



wwPDB/EMDataBank EM Map/Model Validation Summary Report ⓘ

Nov 1, 2017 – 05:23 PM EDT

PDB ID : 5WJ9
EMDB ID: : EMD-8841
Title : Human TRPML1 channel structure in agonist-bound open conformation
Authors : Schmiede, P.; Li, X.
Deposited on : unknown
Resolution : 3.49 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

<http://wwpdb.org/validation/2016/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

MolProbity : 4.02b-467
Mogul : 1.7.2 (RC1), CSD as538be (2017)
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20030345

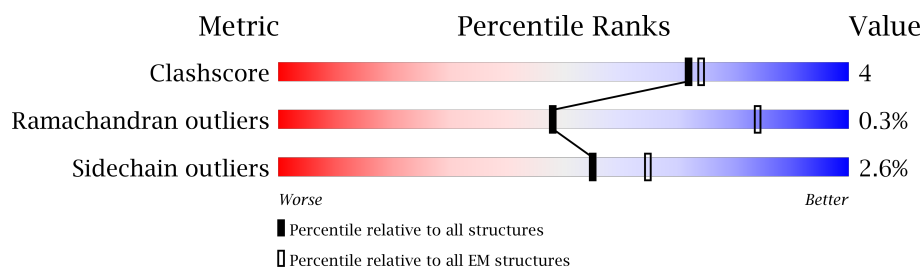
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.49 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	125131	1336
Ramachandran outliers	121729	1120
Sidechain outliers	121581	1026

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 $\leq 5\%$.

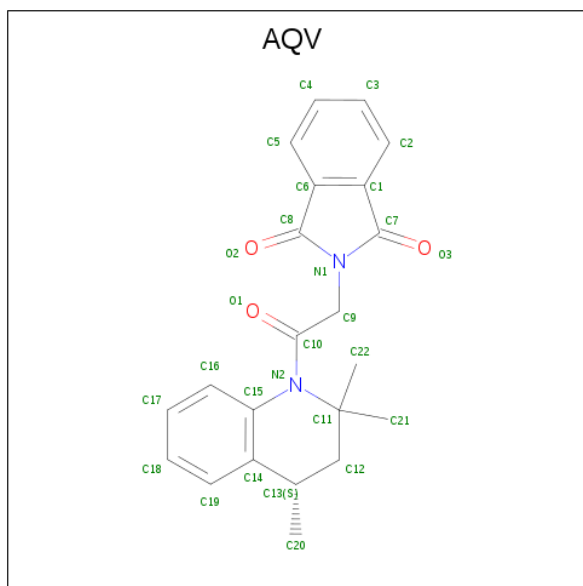
Mol	Chain	Length	Quality of chain
1	A	580	
1	B	580	
1	C	580	
1	D	580	

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 Mucolipin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	479	Total 3858	C 2521	N 644	O 668	S 25	0	0
1	B	479	Total 3858	C 2521	N 644	O 668	S 25	0	0
1	C	479	Total 3858	C 2521	N 644	O 668	S 25	0	0
1	D	479	Total 3858	C 2521	N 644	O 668	S 25	0	0

- Molecule 2 is 2-{2-oxo-2-[(4S)-2,2,4-trimethyl-3,4-dihydroquinolin-1(2H)-yl]ethyl}-1H-isindole-1,3(2H)-dione (three-letter code: AQV) (formula: $C_{22}H_{22}N_2O_3$).



Mol	Chain	Residues	Atoms				AltConf
2	A	1	Total 27	C 22	N 2	O 3	0
2	B	1	Total 27	C 22	N 2	O 3	0

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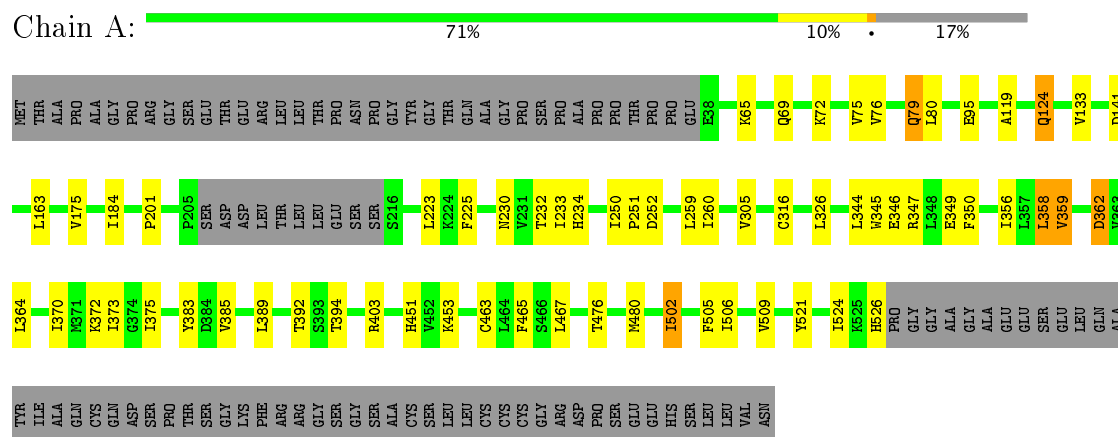
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Mol	Chain	Residues	Atoms				AltConf
2	C	1	Total	C	N	O	0
			27	22	2	3	
2	D	1	Total	C	N	O	0
			27	22	2	3	

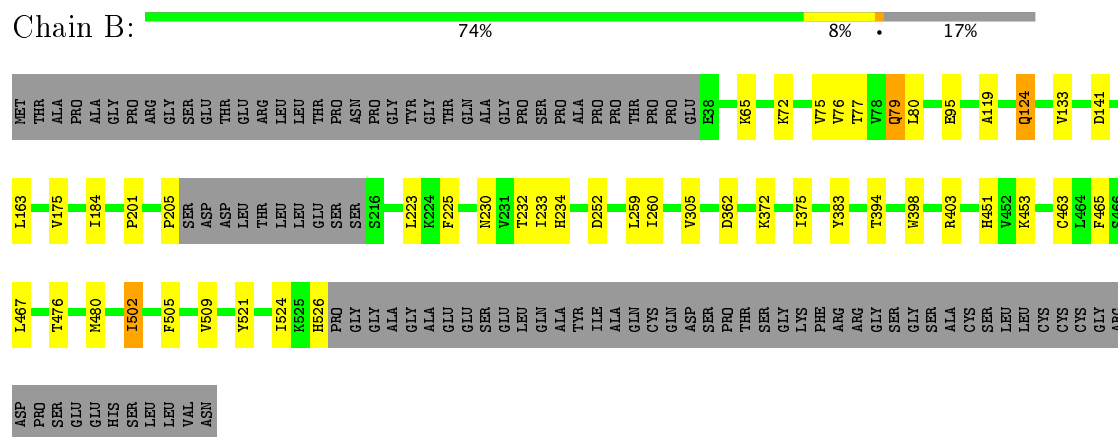
3 Residue-property plots

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. 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.

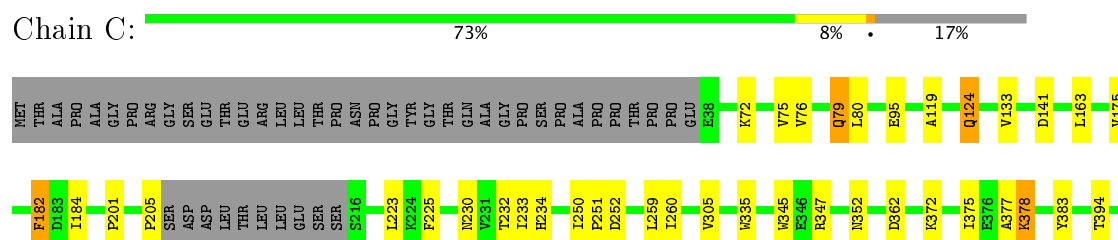
• Molecule 1: Mucolin-1

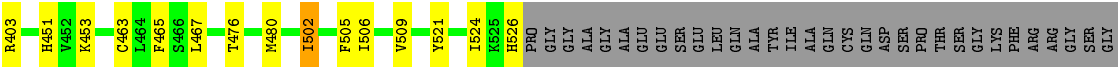


• Molecule 1: Mucolin-1

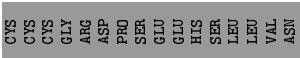
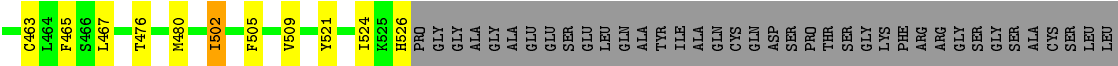
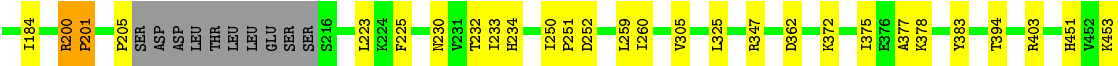
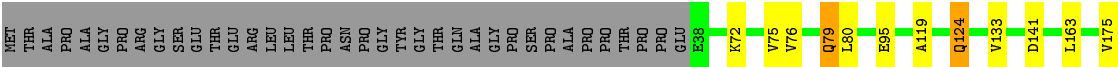


• Molecule 1: Mucolin-1





● Molecule 1: Mucolipin-1



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	56105	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 ($e^-/\text{\AA}^2$)	1.6	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: AQV

