



Full wwPDB NMR Structure Validation Report ⓘ

Feb 20, 2018 – 08:42 am GMT

PDB ID : 1N3H
Title : Coupling of Folding and Binding in the PTB Domain of the Signaling Protein Shc
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Deposited on : 2002-10-28

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

Cyrange : Kirchner and Güntert (2011)
NmrClust : Kelley et al. (1996)
MolProbity : 4.02b-467
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : trunk30686
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30686

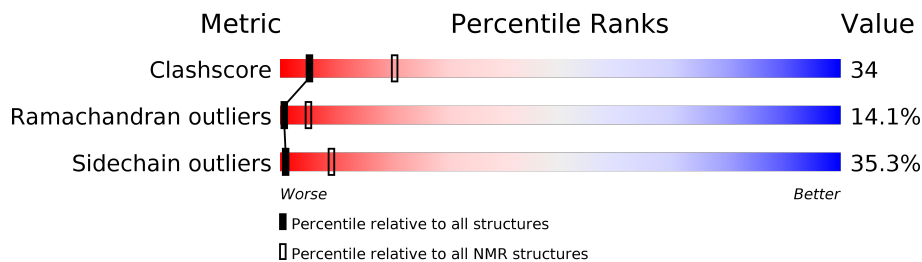
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment is 52%.

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	136279	12091
Ramachandran outliers	132675	10835
Sidechain outliers	132484	10811

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	207	

2 Ensemble composition and analysis

This entry contains 1 models. Identification of well-defined residues and clustering analysis are not possible.

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 3181 atoms, of which 1598 are hydrogens and 0 are deuteriums.

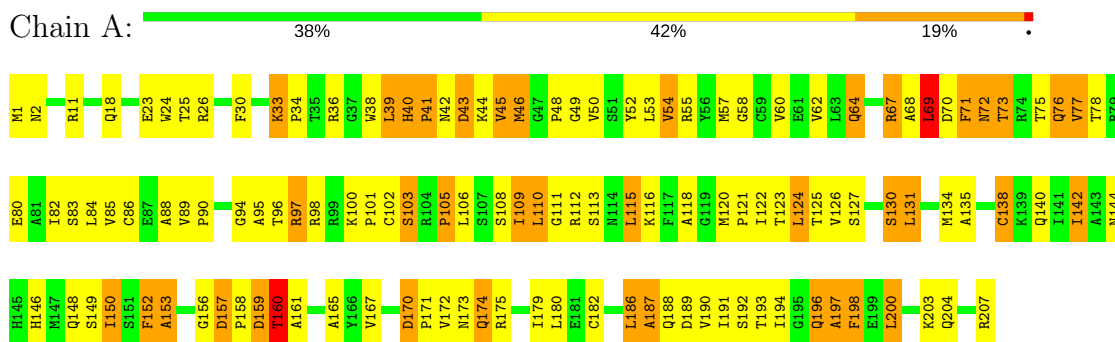
- Molecule 1 is a protein called SHC Transforming protein.

Mol	Chain	Residues	Atoms					Trace	
			Total	C	H	N	O		S
1	A	207	3181	982	1598	296	292	13	0

4 Residue-property plots [i](#)

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

• Molecule 1: SHC Transforming protein



5 Refinement protocol and experimental data overview

The models were refined using the following method: *Distance Geometry, Simulated Annealing, Molecular Dynamics, ARIA*.

Of the 200 calculated structures, 1 were deposited, based on the following criterion: ?.

