



Full wwPDB/EMDataBank EM Map/Model Validation Report ⓘ

Nov 27, 2017 – 02:04 PM EST

PDB ID : 6BMF
EMDB ID: : EMD-8887
Title : Vps4p-Vta1p complex with peptide binding to the central pore of Vps4p
Authors : Han, H.; Monroe, N.; Shen, P.; Sundquist, W.I.; Hill, C.P.
Deposited on : unknown
Resolution : 3.20 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
<http://wwpdb.org/validation/2016/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

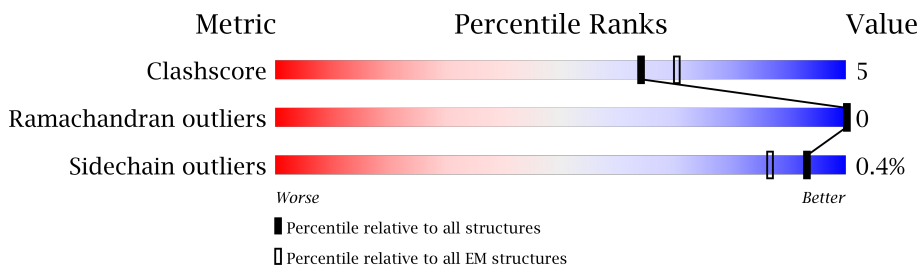
MolProbity : 4.02b-467
Mogul : 1.7.2 (RC1), CSD as538be (2017)
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20030345

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.20 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	337	75% 7% 18%
1	B	337	74% 10% 15%
1	C	337	73% 11% 15%
1	D	337	76% 9% 15%
1	E	337	67% 12% 21%
2	G	10	90% 10%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11033 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.

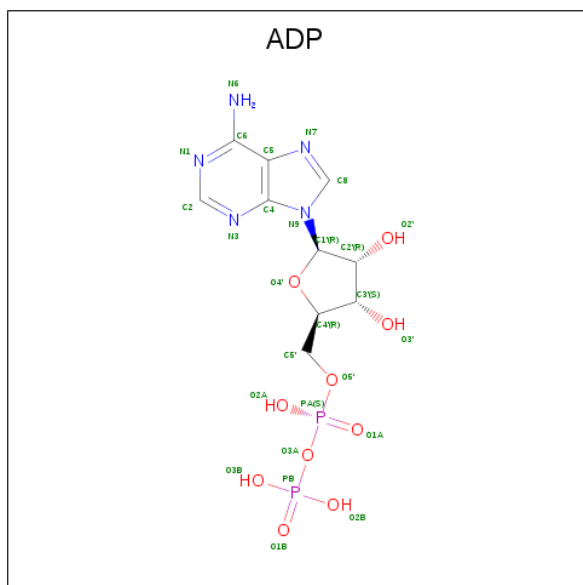
- Molecule 1 is a protein called Vacuolar protein sorting-associated protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	277	Total 2137	C 1353	N 367	O 410	S 7	0	0
1	B	285	Total 2202	C 1391	N 381	O 423	S 7	0	0
1	C	285	Total 2202	C 1391	N 381	O 423	S 7	0	0
1	D	285	Total 2202	C 1391	N 381	O 423	S 7	0	0
1	E	267	Total 2071	C 1312	N 355	O 397	S 7	0	0

- Molecule 2 is a protein called Vps2p.

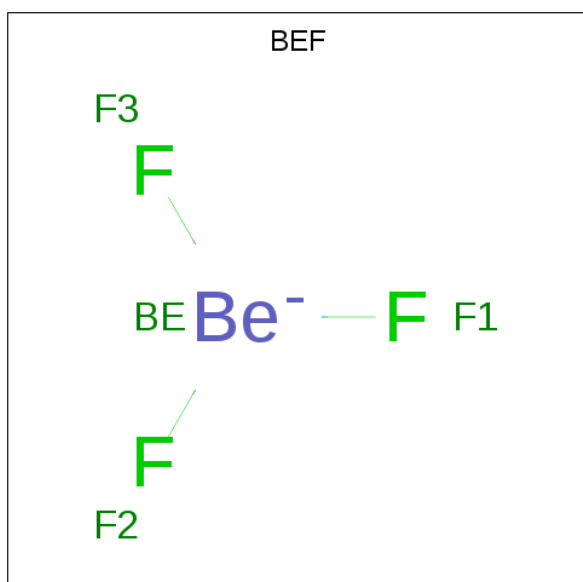
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	G	10	Total 68	C 43	N 11	O 14	0	1

