wwPDB NMR Structure Validation Summary Report (i)

Apr 26, 2016 – 04:41 PM BST

PDB ID	:	1QU6
Title	:	STRUCTURE OF THE DOUBLE-STRANDED RNA-BINDING DOMAIN OF THE PROTEIN KINASE PKR REVEALS THE MOLECULAR BASIS OF ITS DSRNA-MEDIATED ACTIVATION
Authors	:	Nanduri, S.; Carpick, B.W.; Yang, Y.; Williams, B.R.G.; Qin, J.
Deposited on	:	1999-07-08

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
http://wwpdb.org/validation/2016/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:

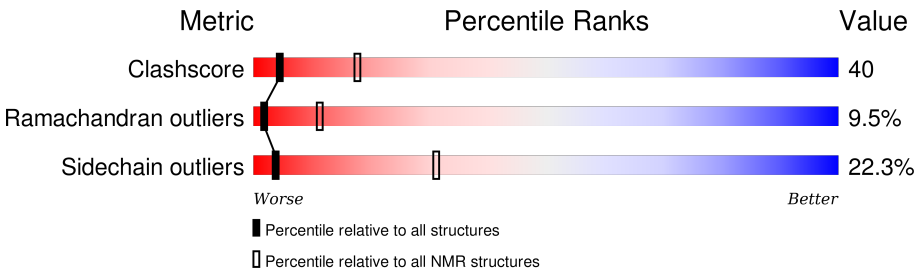
Cyrange	:	Kirchner and Güntert (2011)
NmrClust	:	Kelley et al. (1996)
MolProbity	:	4.02b-467
Mogul	:	unknown
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
RCI	:	v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV	:	Wang et al. (2010)
ShiftChecker	:	rb-20027457
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	rb-20027457

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	114402	11133
Ramachandran outliers	111179	9975
Sidechain outliers	111093	9958

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	179	34% 45% 8% • 13%

2 Ensemble composition and analysis (i)

This entry contains 21 models. Model 21 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:5-A:85, A:105-A:179 (156)	1.68	21

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 2 single-model clusters were found.

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

3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 2765 atoms, of which 1385 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called PROTEIN KINASE PKR.

Mol	Chain	Residues	Atoms						Trace
			Total	C	H	N	O	S	
1	A	179	2765	862	1385	243	267	8	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: PROTEIN KINASE PKR

Chain A: 34% 45% 8% • 13%

G1 S2 H3 M4 D9 L10 S11 A12 G13 F14 F15 L19 N20 T21 Y22 R23 Q24 K25 V29 L30 K31 Y32 Q33 E34 L35 P36 N37 S38 G39 P40 P41 H42 D43 R44 R45 F46 V50 I51 I52 D53 G54 R55 E56 F57 P58 G62 R63 S64 K65 K66 E67 A68 K69 N70

K74 L75 A76 V77 E78 I79 L80 N81 K82 E83 K84 K85 A86 V87 S88 P89 L90 L91 L92 T93 T94 T95 N96 S97 S98 E99 G100 L101 S102 M103 G104 N105 Y106 I107 G108 L109 I110 N111 R112 I113 K117 R118 V121 N122 Y123 C126 V130 H131 G132 P133 E134 H137 Y138 K139 C140

K141 M142 G143 Q144 K145 E146 Y147 S148 I149 G150 A158 K159 Q160 L161 A162 A163 K164 L165 A166 Y167 L168 Q169 I170 L171 C179

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

The representative model is number 21. Colouring as in section 4.1 above.

- Molecule 1: PROTEIN KINASE PKR

Chain A: 31% 37% 17% • 13%

G1 S2 H3 M4 A7 G8 D9 L10 S11 A12 G13 F14 F15 L19 N20 T21 Y22 R23 Q24 K25 V29 L30 K31 Y32 Q33 E34 L35 P36 N37 S38 G39 P40 P41 H42 D43 R44 R45 F46 I51 I52 D53 G54 R55 E56 F57 P58 G62 R63 S64 K65 K66 E67 A68 K69

L80 N81 K82 E83 K84 K85 A86 V87 S88 P89 L90 L91 L92 T93 T94 T95 N96 S97 S98 E99 G100 L101 S102 M103 G104 N105 Y106 I107 G108 L109 I110 N111 R112 I113 A114 Q115 K116 K117 R118 L119 T120 V121 N122 Y123 E124 Q125 C126 A127 S128 G129 V130 H131 G132 P133 E134 Y138 K139 C140 K141

M142 G143 Q144 K145 E146 Y147 S148 I149 G150 T154 K155 Q156 E157 A158 K159 Q160 L161 A162 A163 K164 L165 A166 Y167 L168 Q169 I170 L171 S172 E173 E174 C179

5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *MODIFIED DG/SA PROTOCOL IN XPLOR*.

Of the 90 calculated structures, 21 were deposited, based on the following criterion: *?*.

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

Software name	Classification	Version
X-PLOR	refinement	
NMRPIPE	structure solution	
PIPP	structure solution	

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

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	1223	1226	1226	98±12
All	All	25683	25746	25746	2058

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 40.

5 of 627 unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:A:41:PRO:O	1:A:42:HIS:ND1	0.93	2.02	21	5
1:A:80:LEU:H	1:A:80:LEU:HD22	0.89	1.25	5	1
1:A:10:LEU:N	1:A:10:LEU:HD13	0.87	1.84	14	4
1:A:52:ILE:HD12	1:A:53:ASP:N	0.85	1.87	5	1
1:A:10:LEU:HD13	1:A:10:LEU:N	0.84	1.88	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	155/179 (87%)	106±3 (68±2%)	34±4 (22±2%)	15±2 (10±1%)	2 11
All	All	3255/3759 (87%)	2228 (68%)	717 (22%)	310 (10%)	2 11

5 of 31 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	83	GLU	21
1	A	134	GLU	21
1	A	42	HIS	21
1	A	37	ASN	21
1	A	118	ARG	21

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	127/146 (87%)	99±5 (78±4%)	28±5 (22±4%)	4 31
All	All	2667/3066 (87%)	2073 (78%)	594 (22%)	4 31

5 of 94 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	147	TYR	21
1	A	141	LYS	21
1	A	45	ARG	21
1	A	161	LEU	21
1	A	113	ILE	20

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 carbohydrates 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