



wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 10, 2024 – 08:41 PM EST

PDB ID : 2QZV
Title : Draft Crystal Structure of the Vault Shell at 9 Angstroms Resolution
Authors : Anderson, D.H.; Kickhoefer, V.A.; Sievers, S.A.; Rome, L.H.; Eisenberg, D.
Deposited on : 2007-08-17
Resolution : 9.00 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 ⓘ 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:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

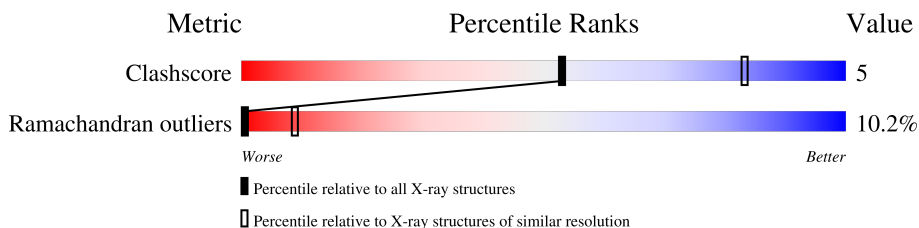
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 9.00 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))
Clashscore	141614	1070 (11.50-3.90)
Ramachandran outliers	138981	1003 (11.50-3.90)

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 ≥ 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	873	
1	B	873	

2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 7404 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 Major vault protein.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
1	A	749	3702	2204	749	749	0	0	0
1	B	749	3702	2204	749	749	0	0	0

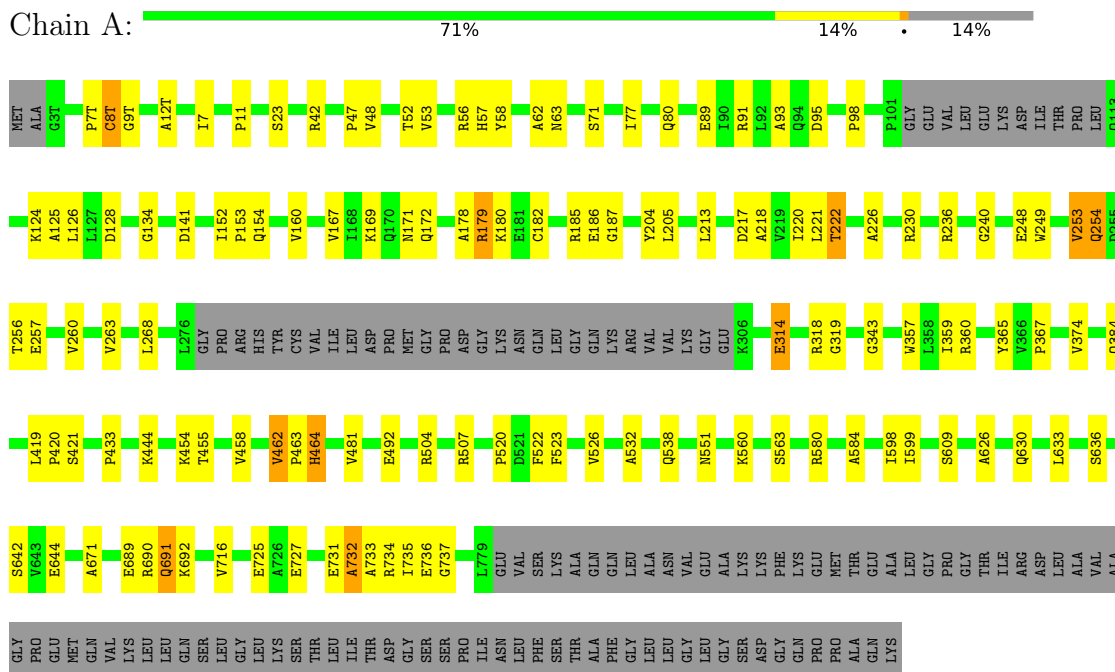
There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1T	MET	-	expression tag	UNP Q62667
A	2T	ALA	-	expression tag	UNP Q62667
A	3T	GLY	-	expression tag	UNP Q62667
A	4T	CYS	-	expression tag	UNP Q62667
A	5T	GLY	-	expression tag	UNP Q62667
A	6T	CYS	-	expression tag	UNP Q62667
A	7T	PRO	-	expression tag	UNP Q62667
A	8T	CYS	-	expression tag	UNP Q62667
A	9T	GLY	-	expression tag	UNP Q62667
A	10T	CYS	-	expression tag	UNP Q62667
A	11T	GLY	-	expression tag	UNP Q62667
A	12T	ALA	-	expression tag	UNP Q62667
B	1T	MET	-	expression tag	UNP Q62667
B	2T	ALA	-	expression tag	UNP Q62667
B	3T	GLY	-	expression tag	UNP Q62667
B	4T	CYS	-	expression tag	UNP Q62667
B	5T	GLY	-	expression tag	UNP Q62667
B	6T	CYS	-	expression tag	UNP Q62667
B	7T	PRO	-	expression tag	UNP Q62667
B	8T	CYS	-	expression tag	UNP Q62667
B	9T	GLY	-	expression tag	UNP Q62667
B	10T	CYS	-	expression tag	UNP Q62667
B	11T	GLY	-	expression tag	UNP Q62667
B	12T	ALA	-	expression tag	UNP Q62667