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

Software name	Classification	Version
X-PLOR	structure solution	3.1
ARIA	structure solution	1.1
X-PLOR	refinement	3.1

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)	BMRB entry 5566
Number of chemical shift lists	1
Total number of shifts	1497
Number of shifts mapped to atoms	1497
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Assignment completeness (well-defined parts)	52%

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

6 Model quality

6.1 Standard geometry

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

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	1583	1598	1593	109
All	All	1583	1598	1593	109

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 34.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)
1:A:88:ALA:HB1	1:A:115:LEU:HD22	0.95	1.35
1:A:126:VAL:HG23	1:A:131:LEU:HD11	0.93	1.39
1:A:186:LEU:HD12	1:A:190:VAL:HG13	0.87	1.46
1:A:73:THR:HG21	1:A:109:ILE:HG21	0.87	1.46
1:A:50:VAL:O	1:A:126:VAL:HG12	0.85	1.71
1:A:82:ILE:O	1:A:85:VAL:HG12	0.81	1.75
1:A:69:LEU:HD13	1:A:70:ASP:N	0.76	1.95
1:A:53:LEU:HD13	1:A:54:VAL:N	0.72	1.99
1:A:73:THR:HG22	1:A:77:VAL:HG23	0.71	1.62
1:A:159:ASP:O	1:A:160:THR:HG23	0.70	1.87
1:A:135:ALA:HB1	1:A:138:CYS:HB2	0.69	1.64
1:A:39:LEU:HA	1:A:194:ILE:HD13	0.69	1.64
1:A:182:CYS:SG	1:A:190:VAL:HG21	0.68	2.29
1:A:64:GLN:CB	1:A:109:ILE:HG22	0.66	2.19
1:A:150:ILE:HD13	1:A:150:ILE:N	0.65	2.07

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Atom-1	Atom-2	Clash(Å)	Distance(Å)
1:A:69:LEU:HD21	1:A:76:GLN:NE2	0.65	2.05
1:A:86:CYS:HB2	1:A:96:THR:HG22	0.64	1.67
1:A:89:VAL:HG11	1:A:118:ALA:CB	0.64	2.22
1:A:38:TRP:CD2	1:A:126:VAL:HG21	0.63	2.28
1:A:126:VAL:HG23	1:A:131:LEU:CD1	0.63	2.21
1:A:73:THR:O	1:A:77:VAL:HG23	0.63	1.94
1:A:64:GLN:HB2	1:A:109:ILE:HG22	0.60	1.71
1:A:39:LEU:O	1:A:194:ILE:HG21	0.58	1.98
1:A:135:ALA:HB2	1:A:142:ILE:HD11	0.56	1.76
1:A:120:MET:HE1	1:A:122:ILE:HG21	0.56	1.77
1:A:73:THR:HG22	1:A:77:VAL:CG2	0.56	2.31
1:A:122:ILE:HD12	1:A:122:ILE:C	0.56	2.21
1:A:45:VAL:HG11	1:A:197:ALA:HB2	0.56	1.78
1:A:42:ASN:O	1:A:45:VAL:HG23	0.55	2.02
1:A:186:LEU:O	1:A:186:LEU:HD13	0.54	2.02
1:A:172:VAL:O	1:A:172:VAL:HG22	0.54	2.02
1:A:83:SER:HA	1:A:95:ALA:HB3	0.54	1.80
1:A:187:ALA:O	1:A:191:ILE:HG22	0.53	2.04
1:A:187:ALA:HA	1:A:190:VAL:HG22	0.53	1.81
1:A:82:ILE:HD11	1:A:165:ALA:HB2	0.53	1.80
1:A:124:LEU:HD21	1:A:131:LEU:HD23	0.51	1.81
1:A:69:LEU:HD13	1:A:70:ASP:H	0.51	1.65
1:A:82:ILE:HG12	1:A:179:ILE:HD12	0.51	1.82
1:A:120:MET:HE1	1:A:122:ILE:CG2	0.50	2.36
1:A:62:VAL:HG13	1:A:110:LEU:H	0.49	1.68
1:A:76:GLN:CB	1:A:105:PRO:CB	0.49	2.90
1:A:157:ASP:CB	1:A:158:PRO:CD	0.48	2.91
1:A:69:LEU:CD2	1:A:76:GLN:NE2	0.48	2.77
1:A:85:VAL:O	1:A:89:VAL:HG12	0.48	2.08
1:A:54:VAL:CB	1:A:180:LEU:HD11	0.47	2.39
1:A:150:ILE:CD1	1:A:150:ILE:N	0.47	2.77
1:A:38:TRP:CD1	1:A:126:VAL:HG11	0.47	2.45
1:A:89:VAL:O	1:A:89:VAL:HG13	0.47	2.10
1:A:54:VAL:HB	1:A:180:LEU:HD11	0.46	1.85
1:A:120:MET:CE	1:A:122:ILE:CG2	0.46	2.93
1:A:30:PHE:O	1:A:30:PHE:CD2	0.46	2.68
1:A:53:LEU:HD22	1:A:122:ILE:O	0.46	2.11
1:A:170:ASP:CB	1:A:171:PRO:CD	0.46	2.93
1:A:68:ALA:CB	1:A:109:ILE:HG23	0.46	2.41
1:A:89:VAL:HG11	1:A:118:ALA:HB1	0.45	1.88
1:A:53:LEU:HD22	1:A:122:ILE:C	0.45	2.30
1:A:115:LEU:HD23	1:A:115:LEU:H	0.45	1.71

