



# Full wwPDB X-ray Structure Validation Report ⓘ

May 25, 2020 – 07:51 am BST

PDB ID : 6FLK  
Title : Crystal structure of Cep120 C2C domain  
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Deposited on : 2018-01-26  
Resolution : 1.60 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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  
Xtrriage (Phenix) : 1.13  
EDS : 2.11  
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) : 2.11

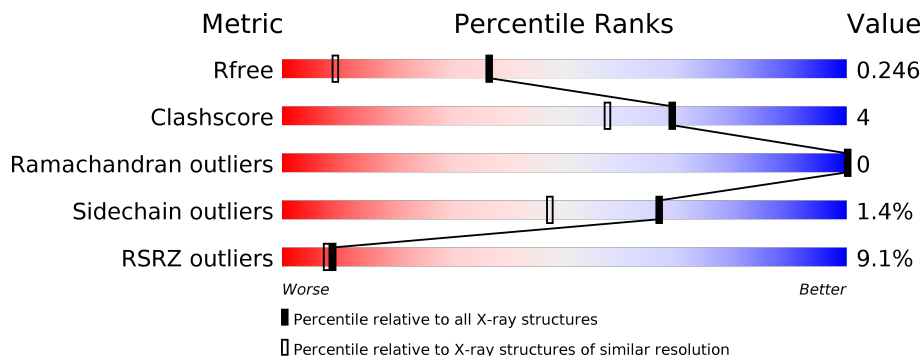
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.60 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	3398 (1.60-1.60)
Clashscore	141614	3665 (1.60-1.60)
Ramachandran outliers	138981	3564 (1.60-1.60)
Sidechain outliers	138945	3563 (1.60-1.60)
RSRZ outliers	127900	3321 (1.60-1.60)

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 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	163	
1	B	163	

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 5464 atoms, of which 2520 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 Cep120.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	154	2521	822	1252	213	226	8	0	3	0
1	B	154	2559	835	1268	220	228	8	0	4	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	448	GLY	-	expression tag	UNP Q8N960
A	449	PRO	-	expression tag	UNP Q8N960
B	448	GLY	-	expression tag	UNP Q8N960
B	449	PRO	-	expression tag	UNP Q8N960

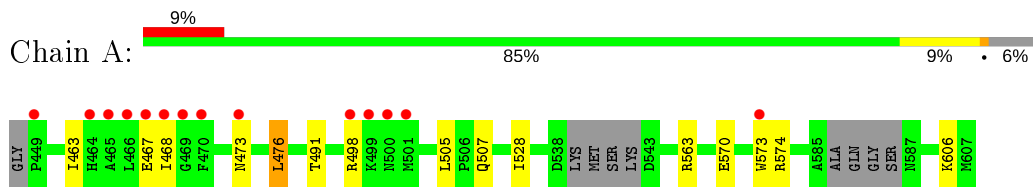
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	198	Total	O	0	0
			198	198		
2	B	186	Total	O	0	0
			186	186		

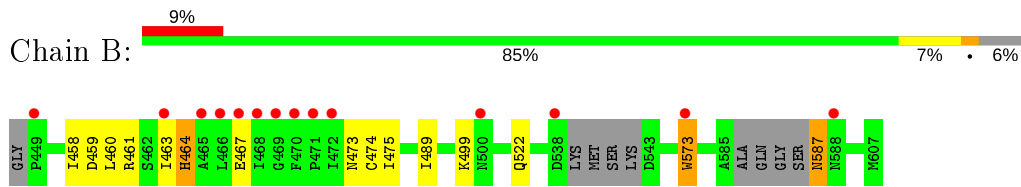
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Cep120



- Molecule 1: Cep120



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	32.40Å 40.95Å 69.13Å 102.47° 98.07° 89.92°	Depositor
Resolution (Å)	39.97 – 1.60 39.97 – 1.60	Depositor EDS
% Data completeness (in resolution range)	75.9 (39.97-1.60) 93.8 (39.97-1.60)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.56 (at 1.60Å)	Xtrriage
Refinement program	PHENIX (dev_2863: ???)	Depositor
R, $R_{free}$	0.197 , 0.246 0.197 , 0.246	Depositor DCC
$R_{free}$ test set	2127 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	15.1	Xtrriage
Anisotropy	0.362	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 54.9	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	0.95	EDS
Total number of atoms	5464	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	23.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.91% 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	0.91	1/1309 (0.1%)	1.14	4/1777 (0.2%)
1	B	1.13	8/1332 (0.6%)	1.26	1/1807 (0.1%)
All	All	1.03	9/2641 (0.3%)	1.20	5/3584 (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	B	0	1

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	522[A]	GLN	N-CA	6.44	1.59	1.46
1	B	522[B]	GLN	N-CA	6.44	1.59	1.46
1	B	460	LEU	C-N	-6.28	1.19	1.34
1	B	573[A]	TRP	N-CA	5.92	1.58	1.46
1	B	573[B]	TRP	N-CA	5.92	1.58	1.46
1	B	463	ILE	C-N	-5.38	1.21	1.34
1	B	522[A]	GLN	CA-C	5.20	1.66	1.52
1	B	522[B]	GLN	CA-C	5.20	1.66	1.52
1	A	528	ILE	C-N	5.07	1.43	1.34

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	491	THR	O-C-N	-6.53	112.26	122.70
1	B	473	ASN	N-CA-C	-6.33	93.92	111.00
1	A	468	ILE	N-CA-C	-5.08	97.28	111.00
1	A	476	LEU	O-C-N	-5.03	114.65	122.70
1	A	473	ASN	N-CA-C	-5.00	97.49	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	464[A]	HIS	Mainchain

## 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	1269	1252	1254	9	1
1	B	1291	1268	1271	10	1
2	A	198	0	0	2	0
2	B	186	0	0	0	0
All	All	2944	2520	2525	19	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 4.

All (19) 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:606:LYS:HA	2:A:705:HOH:O	1.77	0.82
1:B:467:GLU:HG2	1:B:467:GLU:O	2.05	0.56
1:B:464[B]:HIS:N	1:B:464[B]:HIS:ND1	2.56	0.53
1:B:475:ILE:C	1:B:475:ILE:HD12	2.28	0.52
1:A:574:ARG:NH2	2:A:701:HOH:O	2.35	0.52
1:B:459:ASP:OD2	1:B:461[A]:ARG:NH2	2.43	0.52
1:B:587:ASN:OD1	1:B:587:ASN:N	2.42	0.52
1:A:476:LEU:HD22	1:A:505:LEU:HD13	1.93	0.49
1:A:563[B]:ARG:NH1	1:A:573[B]:TRP:CE2	2.81	0.48
1:B:461[B]:ARG:CZ	1:B:461[B]:ARG:HB3	2.46	0.45
1:A:570:GLU:OE1	1:A:606:LYS:NZ	2.47	0.42
1:B:461[B]:ARG:CZ	1:B:461[B]:ARG:CB	2.98	0.42
1:A:463:ILE:HG23	1:A:463:ILE:O	2.19	0.42
1:A:467:GLU:HG3	1:A:467:GLU:O	2.20	0.41
1:A:507:GLN:HG2	1:A:507:GLN:O	2.21	0.40
1:A:463:ILE:O	1:A:463:ILE:CG2	2.70	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:461[A]:ARG:NH2	1:B:461[A]:ARG:HG2	2.35	0.40

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)
1:A:498:ARG:HH22	1:B:499:LYS:O[1_554]	1.58	0.02

## 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	151/163 (93%)	149 (99%)	2 (1%)	0	100	100
1	B	153/163 (94%)	151 (99%)	2 (1%)	0	100	100
All	All	304/326 (93%)	300 (99%)	4 (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	143/146 (98%)	143 (100%)	0	100	100
1	B	145/146 (99%)	141 (97%)	4 (3%)	43	18

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	288/292 (99%)	284 (99%)	4 (1%)	67 47

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	458	ILE
1	B	474	CYS
1	B	489	ILE
1	B	587	ASN

Some 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 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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	B	3

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	B	460:LEU	C	461[C]:ARG	N	1.19
1	B	460:LEU	C	461[A]:ARG	N	1.19
1	B	460:LEU	C	461[B]:ARG	N	1.18

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

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	154/163 (94%)	0.46	14 (9%) 9 8	11, 17, 44, 64	0
1	B	154/163 (94%)	0.51	14 (9%) 9 8	11, 17, 41, 59	0
All	All	308/326 (94%)	0.49	28 (9%) 9 8	11, 17, 44, 64	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	468	ILE	10.3
1	B	468	ILE	6.7
1	B	469	GLY	5.9
1	B	467	GLU	5.7
1	A	500	ASN	4.6
1	B	470	PHE	4.5
1	A	470	PHE	4.5
1	B	500	ASN	4.3
1	A	467	GLU	4.3
1	A	466	LEU	4.0
1	B	466	LEU	3.1
1	A	469	GLY	3.0
1	A	498	ARG	2.9
1	B	465	ALA	2.8
1	A	501	MET	2.7
1	B	472	ILE	2.7
1	A	499	LYS	2.7
1	B	449	PRO	2.7
1	A	465	ALA	2.6
1	A	449	PRO	2.5
1	B	573[A]	TRP	2.5
1	B	538	ASP	2.4
1	A	473	ASN	2.3
1	B	588	ASN	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	463	ILE	2.2
1	B	471	PRO	2.2
1	A	464	HIS	2.1
1	A	573[A]	TRP	2.0

## 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.