



Full wwPDB NMR Structure Validation Report ⓘ

May 28, 2020 – 07:40 pm BST

PDB ID : 1HJN
Title : HUMAN PRION PROTEIN AT PH 7.0
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Deposited on : 2003-02-27

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 : 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 : 2.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

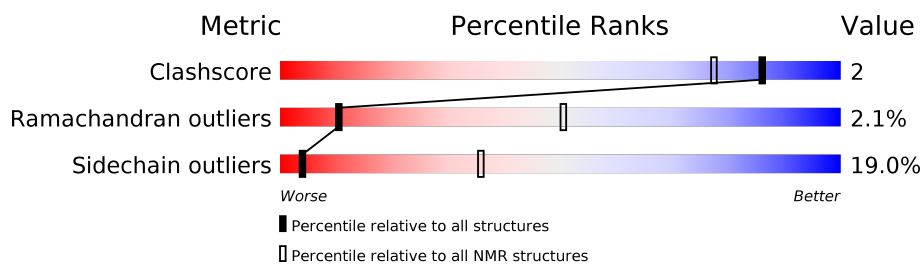
1 Overall quality at a glance i

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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	104	 80% 19% .

2 Ensemble composition and analysis i

This entry contains 20 models. Model 20 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:125-A:228 (104)	0.52	20

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 3 single-model clusters were found.

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

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1691 atoms, of which 814 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called MAJOR PRION PROTEIN PRECURSOR.

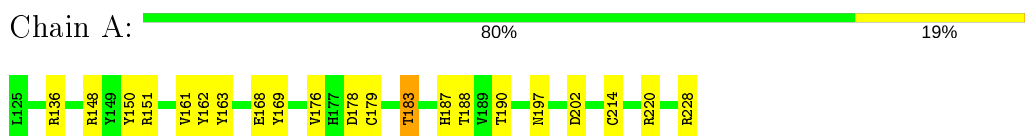
Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	104	1691	544	814	153	171	9	0

4 Residue-property plots [i](#)

4.1 Average score per residue in the NMR ensemble

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: MAJOR PRION PROTEIN PRECURSOR

