



# wwPDB X-ray Structure Validation Summary Report ⓘ

Sep 14, 2020 – 02:38 AM BST

PDB ID : 6JCB  
Title : Crystal structure of aminotransferase CrmG from Actinoalloteichus sp. WH1-2216-6 in C2 space group  
Authors : Xu, J.; Liu, J.  
Deposited on : 2019-01-28  
Resolution : 2.85 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
Xtriage (Phenix)	:	1.13
EDS	:	2.14.4.dev1
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)	:	2.14.4.dev1

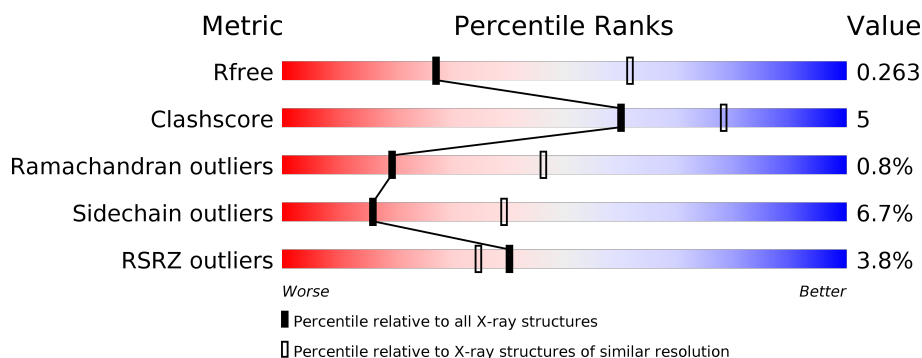
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.85 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	3168 (2.90-2.82)
Clashscore	141614	3438 (2.90-2.82)
Ramachandran outliers	138981	3348 (2.90-2.82)
Sidechain outliers	138945	3351 (2.90-2.82)
RSRZ outliers	127900	3103 (2.90-2.82)

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 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	523	<div> <div>2%</div> <div> <div></div> <div>79%</div> <div>12%</div> <div>•</div> <div>7%</div> </div> </div>
1	B	523	<div> <div>5%</div> <div> <div></div> <div>79%</div> <div>11%</div> <div>•</div> <div>8%</div> </div> </div>
1	C	523	<div> <div>5%</div> <div> <div></div> <div>81%</div> <div>11%</div> <div>•</div> <div>7%</div> </div> </div>
1	D	523	<div> <div>2%</div> <div> <div></div> <div>80%</div> <div>11%</div> <div>•</div> <div>7%</div> </div> </div>

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 15140 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 CrmG.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	486	Total	C	N	O	S	0	0	0
			3752	2341	680	720	11			
1	C	487	Total	C	N	O	S	0	0	0
			3759	2348	681	719	11			
1	B	483	Total	C	N	O	S	0	0	0
			3735	2331	677	716	11			
1	D	489	Total	C	N	O	S	0	0	0
			3775	2357	685	722	11			

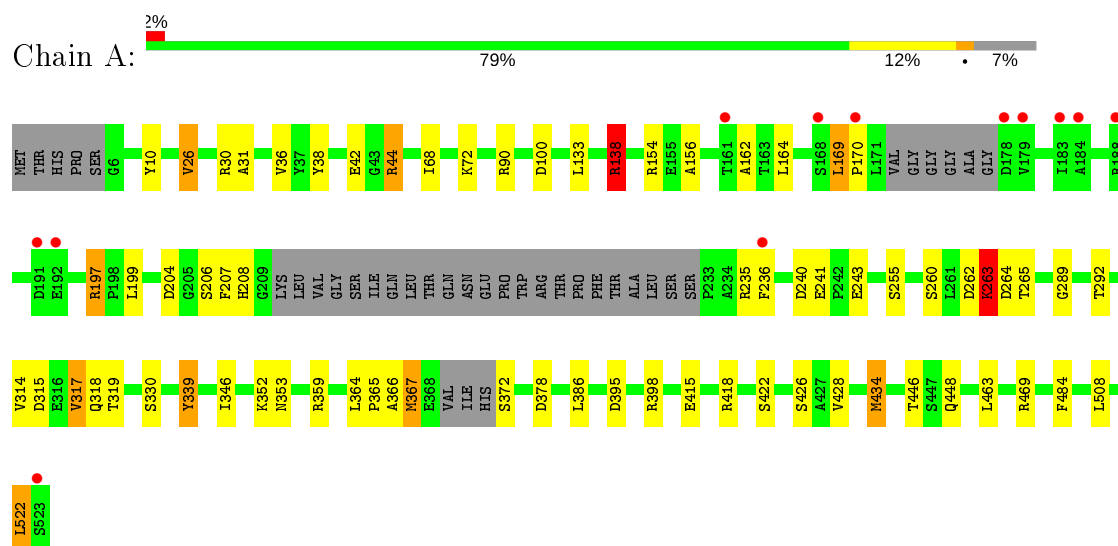
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	44	Total	O	0	0
			44	44		
2	C	21	Total	O	0	0
			21	21		
2	B	23	Total	O	0	0
			23	23		
2	D	31	Total	O	0	0
			31	31		

