Full wwPDB NMR Structure Validation Report (i)

Feb 19, 2022 – 12:52 PM EST

PDB ID	:	1QSV
Title	:	THE VEGF-BINDING DOMAIN OF FLT-1, 20 NMR STRUCTURES
Authors	:	Starovasnik, M.A.; Christinger, H.W.; Wiesmann, C.; Champe, M.A.; de Vos, A.M.; Skelton, N.J.
Deposited on	:	1999-06-23

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 (i) symbol.

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

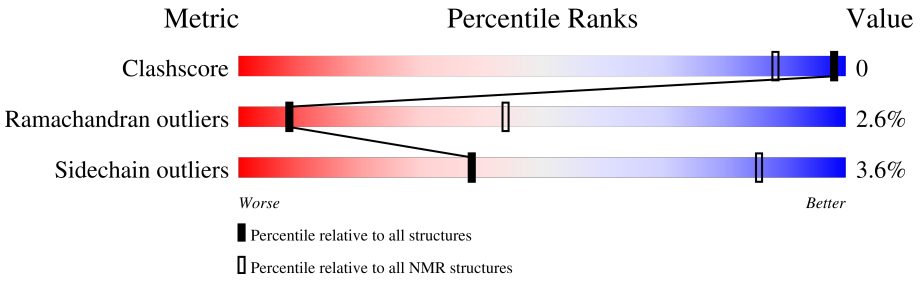
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	2.26
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
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	101	89% • 9%

2 Ensemble composition and analysis (i)

This entry contains 20 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:133-A:224 (92)	0.44	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 2 clusters. No single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 1635 atoms, of which 825 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	101	1635	516	825	138	152	4	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: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A:

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: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A:

4.2.2 Score per residue for model 2

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A:

4.2.3 Score per residue for model 3

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 86% 5% 9%

S129 D130 T131 G132 Y139 I142 P173 H214 R224 Q225 T226 N227 T228 I229

4.2.4 Score per residue for model 4

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 84% 6% • 9%

S129 D130 T131 G132 M138 Y139 E150 R159 P173 S188 R224 Q225 T226 N227 T228 I229

4.2.5 Score per residue for model 5

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 87% • 9%

S129 D130 T131 G132 R133 P173 N196 L215 Q225 T226 N227 T228 I229

4.2.6 Score per residue for model 6

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 86% 5% 9%

S129 D130 T131 G132 E137 M138 Y139 M148 T149 E150 P173 Q225 T226 N227 T228 I229

4.2.7 Score per residue for model 7

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 82% 8% • 9%

S129 D130 T131 G132 M138 Y139 E153 R159 P173 P179 S188 N196 R224 Q225 T226 N227 T228 I229

4.2.8 Score per residue for model 8

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 84% 7% 9%

S129 D130 T131 G132 E137 M138 Y139 S140 E141 I142 M148 P173 K217 Q225 T226 N227 T228 I229

4.2.9 Score per residue for model 9

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 86% 5% 9%

S129 D130 T131 G132 Y139 P173 H214 L215 H223 R224 Q225 T226 N227 T228 I229

4.2.10 Score per residue for model 10

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 87% • 9%

S129 D130 T131 G132 Y139 M148 P173 N196 Q225 T226 N227 T228 I229

4.2.11 Score per residue for model 11

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 83% 8% 9%

S129 D130 T131 G132 Y139 I142 R159 P173 S188 K200 N212 R224 Q225 T226 N227 T228 I229

4.2.12 Score per residue for model 12

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 85% 6% 9%

S129 D130 T131 G132 Y139 M148 T149 E150 P173 T218 R224 Q225 T226 N227 T228 I229

4.2.13 Score per residue for model 13

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 86% 5% 9%

4.2.14 Score per residue for model 14

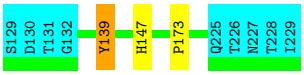
• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 87% • 9%

4.2.15 Score per residue for model 15

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

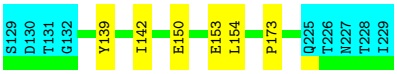
Chain A: 88% •• 9%



4.2.16 Score per residue for model 16

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 85% 6% 9%



4.2.17 Score per residue for model 17

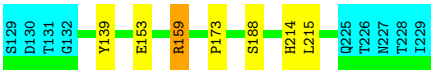
• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A: 83% 8% 9%

4.2.18 Score per residue for model 18

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

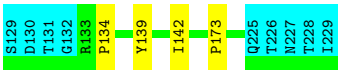
Chain A:



4.2.19 Score per residue for model 19

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A:



4.2.20 Score per residue for model 20

• Molecule 1: VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR 1

Chain A:

5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *DISTANCE GEOMETRY/SIMULATED ANNEALING; MOLECULAR DYNAMICS.*

Of the 50 calculated structures, 20 were deposited, based on the following criterion: *STRUCTURES WITH ACCEPTABLE COVALENT GEOMETRY,STRUCTURES WITH THE LEAST RESTRAINT VIOLATIONS.*

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

Software name	Classification	Version
DGII	structure solution	95.0
Discover	refinement	95.0
Discover	structure solution	95.0

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	745	765	765	0±1
All	All	14900	15300	15300	10

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 0.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:159:ARG:HB2	1:A:188:SER:O	1.19	1.30	18	7
1:A:159:ARG:CB	1:A:188:SER:O	0.79	2.24	18	2
1:A:139:TYR:O	1:A:139:TYR:CG	0.40	2.74	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	92/101 (91%)	77±2 (84±3%)	13±3 (14±3%)	2±1 (3±1%)	8 44
All	All	1840/2020 (91%)	1537 (84%)	255 (14%)	48 (3%)	8 44

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	173	PRO	20
1	A	142	ILE	7
1	A	138	MET	5
1	A	224	ARG	3
1	A	137	GLU	2
1	A	141	GLU	2
1	A	139	TYR	2
1	A	212	ASN	2
1	A	166	THR	1
1	A	211	VAL	1
1	A	215	LEU	1
1	A	179	PRO	1
1	A	134	PRO	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	85/93 (91%)	82±1 (96±1%)	3±1 (4±1%)	38 86
All	All	1700/1860 (91%)	1639 (96%)	61 (4%)	38 86

All 21 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	139	TYR	18
1	A	217	LYS	5
1	A	150	GLU	5
1	A	148	MET	4
1	A	153	GLU	4

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Mol	Chain	Res	Type	Models (Total)
1	A	214	HIS	3
1	A	196	ASN	3
1	A	137	GLU	2
1	A	141	GLU	2
1	A	224	ARG	2
1	A	159	ARG	2
1	A	215	LEU	2
1	A	222	THR	1
1	A	133	ARG	1
1	A	223	HIS	1
1	A	200	LYS	1
1	A	218	THR	1
1	A	147	HIS	1
1	A	154	LEU	1
1	A	164	ASN	1
1	A	138	MET	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 (i)

No chemical shift data were provided