- Molecule 3 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
3	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	B	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	C	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	D	1	Total	C	N	O	P	0
			27	10	5	10	2	
3	E	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 4 is BERYLLIUM TRIFLUORIDE ION (three-letter code: BEF) (formula: BeF₃).



Mol	Chain	Residues	Atoms			AltConf
4	A	1	Total	Be	F	0
			4	1	3	
4	B	1	Total	Be	F	0
			4	1	3	
4	C	1	Total	Be	F	0
			4	1	3	

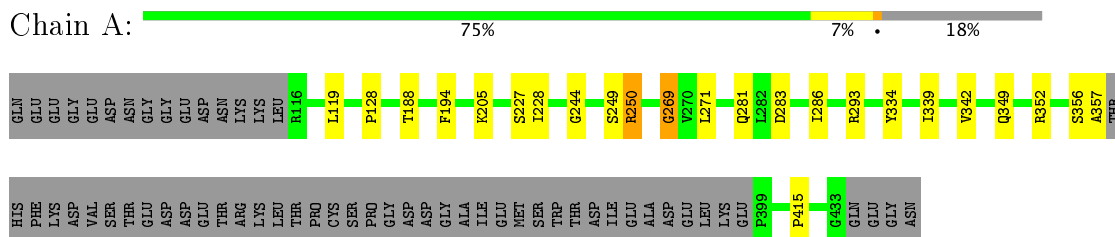
- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
5	B	1	Total	Mg	0
			1	1	
5	A	1	Total	Mg	0
			1	1	
5	D	1	Total	Mg	0
			1	1	
5	C	1	Total	Mg	0
			1	1	

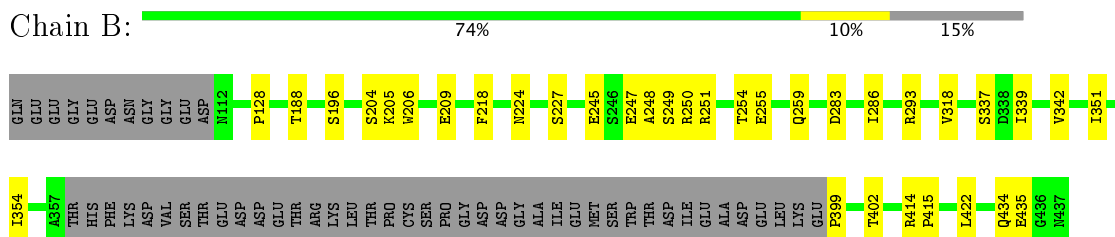
3 Residue-property plots

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.

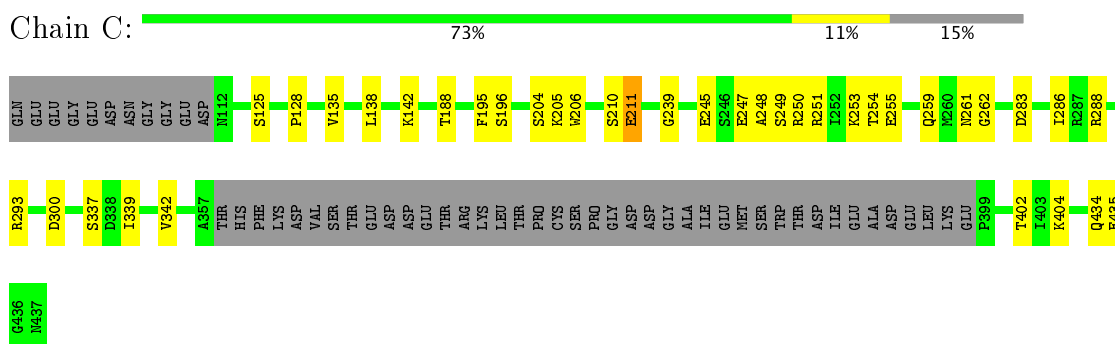
- Molecule 1: Vacuolar protein sorting-associated protein 4



