



wwPDB EM Validation Summary Report ⓘ

Jan 23, 2024 – 08:07 PM JST

PDB ID : 8HWH
EMDB ID : EMD-35058
Title : Cryo-EM Structure of D5 Apo-ssDNA form
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Deposited on : 2022-12-29
Resolution : 3.60 Å(reported)

This is a wwPDB EM 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/EMValidationReportHelp>

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>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : **FAILED**
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

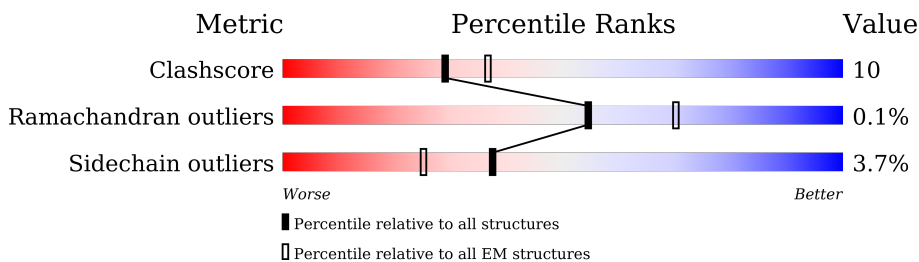
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.60 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)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	785	
1	B	785	
1	C	785	
1	D	785	
1	E	785	
1	F	785	
2	S	6	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 16948 atoms, of which 0 are hydrogens and 0 are deuteriums.

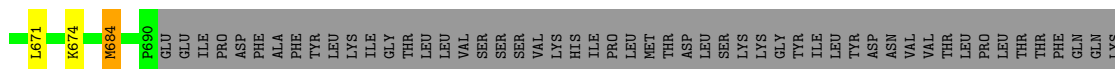
In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Primase D5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	353	2858	1828	485	529	16	0	0
1	B	357	2887	1845	489	537	16	0	0
1	C	361	2920	1868	495	541	16	0	0
1	D	363	2940	1881	497	546	16	0	0
1	E	329	2662	1697	455	495	15	0	0
1	F	316	2561	1636	434	477	14	0	0

- Molecule 2 is a DNA chain called DNA (5'-D(P*TP*TP*TP*TP*T)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	S	6	120	60	12	42	6	0	0



ILE
SER
LYS
TYR
PHE
ASN
SER
ARG
LEU
PHE
GLY
HIS
ASP
ILE
GLU
SER
PHE
ILE
ASN
ARG
HIS
LYS
PHE
ALA
ASN
VAL
SER
SER
VAL
LYS
HIS
ILE
PRO
LEU
MET
THR
ASP
LEU
SER
LYS
GLY
TYR
ILE
LEU
TYR
ASP
ASN
VAL
VAL
THR
LEU
PRO
THR
THR
PHE
GLN
LYS

- Molecule 2: DNA (5'-D(P*TP*TP*TP*TP*TP*T)-3')

Chain S: 17% 83%

T1
T2
T3
T4
T5
T6

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	56953	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor

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	0/2918	0.53	0/3940
1	B	0.25	0/2947	0.53	0/3979
1	C	0.25	0/2980	0.52	0/4022
1	D	0.26	0/3001	0.52	0/4051
1	E	0.25	0/2714	0.52	0/3660
1	F	0.25	0/2610	0.52	0/3521
2	S	0.67	0/131	1.44	0/200
All	All	0.26	0/17301	0.54	0/23373

There are no bond length outliers.

There are no bond angle outliers.

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	2858	0	2885	50	0
1	B	2887	0	2909	66	0
1	C	2920	0	2955	50	0
1	D	2940	0	2968	68	0
1	E	2662	0	2691	63	0
1	F	2561	0	2591	64	0
2	S	120	0	73	8	0
All	All	16948	0	17072	351	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 351 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:F:421:ASP:O	1:F:425:GLY:HA2	1.83	0.77
1:E:336:THR:HG1	1:E:338:SER:HG	1.32	0.75
1:D:389:ARG:NH1	1:E:398:ASP:OD2	2.20	0.74
1:A:510:SER:HB2	1:A:514:ARG:HH21	1.53	0.73
1:B:693:ILE:HB	1:B:696:PHE:HB2	1.71	0.72

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 PDB entries followed by that with respect to all EM entries.

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	349/785 (44%)	329 (94%)	19 (5%)	1 (0%)	41	75
1	B	353/785 (45%)	336 (95%)	17 (5%)	0	100	100
1	C	357/785 (46%)	344 (96%)	13 (4%)	0	100	100
1	D	359/785 (46%)	332 (92%)	26 (7%)	1 (0%)	41	75
1	E	323/785 (41%)	310 (96%)	13 (4%)	0	100	100
1	F	308/785 (39%)	296 (96%)	12 (4%)	0	100	100
All	All	2049/4710 (44%)	1947 (95%)	100 (5%)	2 (0%)	54	83

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	532	LEU
1	A	523	LEU

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 PDB entries followed by that with respect to all EM entries.

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	324/725 (45%)	311 (96%)	13 (4%)	31	65
1	B	327/725 (45%)	318 (97%)	9 (3%)	43	72
1	C	331/725 (46%)	318 (96%)	13 (4%)	32	65
1	D	333/725 (46%)	317 (95%)	16 (5%)	25	60
1	E	302/725 (42%)	296 (98%)	6 (2%)	55	79
1	F	291/725 (40%)	277 (95%)	14 (5%)	25	60
All	All	1908/4350 (44%)	1837 (96%)	71 (4%)	37	66

5 of 71 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	325	LYS
1	F	387	ARG
1	F	554	PHE
1	C	424	ASP
1	C	353	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	475	ASN
1	E	475	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.