



Full wwPDB/EMDatabank EM Map/Model Validation Report ⓘ

Mar 11, 2019 – 09:33 AM EDT

PDB ID : 6NOG
EMDB ID: : EMD-0468
Title : Poised-state Dot1L bound to the H2B-Ubiquitinated nucleosome
Authors : Worden, E.J.; Hoffmann, N.A.; Wolberger, C.
Deposited on : 2019-01-16
Resolution : 3.90 Å(reported)
Based on PDB ID : 3MVD, 1UBQ, 3QOW, 1KX3

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
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

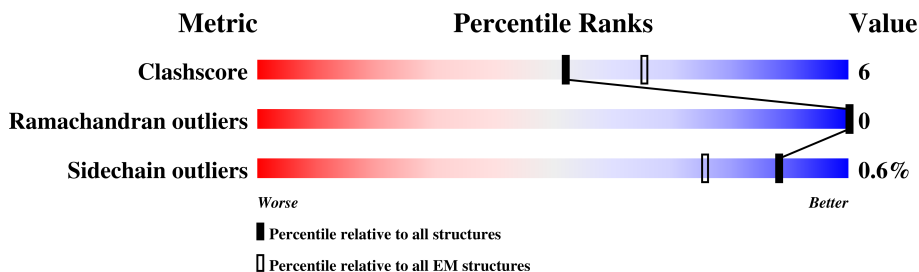
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.90 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	A	135	
1	E	135	
2	B	102	
2	F	102	
3	C	129	
3	G	129	
4	D	122	
4	H	122	
5	L	80	

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Mol	Chain	Length	Quality of chain
6	K	416	 58% 13% 27%
7	I	146	 78% 22%
8	J	146	 77% 23%

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 14929 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 Histone H3.2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	96	791	500	151	137	3	0	0
1	E	96	791	500	151	137	3	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	102	ALA	GLY	engineered mutation	UNP P84233
E	102	ALA	GLY	engineered mutation	UNP P84233

- Molecule 2 is a protein called Histone H4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	78	619	391	120	107	1	0	0
2	F	82	653	412	127	113	1	0	0

- Molecule 3 is a protein called Histone H2A type 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	C	104	800	504	156	140	0	0
3	G	105	809	510	158	141	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	99	ARG	GLY	engineered mutation	UNP P06897
C	123	SER	ALA	engineered mutation	UNP P06897
G	99	ARG	GLY	engineered mutation	UNP P06897

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Chain	Residue	Modelled	Actual	Comment	Reference
G	123	SER	ALA	engineered mutation	UNP P06897

- Molecule 4 is a protein called Histone H2B 1.1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	93	Total	C	N	O	S	0	0
			723	454	129	137	3		
4	H	94	Total	C	N	O	S	0	0
			733	460	131	139	3		

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	32	THR	SER	engineered mutation	UNP P02281
D	120	CYS	LYS	engineered mutation	UNP P02281
H	32	THR	SER	engineered mutation	UNP P02281
H	120	CYS	LYS	engineered mutation	UNP P02281

- Molecule 5 is a protein called Ubiquitin.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	L	74	Total	C	N	O	S	0	0
			593	374	103	115	1		

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	-3	GLY	-	expression tag	UNP J3QS39
L	-2	SER	-	expression tag	UNP J3QS39
L	-1	HIS	-	expression tag	UNP J3QS39
L	0	MET	-	expression tag	UNP J3QS39
L	76	CYS	GLY	engineered mutation	UNP J3QS39

- Molecule 6 is a protein called Histone-lysine N-methyltransferase, H3 lysine-79 specific.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	K	302	Total	C	N	O	S	0	0
			2431	1546	421	452	12		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	1	GLY	-	expression tag	UNP Q8TEK3

- Molecule 7 is a DNA chain called 601 DNA Strand 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	I	146	2975	1413	540	876	146	0	0

