB2	0.45	1.87	6	1
1:B:38:PRO:HB2	1:B:66:ALA:HB1	0.45	1.88	16	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:B:18:THR:HG21	1:B:21:ILE:HD11	0.45	1.88	13	1
1:A:115:THR:HG23	1:A:125:GLN:HB2	0.45	1.88	14	1
1:A:12:GLN:HB3	1:A:85:SER:HB3	0.45	1.87	19	2
1:C:21:ILE:HG21	1:C:117:MET:HE2	0.45	1.88	12	3
1:D:62:VAL:HG21	1:D:110:ALA:HB1	0.45	1.89	3	1
1:A:21:ILE:HG23	1:A:117:MET:SD	0.45	2.52	19	1
1:D:11:PHE:CE2	1:D:102:CYS:SG	0.45	3.09	5	1
1:C:86:ILE:HG13	1:C:98:LEU:HD21	0.45	1.89	6	1
1:A:17:TYR:HE2	1:B:28:ALA:HB1	0.45	1.72	8	1
1:B:68:LEU:HD12	1:B:73:ALA:HB2	0.44	1.89	1	1
1:B:90:GLU:HA	1:B:94:MET:SD	0.44	2.51	8	1
1:C:14:GLN:HB2	1:C:83:ILE:HB	0.44	1.89	18	1
1:A:27:ASN:HB3	1:A:30:HIS:HB2	0.44	1.87	20	3
1:A:64:VAL:HG21	1:A:114:ILE:HG21	0.44	1.88	11	1
1:A:113:CYS:SG	1:B:120:ARG:HD3	0.44	2.53	5	2
1:D:11:PHE:HA	1:D:85:SER:O	0.44	2.12	2	1
1:D:42:LEU:HD13	1:D:128:LEU:HD21	0.44	1.88	3	1
1:A:89:ILE:HB	1:A:94:MET:SD	0.44	2.53	11	1
1:B:21:ILE:HD11	1:B:113:CYS:SG	0.44	2.52	13	2
1:D:42:LEU:HG	1:D:128:LEU:HD21	0.44	1.89	10	1
1:A:31:VAL:HG11	1:A:73:ALA:HA	0.44	1.90	12	1
1:C:27:ASN:HB2	1:C:72:THR:O	0.44	2.13	14	1
1:D:64:VAL:HG11	1:D:126:LEU:HD11	0.44	1.90	1	1
1:C:42:LEU:HD23	1:C:64:VAL:HG22	0.44	1.90	4	1
1:D:16:ILE:HD12	1:D:16:ILE:N	0.44	2.27	7	3
1:D:34:LYS:HB3	1:D:68:LEU:HD23	0.44	1.89	12	1
1:C:28:ALA:HB3	1:C:29:PRO:HD3	0.44	1.90	20	1
1:C:113:CYS:SG	1:D:120:ARG:HD3	0.44	2.53	1	1
1:A:21:ILE:CG2	1:A:117:MET:SD	0.44	3.06	16	2
1:B:13:ILE:HG21	1:B:16:ILE:HG13	0.44	1.90	6	1
1:A:122:THR:HG22	1:B:17:TYR:HB3	0.44	1.89	17	1
1:B:68:LEU:HB2	1:B:73:ALA:HB2	0.44	1.90	19	1
1:C:45:ASP:HB3	1:C:61:ARG:HB2	0.44	1.90	1	1
1:D:24:GLU:HB2	1:D:75:LEU:HB2	0.43	1.90	11	4
1:B:9:MET:HE3	1:B:89:ILE:HD11	0.43	1.91	14	1
1:C:27:ASN:ND2	1:C:71:GLU:HG3	0.43	2.28	6	1
1:C:11:PHE:CE1	1:C:102:CYS:SG	0.43	3.11	14	1
1:A:16:ILE:HD13	1:C:130:PRO:HG3	0.43	1.89	2	1
1:B:34:LYS:HD2	1:B:68:LEU:HB3	0.43	1.88	8	1
1:B:58:VAL:HG21	1:B:98:LEU:HB3	0.43	1.89	5	1
1:C:125:GLN:NE2	1:C:127:ASN:HD21	0.43	2.12	11	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:B:34:LYS:HA	1:B:34:LYS:HE2	0.43	1.90	19	1
1:A:34:LYS:HD3	1:A:35:ASP:H	0.43	1.73	11	1
1:C:42:LEU:HD13	1:C:42:LEU:H	0.43	1.72	14	1
1:A:23:PHE:HB2	1:A:117:MET:HE3	0.43	1.91	20	1
1:B:113:CYS:O	1:B:117:MET:HG2	0.43	2.14	14	7
1:C:11:PHE:HE1	1:C:102:CYS:SG	0.43	2.37	2	1
1:A:94:MET:C	1:A:94:MET:SD	0.43	3.02	9	2
1:B:117:MET:HA	1:B:120:ARG:HD2	0.43	1.91	10	1
1:A:12:GLN:HB2	1:A:85:SER:HB3	0.43	1.90	16	1
1:B:98:LEU:HD12	1:B:102:CYS:SG	0.43	2.54	16	1
1:C:29:PRO:HD3	1:D:19:LYS:HZ1	0.42	1.74	9	1
1:A:100:ALA:HB2	1:A:133:PHE:HD2	0.42	1.73	8	1
1:A:96:HIS:O	1:A:100:ALA:HB3	0.42	2.14	9	1
1:C:27:ASN:HB3	1:C:30:HIS:HB3	0.42	1.90	9	1
1:B:94:MET:SD	1:B:98:LEU:HD11	0.42	2.54	12	1
1:B:11:PHE:HE1	1:B:97:CYS:SG	0.42	2.38	14	1
1:C:94:MET:C	1:C:94:MET:SD	0.42	3.02	10	2
1:C:20:ASP:HA	1:D:23:PHE:O	0.42	2.14	13	2
1:A:21:ILE:HB	1:B:23:PHE:HB3	0.42	1.89	18	2
