



Full wwPDB NMR Structure Validation Report ⓘ

Feb 18, 2018 – 08:37 am GMT

PDB ID : 1SFV
Title : PORCINE PANCREAS PHOSPHOLIPASE A2, NMR, MINIMIZED AVERAGE STRUCTURE
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Deposited on : 1996-02-20

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 : 20171227.v01 (using entries in the PDB archive December 27th 2017)
RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
ShiftChecker : trunk30686
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30686

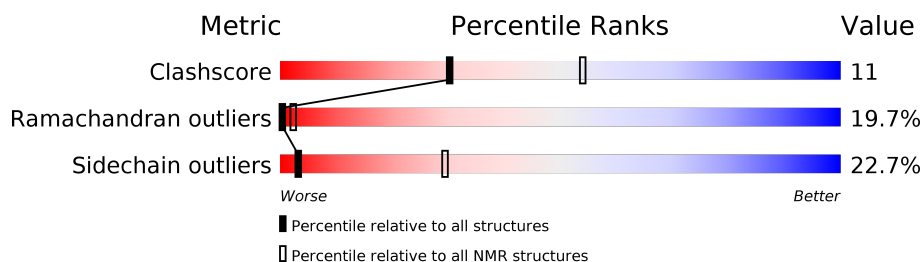
1 Overall quality at a glance

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	136279	12091
Ramachandran outliers	132675	10835
Sidechain outliers	132484	10811

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	124	

2 Ensemble composition and analysis ⓘ

This entry contains 1 models. Identification of well-defined residues and clustering analysis are not possible.

3 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 972 atoms, of which 0 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called PHOSPHOLIPASE A2.

Mol	Chain	Residues	Atoms					Trace
1	A	124	Total	C	N	O	S	0
			971	596	166	193	16	

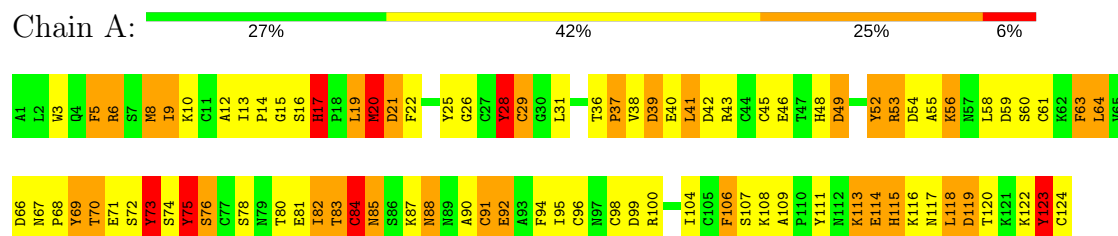
- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	
2	A	1	Total	Ca
			1	1

4 Residue-property plots [i](#)

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: PHOSPHOLIPASE A2



5 Refinement protocol and experimental data overview

Of the ? calculated structures, 1 were deposited, based on the following criterion: ?.

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

Software name	Classification	Version
DISCOVER	refinement	

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](#)

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the (average) root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#Z>5	RMSZ	#Z>5
1	A	1.44	15/993 (1.5%)	2.23	61/1340 (4.6%)
All	All	1.44	15/993 (1.5%)	2.23	61/1340 (4.6%)

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	15
All	All	0	15

All bond outliers are listed below. They are sorted according to the Z-score.

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	40	GLU	CD-OE1	10.93	1.37	1.25
1	A	81	GLU	CD-OE1	10.93	1.37	1.25
1	A	114	GLU	CD-OE2	10.89	1.37	1.25
1	A	71	GLU	CD-OE2	10.88	1.37	1.25
1	A	46	GLU	CD-OE1	10.85	1.37	1.25
1	A	92	GLU	CD-OE2	10.74	1.37	1.25
1	A	124	CYS	C-OXT	7.64	1.37	1.23
1	A	21	ASP	CG-OD1	5.35	1.37	1.25
1	A	54	ASP	CG-OD2	5.34	1.37	1.25
1	A	59	ASP	CG-OD1	5.34	1.37	1.25
1	A	119	ASP	CG-OD1	5.31	1.37	1.25
1	A	49	ASP	CG-OD2	5.30	1.37	1.25
1	A	66	ASP	CG-OD2	5.28	1.37	1.25
1	A	39	ASP	CG-OD2	5.23	1.37	1.25
1	A	99	ASP	CG-OD2	5.03	1.36	1.25

All angle outliers are listed below. They are sorted according to the Z-score.

