



# wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 7, 2022 – 10:55 AM EDT

PDB ID : 3CNV  
Title : Crystal structure of the ligand-binding domain of a putative GntR-family transcriptional regulator from *Bordetella bronchiseptica*  
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Deposited on : 2008-03-26  
Resolution : 2.00 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.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.27  
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) : 2.27

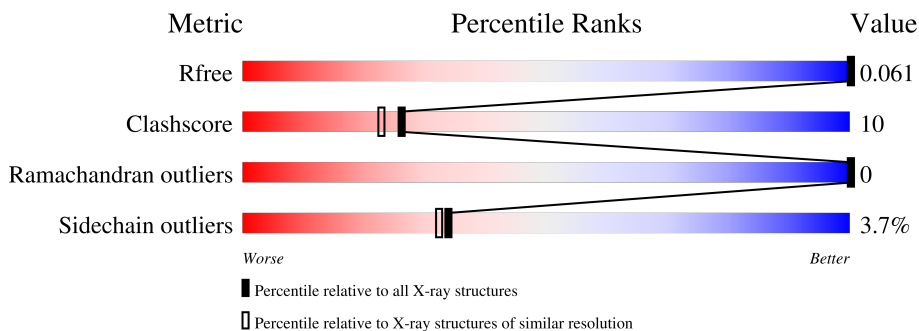
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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))
$R_{free}$	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)

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 of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. 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	162	83% 13% . .
1	B	162	75% 20% . .
1	C	162	84% 14% .
1	D	162	83% 9% . . .

## 2 Entry composition [i](#)

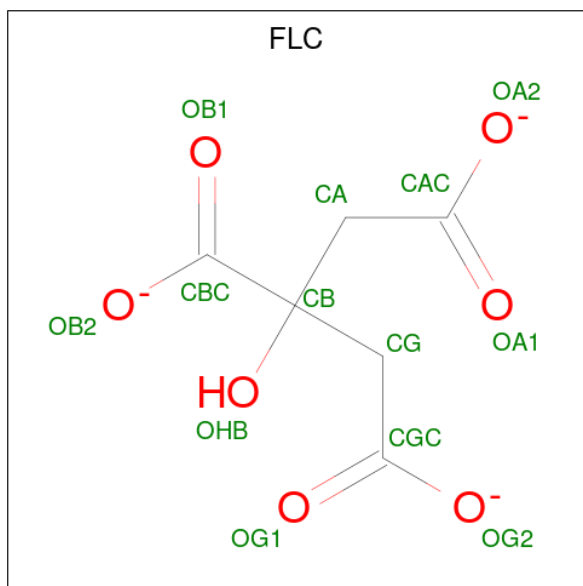
There are 4 unique types of molecules in this entry. The entry contains 5485 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Putative GntR-family transcriptional regulator.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	156	Total 1230	C 782	N 225	O 219	S 1	Se 3	0	1	0
1	B	159	Total 1268	C 802	N 235	O 226	S 1	Se 4	1	1	0
1	C	162	Total 1289	C 814	N 243	O 228	S 1	Se 3	0	2	0
1	D	157	Total 1246	C 790	N 235	O 216	S 1	Se 4	0	1	0

- Molecule 2 is CITRATE ANION (three-letter code: FLC) (formula: C<sub>6</sub>H<sub>5</sub>O<sub>7</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	Total 13	C 6	O 7	0	0
2	B	1	Total 13	C 6	O 7	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	C	1	Total	C	O	0	0
			13	6	7		
2	D	1	Total	C	O	0	0
			13	6	7		

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

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


- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	98	Total	O	0	0
			98	98		
4	B	105	Total	O	0	0
			105	105		
4	C	98	Total	O	0	0
			98	98		
4	D	94	Total	O	0	0
			94	94		

### 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. 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. 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 GntR-family transcriptional regulator

Chain A:  83% 13% . .




- Molecule 1: Putative GntR-family transcriptional regulator

Chain B:  75% 20% . .




- Molecule 1: Putative GntR-family transcriptional regulator

Chain C:  84% 14% .



- Molecule 1: Putative GntR-family transcriptional regulator

Chain D:  83% 9% . . .



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	58.20Å 58.07Å 65.58Å 82.36° 86.52° 68.31°	Depositor
Resolution (Å)	29.91 – 2.00 29.91 – 2.00	Depositor EDS
% Data completeness (in resolution range)	(Not available) (29.91-2.00) 100.0 (29.91-2.00)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3149.24 (at 2.00Å)	Xtrriage
Refinement program	REFMAC 5.4.0069	Depositor
R, $R_{free}$	0.164 , 0.217 0.307 , 0.061	Depositor DCC
$R_{free}$ test set	2710 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	23.3	Xtrriage
Anisotropy	0.288	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 51.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.61$ , $\langle L^2 \rangle = 0.47$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.88	EDS
Total number of atoms	5485	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	21.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.98% 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