1:B:86:ILE:HG12	1:B:98:LEU:HD13	0.42	1.91	16	1
1:B:27:ASN:ND2	1:B:71:GLU:HB2	0.42	2.30	5	1
1:A:11:PHE:HZ	1:A:102:CYS:HG	0.42	1.57	14	1
1:B:86:ILE:HG21	1:B:98:LEU:HD11	0.42	1.91	5	1
1:C:117:MET:HE2	1:D:21:ILE:HG21	0.42	1.90	6	1
1:C:61:ARG:HG3	1:C:79:GLN:HG2	0.42	1.91	20	1
1:A:34:LYS:HB3	1:A:68:LEU:HD11	0.42	1.92	17	1
1:B:41:LYS:HB3	1:B:65:THR:HB	0.42	1.91	3	1
1:A:90:GLU:HA	1:A:94:MET:HE2	0.42	1.92	5	1
1:B:76:CYS:SG	1:B:117:MET:HB2	0.42	2.55	7	1
1:C:42:LEU:HD13	1:C:128:LEU:HD11	0.41	1.90	5	1
1:C:9:MET:SD	1:C:89:ILE:HD12	0.41	2.55	9	1
1:A:17:TYR:HB3	1:B:120:ARG:O	0.41	2.15	16	1
1:A:92:THR:HA	1:A:95:ALA:HB3	0.41	1.93	2	1
1:D:44:LEU:HD23	1:D:44:LEU:H	0.41	1.75	5	1
1:D:45:ASP:HB3	1:D:61:ARG:HB3	0.41	1.91	6	1
1:D:21:ILE:CG2	1:D:117:MET:SD	0.41	3.08	12	1
1:D:25:ALA:CB	1:D:28:ALA:HB2	0.41	2.45	6	1
1:A:109:TYR:CE1	1:C:108:PRO:HA	0.41	2.51	12	1
1:A:42:LEU:HD23	1:A:42:LEU:H	0.41	1.75	4	1
1:A:74:PHE:CE1	1:A:76:CYS:SG	0.41	3.12	14	1
1:C:34:LYS:HE3	1:C:71:GLU:HG3	0.41	1.92	16	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:D:51:LEU:HD11	1:D:57:GLU:HB2	0.41	1.91	19	1
1:B:61:ARG:HB2	1:B:79:GLN:HG2	0.41	1.93	20	1
1:A:15:ARG:HD3	1:B:122:THR:HG21	0.41	1.92	3	1
1:A:111:ARG:NH1	1:C:105:ILE:HD12	0.41	2.31	3	2
1:D:30:HIS:HA	1:D:33:GLN:NE2	0.41	2.30	8	1
1:A:19:LYS:HE3	1:B:28:ALA:HB3	0.41	1.93	13	1
1:C:104:ASN:ND2	1:C:132:ASN:HD22	0.41	2.13	19	1
1:B:34:LYS:HD2	1:B:68:LEU:HB2	0.41	1.93	1	1
1:D:64:VAL:HG21	1:D:114:ILE:HG21	0.41	1.92	5	1
1:B:44:LEU:HD21	1:B:131:VAL:HG11	0.41	1.92	17	1
1:C:11:PHE:HE1	1:C:102:CYS:HG	0.41	1.57	2	1
1:D:86:ILE:HG12	1:D:98:LEU:HD21	0.41	1.92	4	1
1:C:80:GLN:HB2	1:C:110:ALA:HB2	0.41	1.92	10	3
1:A:25:ALA:CB	1:A:28:ALA:HB2	0.41	2.46	8	1
1:A:40:VAL:HA	1:A:65:THR:O	0.41	2.16	10	1
1:A:20:ASP:HA	1:B:23:PHE:O	0.41	2.16	11	1
1:A:22:SER:HB3	1:A:77:GLU:HB2	0.41	1.92	3	1
1:B:13:ILE:HD13	1:B:13:ILE:H	0.41	1.76	10	1
1:C:122:THR:HG23	1:D:17:TYR:HB3	0.41	1.93	12	1
1:C:17:TYR:CE2	1:D:28:ALA:HB1	0.41	2.51	15	1
1:B:9:MET:SD	1:B:89:ILE:HD12	0.41	2.55	18	1
1:D:47:ALA:HB3	1:D:59:VAL:HB	0.41	1.93	19	1
1:A:48:SER:HB3	1:A:58:VAL:HG22	0.40	1.93	16	1
1:A:23:PHE:O	1:B:20:ASP:HA	0.40	2.17	4	1
1:B:89:ILE:HD13	1:B:89:ILE:H	0.40	1.75	10	1
1:B:125:GLN:OE1	1:C:124:PRO:HA	0.40	2.17	1	1
1:B:86:ILE:H	1:B:86:ILE:HD13	0.40	1.76	6	1
1:B:43:ASP:HB3	1:B:63:THR:HB	0.40	1.94	13	1
1:A:68:LEU:HB2	1:A:73:ALA:HB2	0.40	1.94	20	1
1:B:21:ILE:CD1	1:B:113:CYS:SG	0.40	3.10	14	1
1:C:104:ASN:HD21	1:C:132:ASN:ND2	0.40	2.15	14	1
1:D:90:GLU:HA	1:D:94:MET:SD	0.40	2.57	14	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	125/155 (81%)	120±2 (96±1%)	5±1 (4±1%)	0±0 (0±0%)	31	76
1	B	128/155 (83%)	121±1 (94±1%)	6±1 (5±1%)	1±1 (1±0%)	20	70
1	C	126/155 (81%)	116±2 (92±2%)	8±2 (6±2%)	2±1 (1±0%)	13	61
1	D	125/155 (81%)	120±2 (96±1%)	5±2 (4±2%)	0±0 (0±0%)	44	80
2	E	0	-	-	-	-	-
2	F	0	-	-	-	-	-
All	All	10080/14080 (72%)	9525 (94%)	493 (5%)	62 (1%)	23	72