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	0.56	1/3957 (0.0%)	0.60	4/5374 (0.1%)
1	B	0.74	1/3957 (0.0%)	0.58	2/5374 (0.0%)
1	C	0.56	2/3957 (0.1%)	0.57	0/5374
1	D	0.65	2/3957 (0.1%)	0.57	1/5374 (0.0%)
All	All	0.63	6/15828 (0.0%)	0.58	7/21496 (0.0%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	205	PRO	C-O	38.96	2.01	1.23
1	D	526	HIS	C-O	27.99	1.76	1.23
1	A	526	HIS	C-O	23.65	1.68	1.23
1	C	526	HIS	C-O	23.13	1.67	1.23
1	D	205	PRO	C-O	-16.74	0.89	1.23

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	526	HIS	CA-C-O	8.77	138.51	120.10
1	D	526	HIS	CA-C-O	7.66	136.18	120.10
1	B	526	HIS	CA-C-O	7.38	135.60	120.10
1	A	362	ASP	CB-CG-OD1	5.93	123.63	118.30
1	B	205	PRO	CA-C-O	-5.69	106.53	120.20

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	3858	0	3884	38	0
1	B	3858	0	3884	34	0
1	C	3858	0	3884	31	0
1	D	3858	0	3884	28	0
2	A	27	0	0	0	0
2	B	27	0	0	0	0
2	C	27	0	0	0	0
2	D	27	0	0	0	0
All	All	15540	0	15536	123	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 4.

The worst 5 of 123 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:B:77:THR:HG1	1:B:398:TRP:HZ2	0.98	0.92
1:B:394:THR:O	1:B:398:TRP:HD1	1.52	0.92
1:B:77:THR:OG1	1:B:398:TRP:CZ2	2.22	0.90
1:B:394:THR:O	1:B:398:TRP:CD1	2.32	0.82
1:B:77:THR:HG21	1:B:398:TRP:HZ2	1.59	0.67

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	475/580 (82%)	431 (91%)	43 (9%)	1 (0%)	51	85
1	B	475/580 (82%)	431 (91%)	43 (9%)	1 (0%)	51	85
1	C	475/580 (82%)	430 (90%)	43 (9%)	2 (0%)	38	77
1	D	475/580 (82%)	431 (91%)	43 (9%)	1 (0%)	51	85
All	All	1900/2320 (82%)	1723 (91%)	172 (9%)	5 (0%)	48	80

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	378	LYS
1	A	201	PRO
1	B	201	PRO
1	C	201	PRO
1	D	201	PRO

5.3.2 Protein sidechains ⓘ

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	427/507 (84%)	415 (97%)	12 (3%)	49	79
1	B	427/507 (84%)	418 (98%)	9 (2%)	59	84
1	C	427/507 (84%)	415 (97%)	12 (3%)	49	79
1	D	427/507 (84%)	416 (97%)	11 (3%)	51	80
All	All	1708/2028 (84%)	1664 (97%)	44 (3%)	55	80

5 of 44 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	403	ARG
1	C	141	ASP
1	D	347	ARG
1	B	502	ILE
1	C	95	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	97	ASN
1	D	97	ASN
1	C	79	GLN
1	A	97	ASN
1	C	97	ASN

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 ⓘ

4 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	AQV	A	900	-	29,30,30	3.81	19 (65%)	41,46,46	2.53	14 (34%)
2	AQV	B	900	-	29,30,30	3.82	19 (65%)	41,46,46	2.54	14 (34%)
2	AQV	C	900	-	29,30,30	3.82	19 (65%)	41,46,46	2.53	14 (34%)
2	AQV	D	900	-	29,30,30	3.83	19 (65%)	41,46,46	2.53	14 (34%)

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	AQV	A	900	-	-	0/8/43/43	0/4/4/4
2	AQV	B	900	-	-	0/8/43/43	0/4/4/4
2	AQV	C	900	-	-	0/8/43/43	0/4/4/4
2	AQV	D	900	-	-	0/8/43/43	0/4/4/4

The worst 5 of 76 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	900	AQV	C8-N1	-4.69	1.33	1.39
2	A	900	AQV	C8-N1	-4.68	1.33	1.39
2	D	900	AQV	C8-N1	-4.65	1.33	1.39
2	C	900	AQV	C8-N1	-4.65	1.33	1.39
2	B	900	AQV	C1-C7	-3.55	1.43	1.48

The worst 5 of 56 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	900	AQV	O1-C10-C9	-4.83	112.75	120.62
2	D	900	AQV	O1-C10-C9	-4.82	112.77	120.62
2	A	900	AQV	O1-C10-C9	-4.82	112.77	120.62
2	C	900	AQV	O1-C10-C9	-4.78	112.83	120.62
2	B	900	AQV	C1-C6-C8	-3.29	105.48	108.27

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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.