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	111	TYR	CB-CG-CD1	-13.56	112.86	121.00
1	A	111	TYR	CB-CG-CD2	11.18	127.71	121.00
1	A	123	TYR	N-CA-CB	-11.17	90.50	110.60
1	A	106	PHE	CB-CG-CD1	9.69	127.58	120.80
1	A	106	PHE	CB-CG-CD2	-9.42	114.20	120.80
1	A	75	TYR	CB-CG-CD2	-9.04	115.58	121.00
1	A	75	TYR	CB-CG-CD1	8.95	126.37	121.00
1	A	6	ARG	NE-CZ-NH1	8.89	124.75	120.30
1	A	100	ARG	NE-CZ-NH1	8.79	124.69	120.30
1	A	73	TYR	CB-CG-CD2	-8.30	116.02	121.00
1	A	28	TYR	CB-CG-CD2	-8.29	116.03	121.00
1	A	53	ARG	NE-CZ-NH1	8.11	124.35	120.30
1	A	49	ASP	CB-CG-OD2	-7.82	111.26	118.30
1	A	28	TYR	CB-CG-CD1	7.81	125.69	121.00
1	A	114	GLU	CB-CA-C	7.71	125.82	110.40
1	A	43	ARG	NE-CZ-NH1	7.67	124.13	120.30
1	A	42	ASP	CB-CG-OD2	-7.59	111.47	118.30
1	A	122	LYS	N-CA-CB	-7.50	97.10	110.60
1	A	31	LEU	CB-CA-C	7.12	123.73	110.20
1	A	49	ASP	CB-CG-OD1	7.00	124.60	118.30
1	A	20	MET	N-CA-CB	-6.86	98.25	110.60
1	A	59	ASP	CB-CG-OD1	-6.80	112.18	118.30
1	A	69	TYR	CB-CG-CD1	6.80	125.08	121.00
1	A	84	CYS	N-CA-CB	6.69	122.65	110.60
1	A	21	ASP	CB-CG-OD1	-6.61	112.35	118.30
1	A	66	ASP	CB-CG-OD2	-6.50	112.45	118.30
1	A	99	ASP	CB-CG-OD2	-6.44	112.51	118.30
1	A	116	LYS	N-CA-CB	-6.43	99.03	110.60
1	A	75	TYR	N-CA-CB	-6.35	99.17	110.60
1	A	54	ASP	CB-CG-OD2	-6.34	112.59	118.30
1	A	42	ASP	CB-CG-OD1	6.33	123.99	118.30
1	A	72	SER	N-CA-CB	-6.32	101.02	110.50
1	A	64	LEU	CB-CG-CD2	-6.23	100.41	111.00
1	A	17	HIS	CG-ND1-CE1	-6.19	97.65	105.70
1	A	82	ILE	CB-CA-C	6.11	123.81	111.60
1	A	123	TYR	CB-CG-CD2	-6.10	117.34	121.00
1	A	38	VAL	CG1-CB-CG2	-5.89	101.48	110.90
1	A	119	ASP	CB-CG-OD1	-5.89	113.00	118.30
1	A	3	TRP	CD1-NE1-CE2	-5.78	103.80	109.00
1	A	39	ASP	CB-CG-OD2	-5.74	113.14	118.30
1	A	78	SER	CB-CA-C	5.72	120.96	110.10
1	A	114	GLU	N-CA-CB	-5.66	100.41	110.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	59	ASP	CB-CG-OD2	5.62	123.35	118.30
1	A	66	ASP	CB-CG-OD1	5.58	123.32	118.30
1	A	9	ILE	CA-CB-CG2	5.55	122.01	110.90
1	A	19	LEU	C-N-CA	5.53	135.54	121.70
1	A	21	ASP	CB-CG-OD2	5.50	123.25	118.30
1	A	100	ARG	NE-CZ-NH2	-5.46	117.57	120.30
1	A	99	ASP	CB-CG-OD1	5.46	123.21	118.30
1	A	115	HIS	CG-ND1-CE1	-5.43	98.64	105.70
1	A	56	LYS	CB-CA-C	5.42	121.24	110.40
1	A	28	TYR	CA-CB-CG	5.41	123.68	113.40
1	A	69	TYR	CA-CB-CG	5.34	123.55	113.40
1	A	54	ASP	CB-CG-OD1	5.28	123.05	118.30
1	A	48	HIS	CG-ND1-CE1	-5.25	98.87	105.70
1	A	41	LEU	CB-CA-C	5.23	120.14	110.20
1	A	76	SER	N-CA-CB	-5.16	102.76	110.50
1	A	63	PHE	CB-CA-C	5.15	120.70	110.40
1	A	119	ASP	CB-CG-OD2	5.13	122.91	118.30
1	A	98	CYS	CA-CB-SG	-5.08	104.86	114.00
1	A	53	ARG	NE-CZ-NH2	-5.02	117.79	120.30

There are no chirality outliers.