All 10 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	C	9	MET	20
1	B	9	MET	14
1	A	53	ASP	8
1	C	69	GLY	8
1	D	9	MET	4
1	B	130	PRO	3
1	C	130	PRO	2
1	B	38	PRO	1
1	B	124	PRO	1
1	A	36	TRP	1

6.3.2 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	107/132 (81%)	103±2 (96±2%)	4±2 (4±2%)	32	82
1	B	109/132 (83%)	105±2 (96±2%)	4±2 (4±2%)	30	80
1	C	108/132 (82%)	105±1 (97±1%)	3±1 (3±1%)	38	86
1	D	107/132 (81%)	104±1 (97±1%)	3±1 (3±1%)	37	85
2	E	0	-	-	-	-
2	F	0	-	-	-	-
All	All	8620/12000 (72%)	8331 (97%)	289 (3%)	33	83

All 75 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	60	LEU	20
1	D	60	LEU	20
1	C	117	MET	19
1	B	60	LEU	18
1	B	86	ILE	14
1	D	90	GLU	13
1	C	34	LYS	10
1	B	13	ILE	9
1	A	89	ILE	8
1	D	70	GLU	8
1	A	68	LEU	7
1	B	68	LEU	7
1	B	89	ILE	6
1	C	60	LEU	6
1	C	128	LEU	6
1	D	128	LEU	6
1	C	125	GLN	5
1	A	90	GLU	5
1	A	56	TYR	4
1	C	44	LEU	4
1	B	42	LEU	4
1	B	90	GLU	4
1	B	128	LEU	4
1	D	16	ILE	4
1	A	86	ILE	4
1	A	13	ILE	3
1	A	15	ARG	3
1	A	128	LEU	3
1	A	34	LYS	3
1	B	127	ASN	3
1	D	42	LEU	3
1	C	42	LEU	2
1	C	126	LEU	2
1	D	44	LEU	2
1	B	70	GLU	2
1	B	126	LEU	2
1	C	13	ILE	2
1	A	44	LEU	2
1	B	94	MET	2
1	A	14	GLN	2
1	A	98	LEU	2
1	A	16	ILE	2

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Mol	Chain	Res	Type	Models (Total)
1	B	112	GLU	2
1	B	46	THR	1
1	D	41	LYS	1
1	C	41	LYS	1
1	C	93	GLN	1
1	D	13	ILE	1
1	B	92	THR	1
1	D	125	GLN	1
1	A	30	HIS	1
1	B	12	GLN	1
1	B	36	TRP	1
1	D	14	GLN	1
1	D	89	ILE	1
1	B	10	THR	1
1	A	70	GLU	1
1	A	53	ASP	1
1	D	40	VAL	1
1	D	93	GLN	1
1	A	27	ASN	1
1	A	97	CYS	1
1	A	126	LEU	1
1	C	86	ILE	1
1	C	132	ASN	1
1	D	36	TRP	1
1	B	41	LYS	1
1	C	70	GLU	1
1	A	74	PHE	1
1	B	56	TYR	1
1	B	125	GLN	1
1	B	136	LEU	1
1	A	94	MET	1
1	D	9	MET	1
1	A	42	LEU	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 [i](#)

There are no oligosaccharides in this entry.