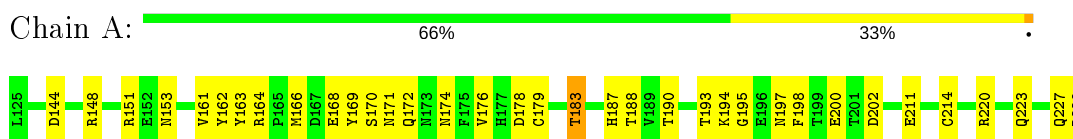


4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

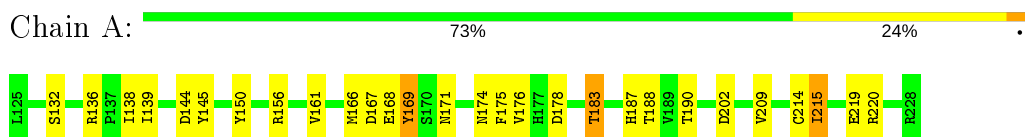
4.2.1 Score per residue for model 1

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



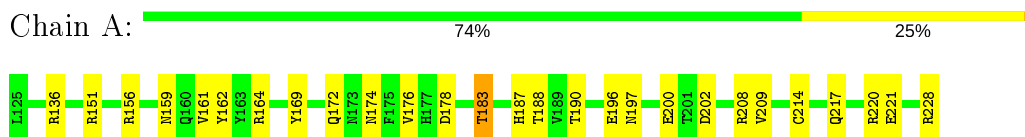
4.2.2 Score per residue for model 2

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



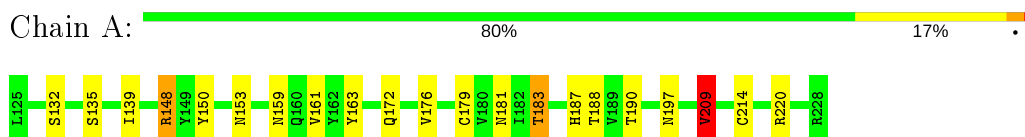
4.2.3 Score per residue for model 3

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



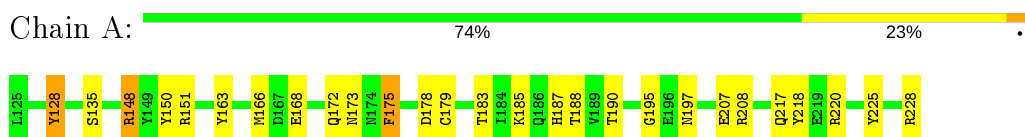
4.2.4 Score per residue for model 4

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



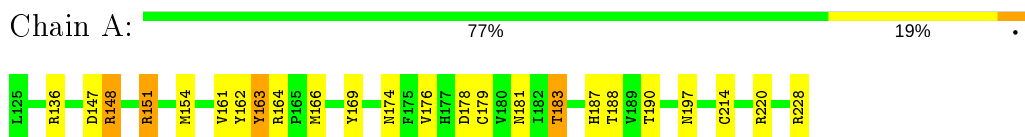
4.2.5 Score per residue for model 5

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



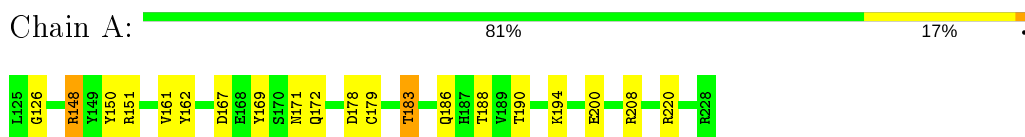
4.2.6 Score per residue for model 6

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



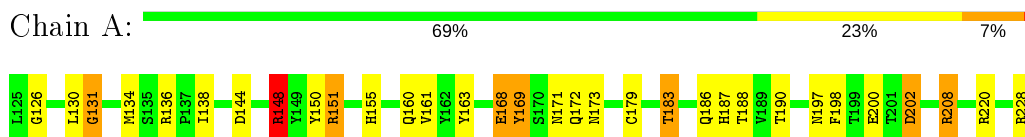
4.2.7 Score per residue for model 7

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



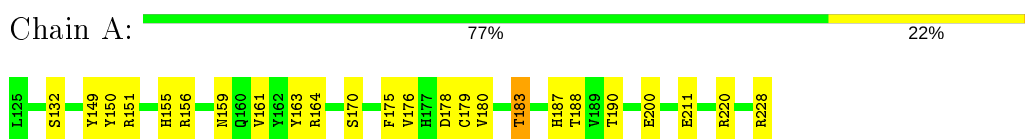
4.2.8 Score per residue for model 8

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



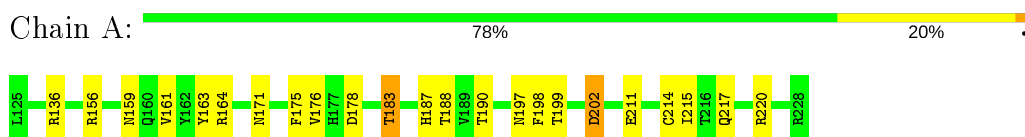
4.2.9 Score per residue for model 9

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



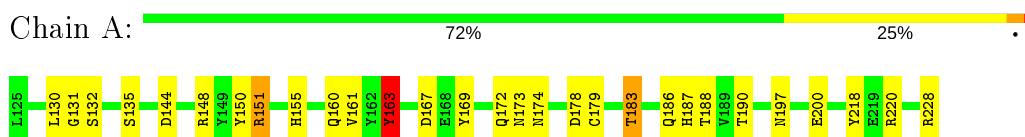
4.2.10 Score per residue for model 10

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



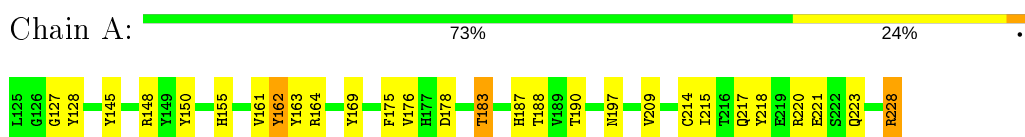
4.2.11 Score per residue for model 11

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



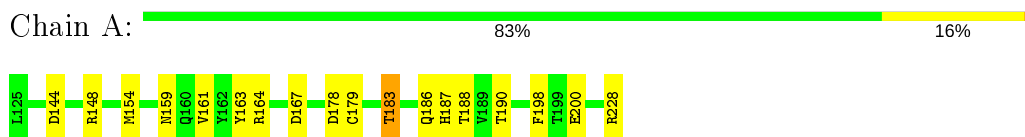
4.2.12 Score per residue for model 12

