



Full wwPDB NMR Structure Validation Report ⓘ

Mar 12, 2026 – 04:04 AM UTC

PDB ID : 1BCV / pdb_00001bcv
Title : SYNTHETIC PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS, NMR, 10 STRUCTURES
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Deposited on : 1998-05-03

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
Mogul	:	2022.3.0, CSD as543be (2022)
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

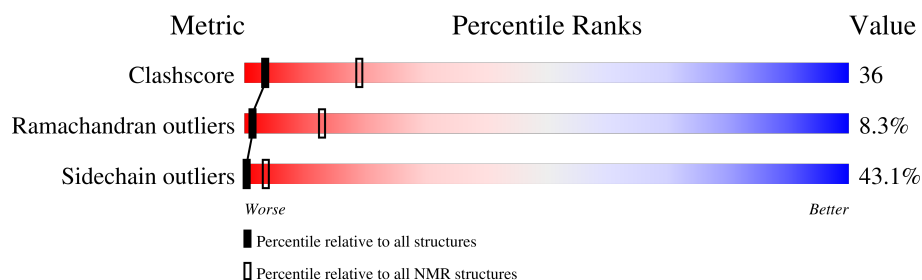
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment 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	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	20	

2 Ensemble composition and analysis ⓘ

This entry contains 10 models.

Cyrange was unable to find well-defined residues.

Error message: Only domains with < 8 residues could be identified.

NmrClust was unable to cluster the ensemble.

Error message: Wrapper check: not enough residues in core to run NmrClust

3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 281 atoms, of which 141 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS.

Mol	Chain	Residues	Atoms					Trace
1	A	20	Total	C	H	N	O	0
			281	85	141	29	26	

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: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS



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: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS



4.2.2 Score per residue for model 2

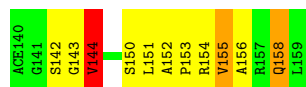
- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS



4.2.3 Score per residue for model 3

- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS

Chain A: 



4.2.4 Score per residue for model 4

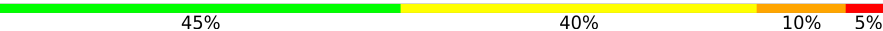
- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS

Chain A: 



4.2.5 Score per residue for model 5

- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS

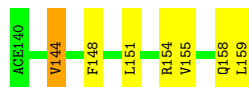
Chain A: 



4.2.6 Score per residue for model 6

- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS

Chain A: 



4.2.7 Score per residue for model 7

- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS



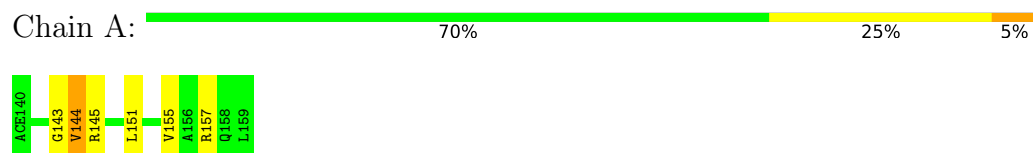
4.2.8 Score per residue for model 8

- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS



4.2.9 Score per residue for model 9

- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS



4.2.10 Score per residue for model 10

- Molecule 1: PEPTIDE CORRESPONDING TO THE MAJOR IMMUNOGEN SITE OF FMD VIRUS



5 Refinement protocol and experimental data overview ⓘ

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

Of the 50 calculated structures, 10 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
DYANA	refinement	1.4
DYANA-1.4	structure solution	

No chemical shift data was provided.

6 Model quality [i](#)

6.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ACE

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	140	141	142	9±5
All	All	1400	1410	1136	92

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 36.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:151:LEU:HD13	1:A:151:LEU:O	0.86	1.70	10	1
1:A:143:GLY:O	1:A:144:VAL:HG13	0.79	1.78	2	8
1:A:152:ALA:HB1	1:A:153:PRO:HD2	0.73	1.60	7	8
1:A:143:GLY:C	1:A:144:VAL:HG22	0.72	2.10	5	8
1:A:151:LEU:HD13	1:A:151:LEU:C	0.71	2.09	10	1
1:A:152:ALA:HB1	1:A:153:PRO:CD	0.64	2.22	2	8
1:A:155:VAL:HG21	1:A:158:GLN:O	0.61	1.95	7	3
1:A:143:GLY:C	1:A:144:VAL:CG2	0.55	2.80	10	7
1:A:151:LEU:HD22	1:A:152:ALA:N	0.55	2.17	10	1
1:A:155:VAL:HG21	1:A:158:GLN:CB	0.55	2.31	8	3
1:A:143:GLY:O	1:A:144:VAL:CG1	0.52	2.56	7	8
1:A:151:LEU:HD12	1:A:152:ALA:O	0.52	2.04	1	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:155:VAL:HG23	1:A:156:ALA:N	0.51	2.21	7	8
1:A:151:LEU:C	1:A:151:LEU:CD1	0.49	2.82	10	1
1:A:154:ARG:CG	1:A:154:ARG:O	0.47	2.62	7	2
1:A:152:ALA:CB	1:A:153:PRO:CD	0.47	2.92	10	6
1:A:156:ALA:C	1:A:158:GLN:N	0.47	2.72	10	1
1:A:155:VAL:HG21	1:A:158:GLN:C	0.46	2.35	3	1
1:A:143:GLY:O	1:A:144:VAL:HG22	0.44	2.13	5	8
1:A:155:VAL:HG21	1:A:158:GLN:HB2	0.44	1.88	8	1
1:A:144:VAL:O	1:A:145:ARG:C	0.43	2.61	4	1
1:A:155:VAL:HG21	1:A:158:GLN:HB3	0.43	1.89	2	1
1:A:155:VAL:CG2	1:A:158:GLN:O	0.43	2.67	10	2
1:A:151:LEU:HD22	1:A:152:ALA:O	0.42	2.15	10	1
1:A:156:ALA:O	1:A:157:ARG:C	0.41	2.63	10	1
1:A:156:ALA:O	1:A:158:GLN:N	0.40	2.54	10	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	18/20 (90%)	10±1 (57±7%)	6±1 (35±6%)	2±1 (8±4%)	1	13
All	All	180/200 (90%)	102 (57%)	63 (35%)	15 (8%)	1	13

All 5 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	144	VAL	10
1	A	148	PHE	2
1	A	142	SER	1
1	A	151	LEU	1
1	A	143	GLY	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	13/13 (100%)	7±1 (57±5%)	6±1 (43±5%)	0 3
All	All	130/130 (100%)	74 (57%)	56 (43%)	0 3

All 12 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	144	VAL	10
1	A	155	VAL	10
1	A	151	LEU	6
1	A	158	GLN	6
1	A	159	LEU	6
1	A	154	ARG	4
1	A	142	SER	3
1	A	157	ARG	3
1	A	145	ARG	3
1	A	150	SER	2
1	A	147	ASP	2
1	A	148	PHE	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 oligosaccharides in this entry.

6.6 Ligand geometry

There are no ligands in this entry.

6.7 Other polymers

There are no such molecules in this entry.

6.8 Polymer linkage issues

There are no chain breaks in this entry.

7 Chemical shift validation

No chemical shift data were provided