



# Full wwPDB NMR Structure Validation Report ⓘ

Oct 11, 2021 – 12:45 AM EDT

PDB ID : 2PQE  
Title : Solution structure of proline-free mutant of staphylococcal nuclease  
Authors : Shan, L.; Tong, Y.; Xie, T.; Wang, M.; Wang, J.  
Deposited on : 2007-05-01

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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.

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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

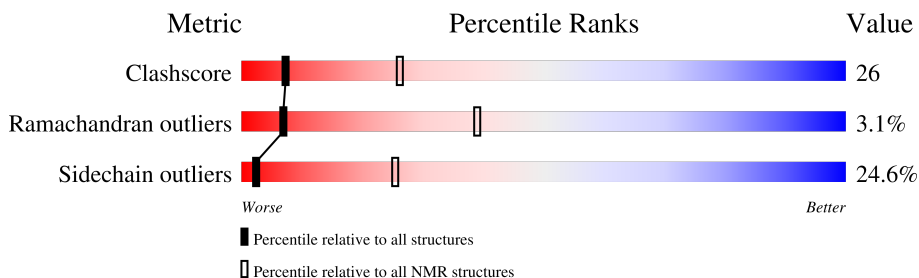
# 1 Overall quality at a glance

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  $\geq 3$ , 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	149	

## 2 Ensemble composition and analysis i

This entry contains 21 models. Model 1 is the overall representative, medoid model (most similar to other models).

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:9-A:42, A:53-A:112, A:118-A:141 (118)	0.25	1

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 4 clusters and 6 single-model clusters were found.

Cluster number	Models
1	1, 4, 5, 6, 10, 16
2	7, 17, 19, 20
3	2, 11, 12
4	15, 21
Single-model clusters	3; 8; 9; 13; 14; 18

### 3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 2377 atoms, of which 1207 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called Thermonuclease.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	149	2377	735	1207	206	225	4	0

There are 6 discrepancies between the modelled and reference sequences:

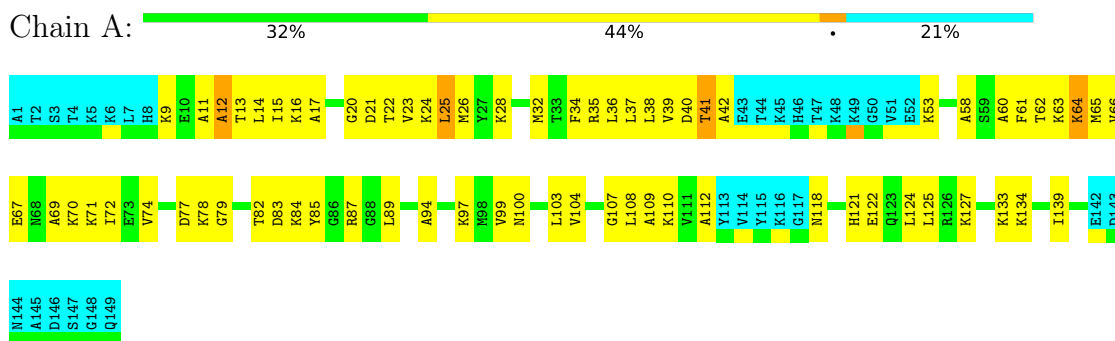
Chain	Residue	Modelled	Actual	Comment	Reference
A	11	ALA	PRO	engineered mutation	UNP Q8NXI6
A	31	ALA	PRO	engineered mutation	UNP Q8NXI6
A	42	ALA	PRO	engineered mutation	UNP Q8NXI6
A	47	THR	PRO	engineered mutation	UNP Q8NXI6
A	56	ALA	PRO	engineered mutation	UNP Q8NXI6
A	117	GLY	PRO	engineered mutation	UNP Q8NXI6

## 4 Residue-property plots i

### 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: Thermonuclease

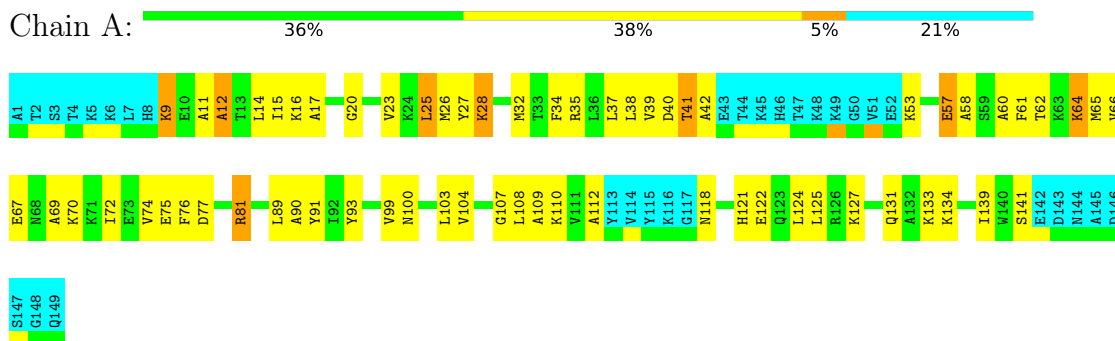


### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

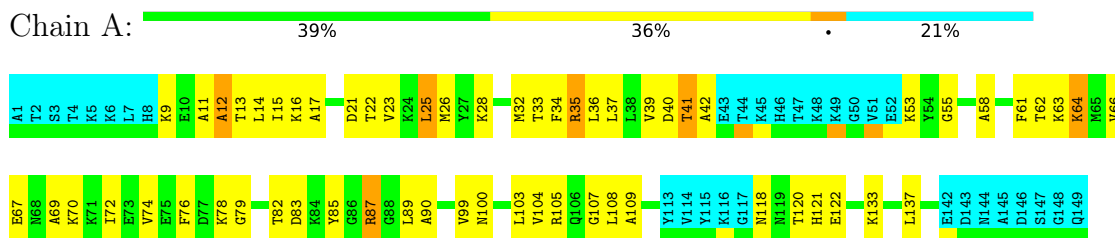
#### 4.2.1 Score per residue for model 1 (medoid)

