



Full wwPDB X-ray Structure Validation Report

Feb 28, 2014 – 02:25 AM GMT

PDB ID : 2F46
Title : Crystal structure of a putative phosphatase (nma1982) from neisseria meningitidis z2491 at 1.41 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2005-11-22
Resolution : 1.41 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>

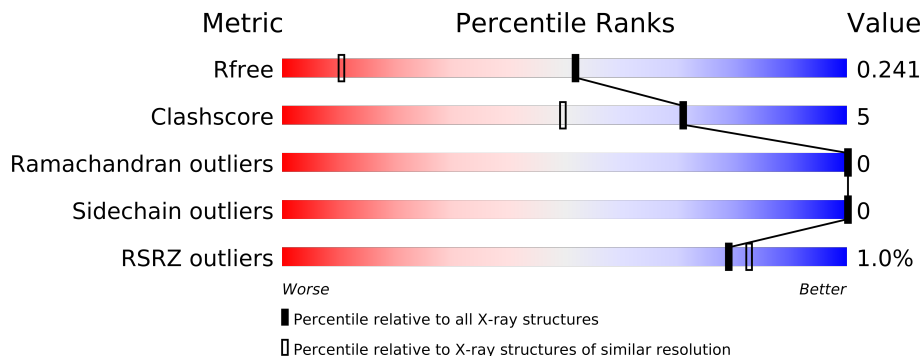
The following versions of software and data (see [references](#)) were used in the production of this report:

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 1.41 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	1110 (1.44-1.40)
Clashscore	79885	1263 (1.44-1.40)
Ramachandran outliers	78287	1226 (1.44-1.40)
Sidechain outliers	78261	1225 (1.44-1.40)
RSRZ outliers	66119	1110 (1.44-1.40)

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	156	
1	B	156	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
2	CL	A	156	-	X
3	UNL	B	157	-	X

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 2866 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 hypothetical protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	143	Total	C	N	O	S	Se	0	12	1
			1211	759	222	222	5	3			
1	B	143	Total	C	N	O	S	Se	0	14	1
			1237	777	227	226	4	3			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	LEADER SEQUENCE	GB 7380613
A	1	MSE	MET	MODIFIED RESIDUE	GB 7380613
A	14	MSE	MET	MODIFIED RESIDUE	GB 7380613
A	45	ILE	VAL	SEE REMARK 999	GB 7380613
A	102	TYR	SER	SEE REMARK 999	GB 7380613
A	127	MSE	MET	MODIFIED RESIDUE	GB 7380613
B	0	GLY	-	LEADER SEQUENCE	GB 7380613
B	1	MSE	MET	MODIFIED RESIDUE	GB 7380613
B	14	MSE	MET	MODIFIED RESIDUE	GB 7380613
B	45	ILE	VAL	SEE REMARK 999	GB 7380613
B	102	TYR	SER	SEE REMARK 999	GB 7380613
B	127	MSE	MET	MODIFIED RESIDUE	GB 7380613

- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total	Cl	0	0
			1	1		
2	A	1	Total	Cl	0	0
			1	1		

- Molecule 3 is UNKNOWN LIGAND (three-letter code: UNL) (formula:).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	O	0	0
			5	5		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	191	Total	O	0	0
			191	191		
4	B	218	Total	O	0	2
			220	220		

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- Molecule 1: hypothetical protein

	GLY
MSE	
PRO	
SER	
GLU	
LYS	
GLN	
PRO	
GLN	
SER	
LYS	
GLY	
ASN	
K13	
M14	
I45	
Q62	
W66	
L67	
K87	
C108	
R109	
D151	
N152	
A153	
R154	
V155	

- Molecule 1: hypothetical protein

GLY	MSE	PRO	SER	GLU	LYS	GLN	PRO	GLN	SER	LYS	GLY	ASN	K13	M14	I45	N48	Q62	W66	L67	R83	H88	R94	C114	R121	R135	D151	R154	V155
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4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	144.28Å 33.47Å 59.90Å 90.00° 96.18° 90.00°	Depositor
Resolution (Å)	18.62 – 1.41 18.62 – 1.41	Depositor EDS
% Data completeness (in resolution range)	83.4 (18.62-1.41) 83.5 (18.62-1.41)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.85 (at 1.41Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.200 , 0.228 0.212 , 0.241	Depositor DCC
R_{free} test set	2352 reflections (5.36%)	DCC
Wilson B-factor (Å ²)	13.4	Xtriage
Anisotropy	0.194	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.41 , 51.2	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 46237 reflections	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	2866	wwPDB-VP
Average B, all atoms (Å ²)	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 96.64 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 4.3707e-10. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