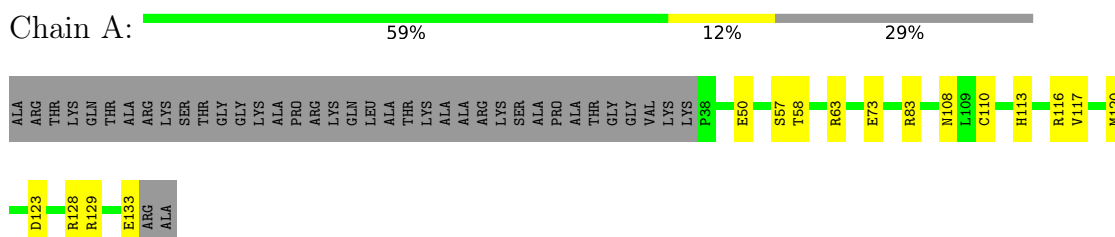
- Molecule 8 is a DNA chain called 601 DNA Strand 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
8	J	146	3011	1425	564	876	146	0	0

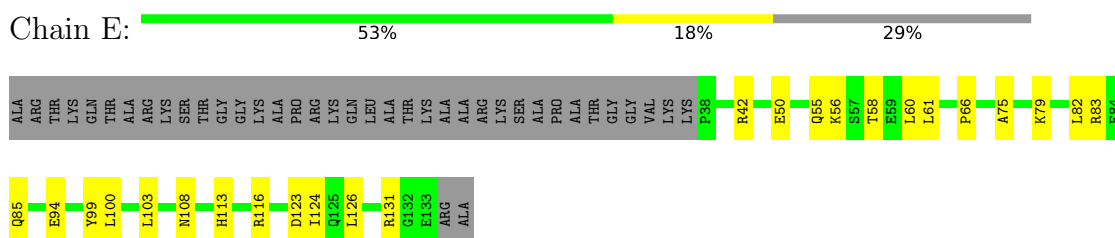
3 Residue-property plots

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.