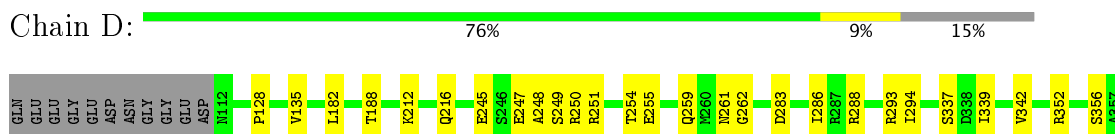
- Molecule 1: Vacuolar protein sorting-associated protein 4

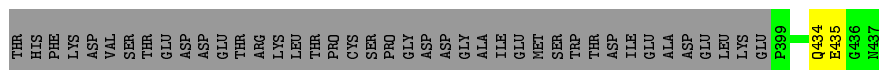


- Molecule 1: Vacuolar protein sorting-associated protein 4



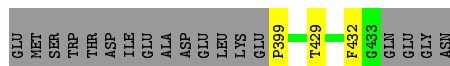
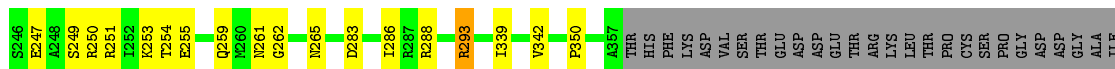
- Molecule 1: Vacuolar protein sorting-associated protein 4





- Molecule 1: Vacuolar protein sorting-associated protein 4

Chain E: 67% 12% 21%



- Molecule 2: Vps2p

Chain G: 90% 10%



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	82225	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 ($e^-/\text{\AA}^2$)	1.55	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: MG, BEF, ACE, ADP, NH2

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	0.73	0/2171	0.82	2/2928 (0.1%)
1	B	0.81	0/2237	0.80	0/3017
1	C	0.82	1/2237 (0.0%)	0.85	2/3017 (0.1%)
1	D	0.78	0/2237	0.79	0/3017
1	E	0.72	0/2106	0.81	0/2843
2	G	1.02	0/64	1.07	0/86
All	All	0.78	1/11052 (0.0%)	0.81	4/14908 (0.0%)

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	A	0	1
1	B	0	1
1	C	0	1
All	All	0	3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	211	GLU	CG-CD	-5.85	1.43	1.51

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	250	ARG	NE-CZ-NH1	-6.81	116.89	120.30
1	C	138	LEU	CB-CG-CD2	-6.21	100.45	111.00
1	A	119	LEU	CB-CG-CD1	-5.34	101.92	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	195	PHE	CB-CG-CD1	5.11	124.38	120.80

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	269	GLY	Peptide
1	B	205	LYS	Peptide
1	C	125	SER	Mainchain

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	2137	0	2178	13	0
1	B	2202	0	2249	24	0
1	C	2202	0	2249	27	0
1	D	2202	0	2249	21	0
1	E	2071	0	2110	29	0
2	G	68	0	72	1	0
3	A	27	0	12	1	0
3	B	27	0	12	1	0
3	C	27	0	12	1	0
3	D	27	0	12	0	0
3	E	27	0	12	0	0
4	A	4	0	0	1	0
4	B	4	0	0	1	0
4	C	4	0	0	1	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
All	All	11033	0	11167	109	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 5.

All (109) 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:245:GLU:O	1:B:249:SER:HB3	1.69	0.91
1:C:245:GLU:O	1:C:249:SER:HB3	1.74	0.87
1:A:356:SER:C	1:A:357:ALA:CA	2.43	0.87
1:E:186:VAL:O	1:E:190:ALA:HB2	1.75	0.86
1:D:245:GLU:O	1:D:249:SER:HB3	1.80	0.81
1:B:245:GLU:O	1:B:249:SER:CB	2.44	0.65
1:D:337:SER:OG	1:E:288:ARG:NH1	2.30	0.65
1:B:248:ALA:HB1	1:C:251:ARG:HH22	1.62	0.64
1:E:245:GLU:O	1:E:249:SER:HB3	1.98	0.64
1:E:127:LYS:NZ	1:E:188:THR:O	2.29	0.63
1:A:281:GLN:OE1	1:B:250:ARG:NH2	2.31	0.63
1:E:247:GLU:HG2	1:E:251:ARG:HD2	1.79	0.62
1:E:247:GLU:O	1:E:251:ARG:HB2	2.01	0.61
1:D:128:PRO:O	1:D:188:THR:OG1	2.20	0.58
1:E:204:SER:OG	1:E:205:LYS:N	2.37	0.58
1:C:128:PRO:O	1:C:188:THR:OG1	2.22	0.58
1:E:222:ARG:NE	1:E:265:ASN:O	2.37	0.57
1:C:247:GLU:O	1:C:251:ARG:HB2	2.03	0.57
1:D:352:ARG:O	1:D:356:SER:HB3	2.05	0.57
1:E:185:ALA:O	1:E:189:GLU:HB2	2.04	0.57
3:C:501:ADP:O3B	4:C:502:BEF:F2	2.13	0.56
1:A:227:SER:H	1:A:269:GLY:HA2	1.71	0.56
1:E:255:GLU:OE2	1:E:259:GLN:NE2	2.40	0.55
1:E:131:LYS:N	1:E:134:ASP:OD2	2.41	0.54
1:A:128:PRO:O	1:A:188:THR:OG1	2.25	0.54
1:D:245:GLU:O	1:D:249:SER:CB	2.53	0.54
1:B:255:GLU:O	1:B:259:GLN:HB2	2.08	0.54
1:C:248:ALA:HB1	1:D:251:ARG:HH22	1.72	0.54
1:C:255:GLU:O	1:C:259:GLN:HB2	2.08	0.54
1:D:255:GLU:O	1:D:259:GLN:HB2	2.08	0.54
1:E:255:GLU:O	1:E:259:GLN:HB2	2.08	0.54
1:B:255:GLU:OE2	1:B:259:GLN:NE2	2.40	0.54
1:D:255:GLU:OE2	1:D:259:GLN:NE2	2.40	0.53
1:E:293:ARG:NH2	1:E:432:PHE:O	2.41	0.53
1:D:135:VAL:HG11	1:D:182:LEU:HD13	1.90	0.53
1:B:337:SER:OG	1:C:288:ARG:NH1	2.42	0.52
1:E:146:LYS:O	1:E:150:ILE:HB	2.09	0.52
1:C:255:GLU:OE2	1:C:259:GLN:NE2	2.40	0.52
1:E:350:PRO:HB3	1:E:399:PRO:HB2	1.92	0.52
1:B:354:ILE:HD12	1:B:399:PRO:HD3	1.91	0.52
3:B:501:ADP:O3B	4:B:502:BEF:F2	2.17	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:204:SER:HB3	1:B:209:GLU:HB2	1.92	0.51
1:C:211:GLU:OE1	1:C:251:ARG:HB3	2.12	0.50
1:D:250:ARG:O	1:D:254:THR:CB	2.60	0.50
1:B:128:PRO:O	1:B:188:THR:OG1	2.28	0.50
1:B:250:ARG:O	1:B:254:THR:CB	2.60	0.50
1:E:250:ARG:O	1:E:254:THR:CB	2.60	0.50
1:E:172:TYR:HH	1:E:429:THR:HG1	1.59	0.49
1:B:250:ARG:O	1:B:254:THR:HB	2.13	0.49
1:C:250:ARG:O	1:C:254:THR:HB	2.13	0.49
1:D:250:ARG:O	1:D:254:THR:HB	2.12	0.49
1:B:247:GLU:O	1:B:251:ARG:HB2	2.13	0.49
1:C:250:ARG:O	1:C:254:THR:CB	2.60	0.49
1:D:294:ILE:HA	1:D:434:GLN:HB3	1.95	0.49
1:E:239:GLY:H	1:E:253:LYS:HE2	1.77	0.49
1:A:244:GLY:C	1:A:250:ARG:HH12	2.16	0.48
1:E:250:ARG:O	1:E:254:THR:HB	2.12	0.48
1:C:300:ASP:N	1:C:300:ASP:OD1	2.43	0.47
1:C:261:ASN:ND2	1:C:288:ARG:HH22	2.11	0.47
1:D:248:ALA:HB1	1:E:251:ARG:HH22	1.78	0.47
1:A:349:GLN:OE1	1:A:352:ARG:NH1	2.46	0.47
1:E:139:GLU:HA	1:E:142:LYS:HD2	1.96	0.47
1:E:186:VAL:O	1:E:190:ALA:CB	2.55	0.47
3:A:501:ADP:O1B	4:A:502:BEF:F2	2.22	0.47
1:D:212:LYS:O	1:D:216:GLN:HB2	2.16	0.46
1:E:127:LYS:HZ3	1:E:191:ASN:H	1.64	0.45
1:B:414:ARG:HD3	1:B:415:PRO:HD2	1.99	0.45
1:E:127:LYS:HG2	1:E:188:THR:HA	1.98	0.45
1:C:239:GLY:H	1:C:253:LYS:CE	2.30	0.45
1:D:247:GLU:O	1:D:251:ARG:HB2	2.17	0.45
1:C:135:VAL:HB	1:C:142:LYS:HE2	1.99	0.44
1:C:206:TRP:HZ3	2:G:167:ILE:HB	1.82	0.44
1:C:245:GLU:O	1:C:249:SER:CB	2.57	0.44
1:A:334:TYR:CE1	1:A:415:PRO:HG3	2.52	0.44
1:A:194:PHE:HD1	1:A:228:ILE:HG23	1.83	0.44
1:C:337:SER:OG	1:D:288:ARG:NH1	2.50	0.44
1:B:351:ILE:HA	1:B:354:ILE:HG22	2.00	0.43
1:C:261:ASN:OD1	1:C:262:GLY:N	2.51	0.43
1:D:434:GLN:HG3	1:D:435:GLU:H	1.84	0.43
1:C:239:GLY:H	1:C:253:LYS:HE2	1.83	0.43
1:B:434:GLN:HG3	1:B:435:GLU:H	1.84	0.43
1:E:247:GLU:HG2	1:E:251:ARG:NH1	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:210:SER:OG	1:C:247:GLU:OE2	2.36	0.43
1:C:196:SER:O	1:C:196:SER:OG	2.35	0.43
1:C:283:ASP:HB3	1:C:286:ILE:HD12	2.01	0.43
1:C:434:GLN:HG3	1:C:435:GLU:H	1.84	0.42
1:D:283:ASP:HB3	1:D:286:ILE:HD12	2.01	0.42
1:A:283:ASP:HB3	1:A:286:ILE:HD12	2.01	0.42
1:B:224:ASN:O	1:B:227:SER:OG	2.37	0.42
1:B:283:ASP:HB3	1:B:286:ILE:HD12	2.01	0.42
1:A:249:SER:HB3	1:A:250:ARG:NH1	2.34	0.42
1:B:318:VAL:HG11	1:B:402:THR:HG23	2.00	0.42
1:B:218:PHE:CD2	1:B:259:GLN:HG3	2.54	0.42
1:D:261:ASN:OD1	1:D:262:GLY:N	2.51	0.41
1:E:283:ASP:HB3	1:E:286:ILE:HD12	2.01	0.41
1:C:204:SER:OG	1:C:205:LYS:N	2.52	0.41
1:C:339:ILE:HA	1:C:342:VAL:HG22	2.03	0.41
1:D:250:ARG:O	1:D:254:THR:OG1	2.34	0.41
1:E:339:ILE:HA	1:E:342:VAL:HG22	2.03	0.41
1:B:196:SER:O	1:B:196:SER:OG	2.37	0.41
1:C:402:THR:HG22	1:C:404:LYS:H	1.84	0.41
1:B:422:LEU:HD23	1:B:422:LEU:HA	1.89	0.41
1:D:339:ILE:HA	1:D:342:VAL:HG22	2.03	0.41
1:A:228:ILE:HD12	1:A:271:LEU:HD23	2.02	0.41
1:A:205:LYS:HD3	1:B:206:TRP:HB3	2.02	0.41
1:B:339:ILE:HA	1:B:342:VAL:HG22	2.03	0.41
1:E:261:ASN:OD1	1:E:262:GLY:N	2.51	0.41
1:A:339:ILE:HA	1:A:342:VAL:HG22	2.03	0.40
1:E:137:GLY:O	1:E:142:LYS:HE3	2.21	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	272/337 (81%)	243 (89%)	29 (11%)	0	100	100
1	B	281/337 (83%)	257 (92%)	24 (8%)	0	100	100
1	C	281/337 (83%)	252 (90%)	29 (10%)	0	100	100
1	D	281/337 (83%)	251 (89%)	30 (11%)	0	100	100
1	E	263/337 (78%)	232 (88%)	31 (12%)	0	100	100
2	G	8/10 (80%)	6 (75%)	2 (25%)	0	100	100
All	All	1386/1695 (82%)	1241 (90%)	145 (10%)	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	233/285 (82%)	232 (100%)	1 (0%)	93	97
1	B	240/285 (84%)	239 (100%)	1 (0%)	93	97
1	C	240/285 (84%)	239 (100%)	1 (0%)	93	97
1	D	240/285 (84%)	239 (100%)	1 (0%)	93	97
1	E	226/285 (79%)	225 (100%)	1 (0%)	93	97
2	G	8/8 (100%)	8 (100%)	0	100	100
All	All	1187/1433 (83%)	1182 (100%)	5 (0%)	93	97

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	293	ARG
1	B	293	ARG
1	C	293	ARG
1	D	293	ARG
1	E	293	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such

sidechains are listed below:

Mol	Chain	Res	Type
1	A	259	GLN
1	D	216	GLN
2	G	169	ASN

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](#)

Of 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 for Mogul analysis.

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
3	ADP	A	501	5,4	25,29,29	1.40	3 (12%)	24,45,45	1.68	6 (25%)
4	BEF	A	502	3	0,3,3	0.00	-	0,3,3	0.00	-
3	ADP	B	501	5,4	25,29,29	1.56	4 (16%)	24,45,45	1.58	4 (16%)
4	BEF	B	502	3	0,3,3	0.00	-	0,3,3	0.00	-
3	ADP	C	501	5,4	25,29,29	1.58	5 (20%)	24,45,45	1.78	7 (29%)
4	BEF	C	502	3	0,3,3	0.00	-	0,3,3	0.00	-
3	ADP	D	501	5	25,29,29	1.16	2 (8%)	24,45,45	1.95	7 (29%)
3	ADP	E	501	-	25,29,29	0.91	2 (8%)	24,45,45	1.78	2 (8%)

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
3	ADP	A	501	5,4	-	0/12/32/32	0/3/3/3
4	BEF	A	502	3	-	0/0/0/0	0/0/0/0
3	ADP	B	501	5,4	-	0/12/32/32	0/3/3/3
4	BEF	B	502	3	-	0/0/0/0	0/0/0/0
3	ADP	C	501	5,4	-	0/12/32/32	0/3/3/3
4	BEF	C	502	3	-	0/0/0/0	0/0/0/0
3	ADP	D	501	5	-	0/12/32/32	0/3/3/3
3	ADP	E	501	-	-	0/12/32/32	0/3/3/3

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	501	ADP	PB-O3A	-4.33	1.53	1.60
3	C	501	ADP	PB-O3A	-4.08	1.53	1.60
3	A	501	ADP	PB-O3A	-3.53	1.54	1.60
3	C	501	ADP	C8-N7	-3.03	1.29	1.34
3	B	501	ADP	C8-N7	-2.73	1.29	1.34
3	A	501	ADP	C8-N7	-2.52	1.30	1.34
3	D	501	ADP	C2'-C1'	-2.46	1.49	1.53
3	B	501	ADP	PA-O2A	-2.35	1.43	1.55
3	C	501	ADP	C5-C4	-2.17	1.35	1.40
3	A	501	ADP	PB-O2B	-2.12	1.46	1.54
3	C	501	ADP	PA-O2A	-2.08	1.44	1.55
3	B	501	ADP	PB-O2B	-2.07	1.46	1.54
3	E	501	ADP	C2'-C1'	-2.06	1.50	1.53
3	C	501	ADP	PB-O2B	-2.06	1.46	1.54
3	E	501	ADP	C5-C4	2.14	1.45	1.40
3	D	501	ADP	C5-C4	2.22	1.45	1.40

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	501	ADP	N3-C2-N1	-6.65	123.07	128.86
3	D	501	ADP	N3-C2-N1	-5.97	123.66	128.86
3	B	501	ADP	O3B-PB-O1B	-4.13	94.35	110.50
3	C	501	ADP	C4'-O4'-C1'	-4.07	105.44	109.77
3	A	501	ADP	C2'-C3'-C4'	-3.99	94.84	102.62
3	A	501	ADP	O3B-PB-O1B	-3.48	96.89	110.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	501	ADP	C4-C5-N7	-3.25	106.27	109.41
3	C	501	ADP	O3B-PB-O1B	-3.17	98.10	110.50
3	A	501	ADP	C4'-O4'-C1'	-2.76	106.83	109.77
3	D	501	ADP	O3'-C3'-C4'	-2.70	103.20	111.09
3	D	501	ADP	O3'-C3'-C2'	-2.68	103.23	111.83
3	A	501	ADP	N3-C2-N1	-2.66	126.54	128.86
3	C	501	ADP	O4'-C4'-C3'	-2.46	100.27	105.17
3	D	501	ADP	O2'-C2'-C1'	-2.40	104.09	111.61
3	B	501	ADP	O2'-C2'-C3'	-2.39	104.18	111.83
3	B	501	ADP	O3'-C3'-C2'	-2.24	104.64	111.83
3	D	501	ADP	C4-C5-N7	-2.22	107.27	109.41
3	C	501	ADP	O2'-C2'-C3'	-2.13	105.01	111.83
3	C	501	ADP	C2'-C3'-C4'	-2.11	98.51	102.62
3	C	501	ADP	N3-C2-N1	-2.09	127.04	128.86
3	A	501	ADP	O4'-C4'-C3'	-2.04	101.12	105.17
3	A	501	ADP	O5'-PA-O1A	2.13	117.85	109.25
3	D	501	ADP	O3B-PB-O2B	2.37	117.18	107.61
3	D	501	ADP	C4'-O4'-C1'	2.94	112.90	109.77
3	B	501	ADP	C4-C5-N7	3.12	112.42	109.41
3	C	501	ADP	C4-C5-N7	3.64	112.93	109.41

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

6 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	501	ADP	1	0
4	A	502	BEF	1	0
3	B	501	ADP	1	0
4	B	502	BEF	1	0
3	C	501	ADP	1	0
4	C	502	BEF	1	0

5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.