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Atom-1	Atom-2	Clash(Å)	Distance(Å)
1:A:109:ILE:HD13	1:A:109:ILE:H	0.45	1.72
1:A:153:ALA:HB2	1:A:167:VAL:HG11	0.45	1.88
1:A:60:VAL:HG13	1:A:179:ILE:HG12	0.45	1.89
1:A:89:VAL:HG21	1:A:118:ALA:HB3	0.45	1.89
1:A:53:LEU:C	1:A:53:LEU:HD13	0.44	2.32
1:A:180:LEU:HD21	1:A:182:CYS:SG	0.44	2.53
1:A:86:CYS:CB	1:A:96:THR:HG22	0.44	2.40
1:A:43:ASP:O	1:A:48:PRO:CD	0.44	2.66
1:A:80:GLU:O	1:A:84:LEU:CB	0.44	2.66
1:A:189:ASP:HA	1:A:194:ILE:HD12	0.44	1.88
1:A:76:GLN:HB2	1:A:105:PRO:CB	0.44	2.43
1:A:96:THR:HG23	1:A:97:ARG:N	0.43	2.28
1:A:115:LEU:N	1:A:115:LEU:HD23	0.43	2.28
1:A:187:ALA:O	1:A:191:ILE:CG2	0.43	2.66
1:A:52:TYR:CB	1:A:186:LEU:N	0.43	2.82
1:A:72:ASN:O	1:A:73:THR:CB	0.43	2.66
1:A:68:ALA:CB	1:A:109:ILE:CG2	0.43	2.97
1:A:77:VAL:HG22	1:A:109:ILE:HG13	0.43	1.91
1:A:170:ASP:CB	1:A:171:PRO:HD3	0.43	2.44
1:A:84:LEU:HD21	1:A:113:SER:N	0.43	2.29
1:A:30:PHE:O	1:A:30:PHE:CG	0.43	2.72
1:A:88:ALA:CB	1:A:115:LEU:HD22	0.43	2.25
1:A:124:LEU:CD2	1:A:125:THR:N	0.42	2.82
1:A:42:ASN:O	1:A:46:MET:CG	0.42	2.67
1:A:157:ASP:CB	1:A:158:PRO:HD3	0.42	2.44
1:A:121:PRO:O	1:A:122:ILE:CG2	0.42	2.68
1:A:33:LYS:N	1:A:34:PRO:CD	0.42	2.82
1:A:69:LEU:HB2	1:A:73:THR:HG23	0.42	1.91
1:A:75:THR:OG1	1:A:76:GLN:N	0.42	2.53
1:A:105:PRO:HG2	1:A:109:ILE:CG1	0.42	2.45
1:A:86:CYS:O	1:A:90:PRO:N	0.42	2.52
1:A:60:VAL:O	1:A:60:VAL:HG23	0.42	2.14
1:A:38:TRP:O	1:A:40:HIS:N	0.41	2.53
1:A:40:HIS:CD2	1:A:41:PRO:HD2	0.41	2.50
1:A:152:PHE:O	1:A:153:ALA:HB2	0.41	2.16
1:A:38:TRP:CE3	1:A:126:VAL:HG21	0.41	2.51
1:A:135:ALA:HB3	1:A:140:GLN:HG2	0.41	1.91
1:A:196:GLN:O	1:A:198:PHE:N	0.41	2.53
1:A:43:ASP:O	1:A:48:PRO:HD2	0.41	2.15
1:A:186:LEU:O	1:A:186:LEU:CD1	0.41	2.67
1:A:52:TYR:HB3	1:A:186:LEU:N	0.41	2.31
1:A:186:LEU:O	1:A:188:GLN:N	0.41	2.53

