



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jul 3, 2017 – 10:34 PM EDT

PDB ID : 2Y3P  
Title : Crystal structure of N-terminal domain of GyrA with the antibiotic simocyclinone D8  
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Deposited on : unknown  
Resolution : 2.62 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
Mogul	:	1.7.2 (RC1), CSD as538be (2017)
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

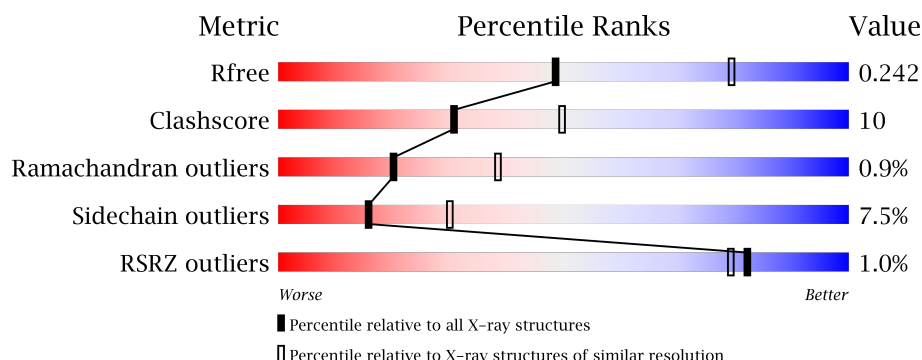
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.62 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	2983 (2.64-2.60)
Clashscore	112137	3351 (2.64-2.60)
Ramachandran outliers	110173	3298 (2.64-2.60)
Sidechain outliers	110143	3298 (2.64-2.60)
RSRZ outliers	101464	2992 (2.64-2.60)

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	522	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%; text-align: center;">%</div> <div style="position: absolute; top: 10px; left: 0; width: 100%; text-align: center;">69% 23% • 5%</div> </div> </div>
1	B	522	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%; text-align: center;">%</div> <div style="position: absolute; top: 10px; left: 0; width: 100%; text-align: center;">75% 20% • •</div> </div> </div>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 7953 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.

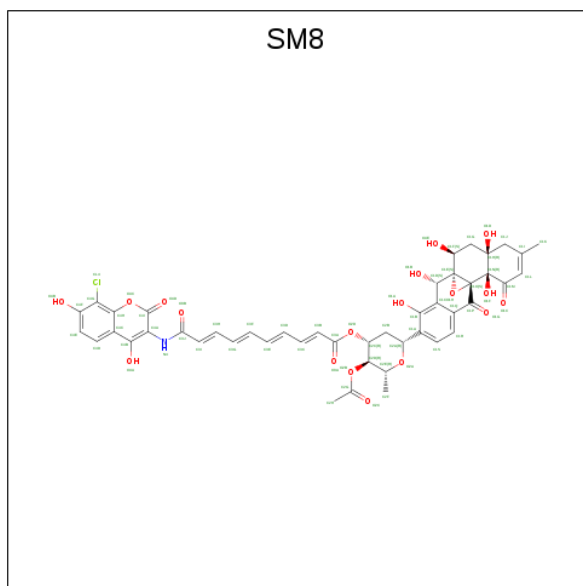
- Molecule 1 is a protein called DNA GYRASE SUBUNIT A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	496	Total	C	N	O	S	0	0	0
			3845	2415	688	727	15			
1	B	506	Total	C	N	O	S	0	0	0
			3876	2436	694	731	15			

- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	2	Total	Mg	0	0
			2	2		
2	A	2	Total	Mg	0	0
			2	2		

- Molecule 3 is SIMOCYCLINONE D8 (three-letter code: SM8) (formula: C<sub>46</sub>H<sub>42</sub>ClNO<sub>18</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 66	C 46	Cl 1	N 1	O 18	0	0
3	B	1	Total 66	C 46	Cl 1	N 1	O 18	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	46	Total 46	O 46	0	0
4	B	50	Total 50	O 50	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	143.91Å 153.09Å 177.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	27.47 – 2.62 27.47 – 2.62	Depositor EDS
% Data completeness (in resolution range)	99.7 (27.47-2.62) 99.7 (27.47-2.62)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.35 (at 2.61Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.202 , 0.241 0.204 , 0.242	Depositor DCC
$R_{free}$ test set	2967 reflections (5.30%)	DCC
Wilson B-factor (Å <sup>2</sup> )	44.5	Xtriage
Anisotropy	0.102	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 50.6	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	7953	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.20% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, SM8

