



Full wwPDB X-ray Structure Validation Report

Feb 28, 2014 – 07:54 AM GMT

PDB ID : 3CC0
Title : The Dvl2 PDZ Domain in Complex with the N3 Inhibitory Peptide
Authors : Appleton, B.A.; Wiesmann, C.
Deposited on : 2008-02-23
Resolution : 1.75 Å(reported)

This is a full wwPDB validation 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/ValidationPDFNotes.html>

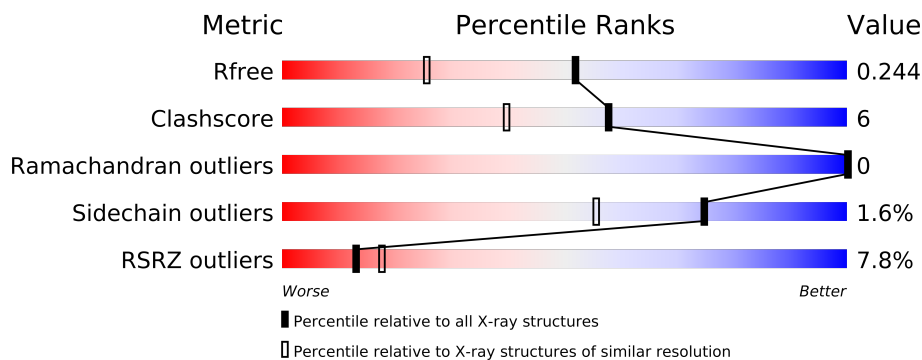
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : dev-1323
EDS : stable22639
Percentile statistics : 21963
Refmac : 5.8.0049
CCP4 : 6.3.0 (Settle)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance

The reported resolution of this entry is 1.75 Å.

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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	66092	1134 (1.76-1.76)
Clashscore	79885	1304 (1.76-1.76)
Ramachandran outliers	78287	1288 (1.76-1.76)
Sidechain outliers	78261	1288 (1.76-1.76)
RSRZ outliers	66119	1135 (1.76-1.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	108	
1	B	108	
1	C	108	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2461 atoms, of which 0 are hydrogen and 0 are deuterium.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Dishevelled-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	106	Total	C	N	O	S	0	0	0
			792	495	137	154	6			
1	B	103	Total	C	N	O	S	0	1	0
			773	487	130	149	7			
1	C	98	Total	C	N	O	S	0	0	0
			739	464	125	145	5			

There are 54 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	260	GLY	-	EXPRESSION TAG	UNP O14641
A	261	SER	-	EXPRESSION TAG	UNP O14641
A	262	HIS	-	EXPRESSION TAG	UNP O14641
A	263	MET	-	EXPRESSION TAG	UNP O14641
A	354	SER	CYS	ENGINEERED	UNP O14641
A	355	GLY	-	LINKER	UNP O14641
A	356	GLY	-	LINKER	UNP O14641
A	357	GLY	-	LINKER	UNP O14641
A	358	GLY	-	SEE REMARK 999	UNP O14641
A	359	GLU	-	SEE REMARK 999	UNP O14641
A	360	ILE	-	SEE REMARK 999	UNP O14641
A	361	VAL	-	SEE REMARK 999	UNP O14641
A	362	LEU	-	SEE REMARK 999	UNP O14641
A	363	TRP	-	SEE REMARK 999	UNP O14641
A	364	SER	-	SEE REMARK 999	UNP O14641
A	365	ASP	-	SEE REMARK 999	UNP O14641
A	366	ILE	-	SEE REMARK 999	UNP O14641
A	367	PRO	-	SEE REMARK 999	UNP O14641
B	260	GLY	-	EXPRESSION TAG	UNP O14641
B	261	SER	-	EXPRESSION TAG	UNP O14641
B	262	HIS	-	EXPRESSION TAG	UNP O14641
B	263	MET	-	EXPRESSION TAG	UNP O14641
B	354	SER	CYS	ENGINEERED	UNP O14641