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

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	0.70	0/1240	0.76	0/1672
1	B	0.64	0/1266	0.76	1/1704 (0.1%)
All	All	0.67	0/2506	0.76	1/3376 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	135	ARG	NE-CZ-NH2	-5.39	117.61	120.30

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	1211	0	1178	9	0
1	B	1237	0	1198	9	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	B	5	0	0	5	0
4	A	191	0	0	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	220	0	0	1	0
All	All	2866	0	2376	22	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 5.

All (22) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
3:B:157:UNL:O4	3:B:157:UNL:O3	2.20	0.59
1:A:109[A]:ARG:CZ	4:A:314:HOH:O	2.49	0.59
1:A:87:LYS:CB	4:A:199:HOH:O	2.51	0.59
1:B:83[B]:ARG:HG2	4:B:366:HOH:O	2.09	0.52
3:B:157:UNL:O5	3:B:157:UNL:O4	2.29	0.51
1:B:14[B]:MSE:HE2	1:B:14[B]:MSE:HA	1.92	0.51
1:B:88:HIS:NE2	3:B:157:UNL:O1	2.28	0.50
3:B:157:UNL:O2	3:B:157:UNL:O1	2.30	0.50
1:B:62:GLN:NE2	1:B:66:TRP:NE1	2.61	0.49
3:B:157:UNL:O1	3:B:157:UNL:O3	2.31	0.48
1:A:14[A]:MSE:HE2	1:A:14[A]:MSE:HA	1.96	0.48
1:B:151:ASP:O	1:B:154[B]:ARG:CG	2.64	0.46
1:B:48:ASN:HD22	1:B:114[B]:CYS:HB3	1.81	0.46
1:A:45[B]:ILE:CD1	1:A:67:LEU:HD13	2.47	0.45
1:B:13:LYS:O	1:B:14[B]:MSE:HB2	2.18	0.44
1:A:108[B]:CYS:O	1:A:109[B]:ARG:C	2.53	0.43
1:B:45[B]:ILE:CD1	1:B:67:LEU:HD13	2.49	0.43
1:A:151:ASP:O	1:A:154:ARG:CG	2.66	0.43
1:A:109[A]:ARG:NH2	4:A:314:HOH:O	2.52	0.42
1:B:94[B]:ARG:NH2	1:B:121:ARG:NH2	2.68	0.42
1:A:14[B]:MSE:HA	4:A:187:HOH:O	2.20	0.42
1:A:62:GLN:NE2	1:A:66:TRP:NE1	2.66	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	153/156 (98%)	150 (98%)	3 (2%)	0	100	100
1	B	155/156 (99%)	153 (99%)	2 (1%)	0	100	100
All	All	308/312 (99%)	303 (98%)	5 (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	124/128 (97%)	124 (100%)	0	100	100
1	B	124/128 (97%)	124 (100%)	0	100	100
All	All	248/256 (97%)	248 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	48	ASN

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 ⓘ

Of 3 ligands modelled in this entry, 1 is unknown and 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

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	143/156 (91%)	-0.00	2 (1%) 72 76	8, 16, 30, 41	0
1	B	143/156 (91%)	-0.03	1 (0%) 84 87	7, 16, 28, 38	0
All	All	286/312 (91%)	-0.01	3 (1%) 79 83	7, 16, 30, 41	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	155	VAL	3.5
1	A	153	ALA	2.7
1	B	66	TRP	2.1

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 ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors(\AA^2)	Q<0.9
3	UNL	B	157	5/-	0.17	5.16	29,35,44,45	0
2	CL	A	156	1/1	0.10	5.10	26,26,26,26	0
2	CL	B	156	1/1	0.07	1.94	24,24,24,24	0

6.5 Other polymers ⓘ

There are no such residues in this entry.