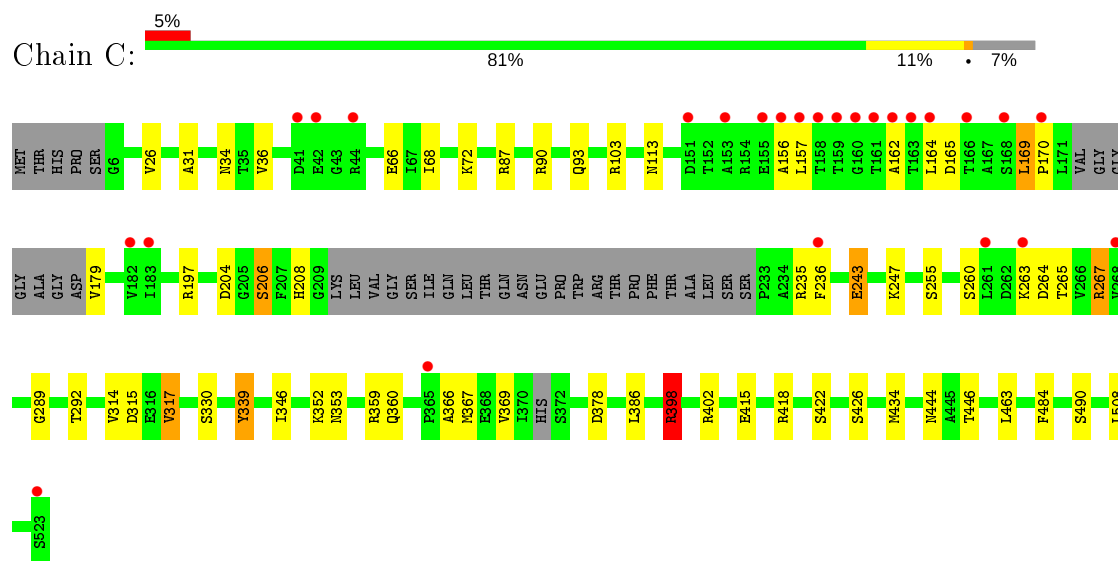
### 3 Residue-property plots [i](#)

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.