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Chain	Residue	Modelled	Actual	Comment	Reference
B	355	GLY	-	LINKER	UNP O14641
B	356	GLY	-	LINKER	UNP O14641
B	357	GLY	-	LINKER	UNP O14641
B	358	GLY	-	SEE REMARK 999	UNP O14641
B	359	GLU	-	SEE REMARK 999	UNP O14641
B	360	ILE	-	SEE REMARK 999	UNP O14641
B	361	VAL	-	SEE REMARK 999	UNP O14641
B	362	LEU	-	SEE REMARK 999	UNP O14641
B	363	TRP	-	SEE REMARK 999	UNP O14641
B	364	SER	-	SEE REMARK 999	UNP O14641
B	365	ASP	-	SEE REMARK 999	UNP O14641
B	366	ILE	-	SEE REMARK 999	UNP O14641
B	367	PRO	-	SEE REMARK 999	UNP O14641
C	260	GLY	-	EXPRESSION TAG	UNP O14641
C	261	SER	-	EXPRESSION TAG	UNP O14641
C	262	HIS	-	EXPRESSION TAG	UNP O14641
C	263	MET	-	EXPRESSION TAG	UNP O14641
C	354	SER	CYS	ENGINEERED	UNP O14641
C	355	GLY	-	LINKER	UNP O14641
C	356	GLY	-	LINKER	UNP O14641
C	357	GLY	-	LINKER	UNP O14641
C	358	GLY	-	SEE REMARK 999	UNP O14641
C	359	GLU	-	SEE REMARK 999	UNP O14641
C	360	ILE	-	SEE REMARK 999	UNP O14641
C	361	VAL	-	SEE REMARK 999	UNP O14641
C	362	LEU	-	SEE REMARK 999	UNP O14641
C	363	TRP	-	SEE REMARK 999	UNP O14641
C	364	SER	-	SEE REMARK 999	UNP O14641
C	365	ASP	-	SEE REMARK 999	UNP O14641
C	366	ILE	-	SEE REMARK 999	UNP O14641
C	367	PRO	-	SEE REMARK 999	UNP O14641

- Molecule 2 is water.

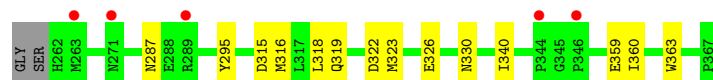
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	68	Total O 68 68	0	0
2	B	47	Total O 47 47	0	0
2	C	42	Total O 42 42	0	0

3 Residue-property plots i

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-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. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

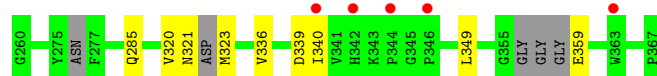
- Molecule 1: Dishevelled-2

Chain A:



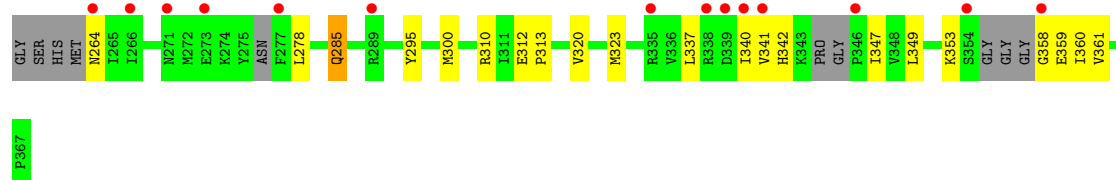
- Molecule 1: Dishevelled-2

Chain B:



- Molecule 1: Dishevelled-2

Chain C:



4 Data and refinement statistics

Property	Value	Source
Space group	P 65	Depositor
Cell constants a, b, c, α , β , γ	52.62Å 52.62Å 171.10Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	20.00 – 1.75 45.57 – 1.75	Depositor EDS
% Data completeness (in resolution range)	99.6 (20.00-1.75) 99.3 (45.57-1.75)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.08 (at 1.75Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.188 , 0.238 0.195 , 0.244	Depositor DCC
R_{free} test set	1349 reflections (5.28%)	DCC
Wilson B-factor (Å ²)	21.6	Xtriage
Anisotropy	0.183	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 42.7	EDS
Estimated twinning fraction	0.078 for h,-h-k,-l	Xtriage
L-test for twinning	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Outliers	1 of 26879 reflections (0.004%)	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	2461	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.88% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

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 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	0.67	0/803	0.75	2/1083 (0.2%)
1	B	0.63	0/784	0.75	0/1053
1	C	0.58	0/745	0.72	0/1001
All	All	0.63	0/2332	0.74	2/3137 (0.1%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	315	ASP	CB-CG-OD1	6.09	123.78	118.30
1	A	322	ASP	CB-CG-OD1	5.14	122.92	118.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	792	0	791	9	0
1	B	773	0	775	5	0
1	C	739	0	737	18	0
2	A	68	0	0	2	0
2	B	47	0	0	0	0
2	C	42	0	0	2	0
All	All	2461	0	2303	29	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 6.