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



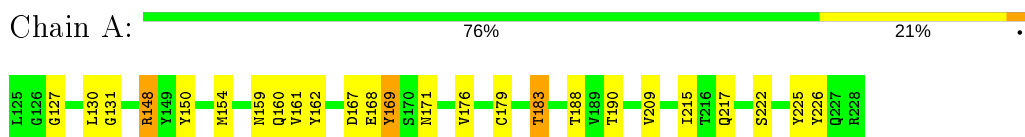
4.2.13 Score per residue for model 13

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



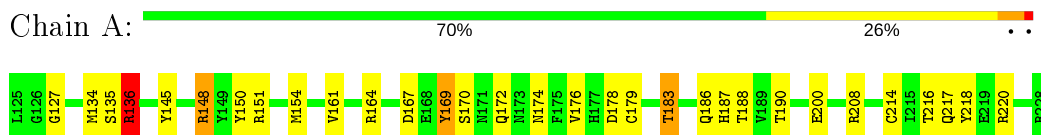
4.2.14 Score per residue for model 14

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



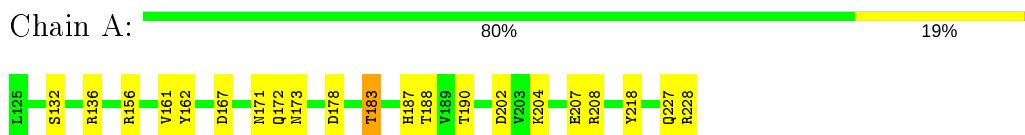
4.2.15 Score per residue for model 15

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



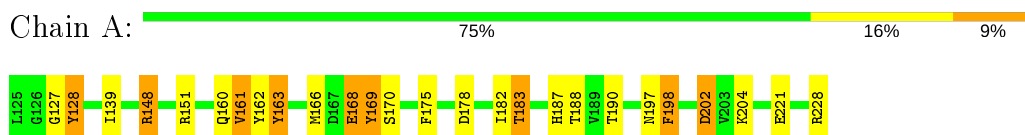
4.2.16 Score per residue for model 16

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



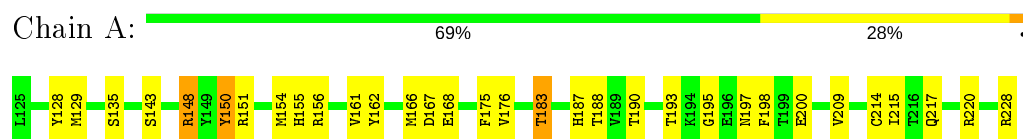
4.2.17 Score per residue for model 17

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



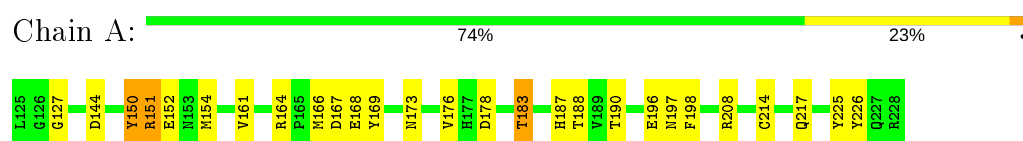
4.2.18 Score per residue for model 18

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



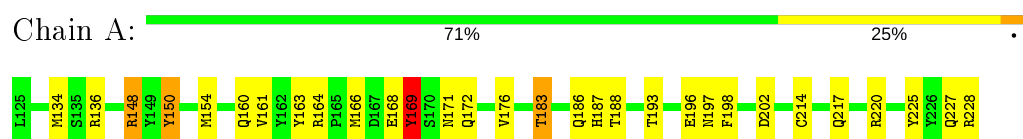
4.2.19 Score per residue for model 19

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



4.2.20 Score per residue for model 20 (medoid)

- Molecule 1: MAJOR PRION PROTEIN PRECURSOR



5 Refinement protocol and experimental data overview i

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

Of the 20 calculated structures, 20 were deposited, based on the following criterion: *LOWER TARGET FUNCTION*.

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

Software name	Classification	Version
OPALP	refinement	
DYANA	structure solution	

No chemical shift data was provided. No validations of the models with respect to experimental NMR restraints is performed at this time.

COVALENT-GEOMETRY INFOmissingINFO

5.1 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	877	814	813	4±2
