wwPDB NMR Structure Validation Summary Report (i)

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PDB ID	:	1AH2
Title	:	SERINE PROTEASE PB92 FROM BACILLUS ALCALOPHILUS, NMR, 18 STRUCTURES
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Deposited on	:	1997-04-11

This is a wwPDB NMR Structure Validation Summary 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 (i) symbol.

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

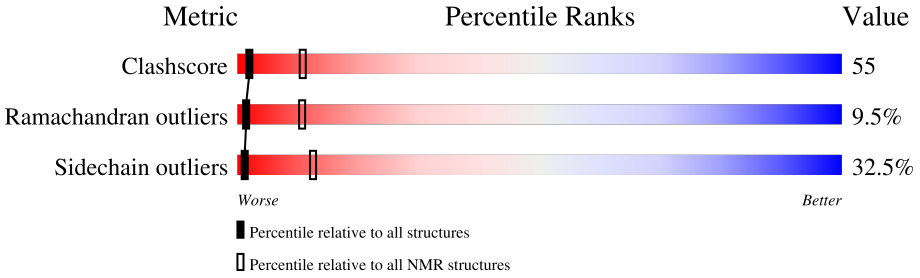
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	2.26
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.26

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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



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

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

Mol	Chain	Length	Quality of chain
1	A	269	16% 64% 14% • •

2 Ensemble composition and analysis (i)

This entry contains 18 models. Model 9 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:3-A:51, A:55-A:96, A:100-A:251, A:256-A:269 (257)	0.70	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 3 single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 3721 atoms, of which 1839 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called SERINE PROTEASE PB92.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	269	3721	1151	1839	348	380	3	0

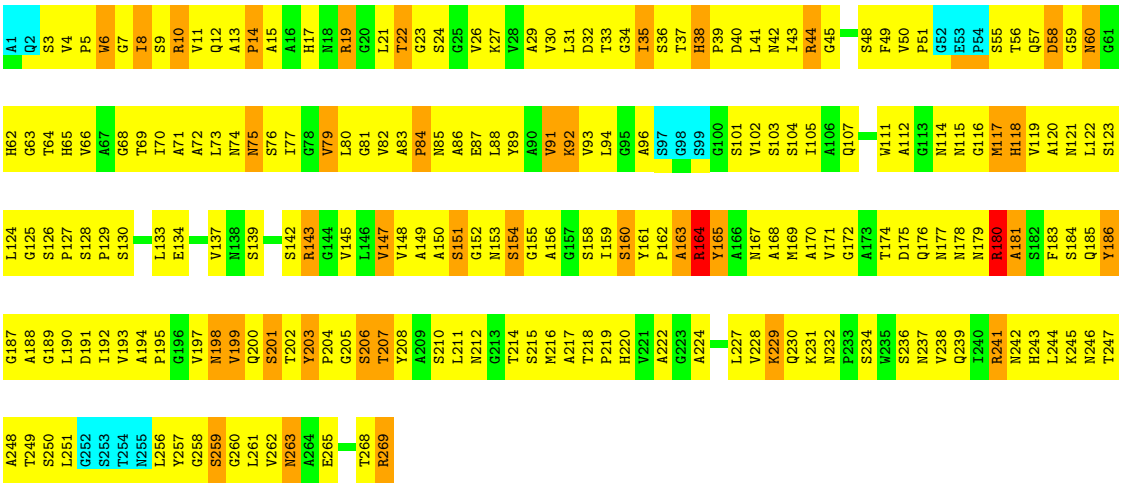
4 Residue-property plots (i)