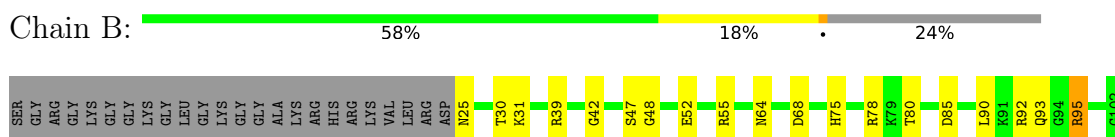
- Molecule 1: Histone H3.2



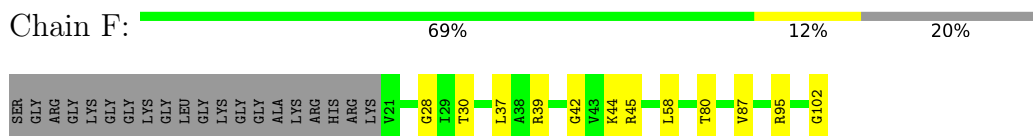
- Molecule 1: Histone H3.2



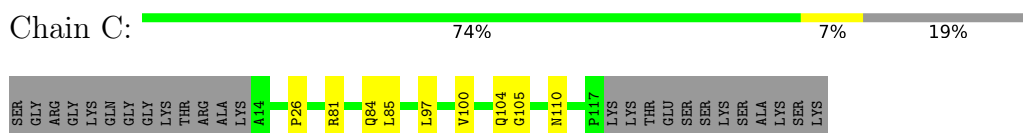
- Molecule 2: Histone H4



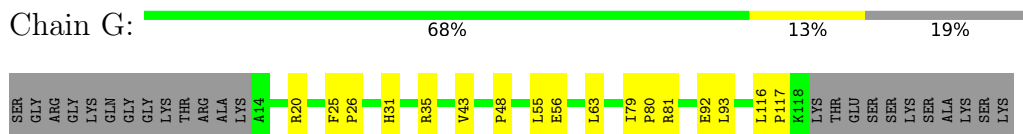
- Molecule 2: Histone H4



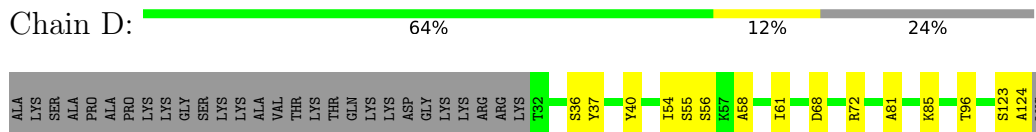
- Molecule 3: Histone H2A type 1



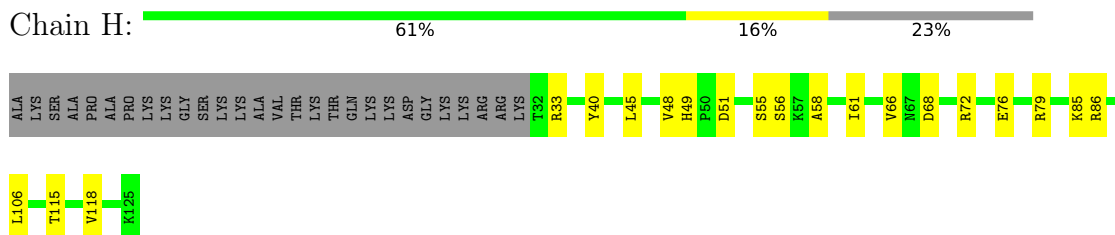
- Molecule 3: Histone H2A type 1



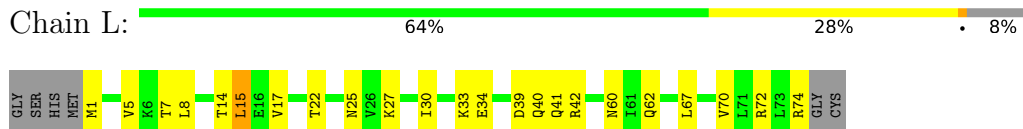
- Molecule 4: Histone H2B 1.1



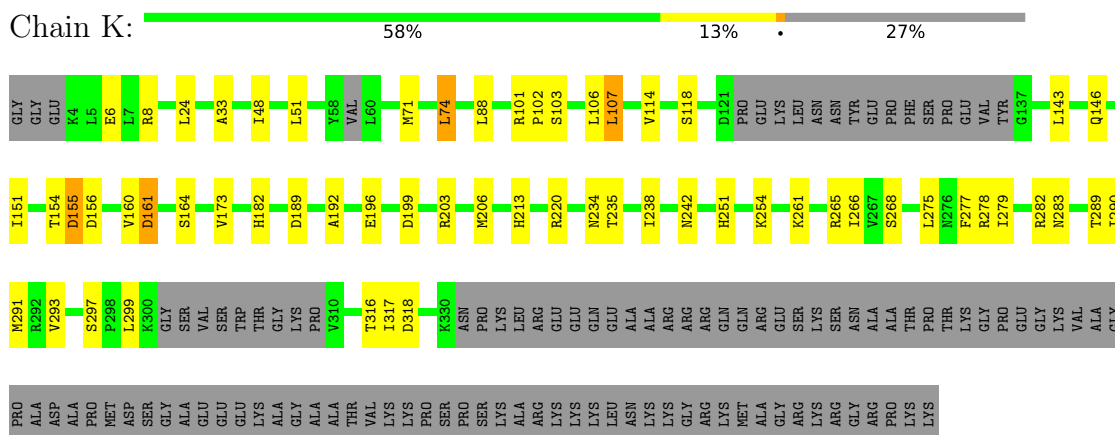
- Molecule 4: Histone H2B 1.1



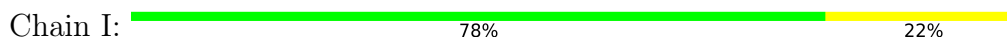
- Molecule 5: Ubiquitin



- Molecule 6: Histone-lysine N-methyltransferase, H3 lysine-79 specific



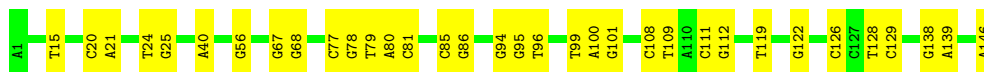
- Molecule 7: 601 DNA Strand 1





- Molecule 8: 601 DNA Strand 2

Chain J: 77% 23%



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	108658	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 ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (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 >2	RMSZ	# Z >2
