



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 11, 2024 – 10:16 PM EDT

PDB ID : 2WVC  
Title : Structural and mechanistic insights into Helicobacter pylori NikR function  
Authors : Dian, C.; Bahlawane, C.; Muller, C.; Round, A.; Delay, C.; Fauquant, C.; Schauer, K.; de Reuse, H.; Michaud-Soret, I.; Terradot, L.  
Deposited on : 2009-10-16  
Resolution : 2.10 Å (reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

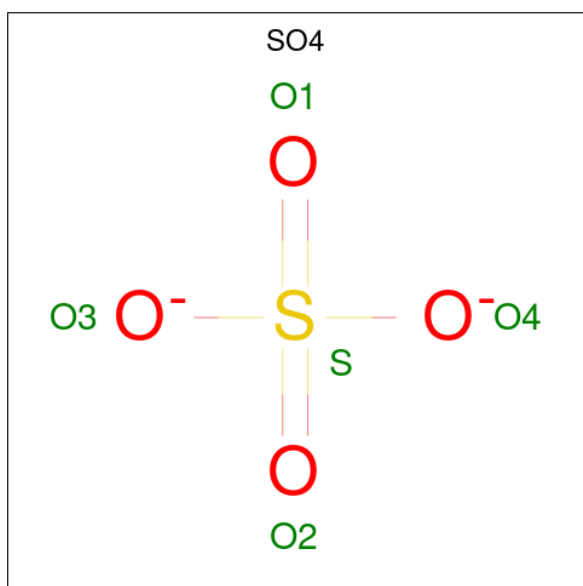
MolProbity : 4.02b-467  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
EDS : 2.36.2  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2





Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	A	1	Total C O 6 3 3	0	0
2	B	1	Total C O 6 3 3	0	0
2	B	1	Total C O 6 3 3	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO<sub>4</sub>) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0
3	A	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0
3	B	1	Total O S 5 4 1	0	0

- Molecule 4 is FORMIC ACID (three-letter code: FMT) (formula: CH<sub>2</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 3 1 2	0	0
4	B	1	Total C O 3 1 2	0	0
4	B	1	Total C O 3 1 2	0	0

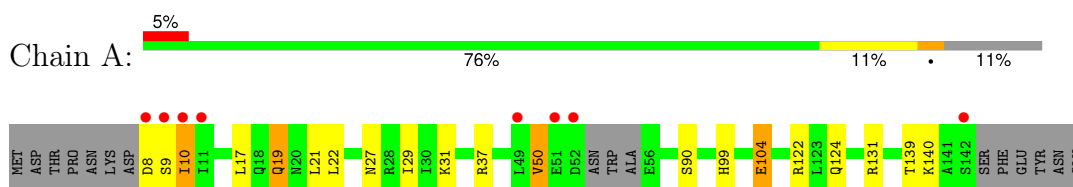
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	54	Total O 54 54	0	0
5	B	55	Total O 55 55	0	0

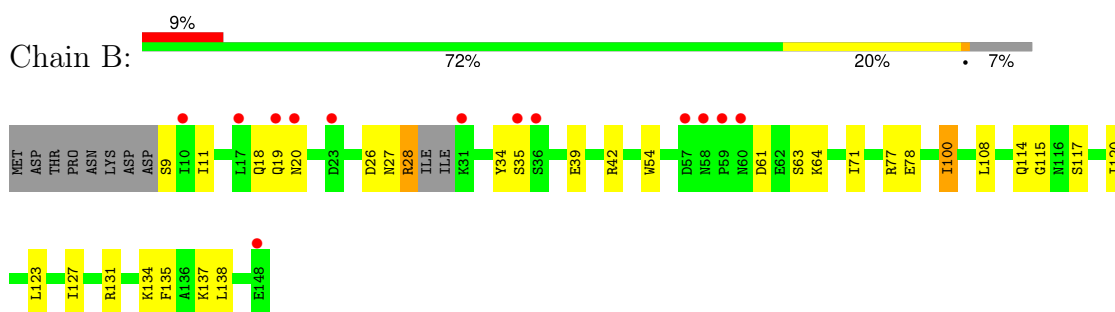
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes 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: PUTATIVE NICKEL-RESPONSIVE REGULATOR



- Molecule 1: PUTATIVE NICKEL-RESPONSIVE REGULATOR









hydrogen atoms). The all-atom clashscore for this structure is 9.