- Molecule 1: Thermonuclease



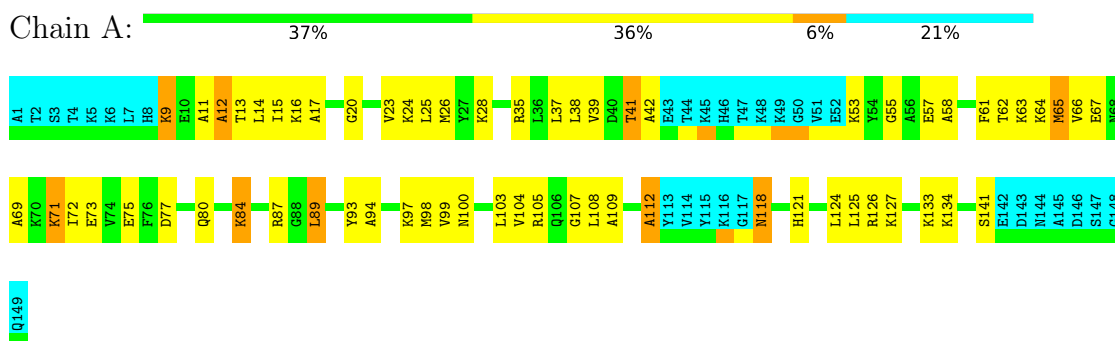
### 4.2.2 Score per residue for model 2

- Molecule 1: Thermonuclease



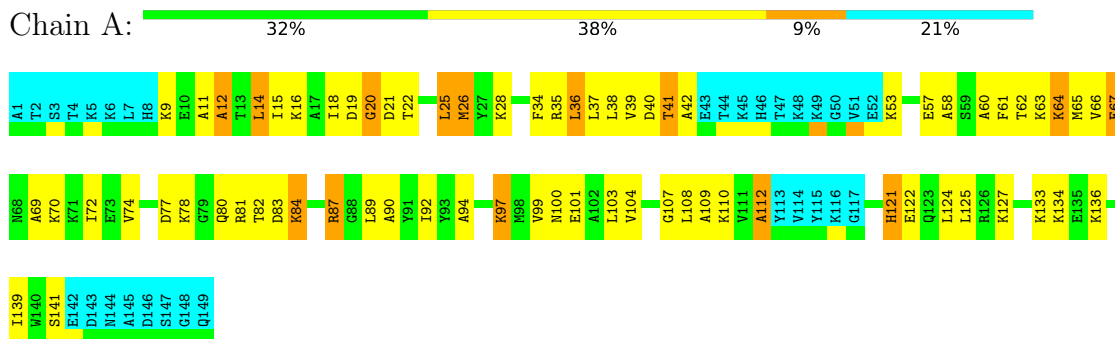
### 4.2.3 Score per residue for model 3

- Molecule 1: Thermonuclease



### 4.2.4 Score per residue for model 4

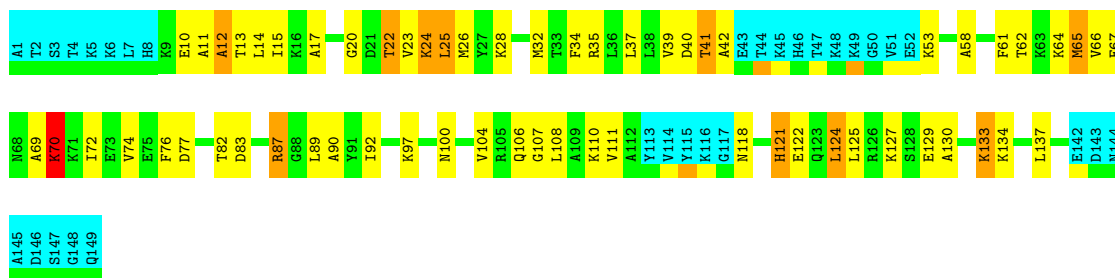
- Molecule 1: Thermonuclease



### 4.2.5 Score per residue for model 5

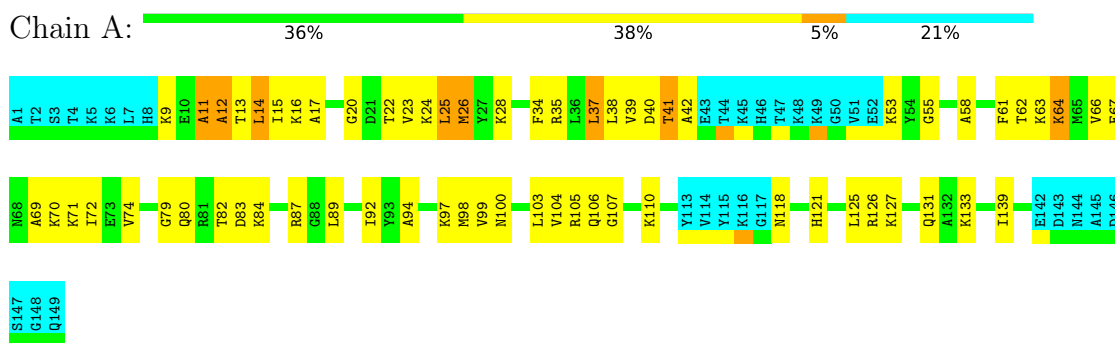
- Molecule 1: Thermonuclease





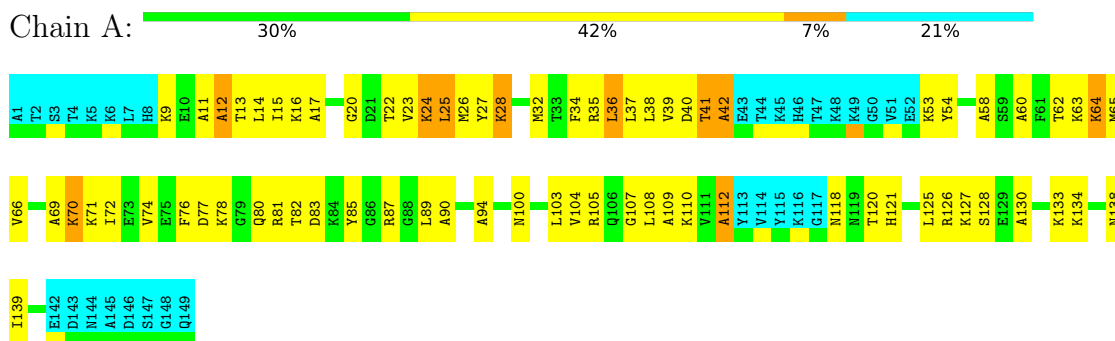
#### 4.2.6 Score per residue for model 6

- Molecule 1: Thermonuclease



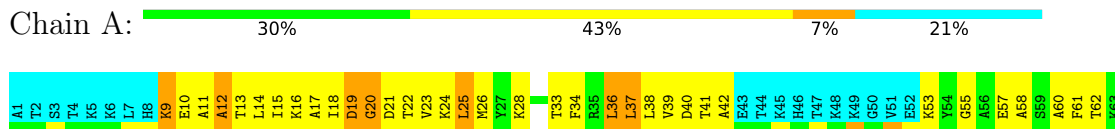
#### 4.2.7 Score per residue for model 7

