



Full wwPDB EM Model Validation Report ⓘ

Feb 25, 2020 – 12:12 PM EST

PDB ID : 6L2T
EMDB ID : EMD-0814
Title : African swine fever virus major capsid protein p72
Authors : Wang, N.; Rao, Z.; Wang, X.
Deposited on : 2019-10-06
Resolution : 4.10 Å(reported)

This is a Full wwPDB EM Model Validation 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.

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

MolProbity : 4.02b-467
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) : 2.8

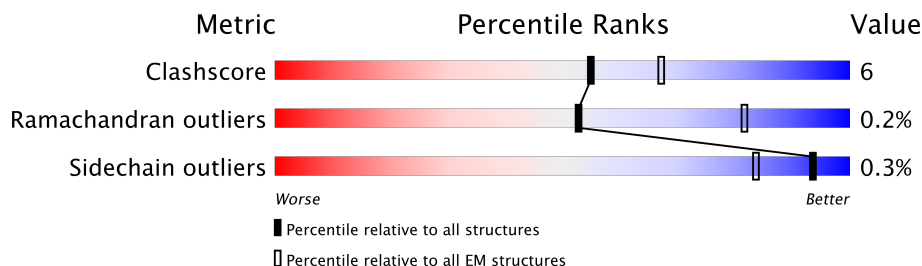
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.10 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	136327	1886
Ramachandran outliers	132723	1663
Sidechain outliers	132532	1531

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 on 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	646	
1	B	646	
1	C	646	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 13604 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.

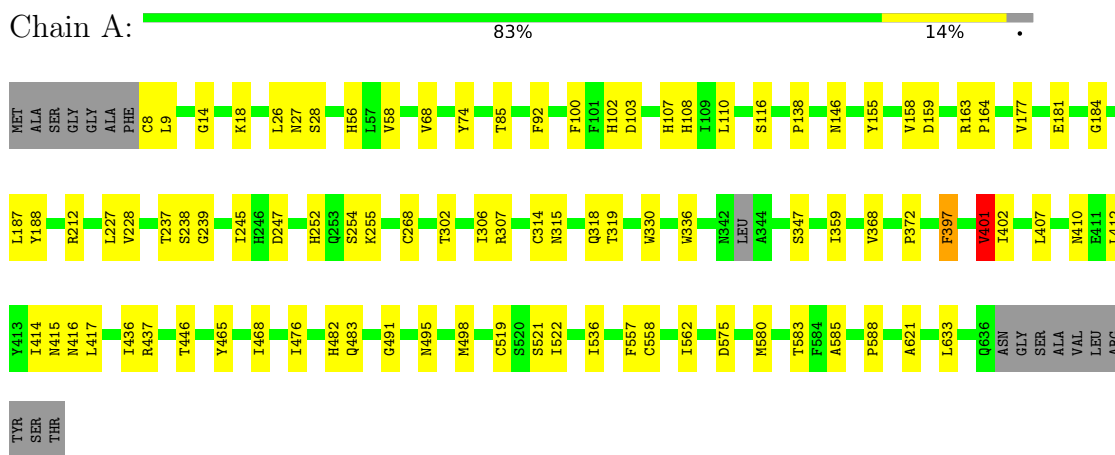
- Molecule 1 is a protein called B646L, Major capsid protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	628	Total	C	N	O	S	0	0
			4511	2892	787	817	15		
1	B	628	Total	C	N	O	S	0	0
			4554	2924	788	826	16		
1	C	633	Total	C	N	O	S	0	0
			4539	2912	787	824	16		

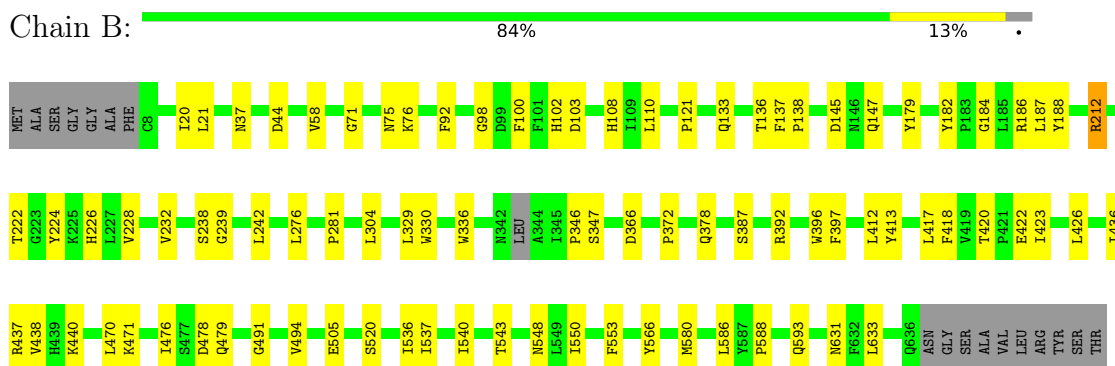
3 Residue-property plots

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.

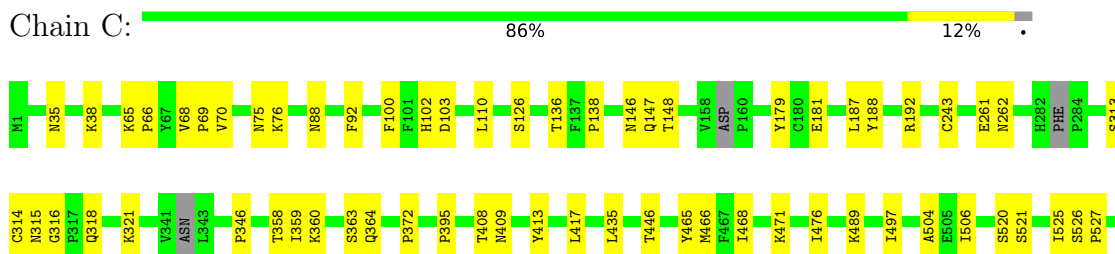
- Molecule 1: B646L,Major capsid protein



- Molecule 1: B646L,Major capsid protein



- Molecule 1: B646L,Major capsid protein



I537	K538	N539	I540	K552	P553	P554	F557	G567	I571	M580	T583	P584	A585	A621	S626	S627	F632	Q636	ASN	GLY	SER	ALA	VAL	LEU	ARG	TYR	SER	THR
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	43811	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 ($e^-/\text{\AA}^2$)	35	Depositor
Minimum defocus (nm)	Not provided	Depositor
Maximum defocus (nm)	Not provided	Depositor
Magnification	Not provided	Depositor
Image detector	GATAN K2 QUANTUM (4k 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	0.26	0/4644	0.47	0/6387
1	B	0.26	0/4689	0.46	0/6448
1	C	0.26	0/4669	0.45	0/6417
All	All	0.26	0/14002	0.46	0/19252

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	4511	0	4010	61	0
1	B	4554	0	4110	55	0
1	C	4539	0	4071	50	0
All	All	13604	0	12191	150	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 6.