6.6 Ligand geometry [i](#)

There are no ligands in this entry.

6.7 Other polymers [i](#)

There are no such molecules in this entry.

6.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

7 Chemical shift validation

The completeness of assignment taking into account all chemical shift lists is 13% for the well-defined parts and 14% for the entire structure.

7.1 Chemical shift list 1

File name: working_cs.cif

Chemical shift list name: *assigned_chemical_shift_list_1*

7.1.1 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	1049
Number of shifts mapped to atoms	1049
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

7.1.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	139	0.25 ± 0.15	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	128	0.84 ± 0.22	Should be checked
$^{13}\text{C}'$	137	0.29 ± 0.15	None needed (< 0.5 ppm)
^{15}N	133	-1.16 ± 0.25	Should be applied

7.1.3 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 13%, i.e. 893 atoms were assigned a chemical shift out of a possible 6735. 0 out of 81 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	459/2492 (18%)	112/1008 (11%)	235/1008 (23%)	112/476 (24%)
Sidechain	369/3667 (10%)	204/2403 (8%)	165/1152 (14%)	0/112 (0%)

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	Total	¹ H	¹³ C	¹⁵ N
Aromatic	65/576 (11%)	33/280 (12%)	31/276 (11%)	1/20 (5%)
Overall	893/6735 (13%)	349/3691 (9%)	431/2436 (18%)	113/608 (19%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 11%, i.e. 1049 atoms were assigned a chemical shift out of a possible 9404. 0 out of 104 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹ H	¹³ C	¹⁵ N
Backbone	542/3490 (16%)	133/1412 (9%)	276/1408 (20%)	133/670 (20%)
Sidechain	430/5094 (8%)	237/3318 (7%)	193/1612 (12%)	0/164 (0%)
Aromatic	77/820 (9%)	39/396 (10%)	37/394 (9%)	1/30 (3%)
Overall	1049/9404 (11%)	409/5126 (8%)	506/3414 (15%)	134/864 (16%)

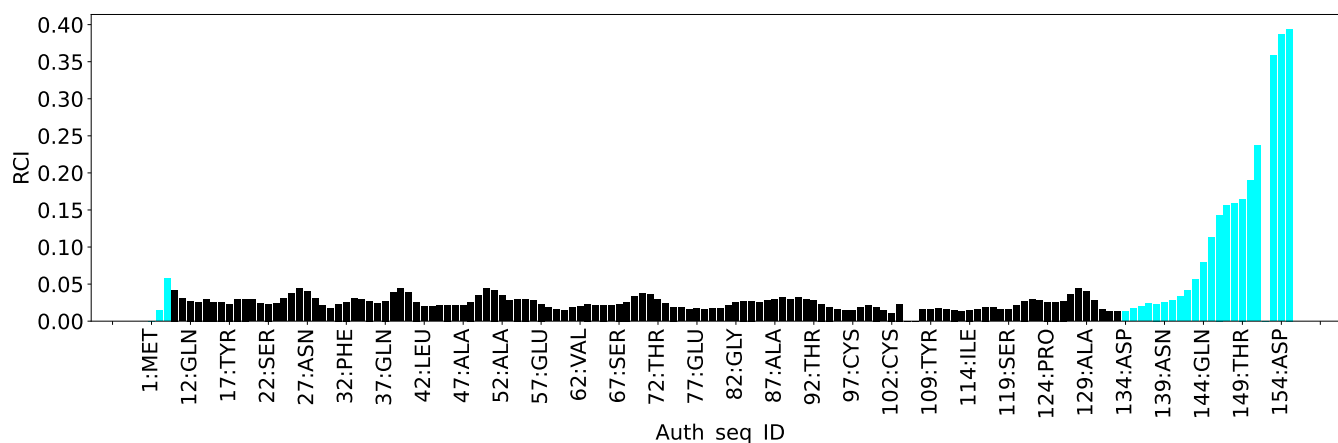
7.1.4 Statistically unusual chemical shifts ⓘ

There are no statistically unusual chemical shifts.

7.1.5 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. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:



7.2 Chemical shift list 2

File name: working_cs.cif

Chemical shift list name: *assigned_chemical_shift_list_2*

7.2.1 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	1044
Number of shifts mapped to atoms	1044
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

7.2.2 Chemical shift referencing

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	140	0.27 ± 0.10	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	126	0.78 ± 0.20	Should be checked
$^{13}\text{C}'$	135	0.26 ± 0.12	None needed (< 0.5 ppm)
^{15}N	132	-1.09 ± 0.27	Should be applied