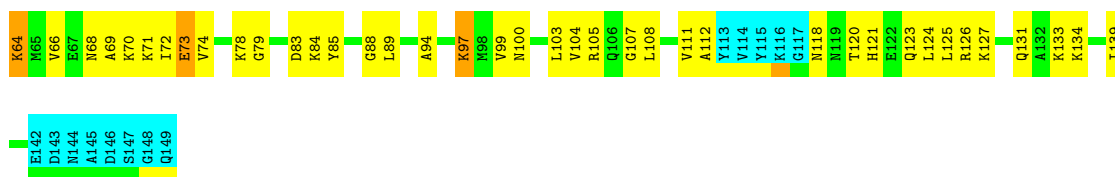
- Molecule 1: Thermonuclease



#### 4.2.8 Score per residue for model 8

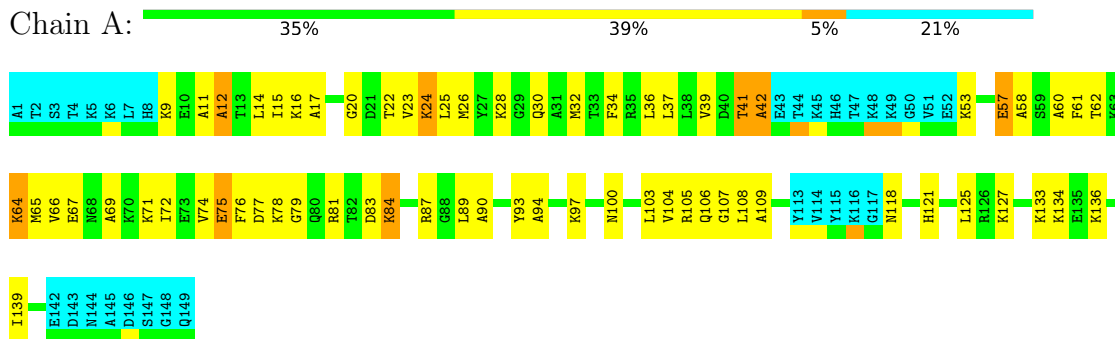
- Molecule 1: Thermonuclease





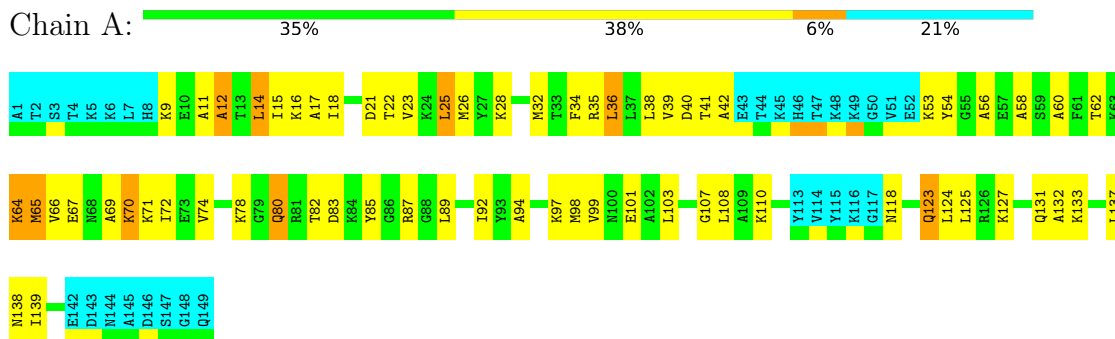
#### 4.2.9 Score per residue for model 9

- Molecule 1: Thermonuclease



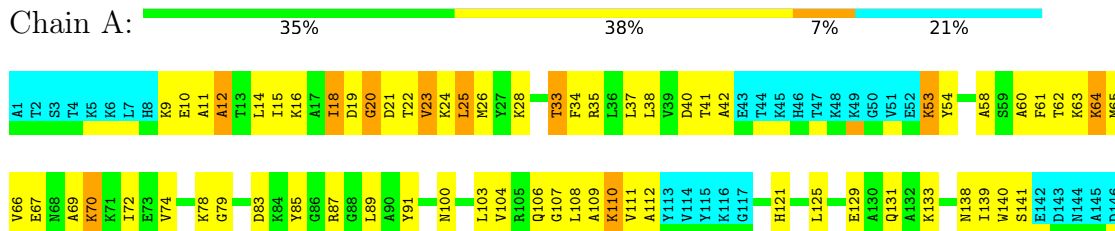
#### 4.2.10 Score per residue for model 10

- Molecule 1: Thermonuclease



#### 4.2.11 Score per residue for model 11

- Molecule 1: Thermonuclease





S147  
G146  
Q149

#### 4.2.12 Score per residue for model 12

- Molecule 1: Thermonuclease

Chain A:  30% 44% 5% 21%

A1 T2 S3 T4 K5 K6 L7 H8 K9 E10 A11 A12 T13 L14 L15 K16 A17 D18 D19 G20 T21 T22 V23 K24 L25 M26 Y27 K28 T33 F34 R35 L36 L37 L38 V39 D40 T41 A42 E43 T44 K45 H46 T47 K48 K49 G50 V51 E52 K53 Y54 E57 A58 F61 T62 K63 K64 M65

V66 E67 M68 A69 K70 K71 L72 E73 F74 E75 F76 D77 K78 G79 Q80 R81 T82 K84 Y85 G86 R87 G88 L89 M90 A94 A97 N98 V99 M100 L103 V104 R105 Q106 G107 L108 A109 K110 V111 V112 V113 V114 K115 K116 M117 M118 N119 T120 H121 L124 S128 A132 K133

L137 M138 I139 E142 D143 M144 A145 S147 G148 Q149

#### 4.2.13 Score per residue for model 13

- Molecule 1: Thermonuclease

Chain A:  34% 38% 7% 21%

A1 T2 S3 T4 K5 K6 L7 H8 K9 E10 A11 A12 T13 L14 L15 K16 A17 G20 D21 T22 V23 K24 L25 M26 Y27 K28 M32 T33 F34 R35 L36 L37 L38 V39 D40 T41 A42 E43 T44 K45 H46 T47 K48 K49 V51 E52 K53 Y54 A58 F61 T62 K63 K64 M65 V66

A69 K70 K71 I72 E75 F76 K78 G79 T82 D83 K84 Y85 G86 R87 G88 L89 A94 A97 N98 V99 M100 E101 L103 V104 G107 L108 A109 K110 V111 V112 V113 V114 V115 K116 G117 M116 E122 L125 R126 K133 K134 M138 L139 W140 S141 D142 D143

M144 A145 D146 S147 G148 Q149

#### 4.2.14 Score per residue for model 14

- Molecule 1: Thermonuclease

Chain A:  36% 40% 21%

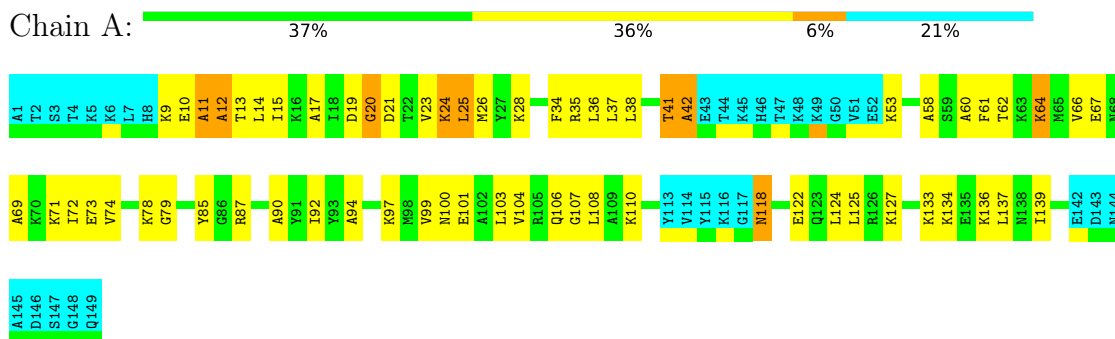
A1 T2 S3 T4 K5 K6 L7 H8 K9 E10 A11 A12 T13 L14 L15 K16 A17 D21 T22 V23 K24 L25 M26 Y27 K28 F34 R35 L36 L37 L38 V39 D40 T41 A42 E43 T44 K45 H46 T47 K48 K49 G50 V51 E52 K53 Y54 G55 A58 S59 A60 F61 T62 K63 K64 M65 V66 E67