1	A	0.50	0/803	0.60	0/1078
1	E	0.52	0/803	0.61	0/1078
2	B	0.56	0/626	0.67	0/837
2	F	0.56	0/660	0.67	0/883
3	C	0.48	0/810	0.74	0/1095
3	G	0.55	0/819	0.84	0/1106
4	D	0.51	0/734	0.57	0/990
4	H	0.53	0/744	0.59	0/1001
5	L	0.32	0/599	0.69	1/806 (0.1%)
6	K	0.36	0/2486	0.76	6/3363 (0.2%)
7	I	1.04	0/3333	1.05	3/5137 (0.1%)
8	J	1.06	0/3381	1.03	3/5221 (0.1%)
All	All	0.78	0/15798	0.87	13/22595 (0.1%)

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	K	156	ASP	CB-CG-OD1	6.48	124.13	118.30
7	I	91	DA	O4'-C4'-C3'	-6.45	101.92	104.50
7	I	48	DT	O4'-C4'-C3'	-5.91	102.14	104.50
6	K	74	LEU	CA-CB-CG	5.83	128.72	115.30
6	K	161	ASP	CB-CG-OD2	5.55	123.30	118.30
5	L	15	LEU	CA-CB-CG	5.54	128.05	115.30
8	J	56	DG	O4'-C4'-C3'	-5.34	102.36	104.50
6	K	101	ARG	NE-CZ-NH1	5.34	122.97	120.30
6	K	318	ASP	CB-CG-OD1	5.30	123.07	118.30
8	J	126	DC	P-O3'-C3'	5.22	125.97	119.70
7	I	48	DT	C4'-C3'-C2'	-5.17	98.45	103.10
8	J	15	DT	P-O3'-C3'	5.14	125.87	119.70
6	K	291	MET	CA-CB-CG	5.04	121.86	113.30