7.2.3 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 13%, i.e. 888 atoms were assigned a chemical shift out of a possible 6735. 0 out of 81 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	456/2492 (18%)	111/1008 (11%)	234/1008 (23%)	111/476 (23%)
Sidechain	367/3667 (10%)	204/2403 (8%)	163/1152 (14%)	0/112 (0%)
Aromatic	65/576 (11%)	33/280 (12%)	31/276 (11%)	1/20 (5%)
Overall	888/6735 (13%)	348/3691 (9%)	428/2436 (18%)	112/608 (18%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 11%, i.e. 1044 atoms were assigned a chemical shift out of a possible 9404. 0 out of 104 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹ H	¹³ C	¹⁵ N
Backbone	539/3490 (15%)	132/1412 (9%)	275/1408 (20%)	132/670 (20%)
Sidechain	428/5094 (8%)	237/3318 (7%)	191/1612 (12%)	0/164 (0%)
Aromatic	77/820 (9%)	39/396 (10%)	37/394 (9%)	1/30 (3%)
Overall	1044/9404 (11%)	408/5126 (8%)	503/3414 (15%)	133/864 (15%)

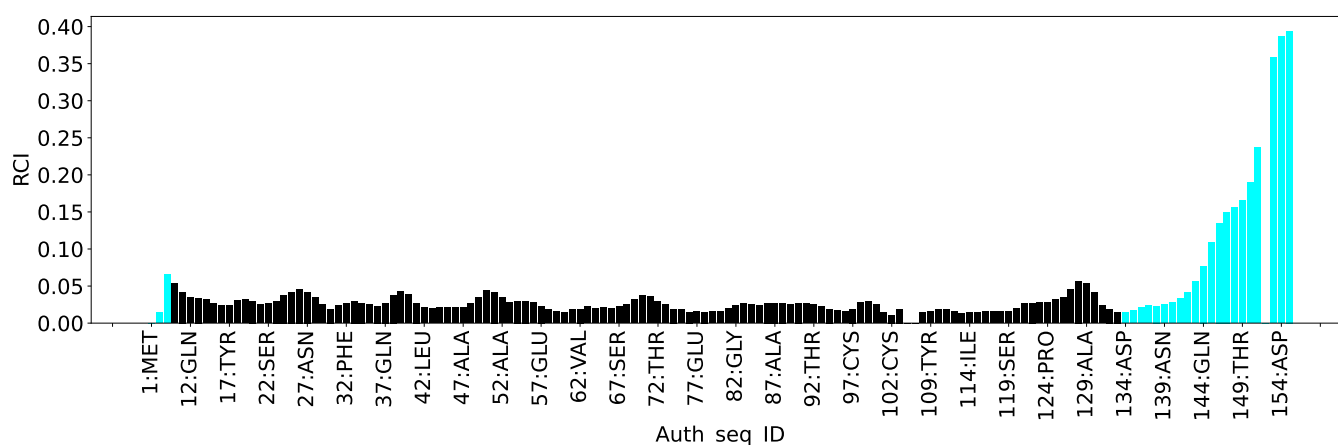
7.2.4 Statistically unusual chemical shifts [i](#)

There are no statistically unusual chemical shifts.

7.2.5 Random Coil Index (RCI) plots [i](#)

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. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:



7.3 Chemical shift list 3

File name: working_cs.cif

Chemical shift list name: *assigned_chemical_shift_list_3*

7.3.1 Bookkeeping [i](#)

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	1044
Number of shifts mapped to atoms	1044
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

7.3.2 Chemical shift referencing [i](#)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	140	0.27 ± 0.10	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	126	0.78 ± 0.20	Should be checked
$^{13}\text{C}'$	135	0.26 ± 0.12	None needed (< 0.5 ppm)
^{15}N	132	-1.09 ± 0.27	Should be applied

7.3.3 Completeness of resonance assignments [i](#)

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 13%, i.e. 888 atoms were assigned a chemical shift out of a possible 6735. 0 out of 81 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	456/2492 (18%)	111/1008 (11%)	234/1008 (23%)	111/476 (23%)
Sidechain	367/3667 (10%)	204/2403 (8%)	163/1152 (14%)	0/112 (0%)
Aromatic	65/576 (11%)	33/280 (12%)	31/276 (11%)	1/20 (5%)
Overall	888/6735 (13%)	348/3691 (9%)	428/2436 (18%)	112/608 (18%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 11%, i.e. 1044 atoms were assigned a chemical shift out of a possible 9404. 0 out of 104 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	539/3490 (15%)	132/1412 (9%)	275/1408 (20%)	132/670 (20%)
Sidechain	428/5094 (8%)	237/3318 (7%)	191/1612 (12%)	0/164 (0%)
Aromatic	77/820 (9%)	39/396 (10%)	37/394 (9%)	1/30 (3%)
Overall	1044/9404 (11%)	408/5126 (8%)	503/3414 (15%)	133/864 (15%)