M68 A69 K70 K71 I72 E73 F74 D77 G78 G79 Q80 D83 F84 Y85 L89 A90 Y91 I92 K97 M98 V99 L103 G107 L108 A109 K110 V111 V112 V113 V114 V115 K116 G117 M118 N119 T120 H121 L125 R126 K127 S128 E129 A130 Q131 A132 K133 K134 M138 L137 M138 I137 M138 I139 E142

D143 M144 A145 D146 S147 G148 Q149

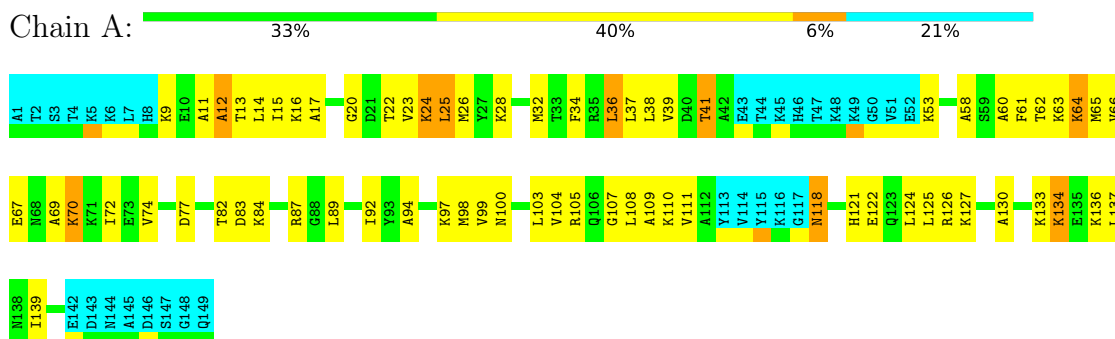
## 4.2.15 Score per residue for model 15

- Molecule 1: Thermonuclease



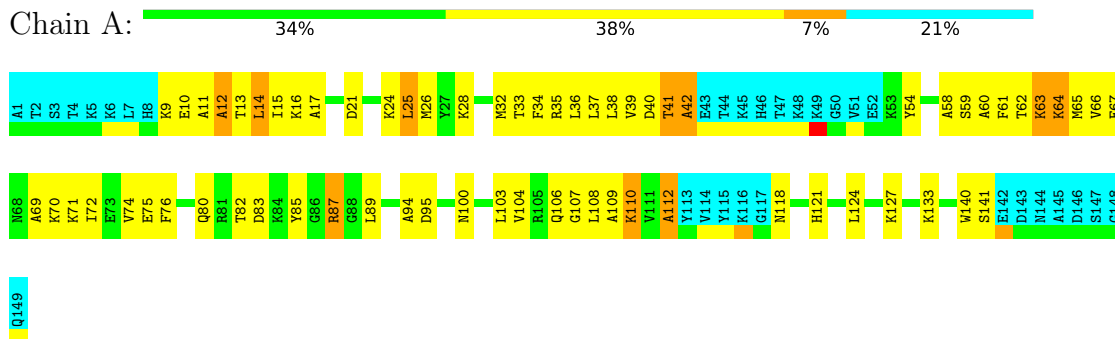
## 4.2.16 Score per residue for model 16

- Molecule 1: Thermonuclease



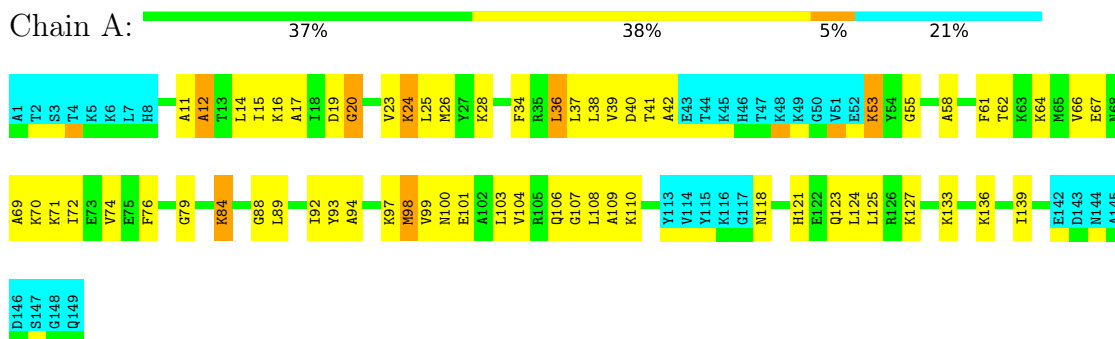
## 4.2.17 Score per residue for model 17

- Molecule 1: Thermonuclease



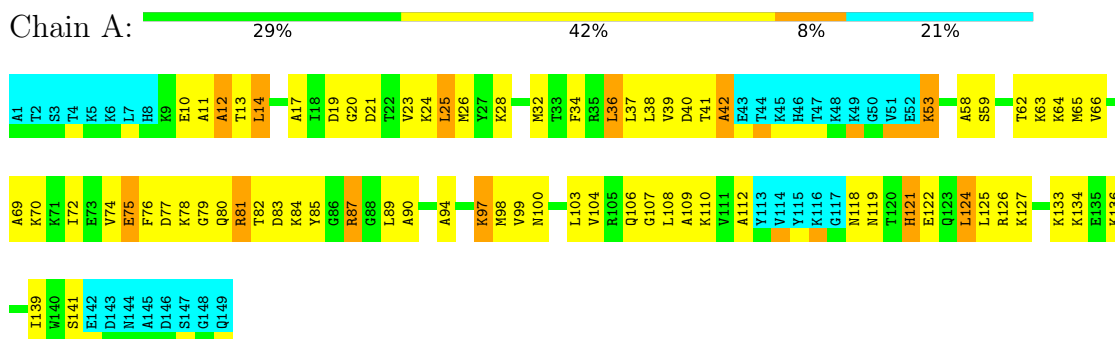
### 4.2.18 Score per residue for model 18

- Molecule 1: Thermonuclease



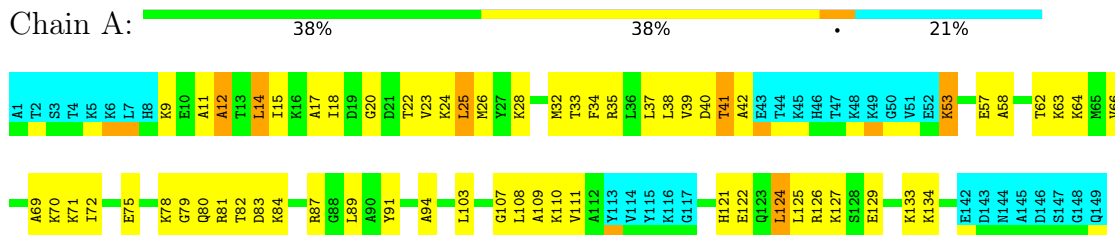
### 4.2.19 Score per residue for model 19

- Molecule 1: Thermonuclease



### 4.2.20 Score per residue for model 20

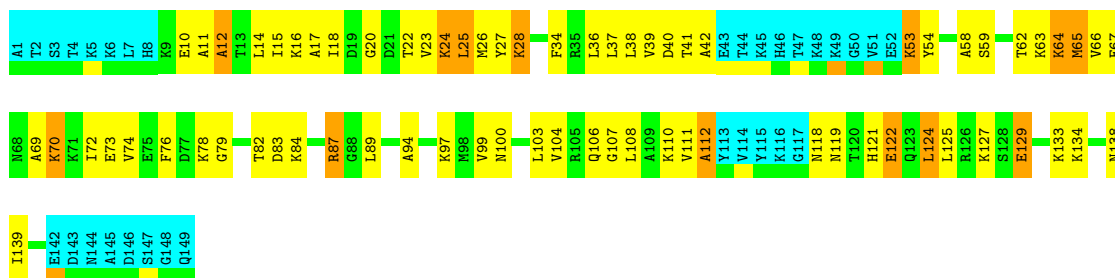
- Molecule 1: Thermonuclease



### 4.2.21 Score per residue for model 21

- Molecule 1: Thermonuclease





## 5 Refinement protocol and experimental data overview

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

Of the 200 calculated structures, 21 were deposited, based on the following criterion: *structures with the lowest energy*.