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	0.88	1/3906 (0.0%)	0.91	5/5296 (0.1%)
1	B	0.88	4/3938 (0.1%)	0.90	1/5344 (0.0%)
All	All	0.88	5/7844 (0.1%)	0.90	6/10640 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	201	GLU	CG-CD	6.72	1.62	1.51
1	B	168	VAL	CB-CG2	-5.70	1.40	1.52
1	A	168	VAL	CB-CG2	-5.67	1.41	1.52
1	B	314	GLU	CG-CD	5.12	1.59	1.51
1	B	201	GLU	CB-CG	5.04	1.61	1.52

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	121	ARG	NE-CZ-NH2	-6.58	117.01	120.30
1	A	475	LEU	CA-CB-CG	6.11	129.35	115.30
1	A	297	ASP	CB-CA-C	-5.29	99.83	110.40
1	B	461	LEU	CA-CB-CG	5.24	127.36	115.30
1	A	38	ARG	CG-CD-NE	5.23	122.79	111.80

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	297	ASP	Peptide

## 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	3845	0	3808	91	0
1	B	3876	0	3801	72	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	66	0	39	2	0
3	B	66	0	38	1	0
4	A	46	0	0	3	0
4	B	50	0	0	0	0
All	All	7953	0	7686	161	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 161 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:68:ARG:HG3	1:A:68:ARG:HH11	0.98	1.11
1:A:387:LEU:O	1:A:390:ILE:HG13	1.66	0.96
1:A:38:ARG:HG3	1:A:38:ARG:HH11	1.30	0.95
1:A:68:ARG:CG	1:A:68:ARG:HH11	1.81	0.94
1:A:68:ARG:NH1	1:A:68:ARG:HG3	1.79	0.93

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	492/522 (94%)	452 (92%)	36 (7%)	4 (1%)	22	42
1	B	502/522 (96%)	466 (93%)	31 (6%)	5 (1%)	18	35
All	All	994/1044 (95%)	918 (92%)	67 (7%)	9 (1%)	20	38

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	418	GLY
1	A	401	PRO
1	B	83	SER
1	A	83	SER
1	B	464	GLN

### 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	396/437 (91%)	367 (93%)	29 (7%)	16	32
1	B	392/437 (90%)	362 (92%)	30 (8%)	15	28
All	All	788/874 (90%)	729 (92%)	59 (8%)	16	30

5 of 59 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	474	LEU

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Mol	Chain	Res	Type
1	B	57	ASN
1	B	467	THR
1	A	510	ARG
1	B	20	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	454	GLN
1	B	471	HIS
1	B	453	GLN
1	A	389	ASN
1	B	419	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](#)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 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
3	SM8	A	901	2	65,73,73	2.07	11 (16%)	72,115,115	1.98	18 (25%)
3	SM8	B	901	2	65,73,73	2.10	10 (15%)	72,115,115	2.00	20 (27%)

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
3	SM8	A	901	2	-	0/27/119/119	0/7/8/8
3	SM8	B	901	2	-	0/27/119/119	0/7/8/8

The worst 5 of 21 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	901	SM8	C3I-C3J	-7.47	1.34	1.48
3	B	901	SM8	C3I-C3J	-7.37	1.34	1.48
3	B	901	SM8	C3B-C3A	-6.03	1.34	1.48
3	A	901	SM8	C3B-C3A	-5.97	1.34	1.48
3	A	901	SM8	C3F-C3E	-3.86	1.33	1.44

The worst 5 of 38 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	901	SM8	C1I-C1L-C1M	-6.44	116.70	123.19
3	A	901	SM8	C2C-O2D-C3A	-5.79	109.19	117.61
3	B	901	SM8	C2D-O2B-C2G	-4.81	110.18	117.72
3	A	901	SM8	C2D-O2B-C2G	-4.20	111.14	117.72
3	A	901	SM8	C3E-C3F-C3G	-4.03	115.82	124.88

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	901	SM8	2	0
3	B	901	SM8	1	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	496/522 (95%)	-0.40	6 (1%) 79 75	29, 48, 92, 106	0
1	B	506/522 (96%)	-0.43	4 (0%) 86 83	28, 47, 90, 113	0
All	All	1002/1044 (95%)	-0.42	10 (0%) 82 79	28, 48, 91, 113	0

The worst 5 of 10 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	399	HIS	3.8
1	A	24	TYR	3.0
1	A	445	ASP	2.8
1	B	445	ASP	2.6
1	B	19	SER	2.6

### 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](#)

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, 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	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	SM8	B	901	66/66	0.87	0.20	0.49	33,51,57,63	0
3	SM8	A	901	66/66	0.88	0.18	0.35	34,51,61,67	0
2	MG	B	952	1/1	0.95	0.26	-	31,31,31,31	0
2	MG	A	952	1/1	0.96	0.17	-	37,37,37,37	0
2	MG	B	951	1/1	0.97	0.09	-	60,60,60,60	0
2	MG	A	951	1/1	0.91	0.05	-	58,58,58,58	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.