



wwPDB/EMDataBank EM Map/Model Validation Summary Report ⓘ

Feb 18, 2018 – 07:09 am GMT

PDB ID : 5WP6
EMDB ID: : EMD-8871
Title : Cryo-EM structure of a human TRPM4 channel in complex with calcium and decavanadate
Authors : Winkler, P.A.; Huang, Y.; Sun, W.; Du, J.; Lu, W.
Deposited on : 2017-08-03
Resolution : 3.80 Å(reported)

This is a wwPDB/EMDataBank EM Map/Model Validation Summary Report
for a publicly released PDB/EMDB 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.

MolProbity : 4.02b-467
Mogul : 1.7.3 (157068), CSD as539be (2018)
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30686

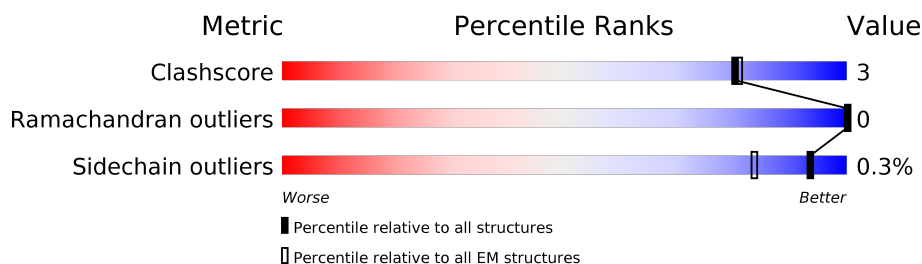
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.80 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	136279	1886
Ramachandran outliers	132675	1663
Sidechain outliers	132484	1531

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	1214	75% 6% 20%
1	B	1214	75% 6% 20%
1	C	1214	75% 6% 20%
1	D	1214	75% 5% 20%

2 Entry composition [i](#)

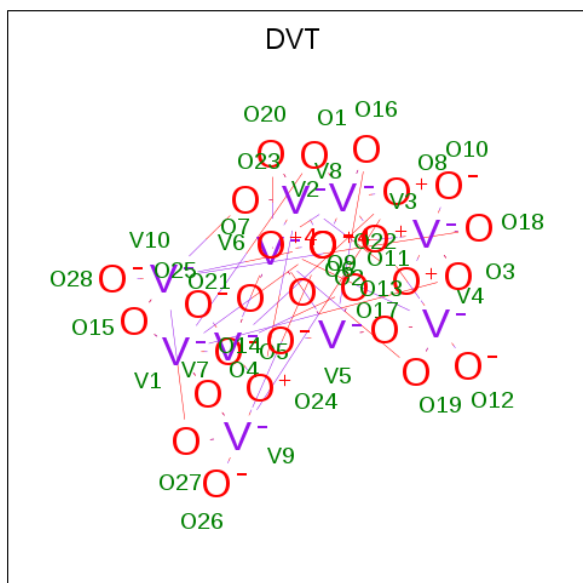
There are 2 unique types of molecules in this entry. The entry contains 29036 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Transient receptor potential cation channel subfamily M member 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	977	Total	C	N	O	S	0	0
			7183	4664	1276	1216	27		
1	B	977	Total	C	N	O	S	0	0
			7183	4664	1276	1216	27		
1	C	977	Total	C	N	O	S	0	0
			7183	4664	1276	1216	27		
1	D	977	Total	C	N	O	S	0	0
			7183	4664	1276	1216	27		

- Molecule 2 is DECAVANADATE (three-letter code: DVT) (formula: $O_{28}V_{10}$).



Mol	Chain	Residues	Atoms			AltConf
2	A	1	Total	O	V	0
			76	56	20	
2	A	1	Total	O	V	0
			76	56	20	

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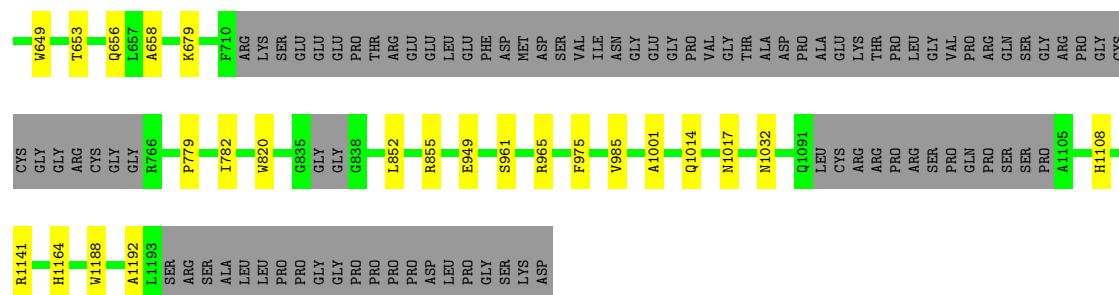
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Mol	Chain	Residues	Atoms			AltConf
2	B	1	Total 76	O 56	V 20	0
2	B	1	Total 76	O 56	V 20	0
2	C	1	Total 76	O 56	V 20	0
2	C	1	Total 76	O 56	V 20	0
2	D	1	Total 76	O 56	V 20	0
2	D	1	Total 76	O 56	V 20	0