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

Software name	Classification	Version
CNS	refinement	1.1
CNS	structure solution	1.1

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	927	967	966	50±5
All	All	19467	20307	20286	1048

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 26.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:41:THR:HG22	1:A:58:ALA:HB1	1.08	1.15	13	21
1:A:14:LEU:HD13	1:A:66:VAL:HG21	0.91	1.40	12	1
1:A:14:LEU:HD13	1:A:66:VAL:CG2	0.82	2.04	12	1
1:A:41:THR:HG22	1:A:58:ALA:CB	0.82	2.05	15	9
1:A:69:ALA:CB	1:A:94:ALA:HB1	0.81	2.05	17	15
1:A:12:ALA:HB3	1:A:26:MET:O	0.81	1.75	6	20
1:A:37:LEU:HD13	1:A:118:ASN:ND2	0.80	1.91	14	2
1:A:34:PHE:CE2	1:A:74:VAL:HG21	0.79	2.12	8	14
1:A:20:GLY:O	1:A:62:THR:HG21	0.78	1.78	15	17
1:A:11:ALA:HB2	1:A:74:VAL:HG22	0.77	1.56	15	12
1:A:107:GLY:O	1:A:139:ILE:HG23	0.77	1.79	14	16
1:A:69:ALA:HB2	1:A:94:ALA:HB1	0.77	1.56	20	15
1:A:37:LEU:HD22	1:A:118:ASN:ND2	0.77	1.94	12	3
1:A:18:ILE:HD12	1:A:22:THR:HG22	0.77	1.56	10	4

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:89:LEU:HD12	1:A:89:LEU:O	0.76	1.80	17	4
1:A:36:LEU:HD22	1:A:39:VAL:HG21	0.76	1.57	10	5
1:A:41:THR:CG2	1:A:58:ALA:HB1	0.74	2.13	7	14
1:A:37:LEU:HD13	1:A:118:ASN:CG	0.74	2.03	1	3
1:A:82:THR:HG22	1:A:87:ARG:O	0.73	1.82	4	13
1:A:100:ASN:O	1:A:104:VAL:HG23	0.73	1.83	3	18
1:A:121:HIS:O	1:A:125:LEU:HD12	0.73	1.83	16	10
1:A:13:THR:O	1:A:25:LEU:HD23	0.72	1.83	17	6
1:A:17:ALA:HB1	1:A:23:VAL:HG12	0.72	1.62	13	16
1:A:80:GLN:O	1:A:89:LEU:HD11	0.71	1.85	20	4
1:A:17:ALA:CB	1:A:23:VAL:HG12	0.71	2.16	9	16
1:A:111:VAL:HG23	1:A:129:GLU:HG3	0.71	1.62	5	1
1:A:25:LEU:HD11	1:A:72:ILE:CG2	0.71	2.15	17	17
1:A:37:LEU:O	1:A:39:VAL:HG23	0.70	1.87	9	17
1:A:37:LEU:HD13	1:A:118:ASN:OD1	0.70	1.86	1	1
1:A:104:VAL:HG22	1:A:109:ALA:O	0.70	1.87	11	5
1:A:18:ILE:O	1:A:18:ILE:HD13	0.70	1.85	11	1
1:A:14:LEU:HD22	1:A:66:VAL:HB	0.70	1.63	4	2
1:A:38:LEU:HD11	1:A:118:ASN:O	0.69	1.87	16	4
1:A:25:LEU:HD11	1:A:72:ILE:HG21	0.69	1.65	11	16
1:A:62:THR:OG1	1:A:103:LEU:HD11	0.69	1.87	21	3
1:A:39:VAL:CG1	1:A:109:ALA:HB1	0.69	2.18	3	7
1:A:122:GLU:HA	1:A:125:LEU:HD12	0.69	1.63	21	5
1:A:107:GLY:C	1:A:108:LEU:HD12	0.69	2.08	16	7
1:A:38:LEU:HA	1:A:112:ALA:HB3	0.68	1.65	17	7
1:A:14:LEU:HG	1:A:66:VAL:HG22	0.68	1.64	8	2
1:A:74:VAL:HG12	1:A:92:ILE:HD13	0.68	1.64	14	6
1:A:34:PHE:CE2	1:A:74:VAL:HG11	0.68	2.23	5	4
1:A:39:VAL:HG12	1:A:109:ALA:HB1	0.67	1.65	17	9
1:A:14:LEU:HD13	1:A:14:LEU:O	0.67	1.88	17	3
1:A:37:LEU:HD21	1:A:89:LEU:HD13	0.67	1.65	20	4
1:A:37:LEU:HD21	1:A:118:ASN:HB3	0.67	1.67	17	3
1:A:14:LEU:HD13	1:A:66:VAL:HB	0.67	1.66	2	3
1:A:41:THR:HG21	1:A:103:LEU:HD22	0.66	1.65	20	2
1:A:14:LEU:HD21	1:A:23:VAL:CG2	0.65	2.21	11	1
1:A:38:LEU:HB3	1:A:125:LEU:HD13	0.65	1.67	4	5
1:A:15:ILE:HD11	1:A:26:MET:HG3	0.64	1.69	4	1
1:A:36:LEU:HD22	1:A:39:VAL:CG2	0.64	2.22	18	3
1:A:83:ASP:HB3	1:A:89:LEU:HD11	0.64	1.69	5	6
1:A:62:THR:O	1:A:66:VAL:HG13	0.63	1.93	4	13
1:A:58:ALA:HA	1:A:108:LEU:HD12	0.63	1.70	17	7

