



# wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 6P7L  
Title : 1.8 Angstrom structure of Aln2 from Streptomyces sp. CM020  
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Deposited on : 2019-06-06  
Resolution : 1.80 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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35.1  
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) : 2.35.1

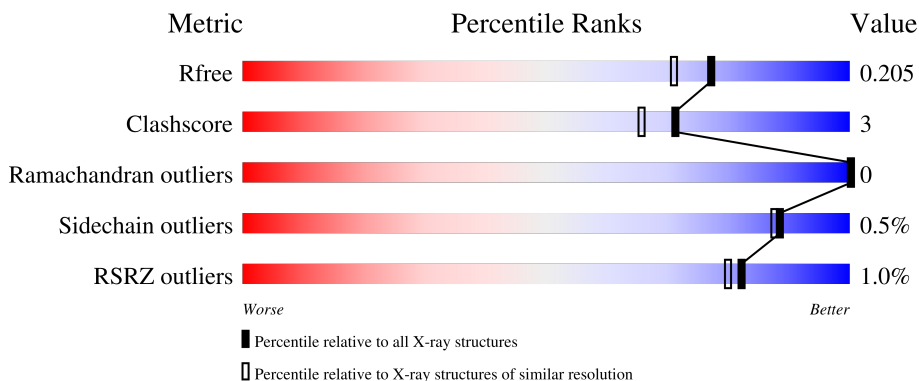
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.80 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.



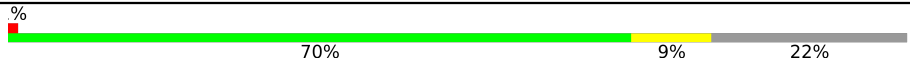
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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  $\leq 5\%$ . 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	172	
1	B	172	
1	C	172	
1	D	172	
1	E	172	

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Mol	Chain	Length	Quality of chain
1	F	172	 <p>A horizontal bar chart representing the quality of the chain. The bar is divided into three segments: a green segment on the left labeled '70%', a yellow segment in the middle labeled '9%', and a grey segment on the right labeled '22%'. A small red square is positioned at the beginning of the bar, with a '%' symbol above it.</p>

## 2 Entry composition [i](#)

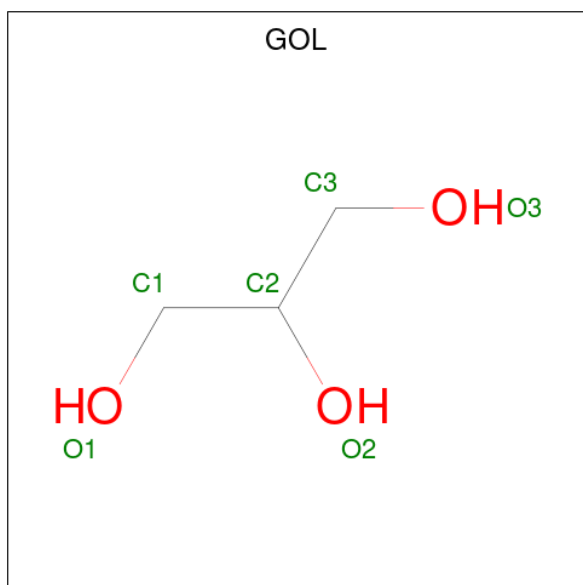
There are 3 unique types of molecules in this entry. The entry contains 12923 atoms, of which 6073 are hydrogens and 0 are deuteriums.

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 Aln2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	140	Total 2096	C 665	H 1033	N 192	O 201	S 5	0	0	0
1	B	137	Total 2084	C 661	H 1027	N 189	O 202	S 5	0	0	0
1	C	138	Total 2079	C 661	H 1023	N 190	O 200	S 5	0	0	0
1	D	137	Total 2047	C 655	H 1003	N 186	O 198	S 5	0	0	0
1	E	137	Total 2050	C 656	H 1005	N 186	O 198	S 5	0	0	0
1	F	135	Total 1996	C 641	H 974	N 180	O 196	S 5	0	0	0

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).

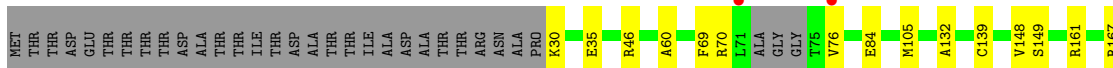


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	114	Total	O	0	0
			114	114		
3	B	89	Total	O	0	0
			89	89		
3	C	113	Total	O	0	0
			113	113		
3	D	80	Total	O	0	0
			80	80		
3	E	77	Total	O	0	0
			77	77		
3	F	84	Total	O	0	0
			84	84		