All	All	17540	16280	16260	71

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 2.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:161:VAL:HA	1:A:183:THR:HG21	0.66	1.67	14	19
1:A:130:LEU:HD13	1:A:131:GLY:N	0.59	2.12	11	3
1:A:176:VAL:HG22	1:A:214:CYS:HB3	0.58	1.75	10	9
1:A:199:THR:H	1:A:202:ASP:CG	0.57	2.03	10	1
1:A:130:LEU:HD11	1:A:160:GLN:NE2	0.56	2.15	14	3
1:A:151:ARG:CA	1:A:151:ARG:HE	0.54	2.14	8	1
1:A:138:ILE:H	1:A:138:ILE:HD12	0.53	1.64	2	1
1:A:138:ILE:HG23	1:A:151:ARG:NH1	0.53	2.18	8	1
1:A:131:GLY:HA2	1:A:163:TYR:CE1	0.50	2.41	11	1
1:A:176:VAL:HG21	1:A:215:ILE:HG12	0.50	1.82	14	3

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:198:PHE:CD2	1:A:202:ASP:HB3	0.49	2.43	17	2
1:A:151:ARG:N	1:A:151:ARG:HE	0.48	2.05	8	1
1:A:151:ARG:HE	1:A:151:ARG:N	0.48	2.07	19	1
1:A:134:MET:CE	1:A:216:THR:HG21	0.47	2.40	15	1
1:A:176:VAL:HG22	1:A:214:CYS:CB	0.46	2.41	3	6
1:A:216:THR:HG23	1:A:217:GLN:N	0.45	2.26	15	1
1:A:138:ILE:HG23	1:A:151:ARG:HH12	0.45	1.71	8	1
1:A:180:VAL:HG21	1:A:211:GLU:HG3	0.45	1.89	9	1
1:A:180:VAL:HG21	1:A:211:GLU:HA	0.44	1.90	9	1
1:A:150:TYR:CD2	1:A:151:ARG:NH2	0.43	2.86	19	1
1:A:139:ILE:CG1	1:A:209:VAL:HG13	0.43	2.44	4	1
1:A:175:PHE:CE2	1:A:218:TYR:CE1	0.43	3.07	5	1
1:A:161:VAL:HA	1:A:183:THR:CG2	0.42	2.43	19	2
1:A:169:TYR:CE2	1:A:175:PHE:HA	0.42	2.49	2	1
1:A:150:TYR:CE1	1:A:209:VAL:HG21	0.42	2.50	12	1
1:A:128:TYR:CD2	1:A:182:ILE:HG21	0.42	2.50	17	1
1:A:139:ILE:CG1	1:A:209:VAL:HG23	0.41	2.45	2	1
1:A:172:GLN:HA	1:A:218:TYR:CE2	0.41	2.51	11	1
1:A:151:ARG:CZ	1:A:154:MET:CE	0.41	2.98	19	1
1:A:175:PHE:CD2	1:A:218:TYR:CE1	0.41	3.08	5	1
1:A:169:TYR:CD1	1:A:175:PHE:CD1	0.41	3.09	17	1
1:A:150:TYR:OH	1:A:209:VAL:HG21	0.40	2.17	18	1