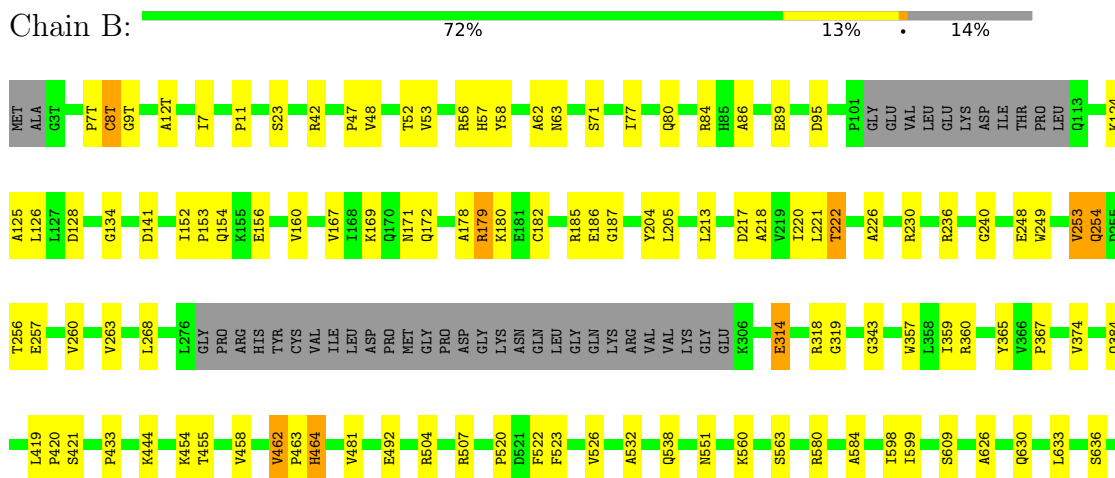
3 Residue-property plots [i](#)

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. 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. 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: Major vault protein



- Molecule 1: Major vault protein



S642	GLN
Y643	SER
E644	LEU
A671	GLY
L688	LEU
E689	LYS
R690	SER
Q691	THR
A733	LEU
R734	ILE
I735	THR
E736	ASP
G737	GLY
I779	SER
GLU	PRO
VAL	ILE
SER	ASN
LYS	LEU
ALA	PHE
GLN	THR
GLN	THR
LEU	ALA
ALA	PHE
ASN	GLY
VAL	LEU
GLU	LEU
ALA	GLY
LYS	SER
LYS	ASP
PHE	GLY
LYS	GLN
GLU	PRO
MET	PRO
THR	ALA
GLU	GLN
ALA	LYS
LEU	LEU
GLY	LEU
PRO	PRO
GLY	GLY
THR	THR
ILE	ILE
ARG	ARG
ASP	ASP
LEU	LEU
ALA	ALA
VAL	VAL
ALA	ALA
GLY	GLY
PRO	PRO
GLU	GLU
MET	MET
GLN	GLN
VAL	VAL
LYS	LYS
LEU	LEU

LEU
GLN
SER
LEU
GLY
LEU
LYS
SER
THR
LEU
ILE
THR
ASP
GLY
SER
SER
PRO
ILE
ASN
LEU
PHE
SER
THR
THR
ALA
PHE
GLY
LEU
LEU
GLY
LEU
GLY
GLY
SER
ASP
GLY
GLN
PRO
PRO
ALA
GLN
LYS

4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	631.45Å 464.72Å 584.57Å 90.00° 123.84° 90.00°	Depositor
Resolution (Å)	200.00 – 9.00 188.73 – 9.00	Depositor EDS
% Data completeness (in resolution range)	98.0 (200.00-9.00) 91.2 (188.73-9.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.22	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.09 (at 8.44Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.615 , (Not available) 0.563 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	-1.2	Xtrriage
Anisotropy	4.910	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.53$, $\langle L^2 \rangle = 0.37$	Xtrriage
Estimated twinning fraction	0.000 for h,-k,-h-l	Xtrriage
F_o, F_c correlation	0.66	EDS
Total number of atoms	7404	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.46% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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	0.31	0/3699	0.70	4/5148 (0.1%)
1	B	0.31	0/3699	0.69	5/5148 (0.1%)
All	All	0.31	0/7398	0.69	9/10296 (0.1%)

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	A	222	THR	N-CA-C	5.51	125.87	111.00
1	B	222	THR	N-CA-C	5.50	125.86	111.00
1	B	8(T)	CYS	N-CA-C	5.29	125.27	111.00
1	A	8(T)	CYS	N-CA-C	5.28	125.25	111.00
1	A	220	ILE	C-N-CA	5.20	134.71	121.70

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	3702	0	1718	33	0
1	B	3702	0	1718	32	0
All	All	7404	0	3436	58	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 58 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:98:PRO:CB	1:B:156:GLU:CB	2.42	0.98
1:A:692:LYS:CB	1:B:688:LEU:HA	2.32	0.58
1:A:56:ARG:O	1:A:58:TYR:N	2.36	0.58
1:B:56:ARG:O	1:B:58:TYR:N	2.36	0.58
1:A:172:GLN:HA	1:A:217:ASP:HA	1.86	0.57

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	743/873 (85%)	524 (70%)	141 (19%)	78 (10%)	0	8
1	B	743/873 (85%)	528 (71%)	142 (19%)	73 (10%)	0	10
All	All	1486/1746 (85%)	1052 (71%)	283 (19%)	151 (10%)	0	9

5 of 151 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	8(T)	CYS
1	A	57	HIS
1	A	71	SER
1	A	160	VAL
1	A	179	ARG

5.3.2 Protein sidechains [i](#)

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

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

6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.