



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jul 25, 2017 – 01:43 AM EDT

PDB ID : 5L0X  
Title : Crystal structure of inactive V. cholerae quorum-sensing regulator HapR G39D  
Authors : Cruite, J.; Kull, F.J.  
Deposited on : unknown  
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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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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
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20029824
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	rb-20029824

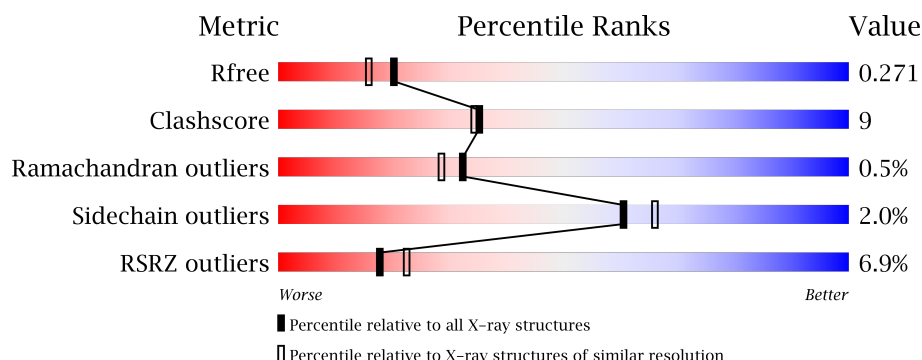
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.10 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))
$R_{free}$	100719	4243 (2.10-2.10)
Clashscore	112137	4788 (2.10-2.10)
Ramachandran outliers	110173	4740 (2.10-2.10)
Sidechain outliers	110143	4741 (2.10-2.10)
RSRZ outliers	101464	4275 (2.10-2.10)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	223	<div> <div>9%</div> <div>69%</div> <div>19%</div> <div>12%</div> </div>
1	B	223	<div> <div>3%</div> <div>71%</div> <div>16%</div> <div>12%</div> </div>

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3323 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Hemagglutinin/protease regulatory protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	197	Total	C	N	O	S	0	0	0
			1621	1037	279	293	12			
1	B	197	Total	C	N	O	S	0	0	0
			1621	1037	279	293	12			

There are 40 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP B2CKQ3
A	-18	GLY	-	expression tag	UNP B2CKQ3
A	-17	SER	-	expression tag	UNP B2CKQ3
A	-16	SER	-	expression tag	UNP B2CKQ3
A	-15	HIS	-	expression tag	UNP B2CKQ3
A	-14	HIS	-	expression tag	UNP B2CKQ3
A	-13	HIS	-	expression tag	UNP B2CKQ3
A	-12	HIS	-	expression tag	UNP B2CKQ3
A	-11	HIS	-	expression tag	UNP B2CKQ3
A	-10	HIS	-	expression tag	UNP B2CKQ3
A	-9	SER	-	expression tag	UNP B2CKQ3
A	-8	SER	-	expression tag	UNP B2CKQ3
A	-7	GLY	-	expression tag	UNP B2CKQ3
A	-6	LEU	-	expression tag	UNP B2CKQ3
A	-5	VAL	-	expression tag	UNP B2CKQ3
A	-4	PRO	-	expression tag	UNP B2CKQ3
A	-3	ARG	-	expression tag	UNP B2CKQ3
A	-2	GLY	-	expression tag	UNP B2CKQ3
A	-1	SER	-	expression tag	UNP B2CKQ3
A	0	HIS	-	expression tag	UNP B2CKQ3
B	-19	MET	-	initiating methionine	UNP B2CKQ3
B	-18	GLY	-	expression tag	UNP B2CKQ3
B	-17	SER	-	expression tag	UNP B2CKQ3
B	-16	SER	-	expression tag	UNP B2CKQ3
B	-15	HIS	-	expression tag	UNP B2CKQ3