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:11:ALA:HB1	1:A:25:LEU:HD22	0.63	1.70	8	8
1:A:37:LEU:HD22	1:A:118:ASN:OD1	0.63	1.93	18	2
1:A:105:ARG:O	1:A:137:LEU:HD13	0.63	1.94	16	1
1:A:25:LEU:HD13	1:A:74:VAL:CG1	0.63	2.22	14	4
1:A:111:VAL:HG23	1:A:129:GLU:CG	0.62	2.24	5	2
1:A:38:LEU:HD12	1:A:118:ASN:ND2	0.62	2.09	3	1
1:A:11:ALA:HB3	1:A:73:GLU:HA	0.62	1.69	8	3
1:A:22:THR:HG23	1:A:35:ARG:NE	0.62	2.08	11	1
1:A:14:LEU:N	1:A:72:ILE:HD13	0.62	2.10	8	5
1:A:121:HIS:CB	1:A:124:LEU:HD21	0.62	2.23	5	4
1:A:15:ILE:HD11	1:A:26:MET:HB2	0.62	1.72	12	5
1:A:121:HIS:CG	1:A:124:LEU:HD21	0.62	2.29	3	2
1:A:121:HIS:HB3	1:A:124:LEU:HD21	0.62	1.70	21	4
1:A:14:LEU:HD22	1:A:15:ILE:N	0.62	2.08	13	14
1:A:37:LEU:HD21	1:A:118:ASN:CB	0.62	2.25	13	1
1:A:72:ILE:HD12	1:A:72:ILE:N	0.62	2.10	8	21
1:A:38:LEU:HD11	1:A:119:ASN:HA	0.61	1.73	14	2
1:A:37:LEU:HD21	1:A:89:LEU:HD22	0.61	1.70	7	2
1:A:42:ALA:HB2	1:A:55:GLY:O	0.61	1.95	8	4
1:A:25:LEU:HD11	1:A:72:ILE:HG22	0.61	1.71	17	5
1:A:65:MET:O	1:A:69:ALA:HB2	0.61	1.96	5	10
1:A:42:ALA:HB2	1:A:55:GLY:HA2	0.61	1.71	2	1
1:A:62:THR:HG23	1:A:99:VAL:HG11	0.60	1.71	6	3
1:A:101:GLU:CD	1:A:124:LEU:HD13	0.60	2.15	15	1
1:A:42:ALA:HB2	1:A:58:ALA:HB3	0.60	1.73	19	9
1:A:37:LEU:HD11	1:A:77:ASP:OD1	0.60	1.97	3	1
1:A:15:ILE:HD11	1:A:26:MET:CB	0.60	2.26	13	2
1:A:62:THR:O	1:A:66:VAL:HG22	0.60	1.97	2	14
1:A:99:VAL:HG12	1:A:103:LEU:CD1	0.59	2.27	1	11
1:A:18:ILE:CD1	1:A:33:THR:HG23	0.59	2.27	8	3
1:A:83:ASP:HB2	1:A:89:LEU:HD11	0.58	1.75	16	6
1:A:14:LEU:HD11	1:A:23:VAL:HG21	0.58	1.76	2	1
1:A:37:LEU:HD12	1:A:89:LEU:HD13	0.58	1.74	19	2
1:A:15:ILE:HD11	1:A:26:MET:CG	0.58	2.29	4	1
1:A:107:GLY:O	1:A:108:LEU:HD22	0.58	1.99	17	3
1:A:18:ILE:HG22	1:A:22:THR:O	0.58	1.99	11	2
1:A:34:PHE:CZ	1:A:74:VAL:HG21	0.57	2.34	4	4
1:A:121:HIS:C	1:A:125:LEU:HD12	0.57	2.19	5	4
1:A:133:LYS:HG3	1:A:134:LYS:N	0.57	2.14	5	1
1:A:36:LEU:HD22	1:A:92:ILE:HG12	0.57	1.74	16	1
1:A:14:LEU:HD22	1:A:15:ILE:H	0.57	1.59	8	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:107:GLY:C	1:A:108:LEU:HD22	0.57	2.19	20	11
1:A:38:LEU:HD12	1:A:91:TYR:OH	0.57	1.99	1	1
1:A:33:THR:HG21	1:A:87:ARG:NH1	0.56	2.15	2	1
1:A:11:ALA:O	1:A:12:ALA:HB2	0.56	2.00	17	19
1:A:57:GLU:HG2	1:A:108:LEU:HD21	0.56	1.77	9	1
1:A:83:ASP:HB2	1:A:89:LEU:HD23	0.56	1.77	17	4
1:A:14:LEU:HD13	1:A:66:VAL:CB	0.55	2.32	2	3
1:A:38:LEU:HD22	1:A:122:GLU:OE1	0.55	2.01	15	1
1:A:39:VAL:HG13	1:A:109:ALA:HB1	0.55	1.77	18	1
1:A:37:LEU:CD2	1:A:89:LEU:HD22	0.54	2.31	16	4
1:A:37:LEU:HD11	1:A:118:ASN:ND2	0.54	2.17	13	2
1:A:75:GLU:O	1:A:90:ALA:HB1	0.54	2.01	9	3
1:A:14:LEU:HD23	1:A:72:ILE:HD11	0.54	1.78	10	2
1:A:132:ALA:CB	1:A:137:LEU:HD12	0.54	2.33	12	1
1:A:130:ALA:HB1	1:A:134:LYS:HE3	0.54	1.78	5	1
1:A:14:LEU:HD13	1:A:14:LEU:C	0.53	2.23	17	2
1:A:21:ASP:O	1:A:35:ARG:HA	0.53	2.03	10	5
1:A:14:LEU:H	1:A:72:ILE:HD13	0.53	1.62	21	9
1:A:14:LEU:CD1	1:A:23:VAL:HG21	0.53	2.34	2	1
1:A:17:ALA:HA	1:A:23:VAL:HG12	0.53	1.81	6	13
1:A:17:ALA:CA	1:A:23:VAL:HG12	0.53	2.34	6	13
1:A:14:LEU:C	1:A:14:LEU:HD13	0.53	2.22	13	6
1:A:41:THR:O	1:A:42:ALA:HB2	0.52	2.04	15	4
1:A:11:ALA:HB2	1:A:74:VAL:CG2	0.52	2.34	8	3
1:A:36:LEU:HD22	1:A:92:ILE:CG1	0.52	2.35	16	1
1:A:38:LEU:O	1:A:125:LEU:HD23	0.51	2.05	10	1
1:A:111:VAL:O	1:A:111:VAL:HG13	0.51	2.05	8	4
1:A:64:LYS:CD	1:A:64:LYS:N	0.51	2.73	13	4
1:A:69:ALA:O	1:A:72:ILE:HD11	0.51	2.05	3	6
1:A:62:THR:O	1:A:66:VAL:HG12	0.51	2.05	6	4
1:A:37:LEU:HD22	1:A:118:ASN:HD22	0.51	1.61	12	2
1:A:104:VAL:CG2	1:A:109:ALA:HB3	0.51	2.35	9	1
1:A:61:PHE:CD2	1:A:103:LEU:HD23	0.51	2.40	16	2
1:A:34:PHE:HB3	1:A:92:ILE:HD11	0.51	1.82	5	1
1:A:37:LEU:HD23	1:A:89:LEU:HD22	0.51	1.82	18	2
1:A:91:TYR:OH	1:A:125:LEU:HD11	0.51	2.06	1	1
1:A:18:ILE:CD1	1:A:22:THR:HG22	0.51	2.36	8	1
1:A:41:THR:O	1:A:42:ALA:HB3	0.51	2.06	4	9
1:A:10:GLU:O	1:A:74:VAL:HG22	0.50	2.05	5	3
1:A:80:GLN:HG2	1:A:89:LEU:HD12	0.50	1.84	10	1
1:A:14:LEU:CG	1:A:66:VAL:HG22	0.50	2.34	8	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:11:ALA:HB1	1:A:25:LEU:CD2	0.50	2.35	8	1
1:A:14:LEU:HD22	1:A:24:LYS:O	0.50	2.07	3	10
1:A:61:PHE:HD2	1:A:108:LEU:HD22	0.50	1.67	16	1
1:A:37:LEU:HD11	1:A:89:LEU:HD13	0.50	1.83	7	1
1:A:37:LEU:HD23	1:A:38:LEU:HG	0.49	1.83	17	2
1:A:132:ALA:HA	1:A:137:LEU:HD12	0.49	1.83	10	1
1:A:54:TYR:HB2	1:A:139:ILE:HG22	0.49	1.83	12	1
1:A:121:HIS:HB3	1:A:124:LEU:HD12	0.49	1.82	17	3
1:A:37:LEU:CD2	1:A:89:LEU:HD13	0.49	2.37	20	1
1:A:99:VAL:HG12	1:A:103:LEU:HD11	0.48	1.86	1	1
1:A:99:VAL:HG12	1:A:103:LEU:HD12	0.48	1.85	12	7
1:A:69:ALA:O	1:A:70:LYS:HB2	0.48	2.08	19	4
1:A:18:ILE:HD13	1:A:18:ILE:C	0.48	2.27	11	1
1:A:62:THR:HG1	1:A:103:LEU:HD11	0.48	1.66	21	1
1:A:19:ASP:O	1:A:21:ASP:N	0.48	2.47	4	5
1:A:103:LEU:HD23	1:A:108:LEU:HB2	0.48	1.86	7	1
1:A:38:LEU:HD13	1:A:125:LEU:CD1	0.48	2.39	21	1
1:A:120:THR:HG22	1:A:121:HIS:CD2	0.48	2.44	8	1
1:A:37:LEU:HD12	1:A:90:ALA:HA	0.48	1.86	15	4
1:A:22:THR:HG23	1:A:35:ARG:HG2	0.48	1.84	5	2
1:A:64:LYS:N	1:A:64:LYS:HD2	0.48	2.24	12	1
1:A:36:LEU:HD13	1:A:39:VAL:HG11	0.47	1.86	4	2