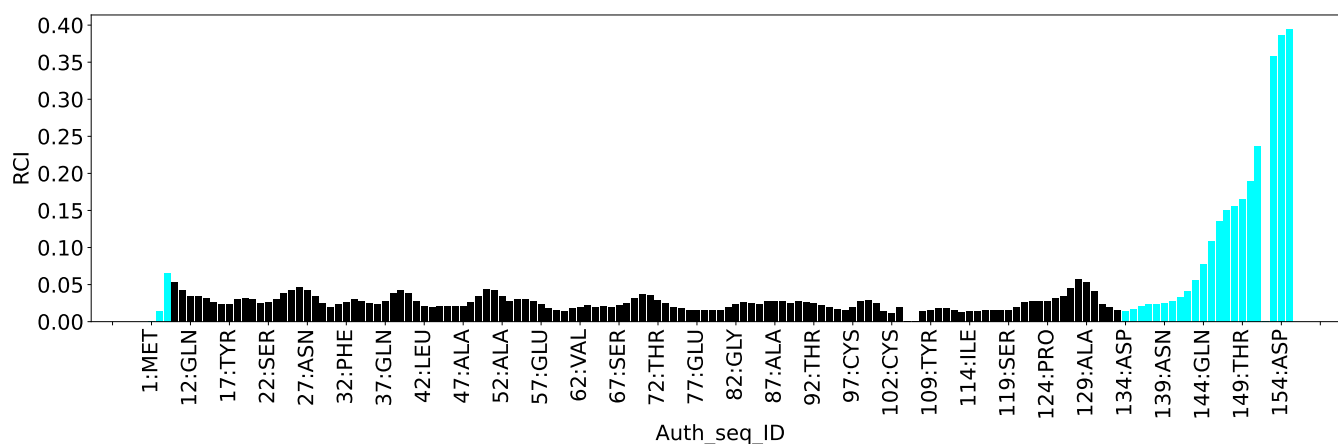
7.3.4 Statistically unusual chemical shifts [i](#)

There are no statistically unusual chemical shifts.

7.3.5 Random Coil Index (RCI) plots [i](#)

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. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:



7.4 Chemical shift list 4

File name: working_cs.cif

Chemical shift list name: *assigned_chemical_shift_list_4*

7.4.1 Bookkeeping [i](#)

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	1049
Number of shifts mapped to atoms	1049
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

7.4.2 Chemical shift referencing ⓘ

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	139	0.25 ± 0.15	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	128	0.84 ± 0.22	Should be checked
$^{13}\text{C}'$	137	0.29 ± 0.15	None needed (< 0.5 ppm)
^{15}N	133	-1.16 ± 0.25	Should be applied

7.4.3 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 13%, i.e. 893 atoms were assigned a chemical shift out of a possible 6735. 0 out of 81 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	459/2492 (18%)	112/1008 (11%)	235/1008 (23%)	112/476 (24%)
Sidechain	369/3667 (10%)	204/2403 (8%)	165/1152 (14%)	0/112 (0%)
Aromatic	65/576 (11%)	33/280 (12%)	31/276 (11%)	1/20 (5%)
Overall	893/6735 (13%)	349/3691 (9%)	431/2436 (18%)	113/608 (19%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 11%, i.e. 1049 atoms were assigned a chemical shift out of a possible 9404. 0 out of 104 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	542/3490 (16%)	133/1412 (9%)	276/1408 (20%)	133/670 (20%)
Sidechain	430/5094 (8%)	237/3318 (7%)	193/1612 (12%)	0/164 (0%)
Aromatic	77/820 (9%)	39/396 (10%)	37/394 (9%)	1/30 (3%)
Overall	1049/9404 (11%)	409/5126 (8%)	506/3414 (15%)	134/864 (16%)

7.4.4 Statistically unusual chemical shifts ⓘ

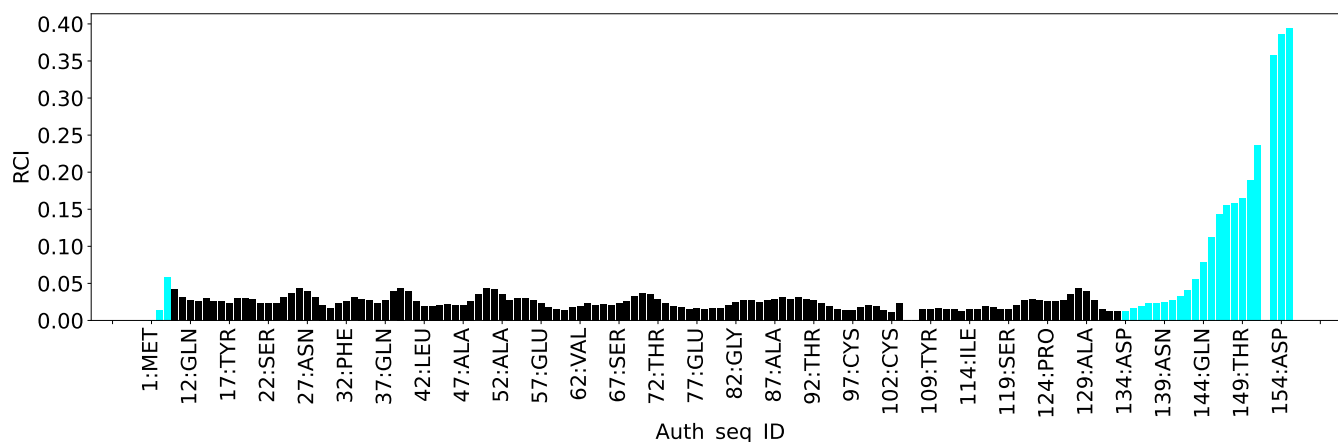
There are no statistically unusual chemical shifts.