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Atom-1	Atom-2	Clash(Å)	Distance(Å)
1:A:105:PRO:HG2	1:A:109:ILE:HD11	0.40	1.92
1:A:124:LEU:HD23	1:A:125:THR:N	0.40	2.31
1:A:76:GLN:CB	1:A:105:PRO:HB2	0.40	2.46
1:A:105:PRO:HG2	1:A:109:ILE:CD1	0.40	2.47
1:A:109:ILE:O	1:A:110:LEU:CB	0.40	2.69
1:A:120:MET:CE	1:A:122:ILE:HG21	0.40	2.46
1:A:135:ALA:HB2	1:A:142:ILE:CD1	0.40	2.46
1:A:189:ASP:O	1:A:193:THR:N	0.40	2.54
1:A:43:ASP:N	1:A:46:MET:HE2	0.40	2.32
1:A:89:VAL:HG22	1:A:89:VAL:O	0.40	2.17

6.3 Torsion angles [i](#)

6.3.1 Protein backbone [i](#)

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	205/207 (99%)	120 (59%)	56 (27%)	29 (14%)	1	5
All	All	205/207 (99%)	120 (59%)	56 (27%)	29 (14%)	1	5

All 29 Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type
1	A	97	ARG
1	A	156	GLY
1	A	71	PHE
1	A	203	LYS
1	A	72	ASN
1	A	69	LEU
1	A	67	ARG
1	A	102	CYS
1	A	197	ALA
1	A	200	LEU
1	A	103	SER
1	A	111	GLY
1	A	94	GLY

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Mol	Chain	Res	Type
1	A	161	ALA
1	A	174	GLN
1	A	130	SER
1	A	101	PRO
1	A	175	ARG
1	A	160	THR
1	A	58	GLY
1	A	153	ALA
1	A	187	ALA
1	A	157	ASP
1	A	77	VAL
1	A	41	PRO
1	A	33	LYS
1	A	49	GLY
1	A	24	TRP
1	A	105	PRO

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	170/170 (100%)	110 (65%)	60 (35%)	1 9
All	All	170/170 (100%)	110 (65%)	60 (35%)	1 9

All 60 residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type
1	A	146	HIS
1	A	173	ASN
1	A	54	VAL
1	A	71	PHE
1	A	73	THR
1	A	170	ASP
1	A	57	MET
1	A	43	ASP
1	A	36	ARG

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Mol	Chain	Res	Type
1	A	109	ILE
1	A	186	LEU
1	A	116	LYS
1	A	196	GLN
1	A	115	LEU
1	A	144	ASN
1	A	69	LEU
1	A	123	THR
1	A	67	ARG
1	A	26	ARG
1	A	160	THR
1	A	149	SER
1	A	200	LEU
1	A	103	SER
1	A	55	ARG
1	A	207	ARG
1	A	39	LEU
1	A	150	ILE
1	A	40	HIS
1	A	174	GLN
1	A	45	VAL
1	A	134	MET
1	A	23	GLU
1	A	46	MET
1	A	25	THR
1	A	148	GLN
1	A	110	LEU
1	A	78	THR
1	A	142	ILE
1	A	130	SER
1	A	18	GLN
1	A	159	ASP
1	A	204	GLN
1	A	44	LYS
1	A	138	CYS
1	A	198	PHE
1	A	108	SER
1	A	1	MET
1	A	2	ASN
1	A	98	ARG
1	A	64	GLN
1	A	100	LYS