1:A:61:PHE:CD2	1:A:108:LEU:HD22	0.47	2.44	16	1
1:A:111:VAL:HG23	1:A:129:GLU:OE2	0.47	2.09	20	1
1:A:65:MET:SD	1:A:99:VAL:HG22	0.47	2.49	3	1
1:A:25:LEU:CB	1:A:34:PHE:CD1	0.47	2.98	17	4
1:A:17:ALA:HB3	1:A:63:LYS:HB3	0.47	1.85	17	1
1:A:25:LEU:HD13	1:A:74:VAL:HG13	0.47	1.86	14	1
1:A:103:LEU:HD23	1:A:108:LEU:CB	0.47	2.39	7	1
1:A:17:ALA:HA	1:A:23:VAL:HG23	0.47	1.87	10	2
1:A:42:ALA:HB2	1:A:55:GLY:CA	0.47	2.40	2	1
1:A:121:HIS:O	1:A:125:LEU:HD13	0.47	2.09	11	1
1:A:32:MET:CG	1:A:34:PHE:CE1	0.47	2.98	20	11
1:A:10:GLU:O	1:A:11:ALA:HB3	0.46	2.09	15	2
1:A:89:LEU:O	1:A:90:ALA:HB2	0.46	2.11	14	7
1:A:14:LEU:CD2	1:A:23:VAL:CG2	0.46	2.93	11	1
1:A:41:THR:CG2	1:A:103:LEU:HD22	0.46	2.38	20	1
1:A:11:ALA:HB2	1:A:74:VAL:HG13	0.46	1.88	17	1
1:A:72:ILE:HG23	1:A:93:TYR:O	0.46	2.10	3	4
1:A:58:ALA:CA	1:A:108:LEU:HD12	0.46	2.41	17	1
1:A:111:VAL:HG23	1:A:129:GLU:CD	0.46	2.31	14	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:61:PHE:CD1	1:A:103:LEU:CD2	0.46	2.99	17	13
1:A:61:PHE:HD2	1:A:103:LEU:HD23	0.46	1.71	16	2
1:A:69:ALA:O	1:A:70:LYS:CB	0.45	2.64	11	11
1:A:107:GLY:O	1:A:108:LEU:HD12	0.45	2.10	16	3
1:A:66:VAL:HG23	1:A:67:GLU:N	0.45	2.26	15	11
1:A:36:LEU:HB3	1:A:39:VAL:HB	0.45	1.88	19	1
1:A:37:LEU:HG	1:A:89:LEU:HD22	0.45	1.87	2	1
1:A:121:HIS:CD2	1:A:124:LEU:HD21	0.45	2.47	4	2
1:A:57:GLU:HG2	1:A:108:LEU:HD11	0.45	1.89	1	1
1:A:108:LEU:HD12	1:A:108:LEU:N	0.45	2.26	11	2
1:A:11:ALA:O	1:A:12:ALA:CB	0.45	2.65	17	9
1:A:91:TYR:CZ	1:A:121:HIS:ND1	0.45	2.85	11	1
1:A:60:ALA:O	1:A:64:LYS:HG2	0.45	2.12	17	2
1:A:64:LYS:N	1:A:64:LYS:HD3	0.45	2.27	21	3
1:A:63:LYS:CD	1:A:64:LYS:CD	0.45	2.94	12	1
1:A:22:THR:HG23	1:A:35:ARG:CD	0.45	2.41	11	1
1:A:110:LYS:CB	1:A:140:TRP:CZ2	0.44	3.00	13	3
1:A:76:PHE:CE1	1:A:81:ARG:CG	0.44	3.00	7	2
1:A:89:LEU:HD12	1:A:89:LEU:C	0.44	2.32	19	3
1:A:54:TYR:CE1	1:A:138:ASN:ND2	0.44	2.86	12	2
1:A:15:ILE:CD1	1:A:26:MET:N	0.44	2.80	8	5
1:A:85:TYR:CD2	1:A:87:ARG:NH2	0.44	2.85	11	1
1:A:58:ALA:HA	1:A:108:LEU:HD23	0.44	1.89	16	1
1:A:39:VAL:HG22	1:A:125:LEU:HD23	0.44	1.88	14	1
1:A:13:THR:O	1:A:26:MET:N	0.44	2.48	15	9
1:A:41:THR:HG23	1:A:58:ALA:HB1	0.44	1.89	8	1
1:A:92:ILE:O	1:A:99:VAL:HG23	0.44	2.13	16	1
1:A:69:ALA:HB1	1:A:95:ASP:N	0.43	2.28	17	1
1:A:37:LEU:HD13	1:A:118:ASN:HD22	0.43	1.71	14	1
1:A:101:GLU:OE2	1:A:124:LEU:HD13	0.43	2.13	15	1
1:A:38:LEU:HD13	1:A:125:LEU:HD13	0.43	1.90	18	1
1:A:100:ASN:ND2	1:A:124:LEU:HD11	0.43	2.28	4	1
1:A:14:LEU:HG	1:A:66:VAL:CG2	0.43	2.44	21	2
1:A:54:TYR:O	1:A:58:ALA:HB2	0.43	2.13	17	1
1:A:11:ALA:CB	1:A:74:VAL:HG22	0.43	2.38	8	1
1:A:36:LEU:HD13	1:A:39:VAL:CG1	0.43	2.43	4	1
1:A:60:ALA:O	1:A:64:LYS:CG	0.42	2.67	4	10
1:A:61:PHE:CB	1:A:108:LEU:CD2	0.42	2.97	11	1
1:A:17:ALA:HB3	1:A:63:LYS:HG2	0.42	1.91	20	1
1:A:27:TYR:O	1:A:28:LYS:HG3	0.42	2.14	21	3
1:A:93:TYR:CE2	1:A:98:MET:HE2	0.42	2.49	3	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:98:MET:CE	1:A:124:LEU:HD13	0.42	2.44	18	1
1:A:123:GLN:NE2	1:A:124:LEU:HD21	0.42	2.30	10	1
1:A:111:VAL:HG23	1:A:129:GLU:CB	0.42	2.45	5	1
1:A:121:HIS:CG	1:A:124:LEU:HD12	0.42	2.50	8	1
1:A:72:ILE:N	1:A:72:ILE:CD1	0.42	2.82	5	6
1:A:94:ALA:O	1:A:97:LYS:N	0.42	2.52	18	11
1:A:41:THR:HG23	1:A:108:LEU:O	0.42	2.15	14	1
1:A:62:THR:O	1:A:66:VAL:CG1	0.42	2.67	12	1
1:A:36:LEU:HD21	1:A:100:ASN:HB3	0.41	1.92	4	1
1:A:66:VAL:HG13	1:A:67:GLU:N	0.41	2.30	6	1
1:A:27:TYR:CD2	1:A:28:LYS:HD3	0.41	2.49	7	1
1:A:59:SER:O	1:A:63:LYS:CB	0.41	2.68	21	1
1:A:32:MET:HG3	1:A:34:PHE:CE1	0.41	2.50	2	4
1:A:54:TYR:CZ	1:A:138:ASN:OD1	0.41	2.73	14	1
1:A:9:LYS:HB3	1:A:93:TYR:CD1	0.41	2.51	1	1
1:A:76:PHE:CE2	1:A:89:LEU:O	0.41	2.74	17	3
1:A:76:PHE:CD2	1:A:89:LEU:O	0.41	2.73	18	3
1:A:25:LEU:HB3	1:A:34:PHE:CD1	0.41	2.50	15	5
1:A:37:LEU:CD1	1:A:89:LEU:HD13	0.41	2.45	19	2
1:A:36:LEU:HD22	1:A:100:ASN:HB3	0.41	1.93	9	2
1:A:130:ALA:HB1	1:A:134:LYS:CE	0.41	2.45	7	1
1:A:38:LEU:CA	1:A:112:ALA:HB3	0.41	2.46	8	1
1:A:61:PHE:O	1:A:61:PHE:CD1	0.41	2.74	5	1
1:A:9:LYS:CD	1:A:9:LYS:N	0.41	2.84	3	1
1:A:71:LYS:CE	1:A:73:GLU:CG	0.41	2.99	3	1
1:A:54:TYR:CZ	1:A:138:ASN:CB	0.41	3.04	10	4
1:A:33:THR:CG2	1:A:35:ARG:NH1	0.41	2.83	11	1
1:A:41:THR:O	1:A:42:ALA:CB	0.41	2.69	15	1
1:A:41:THR:HG23	1:A:109:ALA:HB2	0.41	1.92	17	1
1:A:76:PHE:CE1	1:A:81:ARG:HG2	0.41	2.51	1	1
1:A:76:PHE:CD1	1:A:89:LEU:O	0.41	2.74	13	3
1:A:83:ASP:O	1:A:85:TYR:CD2	0.41	2.74	8	2
1:A:39:VAL:HG22	1:A:125:LEU:CD2	0.41	2.46	16	1
1:A:84:LYS:O	1:A:85:TYR:CD1	0.41	2.74	12	2
1:A:69:ALA:HB1	1:A:95:ASP:HB2	0.41	1.91	17	1
1:A:91:TYR:HE2	1:A:125:LEU:HD21	0.41	1.75	20	1
1:A:76:PHE:CE1	1:A:89:LEU:O	0.40	2.74	2	1
1:A:38:LEU:CD1	1:A:125:LEU:CD1	0.40	2.99	20	1
1:A:98:MET:CB	1:A:101:GLU:CG	0.40	3.00	10	1
1:A:21:ASP:OD1	1:A:36:LEU:HD12	0.40	2.16	15	1
1:A:130:ALA:O	1:A:134:LYS:N	0.40	2.54	16	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:66:VAL:CG1	1:A:67:GLU:N	0.40	2.84	6	1
1:A:14:LEU:HD22	1:A:14:LEU:C	0.40	2.35	20	1
1:A:76:PHE:CE2	1:A:81:ARG:HG3	0.40	2.51	19	1
1:A:17:ALA:HB3	1:A:63:LYS:CG	0.40	2.46	20	1