ALA  
ARG  
THR  
GLN  
GLY

## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	50.20Å 84.93Å 104.66Å 90.00° 100.11° 90.00°	Depositor
Resolution (Å)	42.72 – 1.80 42.72 – 1.80	Depositor EDS
% Data completeness (in resolution range)	97.9 (42.72-1.80) 97.9 (42.72-1.80)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.87 (at 1.81Å)	Xtrriage
Refinement program	PHENIX 1.16_3549, PHENIX 1.16_3549	Depositor
R, $R_{free}$	0.163 , 0.205 0.163 , 0.205	Depositor DCC
$R_{free}$ test set	3947 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	18.8	Xtrriage
Anisotropy	0.075	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.43 , 58.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	12923	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	32.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.28% 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:  
GOL

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	0.56	1/1083 (0.1%)	0.75	1/1469 (0.1%)
1	B	0.50	0/1076	0.68	0/1458
1	C	0.53	0/1075	0.73	2/1456 (0.1%)
1	D	0.45	0/1063	0.70	1/1442 (0.1%)
1	E	0.56	1/1064 (0.1%)	0.75	2/1443 (0.1%)
1	F	0.51	0/1041	0.73	1/1414 (0.1%)
All	All	0.52	2/6402 (0.0%)	0.72	7/8682 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	75	THR	CB-CG2	-9.54	1.20	1.52
1	A	70	ARG	CG-CD	-5.12	1.39	1.51

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	105	MET	CG-SD-CE	-10.04	84.13	100.20
1	C	105	MET	CG-SD-CE	-9.38	85.19	100.20
1	F	105	MET	CG-SD-CE	-8.52	86.58	100.20
1	A	105	MET	CG-SD-CE	-8.50	86.60	100.20
1	E	75	THR	OG1-CB-CG2	-7.35	93.09	110.00

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	1063	1033	1033	7	0
1	B	1057	1027	1027	7	0
1	C	1056	1023	1023	8	0
1	D	1044	1003	1010	6	0
1	E	1045	1005	1012	8	0
1	F	1022	974	974	10	0
2	A	6	8	8	1	0
3	A	114	0	0	1	0
3	B	89	0	0	3	1
3	C	113	0	0	4	0
3	D	80	0	0	4	1
3	E	77	0	0	2	0
3	F	84	0	0	5	0
All	All	6850	6073	6087	43	1

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 3.

The worst 5 of 43 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:105:MET:SD	3:D:263:HOH:O	2.19	0.99
1:B:71:LEU:HD12	1:B:75:THR:HG23	1.51	0.93
1:B:167:ARG:NH2	3:B:202:HOH:O	2.15	0.80
1:F:30:LYS:N	3:F:202:HOH:O	2.16	0.79
1:B:65:ALA:O	3:B:201:HOH:O	2.01	0.78

All (1) 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)
3:B:278:HOH:O	3:D:256:HOH:O[1_545]	2.17	0.03

## 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	138/172 (80%)	138 (100%)	0	0	100	100
1	B	133/172 (77%)	133 (100%)	0	0	100	100
1	C	134/172 (78%)	134 (100%)	0	0	100	100
1	D	133/172 (77%)	133 (100%)	0	0	100	100
1	E	133/172 (77%)	132 (99%)	1 (1%)	0	100	100
1	F	131/172 (76%)	129 (98%)	2 (2%)	0	100	100
All	All	802/1032 (78%)	799 (100%)	3 (0%)	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	107/135 (79%)	107 (100%)	0	100	100
1	B	109/135 (81%)	109 (100%)	0	100	100
1	C	107/135 (79%)	107 (100%)	0	100	100
1	D	106/135 (78%)	106 (100%)	0	100	100
1	E	106/135 (78%)	104 (98%)	2 (2%)	57	46
1	F	103/135 (76%)	102 (99%)	1 (1%)	76	71
All	All	638/810 (79%)	635 (100%)	3 (0%)	88	87

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	30	LYS
1	E	69	PHE
1	F	69	PHE

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](#)

1 ligand is 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	201	-	5,5,5	0.97	0	5,5,5	0.80	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	201	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	201	GOL	C1-C2-C3-O3
2	A	201	GOL	O2-C2-C3-O3

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	201	GOL	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	140/172 (81%)	-0.21	1 (0%) 87 86	13, 19, 56, 71	0
1	B	137/172 (79%)	0.01	3 (2%) 62 57	14, 25, 60, 75	0
1	C	138/172 (80%)	-0.27	0 100 100	12, 21, 53, 67	0
1	D	137/172 (79%)	-0.07	2 (1%) 73 70	14, 25, 56, 72	0
1	E	137/172 (79%)	-0.13	0 100 100	14, 25, 62, 74	0
1	F	135/172 (78%)	-0.16	2 (1%) 73 70	14, 25, 59, 80	0
All	All	824/1032 (79%)	-0.14	8 (0%) 82 80	12, 23, 60, 80	0

The worst 5 of 8 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	76	VAL	3.0
1	D	168	ALA	2.8
1	F	71	LEU	2.7
1	B	75	THR	2.6
1	A	71	LEU	2.5

### 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(Å <sup>2</sup> )	Q<0.9
2	GOL	A	201	6/6	0.94	0.17	21,60,106,127	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.