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	791	0	828	17	0
1	E	791	0	828	25	0
2	B	619	0	659	13	0
2	F	653	0	696	12	0
3	C	800	0	851	8	0
3	G	809	0	864	18	0
4	D	723	0	739	10	0
4	H	733	0	752	16	0
5	L	593	0	623	14	0
6	K	2431	0	2367	32	0
7	I	2975	0	1639	22	0
8	J	3011	0	1639	22	0
All	All	14929	0	12485	165	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 (165) 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)
3:G:116:LEU:HD12	3:G:117:PRO:HD2	1.26	1.08
3:G:79:ILE:HG22	3:G:80:PRO:HD2	1.63	0.80
3:G:116:LEU:CD1	3:G:117:PRO:HD2	2.13	0.73
6:K:251:HIS:HA	6:K:254:LYS:HE2	1.72	0.71
1:A:117:VAL:O	1:A:117:VAL:HG12	1.90	0.68
6:K:206:MET:HG2	6:K:213:HIS:HD2	1.59	0.67
6:K:265:ARG:HG2	6:K:316:THR:HG22	1.79	0.65
3:G:79:ILE:HG22	3:G:80:PRO:CD	2.30	0.62
6:K:289:THR:HG23	6:K:290:ILE:HG23	1.81	0.61
2:B:52:GLU:OE2	2:B:55:ARG:NH1	2.34	0.61
1:E:83:ARG:HH22	8:J:100:DA:H4'	1.66	0.61
6:K:155:ASP:OD1	6:K:155:ASP:N	2.34	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:L:41:GLN:O	5:L:72:ARG:NH1	2.34	0.60
6:K:160:VAL:HG12	6:K:235:THR:HG21	1.83	0.60
1:E:83:ARG:HB2	2:F:80:THR:HG22	1.83	0.59
4:D:58:ALA:HA	4:D:61:ILE:HD12	1.82	0.59
6:K:238:ILE:HB	6:K:266:ILE:HG22	1.84	0.59
6:K:189:ASP:OD1	6:K:220:ARG:NH2	2.36	0.58
7:I:108:DT:H3	8:J:40:DA:H61	1.51	0.58
1:E:108:ASN:ND2	2:F:42:GLY:O	2.37	0.58
4:D:68:ASP:OD1	4:D:72:ARG:NH2	2.37	0.57
4:D:36:SER:OG	4:D:37:TYR:N	2.37	0.57
8:J:94:DG:H2'	8:J:95:DG:H8	1.70	0.57
4:H:51:ASP:OD1	4:H:51:ASP:N	2.37	0.56
7:I:29:DA:H61	8:J:119:DT:H3	1.53	0.56
6:K:24:LEU:HB2	6:K:33:ALA:HB3	1.88	0.56
5:L:39:ASP:OD1	5:L:39:ASP:N	2.39	0.56
1:A:83:ARG:NH2	7:I:100:DG:O3'	2.39	0.56
1:E:50:GLU:OE2	2:F:39:ARG:NE	2.37	0.55
1:A:50:GLU:OE2	2:B:39:ARG:NE	2.39	0.55
2:B:78:ARG:NH2	2:B:85:ASP:OD2	2.38	0.55
2:B:30:THR:OG1	2:B:31:LYS:N	2.39	0.55
6:K:154:THR:OG1	6:K:155:ASP:OD1	2.24	0.55
6:K:6:GLU:OE2	6:K:8:ARG:NH1	2.40	0.55
1:A:57:SER:OG	1:A:58:THR:N	2.40	0.55
3:G:31:HIS:HD2	3:G:48:PRO:HG3	1.73	0.54
2:F:39:ARG:NH1	2:F:44:LYS:O	2.38	0.54
2:B:93:GLN:HB3	2:B:95:ARG:HH21	1.71	0.54
5:L:7:THR:OG1	5:L:8:LEU:N	2.41	0.54
6:K:275:LEU:HD23	6:K:293:VAL:HG13	1.90	0.54
2:F:87:VAL:HG11	2:F:102:GLY:HA3	1.89	0.54
5:L:5:VAL:HG22	5:L:67:LEU:HD23	1.90	0.53