The worst 5 of 38 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:99[A]:HIS:HD2	5:A:2028:HOH:O	1.57	0.86
1:A:17:LEU:HD22	1:A:21:LEU:HD23	1.72	0.72
1:A:19:GLN:HG2	1:B:11:ILE:CD1	2.25	0.66
1:B:100:ILE:CD1	1:B:108:LEU:HB3	2.29	0.63
1:A:8:ASP:HA	1:B:19:GLN:HB3	1.81	0.62

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 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 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	129/148 (87%)	126 (98%)	3 (2%)	0	100	100
1	B	135/148 (91%)	131 (97%)	4 (3%)	0	100	100
All	All	264/296 (89%)	257 (97%)	7 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 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 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	114/135 (84%)	110 (96%)	4 (4%)	36	38
1	B	120/135 (89%)	112 (93%)	8 (7%)	16	13
All	All	234/270 (87%)	222 (95%)	12 (5%)	26	22

5 of 12 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	34	TYR
1	B	100	ILE
1	B	134	LYS
1	B	131[A]	ARG
1	A	104	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	80	ASN
1	B	88	HIS
1	B	121	GLN
1	B	114	GLN
1	B	20	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

12 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GOL	A	1143	-	5,5,5	0.36	0	5,5,5	0.27	0
4	FMT	B	1151	-	2,2,2	0.75	0	1,1,1	0.28	0
4	FMT	B	1150	-	2,2,2	0.74	0	1,1,1	0.23	0
2	GOL	B	1152	-	5,5,5	0.37	0	5,5,5	0.40	0
2	GOL	A	1144	-	5,5,5	0.37	0	5,5,5	0.43	0
2	GOL	B	1153	-	5,5,5	0.37	0	5,5,5	0.36	0
3	SO4	B	1154	-	4,4,4	0.23	0	6,6,6	0.11	0
2	GOL	A	1145	-	5,5,5	0.35	0	5,5,5	0.33	0
3	SO4	A	1146	-	4,4,4	0.24	0	6,6,6	0.07	0
4	FMT	B	1149	-	2,2,2	0.74	0	1,1,1	0.23	0
3	SO4	B	1155	-	4,4,4	0.23	0	6,6,6	0.08	0
3	SO4	A	1147	-	4,4,4	0.23	0	6,6,6	0.11	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GOL	A	1143	-	-	0/4/4/4	-
2	GOL	B	1152	-	-	2/4/4/4	-
2	GOL	A	1144	-	-	4/4/4/4	-
2	GOL	B	1153	-	-	4/4/4/4	-
2	GOL	A	1145	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 12 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1144	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
2	B	1152	GOL	C1-C2-C3-O3
2	B	1153	GOL	C1-C2-C3-O3
2	A	1144	GOL	O1-C1-C2-C3
2	A	1145	GOL	O1-C1-C2-C3

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1144	GOL	1	0
2	A	1145	GOL	2	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	132/148 (89%)	0.19	8 (6%) 21 26	17, 30, 73, 98	3 (2%)
1	B	138/148 (93%)	0.44	13 (9%) 8 11	17, 32, 72, 86	0
All	All	270/296 (91%)	0.31	21 (7%) 13 17	17, 31, 73, 98	3 (1%)

The worst 5 of 21 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	8	ASP	4.2
1	B	60	ASN	4.1
1	A	9	SER	4.1
1	B	20	ASN	4.0
1	A	11	ILE	3.9

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

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. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	FMT	B	1149	3/3	0.40	0.22	65,65,66,67	0
2	GOL	A	1144	6/6	0.59	0.28	50,55,56,62	0
2	GOL	B	1153	6/6	0.67	0.28	40,52,54,55	0
2	GOL	A	1145	6/6	0.74	0.26	65,70,72,73	0
2	GOL	B	1152	6/6	0.74	0.22	56,58,59,60	0
4	FMT	B	1150	3/3	0.77	0.16	59,59,60,61	0
4	FMT	B	1151	3/3	0.83	0.19	56,56,58,58	0
3	SO4	B	1155	5/5	0.91	0.14	58,59,60,61	5
3	SO4	A	1146	5/5	0.91	0.17	51,52,60,60	0
2	GOL	A	1143	6/6	0.94	0.11	28,34,38,38	0
3	SO4	B	1154	5/5	0.97	0.12	55,55,59,60	0
3	SO4	A	1147	5/5	0.98	0.09	49,51,52,53	5

## 6.5 Other polymers [i](#)

There are no such residues in this entry.