All (29) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:C:278:LEU:HD11	1:C:347:ILE:HD12	1.75	0.69
1:C:313:PRO:HG2	1:C:359:GLU:O	1.96	0.66
1:A:323:MET:HG3	1:A:340:ILE:HD13	1.76	0.66
1:A:363:TRP:CZ2	1:C:341:VAL:HG11	2.32	0.63
1:A:319:GLN:NE2	2:A:1138:HOH:O	2.30	0.57
1:C:310:ARG:O	1:C:353:LYS:NZ	2.37	0.53
1:C:359:GLU:O	1:C:360:ILE:HD13	2.09	0.53
1:A:359:GLU:CD	2:C:1114:HOH:O	2.46	0.52
1:A:318:LEU:HD22	1:A:326:GLU:HG2	1.91	0.52
1:B:321:ASN:HB2	1:B:340:ILE:HD11	1.91	0.51
1:C:358:GLY:HA2	2:C:1151:HOH:O	2.09	0.51
1:C:341:VAL:HG23	1:C:342:HIS:CD2	2.46	0.51
1:B:323:MET:HG3	1:B:336:VAL:CG1	2.41	0.50
1:C:285:GLN:HG3	1:C:295:TYR:CD1	2.49	0.48
1:C:320:VAL:HG13	1:C:349:LEU:HD23	1.96	0.48
1:B:285:GLN:NE2	1:C:359:GLU:OE2	2.48	0.47
1:B:323:MET:HG3	1:B:336:VAL:HG13	1.99	0.45
1:B:320:VAL:HG22	1:B:349:LEU:CD2	2.47	0.45
1:A:363:TRP:CE2	1:C:341:VAL:HG11	2.52	0.45
1:A:295:TYR:CE2	1:A:316:MET:HE2	2.52	0.44
1:C:300:MET:HG3	1:C:361:VAL:HB	1.98	0.44
1:C:337:LEU:O	1:C:341:VAL:HG22	2.17	0.44
1:C:312:GLU:HG3	1:C:353:LYS:HZ1	1.83	0.43
1:C:278:LEU:HD11	1:C:347:ILE:CD1	2.46	0.43
1:C:323:MET:HG3	1:C:340:ILE:HD11	2.02	0.42
1:C:320:VAL:HG22	1:C:349:LEU:CD2	2.50	0.41
1:A:287:ASN:HB3	1:A:330:ASN:OD1	2.20	0.41
1:C:320:VAL:HG22	1:C:349:LEU:HD22	2.02	0.41
1:A:360:ILE:HD11	2:A:1118:HOH:O	2.19	0.41

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 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 X-ray entries followed by that with respect to entries

of similar resolution. 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	104/108 (96%)	102 (98%)	2 (2%)	0	100	100
1	B	96/108 (89%)	93 (97%)	3 (3%)	0	100	100
1	C	90/108 (83%)	89 (99%)	1 (1%)	0	100	100
All	All	290/324 (90%)	284 (98%)	6 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution. 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	86/87 (99%)	86 (100%)	0	100	100
1	B	85/87 (98%)	83 (98%)	2 (2%)	61	34
1	C	81/87 (93%)	79 (98%)	2 (2%)	60	33
All	All	252/261 (97%)	248 (98%)	4 (2%)	75	55

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	339	ASP
1	B	359	GLU
1	C	264	ASN
1	C	285	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	285	GLN
1	C	324	ASN
1	C	342	HIS

5.3.3 RNA ⓘ

There are no RNA chains in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	106/108 (98%)	0.58	5 (4%) 30 37	19, 26, 37, 43	0
1	B	103/108 (95%)	0.59	5 (4%) 28 36	18, 24, 48, 60	0
1	C	98/108 (90%)	0.92	14 (14%) 3 5	18, 27, 47, 52	0
All	All	307/324 (94%)	0.69	24 (7%) 13 18	18, 26, 44, 60	0

All (24) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	354	SER	6.5
1	C	346	PRO	5.6
1	B	340	ILE	5.0
1	C	273	GLU	4.6
1	C	341	VAL	4.3
1	C	266	ILE	4.0
1	B	344	PRO	3.6
1	C	339	ASP	3.4
1	A	271	ASN	3.3
1	C	264	ASN	3.2
1	B	342	HIS	3.2
1	C	289	ARG	3.0
1	A	263	MET	2.7
1	C	271	ASN	2.5
1	C	335	ARG	2.5
1	A	289	ARG	2.4
1	A	346	PRO	2.3
1	C	358	GLY	2.3
1	C	338	ARG	2.3
1	C	340	ILE	2.2
1	B	363	TRP	2.1
1	A	344	PRO	2.1
1	C	277	PHE	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	346	PRO	2.0

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

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

6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.