1:A:123:ASP:OD1	1:E:113:HIS:NE2	2.42	0.53
1:A:128:ARG:NE	1:A:133:GLU:OE1	2.41	0.53
4:D:123:SER:OG	4:D:124:ALA:N	2.42	0.53
1:E:55:GLN:HE22	3:C:110:ASN:H	1.57	0.53
1:E:56:LYS:O	3:C:81:ARG:NH1	2.36	0.53
4:H:55:SER:OG	4:H:56:SER:N	2.41	0.53
4:H:68:ASP:OD2	4:H:72:ARG:NH2	2.42	0.53
6:K:278:ARG:O	6:K:283:ASN:ND2	2.38	0.52
2:B:68:ASP:OD2	2:B:92:ARG:NH1	2.43	0.52
1:E:116:ARG:NH2	1:E:123:ASP:OD1	2.43	0.52
6:K:189:ASP:HA	6:K:220:ARG:HH22	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:55:SER:OG	4:D:56:SER:N	2.44	0.51
3:G:56:GLU:OE2	6:K:282:ARG:NH1	2.44	0.51
3:G:55:LEU:HD11	4:H:66:VAL:HG13	1.92	0.51
6:K:199:ASP:OD1	6:K:203:ARG:NE	2.42	0.50
5:L:30:ILE:HA	5:L:33:LYS:HG2	1.94	0.50
6:K:161:ASP:O	6:K:164:SER:OG	2.29	0.50
2:F:45:ARG:HE	8:J:81:DC:H4'	1.77	0.49
2:F:30:THR:HG21	7:I:61:DA:H5''	1.94	0.49
3:C:84:GLN:HE21	3:C:105:GLY:HA3	1.78	0.49
7:I:30:DA:H1'	7:I:31:DT:H5'	1.96	0.48
8:J:77:DC:H2''	8:J:78:DG:C8	2.48	0.48
6:K:103:SER:H	6:K:106:LEU:HD12	1.78	0.48
1:E:94:GLU:OE2	3:C:104:GLN:NE2	2.44	0.48
7:I:2:DT:O4	8:J:146:DA:N6	2.47	0.48
4:H:86:ARG:NH2	7:I:41:DA:OP2	2.47	0.47
1:E:85:GLN:NE2	7:I:50:DG:OP1	2.38	0.47
6:K:48:ILE:HG22	6:K:51:LEU:H	1.80	0.47
1:E:103:LEU:HA	1:E:131:ARG:HH12	1.79	0.47
5:L:60:ASN:OD1	5:L:62:GLN:NE2	2.47	0.47
7:I:121:DG:H2''	7:I:122:DG:C8	2.50	0.47
3:G:63:LEU:HD13	4:H:45:LEU:HD13	1.97	0.46
1:A:129:ARG:O	1:A:129:ARG:NH1	2.42	0.46
1:A:113:HIS:NE2	1:E:123:ASP:OD2	2.38	0.46
1:E:75:ALA:HB1	1:E:82:LEU:HD12	1.97	0.46
5:L:1:MET:N	5:L:17:VAL:O	2.40	0.46
6:K:242:ASN:OD1	6:K:268:SER:OG	2.33	0.46
3:G:93:LEU:HA	3:G:93:LEU:HD23	1.82	0.46
4:H:33:ARG:NH2	7:I:29:DA:OP1	2.48	0.46
4:H:58:ALA:HA	4:H:61:ILE:HD12	1.97	0.46
8:J:94:DG:H2'	8:J:95:DG:C8	2.49	0.46
7:I:14:DG:H2'	7:I:15:DT:H71	1.98	0.45
1:A:108:ASN:ND2	2:B:42:GLY:O	2.49	0.45
5:L:22:THR:HG23	5:L:25:ASN:H	1.81	0.45
1:A:58:THR:HG22	3:G:81:ARG:HD3	1.98	0.45
4:D:54:ILE:HA	4:D:54:ILE:HD12	1.87	0.45
3:G:26:PRO:HD3	4:H:40:TYR:CG	2.52	0.45
8:J:95:DG:H2'	8:J:96:DT:H71	1.99	0.44
2:B:47:SER:OG	2:B:48:GLY:N	2.49	0.44
1:E:42:ARG:HG3	7:I:144:DC:H5''	1.99	0.44
2:B:64:ASN:HB3	2:B:93:GLN:HE22	1.82	0.44
3:C:26:PRO:HD3	4:D:40:TYR:CD1	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:79:ILE:CG2	3:G:80:PRO:CD	2.95	0.44
7:I:50:DG:N2	8:J:99:DT:O2	2.51	0.44
3:G:25:PHE:HA	3:G:25:PHE:HD1	1.66	0.43
4:H:76:GLU:OE2	4:H:79:ARG:NH1	2.50	0.43
7:I:104:DT:C6	7:I:105:DT:H72	2.52	0.43
7:I:36:DC:H2''	7:I:37:DG:C8	2.53	0.43
8:J:128:DT:H2''	8:J:129:DC:C5	2.53	0.43
8:J:79:DT:H2''	8:J:80:DA:C8	2.53	0.43
1:E:60:LEU:HD23	1:E:60:LEU:HA	1.84	0.43
8:J:138:DG:H2''	8:J:139:DA:C8	2.53	0.43
6:K:102:PRO:HB2	6:K:106:LEU:HB2	2.00	0.43
6:K:277:PHE:HE2	6:K:279:ILE:HG12	1.82	0.43
2:B:90:LEU:HD23	2:B:90:LEU:HA	1.86	0.43
8:J:67:DG:H2''	8:J:68:DG:C8	2.54	0.43
1:A:110:CYS:HA	1:E:126:LEU:HD11	2.00	0.43
7:I:82:DC:H2''	7:I:83:DG:C8	2.54	0.43
8:J:111:DC:H2''	8:J:112:DG:C8	2.54	0.43
8:J:85:DC:H2''	8:J:86:DG:C8	2.54	0.43
3:C:26:PRO:HD3	4:D:40:TYR:CG	2.54	0.43
1:A:83:ARG:HB2	2:B:80:THR:HG22	1.99	0.43
1:E:103:LEU:HD21	1:E:124:ILE:HD11	2.00	0.43
3:C:97:LEU:HB3	3:C:100:VAL:HB	2.01	0.43
2:B:75:HIS:CG	4:D:96:THR:HG21	2.53	0.43
1:A:63:ARG:HD3	1:A:63:ARG:HA	1.79	0.42
1:E:66:PRO:HB3	2:F:28:GLY:HA3	2.00	0.42
3:G:31:HIS:HE1	3:G:35:ARG:HH12	1.67	0.42
7:I:39:DA:H61	8:J:109:DT:H3	1.67	0.42
7:I:42:DC:H2''	7:I:43:DA:C8	2.53	0.42
4:H:40:TYR:OH	8:J:122:DG:OP1	2.36	0.42
6:K:103:SER:O	6:K:107:LEU:HD12	2.19	0.42
4:H:85:LYS:HB2	4:H:85:LYS:HE3	1.79	0.42
1:A:113:HIS:HB2	1:E:126:LEU:HD13	2.01	0.42
4:H:115:THR:HA	4:H:118:VAL:HG12	2.01	0.42
6:K:234:ASN:HA	6:K:261:LYS:HE3	2.01	0.42
6:K:290:ILE:HD12	6:K:317:ILE:HD13	2.02	0.42
6:K:143:LEU:HD22	6:K:299:LEU:HD13	2.00	0.42
6:K:88:LEU:HA	6:K:88:LEU:HD12	1.81	0.42
5:L:33:LYS:HG3	5:L:34:GLU:HG2	2.00	0.42
6:K:173:VAL:HG12	6:K:182:HIS:HE1	1.85	0.42
7:I:24:DC:H2''	7:I:25:DG:C8	2.54	0.42
8:J:108:DC:H2''	8:J:109:DT:C5	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:J:20:DC:H2''	8:J:21:DA:C8	2.55	0.42
6:K:192:ALA:O	6:K:196:GLU:HG3	2.19	0.42
3:G:26:PRO:HD3	4:H:40:TYR:CD1	2.55	0.41
1:A:73:GLU:OE2	2:B:25:ASN:ND2	2.54	0.41
5:L:42:ARG:HB3	5:L:70:VAL:HG23	2.00	0.41
1:E:83:ARG:NH1	8:J:101:DG:H5'	2.36	0.41
4:H:48:VAL:HG13	4:H:49:HIS:HD2	1.85	0.41
5:L:14:THR:OG1	5:L:15:LEU:N	2.53	0.41
5:L:33:LYS:HB2	5:L:33:LYS:HE2	1.79	0.41
2:F:37:LEU:HA	2:F:37:LEU:HD23	1.89	0.41
3:G:92:GLU:CD	4:H:106:LEU:HB2	2.41	0.41