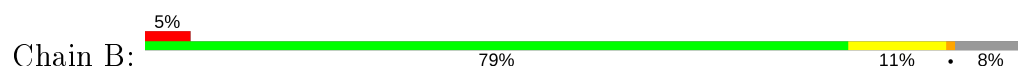
#### • Molecule 1: CrmG

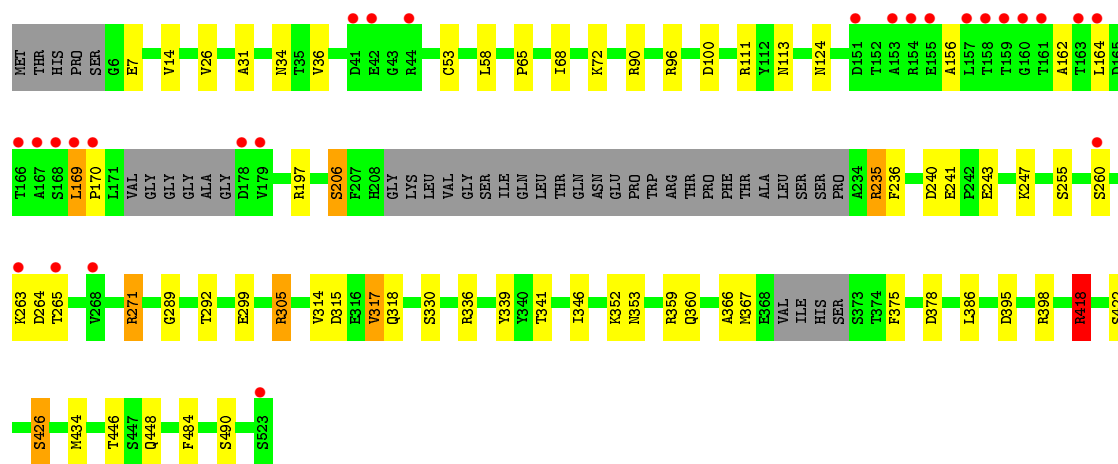


#### • Molecule 1: CrmG

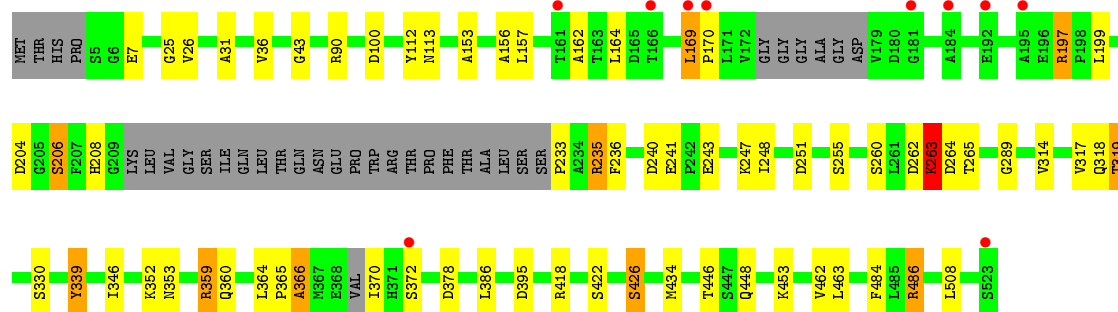
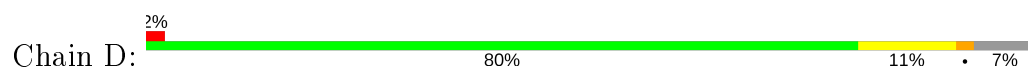


#### • Molecule 1: CrmG





• Molecule 1: CrmG



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	122.13Å 114.83Å 156.17Å 90.00° 92.16° 90.00°	Depositor
Resolution (Å)	18.00 – 2.85 38.87 – 2.85	Depositor EDS
% Data completeness (in resolution range)	92.8 (18.00-2.85) 93.2 (38.87-2.85)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.48 (at 2.86Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, $R_{free}$	0.210 , 0.262 0.214 , 0.263	Depositor DCC
$R_{free}$ test set	2342 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	35.9	Xtriage
Anisotropy	0.018	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 43.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.105 for -h,-k,l	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	15140	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 48.40 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.6448e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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	0.72	0/3811	0.86	2/5153 (0.0%)
1	B	0.72	0/3793	0.87	3/5129 (0.1%)
1	C	0.72	0/3818	0.87	2/5163 (0.0%)
1	D	0.72	0/3835	0.87	2/5186 (0.0%)
All	All	0.72	0/15257	0.87	9/20631 (0.0%)

There are no bond length outliers.

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	305	ARG	CG-CD-NE	-5.89	99.42	111.80
1	A	138	ARG	CG-CD-NE	5.71	123.80	111.80
1	C	398	ARG	NE-CZ-NH2	5.38	122.99	120.30
1	A	339	TYR	CB-CG-CD1	5.25	124.15	121.00
1	B	96	ARG	CG-CD-NE	5.24	122.80	111.80

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	3752	0	3721	41	0
1	B	3735	0	3705	34	0
1	C	3759	0	3737	32	0
1	D	3775	0	3749	42	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	44	0	0	1	0
2	B	23	0	0	0	0
2	C	21	0	0	1	0
2	D	31	0	0	1	0
All	All	15140	0	14912	138	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 5.

The worst 5 of 138 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:319:THR:HA	1:A:434:MET:CE	1.89	1.01
1:A:42:GLU:HB2	1:A:44:ARG:HD3	1.45	0.98
1:B:271:ARG:HH11	1:B:271:ARG:HG2	1.27	0.98
1:D:113:ASN:ND2	1:D:360:GLN:HE21	1.78	0.80
1:C:113:ASN:ND2	1:C:360:GLN:HE21	1.79	0.79

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	478/523 (91%)	446 (93%)	28 (6%)	4 (1%)	19	46
1	B	475/523 (91%)	444 (94%)	27 (6%)	4 (1%)	19	46
1	C	479/523 (92%)	448 (94%)	28 (6%)	3 (1%)	25	53
1	D	481/523 (92%)	449 (93%)	28 (6%)	4 (1%)	19	46
All	All	1913/2092 (91%)	1787 (93%)	111 (6%)	15 (1%)	19	46

5 of 15 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	156	ALA
1	A	366	ALA
1	A	367	MET
1	C	156	ALA
1	C	366	ALA

### 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	392/422 (93%)	361 (92%)	31 (8%)	12	31
1	B	390/422 (92%)	363 (93%)	27 (7%)	15	38
1	C	393/422 (93%)	368 (94%)	25 (6%)	17	41
1	D	395/422 (94%)	373 (94%)	22 (6%)	21	47
All	All	1570/1688 (93%)	1465 (93%)	105 (7%)	16	39

5 of 105 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	359	ARG
1	B	100	ASP
1	D	319	THR
1	C	367	MET
1	C	426	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	B	113	ASN
1	D	448	GLN
1	B	401	GLN
1	C	444	ASN
1	B	124	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](#)

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	486/523 (92%)	-0.20	12 (2%) 57 54	18, 33, 79, 119	0
1	B	483/523 (92%)	-0.10	26 (5%) 25 21	18, 34, 82, 108	0
1	C	487/523 (93%)	-0.15	26 (5%) 26 22	17, 31, 75, 97	0
1	D	489/523 (93%)	-0.20	10 (2%) 65 62	18, 33, 85, 121	0
All	All	1945/2092 (92%)	-0.16	74 (3%) 40 35	17, 33, 81, 121	0

The worst 5 of 74 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	157	LEU	5.3
1	C	161	THR	4.6
1	B	159	THR	4.5
1	B	161	THR	4.4
1	B	158	THR	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 monosaccharides 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.