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: SERINE PROTEASE PB92

Chain A: 16% 64% 14%

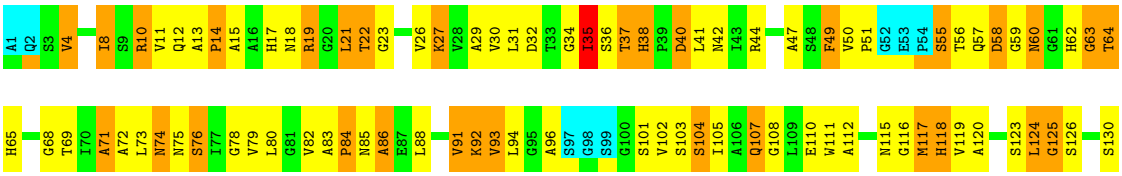


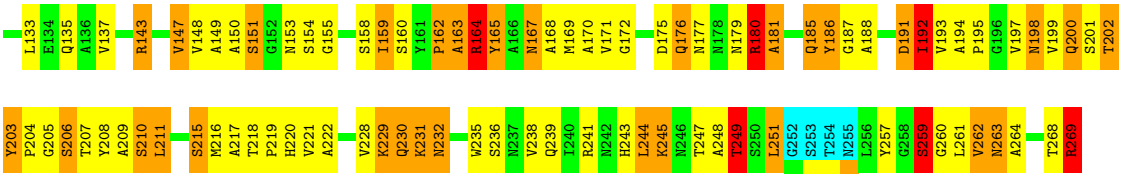
4.2 Residue scores for the representative (medoid) model from the NMR ensemble

The representative model is number 9. Colouring as in section 4.1 above.

• Molecule 1: SERINE PROTEASE PB92

Chain A: 30% 40% 23%




L133
E134
Q135
A136
V137
R143
V147
V148
A149
A150
S151
C152
N153
S154
G155
S158
I159
S160
Y161
P162
A163
R164
Y165
A166
N167
A168
M169
A170
V171
G172
D175
Q176
N177
N178
N179
R180
A181
Q185
Y186
G187
A188
D191
I192
V193
A194
P195
G196
V197
N198
V199
Q200
S201
T202
Y203
P204
G205
S206
T207
Y208
A209
S210
L211
S215
M216
A217
T218
P219
H220
V221
A222
V228
K229
Q230
K231
N232
W235
S236
N237
V238
Q239
I240
R241
M242
H243
L244
K245
N246
T247
A248
T249
S250
L251
G252
S253
T254
N255
L256
Y257
G258
S259
G260
L261
V262
N263
A264
T268
R269

5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *DGSA*.

Of the 20 calculated structures, 18 were deposited, based on the following criterion: *NO NOE AND H-BOND VIOLATIONS > 0.5 A*.

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

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

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.

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	Chirality	Planarity
1	A	0.0±0.0	7.4±0.9
All	All	0	133

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

5 of 8 unique planar outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Group	Models (Total)
1	A	10	ARG	Sidechain	17
1	A	19	ARG	Sidechain	17
1	A	143	ARG	Sidechain	17
1	A	164	ARG	Sidechain	17
1	A	269	ARG	Sidechain	17

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	1807	1774	1774	197±18
All	All	32526	31932	31932	3545

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 55.

5 of 1793 unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:31:LEU:HD23	1:A:93:VAL:HG21	1.01	1.28	3	10
1:A:72:ALA:HB3	1:A:81:GLY:N	0.99	1.70	7	12
1:A:186:TYR:CD2	1:A:190:LEU:HD22	0.97	1.94	5	1
1:A:137:VAL:HG21	1:A:166:ALA:HB1	0.96	1.34	1	1
1:A:20:GLY:C	1:A:21:LEU:HD13	0.94	1.83	7	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	256/269 (95%)	180±6 (71±2%)	51±4 (20±2%)	24±4 (9±2%)	1 11
All	All	4608/4842 (95%)	3249 (71%)	923 (20%)	436 (9%)	1 11

5 of 98 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	84	PRO	18
1	A	163	ALA	18
1	A	198	ASN	17
1	A	14	PRO	15
1	A	79	VAL	15

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	186/194 (96%)	126±5 (68±3%)	60±5 (32±3%)	1 12
All	All	3348/3492 (96%)	2261 (68%)	1087 (32%)	1 12

5 of 150 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	91	VAL	18
1	A	263	ASN	18
1	A	38	HIS	17
1	A	143	ARG	17
1	A	203	TYR	17

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 (i)

No chemical shift data were provided