WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Jan 14, 2024 – 01:36 pm GMT

|		
PDB ID	:	6R65
Title	:	Crystal Structure of human TMEM16K / Anoctamin 10 (Form 2)
Authors	:	Bushell, S.R.; Pike, A.C.W.; Chu, A.; Tessitore, A.; Rotty, B.; Mukhopadhyay, S.; Kupinska, K.; Shrestha, L.; Borkowska, O.; Chalk, R.; Burgess-Brown, N.A.; Love, J.; Edwards, A.M.; Arrowsmith, C.H.; Bountra, C.; Carpenter, E.P.; Structural Genomics Consortium (SGC)
Deposited on	:	2019-03-26
Resolution	:	3.50 Å(reported)

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 3.50 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	Percentile Ranks	Value
Rfree		0.261
Clashscore		3
Ramachandran outliers		0.2%
Sidechain outliers		1.3%
RSRZ outliers		4.9%

Worse — *Better*

▌ Percentile relative to all X-ray structures
⓪ Percentile relative to X-ray structures of similar resolution
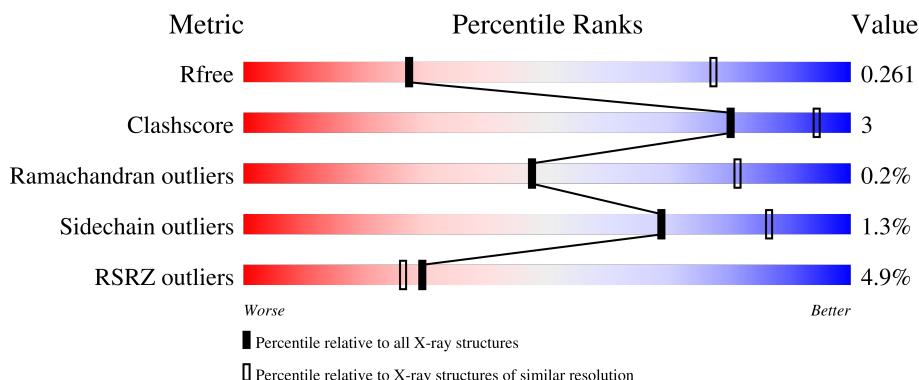
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1659 (3.60-3.40)
Clashscore	141614	1036 (3.58-3.42)
Ramachandran outliers	138981	1005 (3.58-3.42)
Sidechain outliers	138945	1006 (3.58-3.42)
RSRZ outliers	127900	1559 (3.60-3.40)

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 <=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	667	3% / 83% / 8% / 8%
1	B	667	6% / 85% / 8% / 7%
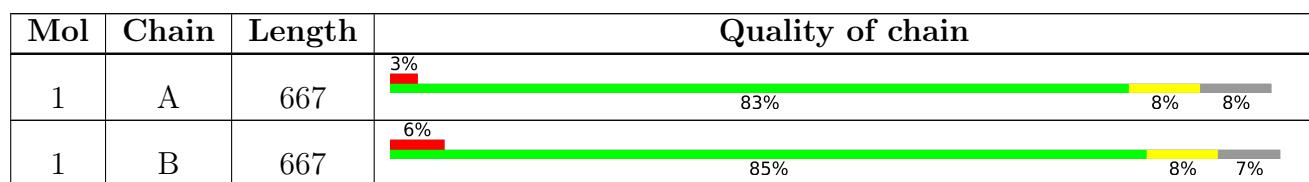
2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 9648 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 Anoctamin-10.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	611	Total	C	N	O	S	0	0	0
			4768	3147	754	841	26			
1	B	623	Total	C	N	O	S	0	0	0
			4874	3216	773	858	27			

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	661	ALA	-	expression tag	UNP Q9NW15
A	662	GLU	-	expression tag	UNP Q9NW15
A	663	ASN	-	expression tag	UNP Q9NW15
A	664	LEU	-	expression tag	UNP Q9NW15
A	665	TYR	-	expression tag	UNP Q9NW15
A	666	PHE	-	expression tag	UNP Q9NW15
A	667	GLN	-	expression tag	UNP Q9NW15
B	661	ALA	-	expression tag	UNP Q9NW15
B	662	GLU	-	expression tag	UNP Q9NW15
B	663	ASN	-	expression tag	UNP Q9NW15
B	664	LEU	-	expression tag	UNP Q9NW15
B	665	TYR	-	expression tag	UNP Q9NW15
B	666	PHE	-	expression tag	UNP Q9NW15
B	667	GLN	-	expression tag	UNP Q9NW15

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	3	Total	Ca	0	0
			3	3		
2	B	3	Total	Ca	0	0
			3	3		

3 Residue-property plots ⓘ

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 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: Anoctamin-10

Chain A:

• Molecule 1: Anoctamin-10

Chain B:
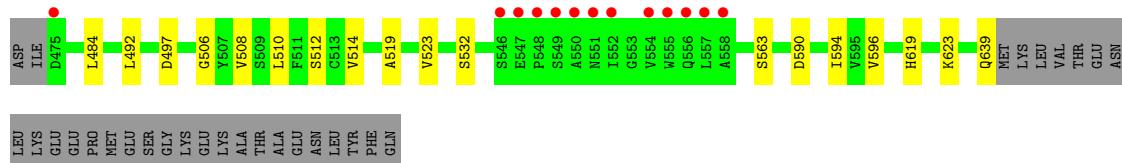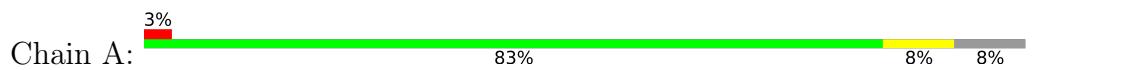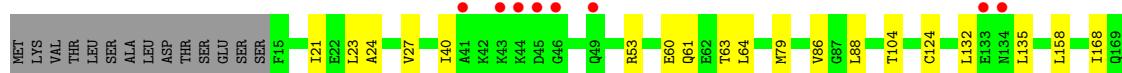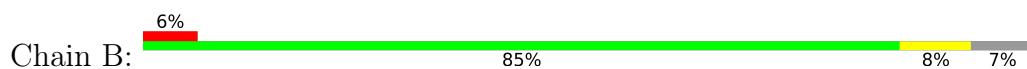
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	113.16Å 152.27Å 153.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.69 – 3.50 78.19 – 3.50	Depositor EDS
% Data completeness (in resolution range)	70.0 (39.69-3.50) 69.9 (78.19-3.50)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.46 (at 3.49Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.237 , 0.249 0.254 , 0.261	Depositor DCC
R_{free} test set	1191 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	83.6	Xtriage
Anisotropy	0.119	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 67.8	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.43$, $< L^2 > = 0.25$	Xtriage
Estimated twinning fraction	0.056 for -h,l,k	Xtriage
F_o,F_c correlation	0.75	EDS
Total number of atoms	9648	wwPDB-VP
Average B, all atoms (Å^2)	92.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.99% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< \lvert L \rvert >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	0.40	0/4882	0.55	0/6648
1	B	0.41	0/4996	0.55	0/6807
All	All	0.40	0/9878	0.55	0/13455

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 ⓘ

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	4768	0	4647	27	0
1	B	4874	0	4722	27	0
2	A	3	0	0	0	0
2	B	3	0	0	0	0
All	All	9648	0	9369	52	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.

All (52) 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:238:GLU:HA	1:B:243:TYR:HE1	1.61	0.63
1:B:60:GLU:H	1:B:63:THR:HB	1.65	0.61
1:A:238:GLU:HA	1:A:243:TYR:HE1	1.67	0.59
1:B:238:GLU:HA	1:B:243:TYR:CE1	2.38	0.58
1:A:429:LEU:HD23	1:A:514:VAL:HG11	1.84	0.58
1:B:429:LEU:HD23	1:B:514:VAL:HG11	1.85	0.57
1:A:506:GLY:O	1:A:510:LEU:HB2	2.09	0.53
1:A:238:GLU:HA	1:A:243:TYR:CE1	2.44	0.53
1:A:206:GLU:O	1:A:210:LEU:HB2	2.09	0.53
1:B:206:GLU:O	1:B:210:LEU:HB2	2.09	0.53
1:B:326:LEU:HG	1:B:410:LEU:HD13	1.90	0.52
1:A:79:MET:HE1	1:A:124:CYS:HA	1.90	0.52
1:A:596:VAL:HG21	1:B:596:VAL:HG21	1.91	0.52
1:A:326:LEU:HG	1:A:410:LEU:HD13	1.91	0.52
1:B:508:VAL:O	1:B:512:SER:HB3	2.11	0.51
1:A:460:GLY:HA2	1:A:484:LEU:HD11	1.93	0.51
1:A:132:LEU:HA	1:A:135:LEU:HD12	1.94	0.50
1:B:132:LEU:HA	1:B:135:LEU:HD12	1.94	0.49
1:A:508:VAL:O	1:A:512:SER:HB3	2.12	0.49
1:A:211:TYR:CZ	1:A:497:ASP:HB3	2.48	0.49
1:A:221:ALA:O	1:A:224:PRO:HD2	2.14	0.48
1:B:220:PHE:HA	1:B:223:ILE:HD12	1.96	0.48
1:B:221:ALA:O	1:B:224:PRO:HD2	2.14	0.48
1:B:519:ALA:O	1:B:523:VAL:HG23	2.14	0.48
1:A:220:PHE:HA	1:A:223:ILE:HD12	1.96	0.48
1:B:61:GLN:HA	1:B:64:LEU:HD12	1.95	0.47
1:B:506:GLY:O	1:B:510:LEU:HB2	2.15	0.47
1:B:590:ASP:O	1:B:594:ILE:HG12	2.14	0.47
1:A:519:ALA:O	1:A:523:VAL:HG23	2.14	0.47
1:A:590:ASP:O	1:A:594:ILE:HG12	2.15	0.46
1:A:639:GLN:HG3	1:B:104:THR:HG21	1.96	0.46
1:B:79:MET:HE1	1:B:124:CYS:HA	1.97	0.46
1:B:460:GLY:HA2	1:B:484:LEU:HD11	1.98	0.46
1:B:21:ILE:HG12	1:B:170:VAL:HG22	1.97	0.46
1:A:254:SER:HB3	1:A:563:SER:HB2	1.98	0.45
1:B:86:VAL:HG23	1:B:88:LEU:HG	1.99	0.45
1:B:254:SER:HB3	1:B:563:SER:HB2	1.99	0.45
1:A:86:VAL:HG23	1:A:88:LEU:HG	1.99	0.45
1:A:23:LEU:HD23	1:A:27:VAL:HG11	1.99	0.44
1:A:64:LEU:HD11	1:A:470:LEU:HD13	1.99	0.44
1:A:23:LEU:HB2	1:A:68:ASN:HB3	2.01	0.43
1:A:619:HIS:HB2	1:A:623:LYS:NZ	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:479:TYR:O	1:B:483:ILE:HG12	2.19	0.42
1:A:24:ALA:HA	1:A:168:ILE:HD11	2.02	0.42
1:B:536:LYS:HE2	1:B:541:PHE:HE2	1.85	0.41
1:A:158:LEU:HD11	1:A:170:VAL:HG21	2.03	0.41
1:B:23:LEU:HD23	1:B:27:VAL:HG11	2.02	0.41
1:B:284:PRO:HB3	1:B:391:ARG:HG2	2.03	0.41
1:A:42:LYS:HA	1:A:49:GLN:HG3	2.03	0.40
1:A:284:PRO:HB3	1:A:391:ARG:HG2	2.03	0.40
1:B:24:ALA:HA	1:B:168:ILE:HD11	2.03	0.40
1:B:158:LEU:HD11	1:B:170:VAL:HG21	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	601/667 (90%)	581 (97%)	19 (3%)	1 (0%)	47	81
1	B	619/667 (93%)	597 (96%)	21 (3%)	1 (0%)	47	81
All	All	1220/1334 (92%)	1178 (97%)	40 (3%)	2 (0%)	47	81

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	187	TYR
1	B	187	TYR

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 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	485/591 (82%)	478 (99%)	7 (1%)	67	85
1	B	490/591 (83%)	484 (99%)	6 (1%)	71	87
All	All	975/1182 (82%)	962 (99%)	13 (1%)	69	86

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	25	GLN
1	A	40	ILE
1	A	53	ARG
1	A	210	LEU
1	A	410	LEU
1	A	492	LEU
1	A	532	SER
1	B	40	ILE
1	B	53	ARG
1	B	201	ARG
1	B	210	LEU
1	B	410	LEU
1	B	532	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	638	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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

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 ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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	611/667 (91%)	0.08	22 (3%)	42	38	63, 91, 140, 211	0
1	B	623/667 (93%)	0.09	39 (6%)	20	18	60, 87, 118, 139	0
All	All	1234/1334 (92%)	0.08	61 (4%)	29	26	60, 89, 127, 211	0

All (61) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	398	ASN	6.2
1	B	587	SER	6.1
1	B	45	ASP	5.7
1	B	586	GLU	5.1
1	B	585	PRO	4.8
1	B	490	THR	4.4
1	B	496	ASP	4.4
1	B	588	LYS	4.0
1	B	494	THR	4.0
1	B	581	ASN	3.9
1	B	495	PHE	3.8
1	A	556	GLN	3.5
1	B	491	TYR	3.5
1	A	374	ASN	3.5
1	B	49	GLN	3.4
1	B	489	GLY	3.4
1	A	551	ASN	3.4
1	B	401	ILE	3.3
1	A	558	ALA	3.3
1	B	493	GLY	3.3
1	A	475	ASP	3.2
1	B	589	ALA	3.2
1	B	554	VAL	3.2
1	A	398	ASN	3.2

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Mol	Chain	Res	Type	RSRZ
1	B	396	TYR	3.1
1	B	492	LEU	3.0
1	B	394	SER	3.0
1	A	554	VAL	2.9
1	B	584	PHE	2.8
1	A	557	LEU	2.7
1	A	547	GLU	2.7
1	B	44	LYS	2.7
1	A	549	SER	2.6
1	A	548	PRO	2.6
1	B	557	LEU	2.6
1	B	611	PHE	2.6
1	A	372	ILE	2.5
1	B	133	GLU	2.5
1	A	455	LEU	2.5
1	A	550	ALA	2.4
1	B	555	TRP	2.4
1	B	43	LYS	2.4
1	A	402	LEU	2.4
1	A	125	GLN	2.4
1	B	46	GLY	2.3
1	A	555	TRP	2.3
1	B	556	GLN	2.3
1	A	552	ILE	2.3
1	B	400	LEU	2.3
1	B	629	PHE	2.2
1	B	497	ASP	2.2
1	B	397	GLN	2.2
1	A	452	PRO	2.2
1	B	558	ALA	2.1
1	A	349	ASN	2.1
1	B	395	ALA	2.1
1	A	407	PHE	2.1
1	B	41	ALA	2.1
1	B	134	ASN	2.0
1	B	541	PHE	2.0
1	A	546	SER	2.0

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 ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
2	CA	B	701	1/1	0.87	0.22	85,85,85,85	0
2	CA	A	701	1/1	0.96	0.18	92,92,92,92	0
2	CA	B	703	1/1	0.97	0.12	65,65,65,65	0
2	CA	B	702	1/1	0.98	0.15	78,78,78,78	0
2	CA	A	703	1/1	0.98	0.10	84,84,84,84	0
2	CA	A	702	1/1	0.99	0.14	75,75,75,75	0

6.5 Other polymers ⓘ

There are no such residues in this entry.