- Molecule 1: Transient receptor potential cation channel subfamily M member 4







4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	121906	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	54	Depositor
Minimum defocus (nm)	Not provided	Depositor
Maximum defocus (nm)	Not provided	Depositor
Magnification	Not provided	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: DVT

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	$\# Z > 2$	RMSZ	$\# Z > 2$
1	A	0.44	0/7347	0.57	0/10018
1	B	0.45	0/7347	0.57	0/10018
1	C	0.45	0/7347	0.57	0/10018
1	D	0.45	0/7347	0.57	0/10018
All	All	0.45	0/29388	0.57	0/40072

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	7183	0	6861	48	0
1	B	7183	0	6861	45	0
1	C	7183	0	6861	48	0
1	D	7183	0	6861	45	0
2	A	76	0	0	1	0
2	B	76	0	0	1	0
2	C	76	0	0	1	0
2	D	76	0	0	1	0
All	All	29036	0	27444	164	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 3.

The worst 5 of 164 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:C:985:VAL:HG11	1:C:1014:GLN:HG2	1.80	0.64
1:B:985:VAL:HG11	1:B:1014:GLN:HG2	1.79	0.64
1:D:985:VAL:HG11	1:D:1014:GLN:HG2	1.80	0.64
1:A:985:VAL:HG11	1:A:1014:GLN:HG2	1.79	0.63
1:A:214:ARG:NH1	1:B:453:HIS:HB3	2.21	0.55

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	959/1214 (79%)	895 (93%)	64 (7%)	0	100	100
1	B	959/1214 (79%)	895 (93%)	64 (7%)	0	100	100
1	C	959/1214 (79%)	895 (93%)	64 (7%)	0	100	100
1	D	959/1214 (79%)	895 (93%)	64 (7%)	0	100	100
All	All	3836/4856 (79%)	3580 (93%)	256 (7%)	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 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	658/1000 (66%)	656 (100%)	2 (0%)	93	97
1	B	658/1000 (66%)	656 (100%)	2 (0%)	93	97
1	C	658/1000 (66%)	656 (100%)	2 (0%)	93	97
1	D	658/1000 (66%)	656 (100%)	2 (0%)	93	97
All	All	2632/4000 (66%)	2624 (100%)	8 (0%)	93	97

5 of 8 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	1141	ARG
1	D	1141	ARG
1	C	1141	ARG
1	B	820	TRP
1	C	820	TRP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1051	GLN
1	C	1014	GLN
1	D	1014	GLN
1	B	1017	ASN
1	C	1051	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry

8 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	DVT	A	2001	-	20,60,60	1.20	2 (10%)	0,206,206	0.00	-
2	DVT	A	2002	-	20,60,60	1.22	3 (15%)	0,206,206	0.00	-
2	DVT	B	2001	-	20,60,60	1.20	2 (10%)	0,206,206	0.00	-
2	DVT	B	2002	-	20,60,60	1.22	3 (15%)	0,206,206	0.00	-
2	DVT	C	2001	-	20,60,60	1.20	2 (10%)	0,206,206	0.00	-
2	DVT	C	2002	-	20,60,60	1.23	3 (15%)	0,206,206	0.00	-
2	DVT	D	2001	-	20,60,60	1.20	2 (10%)	0,206,206	0.00	-
2	DVT	D	2002	-	20,60,60	1.23	3 (15%)	0,206,206	0.00	-

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	DVT	A	2001	-	-	0/0/560/560	0/0/23/23
2	DVT	A	2002	-	-	0/0/560/560	0/0/23/23
2	DVT	B	2001	-	-	0/0/560/560	0/0/23/23
2	DVT	B	2002	-	-	0/0/560/560	0/0/23/23
2	DVT	C	2001	-	-	0/0/560/560	0/0/23/23
2	DVT	C	2002	-	-	0/0/560/560	0/0/23/23
2	DVT	D	2001	-	-	0/0/560/560	0/0/23/23
2	DVT	D	2002	-	-	0/0/560/560	0/0/23/23

The worst 5 of 20 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	2002	DVT	O1-V2	2.02	1.72	1.69
2	A	2002	DVT	O1-V2	2.03	1.72	1.69

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	2002	DVT	O1-V2	2.05	1.72	1.69
2	B	2002	DVT	O1-V2	2.06	1.72	1.69
2	C	2002	DVT	O8-V7	2.37	2.05	2.00

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	2002	DVT	1	0
2	B	2002	DVT	1	0
2	C	2002	DVT	1	0
2	D	2002	DVT	1	0

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.