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

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	1.05	0/1254	1.08	3/1696 (0.2%)
1	B	1.13	4/1292 (0.3%)	1.14	11/1742 (0.6%)
1	C	1.11	2/1317 (0.2%)	1.08	7/1776 (0.4%)
1	D	1.05	2/1270 (0.2%)	1.04	6/1715 (0.3%)
All	All	1.09	8/5133 (0.2%)	1.09	27/6929 (0.4%)

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	149	ARG	CB-CG	-7.73	1.31	1.52
1	D	123	CYS	CB-SG	6.56	1.93	1.82
1	B	208	ALA	CA-CB	6.42	1.66	1.52
1	B	190	GLU	CG-CD	5.49	1.60	1.51
1	C	220	GLU	CD-OE1	5.48	1.31	1.25

The worst 5 of 27 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	199	ARG	NE-CZ-NH1	-10.05	115.28	120.30
1	B	101	ARG	NE-CZ-NH1	8.59	124.59	120.30
1	A	163	LEU	CA-CB-CG	7.61	132.79	115.30
1	B	101	ARG	NE-CZ-NH2	-7.48	116.56	120.30
1	D	139	ARG	NE-CZ-NH1	-7.32	116.64	120.30

There are no chirality outliers.

There are no planarity outliers.

## 5.2 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 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	1230	0	1233	17	0
1	B	1268	0	1279	52	0
1	C	1289	0	1301	25	0
1	D	1246	0	1260	28	0
2	A	13	0	5	0	0
2	B	13	0	5	0	0
2	C	13	0	5	0	0
2	D	13	0	5	0	0
3	A	1	0	0	0	0
3	B	2	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	98	0	0	3	0
4	B	105	0	0	6	0
4	C	98	0	0	11	0
4	D	94	0	0	6	0
All	All	5485	0	5093	106	0

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 10.

The worst 5 of 106 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:C:205[B]:ARG:HH11	1:C:205[B]:ARG:HG3	1.02	1.09
1:A:258[A]:LEU:HD22	1:B:104:ARG:NH2	1.69	1.07
1:B:244:ARG:HH12	1:B:246:LEU:CD1	1.71	1.03
1:C:205[B]:ARG:HH11	1:C:205[B]:ARG:CG	1.73	1.01
1:D:223:ARG:NH1	1:D:250:ASP:OD2	1.96	0.98

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	153/162 (94%)	152 (99%)	1 (1%)	0	100	100
1	B	156/162 (96%)	155 (99%)	1 (1%)	0	100	100
1	C	162/162 (100%)	158 (98%)	4 (2%)	0	100	100
1	D	154/162 (95%)	154 (100%)	0	0	100	100
All	All	625/648 (96%)	619 (99%)	6 (1%)	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	127/132 (96%)	123 (97%)	4 (3%)	40	40
1	B	132/132 (100%)	128 (97%)	4 (3%)	41	41
1	C	132/132 (100%)	126 (96%)	6 (4%)	27	24
1	D	128/132 (97%)	122 (95%)	6 (5%)	26	22
All	All	519/528 (98%)	499 (96%)	20 (4%)	34	30

5 of 20 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	119	ARG
1	D	153	MSE
1	D	258	LEU

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Mol	Chain	Res	Type
1	D	220	GLU
1	B	149	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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](#)

Of 9 ligands modelled in this entry, 5 are monoatomic - leaving 4 for Mogul analysis.

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	FLC	A	301	-	3,12,12	1.99	2 (66%)	3,17,17	1.63	1 (33%)
2	FLC	B	301	-	3,12,12	1.85	1 (33%)	3,17,17	2.49	2 (66%)
2	FLC	C	301	-	3,12,12	1.64	1 (33%)	3,17,17	3.61	2 (66%)
2	FLC	D	301	-	3,12,12	1.50	1 (33%)	3,17,17	1.52	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	FLC	A	301	-	-	0/6/16/16	-
2	FLC	B	301	-	-	0/6/16/16	-
2	FLC	C	301	-	-	0/6/16/16	-
2	FLC	D	301	-	-	0/6/16/16	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	301	FLC	CG-CB	-2.74	1.51	1.54
2	A	301	FLC	CG-CB	-2.44	1.51	1.54
2	A	301	FLC	CA-CB	-2.19	1.51	1.54
2	D	301	FLC	CG-CB	-2.18	1.51	1.54
2	C	301	FLC	CG-CB	-2.15	1.51	1.54

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	301	FLC	CB-CG-CGC	-5.01	106.97	114.98
2	C	301	FLC	CB-CA-CAC	-3.76	108.96	114.98
2	B	301	FLC	CB-CG-CGC	-3.43	109.49	114.98
2	B	301	FLC	CB-CA-CAC	-2.57	110.86	114.98
2	A	301	FLC	CB-CA-CAC	-2.06	111.69	114.98

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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

### 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.