5.2 Torsion angles [i](#)

5.2.1 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	102/104 (98%)	90±3 (88±3%)	10±3 (10±3%)	2±1 (2±1%)	10	50
All	All	2040/2080 (98%)	1799 (88%)	198 (10%)	43 (2%)	10	50

All 15 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	166	MET	7
1	A	168	GLU	5
1	A	127	GLY	5
1	A	135	SER	4
1	A	128	TYR	4
1	A	172	GLN	4
1	A	195	GLY	3
1	A	132	SER	2
1	A	170	SER	2
1	A	126	GLY	2
1	A	131	GLY	1
1	A	169	TYR	1
1	A	167	ASP	1
1	A	198	PHE	1
1	A	134	MET	1

5.2.2 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	97/97 (100%)	79±3 (81±3%)	18±3 (19±3%)	4	36
All	All	1940/1940 (100%)	1572 (81%)	368 (19%)	4	36

All 65 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	183	THR	20
1	A	188	THR	20
1	A	190	THR	19
1	A	187	HIS	18
1	A	178	ASP	15
1	A	220	ARG	13
1	A	197	ASN	13
1	A	148	ARG	13
1	A	163	TYR	12
1	A	169	TYR	11
1	A	179	CYS	11

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Mol	Chain	Res	Type	Models (Total)
1	A	151	ARG	9
1	A	200	GLU	9
1	A	228	ARG	9
1	A	202	ASP	8
1	A	217	GLN	8
1	A	171	ASN	8
1	A	167	ASP	8
1	A	168	GLU	6
1	A	186	GLN	6
1	A	154	MET	6
1	A	174	ASN	6
1	A	144	ASP	6
1	A	159	ASN	6
1	A	162	TYR	6
1	A	175	PHE	5
1	A	155	HIS	5
1	A	173	ASN	5
1	A	208	ARG	5
1	A	164	ARG	5
1	A	172	GLN	5
1	A	198	PHE	5
1	A	156	ARG	4
1	A	136	ARG	4
1	A	193	THR	3
1	A	145	TYR	3
1	A	215	ILE	3
1	A	221	GLU	3
1	A	132	SER	3
1	A	196	GLU	3
1	A	209	VAL	3
1	A	225	TYR	3
1	A	227	GLN	3
1	A	160	GLN	2
1	A	153	ASN	2
1	A	223	GLN	2
1	A	211	GLU	2
1	A	207	GLU	2
1	A	218	TYR	2
1	A	204	LYS	2
1	A	194	LYS	2
1	A	181	ASN	2
1	A	170	SER	2

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Mol	Chain	Res	Type	Models (Total)
1	A	147	ASP	1
1	A	143	SER	1
1	A	166	MET	1
1	A	152	GLU	1
1	A	226	TYR	1
1	A	135	SER	1
1	A	129	MET	1
1	A	176	VAL	1
1	A	222	SER	1
1	A	219	GLU	1
1	A	185	LYS	1
1	A	161	VAL	1

5.2.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.4 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.5 Ligand geometry [i](#)

There are no ligands in this entry.

5.6 Other polymers [i](#)

There are no such molecules in this entry.

5.7 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Chemical shift validation

No chemical shift data were provided