7.4.5 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. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:



7.5 Chemical shift list 5

File name: working_cs.cif

Chemical shift list name: *assigned_chemical_shift_5*

7.5.1 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	270
Number of shifts mapped to atoms	270
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

7.5.2 Chemical shift referencing ⓘ

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	40	-0.53 ± 0.20	Should be checked
$^{13}\text{C}_\beta$	39	0.57 ± 0.32	None needed (imprecise)
$^{13}\text{C}'$	35	-0.45 ± 0.17	None needed (< 0.5 ppm)

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Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
^{15}N	34	-1.15 $\pm$ 0.59	None needed (imprecise)

7.5.3 Completeness of resonance assignments [i](#)

The following table shows the completeness of the chemical shift assignments for the well-defined regions of the structure. The overall completeness is 0%, i.e. 8 atoms were assigned a chemical shift out of a possible 6735. 0 out of 81 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	4/2492 (0%)	1/1008 (0%)	2/1008 (0%)	1/476 (0%)
Sidechain	4/3667 (0%)	3/2403 (0%)	1/1152 (0%)	0/112 (0%)
Aromatic	0/576 (0%)	0/280 (0%)	0/276 (0%)	0/20 (0%)
Overall	8/6735 (0%)	4/3691 (0%)	3/2436 (0%)	1/608 (0%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 3%, i.e. 269 atoms were assigned a chemical shift out of a possible 9404. 0 out of 104 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	143/3490 (4%)	34/1412 (2%)	75/1408 (5%)	34/670 (5%)
Sidechain	126/5094 (2%)	69/3318 (2%)	57/1612 (4%)	0/164 (0%)
Aromatic	0/820 (0%)	0/396 (0%)	0/394 (0%)	0/30 (0%)
Overall	269/9404 (3%)	103/5126 (2%)	132/3414 (4%)	34/864 (4%)

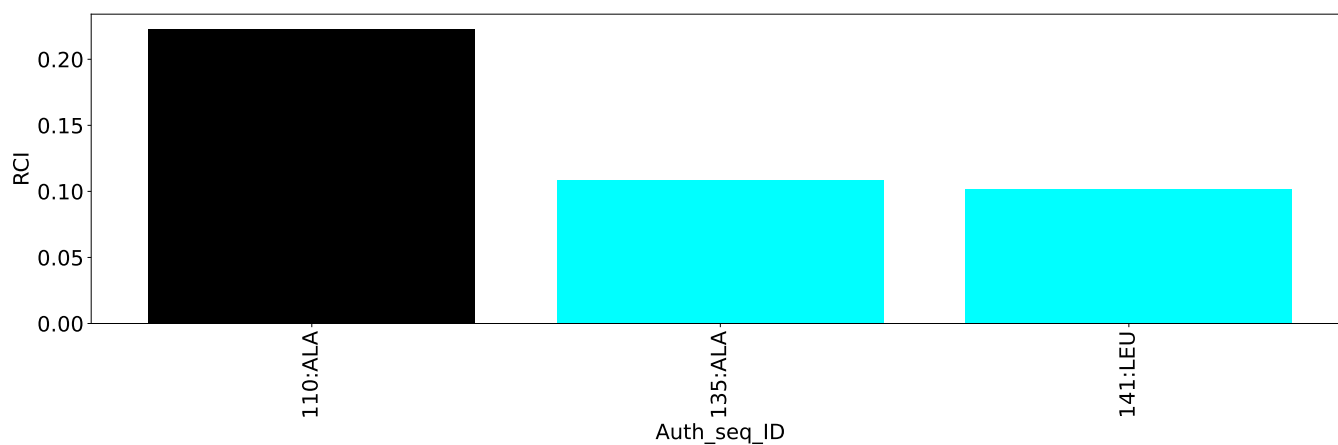
7.5.4 Statistically unusual chemical shifts [i](#)

There are no statistically unusual chemical shifts.