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Mol	Chain	Res	Type
1	A	76	GLN
1	A	131	LEU
1	A	127	SER
1	A	124	LEU
1	A	192	SER
1	A	106	LEU
1	A	11	ARG
1	A	112	ARG
1	A	152	PHE

6.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

6.5 Carbohydrates [i](#)

There are no carbohydrates 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 (i)

The completeness of assignment taking into account all chemical shift lists is 52% for the well-defined parts and 52% for the entire structure.

7.1 Chemical shift list 1

File name: BMRB entry 5566

Chemical shift list name: *assigned_chem_shift_list_1*

7.1.1 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	1497
Number of shifts mapped to atoms	1497
Number of unparsed shifts	0
Number of shifts with mapping errors	0
Number of shifts with mapping warnings	0
Number of shift outliers (ShiftChecker)	2

7.1.2 Chemical shift referencing (i)

The following table shows the suggested chemical shift referencing corrections.

Nucleus	# values	Correction \pm precision, ppm	Suggested action
$^{13}\text{C}_\alpha$	167	0.05 \pm 0.05	None needed (< 0.5 ppm)
$^{13}\text{C}_\beta$	150	0.29 \pm 0.14	None needed (< 0.5 ppm)
$^{13}\text{C}'$	0	—	None (insufficient data)
^{15}N	165	0.23 \pm 0.18	None needed (< 0.5 ppm)

7.1.3 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 52%, i.e. 1297 atoms were assigned a chemical shift out of a possible 2510. 15 out of 32 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	^1H	^{13}C	^{15}N
Backbone	646/1015 (64%)	315/404 (78%)	167/414 (40%)	164/197 (83%)
Sidechain	593/1337 (44%)	332/789 (42%)	261/471 (55%)	0/77 (0%)

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	Total	¹H	¹³C	¹⁵N
Aromatic	58/158 (37%)	32/82 (39%)	24/64 (38%)	2/12 (17%)
Overall	1297/2510 (52%)	679/1275 (53%)	452/949 (48%)	166/286 (58%)

The following table shows the completeness of the chemical shift assignments for the full structure. The overall completeness is 52%, i.e. 1297 atoms were assigned a chemical shift out of a possible 2510. 15 out of 32 assigned methyl groups (LEU and VAL) were assigned stereospecifically.

	Total	¹H	¹³C	¹⁵N
Backbone	646/1015 (64%)	315/404 (78%)	167/414 (40%)	164/197 (83%)
Sidechain	593/1337 (44%)	332/789 (42%)	261/471 (55%)	0/77 (0%)
Aromatic	58/158 (37%)	32/82 (39%)	24/64 (38%)	2/12 (17%)
Overall	1297/2510 (52%)	679/1275 (53%)	452/949 (48%)	166/286 (58%)

7.1.4 Statistically unusual chemical shifts [i](#)

The following table lists the statistically unusual chemical shifts. These are statistical measures, and large deviations from the mean do not necessarily imply incorrect assignments. Molecules containing paramagnetic centres or hemes are expected to give rise to anomalous chemical shifts.

Mol	Chain	Res	Type	Atom	Shift, ppm	Expected range, ppm	Z-score
1	A	121	PRO	N	31.27	167.35 – 100.35	-15.3
1	A	203	LYS	CD	41.49	34.86 – 23.06	10.6

7.1.5 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.

Random coil index (RCI) for chain A:

