



Full wwPDB/EMDatabank EM Map/Model Validation Report ⓘ

Mar 5, 2019 – 11:36 AM EST

PDB ID : 6IMM
EMDB ID: : EMD-9693
Title : Cryo-EM structure of an alphavirus, Sindbis virus
Authors : Zhang, X.; Ma, J.; Chen, L.
Deposited on : 2018-10-23
Resolution : 3.50 Å(reported)

This is a Full wwPDB/EMDatabank EM Map/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.

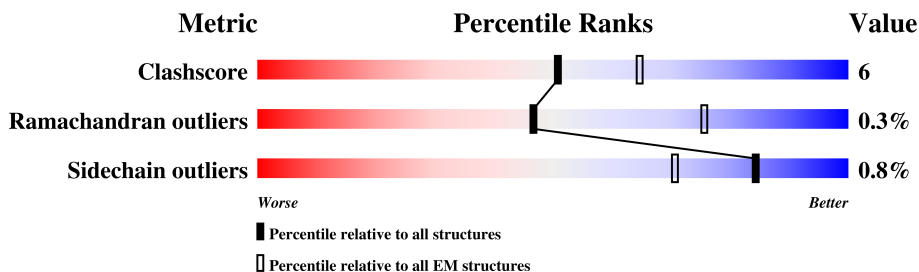
MolProbity : 4.02b-467
Mogul : 1.7.3 (157068), CSD as539be (2018)
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20031633

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 3.50 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	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. 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	N	439	85% 11% .
1	T	439	86% 10% .
1	Z	439	79% 16% . .
1	a	439	95% . .
2	P	388	72% 11% . 16%
2	V	388	70% 13% . 16%
2	d	388	81% . 16%
2	e	388	80% . 16%
3	R	69	58% 9% . 32%

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Mol	Chain	Length	Quality of chain
3	X	69	 55% 13% 32%
3	h	69	 68% 32%
3	i	69	 68% 32%

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 23966 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 Spike glycoprotein E1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	N	423	Total 3132	C 1984	N 529	O 599	S 20	0	0
1	T	423	Total 3132	C 1984	N 529	O 599	S 20	0	0
1	Z	423	Total 3132	C 1984	N 529	O 599	S 20	0	0
1	a	423	Total 3132	C 1984	N 529	O 599	S 20	0	0

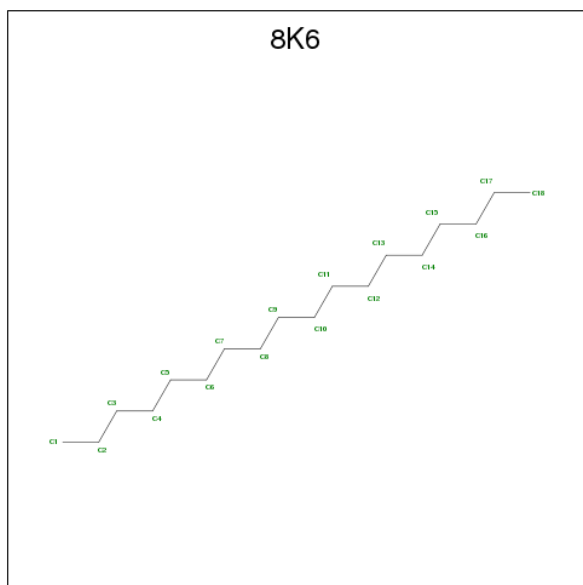
- Molecule 2 is a protein called Spike glycoprotein E2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	P	325	Total 2499	C 1596	N 443	O 445	S 15	0	0
2	V	325	Total 2499	C 1596	N 443	O 445	S 15	0	0
2	d	325	Total 2499	C 1596	N 443	O 445	S 15	0	0
2	e	325	Total 2499	C 1596	N 443	O 445	S 15	0	0

- Molecule 3 is a protein called Assembly protein E3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	R	47	Total 356	C 221	N 60	O 69	S 6	0	0
3	X	47	Total 356	C 221	N 60	O 69	S 6	0	0
3	h	47	Total 356	C 221	N 60	O 69	S 6	0	0
3	i	47	Total 356	C 221	N 60	O 69	S 6	0	0

- Molecule 4 is Octadecane (three-letter code: 8K6) (formula: C₁₈H₃₈).

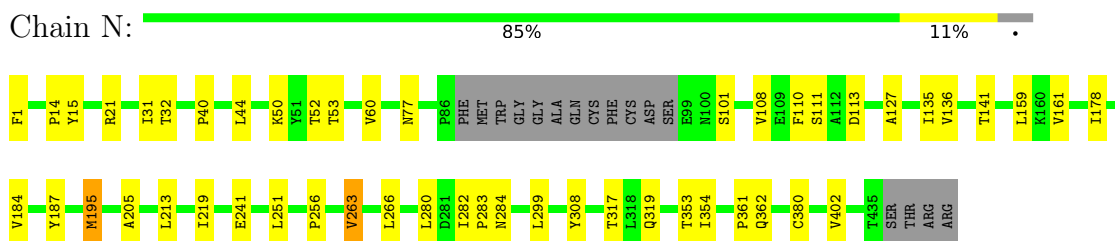


Mol	Chain	Residues	Atoms	AltConf
4	d	1	Total C 18 18	0

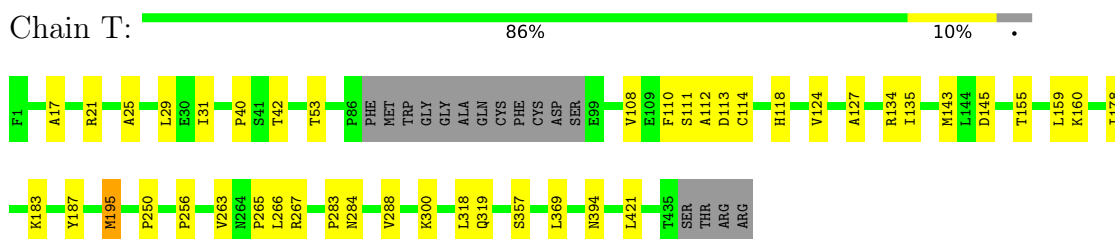
3 Residue-property plots [i](#)

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.

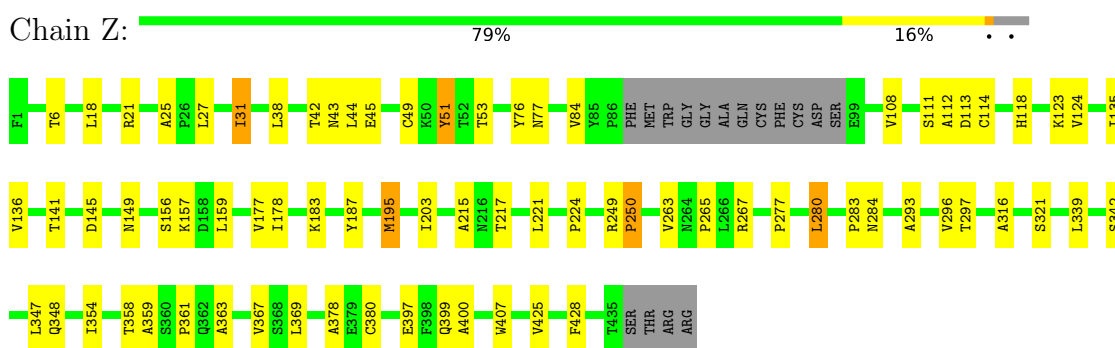
- Molecule 1: Spike glycoprotein E1



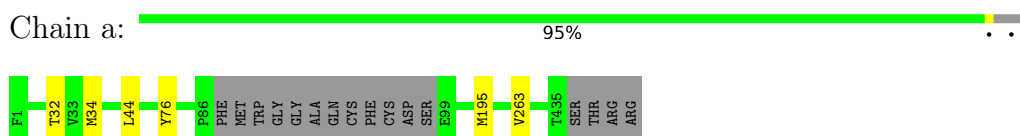
- Molecule 1: Spike glycoprotein E1



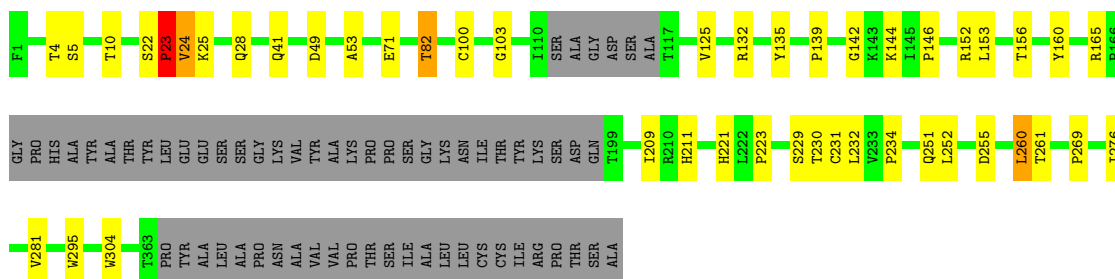
- Molecule 1: Spike glycoprotein E1



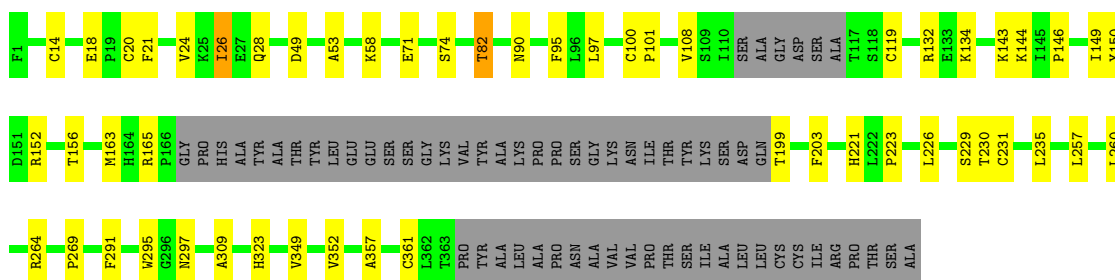
- Molecule 1: Spike glycoprotein E1



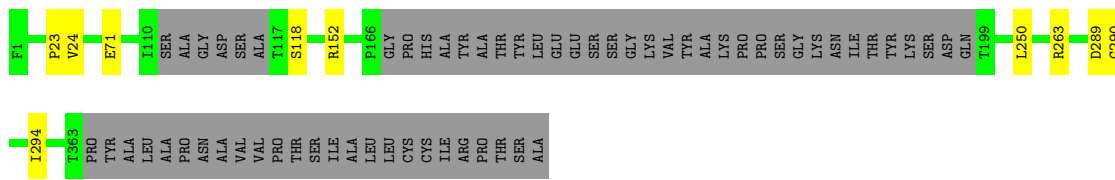
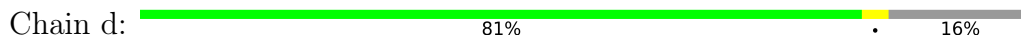
- Molecule 2: Spike glycoprotein E2



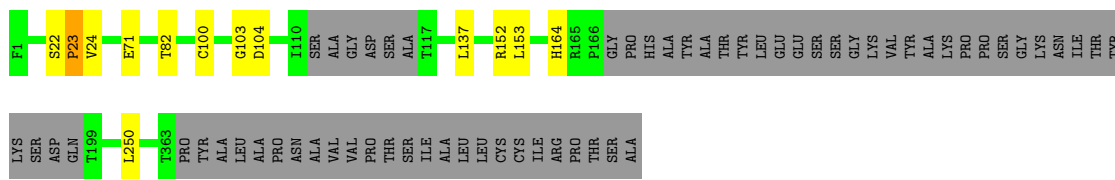
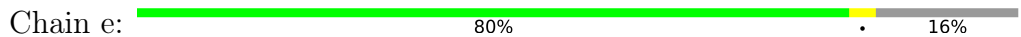
• Molecule 2: Spike glycoprotein E2



• Molecule 2: Spike glycoprotein E2



• Molecule 2: Spike glycoprotein E2



• Molecule 3: Assembly protein E3



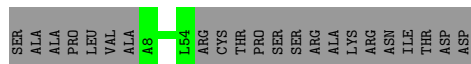
- Molecule 3: Assembly protein E3

Chain X:  55% 13% 32%



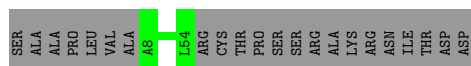
- Molecule 3: Assembly protein E3

Chain h:  68% 32%



- Molecule 3: Assembly protein E3

Chain i:  68% 32%



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	29974	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	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: 8K6

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	N	0.49	0/3206	0.67	2/4383 (0.0%)
1	T	0.48	0/3206	0.65	0/4383
1	Z	0.67	2/3206 (0.1%)	0.79	7/4383 (0.2%)
1	a	0.51	0/3206	0.66	2/4383 (0.0%)
2	P	0.46	0/2572	0.71	1/3514 (0.0%)
2	V	0.48	0/2572	0.69	1/3514 (0.0%)
2	d	0.59	0/2572	0.75	1/3514 (0.0%)
2	e	0.48	0/2572	0.71	3/3514 (0.1%)
3	R	0.34	0/362	0.58	1/493 (0.2%)
3	X	0.34	0/362	0.58	0/493
3	h	0.32	0/362	0.53	0/493
3	i	0.36	0/362	0.55	0/493
All	All	0.52	2/24560 (0.0%)	0.70	18/33560 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	N	0	1
1	T	0	1
1	Z	0	3
1	a	0	2
2	P	0	4
2	V	0	3
2	d	0	4
2	e	0	4
All	All	0	22

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	Z	367	VAL	CB-CG2	-6.40	1.39	1.52
1	Z	49	CYS	CB-SG	-5.39	1.73	1.81

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	Z	27	LEU	CA-CB-CG	7.47	132.49	115.30
2	V	221	HIS	C-N-CA	7.02	139.25	121.70
2	e	164	HIS	C-N-CA	6.56	138.10	121.70
1	Z	339	LEU	CA-CB-CG	6.12	129.37	115.30
3	R	12	LEU	CA-CB-CG	5.93	128.94	115.30
1	a	44	LEU	CA-CB-CG	5.92	128.93	115.30
2	e	153	LEU	CA-CB-CG	5.72	128.46	115.30
1	a	34	MET	CA-CB-CG	5.69	122.97	113.30
1	Z	249	ARG	O-C-N	5.62	131.77	121.10
2	d	294	ILE	CG1-CB-CG2	-5.60	99.08	111.40
2	P	260	LEU	CA-CB-CG	5.58	128.14	115.30
1	Z	249	ARG	C-N-CD	5.53	140.02	128.40
1	Z	44	LEU	CA-CB-CG	5.52	128.00	115.30
1	N	354	ILE	CG1-CB-CG2	-5.51	99.28	111.40
2	e	137	LEU	CA-CB-CG	5.47	127.88	115.30
1	Z	38	LEU	CA-CB-CG	5.46	127.85	115.30
1	Z	18	LEU	CA-CB-CG	5.21	127.29	115.30
1	N	44	LEU	CA-CB-CG	5.06	126.94	115.30

There are no chirality outliers.

All (22) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	N	263	VAL	Peptide
2	P	165	ARG	Peptide
2	P	22	SER	Peptide
2	P	23	PRO	Peptide
2	P	71	GLU	Peptide
1	T	263	VAL	Peptide
2	V	18	GLU	Peptide
2	V	26	ILE	Peptide
2	V	71	GLU	Peptide
1	Z	263	VAL	Peptide
1	Z	51	TYR	Peptide
1	Z	76	TYR	Peptide
1	a	263	VAL	Peptide

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Mol	Chain	Res	Type	Group
1	a	76	TYR	Peptide
2	d	118	SER	Peptide
2	d	289	ASP	Peptide
2	d	290	GLY	Peptide
2	d	71	GLU	Peptide
2	e	103	GLY	Peptide
2	e	22	SER	Peptide
2	e	23	PRO	Peptide
2	e	71	GLU	Peptide

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	N	3132	0	3043	28	0
1	T	3132	0	3043	25	0
1	Z	3132	0	3043	37	0
1	a	3132	0	3043	0	0
2	P	2499	0	2408	24	0
2	V	2499	0	2408	29	0
2	d	2499	0	2408	0	0
2	e	2499	0	2408	0	0
3	R	356	0	346	4	0
3	X	356	0	346	6	0
3	h	356	0	346	0	0
3	i	356	0	346	0	0
4	d	18	0	38	0	0
All	All	23966	0	23226	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)
2:V:144:LYS:HA	2:V:231:CYS:O	1.67	0.95

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:P:144:LYS:HA	2:P:231:CYS:O	1.72	0.90
2:V:149:ILE:O	2:V:226:LEU:HA	1.77	0.84
1:Z:31:ILE:HG22	1:Z:135:ILE:HG12	1.73	0.70
1:N:1:PHE:HB2	1:N:21:ARG:HH21	1.58	0.68
1:Z:21:ARG:NH2	1:Z:284:ASN:OD1	2.27	0.67
1:Z:77:ASN:HB2	1:Z:221:LEU:HD23	1.76	0.66
1:Z:363:ALA:HB3	1:Z:378:ALA:HB3	1.77	0.65
1:N:77:ASN:ND2	1:N:219:ILE:O	2.31	0.63
1:T:256:PRO:HA	2:V:269:PRO:HG3	1.81	0.62
1:N:361:PRO:HA	1:N:380:CYS:HB2	1.81	0.62
1:T:155:THR:HG22	1:T:160:LYS:HG2	1.82	0.62
1:N:53:THR:HG22	1:N:108:VAL:HG12	1.82	0.61
2:P:132:ARG:NH2	2:P:261:THR:OG1	2.33	0.61
2:P:152:ARG:HB3	2:P:153:LEU:HD12	1.83	0.61
2:P:252:LEU:HD22	2:P:276:ILE:HD11	1.83	0.60
1:T:300:LYS:HB2	1:T:319:GLN:HB2	1.83	0.60
1:T:21:ARG:NH2	1:T:284:ASN:OD1	2.34	0.60
1:N:31:ILE:HG22	1:N:135:ILE:HG12	1.84	0.59
1:T:53:THR:HG22	1:T:108:VAL:HG12	1.84	0.59
1:N:317:THR:HG22	1:N:353:THR:HG22	1.85	0.59
2:V:20:CYS:SG	2:V:21:PHE:N	2.73	0.59
1:Z:178:ILE:HD13	1:Z:187:TYR:HB3	1.84	0.58
1:N:50:LYS:HE2	1:N:241:GLU:HB2	1.86	0.58
1:Z:347:LEU:HD23	1:Z:348:GLN:H	1.68	0.58
2:V:156:THR:HA	2:V:223:PRO:HA	1.86	0.57
2:P:23:PRO:O	2:P:25:LYS:N	2.31	0.57
1:T:357:SER:O	1:T:394:ASN:ND2	2.39	0.56
2:P:139:PRO:HG3	2:P:234:PRO:HB3	1.87	0.56
1:N:178:ILE:HD13	1:N:187:TYR:HB3	1.89	0.55
1:N:161:VAL:HG22	1:N:280:LEU:HG	1.87	0.55
3:X:33:ALA:HA	3:X:36:ILE:HD12	1.87	0.55
2:V:264:ARG:HA	2:V:291:PHE:H	1.71	0.55
1:Z:159:LEU:HD22	1:Z:280:LEU:HD21	1.90	0.54
2:V:134:LYS:HD3	2:V:257:LEU:HD13	1.90	0.54
1:Z:159:LEU:HB3	1:Z:283:PRO:HD3	1.89	0.54
1:T:40:PRO:HA	1:T:127:ALA:HA	1.91	0.54
1:T:178:ILE:HD13	1:T:187:TYR:HB3	1.90	0.53
1:N:113:ASP:OD1	1:N:113:ASP:N	2.41	0.53
2:P:229:SER:OG	2:P:230:THR:N	2.41	0.53
1:N:40:PRO:HA	1:N:127:ALA:HA	1.90	0.53
3:R:33:ALA:HA	3:R:36:ILE:HD12	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:N:77:ASN:HD22	1:N:219:ILE:HG23	1.74	0.53
1:T:159:LEU:HB3	1:T:283:PRO:HD3	1.91	0.53
2:P:103:GLY:HA2	2:P:125:VAL:HB	1.90	0.53
2:P:255:ASP:N	2:P:255:ASP:OD1	2.41	0.53
1:T:113:ASP:OD1	1:T:113:ASP:N	2.40	0.52
1:Z:195:MET:SD	1:Z:195:MET:N	2.77	0.52
1:T:145:ASP:N	1:T:145:ASP:OD1	2.41	0.52
2:V:143:LYS:HD2	2:V:235:LEU:HD21	1.90	0.52
2:V:165:ARG:NH1	2:V:199:THR:OG1	2.44	0.51
2:P:82:THR:HG21	2:P:100:CYS:HB3	1.92	0.51
1:Z:53:THR:HA	1:Z:108:VAL:HA	1.92	0.51
1:T:318:LEU:HD13	1:T:369:LEU:HD12	1.92	0.51
1:Z:297:THR:O	1:Z:321:SER:OG	2.27	0.51
1:N:362:GLN:NE2	1:N:402:VAL:O	2.44	0.51
1:Z:113:ASP:OD1	1:Z:113:ASP:N	2.43	0.51
2:P:251:GLN:HG3	2:P:281:VAL:HG22	1.93	0.51
1:Z:399:GLN:HA	1:Z:407:TRP:HZ2	1.76	0.51
2:P:135:TYR:HB3	2:P:234:PRO:HG3	1.92	0.51
1:Z:358:THR:OG1	1:Z:359:ALA:N	2.44	0.51
1:Z:53:THR:HG22	1:Z:108:VAL:HG12	1.93	0.50
2:V:14:CYS:HA	2:V:119:CYS:HA	1.93	0.49
3:R:12:LEU:HG	3:R:36:ILE:HG12	1.94	0.49
2:V:163:MET:HG2	2:V:203:PHE:HA	1.94	0.49
3:R:29:GLU:HB3	3:R:32:ARG:HB2	1.94	0.49
2:V:97:LEU:HD11	2:V:150:TYR:HB3	1.95	0.49
1:Z:114:CYS:O	1:Z:118:HIS:ND1	2.45	0.48
3:X:36:ILE:O	3:X:40:ASN:ND2	2.46	0.48
1:Z:45:GLU:OE2	1:Z:123:LYS:NZ	2.36	0.48
3:R:23:PRO:HA	3:R:24:THR:HA	1.60	0.48
1:T:31:ILE:HG22	1:T:135:ILE:HG12	1.96	0.48
2:P:146:PRO:HA	2:P:230:THR:HA	1.95	0.47
2:V:260:LEU:HB2	2:V:295:TRP:HD1	1.79	0.47
2:V:58:LYS:HA	2:V:74:SER:HA	1.97	0.47
1:N:60:VAL:HA	1:N:101:SER:O	2.14	0.47
1:N:205:ALA:HB2	1:N:213:LEU:HD23	1.96	0.47
1:N:195:MET:SD	1:N:195:MET:N	2.88	0.47
2:V:82:THR:HG21	2:V:100:CYS:HB3	1.96	0.47
2:V:357:ALA:O	2:V:361:CYS:HB2	2.15	0.47
2:P:142:GLY:HA3	2:P:232:LEU:HB3	1.97	0.46
1:Z:425:VAL:HA	1:Z:428:PHE:HD2	1.80	0.46
2:V:90:ASN:ND2	2:V:152:ARG:O	2.46	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:X:29:GLU:HB3	3:X:32:ARG:HD2	1.97	0.46
2:P:260:LEU:HA	2:P:295:TRP:HD1	1.81	0.46
2:P:4:THR:OG1	2:P:5:SER:N	2.49	0.46
2:V:49:ASP:N	2:V:53:ALA:O	2.42	0.46
2:V:349:VAL:HA	2:V:352:VAL:HG12	1.98	0.45
1:Z:108:VAL:HG11	1:Z:217:THR:HG21	1.98	0.45
1:T:265:PRO:HD2	1:T:267:ARG:HH11	1.82	0.45
1:Z:42:THR:HG22	1:Z:124:VAL:HG22	1.97	0.45
1:N:1:PHE:N	1:N:282:ILE:O	2.44	0.45
2:P:28:GLN:HB3	2:P:41:GLN:HB3	1.99	0.45
1:N:299:LEU:HA	1:N:319:GLN:O	2.17	0.45
1:Z:215:ALA:HB1	1:Z:217:THR:HG23	1.98	0.45
1:Z:84:VAL:HG21	1:Z:224:PRO:HG2	1.99	0.45
1:N:256:PRO:HA	2:P:269:PRO:HG3	1.99	0.45
1:N:159:LEU:HB3	1:N:283:PRO:HD3	1.97	0.44
2:P:10:THR:O	2:P:10:THR:OG1	2.34	0.44
1:T:114:CYS:O	1:T:118:HIS:ND1	2.49	0.44
2:V:146:PRO:HA	2:V:230:THR:HA	1.99	0.44
1:N:21:ARG:NH1	1:N:284:ASN:OD1	2.48	0.44
1:Z:145:ASP:N	1:Z:145:ASP:OD1	2.50	0.44
1:Z:265:PRO:HD2	1:Z:267:ARG:NH1	2.31	0.44
1:Z:6:THR:HA	1:Z:277:PRO:HA	1.98	0.44
3:X:12:LEU:HG	3:X:36:ILE:HG12	1.99	0.44
2:V:24:VAL:HG11	2:V:108:VAL:HG11	2.00	0.44
1:Z:361:PRO:HA	1:Z:380:CYS:HB2	2.00	0.43
1:N:184:VAL:HG12	1:N:251:LEU:HD12	2.01	0.43
2:P:142:GLY:HA3	2:P:232:LEU:HD22	2.00	0.43
2:P:209:ILE:O	2:P:211:HIS:N	2.49	0.43
1:T:183:LYS:HD3	1:T:250:PRO:HG3	2.00	0.43
1:T:195:MET:SD	1:T:195:MET:N	2.90	0.43
1:Z:156:SER:OG	1:Z:157:LYS:N	2.49	0.43
1:Z:183:LYS:HD3	1:Z:250:PRO:HG3	1.99	0.43
1:T:111:SER:OG	1:T:112:ALA:N	2.51	0.43
3:X:25:CYS:HB3	3:X:28:ARG:HB2	1.99	0.43
2:P:160:TYR:CD1	2:P:221:HIS:HB3	2.54	0.43
2:P:49:ASP:N	2:P:53:ALA:O	2.37	0.43
2:V:26:ILE:O	2:V:28:GLN:N	2.50	0.43
2:V:132:ARG:HD3	2:V:297:ASN:H	1.83	0.42
1:N:263:VAL:HA	1:N:266:LEU:H	1.84	0.42
1:Z:25:ALA:HB2	1:Z:293:ALA:HB2	2.00	0.42
1:T:42:THR:HG22	1:T:124:VAL:HG22	2.02	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:Z:397:GLU:HB2	1:Z:400:ALA:HB3	2.02	0.42
1:Z:43:ASN:OD1	1:Z:43:ASN:N	2.52	0.42
1:T:134:ARG:HG2	1:T:143:MET:SD	2.59	0.42
2:V:309:ALA:HB3	2:V:323:HIS:CD2	2.54	0.42
1:T:42:THR:HG21	1:T:266:LEU:HD23	2.02	0.42
1:T:265:PRO:HD2	1:T:267:ARG:NH1	2.35	0.42
1:Z:296:VAL:HG21	1:Z:369:LEU:HD22	2.01	0.42
2:P:156:THR:HA	2:P:223:PRO:HA	2.02	0.42
1:T:421:LEU:HD23	2:V:349:VAL:HG21	2.00	0.41
1:Z:51:TYR:HB3	1:Z:203:ILE:HD11	2.02	0.41
2:V:229:SER:OG	2:V:230:THR:N	2.53	0.41
3:X:25:CYS:SG	3:X:26:TYR:N	2.93	0.41
1:N:52:THR:HG23	1:N:111:SER:HA	2.03	0.41
1:Z:111:SER:OG	1:Z:112:ALA:N	2.53	0.41
2:V:150:TYR:CZ	2:V:226:LEU:HD12	2.56	0.41
1:Z:316:ALA:HB3	1:Z:354:ILE:HD11	2.02	0.41
1:Z:149:ASN:OD1	1:Z:149:ASN:N	2.54	0.41
2:V:260:LEU:HB2	2:V:295:TRP:CD1	2.56	0.41
1:N:15:TYR:HB3	1:N:31:ILE:HG13	2.02	0.40
1:T:25:ALA:HB3	1:T:288:VAL:HG13	2.03	0.40
1:N:136:VAL:HG22	1:N:141:THR:HG22	2.03	0.40
1:T:17:ALA:HB3	1:T:29:LEU:HB3	2.03	0.40
2:V:95:PHE:CE2	2:V:223:PRO:HD2	2.55	0.40
1:Z:136:VAL:HG22	1:Z:141:THR:HG22	2.03	0.40
1:N:308:TYR:HB3	1:N:380:CYS:HB3	2.03	0.40
1:N:14:PRO:HA	1:N:32:THR:HG22	2.03	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	N	419/439 (95%)	361 (86%)	58 (14%)	0	100	100
1	T	419/439 (95%)	364 (87%)	55 (13%)	0	100	100
1	Z	419/439 (95%)	347 (83%)	70 (17%)	2 (0%)	31	71
1	a	419/439 (95%)	362 (86%)	57 (14%)	0	100	100
2	P	319/388 (82%)	255 (80%)	62 (19%)	2 (1%)	27	68
2	V	319/388 (82%)	265 (83%)	53 (17%)	1 (0%)	43	78
2	d	319/388 (82%)	257 (81%)	60 (19%)	2 (1%)	27	68
2	e	319/388 (82%)	279 (88%)	37 (12%)	3 (1%)	19	60
3	R	45/69 (65%)	35 (78%)	10 (22%)	0	100	100
3	X	45/69 (65%)	39 (87%)	6 (13%)	0	100	100
3	h	45/69 (65%)	37 (82%)	8 (18%)	0	100	100
3	i	45/69 (65%)	40 (89%)	5 (11%)	0	100	100
All	All	3132/3584 (87%)	2641 (84%)	481 (15%)	10 (0%)	47	78

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	P	23	PRO
2	P	24	VAL
2	d	24	VAL
2	e	24	VAL
2	e	104	ASP
2	d	23	PRO
2	e	23	PRO
1	Z	342	SER
1	Z	250	PRO
2	V	101	PRO

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.

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	N	336/362 (93%)	334 (99%)	2 (1%)	87	95
1	T	336/362 (93%)	334 (99%)	2 (1%)	87	95
1	Z	336/362 (93%)	332 (99%)	4 (1%)	74	88
1	a	336/362 (93%)	334 (99%)	2 (1%)	87	95
2	P	266/336 (79%)	263 (99%)	3 (1%)	76	89
2	V	266/336 (79%)	265 (100%)	1 (0%)	92	96
2	d	266/336 (79%)	263 (99%)	3 (1%)	76	89
2	e	266/336 (79%)	262 (98%)	4 (2%)	67	86
3	R	39/57 (68%)	39 (100%)	0	100	100
3	X	39/57 (68%)	39 (100%)	0	100	100
3	h	39/57 (68%)	39 (100%)	0	100	100
3	i	39/57 (68%)	39 (100%)	0	100	100
All	All	2564/3020 (85%)	2543 (99%)	21 (1%)	84	92

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	N	110	PHE
1	N	195	MET
2	P	24	VAL
2	P	82	THR
2	P	304	TRP
1	T	110	PHE
1	T	195	MET
2	V	82	THR
1	Z	31	ILE
1	Z	177	VAL
1	Z	195	MET
1	Z	280	LEU
1	a	32	THR
1	a	195	MET
2	d	152	ARG
2	d	250	LEU
2	d	263	ARG
2	e	82	THR
2	e	100	CYS

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Mol	Chain	Res	Type
2	e	152	ARG
2	e	250	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	N	73	HIS
1	N	77	ASN
1	N	175	HIS
1	N	252	GLN
2	P	221	HIS
2	P	298	HIS
1	T	230	HIS
1	T	362	GLN
1	Z	73	HIS
1	a	73	HIS
1	a	362	GLN
2	d	91	HIS
2	d	323	HIS
2	e	68	HIS
2	e	298	HIS
2	e	323	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](#)

1 ligand is 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
4	8K6	d	1001	-	17,17,17	0.43	0	16,16,16	1.22	1 (6%)

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
4	8K6	d	1001	-	-	0/15/15/15	0/0/0/0

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	d	1001	8K6	C9-C8-C7	-2.45	101.11	114.41

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.