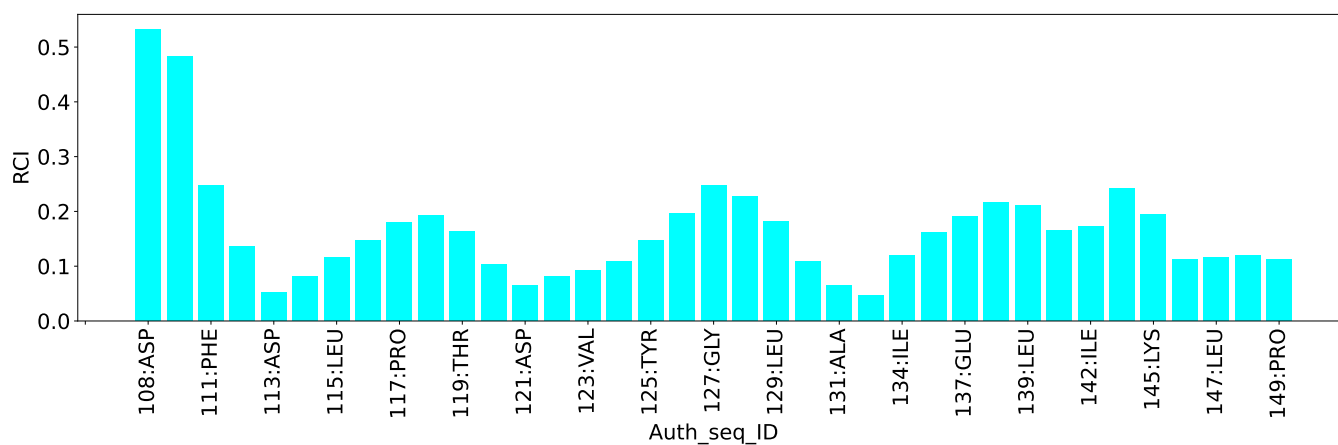
7.5.5 Random Coil Index (RCI) plots [i](#)

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. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:



Random coil index (RCI) for chain E:



7.6 Chemical shift list 6

File name: working_cs.cif

Chemical shift list name: *assigned_chemical_shift_6*

7.6.1 Bookkeeping [i](#)

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	270
Number of shifts mapped to atoms	270
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

7.6.2 Chemical shift referencing ⓘ

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction $\pm$ precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	40	-0.53 ± 0.20	Should be checked
$^{13}\text{C}_\beta$	39	0.57 ± 0.32	None needed (imprecise)
$^{13}\text{C}'$	35	-0.45 ± 0.17	None needed (< 0.5 ppm)
^{15}N	34	-1.15 ± 0.59	None needed (imprecise)

7.6.3 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 0%, i.e. 8 atoms were assigned a chemical shift out of a possible 6735. 0 out of 81 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	4/2492 (0%)	1/1008 (0%)	2/1008 (0%)	1/476 (0%)
Sidechain	4/3667 (0%)	3/2403 (0%)	1/1152 (0%)	0/112 (0%)
Aromatic	0/576 (0%)	0/280 (0%)	0/276 (0%)	0/20 (0%)
Overall	8/6735 (0%)	4/3691 (0%)	3/2436 (0%)	1/608 (0%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 3%, i.e. 269 atoms were assigned a chemical shift out of a possible 9404. 0 out of 104 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	143/3490 (4%)	34/1412 (2%)	75/1408 (5%)	34/670 (5%)
Sidechain	126/5094 (2%)	69/3318 (2%)	57/1612 (4%)	0/164 (0%)
Aromatic	0/820 (0%)	0/396 (0%)	0/394 (0%)	0/30 (0%)
Overall	269/9404 (3%)	103/5126 (2%)	132/3414 (4%)	34/864 (4%)

7.6.4 Statistically unusual chemical shifts ⓘ

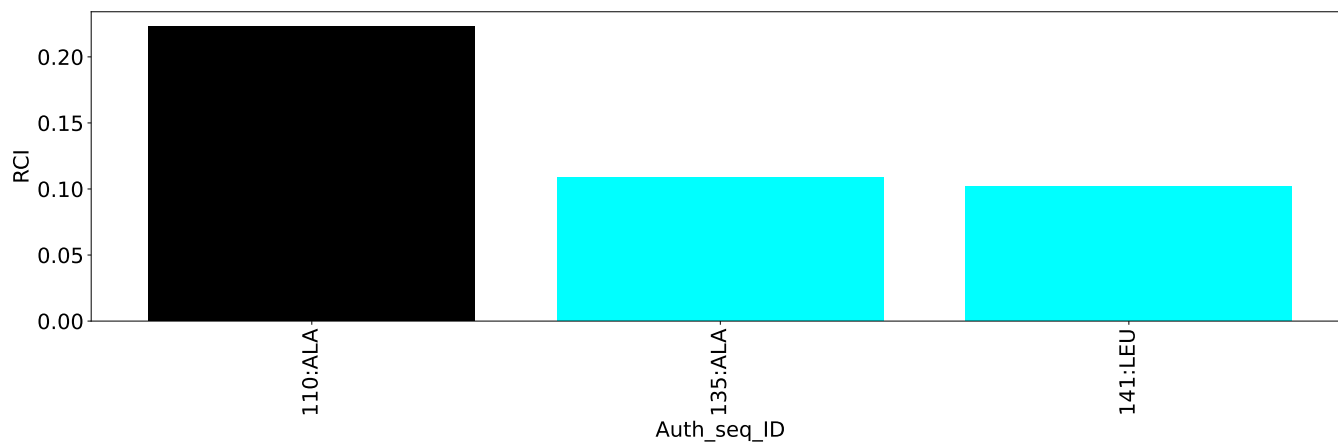
There are no statistically unusual chemical shifts.

7.6.5 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. If well-defined core and ill-defined regions are not identified then it is shown as gray bars.

Random coil index (RCI) for chain A:



Random coil index (RCI) for chain E:

