wwPDB X-ray Structure Validation Summary Report (i)

May 21, 2020 – 12:58 am BST

PDB ID	:	6JRP
Title	:	Crystal structure of CIC-HMG-ETV5-DNA complex
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Deposited on	:	2019-04-05
Resolution	:	3.00 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The following versions of software and data (see references (i)) 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	:	2.11
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 3.00 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.
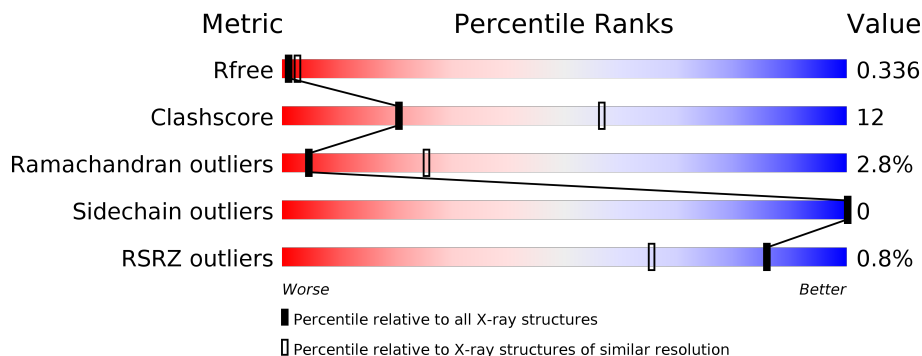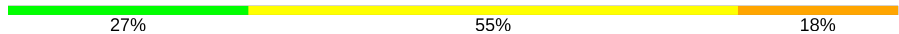
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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 on the lower bar indicate the fraction of residues that contain outliers for >=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 <=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	80	74% 19% 8%
1	D	80	76% 15% • 8%
1	G	80	3% 54% 38% • 8%
1	J	80	% 63% 29% • 8%
2	B	11	73% 27%
2	E	11	73% 27%

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Mol	Chain	Length	Quality of chain
2	H	11	9% 91%
2	K	11	18% 82%
3	C	11	55% 27% 18%
3	F	11	64% 36%
3	I	11	55% 45%
3	L	11	27% 55% 18%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 4360 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 Protein capicua homolog.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	74	Total	C	N	O	S	Se	0	0	0
			644	415	127	99	1	2			
1	D	74	Total	C	N	O	S	Se	0	0	0
			644	415	127	99	1	2			
1	G	74	Total	C	N	O	S	Se	0	0	0
			644	415	127	99	1	2			
1	J	74	Total	C	N	O	S	Se	0	0	0
			644	415	127	99	1	2			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	197	GLY	-	expression tag	UNP Q96RK0
A	198	SER	-	expression tag	UNP Q96RK0
D	197	GLY	-	expression tag	UNP Q96RK0
D	198	SER	-	expression tag	UNP Q96RK0
G	197	GLY	-	expression tag	UNP Q96RK0
G	198	SER	-	expression tag	UNP Q96RK0
J	197	GLY	-	expression tag	UNP Q96RK0
J	198	SER	-	expression tag	UNP Q96RK0

- Molecule 2 is a DNA chain called DNA (5'-D(*AP*TP*GP*AP*AP*TP*GP*AP*AP*AP* A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	11	Total	C	N	O	P	0	0	0
			228	110	49	59	10			
2	E	11	Total	C	N	O	P	0	0	0
			228	110	49	59	10			
2	H	11	Total	C	N	O	P	0	0	0
			228	110	49	59	10			
2	K	11	Total	C	N	O	P	0	0	0
			230	110	49	61	10			

- Molecule 3 is a DNA chain called DNA (5'-D(*TP*TP*TP*TP*CP*AP*TP*TP*CP*AP*T)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	11	Total	C	N	O	P	0	0	0
			217	108	30	69	10			
3	F	11	Total	C	N	O	P	0	0	0
			217	108	30	69	10			
3	I	11	Total	C	N	O	P	0	0	0
			217	108	30	69	10			
3	L	11	Total	C	N	O	P	0	0	0
			219	108	30	71	10			

3 Residue-property plots ⓘ

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: Protein capicua homolog

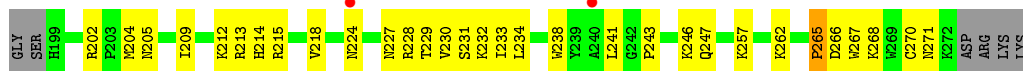- Molecule 1: Protein capicua homolog

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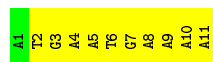
- Molecule 2: DNA (5'-D(*AP*TP*GP*AP*AP*TP*GP*AP*AP*AP*A)-3')

- Molecule 2: DNA (5'-D(*AP*TP*GP*AP*AP*TP*GP*AP*AP*AP*A)-3')

Chain E:

73% 27%

A1 A5 T6 G7 A11

• Molecule 2: DNA (5'-D(*AP*TP*GP*AP*AP*TP*GP*AP*AP*AP*A)-3')

Chain H:

9% 91%

A1 T2 G3 A4 A5 T6 G7 A8 A9 A10 A11

• Molecule 2: DNA (5'-D(*AP*TP*GP*AP*AP*TP*GP*AP*AP*AP*A)-3')

Chain K:

18% 82%

A1 T2 G3 T6 G7 A8 A9 A10 A11

• Molecule 3: DNA (5'-D(*TP*TP*TP*TP*CP*AP*TP*TP*CP*AP*T)-3')

Chain C:

55% 27% 18%

T1 T2 T3 T4 C5 C9 A10 T11

• Molecule 3: DNA (5'-D(*TP*TP*TP*TP*CP*AP*TP*TP*CP*AP*T)-3')

Chain F:

64% 36%
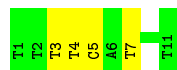
T1 T2 T3 T4 C5 A6 T7 T11

• Molecule 3: DNA (5'-D(*TP*TP*TP*TP*CP*AP*TP*TP*CP*AP*T)-3')

Chain I:

55% 45%

T1 T2 T3 T4 C5 T11
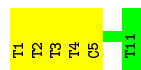
• Molecule 3: DNA (5'-D(*TP*TP*TP*TP*CP*AP*TP*TP*CP*AP*T)-3')

Chain L:

27% 55% 18%

T1 T2 T3 T4 C5 C9 A10 T11

4   Data and refinement statistics   (i)

Property	Value	Source
Space group	P 32	Depositor
Cell constants a, b, c, α, β, γ	66.08Å 66.08Å 158.28Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	38.79 – 3.00 38.79 – 3.00	Depositor EDS
% Data completeness (in resolution range)	99.2 (38.79-3.00) 99.4 (38.79-3.00)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.32 (at 3.01Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.297 , 0.334 0.299 , 0.336	Depositor DCC
R_{free} test set	1522 reflections (9.92%)	wwPDB-VP
Wilson B-factor (Å^2)	30.0	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 15.1	EDS
L-test for twinning[2]	$< |L| > = 0.46, < L^2 > = 0.29$	Xtriage
Estimated twinning fraction	0.015 for -h,-k,l 0.479 for h,-h-k,-l 0.016 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.83	EDS
Total number of atoms	4360	wwPDB-VP
Average B, all atoms (Å^2)	36.0	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 23.37 % 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 4.7238e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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	0.25	0/666	0.47	0/893
1	D	0.22	0/666	0.44	0/893
1	G	0.24	0/666	0.49	0/893
1	J	0.23	0/666	0.49	0/893
2	B	0.49	0/258	0.85	0/397
2	E	0.52	0/258	0.82	0/397
2	H	0.53	0/258	0.87	0/397
2	K	0.51	0/258	0.90	0/397
3	C	0.56	0/240	1.45	3/368 (0.8%)
3	F	0.55	0/240	1.18	0/368
3	I	0.56	0/240	1.17	0/368
3	L	0.57	0/240	1.45	3/368 (0.8%)
All	All	0.39	0/4656	0.83	6/6632 (0.1%)

There are no bond length outliers.

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	L	4	DT	OP1-P-O3'	-11.37	80.18	105.20
3	C	4	DT	OP1-P-O3'	-11.34	80.26	105.20
3	L	4	DT	OP2-P-O3'	-8.82	85.78	105.20
3	C	4	DT	OP2-P-O3'	-8.58	86.32	105.20
3	L	5	DC	OP1-P-OP2	7.63	131.04	119.60

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	644	0	630	11	0
1	D	644	0	630	11	0
1	G	644	0	630	24	0
1	J	644	0	630	19	0
2	B	228	0	125	6	0
2	E	228	0	125	4	0
2	H	228	0	125	13	0
2	K	230	0	125	9	0
3	C	217	0	130	8	0
3	F	217	0	130	5	0
3	I	217	0	130	5	0
3	L	219	0	130	13	0
All	All	4360	0	3540	87	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 12.

The worst 5 of 87 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)
2:K:7:DG:H1	3:L:5:DC:H42	1.21	0.86
2:E:7:DG:H1	3:F:5:DC:H42	1.24	0.85
2:H:7:DG:H1	3:I:5:DC:H42	1.27	0.81
2:B:7:DG:H1	3:C:5:DC:H42	1.28	0.80
1:G:270:CYS:HB3	1:J:268:LYS:HE3	1.65	0.78

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	72/80 (90%)	70 (97%)	1 (1%)	1 (1%)	11	43
1	D	72/80 (90%)	69 (96%)	1 (1%)	2 (3%)	5	25
1	G	72/80 (90%)	64 (89%)	5 (7%)	3 (4%)	3	16
1	J	72/80 (90%)	65 (90%)	5 (7%)	2 (3%)	5	25
All	All	288/320 (90%)	268 (93%)	12 (4%)	8 (3%)	5	25

5 of 8 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	223	PRO
1	D	266	ASP
1	G	266	ASP
1	D	265	PRO
1	G	265	PRO

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	66/69 (96%)	66 (100%)	0	100	100
1	D	66/69 (96%)	66 (100%)	0	100	100
1	G	66/69 (96%)	66 (100%)	0	100	100
1	J	66/69 (96%)	66 (100%)	0	100	100
All	All	264/276 (96%)	264 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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)

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, 95th 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^2)	Q<0.9
1	A	72/80 (90%)	0.10	0	100	100	18, 38, 57, 64	0
1	D	72/80 (90%)	-0.07	0	100	100	19, 34, 56, 62	0
1	G	72/80 (90%)	0.28	2 (2%)	53	25	27, 46, 65, 82	0
1	J	72/80 (90%)	0.33	1 (1%)	75	49	27, 44, 66, 67	0
2	B	11/11 (100%)	-0.03	0	100	100	20, 23, 29, 31	0
2	E	11/11 (100%)	0.08	0	100	100	18, 21, 25, 27	0
2	H	11/11 (100%)	0.26	0	100	100	24, 31, 41, 42	0
2	K	11/11 (100%)	0.32	0	100	100	26, 35, 43, 47	0
3	C	11/11 (100%)	-0.17	0	100	100	18, 22, 31, 34	0
3	F	11/11 (100%)	-0.31	0	100	100	17, 21, 22, 23	0
3	I	11/11 (100%)	0.01	0	100	100	20, 26, 43, 44	0
3	L	11/11 (100%)	0.08	0	100	100	27, 33, 42, 45	0
All	All	376/408 (92%)	0.13	3 (0%)	86	65	17, 37, 62, 82	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	240	ALA	3.6
1	G	224	ASN	2.6
1	J	261	PHE	2.1

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.