All (150) 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:100:PHE:HB2	1:B:417:LEU:HB2	1.62	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:138:PRO:HG3	1:A:146:ASN:H	1.49	0.78
1:C:408:THR:HG22	1:C:409:ASN:H	1.54	0.72
1:A:372:PRO:HB3	1:A:397:PHE:HB2	1.76	0.66
1:A:583:THR:HG22	1:A:585:ALA:H	1.61	0.66
1:C:504:ALA:HB3	1:C:521:SER:HB3	1.77	0.65
1:B:136:THR:HA	1:B:396:TRP:HE1	1.63	0.63
1:A:100:PHE:HB2	1:A:417:LEU:HB2	1.80	0.63
1:A:558:CYS:HA	1:A:562:ILE:HD12	1.80	0.63
1:A:252:HIS:H	1:A:255:LYS:HD3	1.62	0.63
1:A:181:GLU:HA	1:A:318:GLN:HE21	1.65	0.62
1:B:186:ARG:NH1	1:B:366:ASP:O	2.32	0.62
1:C:583:THR:HG22	1:C:585:ALA:H	1.64	0.60
1:A:116:SER:OG	1:A:401:VAL:HG12	2.00	0.60
1:C:138:PRO:HG3	1:C:146:ASN:H	1.69	0.58
1:A:184:GLY:HA3	1:A:228:VAL:HB	1.87	0.57
1:C:315:ASN:OD1	1:C:316:GLY:N	2.38	0.57
1:A:446:THR:OG1	1:A:621:ALA:O	2.23	0.56
1:B:37:ASN:ND2	1:B:44:ASP:O	2.38	0.56
1:A:158:VAL:HG12	1:A:159:ASP:H	1.71	0.56
1:B:372:PRO:HA	1:B:397:PHE:HB3	1.86	0.56
1:B:593:GLN:NE2	1:C:65:LYS:O	2.37	0.55
1:A:314:CYS:SG	1:A:315:ASN:N	2.79	0.55
1:A:255:LYS:HE3	1:B:133:GLN:HA	1.90	0.54
1:A:498:MET:HG2	1:C:243:CYS:HB2	1.88	0.54
1:B:387:SER:H	1:B:520:SER:HB3	1.72	0.54
1:C:75:ASN:OD1	1:C:76:LYS:N	2.35	0.54
1:B:102:HIS:CG	1:B:103:ASP:H	2.26	0.54
1:B:491:GLY:HA2	1:B:536:ILE:HD11	1.90	0.54
1:C:181:GLU:HA	1:C:318:GLN:HE21	1.73	0.54
1:C:446:THR:OG1	1:C:621:ALA:O	2.26	0.54
1:B:76:LYS:HE2	1:B:413:TYR:HE1	1.74	0.53
1:B:471:LYS:HD3	1:B:476:ILE:HD11	1.92	0.52
1:B:100:PHE:CD1	1:B:346:PRO:HA	2.46	0.51
1:C:471:LYS:NZ	1:C:489:LYS:O	2.42	0.51
1:C:88:ASN:HB3	1:C:360:LYS:HG2	1.93	0.51
1:B:145:ASP:HB3	1:B:147:GLN:HE21	1.76	0.51
1:A:476:ILE:HA	1:A:483:GLN:HE21	1.76	0.51
1:B:71:GLY:O	1:B:418:PHE:N	2.40	0.50
1:B:98:GLY:HA2	1:B:418:PHE:HE1	1.76	0.50
1:A:397:PHE:CD2	1:A:397:PHE:C	2.84	0.50
1:B:110:LEU:HD12	1:B:179:TYR:HE2	1.77	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:100:PHE:HB2	1:C:417:LEU:HB2	1.93	0.49
1:A:238:SER:OG	1:A:239:GLY:N	2.45	0.49
1:C:626:SER:OG	1:C:627:SER:N	2.45	0.49
1:A:412:LEU:HD23	1:A:414:ILE:HD11	1.94	0.49
1:C:35:ASN:HA	1:C:38:LYS:HG2	1.94	0.49
1:B:436:ILE:HD13	1:B:633:LEU:HD22	1.92	0.49
1:C:471:LYS:HD3	1:C:476:ILE:HD11	1.93	0.49
1:C:497:ILE:HD11	1:C:527:PRO:HB3	1.94	0.49
1:A:307:ARG:HD2	1:C:313:SER:HB3	1.94	0.49
1:C:76:LYS:HE2	1:C:413:TYR:HE1	1.78	0.48
1:A:330:TRP:CH2	1:C:557:PHE:HB2	2.47	0.48
1:B:121:PRO:HB2	1:B:137:PHE:HE1	1.78	0.48
1:B:420:THR:HG22	1:B:422:GLU:H	1.79	0.48
1:B:242:LEU:HD12	1:B:304:LEU:HD12	1.96	0.48
1:C:147:GLN:O	1:C:148:THR:OG1	2.28	0.48
1:C:372:PRO:HB3	1:C:395:PRO:HB3	1.96	0.48
1:A:491:GLY:HA2	1:A:536:ILE:HD11	1.94	0.48
1:B:566:TYR:HB3	1:B:588:PRO:HG3	1.95	0.48
1:B:550:ILE:HG23	1:B:553:PHE:CE2	2.49	0.48
1:A:110:LEU:HD11	1:A:187:LEU:HD11	1.96	0.48
1:A:138:PRO:HD2	1:A:155:TYR:HE2	1.77	0.48
1:A:247:ASP:HB3	1:B:494:VAL:HG13	1.95	0.48
1:B:238:SER:OG	1:B:239:GLY:N	2.46	0.48
1:A:102:HIS:CD2	1:A:103:ASP:H	2.31	0.47
1:C:520:SER:OG	1:C:521:SER:N	2.47	0.47
1:A:163:ARG:N	1:A:164:PRO:HD3	2.30	0.47
1:A:318:GLN:N	1:A:318:GLN:OE1	2.47	0.47
1:B:75:ASN:OD1	1:B:76:LYS:N	2.39	0.47
1:A:557:PHE:HB2	1:B:330:TRP:CH2	2.49	0.47
1:C:314:CYS:SG	1:C:315:ASN:N	2.88	0.47
1:A:26:LEU:HD12	1:A:56:HIS:CD2	2.50	0.46
1:C:261:GLU:HG2	1:C:262:ASN:N	2.30	0.46
1:C:567:GLY:HA2	1:C:571:ILE:HD12	1.96	0.46
1:A:107:HIS:O	1:A:108:HIS:ND1	2.48	0.46
1:A:407:LEU:HD13	1:A:410:ASN:OD1	2.16	0.46
1:A:347:SER:OG	1:A:347:SER:O	2.31	0.46
1:B:476:ILE:H	1:B:476:ILE:HD12	1.80	0.46
1:A:188:TYR:CE2	1:A:359:ILE:HD13	2.50	0.46
1:B:336:TRP:HB3	1:B:437:ARG:O	2.16	0.46
1:A:519:CYS:HB3	1:C:506:ILE:HD11	1.97	0.45
1:B:92:PHE:CD2	1:B:412:LEU:HD22	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:306:ILE:HG13	1:C:321:LYS:HG2	1.98	0.45
1:B:347:SER:OG	1:B:347:SER:O	2.28	0.45
1:B:438:VAL:HG21	1:B:440:LYS:HE2	1.99	0.45
1:A:227:LEU:HG	1:A:330:TRP:HB2	1.97	0.45
1:C:126:SER:H	1:C:136:THR:HG21	1.82	0.45
1:A:254:SER:CB	1:A:268:CYS:H	2.30	0.45
1:B:543:THR:HG22	1:B:548:ASN:HA	1.99	0.45
1:A:336:TRP:HB3	1:A:437:ARG:O	2.17	0.45
1:C:187:LEU:HD23	1:C:187:LEU:HA	1.83	0.45
1:A:397:PHE:O	1:A:397:PHE:CG	2.70	0.44
1:B:470:LEU:HB2	1:B:537:ILE:HD11	2.00	0.44
1:C:92:PHE:HE2	1:C:359:ILE:HD12	1.82	0.44
1:B:137:PHE:HA	1:B:138:PRO:HD3	1.84	0.44
1:B:226:HIS:HE1	1:B:232:VAL:HG11	1.82	0.44
1:A:245:ILE:HG21	1:A:302:THR:HG22	1.99	0.44
1:A:177:VAL:HG13	1:A:368:VAL:HG13	1.98	0.44
1:B:108:HIS:NE2	1:B:188:TYR:OH	2.39	0.44
1:B:631:ASN:OD1	1:B:631:ASN:N	2.50	0.44
1:C:147:GLN:HG2	1:C:147:GLN:O	2.18	0.44
1:C:102:HIS:CG	1:C:103:ASP:H	2.35	0.44
1:A:416:ASN:O	1:A:417:LEU:HD12	2.18	0.43
1:B:478:ASP:OD1	1:B:479:GLN:N	2.51	0.43
1:C:465:TYR:O	1:C:466:MET:HG2	2.18	0.43
1:A:74:TYR:CD1	1:A:415:ASN:HB3	2.53	0.43
1:C:100:PHE:CE2	1:C:346:PRO:HA	2.53	0.43
1:B:423:ILE:HG23	1:B:426:LEU:HD21	2.00	0.43
1:A:397:PHE:O	1:A:397:PHE:CD2	2.71	0.43
1:B:102:HIS:CD2	1:B:103:ASP:H	2.37	0.43
1:B:136:THR:HA	1:B:396:TRP:NE1	2.30	0.43
1:C:110:LEU:HD23	1:C:179:TYR:HE2	1.83	0.43
1:A:107:HIS:HE1	1:C:554:PRO:HG2	1.83	0.43
1:B:224:TYR:O	1:B:228:VAL:HG22	2.19	0.43
1:A:465:TYR:HE1	1:A:588:PRO:HB2	1.82	0.43
1:A:14:GLY:O	1:A:18:LYS:HB2	2.19	0.42
1:B:182:TYR:OH	1:B:212:ARG:NH1	2.48	0.42
1:B:276:LEU:HD12	1:B:281:PRO:HG3	2.00	0.42
1:B:586:LEU:HD11	1:C:70:VAL:HG21	2.01	0.42
1:C:537:ILE:HD13	1:C:540:ILE:HD11	2.01	0.42
1:C:539:ASN:HD22	1:C:552:LYS:HB3	1.85	0.42
1:A:68:VAL:HG21	1:B:58:VAL:HA	2.00	0.42
1:C:435:LEU:HA	1:C:632:PHE:HB3	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:184:GLY:HA3	1:B:228:VAL:HB	2.02	0.42
1:B:378:GLN:CB	1:B:392:ARG:H	2.33	0.42
1:A:436:ILE:HD13	1:A:633:LEU:HD22	2.00	0.42
1:B:100:PHE:HD1	1:B:346:PRO:HA	1.84	0.42
1:C:192:ARG:HB3	1:C:358:THR:OG1	2.20	0.42
1:C:363:SER:OG	1:C:364:GLN:N	2.52	0.42
1:B:505:GLU:O	1:C:521:SER:OG	2.35	0.42
1:C:525:ILE:HG13	1:C:526:SER:H	1.85	0.42
1:A:58:VAL:HG12	1:C:68:VAL:HG21	2.01	0.41
1:B:187:LEU:HD11	1:B:329:LEU:HD12	2.01	0.41
1:A:575:ASP:HA	1:B:222:THR:HG21	2.02	0.41
1:C:468:ILE:HB	1:C:580:MET:HB2	2.03	0.41
1:A:482:HIS:NE2	1:A:495:ASN:OD1	2.53	0.41
1:A:8:CYS:SG	1:A:9:LEU:N	2.91	0.41
1:A:92:PHE:CD2	1:A:412:LEU:HD22	2.56	0.41
1:A:468:ILE:HB	1:A:580:MET:HB2	2.01	0.41
1:A:56:HIS:CD2	1:C:66:PRO:HB2	2.56	0.41
1:B:20:ILE:HG23	1:B:21:LEU:HD12	2.03	0.41
1:B:540:ILE:HD11	1:B:580:MET:SD	2.61	0.41
1:C:68:VAL:HA	1:C:69:PRO:HD3	1.95	0.41
1:A:237:THR:OG1	1:A:238:SER:N	2.54	0.40
1:A:27:ASN:OD1	1:A:28:SER:N	2.53	0.40
1:C:188:TYR:CE2	1:C:359:ILE:HD13	2.56	0.40
1:A:521:SER:O	1:A:522:ILE:HD13	2.21	0.40
1:A:336:TRP:CD2	1:A:436:ILE:HD12	2.56	0.40
1:A:315:ASN:HA	1:A:319:THR:HG21	2.04	0.40

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	624/646 (97%)	537 (86%)	84 (14%)	3 (0%)	31	72
1	B	624/646 (97%)	537 (86%)	87 (14%)	0	100	100
1	C	625/646 (97%)	537 (86%)	88 (14%)	0	100	100
All	All	1873/1938 (97%)	1611 (86%)	259 (14%)	3 (0%)	53	84

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	401	VAL
1	A	402	ILE
1	A	85	THR

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	423/576 (73%)	420 (99%)	3 (1%)	85	92
1	B	439/576 (76%)	438 (100%)	1 (0%)	94	96
1	C	430/576 (75%)	430 (100%)	0	100	100
All	All	1292/1728 (75%)	1288 (100%)	4 (0%)	93	96

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	212	ARG
1	A	397	PHE
1	A	401	VAL
1	B	212	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	ASN

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Mol	Chain	Res	Type
1	A	102	HIS
1	A	282	HIS
1	A	483	GLN
1	B	102	HIS
1	B	147	GLN
1	B	226	HIS
1	B	565	HIS
1	C	102	HIS
1	C	539	ASN
1	C	597	HIS

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 carbohydrates 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.