2:F:95:ARG:HA	2:F:95:ARG:HD3	1.77	0.41
6:K:71:MET:HA	6:K:74:LEU:HG	2.03	0.41
1:E:100:LEU:HD11	2:F:58:LEU:HD13	2.03	0.41
8:J:24:DT:H2''	8:J:25:DG:C8	2.55	0.41
6:K:114:VAL:O	6:K:118:SER:OG	2.37	0.41
6:K:146:GLN:NE2	6:K:297:SER:O	2.54	0.41
7:I:46:DT:H1'	7:I:47:DC:H5'	2.03	0.41
1:A:116:ARG:HH21	1:A:120:MET:HG3	1.87	0.40
7:I:68:DT:H2''	7:I:69:DA:N7	2.36	0.40
4:D:81:ALA:O	4:D:85:LYS:N	2.54	0.40
1:E:61:LEU:HD13	1:E:61:LEU:HA	1.87	0.40
1:E:99:TYR:HD1	2:F:95:ARG:HH12	1.69	0.40
1:E:79:LYS:HD3	1:E:82:LEU:HD21	2.04	0.40
5:L:40:GLN:HE22	5:L:74:ARG:HB2	1.85	0.40
5:L:27:LYS:HE3	5:L:41:GLN:HB2	2.04	0.40
3:C:81:ARG:HE	3:C:85:LEU:HD11	1.86	0.40
1:A:113:HIS:CD2	1:E:126:LEU:HD22	2.57	0.40
3:G:20:ARG:NH2	7:I:32:DT:OP1	2.54	0.40
3:G:79:ILE:CG2	3:G:80:PRO:HD2	2.42	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	94/135 (70%)	89 (95%)	5 (5%)	0	100	100
1	E	94/135 (70%)	89 (95%)	5 (5%)	0	100	100
2	B	76/102 (74%)	69 (91%)	7 (9%)	0	100	100
2	F	80/102 (78%)	72 (90%)	8 (10%)	0	100	100
3	C	102/129 (79%)	99 (97%)	3 (3%)	0	100	100
3	G	103/129 (80%)	101 (98%)	2 (2%)	0	100	100
4	D	91/122 (75%)	88 (97%)	3 (3%)	0	100	100
4	H	92/122 (75%)	88 (96%)	4 (4%)	0	100	100
5	L	72/80 (90%)	71 (99%)	1 (1%)	0	100	100
6	K	294/416 (71%)	287 (98%)	7 (2%)	0	100	100
All	All	1098/1472 (75%)	1053 (96%)	45 (4%)	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	84/110 (76%)	84 (100%)	0	100	100
1	E	84/110 (76%)	83 (99%)	1 (1%)	74	87
2	B	63/78 (81%)	62 (98%)	1 (2%)	65	84
2	F	67/78 (86%)	67 (100%)	0	100	100
3	C	82/101 (81%)	82 (100%)	0	100	100
3	G	83/101 (82%)	82 (99%)	1 (1%)	74	87
4	D	79/102 (78%)	79 (100%)	0	100	100
4	H	80/102 (78%)	80 (100%)	0	100	100
5	L	68/72 (94%)	68 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
6	K	262/359 (73%)	259 (99%)	3 (1%)	76	88
All	All	952/1213 (78%)	946 (99%)	6 (1%)	88	94

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	58	THR
2	B	95	ARG
3	G	43	VAL
6	K	107	LEU
6	K	151	ILE
6	K	155	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	76	GLN
1	E	55	GLN
3	C	31	HIS
3	C	84	GLN
3	G	31	HIS
4	D	49	HIS
4	H	49	HIS
4	H	82	HIS
5	L	2	GLN
6	K	252	GLN

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.