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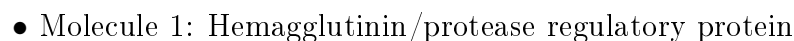
Chain	Residue	Modelled	Actual	Comment	Reference
B	-14	HIS	-	expression tag	UNP B2CKQ3
B	-13	HIS	-	expression tag	UNP B2CKQ3
B	-12	HIS	-	expression tag	UNP B2CKQ3
B	-11	HIS	-	expression tag	UNP B2CKQ3
B	-10	HIS	-	expression tag	UNP B2CKQ3
B	-9	SER	-	expression tag	UNP B2CKQ3
B	-8	SER	-	expression tag	UNP B2CKQ3
B	-7	GLY	-	expression tag	UNP B2CKQ3
B	-6	LEU	-	expression tag	UNP B2CKQ3
B	-5	VAL	-	expression tag	UNP B2CKQ3
B	-4	PRO	-	expression tag	UNP B2CKQ3
B	-3	ARG	-	expression tag	UNP B2CKQ3
B	-2	GLY	-	expression tag	UNP B2CKQ3
B	-1	SER	-	expression tag	UNP B2CKQ3
B	0	HIS	-	expression tag	UNP B2CKQ3

- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	41	Total O 41 41	0	0
2	B	40	Total O 40 40	0	0



- Molecule 1: Hemagglutinin/protease regulatory protein



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	43.47Å 85.71Å 112.25Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.43 – 2.10 19.43 – 2.10	Depositor EDS
% Data completeness (in resolution range)	100.0 (19.43-2.10) 91.6 (19.43-2.10)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.96 (at 2.09Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155)	Depositor
R, $R_{free}$	0.222 , 0.260 0.228 , 0.271	Depositor DCC
$R_{free}$ test set	1879 reflections (7.90%)	DCC
Wilson B-factor (Å <sup>2</sup> )	32.8	Xtriage
Anisotropy	0.441	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 54.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	3323	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 19.72% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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	0.43	1/1654 (0.1%)	0.56	0/2235
1	B	0.48	0/1654	0.58	0/2235
All	All	0.46	1/3308 (0.0%)	0.57	0/4470

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	199	CYS	CB-SG	-5.17	1.73	1.81

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 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 the 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 within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1621	0	1613	29	1
1	B	1621	0	1613	31	1
2	A	41	0	0	0	1
2	B	40	0	0	7	0
All	All	3323	0	3226	60	2

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 9.

The worst 5 of 60 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:B:10:ARG:HH11	1:B:11:THR:H	1.12	0.95
1:B:153:GLU:OE1	2:B:302:HOH:O	2.04	0.72
1:A:92:THR:O	1:A:96:THR:HG23	1.93	0.69
1:A:147:LYS:HG2	1:A:151:ARG:NH2	2.07	0.69
1:B:8:ARG:NE	2:B:301:HOH:O	1.99	0.64

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:339:HOH:O	2:A:341:HOH:O[4_545]	2.02	0.18
1:A:6:GLU:OE2	1:B:74:ARG:NE[3_445]	2.04	0.16

## 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	195/223 (87%)	190 (97%)	3 (2%)	2 (1%)	18	12
1	B	195/223 (87%)	193 (99%)	2 (1%)	0	100	100
All	All	390/446 (87%)	383 (98%)	5 (1%)	2 (0%)	32	28

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	199	CYS
1	A	200	ILE

### 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	179/202 (89%)	177 (99%)	2 (1%)	78	83
1	B	179/202 (89%)	174 (97%)	5 (3%)	49	52
All	All	358/404 (89%)	351 (98%)	7 (2%)	60	66

5 of 7 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	29	VAL
1	B	157	LYS
1	B	74	ARG
1	A	173	SER
1	B	124	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	184	GLN
1	B	134	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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 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	197/223 (88%)	0.66	20 (10%) <b>7</b> <b>9</b>	23, 44, 71, 87	0
1	B	197/223 (88%)	0.32	7 (3%) 43 50	28, 42, 56, 74	0
All	All	394/446 (88%)	0.49	27 (6%) <b>18</b> <b>22</b>	23, 43, 67, 87	0

The worst 5 of 27 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	201	TYR	7.5
1	A	157	LYS	6.2
1	A	125	GLU	5.0
1	A	156	GLU	4.5
1	A	200	ILE	4.3

### 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 carbohydrates in this entry.

### 6.4 Ligands [i](#)

There are no ligands in this entry.

### 6.5 Other polymers [i](#)

There are no such residues in this entry.