All planar outliers are listed below.

Mol	Chain	Res	Type	Group
1	A	113	LYS	Peptide
1	A	88	ASN	Peptide
1	A	75	TYR	Sidechain
1	A	73	TYR	Sidechain
1	A	14	PRO	Peptide
1	A	115	HIS	Sidechain
1	A	76	SER	Peptide
1	A	69	TYR	Sidechain
1	A	25	TYR	Sidechain
1	A	64	LEU	Peptide
1	A	20	MET	Peptide
1	A	22	PHE	Sidechain
1	A	123	TYR	Sidechain
1	A	28	TYR	Sidechain
1	A	52	TYR	Sidechain

6.2 Too-close contacts

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	971	0	886	20
All	All	972	0	886	20

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 11.

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

Atom-1	Atom-2	Clash(Å)	Distance(Å)
1:A:26:GLY:HA2	1:A:118:LEU:HD22	0.70	1.62
1:A:8:MET:SD	1:A:75:TYR:CD2	0.58	2.97
1:A:91:CYS:O	1:A:95:ILE:HD13	0.57	1.99
1:A:13:ILE:HG22	1:A:15:GLY:CA	0.55	2.31
1:A:26:GLY:CA	1:A:118:LEU:HD22	0.53	2.34
1:A:55:ALA:CB	1:A:95:ILE:HD11	0.52	2.34
1:A:83:THR:HG23	1:A:84:CYS:H	0.51	1.64
1:A:5:PHE:CE2	1:A:9:ILE:HD11	0.51	2.41
1:A:12:ALA:HB1	1:A:107:SER:HB2	0.51	1.81
1:A:13:ILE:HG22	1:A:15:GLY:HA3	0.50	1.83
1:A:118:LEU:HD23	1:A:123:TYR:CG	0.50	2.42
1:A:8:MET:SD	1:A:75:TYR:CG	0.48	3.07
1:A:118:LEU:HG	1:A:123:TYR:CD2	0.47	2.44
1:A:84:CYS:SG	1:A:85:ASN:N	0.45	2.90
1:A:45:CYS:SG	1:A:106:PHE:CZ	0.44	3.11
1:A:17:HIS:CD2	1:A:21:ASP:H	0.42	2.32
1:A:45:CYS:SG	1:A:106:PHE:CE1	0.41	3.14
1:A:55:ALA:HB2	1:A:95:ILE:HD11	0.41	1.92
1:A:60:SER:CB	1:A:90:ALA:HB3	0.41	2.46
1:A:8:MET:SD	1:A:73:TYR:CE2	0.40	3.13

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	122/124 (98%)	73 (60%)	25 (20%)	24 (20%)	0	2
All	All	122/124 (98%)	73 (60%)	25 (20%)	24 (20%)	0	2

All 24 Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type
1	A	118	LEU
1	A	63	PHE
1	A	117	ASN
1	A	120	THR
1	A	73	TYR
1	A	29	CYS
1	A	80	THR
1	A	74	SER
1	A	58	LEU
1	A	83	THR
1	A	84	CYS
1	A	19	LEU
1	A	91	CYS
1	A	20	MET
1	A	82	ILE
1	A	119	ASP
1	A	70	THR
1	A	37	PRO
1	A	49	ASP
1	A	68	PRO
1	A	88	ASN
1	A	67	ASN
1	A	109	ALA
1	A	16	SER

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	110/110 (100%)	85 (77%)	25 (23%)	3	29
All	All	110/110 (100%)	85 (77%)	25 (23%)	3	29

All 25 residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type
1	A	92	GLU
1	A	39	ASP
1	A	96	CYS
1	A	104	ILE
1	A	29	CYS
1	A	87	LYS
1	A	17	HIS
1	A	56	LYS
1	A	5	PHE
1	A	108	LYS
1	A	85	ASN
1	A	10	LYS
1	A	41	LEU
1	A	94	PHE
1	A	36	THR
1	A	61	CYS
1	A	113	LYS
1	A	8	MET
1	A	70	THR
1	A	114	GLU
1	A	37	PRO
1	A	53	ARG
1	A	28	TYR
1	A	52	TYR
1	A	6	ARG

6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

6.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

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

No chemical shift data were provided