## 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	118/149 (79%)	95±2 (80±2%)	19±3 (16±2%)	4±1 (3±1%)	7	39
All	All	2478/3129 (79%)	1993 (80%)	407 (16%)	78 (3%)	7	39

All 13 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	A	12	ALA	21
1	A	79	GLY	12
1	A	112	ALA	8
1	A	42	ALA	7
1	A	20	GLY	5
1	A	53	LYS	5
1	A	84	LYS	4
1	A	70	LYS	4
1	A	137	LEU	3
1	A	118	ASN	3
1	A	11	ALA	3
1	A	88	GLY	2
1	A	69	ALA	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	94/120 (78%)	71±3 (75±3%)	23±3 (25±3%)	2	25
All	All	1974/2520 (78%)	1489 (75%)	485 (25%)	2	25

All 61 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	25	LEU	21
1	A	28	LYS	21
1	A	64	LYS	21
1	A	133	LYS	21
1	A	53	LYS	20
1	A	9	LYS	17
1	A	16	LYS	17
1	A	40	ASP	17
1	A	110	LYS	17
1	A	127	LYS	17
1	A	78	LYS	14
1	A	41	THR	13
1	A	24	LYS	13
1	A	134	LYS	11
1	A	71	LYS	11
1	A	35	ARG	10
1	A	77	ASP	10
1	A	63	LYS	10
1	A	87	ARG	10
1	A	84	LYS	10
1	A	106	GLN	10
1	A	65	MET	9
1	A	126	ARG	9
1	A	36	LEU	9
1	A	22	THR	8
1	A	14	LEU	8
1	A	97	LYS	8
1	A	57	GLU	7
1	A	105	ARG	7
1	A	136	LYS	7
1	A	85	TYR	7
1	A	81	ARG	6
1	A	122	GLU	6

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Mol	Chain	Res	Type	Models (Total)
1	A	131	GLN	6
1	A	141	SER	6
1	A	75	GLU	6
1	A	70	LYS	6
1	A	124	LEU	5
1	A	67	GLU	5
1	A	98	MET	5
1	A	121	HIS	4
1	A	80	GLN	4
1	A	101	GLU	3
1	A	128	SER	3
1	A	19	ASP	3
1	A	123	GLN	3
1	A	120	THR	2
1	A	26	MET	2
1	A	37	LEU	2
1	A	10	GLU	2
1	A	68	ASN	2
1	A	33	THR	2
1	A	129	GLU	2
1	A	119	ASN	2
1	A	59	SER	2
1	A	89	LEU	1
1	A	73	GLU	1
1	A	30	GLN	1
1	A	18	ILE	1
1	A	23	VAL	1
1	A	125	LEU	1

### 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 monosaccharides 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

No chemical shift data were provided